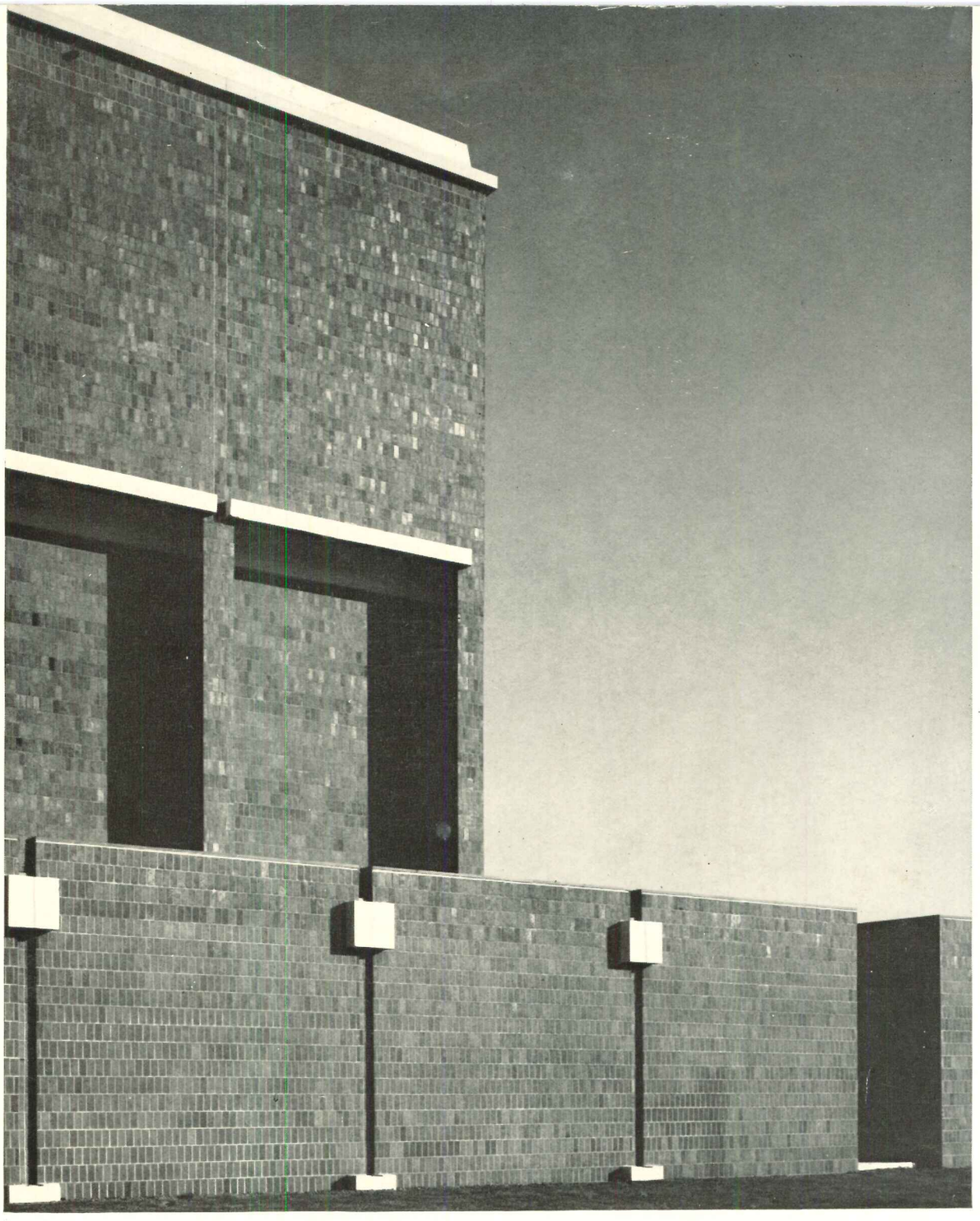

ARCHITECTURAL RECORD

12 DECEMBER 1964 • TWO DOLLARS PER COPY

BUILDING TYPES STUDY: THEATERS AND AUDITORIUMS

"CAN CITIES COMPETE WITH SUBURBIA FOR FAMILY LIVING?"
BY CATHERINE B. WURSTER

SEMI-ANNUAL INDEX • FULL CONTENTS ON PAGES 4 & 5

Robert E. Lamb, Inc., Valley Forge, Pa. Murray quarry floor is 6″ x 6″ x ½″, Fawn Gray. Architect: Jules Gregory. Tile Contractor: Wissahickon Tile Company. Plate 510.

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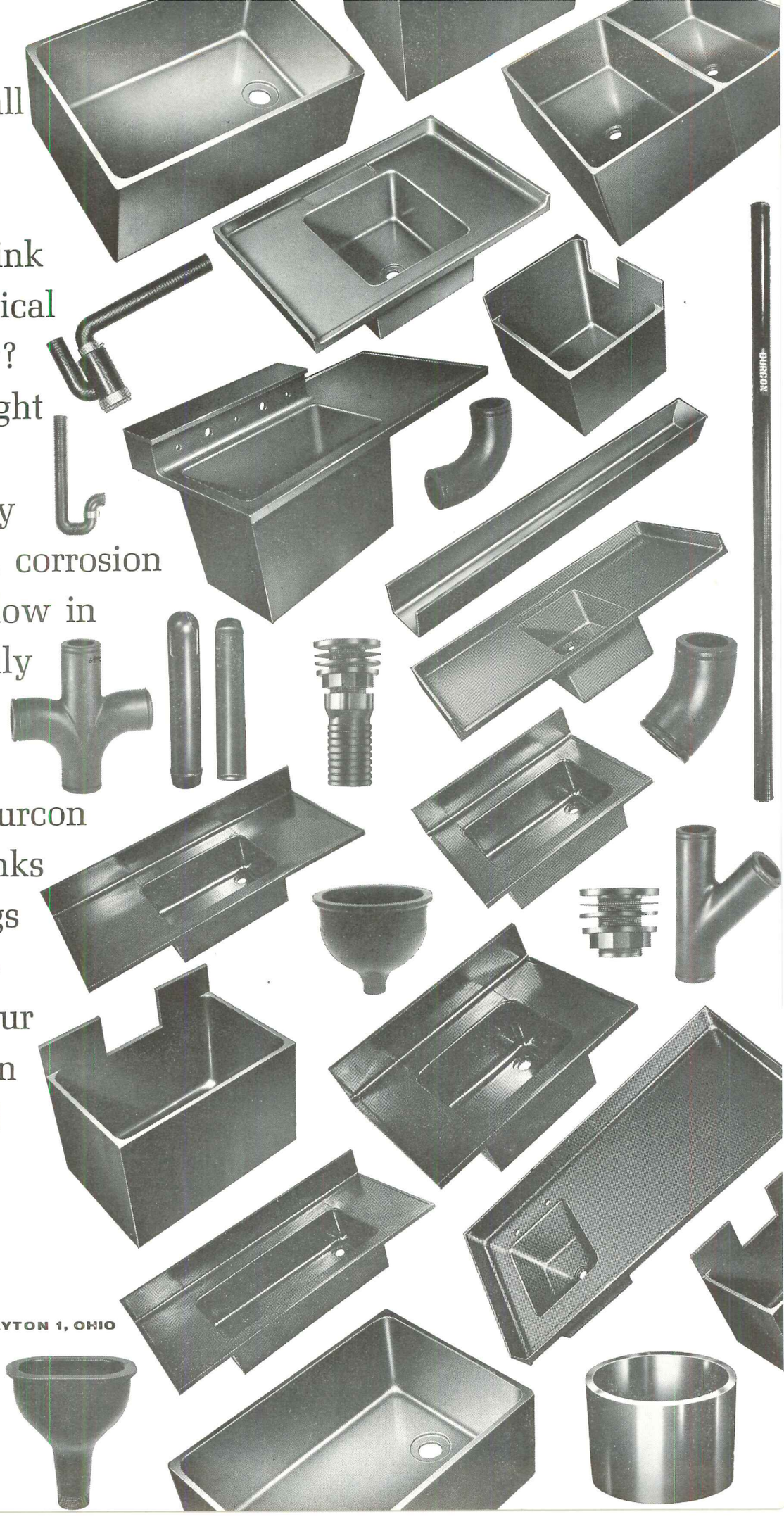

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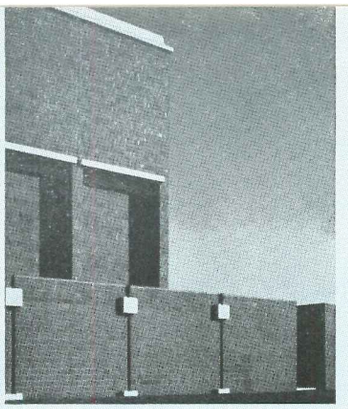
Associate Architect: J. Russell Bailey, A.I.A., Orange, Va.
Mechanical Engineer: George Nottingham, Jr., Macon, Georgia
Ceiling Systems Contractor: The Bob Ginn Co., Macon, Georgia
Lighting Engineer: Bush-May & Williams, Atlanta, Georgia
General Contractor: Perdue & Williams, Macon, Georgia

Ceiling Systems by Armstrong



Cover:

Benedicta Arts Center, College of St. Benedict, St. Joseph, Minnesota. Architects and engineers: Hammel, Green and Abrahamson, Inc. Photograph by Shin Koyama

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Architectural Engineering

ARCHITECTURAL

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RECORD

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December 1964

Building Types Study 340: Theaters and Auditoriums

Coming in the Record

LEWIS MUMFORD ON "THE ARCHITECTURE OF REGIONS"
A document which he believes has no equal in "consequence to the arts of improving the environment" since the announcement of the Tennessee Valley Authority, the recently announced development policy for New York State, is related to the past and the future of regional planning in a major critical article by Lewis Mumford; an important contribution to the literature of community architecture.

HOW GOOD INDUSTRIAL BUILDINGS HAPPEN
Next month's Building Types Study on Industrial Buildings will analyze the question of how good industrial buildings come to be by examining the circumstances, including architect-client relationships, in which several recent examples were achieved.

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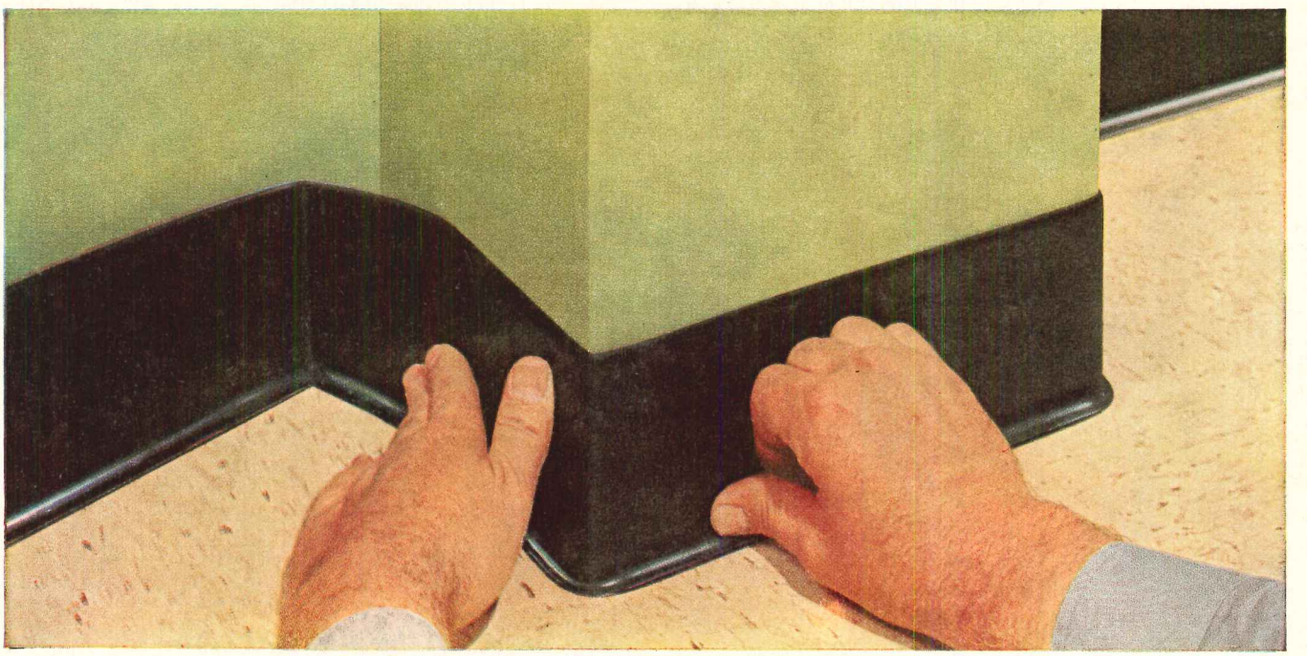

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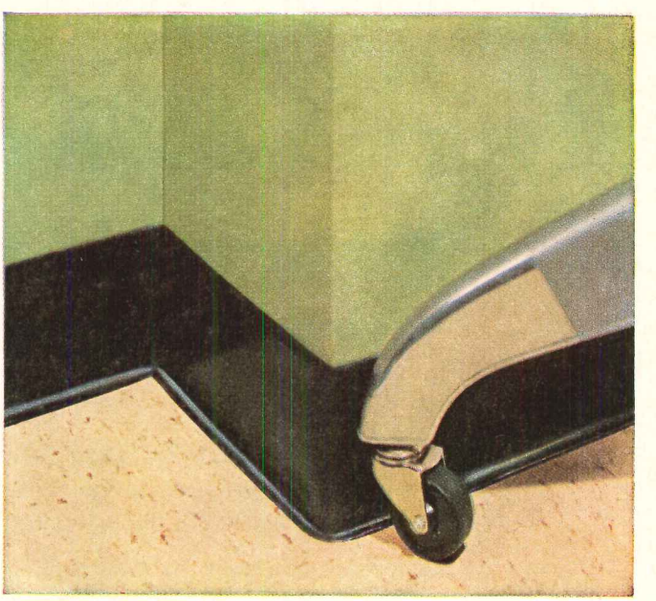

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"Great New Dimension for Architecture"

Afraid that many architects may have missed it, if they weren't too immediately interested in urban planning, I want to give added emphasis to Albert Mayer's remarks on a new resource for architectural inspiration. In the seventh and final article of his really great series (ARCHITECTURAL RECORD, October 1964) he offers this on "architecture at regional scale."

"I now want to talk about architecture in the new dimension: the crescendo toward and into the regional scale. I am not talking about 'regional architecture' in the accepted sense, fine and important as that is, characteristic of a region, stemming from its climate, materials, expression of local-regional living. Examples are the 18th-century houses of New England streets and towns, possibly the ante-bellum architecture of the South, the work of Maybeck and his followers and architectural descendants in the Bay Area in California, perhaps Frank Lloyd Wright's prairie architecture. . . .

"It is the new regional *scale* and *opportunity*, of which there are few examples, because the regional challenge, the regional plan-and-synthesis are only emerging, the implications and integrations from multifaceted requirements and factors that are beginning to crystallize. . . .

"In urban and regional development there is . . . a myriad opportunity and need, at many scales, many social-physical levels, from the apparently small to the full regional enterprise. All these cry out for the same penetration and dedication, the same searching for and winning of the internal social-physical-spiritual meaning; and then, expressing it. Of course, that substantive meaning must have been achieved to begin with, that soul-and-life-satisfying set of interconnected scales culminating in regional synthesis. To work out some such substantive synthesis is of course what all the preceding articles have been concerned with.

"It seems to me that the ultimate expression and creation in architecture can be of the highest, if and when the architect fully grasps all this substance, is fully attuned to it, has a deep sympathy with it. . . . I believe that every gifted architect should be strengthened by such a regional-local absorption and attempt to fully understand it, be steeped in it, belong to it. This may be in terms of a town or a city district or a subregion or whatever. And I believe that no matter how many office buildings and cultural centers he designs in how many parts of the world, he ought to have this firm base.

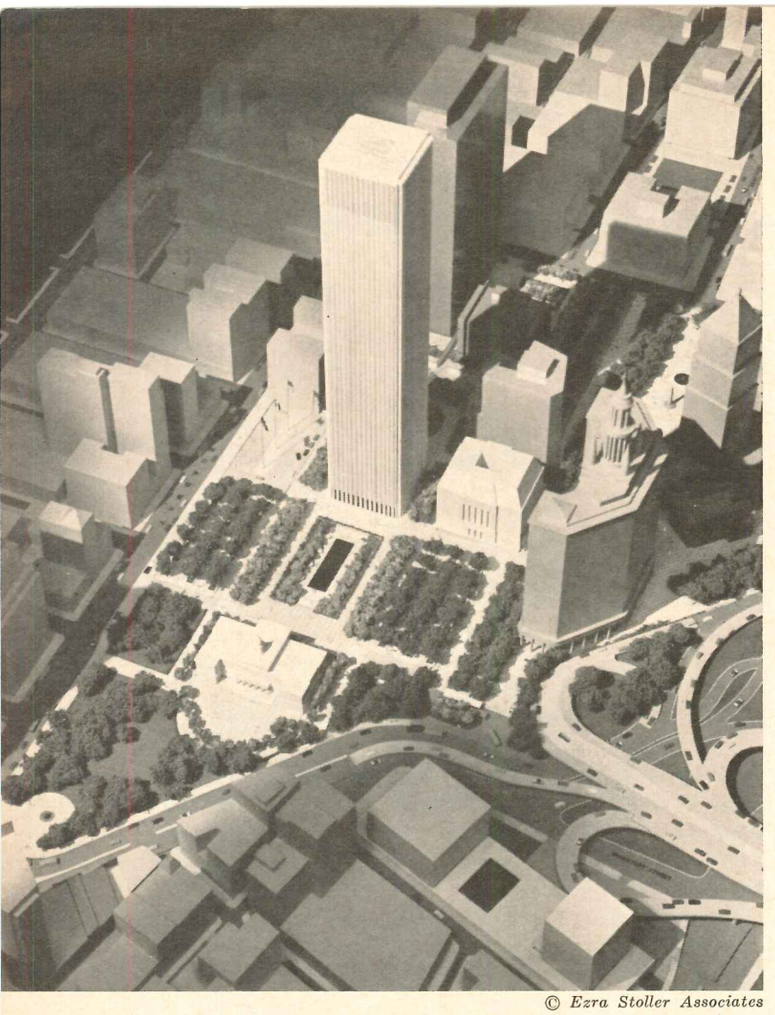
"I think of the legend of Antaeus, who could not be vanquished while his feet were firmly on earth. Hercules finally conquered him, after he had managed to get him to leave that source of his strength. Not only does this deep local attachment, in my feeling, strengthen the architect. But it gives to the grass roots or to the asphalt purlieus the benefit of the high talents which they deserve."

Mayer makes a distinction between this version of "regional architecture" and what is usually understood by the term. Enough distinction, one would guess, to remove the usually stuffy attitude which the term engenders. But one has to suspect that there was something of Antaeus in Maybeck, in his architectural descendants, in Wright. Mayer mentions, between the paragraphs cited above, the Los Altos area of California, the "crowning element" of which is Foothill Junior College by Ernest Kump, and the famous TVA development, as examples of his concept of regional architecture at work. He says: "Roland Wank was the built-in regional architect, for 15 years, who in that whole period was intimately connected with the thinkers, the planners, the engineers, the hydrographers: worked and argued and lived with them. He absorbed their thinking, their language, their aspirations, posed his own analysis, infused into them his own feelings and interpretations. Thus, what would have been an impressive manifestation in any case, takes its place among the great architectural-natural synthesis of any time."

Sounds to me quite like a description of the architect's functions today, and of the satisfactions he might hope to achieve.

—*Emerson Goble*

CIVIC CENTER PLAN REVISED IN NEW YORK



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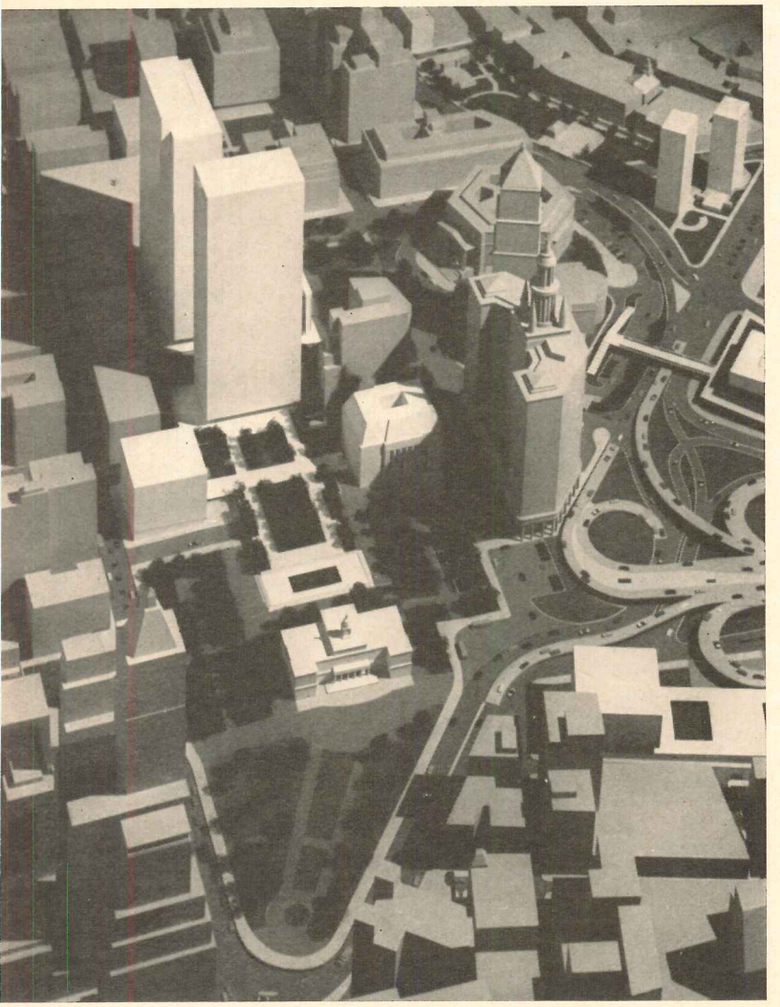


A revised concept for development of a Civic Center for New York City (*top left*) prepared by Edward Durell Stone and Eggers and Higgins, architects, calls for a municipal building of 52 stories which would include the executive offices of the Mayor and the City Council. The proposal, made public by Public Works Commissioner Bradford N. Clark, augments a plan for the same area made in 1962 by architects Max Abramovitz, Simon Breines and Robert W. Cutler (known as the ABC Plan) as the result of a study initiated by the City Planning Commission. The basic idea underlying the ABC plan is to link all of the buildings on a pedestrian mall in the 15-acre park site. ("Architects Plan Civic Center for New York City," January 1963, pages 12-13.)

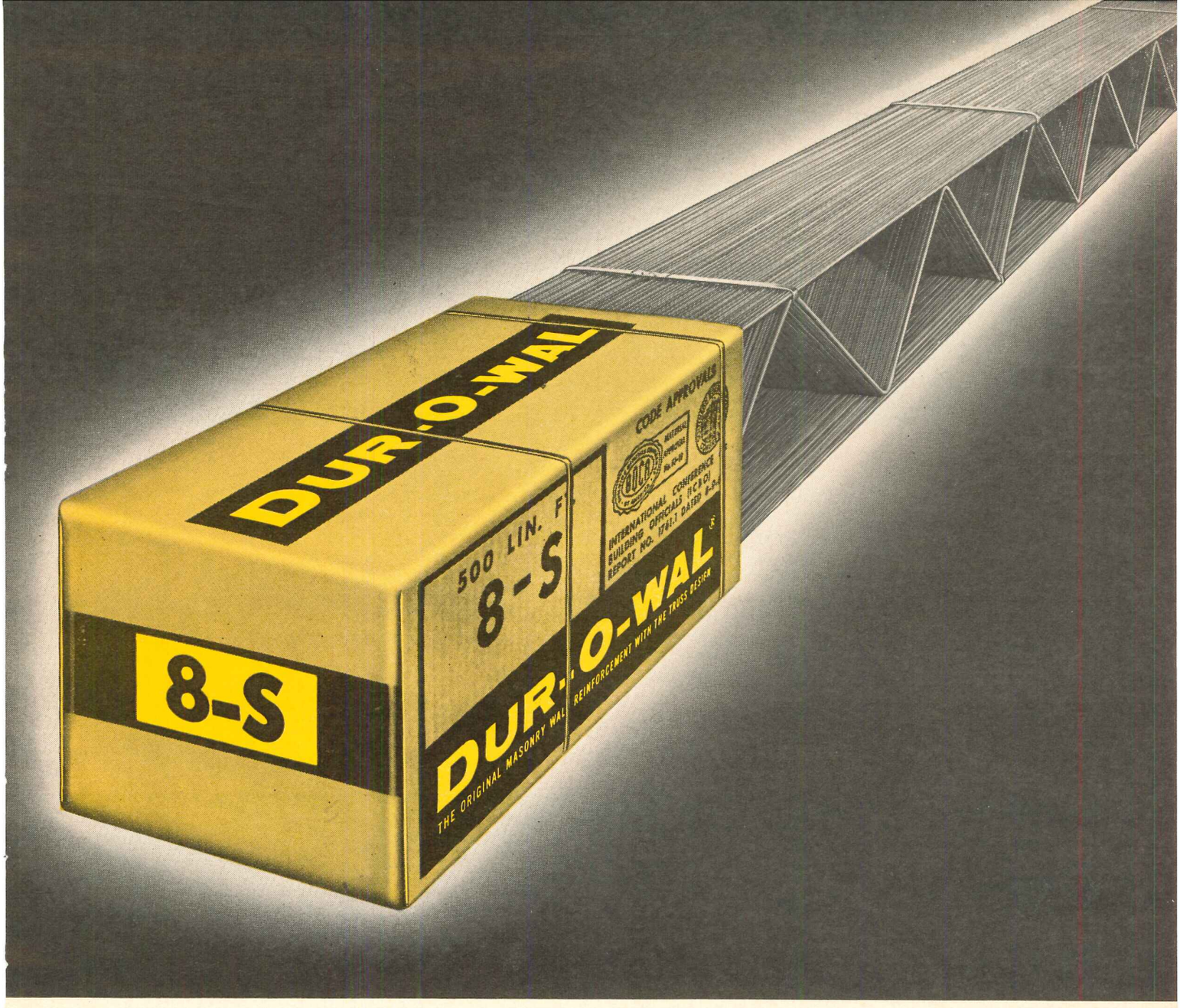
The current proposal, with two significant modifications, will embody the principal features of the earlier plan. In the ABC plan, the executive offices of the Mayor and City Council were to be in separate structures. According to Simon Breines, the incorporation of the executive offices into the municipal building is definitely advantageous, because the Mayor's office will have closer access to the offices of his city councilmen.

The second modification, made after consultation with the original designers, is to move the municipal building one full block closer to City Hall. Mr. Breines feels that this change in site will result in a better relationship between the Municipal Building and Federal Office Building, which will rise as a similar tower-type structure nearly 300 feet away. In the previous plan the two towers were only about 100 feet apart. More light, air and space will be generated because of this change.

Mr. Stone's plan tentatively calls for a depressed court approximately 220 by 140 feet with open stairs connecting the plaza to concourse level. The depressed court is similar in character to that of Rockefeller Plaza. The concourse, just below plaza level, will contain a commercial area with approximately 150 thousand square feet of rentable space. The concourse will allow covered circulation amongst three major subways and the various buildings accessible from this level. The Municipal Building will provide underground parking for 535 cars.

In a joint statement by Edward Durell Stone and David L. Eggers, they feel that "the architect's struggle to create order and beauty in our cities is in large part a struggle to create *open space*. Space, that is, in which to resolve our idealism; space to speak eloquently for the dignity of the people; space to humanize the present and award to the future. Space, in short, that will contribute to the long-term economic and social well-being of the community.

"The awesome density of Manhattan Island makes such areas extremely difficult to come by. . . . It has been said that our cities show what we are as a people. The architects of the Civic Center are confident that with this spacious concept they have offered New Yorkers a truly appropriate expression of their role as citizens of the headquarters city of the world."



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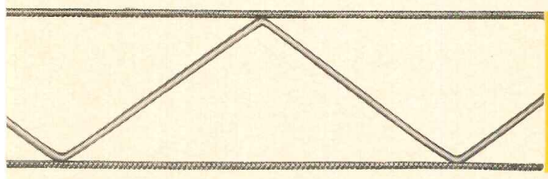

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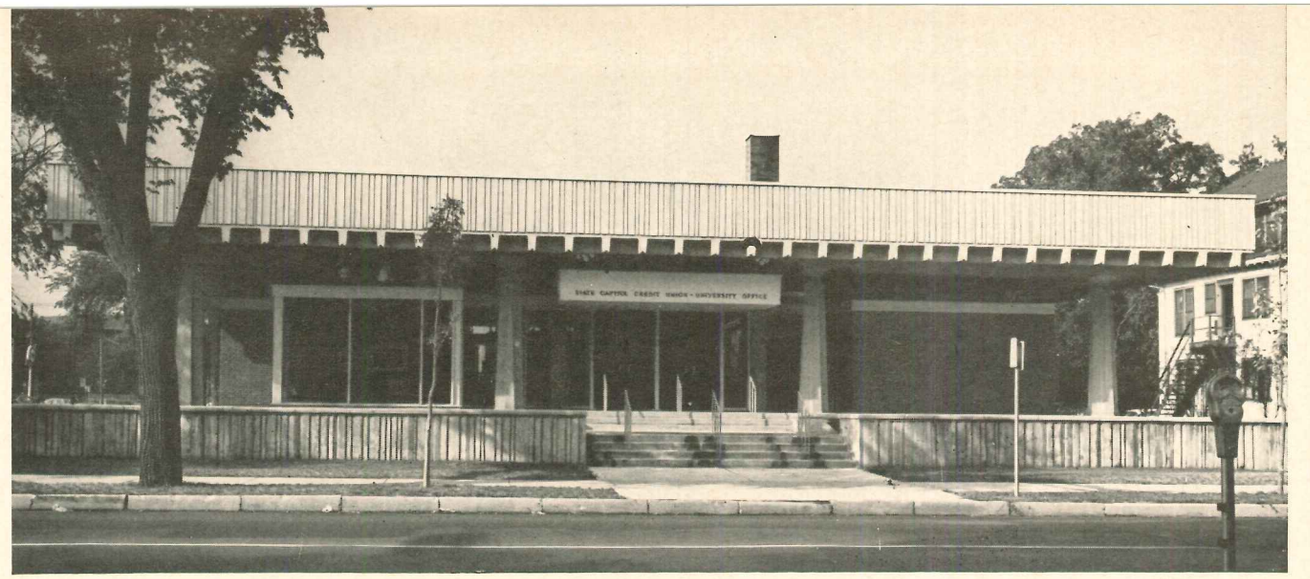


Minnesota Honor Award

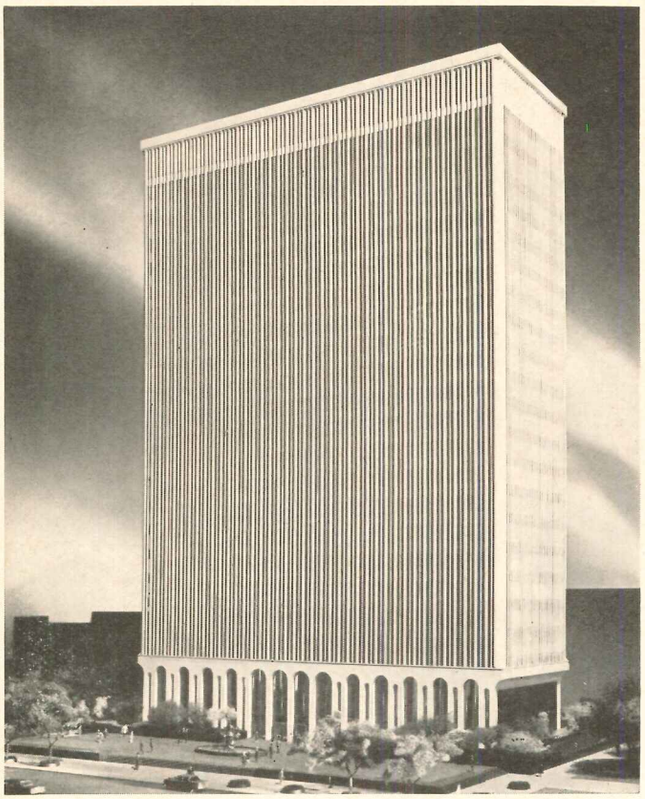
The University Office for the State Capitol Credit Union, St. Paul, Minnesota, designed by Ralph Rapson, was given the top award in the Eighth Annual Honor Awards program for Minnesota architects sponsored by the Minnesota Society of Architects, A.I.A. The poured-in-place reinforced concrete structure has a metal pan waffle slab concrete roof supported by 16 reinforced cross-shaped concrete columns. The building, raised up on an exposed concrete podium, gets natural light through continuous glass between its low brick walls and concrete roof and the rough clerestories

Lés Turnau

Minnesota Merit Award

The second highest award went to Sövik, Mathre and Madson for the design of the Westwood Lutheran Church of St. Louis Park, Minnesota. The church was cited for design simplicity and the creative use of brick, concrete, quarry tile and oak materials. A four-man jury of three practicing architects and an art critic selected the winners. The jury included Edward V. Olencki, A.I.A., Alden B. Dow, F.A.I.A., Glen Paulsen, A.I.A., and John K. Sherman of the Minneapolis Star-Tribune. John Rauma, A.I.A., Minneapolis architect, was chairman of the 1964 Honor Awards Program for the Minnesota Society

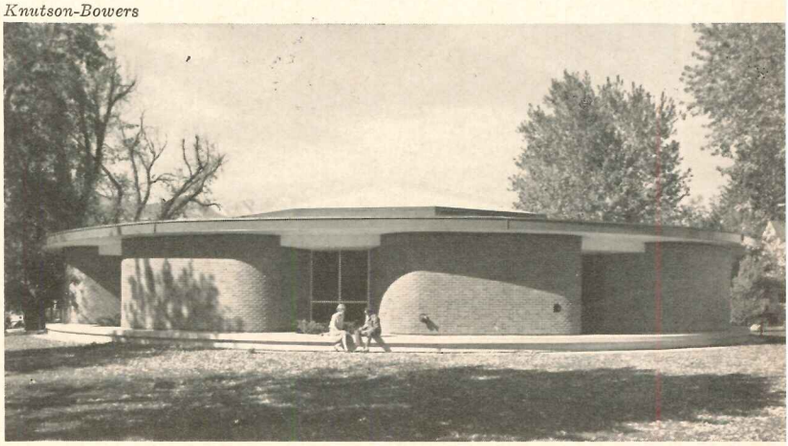
Baltazar Korab



Buffalo Bank by Yamasaki

Designed by Minoru Yamasaki, architect, the Manufacturers and Traders Trust Company building in Buffalo, New York, will have a first floor banking room 35 feet high, framed by arched windows and integrated with the central lobby space so that it will appear to be one great room, 190 feet long and 70 feet wide. The arched marble sheathed columns, 14 feet on centers, which support the long span building framing, are made possible through the use of new high strength structural steels. Structural engineers are Worthington, Skilling, Helle and Jackson. The vertical elements of the steel-framed tower will be sheathed with precast concrete shells of marble aggregate prestressed concrete ground to a smooth white finish. The facade will be enclosed with anodized aluminum spandrel panels and special heat-absorbing glass panel windows. The 21-story structure will overlook a landscaped plaza, 220 feet wide by 75 feet deep with fountains, trees, flowers and benches

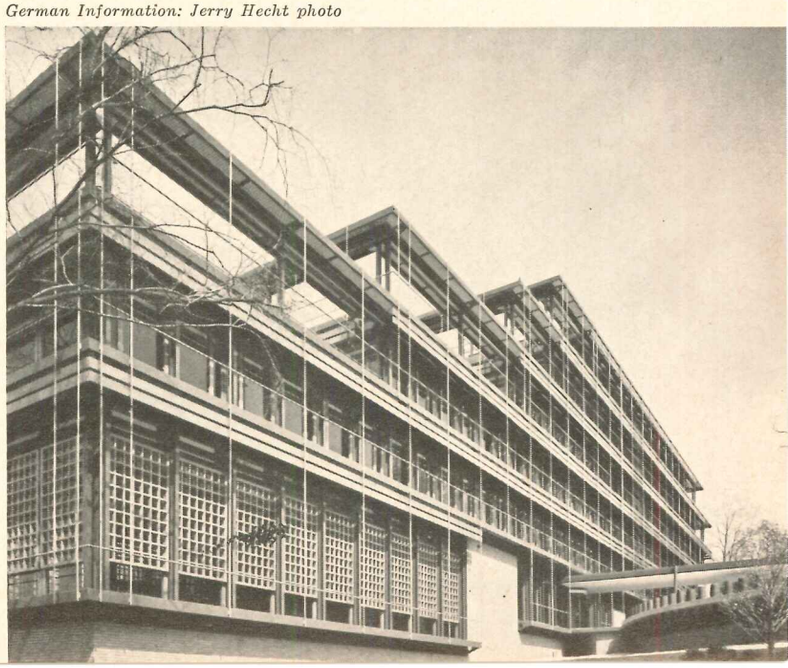
Knutson-Bowers



"Study-While-Ill" Infirmary

The Boettcher Health Center at Colorado College, Colorado Springs, is designed with men's and women's study lounges adjoining their rooms. The red and charcoal brick structure is designed by the architectural firm of Caudill, Rowlett and Scott. Carlisle B. Guy was associate architect and the general contractor was Gerald H. Phipps. The design concept of the 20-bed, $275,000 infirmary is that of three circles, one inside the other. The inner circle houses the nurses' station; the second circle contains the study lounges and main examination room; and the outer circle is occupied by patients' rooms, treatment rooms and other facilities

German Information: Jerry Hecht photo



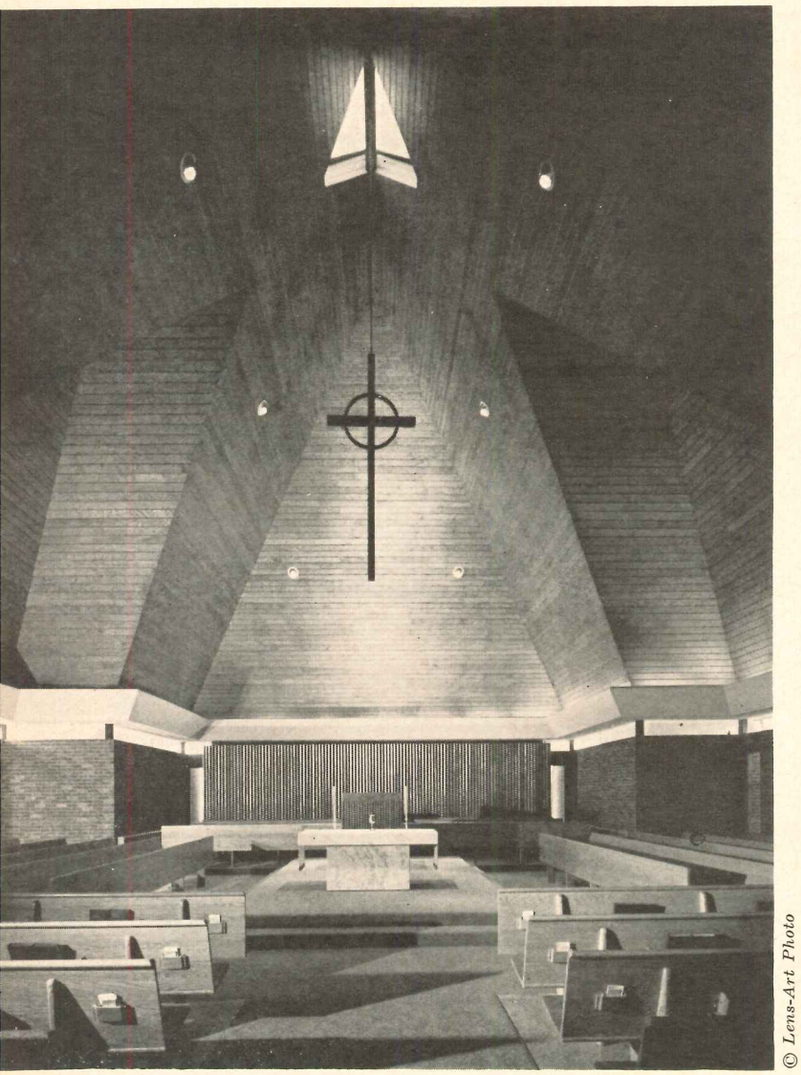
Design for a Difficult Site

German architect Egon Eiermann designed the German Chancellory in Washington, D.C., so that it would conform to a residential neighborhood as well as to a difficult site, which slopes 50 feet over a distance of 130 yards. The solution is a 50-foot-wide, two-story facade at street level rising gradually to six stories at its highest point by means of terraced setbacks which drop again at the rear. The entire facade has a framework of light steel which is supported by narrow balconies attached to exposed steel structural columns. The building has 140 offices with a floor area of 95,000 square feet. Underground parking is provided for 100 cars

DETROIT A.I.A. GIVES FOUR AWARDS

A first honor and three awards of merit were presented by Philip J. Meathe, chapter president, in the 1964 honor awards programs of the Detroit Chapter of the American Institute of Architects at their annual meeting on October 21 in Berkley, Michigan.

Judging took place in Philadelphia with J. Roy Carroll Jr., F.A.I.A., Vincent Kling, F.A.I.A., and Robert Geddes, A.I.A. serving as jurors. The four winners were selected from 40 entries submitted by 22 firms in the Detroit area.



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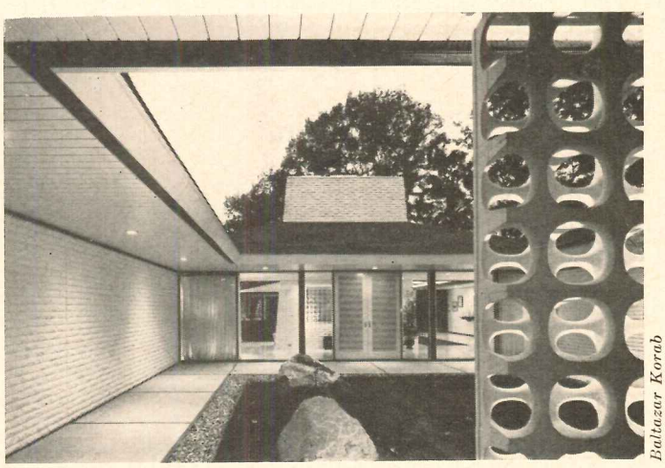
FIRST HONOR: Chapel for University Presbyterian Church
Rochester, Michigan
Architects: Linn Smith Associates, Inc., Linn Smith, F.A.I.A.
Almon Durkee, A.I.A., Richard Albyn, A.I.A.
Mechanical and electrical engineer: Gordon E. Hoyem, P.E.
Structural engineers: McClurg, McClurg, Paxton & Mikle
General contractor: Sund Construction Company

Baltazar Korab

MERIT AWARD: Michigan Consolidated Gas Company
Detroit, Michigan
Associated Architects and Engineers:
Minoru Yamaski; Smith, Hinchman & Grylls

Baltazar Korab

MERIT AWARD: Residence for Mr. & Mrs. William B. Bachman Jr. Bloomfield Hills, Michigan
Architects: Tarapata-McMahon Associates, Inc.



Baltazar Korab

MERIT AWARD: The Manufacturers National Bank of Detroit, Hunter Boulevard Branch, Birmingham, Michigan
Architects: Louis G. Redstone, Architects, Inc.

Another by Saarinen

Designed by Eero Saarinen, the School of Music building at the University of Michigan, pulls together in a central facility activities which had been conducted in 13 different buildings. Plans for the final design were completed in 1956, although due to a construction delay, the building was not dedicated until this September. Faced with textured brick and within a landscaped setting, the building contains specialized facilities to accommodate approximately 1,000 music majors

University of Michigan News Service

Dining Hall by Kling

Architect Vincent Kling has designed the Philip T. Sharples Dining Hall at Swarthmore College, Swarthmore, Pa., not as a dining "hall," but rather as six deliberately different dining areas grouped around a central lounge under steeply pitched roofs. The plan of the building is a cruciform. At the center is the lounge which rises three stories and is lighted by clerestories. The three largest dining rooms extend as arms of the cross to the east, south and west, with the kitchen and serving pantry occupying the north arm

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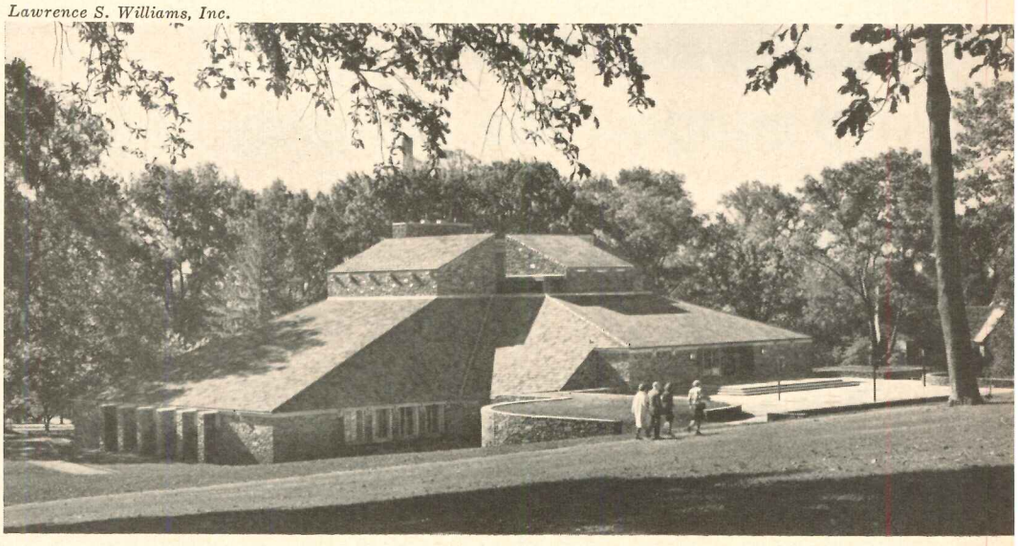

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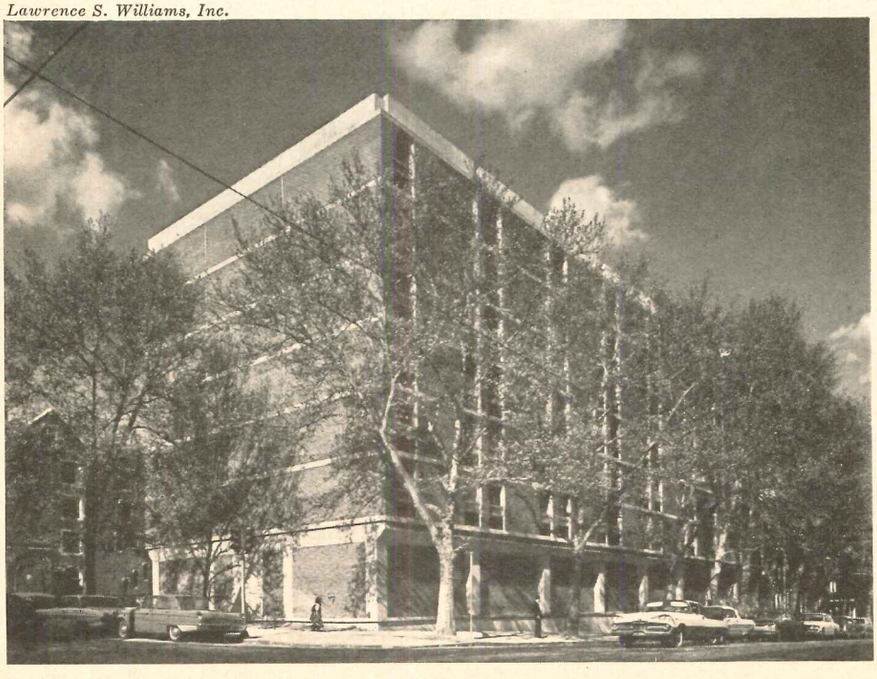

Dormitory at Penn

The Harold C. Mayer Hall for married graduate students at the University of Pennsylvania, Philadelphia, is primarily of reinforced concrete construction and is faced with red-brown brick similar to other campus structures. Designed by Eshbach, Pullinger, Stevens & Bruder, architects and engineers, the building has 98 apartments. Twelve apartments are one-room efficiencies, another 12 have two bedrooms and combination living-dining room, and the remaining 74 have one bedroom and a living-dining room

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Architects: Hayes, Howell & Associates, A.I.A., Southern Pines, North Carolina

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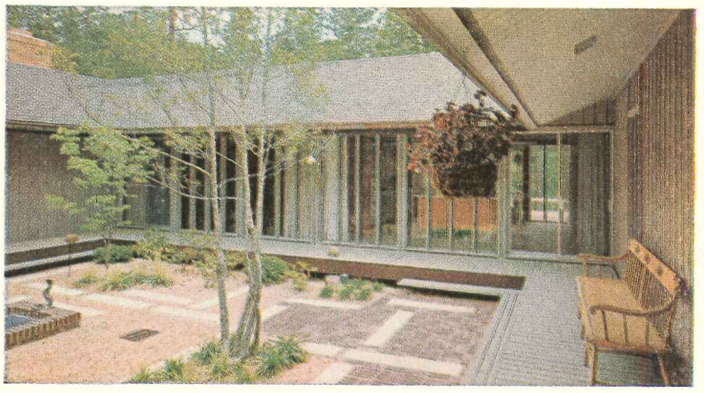

The patio plan provides each room within a pleasant view of a private courtyard. The resilient wood floor assures walking comfort.

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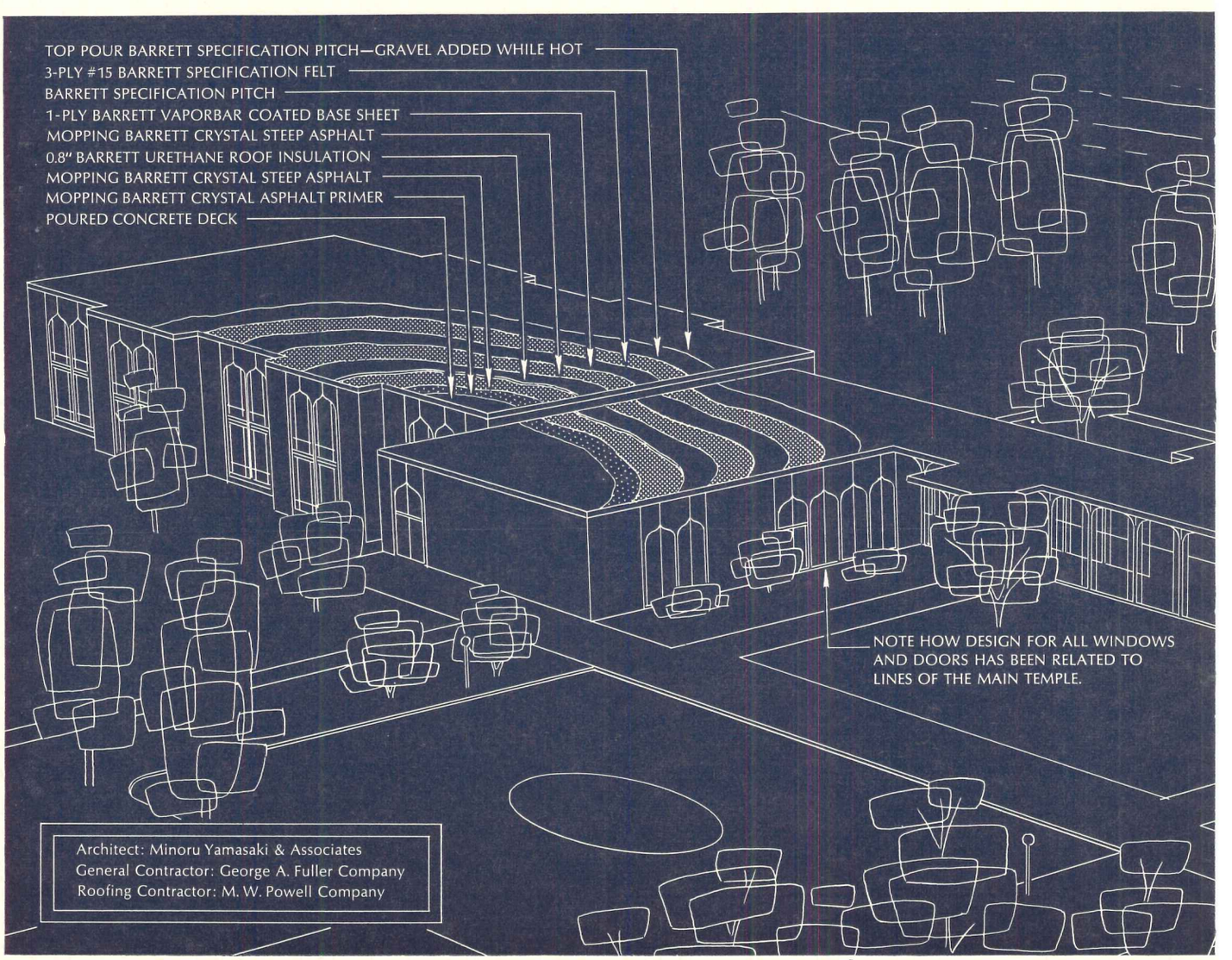
Barrett... exciting new building materials from chemistry



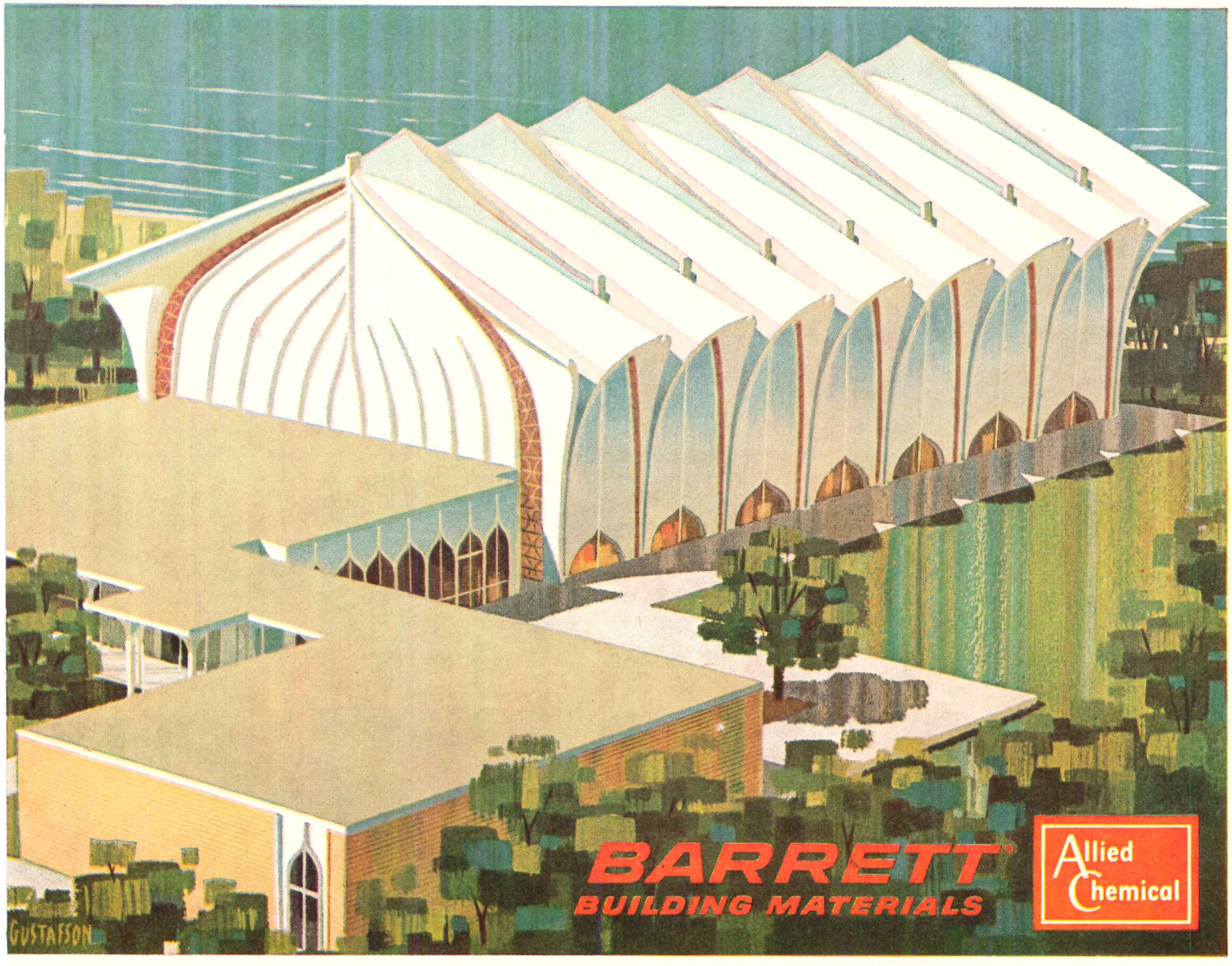
Barrett Urethane permits extra thin roof to accent sculptured beauty of Yamasaki-designed temple!

In designing Chicago's new North Shore Congregation Israel in Glencoe, Illinois, a major element in the esthetic relationship between the flat-roofed front buildings and the main temple itself is the thin "facing" edge of the flat area. Architect Minoru Yamasaki solved this critical design problem by specifying Barrett Urethane Insulation for the entire roof area of approximately 208 squares.

Utilizing 3' x 4' x .8" panels of Barrett Urethane with Barrett Built Up Roofing, Mr. Yamasaki was able to combine the desired thermal-efficiency-to-thickness ratio, plus a K-factor of 0.13, the lowest in the industry, with the narrow side contour line specified in his design. You have only to look at this magnificent temple to see how effectively the building materials used have fulfilled his requirements.

For your next project, take advantage of the new design freedom which Barrett Urethane Roof Insulation offers. Ask your Barrett representative for full details. Or write to: Barrett Division, Allied Chemical Corporation, Dept. AR-5, 40 Rector Street, New York 10006.

The Marina Towers—twin 60-story Chicago apartments are protected by Barrett Built Up Roofing and felt waterproofing. Bertrand Goldberg Associates of Chicago are the architects.



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PRESIDENT APPROVES PENNSYLVANIA AVENUE PROPOSAL

President Lyndon Johnson gave his support to the report of the Council on Pennsylvania Avenue in Washington on October 23 ("Plan Prescribes a Grand National Axis for Redevelopment of Pennsylvania Avenue," July 1964, pages 23, 26, 272).

In a statement which came before rather than, as expected, after the Election, the President called for an "immediate study" of the arrangements for implementing the plan.

The complete text of the President's statement follows:

"Last June, shortly after I received the report of the Council on Pennsylvania Avenue, I stated that I would welcome widespread reaction to the Council's proposals. There has been reaction, almost all of it favorable, from many quarters.

"During these past months, I have also been able to give the Council's report some further study. Although I recognize that details may require modification, and that any plan such as this must remain flexible, I believe that it should be accepted as a worthy and challenging goal for our Nation's most important street, our Nation's ceremonial drive.

"The new building for the Federal Bureau of Investigation is already being designed in accordance with the plan. Private development, which has already begun, should also have the plan as a guide. Every Government agency and department which received and reported on the Council's plan has approved it, some with suggestions for improvement or for further study.

"I was particularly impressed by the approval of the National Capital Planning Commission, which really has the major responsibility for the development of the city; by the Commission on Fine Arts; and by the District of Columbia Board of Commissioners. I have likewise been heartened by the enthusiastic response to the plan from so many national and local organizations concerned with the development of our Nation's Capital.

"Congress must, of course, be consulted, and must approve the concept of the plan. Meanwhile, however, I believe that we should undertake an immediate study of the best arrangements for implementing the plan and making whatever adjustments and modifications may be necessary."

SAN FRANCISCO SPONSORS INTERNATIONAL COMPETITION

The Art Commission of the City of San Francisco has announced an international competition for the enhancement of the Civic Center Plaza. The jury, which is composed of Thomas Church, landscape architect; Jacques Lipschitz and Constantino Nivola (alternates), sculptors; Dr. Lorenz Eitner, Stanford University; Moses Lasdy, art patron; and Luis Barragan, an architect from Mexico —will select three competitors to receive first second and third prizes of $3,750, $3,250 and $3,000. If the design is approved by the Art Commission, the winner will receive an additional $10,000.

The single stage competition is open to artists, sculptors, architects, landscape architects, and civic and urban designers who file a registration form with professional adviser, Henry Schubart Jr., San Francisco Civic Center Plaza Competition, 52 Vallejo Street, San Francisco 11, California, before December 31.

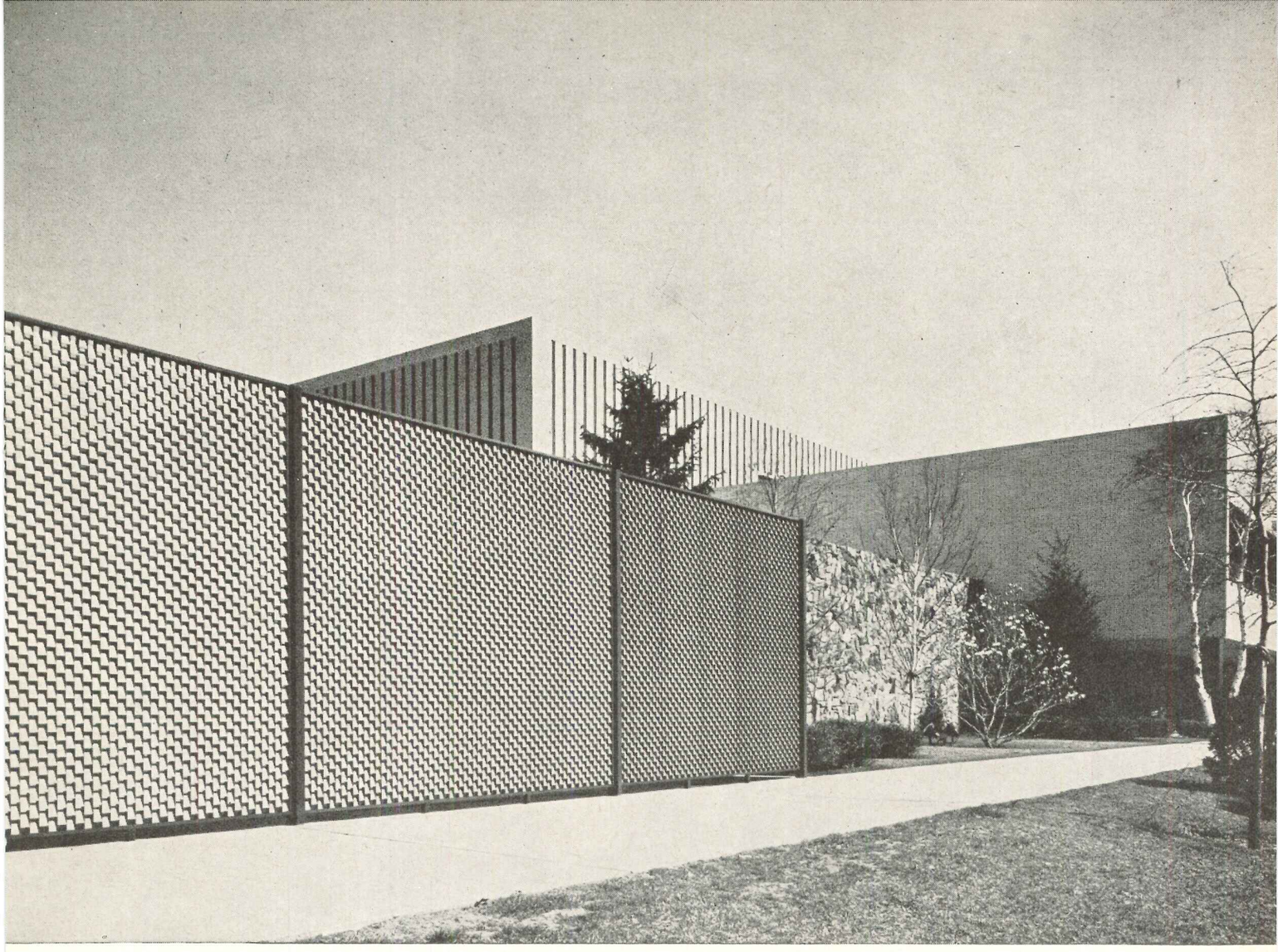
The winning design must enhance the use as well as the appearance of the Plaza, taking into account daytime and nighttime activity, climate and variations of season.

The competition is approved by the Union Internationale des Architectes, International Association of Plastic Arts, the American Institute of Architects and the American Society of Landscape Architects.

BUILDING COORDINATORS HOLD SECOND MEETING

The Building Construction Coordinating Committee held its second organizational meeting October 15 to explore the feasibility of a cooperative interest group amongst six national organizations ("Joint Organization of Building Industry Groups?," September 1964, page 23). Represented at the meeting were the Associated General Contractors, the American Institute of Architects, Consulting Engineers Council, the Council of Mechanical Specialty Contracting Industries, the National Society of Professional Engineers and the Producers Council.

John Stetson, F.A.I.A., of Palm Beach, Florida, was elected temporary chairman of the coordinating committee during its period of organization. He will serve until the boards of each of the participating organizations have approved the objectives, composition and functions of the committee. The first chairman will be selected at a meeting to be held early in 1965.



Architect: Abbott, Merkt & Co., New York City

BORDEN ARCHITECTURAL DECOR PANELS: DECA-GRID

Shown above: Custom-designed Borden Deca-Grid panels with tilted spacers, used to separate and screen the service area at Saks in Garden City, Long Island.

With the Deca-Grid style, specifications for spacings and spacer bar positions may be varied almost indefinitely. Another variation available for Deca-Grid is known as the Slant-Tab variation—here the spacers are mounted at angles of 30°, 45°, 60° or 90° and the spacers (called Slant-Tabs) may be altered in length, depending on angle of mounting selected.

All the Borden Decor Panel styles, including Deca-Grid Deca-Gril, Deca-Ring and Decor-Plank, are highly versatile in design specification and in application such as for facades, dividers, grilles, fencing, refacing of existing buildings, etc. Fabricated in standard or custom designs in sturdy, lightweight aluminum, Borden Architectural Decor Panels provide a handsome, flexible, maintenance-free building component.

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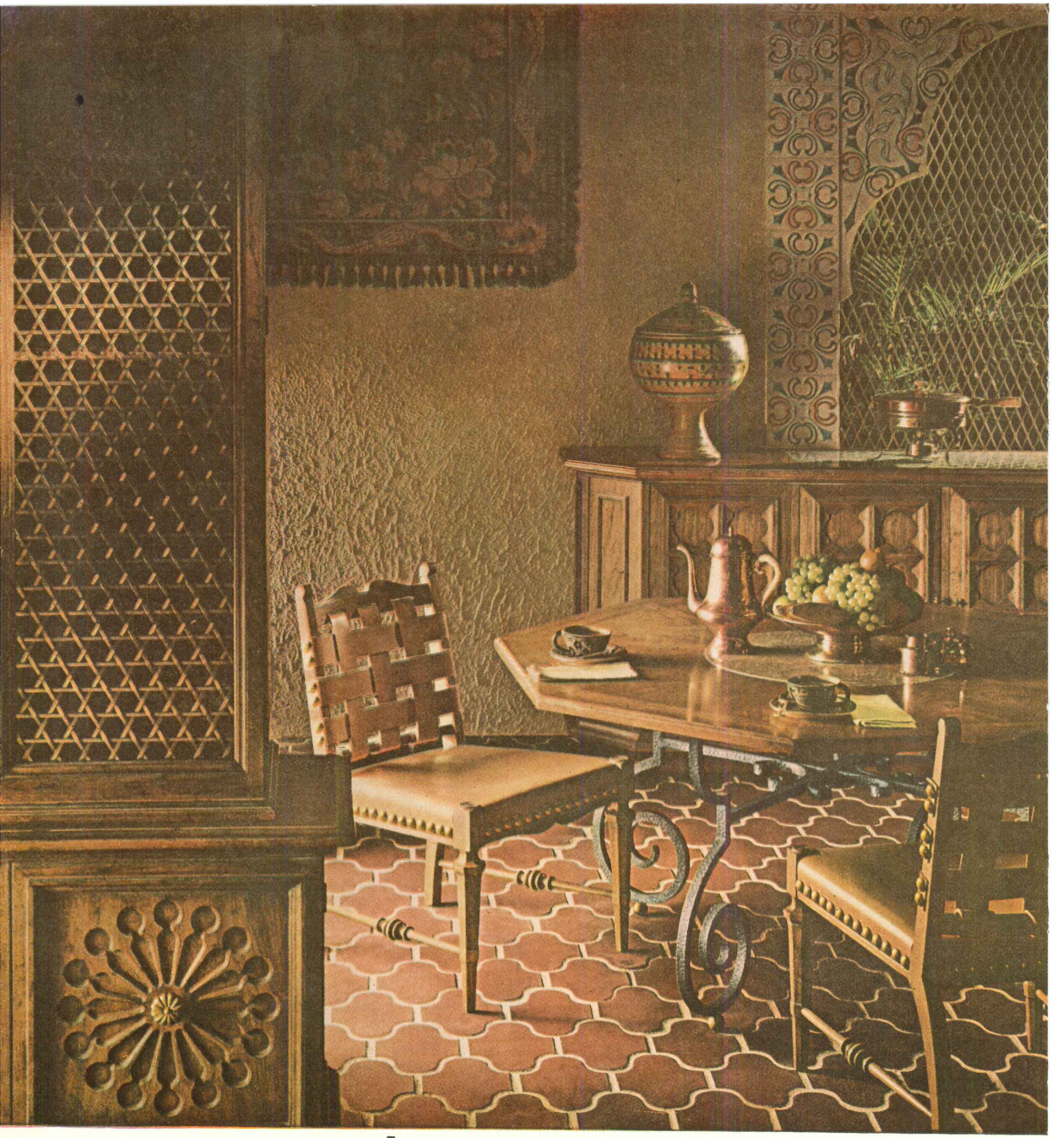

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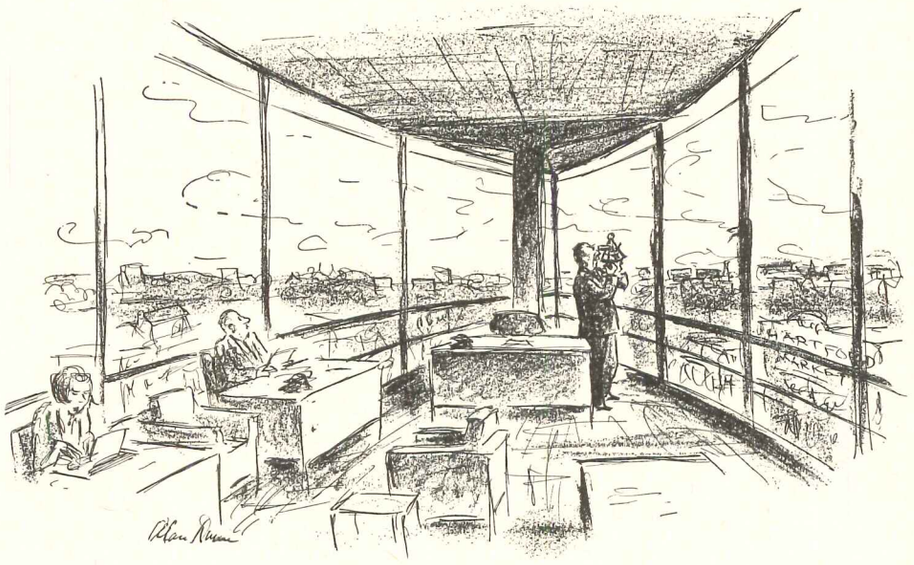

Drawn for the RECORD *by Alan Dunn*

"FUTURE BY DESIGN" DISCUSSED IN NEW YORK

A symposium, "The Future by Design," held in New York City October 14-16, was called by William F. R. Ballard, A.I.A., chairman of the New York City Planning Commission, "to develop the necessary understanding and support for comprehensive planning for New York City, popularly referred to as a master plan." The basic costs of the symposium were underwritten by a grant from the Lavenburg Foundation.

There was not a practicing architect among the 29 speakers and panelists on the two-day program, a fact explained by Mr. Ballard on the ground that this symposium was intended to encompass only the dimensions of the planning problem and not physical design.

Barbara Ward (Lady Jackson), British author and economist, opened the conference by stating, "Our world is an urbanizing world. In the next half century, it looks as though the rate of growth of cities will be twice the rate of population growth. . . . At the center of this process is New York. It is not increasing at the maximum rate. But this is perhaps because it has already done so. It is, with the possible exception of Tokyo, the vastest megalopolis in the world. It *is* where the other cities are going."

In the first panel discussion, "The Forces Shaping New York's Future," Daniel Bell, professor and chairman of the Department of Sociology at Columbia University, historically traced the development of New York City from a port city to a manufacturing city to a "headquarters" city to a cultural center. He feels that each of these phases of growth continues independently today. Compounded by economic and political factors, any planning decisions are impossible because of the vested interests of each group.

The city as a whole should be a work of art, according to August Heckscher, executive director of the Twentieth Century Fund and former White House Consultant on the Arts. "The ideal of the city as a work of art does not presuppose that it will all be at the same level of taste and fitness. . . ." The city "should seek a high level of architecture, showing the best work of the best architects and builders of the times."

Daniel P. Moynihan, Assistant Secretary of Labor, foresees increasing employment problems among New York's "new immigrant population" —Negroes and Puerto Ricans—who are seeking unskilled jobs which are diminishing in number. "The trivialization and erosion of jobs at the lower end of the work force is a deep current in modern civilization. . . . The day may come when the principal source of mass alienation will derive not from the fact that an elite has usurped all the property and the leisure that goes with it, but rather from the fact that it has grabbed up all the really hard, exhausting and interesting jobs."

Also speaking on this panel were Edward Banfield, professor of urban government at Harvard University, Harrison Brown, professor of geochemistry at the Calif. Institute of Technology, and Bayard Rustin, deputy director, March on Washington.

In the second panel discussion entitled "Coping with the Future: What We Can Do, Can't Do, and Why," Adolf A. Berle Jr. (lawyer and economist), felt that the City Planning Commission should give more emphasis to preservation of residential neighborhoods. He thinks that these areas should be identified and fostered, and that the city should create park spaces such as Gramercy Park to mold these areas. "The blunt fact is that in New York, one of the most prosperous places in the world, our resident gets less for his money than perhaps anywhere else in the world."

"To have a future by design, we must first have designs for the future and the means of producing such designs and for injecting them into the public stream of consciousness. In

continued on page 254

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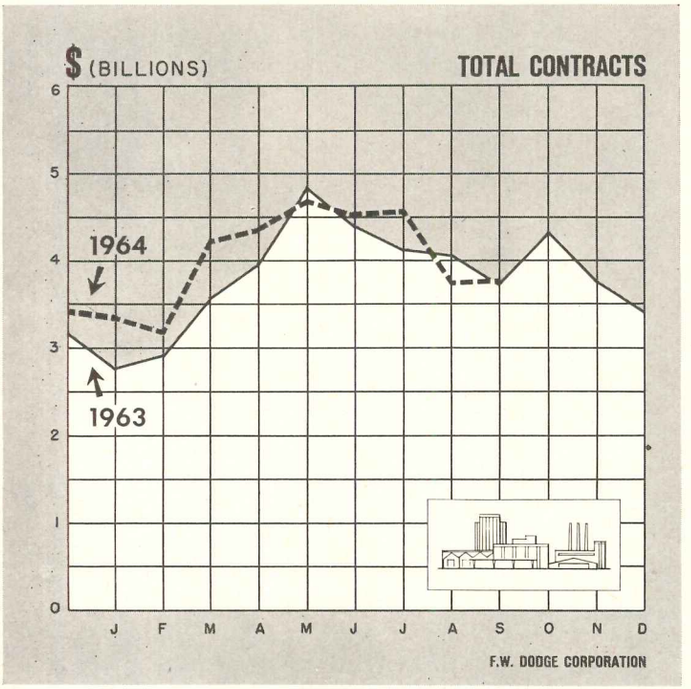
North Shore Congregation Israel Synagogue, Glencoe, Ill. Architect: Minoru Yamasaki & Associates, Birmingham, Mich. Structural Engineers: Worthington, Skilling, Helle, and Jackson, Seattle.

IN THE MOOD OF WORSHIP.... CONCRETE SHAPES A SANCTUARY OF INSPIRING BEAUTY...

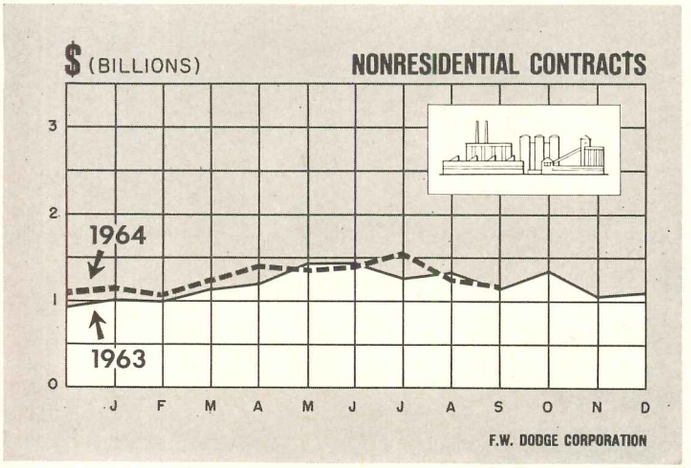
Rising 55 feet, fan vault shells of precast concrete are interlaced with stained glass skylights to form the arching canopy of the new "Temple of Light" synagogue in Glencoe, Illinois. ☐ Concrete side wall panels and the great end walls are sculptured to repeat the majestic, curving motif of the shells. The design effect, both inside and out, is one of tranquility and spiritual uplift. ☐ Such total plasticity of form is possible only with concrete. It is a basic reason more and more architects are choosing this versatile material to express dramatic new design concepts.

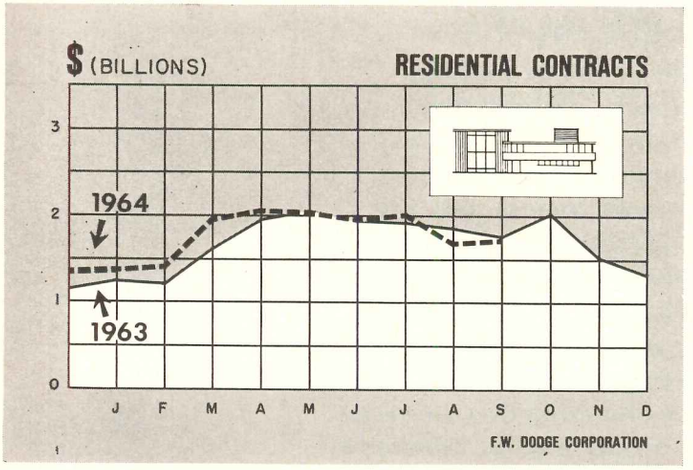
An organization to improve and extend the uses of concrete **PORTLAND CEMENT ASSOCIATION**

URBAN RENEWAL SPARKS $2 BILLION PRIVATE INVESTMENT



Total contracts include residential, nonresidential and non-building contracts





In the hope of getting more architects involved in urban renewal at the community level, President Arthur G. Odell Jr. of the American Institute of Architects recently put his challenge to the profession in quite unmistakable language. Having convinced and aroused the public on the *need* for urban renewal, he argues, the time has come to substitute constructive action for words.

For too long, perhaps, the appeal of urban renewal work has been diminished by urban renewal's not-too-attractive dual image of slum clearance and public housing—an image which Commissioner Slayton of the Urban Renewal Administration is trying hard to dispell with some newly gathered facts.

There's good reason why urban renewal initially became synonymous with slum clearance, since the program's legal origin—Title I of the Housing Act of 1949—was geared largely to the residential needs of blighted neighborhoods. The typical project during the early years of urban renewal usually involved replacing dilapidated tenements with uninspired, low-cost, high-rise apartments, and little more.

Subsequent revisions and amendments to Title I (1954 and 1959 brought the big changes) helped to broaden the concept of urban renewal from slum clearance to something a lot closer to urban redevelopment. With the inclusion of nonresidential projects, and the emphasis on extensive, city-wide planning, current urban renewal construction is divided roughly down the middle between housing and non-residential work.

These changes in the basic character of urban renewal have stimulated rapid growth in recent years. To date nearly 1,500 different projects have been initiated (with hundreds more being studied) in more than 700 cities throughout the country. And they're not just the big cities, either; nearly half of the localities had populations of less than 25,000. What's more, the pace is accelerating. By the end of 1963, local renewal agencies had acquired approximately two and a half times as much land as they had accumulated in all the years up to 1960!

Data just released by the Urban Renewal Administration show that the vast bulk of urban renewal building is privately financed. Government's role in urban renewal is mainly in the area of acquiring and clearing land; beyond that, government makes direct capital grants for projects, but recent experience shows that for each dollar of Federal grants, an additional *seven* dollars of redevelopment investment is made. Of those funds, five and a half dollars represent private capital. (The balance comes from state or local government sources.) At the end of last year there was just short of $2 billion of private investment in urban renewal construction already finished or then in progress, and that represented a gain of better than 60 per cent from mid-1962.

A far cry from its early beginnings in public housing for slum neighborhoods, urban renewal—with a strong underpinning of private enterprise—has become the business of rebuilding cities. This curious blend of businessmen, bulldozers, and bureaucrats which is urban renewal is bound to play an increasing part in metropolitan construction because it has become not only an accepted program, but a profitable one as well.

George A. Christie, Chief Economist
F. W. Dodge Company
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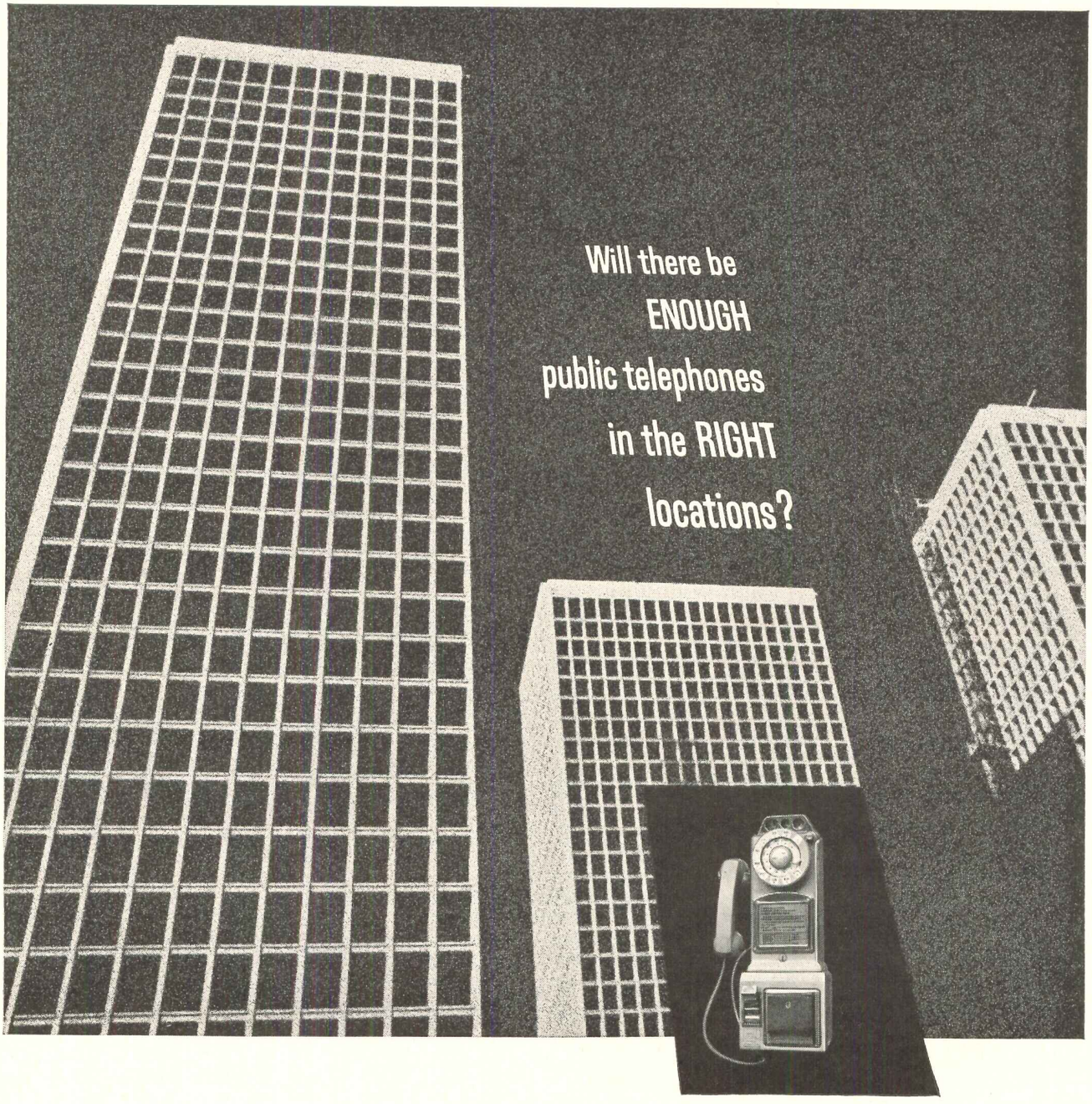

Yes, if they're planned for early enough.

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In addition to design, careful early planning is also the practical thing to do, for it eliminates the possibility of expensive, troublesome afterthoughts.

The easiest, surest way to do your public telephone planning is to call your local Bell Telephone Business Office and ask to have a Public Telephone Consultant contact you.

For general information on telephone planning, see Sweet's Architectural File, 33a/Be.

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Building Construction Costs

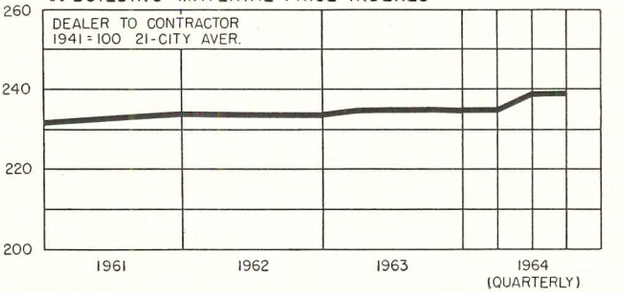
By William H. Edgerton
Manager-Editor, Dow Building Cost Calculator, an F. W. Dodge service

The information presented here permits quick approximations of building construction costs in 21 leading cities and their suburban areas (within a 25-mile radius). The tables and charts can be used independently, or in combination as a system of complementary cost indicators. Information is included on past and present costs, and future cost can be projected by analysis of cost trends.

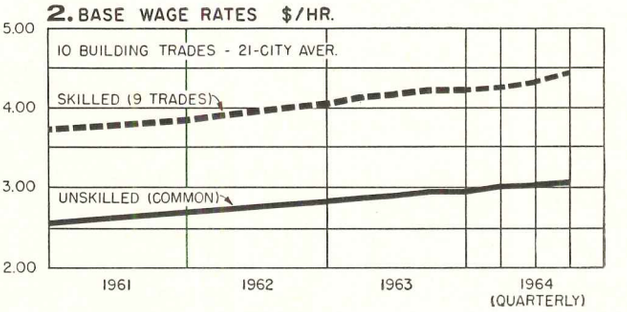
A. CURRENT BUILDING COST INDEXES—NOVEMBER 1964
1941 Averages for each city = 100.0

Metropolitan Area	Cost Differential	Current Dow Index Residential	Current Dow Index Nonresidential	Per Cent Change Year Ago Res. & Nonres.
U.S. AVERAGE— 21 Cities	8.5	266.0	282.1	+1.82
Atlanta	7.1	299.8	318.0	+2.48
Baltimore	8.0	268.6	295.9	+1.70
Birmingham	7.4	246.3	264.9	+1.71
Boston	8.4	241.2	255.3	+2.94
Chicago	8.8	295.4	310.7	+1.49
Cincinnati	8.8	257.4	273.6	+2.04
Cleveland	9.3	269.7	286.6	+2.20
Dallas	7.8	251.2	259.5	+1.34
Denver	8.8	273.5	290.7	+1.29
Detroit	8.9	267.7	281.0	+1.83
Kansas City	8.3	239.6	253.6	+0.72
Los Angeles	8.4	269.0	294.3	+1.62
Miami	8.4	264.2	277.4	+1.48
Minneapolis	8.9	267.4	285.3	+2.21
New Orleans	7.9	239.4	253.7	+0.56
New York	10.0	275.0	295.8	+2.12
Philadelphia	8.7	265.0	278.2	+1.18
Pittsburgh	9.1	251.4	267.3	+2.08
St. Louis	8.9	260.1	275.6	+3.00
San Francisco	8.5	341.0	373.1	+3.28
Seattle	8.5	244.6	273.4	+1.95

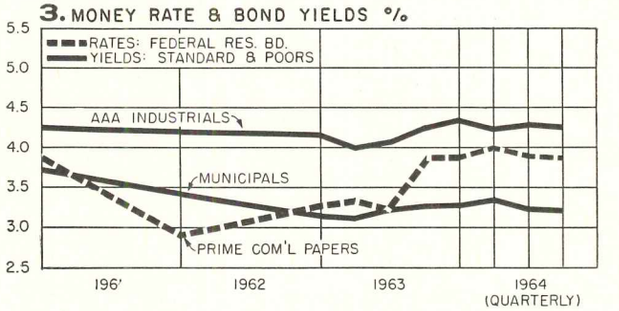
1. BUILDING MATERIAL PRICE INDEXES



2. BASE WAGE RATES $/HR.



3. MONEY RATE & BOND YIELDS %



B. HISTORICAL BUILDING COST INDEXES—AVERAGE OF ALL BUILDING TYPES, 21 CITIES
1941 average for each city = 100

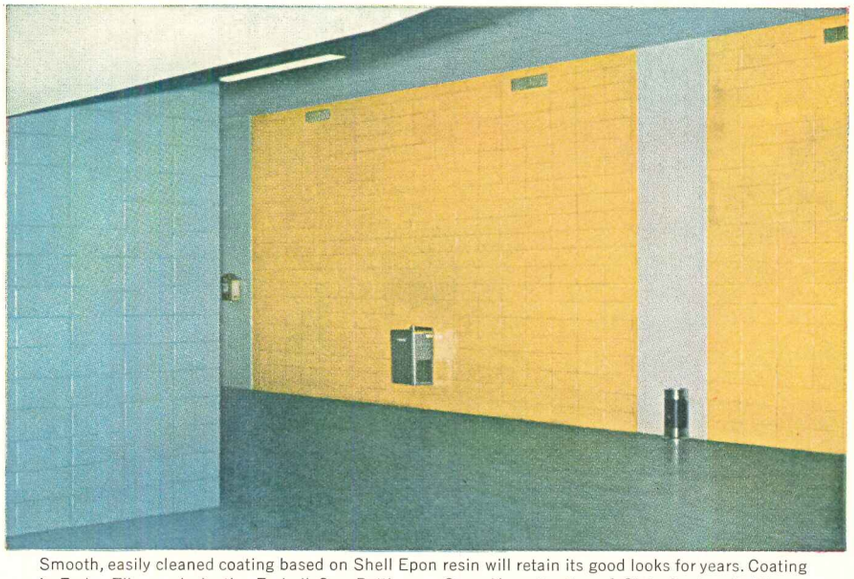
Metropolitan Area	1952	1957	1958	1959	1960	1961	1962	1963 (Quarterly) 1st	2nd	3rd	4th	1964 (Quarterly) 1st	2nd	3rd	4th
U.S. AVERAGE 21 Cities	213.5	244.1	248.9	255.0	259.2	264.6	266.8	269.4	270.3	273.4	275.0	274.7	276.8	278.6	
Atlanta	223.5	269.6	277.7	283.3	289.0	294.7	298.2	302.0	303.0	305.7	307.5	310.0	312.3	313.4	
Baltimore	213.3	249.4	251.9	264.5	272.6	269.9	271.8	272.3	272.9	275.5	277.1	277.2	279.3	280.5	
Birmingham	208.1	228.6	233.2	233.2	240.2	249.9	250.0	251.3	252.0	256.3	257.8	258.0	259.9	260.1	
Boston	199.0	224.0	230.5	230.5	232.8	237.5	239.8	240.4	241.2	244.1	245.6	246.1	247.9	251.3	
Chicago	231.2	267.8	273.2	278.6	284.2	289.9	292.0	296.4	296.4	301.0	302.8	302.2	304.5	305.1	
Cincinnati	207.7	245.1	250.0	250.0	255.0	257.6	258.8	260.0	260.7	263.9	265.5	265.1	267.1	268.9	
Cleveland	220.7	258.0	257.9	260.5	263.1	265.7	268.5	272.3	272.8	275.8	277.4	276.3	278.4	282.0	
Dallas	221.9	228.4	230.5	237.5	239.9	244.7	246.9	251.5	252.2	253.0	254.5	253.7	255.6	255.6	
Denver	211.8	245.6	252.8	257.9	257.9	270.9	274.9	275.0	275.4	282.5	284.2	282.6	284.7	287.3	
Detroit	197.8	237.4	239.8	249.4	259.5	264.7	265.9	276.1	267.9	272.2	273.8	272.7	274.7	277.7	
Kansas City	213.3	230.5	235.0	239.6	237.1	237.1	240.1	242.3	242.9	247.8	249.3	246.2	248.0	249.6	
Los Angeles	210.3	248.4	253.4	263.5	263.6	274.3	276.3	279.1	279.7	282.5	284.2	284.0	286.1	286.1	
Miami	199.4	234.6	239.3	249.0	256.5	259.1	260.3	262.4	266.7	269.3	270.9	270.1	272.1	273.1	
Minneapolis	213.5	235.6	249.9	254.9	260.0	267.9	269.0	271.4	272.1	275.3	276.9	275.0	277.1	281.6	
New Orleans	207.1	232.8	235.1	237.5	242.3	244.7	245.1	246.5	246.5	248.3	249.8	247.1	248.9	249.3	
New York	207.4	240.4	247.6	260.2	265.4	270.8	276.0	280.9	280.9	282.3	284.0	284.8	286.9	289.7	
Philadelphia	228.3	255.0	257.6	262.8	262.8	265.4	265.2	265.6	265.6	271.2	272.8	271.1	273.1	274.5	
Pittsburgh	204.0	234.1	236.4	241.1	243.5	250.9	251.8	255.0	256.1	258.2	259.7	260.8	262.7	262.9	
St. Louis	213.1	237.4	239.7	246.9	251.9	256.9	255.4	260.1	262.4	263.4	265.0	266.8	268.8	271.4	
San Francisco	266.4	302.5	308.6	321.1	327.5	337.4	343.3	350.1	250.1	352.4	354.5	358.2	360.9	364.1	
Seattle	191.8	221.4	225.8	232.7	237.4	247.0	252.5	256.5	257.8	260.6	262.2	260.1	262.0	265.7	

HOW TO USE TABLES AND CHARTS: Building costs may be directly compared to costs in the 1941 base year in tables A and B: an index of 256.3 for a given city for a certain period means that costs in that city for that period are 2.563 times 1941 costs, an increase of 156.3% over 1941 costs.

TABLE A. Differences in costs between two cities may be compared by dividing the cost differential figure of one city by that of a second: if the cost differential of one city (10.0) divided by that of a second (8.0) equals 125%, then costs in first city are 25% higher than costs in second. Also, costs in second city are 80% of those in first (8.0 ÷ 10.0 = 80%) or 20% lower in the second city

TABLE B. Costs in a given city for a certain period may be compared with costs in another period by dividing one index into the other: if index for a city for one period (200.0) divided by index for a second period (150.0) equals 133%, the costs in the one period are 33% higher than those of the other. Also, second period costs are 75% of those of the other date (150.0 ÷ 200.0 = 75%) or 25% lower in the second period. CHART 1. Building materials indexes reflect prices paid by builders for quantity purchases delivered at construction sites. CHART 2. The $1.20 per hour gap between skilled and unskilled labor has remained fairly constant. CHART 3. Barometric business indicators that reflect variations in the state of the money market

Durable coating based on Shell Epon® resin beautifies 250,000 square feet of Baltimore Civic Center



Smooth, easily cleaned coating based on Shell Epon resin will retain its good looks for years. Coating is Farbo-Tile, made by the Farboil Co., Baltimore. General contractor of Civic Center: Baltimore Contractors, Inc., Baltimore. Architect: A. G. Odell, Jr. & Associates, Charlotte, North Carolina.

Low maintenance coating of Epon resin selected for appearance and long service in one of nation's largest epoxy coating applications.

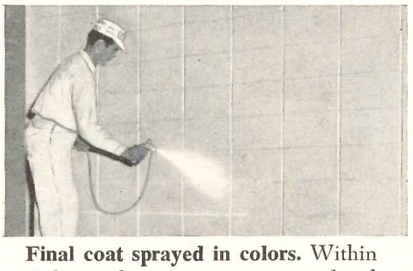
INTERIOR WALLS throughout the $13,000,000 Baltimore Civic Center are finished with Farbo-Tile*, a tile-like coating based on Shell Epon resin. The coating was applied to an average thickness of 30 mils, in six colors.

This coating gives the concrete block walls an eye-catching finish that will last for years. It can be cleaned easily and resists marring, scratching and attack from chemicals and solvents. Colors won't fade.

How coatings were applied to concrete block

The first coat was applied by brushing. Within 48 hours, following inspection and touch-up, the final coat in the specified colors was applied by airless spray. Because the coating of Epon resin is easy to clean and resists abrasion, the job was done while other construction was still in progress.

Brush-applied first coat. Initial coat, light gray in color, was brushed on concrete blocks. (Airless spray was used on poured concrete surfaces.) Leftover coating was stored overnight in dry containers at 45°F. to prevent curing.



Final coat sprayed in colors. Within 48 hours, first coats were inspected and touched up. The final coat, in six different shades, was applied with airless sprayers. Beige, light beige, blue, carrot, dusty gray, and "incense" were used.

Mail the coupon below if you would like to be referred to a supplier of tile-like coatings based on Shell Epon resin.

*Farbo-Tile is a formulation of the Farboil Co., Baltimore, Md.

Shell Chemical Co.
Plastics & Resins Div.
110 W. 51st St.
N. Y., N. Y. 10020

Please put me in touch with a supplier of tile-like coatings based on Shell Epon resin.

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Position _____

Firm _____

Address _____

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ARC-12

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ACOUSTI-SHELL* CRAWFORD SAVINGS AND LOAN, CHICAGO. PHOTO BY HEDRICH-BLESSING.

ACOUSTI-CLAD* ST. JOSEPHS HOSPITAL, CHICAGO. PHOTO BY HEDRICH-BLESSING.

Silence makes a big noise

See for yourself what all the shouting's about. Pictured above (and described at the right) are four beautiful ways to hush room noise to a whisper . . . ceilings of Johns-Manville acoustical tiles and panels. They're part of the most extensive line in the industry . . . a line that solves every acoustical need, every aesthetic taste. For full details, send for our free, illustrated brochure. Write to Johns-Manville, Box 111, New York, New York 10016. In Canada: Port Credit, Ontario. Cable address: Johnmanvil.

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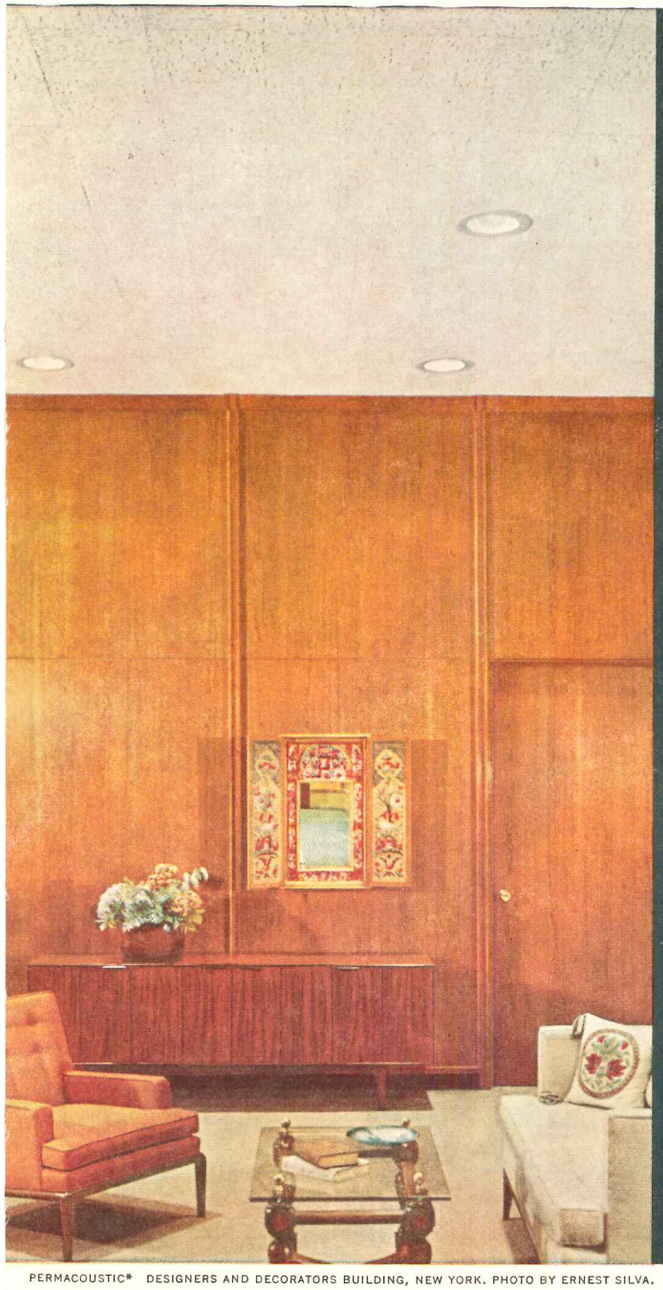
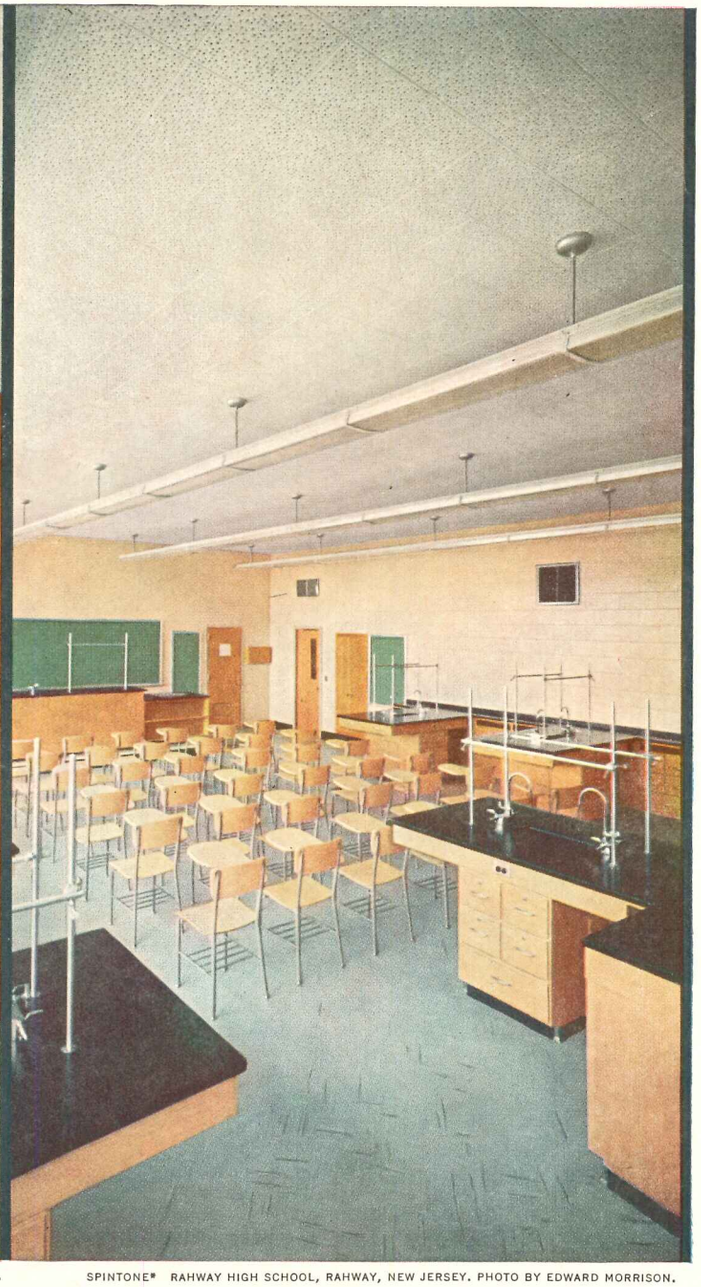
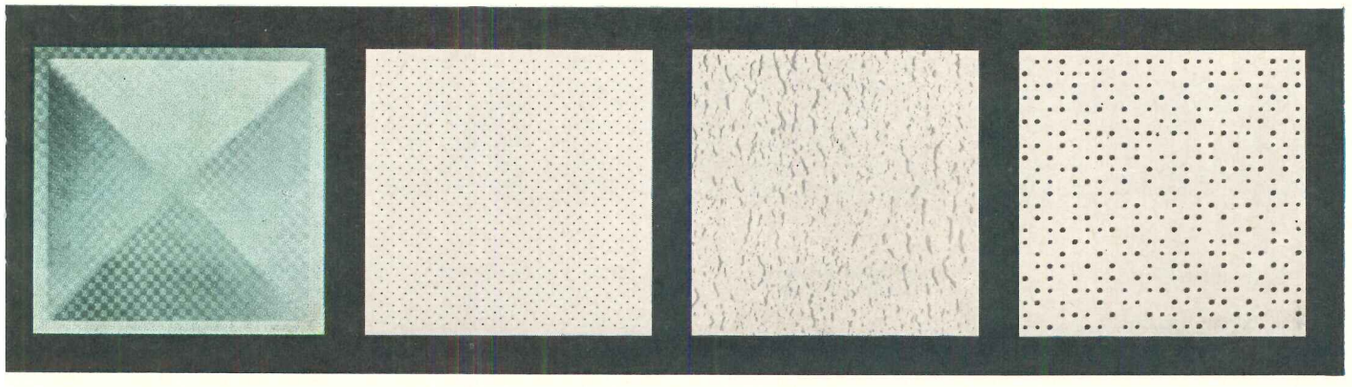


PERMACOUSTIC* DESIGNERS AND DECORATORS BUILDING, NEW YORK. PHOTO BY ERNEST SILVA.



SPINTONE* RAHWAY HIGH SCHOOL, RAHWAY, NEW JERSEY. PHOTO BY EDWARD MORRISON.



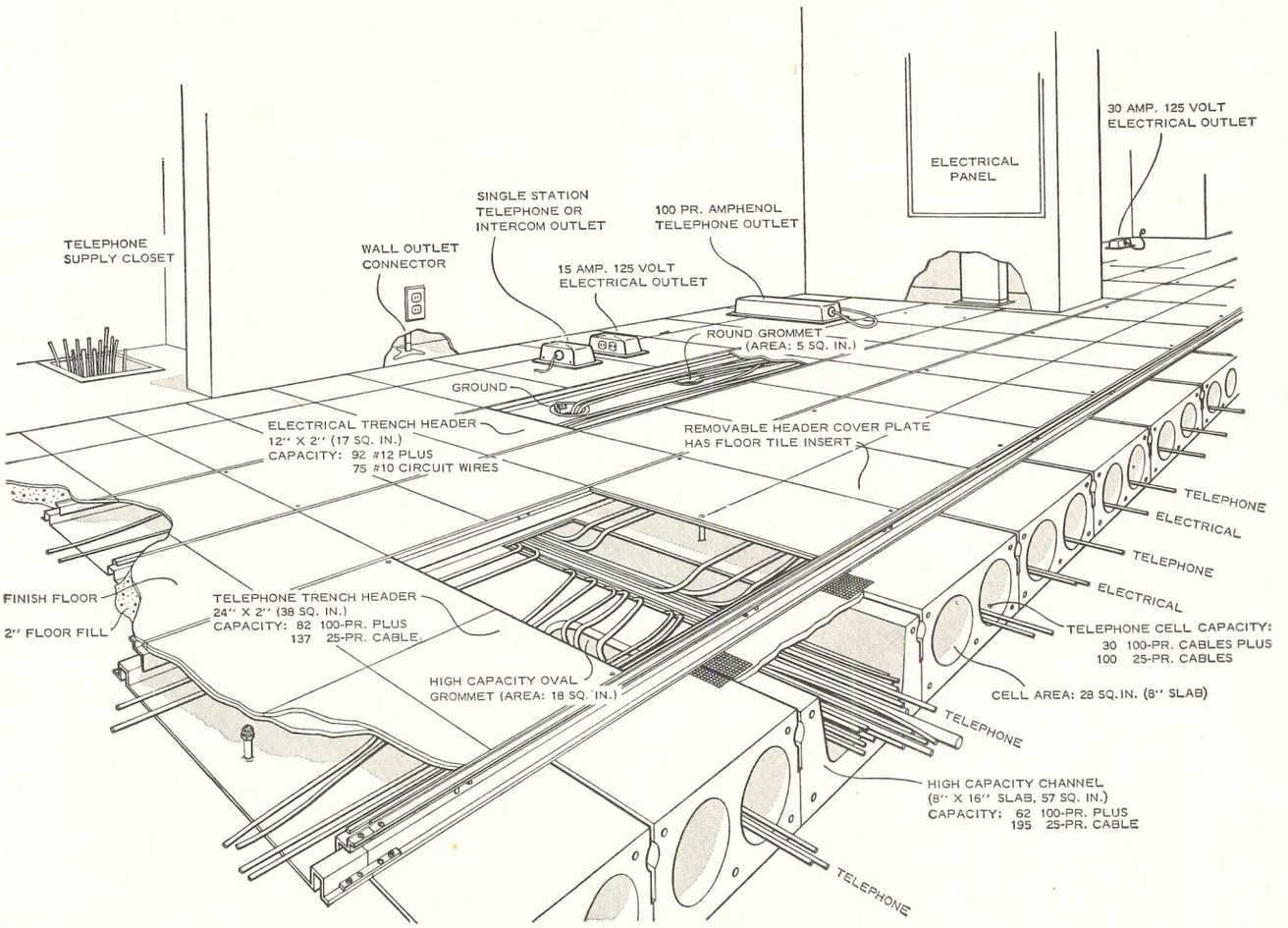
ACOUSTI-SHELL The 3-dimensional, fiber glass, acoustical ceiling panel. This vault design adds height and interest to any room or area. Acousti-Shell is available in 24" x 24" and 48" x 48" units. Finished with fiber glass fabrics (as shown) or with painted finish.

ACOUSTI-CLAD Made with an incombustible core and faced with aluminum. 12"x12" tile available with random or diagonal perforations in white, silver, gold and copper finishes. Wash or paint without loss of acoustical efficiency. N.R.C. spec range: .50-.60.

PERMACOUSTIC Fissured, noncombustible tile made of fibers spun from stone. It has a white, factory-applied finish available in three styles: textured, fissured and striated. Choose 12" x 12" or 12"x24" units. N.R.C. spec range: .65-.80.

SPINTONE Made of mineral wool fiber, it is available in both tiles and panels. Spintone offers the following styles: Pierced and fissured; random or uniform perforations. Strong and easy to maintain, Spintone absorbs up to 80% of air-borne disturbances within a room. N.R.C. spec. range: .55-.75.

For more data, circle 15 on Inquiry Card



New Raceway System for Telephone Wiring Meets High Capacity Demands of Tomorrow's Office Buildings

Most office phones today carry multiple lines, hold buttons and lights. They are wired with a 25-pair cable that is about half an inch in diameter. Many new offices are installing the new Call Director or Commander phones served by 75 or 100-pair cables up to $\frac{7}{8}$-inch in diameter. These systems need big ducts.

The Flexicore-Flexiflor system shown above offers extreme high capacity through the use of channel slabs, trench header ducts and large cells in the slab. This telephone distribution system is designed to handle 82 100-pair plus 137 25-pair cables, or the equivalent in other sizes. The cables feed from the panel through the channel slab, transversely through the 24-inch trench header duct, then down into the cells of the Flexicore slabs. Wiring can run in either direction to telephone floor outlets located at any point along the cells. Every second cell is assigned to telephone, providing lines of availability only 16 inches apart.

Electrical distribution is handled through the high capacity trench header duct system shown. Many variations of both systems are possible, using Underwriters' approved Flexicore floor decks and Flexiflor electrical fittings. Cost is low because most of the ductwork is a part of the structural floor.

For more information ask for "Underfloor Electrical Distribution." Write or phone The Flexicore Co., Inc., Dayton 1, Ohio, The Flexicore Manufacturers Association, 297 S. High Street, Columbus 15, Ohio, or look under "Flexicore" in the white pages of your telephone book.

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For quality, performance and *true* economy, specify Hillyard products. They not only safeguard against stains, damage and wear during final finishing and enhance acceptance-day appearance but enable the building owner to make substantial savings on maintenance labor—the biggest single item in overall cleaning costs.

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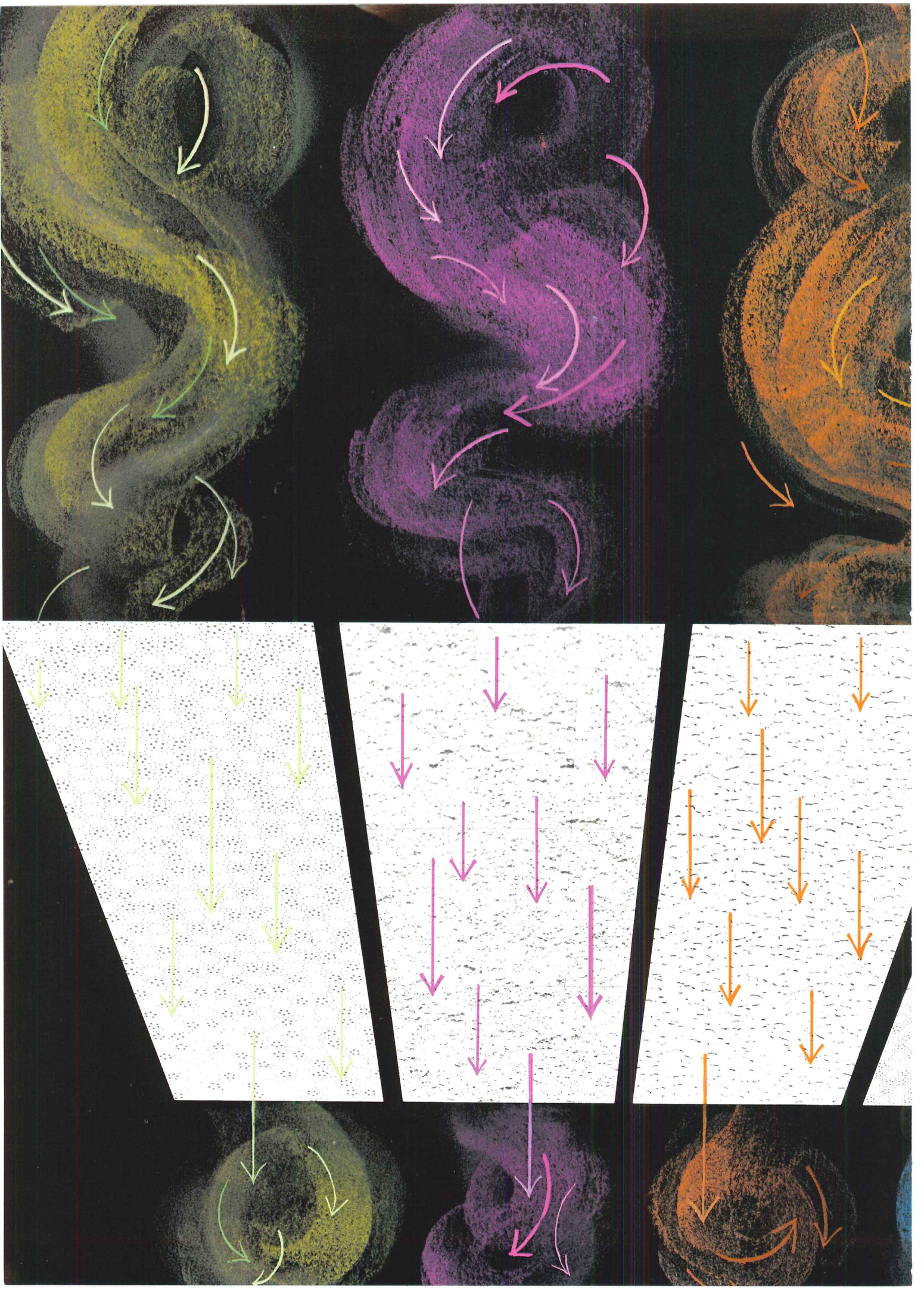

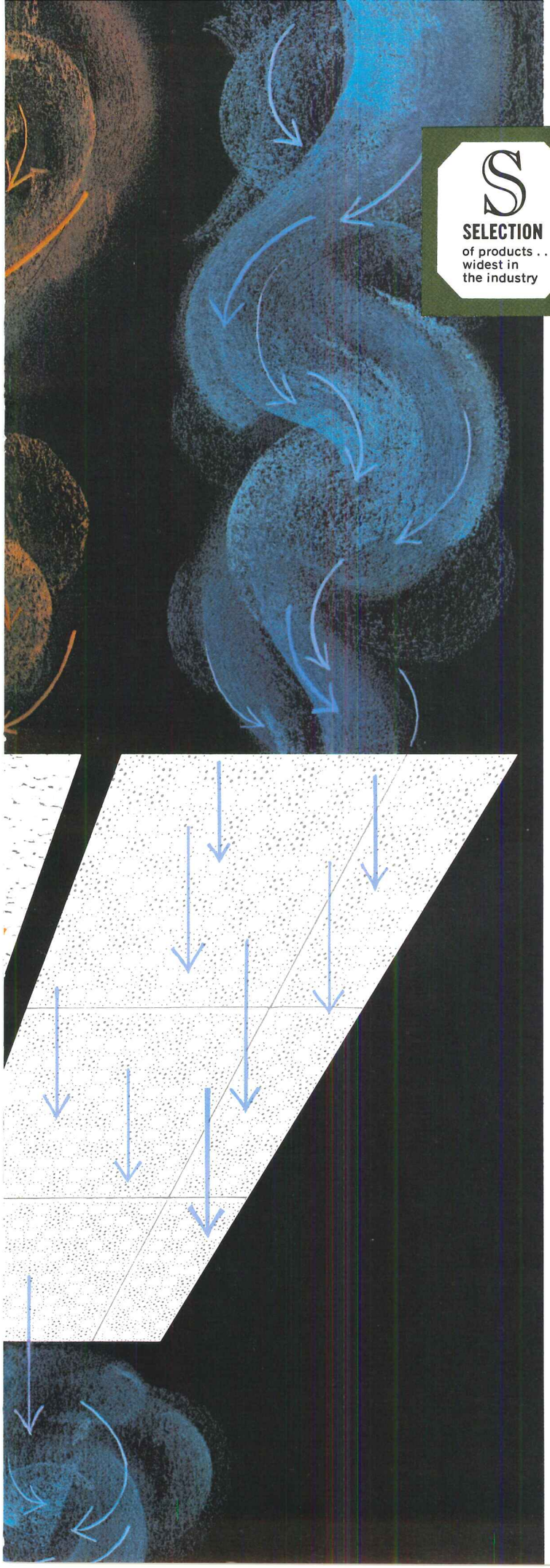

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Job-proved systems that enable you to design efficient, accurately engineered ventilating ceiling assemblies

No longer need there be any "guesswork" about the planning and efficient performance of ventilating ceiling systems. The Celotex Corporation—through the development of accurate engineering techniques, and new through-perforated acoustical tile and lay-in panels—has given new importance to this modern concept of air distribution.

In Celo-Flow Systems, the pre-determined volume of air enters the plenum . . . passes through the pre-determined number of through-perforated tiles or panels at proper velocity . . . and blends into a gentle, comfortable, draft-free movement through the zone of occupancy to exhaust outlets.

You have a choice of exclusive tile and panel designs, in types compatible for use in the same building: Safetone® Class A Incombustible or Protectone® products for time-rated floor and ceiling assemblies. Identical products are available without through-perforations.

Left to right: Embassy Panels: 2′ x 2′, 2′ x 4′
Natural Fissured Tile: 12″ x 12″
Fissureflow Panels: 2′ x 2′, 2′ x 4′
Embassy Tile: 12″ x 12″

Call your Acousti-Celotex consultant-distributor for complete information, samples and guide specifications. He's listed in the Yellow Pages.

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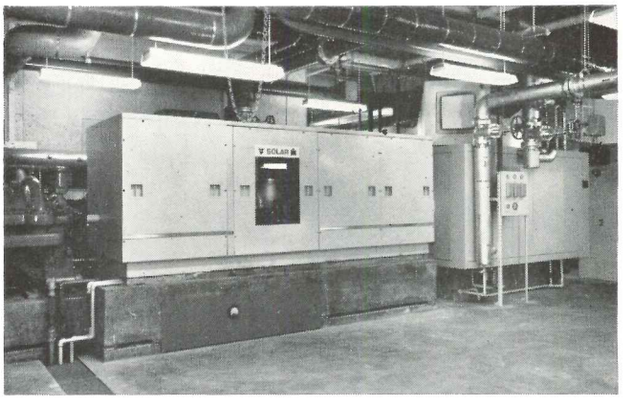
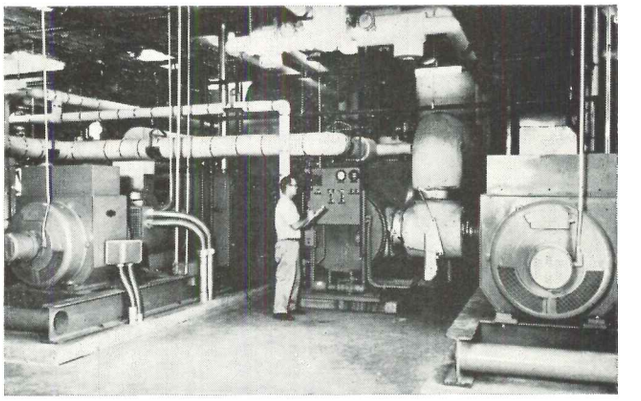
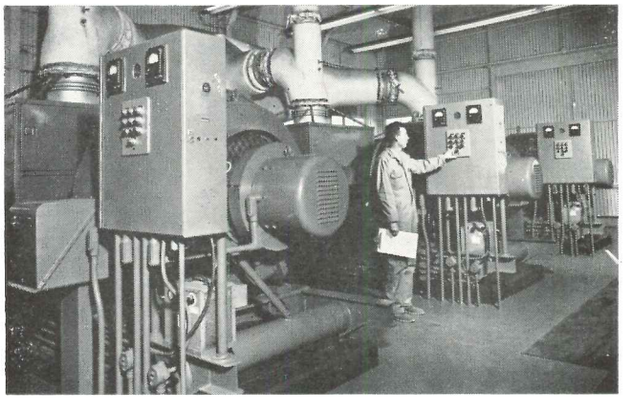
Affiliate: South Shore Oil and Development Company.



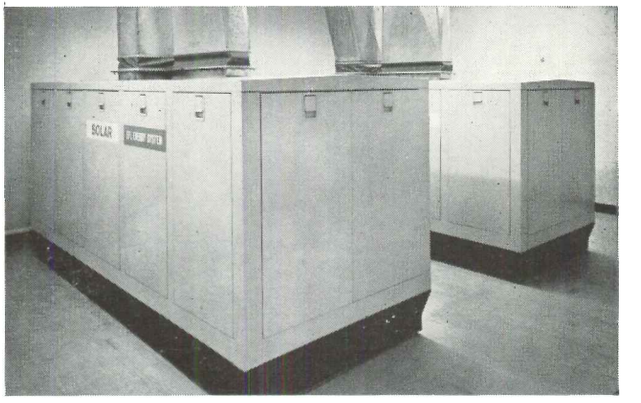
Washington Natural Gas Company in Seattle



Gas turbine energy system at McAllen High School



Warren Petroleum Corp. refinery, Monument, N.M.



T-350 gas turbine energy system for Standard Pipeprotection, Inc.

These companies get high thermal efficiencies with Solar gas turbine energy systems

The Solar gas turbine energy system concept of employing both the shaft horsepower and the exhaust heat of a rugged, dependable Solar gas turbine can achieve thermal efficiencies over 70 per cent. Significant savings in power costs are currently being realized in a wide variety of uses. Here are four typical applications that demonstrate the versatility of Solar gas turbine energy systems.

Washington Natural Gas Company

Washington Natural Gas Company's new four story Seattle office building is air conditioned by a Solar *T-350* gas turbine energy system. The turbine drives a centrifugal vapor cycle refrigeration compressor, while exhaust heat is recovered to run an absorption air conditioner. The system provides 320 tons of air conditioning at full load. Fuel consumption is reduced with a recuperator.

McAllen High School

Two 1100 hp Solar *Saturn*® turbines are in operation at McAllen, Texas, high school. Shaft power is used to generate 60 and 840 cycle electricity, and exhaust heat is used to make steam for heating and 467 tons of absorption air conditioning. All of the 2400-pupil school's high frequency lighting, cooling and electrical needs are supplied by the system.

Warren Petroleum Corporation

Three Solar *Saturn* 1100 hp gas turbines driving 700 kw generators provide all of the electrical power used at Warren Petroleum Corporation's Monument, N.M., natural gasoline refinery. Exhaust heat is ducted from the turbines into a boiler, which produces 17,350 lbs of steam per hour at 65 psig for plant processes.

Standard Pipeprotection, Inc.

Exhaust heat without processing of any kind is used to dry pipe at Standard Pipeprotection's new Houston, Texas, plant. Two Solar *T-350* gas turbine energy systems drive 60-cycle, 200 kw generators to supply electrical power in the plant.

Write for Information

For more information about Solar gas turbine energy systems, write Solar, Dept. M-418, San Diego, California 92112.

SOLAR

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And that's how to get the most for your money in carpet.

The answer is wool...it costs less in the long run

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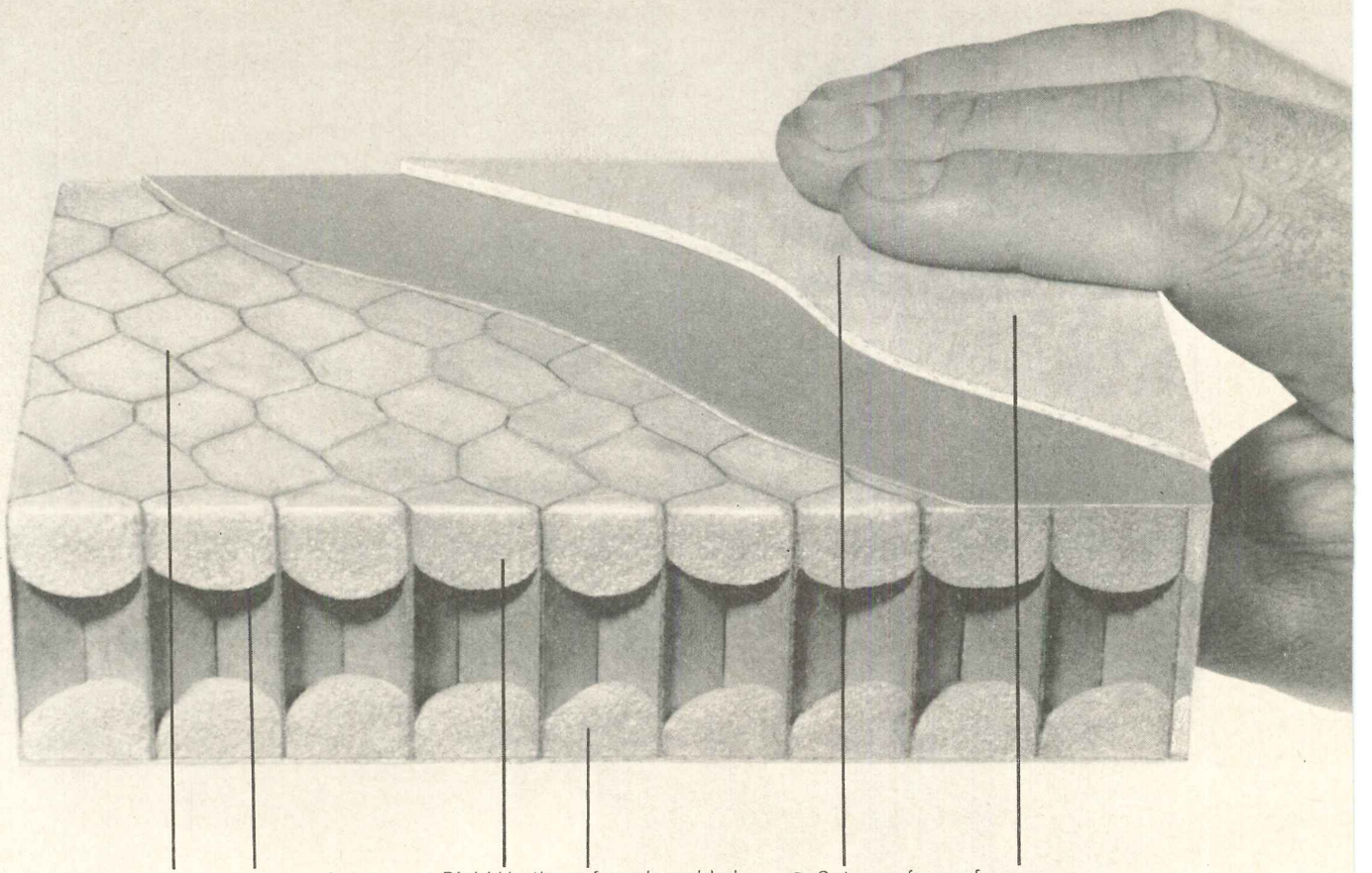

1. Honeycomb kraft core, pound per pound, produces the strongest and most economical sandwich structure known.

2. Rigid Urethane foam is molded into the top and bottom sections of each Honeycomb cell. With trapped air between the Urethane layers, it need not be necessary to fill the cells completely with foam to obtain the required amount of insulation.

3. Outer surfaces of the composite URECOMB core provide a continuing bonding surface for the application of wood, metal, asbestos, plastics or whatever facing material suits the designer's taste.

A new sandwich created for your taste

Union-Camp's new URECOMB core gives you the insulation of rigid Urethane foam plus the strength of Honeycomb—in one lightweight sandwich panel core.

What a combination! Rigid Urethane foam —an outstanding insulator. And Union Honeycomb—incredibly strong and lightweight. Together, they make URECOMB—the most efficient structural sandwich core ever developed.

Amazing strength-weight ratio. The URECOMB core in a typical wall panel (2" thick) has a compression strength of more than 50 lbs. per square inch . . . yet it may weigh less than ½ a pound per square foot!

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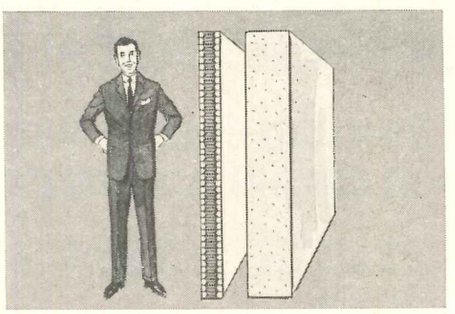

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Books Received

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BALDINELLI. *By Umbro Appollonio. Edizioni D'Arte Moderna, Torriani-Roma, Via Pettinengo $31. 75 pp., illus. $10.95.*

THE BEST IN 20TH CENTURY ARCHITECTURE. *Edited by Georges and Rosamond Bernier. William Morrow and Company, Inc., 425 Park Ave., South, New York, N.Y., 10016. 278 pp., illus. $15.00.*

CONCRETE CORROSION AND CONCRETE PROTECTION. *By Imre Biczòk. Publishing House of the Hungarian Academy of Sciences, Budapest 62, P.O.B. 149. 543 pp., illus. $13.50.*

IL RAME NELL' ARCHITETTURA I TETTI. *By Centro Italiano Sviluppo e Applicazioni Del Rame, via Durini, 14, Milano. 243 pp., illus.*

THESAURUS OF ENGINEERING TERMS. *By the Engineers Joint Council. Engineers Joint Council, 345 East 47th St., New York, N.Y., 10017. 302 pp. $15.00.*

THE CHATEAU OF CHAMBORD. *By Pierre Bascar. The Macmillan Company, 60 Fifth Ave., New York, N.Y., 10011. 115 pp., illus. $9.95.*

THE HEART OF OUR CITIES. *By Victor Gruen. Simon and Schuster, 630 Fifth Ave., New York, N.Y., 10020. 386 pp., illus. $8.50.*

GREEK REVIVAL ARCHITECTURE IN AMERICA. *By Talbot Hamlin. Dover Publications Inc., 180 Varick St., New York, N.Y., 10014. 439 pp., illus. Paperbound, $3.00.*

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ESSENTIALS OF STRUCTURAL DESIGN. *By Anthony Hoadley. John Wiley & Sons, Inc., 605 Third Ave., New York, N.Y. 609 pp., illus. $11.50.*

LOST EXAMPLES OF COLONIAL ARCHITECTURE. *By John Mead Howells. Dover Publications Inc., 180 Varick St., New York, N.Y., 10014. 439 pp., illus. Paperbound, $2.75.*

MEDIEVAL STAINED GLASS. *By Heribert Hutter. Crown Publishers, Inc., 419 Park Ave. South, New York, N.Y., 10016. 63 pp., illus. 95 cents.*

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KOREAN PAINTING. *By Alfred Janata. Crown Publishers, Inc., 419 Park Ave. South, New York, N.Y., 10016. 64 pp., illus. 95 cents.*

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COSTUME IN ANTIQUITY. *By James Laver. Clarkson N. Potter, Inc., 23 East 67th St., New York, N.Y., 10021. 139 pp., illus. $4.95.*

HOUSING—THE COOPERATIVE WAY. *Edited by Jerome Liblit. Twayne Publishers—Bookman Associates, 31 Union Square, New York, N.Y., 10002. 300 pp. $6.00.*

ELEMENTS OF THE ART OF ARCHITECTURE. *By William Muschenheim. The Viking Press, Inc., 625 Madison Ave., New York, N.Y., 10022. 200 pp., illus. $6.50.*

DIMENSIONAL TOLERANCES FOR CAST-IN-PLACE CONCRETE. *By the Building Research Advisory Board, National Academy of Sciences, 2101 Constitution Ave., Washington 25, D.C. 22 pp. $2.00.*

BYZANTINE MOSAIACS. *By Heinroch Neumayer. Crown Publishers, Inc., 419 Park Ave. South, New York, N.Y., 10016. 63 pp., illus. 95 cents.*

THE PEOPLE'S ARCHITECTS. *Edited by Harry S. Ransom. The University of Chicago Press, 5750 Ellis Ave., Chicago, Ill., 60637. 120 pp., illus. $6.95.*

YOUR ENGINEERED HOUSE. *By Rex Roberts. M. Evans and Company, Inc., 216 East 49th St., New York, N.Y., 10017. 237 pp., illus. $7.50.*

LOTUS: ARCHITECTURAL ANNUAL 1964-1965. *By Giulia Veronesi and Bruno Alfieri. Wittenborn and Company, 1018 Madison Ave., New York, N.Y., 10021. 223 pp., illus. $15.00.*

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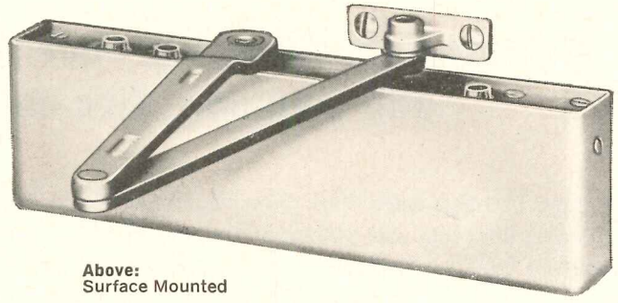
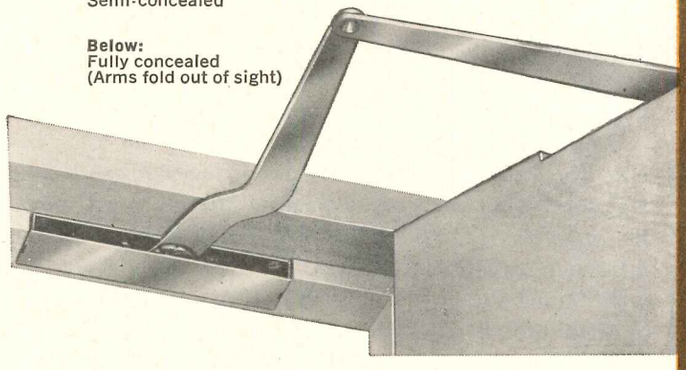


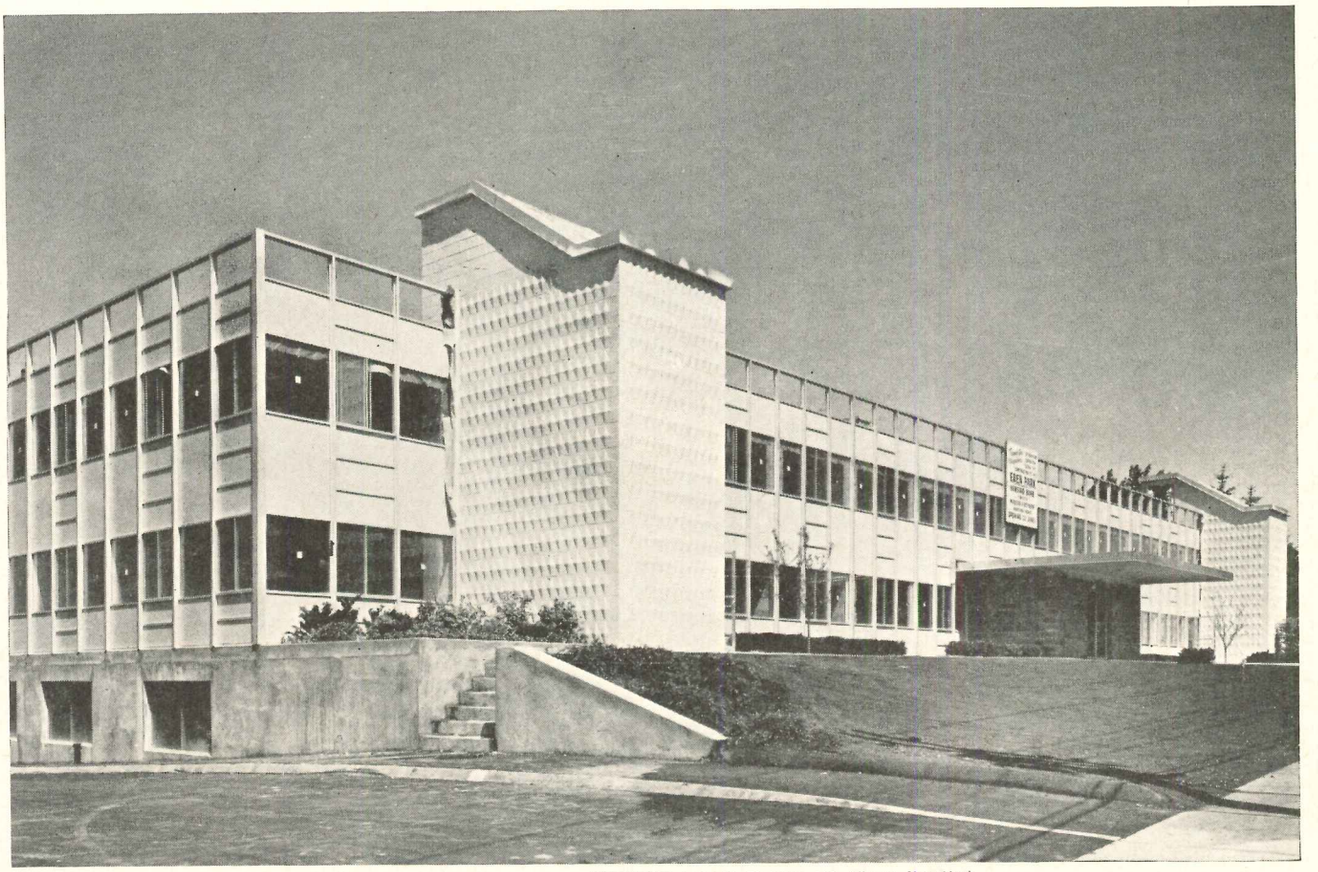
Above:
Surface Mounted

Upper Left:
Semi-concealed

Below:
Fully concealed
(Arms fold out of sight)



For more data, circle 36 on Inquiry Card



Nearly completed Eden Park Nursing Home has floors and roof of prestressed concrete.

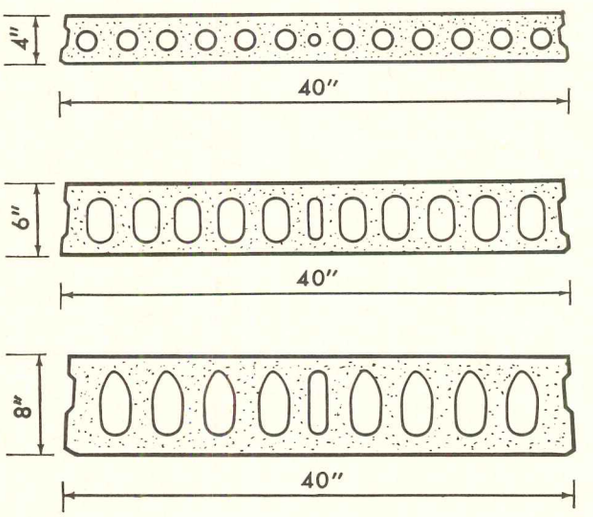
ARCHITECT: Leon M. Einhorn, AIA, Albany, New York
CONTRACTOR AND OWNER: Frank L. Hoffman, Albany, New York
PRESTRESSED CONCRETE FABRICATOR: Spancrete Northeast, Inc., South Bethlehem, New York

Prestressed floor and roof sections in new nursing home add economy, fire safety, design flexibility

The new, 120-bed Eden Park Nursing Home, Troy, New York has a floor and roof system of Spancrete® hollow core prestressed concrete sections. Designing for spans up to 34 feet, the architect achieved reduced framing costs and at the same time provided flexibility in the use of space. Placement of the sections was fast and economical, with 8,000 square feet per day being installed. The exposed Spancrete sections provide (with paint) economical finished ceilings. In addition, important fire resistive construction is achieved.

The selection of prestressed concrete for the Eden Park Nursing Home is another example of the variety of design and construction needs this material meets. On this project the prestressing strand selected by the prestressed concrete fabricator was Union TUFWIRE® Strand. Job-proved TUFWIRE Strand and other Union Wire Rope products are made by **Armco Steel Corporation, Steel Division, Department S-1784, 7000 Roberts Street, Kansas City, Missouri 64125.**

Cross sections of 4″, 6″ and 8″ Spancrete



ARMCO STEEL

For more data, circle 37 on Inquiry Card

How do you top architecture like this?

With Johns-Manville Last-O-Roof

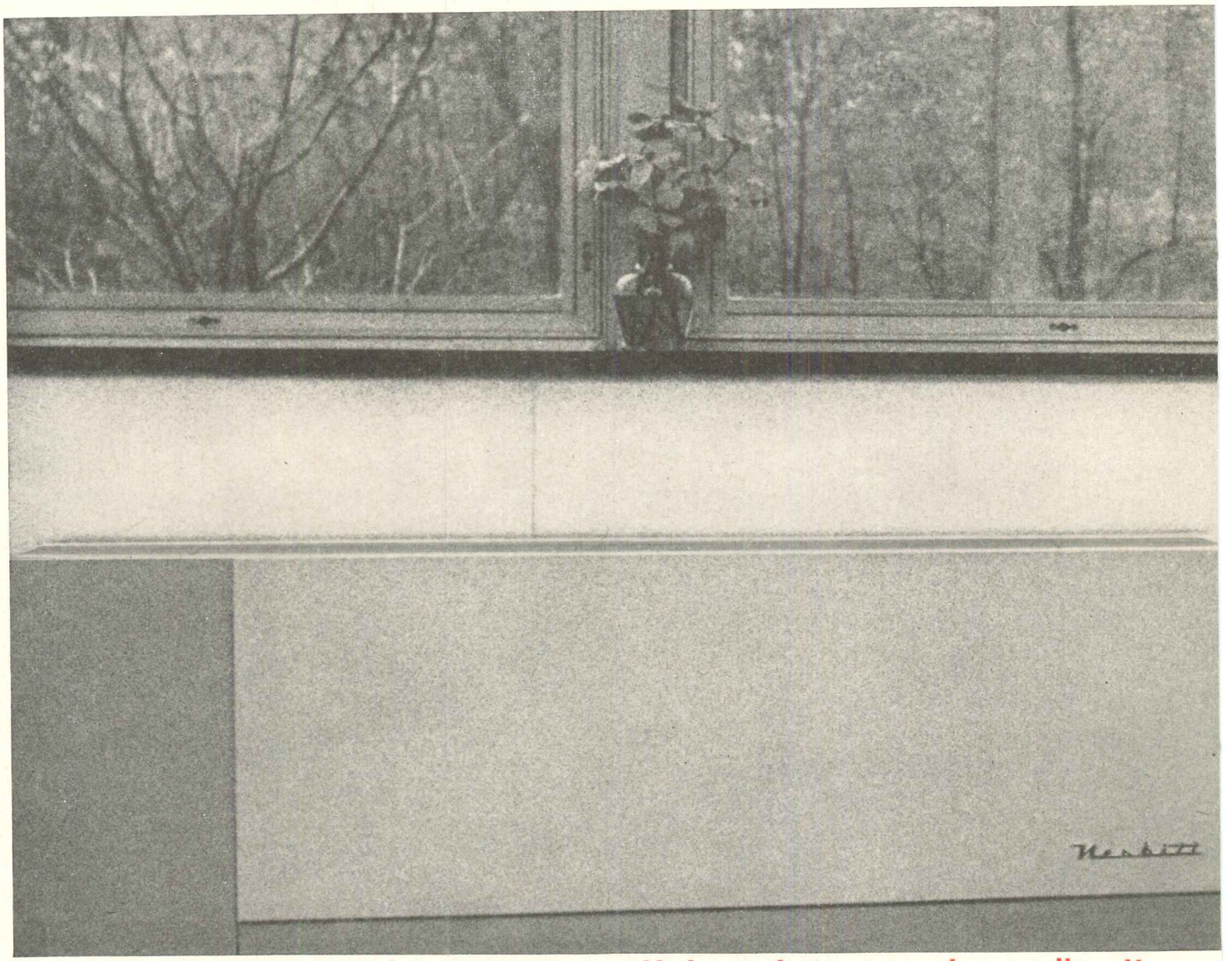
This is the new Beckman Auditorium at the California Institute of Technology. It was designed by Edward Durell Stone, built by M. J. Brock & Sons, Los Angeles, and the roofing job was handled by the Lytle Corporation of Pasadena.

This was a tough job, and Last-O-Roof was chosen because it makes tough roofing jobs easy. Last-O-Roof is a single-membrane, plastic elastomer product that can be installed in one step. It's a complete roofing system of totally compatible components... roofing membranes, cements, flashings and finishes. (The gold circles on the roof are a decorative paint.) Applied cold, Last-O-Roof can be used on low or steep slopes as well as involved configurations.

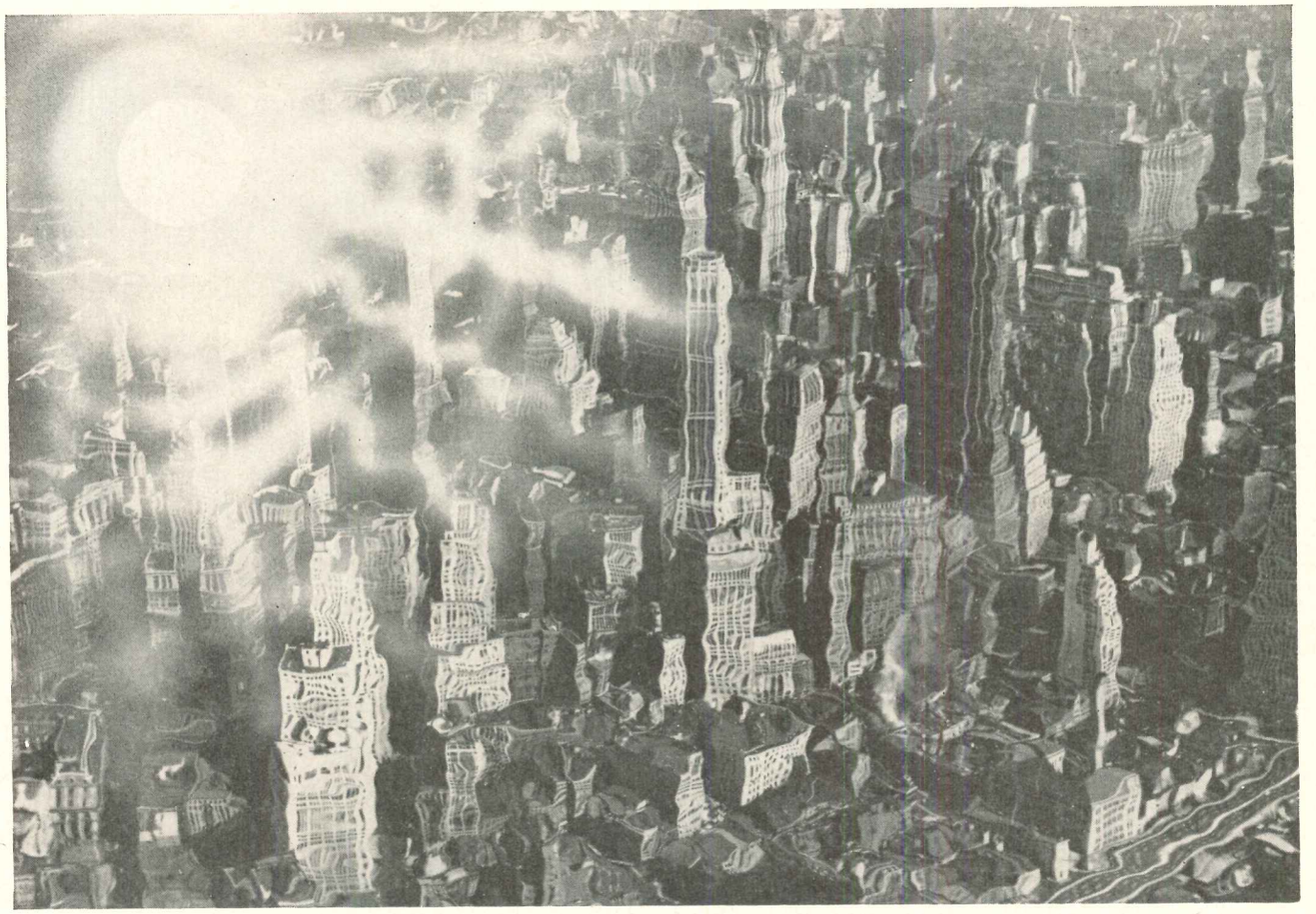
For complete information about J-M Last-O-Roof write Johns-Manville, Box 111, 22 East 40th Street, New York, New York 10016. Cable Johnmanvil.

Johns-Manville JM PRODUCTS

For more data, circle 38 on Inquiry Card

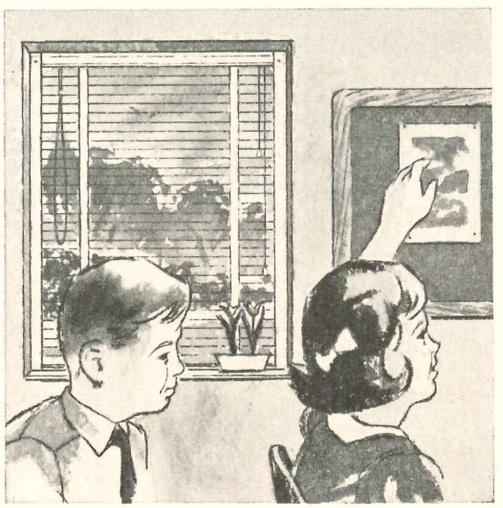


Mail from home. A most pleasant pause in a long, long day. Student nurses put all they have into their jobs. And when they get a chance to relax, they make the most of it. That's where the architect who designed their living quarters made things a little bit easier for these young ladies. He knew that even such a small matter as a letter from a hometown boy friend can send temperatures soaring in the nurses' dorm. And so he included air conditioning in his design. Nesbitt air conditioning. The Nesbitt Roommate II in the background behind the girls chatting above.



THE DAY A CITY SWELTERED

It was a hot mid-August day. The thermometer hovered in the high nineties and millions of workers were grateful for the coolness of air conditioning. Gradually, the buildings began to simmer and a city began to swelter. Overloading had caused power failure.



VENETIAN BLINDS ARE A SAFETY FACTOR

Scientific surveys have proven that Venetian Blinds can lower room temperature in the summer, or raise it in the winter. Venetian Blinds are the only window covering that can control outside light TO SUIT ANY PROJECTOR OR ANY STUDENT ACTIVITY. Venetian Blinds beautify the classroom or the office.

LEVOLOR BLINDS ARE FULLY ENGINEERED

Every component in a LEVOLOR Venetian Blind from the smallest tilter to the heavy bottom bar has been designed and manufactured from years of experience. Every part, right to the safety locking installation brackets are designed especially for schools. Why not get the facts on the LEVOLOR heavy duty (orange line) Venetian Blind? Write for The LEVOLOR Architects Manual.

School Specification Div.
LEVOLOR LORENTZEN, INC.,
720 MONROE ST., HOBOKEN, N. J.

LEVOLOR VENETIAN BLINDS

AUDIO-VISUAL · MOTORIZED · OSCILLATING ROLLER · SPECIAL DESIGNS

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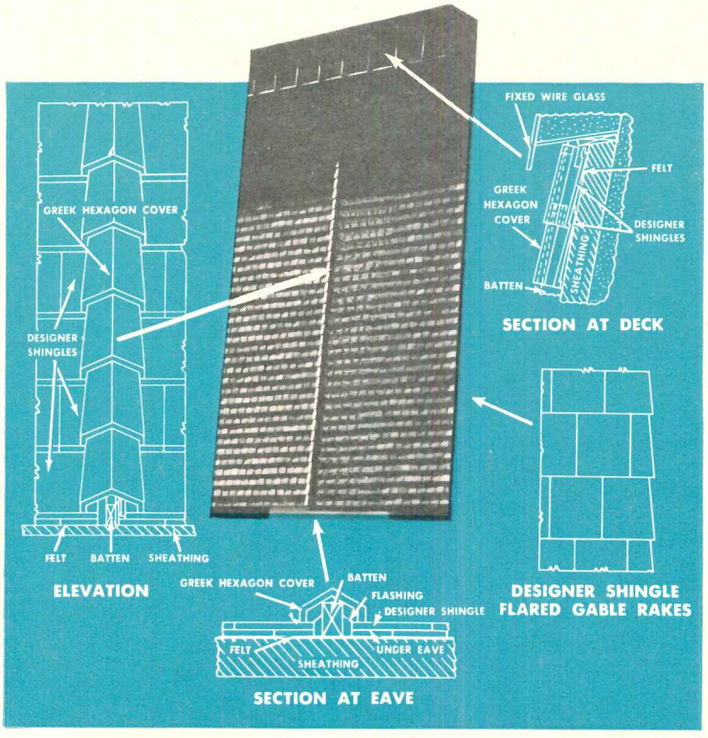
Harris Memorial Methodist Church
Honolulu, Hawaii

Architects:
Wilson Associates, Inc., Honolulu

Roofing Tile:
Ludowici-Celadon

When the Roof Becomes a Major Element in the Design...



Architects depend on Ludowici-Celadon tile roofing for versatility of texture and color . . . In this imposing edifice, modern Designer Gray is accented by the classic Greek tile motif for a pleasing effect . . . but equally important is the fact that the roof will retain its permanent beauty and enduring protectiveness for generations to come. We'd like to send you our free illustrated brochure.

DESIGNER tile roofing is one of the several Ludowici-Celadon patterns and colors offering wide flexibility in exterior design. Here it is combined with Greek tile over the battens.

For additional information, write Dept. AR

*** LUDOWICI-CELADON CO.**
75 E. WACKER DRIVE • CHICAGO, ILL. 60601

Manufacturers of quarry tile, the nation's largest producer of roofing tile and NAILON Facing Brick

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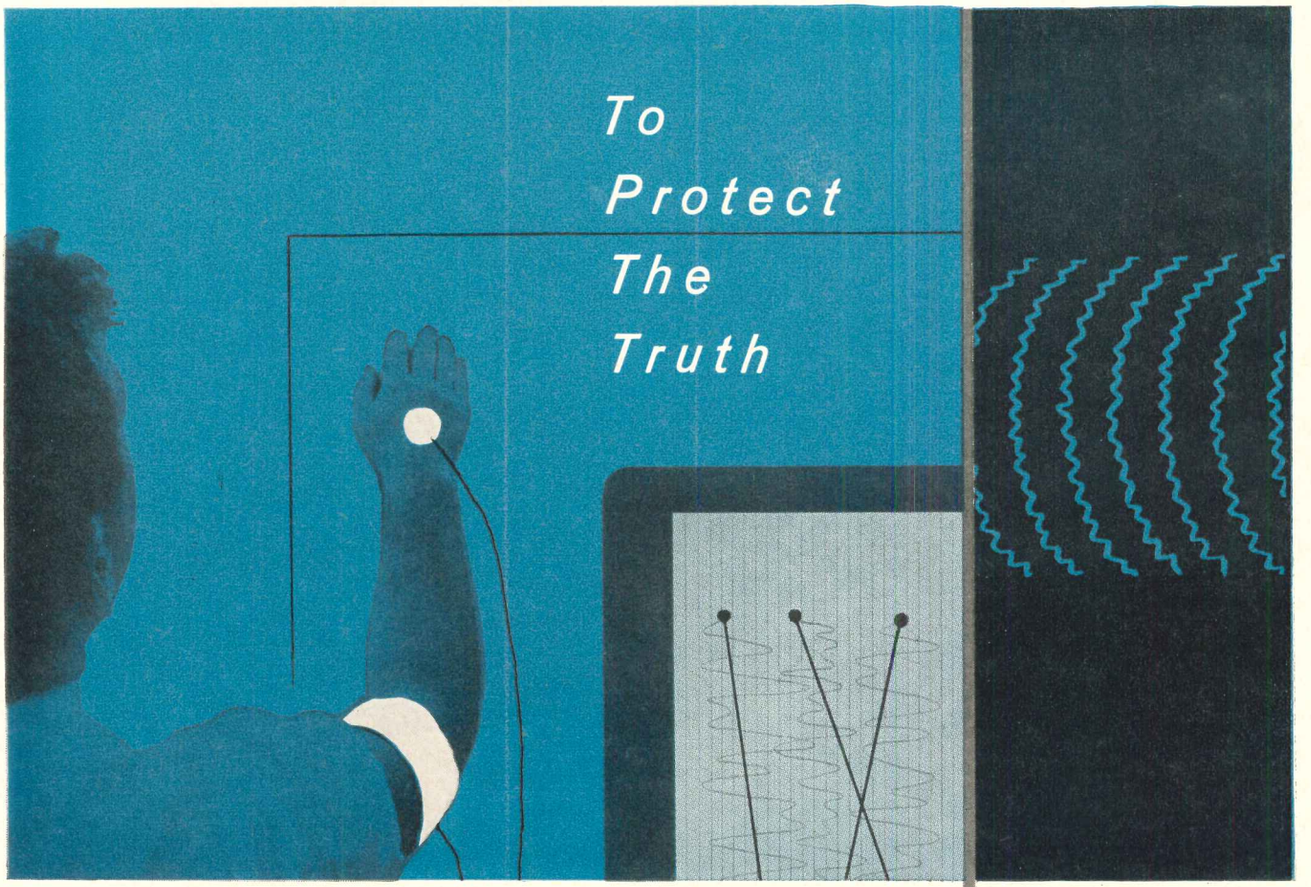
Lead "Sinks" Sound Level



Police investigators using the polygraph (lie detector) in the Bergen County, N. J. Prosecutor's Office had a noise problem. Polygraph tests had to be made in a room adjacent to a busy office. In order to insure fair, reliable tests, office routine had to be virtually halted or tests put off until after normal office hours for the sake of quiet.

The problem was solved, economically, by laminating 1/16" lead sheet to the walls and sealing sound leaks with leaded plastic. This produced a minimum noise reduction of 40 decibels, 17 lower than provided by the unleaded wall.

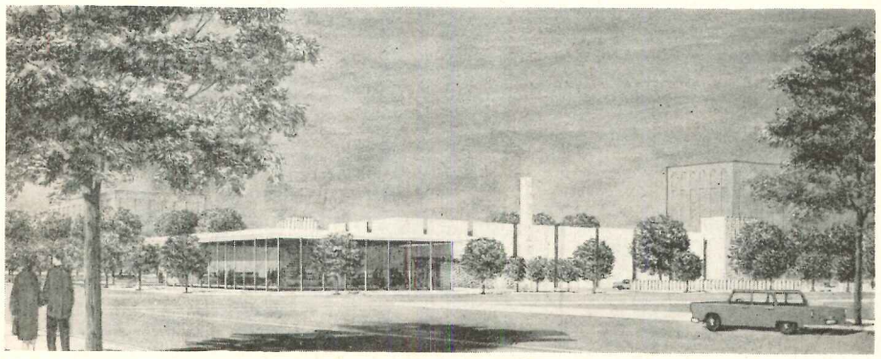
This is one more example of the noise-damping capabilities of lead. It is being used in a variety of forms, to "sink" sound levels in such diverse applications as jet airliners, hydrofoils, pressure-reduction valves, offices and classrooms, transformers and office equipment.

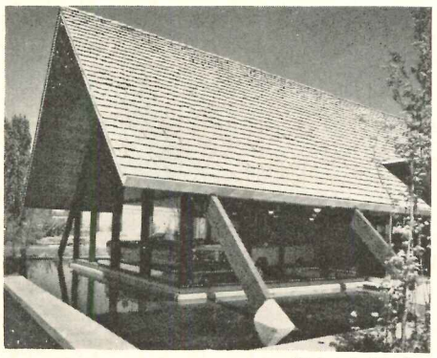
When you design for quiet, consider lead.

ST. JOSEPH LEAD COMPANY

250 Park Avenue • New York 17, New York

PB-260





Richards Studios

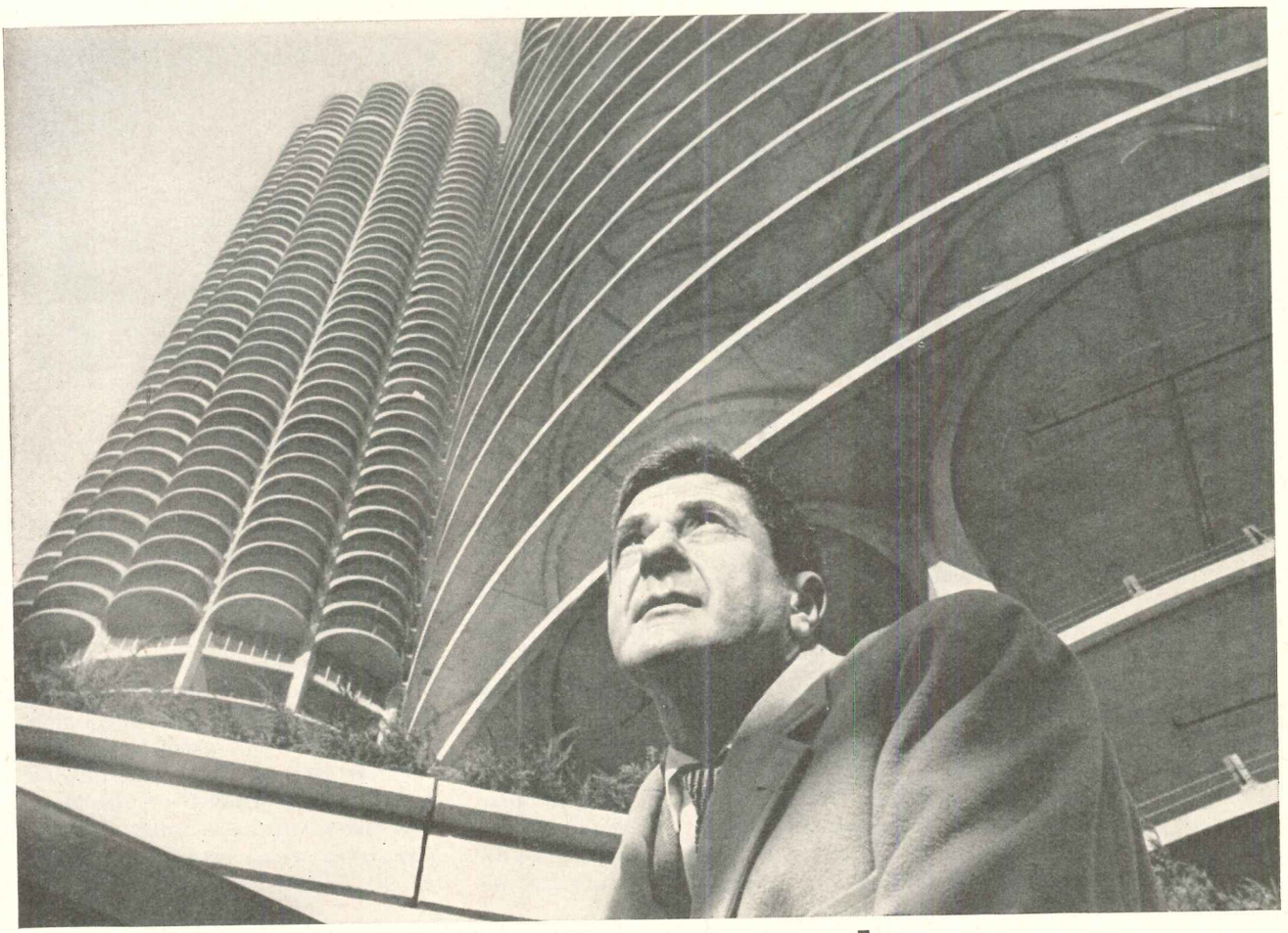
AUTOMOBILE SHOWROOMS ENHANCE NEIGHBORHOODS

Two automobile sales and service centers are designed to enhance their surrounding neighborhoods in Olympia, Washington and Minneapolis, Minnesota. The Hansard Pontiac Company complex in Minneapolis (*above left*) designed by architects Liebenberg, Kaplan and Glotter, will consist of a two-level new car display area, and a four-level service center with a total space of approximately 172,000 square feet. The building will be surrounded by five distinct landscaped areas for parking facilities.

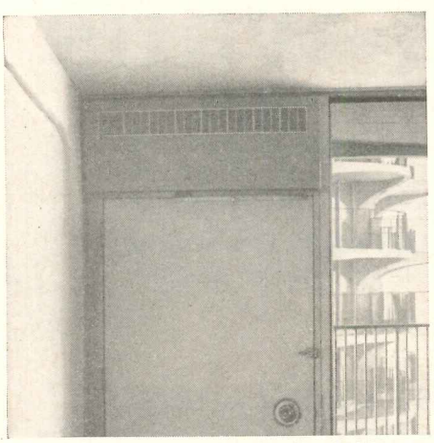
The new car display area will accommodate 25 new model cars on each level, with a circular stairway connecting them. There will be floor-to-ceiling glass on three sides. The complex of buildings and service areas is scheduled for completion in late spring, 1965.

A moat on three sides of the showroom is a prominent design feature of the Dick Lewis Pontiac Cadillac Park in Olympia, Washington. Designed by Bennett & Johnson, architects, the A-frame structure has approximately 13,200 square feet of floor space. The showroom, parts and office area account for 3,900 square feet with the service facilities utilizing the remaining space.

The structure is located 10 blocks from the heart of the city in a three-acre landscaped site. The paved area rises and falls so that many used cars can be parked with the illusion of only a few. While the landscaping was under way, an artesian well was discovered which provides a stream in the landscaped setting.



How Bertrand Goldberg used General Electric Zoneline Air Conditioning to design Marina City "for the varying needs of the individual tenant."



Again demonstrating its flexibility, a Zoneline unit has been installed above a door in a typical Marina City apartment.

Bertrand Goldberg explains a step forward in apartment design: "Today we are designing as flexibly as possible for the varying needs of the individual tenant. In the past we've frequently forgotten that each tenant has needs and preferences which are different from his neighbor's."

This new approach to apartment design is exemplified in Mr. Goldberg's Marina City, a 60-story project in Chicago housing 896 families, recreation and shopping facilities and a 700-boat marina.

"At Marina City individual Zoneline air conditioning units for each room allow not only each tenant—but each room occupant—to enjoy exactly the temperature and air environment that he desires. The push of a button gives each room occupant his choice of hot or cold air, automatic or manually controlled and either re-circulated or filtered outdoor air."

Goldberg is also enthusiastic about Zoneline because it can be used so unobtrusively that "it doesn't compromise the integrity of the architectural design."

In addition to Zoneline room air conditioning, Marina City features 117 three-ton and 117 five-ton G-E central air conditioning units. Using both room and central air conditioning in the same building is just one more example of how Zoneline's flexibility and custom design can make it an integral part of any architectural design. For details, write Air Conditioning Department, General Electric, Appliance Park, Louisville 1, Kentucky.

GENERAL ELECTRIC

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Now...transparent walls of sculptured PLEXIGLAS

The magnificent transparent walls of Schaefer Center Restaurant at the New York World's Fair© are made of PLEXIGLAS® acrylic plastic.

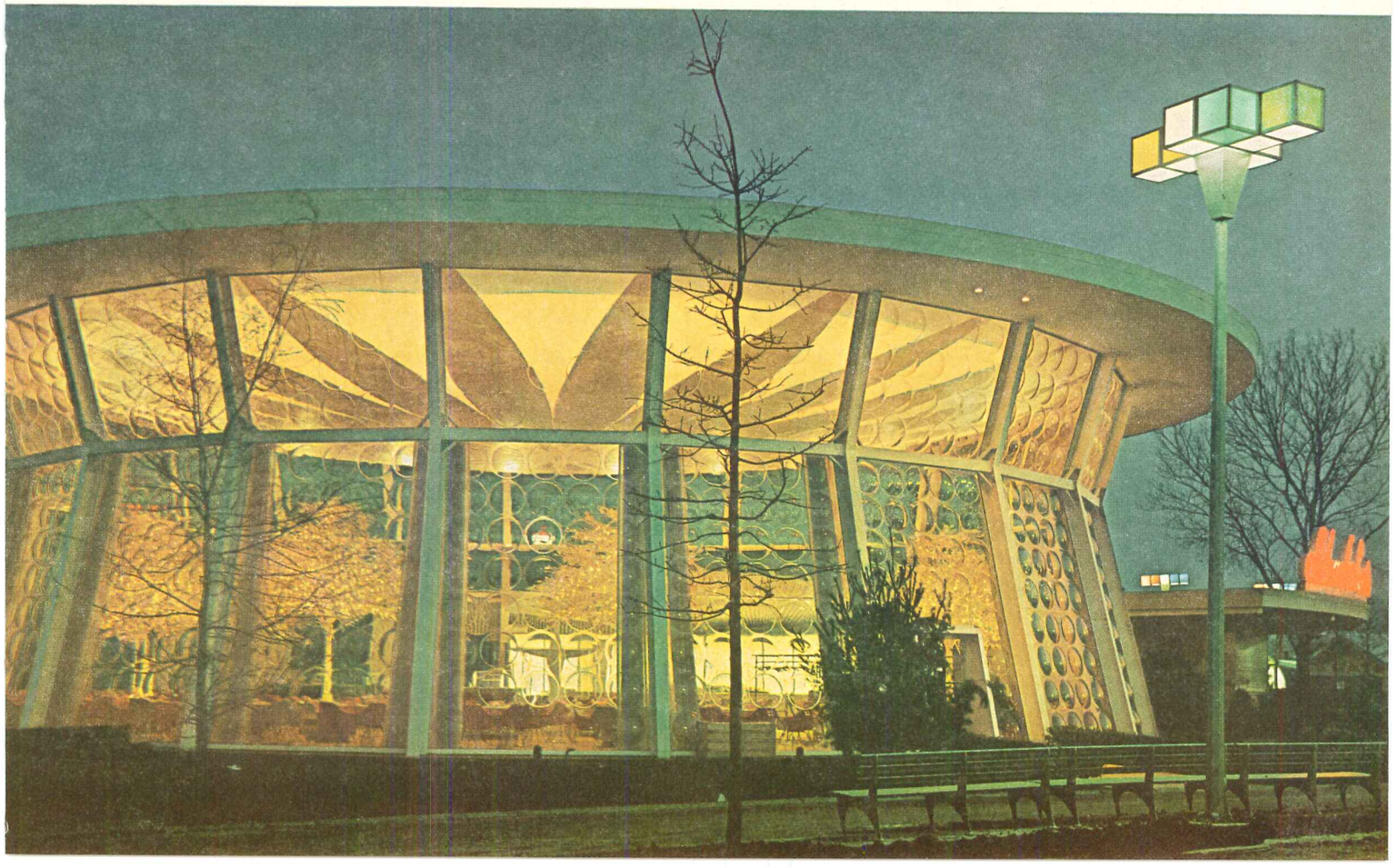
Because PLEXIGLAS is easy to form, it was possible to design these transparent walls with hundreds of domes that give beautiful reflections inside and outside the building. The result is an enchanting appearance—day and night.

The largest panels are twelve by eighteen feet, made possible by cemented joints that are virtually invisible. All panels are one-half inch thick, with a slight gray tint that reduces glare and solar heat gain.

This is just one of the many exciting uses of PLEXIGLAS in architecture at the New York World's Fair. It's an example of the many imaginative architectural uses for PLEXIGLAS today.

ROHM & HAAS
PHILADELPHIA, PA. 19105

Architects: Eggers & Higgins, New York City. Interior Designers: Walter Dorwin Teague Assoc., New York City. *©1964 New York World's Fair 1964-1965 Corp.*



Three Cleveland architectural firms have organized Cleveland Federal Building Architects to design the new Cleveland Federal Office Building. They are: Outcalt, Guenther, Rode, Toguchi & Bonebrake; Shafer, Flynn & Associates and Dalton-Dalton Associates. The contractors (joint venture) are Frank Briscoe Company, Newark, N.J., and Huber, Hunt and Nichols, Inc., Indianapolis, Ind.

HAUGHTON TOTALLY-AUTOMATED ELEVATORS FOR PRESTIGE BUILDINGS

Total elevator automation is made possible by a number of unique developments to come from our work in Elevonics*. One of them is our remarkable new electronic computer-control system. This giant step forward in elevator technology constantly monitors elevator service demands on every floor . . . and automatically controls each car to coddle tenants and visitors with the ultimate in swift, smooth service. Even peak traffic, experienced during rush hours, is handled with such incredible speed and efficiency that elevator service is virtually instantaneous. Among the growing number of prestige buildings to benefit from Haughton elevator technology will be the Federal Office Building to be built in Cleveland, Ohio. 28 Haughton automatic high-speed units will achieve complete compatibility with this building's vertical transportation requirements. Include Haughton totally-automated elevators in your plans for new construction or modernization. See our catalog in Sweet's, or write us for information. Haughton Elevator Company, Division of Toledo Scale Corporation, Toledo, Ohio 43609.

*Haughton's advanced program in systems research and engineering, with specific emphasis on the creative application of electronic devices and instrumentation for betterment of systems design and performance. Registered in U. S. Patent Office.

HAUGHTON ELEVATORS

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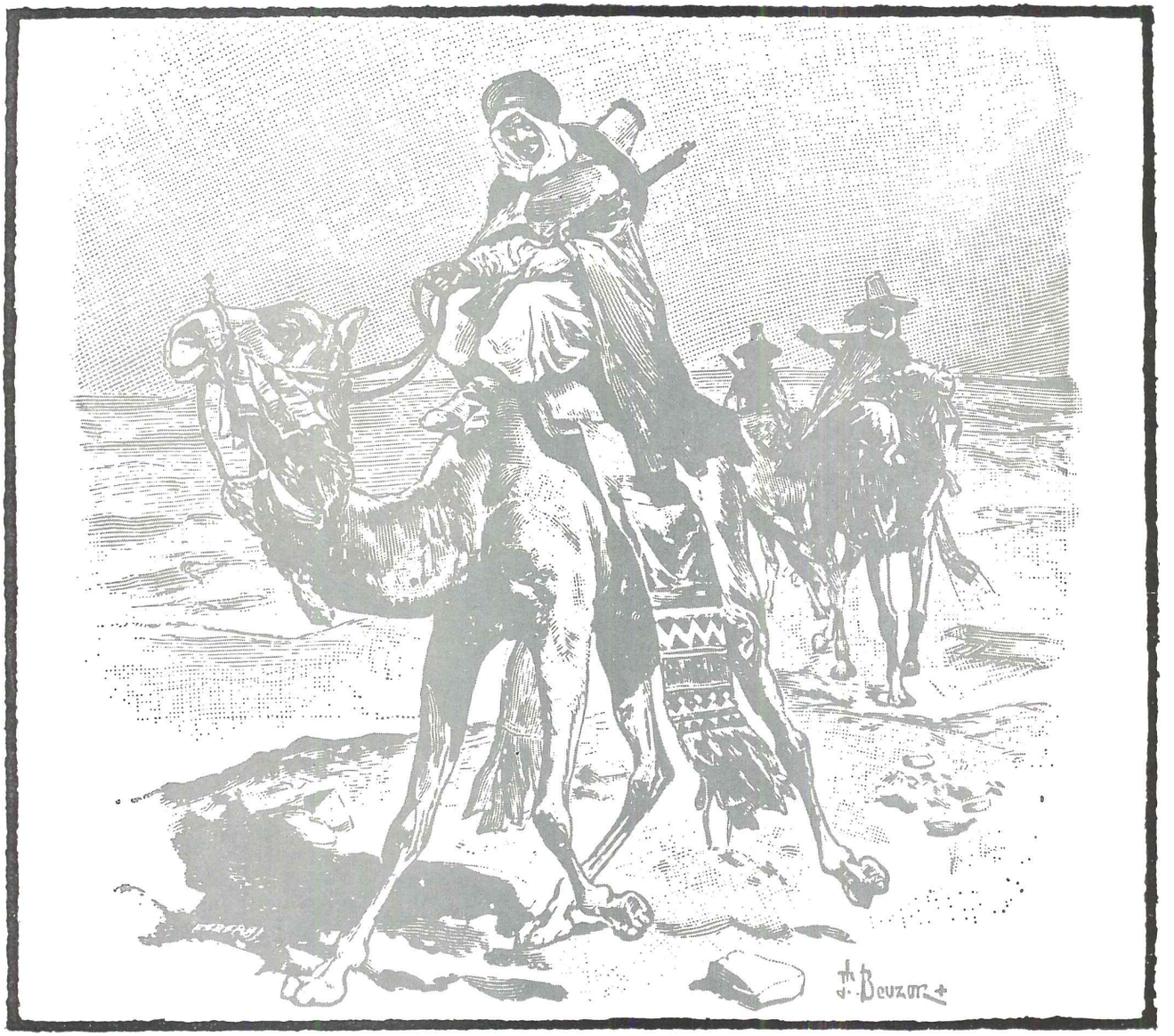
For more data, circle 46 on Inquiry Card ➔

UNRETOUCHED PHOTO OF SUMMITVILLE TILE INSTALLATION



BEDS OR BEDOUINS...

CHANGING SHEETS IS ALWAYS A PROBLEM

A regular change of sheets can present design problems for you, space problems for your client—whether the plans are for a hotel, motel, boarding school...whether it's Pittsburgh, Miami, Chicago, San Francisco or the next oasis.

Acquaint your client with the facts about Linen Supply: no expensive, high-maintenance, space-wasting laundry facilities...no extra payroll problems...no monthly bills for detergents, bleaches, replacement linens and extra water and electricity. And, using the services of his local Linen Supplier, he can turn these savings to a profit—by turning the space that might have been wasted on unnecessary laundry facilities into profit-making accommodations!

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LINEN SUPPLY ASSOCIATION OF AMERICA • 975 Arthur Godfrey Road, Miami Beach, Fla. 33140

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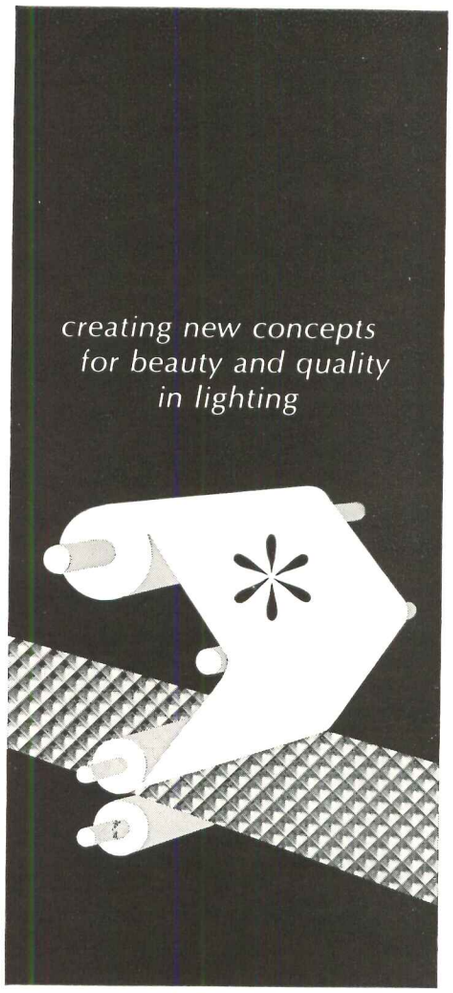

WHY WOULD K-S-H INTRODUCE "TEDLAR"-PROTECTED LIGHTING PANELS?

You can't see Du Pont "Tedlar" film on K-S-H polystyrene lenses. It doesn't hide their beauty or alter their superb light control values.

It *does* add untold years of life to the polystyrene. "Tedlar" film-protected K-S-H panels for interior use have passed 10-year accelerated tests with no trace of fading or yellowing. They may go on forever. No one knows for sure! They're easy to clean and practically stainproof. Priced economically—just slightly above our regular polystyrene.

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"Tedlar" is a Du Pont registered trademark

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K-LITE®
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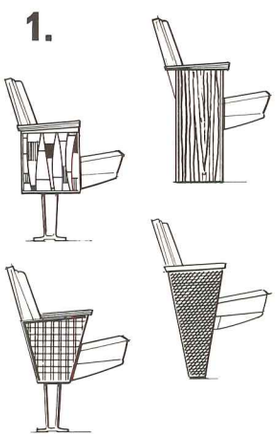
1.



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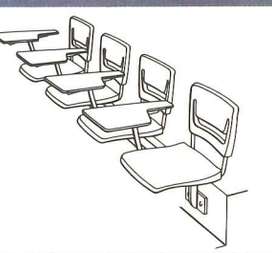

4.

Designer's designs... all of them new!

It's plain to see that your design objectives and ours are one and the same. We, as do you, strive for clean and uncluttered lines. We, as do you, strive to achieve an illusion of spaciousness while retaining real ruggedness. We, as do you, strive for designs of lasting beauty and durability. All this . . . with the lowest possible cost and upkeep. *Write Dept. AR12 for further information on products described below.*

1. **Custom styling in auditorium seating** at far less than custom cost. The new Stellar Chair is the first to give you a wide choice of all design elements – style, fabric, aisle standard, seat and back, width and mounting – to achieve the look you want. Note, too, the completely redesigned folding tablet arm. It actually doubles as the end standard design on aisle seat when folded. In use it offers a more generous, more comfortably positioned writing surface. Even the basic construction of the Stellar Chair can be altered without great difficulty or expense; the fully upholstered purple chair with sumptuously deep back cushion illustrates the point.

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AMERICAN SEATING®

The standard by which all public seating is measured
GRAND RAPIDS, MICHIGAN 49502

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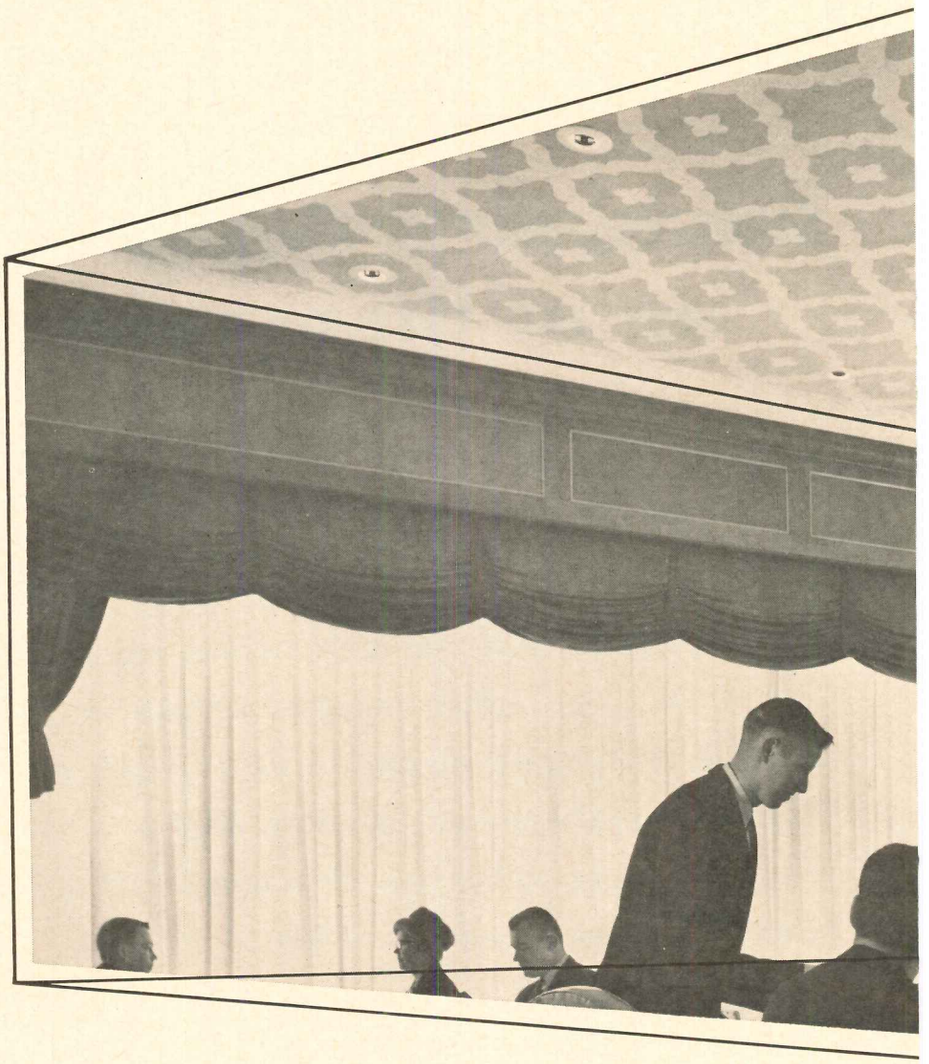
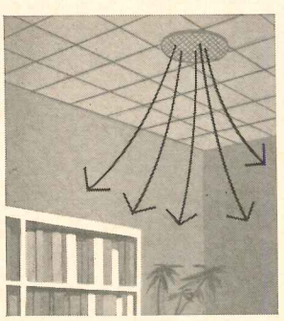
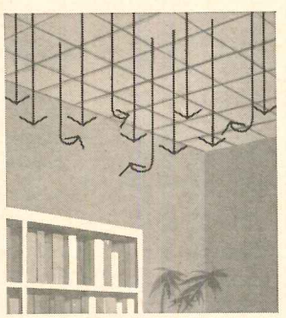


draft-free AIRSON* controls air penetration

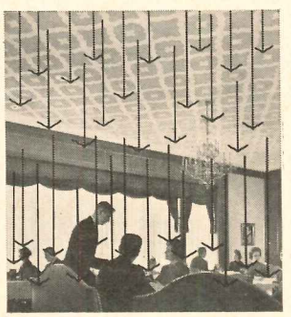
AIR DISTRIBUTION SYSTEM



NO DRAFTS, therefore no hot spots, cold spots, or stale air pockets and stratified air.

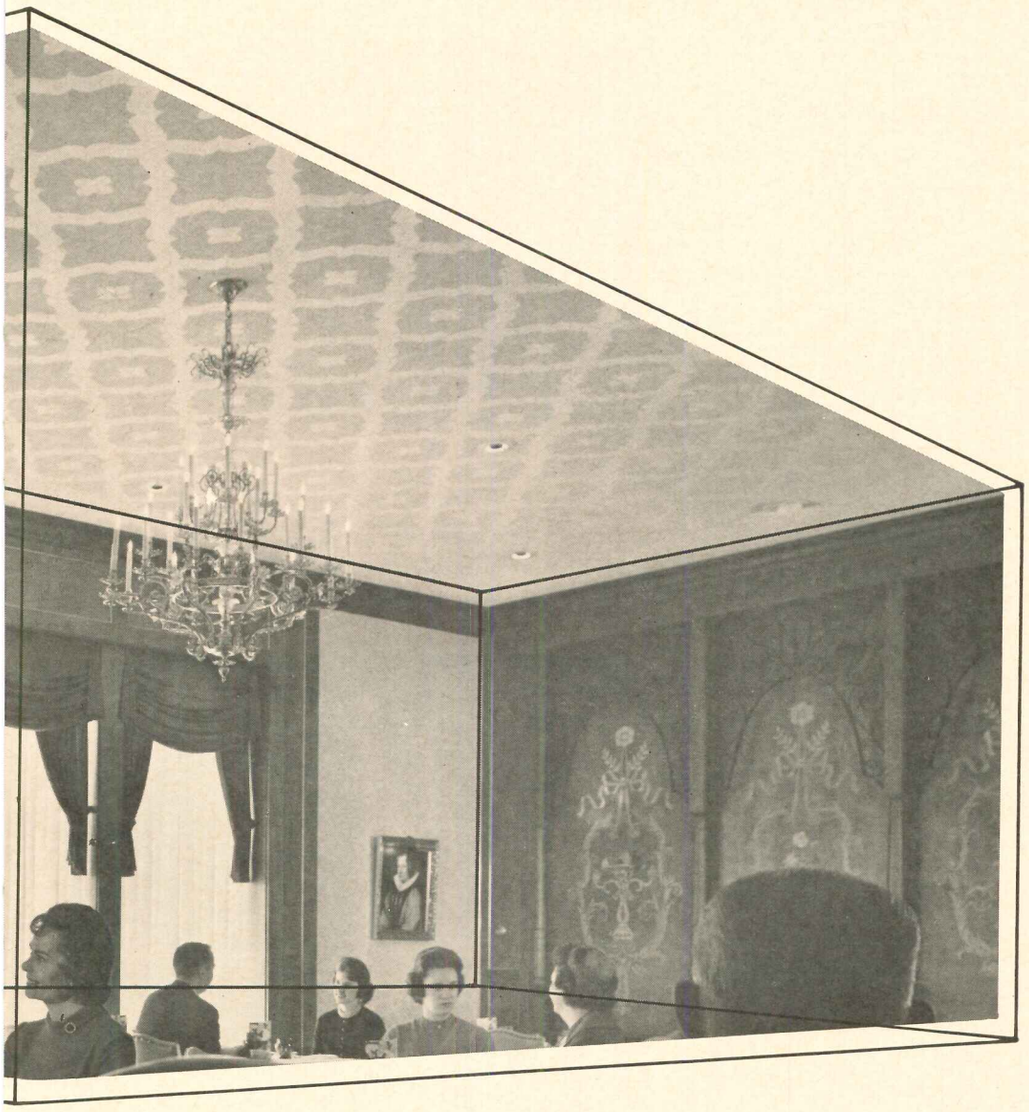


NO SHALLOW DUMPING of air into a room, so no ventilation without penetration.



AIRSON AIR WHERE YOU WANT IT: wall to wall and ceiling to floor. A comfort cube!

*T.M. Reg. U.S. Pat. Off.



. . . makes every room a comfort cube

To make any room a "comfort cube," heated or cooled air has to get down to the people—and that takes effective air *penetration*. The ceiling system that assures best air penetration—produces best air motion†—is the AIRSON Air Distribution System. AIRSON is a suspended ceiling of either ACOUSTONE* Mineral Acoustical Tile or AURATONE Noncombustible Acoustical Panels, through which heated or cooled air moves, under complete control, from the plenum into the room.

Three complete AIRSON Air Distribution Systems

AIRSON ACOUSTONE (shown above)—utilizing slotted ACOUSTONE Mineral Acoustical Tile; choose one of many designer-patterns to blend with your building.

AIRSON AURATONE (not shown)—utilizing slotted AURATONE Acoustical Panels and standard exposed metal grid, for less expensive installations.

AIRSON Air Distribution Grid (not shown)—utilizing standard, unslotted ceiling panels and distributing air through controlled openings in steel or aluminum tee members of the grid system.

All three offer excellent air distribution control.

To check the facts on AIRSON and the "comfort cube," see your U.S.G. Architect Service Representative; or write us at 101 So. Wacker Drive, Dept. AR-45, Chicago, Illinois 60606.

†"Room comfort requires control of three elements: temperature, humidity, and air motion."
—ASHRAE GUIDE.

UNITED STATES GYPSUM
THE GREATEST NAME IN BUILDING

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DELOS SYMPOSIUM EXPLORES FUTURE OF URBAN GROWTH

The Second Delos Symposium, called by the Greek planner Constantinos A. Doxiadis held on board a boat cruising the Greek seas, convened for the fundamental purpose of demanding that some part of the world's resources and vision be devoted to the urgent task of building a decent home on earth for all mankind. In the First Delos Symposium, held a year ago, the conferees signed the Declaration of Delos, the purpose of which was to underline, with all possible urgency, the crisis that has overtaken the world's cities under the impact of modern science and technology.

Participating in the symposium were: Charles Abrams, American lawyer and housing expert; Edmund N. Bacon, American architect and city planner; Allah Bukhsh K. Brohi, Pakistani lawyer and statesman; Colin Grant Clark, British economist; Albert M. Cole, American lawyer and Congressman; A. Olumide, Nigerian architect and planner; Constantinos A. Doxiadis, Greek architect and ekistician.

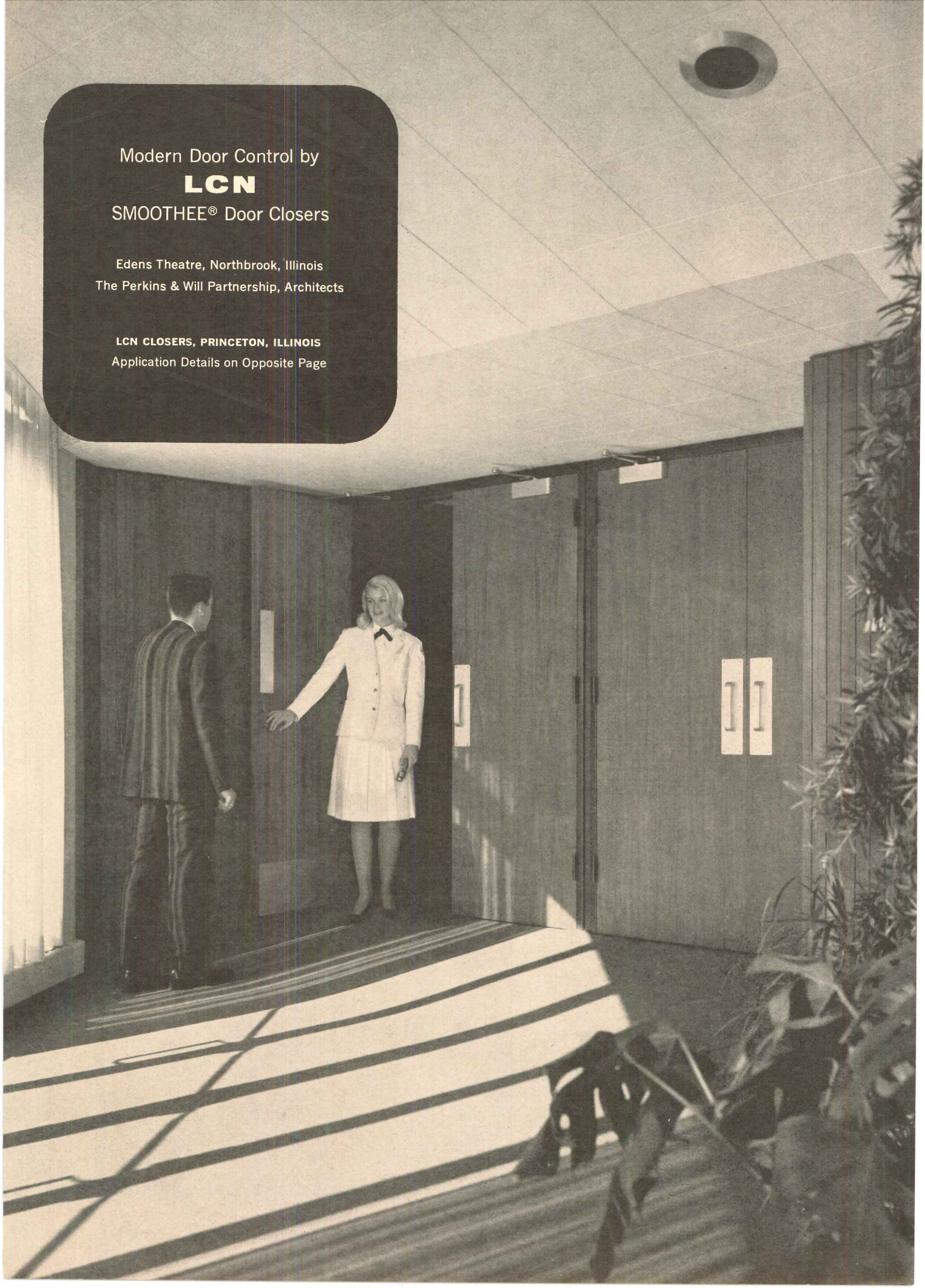
Also Leonard J. Duhl, American psychiatrist; Lyle C. Fitch, American economist and administrator; Richard Buckminster Fuller, American designer and engineer; Juliusz Gorynski, Polish architect and administrator; Jean Gottmann, French geographer; Eiichi Isomura, Japanese sociologist; Emrys Jones, British geographer; Arthur Koestler, British (naturalized) journalist and author; Jose-Ramon Lasuen Sancho, Spanish economist; (Life Baron) Richard Llewelyn-Davies, British architect.

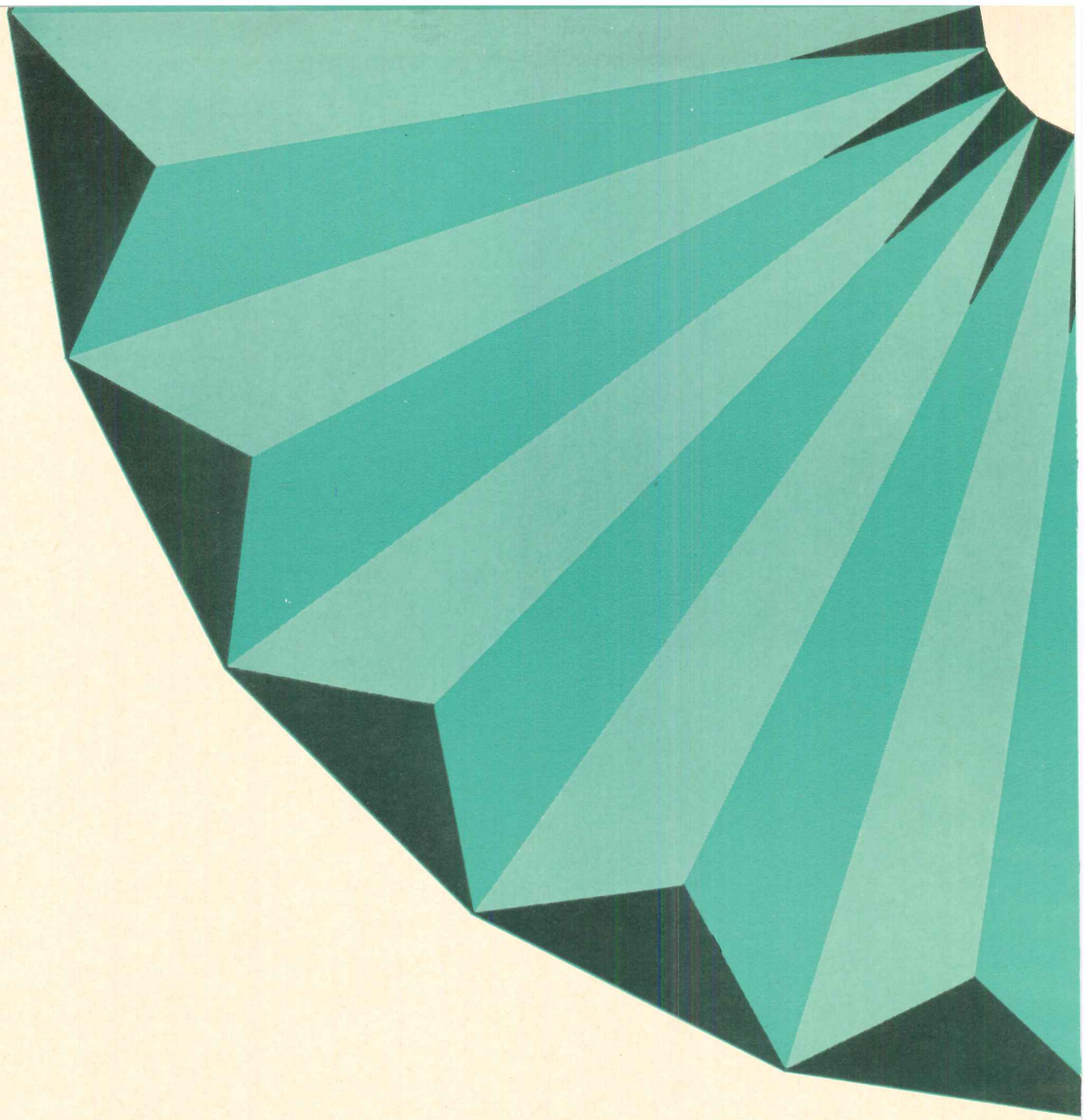
Also Mohamed S. Makiya, Iraqi architect and town planner; Sir Robert H. Matthew, British architect; Margaret Mead, American anthropologist; Richard L. Meier, American research scientist; Martin Meyerson, American city planner; Helio Modesto, Brazilian architect and town planner; Waldemar A. Nielsen, American economist; John Winchell Riley, American sociologist; Arieh Sharon, Israeli architect and town planner; Olga Vasilievna Smirnova, Russian architect and city planner; Konstantin Ivanovitch Trapeznikov, Russian architect and city planner; Rexford G. Rugwell, American political scientist; C. H. Waddington, British biologist; and (Lady Robert Jackson) Barbara Ward, British economist and author.

The problem of man dealing with this modern science and technology, as well as coping with the enormous population explosion in cities and its results thereof, make up a new academic discipline known as "ekistics, or the science of human settlements," according to the conferees. The symposium participants devoted their attention to three particular fields: the content of a discipline of human settlements; the methods of training men and women to work in this new field of ekistics; and some of the political and economic obstacles likely to impede the development of an integrated, international approach.

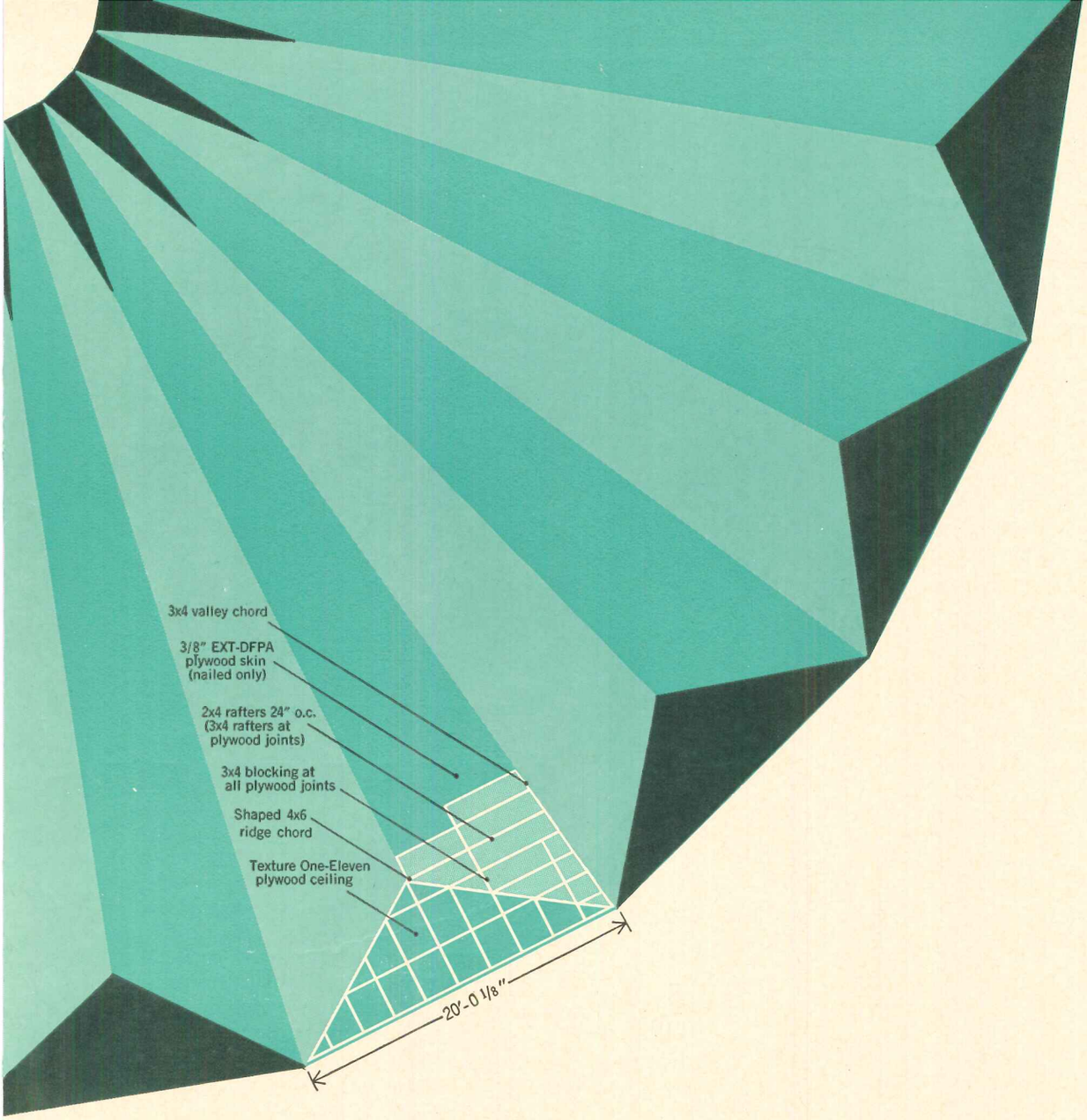
The symposium felt that institutions should be developed at the local, national and international level, dealing in research, planning, finance and action in the field of human settlements. These institutions, to be the prime agents in developing the content of studies within the new discipline, should be strategically organized to give more impetus and information in the field of ekistics.

The symposium believed that, although modern man is part of an "educating society," the institutions of this society do not do enough to tell them how to understand or live in an urbanizing world. Therefore, a more general kind of education is needed which will introduce the concept of ekistics in its programs. The symposium recommended that the United Nations recognize human settlements as a separate sector of its activities, and form appropriate organizations and allocate finances for it.

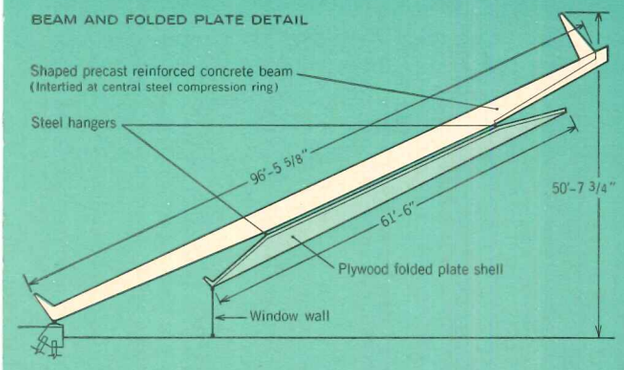

Modern Door Control by
LCN
SMOOTHEE® Door Closers
Edens Theatre, Northbrook, Illinois
The Perkins & Will Partnership, Architects
LCN CLOSERS, PRINCETON, ILLINOIS
Application Details on Opposite Page



the most exciting ideas take shape in plywood



BEAM AND FOLDED PLATE DETAIL



ST. PETER'S CHURCH, PACIFICA, CALIFORNIA

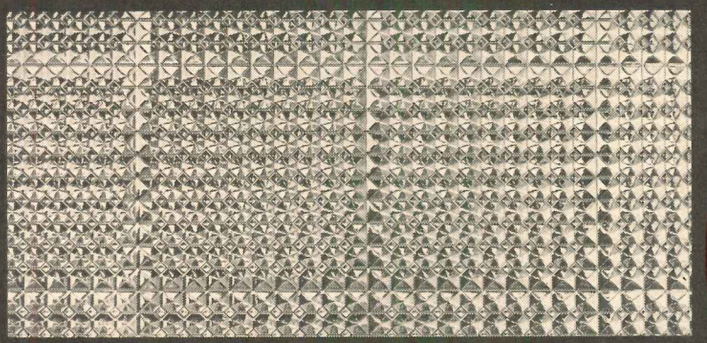
ARCHITECT:	MARIO J. CIAMPI, F.A.I.A. PAUL W. REITER, ASSOCIATE ARCHITECT SAN FRANCISCO
STRUCTURAL ENGINEER:	ISADORE THOMPSON, SAN FRANCISCO
CONTRACTOR:	PACIFIC COAST BUILDERS, SAN FRANCISCO

In this unique structural concept, a parasol-like roof made of 20 plywood folded plates hangs beneath slender concrete beams. Each of these big plywood units is so nearly self-sustaining that it requires beam connections at only two points. The result is a magnificent post-free interior space. As in so many of today's new architectural forms, only plywood provides the right combination of design adaptability, special strength properties and low in-place cost. For more information write (USA only) American Plywood Association, Tacoma, Wash. 98401.

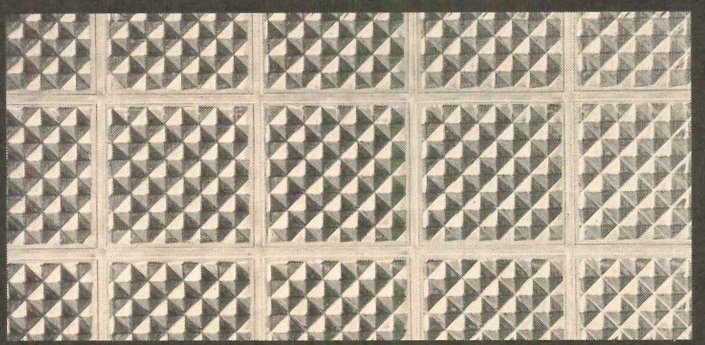
AMERICAN PLYWOOD ASSOCIATION

The new name for Douglas Fir Plywood Association.
Quality-tested by the Division For Product Approval.

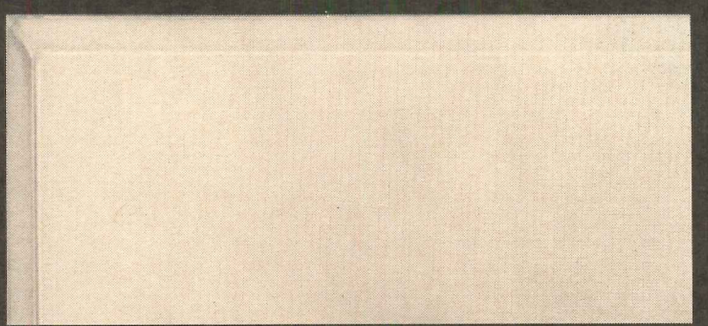
TESTED DFPA QUALITY



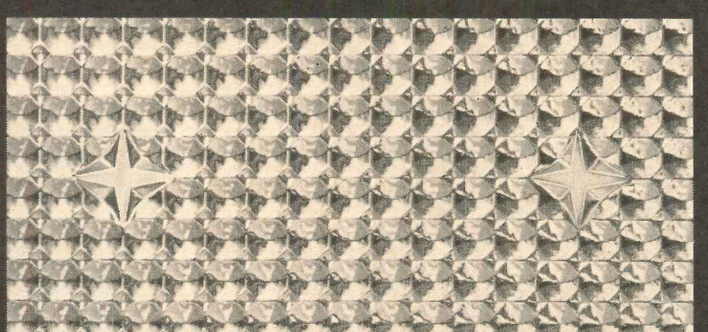
OCTEX Octagonal and square prisms in grid line of 2-1/2" squares. Acrylic or polystyrene. 1/2 ACTUAL SIZE



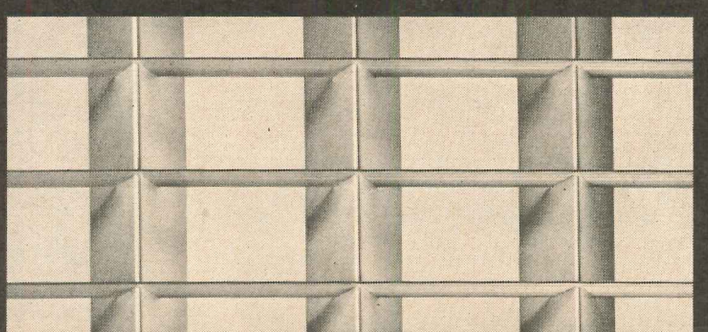
WAFFLETEX® Features small louvers with recessed refracting prisms. Acrylic. ACTUAL SIZE



CRESTEX® Molded acrylic panel in matte finish. Dished profile. Acrylic. 1/2 ACTUAL SIZE



STARTEX Sculptured stars against octagonal prisms, in crystal glass. ACTUAL SIZE



PARALOUVER® Alzak aluminum with parabolic surfaces for low brightness. 1/4 ACTUAL SIZE

ARCHITECTS TAKE NOTE:
You get more latitude for creative interior design with this wide selection of distinctive patterns

When you need more than "looks," choose Day-Brite

ENCLOSURES

On "looks" alone, Day-Brite enclosures win Best of Show. Clean, imaginative styling that enhances any fixture, complements every decor. But the real story of Day-Brite superiority is functional. Lenses are optically engineered for maximum efficiency and control of brightness. Precision-fabricated from 100% virgin acrylic, highest quality light-stabilized polystyrene, crystal glass or Alzak aluminum, Day-Brite enclosures last and last. And features such as separable hinges that disengage from either side for easier maintenance . . . framed panels that minimize chipping or cracking and conceal lamps for good visual comfort . . . all help make Day-Brite enclosures the best buy for your client's lighting dollar. For every commercial, institutional or industrial application, specify Day-Brite . . . the enclosures that look right, fit right, control right.

DAY-BRITE®

A DIVISION OF EMERSON ELECTRIC

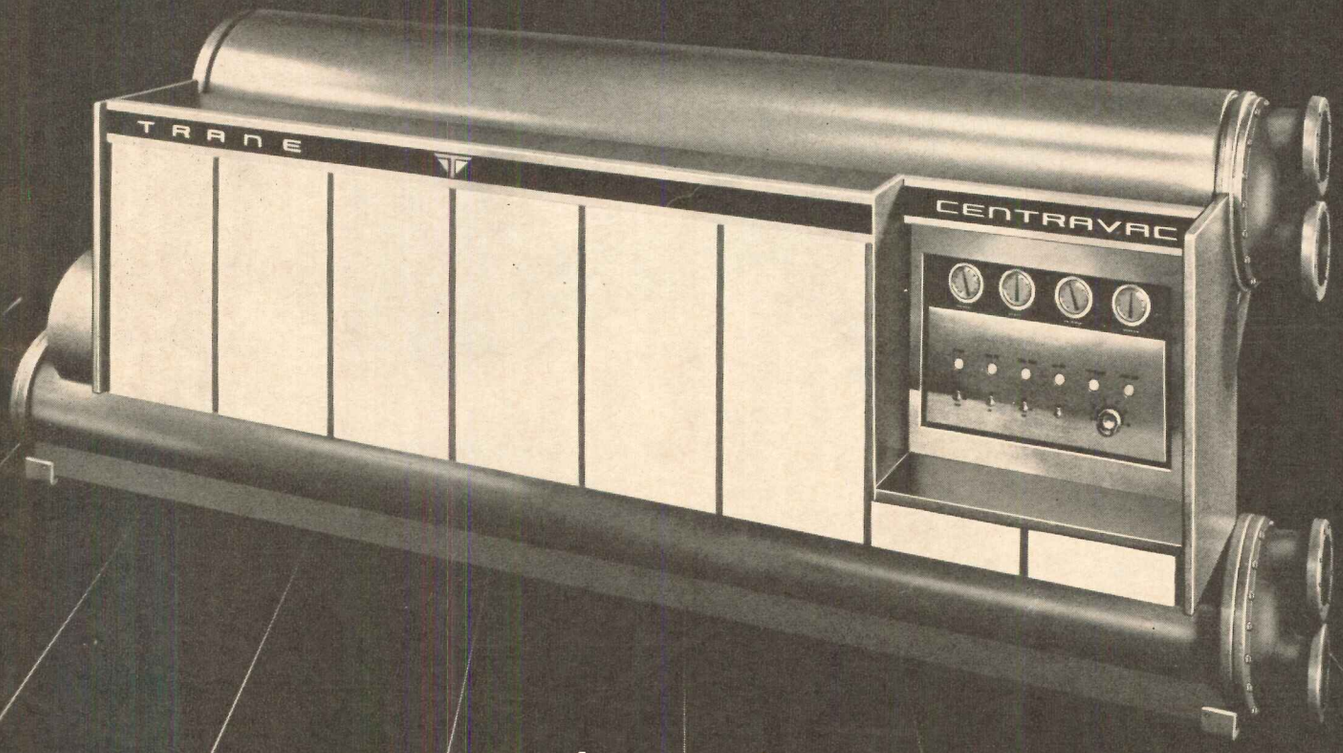
DAY-BRITE LIGHTING 5411 BULWER AVE. ST. LOUIS, MO. 63147

For more data, circle 52 on Inquiry Card

FROM TRANE...

DIRECT-DRIVE, COMPACT

CENTRAVAC

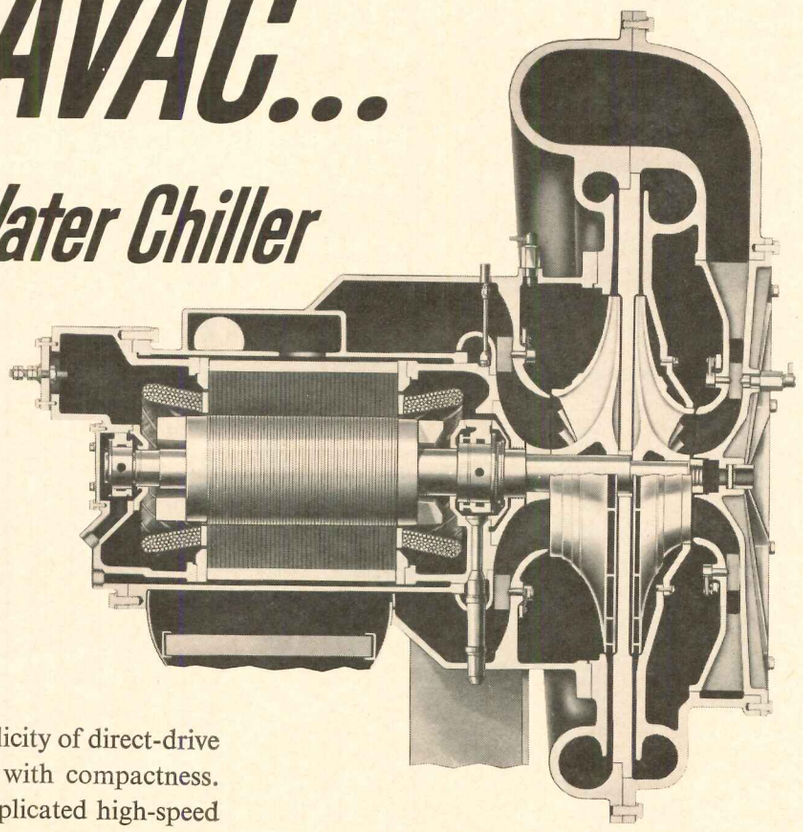


...a major advance in centrifugal water chillers

TRANE®

CENTRAVAC...

Centrifugal Water Chiller



Direct-drive—no gears

The dependability and design simplicity of direct-drive have been successfully combined with compactness. Competitive makes use more complicated high-speed gear-driven compressors to achieve compactness.

But, the Model PCV CenTraVac—designed for maximum reliability—has only *one* rotating part, two simple journal bearings, no gears and no high-load thrust bearings. Compare this with a high-speed, gear-driven centrifugal machine (with gears operating in a refrigerant atmosphere), dependent upon the reliability of 2 to 5 gears, up to 7 journal bearings, plus a high-load thrust bearing.

Between motor and compressor there is nothing to fail. Two-stage, back-to-back impellers are directly connected to the motor shaft. A balanced thrust arrangement—only one rotating part.

As a result, the Trane direct-drive, compact PCV CenTraVac provides the unmatched dependability inherent in a machine of fewer moving parts to insure longer life and a minimum of maintenance.

Power saving two-stage compressor design

Two-stage compressor design with inlet vanes controlling the flow of refrigerant gas to each compression stage is another important CenTraVac feature. Provides lower power consumption, smoother operation at part-load than single-stage high-speed machines for three reasons:

1. Better compressor efficiency at part-load with dual inlet vane control—regardless of number of compression stages. Inlet vanes ahead of each stage make modulation of each impeller's performance possible.
2. Wider range of stable compressor operation with two-stage control. At same entering condenser water temperature, single-stage compressor encounters surge at substantially higher part-load point. Requires intentional gas bypass with artificial loading of compressor at part-load to avoid surge.

   Means single-stage machine less efficient at part-load, does more work to compress recirculated gas.
3. Power loss, inherent in gear trains, typically amounts to at least 3% of full-load power input. Loss does not decrease with load. At 10% of full-load, gear loss alone represents at least 15% of total power required.

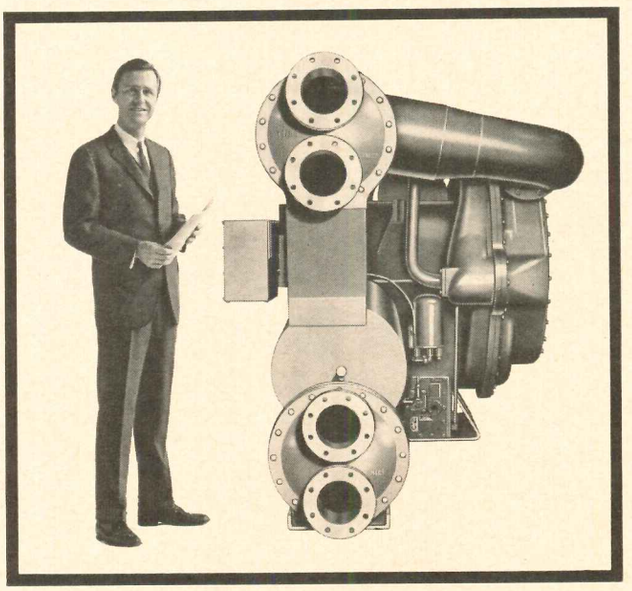
So, *any* single-stage gear-drive compressor requires at least 50% more power input at 10% of full-load to produce same refrigeration effect as two-stage compressor with dual inlet vanes.

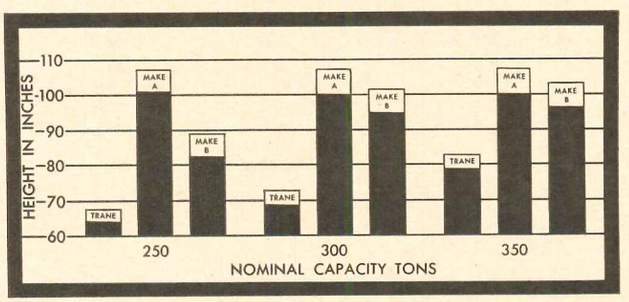
Space and weight-saving compactness

The compact PCV CenTraVac is substantially lower than competitive makes in the critical height dimension. It weighs significantly less than most other centrifugals and occupies little floor space.

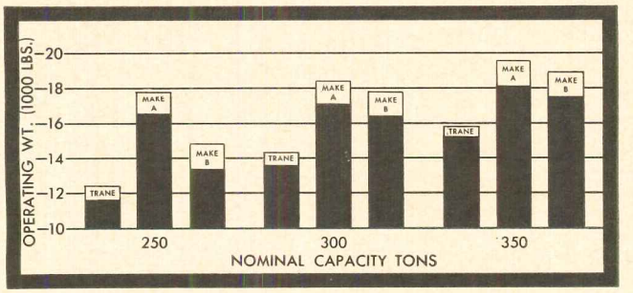
Being lower, the advanced PCV CenTraVac may be installed in equipment rooms having low ceilings, or on intermediate floors of new or existing buildings where headroom is restricted.

With less weight, this CenTraVac may be installed on upper floors and penthouses, often with appreciable savings in building structural steel.

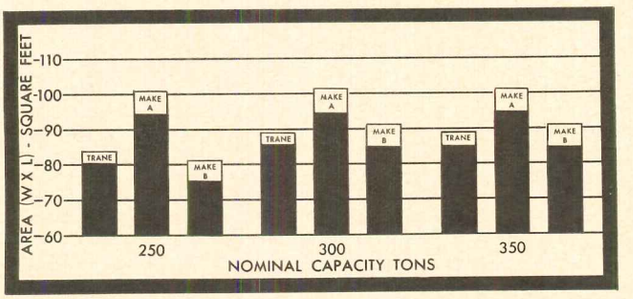




Here, height of PCV CenTraVac is compared to two major competitive gear-drive makes. Competitive makes range from 25 to 60% higher.



Note weight advantage of CenTraVac over other two makes which are from 18 to 45% heavier.



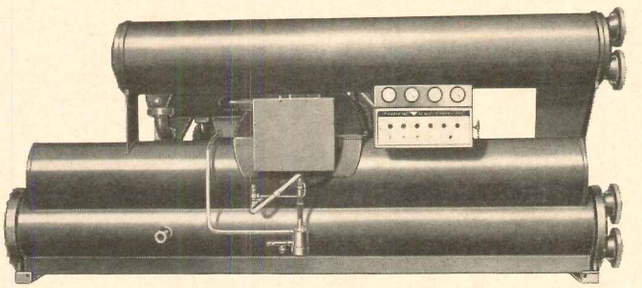
Rectangular floor space area required by compact CenTraVac is compared to floor space area required by competitive makes.

Factory-assembled, ready to run

The CenTraVac is a complete factory-assembled water chiller. Only external and auxiliary water piping connections and main electrical connections are necessary.

Nine models . . . ready now

Sizes range from 225 to 555 tons. For complete information, call your nearest TRANE Sales Office. Or, write for the new Model PCV CenTraVac Catalog.



Factory-assembled CenTraVac shown here with optional decorative front panel removed.

There are three top priority lighting areas in every school

Here's a better way to light them

1. *Priority zone one—classrooms and offices*

These are the most important lighting areas in any school. The new Encore lighting systems provide an environment that is perfect for all lighting tasks. There's no glare, reflection, or dark areas. It meets the new American Standard Guide for school lighting . . . and meets it at a lower cost! A typical classroom installation of Encore requires ⅓ the number of units used in other conventional systems. Encore can be installed in rows, patterns, or spline systems, using existing outlets. Make sure your school has the best lighting available. It pays off not only in bright students and better study habits, but in lower annual maintenance costs, too!

2. *Priority zone two—special function rooms*

These are the rooms for special activities, such as your chemistry lab, manual arts shops and locker rooms. Here, the ordinary kind of lighting is not applicable. For example, in a chemistry lab, where highly explosive gases or volatile fumes are present, you should consider carefully the type of protected lighting that will provide adequate illumination, plus complete safety. In the manual arts room or machine shop, an industrial fluorescent system similar to those found in modern manufacturing plants, is the logical solution. In the locker rooms, an all porcelain unit that offers maximum resistance to corrosion, is your best choice.

3. *Priority zone three—high ceiling areas*

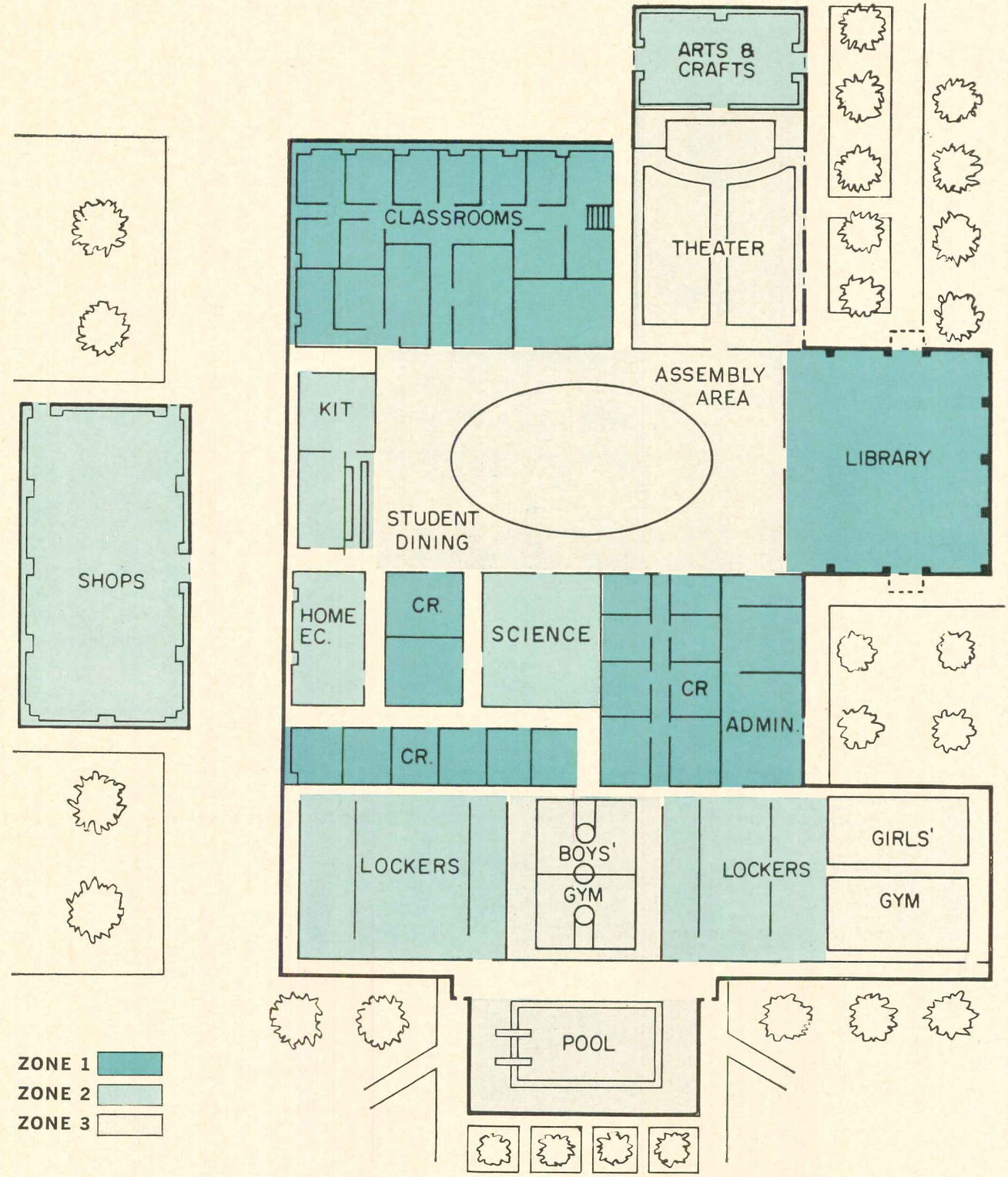
In the auditorium and gymnasium areas as well as large study halls, ceilings normally are higher, requiring large area light sources. In the two-light version, the new Encore system can be suspended in areas to be used primarily as study halls. On the other hand, auditoriums should use lighting units such as the eight-lamp 4'x4' Cordova series in walnut and brass. Actually, Thomas Industries makes a complete line of fluorescent modulars that can be attached, suspended or recessed, depending on the auditorium requirements. In the gymnasium, you need concentrated High-bay lighting fixtures. We make all types—incandescent, fluorescent or Mercury-Vapor.

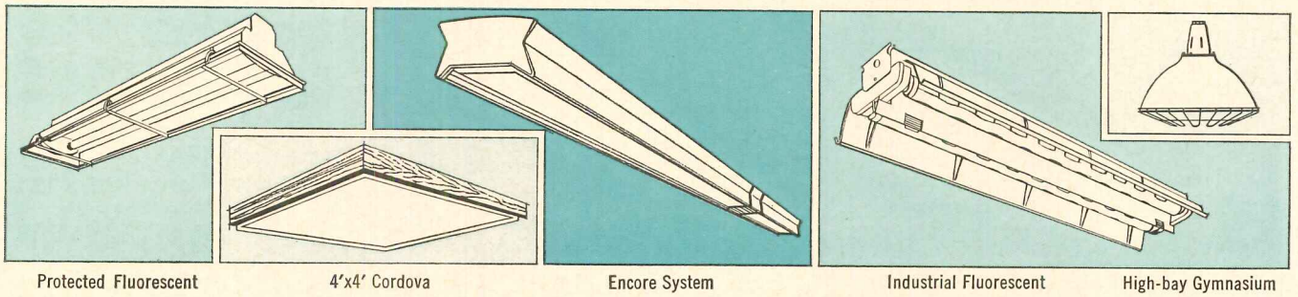
All these fixtures and many more are available from your Benjamin Products lighting distributor. If you're an architect, electrical engineer or contractor interested in lighting, Benjamin lighting products are the best way to insure customer satisfaction and make your lighting dollars stretch farther.

For your copy of a brochure entitled, "Better School Lighting," write to: Educational Lighting,

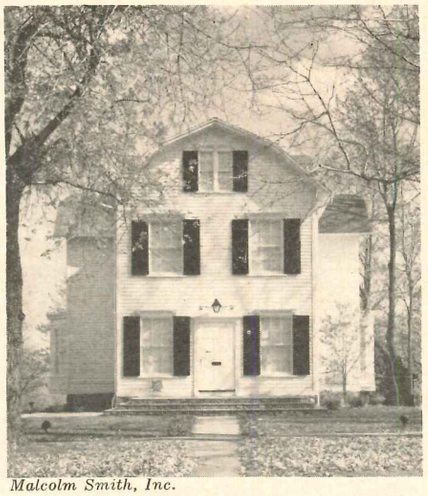
Benjamin Products
THOMAS INDUSTRIES INC.
207 East Broadway, Louisville 2, Kentucky

For more data, circle 57 on Inquiry Card





Protected Fluorescent | 4'x4' Cordova | Encore System | Industrial Fluorescent | High-bay Gymnasium



Malcolm Smith, Inc.

MUSEUM OPENS IN CONNECTICUT

"Old Hundred," the Larry Aldrich Museum, was opened to the public in Ridgefield, Conn. on November 7. The museum is housed in a 1783 structure formerly used as a grocery and hardware store, a cracker-barrel political forum, a private residence and a church. Remodeling of the building was undertaken by architect Edward Wallace of Darien, Conn.

The museum will exhibit contemporary painting and sculpture (executed since 1951) collected by Mr. Aldrich, an internationally known collector and a leader in the fashion field. A diversified program of exhibitions is planned, including works from other private collections and one-man shows by contemporary artists.

Gallery hours will be from 12 to 6 P.M. on Saturdays, from 2 to 6 P.M. on Sundays, as well as by special appointment.

N.A.H.B. NAMES NEW STAFF CHIEF

Bernard L. Boutin has been named executive vice president of the National Association of Home Builders. Formerly administrator for the General Services Administration, Mr. Boutin takes over the post vacant since the resignation of John M. Dickerman.

For more data, circle 60 on Inquiry Card ➔

Graph paper is out... now that Barwick has Colorset

There's no longer any need to "graph" a rose. Barwick's new COLORSET makes step-and-ladder carpet designing passé. Any design that can be put on *plain white paper* can be magnetically deep-dyed into thick, plush Barwick carpet. This radically different electronic method for creating multicolor patterns can turn out 5 beautiful yards of elegant Barwick carpet . . . with as many as 12 luscious colors - in any yarn . . . *in just one minute.* A new concept, COLORSET is the first *real* advance in patterned carpet since the Jacquard loom was introduced in 1804. Never before were color and design possibilities so unlimited . . . nor has contract carpet seen such a creative challenge.

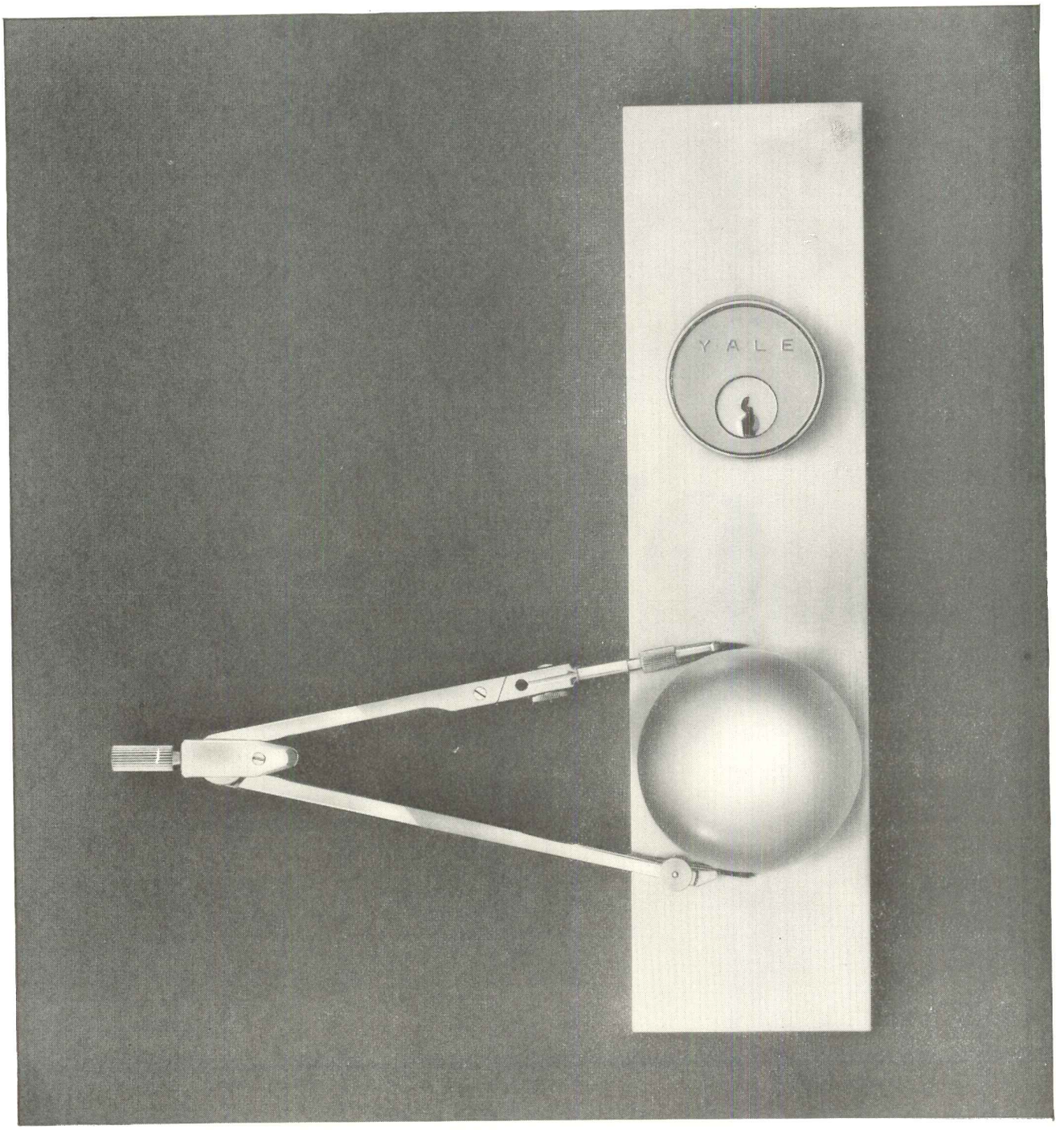
And beneath the beauty of each Barwick carpet are the quality, durability and ease of maintenance features that promise years of top performance. Select from a collection of imaginative designs in a rich range of luscious, lasting colors. For information and samples, write to our CONTRACT DEPARTMENT.

Barwick fashions ACRILAN ACRYLIC—NYLON—HERCULON OLEFIN (the longest wearing carpet fibers known) into luxurious COLORSET carpet pile of radiant, enduring multicolor designs.

E T Barwick mills, inc.

CHAMBLEE, GEORGIA

World's largest maker of tufted carpets and rugs



Sphere+Cylinder+Rectangle=Finlandia

The newest Yale mortise lock design, Finlandia, is a graceful fusion of geometric elements. Its knob is a perfect sphere—the essence of classical simplicity. A raised collar gives a flush profile to the rugged Yale cylinder. Clean, sharp lines of the rectangular escutcheon plate are unmarred by any visible attaching screws (inside as well as out). All parts are combined to achieve a dynamic balance for smart, modern appearance. Available in all standard finishes including stainless steel, Finlandia adds a new dimension to Yale integrity of design.

YALE®
THE FINEST NAME IN LOCKS AND HARDWARE
YALE & TOWNE

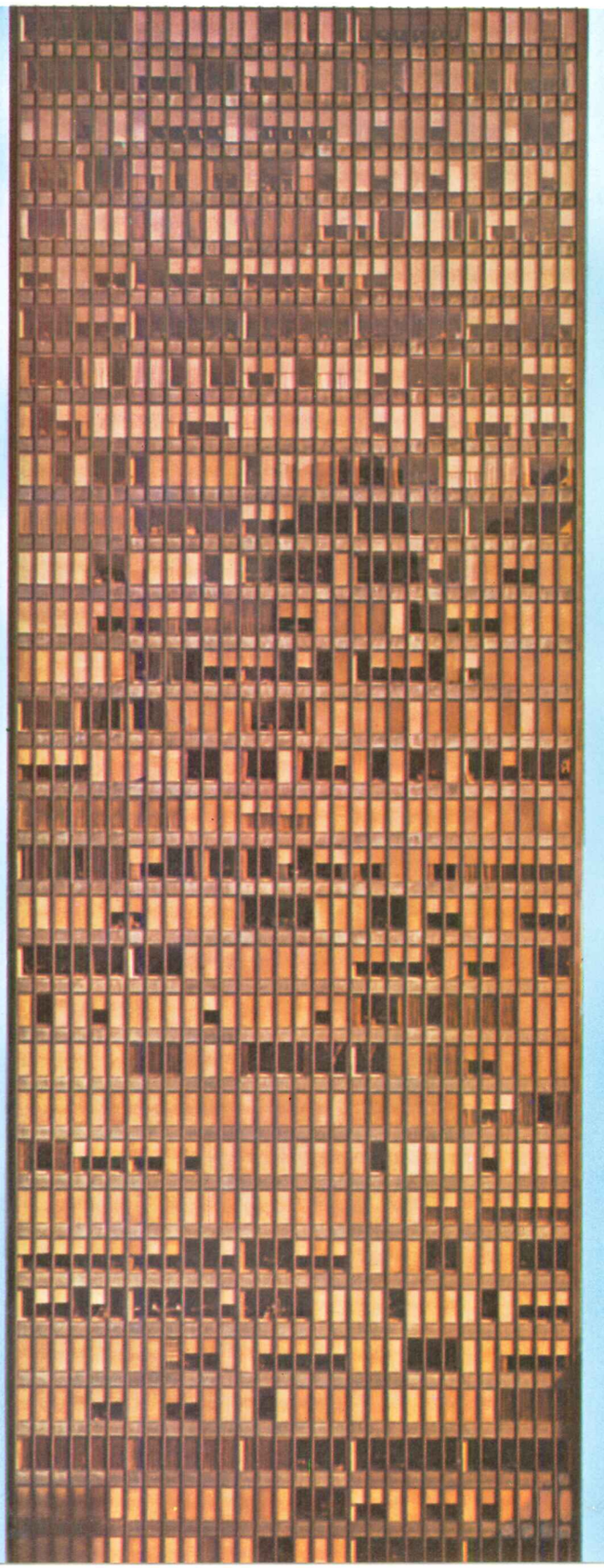
For more data, circle 61 on Inquiry Card

For more data, circle 62 on Inquiry Card →

The Building

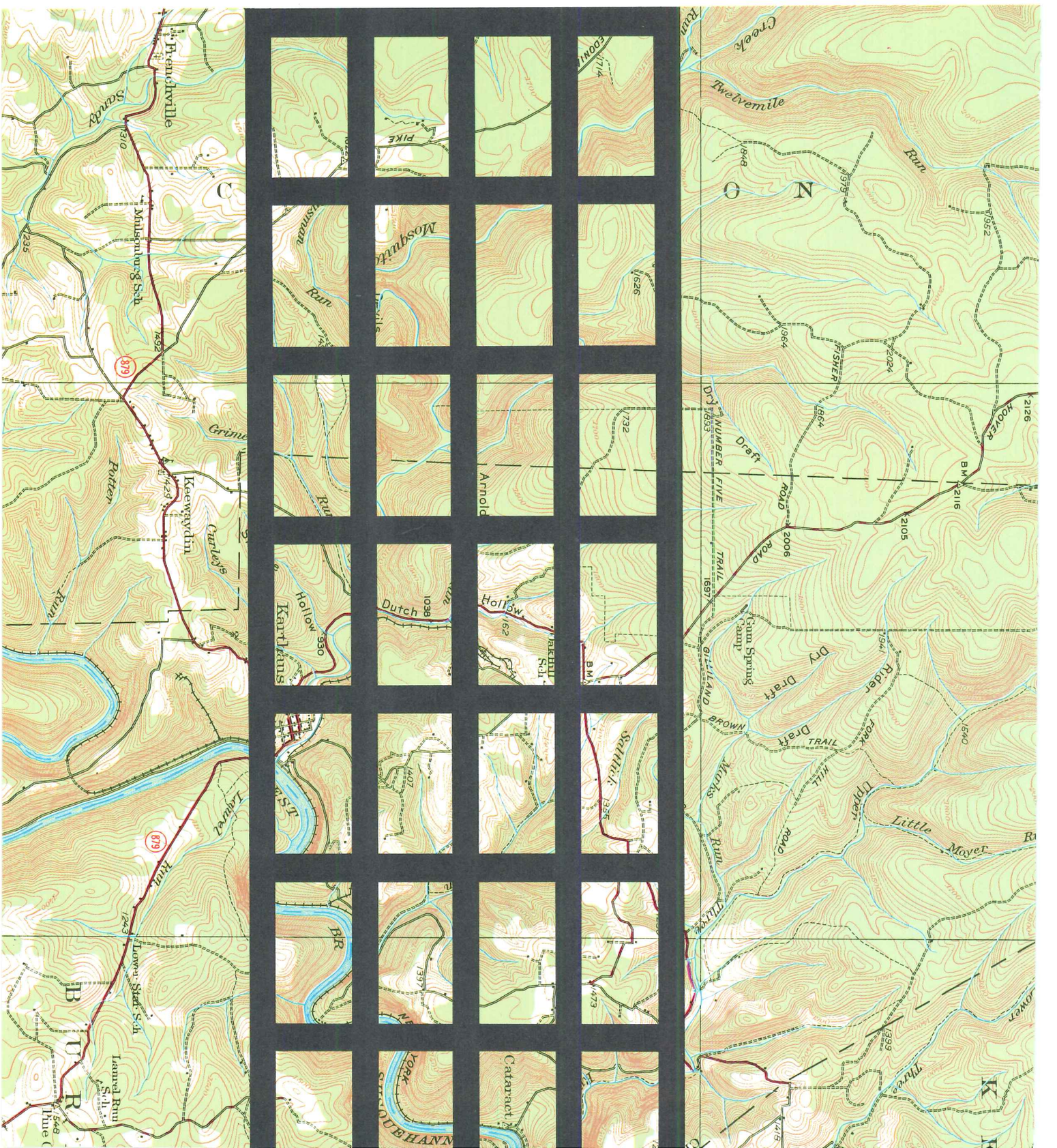
. . . made alive by a system of wires, cables, meters, ducts, transformers, relays, switches, motors, coils, lamps, compressors, partitions, surfaces, people . . . and power.

Here's the story of **Westinghouse** and total construction capability.



The Building and its environment

Westinghouse has a new computerized environmental analysis technique to aid building designers. It analyzes and predicts the total effect of such elements as material density, composition and conductivity; solar exposure through the times of day and seasons of the year; climatic factors of precipitation, temperature and wind; and building occupancy. The technique accurately determines the heating, cooling and energy requirements for each individual building.

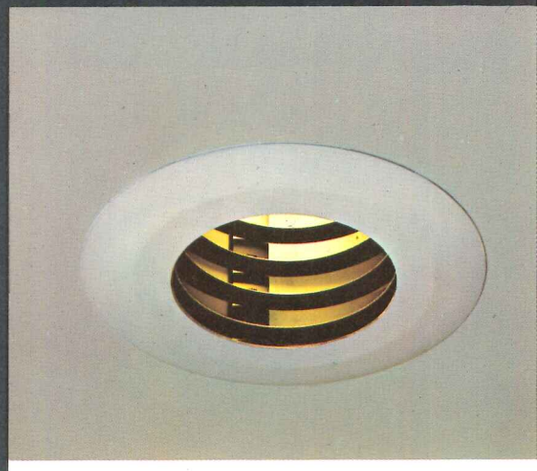


The Building and its illumination

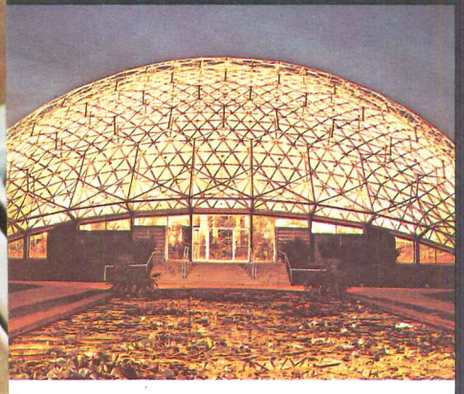
Westinghouse creates lighting for offices, showrooms, sales floors, conference rooms, auditoriums, reception rooms, hallways, lobbies, entranceways, stairways and exteriors.

Westinghouse Airliner luminaires make design and installation a snap. Cantilever hangers snap fixture in tight. Air is quietly diffused into the room from an uncluttered ceiling.

Versatile Westinghouse "eyeball" units are easily turned to beam a spot of light in any direction. Come in shielded or open types for counters, displays or show windows.

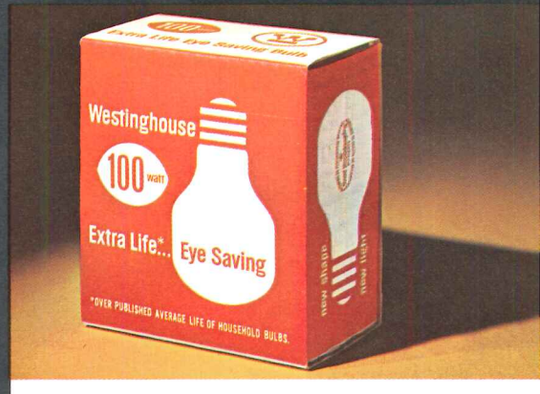


Westinghouse low brightness aperture units conceal the source of light, yet project enough for general illumination. Widely used in concourses, lobbies and under marquees.



By lighting entirely from within, Westinghouse floodlighting is used in an artistically unusual way. Effect is heightened by revolving light shields of red, blue, yellow and white.

New Westinghouse Colamar Mark 50 controls air, acoustics and lighting in one space-saving ceiling system. Flexible to fill individual requirements and to give complete design freedom.



New Shape bulb is one of many Westinghouse lamps that do thousands of lighting jobs. Regular replacement of building's lamps proves more economical under Westinghouse Group Relamping Plan.

Specially designed decorative pylon lighting creates atmosphere and mood on exterior walks and concourses. Used as supplementary lighting to give soft illumination.

Luminous ceiling brightens kitchen. Westinghouse Stripliner luminaires are installed above plastic panels. Panels easily removed for simple lamp replacement and cleaning.

The Building and its interior

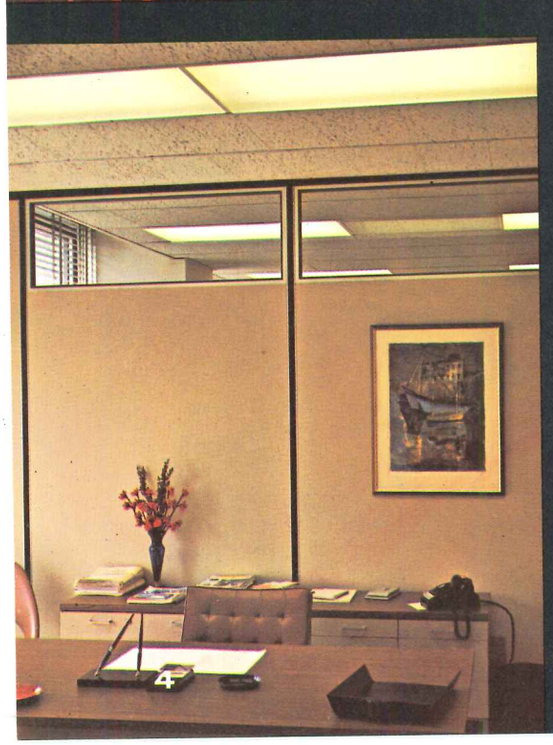
Westinghouse makes partitions that can become large offices or small, long corridors or short, half high or ceiling high. Westinghouse Micarta® surfaces are protective, colorful, durable. Westinghouse appliances equip offices and apartment buildings with fountains, televisions, ranges, refrigerators, washers and dryers.

(1) Modern Westinghouse kitchens for apartments. Westinghouse supplies ranges, refrigerators, dishwashers, waste disposers, panels, surfaces and lighting.

(2) Rich, "oil-rub" finish on conference table is Westinghouse Micarta® laminated plastic surface. Wall paneling is also Micarta.

(3) Movable or stationary partitions from Westinghouse Architectural Systems. Thin profile saves space. Can be sound controlled to suit needs.

(4) Ceiling-high partitions can be used alone or in combination with other heights. In minutes, panel can be replaced with one of different color, a glass unit or a door.

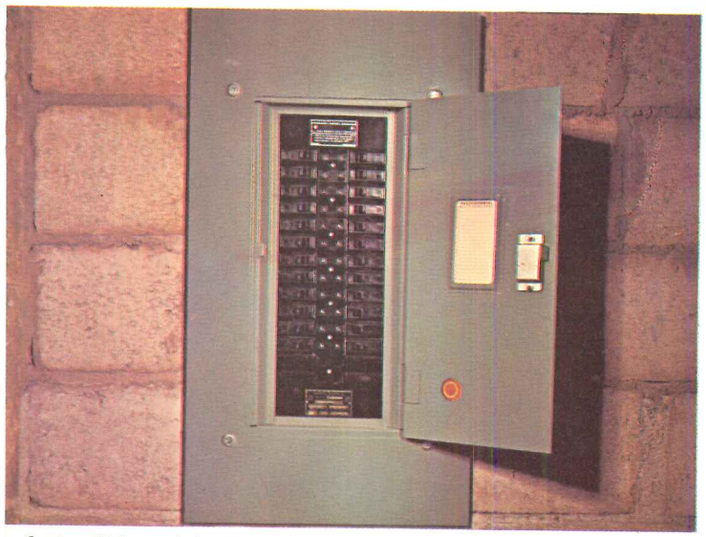


(5) As smart and functional as modern architecture, Westinghouse on-the-wall water cooler sets at any height. Compact design saves space. Open floor is easy to clean.

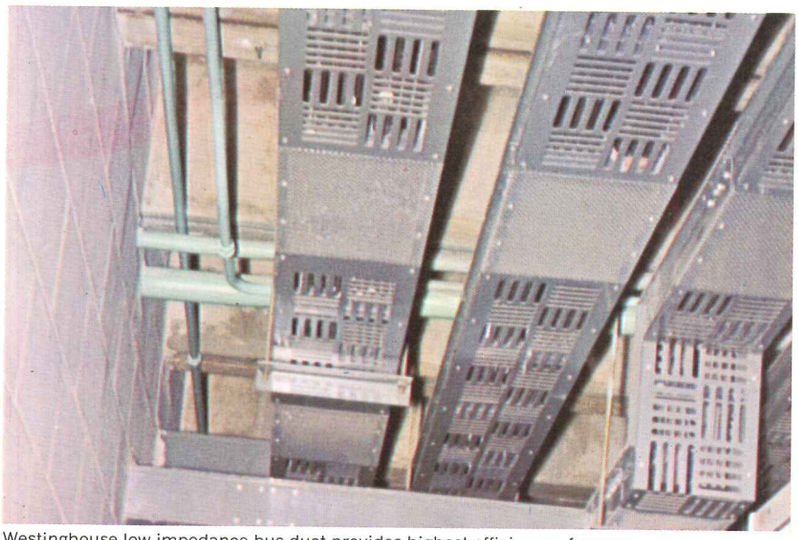
(6) Bryant Fashion Plate wall switch needs only a touch to turn lights on or off. Tops for styling, versatility, decorating possibilities. Available with transparent actuator to accommodate matching wallpaper or fabric.

The Building and its power

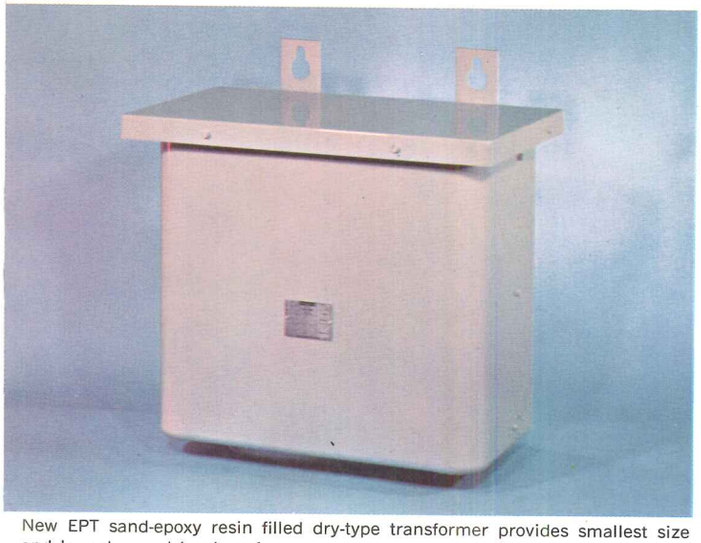
Westinghouse electric power distribution equipment carries, transforms, controls, measures and records electric power.



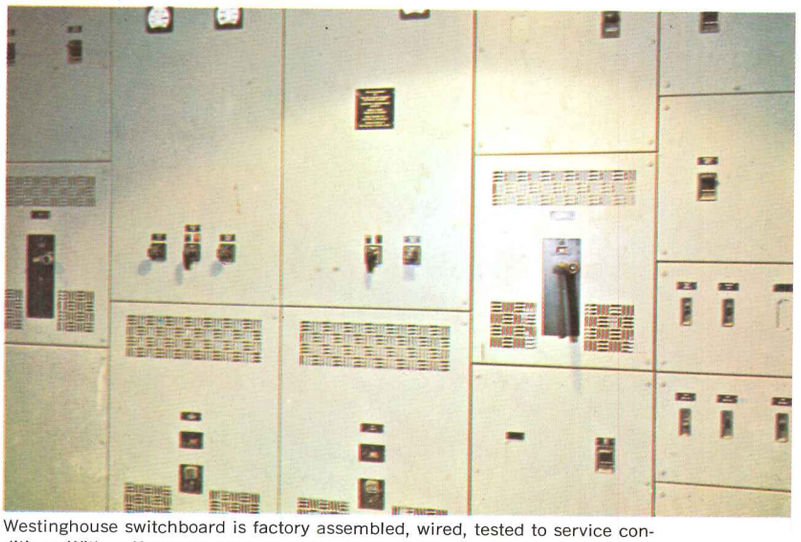
Custom-fit for each installation, Westinghouse panelboards feature AB De-ion® circuit breakers to control and protect against overloads and shorts.



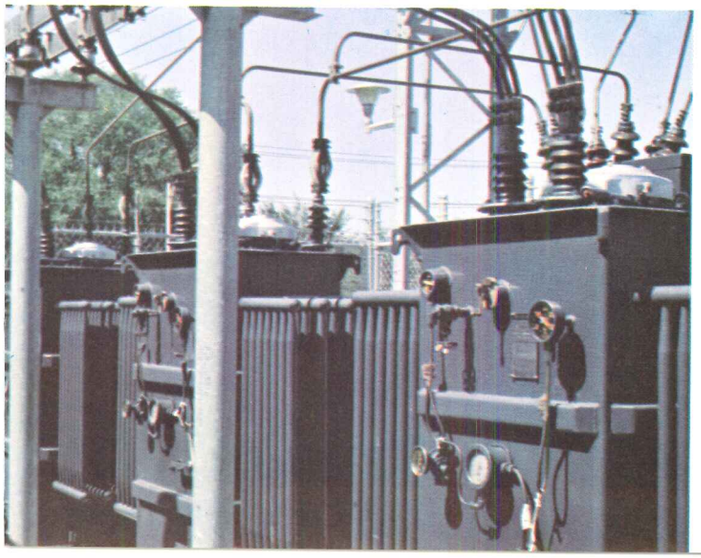
Westinghouse low-impedance bus duct provides highest efficiency of power distribution. Custom-fitted to job for fast, positive installation.



New EPT sand-epoxy resin filled dry-type transformer provides smallest size and lowest sound level performance.



Westinghouse switchboard is factory assembled, wired, tested to service conditions. With uniform construction, conduit layouts can be planned in advance.



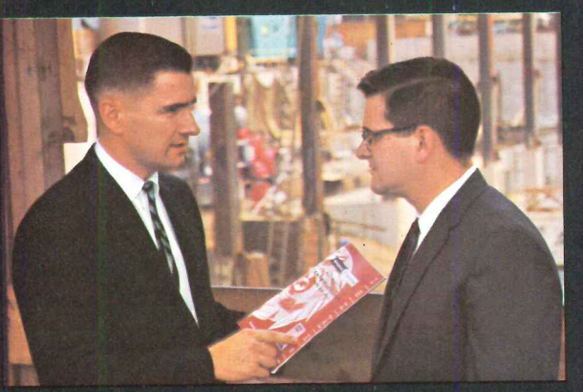
Westinghouse space-saving transformers have lower impedance, lower losses and lower exciting current.

The Building and its builders

Westinghouse works with each member of the building team. A single contact coordinates every detail with architect, contractor, engineer, owner, investor. For more information write: Construction Group, Westinghouse Electric Corporation, 24-E, Three Gateway Center, Pittsburgh, Pa. 15222.

Westinghouse region construction representative discusses building's function, needs and financing possibilities with owner.

Westinghouse contact suggests to architect how product line can be modified or combined to better fit the design.



Westinghouse contact answers another question from engineer about new developments in air handling equipment.

In the field, Westinghouse and the contractor coordinate delivery and installation.

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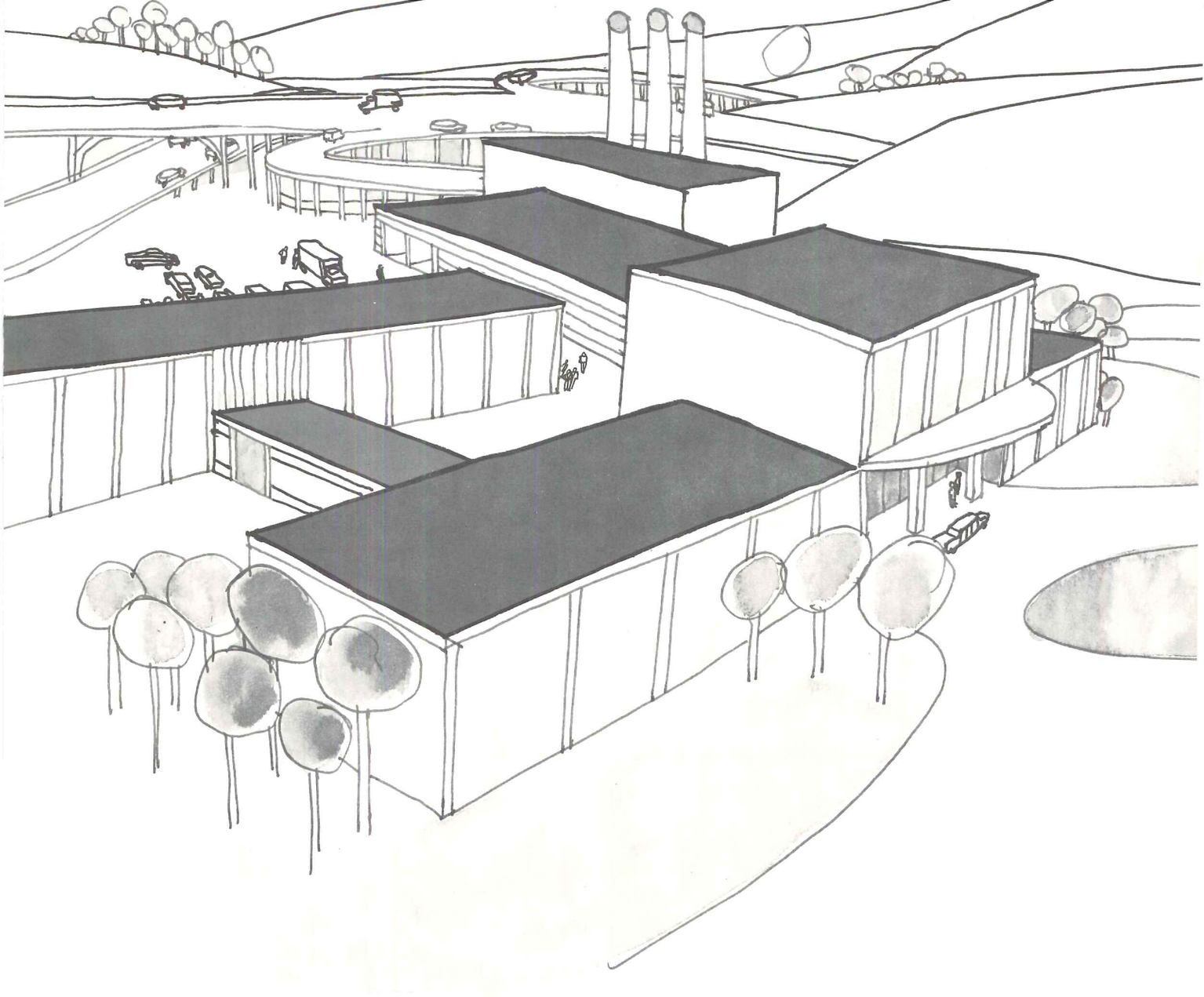

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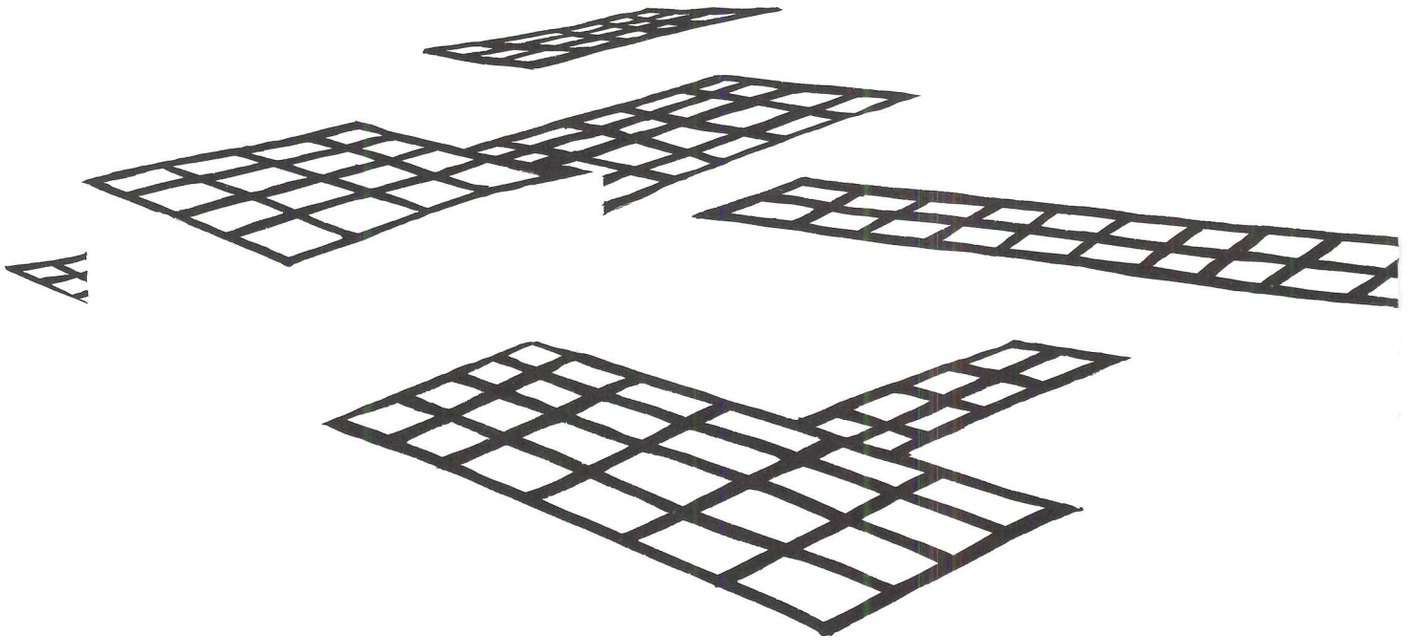

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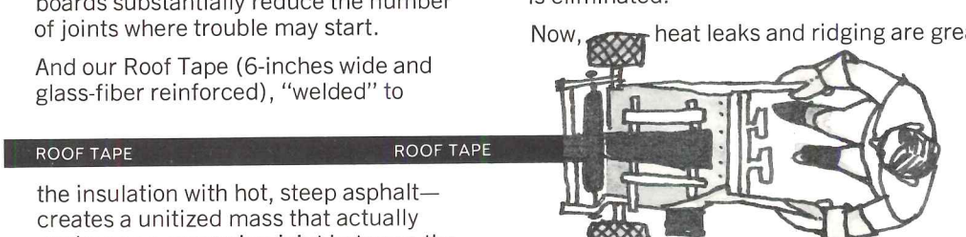

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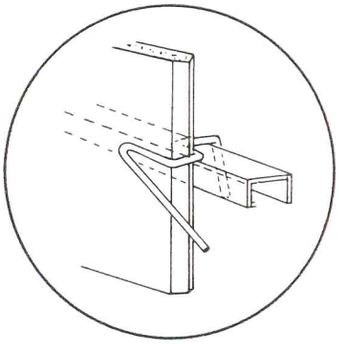

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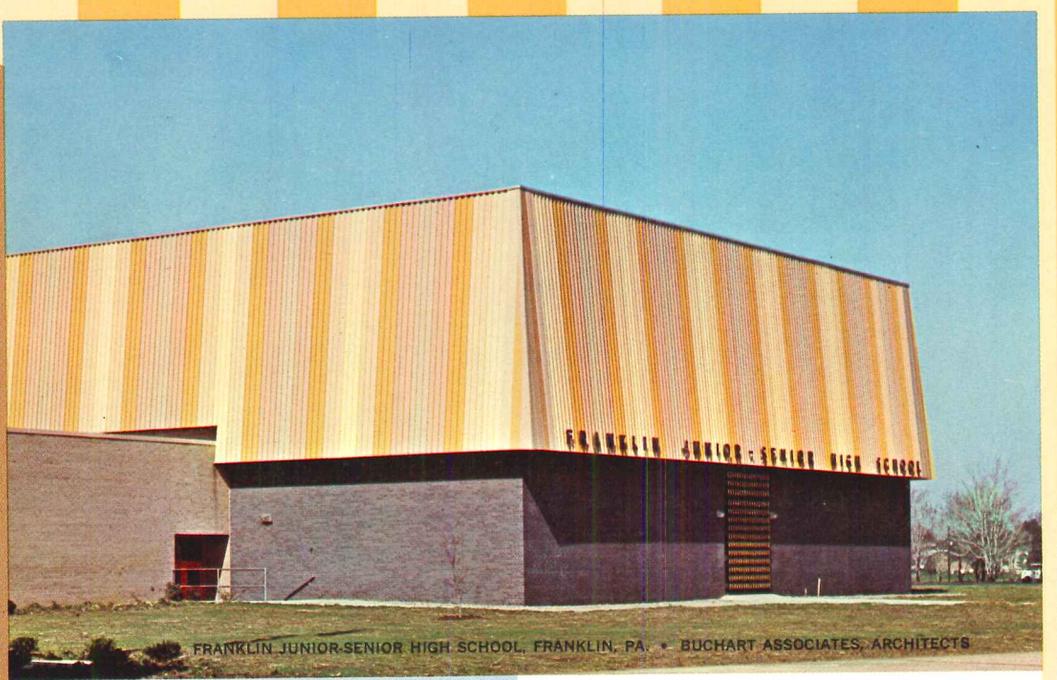

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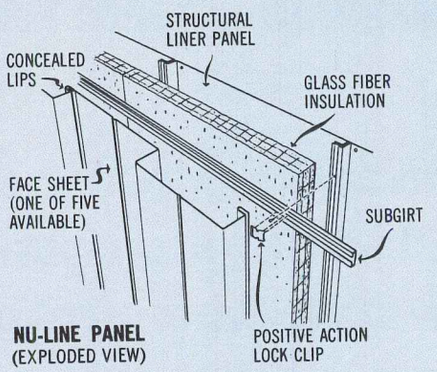

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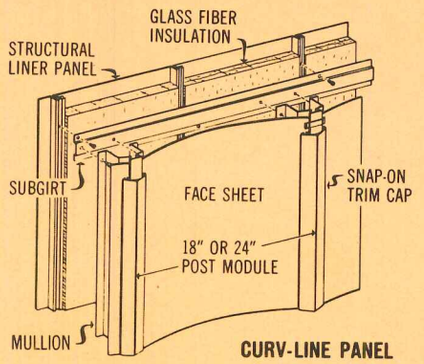

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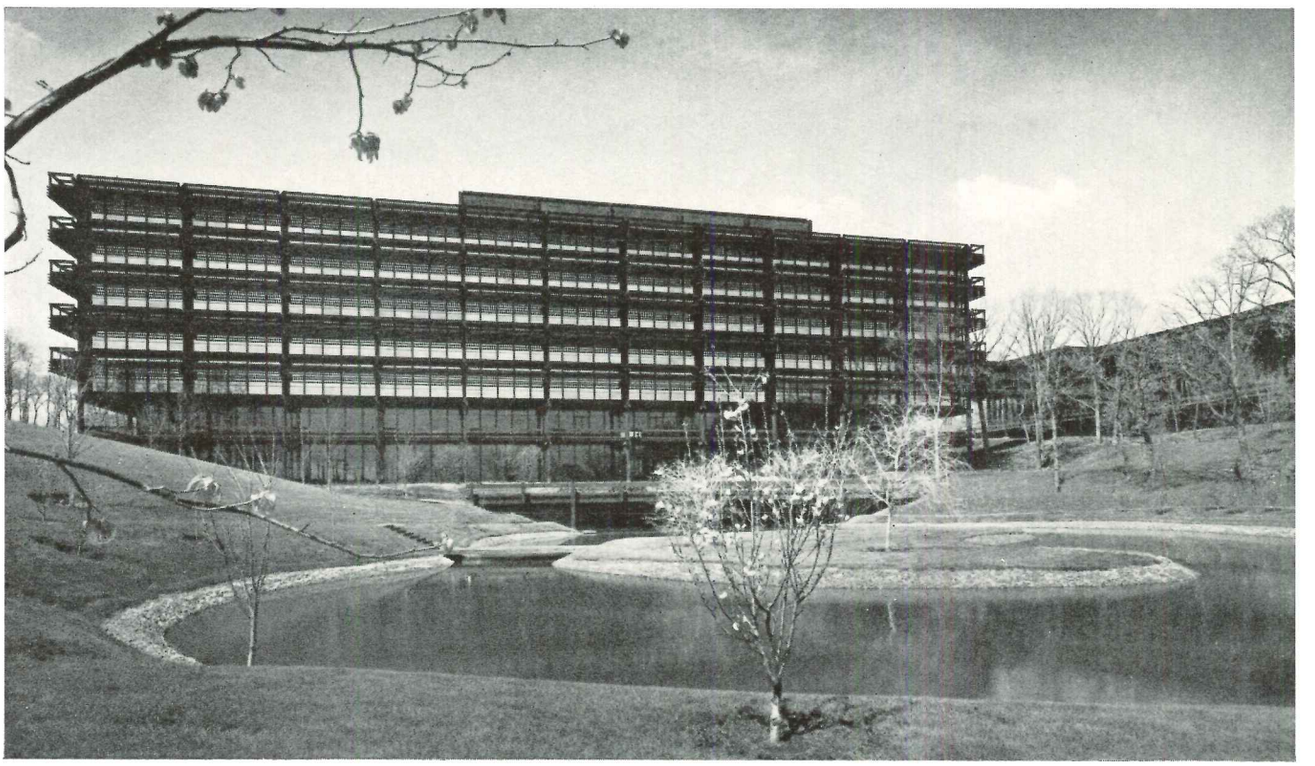

The Deere & Company Administrative Center is placed in beautiful, wooded surroundings at Moline, Illinois.
Architect: Eero Saarinen & Associates / General Contractor: Huber, Hunt & Nichols.

Regarding their new structure, Deere & Company management says: "This new Deere headquarters is the product of seven years intensive planning and of building to handle the Company's present and future needs for adequate and efficient housing for its administrative staff.

"To be successful, office buildings must be designed and planned for people in such a way as to enhance their working together in complex organizations. The best office buildings in this sense require the best talents of master architects. The Deere & Company Administrative Center was designed by the late Eero Saarinen, one of the most eminent and creative architects of recent times." The Montgomery Elevator units, with MEASURED-DEMAND automatic control, that serve the Center are ready to provide vertical transportation for Deere's 900 administrative staff for many, many years to come.

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BUILDING TYPES STUDY 340: THEATERS AND AUDITORIUMS

BETTER ARCHITECTURE FOR THE PERFORMING ARTS

"Speak the speech, I pray you, as I pronounced it to you, trippingly on the tongue. But if you mouth it, as many of our players do, I had as lief the town crier spoke my lines. Nor do not saw the air too much with your hand, thus, but use all gently . . ."
SHAKESPEARE: *Hamlet,* III, C.1601

Were Hamlet instructing the three Players from a seat not too near the stage in a badly designed multi-purpose auditorium, he might indeed settle for the town crier. As he strained forward to hear the lines of his little play, he might also wish for an exaggerated gesture or two, since he would be unable to discern the expressions on the Players' faces. Hamlet, discouraged, would probably have forsaken the drama, to devise some other way to give the King and Queen of Denmark their moment of truth.

Good acoustics and visual perception are the essential, shaping demands for contemporary theaters and auditoriums. American audiences are pampered by home TV and high-fidelity. A significant segment of this audience has well developed taste.

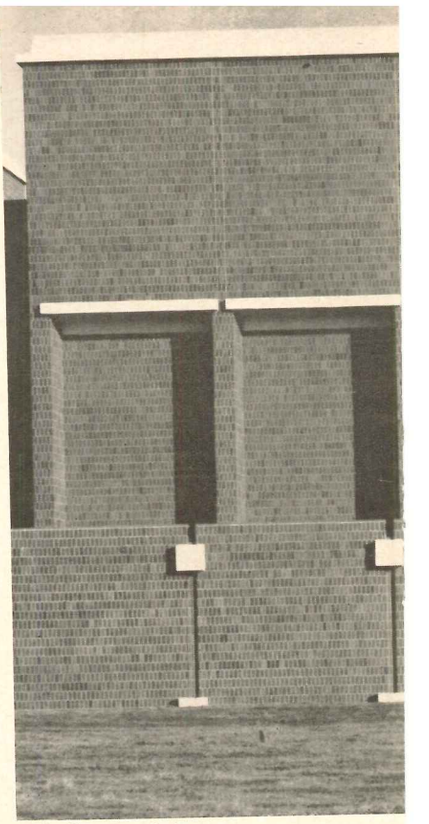
Other exacting forces are adding to the clamor for better architecture for the performing arts. The "grass roots" music and drama professionals have a great deal to say when a building they expect to occupy is being planned. Philanthropic sources are financing research in theater technology and paying for the time consumed in reaching solutions to difficult programs.

Have the performing arts changed so much that no architect can design a decent hall to house them without a foundation grant and a flock of consultants? In 1926 Bernard Shaw could write in the New York Herald Tribune: "The 19th century has left our cities stuffed with pestiferous playgoer barrels in which the unfortunate playwrights and actors were expected by sheer force of entertaining power to set up an attraction that would counterbalance the greatest discomfort of the greatest number. There is a tradition of discomfort in the theater dating back to a time when ground rents, which now make it compulsory, were comparatively negligible. . . . It was the business of the play and of the actors to hold you spellbound and forgetful. . . ."

The arts of music and drama have not lost this power, but today they are performed in new contexts which serve to diminish their impact. Box office considerations are making new urban theaters and auditoriums too big for good acoustics and vision. Shaw's "pestiferous playgoer barrels" are too small, but at least the playgoer can see and hear in them. Many 19th-century concert halls are also too small and crowded for comfort, but a number of them including Boston's Symphony Hall are considered excellent for musical acoustics. Frequently today one great new civic all-purpose hall must serve opera and symphony, conventional drama, experimental theater, musical comedy, chamber music or other art forms. Campus halls for the performing arts are not necessarily oversize, but high costs often force a single multi-purpose design.

The major planning problem, for which so much research and consultation becomes necessary, is derived from these two basic circumstances which affect sight and hearing; the need for bigness and the need for flexibility. The theaters and auditoriums which appear on the following pages are interesting solutions. They include campus and urban theaters, big halls and small, flexible and single purpose spaces. Their dimensions have been shaped by technical criteria under architectural control.

—Mildred F. Schmertz



Shin Koyama photos

Flexible Design for the Performing Arts

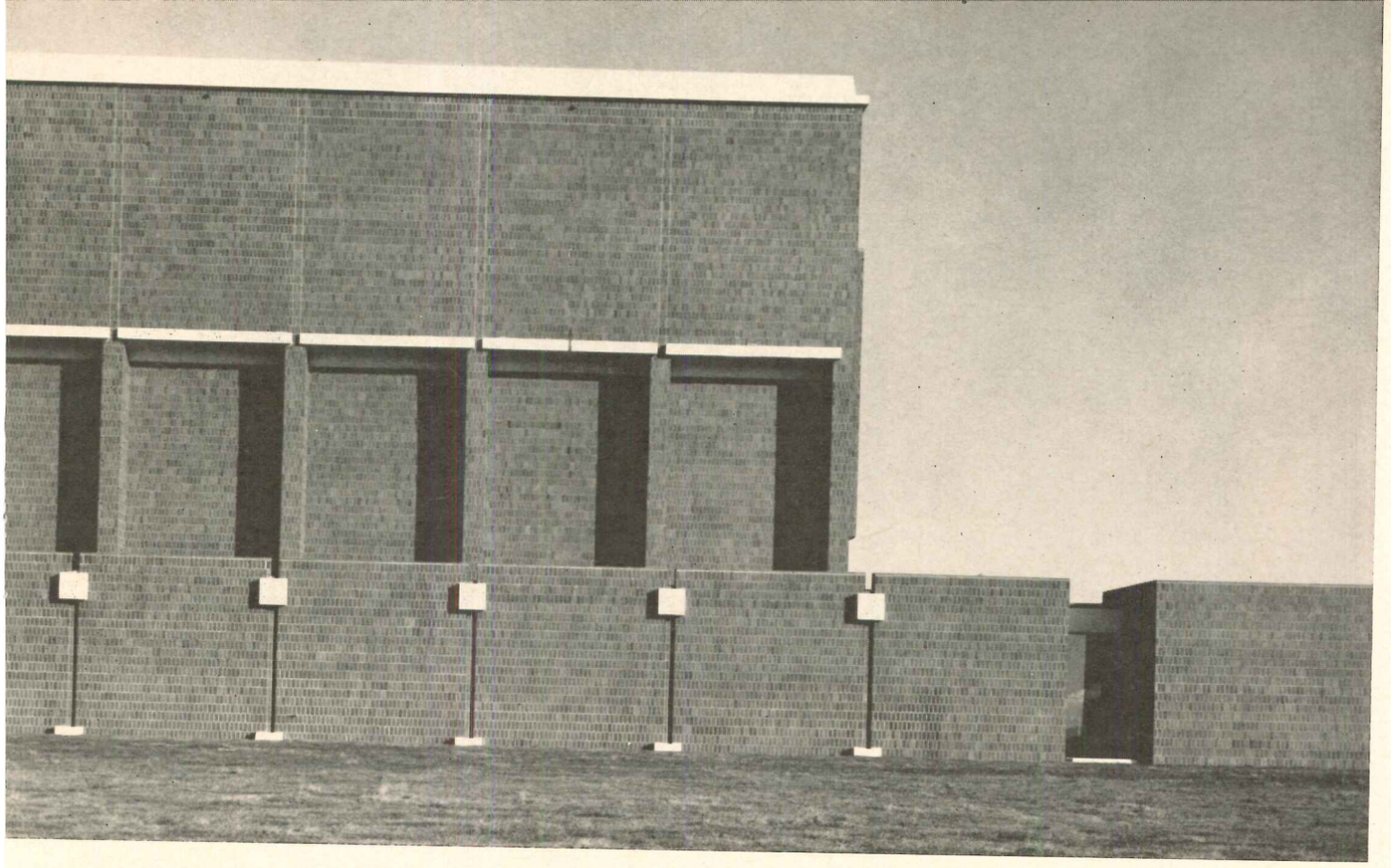
Benedicta Arts Center
College of Saint Benedict
St. Joseph, Minnesota

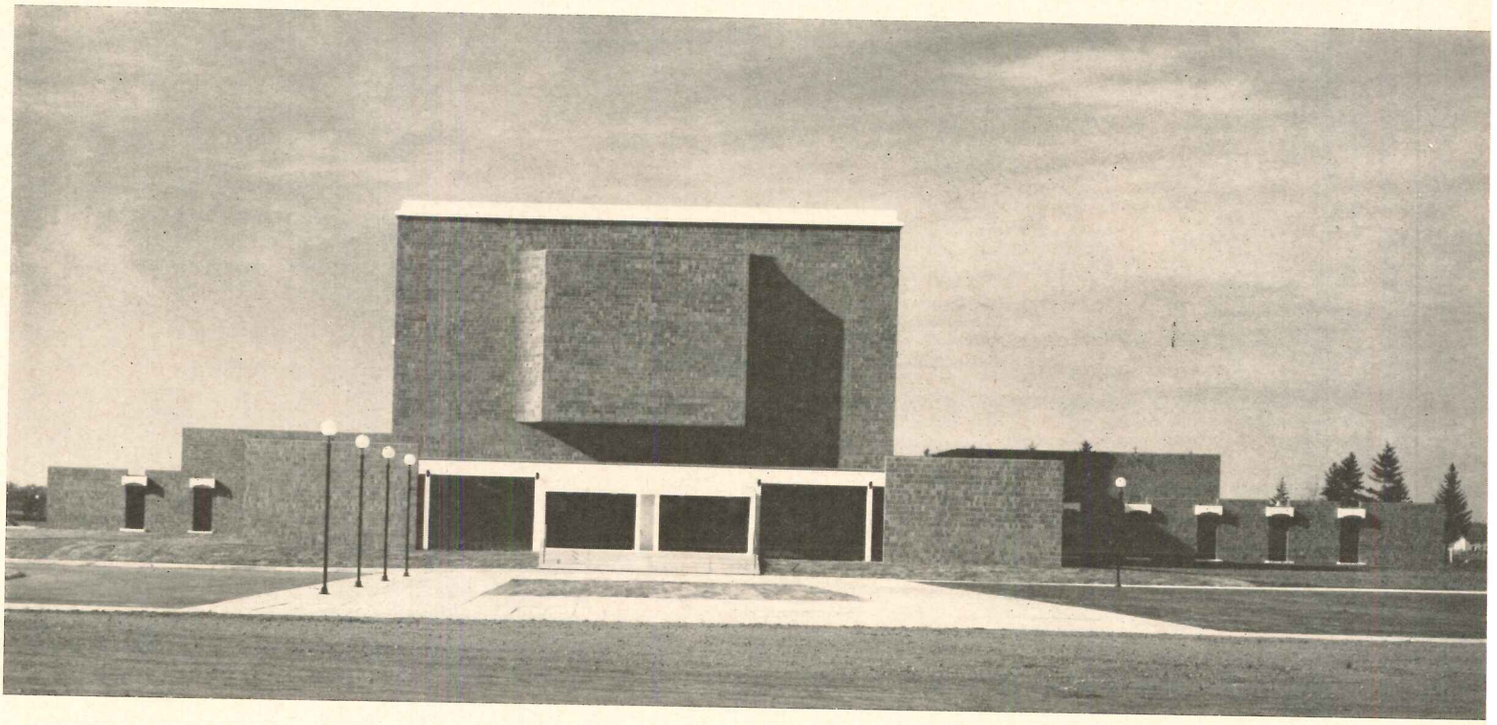
Central Minnesota's new $2,750,000 arts center completed this fall combines art, music, speech and drama facilities for a small women's liberal arts college for 600 to 800 students, which is owned by the Sisters of the Order of Saint Benedict. The arts center boasts two multi-form spaces, one an auditorium and the other a theater, which are served and connected by a common stage house. These spaces offer a number of stage and seating arrangements which adjust to the requirements of the many kinds of musical and dramatic performances planned for an active center which hopes to become the cultural nucleus of the surrounding community.

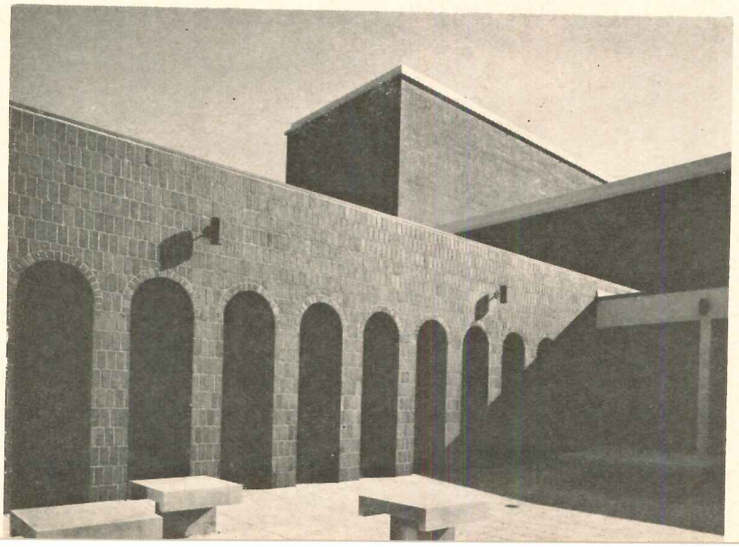
Architect Curtis Green, of Hammel, Green and Abrahamson, Inc., architects and engineers for the arts center, has described the development of the design as follows: "Due to the size and financial limitations of the college, the nuns were obviously thinking of only one auditorium for both theater and music. During a meeting attended by Russell Johnson of Bolt, Beranek and Newman, Inc., the acoustical consultants, we determined that standards of acoustical and visual quality for type of performance, and requirements for flexibility of use and scheduling would not be adequately satisfied by one multi-purpose hall. An auditorium and theater, each with its own stage, required too big a jump in the budget, so a solution providing flexibility of staging within one stage house as well as within the auditorium and theater was sought. It was agreed that the theater must necessarily have the most frequent access to the stage house, and that most speaking and music programs could be more successfully produced from within the limits of the auditorium by not extending into the stage house. It is generally agreed that an orchestra located behind the proscenium under a high stage house requires a sound-reflective enclosure. Such a shell, unless it were completely mechanized would have to be assembled and taken apart by the nuns and women students. No shell device seemed as sound a solution as designing the auditorium to function independently of the stage house, except for opera and other special types of performance. We therefore located the 20-ton sound isolation door between the auditorium and stage house."

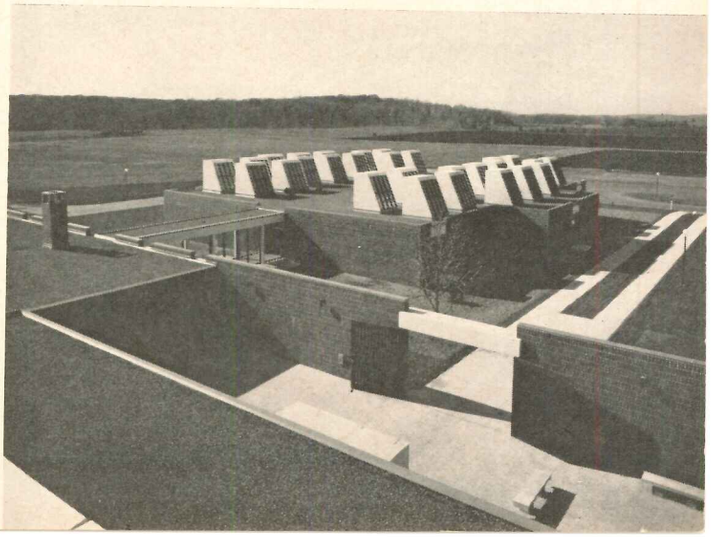
Above: Facade of auditorium and wall of surrounding court. The projection at the upper level on the sides of the auditorium provides a continuous walkway around the auditorium for servicing the moveable sound absorption (burlap draperies), the catwalks and follow-spot areas. The brick is laid in a paving pattern for the exterior and interior faces of the exterior wall. Entrance (*right*) is main approach to auditorium

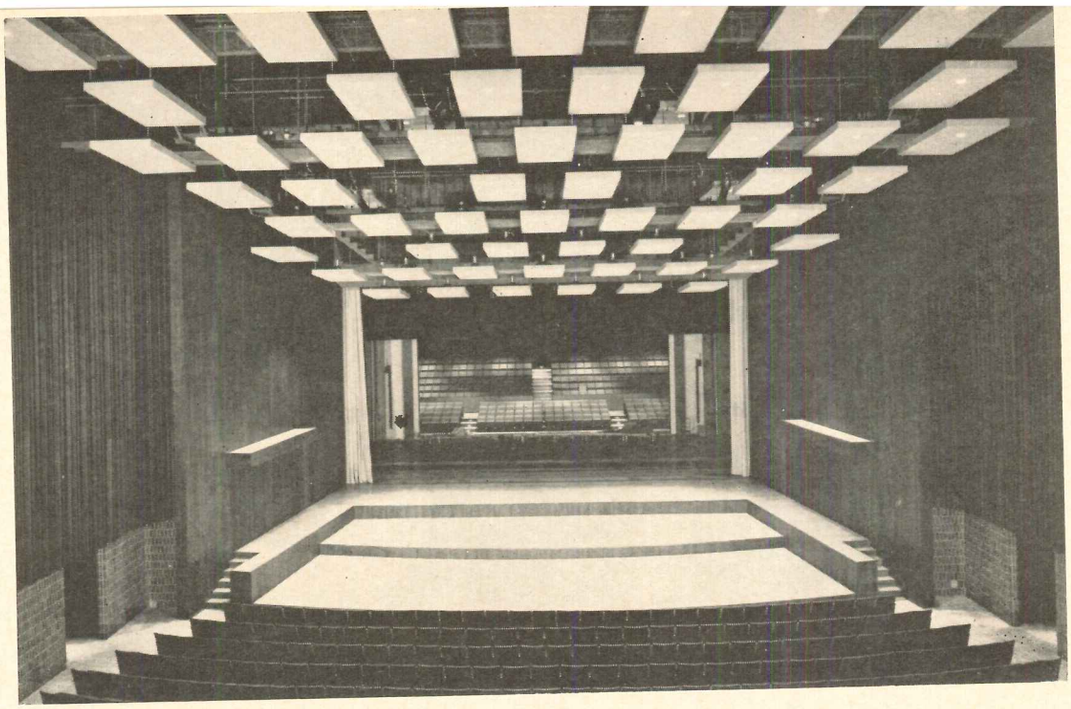
Said architect Curtis Green: "This building is constructed on wide open, flat land, and therefore we tried to create some protected inner spaces where art and sculpture could be placed and be accessible for viewing in the out-of-doors." Skylights (*far right*) illuminate studio classrooms

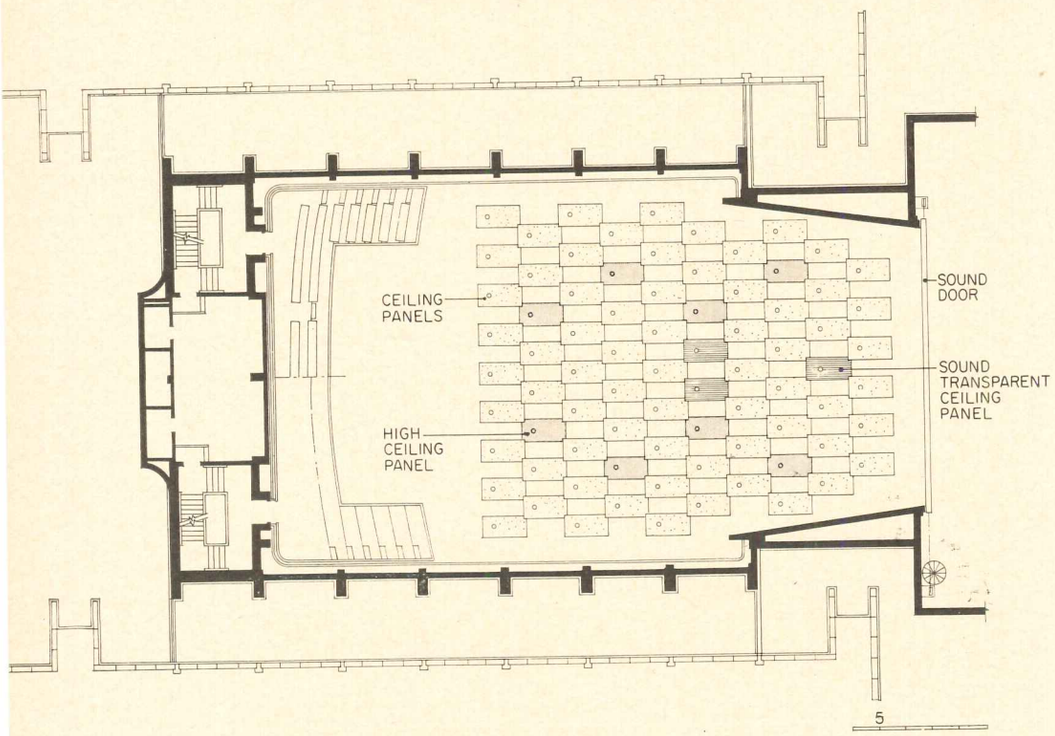




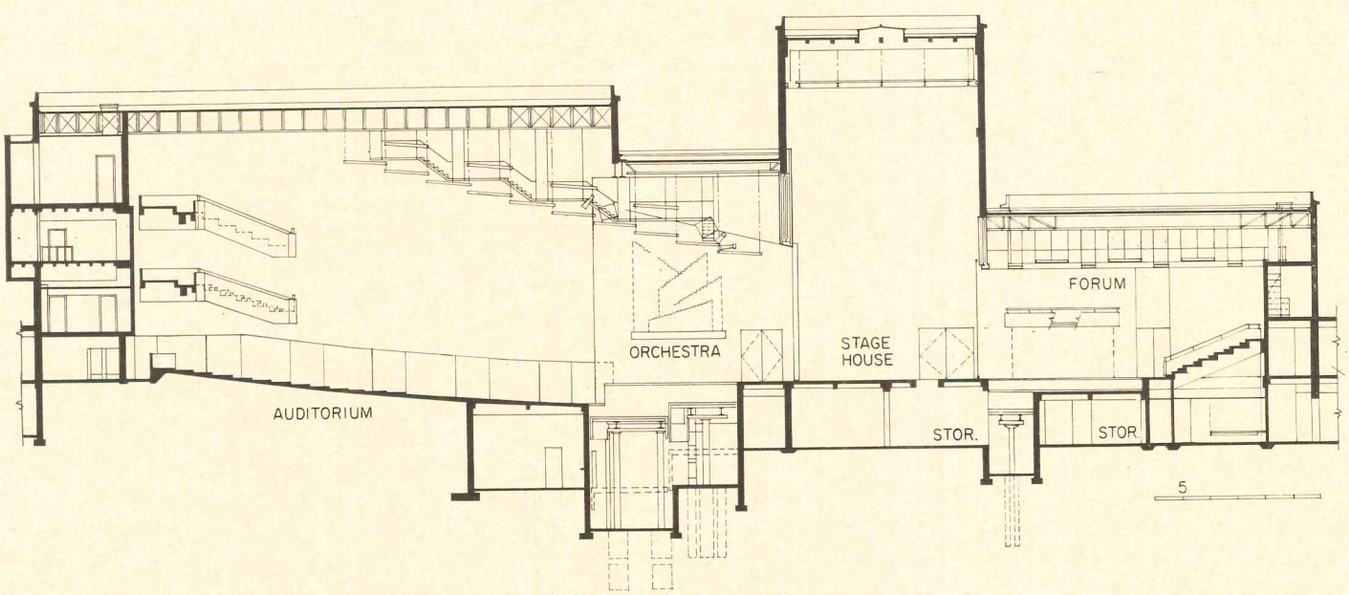








The photograph *(above)* and the plan *(left)* show the pattern of acoustic "clouds" in the auditorium. The Minneapolis Symphony Orchestra conducted by Stanislaw Skrowaczewski gave the second concert in a series of dedicatory programs which commenced this fall. The conductor told college officials he rated the auditorium among two or three of the best in which the orchestra has played. The director of the United States Marine Band which had played there earlier also praised the acoustical quality of the hall. The photograph was taken from the lower balcony in the auditorium and shows the stage house with the sound door lifted and the theater beyond. The performing area is surrounded on the three sides with hardwood paneling. The vertical slats conceal the moveable sound absorptive burlap draperies used for acoustical adjustment



The plan (*top right*) and the section (*across-page bottom*) indicate the built-in flexibility of the scheme. In the 1,000-seat auditorium, the first elevator (audience side) will serve as the orchestra pit for operas using the stage house and forestage. The second elevator when raised extends the forestage allowing the singers to occupy positions which are well into the auditorium, an improvement over acoustical conditions in most modern opera houses where much of the singer's vocal power is lost in the stage house.

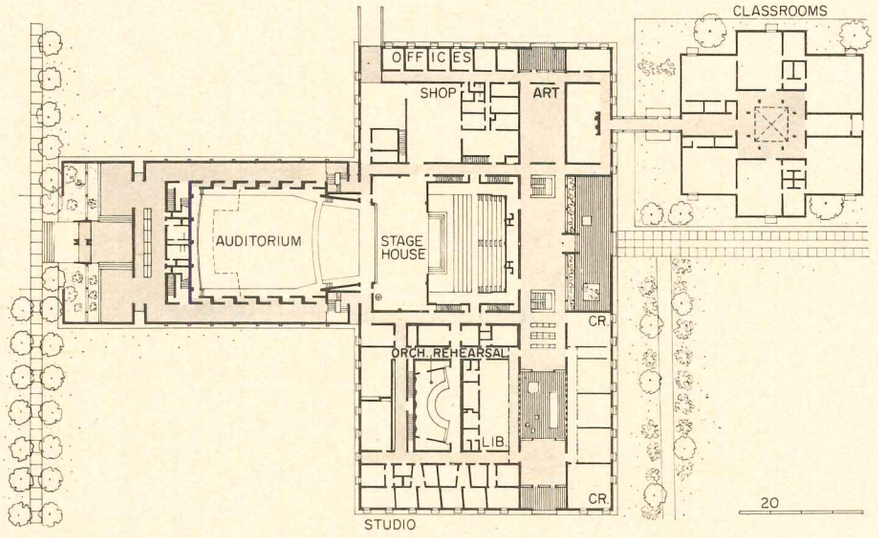
Both elevators can be lowered in steps to provide risers for visiting symphony orchestras as shown in the photograph (*right*). It is possible, by lowering the second elevator and raising the first, to have dancers or performers on the first, the orchestra pit in the second, and a choral group on the forestage or in the stage house.

Both elevators when brought level with the lower end of the raked auditorium floor create space for 200 additional seats for performances where only the forestage or stage house are used.

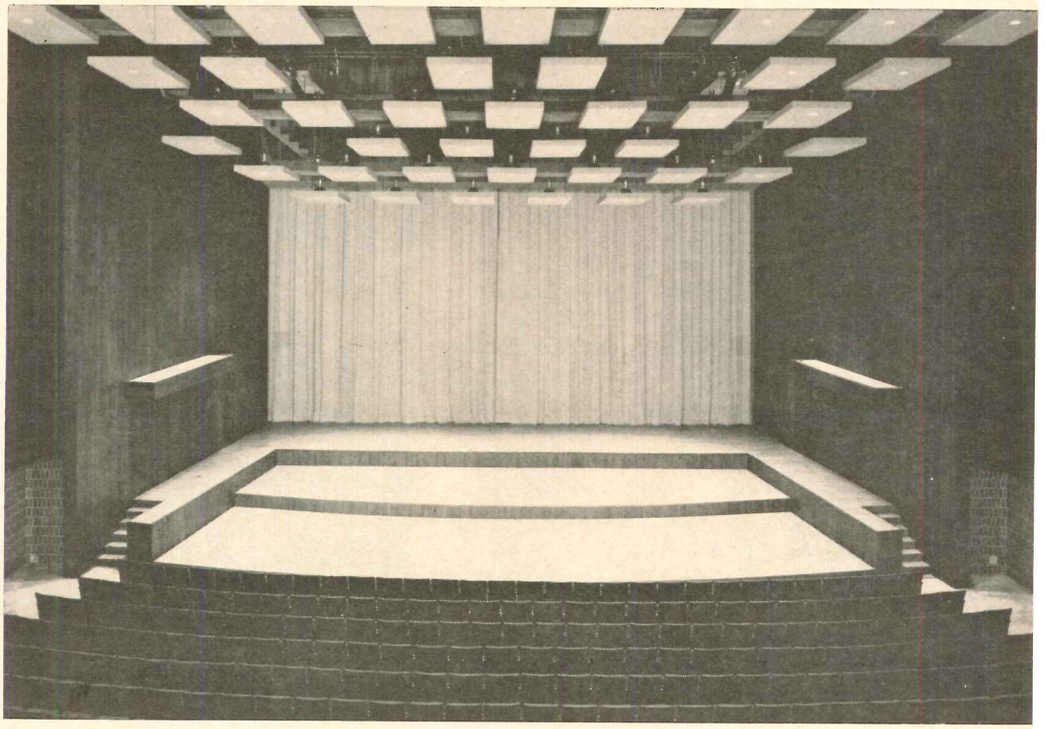
The 350-seat theater (called the Forum by the college) serves as a large lecture room, recital hall and meeting room as well as a facility for the dramatic arts. The stage house is separated from the theater by means of the traditional proscenium opening. It is a simple rectangular room with fixed seating for approximately two-thirds of the audience. The remaining one-third is seated on the same type of seat, mounted to non-mechanized moveable seating wagons. By raising the orchestra pit-forestage elevator, and moving the seating wagons to the sides, it is possible to convert this room to a projected or open stage arrangement with three-quarter round seating, ideal for acting, recitals, chamber music and as a lecture demonstration area.

The plan permits the use of both auditorium and theater facilities at the same time with only moderate acoustical isolation between the two rooms required. Both rooms can be "tuned" acoustically by operating push button sound absorptive burlap draperies behind the wall battens.

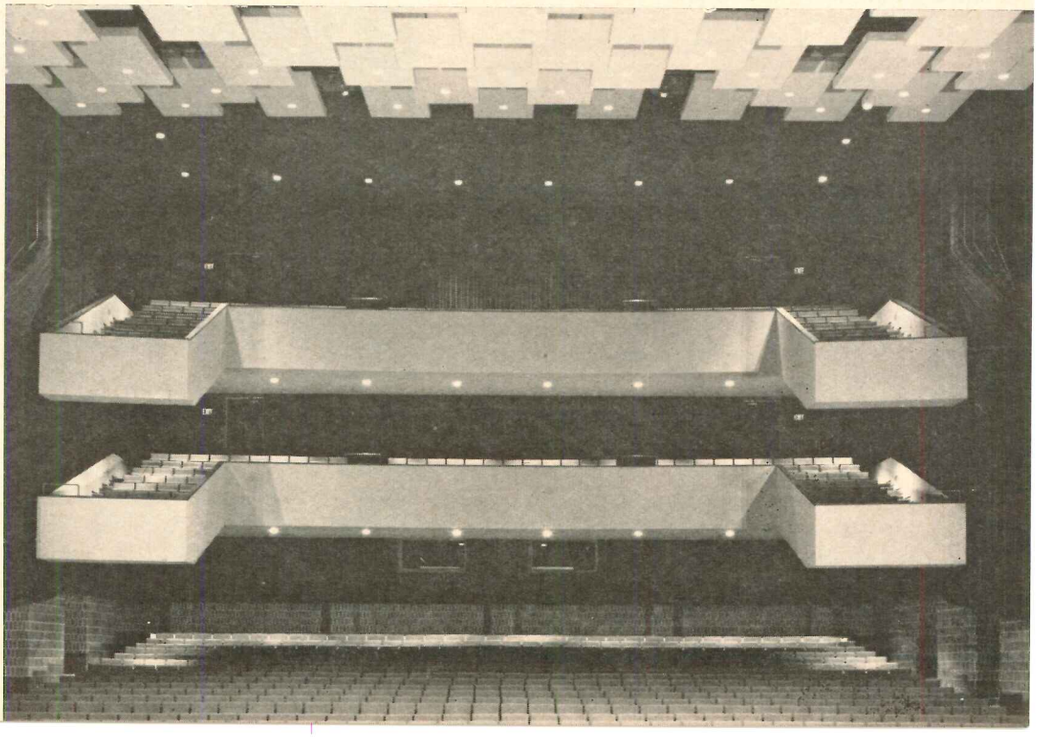
Architects and engineers: *Hammel, Green and Abrahamson, Inc.; acoustical consultants*: *Bolt, Beranek and Newman, Inc.; landscape architect*: *Mr. Charles Wood*

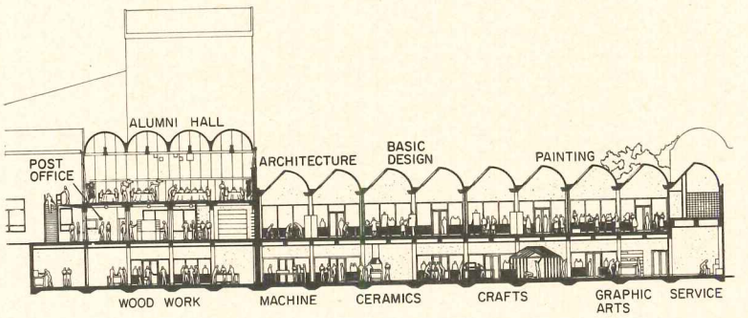


Stage arrangement for orchestral performance

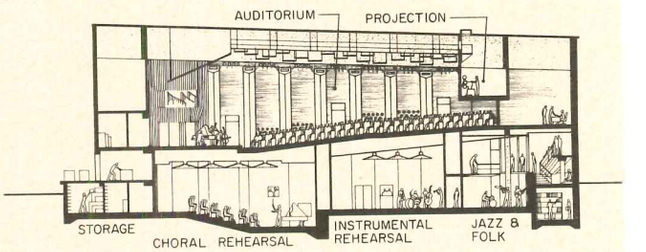


The balconies seat 125 persons each





SECTION C-C

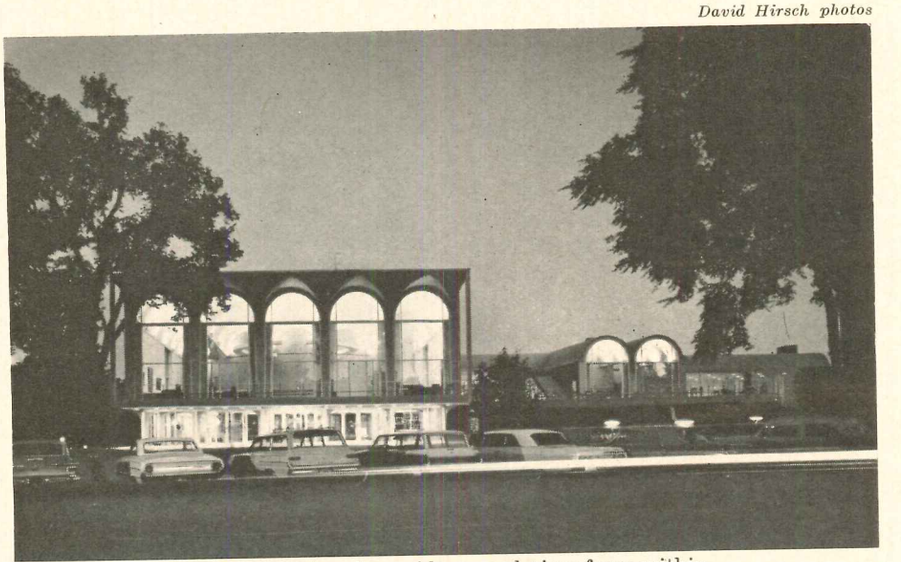


SECTION B-B

Campus Center Designed to Provide Creative Arts Context for Social Activities

Hopkins Center
Dartmouth College
Hanover, New Hampshire

David Hirsch photos



Glass facades attract interest and provide a good view from within

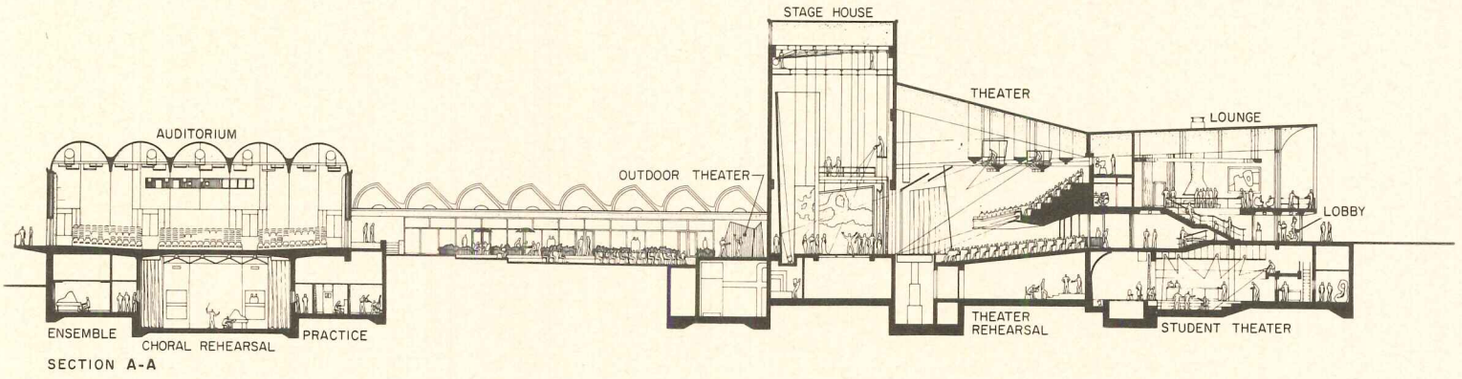
Early in the planning stages of Hopkins Center, college president John S. Dickey called for a building which would provide "both a physical focus and a significant context for the social life of the college . . . (to) expose all of our students to painting, sculpture, architecture, music, poetry, print making, woodworking, the craft arts and the theater."

Both the program for Hopkins Center and its architectural solution by Wallace Harrison and project architect Walter Colvin are considered valuable prototypes for new campus fine arts centers being planned elsewhere in the country.

The center includes, in addition to spaces for social gathering: a 900-seat auditorium designed to accommodate an entire class for music, films and large lectures; a 450-seat theater for dramatic performances and lectures with generous supporting space; and a smaller arena theater. Facilities for art and architecture are included. All these areas are opened up as much as possible toward major circulation spaces so the undergraduate "sidewalk superintendents" may see others at work in the arts.

The theater director asked for and got a proscenium stage augmented by side stages and a forestage. The arena theater at the ground floor of the center can be used for theater-in-the-round or as a proscenium stage facility although it is not ideal for either. It is non-mechanized. In

Auditorium and large lecture hall



SECTION A-A

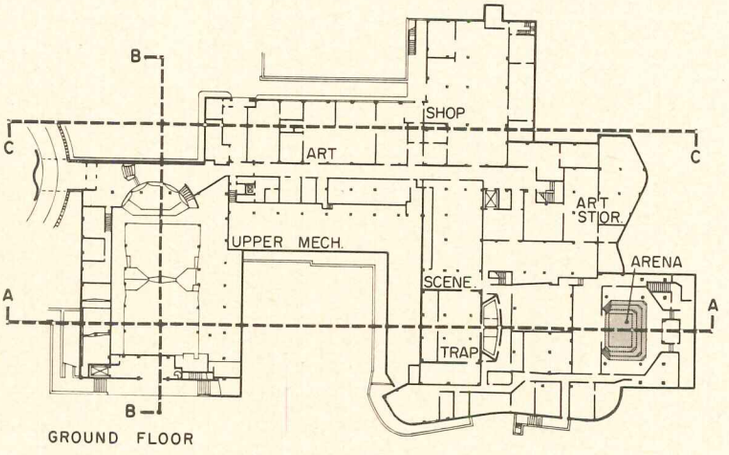
the view of the college, its inclusion in the scheme made it unnecessary for the main theater to be a multi-form facility. Since both the main theater and the arena theater are part of a liberal arts rather than a professional drama curriculum, the college did not wish to invest in the mechanization a single truly flexible multi-form theater would require, on the theory that non-professional students should not be required to master the technology of the mechanized theater. Many theater specialists consider the Loeb Drama Center at Harvard overly mechanized for its purpose.

In the main theater horizontal and vertical sight lines are excellent as the plan and section respectively show. Theater side stages when not required by the type of performance are closed off by folding panels shown to the left and right of the forestage in the main floor plan. Two doorways at the rear of the stage house provide access to the outdoor theater in the courtyard beyond. In the theater as shown in section A-A note the short distance from the proscenium wall to the last balcony seat, a length of approximately 60 feet, which offers the quality of intimacy between audience and performer.

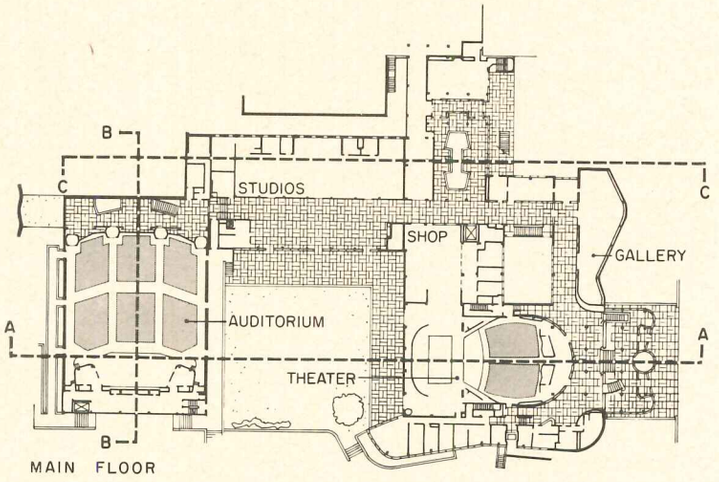
The acoustical panels shown in the photograph (*opposite-page bottom*) are hung below the five barrel vaults over the auditorium which are shown in section A-A (*above*).

Total cost of the center was approximately $7,500,000.

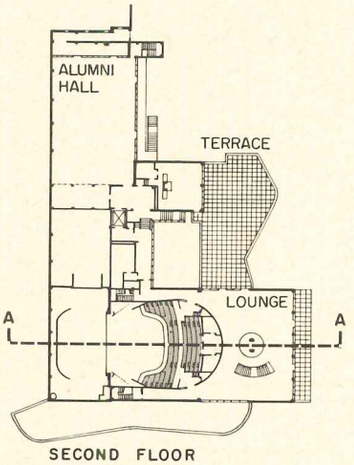
Architects: Harrison & Abramovitz; consulting architects for the college: Campbell & Aldrich; structural engineer: Paul Weidlinger; mechanical and electrical engineers: Syska & Hennessy; acoustical engineers: Bolt, Beranek & Newman, Inc.; theater consultant: Edward C. Cole



GROUND FLOOR



MAIN FLOOR



SECOND FLOOR

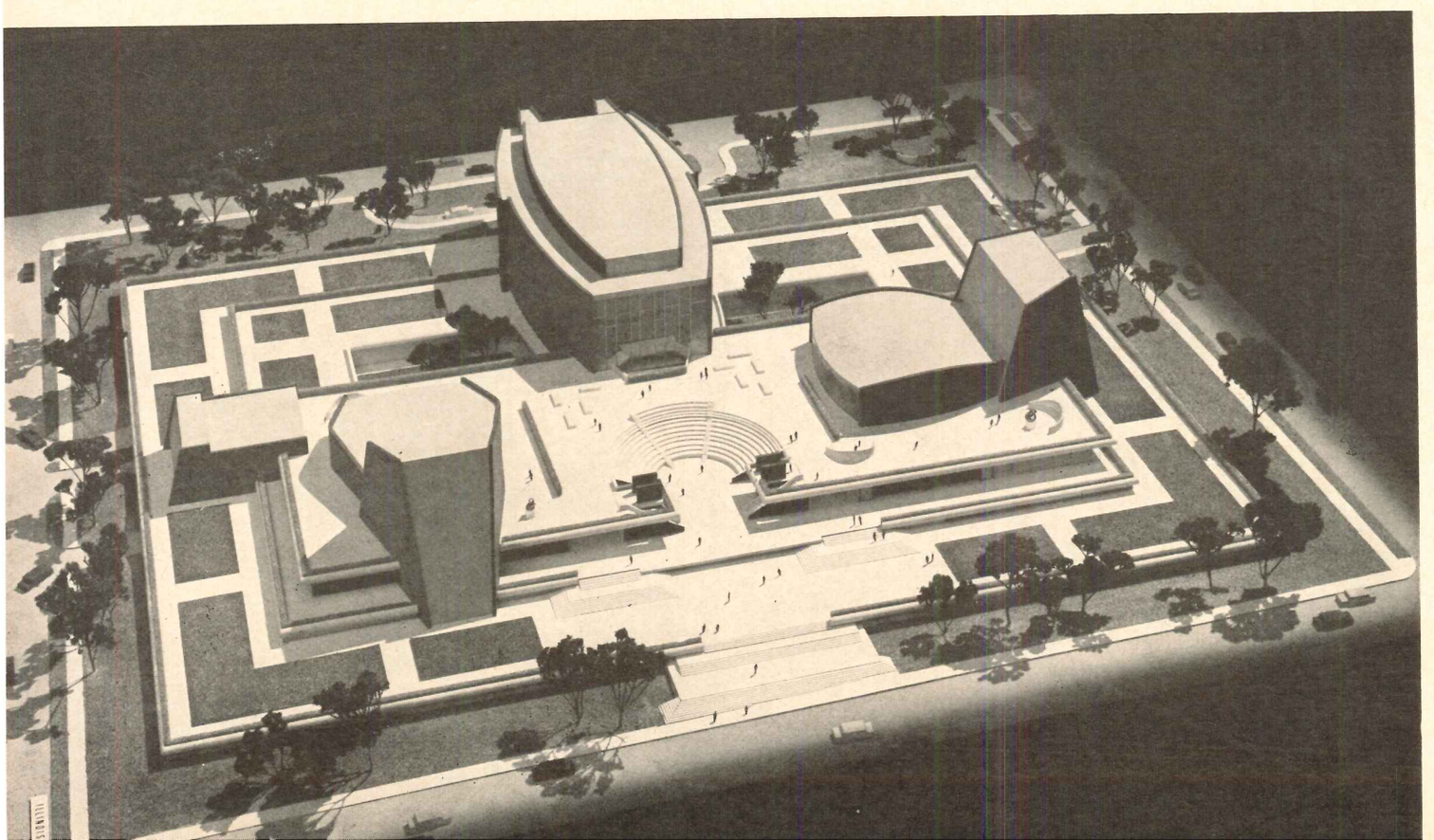
Four Single Purpose Halls for a Performing Arts Center With a Big Budget

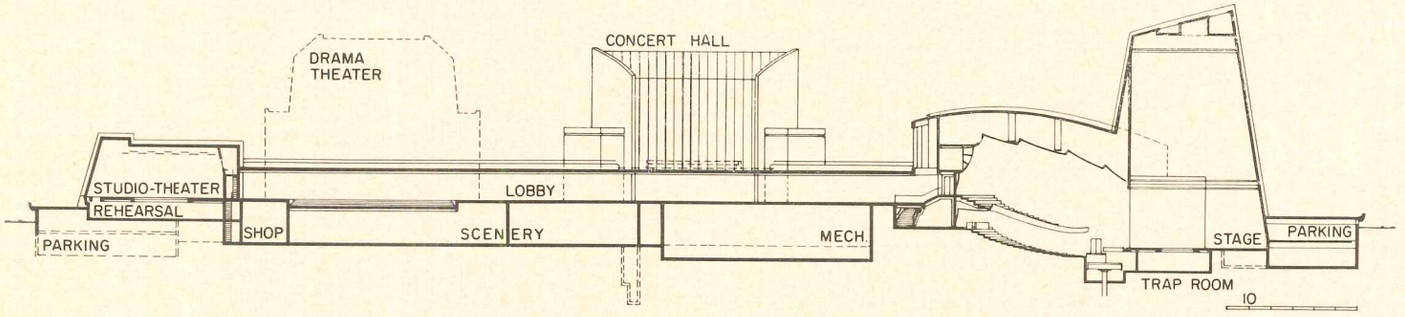
Krannert Center
for the Performing Arts
University of Illinois

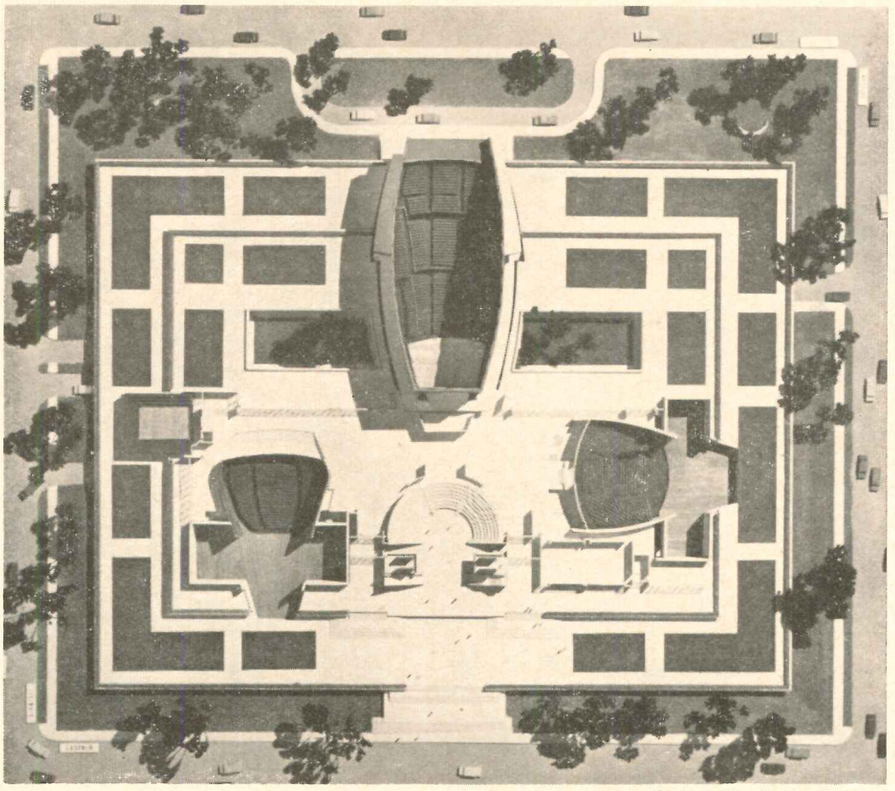
Most architects designing tightly budgeted campus performing arts centers, or theater and music facilities in campus fine arts centers, must concern themselves with flexibility of use, and provide within a single space multiform arrangements for the differing acoustical and visual requirements of the basic types of performance. Architects designing drama and music facilities for civic performing arts centers which must realize a financial return are frequently forced to make the halls much larger than they should be for optimum performing conditions, to provide enough seats to pay the bills. At this point the architect and his consultants must begin adjusting shape, seating arrangements, cubic volume and special acoustical devices in an effort to strike a compromise in which orchestral or chamber music, opera or dramatic theater appear and sound to some advantage in halls too big for any of them.

Architects Harrison and Abramovitz have contended more than most with these problems, so it seems quite proper that they should at last be commissioned to design a $14,325,000 campus performing arts center which Max Abramovitz calls "deluxe multipurpose," for which each hall will be scaled to the optimum size and shape for the type of performance it serves, and no sound amplification will be needed. For a campus site almost as big as Lincoln Center the architects are at work on a music auditorium to seat 2,200 shown at center of model, a music theater for 1,000 to the right of the outdoor ampitheater, a drama theater to seat 700 in the left foreground, and an experimental theater for 250 at the far left. The ampitheater will accommodate about 1,000 persons. Design of the halls is still under development but the basic concepts of the site have been established. The buildings are composed about a central east-west axis which bisects the music auditorium on the east and corresponds to an existing street leading west to the heart of the campus. The automobile entrance to the music auditorium is on the east. Below the plaza is the lobby level which interconnects the four halls, and below this are several levels containing classrooms, practice rooms, rehearsal areas, offices, dressing rooms, workshops and parking for 800 cars. The center will be built all at once, construction will begin one year from now to be finished for the 1967-1968 academic year.

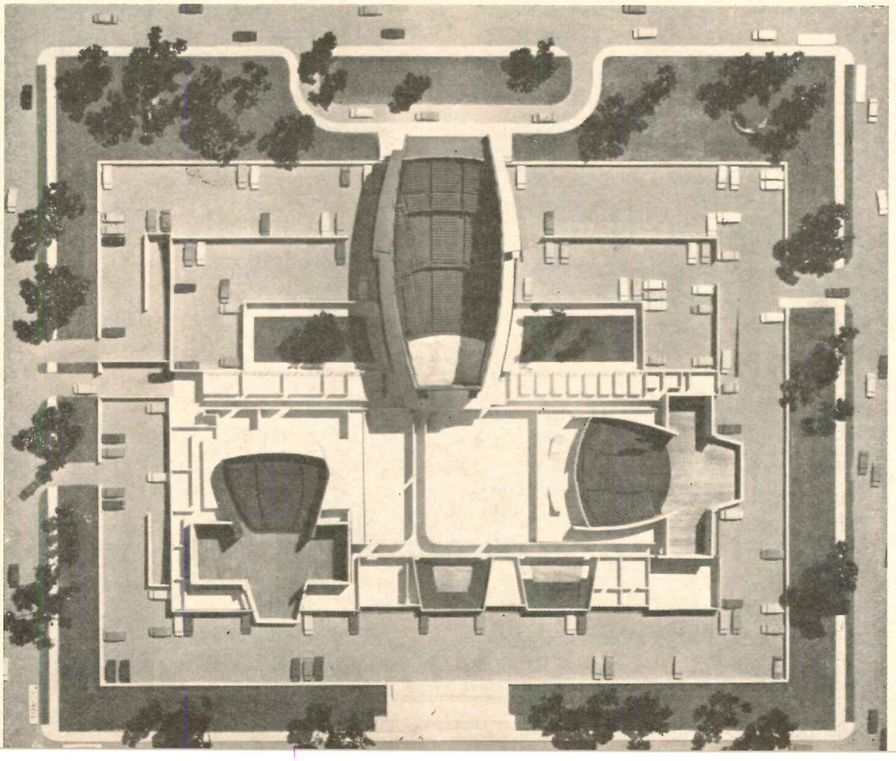
Architects: Harrison & Abramovitz; theater consultant: Jo Mielziner; theater engineer consultant: George C. Izenour; acoustical consultant: Dr. Cyril Harris







Model with roofs and plaza level removed showing interconnecting lobby and seating configurations



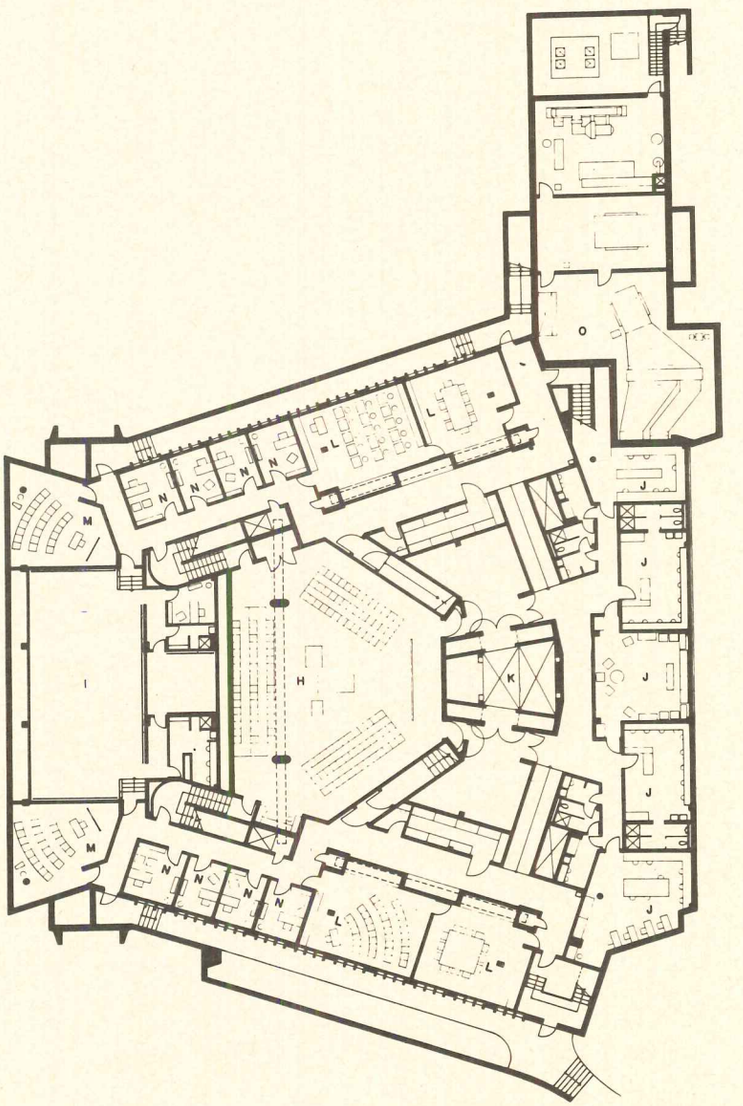
Model with lobby level removed showing classrooms, offices, shops, rehearsal rooms, storage and parking

One Multi-purpose Theater-Auditorium Adapts to Every Use

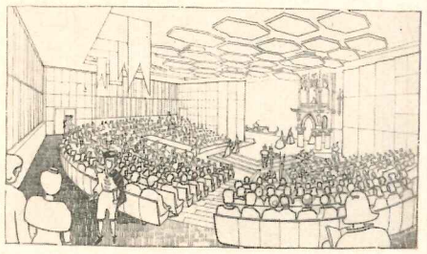
Loretto Hilton Center
for the Performing Arts
Webster College
Webster Groves, Missouri

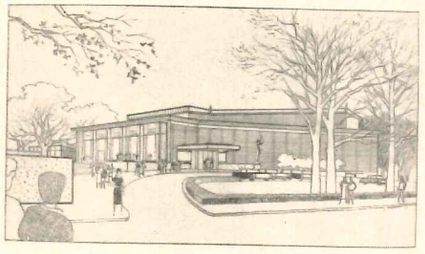
In this ingeniously developed concept, moveable sound proof walls, elevators and traps transform the acoustical and visual qualities of the space in a number of surprising ways. Webster College's $1,600,017 performing arts center now under construction and scheduled for completion in September, 1965, belongs to the Sisters of Loretto, and will serve the St. Louis community as well as the students of this 48-year-old Catholic school for women. The center is named after Conrad W. Hilton, a long-time benefactor of the Sisters of Loretto, who raised $1,500,000 for the new theater.

The college could not justify the expenditure of the sum necessary to provide a fine theater without building into it some multi-use features to serve the other arts and the college as a whole. In addition, the college administrators required that no supplementary spaces sit idle much of the time, but that all spaces be independently and simultaneously usable. This need found expression in three sloping lecture rooms—two seating 125 and one seating 250—immediately adjacent to the main room. By means of delicately balanced, vertically bi-parting, moveable wall sections formed as heavy steel girders, these normally independent teaching spaces can be opened into the main room, thereby expanding it to a capacity of 750 to 1,000 persons. By means of a simple treatment of the rear walls of each lecture area and the drama room sides of the girders, the acoustics of the entire space can be changed from absorptive for the spoken word to reverberant for musical performances. Between the flanges of the lecture room sides of the girders, concealed by sliding chalkboard panels,

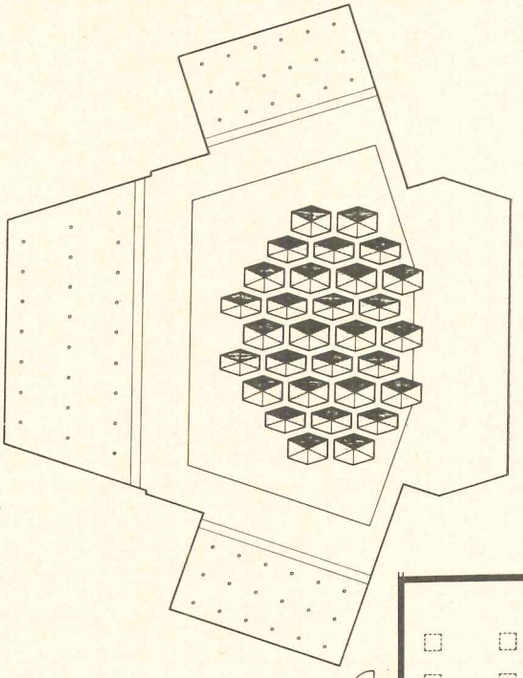


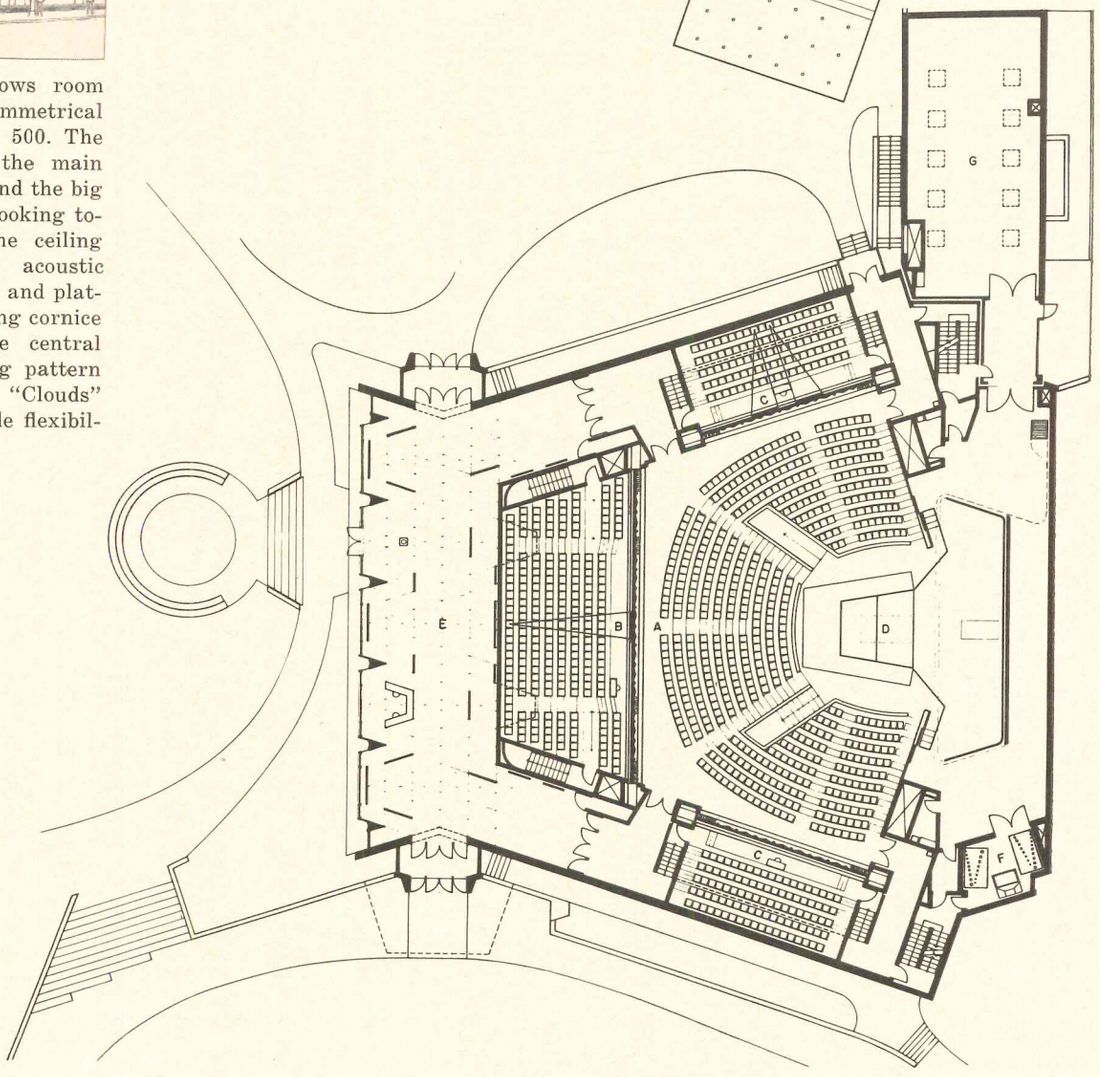
Independent and simultaneous use of the principal rooms. Lower floor: (H) rehearsal hall and experimental theater, seating 130; (I) ballet studio and recital hall; (J) green room, dressing, costume and property rooms; (K) lift room and storage; (L) four general classrooms, each seating 25 to 30; (M) two audio-visual classrooms each seating 25; (N) 12 offices of practice rooms; (O) mechanical plant detached for acoustical isolation



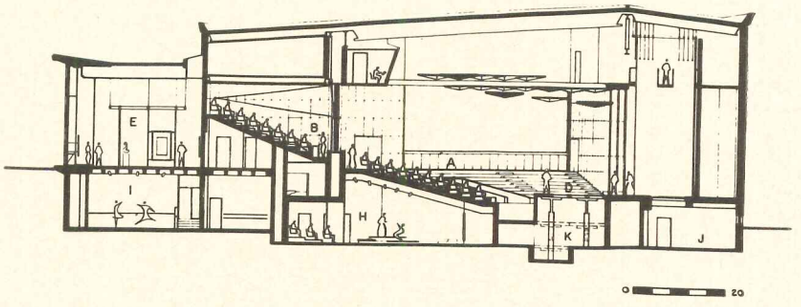


The interior perspective shows room arranged for drama with a symmetrical thrust stage and seating for 500. The exterior perspective shows the main entrance towards the street and the big north windows of the foyer looking toward the inner campus. The ceiling plan (*above right*) shows acoustic "clouds" which have catwalks and platforms above, and the projecting cornice about the perimeter of the central space, as well as the lighting pattern of the lecture hall ceilings. "Clouds" and projecting cornice provide flexibility for stage lighting





Independent and simultaneous use of the principal rooms. Upper Floor: (A) performing center, seating 500; (B) lecture hall, seating 250 and openable to (A); (C) two lecture halls, each seating 125 and openable to (A); (D) stage platform with two lifts, four traps, flexible pit; (E) foyer and exhibition gallery; (F) organ studio with mobile pipe organ chambers and console; (G) shop and receiving detached for acoustical isolation



will be storage for seats, lecterns, screens and other equipment needed for classroom use.

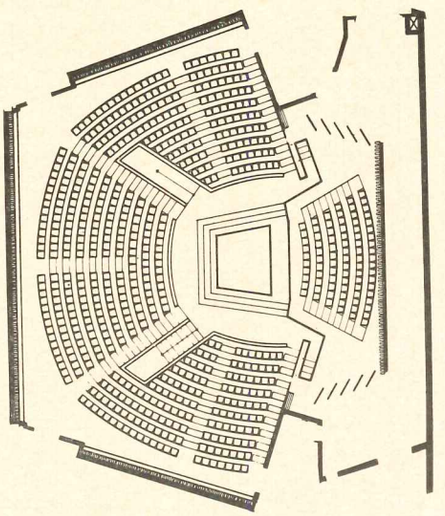
Since the program required a variety of uses of the stage, and not all were compatible with the thrust stage, great flexibility was needed in this element. The entire thrust stage and forward gutter area can, by means of two lifts and boxing, be adjusted vertically from 4 feet below the gutter level to 2 feet above this level, permitting many forms of both stage and orchestra pit in a wide range of locations. Four of these arrangements are shown.

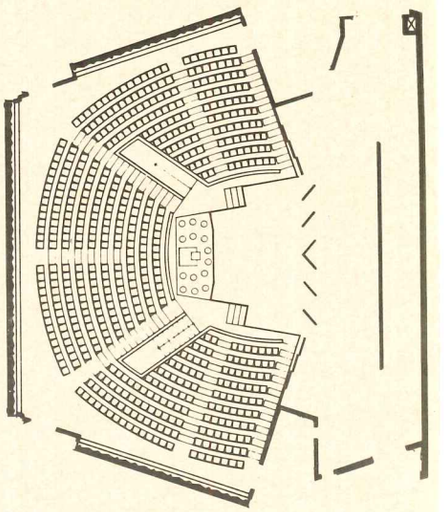
The building contains 55,000 square feet of usable floor space, and is presently under construction at a cost, completely equipped, of approximately $29.00 per square foot.

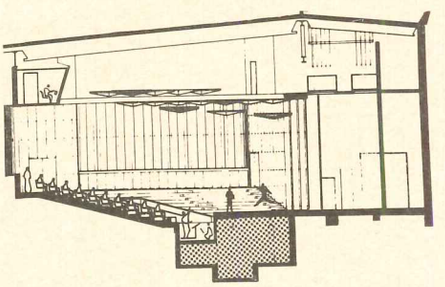
Said George C. Izenour: "This is the first instance, that I know of, where an attempt has or is being made to divide a theater auditorium into smaller units by means of elements that are of sufficient mass as to render the spaces so divided completely isolated from each other accoustically as well as visually. These elements as have been determined by previous measurement, must possess a unit mass of approximately 25 pounds per square foot and must provide in addition an air tight, or precision, fit to the opening they are designed to seal off. The solution here utilizes the density of steel fabricated in the form of plate girders of sufficient length and height to provide the required mass plus a neoprene gasketing system with sealed-in air to provide the precision fit between the moveable and static elements."

Research and consultation was made possible by Educational Facilities Laboratory, Inc.

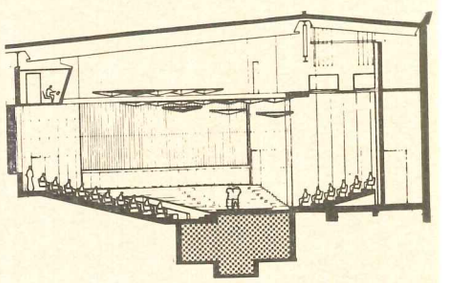
Architects: Murphy and Mackey, Joseph D. Murphy, F.A.I.A. (partner in charge of design), Theodore J. Wofford, A.I.A. (project coordinator and stage design); mechanical engineer: Paul Londe & Associates; structural engineer: Albert Alper; principle theater consultant for moveable walls, lighting and special equipment design: George C. Izenour; theater consultants: Sir Tyrone Guthrie, Jo Meilziner; acoustical consultant: Robert Newman of Bolt, Beranek & Newman, Inc.; general contractor: Gamble Construction Company



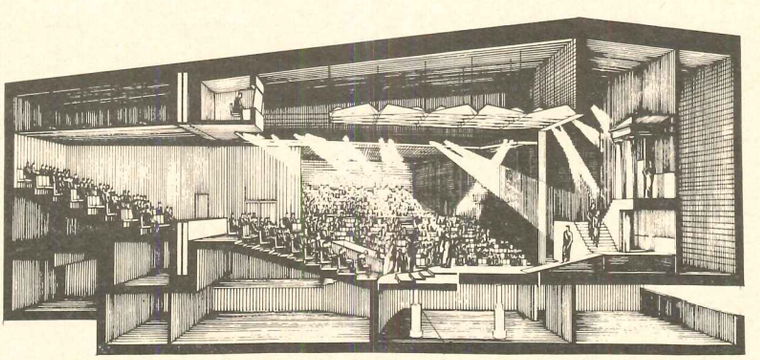




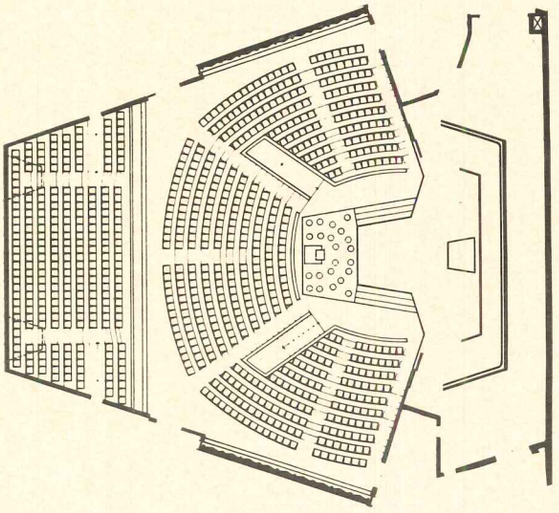
Theater in the round for 600 spectators. Fabric draperies cover the three moveable walls and cyclorama wall for absorptive acoustics for speech

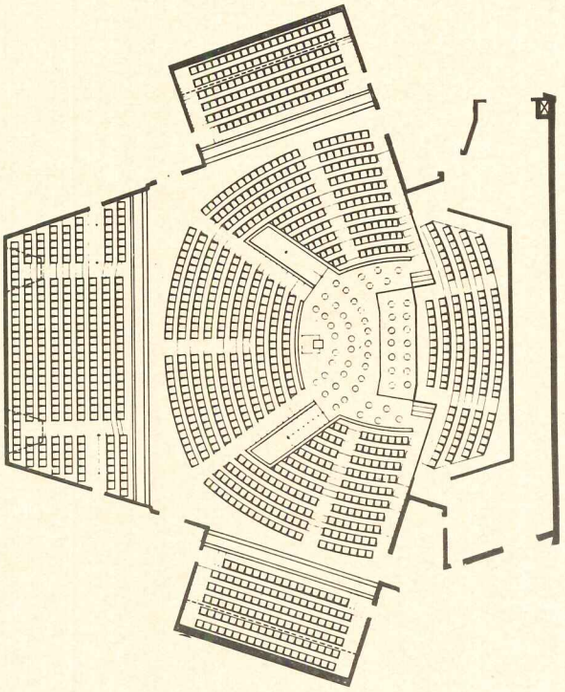


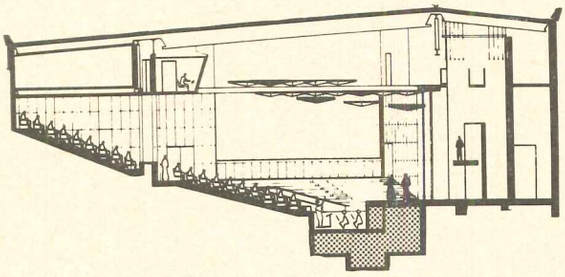
Ballet for 500 spectators performed on a thrust stage with an orchestra pit for 15 musicians. The dancing area is defined by the use of moveable wood stage panels at the rear of the thrust stage. Wood paneling is used on the three moveable walls for reverberant acoustics for music



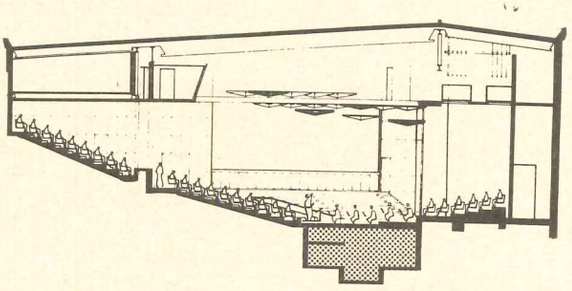
Section showing the dividing walls open for a combined single audience of 1,000. Projecting cornice and acoustic "clouds" are sources of lighting



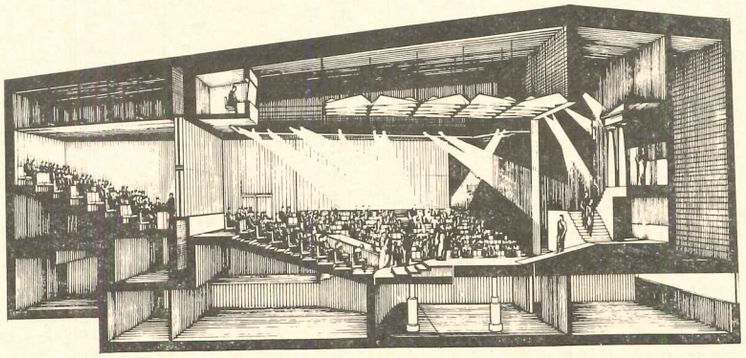




Musical comedy for 750 spectators using a combined thrust and deep stage, and an orchestra pit for 23 musicians. One moveable wall is open. The cyclorama and moveable wood stage panels provide acoustical reinforcement of sound, and wood paneling for the two side moveable walls and plaster on the rear wall produce reverberant acoustics for music and song. This form for 750 is also applicable to drama, opera, ballet and recital



Symphony orchestra performance for audience of 1,000 to 1,200 in the round. All three moveable walls are open. Fifty to 60 musicians can be located on the level just below the first row of seats, with additional audience seating for 130 at stage level. This arrangement, with the thrust stage added for use as the sanctuary and the organ and choir behind a scrim curtain on stage, will serve the college for the celebration of the Mass



Section showing the dividing walls and simultaneously, but separately, one lecture hall for 250 also in use

"A Pure Hall" for Music

Warner Concert Hall
Oberlin College
Oberlin, Ohio

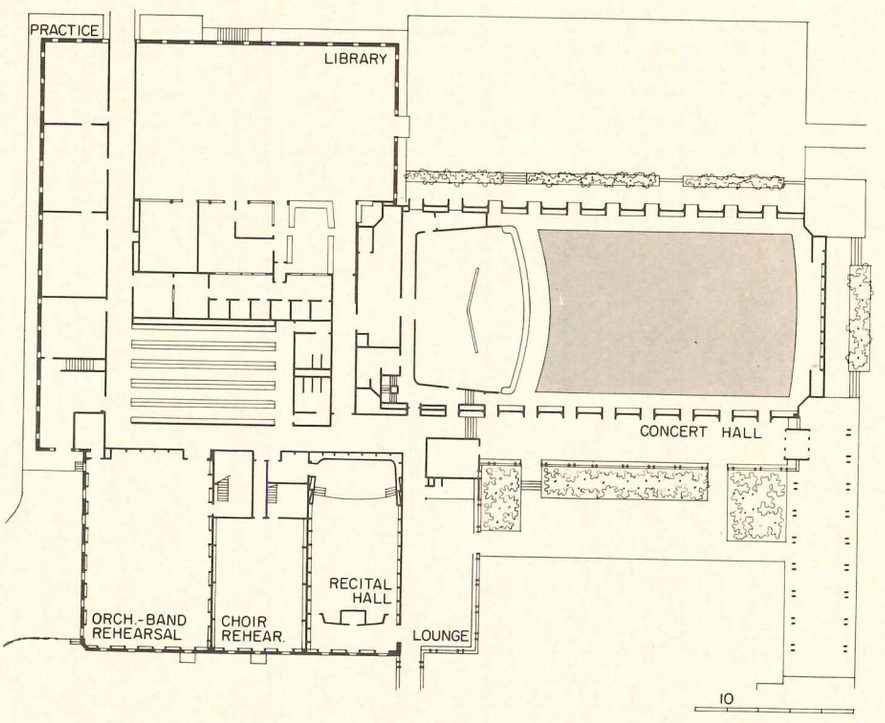
The permanent concert platform will seat from 85 to 100 musicians, and the continental seating handles an audience of 667. Ceiling is 40 feet high and width of hall is approximately 65 feet. A Holtkamp concert organ with 4,344 pipes is located behind the concert platform about 12 feet above the stage

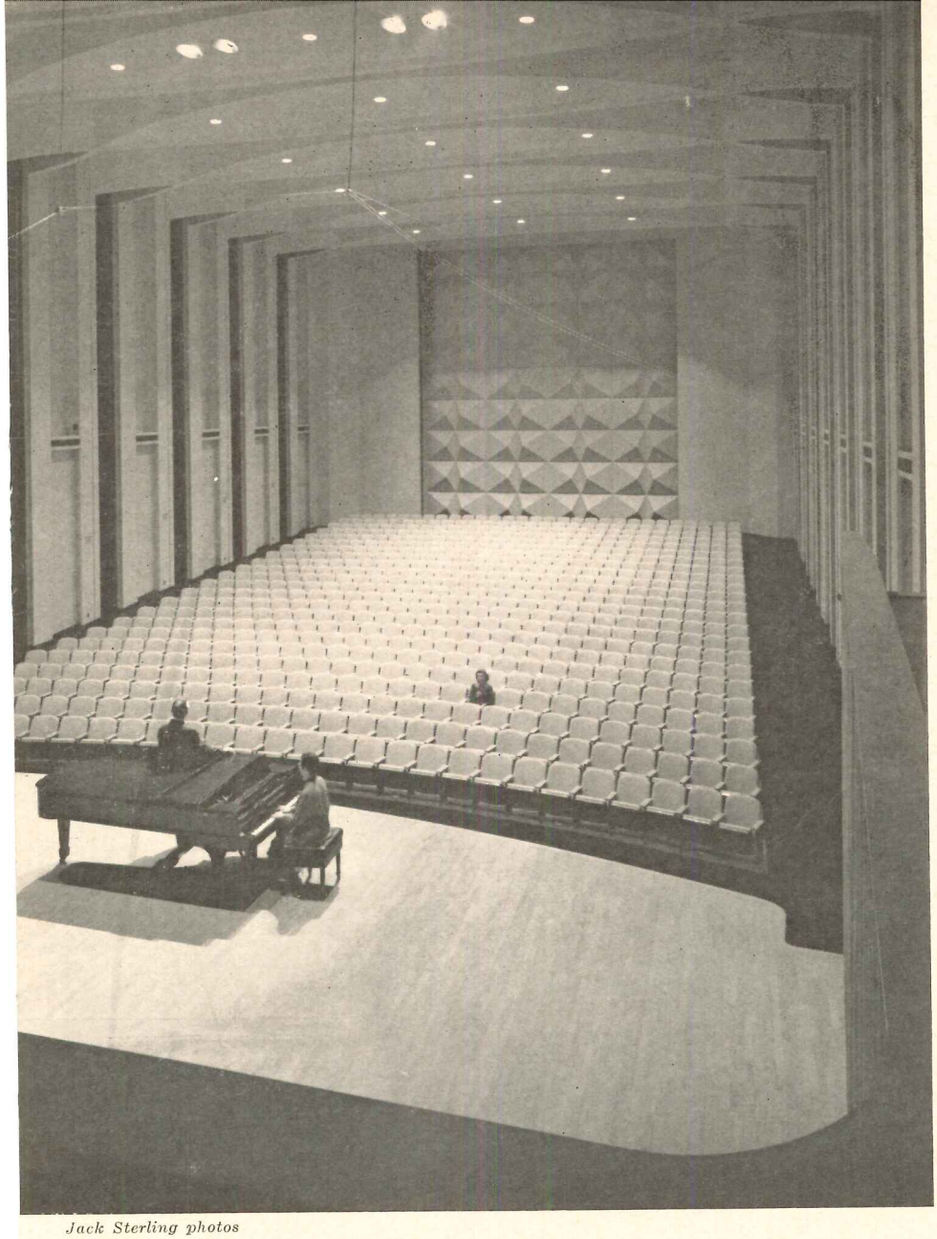
Russell Johnson of Bolt, Beranek and Newman, Inc., acoustical consultants, calls Oberlin's new auditorium "a pure hall" and described it while in the design stage, in his article "Auditorium Acoustics for Music Performance" in the December 1960 ARCHITECTURAL RECORD, as follows:

"This hall design is a simple rectangle, which is significantly better than the so-called "intimate" audience seating arrangements which are so popular. The hall is more than twice as long as it is wide. The ceiling is high and horizontal and the width is narrow, about 65 feet. The proportions are in the neighborhood of 1:1:2. This hall will be used for all types of music performance.

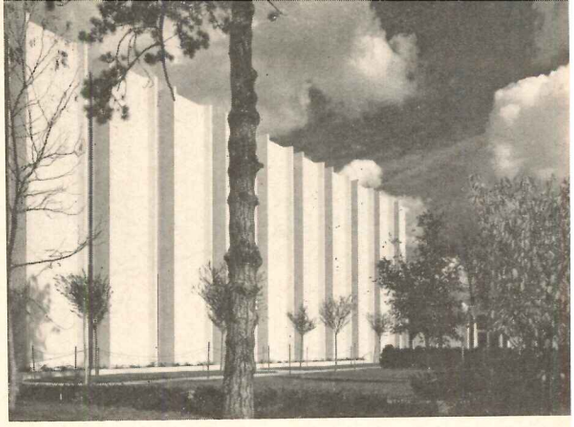
"There are two enclosures provided. The permanent enclosure consists of 11-foot-high walls spaced about 50 feet apart, providing sufficient space for a symphony orchestra. Elements for acoustical diffusion are located at the side walls of the stage, concealed behind this 11-foot-high acoustically transparent screen. The other enclosure is a hydraulically-operated wall, recessed into the stage floor, for recital performances, string quartets and small instrumental ensembles. This enclosure is constructed of 2-inch wood plank braced with a heavy steel frame.

"The audience is the largest and, therefore, most important source of sound absorption present in a hall. Since this hall will be used for performances for low to high capacity audiences, for rehearsals and for recordings, the audience size will vary from no one present to a capacity house. Under these conditions, it is essential in a hall of this size to provide some mechanized means of adjusting the reverberation. This is particularly important since some of the performances will require rather





Jack Sterling photos



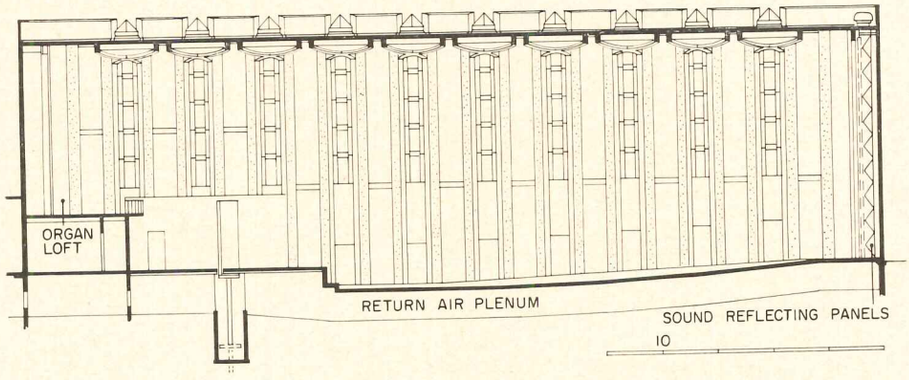
Concert hall exterior

The rear wall consists of multi-faceted projections of considerable depth for acoustical diffusion. A large set of draperies conceals the wall when it is not required, and these in combination with 40 sets of draperies along the sides of the hall make possible variations in reverberation time to compensate acoustically for different performance requirements

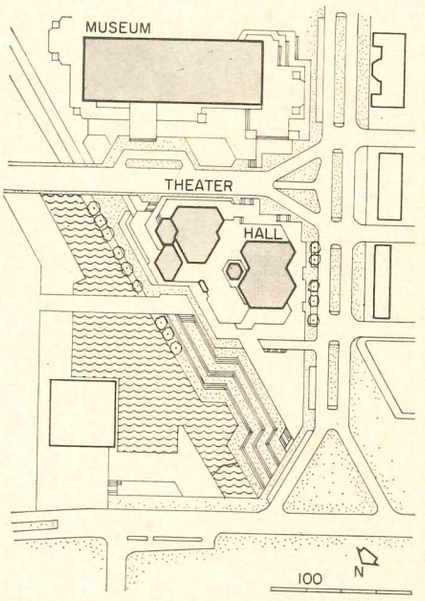
short reverberation, others long.

"To be able to make any significant change in the reverberation, modification of the acoustical properties of a very high percentage of the wall surfaces of a hall is required. Use of a reverberation adjusting device is required on practically all of the side wall area from floor to ceiling plus the rear wall, if one is to provide a worthwhile degree of variability. This design incorporates about 6,000 square feet of adjustable curtain, which, under certain conditions of occupancy and setting of the adjustable drapery, will provide reverberation times ranging from 1.2 seconds to 2.3 seconds in the mid-frequency range."

Architects: Minoru Yamasaki and Associates; structural consultants: Worthington, Skilling, Helle & Jackson; acoustical consultants: Bolt, Beranek & Newman, Inc.; general contractor: John G. Ruhlin Company



A Performing Arts Center for an Urban Re-development Area

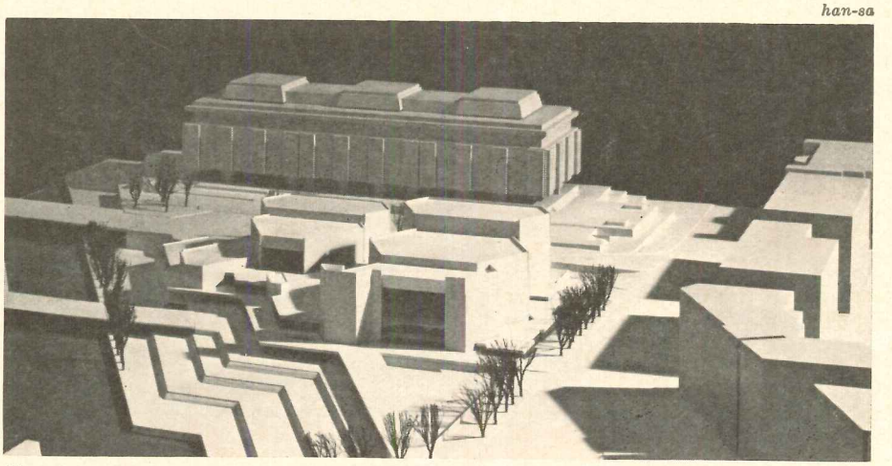


Canadian Center for the Performing Arts Ottawa, Canada

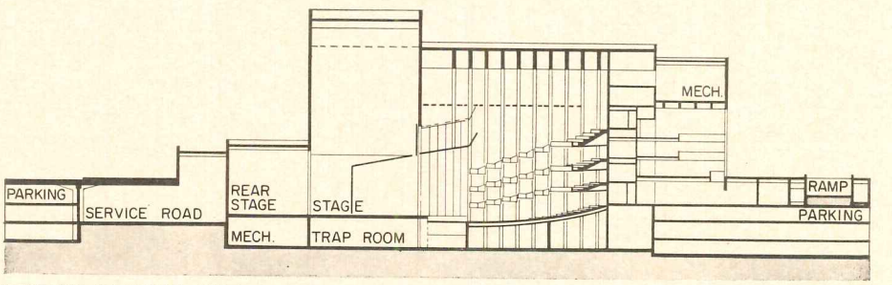
Masterfully arranged on a difficult triangular site bordered by a canal and two major traffic arteries, and ingeniously developed within a triangular module, Ottawa's new center will house a 2,300-seat opera and concert hall with the largest stage in Canada, a 300-seat studio theater and an 850-seat main theater. The scheme's broad terraces make the most of the waterfront site. Citizens of Ottawa have had to watch and hear their visiting performers from a 2,350-seat movie house, the best Canada's capital city has been able to offer touring artists. A recently formed private citizens group calling itself the National Capital Arts Alliance prevailed upon the Canadian Federal Government to invest $18 million in the projected center. The government's new founded generosity toward the arts is related to the desire to build more recreational facilities in time for the 1967 Centennial.

Architects for Ottawa's center, and for most of the other Canadian theaters and auditoriums recently built or in the planning stage, are the firm of Affleck, Desbarats, Dimakopoulos, Lebensold and Sise.

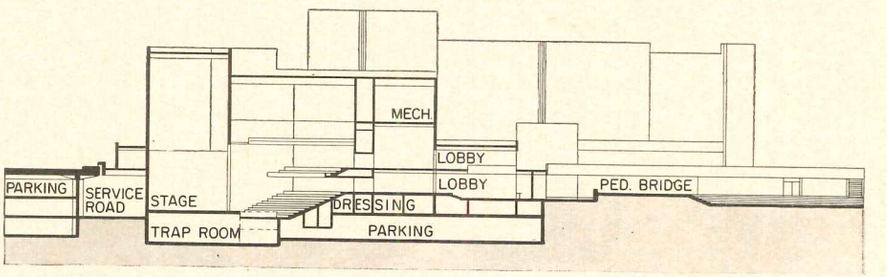
han-sa



Structure at rear of model is proposed museum

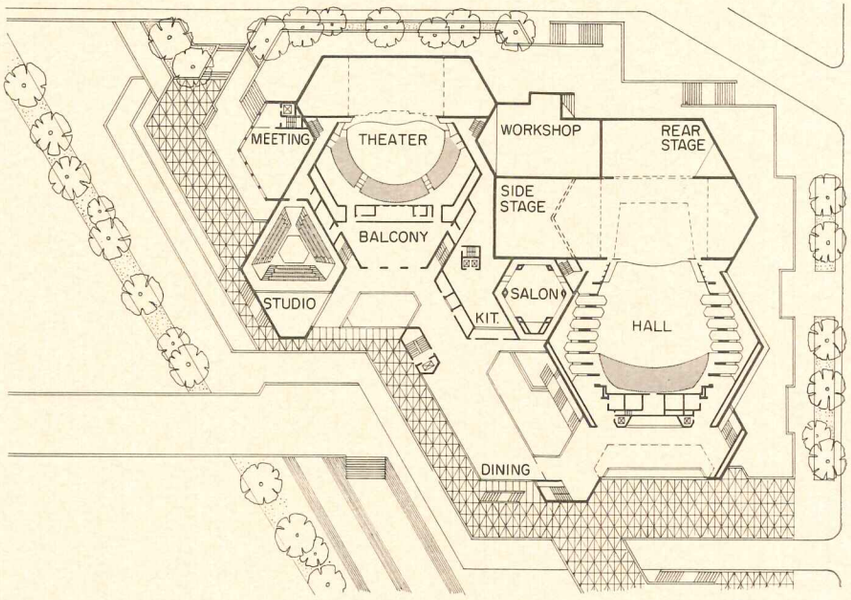


SECTION THROUGH HALL

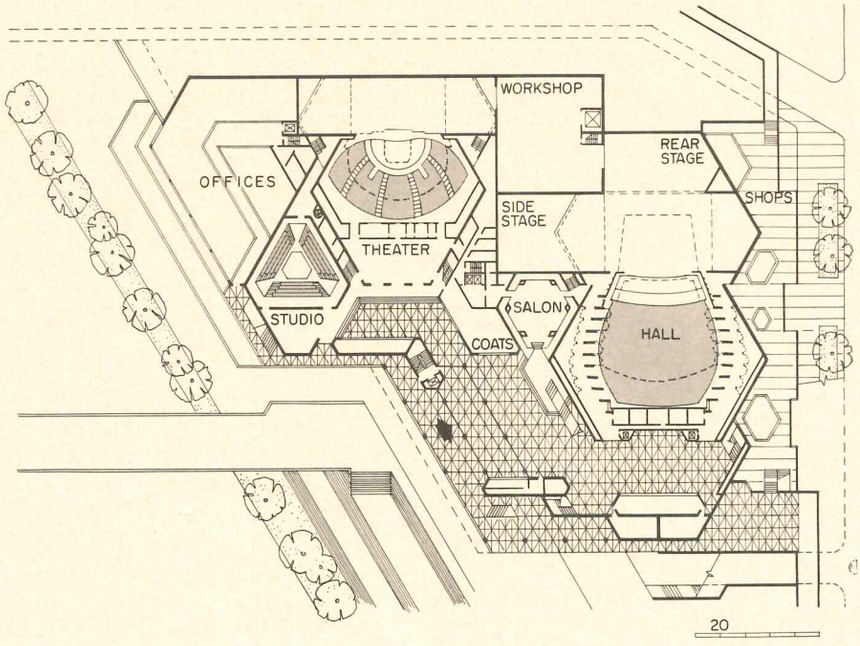


SECTION THROUGH THEATER

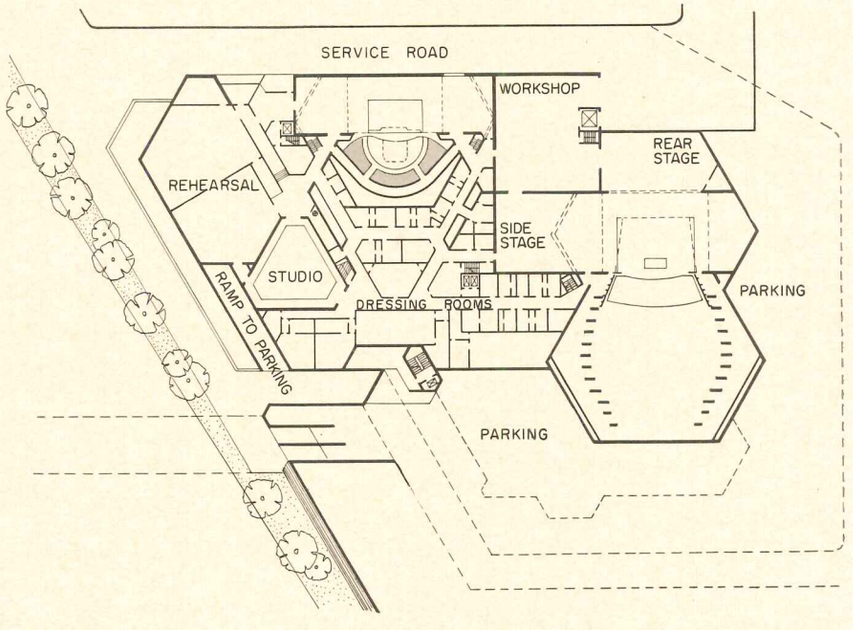
20



At the balcony level is the kitchen and a restaurant which overlooks foyer

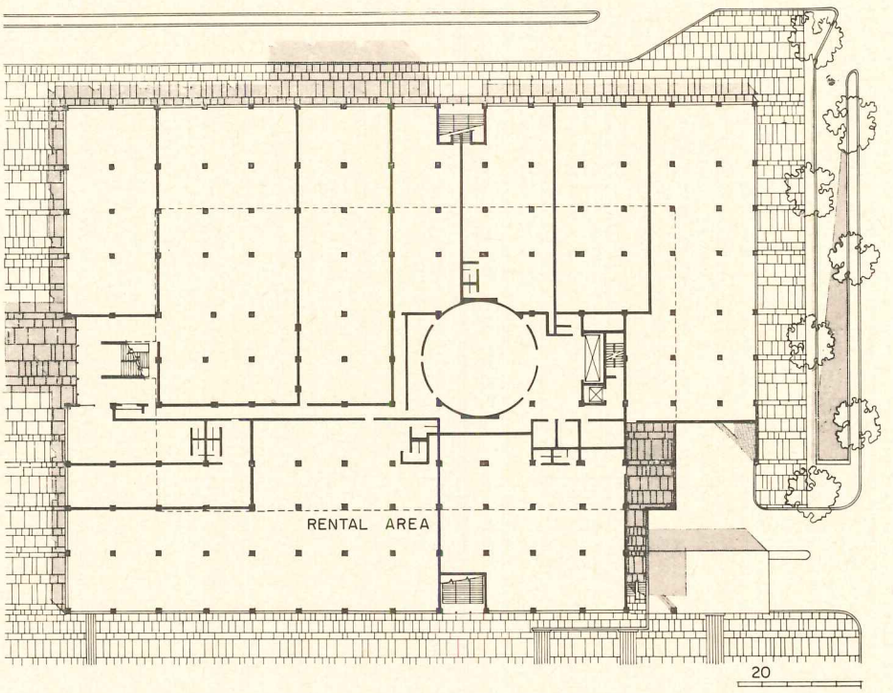


Plan at entrance level. The scheme is greatly enhanced by the generosity of its public spaces. Two bars are provided, one adjacent to the theater, and the other in the concert hall foyer located upon the central axis of the hall. Continental seating for the concert hall has spacious access



Dressing rooms, offices, rehearsal spaces, workshops and other supporting spaces link all three theaters below the level of the main terrace. Three levels of parking are also under the podium

City Theater Designed to Pay Its Way



Shops at street level. Parking is on two levels below grade

Theater Block—Charles Center
Baltimore, Maryland

Architect John M. Johansen describes his project as follows: "This block, a part of the total Charles Center Redevelopment project sponsored by the Greater Baltimore Committee, is at the intersection of Charles and Baltimore Streets in the central business area of the city. With the loss of the old Ford Theater, a new legitimate theater for Broadway-type shows was a civic need, and a prominent place off the main plaza was given for this purpose. It was to be a low and expressive structure surrounded by tall hotels and office buildings.

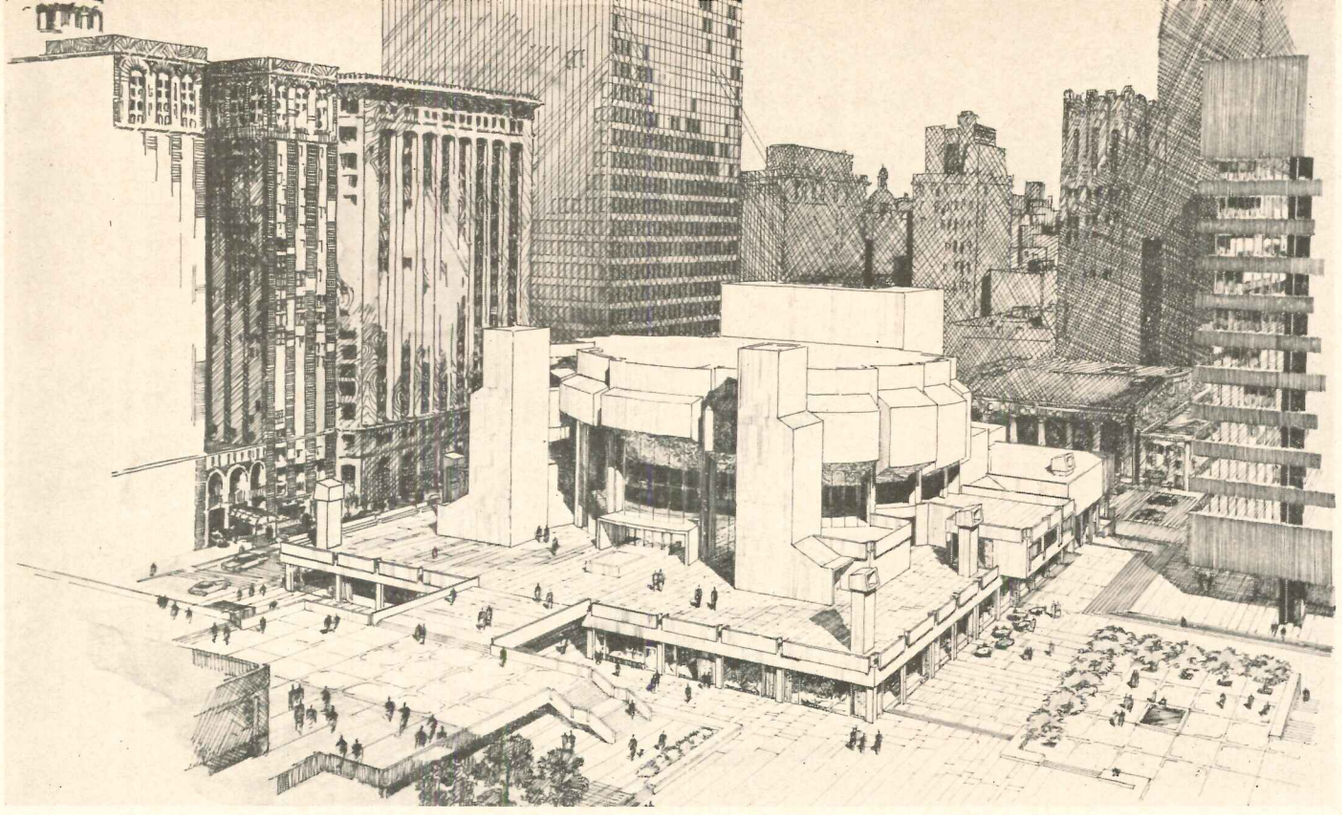
"In order to make best use of the block from a financial point of view, an assembly of uses was made in which two levels below grade for parking 200 cars was combined with a complete floor at street level to consist of 50,000 square feet of rental space for shops and a restaurant. Above this will be the theater with 1,500 seats and supplementary functions. This assembly of uses was found to be compatible both from a financial and architectural point of view.

"The street grade story of rental space forms a generous platform as a setting for the theater. This platform forms extensive terraces which, on the plaza side, connect by bridge to an extensive inter-block system of elevated walkways. A broad stair leads to the terrace from a shopping arcade off the plaza, and the terrace allows entrances to the theater lobby and side lounges.

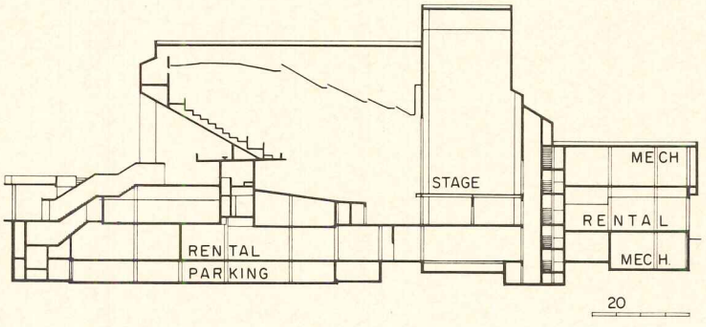
"The theater itself faces the plaza. Its stage tower and off-stage functions are developed away from the plaza. Four massive stair towers—two flanking the entrance and one on each side of the stage—rise above the theater roof. Servicing of the theater takes place at the street level at rear, where truck loading platforms accommodate the shops as well. Scenery is brought up in elevators to stage level or to the understage area as required. An interesting feature of the theater is the experimental stage. This combines the conventional orchestra pit with trapped areas of the stage to form one circular area which is sunken, but which can be filled in as partial seating, orchestra pit, or stage in any combination or at any level. Performers can approach from below from any direction. Staging can be conventional or of any design whatever. The hall seating is derivative of the Greek theater, although the marginal seats at the sides are eliminated and the circular form is less than half round. This form, with the balcony, gives the best results in an effort to bring the greatest number of seats close to the stage. At the rear rows of the floor seating, there have been developed boxes, with floors raised for improved view. It is the intention that these less valuable seats at the rear, if properly featured, can be made quite popular.

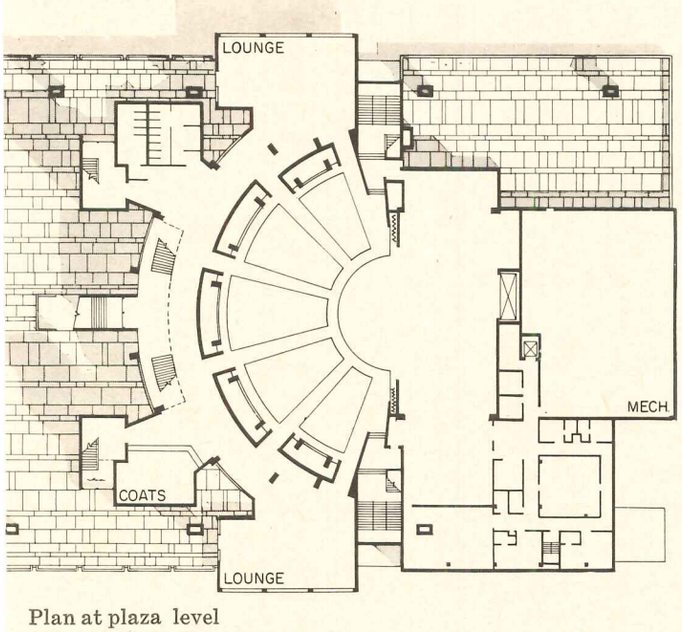
"Because this is a low budget theater project taking its place in the financial balance of the entire block, little money could be spent on the design of a theater as a building within a building; or on the design of an outer architectural form. For this reason, the inner form, i.e., the shape determined by seating and acoustics and circulation channels, horizontal and vertical, had on its reverse side to become the outer form. The result then is a rather mighty, fan-shaped structure flaring out as it rises and held up by strong concrete piers in radial arrangement. The seating groups within are expressed outside as segments from the hall form, breaking out between the piers. Under this flaring shape, huddle the lounges and service elements. The stair towers work with the stage tower to surround, unify and hold the theater hall itself. To further express the stair functions, the towers pitch out at their bases suggesting the spill out of theatergoers who will use them.

"By giving expressiveness to all functions of theater attendance, it is intended that an atmosphere of pageantry be experienced, in which, by participation the theater-goers or audience, become performers."

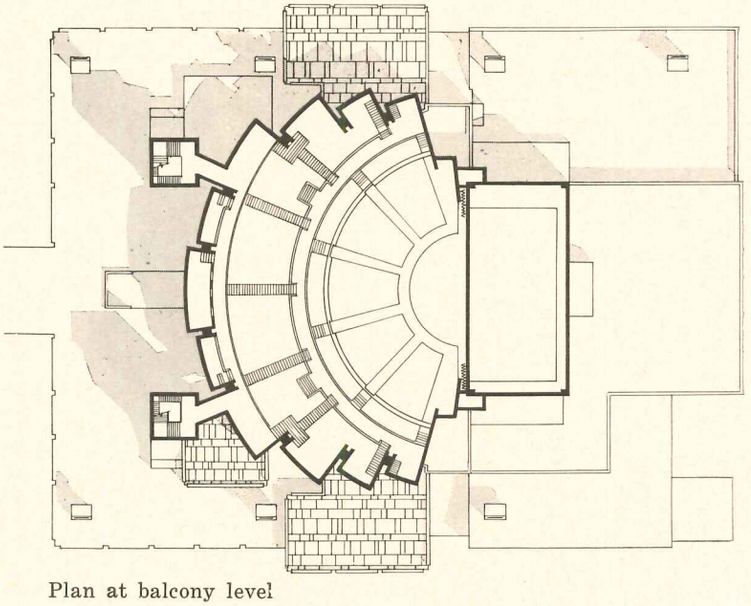


Low theater does not block light and view for surrounding structures





Plan at plaza level



Plan at balcony level

Design for Good Acoustics in a Big Hall

Civic Auditorium
Jacksonville, Florida

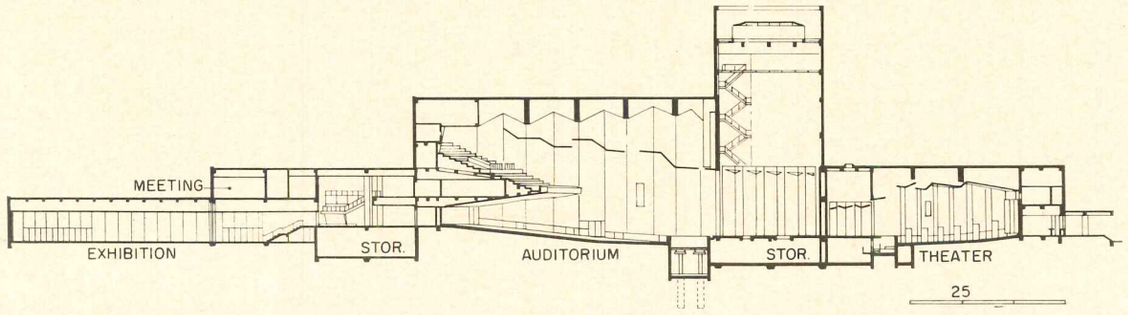
Alexandre Georges photos

The architects and acoustical consultants for the Jacksonville Civic Auditorium do not claim to have created the ideal concert hall, such as Symphony Hall in Boston or the Grosser Musikvereinssale in Vienna. But they and the citizens of Jacksonville believe they have built a good concert hall and a good theater.

To reduce sound transmission between the multi-purpose auditorium and the theater during simultaneous performance, separate construction was used for the auditorium and the theater stage houses. The two independent walls separating the spaces can be seen in the section.

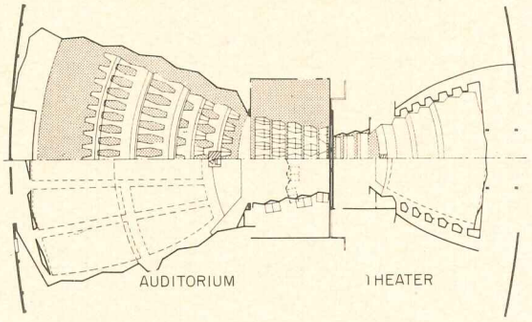
Box office considerations required that the architects and acoustical consultants provide optimum acoustical conditions for an auditorium of 3,200 seats. In his book "Music, Acoustics and Architecture," Leo L. Beranek states: "It is a great deal easier to design good acoustics into a hall with fewer than 2,000 seats than one with 2,500 or more seats." For the number of seats projected for the Jacksonville auditorium, the required cubic volume-to-seating area ratio called for a volume of one million cubic feet to result in a full house mid-frequency reverberation time of the desired 1.7 to 1.75 seconds. To achieve this volume within the selected length and width ratio of the hall as determined by seat and aisle patterns, it was necessary to fix the ceiling height at 65 feet for the acoustical boundary of the space. A much lower ceiling height was required, however, for "first" reflections" or the necessary short "initial-time-delay gap." The latter Beranek defines as the interval at the listener's ear between the arrival of the direct sound and that of the first reflected sound. A short interval produces acoustical intimacy. According to Beranek: "The essence of the problem is that in the ear two reflections tend to merge into one if they are separated by less than about 20 milliseconds. Whenever two re-

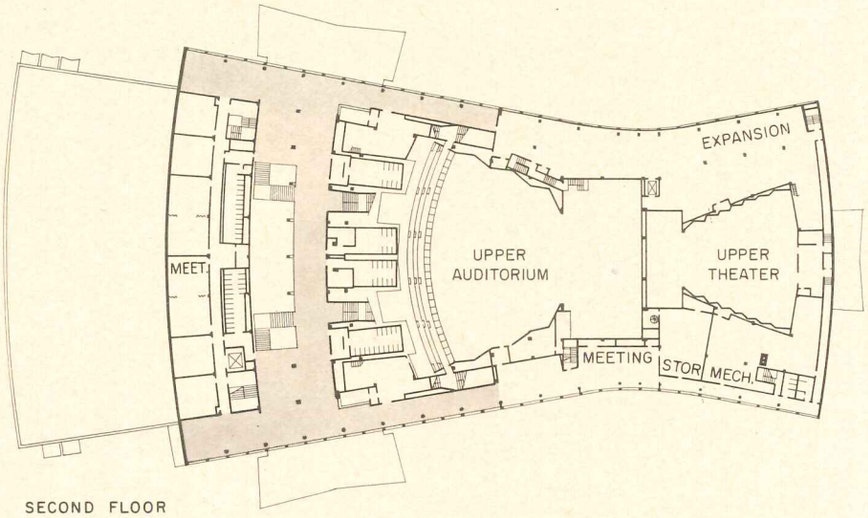
According to David L. Klepper of Bolt, Beranek and Newman, Inc., acoustical consultants for the building, the sound-reflecting panels (*below*) accomplish the following acoustical functions: (1) provide short-delayed, reflected sound energy and reduce the initial time-delay gap. The angles and elevations for the panels have been designed to insure reinforcement throughout the auditorium; and the panels are sufficiently large (with each group considered as a continuous panel) to provide this reinforcement throughout the audible frequency range; (2) evenly distribute sound energy throughout the auditorium. The side-to-side distribution in the wide fan-shaped auditorium is particularly difficult; therefore, the forward panels incorporate side-to-side splays providing this side-to-side distribution; (3) provide multiple delayed random reflections between the panels and the main ceiling above. These multiple reflections simulate reflections between the parallel side walls in a rectangular concert hall. Functions (1) and (2) are of concern for both speech and music activities. Function (3) is concerned solely with music.



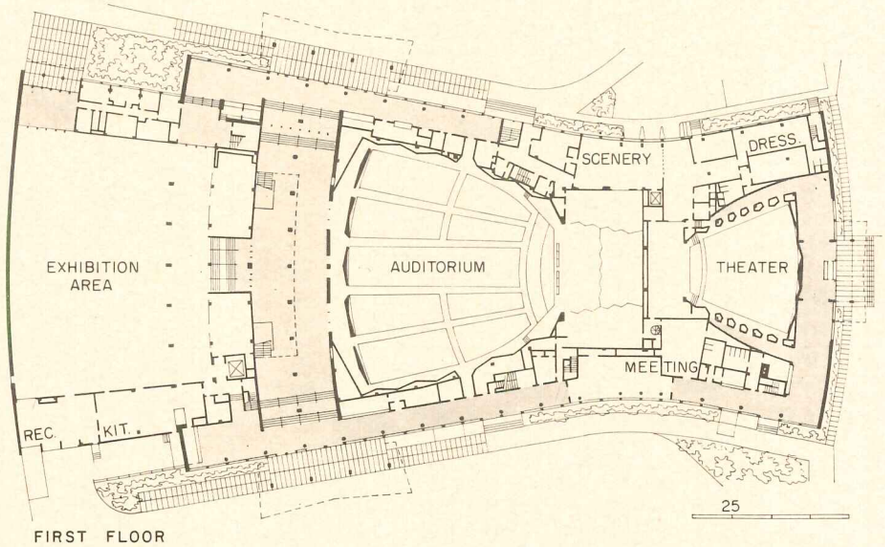
flections are separated by as much as 70 milliseconds, the ear hears the second sound as an echo. . . . Can suitable initial-time-delay gaps be provided in wide opera houses or in halls where there are no large reflecting surfaces near the stage? The best way to create the important short-time-delay reflections seems to be to provide intermediate sound-reflecting surfaces below the main ceiling, directly in front of the proscenium and extending at least over the front half of the main floor. Hanging panels or a suspended false ceiling sufficiently open to afford access of the sound into the space above will preserve a long reverberation time." These measures were taken in the auditorium. A moveable orchestra enclosure allows this auditorium to be used as a concert hall. It reflects sound energy to the audience that would otherwise be absorbed in the stagehouse; mixes and blends sound energy from the various instruments of the orchestra; allows different members of the orchestra and chorus to hear each other; and permits the conductor to hear them.

The 609-seat theater is designed for a full-house mid-frequency reverberation time of 1.1 seconds with sound-absorbing treatment on 50 per cent of the rear wall panels. The architectural design permits the absorptive treatment to be removed should the primary use of the room become chamber music concerts, increasing the reverberation time to 1.3 seconds, or put back again for speech uses. The theater's small stage and over-all size allow the hard back wall of the stage (with curtains pulled to the sides) to provide enough reinforcement for small music groups or soloists.



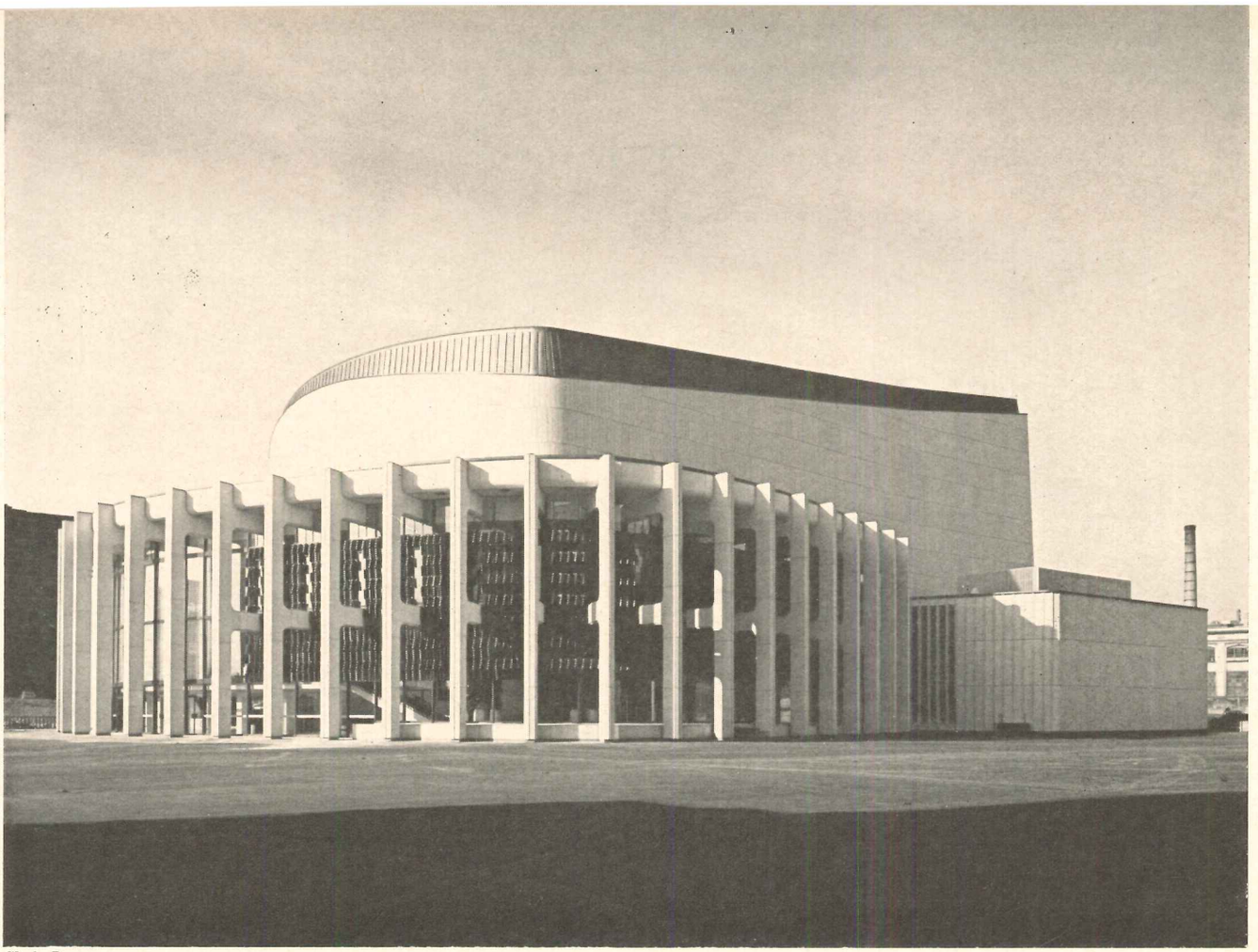


SECOND FLOOR



FIRST FLOOR

Architects: Kemp, Bunch & Jackson; mechanical and electrical engineers: Van Wagenen & Van Wagenen; acoustical consultants: Bolt, Beranek & Newman, Inc.; stage equipment consultant: Peter Tozzi; civil engineers: Robert M. Angas and Associates; general contractors: The Auchter Company



Chris Payne

Audience enters by crossing plaza. An arrival lobby below plaza is for those coming by taxis and chauffeur driven cars. Underground garages connect to the main foyer by means of escalators

Multi-purpose Hall for Opera, Concerts, Musical Comedy

La Grande Salle
Place des Arts
Montreal, Canada

Designed by the architects Affleck, Desbarats, Dimakopoulus, Lebensold, Michaud and Sise, this hall, finished last year, is the first completed building of downtown Montreal's performing arts center.

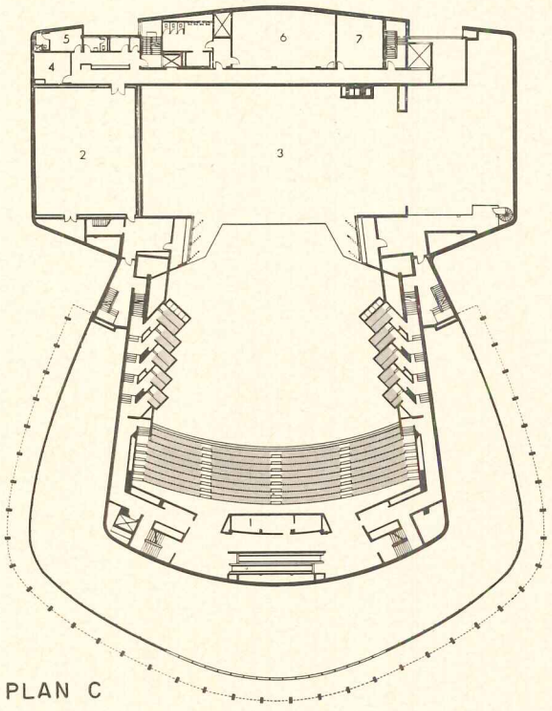
The architects, who have designed a number of Canadian theaters and auditoriums now built or in the planning and construction stage, make understanding use of available acoustical technology in their creation of well realized architectural forms. The effect of acoustical factors on the architects' design solution for La Grande Salle has been well described in an article by Russell Johnson of Bolt, Beranek and Newman, Inc., which first appeared in the RAIC Journal, November 1963 and is adapted here.

"La Grande Salle would combine in approximately equal balance the functions of an opera house and a concert hall, and would also be used as a theater for musical comedy and revues. The economic study on which the architectural program for the building was based indicated a need for approximately 3,000 seats.

"It was desired to locate the seats so that no one would be too far from the actors and musicians on stage, for visual reasons; and, at the same time, to achieve as narrow and parallel a shape as possible to maintain acoustical clarity and definition for musical and speech sounds. The requirements for vision seemed to dictate a rather wide, shallow hall, fan-shaped, with one or, at the most, two deep balconies in the rear of the auditorium. This approach was in conflict, however, with the acoustical desirability for a narrow hall, and the architects' solution was a return to the basic architectural characteristics of the so-called Italian opera house—the use of multiple, horseshoe-shaped tiers of seating which provide a narrow and shallow room.

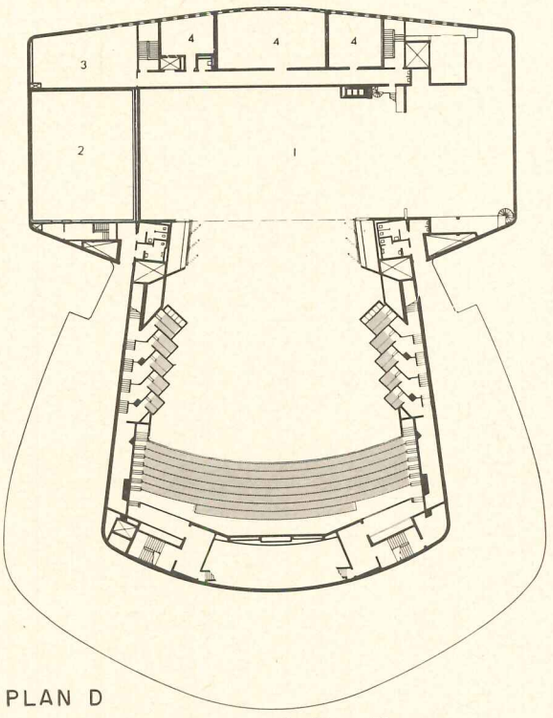
"The final design of La Grande Salle is relatively narrow, particularly in the front half of the auditorium, and relatively shallow (140 feet from the conductor's podium to the furthermost seat) and, at the same time to provide sufficient floor area for audience seating, incorporates three tiers above the main floor, with each tier continuing along the side walls almost to the proscenium opening itself. The walls in the front half of the auditorium were kept close to parallel for acoustical reasons, and the hall was widened toward the rear in order to help achieve the required seating capacity.

"The three balconies across the rear of the house were made as shallow as possible to minimize the decrease in liveness, which is a characteristic of deep underbalcony areas.



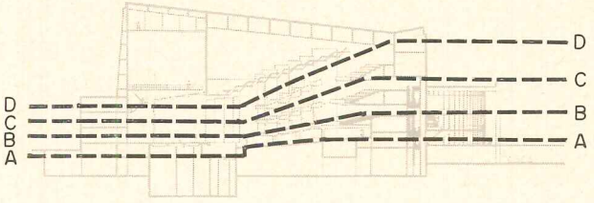
PLAN C

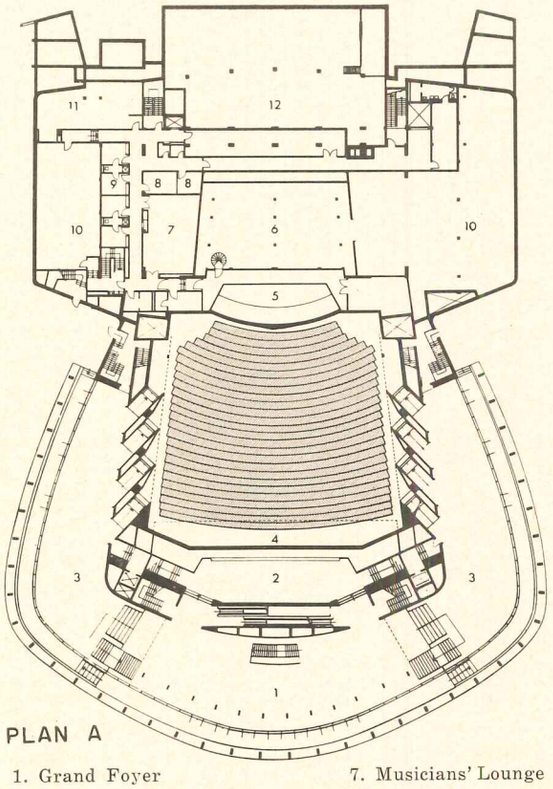
1. Sound Control Room
2. Main Rehearsal Room
3. Stage House
4. Music Library
5. Conductor
6. Men's Dressing Room
7. Ballet Room



PLAN D

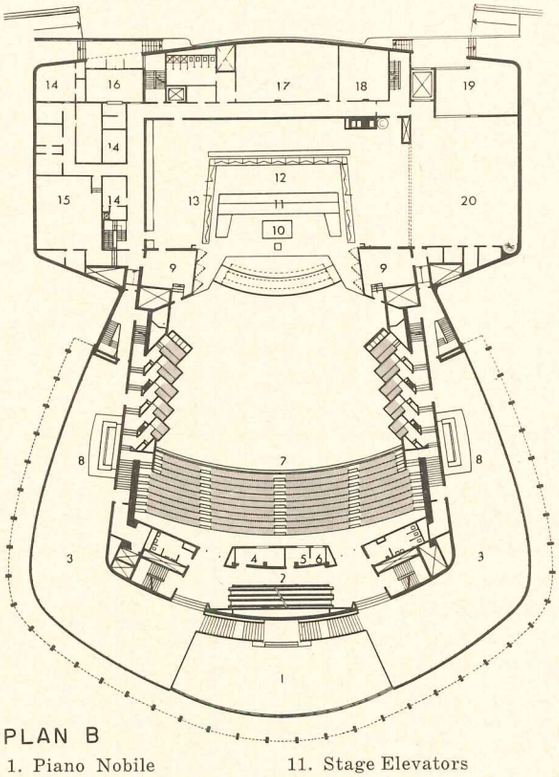
1. Stage House
2. Upper Part of Main Rehearsal Room
3. Offices
4. Rehearsal Room





PLAN A

1. Grand Foyer
2. Cloakroom
3. Foyer Lounge
4. Parterre
5. Orchestra Pit
6. Upper Part of Trap Room
7. Musicians' Lounge
8. Offices
9. Dressing Rooms
10. Storage
11. Musicians' Lounge
12. Upper Part of Boiler Room



PLAN B

1. Piano Nobile
2. Escalators
3. Foyer Lounge
4. Lighting Control
5. Radio Control
6. Announcer's Booth
7. First Balcony
8. Bar
9. Forestage
10. Piano Elevator
11. Stage Elevators
12. Stage
13. Orchestra Shell
14. Dressing Rooms
15. Green Room
16. Stage Entrance
17. Women's Dressing Room
18. Costumes
19. Loading Area
20. Side Stage

Panda

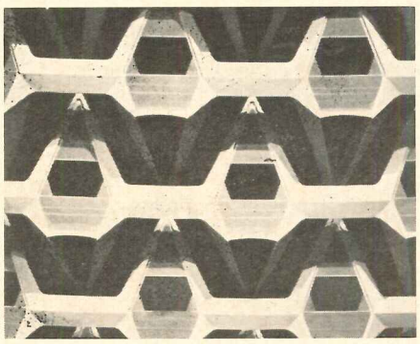
Approximately 1,400 are seated at orchestra level. Three balconies have about 400 seats each, boxes seat 200

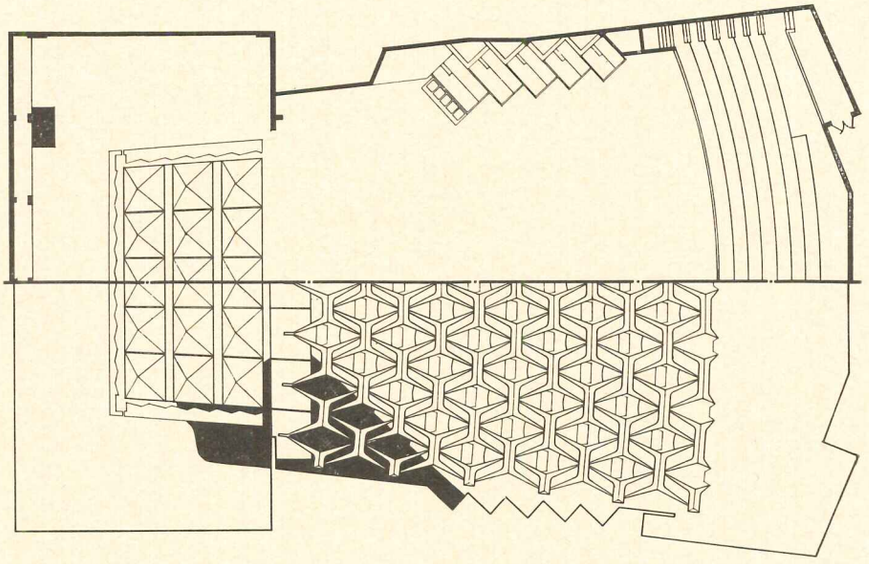
"If the ceiling of this hall were to be designed in the conventional way (that is, a solid continuous surface running from the top of the proscenium opening, sloping gradually upwards and terminating a few feet above the last row in the top balcony) the resulting reverberation time would be much too low. This hall, with three overhanging tiers of audience seating and a conventional ceiling, would have not much more than 26.4 cubic feet per square foot of audience area (which would provide about 1.3 seconds mid-frequency reverberation) whereas a reverberation time in the mid-frequency range of 1.7 to 1.8 seconds (desired for concert activities) requires about 36 to 40 cubic feet of cubage for each square foot of audience area.

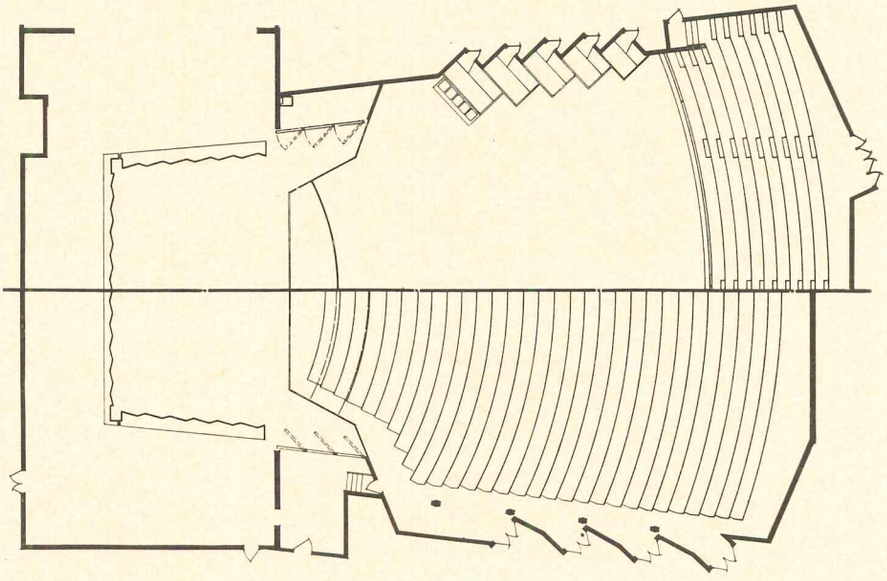
"The length of the hall had been established by visual requirements, and the width of the hall by the requirements for acoustical clarity. The only way remaining to achieve the high cubage required to maintain a sufficiently long reverberation time was to raise the ceiling height. Accordingly, the upper ceiling of the auditorium chamber was set about 80 feet above the stage level. It was recognized that, if no sound-reflecting surfaces were inserted between the sound source on stage and this very high upper ceiling, the excessive time difference between sound reaching a listener on the main floor by the direct path and the reflected sound reaching the same listener via the upper ceiling would produce very noticeable echoes, and in addition, in much of the seating area there would be insufficient definition. The only solution was to utilize sound-reflecting surfaces at an elevation of about 34 to 44 feet above stage level, adjacent to the proscenium opening. The architects developed these sound-reflecting panels into an interwoven lacework of plaster, and extended this "lower" ceiling towards the rear of the hall. The architects also used this partly-open, partly-closed screen to conceal the auditorium lighting, front-of-house stage lighting, and the loudspeaker cluster for the sound reinforcement system.

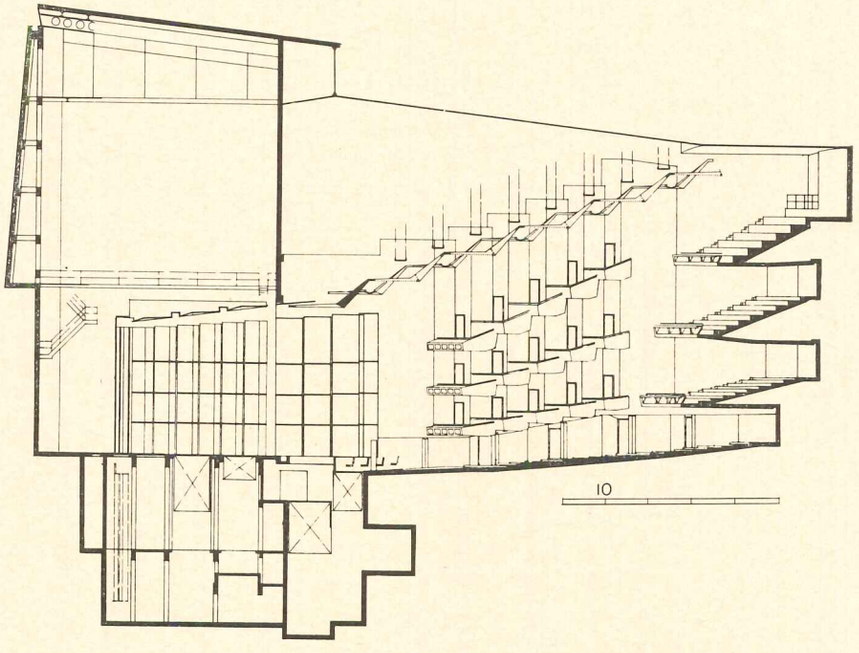
"Our reverberation time design studies indicated that it would be essential to eliminate all sound-absorbing materials from the hall, other than the audience itself and the upholstered seating. Accordingly, the rear walls at all levels were designed to form three large planes, so that no sound-absorbing treatment would be required to minimize echo. The conventional curved rear wall which produces a serious echo unless it is finished with sound-absorbing material was not used.

"The use of nothing but hard, sound-reflecting surfaces for all the walls and the ceilings, then, was designed to lengthen the reverberation time. The acoustical warmth, or richness, of the sound of a hall is imparted to it by low-frequency reverberation. Sufficient reverberation for low frequencies can be maintained only if most of the boundary surfaces of a room are efficient low frequency reflectors. For this reason, all of the





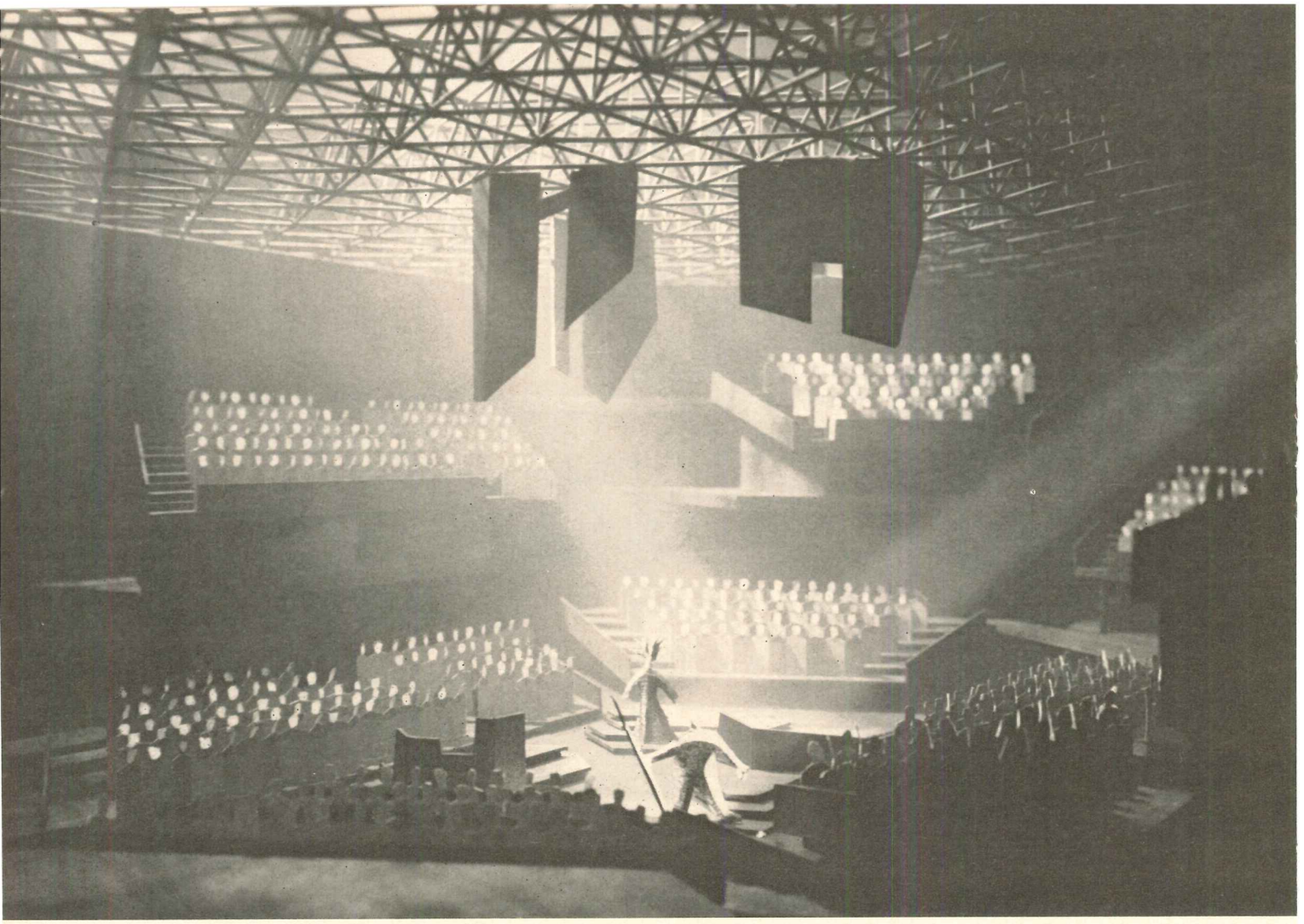




plaster surfaces of the walls were applied directly to reinforced concrete masonry or concrete masonry units, with no intervening air space. The wall areas finished with wood paneling have been given similar excellent low frequency sound-reflecting properties by cementing the panels directly to heavy masonry walls.

"Another important aspect of music acoustics design is the provision of a diffuse, reverberant sound field. Much must still be learned about the acoustics of diffuse sound fields and how this property of a hall is related to the subjective reaction of the concert-goer, but authorities agree that large, flat, unadorned surfaces should be avoided, and that, insofar as possible, contemporary auditoriums should incorporate architecturally-modulated surfaces. This sculpturing of the boundary surfaces of an auditorium, of course, was an always present feature of concert halls built during the 18th and 19th centuries. In La Grande Salle the sculptured balcony and box fronts, the sculptured shaping of the plaster portions of the lower ceiling, the serrated walls behind the tiers of side boxes, and the architecturally-modulated surfaces of the concert shell and the six hinged portal panels which frame the proscenium opening, constitute the architectural breakup needed to help produce a diffuse sound field."

Architects: Affleck, Desbarats, Dimakopoulos, Lebensold, Michaud, Sise; Fred Lebensold, partner-in-charge; structural engineers: Brouillet & Carmel; mechanical engineers: McDougall & Friedman; acoustical consultants: Bolt, Beranek and Newman, Inc.; seating consultant: Ben Schlanger; stage consultant: Donald Oenslager; interior consultant: Henir Beaulac; general contractor: Quemont-Duranceau



Model photograph showing multi-platform arrangement for simultaneous performance

A Space Theater Concept

According to its inventor, architect Hugh Hardy: "The Space Theater assumes the necessity for once again joining performer and audience in a single space to provide a kinetic environment. In this theater the audience and performers can be arranged in different relationships—each suited to the expression of a different theatrical idea. This is accomplished by moving the audience, as well as the stage.

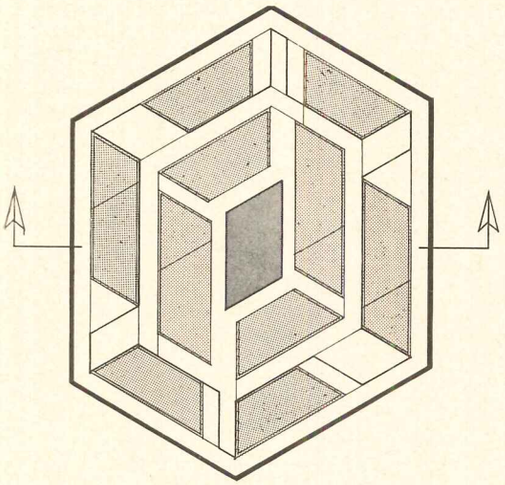
"The Space Theater breaks the entire audience seating into a series of moveable groups. Combined with moveable cross aisles, they form the three traditional relationships (Frontal, Thrust and Surround) as well as encourage the exploration of new relationships. Since chronological order and storytelling as axioms of playwrighting are being diminished in importance, it is possible to imagine a more adventurous use of theater in which two or three things happen simultaneously on one, two or three different stages each in a different place. The range of this experience is limited only by the talents and curiosities of the authors, directors and performers.

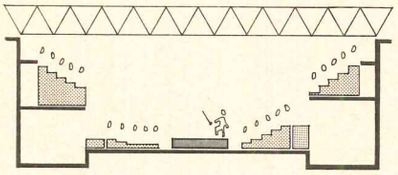
"Such mobility requires that all parts of the Space Theater be flexible. The performers, the audience, the lighting, the scenery, the sound must be able to come from anywhere.

"Our basic system, now under application for a U.S. patent, is based upon a 5-foot triangular module. There are three basic plan shapes which combine with four sections to give 12 different possible seating units. The cross aisle units are also based upon this triangular module, and together with the seating sections, allow a great variety of groupings. No matter what the combination, each pattern allows the audience easy access to their seats. At the same time, the variety of section heights insures that the audience is given good sightlines to the performers. The units are placed on retractable wheels, with a simple three-way locking device for rigidity. They are moved by two small battery-powered trucks similar to those used in warehouses. This system can be used for small theaters as well as large, the capacity being increased as required by adding more units.

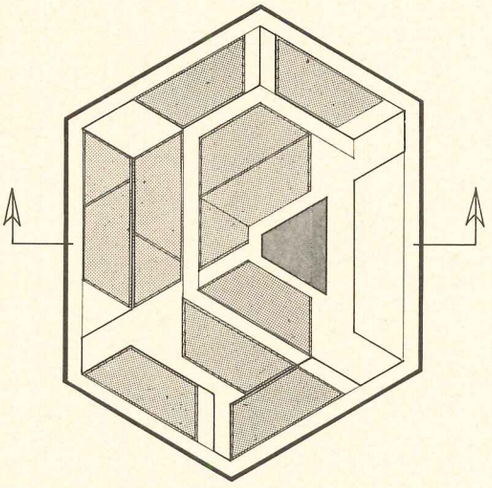
"The mobility of the Space Theater makes it a more commercially attractive use of space. A great many other activities besides the production of plays are possible: concerts, fashion shows, auctions, lectures, movies, symposia, hootenannys and political rallies."

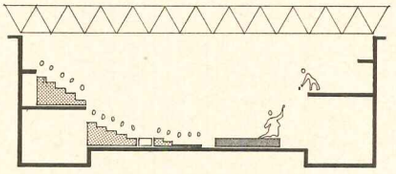
Designed by Hugh Hardy, architect for Mark-L Enterprises, Inc.



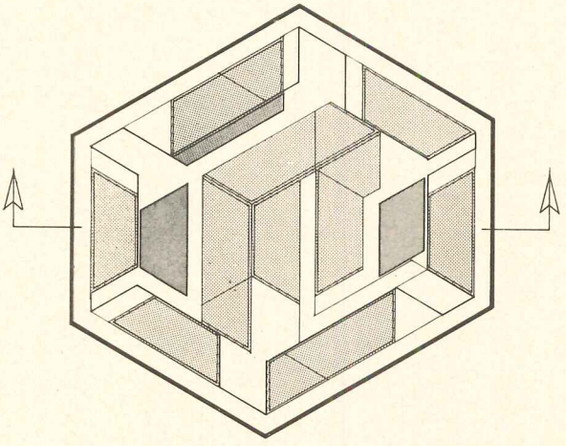


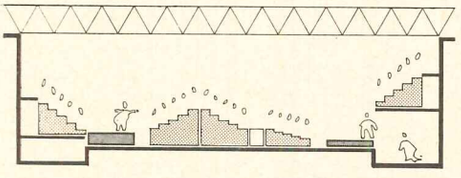
Surround. This relationship gathers the audience to surround the performer and a three-dimensional scenic environment at the center



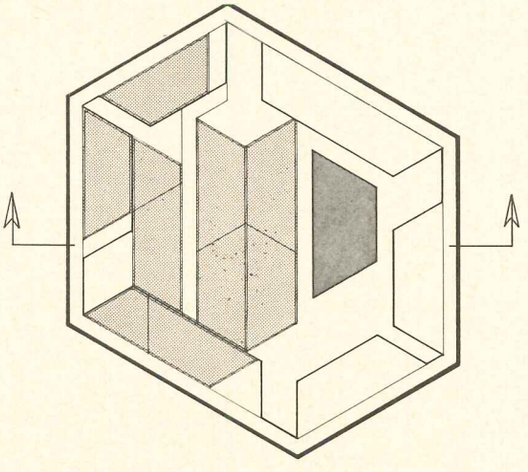


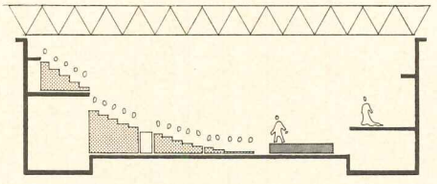
Thrust. This relationship gathers the audience on three sides of a performer who is thrust forward from a three-dimensional scenic environment



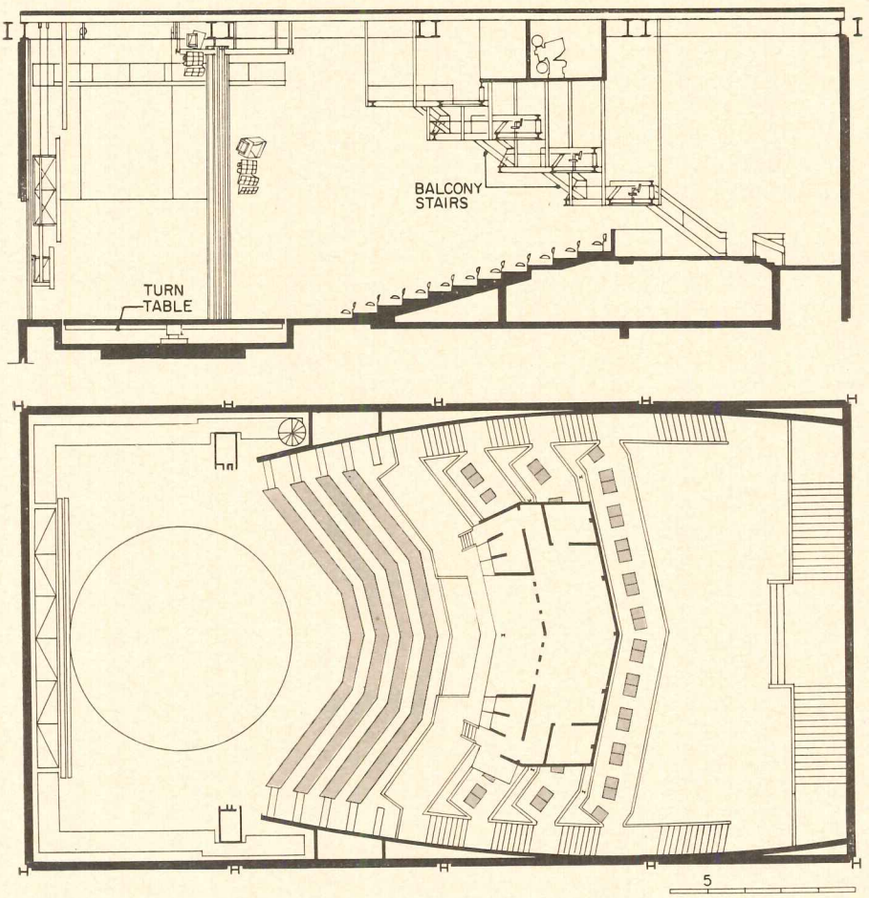


Simultaneous. Performers located on different platforms at different heights at any number of positions within hall





Frontal. This relationship gathers the audience in front of a performer who is seen against a two-dimensional scenic background



Theater for Tractors

This hall for Deere & Company Administrative Center designed by Eero Saarinen and Associates seats 384 people, and has a unique reverse balcony arrangement designed to bring everyone in the audience close to the stage. The four balcony tiers slant forward and upward toward the stage rather than to the rear of the theater. Three tiers have one row of 22 seats each, while the fourth and highest tier closest to the stage, contains stage lighting only. Sixty-six persons can be seated in these balconies and 318 can be seated on the main floor.

The giant stage is equipped with a turntable, 32 feet in diameter. The doors at either end of the stage are 28 feet wide to make it possible to drive large pieces of farm and industrial machinery directly into the theater. The stage is ringed by a high brick outside wall which forms a courtyard that can be used as a product display area.

Projecting balconies

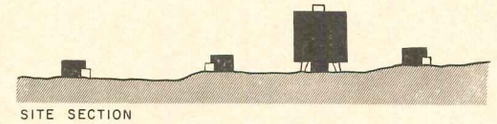
Tractor stage

Theater is part of a larger building complex for Deere & Company near Moline, Illinois

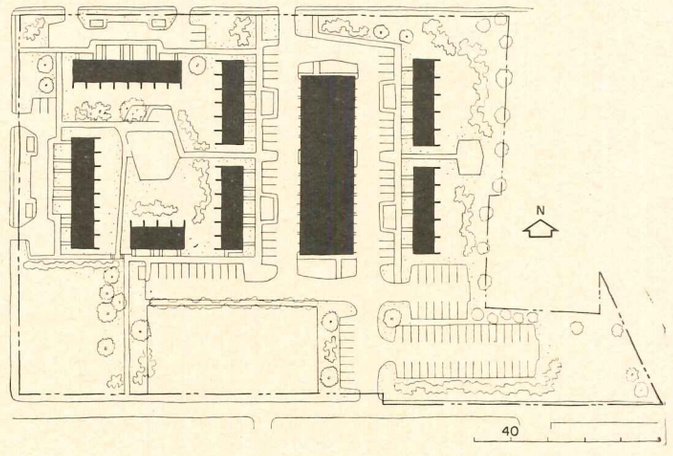
Rental Housing as Architecture

Marcel Breuer's design for Fairview Heights in Ithaca, provides handsome buildings and inviting outdoor spaces

The plan of the new Fairview Heights housing development in Ithaca, New York, consists essentially of two protected groupings of row houses, separated by a high-rise apartment building which is also the visual dominant of the scheme. The high-rise unit is reached by a driveway that splits around its base and is the only automobile access to the site. Parking is provided under the large building at ground level, and along the driveway; otherwise only on the periphery of the 5.3-acre plot. The row houses thus face inward to protected and pleasantly landscaped areas that center on unusual and attractive play areas designed by the architects. The larger of these areas is enclosed by a group of 32 houses (in five buildings) at the lower end of the plot—which slopes one foot in 15. The smaller area—for 10 houses in two units—looks out over a space which ends against the steep slope of the adjacent lot. Building exteriors are of natural concrete, with panels of light or dark brick as infilling.

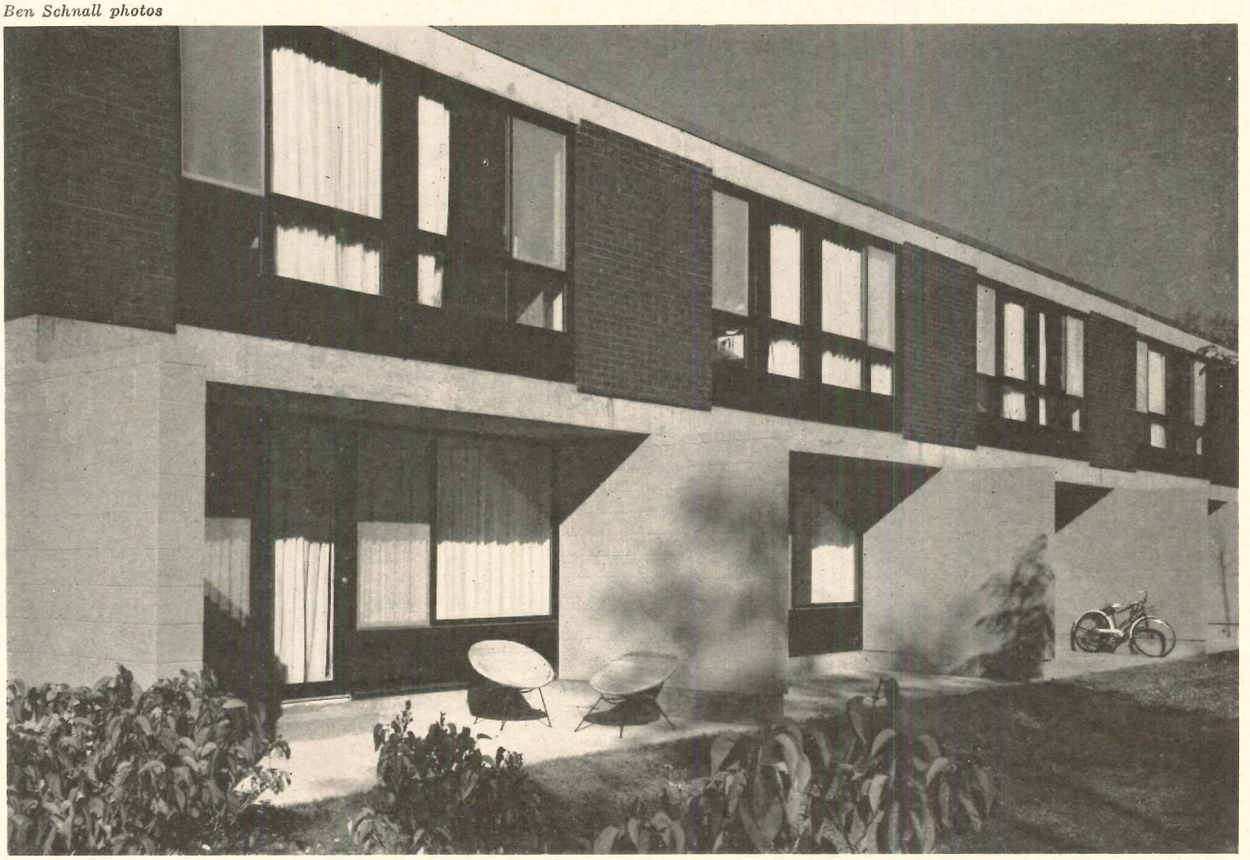


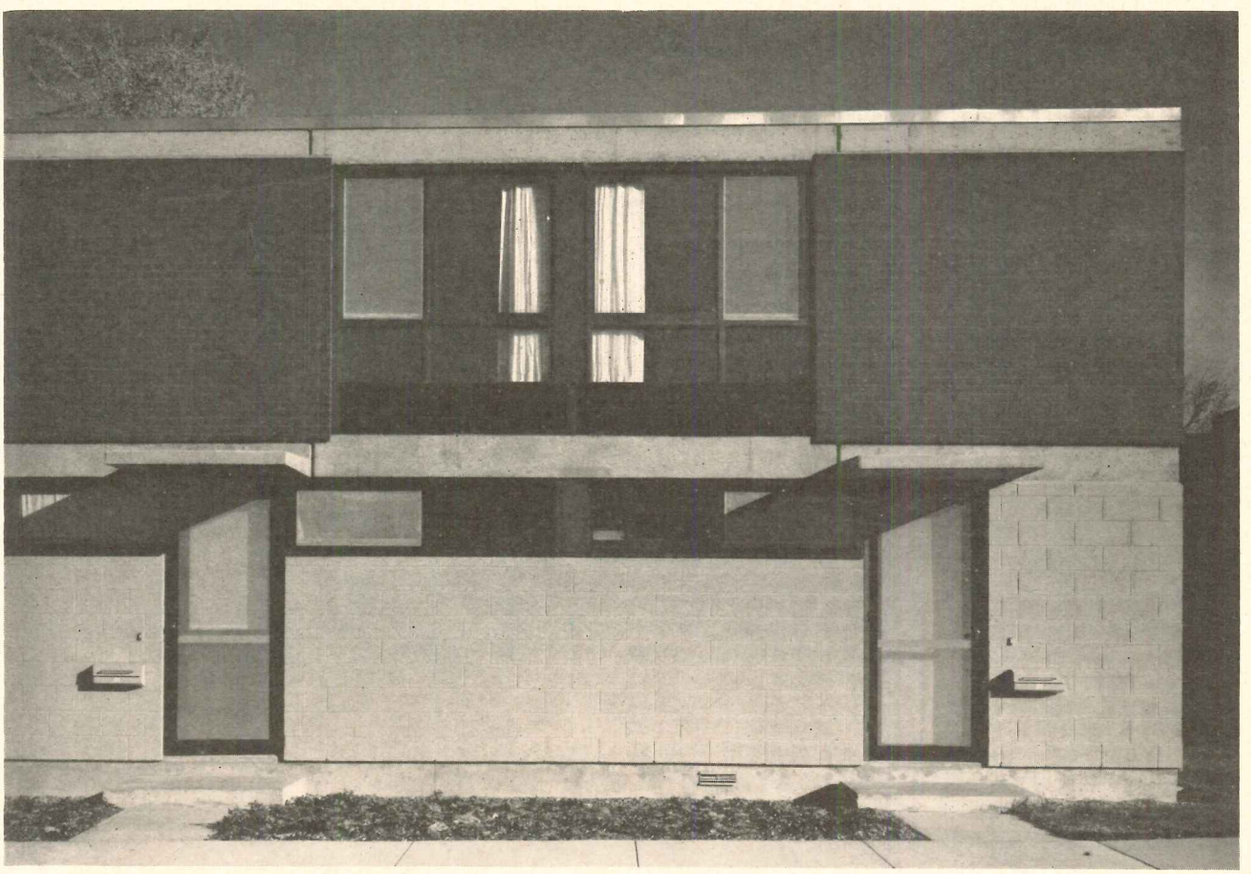
SITE SECTION



Fairview Heights, Ithaca, New York

Ben Schnall photos

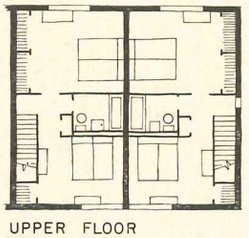




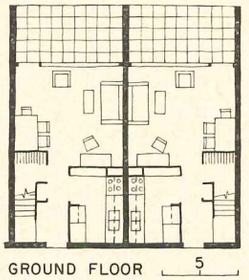
ROW HOUSES

The garden and entrance facades of the row houses are shown (*left*), while the view (*above*) shows the general character of the project and its neighborhood. The Cornell campus is adjacent.

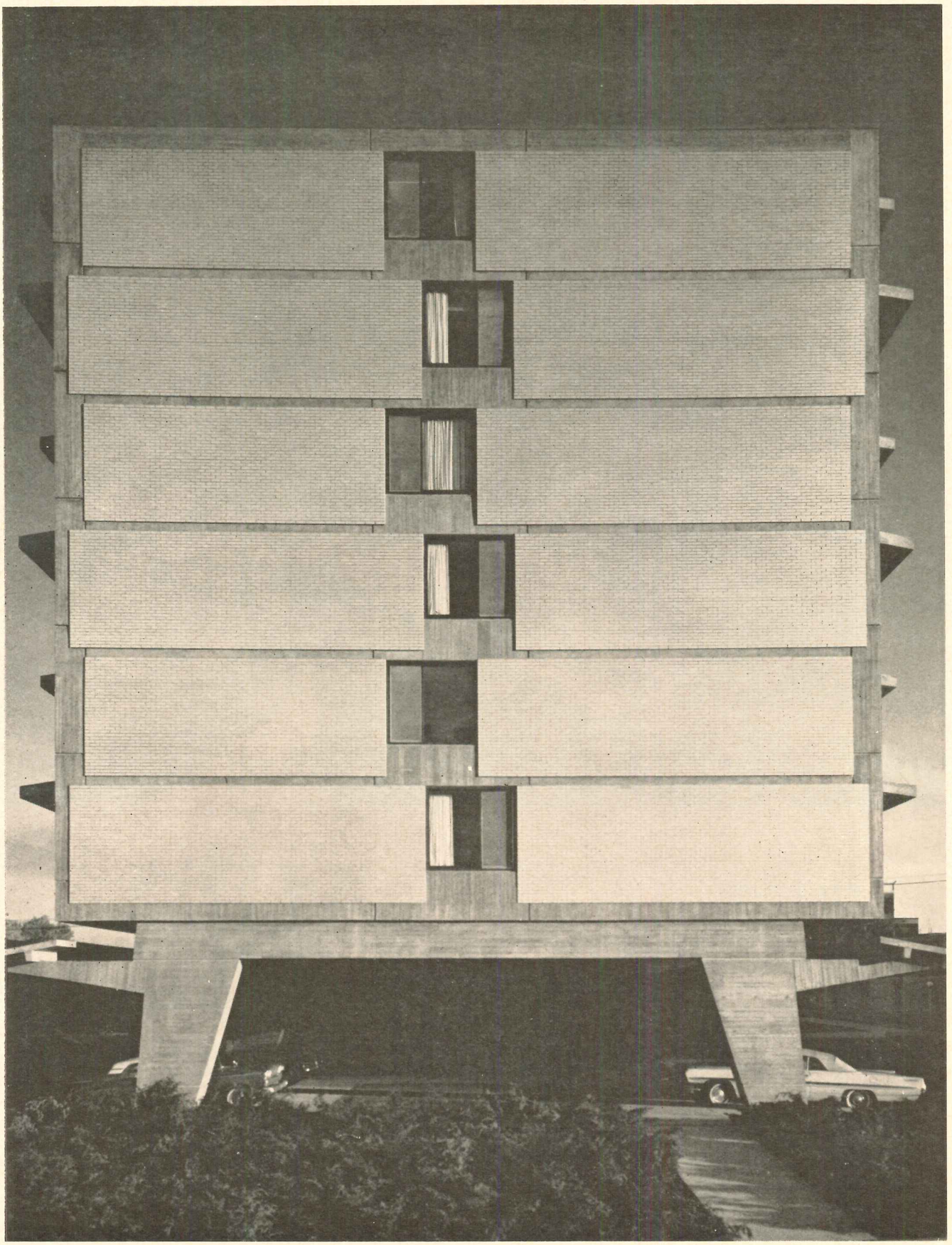
The 42, two-story row houses are of slab and bearing wall construction; the dividing wall serving also for acoustical protection between units. There are two types: the two-bedroom unit, built on a 16-foot module; and the three-bedroom unit, built on a 20-foot module. The sheltered terraces facing the common garden have floors of broomed concrete. Exteriors are of concrete, concrete block and panels of a dark brown-black brick; materials that combine to striking effect. Refuse storage units eliminate the usual rows of refuse cans at doorways.



UPPER FLOOR

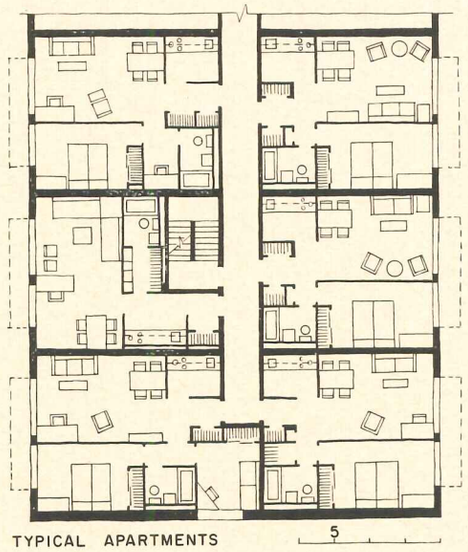


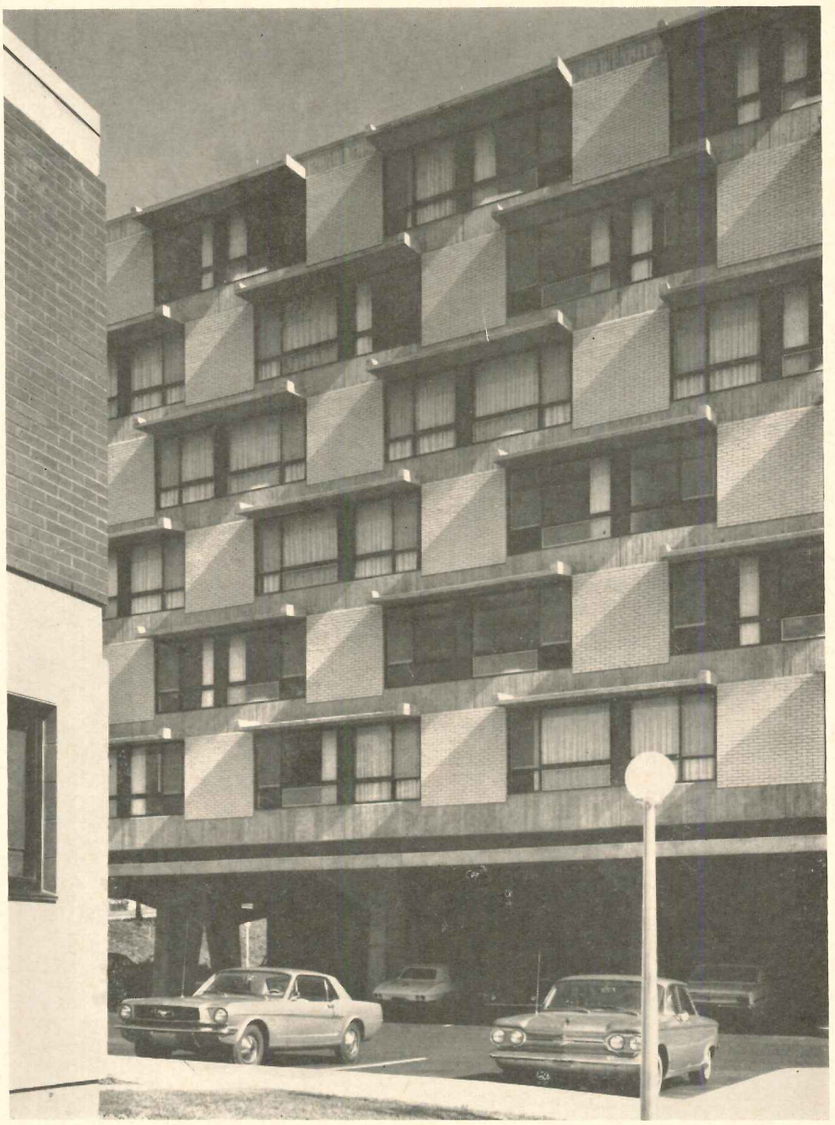
Fairview Heights, Ithaca, New York



HIGH-RISE APARTMENT

The 108-unit apartment building provides efficiency and one-bedroom apartments—some with study. The upper structure consists of slabs and lateral bearing walls, which serve also for soundproofing. The lower structure consists of concrete bents topped by concrete shear walls at the first apartment floor. The panels of light brick—framed in concrete—make an interesting pattern, especially on the end elevations, as shown (*left*). Ceilings are of painted concrete; walls are plastered, except in corridors, where block is the finish; floors are of wood parquet; the sliding windows are of aluminum anodized to a dark bronze color, with a section provided to accept a unit air-conditioner. Row house interior finishes are similar.





Fairview Heights
Ithaca, New York

OWNER:
Fairview Associates

ARCHITECTS:
Marcel Breuer and Hamilton Smith

STRUCTURAL ENGINEERS:
Farkas and Barron

MECHANICAL ENGINEERS:
Galson and Galson

LANDSCAPE ARCHITECTS:
Robert Zion—Harold Breen

GENERAL CONTRACTOR:
A. Friederich & Sons Company

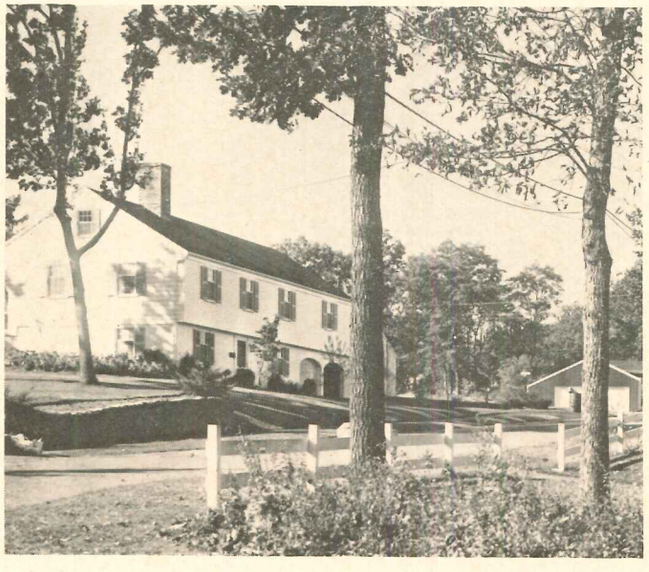
Marcel Breuer on concrete:

"Fairview Heights, a pioneering venture in many ways, represents the new philosophy of concrete. Rough textures of architectural concrete are used here both in the interior and exterior, also in close connection with light and dark brick surfaces. Aside from the surface effects of the textures, sculptured columns and overhangs indicate a structural expression which could not have been conceived in any material except in concrete."

Can Cities Compete with Suburbia for Family Living?

By Catherine Bauer Wurster

Wide World



This article discusses a specific question: why do people live in suburbs, and can they be induced to live in the old cities again? But it requires a somewhat broader introduction, since the whole future of cities is increasingly under debate. Will the old cities survive as great vital centers, or are they dead already? Able thinkers disagree, and the market forces would seem to be divided, some on one side, some on the other.

Since around 1950, there has been a nation-wide drive to "save cities." Articulate and full of zeal, this movement has had wide support and is armed with quite powerful Federal and local tools. The social concern with slums which actuated urban reformers in New Deal days was overwhelmed by a new and direct concern for cities *per se*, with a rare combination of business, political and intellectual motivations behind it.

On the one hand, downtown business and central city governments are interested because they share some highly practical worries: the decay and relative decline which threaten property values and tax-base alike. While, on the other hand, there has been a great (if belated) surge of intellectual interest in cities and urban values. The big crowded city is proclaimed to be the source of all culture, economic advance, urban esthetics and civilization itself. "Sprawl" and "slurbs," the boring conforming middle-class enclave, freeways and automobility, are all denounced as engines of destruction. Publications defending the city run the gamut from mass media to sophisticated sociological and historical studies, such as Morton and Lucia White's "The Intellectual Versus the City" which documents the "fear, ambivalence and animosity" with which Americans, led by their most celebrated thinkers, have always viewed the city.

But has the tide been turned? Are the cities really being saved? Renewal programs have had some dra-

matically visible results, and the market unaided has produced a surprising number of high-rise buildings. But this has only occurred in very choice locations, by and large, and for rather special types of use: "front offices" for big corporations, expensive apartments for adults. Other cleared sites go begging, even with a subsidized write-down, and some of the slum sites in desirable locations cannot be cleared, because of opposition from low-income and minority families who believe—not without reason—that forcible displacement will only worsen their lot.

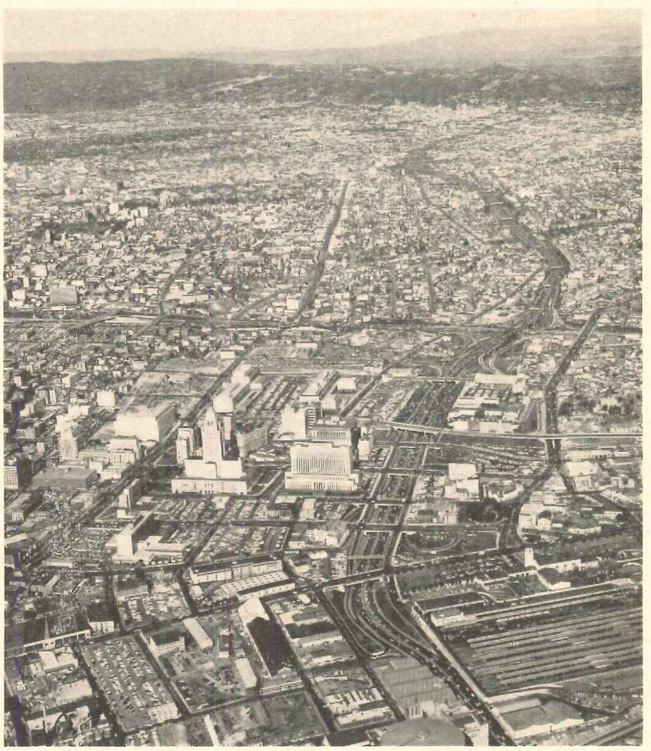
Meanwhile the vast expanse of "gray area" is only getting grayer, in the main. And thus far there is little or no evidence that the suburban push of middle-to-upper-income white families—i.e., those for whom the suburban choice is open—has been deflected or even dented by the fervent claims for the city, or the scornful criticism of suburbia. But as long as that great dominant stratum of American society is not convinced, there can be little hope of restoring either the historic functions or the social balance of the central cities.

Only a limited segment of business and political interests has favored the old cities, however, while the great push of market forces has been on the other side. And now even the intellectuals are increasingly divided. The latest word from urban theorists representing various disciplines—Kenneth Boulding, Scott Greer, Melvin Webber, for example—is that anything resembling the traditional city is probably on the way out. Increasing dispersal is inevitable and even desirable. Communications technology destroys the "friction of space," opening up a wider choice of locations. There is no necessity to live close together, or close to work, shops, amusements. Old-fashioned centers are not needed. Communication, the original reason for cities, is less and less tied to local geography. The most dramatic evidence for this theory lies, of course, in sprawling Los Angeles, "suburbs in search of a city," the perennial nightmare of the urbanists. Its lack of traditional urban form has in no way impeded it from becoming a major population, economic and cultural center—even with serious smog in a land of amenity-seekers. (One can only assume that without smog it would have grown that much faster.) Clearly we do not *have* to have old-fashioned cities any more.

Yet these sophisticated judgments all rest on an implicit assumption, never really spelled out, defended or proven. They simply take it for granted that, given the chance, practically every household and every institution will maximize private space—i.e., choose the biggest and most attractive piece of land available—over every other potential quality the environment might offer. The assumption is that people *are* inherently anti-urban. But are we really? To what extent does the present suburban

Model of Charles Center, Baltimore

"Renewal programs have had some dramatically visible results . . ."



Los Angeles *Fairchild Aerial Surveys*

"One can only assume that without smog it would have grown that much faster"

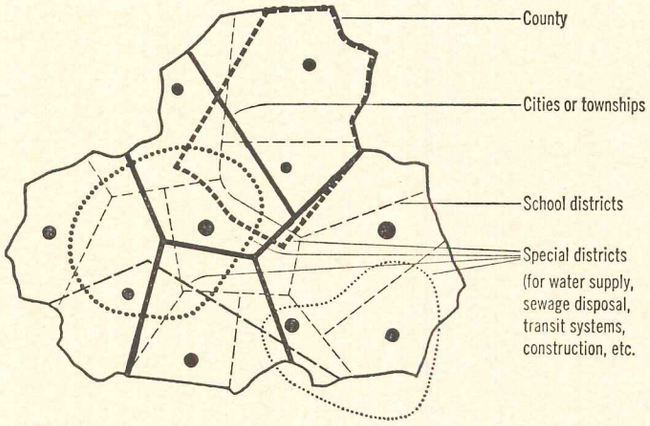


Diagram from "The Future of Our Cities" by Robert A. Futterman, Doubleday & Co. © 1961 by Robert A. Futterman, all rights reserved

". . . suburban communities sprang up without benefit of any broad purposes or guiding criteria"

". . . American families' . . . range of desires is far wider than the rather narrow and over-standardized choices in living environment available to them today"

pattern reflect real and enduring value choices, and to what degree was it shaped by crude short-term decisions, with largely unforeseen results? Might we make different choices in the future? Under what conditions?

Why People Live in Suburbs

Against this background of cosmic but conflicting judgments about the urban future, let us briefly recall how suburbia came into being before trying to weigh its attractions to see if and how the city might compete.

The great wave of postwar growth, mobility and development is rapidly making a majority of Americans into suburbanites. (It's already true in California, even counting Los Angeles as a central city.) But it is sometimes forgotten that the suburban communities sprang up without benefit of any broad purposes or guiding criteria.

After the war we suddenly confronted a marriage-and-baby boom, untrammeled prosperity and a terrific housing shortage. Reprehensible though it may seem from a post-facto view, these conditions were entirely unforeseen, whether by government and industry, or by the depression- and slum-oriented urban thinkers of the day, this author included. But the successive millions of additional urban households had to live somewhere, and this called for successive millions of additional homes. Most of them had to be outside the old cities, simply because these cities were already largely built up and had never even dreamed of undertaking the expansion or satellite programs which were taken for granted in staid European cities such as Stockholm, Copenhagen, Amsterdam and London. The county, state and Federal governments all lacked both the tools necessary to implement change and and any positive criteria for the structure of new development.

So the scattered standardized tracts just happened, shaped by short-term market forces geared solely to the rapid production and profitable sale of a popular commodity, the single-family dwelling, in any location where relatively cheap land and relatively adequate services and communications chanced to be available. The Federal Housing Administration and suburban zoning (i.e., "planning") merely abetted the process, giving it a veneer of bureaucratic order. More recently, when speculative land prices and exclusionary practices had pushed up the price of single homes, reducing the effective market, there has been an even more planless rash of multiple housing, somewhat, but not much, cheaper, which is still continuing. Industry and shopping centers have, of course, followed a similarly random pattern, often quite removed from residential communities.

However unplanned or un-ideal, suburbia has been

attractive enough to induce most of the families who can afford it to live there rather than in the city. But they do so for a number of different reasons, not all of them related to non-urban qualities. For, despite any similarities in their social-economic characteristics, the suburbanities, like any other large group of American families, have highly variegated needs and tastes. In fact, it may be safely assumed that their range of desires is far wider than the rather narrow and over-standardized choices in living environment available to them today. Some would never choose to live in the old city, while others might do so if certain conditions were met.

City and Suburb: Pro and Con

A list of significant factors in the physical environment which have led people to choose suburban homes would certainly include convenience to work; acceptable homes; good schools; automobility; nature, public and private; and "exclusive" communities. Each of these attractions is rather summarily discussed below, in terms of the old cities' potential ability to provide a comparable benefit.

Convenience to Work

It is often forgotten that most suburban workers do not commute to the city. The number and proportion of outlying jobs is steadily increasing, and many people would choose to live there for that reason alone even if living conditions did not seem more attractive. The old notion, long prevalent among transportation engineers and planners, that Americans take positive pleasure in long-distance commuting, has been considerably undermined by the 1960 Census and other recent surveys. People apparently try quite hard to live and work in the same sub-sector of a large metropolitan area, and the principle obstacle to attaining this goal is doubtless the lack of suitable living facilities. Along with land prices, this suggests that the theorists' "frictionless" space is not yet with us. This situation represents a basic opportunity for the old cities, which probably must be grasped if they do not want to see more and more employment follow the employes to suburbia. Some proportion of the households whose workers now commute would live in the city if other conditions were made attractive enough.

Acceptable Homes at Suitable Prices

This has been suburbia's basic attraction: for many moderate-income families it was the best housing they had ever lived in, for some it was better than they had ever expected to have. Both land and houses

United Press International

Westlake Studio and Camera Center

"However unplanned or un-ideal, suburbia has been attractive enough to induce most of the families who can afford it to live there rather than in the city"

JOURNEY TO WORK IN THE SAN FRANCISCO BAY AREA

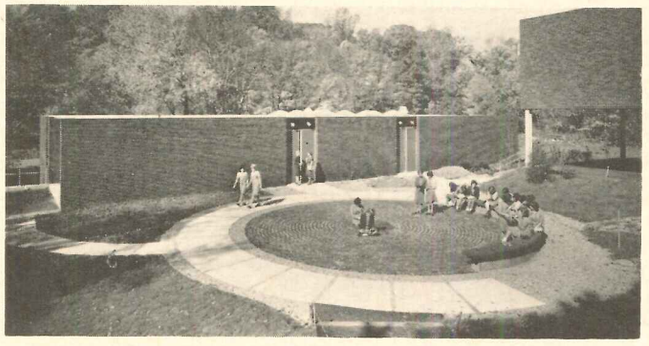
Locality	Percentage of resident workers employed in the same area
Nine-County Bay Area	99
Central Cities	89
San Francisco (County)	93
Oakland	69
Balance of Bay Area	80
Marin County	61
Napa and Sonoma Counties	
Solano County	90
Contra Costa County	65
Balance of Alameda County	63
Santa Clara County	89
San Mateo County	56

Source: U.S. Census 1960

"People apparently try quite hard to live and work in the same sub-sector of a large metropolitan area . . ."

Courtesy City of New York Housing and Redevelopment Board

"In the United States . . . we have never seriously tried to design compact housing suitable for American family life."



Architects: Sherwood, Mills and Smith — *Ben Schnall*

George Zimbel, Courtesy Educational Facilities Laboratories

"The quality of local educational facilities is an increasingly weighty factor in residential choice."

in outlying areas are now much more expensive than they were, and this may help the cities a bit, if they really want to compete. However, they will have to be far more ingenious than they have been, to overcome the disadvantage of higher land costs. Just building ordinary city apartments will not do it.

As long as we continue to cultivate a casual kind of indoor-outdoor freedom in our family life, including Spock-reared children, the single-family house with private outdoor space will remain in prime demand. For the life-style of many families, however, these functions do not require a quarter-acre or even a 60-foot plot, particularly if community recreational facilities are conveniently located. Some might even accept apartment living, if adequate space were cheap enough, and if the facilities and services often provided in European projects were available.

In the United States, however, except in a few experiments which had little influence, we have never seriously tried to design and produce compact housing suitable for American family life. Our general failure is all too evident in most public housing projects; in expensive high-rise apartments; and now, even in the relatively low-density apartments which string along suburban freeways. There are, of course, some more hopeful examples, particularly the revival of the row house. As yet, few urban "town houses" are within reach of middle income families, but there are some encouraging exceptions.

Good Schools

The quality of local educational facilities is an increasingly weighty factor in residential choice. Middle-class families have become acutely aware of the rising educational requirements in the job market, and suburban communities have tended to raise their school standards accordingly. Often they have done this even when it meant losing on earlier suburban advantage, low tax rates, where there was little business or industry to help support the schools.

Meanwhile, however, many of the old cities (which once attracted people just because of their educational opportunities) have fallen behind, not only in the quality of physical facilities, but also in teaching standards. The fact that cities are not meeting the special needs of the disadvantaged is already an issue. If city officials believe that a balanced population is essential in order to maintain an adequate tax base for necessary services, they will have to invest more of their *present* tax income in schools, to insure a superior educational system.

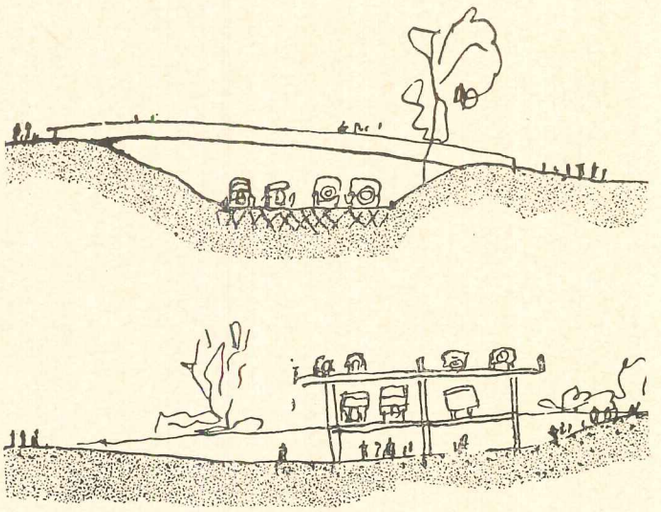
Automobility

Suburbanites are not only dependent on automobiles; a whole generation now takes them for grant-

ed, and may not easily be induced to give them up. After all, rapid self-mobility does have certain real advantages which must not be discounted.

Here we are not concerned with the potential use of mass transit by commuters, but with the attractions of living in a city where driving is often difficult, and may be increasingly discouraged in favor of public transportation. I suspect that many commuters would choose to live in the city, *if* the other attractions were adequate, simply because it should be considerably more convenient to get to work by public means within the city than to drive in from outside or switch halfway to train or bus. Suburban mothers, moreover, spend an enormous proportion of their time just driving people around, not only taking husbands to the station but toting children to and from most of their activities outside the home. Or if there is only one car, the alternative may often be to spend all day trapped at home. It would take an adjustment, but it might be a great relief if everybody over the age of five could walk to their destinations or take a bus at the corner.

One car per family will still be a necessity, however, and the cities might as well face up to it. With increasing leisure, moreover, the weekend exodus may well create worse traffic jams than the commuter has, with much less likelihood of substituting public transport for even a modest proportion of the automobiles. The extent to which suburban-type families are induced to live in the city will only exacerbate this problem. Technology may provide some new solution, but rapid self-mobility in some form will have to be accommodated, even if we do learn to take buses and walk again.



Sketches by Le Corbusier from "Concerning Town Planning" published by the Architectural Press

". . . . rapid self-mobility in some form will have to be accommodated even if we do learn to take buses and walk again"

Nature, Private and Public

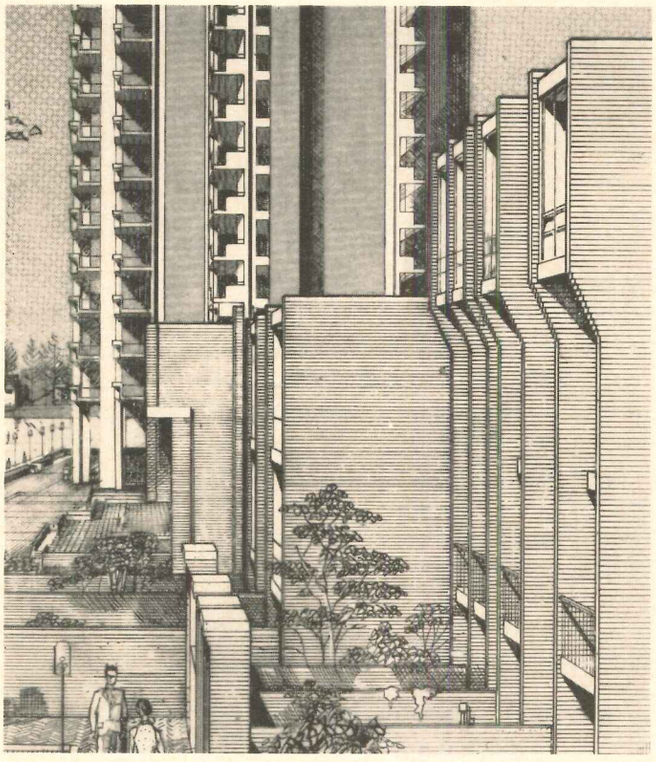
Many people are undoubtedly attracted to suburbia by the desire for a semi-rural environment: owning a large piece of pleasant land around the house, or living close to open country, or preferably both.

If technology really does overcome the frictions of space, complete dispersal may be feasible, with both public and private nature for everyone who wants it. Within the visible future, however, it seems apparent that the attractions of the rurban environment will be harder and harder to achieve for everyday metropolitan living. Land prices have been rising much faster than incomes, and the number of people who can afford large desirable lots is undoubtedly declining. At the same time, the open fields and scenery are rapidly receding in front of the advancing bull-dozers. The greater the demand for private nature, the less there is left of public nature.

A pair of different answers to the whole question of leisure-time tastes may be in the making, however, with a result that may well be of great potential significance for the old cities. For one thing,

Architect: Carl Koch

"Many people are undoubtedly attracted to suburbia by the desire for a semi-rural environment"



Architects: Whittlesey and Conklin

". . . many of the families with commuters might be glad to exchange their somewhat featureless enclaves for a livelier city environment"

TYPICAL SOCIAL DIVISIONS IN 1960

	Old City	New Community
Median Family Income	$5,900	$11,000
Percentage of:		
Families with incomes under $3,000	20	5 (or less)
Families with incomes over $10,000	15	55
Non-white poulation	25	1 (or less)
Non-white children under 18	35-40	——
Whole population under 18	25	40-45
Whole population over 65	15	5

Information furnished by Catherine Bauer Wurster

"Few families who do have other choices will want to bring up their children in an increasingly ghettoized city. . . "

more and more people are acquiring "second houses," from villas in resort communities to self-help cabins in real country, for week-end and vacation use. On the other hand, isn't it at least a defensible notion that education and travel are making people more sophisticated, creating a taste for urban cultural and recreational resources as well as for outdoor activities and nature? Will we want more urbanity and convenience during the week, but with a chance for rural escape?

"Exclusive" Communities

The desire to live in a small, politically independent community, sedulously all white and of approximately the same income-group as oneself (or just a bit higher), is more inherently anti-urban than other traits found in suburbia. It seems to be quite prevalent; how deep does it go?

The suburban pattern, including its enclave communities, came about inadvertently. Nobody said: we will now create a metropolitan area as sharply divided by class and race as possible. The pattern was shaped piece-meal by the blind oversimplifications of zoning, standardized tract development, housing market limitations, tax-base worries, real estate mythology and assorted individual prejudices. After the pattern was set, many people began to believe that it was desirable, even necessary.

It is a recently acquired taste, however, and I suspect that it is less strong and universal among suburban families than it may seem to be. After all, most of them had no other choice if they wanted a nice house and a good school. If they were assured of these benefits, many of the families with commuters might be glad to exchange their somewhat featureless enclaves for a livelier city environment —but only on one condition: that the city's social mix be reasonably well balanced and the streets reasonably safe.

The greatest threat to the old cities is not suburban sprawl, or automobility, or even the taste for homogeneous communities, although these help to create the city's basic problem. It is the trend toward increasing domination of the old cities by the disadvantaged, the low-income and minority families who have no other choice in the current housing market. Few families who do have other choices will want to bring up their children in an increasingly ghettoized city, with its dangerous conflict and hopeless social and economic problems, even if they hate suburbia. More than the fate of the old city is involved in the divided metropolis, and there is no solution without a reversal of the present trends in *both* directions. Little did Mumford realize how grimly prophetic his chapter-heading of 1922 would turn out to be: "Coketown and the Country House."

RECIPE FOR REVIVING CITIES

This article is about the relatively advantaged families who now populate suburbia, and why they live there. But the measures that would attract some of them into the cities are pretty much the same as the measures that ought to be undertaken anyway to help the disadvantaged. What is needed essentially is a wider range of environmental choice for both groups. A reasonably balanced population in the city, with high-level services and a strong economic base, requires a reasonably balanced population outside. If we really want to "save cities," the recipe can be summarized in terms of four basic ingredients:

1. *Reverse the ghetto trend: open up surburbia*

Opportunities for lower income and minority families to live outside the old cities must be greatly expanded, not only for obvious social and civic reasons, but also because most of the new jobs are bound to be located outside. The present pattern is already forcing "out-commuting" as well as "in-commuting." Bold innovations will be required, but the need is beginning to be recognized here and there at all levels of government, and President Johnson supported some practical proposals by the Housing and Home Finance Agency in his housing message last January. But the necessary political steam has not yet come up.

There are of course ample precedents abroad, where it is taken for granted that new development should include a balanced population: by city initiative in Holland and Sweden, by national and city measures combined in Britain.

2. *Provide city homes suitable for families*

Compact housing and neighborhood *can* be designed to suit American family needs, and still compete in price and quality with suburban homes. But it means lower densities, lower land prices, and less greediness for maximum immediate tax benefits than is customary in current renewal programs. Private outdoor space is essential, and the new interest in "town houses" should be pursued. Europe will also provide some useful precedents here.

3. *Go all out for superior schools*

A first-class educational system is an absolute necessity, equally for the advantaged and the disadvantaged, and above all in neighborhoods where there is a mixture of races or classes. Several redevelopment projects that were designed to attract families have failed due to inadequate schools.

4. *Make good leisure-time facilities accessible*

A full range of first-class cultural and recreational opportunities should be a basic part of every city renewal plan, and should be attractive and readily accessible to every one, by foot or public transportation if possible. This includes both urban-type facilities, and a region-wide program for open space conservation. The week-end problem is the ultimate challenge to the public transportation zealots, and, in quite another sense, for the conservationists.

In Conclusion

Perhaps the main thing to remember is that the compact multi-purpose city is no longer an economic and functional necessity as it was from pre-history until a few decades ago. It will only survive, with the values prized by city defenders, to the extent that people choose these values.

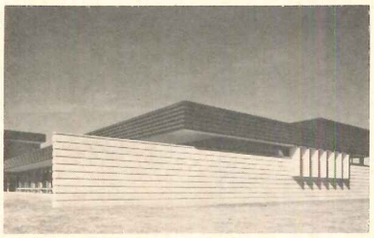
But it isn't hopeless.

Until a century or two ago, almost everyone had to live in the country, doubtless dreaming of the glamorous exciting cities. Then, when we had to live in crowded cities, we longed for nature and privacy and moved out to the suburbs as soon as we could. Now that we do not have to have old-fashioned cities at all any more, it is just possible that many of us might choose to live in a truly urban environment, *if* it can be made attractive enough.

SMALL OFFICE BUILDINGS

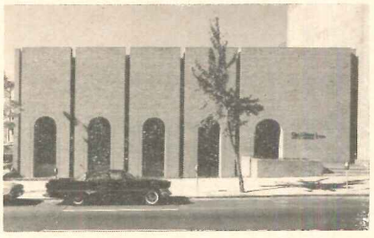
The five buildings shown on the following pages were each commissioned for the use of a single client; and each represent a highly individual solution to the particular problems involved. Together, they show what a variety of needs can be included in the simple category of office space

OFFICES FOR NARROW URBAN SITE
Northwestern Mutual Insurance Building, Atlanta, Georgia
ARCHITECTS AND ENGINEERS: *Toombs, Amisano & Wells*
GENERAL CONTRACTOR: *Benning Construction Co.*

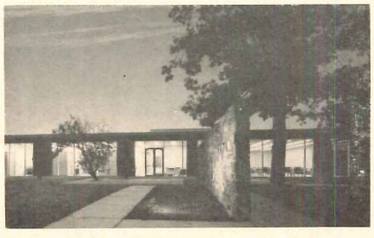


OFFICES AND WAREHOUSE FOR A PUBLISHER
Oxford University Press, Don Mills, Ontario
ARCHITECTS: *Fairfield and DuBois*
STRUCTURAL ENGINEERS: *Robert Halsall & Associates*
MECHANICAL ENGINEERS: *R. T. Tamblyn & Partners, Ltd.*
ELECTRICAL ENGINEERS: *G. E. Mulvey & Company, Ltd.*
LANDSCAPE ARCHITECTS: *Sasaki, Strong & Associates, Ltd.*
GENERAL CONTRACTOR: *Milne & Nicholls, Ltd.*

OFFICES BUILT ALONG A HIGHWAY
Southeastern Department Office Building
Northwestern Mutual Insurance Company of Seattle
Raleigh, North Carolina
ARCHITECTS & ENGINEERS: *G. Milton Small & Associates*
LANDSCAPE ARCHITECT: *Richard C. Bell*
GENERAL CONTRACTOR: *King-Hunter, Inc.*



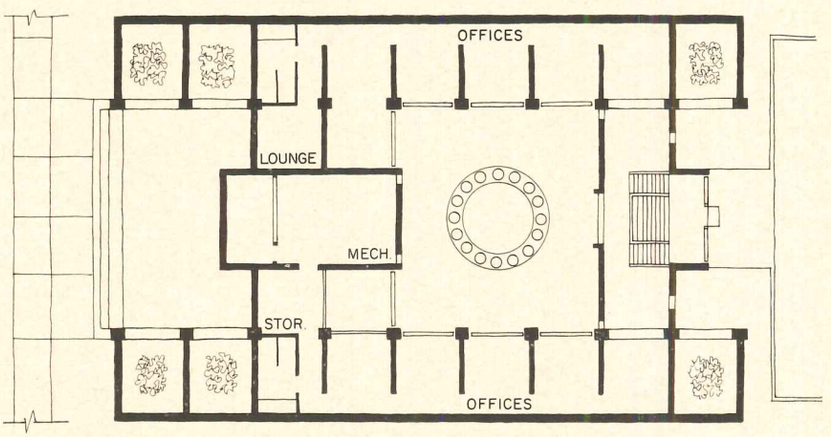
OFFICES AND SHOWROOMS FOR INTERIORS FIRM
The H. Chambers Company, Baltimore, Maryland
ARCHITECTS: *Fisher, Nes, Campbell & Partners*
Charles H. Richter Jr., partner in charge of design
STRUCTURAL ENGINEERS: *Office of Van Rennselaer P. Saxe*
MECHANICAL AND ELECTRICAL ENGINEERS: *Whitman, Requardt & Associates*
GENERAL CONTRACTOR: *C. W. Jackson & Associates, Inc.*

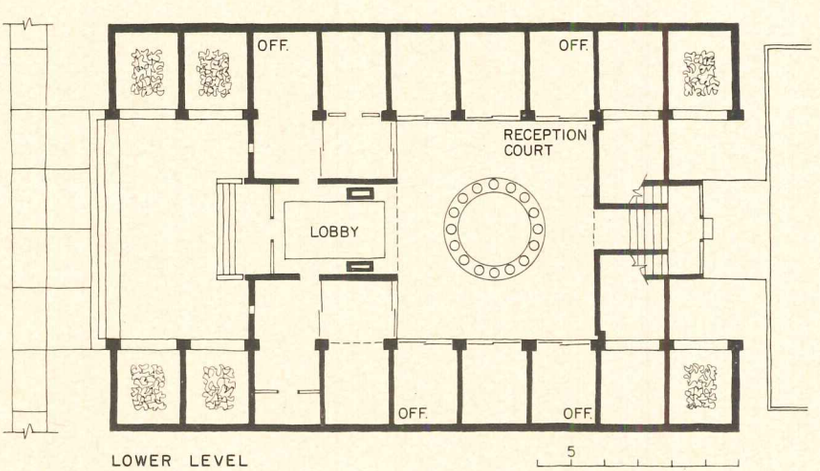


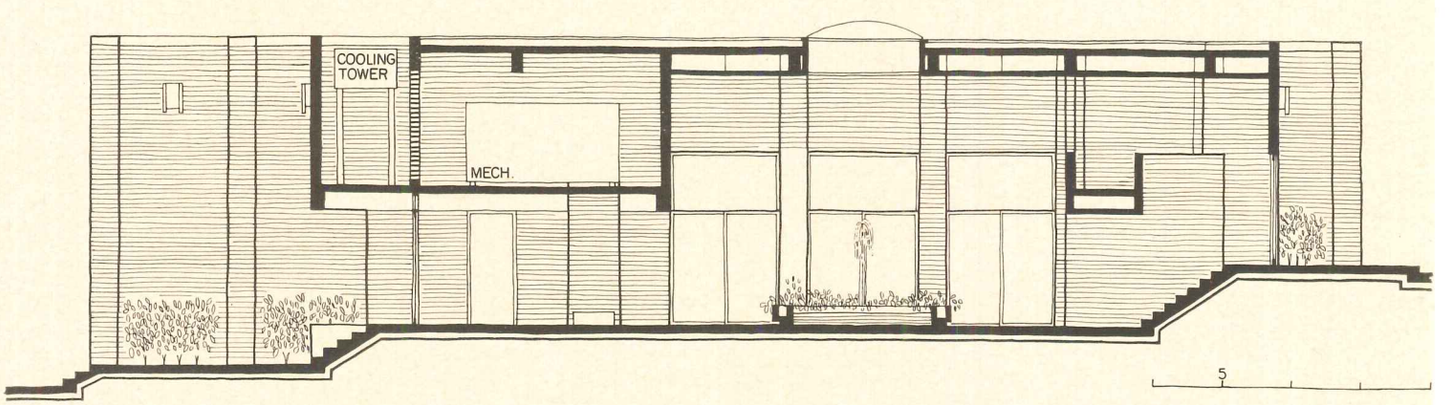
OFFICES FOR PRODUCERS ASSOCIATION
Central Arkansas Milk Producers Association, Little Rock, Arkansas
ARCHITECTS: *Wittenberg, Delony & Davidson, Inc.*
STRUCTURAL ENGINEER: *Lee W. Bransford*
MECHANICAL AND ELECTRICAL ENGINEERS: *Rawland E. Blaylock & Associates*
GENERAL CONTRACTOR: *The Van Joyce Company*

OFFICES FOR NARROW URBAN SITE

Northwestern Mutual Insurance Building
Atlanta, Georgia
ARCHITECTS: *Toombs, Amisano & Wells*







(scale of section is twice that of plan)

The front entrance is recessed, forming a forecourt whose defining walls follow the structural module of the building. It is anticipated that the buildings on either side will come right to the sidewalk line, so that the walls insure that the entrance will always have its present character

George Cserna

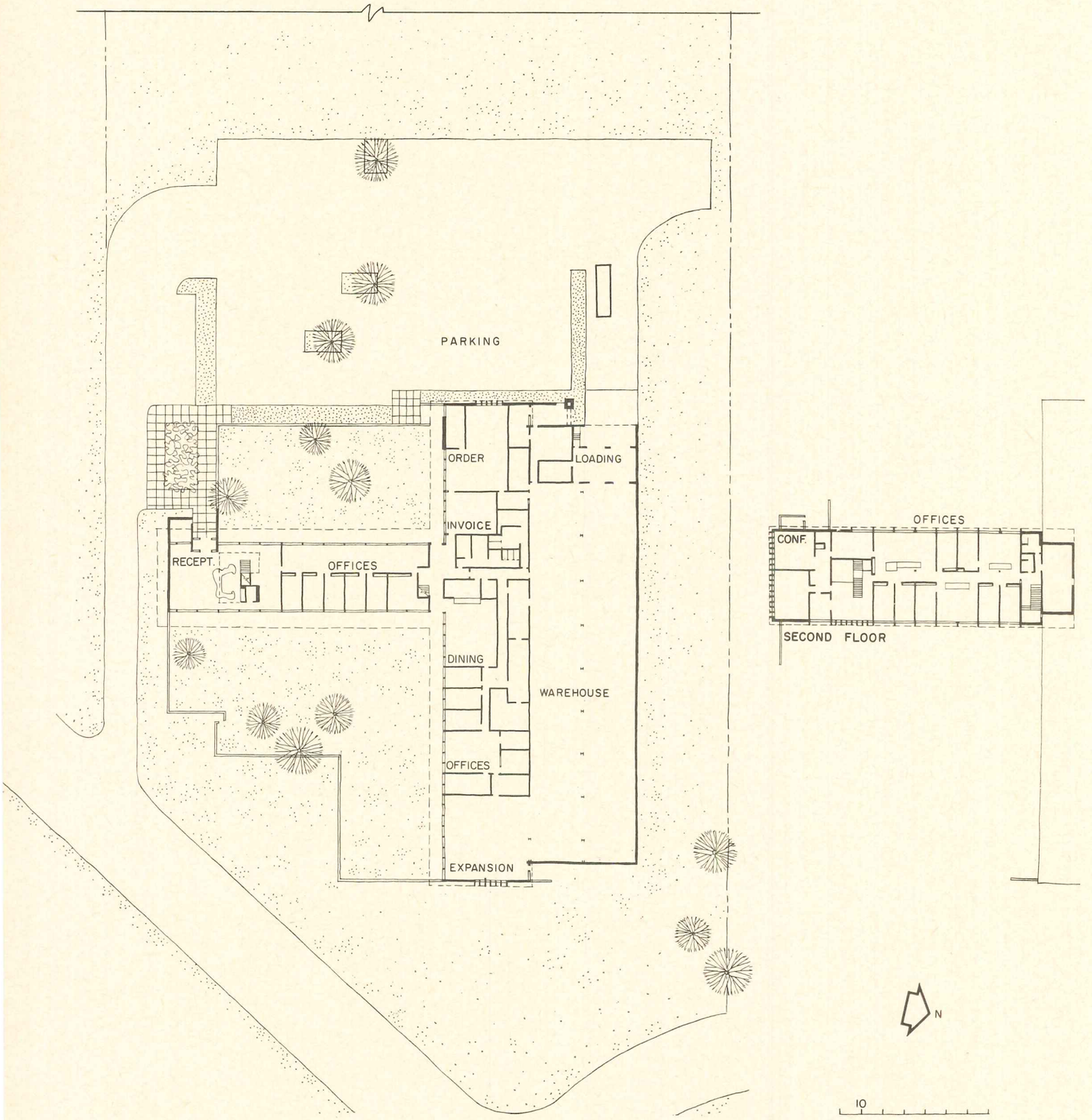
The rear entrance from the parking lot is at a considerably higher level than the street in front, as can be seen in the section (*across-page*)

Clyde May photos

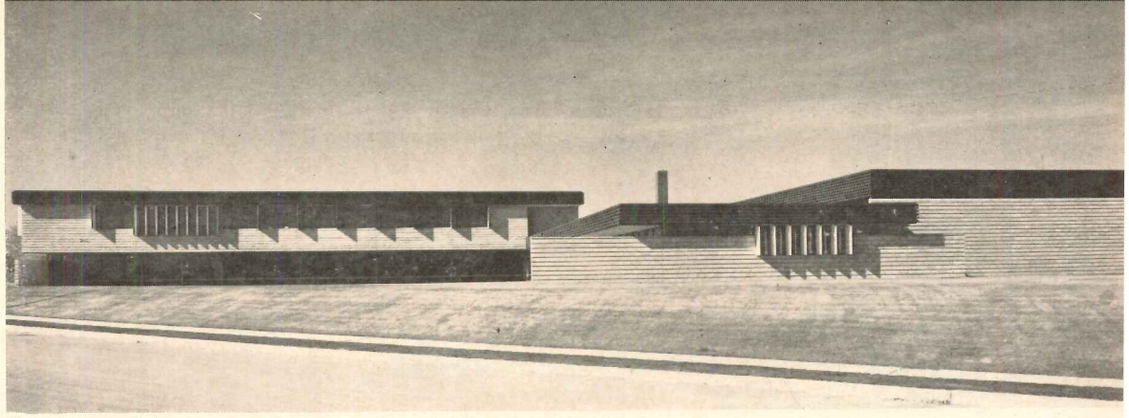
The long sides of the building are windowless, as they are built at the lot line. The offices look out on the sky-lit interior court with its fountain and brick floor

OFFICES AND WAREHOUSE FOR A PUBLISHER

Oxford University Press
Don Mills, Ontario
ARCHITECTS: *Fairfield and DuBois*

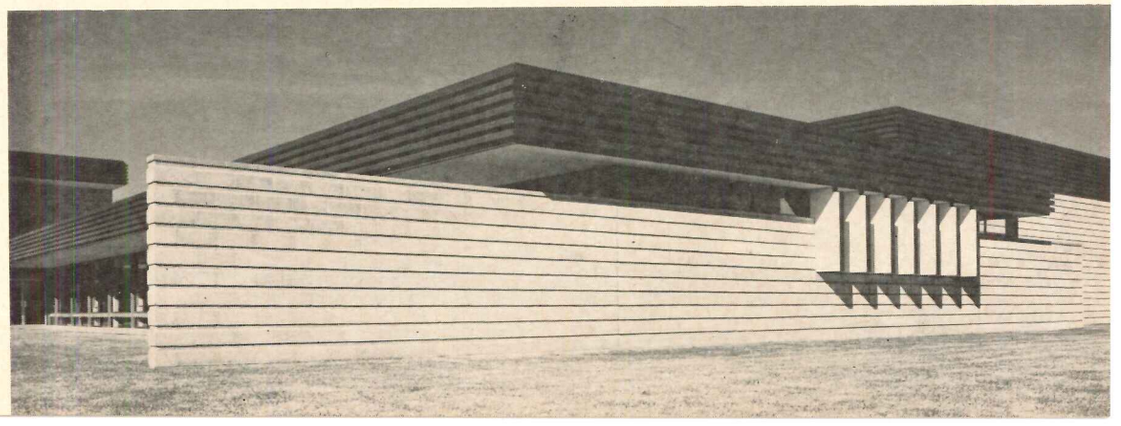


The building is situated in an area that is zoned for light industry. As the neighborhood is developed, 7-foot garden walls will be built, as shown on the plan (*across-page*)



H. R. Jowett photos

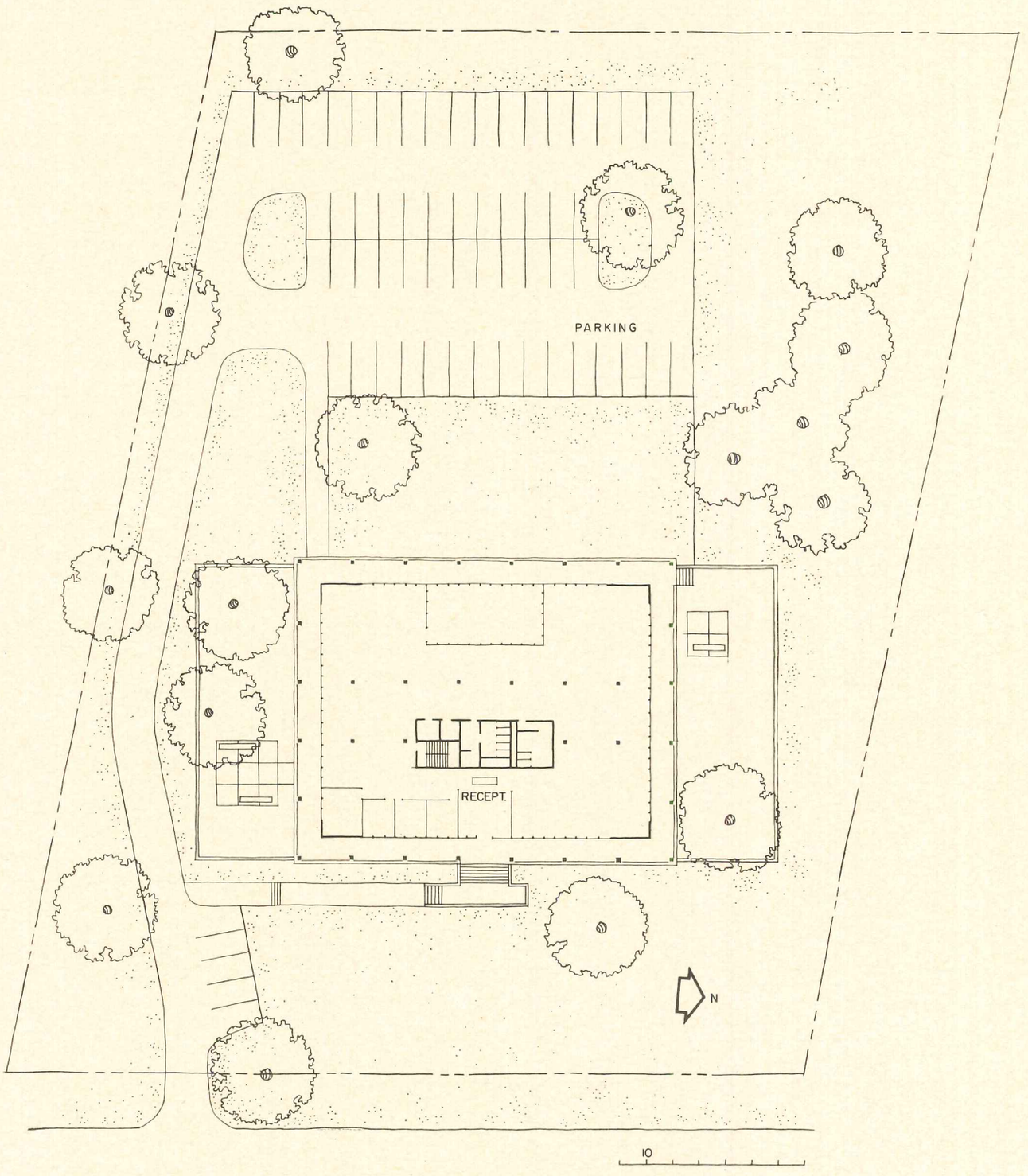
The wall material is a concrete block whose mold has been modified to produce the reveal. The blocks have a protective coating of silicone. Fascias are a standard metal deck, coated with vinyl in a deep olive color before erection. The reveals in the deck reflect the striations in the masonry



The architects sought to relate the various elements of the building by making them part of a pattern of overlapping planes

OFFICES BUILT ALONG A HIGHWAY

Southeastern Department Office Building
Northwestern Mutual Insurance Company of Seattle
Raleigh, North Carolina
Architects: G. Milton Small & Associates



Employes enter at the lower level, where there is a lounge and lunchroom, from the courtyard at the left side of the plan

This view is taken from above the driveway. The main road can be seen in the background at right

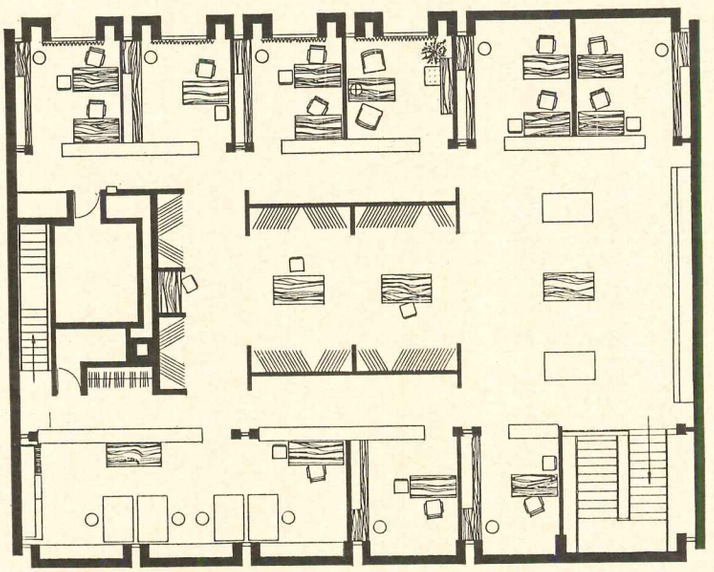
Joseph W. Molitor photos

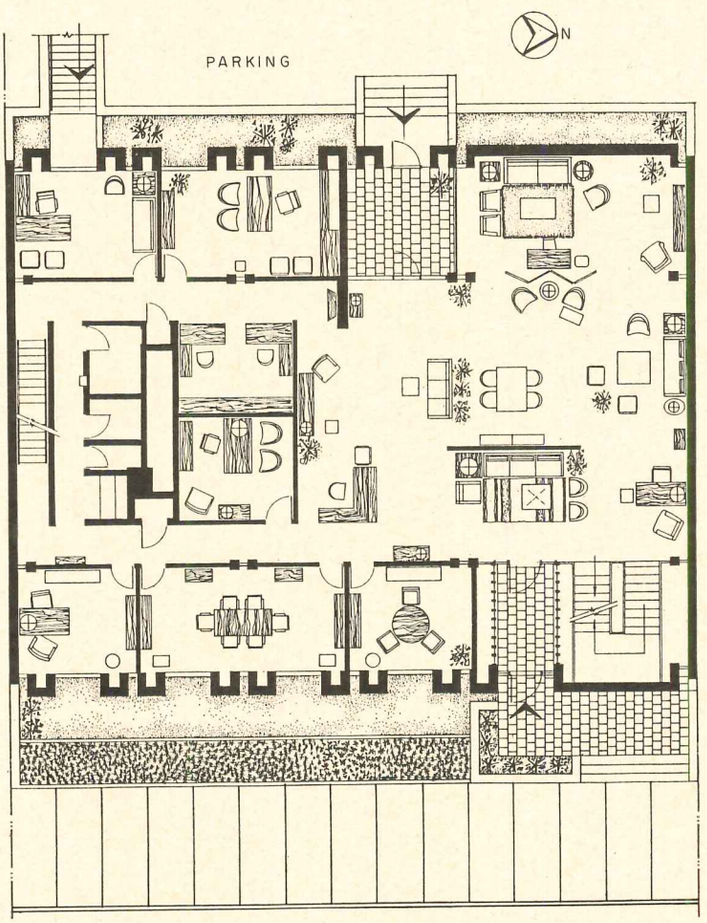
The reception area. The Department Manager's office is along the corridor to the right

The Department Manager's office. A portion of the courtyard is visible through the windows

OFFICES AND SHOWROOMS FOR INTERIORS FIRM

The H. Chambers Company
Baltimore, Maryland
ARCHITECTS: *Fisher, Nes, Campbell & Partners*

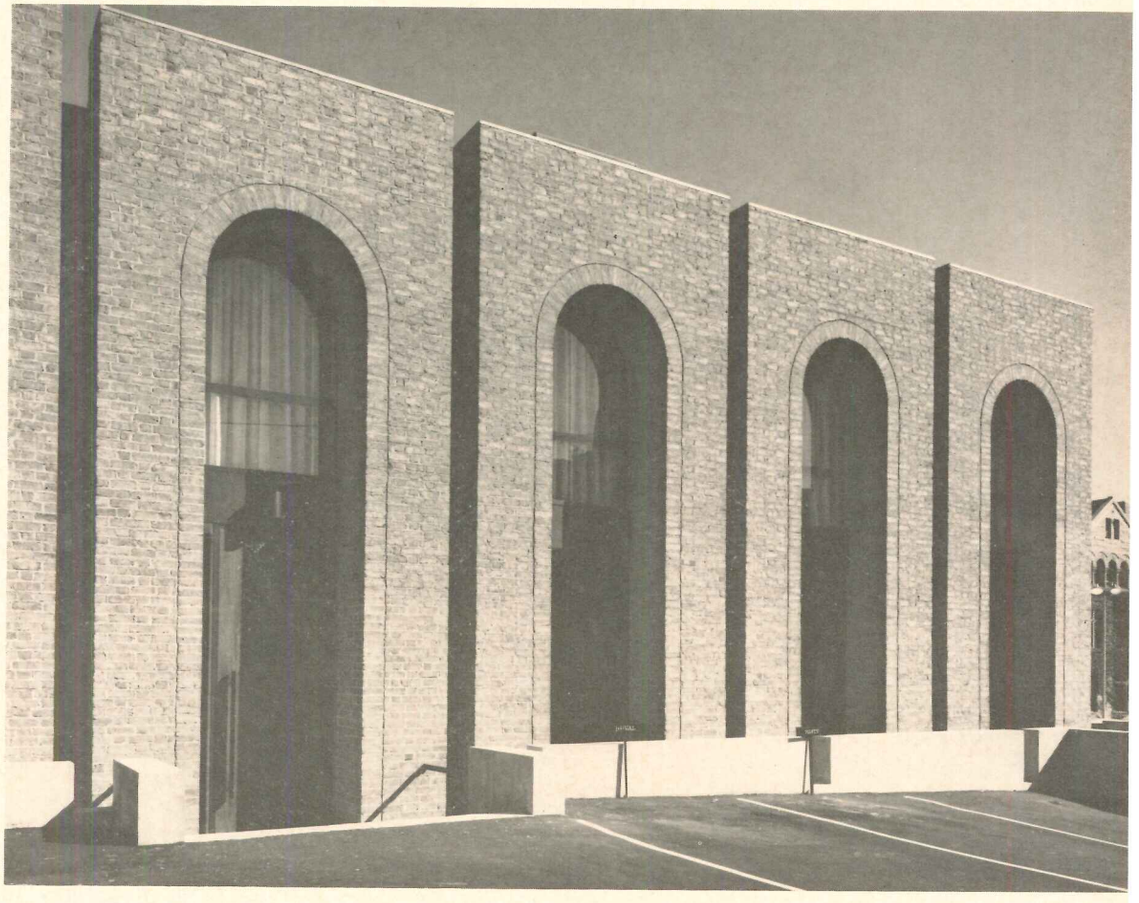




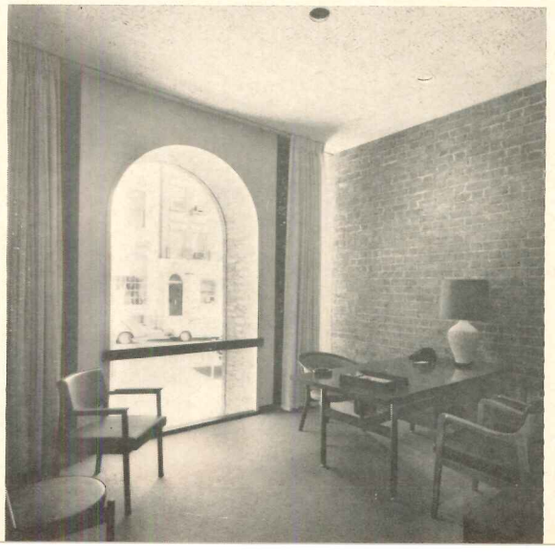
The street floor contains showrooms and executive offices. Other offices and the drafting room are located on the second floor. There is an additional showroom in the basement

View from Charles Street

George Cserna photos



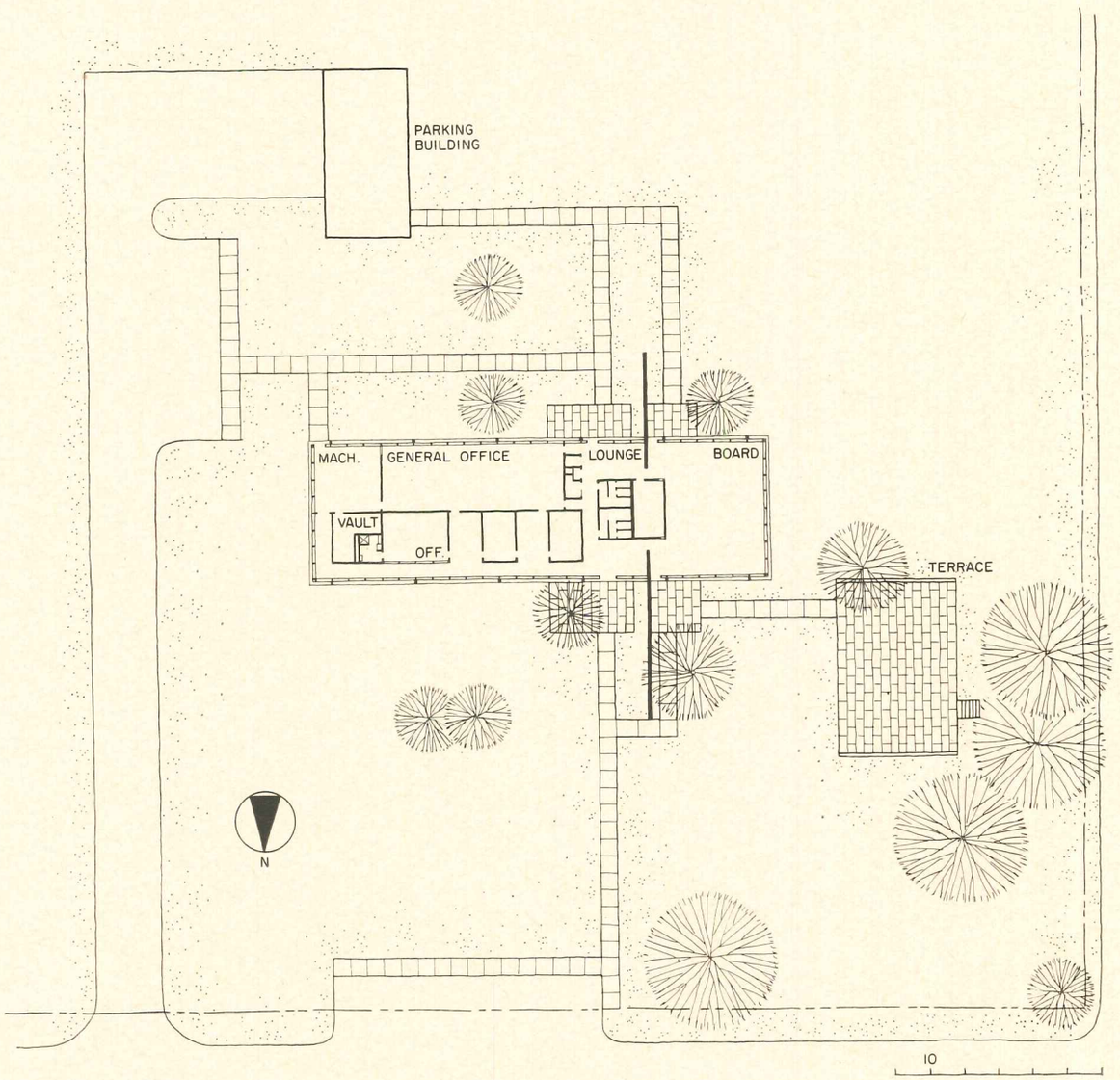
View from parking lot



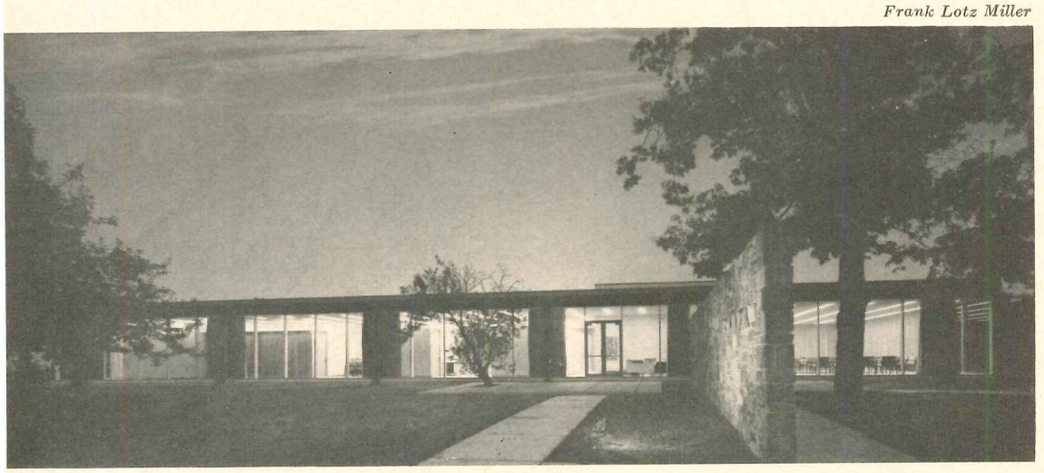
The office shown is on the street floor, and appears in the lower left hand corner of the plan (*across page*). *Far right*: The stairway seen from street floor level

OFFICES FOR PRODUCERS ASSOCIATION

Central Arkansas Milk Producers Association
Little Rock, Arkansas
ARCHITECTS: *Wittenberg, Delony & Davidson, Inc.*



Frank Lotz Miller

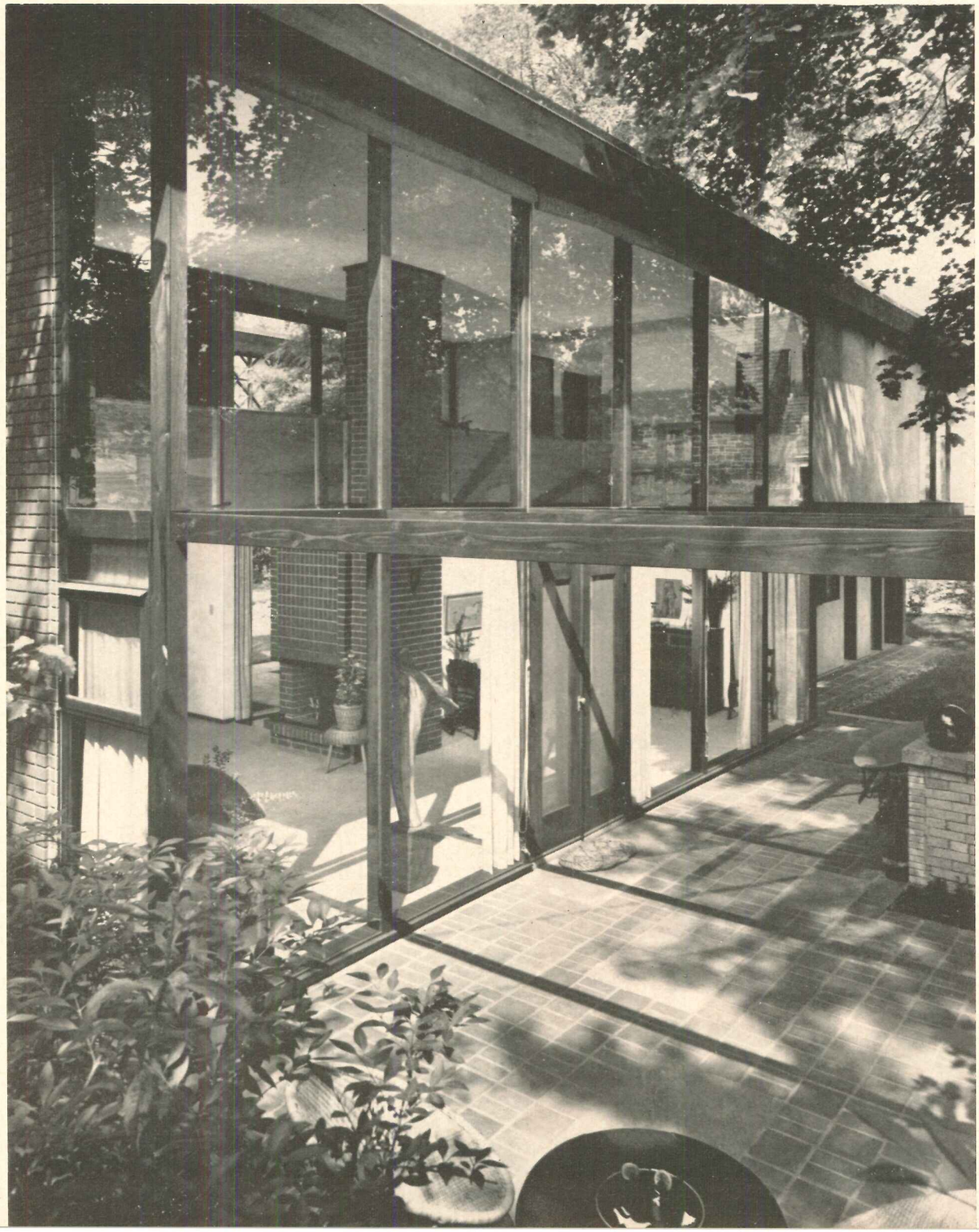


Night view looking towards main entrance. Building is a simple glass and steel box, with the columns on the exterior, and the bar joists of the roof structure supported by a channel section that also forms the fascia. Stone walls, similar to the one along the entrance walk, retain the terrace and enclose the parking building

DRAMATIC LIVING SPACE ON TWO LEVELS

Tasso Katselas creates exciting indoor and outdoor living areas but plan is also zoned for privacy and individual freedom

Marc Neuhof photos

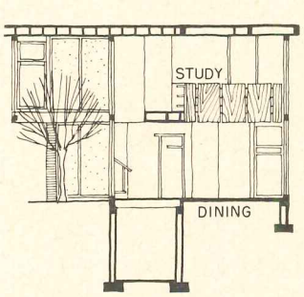


Dramatic interior spaces, emphasis on the indoor-outdoor relationship, the bold use of natural finishes and skillful handling of light and shade, are the striking features of this house. The Evanson house was a somewhat earlier design than Tasso Katselas' own house (RECORD HOUSES 1964) and it is interesting to see how the treatment of space has developed from the earlier to the later design.

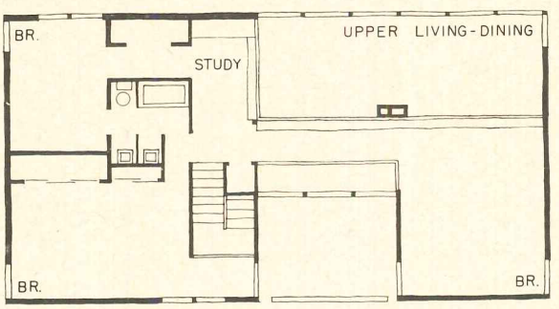
The Evanson house is on a fairly small lot in an elegant, traditional part of Pittsburgh, where an informal contemporary house with large glass areas was something of an innovation. The house, however, harmonizes quite well with its surroundings, and the closed front elevation which affords privacy from the street, is perhaps also something of a concession to the neighborhood.

As in his own house, Tasso Katselas was concerned with creating a space "worth living in," but which would not sacrifice the needs of individuals for "privacy and unrestrained expression." The solution is a large open living space on two levels, the upper part serving as a den or guest bedroom. A bridge overlooking the entry court on one side and the living area on the other leads to the bedrooms which are zoned for complete privacy and quiet.

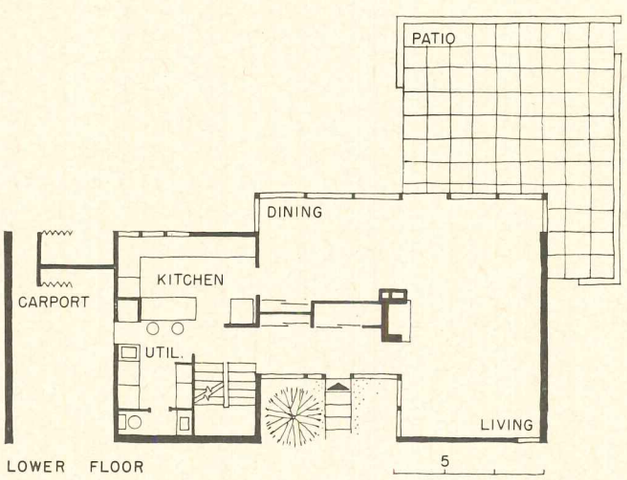
The back of the house opens fully to a paved patio. Wooden beams extend across the patio to give unusual light and shadow and to act as a support for climbing foliage.



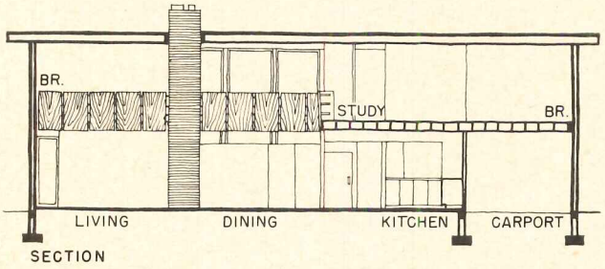
SECTION



UPPER FLOOR



LOWER FLOOR



SECTION

Residence for Mr. and Mrs. Jacob A. Evanson
Pittsburgh, Pennsylvania
ARCHITECT: *Tasso Katselas*
CONTRACTOR: *Century Construction Company*

Careful detailing and the skillful use of contrasting effects prevent the front elevation from presenting an unduly blank and severe appearance. The cantilevered upper floor provides a strong horizontal line, which throws a softening shadow on the lower part of the facade. Unusual patterns of reflected sunlight are created by the decorative grill over the entry court.

The sense of contrast is carried through into the interior of the house where the exposed wooden beams and the large area of brick stand out from the light colored floors and partitions. The solid brick fireplace forms an interesting central focus for the design and seems to pull the different elements together. The living space gives great scope for varied activities, and is particularly suitable for informal musical evenings which is the Evansons' favorite way of entertaining

Architectural Engineering

A New Report on the Alaskan Earthquake

Much of the structural damage caused by the Alaskan earthquake last March might have been prevented by professional earthquake engineering, soils and analysis, improved construction techniques and field inspection of buildings, according to a report by the National Board of Fire Underwriters and Pacific Fire Rating Bureau.

On the basis of structural damage observed, the NBFU-PFRB engineering team attributed failures to one or more of the following four basic deficiencies: (1) *Lack of professional plan checking.* Construction of many new buildings was undertaken apparently without review by engineers qualified in the field of earthquake engineering; (2) *Inadequate field inspection.* Investigators cited instances in which damage revealed improper application of steel reinforcing in concrete block buildings, and improperly welded connections between precast concrete units—deficiencies which could have been detected by field inspection during construction; (3) *Faulty construction techniques.* Evidence was found of construction joint failures in poured-in-place reinforced concrete along with a variety of other construction defects; (4) *Inadequate soils analysis.* The report cites a study of Anchorage soil and foundation conditions published in 1959, which advised that much of the surface sands and gravels in Anchorage covered an unstable base material known as Bootlegger Cove clay and warned against building large structures in such locations.

The ground motion in Anchorage tended to be of the longer rolling type rather than the sharp, short period type, and as a result the earthquake selectively damaged certain classes of construction while leaving other classes relatively undamaged. When ground shifts and foundation failures were not a significant factor, earthquake damage was far more pronounced in the tall buildings than in the low buildings. Large floor area buildings were more often damaged than were small floor area structures.

Wood frame dwellings performed excellently when foundation failure was not a factor. Hollow concrete block buildings, when small in area, and one story high, and when not located in the land movement areas, had no more than slight to moderate damage. Poured-in-place reinforced concrete wall construction performed well for small buildings, but precast reinforced concrete construction had perhaps more than its share of failures. Failures were almost invariably at the connections between precast elements.

A number of multi-story buildings, steel framed and concrete framed, suffered damage due to failure of concrete shear walls.

Copies of the full report may be obtained at a cost of $1.00 from National Board of Fire Underwriters offices.

Crack Control in Concrete Masonry

"Crack Control in Concrete Masonry Unit Construction" is a new report intended to provide improved criteria governing control-joint spacing, prepared by a task force of the Federal Construction Council and issued by the Building Research Advisory Board. The task group concluded that cracks should be controlled so that neither cracks nor crack control should jeopardize structural adequacy or building appearance, and that only minimal maintenance should be necessary of the masonry-mortar system to prevent deleterious affects from the weather. The report is available for $2.00 from the Printing and Publishing Office, National Academy of Sciences—National Research Council, Washington, D. C., 20418.

This Month's AE Section

VENTILATING BOSTON'S UNDERGROUND GARAGE

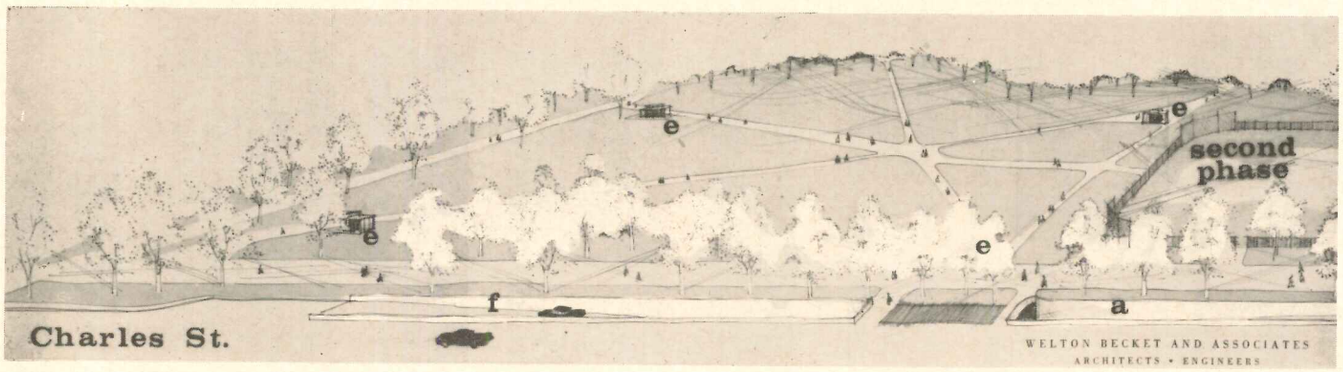
Structurally integrated ventilation system for Boston Common's underground three-floor garage uses hollow columns, saves critical floor-to-floor height

Construction of a three-level, underground municipal parking facility in downtown Boston, Massachusetts, under the famed Boston Common, posed three basic problems: (1) the Common must be restored to its original condition; (2)openings in and out of the garage for air and cars must be on one street only, Charles Street; (3) depth of the garage must be kept to a minimum because the entire area has a high water table.

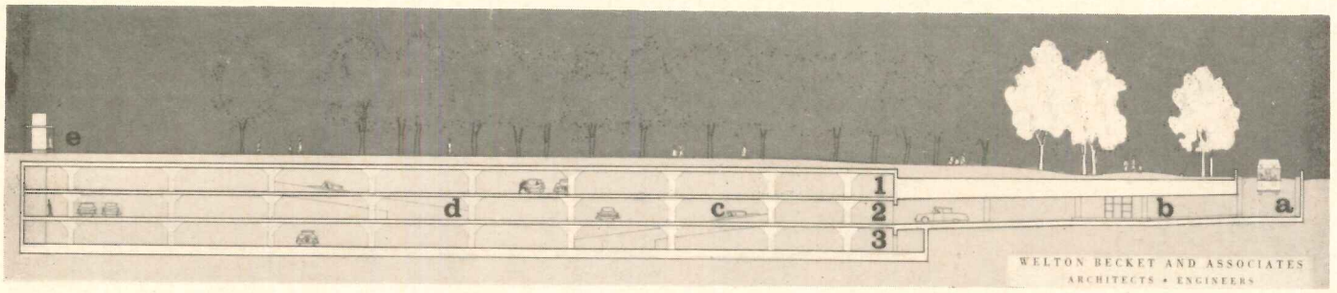
A conventional design for proper distribution of air through the three levels of parking, with the stipulation that all fan equipment must be on one side of the garage, would have required extremely large ductwork emanating from Charles Street and extending throughout the garage. Each floor would have required about 18 in. of additional ceiling height to accommodate ductwork, thereby increasing the depth of the building some 4½ ft.

To overcome this difficulty, an integrated structural and mechanical system was developed by Cosentini Associates in collaboration with architect-engineers Welton Becket and Associates. By eliminating ceiling ductwork, the system was designed so that no additional floor-to-floor height would be required and excellent supply and exhaust distribution could be accomplished at minimum cost. The system uses concrete air plenums, precast concrete roof trenches and hollow structural columns for the over-all air distribution.

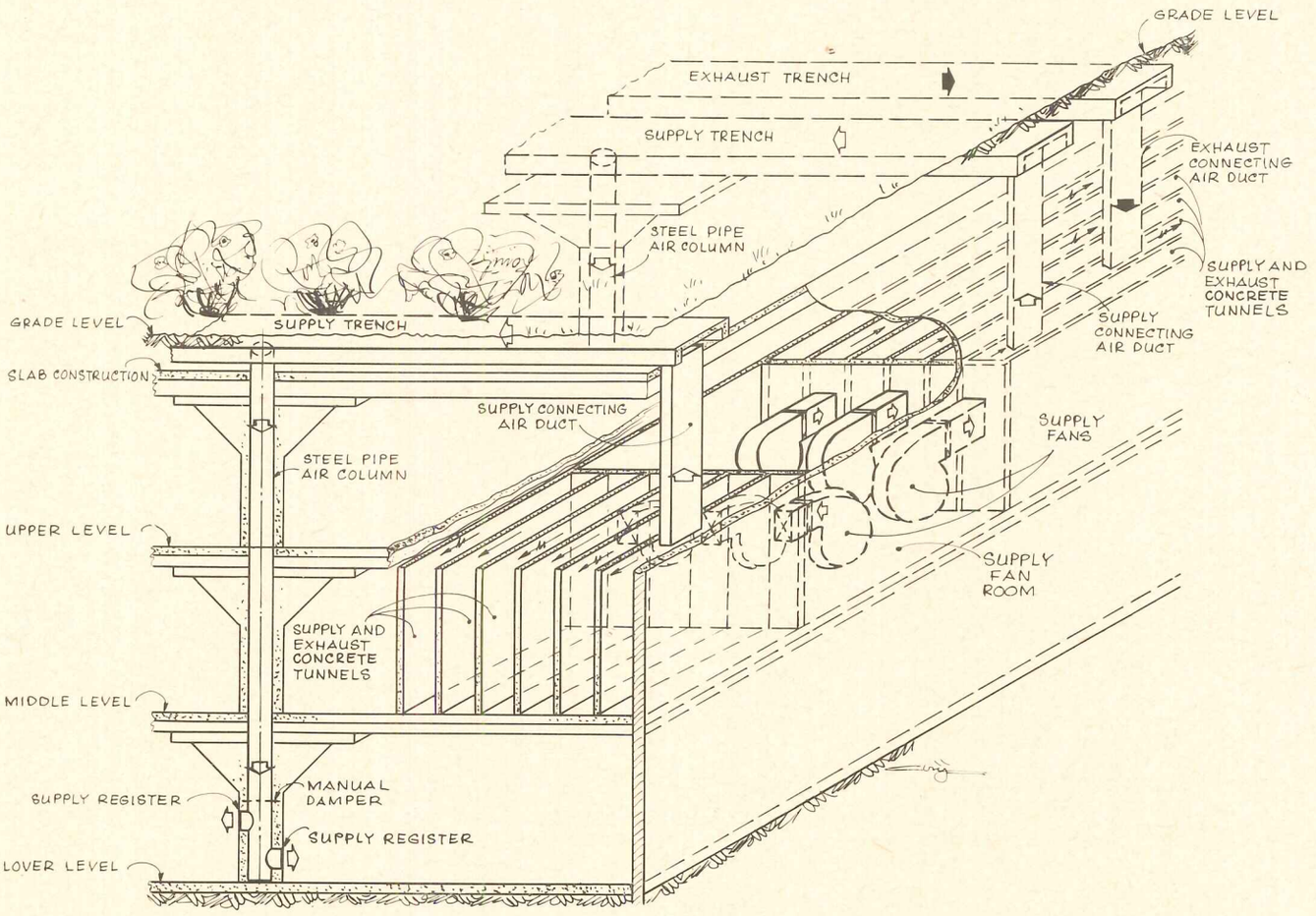
Narrow concrete plenums or tunnels are created by six floor-to-ceiling partitions on the middle level at and parallel to the Charles Street side of the building. A supply fan room in the center of this side divides the plenum area into 12 chambers, six on each side of the supply fan room. Three chambers on each side are separately supplied by one fan each. The other three chambers sandwiched between supply plenums, are vented to exhaust fan rooms at each end of the plenum system. Plenums are connected by vertical metal ducts to precast concrete roof channels which run like inverted trenches the full width



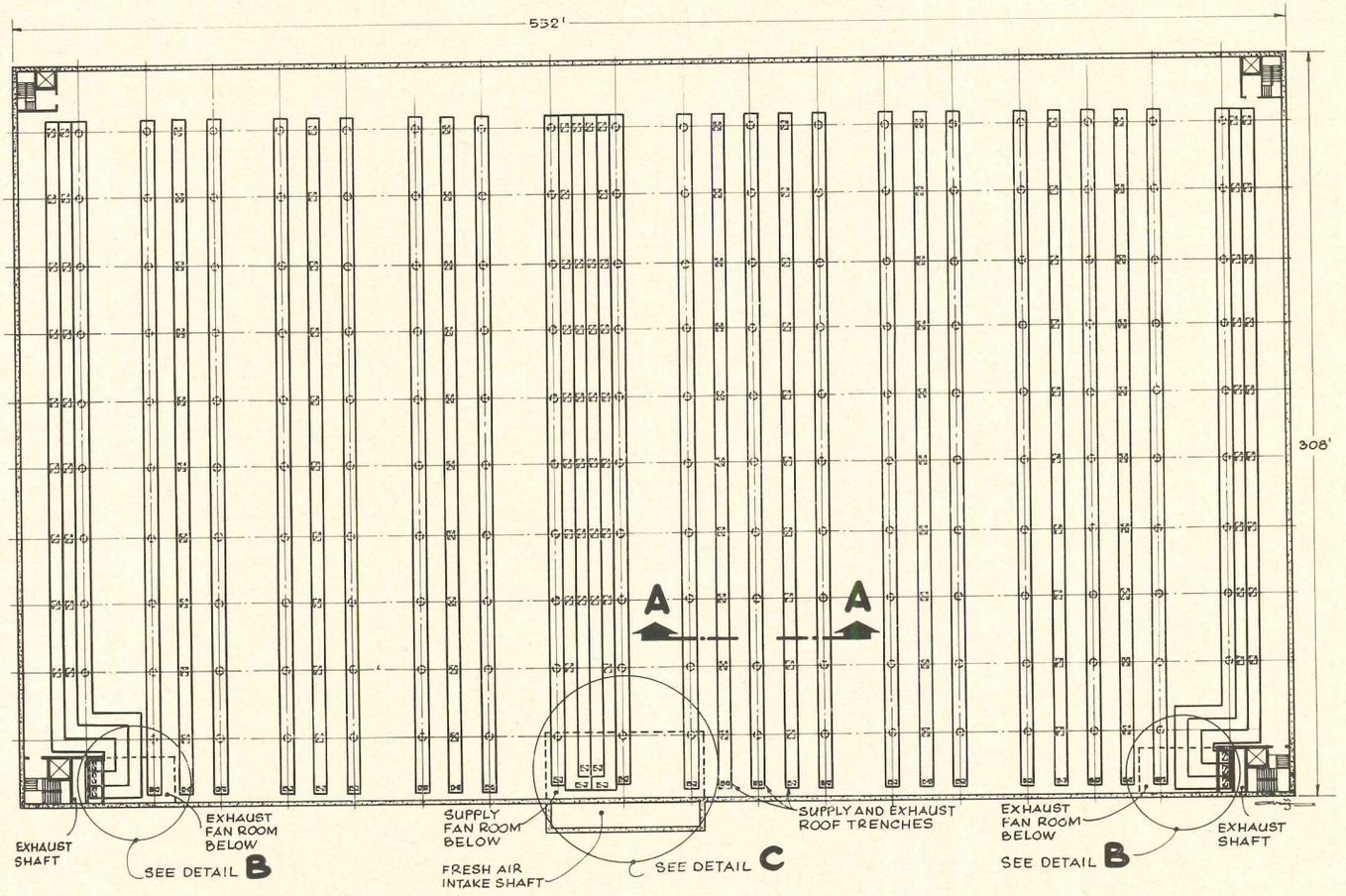
Boston Common Garage. Perspective (*above*) and section (*below*) show: (a) vehicular entrance ramp; (b) toll station; (c) and (d) ramps to lower and upper parking levels; (e) kiosks for pedestrian elevators and stairways; (f) vehicular exit ramp

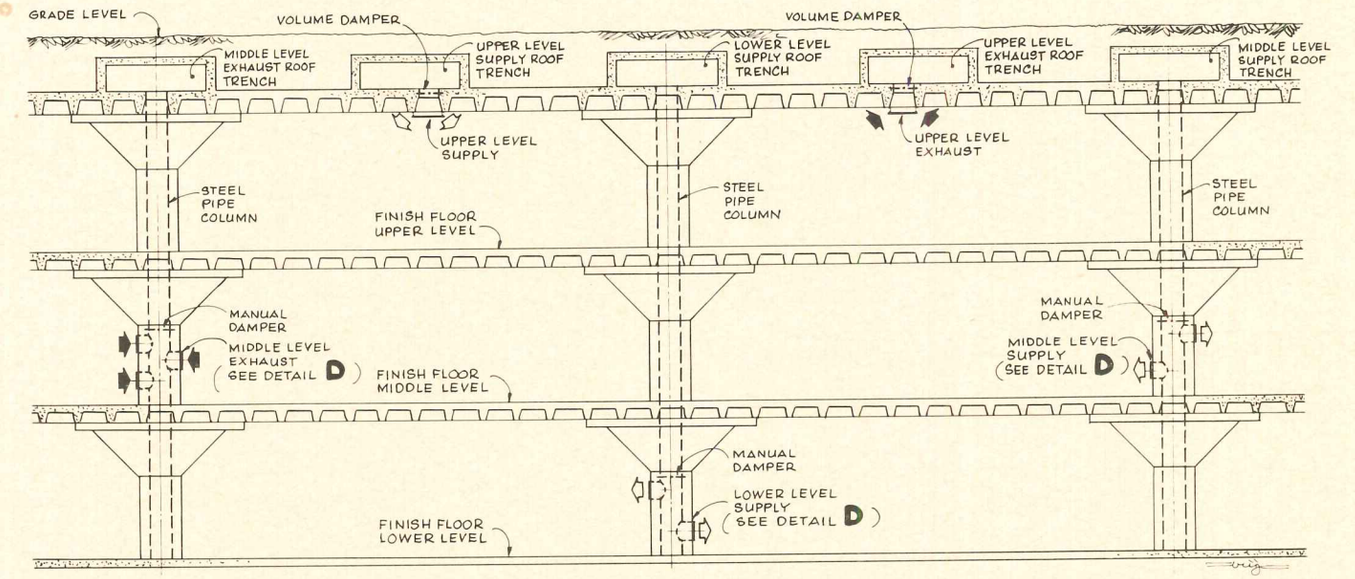


Architects-Engineers: Welton Becket and Associates, Consulting Engineer Ventilation: Cosentini Associates

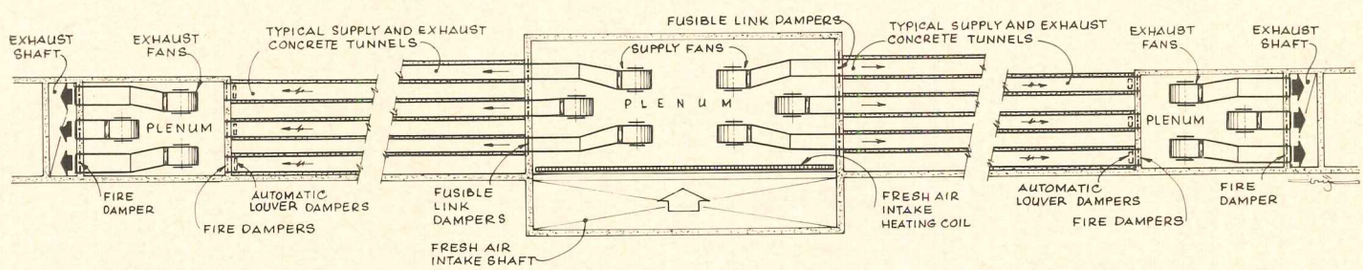


Isometric cutaway of supply fan room and air distribution system. Intake shaft (not shown) supplies air through louver and heating coil in outside wall. Exhaust fan rooms are at near and far ends of plenum system. Fan room at far end is on upper level to permit vehicle access to middle level beneath fan room. Interior plenum parallels approach to exit ramp, is an exhaust plenum with sidewall grills to control exhaust from idling cars





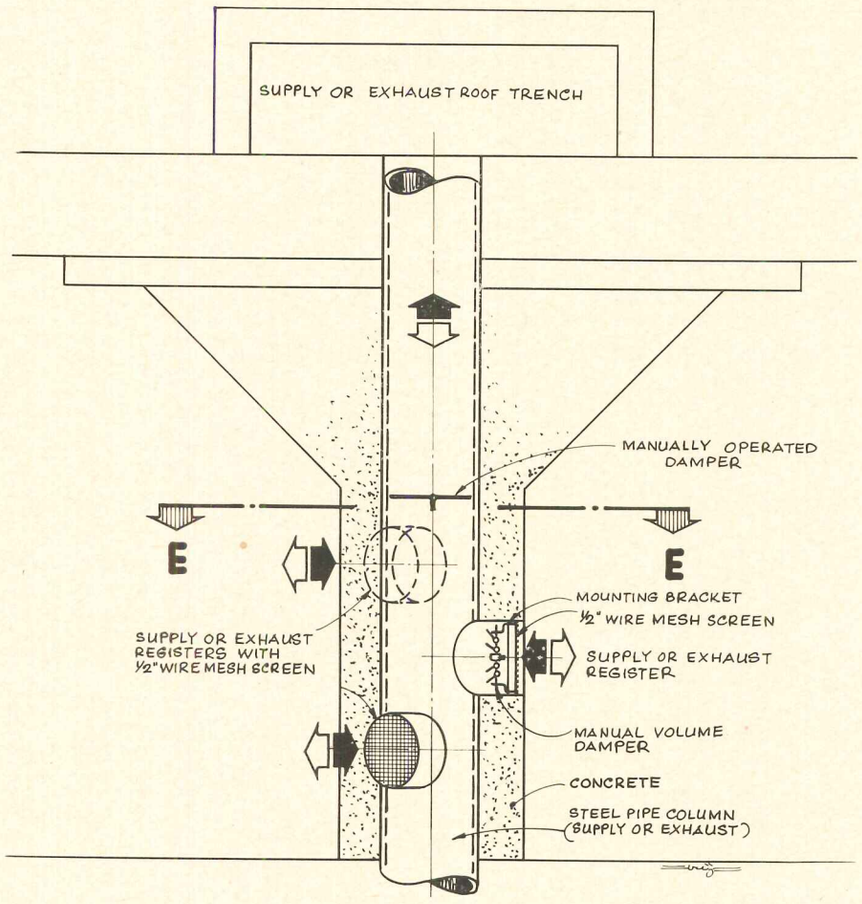
SECTION A-A



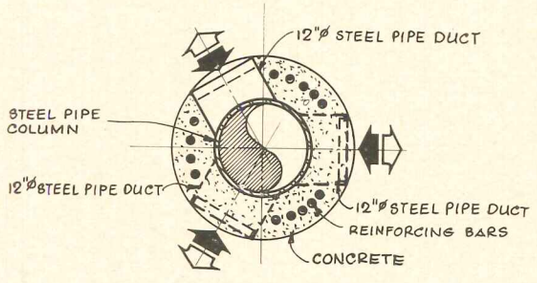
DETAIL B
(exaust fan room)

DETAIL C
(supply fan room)

DETAIL B
(exaust fan room)



DETAIL D



SECTION E-E

of the building. These trenches are vented in turn either to dampered ceiling registers in the upper level ceiling or to hollow structural columns vented at two lower levels.

Hollow structural columns were fabricated with a central, building-height, steel pipe to which steel side outlets were welded at selected levels for ultimate air distribution. Reinforcing rods were attached to the steel cores and the concrete pour made around the entire core assembly. When the forms were stripped, hollow columns were ready for use.

The entire garage is divided into six zones, two on each floor. Each zone is supplied independently by its own supply fan and supply plenum as illustrated. Each zone has automatic safety control devices to deal with fire or carbon monoxide (CO) emergencies. Each zone has an independent exhaust plenum in the partition system described. But the three exhaust plenums on each side join in a common exhaust fan room in which three exhaust fans are available to increase exhaust from any indvidual zone should a build-up of CO occur. This is accomplished by closing down exhaust plenums on those zones which do not indicate high CO content so that additional quantities of air are drawn through the one zone which indicates the problem. As soon as the concentrations of CO are reduced to normal, the exhaust system is put back to normal operation. The garage is heated to reduce cold starting which tends to increase CO.

A system of CO detection with about 90 sampling points indicates the location of any high concentration of CO and sounds an alarm bell in the control office. The emergency procedure for closing and opening dampers is automatic through a key operator on the control panel.

With this combination of six supply fans and six exhaust fans, the operating personnel are able to maintain proper ventilating throughout the entire garage. Those areas which are unoccupied need not have their systems in operation, and the personnel thus control costs.

WHAT'S HAPPENED TO THE BUILT-UP ROOF?

The trend to larger, lighter, flat, insulated roofs as well as changes in roofing materials and decks are cited as contributing to the increased incidence of roofing failures

By Robert M. Stafford, Roofing Consultant, Charlotte, North Carolina

During the last 10 years the built-up roof and those directly engaged in its design, manufacture, sale, and application have been the target of considerable criticism. Some has been constructive, some merely negative. Many times, reasons for roofing problems have not been analyzed properly but attributed to unfounded theories.

It is not the purpose of this article to analyze and offer solutions to all the various defects encountered. We, however, do believe that it will be useful to examine how changes in building design, construction, and materials have affected performance of the built-up roof, and to suggest some courses of action which offer opportunity for improvement.

From the very beginning of the use of felts and bitumen to form a waterproofing membrane about 75 years ago, to the present, the built-up roof has remained substantially as we know it today, at least to the casual observer. During this entire period the roof has been "built" on the job using alternate layers of felt and a liquified bitumen. While there have been some modifications through use of different types of felts, and some changes in bitumen, the built-up roof has remained much the same during its entire history.

For many years following the introduction of built-up roofing, buildings were of fairly heavy, massive materials, rigid in nature and not susceptible to much movement. Buildings with vast floor areas were virtually unknown. When more than a few thousand feet of floor space were needed the space was usually obtained by building additional floors. Typical examples were the textile mills of New England and the South.

Occupancy requirements and interior conditions were uncomplicated. Basic services such as electricity, water, and heat were all that were required.

During this same period the roof decks were usually wood or poured concrete, or, during the latter part of this period, poured gypsum. Roofs were sloped so that rainwater and melting snow and ice drained quickly to drains, gutters or scuppers. The "dead level" roof was hardly known, and if it existed it was probably by coincidence rather than design. The roof was generally applied directly to the deck. Roof areas were relatively small, and it was an exceptional roof that was measured in greater than hundreds of squares.

Built-up roof problems were few, and serious failures were practically non-existent. Even today many roofs applied in the 1920's and early 1930's are still giving trouble free service. The built-up roof has been in fact an amazingly efficient building component taking the brunt of the weather with little or no maintenance.

Roofing materials for built-up roofs were offered by only a few manufacturers and consisted of relatively few items. Felts were made of organic rag or of inorganic asbestos. There was a heavy-coated felt in both types for use as a base felt over a wood deck. There were lighter bitumen-saturated felts (nominal 15 lb) for use in finishing plies. The bitumen was either coal tar pitch for the low slopes or asphalt for the steeper slopes. The basic properties and the quality levels of these materials were kept fairly constant over the years.

So we see that for a period of perhaps 40 years, we had only a few variables to consider—a few different types of buildings, a few different types of roof decks, little or no insulation, simple interior conditions, and little variety in roofing materials.

The approach of World War II and preparations for military production gave sudden impetus not only to the industrial economy but also to changes in design and construction toward lighter buildings and faster construction methods. New materials and new forms of old materials began to appear as the incentive grew for lower cost, labor saving construction methods and materials. As new ways to speed up production and to increase efficiency were developed there also was demand for well planned space built to fit the occupying processes, and for controlled interior climates for product processing as well as for the comfort of the occupants. This trend has continued to the present. A study of the changes in building design and construction over the last 25 years shows a veritable revolution in the building industry—except for the built-up roof.

Changing Building Technology

Some of the manifestations of new requirements and of changes in methods and materials in construction can be identified, and their effects assessed now, others can be identified, but their effects cannot yet be assessed now; others can be identified,

1. Space requirements have moved toward large open floor areas on one level. Advances in steel technology have made this type of construction feasible and economical. Plastic design permits higher allowable loads on the steel than is permitted under elastic design. As higher loads are permitted there may also be greater deformation of the steel. At the same time the trend toward continuity in steel roofs has made it more difficult and expensive to build slope into the large roof areas, so slope has been practically eliminated.

While there is no doubt of the adequacy of the steel in the average building to resist and tolerate the forces set up by the predicted snow and wind loads and by thermal changes, it is also necessary for the designer to make necessary allowances in the other building components for the effect of these forces which might be transmitted away from the steel into the rest of the structure. An example might be found in the case where a light steel roof deck sets up

an undulating action under not abnormal wind conditions. There is no doubt about the ability of the steel structure to endure the stresses. The question is whether or not the other building components have been treated properly to compensate for the deck action.

2. The demand for controlled climates for processes and for human comfort has greatly increased the use of air conditioning and humidifying to the point where most industrial plants and commercial establishments being built today have one or both. Their probable influence and effect on the roof requires careful consideration during the design stage and during construction.

These same conditioning requirements have greatly increased the need for and the use of above-deck insulation. Heavier thicknesses of insulation to meet design requirements have aggravated the effects of the use of insulation upon the roof membrane. Probable condensation problems must be foreseen in considerations of vapor barriers and ventilation requirements.

3. Dozens of new deck materials and new deck construction methods have been introduced. Some of the decks have not been in use long enough to be accepted as "permanent" structural decks. Many have been found to have severe use limitations.

The Less Apparent Changes

Many of the changes in structure, roof deck, and insulation in recent years have been obvious. A closer look, however, will reveal some less obvious changes which also may be affecting roof performance.

1. The physical nature of the deck or of an insulation substrate must necessarily affect the attachment of the built-up roof membrane. From the beginning of the use of above-deck insulation it has been general practice to mop the felts solidly to the insulation. This practice continues, although there is room for doubt that it is a practical method over some types of insulation, and in some cases it provides practically no attachment because of the nature of the substrate. Subsequent effects of this poor or non-existent attachment have yet to be fully assessed. There is no question but that some forms of insulation present problems not heretofore encountered.

2. During the past 15 to 20 years the use of mechanical equipment to apply roofing has become prevalent. Aside from materials handling equipment, probably the most used apparatus is the felt layer. Earlier, the roof plies were placed by hand operation. A roofing mechanic spread hot bitumen and another followed close behind rolling the felt into the fluid bitumen. Behind him was another mechanic who "broomed in" the felt using a stable broom so that entrapped air would be worked out from the underside and the felt firmly set in the bitumen. The modern felt layer combines these three operations. It spreads bitumen, rolls in the felt, and drags a broom over the felt as the machine is being pushed along. Bitumen is thermoplastic: as its temperature is raised, it becomes more fluid and thus flows more readily through machine apertures. The flow of bitumen onto the felt is therefore dependent upon temperature and machine speed. If both are not carefully controlled, there will be too little bitumen deposited and thin plies will result. The felt feeds from a roller to the deck as tension is applied from the forward motion of the machine. Whether or not this tension in the felt is actually built into the roof membrane, with subsequent reaction in the form of membrane shrinkage, has, to our knowledge, never been determined. The use of relatively heavy equipment on a roof during application of roofing can cause damage, especially if the deck is a type that is quite flexible or if the deck units are easily deformed. Damage may be to the deck itself or to the vapor barrier, insulation and roof membrane.

3. Changes have taken place in the refining processes which produce coal tar pitch and asphalts. Have these resulted in changes in the chemical and physical properties of the bitumen? And if so what effect do they have on roof performance? The producers of these materials still furnish them to conform to generally the same specifications which have been in use for many years. Yet in the case of coal tar pitch, many old timer roofers will insist that pitch at proper kettle and mopping temperatures is today much more fluid than it was 15 or more years ago. The surface appearance of pitch roofs five to 10 years old as compared to some 15 or more years old seem, to this observer, to be more embrittled, either through earlier aging or widespread and gross overheating in the kettle. There have been instances in recent years where asphalt manufactured to acceptable standards in all respects showed excessive aggravated flow characteristics on the roof for no apparent reason. Exhaustive laboratory tests failed to reveal any reason for the flow. As a result, several manufacturers of roofing materials have added a "slide test" to their roofing asphalt specifications.

4. Until the beginning of World War II "rag" felt was made from rags. The short supply of suitable rags during and after the war forced the felt manufacturers to turn to other raw material. For use in saturated felt manufacture, rags must be of wool or cotton. Synthetic fibers are not suitable for saturating. It has become almost impossible to obtain the proper quality of rag to use in roofing felt. The industry has, therefore, converted almost exclusively to wood fiber felt. To our knowledge, the question of whether or not the performance of "rag" felt has suffered from this change has not been answered.

If we were to consult the building designers there is no doubt they would say that buildings are being designed today better than they were 25 years ago. The general contractors no doubt would say that buildings are being built better today. Roofing contractors probably would say that roofs are being applied better. And the roofing material manufacturer would probably say that roofing materials are just as good or better than they were 25 years ago. Most people would agree that the relatively few changes in the manufacturers' roofing specifications over the same period were improvements for the most part. Taken separately each is right, at least to a degree. Yet when all the parts are considered together from the point of view of built-up roof performance there seems to be a different answer. There is no question but that during the last 8 to 10 years there has been a serious increase in built-up roof failures.

Much has been written in recent years in attempts to explain and to theorize on these failures. There is no attempt here to discuss in detail any of the single possible causes of failure. Any of the items mentioned previously as well as others can justify separate discussion.

The purpose here is to trace a trend in built-up roof performance during

the past two decades, identify that trend, and suggest some course of action.

Critical Point of Failure

Changes in building design, construction and materials all are pushing the roof system toward the critical point of failure. Only one or two of the influences of severe proportion could easily cause the critical point to be exceeded and roof failure to occur. Or a combination of several of these, each of relatively insignificant magnitude, could have a like effect. Some of the probable sources have been noted, so it would be worthwhile to examine the mechanism through which these cause failure:

1. Higher stress due to structural movement.
2. Greater shrinkage of the roofing membrane.
3. Earlier aging of the bitumen.
4. Higher temperature susceptibility in the bitumen.
5. Lower resistance of roofing to stress and shear forces.
6. Movement within the insulation layer.
7. Moisture effects within the insulation layer.
8. Inadequate or unsuitable systems of application.
9. Failure of, or detrimental effect from deck or substrate.
10. Improper or poor application.

Without question some of these influences have been with us since the beginning of built-up roofing. Without question many of them have developed within recent years. No one has yet been able to point his finger at one or even two or three of them and say with convincing proof that they are the sole causes of the failures. The problem is just not that simple.

In effect the tolerance of the built-up roof has been lowered, and simultaneously the forces which might have a deleterious effect on the roof membrane have increased in number and perhaps in intensity. In order to reduce the likelihood of serious roof failure, every effort must be made to predict the probable conditions adversely affecting the roof on each specific job, correct or counteract these conditions if possible, then specify and build a roof system which will afford the highest possible resistance to failure.

The architect should consider the roof system as carefully as he would a structural component in order to determine what is expected of the system and what design has to be used to fulfill these expectations. The roof cannot be considered to be made up only of the roofing membrane. The deck, the insulation, the membrane, the flashings, and often much of the metal work are closely interrelated and must be considered together as a system. It is not safe to specify a "standard" roof system without first making sure that the "standard" will be suitable without modification. Manufacturers' specifications are made for *average* roofs to perform under *usual* conditions of occupancy and climate, and not *unusual* conditions. The interpretation of these terms can be very broad or very narrow depending upon the viewpoint at the moment of interpretation. It would be safer when specifying a roof system to interpret the terms in a narrow sense and plan accordingly.

The Specification

The very conditions which make a building unique may be the conditions which will most affect the performance of the built-up roof system. The specifications must therefore take these details into account.

After the proper system has been determined a specification must be written which will clearly instruct the appropriate contractors on what is to be done and what standard is to be expected of them. Areas of possible misunderstanding must be kept to a minimum and some mechanism provided for their clarification in the event they do occur. Responsibilities of each contractor or subcontractor should be clearly drawn in the specifications. For example the responsibility for providing an acceptable deck surface should be assigned and along with it a mechanism for deciding any dispute that may arise.

Inspection

Good specifications should be followed by frequent and thorough inspection during the installation of the system by a competent inspector who is thoroughly familiar with roofing systems. Periodic and final inspection reports should be filed with the architect and the owner so that they can be made part of the permanent records of the building. The owner is entitled to receive every consideration in an effort to deliver to him a trouble-free building. The average roof system—deck, insulation, roof membrane, and metal work —represents a minimum investment of $1.25 per sq ft, and often is much more than that. A relatively minor roof failure which permits water entry can cause not only irreparable damage to the roof system itself but also tremendous loss through damaged stock, equipment, and downtime, in addition to the physical discomfort of the occupants.

If the architect or engineer does not have a member of his staff trained in roofing systems he would do well to seek specification and inspection assistance from experienced people engaged in such specialized services. Cost of this service varies with the amount of work involved, with a minimum fee for relatively small jobs. Generally this specification and inspection service ranges from about $1.25 to $2.00 per 100 sq ft of roof area. Fees may also be based upon prevailing engineering consultant fees. In any case the cost is likely to be low when compared to the probable benefits received. In fact the cost of such service will usually be no higher than the cost of a roof surety bond.

The program is not complete once the roof is in place. Just as important to the owner as the specification and the inspection is the third step to provide a well defined program of periodic inspection and maintenance. Most owners have such a program for the interior of the building and for equipment, etc., but few include the roof, in spite of the fact that the roof is probably the most important part of his building in protecting his property. This omission may be due to the misconception that possession of a roof bond is adequate protection, or it may be because the roof is "out of sight, out of mind" until a leak occurs.

It has not been our intention to do more than point out certain historic facts and certain existing conditions in the attempt to arrive at an orderly, practical approach to minimizing the possibility of roof failures. While we would not expect that following these recommendations would eliminate all possibility of failure, we would expect the probabilities to be greatly reduced. In addition we expect that the probably effective life span of the roof would be extended.

PLUMBING CODE ALLOWS FOR SERVICE CONDITIONS

By George R. Jerus; Meyer, Strong and Jones, Mechanical and Electrical Engineers

The lack of adequate knowledge of the hydraulic and pneumatic principles of plumbing systems spurred the National Bureau of Standards to begin experimental studies in 1921 in order to derive a rational basis for sizing the drainage and vent piping used in plumbing systems.

The experiments, initiated by Dr. Roy Hunter of the Bureau, were subsequently carried further by Robert S. Wyly and Herbert N. Eaton of the Bureau, and their findings and analyses were presented in 1961 in the Bureau's Monograph 31. The results of these earlier experiments were the basis of the sizing used in the National Plumbing Code, the present New York Building Construction Code and the codes of many communities seeking to keep abreast of technological advances. When the firm of Meyer, Strong and Jones was retained by the Polytechnic Institute of Brooklyn to draft the plumbing section of a new building code for New York City, the work of Hunter, Wyly and Eaton was reviewed as a first step.

A plumbing code that is founded on empirical formulas developed from actual tests will permit systems that can use minimum-size piping and therefore assure economy. Any plumbing drainage system must consist of two sets of piping: the drain itself, which conveys waterborne liquid and solid wastes from the disposal point; and the vent system, which reduces the intensity of pneumatic disturbances caused by the intermittent and varying flow of water in the drainage piping. The vents prevent the depletion and siphoning of trap seals, which are required to prevent sewer gases from entering the building's atmosphere.

A review of other codes and data prior to formulating the new plumbing code for New York City indicated that the National Plumbing Code had made no corrections for the inevitable fouling of drainage pipes, which reduces their internal diameter and therefore their carrying capacity. It was also found that the tables for permissible lengths of vent pipe had not allowed for exit and entrance losses or for fittings. In some instances additional fittings can materially affect the flow of air in the system and thus produce pneumatic disturbances.

In order to account for this in the New York City Code, is was necessary to go back to the experimental data in Monograph 31 and determine the coefficient for air flow in pipe sizes smaller than those used in the experiments. It was found that a pipe of a given internal diameter had a friction factor equal to 1.28 times the friction factor in a pipe of twice the internal diameter. For example, the coefficient for 2½-in. pipe would be 1.28 times .0307, the friction coefficient in 5-in. pipe.

The next step was to ascertain the extent of fouling in the vents. This was found to be approximately .88 square inch of area regardless of pipe sizes. When this fouling factor was applied to the actual internal diameter of the vent pipe, it reduced the usable internal diameter cited in the formulas in Monograph 31. Some of these reductions due to fouling are:

.25 in. in 1¼-in. pipe
.20 in. in 1½-in. pipe
.146 in. in 2-in. pipe
.117 in. in 2½-in. pipe
.094 in. in 3-in. pipe

Then the number of fittings that might be in a line had to be estimated and converted to an equivalent loss in carrying capacity. In some cases the estimate of the number of fittings was based on the height to which the stack could extend; in others it was based on the fixture-unit limitation. Considering a 3-in. drainage stack and a 3-in. vent stack, we found that a 3-in. drainage stack flowing 7/24 full (.29), and 100 fixture units connected to it, would have a water flow of 66.8 gallons per minute and an air flow of 162 gallons per minute. To determine the permissible length of vent in a system not corrected for fouling and fittings, the friction factor of table 13 of Monograph 31 (.0367) was applied to the following formula, in which L equals vent length in feet, D_v equals vent diameter in inches, f equals the friction factor and Q_a equals the quantity of air in gallons per minute:

$$L = \frac{2200\ (D_v)^5}{f\ (Q_a)^2}$$

Hence:

$$L = \frac{2200\ (D_v)^5}{.0367\ (162)^2}$$

When the actual internal diameter of a 3-in. pipe is substituted, the equation becomes:

$L = 2.29\,(3.068)^5$, or 623 ft

In the National Plumbing Code, the corresponding figure is 600 ft for a loading of 100 fixture units, which indicates that there is no allowance for fouling or fittings considered in the lengths shown in the table.

To arrive at the recommendations for New York City's new Plumbing Code set forth in the tables (size of vent stacks) we took the same conditions used above and applied the necessary corrections:

If the fouled internal diameter of a 3-inch pipe is substituted for the theoretical figure, the equation is:

$L = 2.29\,(2.88)^5$, or 454 ft

But the permissible length, L, would be further limited by the number of fittings. Let us assume that the vent stack is composed of three fixture units on each of 33 floors in order to determine the maximum possible number of fittings. We then determine the sum of the losses through the fittings by another formula, in which L equals the sum of the losses, B is the factor for computing equivalent lengths in feet and C_L is the coefficient of losses: $L = BC_L$.

The losses may be broken down as follows:

Entrance and velocity losses equal 1.5 (6.96 ft) or 10.5 ft; one 45-deg vent base elbow equals .4(6.96 ft) or 2.8 ft; 33 branch connections at 2 ft each equal—66.0 ft.

Therefore L, the sum of the losses, totals 79.3 ft. This figure must be subtracted from the permissible fouled run of 454 ft, leaving 374.7 ft as the permissible length when full correction has been made for fouling and fittings. In Table 1, therefore, the figure of 374 ft appears as the maximum permissible length for this loading of a 3-in. pipe.

The table can also be used for sizing vent branches, because the vent

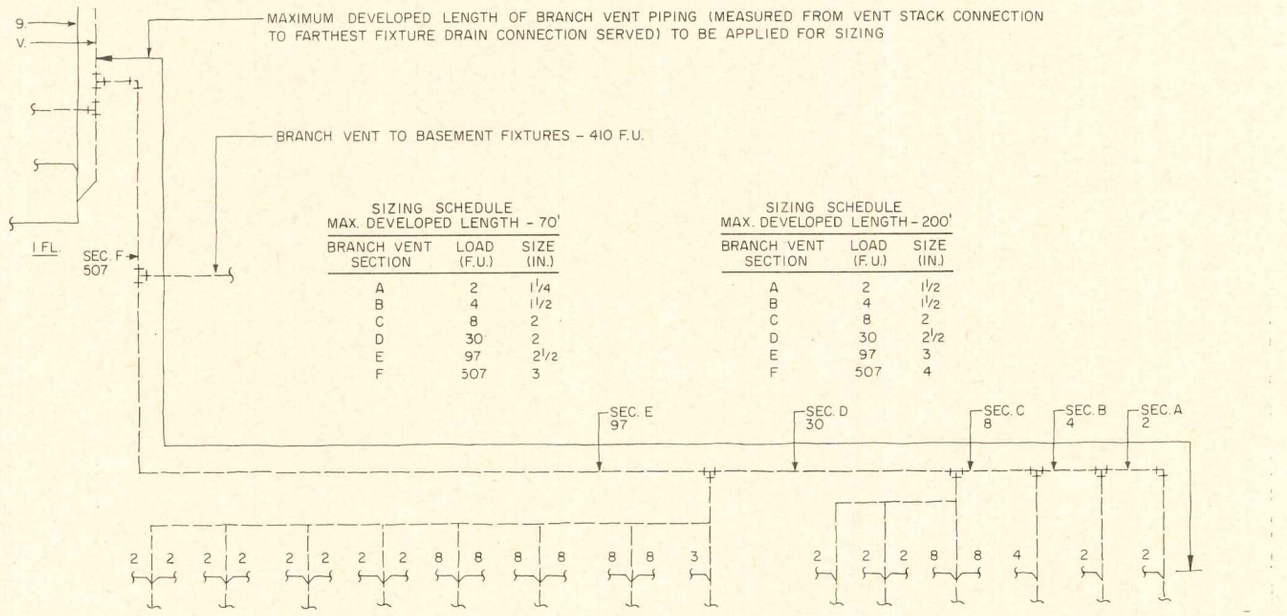


Table 1: Size of Vent Stacks

Size of soil or waste stack in in.	Fixture Units Connected	Diameter of vent required, in.									
		1-¼	1-½	2	2-½	3	4	5	6	8	10
		Maximum developed length of vent, ft.									
1¼	2	84	—	—	—	—	—	—	—	—	—
1½	4	33	207	—	—	—	—	—	—	—	—
2	8	np	30	300	—	—	—	—	—	—	—
2½	30	np	15	70	277	374	—	—	—	—	—
3	98	np	np	24	89	78	371	—	—	—	—
4	507	np	np	np	11	16	110	unlim	—	—	—
5	1,405	np	np	np	np	np	34	383	unlim	—	—
6	2,920	np	np	np	np	np	np	143	383	unlim	—
8	7,600	np	np	np	np	np	np	16	73	366	unlim
10	——	np	np	np	np	np	np	np	np	np	unlim

np—not permitted

Table 2: Maximum Permissible Loads for Drainage Piping

Pipe Diameter in in.	Any horizontal fixture branch or at one story of stack	Total for Stack	Building Drain, and building drain branches from stacks		
			Slope, in in. per ft.		
			⅛	¼	½
1¼[1]	1	2	np	np	np
1½[1]	3	4	np	np	np
2	6	8	np	21	26
2½[1]	12	30	np	24	31
3	20[2]	98[3]	20[2]	27[2]	36[2]
4	160	507	180	216	250
5	360	1,405	390	480	575
6		2,920	700	840	1,000
8		7,600	1,600	1,920	2,300
10			2,900	3,500	4,200
12			4,600	5,600	6,700

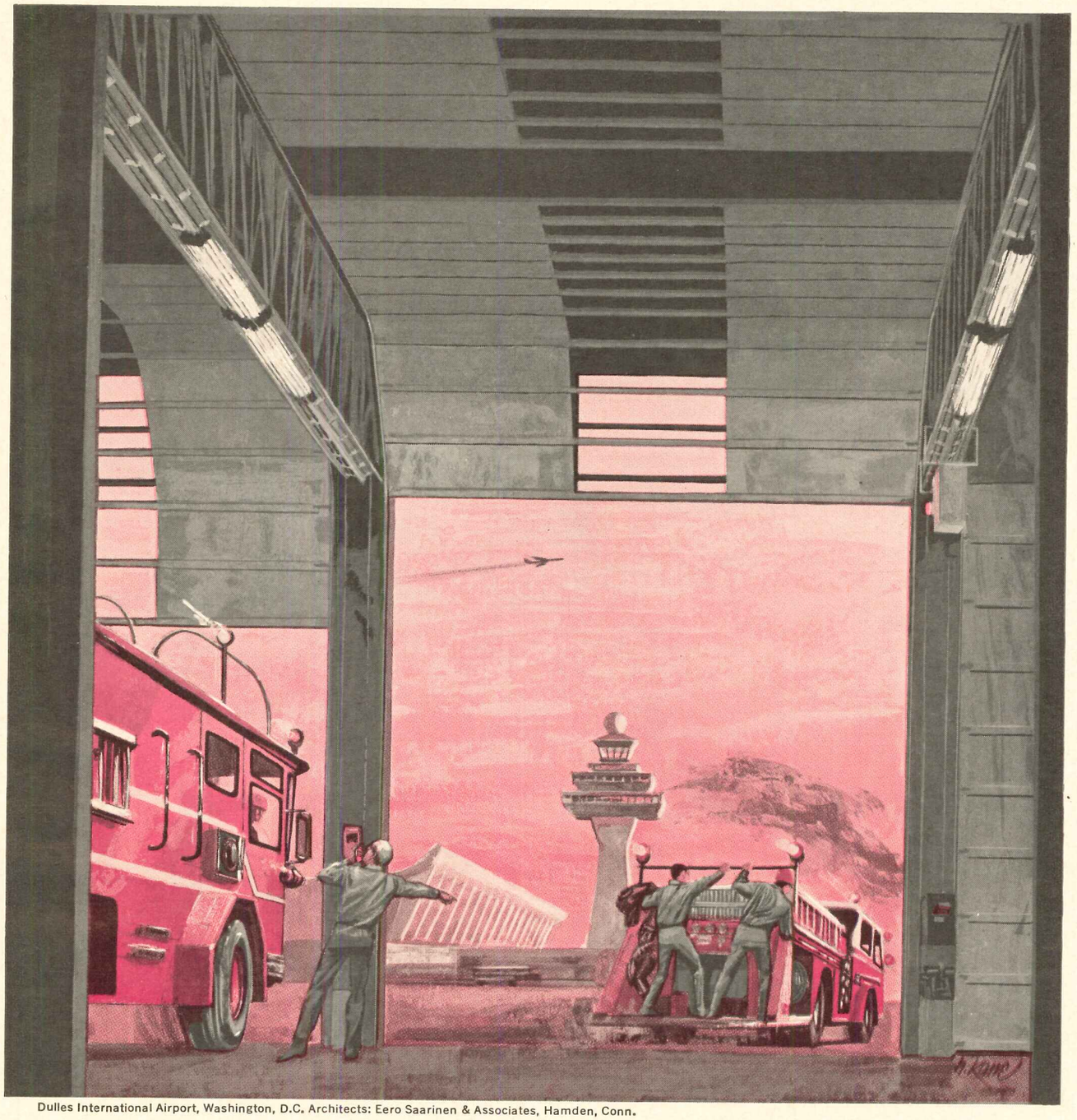
Footnotes: [1] No water closets permitted
[2] Not over two water closets permitted
[3] Not over six water closets permitted

branches serving a number of individual vents can be treated as a vent header, since the function of the branch is comparable in many respects. In sizing the vent header, the column for the size of soil or waste stacks can be disregarded. The vent would then be sized on the maximum developed length of the branch. It is assumed that the header is a vent stack and the drain line is the imaginary drainage stack attending the vent.

This method can be used for sizing the branches because the terminal velocities for the drainage piping are achieved in a very short distance from the inlet of the piping.

The drawing indicates this method of sizing. This example was worked out in collaboration with Mr. Louis S. Nielsen.

Table 2, Maximum Permissible Loads for Sanitary Drainage Piping, incorporates four tables from the National Plumbing Code by placing practical limits on the number of fixture units permitted on branches (floors). The loadings were also made to coincide with the vent table. It has been assumed that in practice not more than 30 fixtures would be connected in any branch interval (one floor), because the pitch of the line and the cost of installation would dictate otherwise. Because of this limit, the table was extended to include a 5-in. branch, which carries beyond the limit of 30 fixtures and would permit 40 water closets plus other fixtures.



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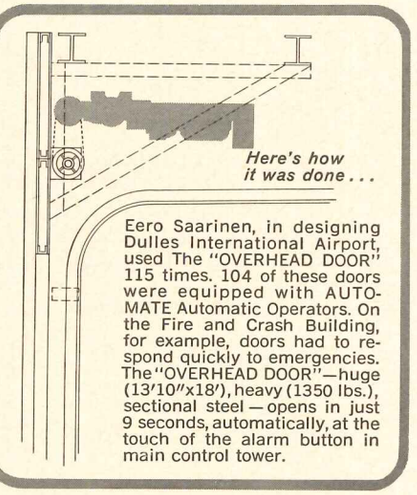

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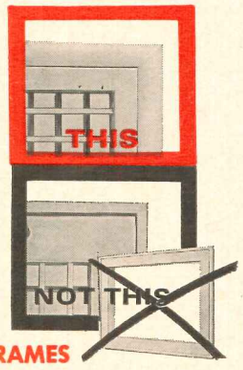

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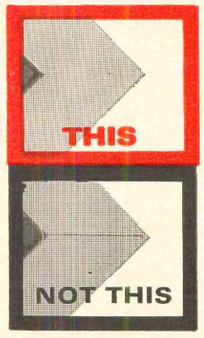

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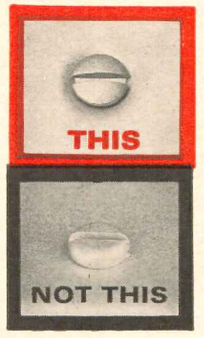

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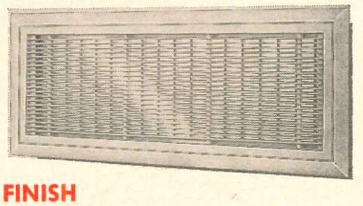

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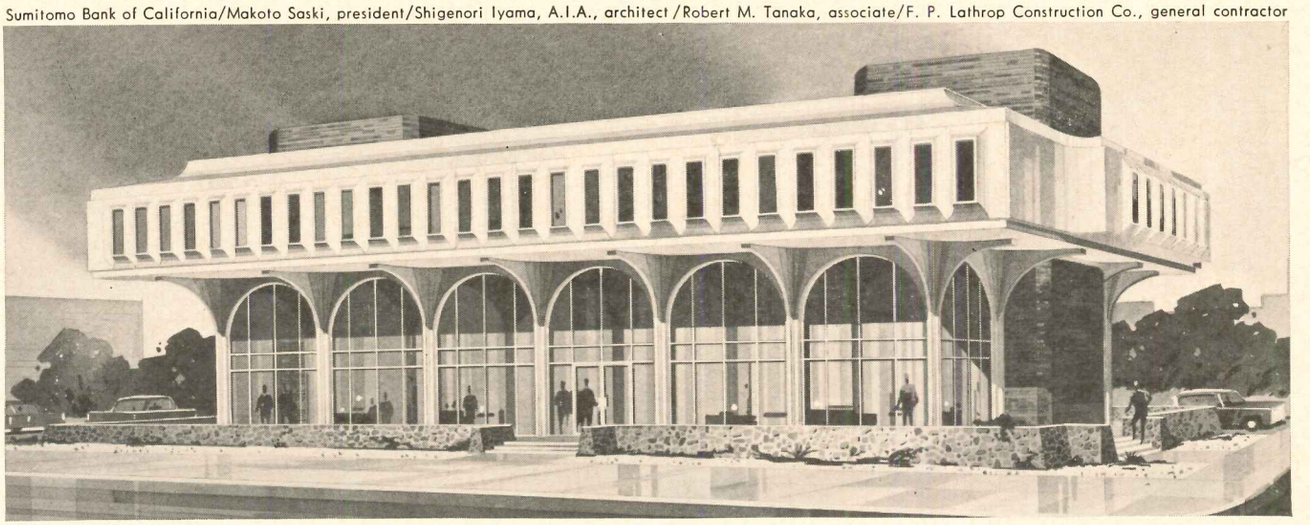
Sumitomo Bank of California/Makoto Saski, president/Shigenori Iyama, A.I.A., architect/Robert M. Tanaka, associate/F. P. Lathrop Construction Co., general contractor



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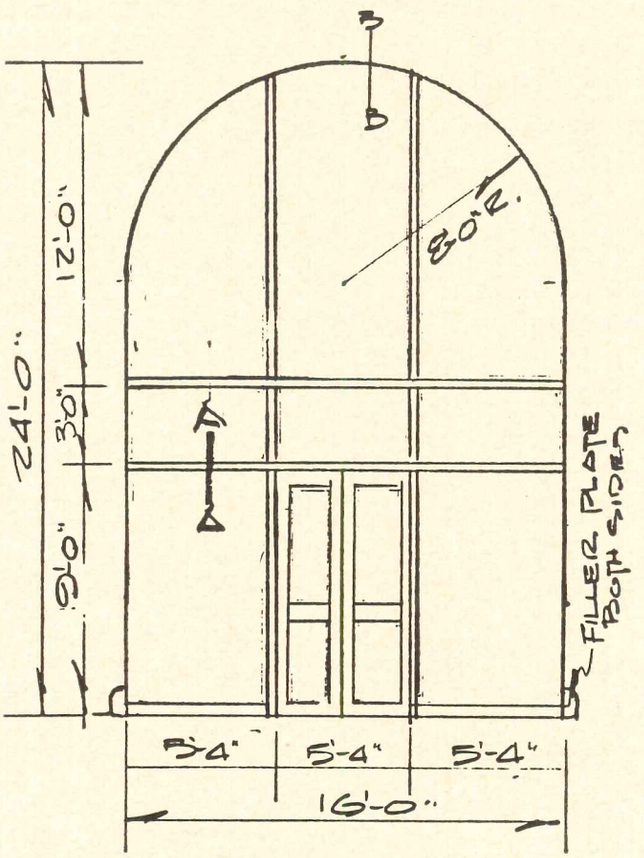

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STAINLESS

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FINISHES FOR ARCHITECTURAL METALS

New manual by NAAMM gives background data to aid in their selection and specification

A new manual on architectural metal finishes* has just been issued by the National Association of Architectural Metal Manufacturers which covers mechanical finishes, chemical finishes and coatings for aluminum, bronze, stainless steel and carbon steel or iron.

The architect must understand the characteristics and limitations of the various finishes, the manual points out, so that he may select those proper for his purposes, and he should be able to clearly define his requirements. The supplier's obligation is to interpret these requirements, furnish the appropriate alloys and take steps to produce the desired effects. The contractor must see that the finishes are installed with care and protected after installation.

An important feature of the new manual is a listing of "Precautions" to indicate the most appropriate applications as well as limitations in certain types of finishes. This article covers the precautions listed in the manual.

PRECAUTIONS

Mechanical Finishes on Aluminum

1. An "As Fabricated" finish is obtainable only on metal in such original forms as flat sheet and lengths of tubing, extrusions or roll-formed shapes. It is discolored by welding, and unless well protected, is usually marred by forming operations, and it cannot be restored. By taking special precautions it may be possible in some cases to protect it from damage, but generally it should not be specified for use on a fabricated product where appearance is critical.
2. Mechanical finishes should not be specified for clad sheet,† because the cladding may be penetrated by the finishing process.
3. Buffed finishes are not recommended for broad flat surfaces where "oil-canning" may be objectionable. If visual flatness of such surfaces is desired, the use of patterned or etched sheet, with or without formed contours, is advised.
4. Sandblast finishes should not be specified for light gage sheet, because distortion usually results.

Chemical Finishes on Aluminum

1. As most chemical finishes are applied by dipping in tanks, the size of the tank may be a limiting factor in some cases.
2. A chemically brightened finish should not be specified for large surfaces. It is appropriate for such applications as window frames, but is not recommended for such items as facias and spandrel panels because of handling problems and difficulties in obtaining uniformity under production conditions.
3. Chemical finishing of assemblies involving different metals or alloys is usually impractical, because each of them is likely to be affected differently.

Anodic Coatings on Aluminum

1. Anodic coating can be restored only by removing the coated item and refinishing it in the shop, at the cost of considerable time and expense. Items subject to heavy wear or abrasion should therefore either receive a sufficiently heavy coating to insure that it will not be worn through, or should be given some other type of finish which may be more easily restored.
2. Flash welding can be successfully done on frontal areas to be anodized, providing the "flash" is mechanically removed, but arc welding of assemblies to be anodized should be done only on concealed areas, because objectionable discoloring may result.
3. Joints between large anodized panels should be interrupted with divider strips, shadow lines, or changes in plane or texture, rather than being treated as simple butt joints, to minimize variations in shade.
4. Assemblies which are to be anodized must have drainage holes provided, so that acid trapped in hollow areas can drain out and be properly flushed. Acid trapped in joints must also be thoroughly washed out; otherwise it will drain out after installation, causing objectionable stains.
5. When heavy gage sheet is used for components which are to be anodized, and no grinding, polishing or buffing is required, a specialty sheet product should be specified, to minimize "structural streaking." Specialty sheet is not generally recommended, however, if mechanical finishing is intended, but the finish in such cases should be sufficiently textured to conceal the structural streaking. If a textured finish is not acceptable, heavy gage specialty sheet can be used, provided extreme care is exercised during both the fabricating and finishing processes.
6. Composite structures consisting of wrought and cast aluminum products will exhibit appearance differences after anodizing, due to their differing alloy composition and metallurgical structures.
7. In specifying color anodizing it must be recognized that each alloy produces its own characteristic shade, and specific colors can be pro-

*Available from the National Association of Architectural Metal Manufacturers, Suite 1501, 228 N. LaSalle St., Chicago, Illinois

† To improve the finishing characteristics and increase the corrosion resistance of certain alloys in sheet and plate form, they are often "clad" with other aluminum alloys. The thickness of the cladding on each side is usually 5 per cent or less of the total thickness, hence it may be penetrated by abrasive processes

vided only by certain alloys. The selection of alloys should be carefully specified and controlled, and not mixed indiscriminately.
8. With the exception of lead and titanium, other metals should not be included in assemblies to be anodized, as anodizing will dissolve them.
9. For maintenance of anodic finishes ordinary wax cleaners, soap or mild detergents and water are generally satisfactory. DO NOT USE alkaline or acid materials.

Mechanical Finishes on Copper
1. The "As Fabricated" (mill) finishes on sheet and plate, except for the bright (specular) finishes produced on sheet by highly polished rolls, are seldom acceptable final finishes for architectural work. On extrusions, the "As Fabricated" finish may be acceptable for some products such as windows, with no further finishing than a light protective coat of oil, but where appearance is critical additional polishing is usually desirable.
2. Unless the "As Fabricated" finish is carefully protected, it is likely to be marred and/or discolored by forming and assembly operations, and it cannot be restored. In general, therefore, it should not be specified on a fabricated product where appearance is critical.
3. For areas not subject to close inspection the cost of a satin finish is often not justified. An appropriate alternate is a low cost "uniform finish" (No. M36, Table 7), which can be applied by belt sanding in a single pass and is quite popular on extrusions, tubes and roll-formed shapes.
4. The appearance of waviness and buckling in large flat areas ("oil canning") can be minimized by specifying the use of matte or textured finishes or contoured surfaces. Highly polished or buffed finishes, on the other hand, tend to magnify such irregularities and should therefore be used only on relatively small areas.
5. Sand blasted or shot blasted finishes should not be specified for light gage sheet, tube or extrusions because of the distortion usually caused by applying such finishes.
6. Because of difficulties encountered in maintenance, wire brushed finishes should be limited to small areas or highlighting.

Chemical Finishes on Copper Alloys
1. Neither matte dipped nor bright dipped finishes should be specified as final finishes. Uniformity is difficult to control in these finishes and they are normally used as "in process" operations to prepare the surface for further finishing.
2. The appearance of statuary finishes is impaired by dirt, mill scale and fingerprints, such disfigurations being in fact magnified by the conversion process. Welding and brazing also should be limited to concealed areas wherever possible, since weld and braze areas tend to color at different rates than the base metal.
3. For maintenance of statuary finishes, periodic rubbing with oil is generally recommended. If clear organic coatings were used to protect the original finish, care must be exercised in stripping the coating prior to re-oiling, in order to avoid marring the conversion film.

Mechanical Finishes on Stainless Steel
1. For some architectural applications, the metal is ordered from the mill with the finish desired for the finished product. If proper care is exercised, such fabricating processes as brake forming, roll forming, punching, shearing, and welding will be likely to affect the surface only locally and in a minor way, and these areas can be "blended" to match the adjacent areas if they have a directional textured finish.
2. The unpolished No. 2D and 2B sheet finishes and the bright rolled finishes cannot be matched in the fabricator's shop. As a general rule, therefore, these finishes should not be specified for products whose fabrication requires severe bending or welding of the metal unless subsequent over-all finishing of the product is intended, or appearance is not critical.
3. To minimize "oil canning" in large flat areas, a non-reflective matte, textured or contoured finish is generally recommended. Highly polished reflective finishes should not be used in such locations if visual flatness is essential.
4. For welded assemblies in which fusion welds must be finished to blend inconspicuously with adjacent metal, a directional textured finish such as No. 4 sheet finish or a special "blendable" finish is usually advisable.
5. All surface protective coverings such as adhesive paper and strippable plastic films should be removed as soon as possible after installation, because they tend to become brittle and unpeelable under prolonged exposure to sunlight.
6. All foreign matter should be thoroughly cleaned from stainless steel surfaces following installation, to prevent its later causing unsightly conditions due to weathering.

Galvanized Finishes
1. In specifying zinc coatings the most important consideration is the coating thickness or weight needed. The standard 1.25-oz coating will normally be adequate, but for critical exposures such as aggressive industrial atmospheres the 2-oz "Seal of Quality" coating is recommended by the American Zinc Institute.
2. Zinc coatings will be burned off by ordinary welding operations. The coating can be restored, to provide excellent corrosion protection, by zinc metallizing, by painting with zinc-rich paint or by use of certain proprietary products.
3. Zinc-coated surfaces in contact with concrete containing cinders or salty aggregates, or with oak or red cedar wood, should be protected by a coat of bituminous paint.
4. Galvanic corrosion is likely to result if a zinc coating is in contact with more noble metals such as copper or copper alloys.
5. Zinc-coated items should not be left standing on cinders at the building site, as the soluble sulphites are very corrosive to zinc.
6. Zinc-coated items should not be stored in packs or bundles where they may be subject to moisture due to condensation or other causes.

Porcelain Enamel Finishes
1. The specification of proper base metal alloys and gages is a matter of critical importance in all architectural porcelain enamel work.
2. All corners, inside and out, which are to be porcelain enameled, should have a minimum radius of 1/16 in., to prevent stress concentrations, burns and build-up of the coating.
3. If fitted or mating extruded aluminum shapes are to be porcelain enameled, proper allowance must be made for the coating thickness in designing the shapes.
4. Aluminum sheet Alloys 1100 and 3003 should be properly reinforced to prevent distortion during the firing operation.

For more information circle selected item numbers on Reader Service Inquiry Card, pages 259–260

KNOLL ADDS FOUR DESIGNS TO ITS COLLECTION OF MIES FURNITURE

Four pieces designed by Ludwig Mies van der Rohe between 1927 and 1931, but which have never before been available in the United States in authorised versions, have just been added to the Knoll collection of furniture.

The earliest of the new pieces are the MR chairs (*center*), which were designed in 1927 for the Exposition de la Mode in Berlin. Knoll manufactures these chairs in two versions, a dining chair as shown in the photo, and a wider, lower model for lounge use; both have saddle leather slings laced over tubular steel frames.

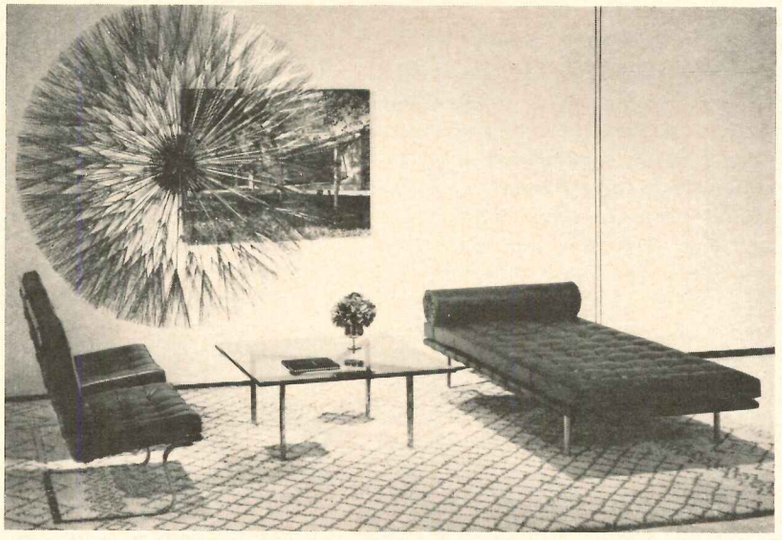
The Tugendhat chair of leather and stainless steel (*top*), was designed in 1930, and takes its name from the Tugendhat family, who commissioned Mies to design their home in Brno, Czechoslovakia. The chairs were designed for the living-dining area of this house. The leather couch with matching bolster was designed a year later as part of the furniture for a model house and bachelor apartment which Mies displayed in the Berlin Building Exposition of 1931.

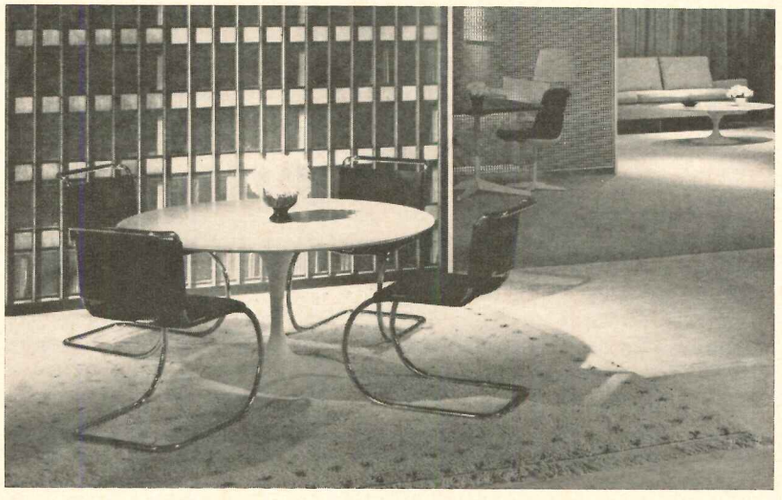
The recent additions bring the number of Mies pieces in the Knoll collection to eight. Besides the renowned Barcelona chair and table, and two versions of the Barcelona stool, Knoll has started manufacturing the Brno chair (*bottom*). This chair was also part of the original furniture in the Tugendhat house.

The Mies furniture is displayed with the rest of the Knoll collection in the company's elegant, newly remodeled New York showroom. Golden wire sculptures by Bertoia (*top*), are effective decorations. Photographs of some of Mies's best known buildings are used as background for the furniture. *Knoll Associates, Inc., 320 Park Ave., New York 22, N.Y.*

CIRCLE 300 ON INQUIRY CARD

continued on page 194





Office Literature

For more information circle selected item numbers on Reader Service Inquiry Card, pages 259–260

SOUND CONTROL BOOKLET

A recently published 12-page booklet on rated sound control construction systems includes the latest technical data on sound conditioned floor and partition systems for single and multi-family construction. Sixteen systems are illustrated and described, each rated by Sound Transmission Class, which signifies its relative efficiency in the reduction of sound transmission. Each system is also assigned a cost index, which provides an accurate method of estimating costs of sound control construction as compared with standard construction. The booklet gives the results of sound control tests of floor-ceiling construction, wood stud partitions, wood stud and resilient channel partitions, and metal stud partitions. *The Celotex Corp., 120 S. LaSalle St., Chicago, Ill., 60603**

CIRCLE 400 ON INQUIRY CARD

SCHOOL LAB EQUIPMENT GUIDE

This 16-page guide to buying school scientific laboratory furniture and equipment covers everything from the initial planning stages to the installation of laboratory furniture. Also included are several sketches to illustrate the best way to measure a room for laboratory facilities, and a chart listing properties of some 12 laboratory bench top materials. *Scientific Apparatus Makers Association, 20 North Wacker Drive, Chicago, Ill., 60606*

CIRCLE 401 ON INQUIRY CARD

NEW CATALOG OF GAS HEATING EQUIPMENT

A 14-page catalog describes and illustrates the company's range of gas heating appliances. Front vented circulators, baseboard and wall heaters of various sizes are described as well as the company's floor furnace warm air system. Photographs, specifications and installation information are given for all models. Selection procedure for different regions is given on the last page. *Temco Inc., Nashville, Tenn., 37202*

CIRCLE 402 ON INQUIRY CARD

ALL-WEATHER WINDOW

The *HPA50-TVB* window, a recent addition to the company's line, is fully described and illustrated in a new brochure. The window, which is double glazed with a Venetian blind between the panes of glass, is planned to provide ventilation, light control, solar heat control, sound and thermal barrier in one unit. The booklet contains diagrams and photographs showing how the window operates, specifications, and a table which indicates how the use of this window can effect savings in air-conditioning costs in a number of situations. *Hupp Corp., Flour City Architectural Metals Division, 2637 27th Ave. South, Minneapolis, Minn.**

CIRCLE 403 ON INQUIRY CARD

COLORED TERRAZZO

A hard-covered loose-leaf folder contains color plates of 16 different colored terrazzos. Perforated tear-away swatches on the back of each plate have a space for recording the job name. Photographs of terrazzo floors in a number of different types of building are included at the back of the folder. *Marble Products Company, 67 Peachtree Park Drive, Atlanta, Ga., 30309*

CIRCLE 404 ON INQUIRY CARD

MULTI-CONDUCTOR CABLE BULLETIN

A new eight-page multi-conductor cable bulletin has been released by Chester Cable Corporation, a subsidiary of Tennessee Corporation.

The two-color bulletin outlines the company's specialization in custom cable construction to meet customers' requirements which are often cross-referenced to industry standards such as IPCEA, IMSA, U/L, EIA, ASTM and various MIL specifications. Included in the bulletin is information on specific types of multi-conductor cables such as computer cables, shielded cables, TV camera cables, missile cables, ribbon cables, inter-office communication and signaling cables. *Chester Cable Corp., 319 Oakland Ave., Chester, N.Y.*

CIRCLE 405 ON INQUIRY CARD

STEEL BOILER RATING BOOK

The Institute of Boiler and Radiator Manufacturers has announced the publication of a new SBI Steel Boilers Rating booklet which shows all SBI ratings in effect on August 17, 1964. According to the institute, any ratings not included in the new booklet can now be considered withdrawn and no longer in effect. *The Institute of Boiler and Radiator Manufacturers, 608 Fifth Ave., New York, N.Y., 10020*

CIRCLE 406 ON INQUIRY CARD

HUMIDIFICATION GUIDE

"The Armstrong Humidification Guide" is a two-color booklet, which discusses the need for humidification in industry, institutions and commercial buildings, and gives details of the relative humidities recommended for various requirements by recognized authorities. The booklet explains why air is dry, and how the condition can be corrected with the use of dry steam. Full data on the selection, sizing, location and installation of Armstrong Dry Steam Humidifiers is also included in the booklet. *Armstrong Machine Works, Three Rivers, Mich.**

CIRCLE 407 ON INQUIRY CARD

NEW ACOUSTICAL FINISH

A four-page brochure gives details of *Faserit Acoustical Ceiling,* which is described as a low-cost, sound absorbing non-combustible acoustical finish, which can be applied directly on monolithic concrete, prefabricated concrete or poured concrete slab. It can also be applied on acoustical plaster and tile, gypsum or Portland cement base coat, plywood, galvanized duct and aluminum. The brochure also gives details of two more *Faserit* products—a ceiling coating for the repair of existing ceilings and a textured spray-on wall coating. *Faserit of America Inc, 6675 Biscayne Blvd., Miami, Fla., 33138*

CIRCLE 408 ON INQUIRY CARD

**Additional product information in Sweet's Architectural File*

more literature on page 246

A SUGGESTION FOR YOU FROM **SILENT GLISS**

the silent drapery track®

PROBLEM

How to cut down on DRAPERY STACKING AREA when space is limited or view is important?

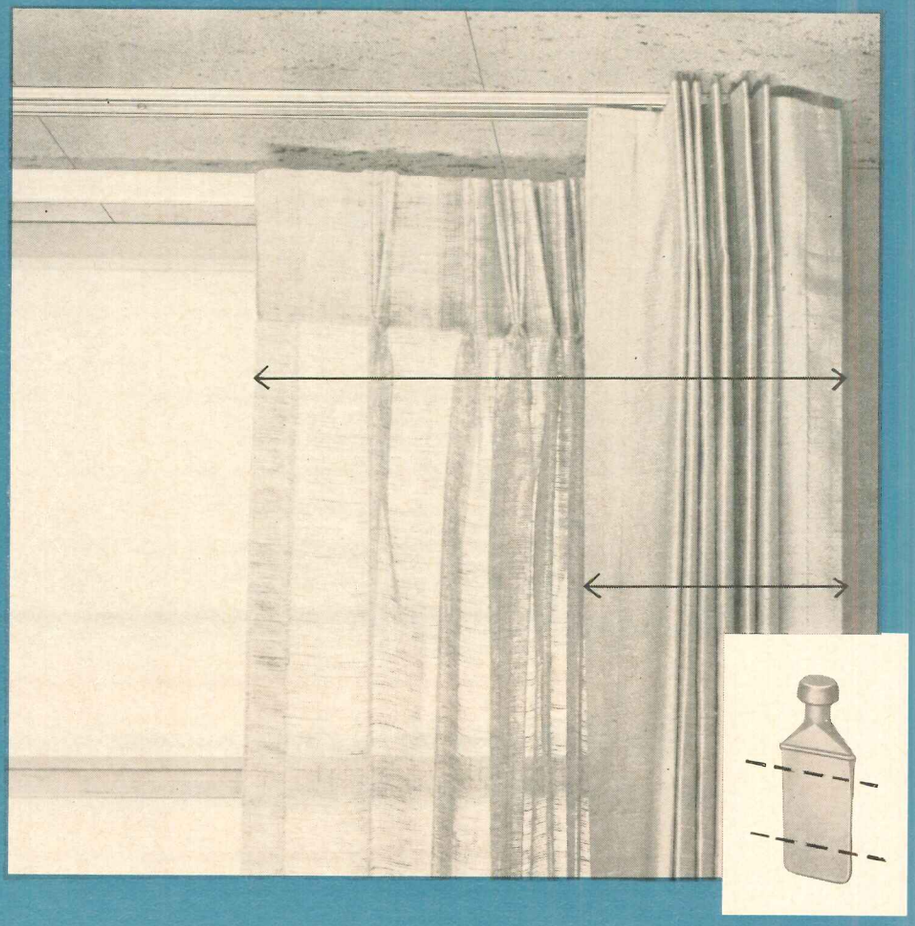
SOLUTION

Use the revolutionary GLISS PLEAT with Silent Gliss Drapery Track and the exclusive Gliss Pleat Sew-on Carrier

This picture tells the story clearly . . . how Gliss-Pleated Draperies hung on Silent Gliss Track *stack in less than half the space* of ordinary triple-pleated draperies of equal yardage.

The secret is the exclusive Gliss Pleat Sew-on Carrier, which goes on *fast* with sewing machine or tacking machine, and *stays on* right through laundry, drycleaning, steam pressing with no parts to lose. It's translucent, and virtually invisible in use, so draperies look as good from the back as from the front. Because it's *centered* on the zig-zag pleats, and ***no hooks are used,*** headings stay erect and beautiful with never a tip-over or droop. And the stitched-in pleats are knife-sharp . . . make the trimmest, best-looking draperies windows can wear!

Gliss Pleat is shown here with S1016 Track, featuring the patented Silent Gliss traversing system that *won't let cords droop.* For complete fabrication instructions, and all descriptive material on Silent Gliss Tracks, write Dept. AR-12 . . .



S3575 Sew-on Carrier. Requires no hooks!

SILENT GLISS, INC.

Distributing Companies

Angevine Co.
Freeport, Illinois

Drapery Hardware Mfg. Co.
Monrovia, California

Three of the Newell Companies ... first family in Drapery Hardware Since 1903

New York Showrooms in the Curtain and Drapery Market — 261 Fifth Avenue

For more data, circle 70 on Inquiry Card

ARCHITECT: THOMAS B. BOURNE ASSOC. INC., WASHINGTON D.C. • CONSULTING ENGINEER: HUDGINS, THOMPSON & BALL, OKLAHOMA CITY, OKLA.
GENERAL CONTRACTOR: ARNOLD LIES CO., AURORA, ILL. • MECHANICAL CONTRACTOR: RUDDY BROS. INC., AURORA, ILL.

This FAA center maintains precision in the air... so does its Carrier Gas-powered air conditioning

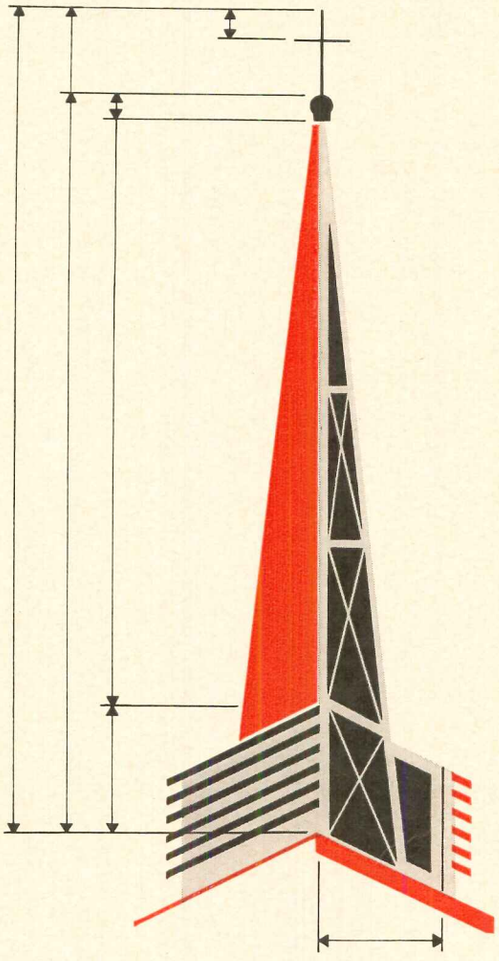
At this FAA Route Traffic Control Center in Aurora, Ill., sensitive electronic equipment calls for close control of temperature and humidity. And that calls for Carrier and Gas! Two gas-powered Carrier absorption refrigeration units supply chilled water for air conditioning. The system maintains an ideal indoor climate in response to cooling load demands. Result: comfort for employees and a safeguard for critically sensitive electronic control gear. Gas, the fuel of efficiency and economy, is used year 'round in the two-floor, 52,000-square-foot building. Costs come in at ground level!

Call your local Gas Company, or write Carrier Air Conditioning Company, Syracuse 1, New York.
AMERICAN GAS ASSOCIATION, INC.

For heating & cooling...Gas is good business

SEE THE CARRIER GAS-POWERED ABSORPTION OPERATING EXHIBIT AT THE FESTIVAL OF GAS PAVILION—N.Y. WORLD'S FAIR 1964-1965

For more data, circle 71 on Inquiry Card



Can a factory fabricate a beautiful spire?

Yes! At Overly, that's part of a 75-year tradition of spire crafting. Basic structural frame assembly, external panels, cornices, grill work and decorative elements are all prefabricated from full-sized patterns drawn to the architect's original design. Thus, factory techniques and equipment combined with specialized skills bring the cost of Overly spires within the reach of every church's budget.

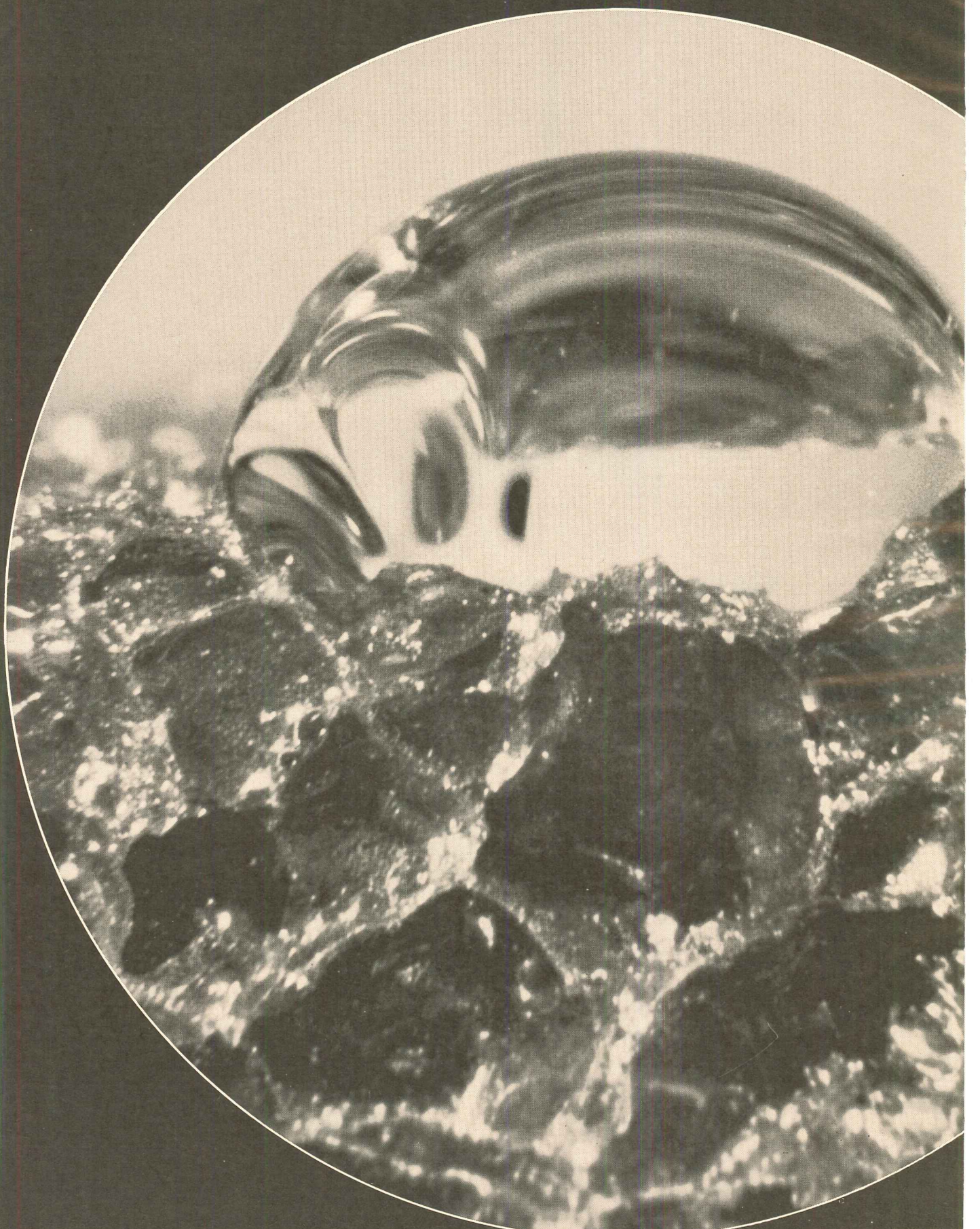
What type of metal can be used? Overly builds spires in all enduring metals—aluminum, copper and stainless steel. And we build them in every kind of design—Gothic, Colonial or Contemporary. We've crafted over 800 spires, for every denomination. And we assume complete responsibility from the drawing board stage through the erection process. Send for our 44-page book entitled, "The Spire," or see our catalog in Sweet's 35c/Ov.

Overly

MANUFACTURING COMPANY
Greensburg, Pennsylvania 15602
Los Angeles, California 90039

For more data, circle 72 on Inquiry Card

Here's the proof in waterproof FOAMGLAS®



nretouched micro-photograph of
DAMGLAS and drop of water 24
mes actual size. It's impossible for
ater to penetrate the sealed glass
lls. Each sealed cell is a separate unit.

The only roof insulation with sealed glass cells that keep water out

This micro-photograph shows you what makes FOAMGLAS the only waterproof roof insulation—it's the sealed glass cells that make up FOAMGLAS. Water or vapor could no more penetrate any of these cells than leak through a drinking glass.

Once your FOAMGLAS Roof Insulation is down, our 20-year guarantee protects your client completely. We can make that guarantee because FOAMGLAS will always keep its original insulating efficiency. Why? FOAMGLAS permeability (moisture absorption) is zero. No other roof insulation can claim that. Check it!

All other insulations will absorb moisture if the roof leaks or if vapor migrates from within the building. That can mean expensive repair or replacement.

Investigate the only waterproof roof insulation . . . available in 2′ x 4′ FOAMGLAS®-BOARD in thicknesses of 1½″, 1¾″ and 2″. Test it yourself. Use the reader-service number to get a free sample and literature. Pittsburgh Corning Corporation, Dept. AR-124, One Gateway Center, Pittsburgh, Pennsylvania 15222.

PITTSBURGH®
CORNING

For more data, circle 73 on Inquiry Card

Product Reports

continued from page 187

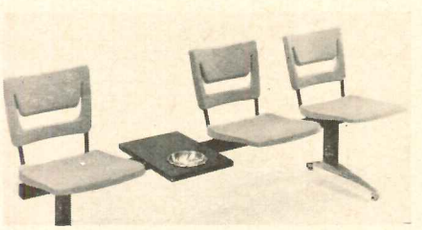
NEW DESIGNS FOR SCHOOL AND WAITING ROOM SEATING

The *Knowledge Center* single unit study desk is a recent addition to the company's *Vanguard* school furniture series.

Designed to swivel away from the window and towards the blackboard,

the seat has a 100 deg swivel action, and a self-returning spring to ensure an orderly appearance when the classroom is empty. The unit is available in two heights, 17 and 18 in., has a top 18 by 24 in., and 37-in. front to back spacing. A cantilevered bookrack beneath the seat provides a rear foot guard.

A new space saving sectional seating unit for use in waiting areas, features seats and backs of *Amerflex*, a polymer plastic material introduced



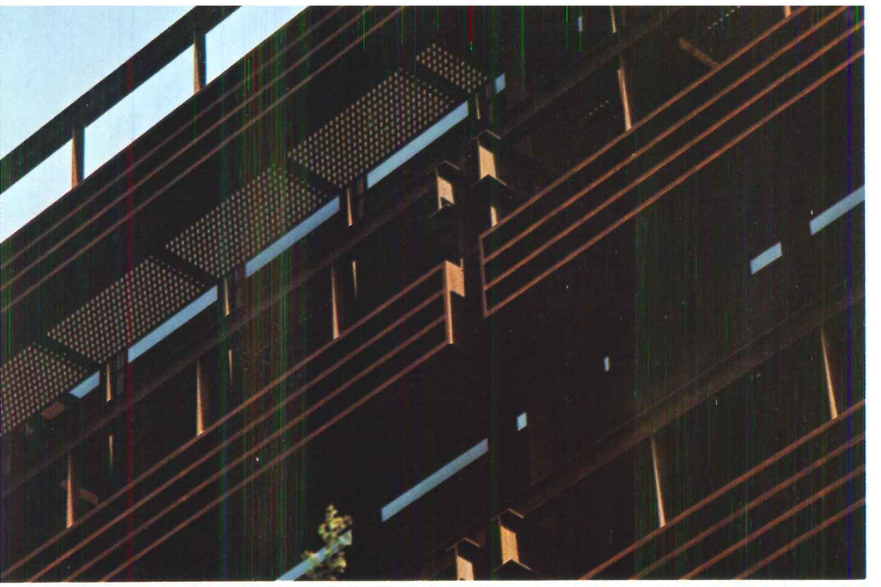
by the company. Mounted on lengths of tubular steel, the unit is available in two-, three-, four- or five-seat combinations with one or two tables between.

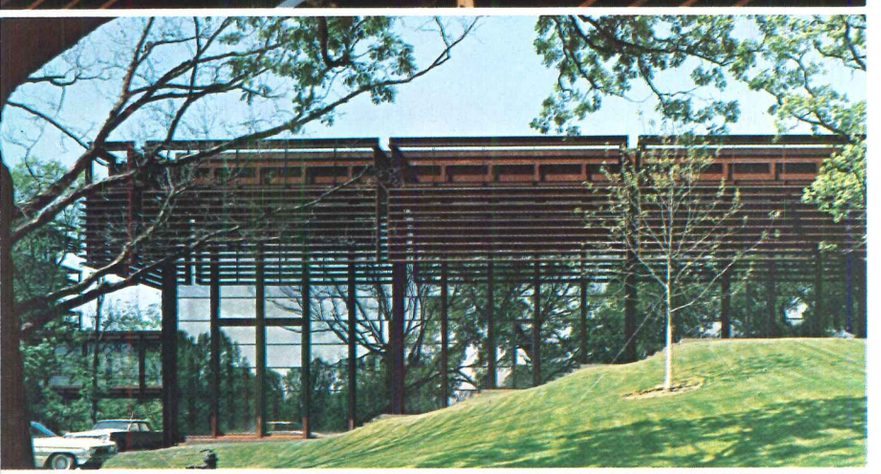
Chrome-plated feet with self leveling glides make for ease of movement. *American Seating Company, Grand Rapids, Mich.*

CIRCLE 301 ON INQUIRY CARD

more products on page 204

A character that only nature can impart... →





"We sought an appropriate material—economical, maintenance-free, bold in character, dark in color. . . ."

The architects, Eero Saarinen and Associates, found the material they sought in a corrosion resistant, high-strength low-alloy steel. They used it boldly in the striking structures that comprise the Deere & Company Administrative Center near Moline, Illinois.

All exterior steel—columns, girders, purlins, sun shades, and wall sections—are bare USS Cor-Ten Steel. Beginning with a surface that was grit blasted to "near-white metal," this remarkable steel has gradually formed a dense, textured, self-protecting oxide that has weathered through a spectrum of orange, russet, and brown hues to its present rich, earthy color. The steel has yet to reach its dark, final color, but time and weather will soon accomplish this.

The Center consists of a main office building, a product display building, and a 387-seat auditorium. The seven-story main office building is set into a wooded ravine and is connected to the flanking structures by a glass enclosed bridge at its fourth-floor level. Two ponds in front of the main building enhance the setting. The largest serves as a spray pond for air conditioning. Future plans call for an additional building on the opposite side of the ravine.

The structures are of all-welded construction, with no expansion joints. Structural neoprene glazing gaskets support the special reflective glass and allow for dimensional changes in the window openings. A total of 2,261 tons of USS Cor-Ten Steel and 1,096 tons of ASTM A36 steel was used in the structures.

Following construction of the Deere & Company buildings, there have been many other applications of bare Cor-Ten steel. Some architects are using it for the entire exterior of buildings, while others are achieving pleasing effects by combining Cor-Ten steel with contrasting materials. *(continued on overleaf)*

USS Cor-Ten Steel

specify MAHOGANY...natural background for fashion

For centuries mahogany has been to the world of wood what leather has been to men's clothing. Both materials have built lasting reputations for beauty, performance, and long life. Little wonder that both leather and mahogany are imitated. Mahogany by so-called Philippine Mahogany, which is not a Genuine Mahogany but may be one of 14 different species of wood.

Just as a top tailor wouldn't think of using an inferior cloth for a fine suit, today's architects should insist on Genuine Mahogany rather than substitutes. One way to be sure is always buy from Weis-Fricker, world's largest producers of Genuine Mahogany. Weis-Fricker imports and manufactures only *Swietenia Macrophylla* from Central and South America. It's yours quickly in any quantity at prices that will please you—and at lengths up to 20 feet, widths to 24 inches, and thicknesses to 4 inches!

From Weis-Fricker you'll get the same magnificent material that tests by the U. S. Forest Products Laboratory and Cornell University show superior over all other popular hardwoods in nearly all properties for mortising, boring, planing, warping, shaping, and turning. And you'll join some of America's top architects who chose Genuine Mahogany recently for the interior of the luxurious Hotel Sheraton in San Juan, the Professional Golf Association's (PGA) clubhouse in Palm Beach, and the Library at the University of Chicago.

For name of nearest dealer to you, write today. Free mahogany kit on request. Contains samples with finishes in red, yellow, green, blue, brown, and violet, plus mahogany fact book with mechanical stresses and other information.

For more data circle 10 on Inquiry Card.

If Mill A and Mill B made a carpet from the exact same specs, would you get the exact same carpet?

How could you?

You can specify, for example, 4000 sq. yds. of 3 ply all wool yarns.

But can you specify, how the wool should be scoured?

You can specify Mint Julep green.

But can you specify the quality of the dye process?

You can specify a ¾ inch pile height.

But can you specify even weight from yard to yard?

You can specify a double jute back.

But can you specify how to put it on?

You can specify a pattern.

But can you specify 63 inspections to make sure of no skips or misweaves?

See our point?

A carpet mill can foul you up.

At Lees, we don't.

We don't give you wool from mangy sheep.

Or nylons or acrylics from mangy manufacturers.

Or streaked, mismatched, off-colored, ravelled, pulled, fluffed, puckered, wrinkled or tacky-backed carpets.

Put it this way. We don't give you trouble.

Except sometimes.

Sometimes we get specs we can't afford to follow as they are.

If we did, we'd have to make substandard carpet.

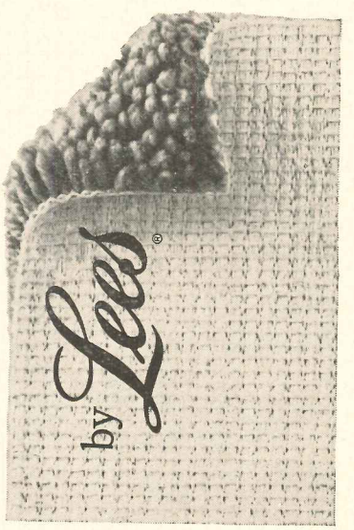
We won't.

We won't sacrifice quality.

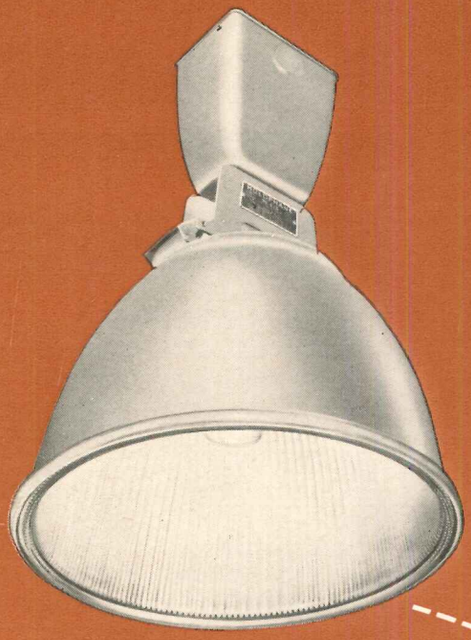
You can expect a good carpet from Lees no matter what you specify.

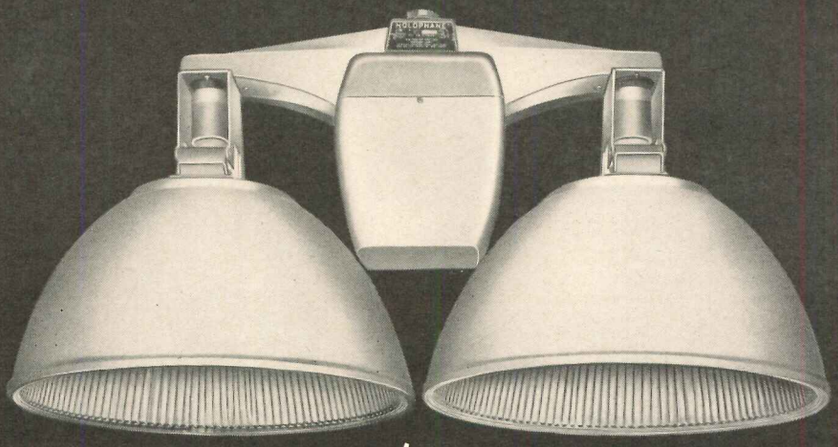
(Or what you don't.)

For a lot of good, down-to-earth reasons, "those heavenly carpets by Lees."



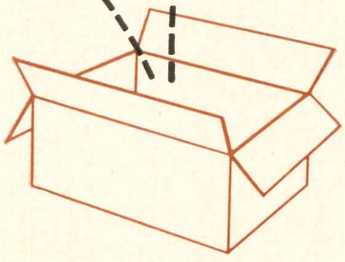
Lighting success . . . beyond all predictions





Out of the carton onto the ceiling

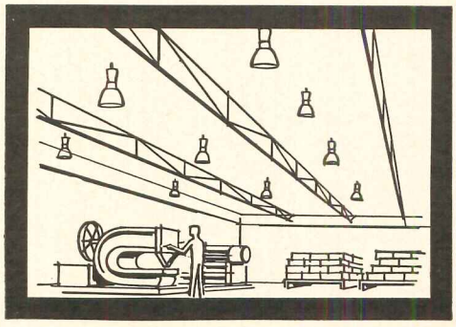
HOLOPHANE Prismpack & Twin Prismpack

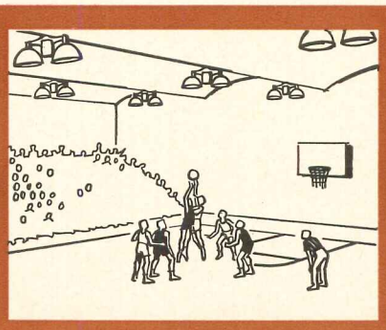


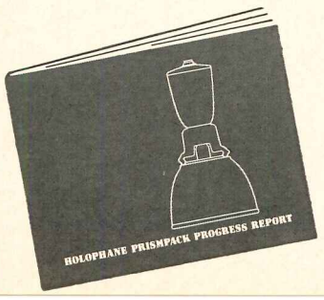
Hundreds of effective installations, throughout the industrial, commercial and institutional fields, support this fact: these luminaires are superior to any mercury lighting units ever made . . . They represent an altogether unique combination of prismatic reflector with integral, constant-wattage ballast . . . Prismatic reflectors deliver highest utilization of light with efficient distributions and low brightness. Mounting heights: 10 to 30 feet . . . Easiest handling: lift luminaire from its carton—connect two wires—set unit in place—and it's ready for operation . . . Most economical to install and maintain . . . *Write for new, informative 12 page brochure showing full-color illustrations of a wide variety of applications.*

HOLOPHANE Company, Inc. *Lighting Authorities Since 1898* / 1120 Avenue of the Americas, New York 36

Holophane Trade Mark







Product Reports

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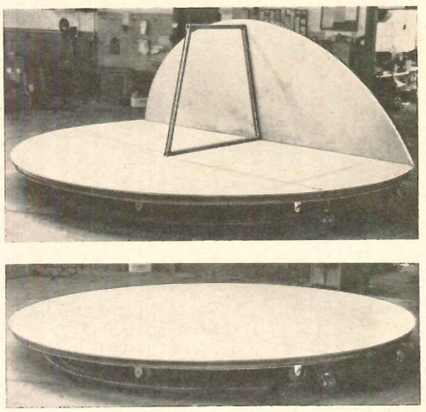


PORTABLE TURNTABLE

Port-A-Fold is the trade name for a new one-piece turntable, which is said to be the first completely portable unit of its kind. The turntable, which is available in varying sizes from 10 ft in diameter, can be folded for easy loading in to trucks and can be ready to operate within minutes of its arrival at the site. The ¾ HP, 110V/10 amp motor gives quiet operation. The turntable rolls easily on four trundling wheels, and tracks on each side can be hinged down to protect floors and to ensure a smooth turning action. The 16-ft diameter model illustrated can handle a load of up to 5,000 lbs. *Macton Machinery Company, Stamford, Conn.*

CIRCLE 302 ON INQUIRY CARD

NEW INFRA-RED HEATER

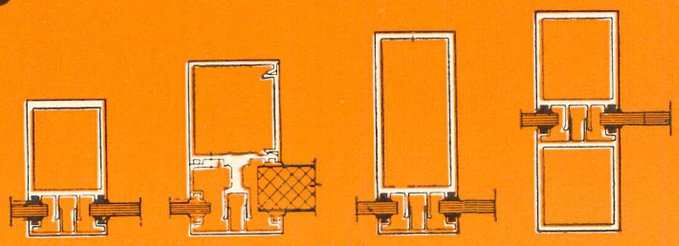
The *Dash-2* line of Panelbloc Infra-Red Heaters features an improved radiation pattern, higher over-all efficiency and a more modern exterior design. All controls are concealed and protected by a steel panel, but are readily available for inspection and adjustment. The new heaters are fully automatic in operation and are thermostatically controlled. A wide range of controls is available which are said to enable the user to have precise amounts of heat exactly where needed. Different heat zones can be maintained in the same unpartitioned area. All units are equipped with safety pilots and self-operated gas shut-off valves. *The Bettcher Manufacturing Corp., 3106 West 61st St., Cleveland, Ohio*

CIRCLE 303 ON INQUIRY CARD

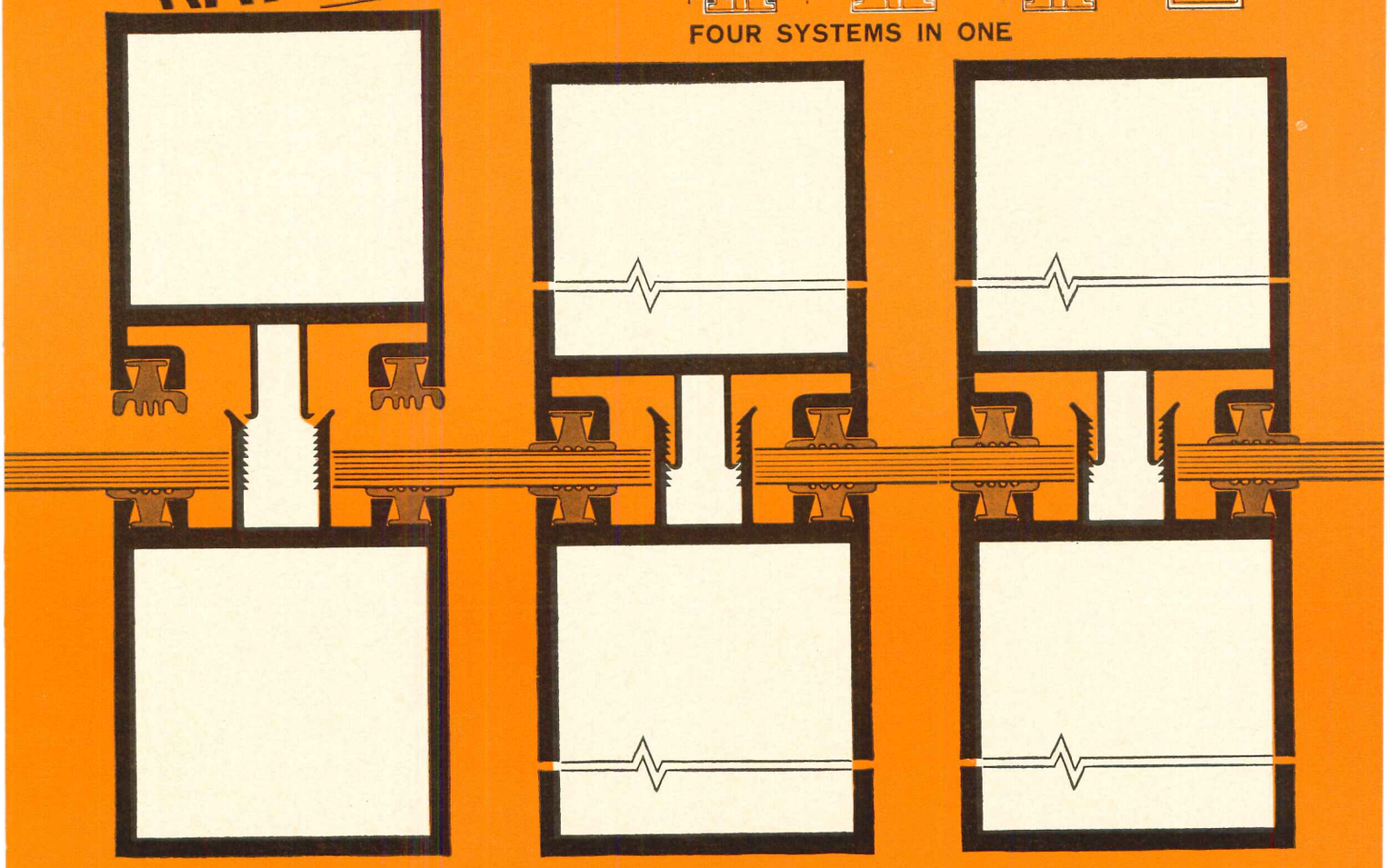
more products on page 208

NEW BUILDING SYSTEM FROM AMARLITE RATCHET

Fit right...Tap it tight



FOUR SYSTEMS IN ONE



FIT right...tap it tight with a rubber mallet! It's that easy to install store fronts, even light to medium curtain walls using Ratchet . . . the brand new building system from Amarlite! Ratchet is easier to use . . . goes up quicker. Its locking principle grips right, grabs tight . . . holds itself together from top to bottom. Heavier gauge precision extrusions assure greater durability, high load strength. The A-1 anodized finish keeps its flawless beauty year after year. For a free detailed brochure, write "Ratchet, Department C."

AMARLITE

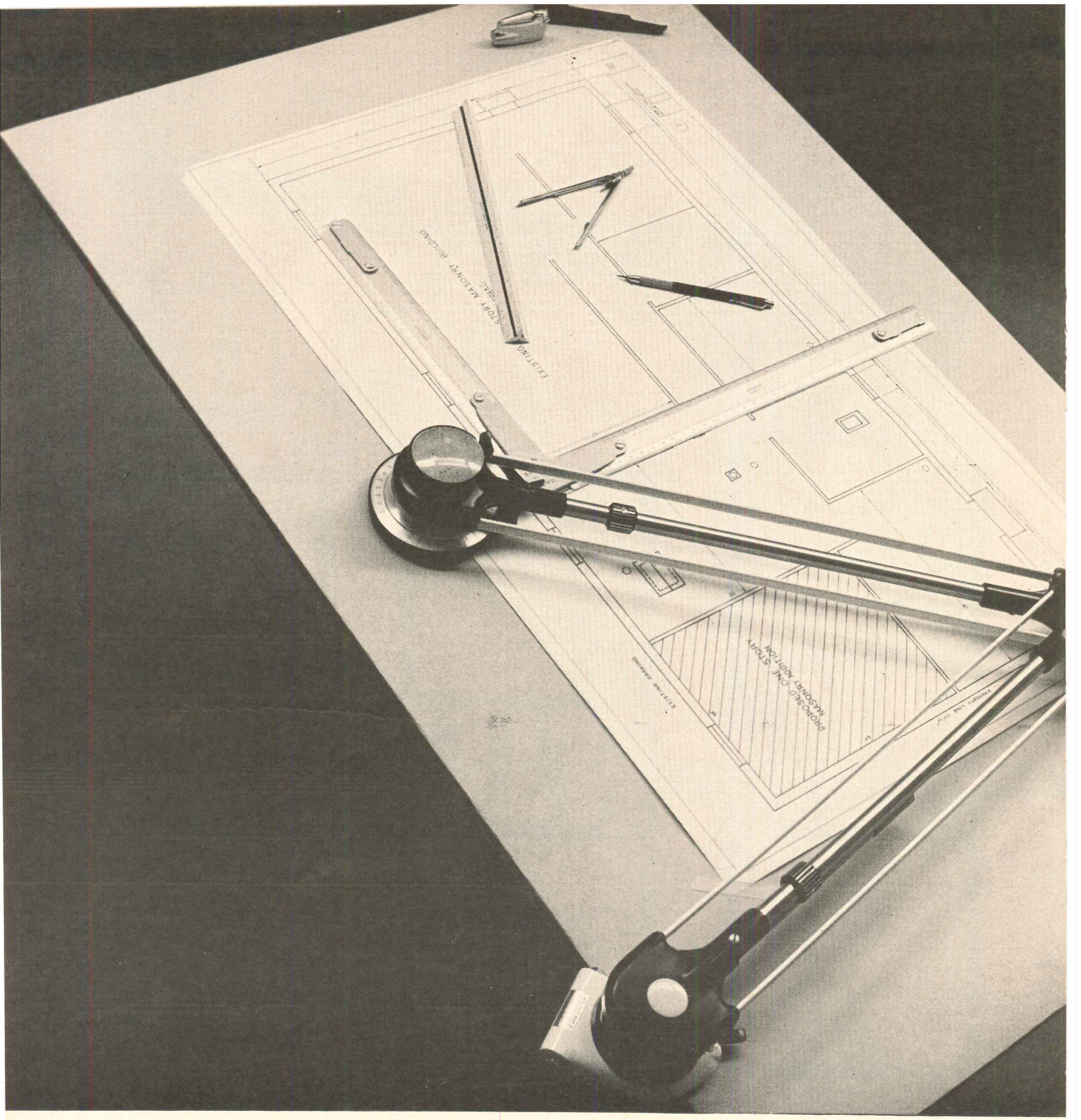
DIVISION OF ANACONDA ALUMINUM COMPANY

MAIN OFFICE • P. O. BOX 1719 • ATLANTA 1, GEORGIA

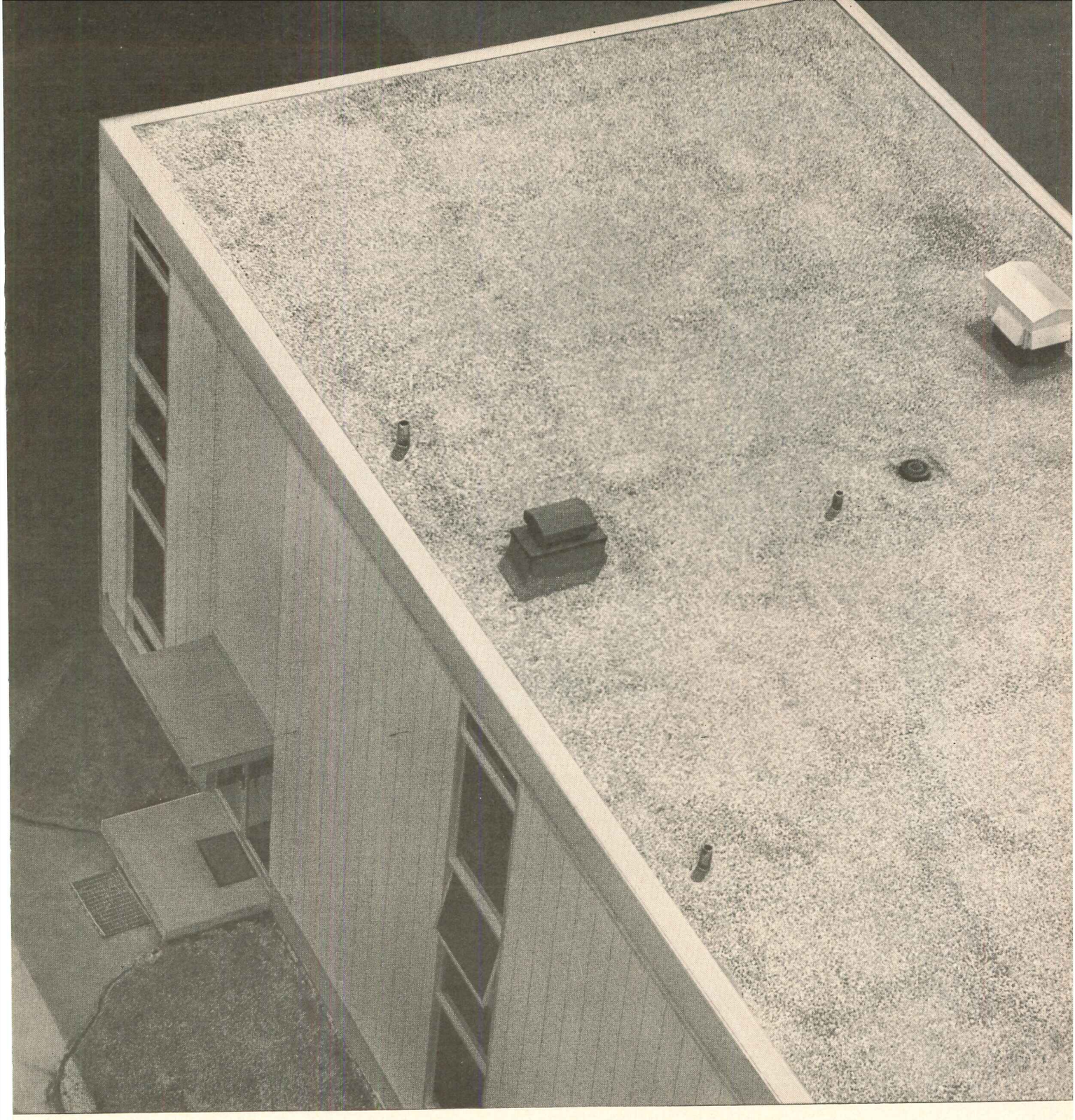
Sales Offices and Warehouses:

Chicago, Illinois
Cleveland, Ohio
Dallas, Texas
Paramus, New Jersey
Atlanta, Georgia
Los Angeles, California

For more data, circle 78 on Inquiry Card



Remember Styrofoam.



OK. Now forget it.

Once a roof is insulated with Styrofoam® RM brand roof insulation, you won't have to worry about that insulation again.
Forget it.
But be sure to remember Styrofoam RM next time you specify roof insulation.
Remember that it's economical. Styrofoam RM costs no more than fiberboard insulations. Remember that its closed-cell structure won't absorb water. No more roof blistering and cracking caused by water-soaked insulation. Remember its low "k" factor. Remember that roofers find it light in weight, easy to handle, fast and easy to install. And most important, remember that with Styrofoam RM roof insulation, heating and cooling costs remain constant for the life of the roof. And clients remain satisfied for at least that long.
Any questions? We'd be happy to send you all the data and specifications you need. Or see Sweet's Architectural File 8a/Dow. The Dow Chemical Company, Plastics Sales Department 1313N12, Midland, Michigan.

Styrofoam is Dow's registered trademark for expanded polystyrene produced by an exclusive manufacturing process. Accept no substitutes... look for this trademark on all Styrofoam brand insulation board.

For more data, circle 79 on Inquiry Card

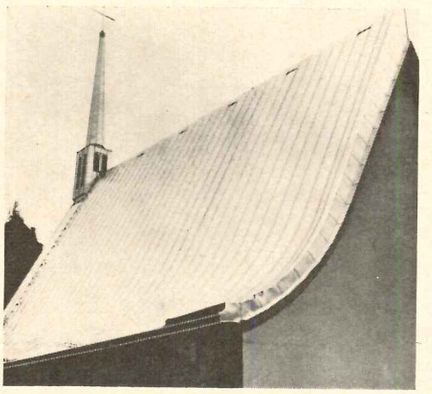
DOW

Product Reports

continued from page 204

SEAM WELDED STAINLESS STEEL ROOFING

A new mechanical roofing technique developed in Sweden, was introduced for the first time in America on the Swedish pavilion at the World's Fair. The roofing, made of thin-gaged seam-welded stainless steel strip, is said to be 100 per cent leakproof and economical in cost. After machine flanging, the stainless steel strip is cut to required lengths and laid high



flanges against low flanges. The sheets are fixed on the underlay by stainless steel nails through silding cleats, which are welded in position to the low flange. An electric seam welding machine is used to unite the the roofing sheets, and the high flange is folded over the lower flange with a special folding machine. *Fagersta Steels, Inc., 2 Henderson Drive, West Caldwell, N.J.*

CIRCLE 304 ON INQUIRY CARD

LAMPS TO WITHSTAND VIBRATION

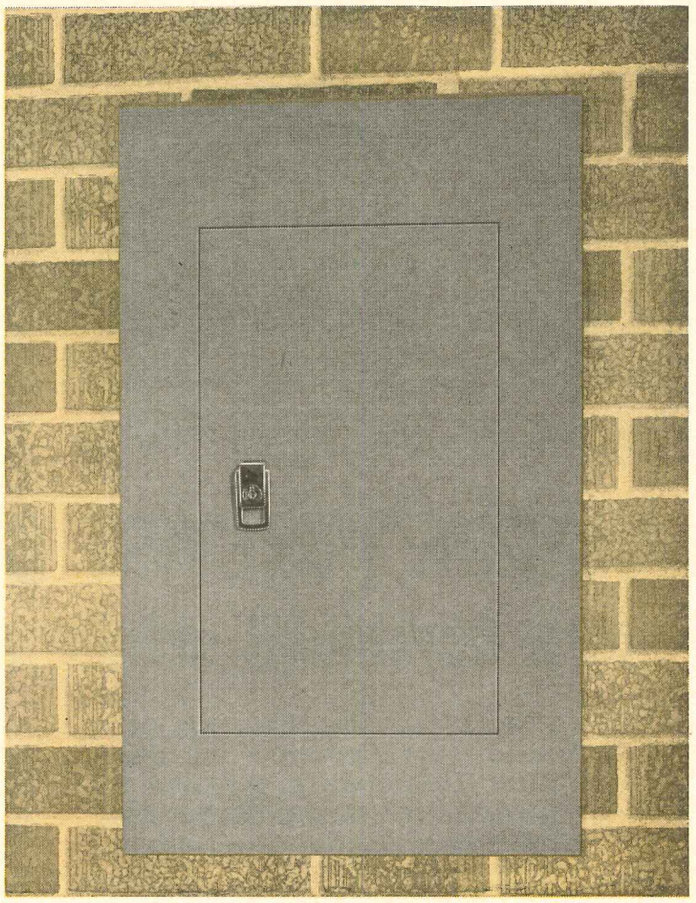
Two new incandescent lamps have been introduced for use in areas where there are problems of excessive vibration or severe shock. The Champion Vibration Service Lamp has seven filament supports and is designed for use where high speed machinery such as generators or motors give rise to severe vibration. The Champion Rough Service Lamp has 16 filament supports and can be used in areas where lamps are subjected to shock, such as at the end of drop cords. *Sales Dept., Champion Lamp Works, Lynn, Mass.*

CIRCLE 305 ON INQUIRY CARD

more products on page 212

from Square D—

NEATER APPEARANCE



Completely Concealed Trim Clamps
and Hinges on Standard Panelboard Fronts—
AT NO EXTRA COST!

Until now, panelboard fronts like the one above were built only on special order. They cost more and it took longer to get them. Even then, only the hinges were concealed. Now, in this new lighting panelboard cabinet, both hinges and trim clamps are completely concealed. No extra cost...and prompt delivery from stock!

This new design gives you more than new eye appeal. It is the only design which can be locked for positive security because the panelboard front cannot be removed while the door is locked.

Square D sells more panelboards than any other manufacturer. This latest design innovation adds significant strength to that position of leadership.

GET THE COMPLETE STORY *from your Square D Field Office*
Or write Square D Company, Mercer Road, Lexington, Kentucky 40501

SQUARE D COMPANY

products sold through Square D electrical distributors everywhere

For more data, circle 82 on Inquiry Card

At St. Ambrose School and Provisional Roman Catholic Church, schoolrooms surround the religious area which is located under a unique fluted roof of precast folded plates. Open ends of the roof sections will be glazed with plastic translucent panels.

UNIQUE PRECAST CONCRETE ROOF
for a combined school and church

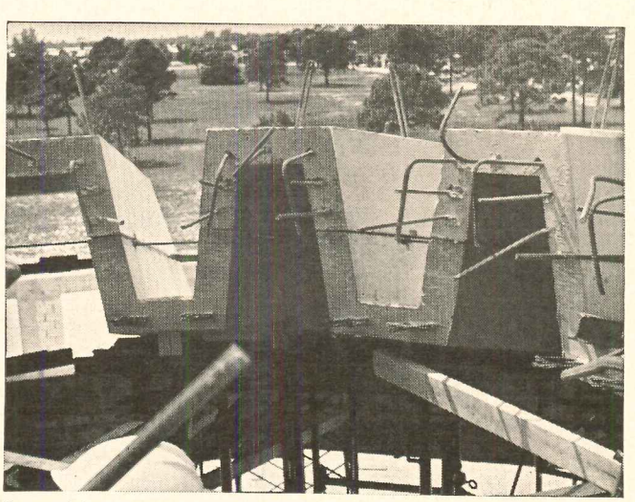
The roof of the central portion of this circular school and church building is composed of huge precast concrete folded plates. Support for the roof is provided by a tension ring of concrete and steel at the outer perimeter and a compression ring at the peak. The 24 folded plate units were erected in just two days.

The roof provides a circular church area, 76′ in diameter, which is entirely free of supporting columns. Schoolrooms and administrative areas are arranged in wedge-shaped sections around the provisional church area which eventually will become the school auditorium when a permanent church is built.

LEHIGH EARLY STRENGTH CEMENT BENEFITS EVERY MEMBER OF THE TEAM. R. H. Wright, Inc., used Lehigh Early Strength Cement for the precast roof units in this building. Here, as in almost any concrete work, this cement provides important benefits for architect, manufacturer and contractor alike. Quicker reuse of forms. Earlier availability of units. Assured on-time delivery for smoother planning. Lehigh Portland Cement Company, Allentown, Pa.

Owner: St. Ambrose School and Provisional Roman Catholic Church, Deerfield Beach, Florida
Architect: Romano & Sullan, Pompano Beach, Florida
Structural Engineers: Nicholas G. Dracos & Associates, Boca Raton, Florida
General Contractor: Pagliara Builders, Inc., Fort Lauderdale, Florida
Precast Roof Units: R. H. Wright, Inc., a unit of Houdaille Industries, Inc., Fort Lauderdale, Florida

LEHIGH CEMENTS



(LEFT PHOTO) Placing one of the 36′ long precast concrete tapered folded plates. Only two days were required to place the 24 roof units. (RIGHT PHOTO) Deep folded plate design is formed by placement of top units on identical inverted bottom units, demanding close tolerances. Protruding re-bars will be anchored into the poured concrete compression ring.

THIS CERAMIC COOLING TOWER WILL GROW...BUT NOT AGE

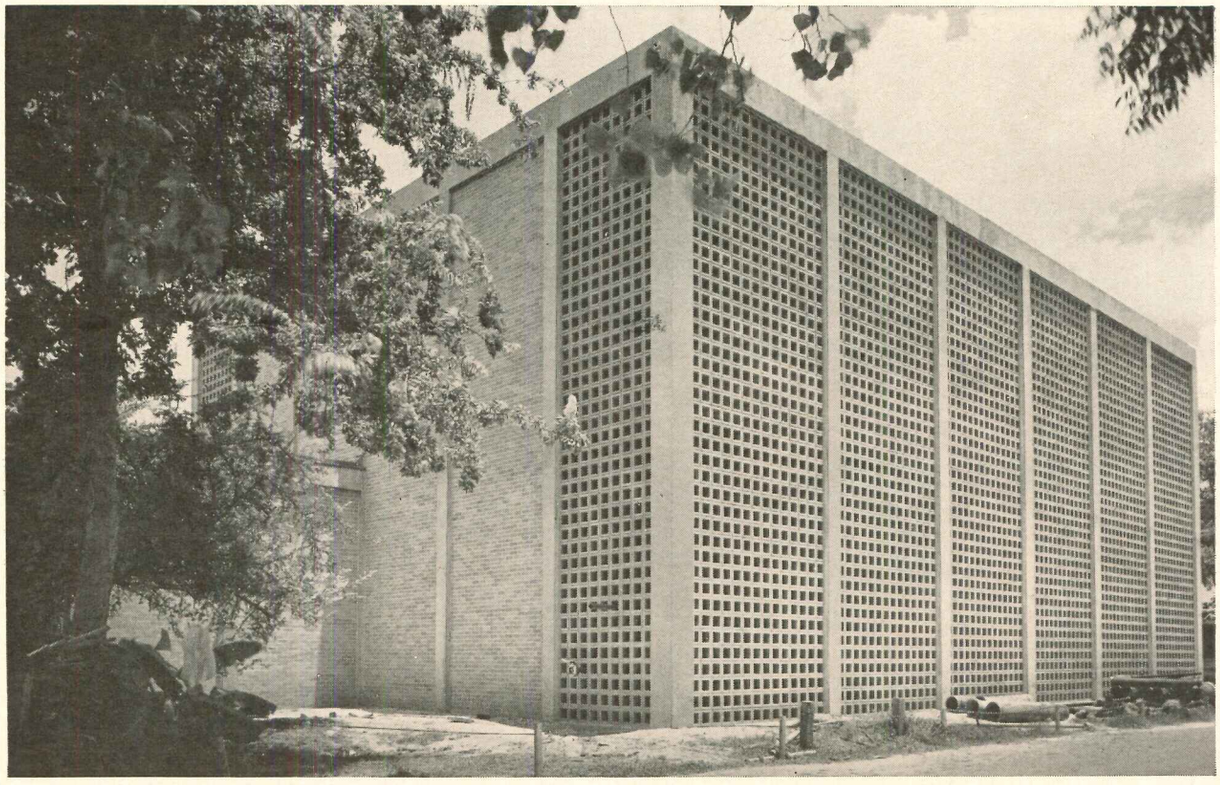
This Ceramic Cooling Tower, recently completed for Houston's St. Joseph Hospital (operated by The Sisters of Charity of The Incarnate Word) is designed to grow in parallel with the hospital's heat transfer requirements.

The hospital will ultimately require a six-cell tower capable of handling by absorption 2240 tons. At present, however, only half that capacity is required. So the entire structure was erected and three cells received internals to handle 1120 tons. The other three cells will receive internals as the need arises. This ability to design for immediate heat transfer needs while providing for long-range requirements can greatly reduce heat transfer costs.

Completely fireproof, waterproof and stainproof Ceramic Cooling Towers operate at peak efficiency over their entire life span. The concept of selecting **Ceramic** was to provide a tower architecturally suitable that would equal the life of the building. Perma-Grid vitrified clay tile fill is chemically inert and cannot deteriorate. Ceramic Cooling Towers provide **complete** architecture freedom; exterior walls can be of any permanent material. **Adjacent parking is permitted, because Ceramic Cooling Towers eliminate free water carry-over.**

While many Ceramic Cooling Towers are custom designed, a range of standard sizes are available for both absorption and motor driven air-conditioning systems. Each installation is supervised by Company engineers dedicated to providing the finest job humanly possible.

Ceramic Cooling Towers are certified by the Cooling Tower Institute — your assurance of performance at not less than 95% of rated capacity. You can depend on maximum value and full capacity **only** with A CTI certified performance tower.



Architects: Golemon & Rolfe, Houston. Consulting Mechanical Engineers: Bernard Johnson Engineers, Inc., Houston.

SEND COUPON FOR COMPLETE TECHNICAL INFORMATION AND LIST OF INSTALLATIONS

NOW AVAILABLE ALL OVER THE WORLD

CERAMIC COOLING TOWER COMPANY
2821 West Seventh ■ Box 425 ■ Fort Worth, Texas
a division of **ACME BRICK COMPANY**

CTI Member

Ceramic Cooling Tower Co.
P. O. Box 425, Department 9
Fort Worth, Texas

Please send material on Ceramic Cooling Towers to:

Name_____

Firm _____

Address_____

City/Zone/State_____

For more data, circle 83 on Inquiry Card

Product Reports

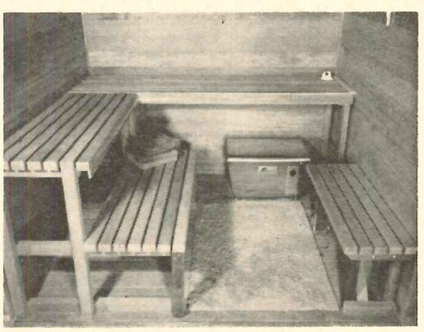
continued from page 208

PANELIZED SAUNA HOUSE HAS FORCED-AIR HEATER

The *Scandia* Sauna is a panelized prefabricated sauna house—6 ft 6 in. by 8 ft, by 6 ft 6 in. high—which can be erected by two men in two hours on any level area, either in a room or outside. Battens beneath the floor panel permit air circulation and minimize moisture in exterior locations. The sauna house is constructed of prime kiln-dried redwood and is insulated with foil-backed fiber glass.

The exterior is weather treated redwood plywood. The house is shipped complete with all necessary hardware. A 12-month warranty against inferior workmanship and materials, also covers warpage, leaking and other defects.

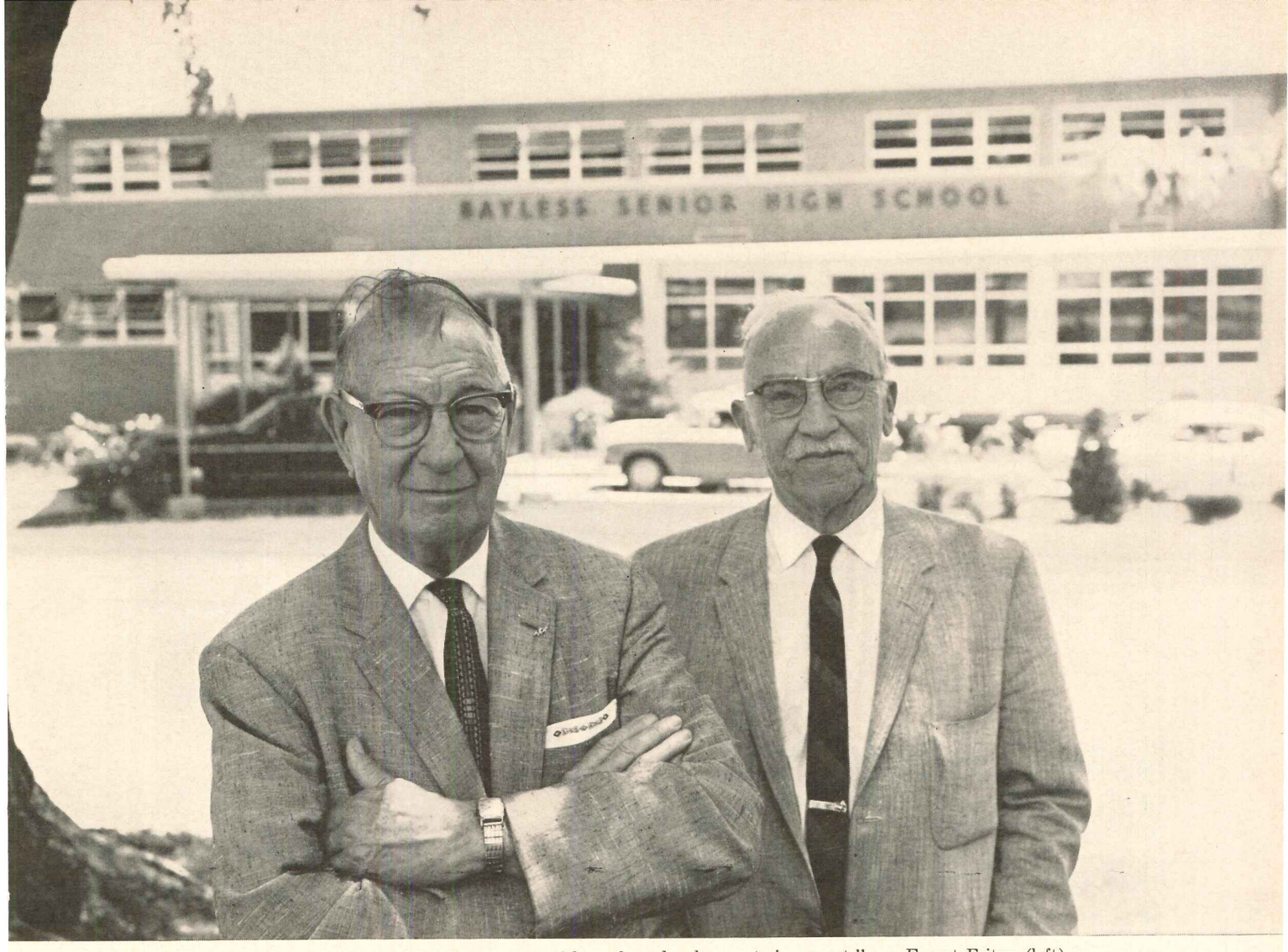
The *Scandia* heater is a forced air unit which heats the room to 180 deg, within 15 minutes. An air insulated



double jacket prevents burns or scorching. A thermostat prevents the unit from reaching a temperature of over 180 deg. The control circuit operates from a 120-volt alternating current power supply, and the power circuit from a 240-volt alternating current supply. *Nordic American Mfg. Co., Inc., 131 Townsend St., San Francisco, Calif., 94107*

CIRCLE 306 ON INQUIRY CARD

more products on page 220



"IN PROFESSIONS LIKE OURS, keeping up with modern developments is a must," say Ernest Friton (left) and Ralf Toensfeldt. "That's why we've started to use total electric design for new schools like this."

"IN ALL OUR YEARS OF PRACTICE, NO ADVANCE WE'VE SEEN TOPS TOTAL ELECTRIC DESIGN"

Ernest T. Friton, architect, and Ralf Toensfeldt, consulting engineer, tell how specifying total electric construction for the Bayless School District's new Senior High School in Affton, Missouri, allowed them to cut costs and simplify design

"Between the two of us," Ernest Friton reports, "Ralf Toensfeldt and I represent close to a full century of engineering and architectural experience. And in all that time, no new development has impressed either of us any more forcibly than this idea of total electric design.

"First of all, you immediately start out ahead of the game when you can heat your building the same way you light it, and work with one source of energy instead of two or more. Also, with electric heating your control systems are extremely flexible and uncomplicated, and construction is faster and less expensive.

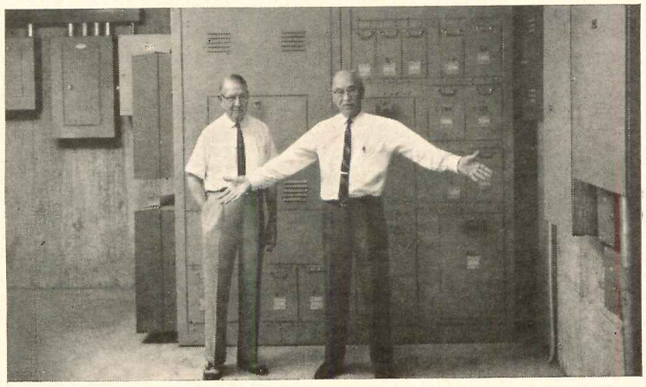
"In this Bayless school, for example, the use of electric heating allowed us to eliminate such high-cost items as trenching, stack and boiler room construction, and steam piping or ductwork. This alone resulted in initial cost savings of better than $35,000—together, of course, with a more efficient building layout.

"Total electric design for schools also turns out to be equally attractive from the client standpoint. According to the Bayless School Board, operating costs have been remarkably low, and maintenance and repairs on equipment, for all practical purposes, have been non-existent."

For architects and engineers, total electric design offers the modern method for combining heating, cooling, water heating and lighting into one efficient operation using a single source of energy. If you are interested in how it can help you in the design of institutional, commercial and industrial buildings, contact your local electric utility company. They will welcome the opportunity to work with you.

BUILD BETTER ELECTRICALLY

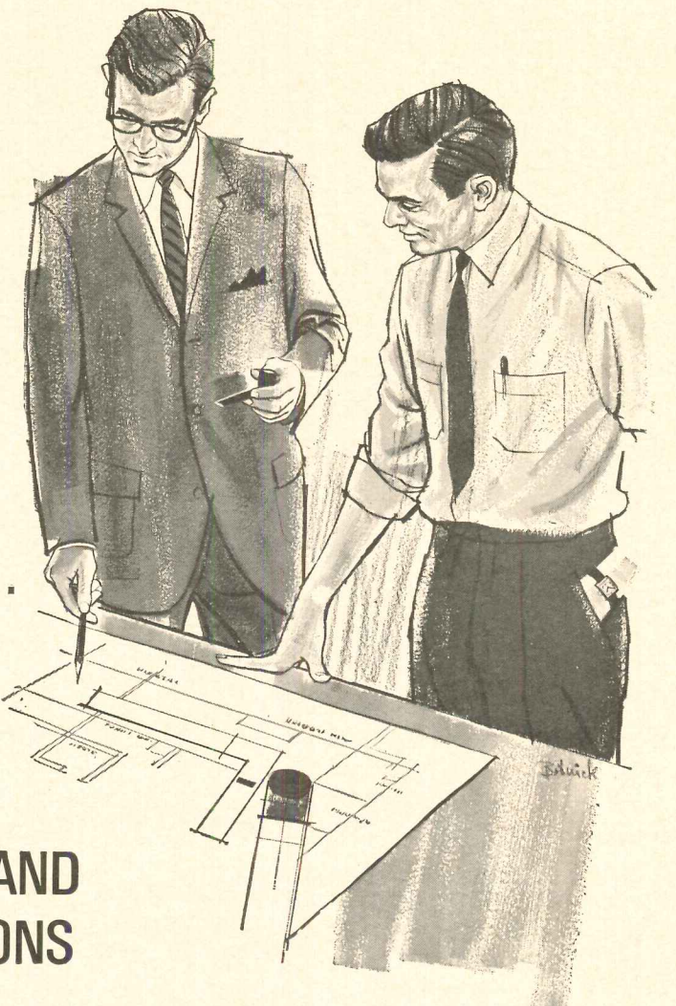
Edison Electric Institute, 750 Third Avenue, New York 17



"SAVINGS IN SPACE are another important advantage of total electric design for schools," points out Ralf Toensfeldt. "With electric heating, for example, this one small control area replaces a full-sized boiler room."

For more data, circle 86 on Inquiry Card

you specify
the space.....



NORRIS PRE-FABRICATED WALK-IN COOLERS, FREEZERS AND COOLER-FREEZER COMBINATIONS WILL FIT

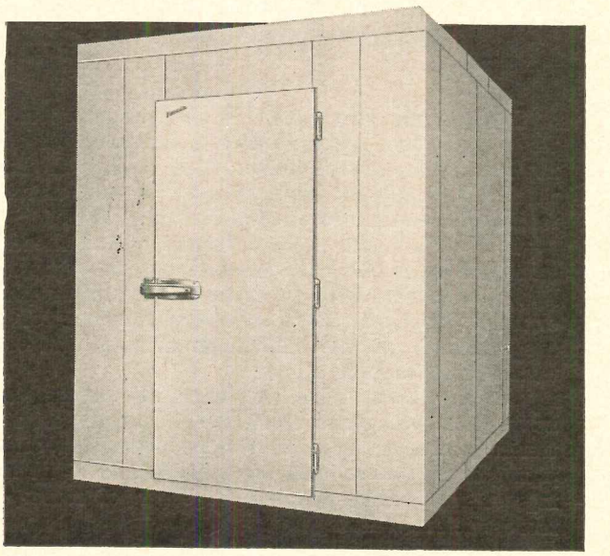
Norris pre-fabricated walk-in coolers, freezers, and cooler-freezer combinations meet any space requirements. Available with or without floors, these versatile walk-ins are supplied in two- and three-foot wall sections, four-foot door sections (7½′ high), and can be set up quickly in virtually any space, any location. The only tool required for installation is a light hammer.

The modular panels of Norris walk-ins are all-metal, with no wood to absorb moisture, and extremely light weight. Standard exteriors are bonderized steel finished in grey baked enamel, interiors are 22-gauge galvanized metal, with custom exteriors or interiors optional at extra cost. Ideal for every institutional, commercial, or industrial refrigeration need, Norris walk-ins can be supplied with the proper self-contained or remote refrigeration equipment to meet any application.

LIGHT WEIGHT

AS LOW AS 4½ LBS. PER SQ. FT.—REDUCES FREIGHT COSTS!

WRITE FOR DESCRIPTIVE LITERATURE!



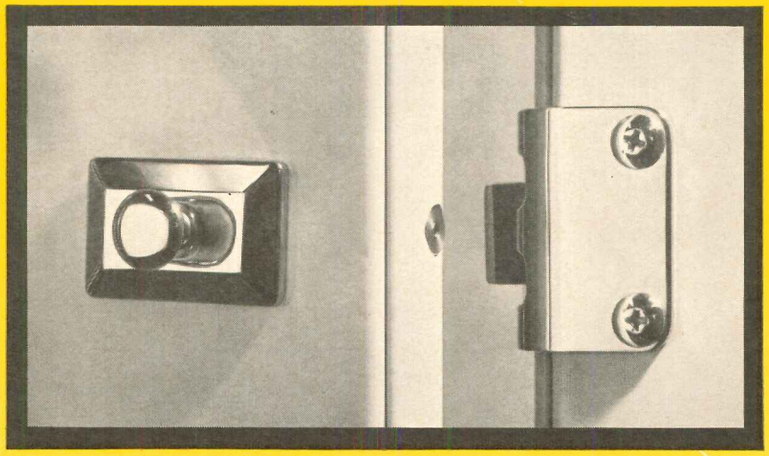
Norris

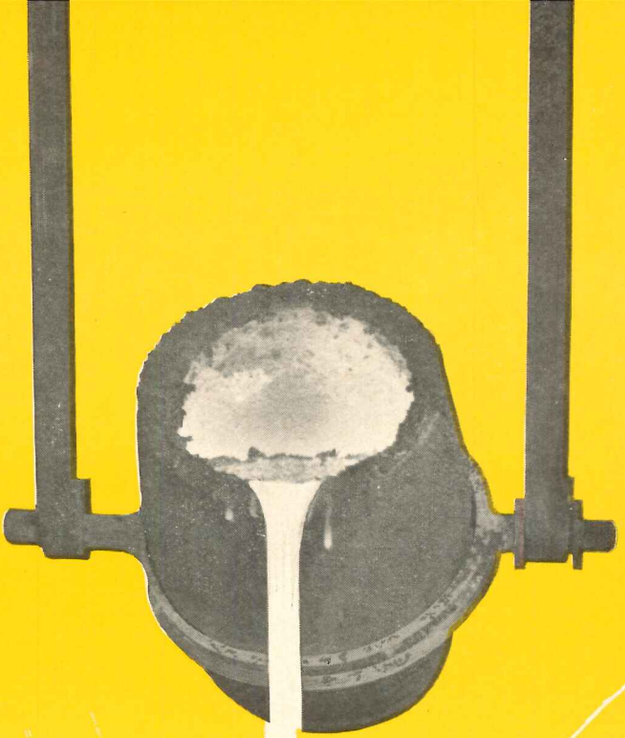
NORRIS DISPENSERS, INC.
2720 LYNDALE AVENUE SOUTH
MINNEAPOLIS 8, MINNESOTA

NORRIS—THE *FIRST* NAME IN MILK SERVING AND STORAGE EQUIPMENT!

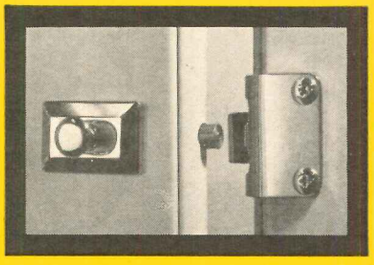
For more data, circle 87 on Inquiry Card

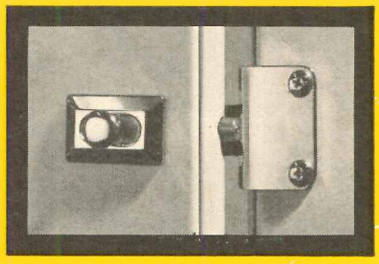
New recessed lift free LATCH



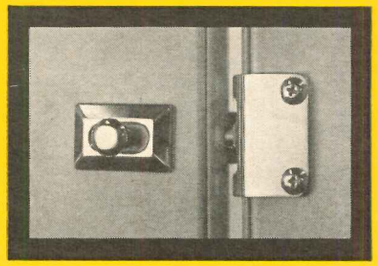


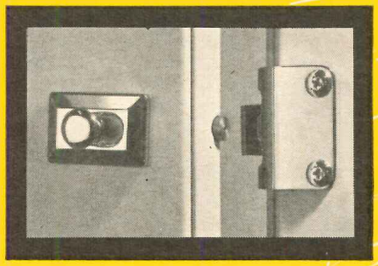
SOLID BRASS





WITH STAINLESS STEEL BOLT





THAT AUTOMATICALLY RETRACTS

When the Weis representative brings a model of the Weis Toilet Compartment to your office, examine its surface mounted hinge and recessed latch. Note the smooth, uncluttered exterior of the entire compartment. The keeper wraps snugly around the stile; there are no projections above or below the door. No cutouts either. While inspecting the model, simulate slamming the door with the bolt extended. At contact see how the bolt immediately retracts, preventing damage to bolt, door, and stile...

For an early demonstration—please write.

HENRY WEIS MFG. CO., ELKHART, INDIANA

See Weis in Sweet's

IF DOOR IS SLAMMED

WEIS

For more data, circle 88 on Inquiry Card

Imaginative use of wood provides privacy, yet never impedes friendliness in the Toluca Townhouse, North Hollywood, Calif. Wood fences have a warm way of keeping pets or people in or out. Architect: Richard D. Stoddard, A.I.A., Sherman Oaks.

For features that set your apartment apart

design with the freedom of WOOD

Wood paneling and beams make the interior of this Santa Barbara apartment an attractive extension of its wood exterior. Architects: Howell & Arendt, A.I.A. in association with Neal Butler, A.I.A.

UNICOM MANUALS 1 & 2: "Design Principles" (122 pages) and "Fabrication of Components" (248 pages), graphically detailing the UNICOM method of house construction, are available at nominal cost to those associated with or supplying the home building industry. For free booklet describing UNICOM, write to: UNICOM, National Lumber Manufacturers Association, 1619 Massachusetts Ave., N.W., Washington, D.C. 20036.

For multi-family apartments or for one-family homes, you can be as daring with, and as demanding of, wood as you wish. Not only will wood add luxury to apartment living, but its practical side, too, makes it desirable.

In the matter of maintaining quiet in a busy area, wood's natural acoustical qualities help keep down the noise. In a dollars-and-cents way, wood helps keep the owner's expense of heating and cooling to a minimum; wood's natural insulation qualities see to that.

And wood's beauty . . . its ready availability in many species, tones, and textures . . . lets you please your client, his prospective tenants, and yourself.

Remember, also, wood's economy, and its ready adaptability to new systems of planning, like UNICOM . . . the *modern* method of modular construction. For more information on designing more freely with wood, write:

NATIONAL LUMBER MANUFACTURERS ASSOCIATION
Wood Information Center, 1619 Massachusetts Ave., N.W., Washington, D.C. 20036

nlma

find the better way with **wood**

Wood, first wedded to water by early shipbuilders, goes modern with today's homebuilders. Pole construction of the Cove Apartments in Belvedere, California, withstands wind and weather. Owner: Belvedere Land Company. Architect: Charles Warren Callister.

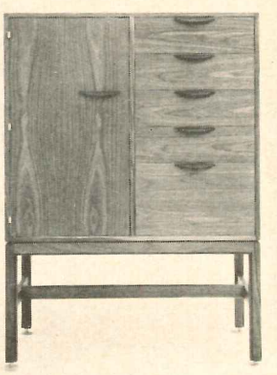
For more data, circle 89 on Inquiry Card

Product Reports

continued from page 212

CABINETS FOR EXECUTIVE OFFICES

The *Group Nine* range of co-ordinated desks and storage units has been designed to be adaptable to the requirements of different types of offices. The cabinets are available with either low or high bases, and can be



combined either vertically or horizontally to form larger units, which can also double as room dividers. Executive or secretarial desks are available in double and single pedestal designs. *Jens Risom Design, Inc., 444 Madison Ave., N.Y., 10022*

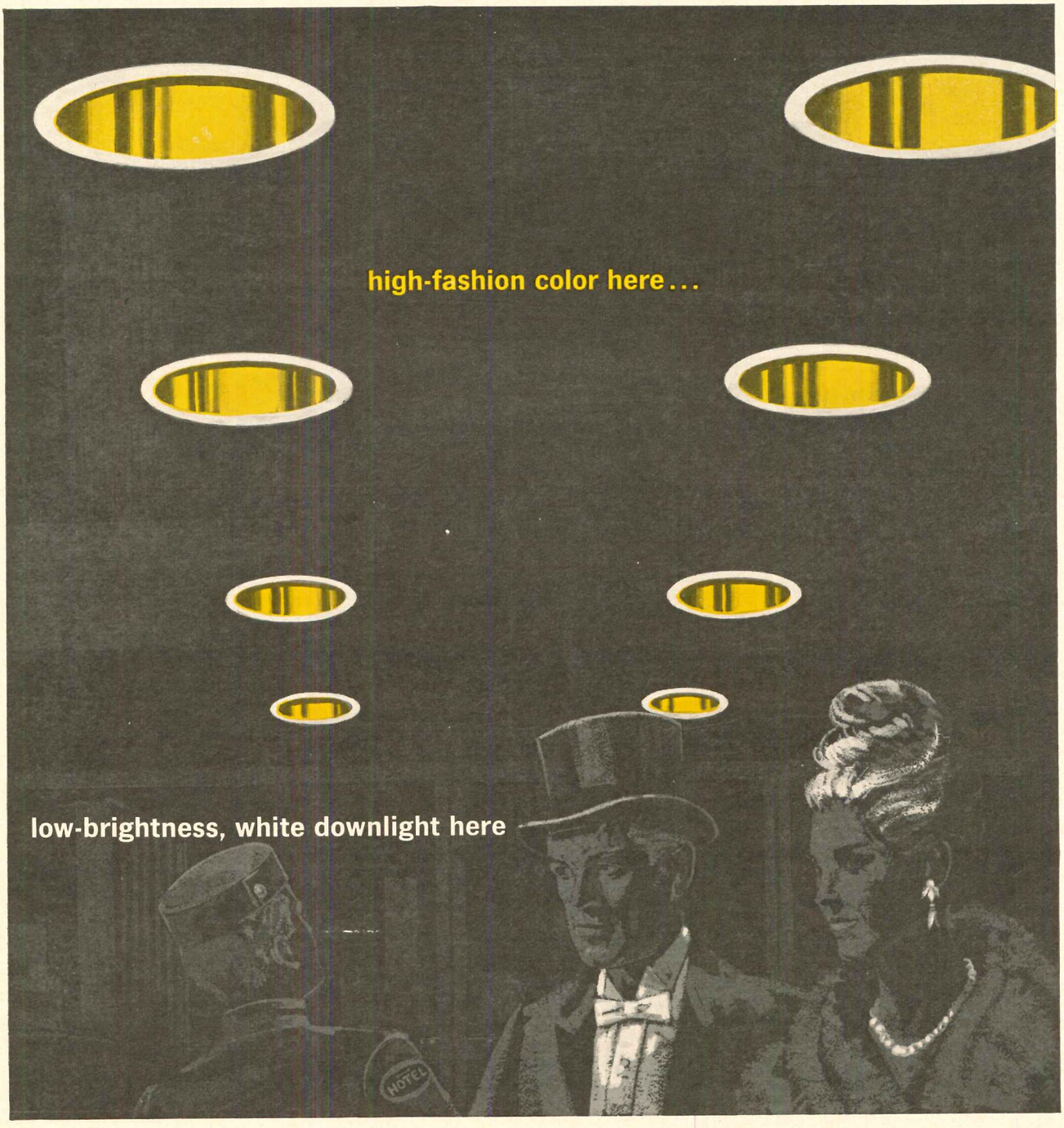
CIRCLE 307 ON INQUIRY CARD

NEW LOCK FOR SLIDING DOORS

A lock with only one moving part has been introduced for the company's *Mildor* range of aluminum sliding glass patio doors. A companion *Nite Lok* can also be provided. Installation is quick and easy, and both lock and handle can readily be changed from one side of the door to the other. The lock has a finger-fitting operator which connects to the latchbolt. When the operator is depressed one-eighth of a turn, the bolt rides over in a positive action to engage a hooked, heavy-duty keeper in the jamb. The stile itself is equipped with a heavy-duty chrome protector plate. When locked, the *Mildor* can be opened from the outside only by a key. If the *Nite Lok* switch is slid up to the "on" position, an internal "dog" is actuated which secures the operator so that not even a key will open the door from the outside. *Miller Industries, Inc., 16295 N.W. 13th Ave., Miami, Fla.*

CIRCLE 308 ON INQUIRY CARD

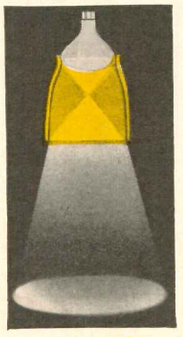
more products on page 224



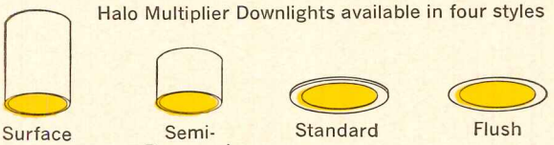
Halo Multiplier Downlights brilliantly utilize a specially-designed spun aluminum reflector (in black, gold or specular Alzak*) and an "R" lamp ranging from 50 W. R20 to 500 W. R40. The mood-setting spot of ceiling color is subtly created through reflection of light off the colored reflector . . . while the lighted area is bathed in a white, controlled downlight with high intensity and low brightness.

Multiplier Downlights are just one of the "colorful" ideas in the Halo Architectural Series. See them all. Send for full-color catalog today.

*proprietary term Aluminum Company of America



Halo Multiplier Downlights available in four styles



halo

HALO LIGHTING INC. 9301 West Bryn Mawr Avenue • Des Plaines, Illinois

For more data, circle 91 on Inquiry Card

At Searstown they needed:

10 duct furnaces,
75 unit heaters,
11 horizontal furnaces,
23 rooftop heating and air conditioning packages,
7 blower package units,
71 remote condensing units,
59 horizontal blower coil units,
1 gas boiler,
3 gas heating/electric cooling packages.

Searstown, Cumberland, Maryland. C. Yoder & Sons, Heating and Cooling Contractor.

They got 'em all from one reliable, dependable source: Janitrol.

When you specify heating and cooling by Janitrol, you specify from the broadest, most complete line in the industry. Does that make a difference? You bet it does.

First, it means you get the right equipment to match the requirements of the job. Not something that just comes close. Janitrol's complete quality line gives you specification flexibility for any heating or cooling application . . . boiler to forced air . . . gas, electric or oil fuels. The Janitrol line is available in a wide variety of models for residential, commercial and industrial applications. Includes make-up air systems, unit heaters, year-round gas/electric packages, forced air furnaces, add-on cooling, electric heat pumps and gas or electric driven air conditioners.

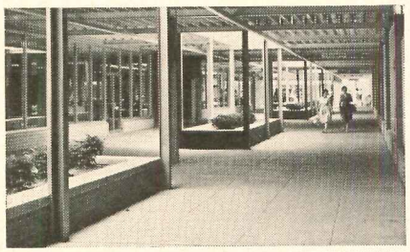
Second, you get the benefit of the longest experience and most dependable design and engineering in the industry. You know when you specify Janitrol equipment it will perform efficiently at or above rated capacity.

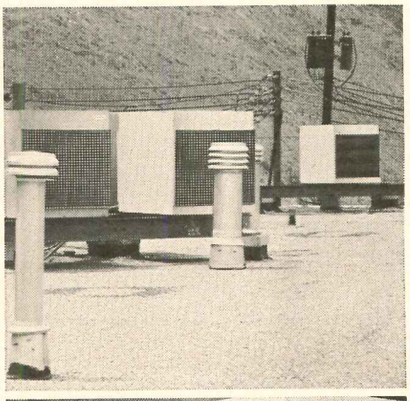
Third, you get more technical help. Janitrol's expert C & I field force is always on call to help you select equipment, handle layouts, take-offs and whatever is necessary to help you get the job right.

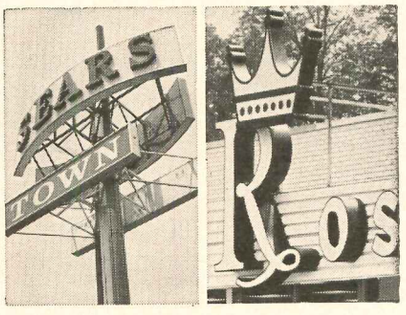
Finally, you get one source, full line responsibility for all phases of the heating and cooling problem—from rough sketch to final completion of the job.

Like to see what more Janitrol can offer to make your job easier? Contact your Janitrol District Manager for full details. His name's in the Yellow Pages.

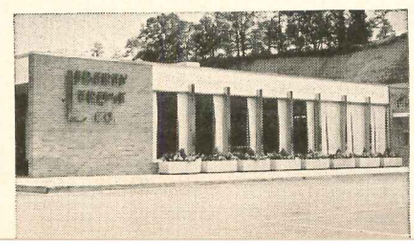
JANITROL DIVISION
Midland-Ross Corporation
Columbus, Ohio Phoenix, Arizona







Janitrol gives you more to work with



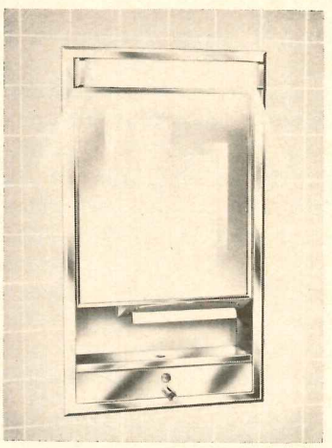
Product Reports

continued from page 220

NEW FRAMING SYSTEM FOR PLASTIC BUILDING PANELS

A new extruded aluminum framing system has been developed which facilitates the installation of *Plexiglas* acrylic plastic when used in facing panels on buildings. The system consists of six different aluminum extrusions, which can be adapted for the framing of any installation. The frames will handle plastic panels up to 4 by 6 ft of $\frac{1}{8}$ or $\frac{3}{16}$ in. thickness. Designed specifically to provide for the thermal expansion of Rohm and Haas Company's *Plexiglas* acrylic plastic panels, the frame members include a base, inside and outside corners, a divider, snap-on mullions and caps. All parts are available in either mill finish or anodized surface, clear or colored. The frame is assembled on the job by nailing or screwing the individual parts to furring strips attached to the building wall. *Excellart Extrusion Division of Marsh Steel and Aluminum Company, 101 East 9th St., North Kansas City, Mo.*

CIRCLE 309 ON INQUIRY CARD



WASHROOM DISPENSER

A single stainless steel cabinet which incorporates a fluorescent light, mirror, paper towel dispenser, shelf and soap dispenser is now available in two different models, *B324*, as illustrated, and *B329*. The company's address which was incorrectly printed in the product item in the September RECORD, page 276, is as follows: *Bobrick Dispensers, Inc., 503 Rogers Ave., Brooklyn, N.Y. 11225*

CIRCLE 310 ON INQUIRY CARD

more products on page 232

"Electro-Sheet" Copper provides lasting, low-cost protection at critical points.

For durable—and economical—protection against water, moisture, vapor and wind, specify Anaconda "Electro-Sheet" Copper-Bonded products. Cheaper substitutes do not provide the same, life-of-the-building, protection.

"Electro-Sheet" is pure copper produced by electrodeposition in thin gages (½ oz. to 7 oz. per sq. ft.) and wide, continuous-length rolls. For building applications, it is bonded to high-grade papers, fabrics and asphaltic compounds. These copper-bonded materials are ideal for concealed flashing at critical areas to provide a nonrusting, lasting barrier to water seepage and moisture penetration. They are strong, flexible, easily installed, and verminproof.

Specify "Electro-Sheet" Copper-Bonded products for flashing spandrels, parapets, door and window casings, shower rooms, and similar applications. Don't gamble with less durable flashings at vulnerable, inaccessible spots. Build in that extra quality that copper offers, at little more than the cost of inferior substitutes. For complete information, mail the coupon at right. 63-1189

ANACONDA®
AMERICAN BRASS COMPANY

Anaconda American Brass Company
Ansonia Division, Ansonia, Conn. 06401

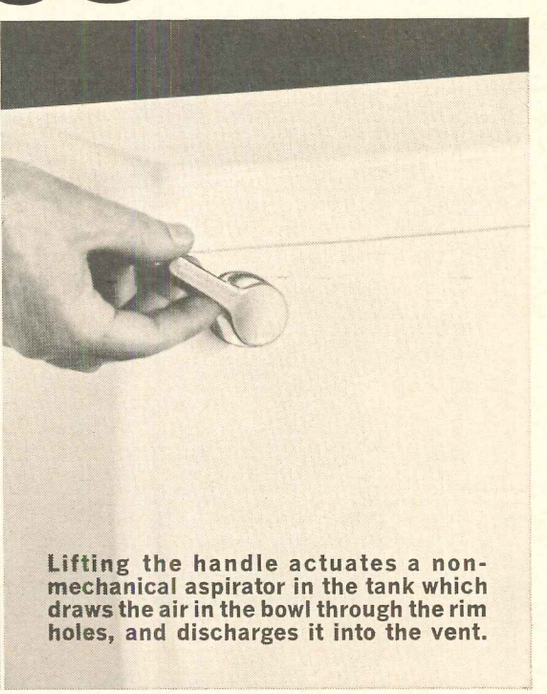
Please send me complete information on "Electro-Sheet" Copper and names of bonded-products manufacturers.

Name_____
Company_____
Address_____
City_____ State_____

For more data, circle 94 on Inquiry Card

Now American-Standard brings you the greatest toilet development since plumbing came indoors

Toilets that ventilate themselves



Lifting the handle actuates a non-mechanical aspirator in the tank which draws the air in the bowl through the rim holes, and discharges it into the vent.

THE EXCLUSIVE NEW "VENT-AWAY"* TOILET VENTILATOR IS BUILT IN FOR A LIFETIME OF SERVICE. IT HAS NO MOVING PARTS TO GET OUT OF ORDER. NOTHING TO INSTALL OR ADJUST.

Here's still another reason for specifying a modern, easy-to-maintain off-the-floor toilet from American-Standard. The unique Vent-Away is available right now on our Glenwall* and Norwall* toilets as an optional feature. Get the details from your American-Standard representative. Or write American-Standard, Plumbing and Heating Division, 40 West 40th Street, New York, New York 10018.

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AMERICAN-Standard
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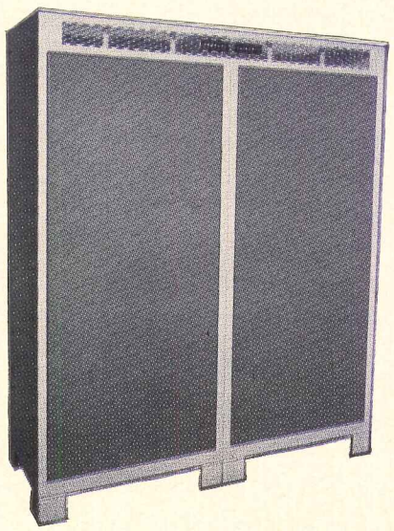
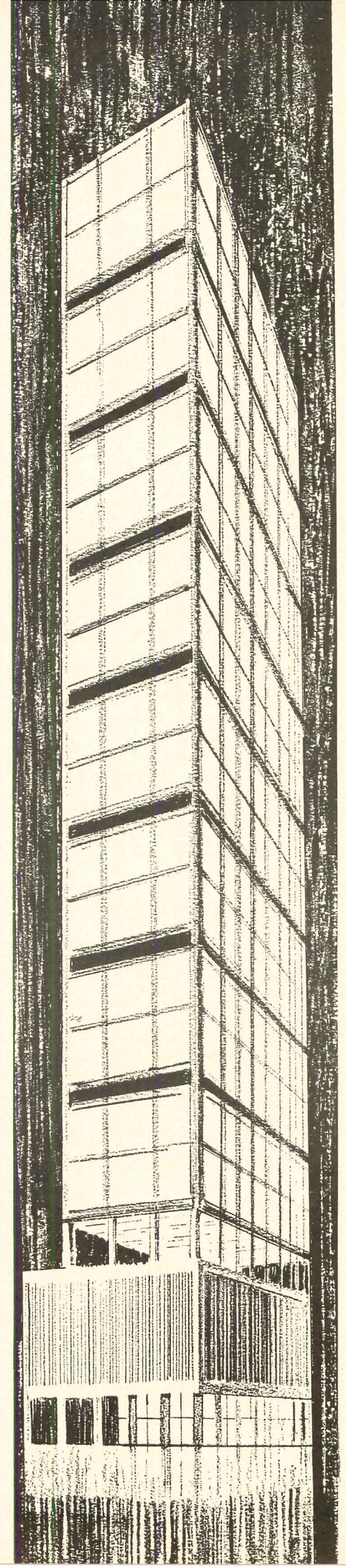
*TRADEMARKS AR&SS CORP.

For more data, circle 95 on Inquiry Card

Now available...

General Electric 3000-cycle Static Converters cut lighting costs 16%





No shadow of doubt: General Electric 3000 cycle Static Converters lighten operating costs of illuminating office buildings, factories, schools, shopping centers, department stores. With 3000-cycle fluorescent lighting systems—retaining conventional 60 cycle power as source—efficiency improvements, reduced air cooling load keep your lighting costs low.

At the higher frequency, lamps provide more light for the same dollar, generate up to 8% more lumens/watt. And improved lamp and ballast efficiency lowers heat loss to reduce air conditioning loads. For more illuminating, cost-saving information on G-E 3000-cycle Static Converters, contact your nearest G-E representative, or clip and mail the coupon below. 331-01

ANNUAL OPERATING COST COMPARISON*
Building with air conditioning at 2500 burning hours

	60 CPS	3000 CPS
Relative initial cost	100	98
Relative operating cost 1.5¢ per kwhr	100	84
Total annual cost 1.5¢ per kwhr	100	91
Total annual cost saving	9%	
Operating cost saving	16%	

* Analysis based on use of G-E F40 CW rapid start fluorescent lamps in static-type, 4-lamp luminaire. Maintenance factor and amortization rates are considered the same for both systems.

General Electric Company
Room 208, Bldg. 6
One River Road
Schenectady, N. Y. 12305

Please rush me publication GED-5256, a complete package of facts and figures on cost saving, high-efficiency 3000-cycle lighting systems using General Electric Converters and related components.

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Position_____

Address_____

State_____

GENERAL ELECTRIC

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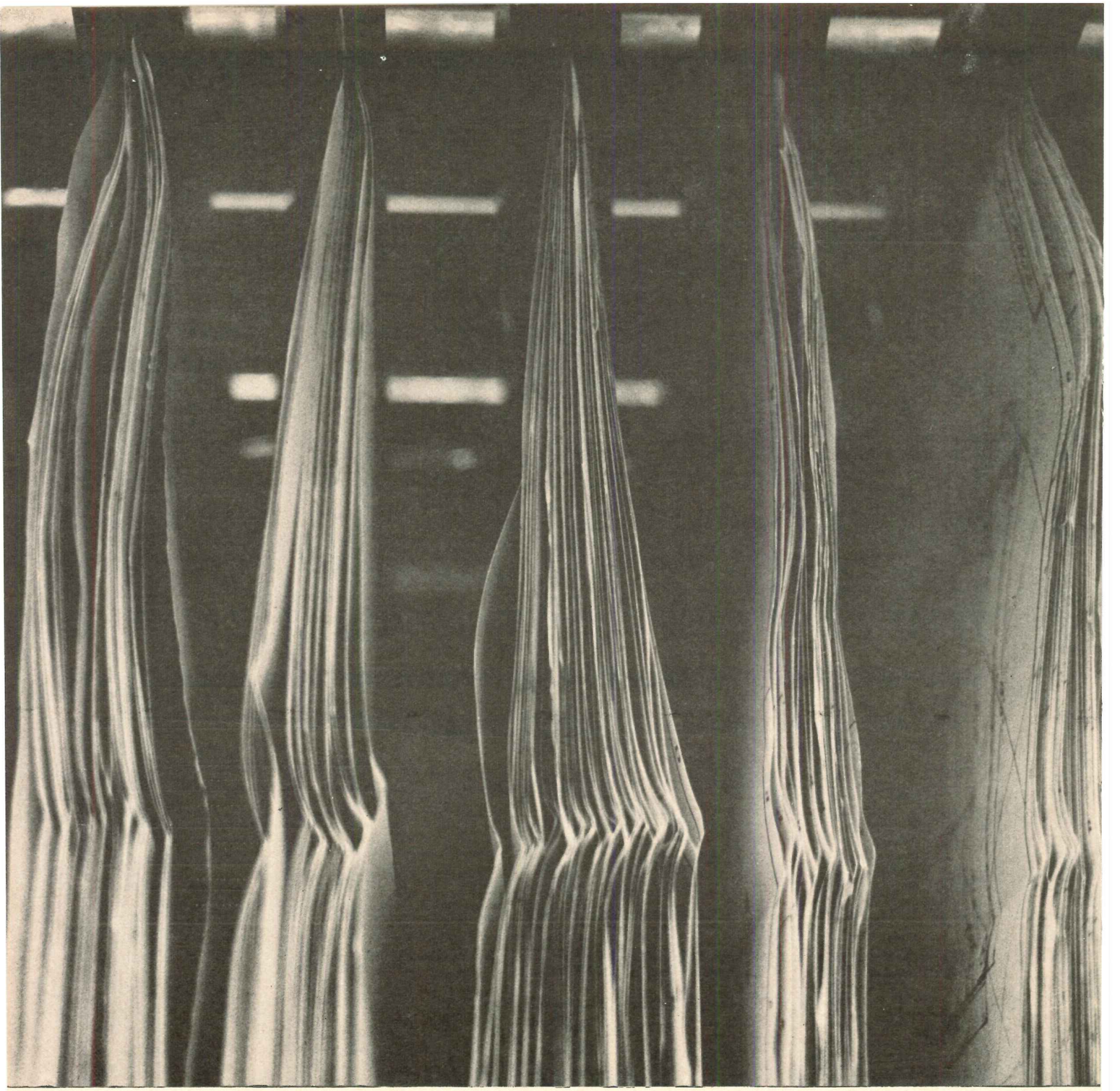

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Because no other manufacturer works with architects as closely, as competently and as completely as does American ■ We will detail a laundry planning engineer to work right with your job captain. Our man will make surveys, recommend equipment, furnish you with comprehensive floor plan drawings and specifications, supervise installation of equipment, and provide continuing service to your client long after the building is completed ■ So, when your building project includes a laundry—be sure to include American Laundry Machinery Industries in your project. Call one of our nearby representatives or offices (see the Yellow Pages) or write for complete information.

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Custom-glazed on the job!

When colored brick would have cost too much, an Aroflint-based coating system solved the problem.

Original plans called for both the white brick and the protruding decorative brick to be kiln-glazed. But the cost of a small quantity of colored brick on a special-order basis was prohibitive. So the brilliant green glaze was applied *on the job!*

Glazing was done with an Aroflint-based coating system. Bricks were dipped on the job, racked until dry, and then laid up in the decorative pattern. When the photo was taken eight months later, the Aroflint-based coating was still bright, clear and intact . . . as it will be several years from now.

Aroflint-based coatings are the advanced new way to surface-coat concrete, wood, brick or metal . . . for exterior or interior use. You get the beauty of glazed materials with possible savings up to $2 per square foot. Aroflint coatings are highly resistant to wear. Dirt does not cling, marks and stains clean off easily. Write for full particulars on this exciting new creative medium for the architect.

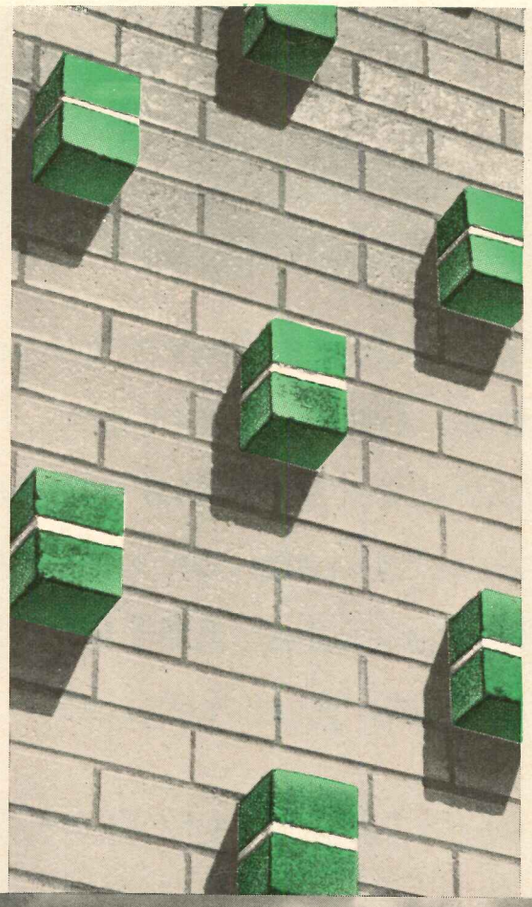
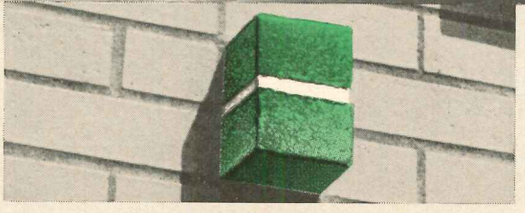


Photo courtesy KIII-TV, Corpus Christi, Texas, and the Briner Paint Manufacturing Company.

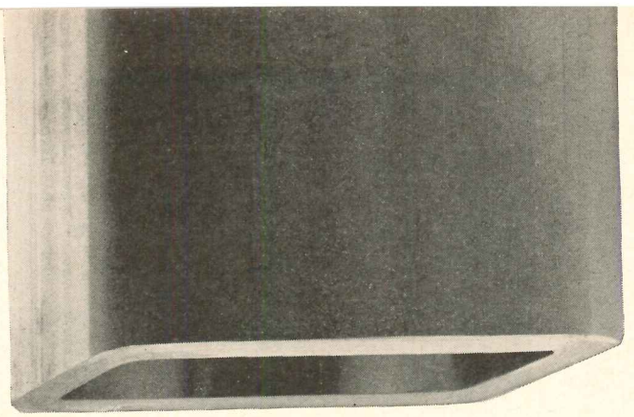


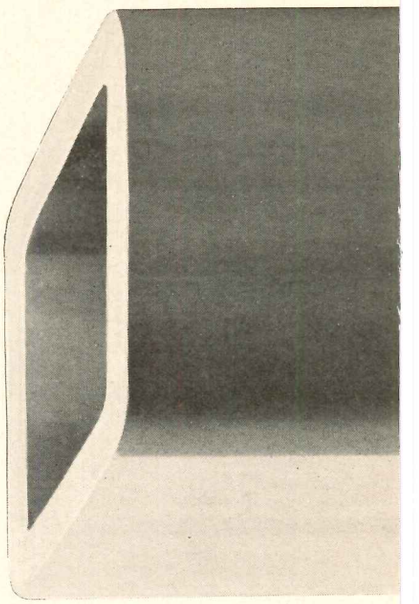
ADM CHEMICALS

ARCHER DANIELS MIDLAND COMPANY, 733 MARQUETTE AVENUE, DEPT. 38, MINNEAPOLIS, MINNESOTA 55440

R-3

For more data, circle 98 on Inquiry Card





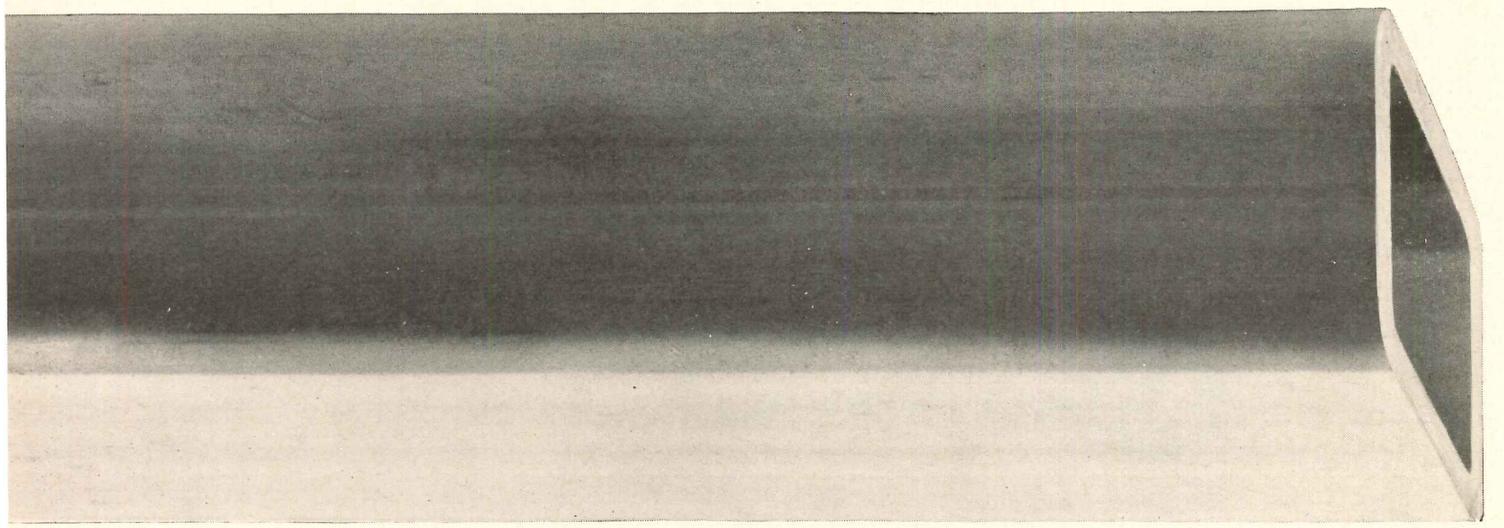
You don't have to wait one day to order structural steel tubing that meets or exceeds the brand-new ASTM Specification A-500 just issued

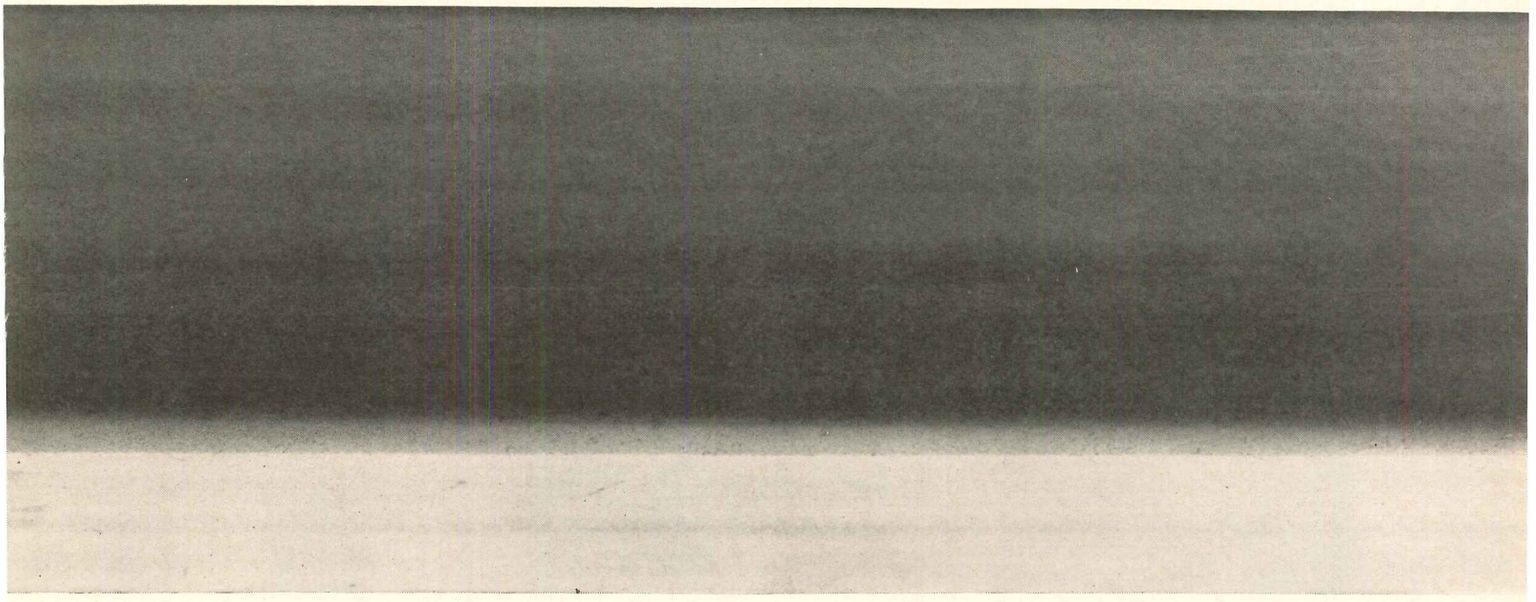
REPUBLIC'S ELECTRUNITE *STRUCTURAL STEEL TUBING*

And it was true even *before* the new specification was published. Actually, ever since early 1962, Republic has been producing ELECTRUNITE® Structural Steel Tubing to its own specifications—which, with one exception, met or exceeded the *new* ASTM Specifications. Now, *all* specifications are met or surpassed.

Two and a half years ago, Republic proved with ELECTRUNITE that the yield strength of structural steel tubing could be increased 36% and put into practical applications never before considered possible. At that time, Republic published its own specifications for this new higher strength tubing. This was the first specification ever issued specifically for structural steel tubing by or for the industry.

Since then, ELECTRUNITE has proved its advantages the hard way in more and more building applications.





ALREADY DOES IT!

With ELECTRUNITE Tubular Steel:

- You'll cut conventional building weight one-third.
- You'll spend less to get more than enough strength in columns, posts, lintels, spandrels, and other structurals.
- Lighter framework allows lighter footings and foundations.
- Provides one-third thinner walls for increased usable floor space.
- Off site fabrication is another cost saver.
- Welding and mechanical joining can be done with a choice of techniques.
- Flat sides of square or rectangular ELECTRUNITE simplifies fitting of masonry, glass, curtain wall sections.
- Smooth, defect-free finish contributes to building appearance in exposed areas, interior or exterior. Can be easily painted.
- Offers a strength-to-weight ratio unsurpassed by any structural steel tubing on the market.

Mail coupon for full information, found in Republic's booklet, "ELECTRUNITE Steel Tubing for Structural Use."

ASTM A-500 SPECIFICATION FOR CARBON STEEL STRUCTURAL TUBING

ROUND STRUCTURAL TUBING

	Grade A	Grade B
Tensile strength, min, psi	45,000	58,000
Yield point, min, psi	33,000	42,000
Elongation in 2 in, min, percent	25[a]	23[b]

SHAPED STRUCTURAL TUBING

Tensile strength, min, psi	45,000	58,000
Yield point, min, psi	39,000	46,000
Elongation in 2 in, min, percent	25[a]	23[b]

(a) Applies to specified wall thicknesses 0.120 in. and over. For wall thicknesses under 0.120 in., the minimum elongation shall be calculated by the formula: percent elongation in 2 in. = $56t + 17.5$.

(b) Applies to specified wall thicknesses 0.180 in. and over. For wall thicknesses under 0.180 in., the minimum elongation shall be calculated by the formula: percent elongation in 2 in. = $61t + 12$.

REPUBLIC STEEL
STEEL AND TUBES DIVISION
CLEVELAND, OHIO 44108

For more data, circle 99 on Inquiry Card

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • DEPT. 8548
201 EAST 131st STREET • CLEVELAND, OHIO 44108

Please send me a copy of Republic's booklet, "ELECTRUNITE Steel Tubing for Structural Use."

Name_____ Title_____

Company_____

Address_____

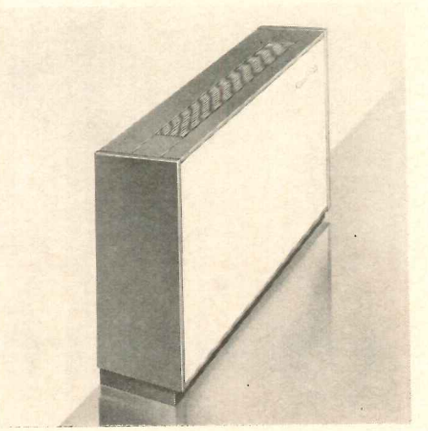
City_____ State_____ Zip_____

Product Reports

continued from page 224

PACKAGED AIR CONDITIONER

A year-round air-conditioning system that is suitable for installation in new buildings or existing structures has just been introduced. The *Nesbitt Roommate pkg* is a quiet operating, self-contained unit, which provides heating and cooling on a room by room basis, and is suitable for offices, motels, apartments and any buildings where individual environmental



control is desirable. The modular construction makes it possible to install the unit for immediate operation. *ITT Nesbitt Inc., State Rd. and Rhawn St., Philadelphia, Pa., 19136*

CIRCLE 311 ON INQUIRY CARD

TOILET VENTILATOR

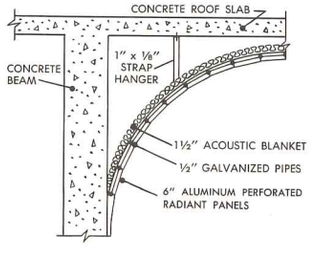
A built in toilet ventilator which removes bowl odors immediately has been introduced by American Standard's Plumbing and Heating Division. Called *Vent-Away*, the new device operates in the toilet tank, is non-corrosive and has no moving parts. The ventilator operates on the venturi principle; water falls in a tube inside the tank, creating air suction behind it. Odors are drawn through rim punchings in the bowl and are carried with this water to the normal discharge outlet. Lifting the regular trip lever on the tank activates the ventilator. Ventilating action stops when the lever is depressed for flushing. At the end of the flush cycle the lever returns to its normal position. *American Standard, Plumbing and Heating Division, 40 West 40th St., New York, N.Y., 10018*

CIRCLE 312 ON INQUIRY CARD

Architects: Shepley, Bulfinch, Richardson & Abbott, Boston, Mass.; Engineers: Richard D. Kimball Co., Boston, Mass.; Gen. Contractor: John A. Volpe Construction Co., Malden, Mass.; Radiant Ceiling Dist.: Pitcher & Co., Cambridge, Mass.

AN INLAND RADIANT CEILING WAS THE ONLY ANSWER

Heating and Cooling this attractive dormitory reception room at Northeastern University, Boston, presented a dual problem: (1) How to heat and cool an area with seven vaults comprising the ceiling — and with outside glass walls measuring approximately 24 feet from floor to ceiling; (2) How to install mechanical equipment without breaking the contour of the vaults. ■ A Burgess-Manning/Inland Radiant-Acoustic Ceiling fulfilled the architect's requirements while providing year 'round comfort. The ceiling heats like the sun, cools without drafts, helps to control noise levels. It takes less space, eliminates much conventional equipment and permits wide design flexibility. For more details, see Sweet's, section 11e/In; or write for Catalog 250.



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EP-42

"The X-ray department is an ancillary facility"

SIR, THAT IDEA IS AS OLD-FASHIONED AS YOUR HIGH-BUTTON SHOES

Nothing ancillary — or subservient — about x-ray these days. Hospital administrators and architects *know* how important full x-ray facilities are to the functioning of the modern hospital. G. E. knows, too. For more than fifty years, from open high-tension overhead equipment to today's complex electronic apparatus, Installation Planning Service has been analyzing, planning and preparing floor plans that properly utilize space and make x-ray equipment and supporting facilities a more profitable hospital function. This wealth of experience is at *your* service when you contact General Electric. There's no cost or obligation, of course.

Progress Is Our Most Important Product

GENERAL ELECTRIC

X-RAY DEPARTMENT • MILWAUKEE, WIS. 53201

Logical first step in planning new facilities is to contact your local G-E representative who will help determine your specific needs. Installation Planning Service then takes over to consider such important details as plumbing, power, wiring and protective requirements. Call the G-E office nearest you. It's listed under "X-Ray" in the Yellow Pages.

For more data, circle 102 on Inquiry Card

Discover the ease of leasing your personal car through FALS

If you're considering leasing your personal car, see your local FALS Dealer. He can provide you the Ford of your choice, equipped the way you want it.

When you lease, instead of buy, you have no down payment . . . no trade-in problems. Your FALS Dealer will help you dispose of your present car . . . take back your leased car at the end of the lease.

Just pick the car and equipment you want and how long the lease is to run. Your FALS Dealer will then provide the car at a low monthly rate. Insurance and various maintenance plans can be included in your lease at a small additional charge.

Discover the ease and other benefits of leasing a new Ford through FALS. Fill out and return the above post-paid card.

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For more data, circle 103 on Inquiry Card

USS HOLLOW STRUCTURALS LET YOU SEE BETTER

Two racing "firsts" make The Meadows (near Washington, Pa.) the most avant-garde harness racetrack in the world: a synthetic track surface guarantees "all-weather" racing; and giant windows framed with USS Hollow Structural Tubing permit a virtually unobstructed view from each of the 600 clubhouse seats.

Because hollow structurals resist bending forces in all directions, they are more structurally efficient than conventional shapes, permitting slimmer framing. Hollow structurals were used for columns, mullions, and muntons. Placement of the glass is simplified by the attachment of glazing stops directly to the structural mullions. For The Meadows, hollow structurals actually cost less than conventional shapes because less labor as well as less steel was required.

Hollow structurals also helped the architect accommodate varying heavy wind loading against the cantilevered clubhouse roof. Tubular mullions were left open at the top and sleeved to steel roof members with plug inserts. As a result, the entire roof overhang "gives" up to 1¾ inches each way, depending on severity of wind loading.

USS Hollow Structural Tubing is one of the most versatile shapes available. They don't have to be boxed in; they're attractive exposed and painted. Besides being used as posts, beams, columns, rafters, and mullions, hollow structurals can also double as conduit and drain housing.

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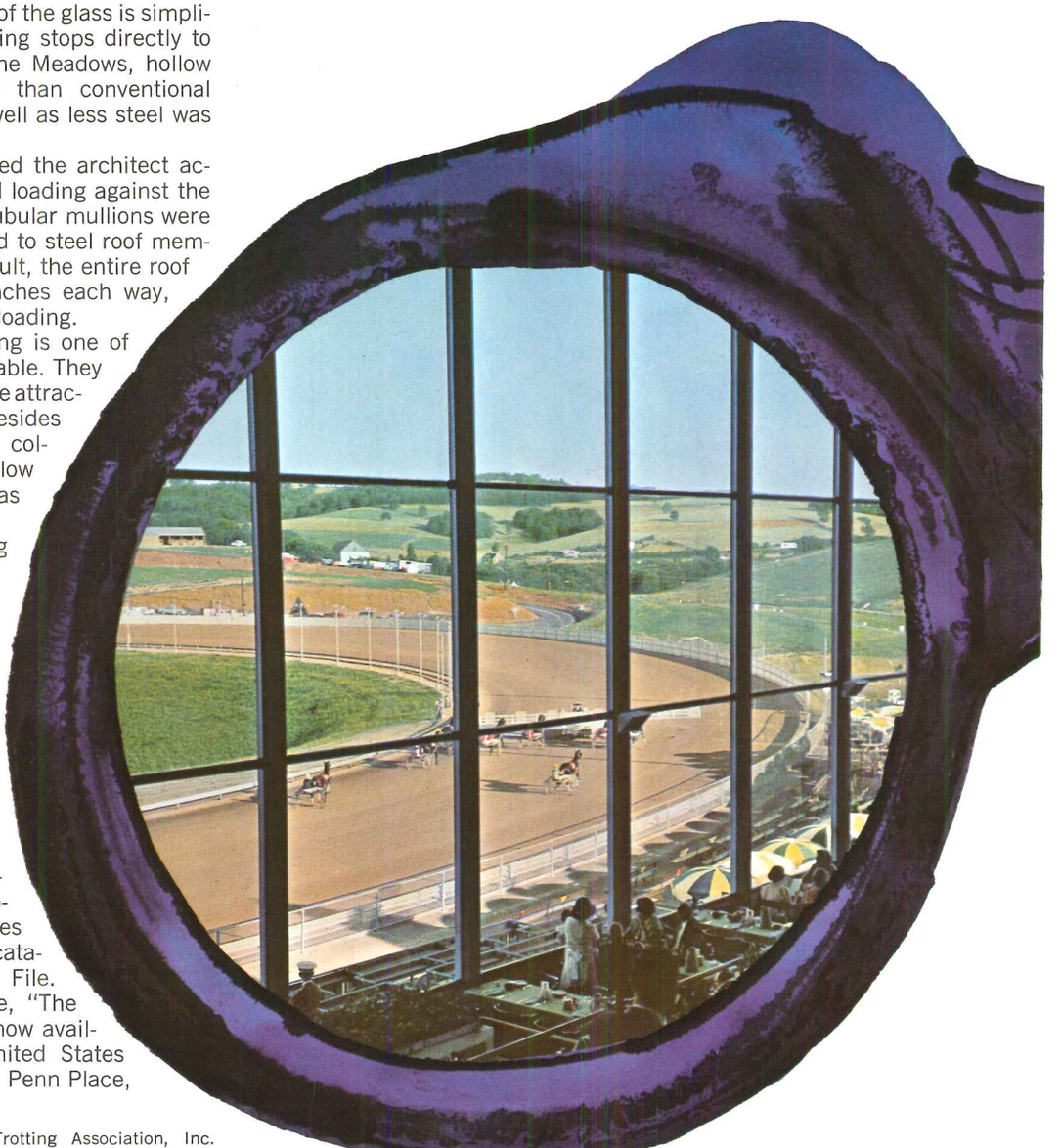
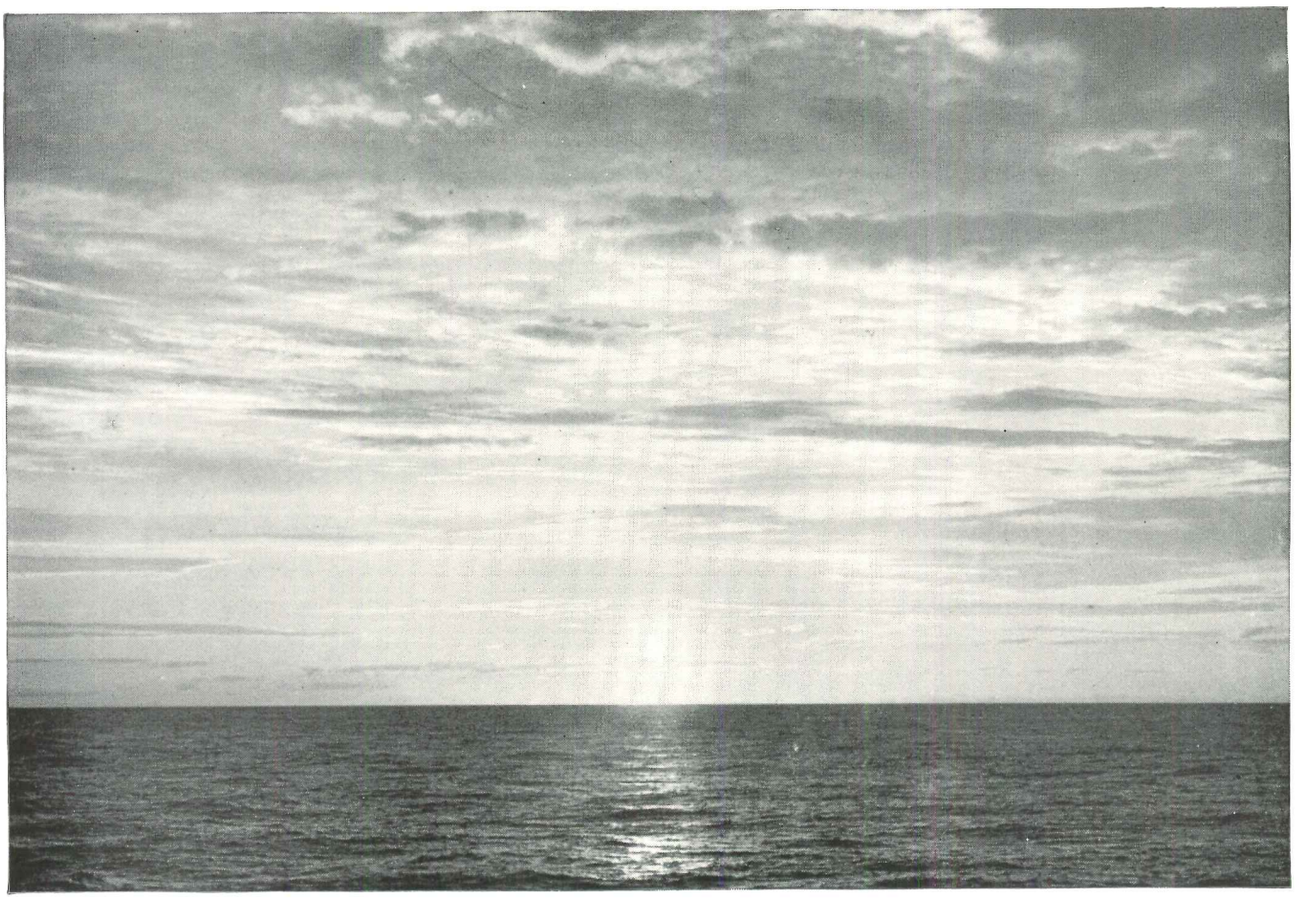
For more information contact the USS Construction Representative at our District Sales Office nearest you, or see our catalog in Sweet's Architectural File. (Also, a new 22-minute movie, "The Shape of Things to Come," is now available upon request.) Write United States Steel, Room 7788, 525 William Penn Place, Pittsburgh, Pa. 15230.



The Meadows—Owner: Washington Trotting Association, Inc. Architects: Thayer-Menges & Associates, New Castle, Pa. Fabricated and erected by American Bridge Division of U. S. Steel.

USS United States Steel

TRADEMARK



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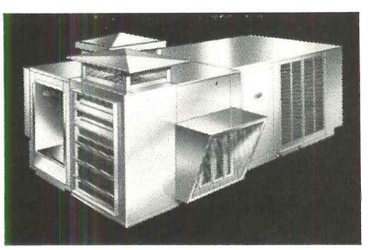

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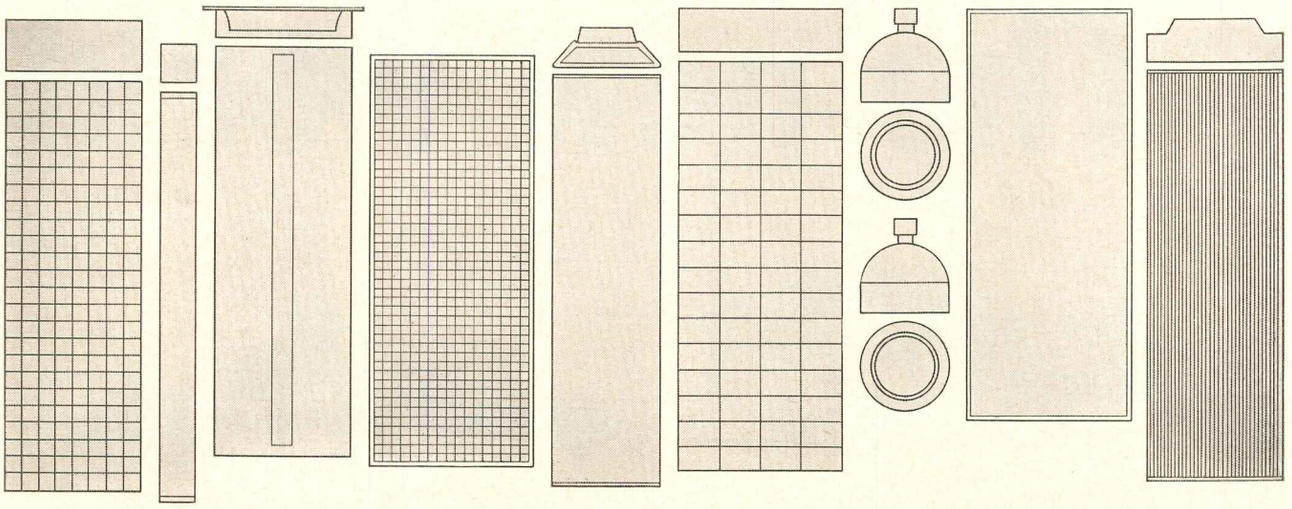

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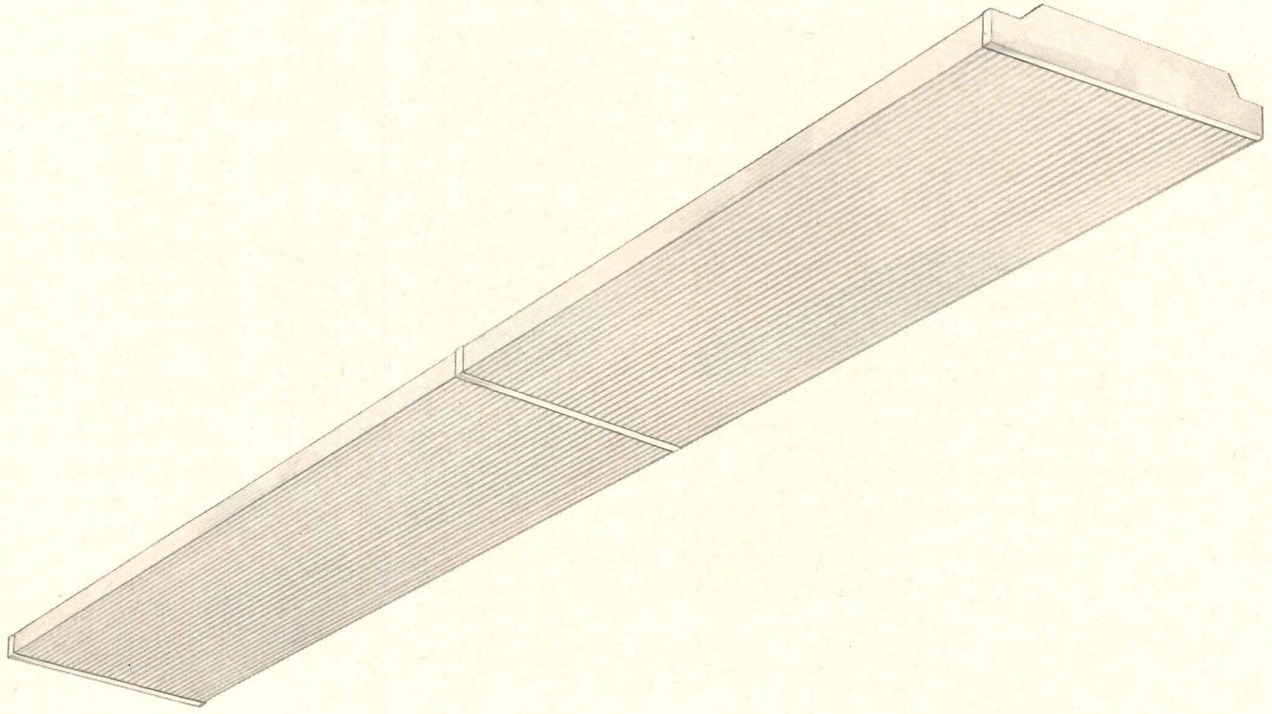

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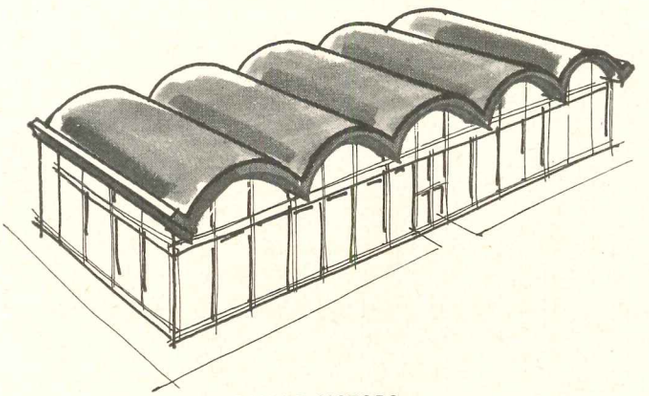
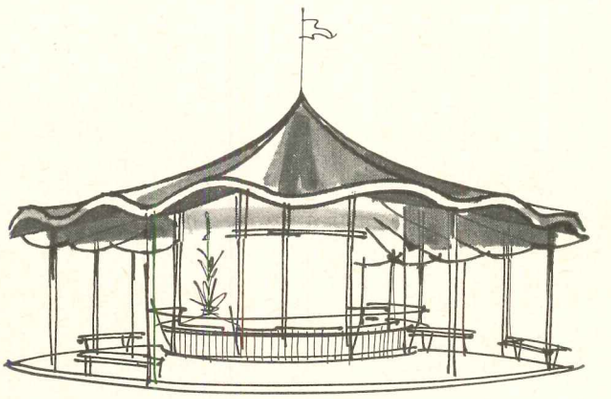
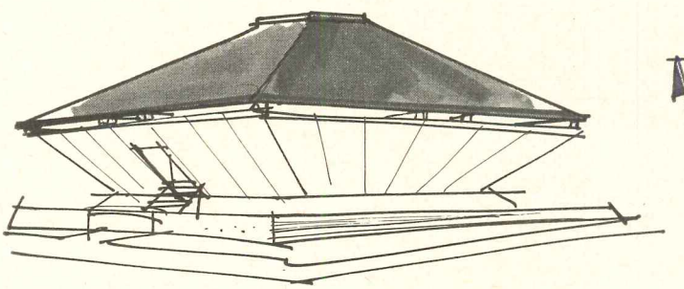


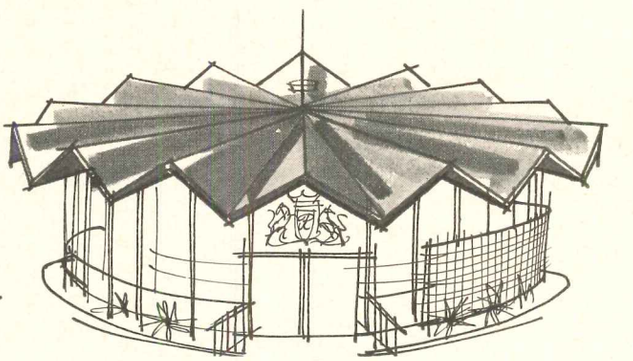
RANKIN MOTORS
London, Ontario
Arch.: Blackwell, Hagarty and Buist



TROPICAL BIRD HOUSE
Edmonton, Alberta
Arch : City of Edmonton Engineering Department



CHAMBER OF DEPUTIES
Campeche, Mexico
Arch.: Ing. Hernan Perez Vega



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ROTHMANS OF PALL MALL
Sydney, Australia
Arch.: Brewster, Murray & Partners

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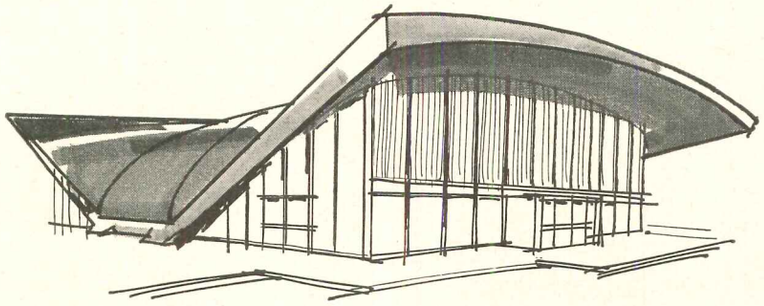
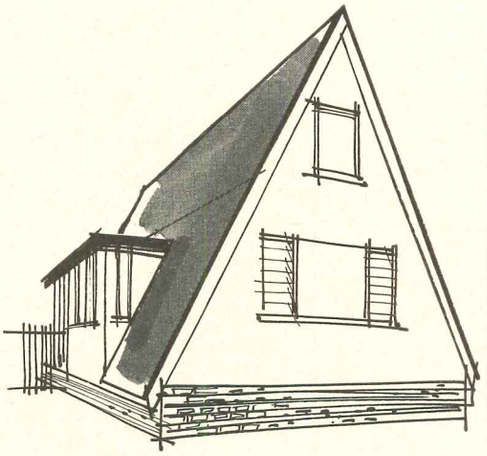
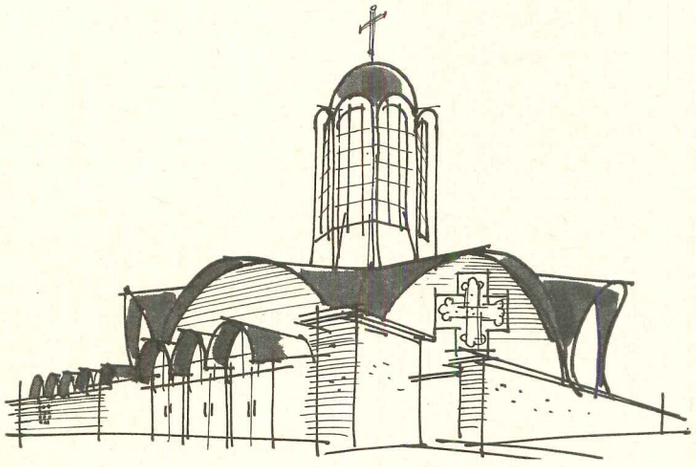


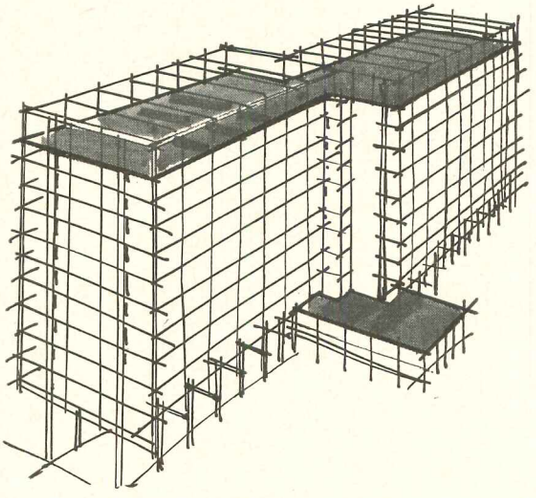
SCHOOL OF ARCHITECTS
Lausanne University, Switzerland
Arch.: Professor Jean Tschumi



RESIDENCE AND STUDIO
Winchester, England
Arch.: Peter Jones



GREEK ORTHODOX CHURCH
Seattle, Washington
Arch.: Paul Thiry



KAHALA HILTON HOTEL
Honolulu, Hawaii
Arch.: Killingsworth, Brady, Smith & Associates

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For more data, circle 107 on Inquiry Card

Office Literature

continued from page 188

WALL DIFFUSERS

Agitair DQM type wall diffusers are described in a recent brochure. Notes are given on construction and selection procedure. Tables and charts are included to show performance level. *Air Devices, Inc., 185 Madison Ave., New York, N.Y., 00016*

CIRCLE 409 ON INQUIRY CARD

FLUORESCENT LAMP BALLASTS

The 1964-1965 catalog contains details of 31 new and revised ballasts as well as more than 200 existing units, designed for indoor and outdoor commercial, industrial and residential applications. Physical and electrical characteristics for each type of ballast are given in tabular form. *Universal Manufacturing Corp., 29-51 East 6th St., Paterson, N.J.*

CIRCLE 410 ON INQUIRY CARD

ELASTOMERIC ROOFING AND FLASHING

Two new four-page catalogs give details of the company's *Gaco flex* elastomeric flashing, membraning and roofing systems. The booklets contain photos of buildings on which these systems have been used. Specifications are included as well as diagrammatic drawings and notes on application. *Gates Engineering Division of the Glidden Company, 100 South West St., Wilmington 99, Del., 19899* *

CIRCLE 411 ON INQUIRY CARD

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A 22-page brochure describes the *INCO* line of adhesives, sealants, compounds, finishes and coatings. How *INCO* products are made and their application in specific industries are discussed in detail in the brochure. A section is included for the inclusion of individual product data sheets, which are available from the company on request. *Intercoastal Corp., Dept. 5207, Baltimore, Md., 21222*

CIRCLE 412 ON INQUIRY CARD

COMPOSITE FLOOR SYSTEMS

Holorib composite beam, composite slab and electrified reinforcing form floor systems are comprehensively described in a 20-page brochure. Design procedure, calculations and details of load carrying capacity and fire resistance are included in the booklet, as well as illustrations of buildings in which these systems have been used. *Fenestra, Inc., Architectural Products Division, 220 Delaware Ave., P.O. Box 1085, Buffalo, N.Y., 14240* *

CIRCLE 413 ON INQUIRY CARD

ALUMINUM ACCESS DOORS

A four-page catalog features the *Newman* line of aluminum access doors, which are designed to provide easy access through walls and to service points, valves and controls. The different types of door are illustrated and installation details are given. Dimensions, specifications and a list of distributors are also included in the brochure. *Newman Brothers, Inc., 5609 Center Hill Ave., Cincinnati, Ohio, 45216**

CIRCLE 414 ON INQUIRY CARD

**Additional product information in Sweet's Architectural File*

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S *See our catalog in Sweets.*

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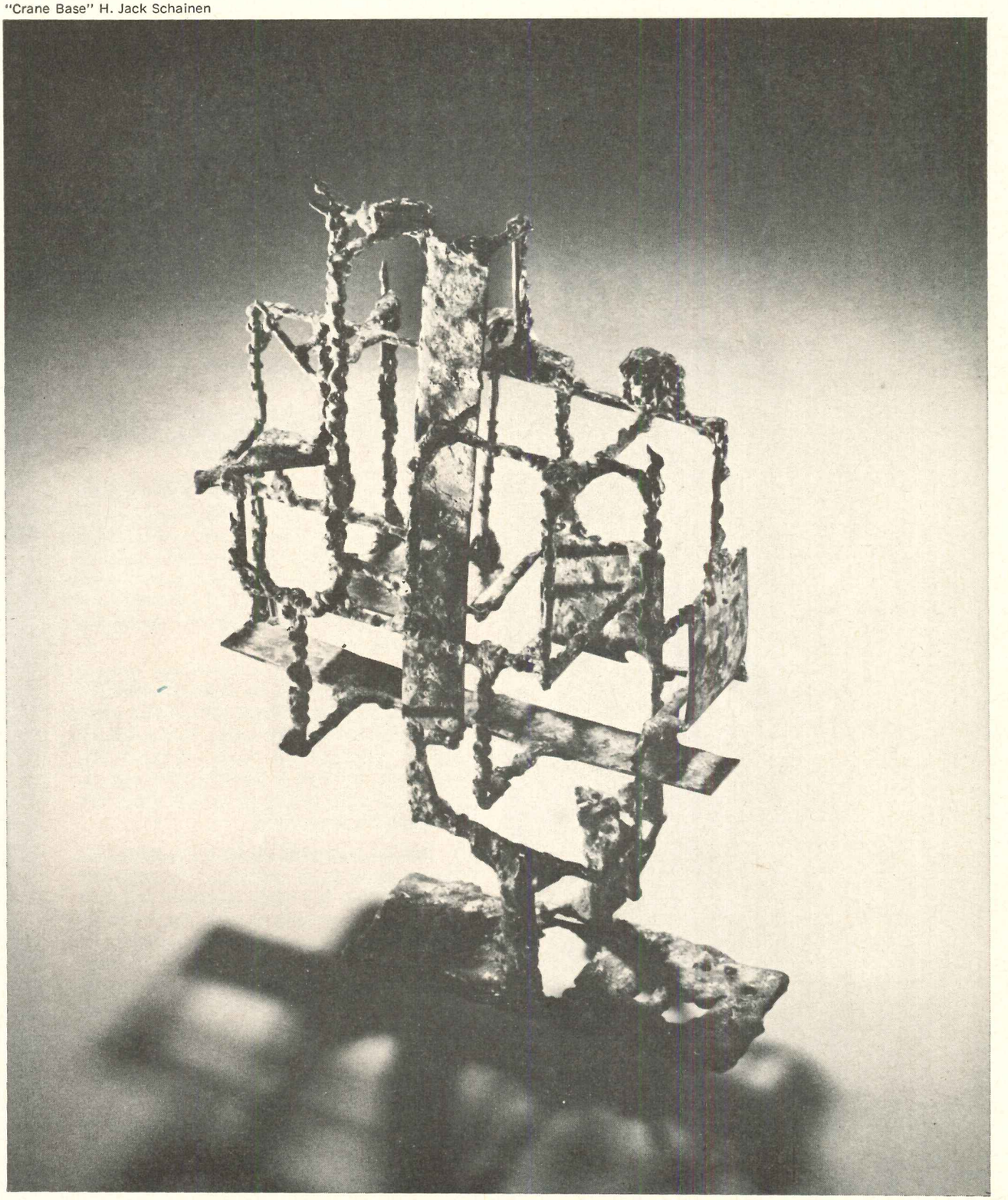

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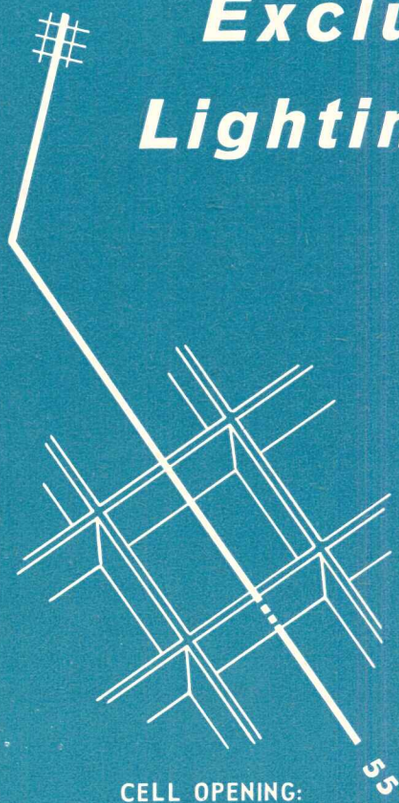

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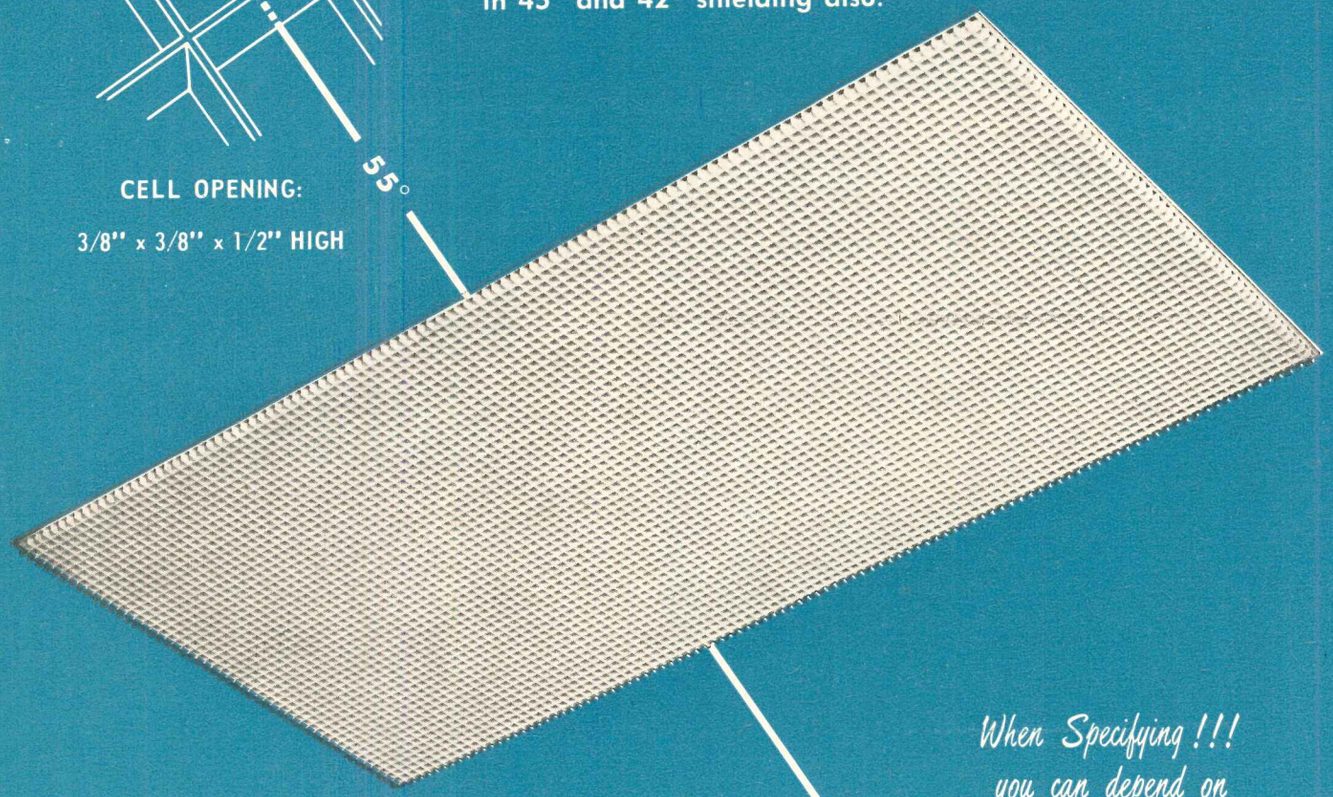

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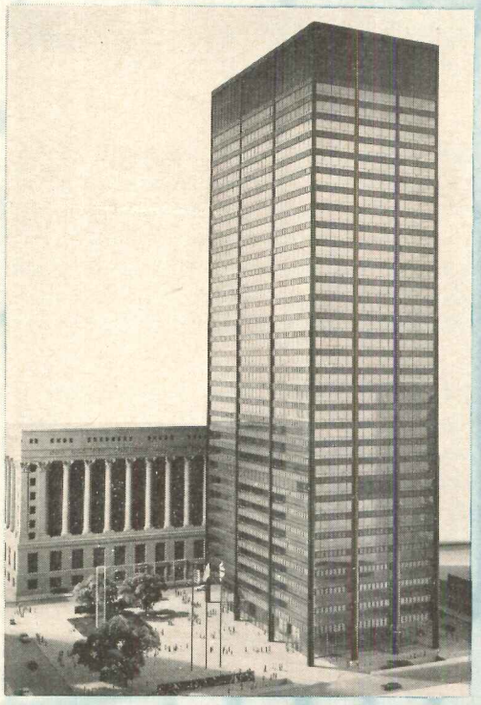

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COLD STORAGE DOORS

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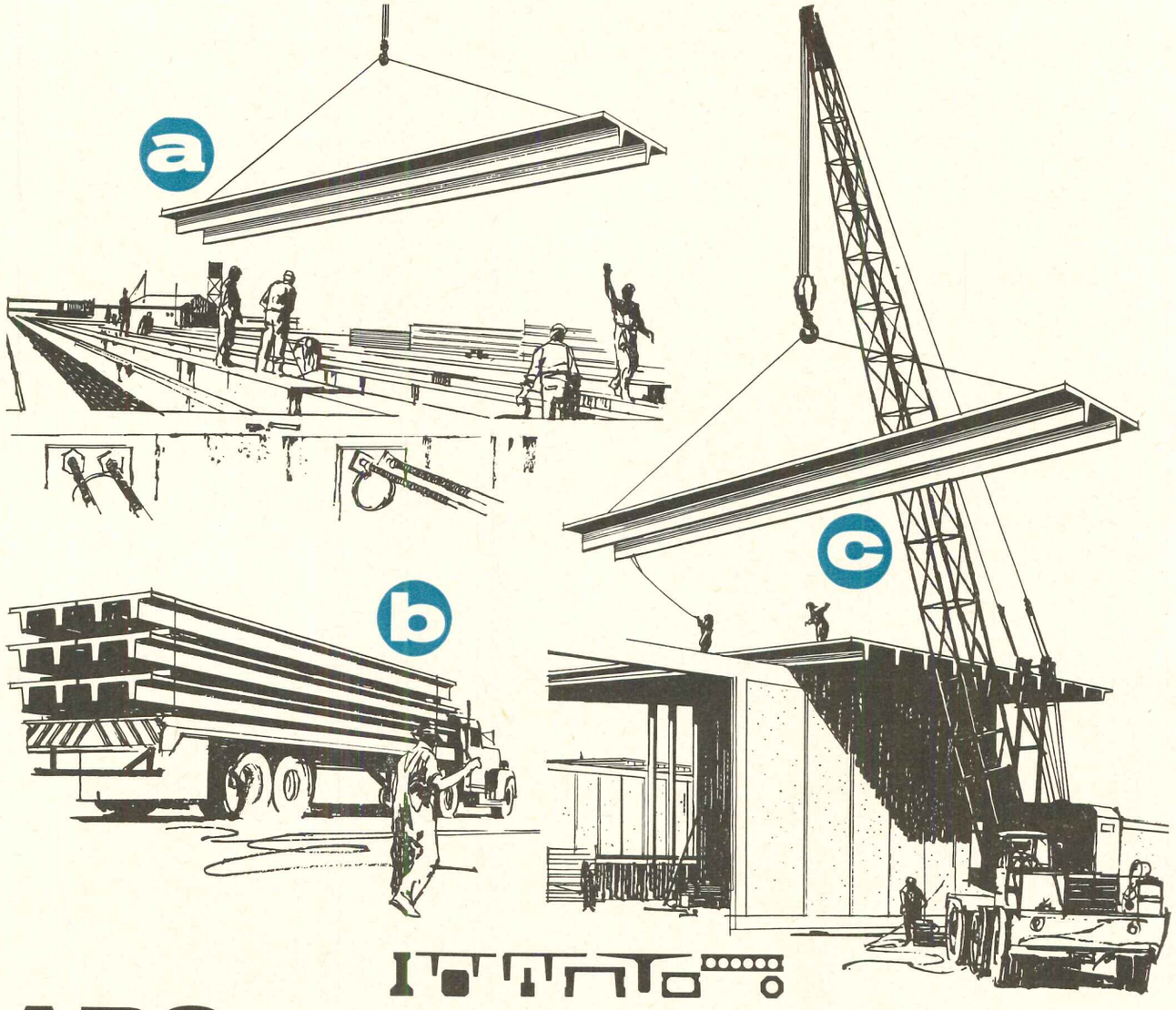

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"Future by Design"

continued from page 23

the past, we have had too little of any of these," said Lyle C. Fitch, president of the Institute of Public Administration.

According to Roger Starr, executive director of the Citizens' Housing and Planning Council of New York, Inc., the city is capable of planning for itself as far as the competency of its staff is concerned. The problem, he thinks, is political because "planning revolves primarily about that peculiar value judgement which for people professionally occupied in politics is the most difficult of all to make, the question of which is more important, the present or the future. In most cases planning involves the sacrifice of present interests to those of the future."

Also on this panel were Wilfred Owen, economist and author at the Brookings Institution, and Allan Temko, a member of the Center for Planning and Development Research at the University of California.

In the third panel discussion, entitled "Determining Priorities For New York City," Charles Abrams, housing consultant and author, summed up the priorities for housing. He feels that public housing expansion should take place on vacant or underdeveloped land in order to minimize evictions. Also there should be "rental subsidies which will enable low income families to enter good housing of their own choosing, whether publicly or privately owned."

Henry Fagin, professor of planning at the University of Wisconsin, conceives of a basic new form concept in the development of transportation in New York City, and gives it top priority. In this concept "the city's design should aim consistently to separate moving streams of transportation, whether on foot, by bicycle, or by auto, taxi or bus. . . . It will integrate transportation into the architecture of the city in the way pioneered by the Grand Central Terminal."

William H. Whyte Jr., consultant on urban affairs and author of the recently published "Cluster Developments," makes two main points in assigning priorities to development of open space in New York City. He thinks that a shift of emphasis in our approach to open space is needed—a shift from thinking in terms of gross acreage and absolute cost to thinking in terms of the effect of open space. Secondly, we must seek "a much greater recognition of the user benefits aspect side of the equation."

Also on this panel were Martin Cherkasky, M.D., director of Montefiore Hospital; James R. Dumpson, commissioner of welfare, New York City; Eli Ginzberg, professor of economics at Columbia University; and Dick Netzer, professor of public finance at New York University.

Jean Gottmann, author of "Megalopolis," gave an "interpretive summary," of the proceedings and noted that the problem of political concern —the conflict between the needs and means of the individual and the needs of the community—were an underlying factor in many of the discussions. He thinks that a great deal of political change, both new institutions and new relationships of present institutions, is needed in New York if planning is to be effective.

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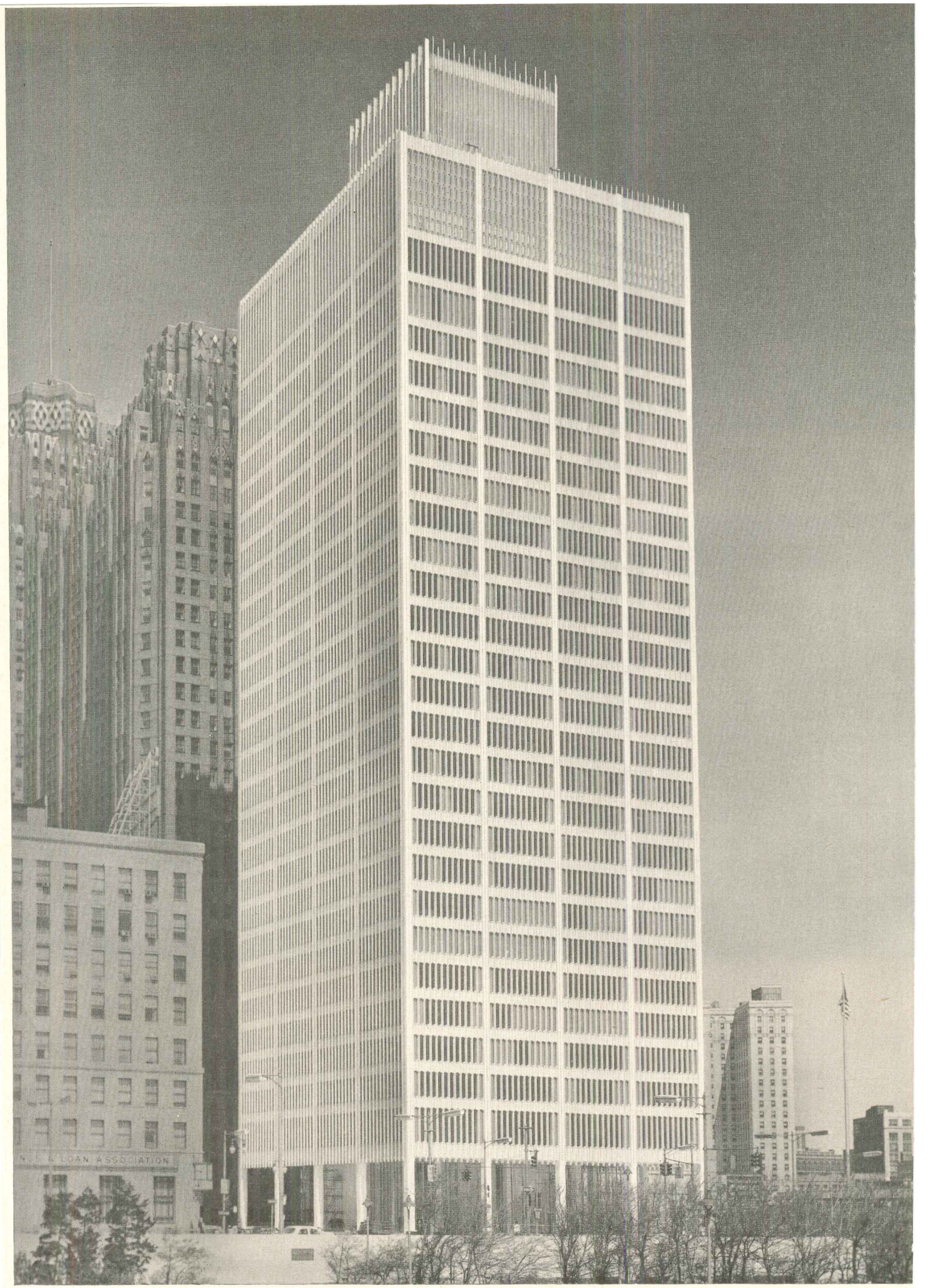
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some feats are impossible without steel

Steel has the most favorable strength-weight-cost combination of any building material. Because of its strength, flexibility of fabrication methods, and wide range of available structural shapes, steel makes possible esthetic and space-saving achievements unattainable with other materials. Steel can be designed as a beam, rigid frame, continuously, compositely, plastically, orthotropically. Steel can be erected in any season, can be handled more roughly than other material. Because there are so many grades of structural steel of varying strength levels, it is never necessary to over-design.

Only steel columns could bear the load. The 30-story Michigan Consolidated Gas Company Building in Detroit is the world's tallest all-welded building for a reason: integrated architectural design prohibited use of columns larger than 2 ft., 4 inches square. Reinforced concrete columns that size couldn't carry the required 6½ million pounds. Connections were welded to eliminate bulkiness and achieve smooth right angles between beams and columns. Heavy columns for lower stories are four plates welded into a rectangular box section. Where extra strength was needed a fifth interior plate was added. Lighter upper columns are regular rolled sections. The field-welded wind-resisting system contains the equivalent of 40 miles of 5/16-inch fillet welds. American Bridge Division fabricated and erected 5,700 tons of steel, inspected welds by radiographic and dry powder magnetic particle techniques. Architects: Minoru Yamasaki—Smith, Hinchman & Grylls, Associated Architects & Engineers. Contractor: Bryant & Detwiler Co.

Steel dome saves Syracuse University $193,500. Fabricated and erected by American Bridge, the low-profile dome of the Syracuse University field house has a rise of only 32 ft. and a diameter of 300 ft. Because there are no interior supports, all of the 80,000-sq.-ft. floor is usable. Seating capacity is over 4,000 with room enough for basketball, track and field meets, or a 70-yd. football practice field. There are over 700 tons of structural steel in the dome and canopy. In a competitive bid with the alternate concrete design, steel saved $193,-500. Architect: King and King. Engineer: Eckerlin and Kleper. Contractor: R. A. Culotti Construction Company.

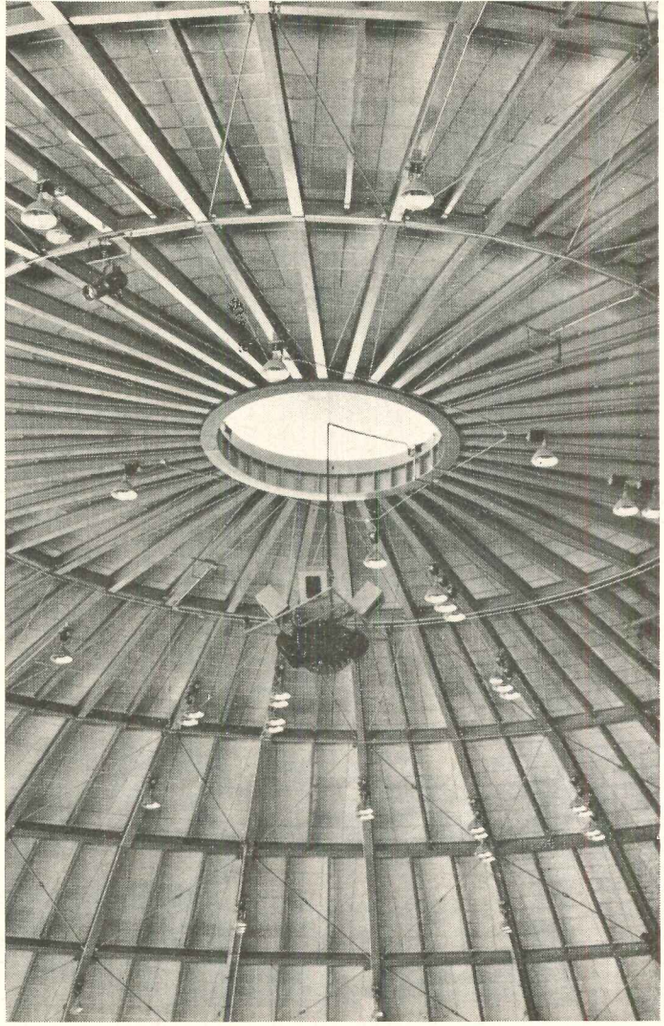
High-rise truss walls—now possible with unique design and the "combination of steels." Through a new building design concept using four different steels of varying strengths, designers trimmed 200 tons of steel (and saved $300,000) from the skeleton of Pittsburgh's IBM Building, first high-rise building with truss walls. External framework is a diagonal, criss-crossing truss system. Only interior vertical supports are the six columns of the central service core. Outer truss walls direct all wind, wall and most floor loads down to two ground contacts on each side of the building. Using different strength steels (from 33,000 to 100,000 psi) engineers accommodated stress levels much as bridge designers have done in the past. This principle also kept truss members a near-uniform size from top to bottom regardless of stresses, and permitted American Bridge use of time-saving modular fabrication and erection.

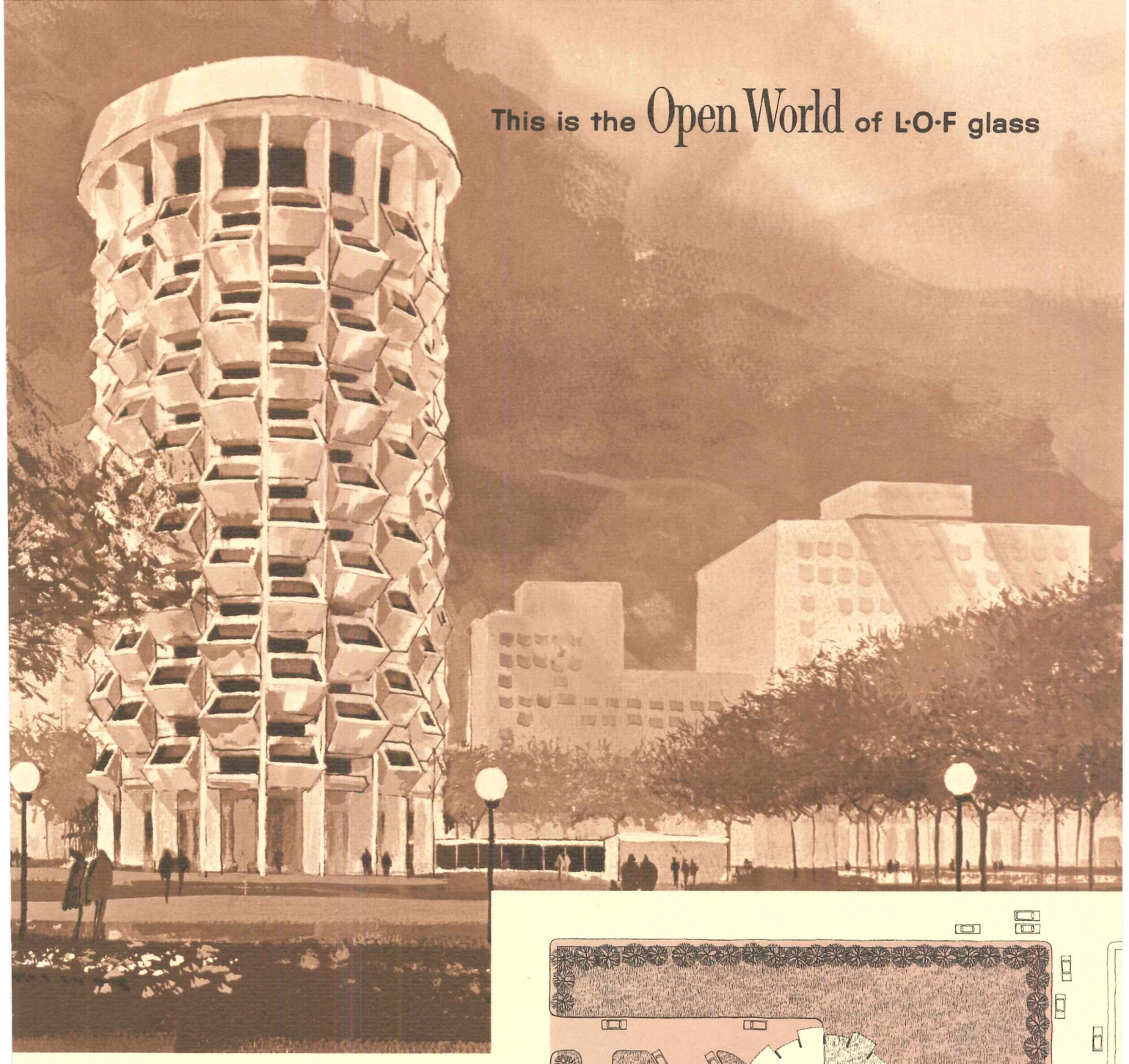
Truss walls form the facade, eliminating spandrels and independent curtain wall system. Diagonals were fireproofed with asbestos plaster and sheathed in 22-gauge stainless steel. Architect: Curtis and Davis Associates. Engineer: Worthington, Skilling, Helle & Jackson. Contractor: George A. Fuller Company.

General Offices: 525 William Penn Place, Pittsburgh, Pa. Contracting Offices in: Ambridge • Atlanta • Bakersfield • Baltimore • Birmingham • Boston • Chicago Cincinnati • Cleveland • Dallas • Denver Detroit • Elmira • Fresno • Gary • Harrisburg, Pa. • Houston • Los Angeles • Minneapolis • New York • Orange, Texas Philadelphia • Phoenix • Pittsburgh Portland, Ore. • Roanoke • St. Louis South San Francisco • United States Steel International, Inc., New York

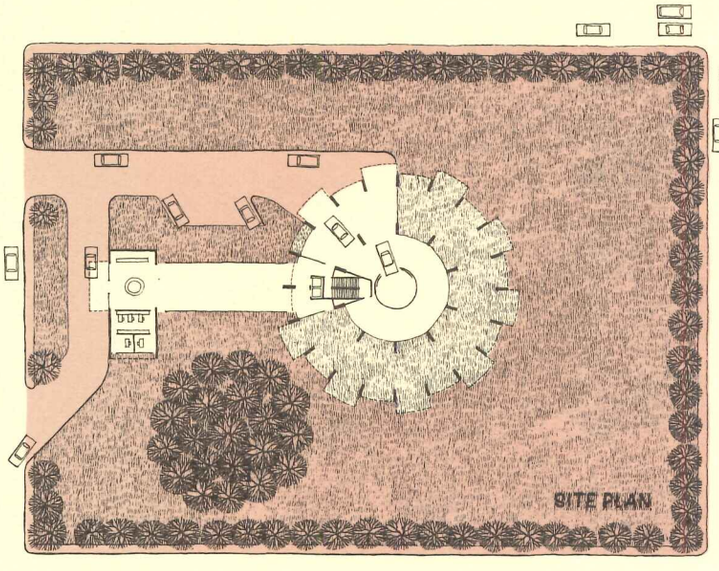
American Bridge Division of United States Steel

USS TRADEMARK





This is the Open World of L·O·F glass



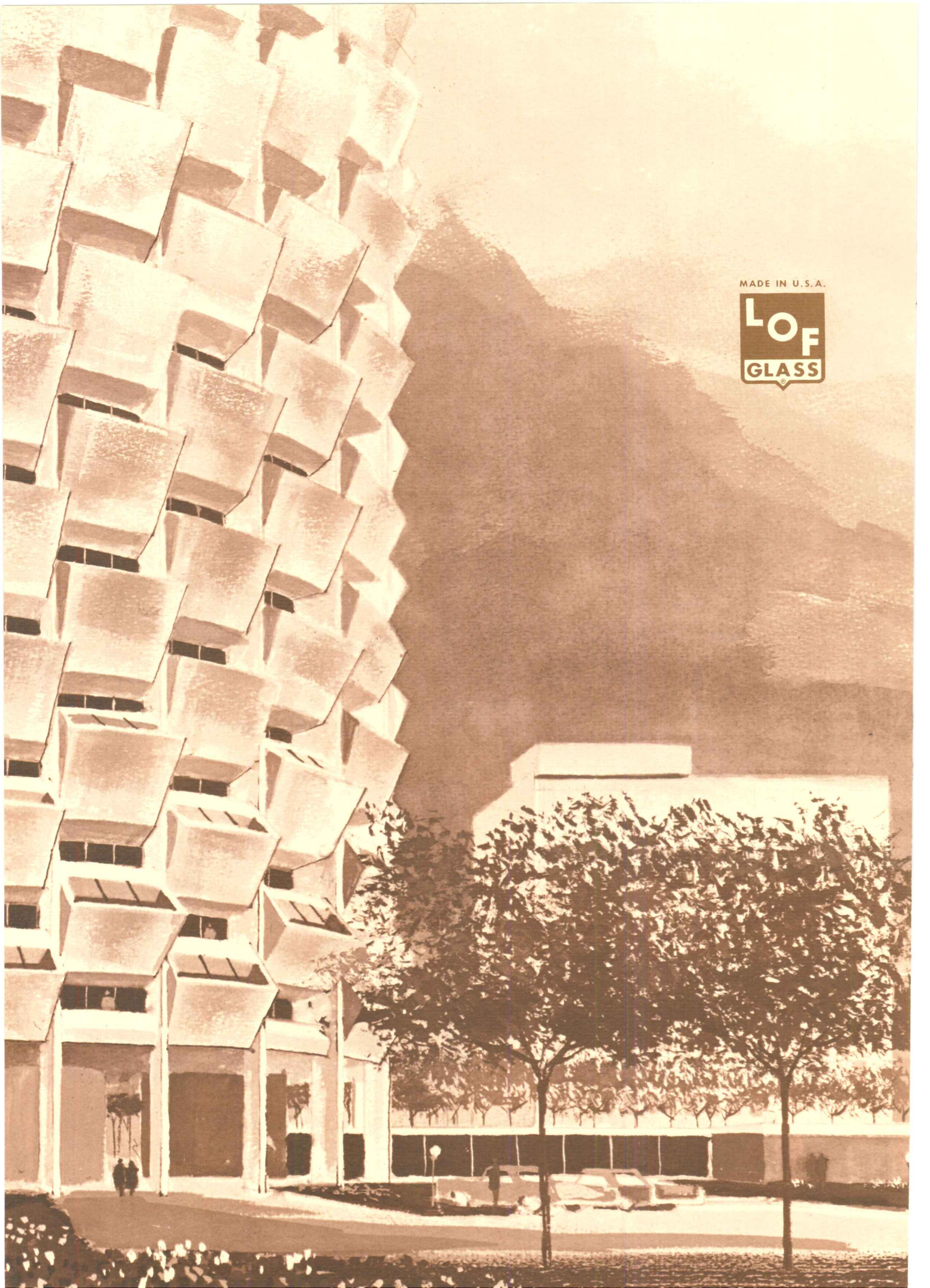
An Automated Motel where guests sleep under the stars

MADE IN U.S.A.
LOF GLASS

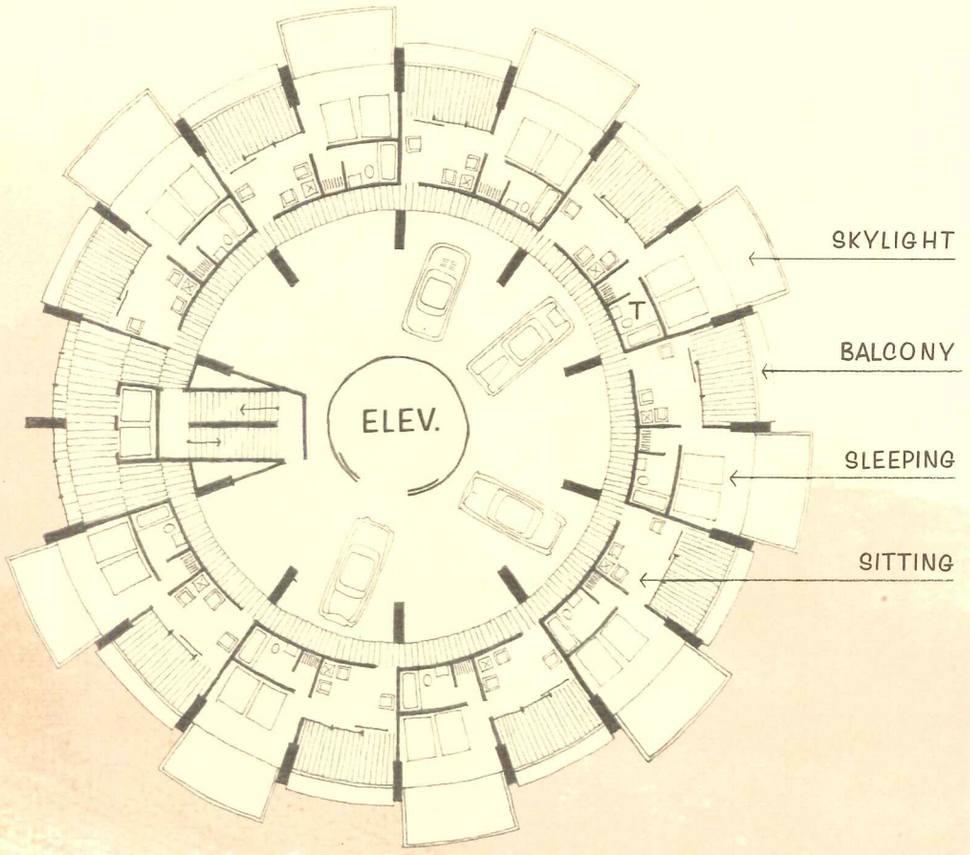
How do you create a feeling of the "wide-open spaces" in a 135-suite downtown motel? And how do you solve the car-parking problem? These were the questions we posed to Sigmund Blum, Director of Design, for Architects Smith, Hinchman & Grylls, Inc., Detroit.

His unique solutions are shown on this and following pages. And they result in a "dream" motel that has been engineered for reality.

The high cost of much redevelopment urban land today rules out a parking lot—and makes high-rise building mandatory. Guests to this envisioned motel would check in on the street level

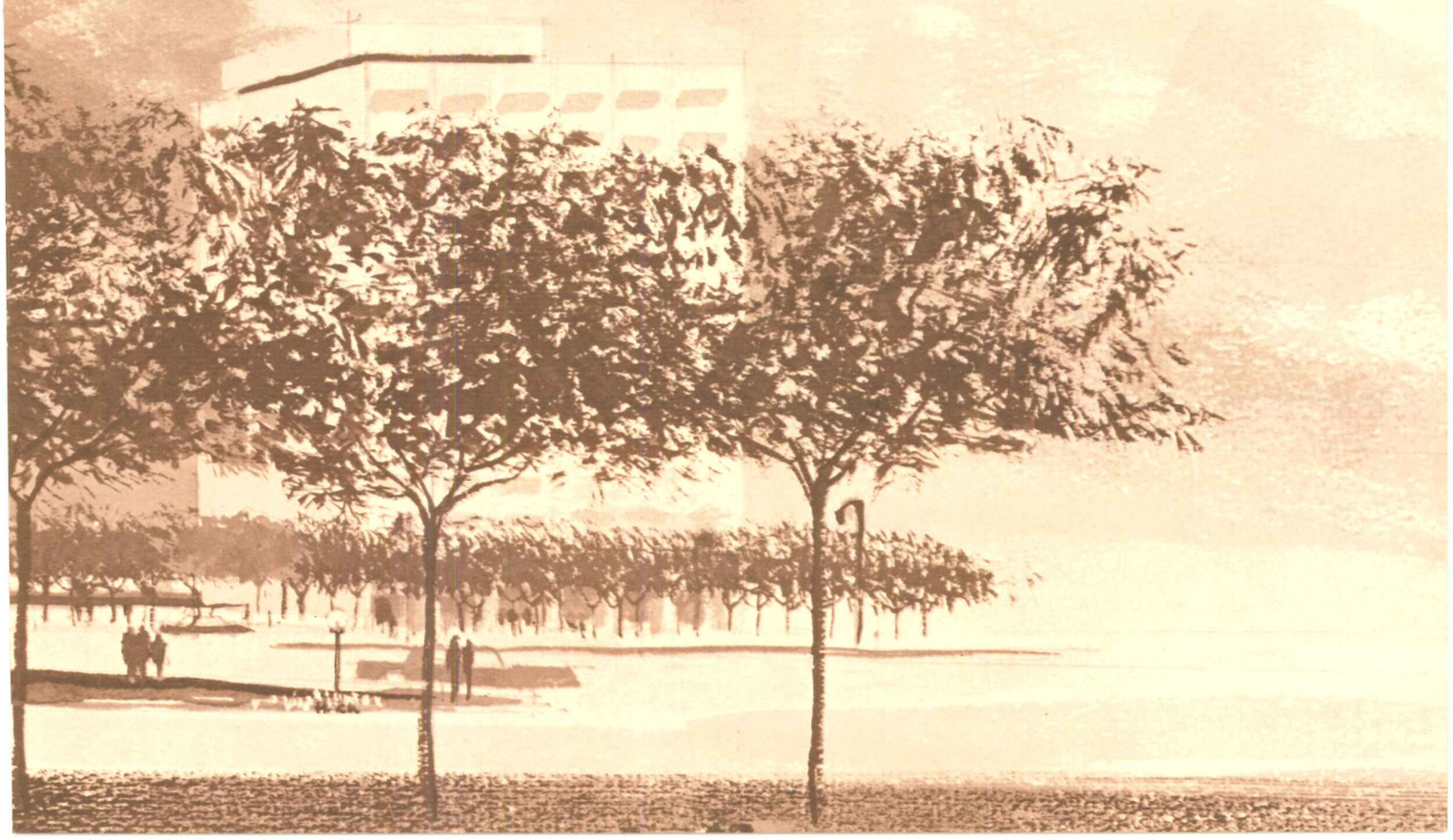

MADE IN U.S.A.
LOF
GLASS

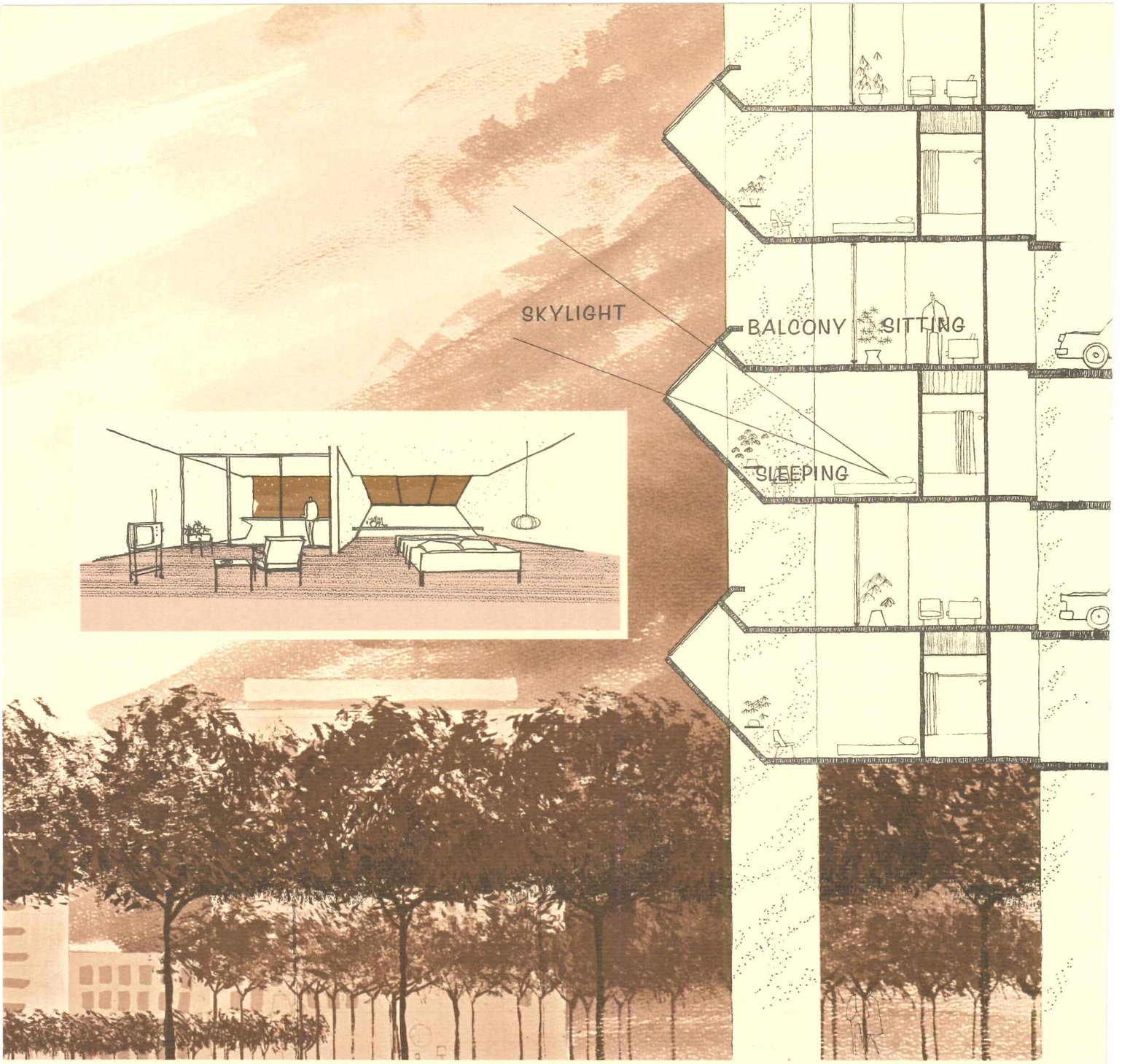
TYPICAL
FLOOR PLAN



without leaving their cars, then drive into an elevator activated by punch-card-automated controls. Cars and passengers would be delivered to spaces adjacent to assigned suites. Luggage could be unloaded conveniently.

Each suite in the plan is divided into two areas, sitting and sleeping. (See above, and next page.) The lounging area is provided with room-wide sliding *Tuf-flex®* glass doors, and a balcony looking down on a landscaped court. The bedroom has a unique "skylight" of tempered heat absorbing glass, or wired glass through which guests can view the stars. Other L·O·F products planned:





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L·O·F GLASS

generous-size mirrors of *Parallel-O-Plate®* glass and showers enclosed with L·O·F Patterned Glass.

Topping off the motel is a restaurant overlooking the city through broad expanses of Heavy-Duty *Parallel-O-Bronze®* plate glass. This imparts a rich "golden" tone to the exterior, and reduces sun heat and glare in the rooms. And on the roof a swimming pool would be enclosed with balustrades of *Tuf-flex* tempered plate glass to serve as a windbreak.

L·O·F GLASS FOR MOTELS AND HOTELS

POLISHED PLATE GLASS
¼" to 1" Parallel-O-Plate®
Twin ground for windows and mirrors
13/64", ¼", 3/8" & ½" Parallel-O-Grey®
Twin-ground tinted plate glass
13/64", ¼", 3/8" & ½" Parallel-O-Bronze®
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Blue-green tint

Rough Plate—eight versatile types
INSULATING GLASS—Thermopane®
SPANDREL GLASS—Vitrolux®
Vitreous colors fused to back of heat-strengthened glass
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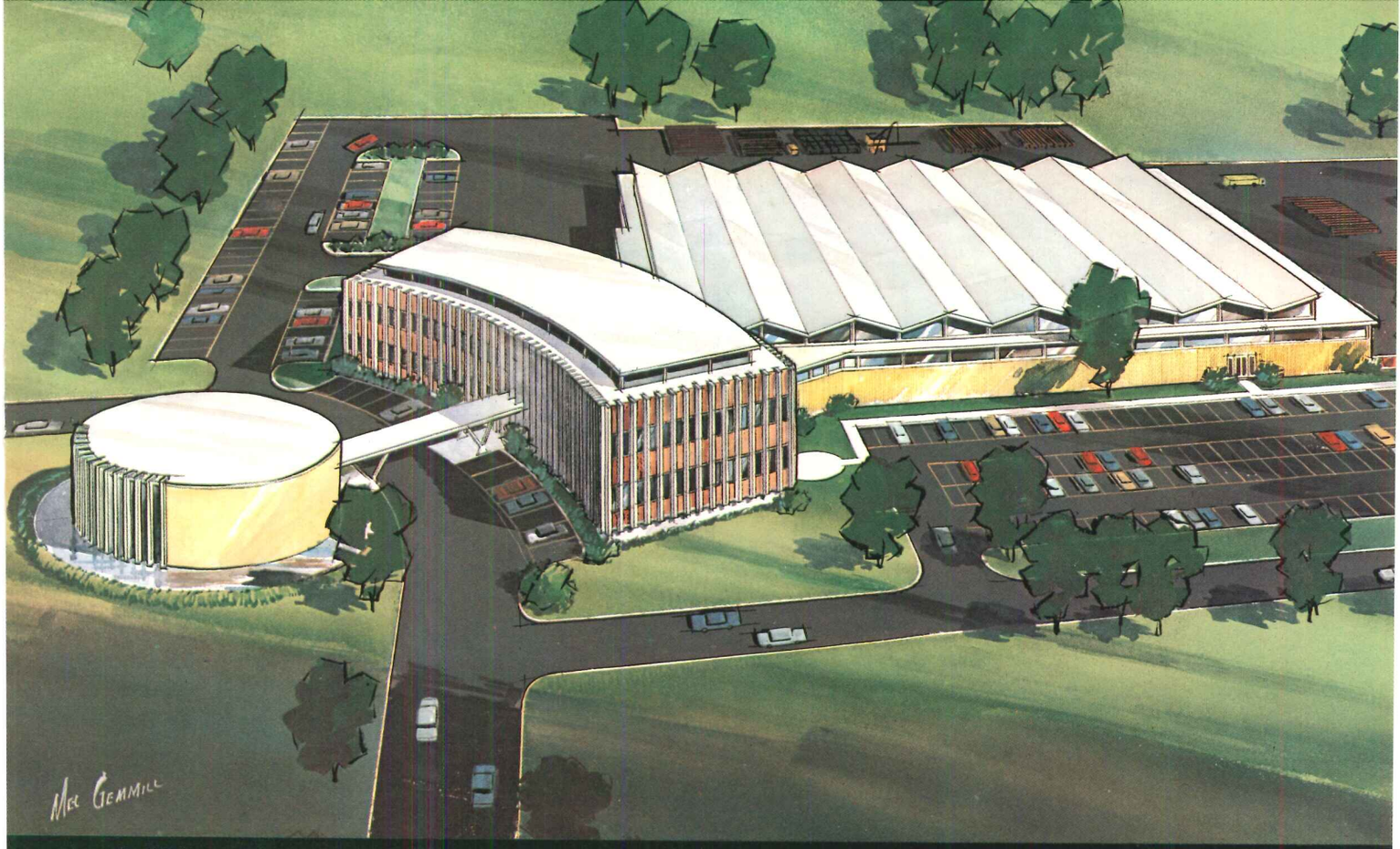
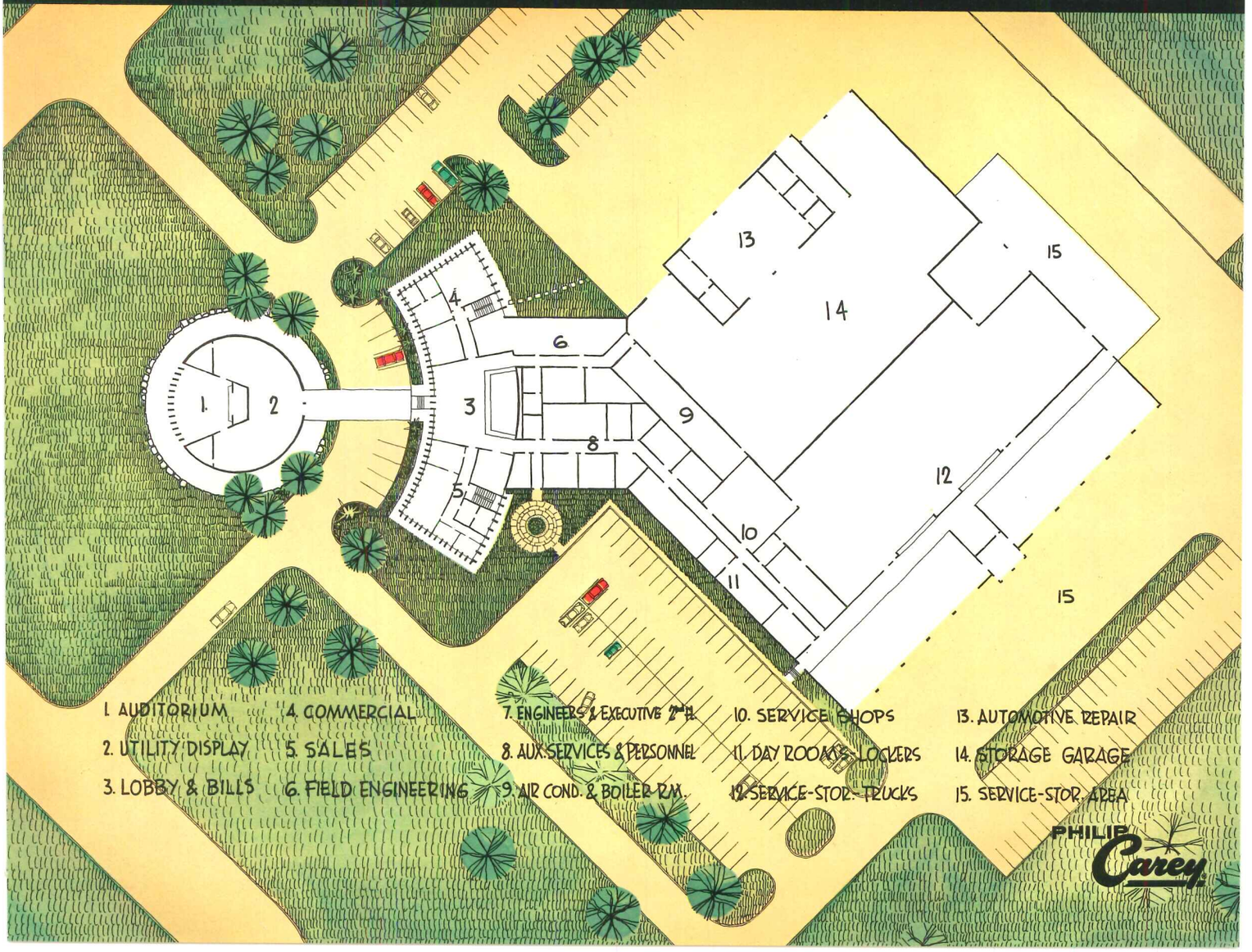
Doors and sidelights
WINDOW GLASS—uniform quality
PATTERNED & WIRED GLASS

L·O·F makes a particular kind of glass for every purpose in Open World design. Refer to Sweet's Architectural File, or call your L·O·F glass distributor or dealer, listed under "Glass" in the Yellow Pages. Or write to Libbey·Owens·Ford Glass Company, 811 Madison Avenue, Toledo, Ohio 43624.

Libbey·Owens·Ford
Toledo, Ohio

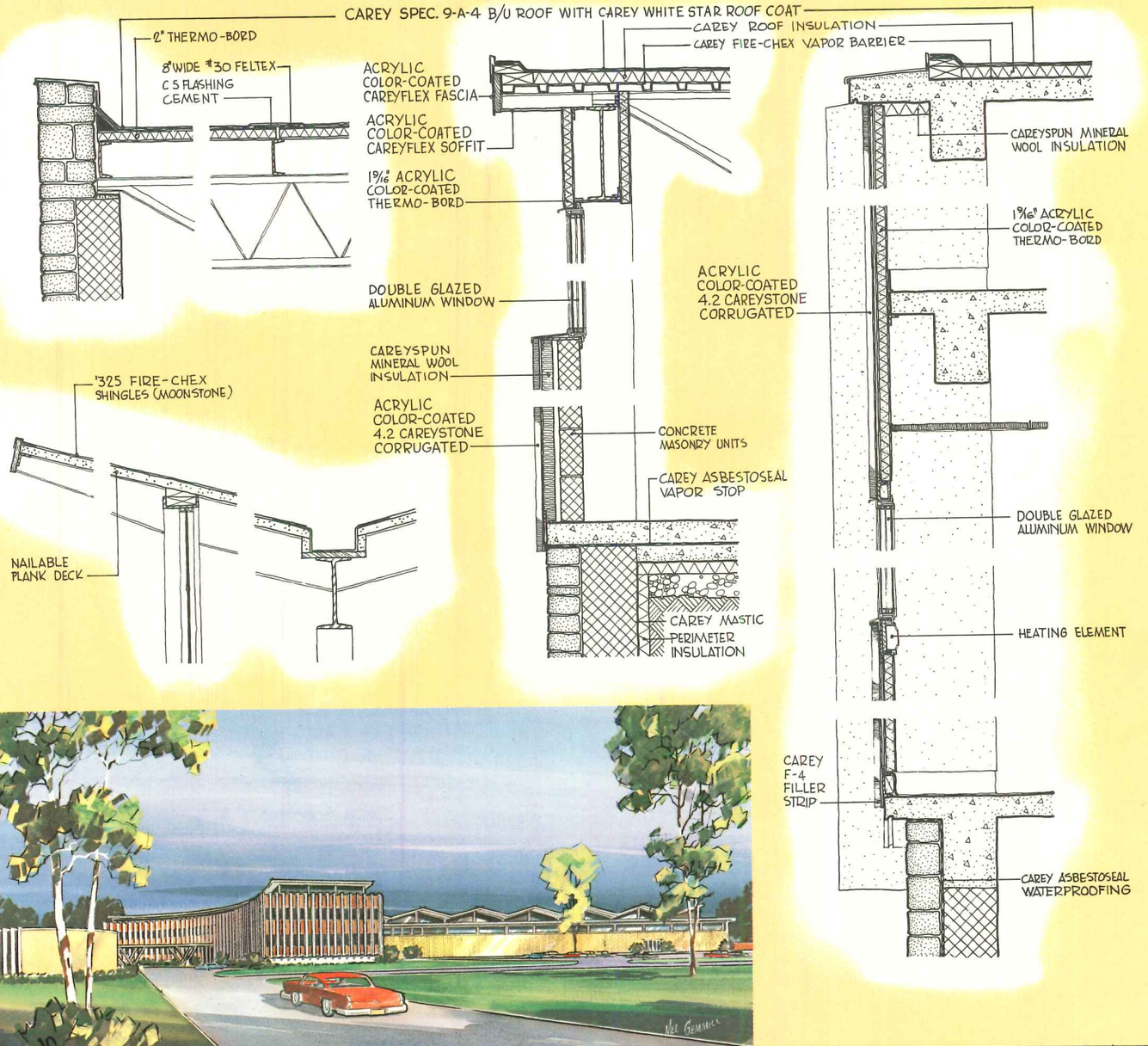


A UTILITIES SERVICE CENTER BY LACY, ATHERTON & DAVIS, ARCHITECTS & ENGINEERS
SPONSORED BY THE PHILIP CAREY MFG. COMPANY



1. AUDITORIUM
2. UTILITY DISPLAY
3. LOBBY & BILLS
4. COMMERCIAL
5. SALES
6. FIELD ENGINEERING
7. ENGINEERS & EXECUTIVE 2ND FL.
8. AUX. SERVICES & PERSONNEL
9. AIR COND. & BOILER RM.
10. SERVICE SHOPS
11. DAY ROOMS - LOCKERS
12. SERVICE-STOR.-TRUCKS
13. AUTOMOTIVE REPAIR
14. STORAGE GARAGE
15. SERVICE-STOR. AREA

PHILIP Carey



A UTILITIES SERVICE CENTER BY LACY, ATHERTON & DAVIS, ARCHITECTS & ENGINEERS
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At the perimeter of the City, this integrated Office and Service Center for Electric, Gas and other Utilities provides departmental facilities for Business, Engineering, Construction, Maintenance, Customer Relations and Public Relations.

The circular Public Building is prominent and accessible to the public, with parking space. A display area demonstrates the advantages of modern appliance living. The auditorium is available for trade meetings and civic groups.

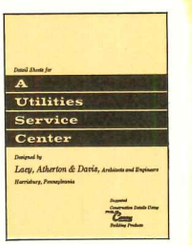
The curved Office Building directly relates to both Public and Service Buildings and has its own parking facilities. Its conformation and easy connection with the Service Building gives good circulation between the two areas. It houses Executive, Sales, Accounting-Billing and Engineering functions.

The large, one-floor Service Building fills the working needs of a complex Utility System . . . Equipment Storage and Repair, Material Stores, Locker and Recreation Rooms, Garage and Maintenance Facilities for both trucks and automobiles.

All Buildings are planned and situated for easy expansion of any or all areas as future increased space needs arise.

Many Philip Carey Building Products have been employed in the design of this building complex, with special emphasis on a most attractive use of Philip Carey thermo-wall curtain walls plus heavy-duty foundation moisture protection.

A short list of products includes: Acrylic Color-Coated Thermo-Bord and Careystone Corrugated; the new Asbestoseal Vapor Stop; and Philip Carey Built-Up Roofing used in conjunction with heat-reflecting Fire-Chex '325 Roofing Shingles. Miami-Carey Range Hoods, Bathroom Cabinets and Mirrors can also be employed in service areas.



WRITE US for your personal File Folder of Construction Details of this project which incorporate a wide selection of Philip Carey products for better building.

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For beauty *and* safety . . . at low initial cost and with all the low maintenance advantages of aluminum . . . use Anchor Railing Systems for balconies, walkways and sun decks. Anchor is your assurance of quality, security and attractiveness.

Our national network of company erectors will install Anchor Railing Systems fast and efficiently . . . anywhere in the United States.

For detailed information, call your local Anchor man, or write: Anchor Post Products, Inc., 6691 Eastern Ave., Baltimore, Maryland 21224.

ANCHOR POST PRODUCTS INC.

Plants in Baltimore, Houston, Los Angeles

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HOW NEW SHIELDING BY CORNING CUTS DOWN HEAT FROM LIGHTING

The new bulletin shown above tells you how new CORNING® Infrared-Reflecting Pattern No. 70 panels keep more than 70% of fluorescent lighting heat out of the occupied area. Designed for use in heat-extraction troffers, IRR No. 70 has an invisible coating which bounces the heat back up into the troffer, where it's exhausted into the plenum. Architects and engineers report IRR No. 70 helps them reduce total air-handling requirements and cuts operating costs appreciably. Write for your copy of the IRR No. 70 bulletin to Building Products Dept., Corning Glass Works, 8512 Crystal Street, Corning, New York.

CORNING

CORNING GLASS WORKS

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How to provide efficient internal communications:

USE "*Instant Indoor Airmail*"

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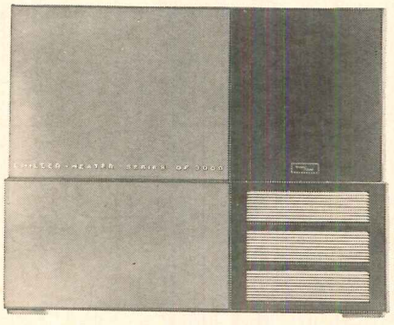
Race track heated and cooled by the same Arkla Gas Unit!



Race fans at Freehold Raceway in New Jersey will now have more than the excitement of the sport to keep them warm on brisk autumn days. And in summer they'll enjoy cool comfort. An Arkla Gas Air Conditioning System was installed with an outside thermostat that compensates at once for changes in weather. This absorption system needs no boiler, no compressor, no lubrication. And because it runs on Gas, fuel costs are low and maintenance minimal. Put a dime on a winner. Call your local Gas Company or write Arkla Air Conditioning Company, General Sales Office, 812 Main Street, Little Rock, Arkansas. AMERICAN GAS ASSOCIATION, INC.

For cooling and heating...Gas is good business!

VISIT THE SPECTACULAR FESTIVAL OF GAS PAVILION AT THE NEW YORK WORLD'S FAIR 1964-1965

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On the Calendar

December

1-3 Atom Fair '64, trade show of the nuclear industry sponsored jointly by the Atomic Industrial Forum and the American Nuclear Society –Brooks Hall, San Francisco Civic Auditorium, San Francisco

6-10 Annual Convention-Exposition, National Association of Home Builders—Chicago

January

25-28 17th International Heating & Air-Conditioning Exposition, American Society of Heating, Refrigerating & Air-Conditioning Engineers—McCormick Place, Chicago

25-29 National Meeting on Steel, American Society for Testing and Materials—Del Prado Hotel, Mexico City

February

13-17 School Building Architectural Exhibit, National Convention of the American Association of School Administrators—Atlantic City, N.J.

Office Notes

Offices Opened

H. G. Barnes, Architect, has announced the opening of offices for the practice of architecture at 210 Elks Building, Jackson, Tenn., with the firm name of **H. G. Barnes, Architect and Associate. Art C. Buehler** is the Associate.

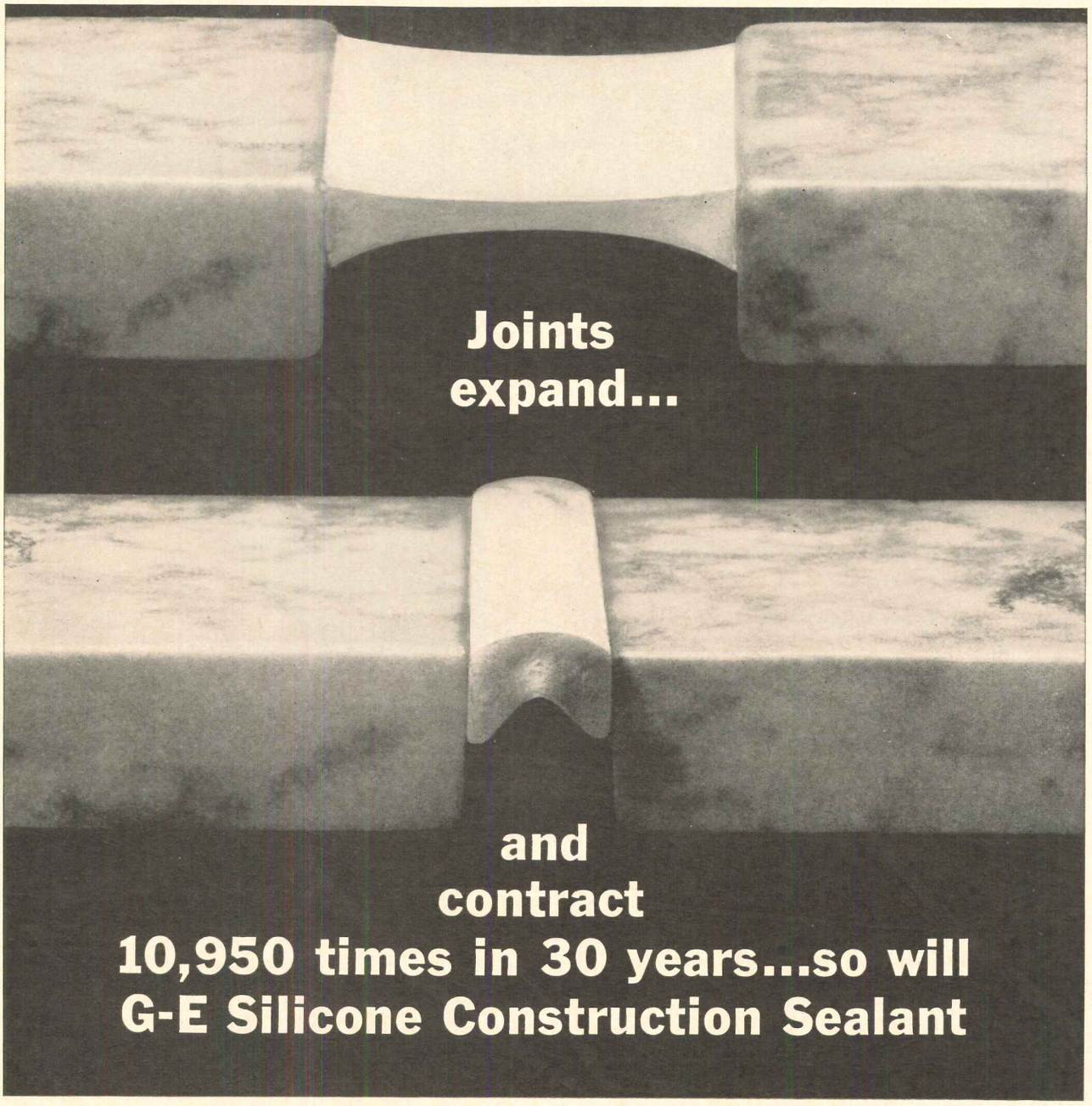
Hammel, Green and Abrahamson, Inc., architects and engineers, have opened a Minneapolis office at 1210 Wesley Temple Building.

Newton LeVine, A.I.A., has established an office for the practice of architecture and planning at 101 Clifton Ave., Lakewood, N.J.

Maury M. Lipowich and Associates have opened an office at 737 N. Michigan Ave., Chicago.

Gus Nick Paras, Architect, has opened a new office at 4623 Kennedy Blvd., Tampa, Fla.

Robert S. Sturgis, A.I.A., has announced the opening of his office at 43 Chatham St., Boston, for the practice of architecture and planning.



Construction joints go through the expansion-contraction cycle at least once a day, and far more often in modern curtain wall buildings. This is the major cause of sealant failure. In the past, even the best elastomeric sealants have been subject to early failure under severe compression-extension conditions. Because these sealants take a "set" during compression, they put a severe strain on the bond during extension. G-E silicone sealant, with almost 100% recovery after severe compression, withstands repeated cycling while maintaining an effective seal.

General Electric Silicone Construction Sealant will take this punishment for years because silicone rubber doesn't lose its elastomeric properties through exposure to sunlight or ozone, the deadly enemies of organic rubber sealants.

It is unaffected by ozone in any concentration over thousands of hours in accelerated aging tests. It withstands weathering, intense heat and sub-zero cold superbly. In fact, our tests support conservative estimates that it will last at least 30 years, much longer than *any* other type of sealant on the market.

G-E Silicone Sealant comes in a variety of non-fading, non-staining, non-bleeding colors including almost invisible translucent. It needs no pre-mixing or catalyst—bonds securely to all common building materials—can be applied easily, efficiently and quickly at any temperature.

For more information, check the listing of distributors. Or write, General Electric Company, Silicone Products Department, Section BG12118, Waterford, New York.

GENERAL ELECTRIC

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TERNE, FRANÇOIS MANSART AND THE CONTEMPORARY IDIOM

Few architectural elements are more traditional than the classic mansard roof. Its current adaption to highly contemporary design thus provides a dramatic example—as does Terne metal itself—of "the very old becoming the very new." And wherever mansard fascia is used, the unique functional characteristics of Follansbee Terne, along with its natural affinity for both form and color, are available at moderate cost.

FOLLANSBEE STEEL CORPORATION
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Follansbee is the world's pioneer producer of seamless Terne roofing

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Harry Weese & Associates
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Jens Jensen Elementary School
Chicago, Illinois

Sheet Metal Roofing Contractor:
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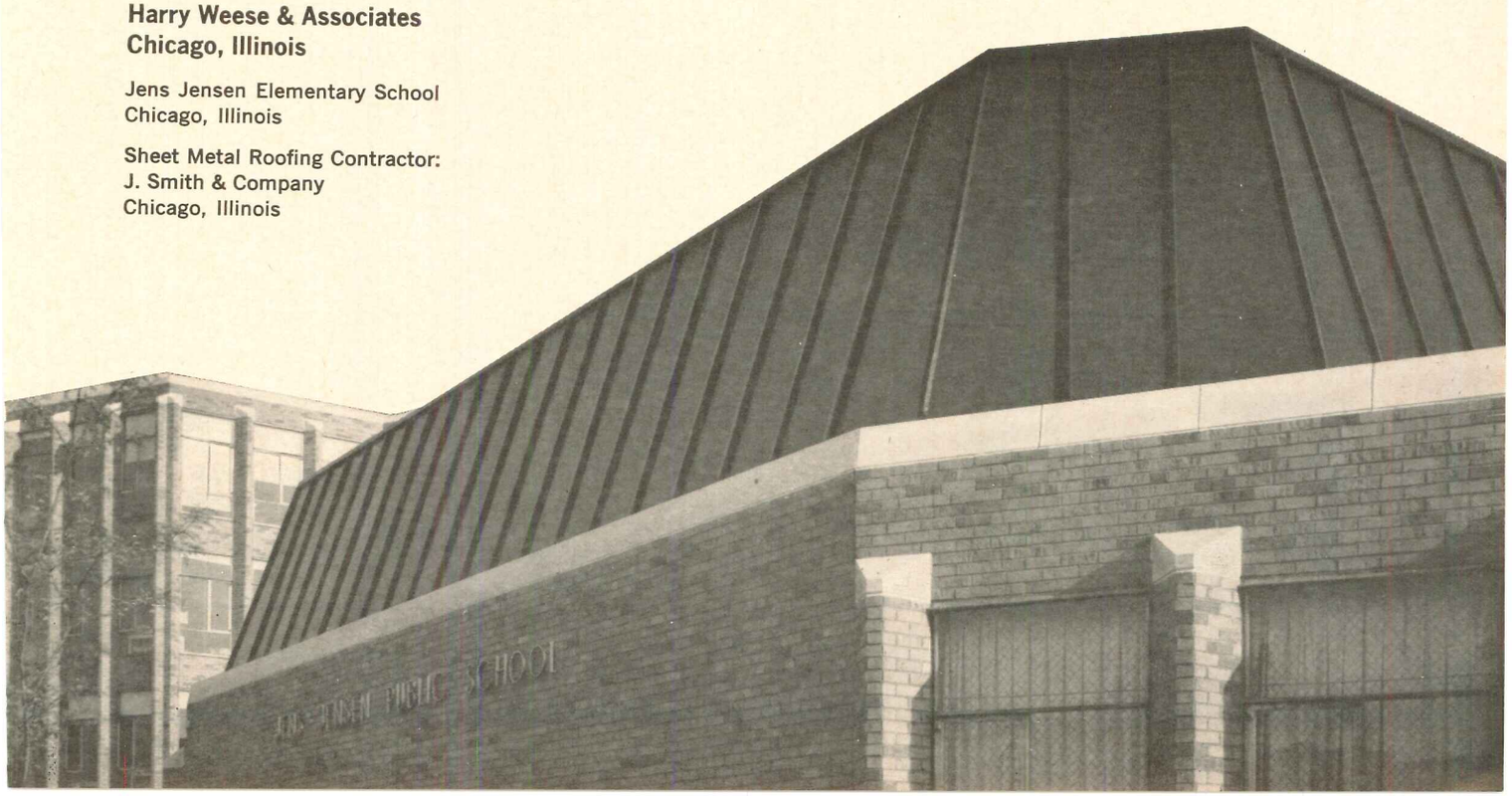
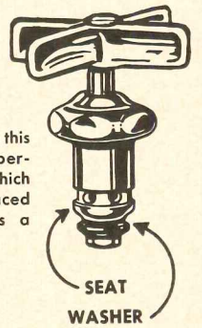
Chicago, Illinois

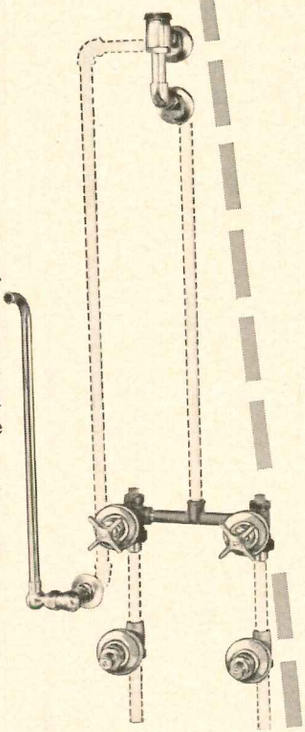


Why Chicago Faucets ask less "time-out" for repairs

Operating records prove it. Chicago Faucets stay leak-free far longer because they close *with* the pressure; washers are spared the life-shortening fight *against* pressure. When they do need attention just lift out the standard operating mechanism, drop in a spare and put the faucet back in service immediately. Products of more than 50 years of specialization, Chicago Faucets promise you maximum service with minimum upkeep. And you choose from the largest selection available of faucets for hospital use.

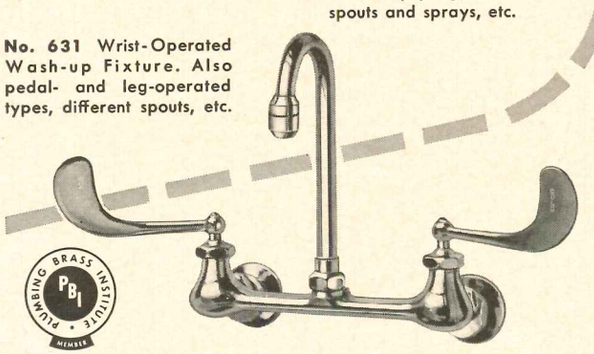


The secret's in this standard operating unit which can be replaced as easily as a light bulb.



No. 904 Bed Pan Flusher with integral vacuum breaker. Others with concealed piping, different spouts and sprays, etc.

No. 631 Wrist-Operated Wash-up Fixture. Also pedal- and leg-operated types, different spouts, etc.



The Chicago Faucet Co.
2100 S. Nuclear Drive, Des Plaines, Ill.
(A suburb of Chicago)

CHICAGO FAUCETS®
Last As Long As the Building

HERE'S HELP—
If you buy or specify faucets for hospital use write for complete catalog . . . or new Sketch Book of engineering data on special faucets.

Distributed through the plumbing trade exclusively

For more data, circle 152 on Inquiry Card

The new look of luxury that speaks in a whisper

Low silhouette! Elongated bowl! Quieter by far! That's the new Case No. 4100 Silhouette. The price? Just $123.95*! Yet what features! Positively will not overflow. Flushes on 14 quarts of water. Operates on as little as 15 pounds pressure. Comes in 50 colors, plus sparkling black. Want more details? See Sweet's (26A) or write direct.

**Suggested consumer price in white*

Case Plumbing Manufacturing Co.
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Case
SINCE 1869

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LONGER WEAR — SAFER STAIRS

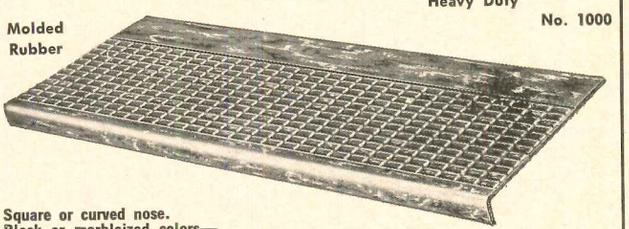
MUSSON

SAFETY DESIGNED
STAIR TREADS

The durability and economy of these treads will appeal to the building owner. Their clean, attractive appearance and safety appeal to users. Specify them.

Heavy Duty
No. 1000

Molded Rubber



Square or curved nose.
Black or marbleized colors—
Red, Green, Gray, Mahogany, Walnut, Beige, Birch, Black.

These high quality treads are ¼" thick and full 12" deep. Standard size lengths in stock are: 24", 30", 36", 42", 48", 54", 60", 72". They are readily trimmed to exact step size and easily installed on wood, metal, marble, or terrazzo steps.

MUSSON HEAVY DUTY RUBBER MATS
Solid or perforated mats for entrances, with pyramid surface design for safety and easy cleaning. Pebble base allows air circulation underneath. ⅜" or ½" thick in Black, Brown, Red, Green, Gray. Sizes up to 6' x 16'6" in one piece.

ALSO ORDER FROM MUSSON
Link Mats—Standing Mats—Runner Matting—Vinyl Stair Treads.

Write for Catalog and Factory Prices

THE R. C. MUSSON RUBBER CO.
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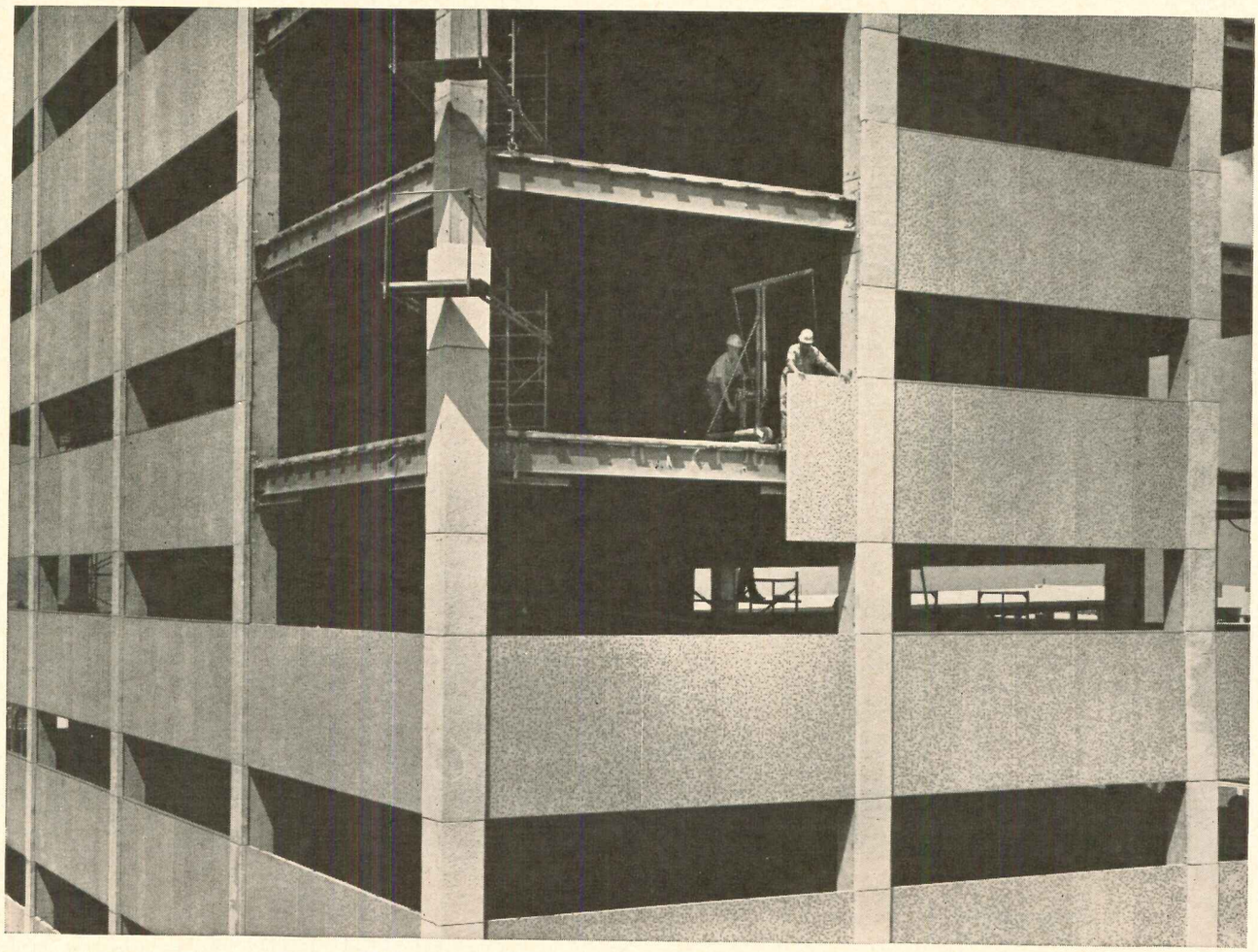

This is MOSAIC Panel Wall*
It is 66% lighter than Pre-cast Panels.

IT IS A COMPLETE INTERIOR-EXTERIOR WALL SYSTEM.

. . . weighs only 10 to 16 pounds per square foot . . . saves you money in structural framing . . . saves installation time; two men can place 40 to 50 panels (average, 40 square feet each) per day . . . saves cost of large rigging crews and heavy lifting equipment . . . rig shown cost only $450, required only two men to operate.

IT HAS A TWO-HOUR FIRE RATING.

. . . tested in accordance with the standard method of fire tests of building construction and materials, ASTM Designation E 119-61 . . . meets the requirements for Class A construction by The New York City Board of Standards and Appeals . . . saves the cost and weight of expensive back-up construction.

IT IS PRE-FINISHED IN A WIDE VARIETY OF SURFACE-MATERIALS.

. . . ceramic mosaics, glass mosaics, stone mosaics, raised aggregates, flat aggregates, limestones, marbles, granites . . . gives the designer unlimited variety in texture, pattern, color and scale . . . all materials are set with special flexible, waterproof and frost-resistant materials, under strict quality-control at the factory.

ITS INTERIOR SURFACE CAN BE FINISHED.

. . . with gypsum wall board, gypsum lath and plaster or metal lath and plaster . . . it even has a space to run conduit.

IT IS PRE-INSULATED.

. . . two layers of insulation give the wall a "U" Factor of .09 . . . sound reduction qualities are excellent.

IT IS FLEXIBLE IN DESIGN.

. . . you specify the exterior and interior finish, the size . . . can be furnished with or without window units, glazed or unglazed . . . you can also specify matching column covers and thin veneering panels for remodeling work or new construction.

IT IS BACKED BY THE MOSAIC TILE COMPANY.

. . . a large, long time supplier to the construction industry who knows your problems and can supply you with on-the-spot assistance. If you are contemplating panel construction of this type, we would welcome an inquiry direct or through your nearest Mosaic representative. "Mosaic" is the trademark of The Mosaic Tile Company.

*(Patent Pending)

MOSAIC®

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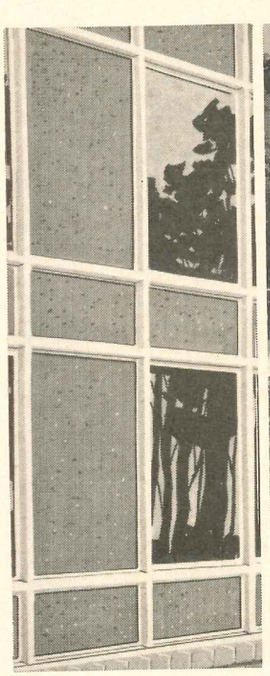
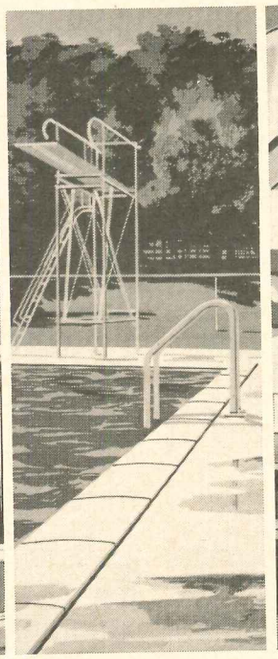
A Subsidiary of The Mosaic Tile Company

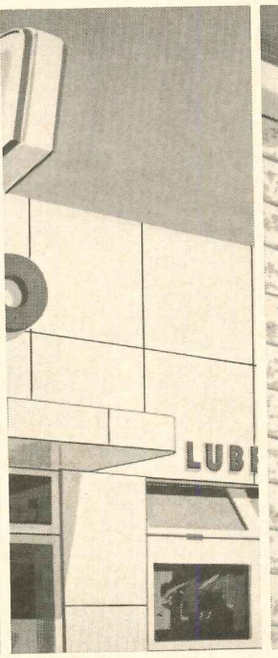
For more data, circle 134 on Inquiry Card



1. PRE-CAST CONCRETE PANELS. **Problem:** Water leakage around pre-cast concrete panels in curtain wall and tilt-up construction. **Solution: DAP Flexiseal.** Conforms to all irregular sealing surfaces, makes a tough bond for watertight, airtight protection. Gives long-term, trouble-free service.

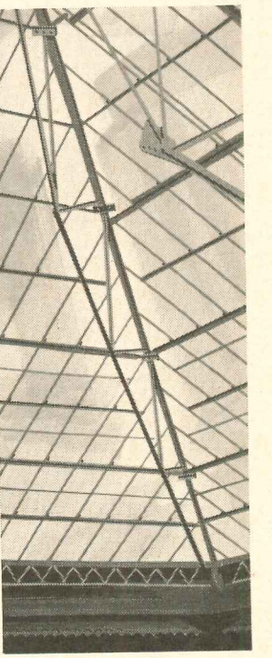


2. SWIMMING POOLS. **Problem:** Sealant between pool's concrete coping and concrete apron is subject to brittleness and cracking in winter, tar-like gumminess in summer. **Solution: DAP Flexiseal.** Forms a rubbery, watertight seal that sets to a non-tacky cure and remains permanently flexible.



3. PORCELAIN PANELS. **Problem:** Severe expansion and contraction — plus the sun's ultraviolet rays — take the life out of ordinary sealants. **Solution: DAP Flexiseal.** Balanced adhesion and cohesion gives exceptional durability and flexibility regardless of temperature and climate.

4. EXPANSION JOINTS. **Problem:** Shear stress causes adhesion or cohesion failure of ordinary sealants between dissimilar materials. **Solution: DAP Flexiseal.** Provides outstanding shear strength for tough, flexible, long-lasting seals between aluminum, brass, copper, steel, glass, concrete, marble, wood.



5. SKYLIGHTS. **Problem:** Temperature extremes and wind pressure cause excessive movement of glass lites with resulting breakdown of seal between glass and metal frames. **Solution: DAP Flexiseal.** Sticks tenaciously to glass and metal, flexes indefinitely to maintain positive, long-lasting seals.

HOW DAP® *FLEXISEAL*® SOLVES 5 CRITICAL PROBLEMS OF

expansion and contraction

No matter how critical the sealing job, Balanced Modulus is your assurance that DAP Flexiseal will give positive, flexible, permanent seals. You can't beat it for tenacious adhesion and resilient cohesion under the most severe conditions of expansion and contraction, temperature and exposure. Formulated with Thiokol* polysulfide polymers, Flexiseal flexes easily . . . won't crack . . . won't shrink . . . bonds tightly to virtually all construction materials.

A two-part sealant, Flexiseal has a smooth, buttery consistency for easy blending and application. And remember: DAP makes Flexiseal in one premium-quality grade only . . . assuring performance that always meets or exceeds Interim Federal Specification TT-S-00227a, and ASA Specification 116.1-1960.

*Trademark of Thiokol Chemical Corp.

DAP®, WORLD'S LARGEST MANUFACTURER OF QUALITY SEALING MATERIALS, OFFERS YOU TECHNICAL SPECIFICATION SERVICE ON SPECIALIZED SEALANTS FOR MODERN CONSTRUCTION.

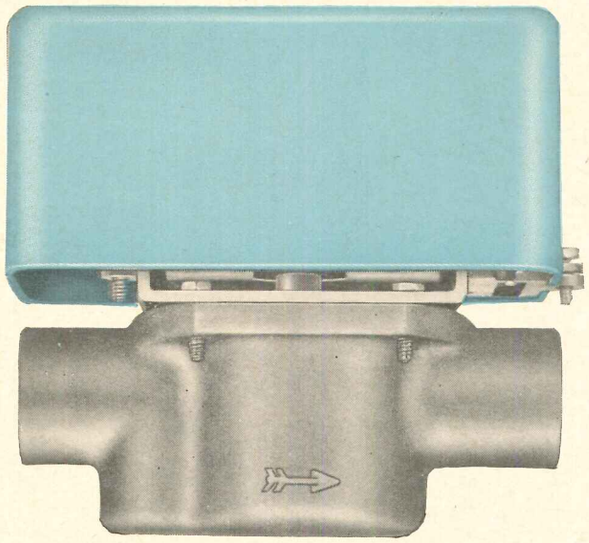
DAP INC., DEPT. AR • GENERAL OFFICES: DAYTON 31, OHIO • SUBSIDIARY OF *Plough, Inc.*

For more data, circle 137 on Inquiry Card

announcing

the Dole Zone Valve!

This new Dole Zone Valve offers you many important features for hydronic heating and cooling systems. For example, the unique Dole heat motor is incorporated to obtain unusually quiet and trouble-free operation. And, the exclusive Dole rotary shear valve provides 100% shut-off at up to 60 feet of differential pressure . . . produces very low pressure drop across the valve.

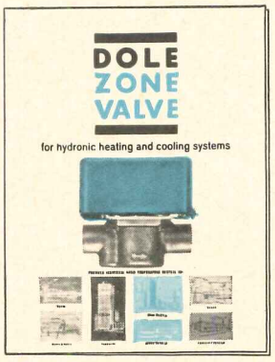


HERE'S THE FULL LIST OF 16 FIELD-TESTED FEATURES YOU GET . . . ALL IMPORTANT!

• Closes Tightly • Silent Operation • Space-Saving Size • Provides Auxiliary Switch • No Relay Needed • Saves Power • Manual Opening • Installs in Any Position • Longer Life • Simple Design • No Lubrication • Leakproof • Wide Application • Installs at Boiler or Radiator • Operates in Systems up to 125 psi System Pressure • Easy Servicing • Available in 3 Sizes for ½", ¾" and 1" SWT Connections

FREE BOOKLET!

Write today for your free copy of this new booklet (ZVS-100) which completely describes the new Dole Zone Valve. No obligation, of course!



Control with

DOLE®

THE DOLE VALVE COMPANY
PLUMBING AND HEATING DIVISION
6201 OAKTON ST., MORTON GROVE, ILL. 60053
Subsidiary of Eaton Manufacturing Company

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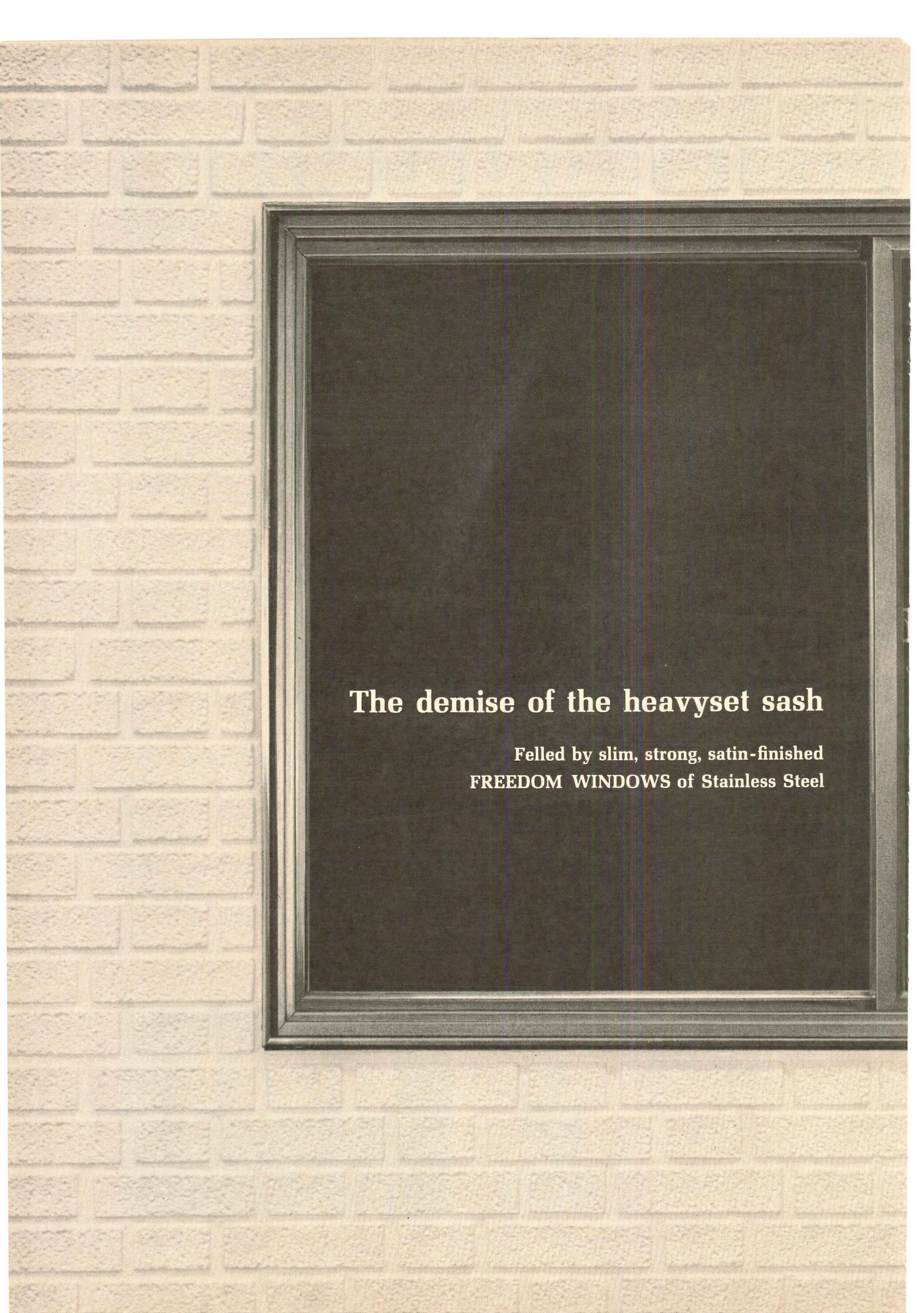
For more data, circle 136 on Inquiry Card ➔


The demise of the heavyset sash
Felled by slim, strong, satin-finished
FREEDOM WINDOWS of Stainless Steel

There was a day when the window frame was a thing of quiet elegance. Take a drive through colonial New England and you'll know when that day was.

But somewhere along the line windows began to take on bulk. They lost their slim precision. Apartments, hotels, schools, and houses (ranch, split-level, modern, and Georgian) all sported excess beef in the portals. Take a drive through Modern Suburbia anywhere and you'll see what we mean.

The new FREEDOM WINDOW of Stainless Steel goes back to first principles. Slimness. Unobtrusive elegance. Perfect proportion. And combines these with the strength; resistance to weather, heat, and corrosion; long-range thrift; and permanence of solid stainless steel.

There are 17 things FREEDOM WINDOWS won't do. They won't stick, rust, etch, crack, chip, peel, flake, twist, rot, discolor, warp, swell, shrink, scratch, bleed, rack, or pit. *Not ever.* Oh, their neutral satin surfaces may occasionally get dirty. If the rain doesn't clean them, soap and water will.

Slim FREEDOM WINDOWS of Stainless Steel (single-hung, double-hung, and sliding) are available from Republic's MAN FROM MANUFACTURING (and *only* from Republic's MAN FROM MANUFACTURING). He's at the other end of both your telephone and the coupon.

MANUFACTURING DIVISION
REPUBLIC STEEL CORPORATION

REPUBLIC STEEL

THE MAN FROM MANUFACTURING

Stainless Steel

MANUFACTURING DIVISION
Republic Steel Corporation • Dept. AR-7405
Youngstown, Ohio 44505

Please send me complete details on FREEDOM WINDOWS of Stainless Steel.

Name_____ Title_____

Company_____

Address_____

City_____ State_____ Zip_____

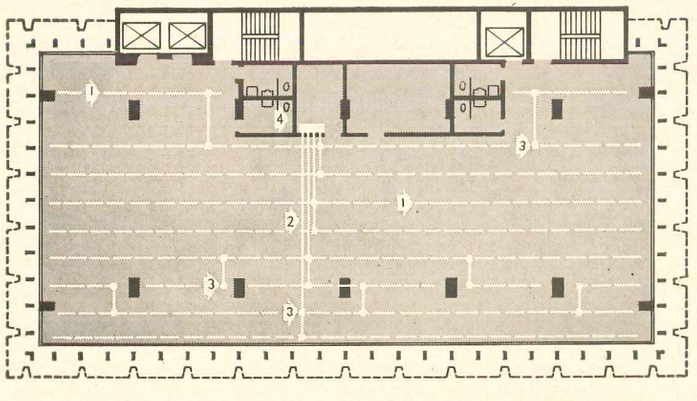
r/c floor electrification

a.i.a. file: 4a

Prepared as a service to architects by Portland Cement Association

Clip along dotted line

Anchor Savings and Loan Building, Madison, Wisconsin. Architects & Engineers: John J. Flad & Associates, Madison.



LEGEND

1 = Distribution Ducts
2 = Pyramidal Feeders
3 = Junction Boxes
4 = Electrical Panel

NOTE:

Space ducts and floor inserts to match desk module. Check with Electrical Engineer.

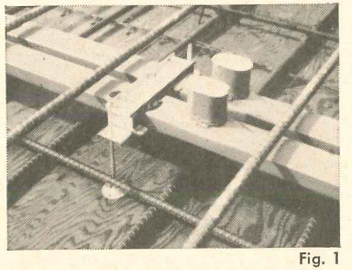


Fig. 1

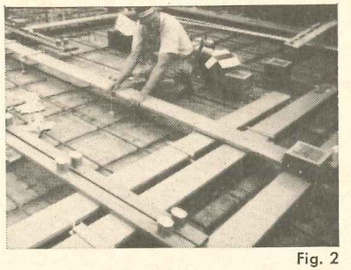


Fig. 2

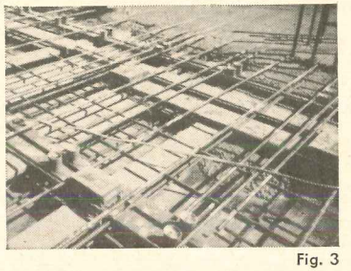


Fig. 3

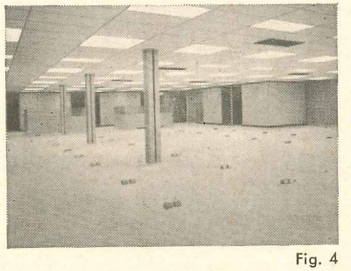


Fig. 4

Today, raceways under concrete floors can be readily designed for maximum versatility. One method, a pyramidal feed system, that provides adequate capacity for future utility requirements as well as changing plant or office layouts is shown at left.

Fig. 1 shows the distribution ducts and the floor inserts. All inserts for the service fittings will be flush with the finished concrete floor. One duct is for power, one for telephone wiring. Fig. 2 shows the installation in progress. The two-level system allows feeder ducts to pass under distribution ducts. Fig. 3 shows the placing of concrete after reinforcement and ducts have been carefully set. Fig. 4 shows a typical completed installation.

In addition to the basic power and telephone services, many modern buildings may require additional raceways for other uses. These include, for example, panelboard feeders with voltages up to 600V, low potential signal services, intercoms, T.V. and programming. Designers should estimate future requirements as generously as possible.

Write for additional free information. (U.S. and Canada only.)

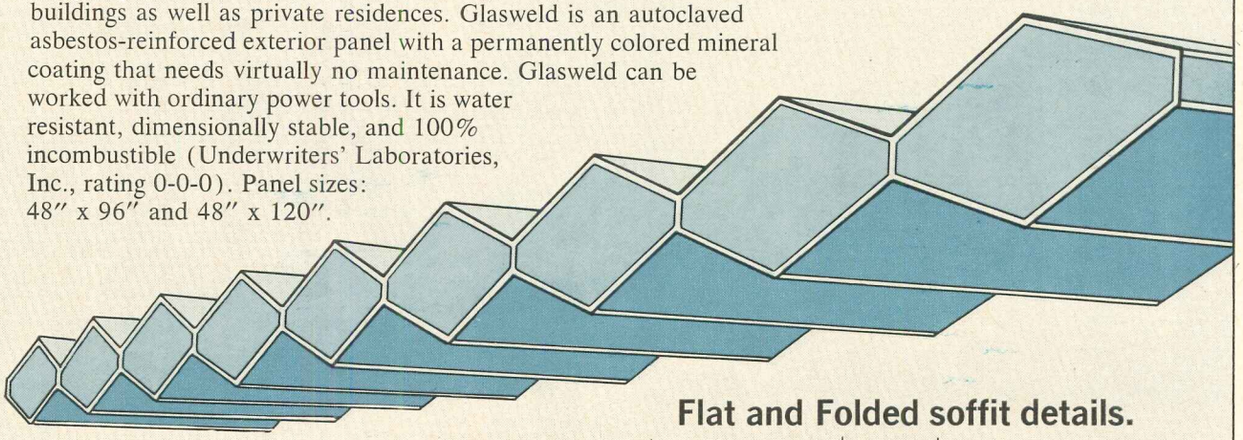
PORTLAND CEMENT ASSOCIATION Dept. 12-8, 33 West Grand Ave., Chicago, Illinois 60610 *An organization to improve and extend the uses of concrete*

Guaranteed color-fast, completely incombustible, easy to handle, economical– 4 of many excellent reasons for choosing Weldwood® Glasweld® for soffits and canopy ceilings.

WELDWOOD®
GLASWELD

Product of United States Plywood
777 Third Avenue
New York, N. Y. 10017

Permanently colored Glasweld offers the architect complete freedom in designing flat or folded soffits for commercial and institutional buildings as well as private residences. Glasweld is an autoclaved asbestos-reinforced exterior panel with a permanently colored mineral coating that needs virtually no maintenance. Glasweld can be worked with ordinary power tools. It is water resistant, dimensionally stable, and 100% incombustible (Underwriters' Laboratories, Inc., rating 0-0-0). Panel sizes: 48″ x 96″ and 48″ x 120″.



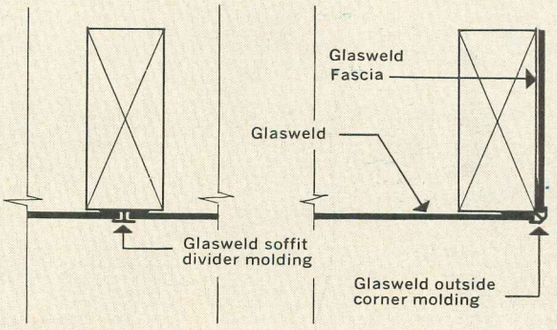
Support spacing.

This schedule is suggested for soffit and ceiling applications where panels are supported on all four sides:

Thickness	Spacing
1/8″*	24″ x 120″
3/16″	36″ x 120″
1/4″	42″ x 120″
5/16″	48″ x 96″

*1/8″ Glasweld deflects no more than 1/240 of the span when framed on 2′ centers.

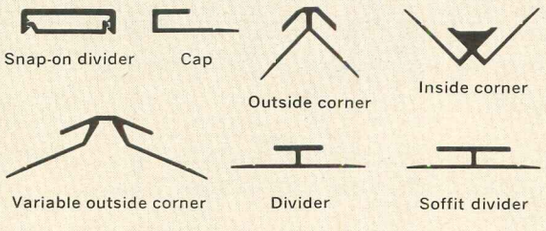
Flat and Folded soffit details.

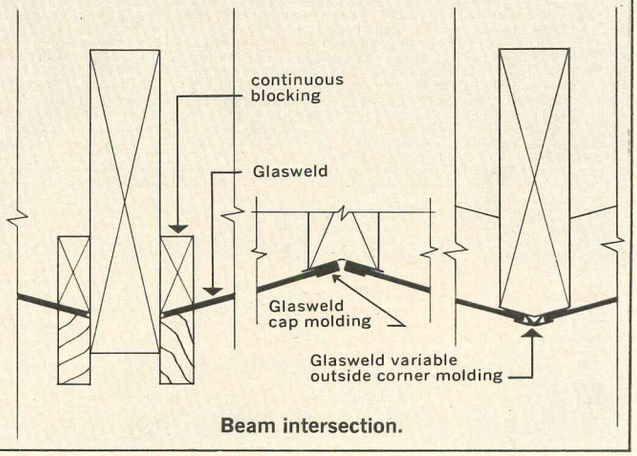


Intermediate joint.
FOLDED (OR FLAT)
SCALE 3′ = 1″ – 0″

Moldings.

Installation of Glasweld is simple, using these well-engineered aluminum moldings. They are available in both anodized and porcelainized finishes to match Glasweld colors.



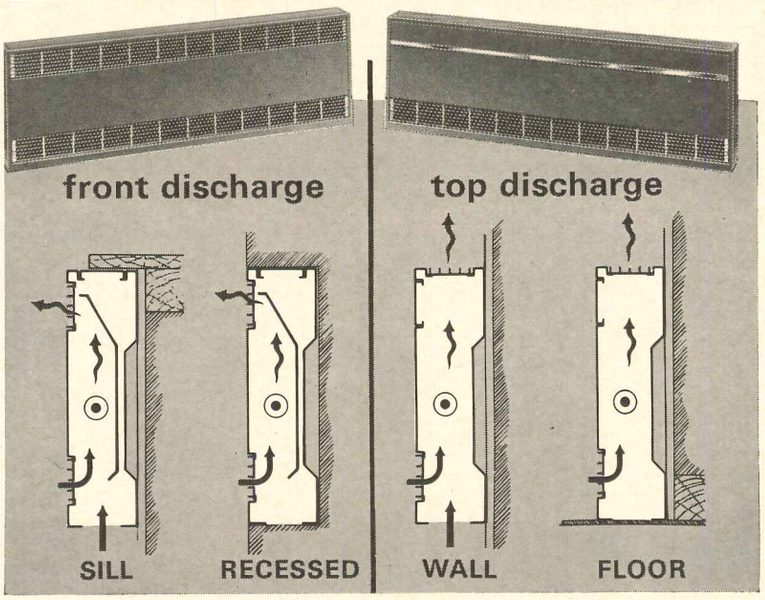


Beam intersection.

For more data, circle 138 on Inquiry Card

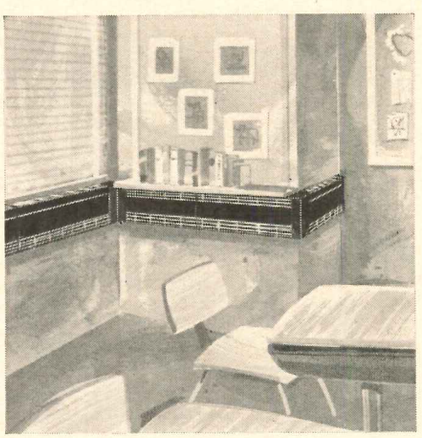
No other convection heater offers so few restrictions to creative architectural design

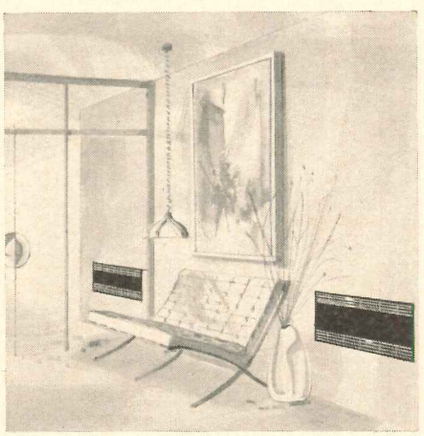
Electromode versatile electric convection heater

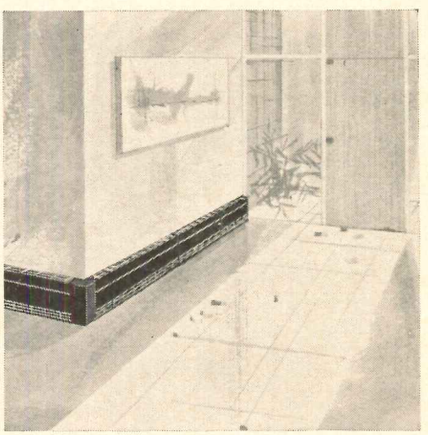


The only electric convection heater that gives you a choice of *air intake* — front, bottom or both—and heated air *discharge* —through the front or top. It is available in lengths of three and four feet, heights of 11, 15 and 20 inches, and depths of 3, 4, and 5 inches.

It is readily adaptable to installation at baseboard level, on the wall at any distance from the floor, or recessed anywhere in the wall . . . in new or existing schools, offices, air terminals, auditoriums, bus terminals, restaurants, churches, factories and theatres.







Offering the utmost versatility in application and installation these Electromode convection heaters will solve many of the design and installation problems you encounter in planning new buildings and in providing flameless electric heat for remodeling and modernization projects. They make it easy to provide commercial, industrial and institutional buildings with all the advantages of flameless electric heat without sacrificing freedom of expression in architectural design. They are quality built by Electromode to assure dependable, carefree performance plus safety and durability.

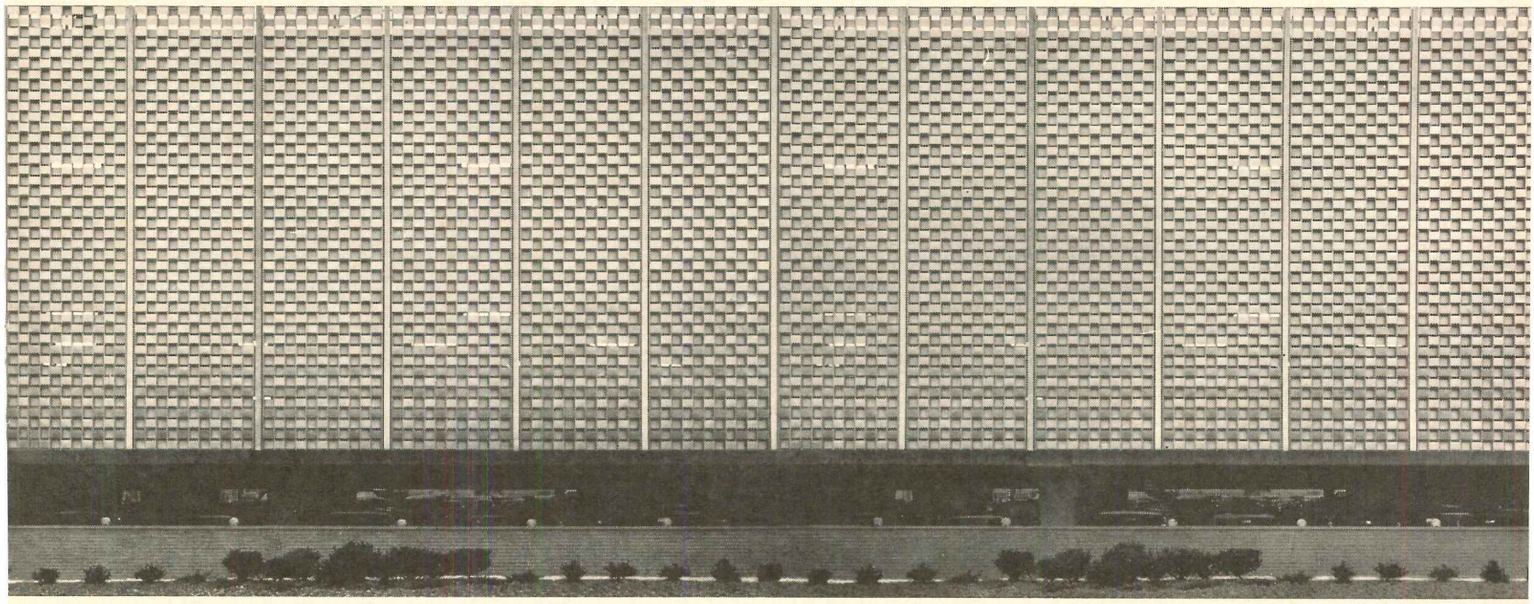
For complete information and specifications on the convection heaters or any of the 400 types, models and capacities of Electromode electric heaters see your Electromode representative or write

Electromode *division* Friden, *Inc.* Dept. AR-124, Rochester, N.Y. 14603

For more data, circle 155 on Inquiry Card

Owner: White Plains Parking Authority
Architects: Abbot, Merkt & Co., N. Y.
Contractor: Polera Construction Co., Scarsdale, N. Y.

Ageless... because it's stainless.



The White Plains Parking Authority had two choices of architectural metals for its parking garage facade.

One would screen headlight glare, admit natural daylight, provide ventilation for auto exhaust.

The other metal would screen headlight glare, admit natural daylight, provide ventilation for auto exhaust—*and have greater strength, have greater corrosion resistance, provide minimum maintenance, last longer, stay attractive, and cost only 5% more.* It's nickel stainless steel.

They chose nickel stainless steel for the facade of the new White Plains Municipal Parking Garage. 5% was a small price to pay for the extra durability and lower maintenance requirements of nickel stainless steel. And it could be readily pre-fabricated into the attractive panel design.

A total of 410 panels and approximately 20,000 square feet of stainless steel was used for the building's exterior. Each of the 4′ x 8′ panels consisted of a 12-gauge roll-formed frame to which ten 22-gauge verticals were welded. Sixty-six 6″ x 10″ stainless steel blanks were then attached alternately to the exterior and interior faces of the verticals in a checkerboard design.

To add variety and interest, the architects specified a textured satin finish and a dull finish on alternating rows of blanks. The panels were fabricated and installed by Trio Industries, Inc., Bridgeport, Conn.

For further information and a series of suggested guide specifications for stainless steel architectural products, write Inco.

INCO The International Nickel Company, Inc., 67 Wall Street, New York 5, N. Y.

Nickel... its contribution is Quality

Mt. San Antonio College Library Building. Architects: Austin Field & Fry, A.I.A., Los Angeles, California

The beauty of marble *the durability of concrete...*

TERRAZZO cuts yearly maintenance costs by as much as $.50 p.s.f.

The striking beauty of terrazzo is only one reason for its growing popularity. Today, more and more architects are specifying terrazzo for its long-term economy as well.

One recent study of floor finishes, reported by the National Terrazzo & Mosaic Association, showed an annual per sq. ft. maintenance cost of $0.875 for terrazzo, $1.40 for asphalt tile, and $1.085 for vinyl tile.

Terrazzo needs no waxing or buffing . . . and since it has no wax coating to hold dirt, it needs mopping far less frequently. And terrazzo is a lifetime surface. When resilient tile floors need replacing in 8 or 10 years, the comparative cost advantages of terrazzo sharply increase.

To economy, add design versatility. Terrazzo can be laid in a wide range of colors and custom patterns. It goes beautifully with every style of architecture.

PORTLAND CEMENT ASSOCIATION

An organization to improve and extend the uses of portland cement and concrete

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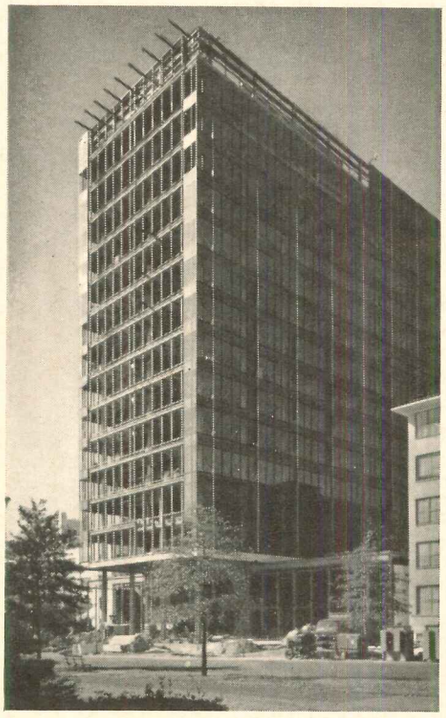
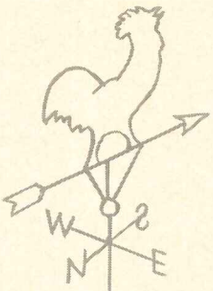


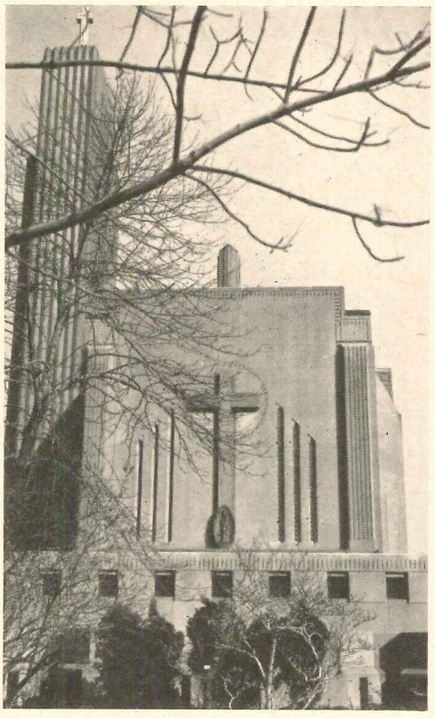


In the East or West,
for big jobs or small,
old jobs or new

the choice is

BFC BETASEAL

169 SEALANT!

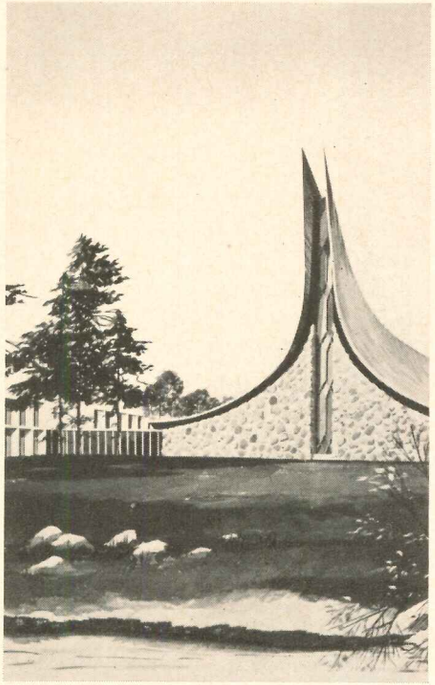


BFC's BETASEAL 169 Sealant is increasingly being used for sealing or caulking jobs on projects of every description.

The reason is simple! This remarkable, synthetic rubber based sealant is tough, long-lasting and resilient. It meets ASA 116.1 and TT-S-00227 specs . . . has excellent adhesion, remains tight under extreme conditions of expansion, contraction and vibration. It offers outstanding resistance to rain, ozone, sunlight and weathering over wide temperature variations.

BETASEAL 169 Sealant is only one of a complete range of outstanding BFC products for architectural use. Others include BETACOTE Coatings, BETATOP floor surfacing materials and world-famous LIQUID ENVELOPE, vinyl-based plastic coatings.

For additional information on any of these products, return coupon.



1. Hoffman-La Roche Research Tower; Nutley, New Jersey
Caulking Contractor: Brisk Waterproofing Co., Inc.; Ridgefield, New Jersey

2. Eastern Airlines Terminal; Kennedy Airport, New York
Caulking Contractor: Grenadier Corporation, New York, New York

3. Loyola University Chapel; Chicago, Illinois
Caulking Contractor: Surface Protection Engineering; Chicago, Illinois

4. Sisters of Mercy Naviate, Farmington, Michigan
Architects: Giffels & Rossetti; Detroit, Mich. General Contractor: James & Savage Corp.; Detroit, Mich. Glass & Glazing Contractor: Ohio Plate Glass Co.; Detroit, Mich.

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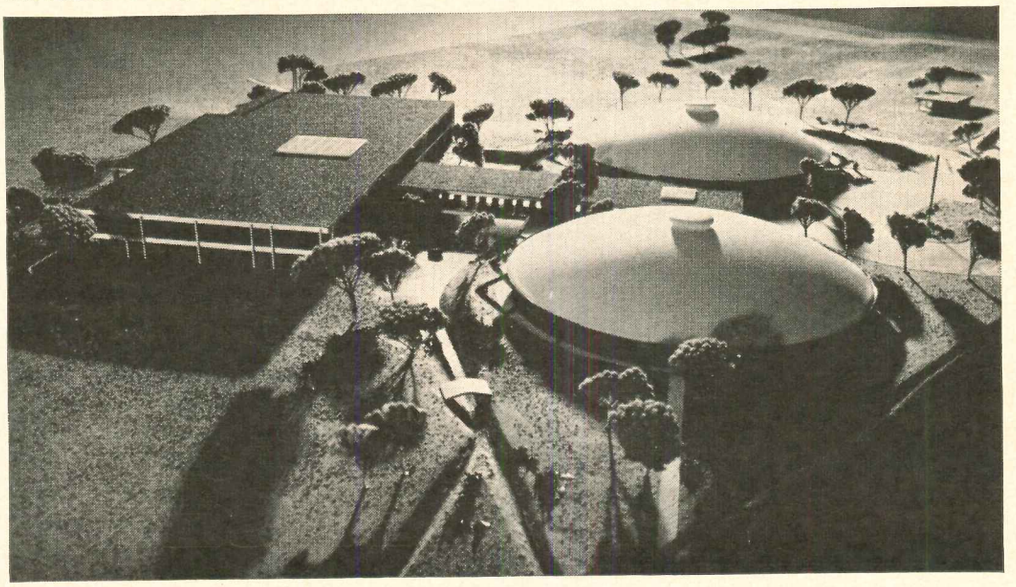
COMPANY_____
ADDRESS_____
CITY_____
STATE_____ ZIP CODE_____

For more data, circle 141 on Inquiry Card

TWIN DOMES WITH 200-FOOT SPANS are distinctive architectural features of this Iowa school complex. One dome covers the field house; the other a fine arts building. Each is supported by 16 wooden arch segments, which meet a steel compression ring at their apex. At their base, a concrete tension ring post-tensioned by the Ryerson BBRV system efficiently and economically compensates for the horizontal thrust—thus relieving the foundation of this load.

Warren G. Harding Junior High School, Cedar Rapids, Iowa; Architects: Kohlmann-Eckman-Hukill; **Structural and Foundation Engineers:** Shive-Hall-Hattery Engineering Services; **Contractor:** Abell-Howe Company.



NEW STRUCTURES SHOW ADVANTAGES OF

PUERTO RICO'S LARGEST, MOST MODERN OFFICE BUILDING will be Banco Popular Center, a 19-story tower now being built at San Juan. The builder wanted maximum areas of unobstructed, column-free floor space, and this was achieved economically with post-tensioned one-way joist slabs—maximum spans are about 40 feet. Ryerson BBRV post-tensioning also made it possible to build each floor (slab, joists and girders) as a monolithic structure with elements combined to achieve shallowest possible structural depth.

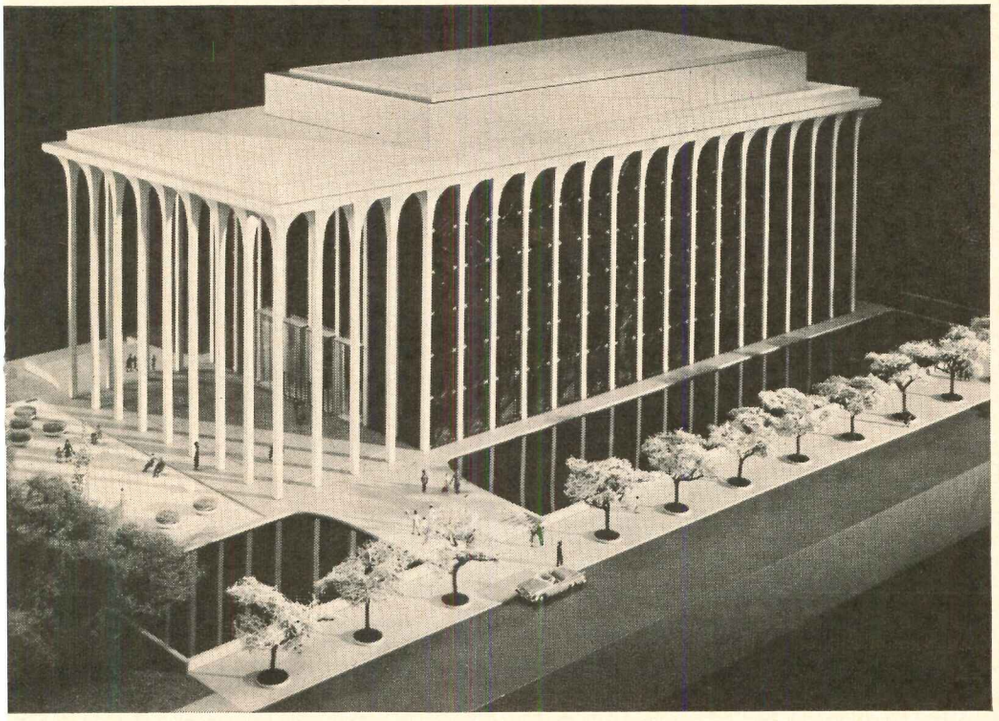
Banco Popular Center, San Juan: Project Manager and Rental Agents: Cushman & Wakefield, Inc.
Architects: Toro-Ferrer, and Kahn & Jacobs
Structural Engineers: Dinos & Vafi, and Lev Zetlin & Associates
General Contractor: George A. Fuller Company of Puerto Rico
Subcontractor for Concrete Work: Pavarini Construction Co., Inc. of Puerto Rico
Subcontractor for Rebar & Post-Tensioning: G & H Steel Service, Inc.

When you specify Ryerson post-tensioning you deal with one of the nation's largest suppliers of construction steels —a company with the resources and facilities to provide a complete service package.

For architects and engineers this package includes assistance in feasibility studies on use of post-tensioning in specific projects...preliminary cost data...sharing of experience in structural design and layout...plus specification information and detailing.

For contractors Ryerson delivers tailor-made tendons, completely assembled and ready for placement. Also provided: equipment for stressing and grouting, technical jobsite assistance, architect-approved drawings, stressing data and reliable labor estimates.

For more information or help on a current project, call the nearest of Ryerson's 20 plants or write Box 8000-A, Chicago Illinois 60680

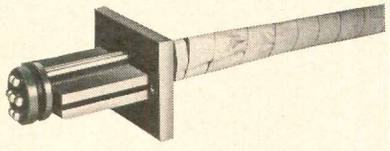


THE 63-FOOT SPAN REQUIRED BY A DEEP COLUMN-FREE PORTICO was achieved here without affecting the striking appearance of structural lightness by the use of post-tensioned concrete. Six interior beams spanning the portico at roof level each contain four 30-wire Ryerson BBRV tendons. Stressing of exterior beams is accomplished with two 40-wire units.

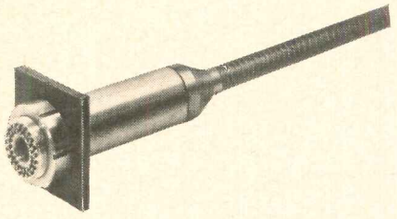
Office Building for Northwestern National Life Insurance Co., Minneapolis, Minnesota; Architects and Engineers: Minoru Yamasaki and Associates; **Structural Engineers:** Worthington, Skilling, Helle & Jackson; **Contractor:** George A. Fuller Company.

BBRV POST-TENSIONING BY RYERSON

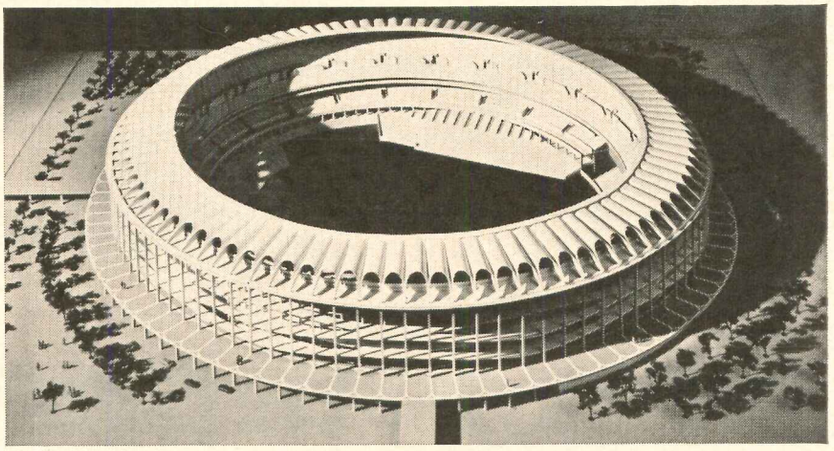
BONDED OR UNBONDED TENDONS ...LOCKNUT OR SHIM-TYPE ANCHORAGE...FOR POSITIVE END ANCHORAGE AND RELIABLE APPLICATION OF FORCES



Typical movable end anchor of Ryerson BBRV *unbonded* (greased and wrapped) tendon after stressing.



Typical movable end anchor of Ryerson BBRV *bonded* (grout type) tendon after stressing.



NO ONE ENDS UP BEHIND A POST in this handsome 50,000-seat sports stadium. Extreme cantilevers, made possible by Ryerson BBRV post-tensioning of the concrete girders, will keep columns back out of sight lines. The outer edge of the oval roof canopy extends 50′ over the upper seating deck. And the upper deck, in turn, cantilevers 40′ over the lower deck. Roof and deck each have 96 beam lines and the girders, 75′ and 67′ long respectively, are each post-tensioned by 6 tendons of 42 or 43 wires.

Civic Center **Busch Memorial Stadium; Engineers and Architects:** Sverdrup & Parcel and Associates, Inc.; **Architect-Designer:** Edward Durell Stone; **Associate Architects:** Schwarz & Van Hoefen; **Contractors:** Fruin Colnon Contracting Co. and Millstone Construction Co.

RYERSON

JOSEPH T. RYERSON & SON, INC., MEMBER OF THE INLAND® STEEL FAMILY

Re-Bars and Accessories • Post-Tensioning • Spirals • Wire Mesh • Open-Web Joists • Sheet Steel Piling and Bearing Piles • Structural Shapes and Tubing • Safety Plate • Stainless Steel • Aluminum Building Products • PVC Water Stops • Expanded Metal • Grating, etc.

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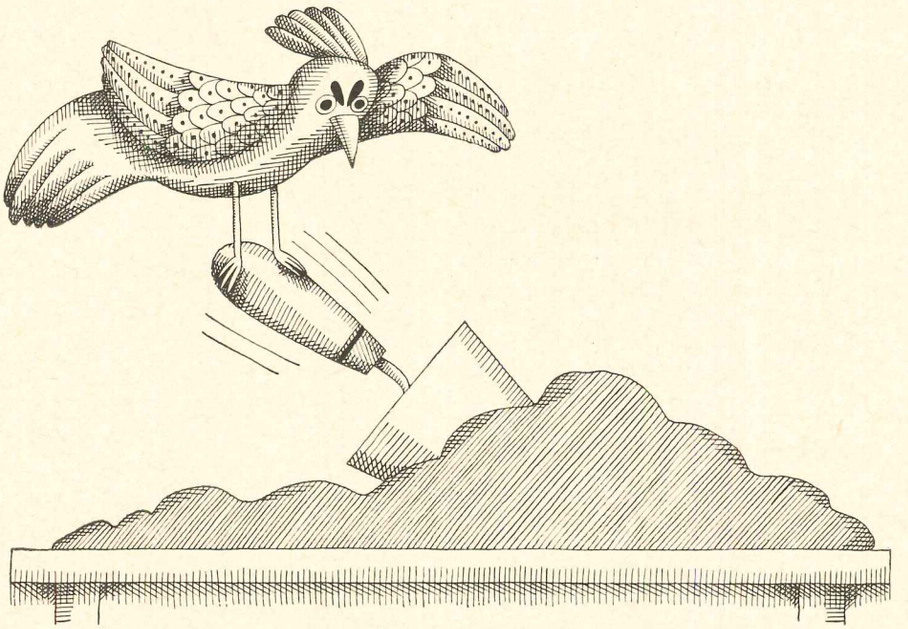
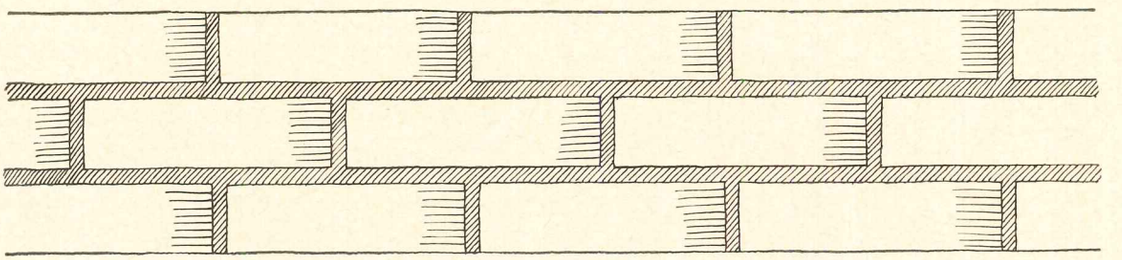


No lost temper



with a well-behaved mortar

Atlas Masonry Cement makes good workmanship easier.

A well-behaved mortar is plastic and cohesive. And it watches its temper so it doesn't go stiff on the mortar board. Atlas Masonry Cement provides a workable mortar with longer board life. It seldom needs retempering on the job. It works smoothly under the trowel. Yet it has good body to prevent droppage and waste . . . hold joint thickness and alignment. Masons know that waterproofed Atlas Masonry Cement assures mortar uniformity – in workability, color, strength and yield, batch after batch. Everything except sand and water is delivered in one bag. Proportioning errors are minimized. It exceeds rigid ASTM and Federal Specifications. Good masonry workmanship comes easier with this product of Universal Atlas Cement, 100 Park Avenue, New York, N. Y. 10017.

USS **Universal Atlas Cement Division of United States Steel**

"USS" and "Atlas" are registered trademarks M-98

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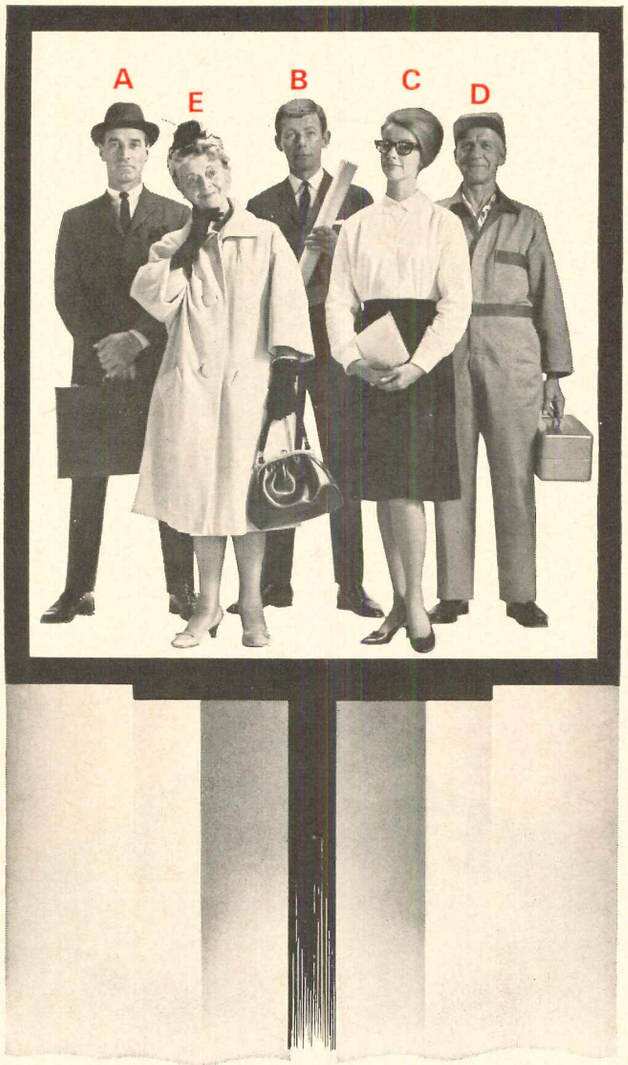
THINKING ABOUT HYDRAULIC ELEVATORS?



A Businessman "Cost less to install and operate . . . maintenance costs are down . . . the general office efficiency is up . . . Fewer holdups."

Hydraulic Elevators cost less to buy . . . to install . . . to operate . . . to maintain. Controls are designed for simplicity.

B Architect "A sensible investment for a good many buildings up to 7 floors . . . Hydraulic elevators require no penthouse construction . . . work equally well in apartment houses, office buildings and factories . . . Take any kind of cabs and doors."

No penthouse "overhead" . . . saves on construction costs . . . wide range of cab designs and colors . . . perfect leveling.

C Secretary "That floor indicator light is the only way you can see the elevator is moving. It just floats you up. The cab design is a real dream too."

Smoothness of operation is perhaps the outstanding feature of a quality hydraulic system.

D Maintenance Man "They don't need to see you too often. No complaints from tenants . . . just a regular checkup . . . all systems go on these Turnbull Hydraulics. Wish they were all like that . . ."

Long life and little actual maintenance are to be expected when hydraulic systems are installed.

E Housewife "My goodness . . . this elevator feels so safe and steady! And it's so good looking."

All modern elevators are safe madam . . . but we agree with you about the smooth ride and good looks of a Turnbull Hydraulic Elevator.

For information and illustrated brochure contact:

- Electric and Hydraulic Passenger and Freight Elevators
- Dumbwaiters
- Moving Walkways
- Power Scaffolds

TURNBULL ELEVATOR

Executive Offices: 311 W. 43rd Street, New York 38, N.Y./ Sales Offices: Atlanta, Georgia; Philadelphia, Pa.; Columbia, S.C.; San Francisco, Los Angeles, Calif./ Canada: Head Office: Toronto/Branches in Principal Cities

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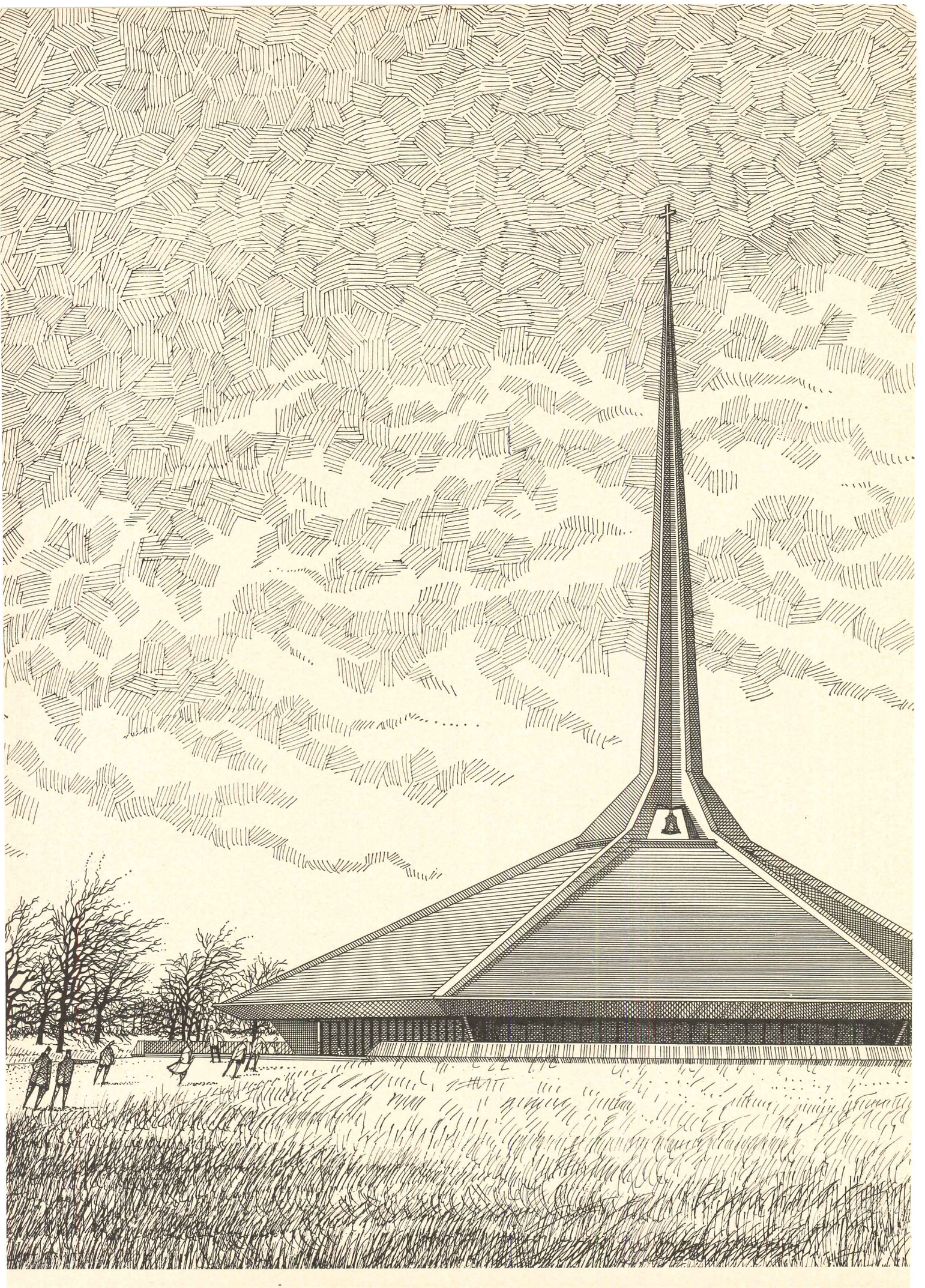
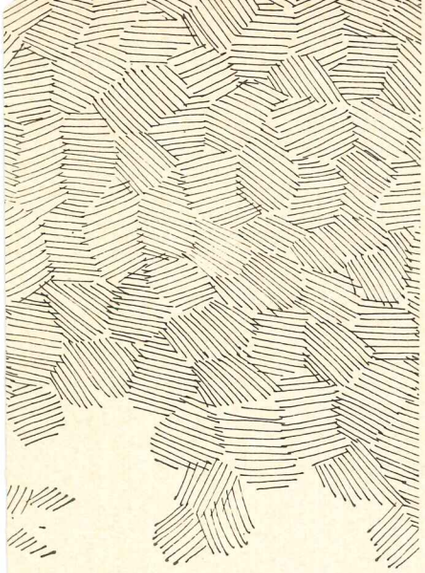
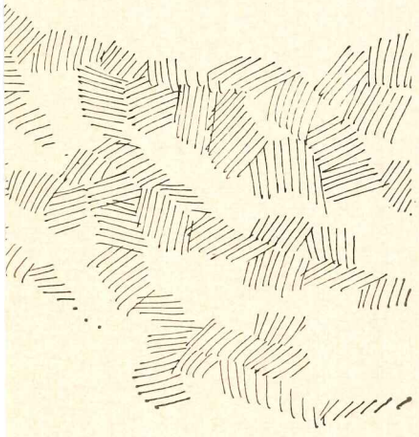




ARCHITECTURE'S BEST-READ PUBLICATION...

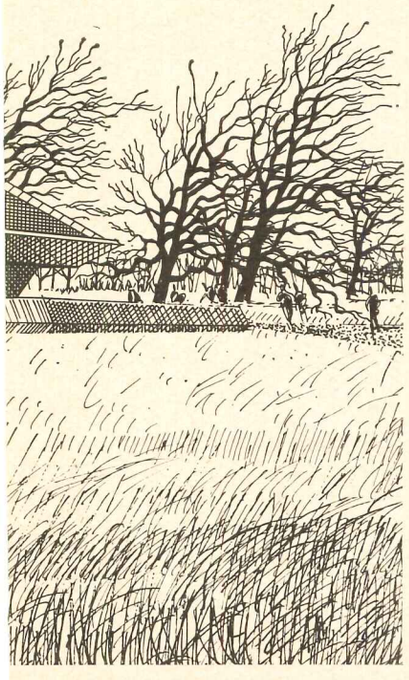


. . . is Architectural Record, according to the results of 207 independently sponsored readership surveys which have been conducted among architects and engineers since 1937.

It is best-read because, through its exclusive information sources, it best serves the needs of its readers in terms of the work actually on their drawing boards. For example, each month the Record presents a Building Types study known through Dodge Reports, McGraw-Hill/Dodge Construction Statistics and Continuing Readership Research, to be of outstanding current interest to architects and engineers. In addition, there are featured building presentations that represent the finest architectural achievements at home and abroad — buildings such as Eero Saarinen's North Christian Church shown in our illustration.

These two editorial elements combined with definitive articles on architectural-engineering, philosophy, construction trends and costs, news and new products — make up "architecture's best-read publication."

Want proof? Write for your copy of 207 independently sponsored readership surveys, or better yet, conduct your own survey.



North Christian Church, Columbus, Indiana
Architects: Eero Saarinen and Associates
Drawing by Davis Bité

ARCHITECTURAL RECORD 330 WEST 42ND STREET NEW YORK, N. Y. 10036

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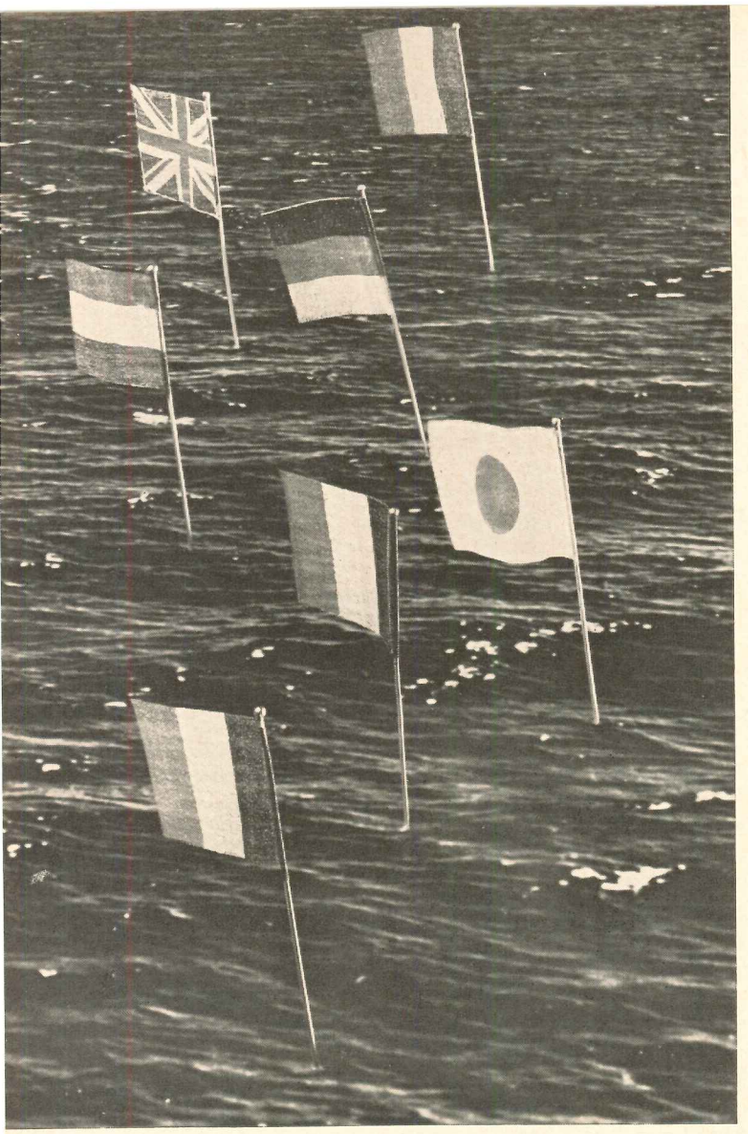

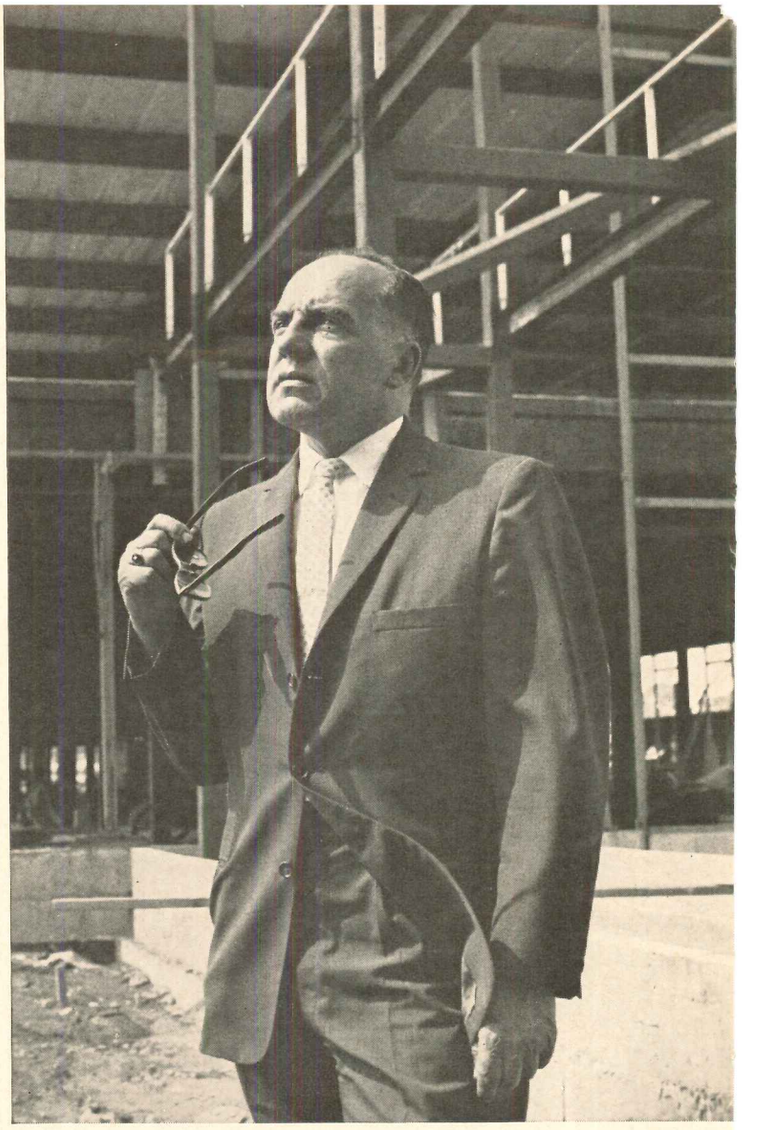

Who gains when foreign structural steel is used in your building? Do you, Mr. Owner?

Foreign structural steel might possibly be priced lower than American-made structural steel. But you might be surprised, upon investigation, at how little (if anything) *you* actually save.

Then ask your architect and engineer which kind of steel *they* prefer—foreign or American-made. We'll eat our hard hats if they don't say "American-made steel."

Remember, your architect and engineer are *responsible* for the structural integrity of your building. That's why they want to be 100% sure that the called-for grades of steel are being supplied. That's why they want *guarantees* for every pound of structural steel delivered.

And because they want to keep your building on schedule, they want a steel source close to home, so that deliveries will be on time and emergencies easy to handle.

American producers stand behind the structural steel they sell. All their production facilities and all their people are as near as your telephone.

Last year some 5-1/2 million tons of foreign steel came into this country. Those 5-1/2 million tons displaced 35,000 American steelworker jobs, and would have meant a payroll of approximately $250 million for American steelworkers. How much of that money might have been spent to buy the goods or services you sell? How many tax dollars did our country lose . . . tax dollars you'll have to help make up? Bethlehem Steel Company, Bethlehem, Pa. *Export Sales:* Bethlehem Steel Export Corporation.

Steel

Steel for Strength

BETHLEHEM STEEL

BETHLEHEM STEEL

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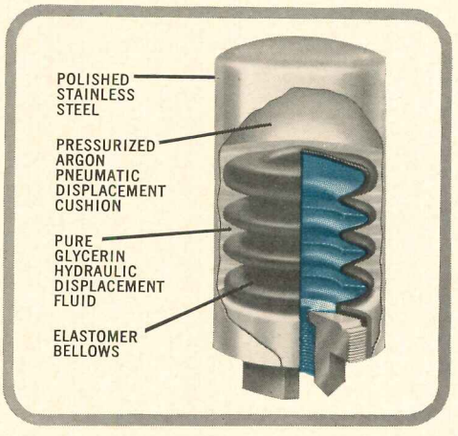
THIS IS THE JOSAM ABSORBOTRON™

THE *NEW* SHOCK ABSORBER WITH HYDRO-PNEUMATIC ACTION
Cuts big shocks down to dead silence

Now . . . Josam can state without reservation that it has developed the completely effective means of controlling hydrostatic shock pressures and water hammer — — with the new ABSORBOTRON Shock Absorber. Josam makes this statement after years of testing under the most rigorous conditions ever endured in any shock absorber. In all cases, the ABSORBOTRON units are functioning as quietly and efficiently as the day they were installed. They have the unqualified endorsement of users who never before found any satisfactory solution to their water hammer problems.

The ABSORBOTRON is a major "breakthrough" in design and construction . . . provides positive assurance that when sized and installed properly, it will effectively and permanently absorb hydrostatic shock by reducing shock pressures to within safe limits that do not exceed 150 P.S.I. This is the normal working pressure at which all plumbing and piping systems and equipment are designed to operate safely. Excessive pressures being eliminated, there is no shock . . . no water hammer with the new ABSORBOTRON.

Get full details and sizing data by writing for free Manual SA-2 today.



Key to the unmatched performance of the ABSORBOTRON is its free-flexing elastomer bellows which directly absorbs and transmits the pressures of hydrostatic shock into the hydro-pneumatic displacment cushion without any restriction. Bellows responds instantly to the slightest pressure — — absorbs the shock immediately . . . eliminates water hammer.

JOSAM

JOSAM MANUFACTURING CO.

Michigan City, Indiana

JOSAM PRODUCTS ARE SOLD THROUGH PLUMBING WHOLESALERS

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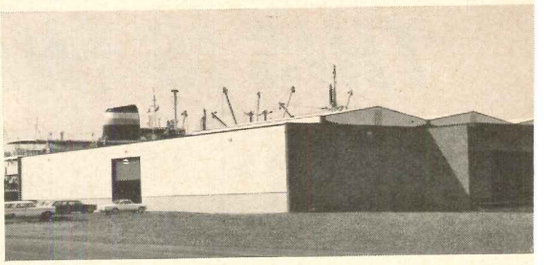
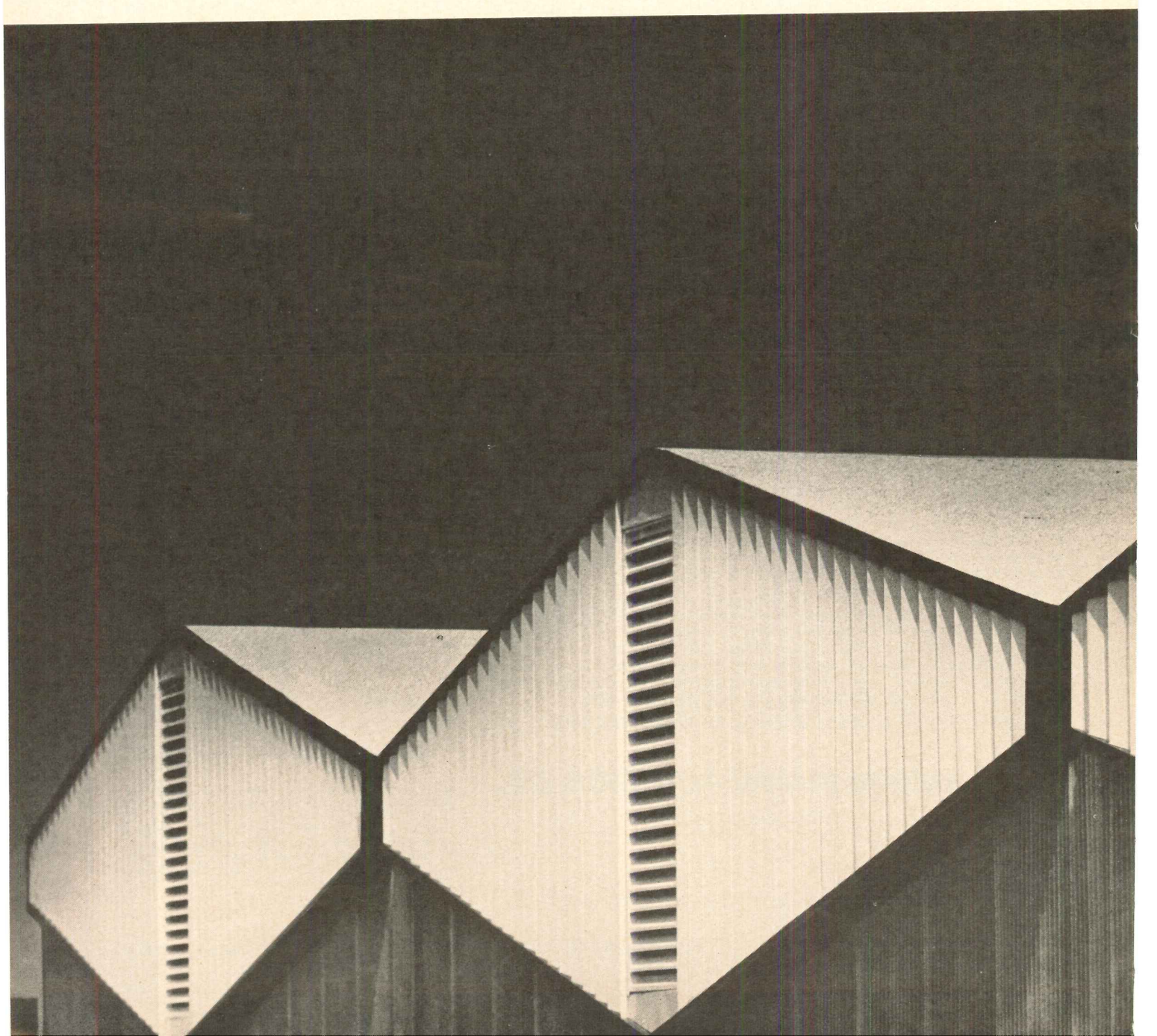
Siding on this lake-front building has a remarkable new finish that outperforms baked enamel 3 to 4 times: Du Pont TEDLAR®





Despite its location on the shore of Lake Erie, exposed to extremes of weather, the siding on this new Transit Building will stay fresh and new-looking for many years. It's surfaced with a new and amazingly tough finish: TEDLAR* PVF film.

Even though these panels with TEDLAR cost more than panels finished with baked enamel, maintenance costs will be lower because TEDLAR is three to four times more resistant to fading and chalking. And TEDLAR has a smooth, stain-resistant surface that does not trap dirt.

TEDLAR proved itself during construction of this building when strong winds spilled a bucket of tar over panels surfaced with TEDLAR as well as some painted parts stacked on the site. Workmen were unable to remove the tar from the painted surfaces, yet the TEDLAR was easily cleaned and restored to original appearance.

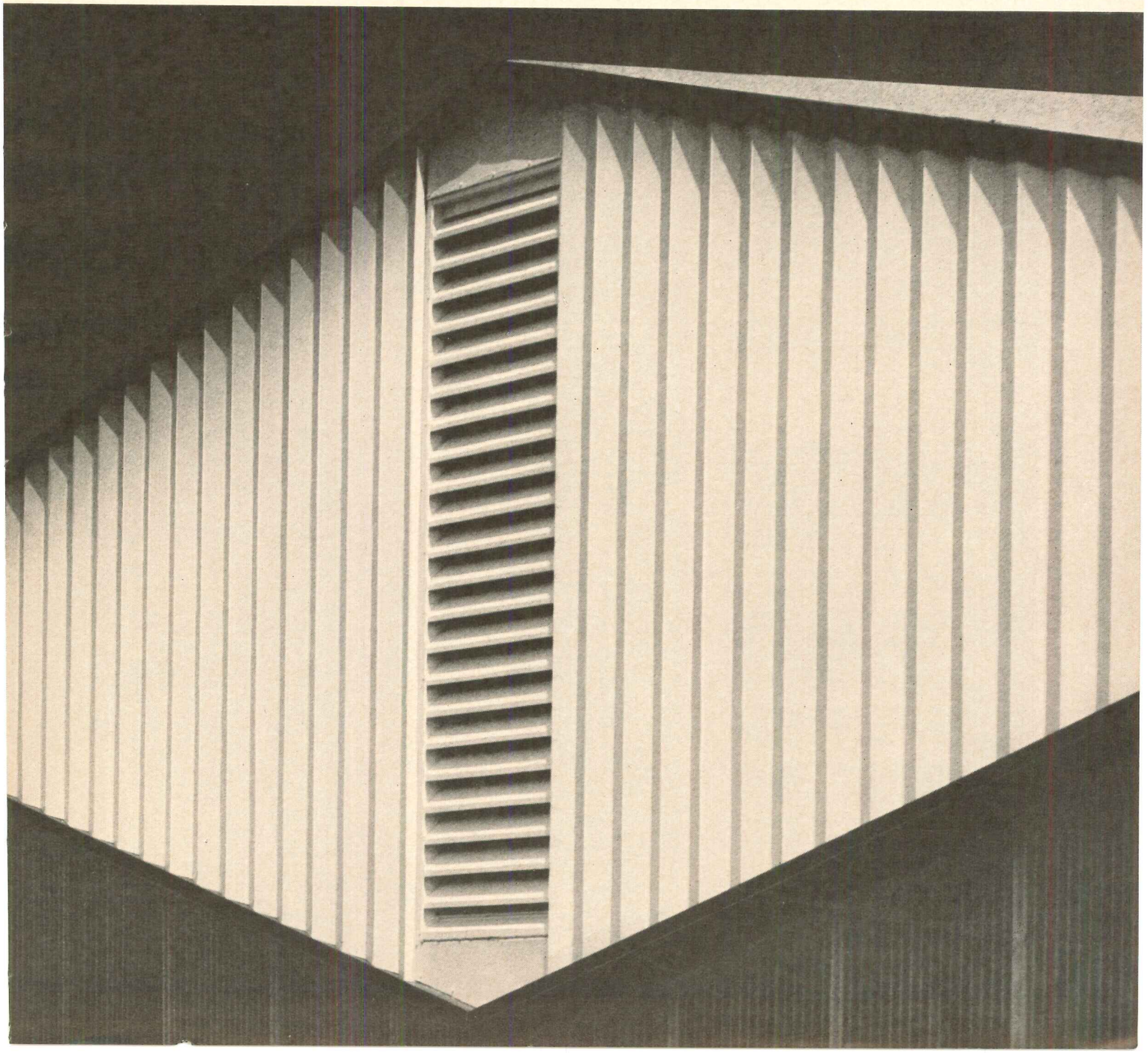
The metal building panels, surfaced with TEDLAR, are made and erected by Elwin G. Smith Co. More and more architects are specifying TEDLAR as the finish on roofing and siding. Du Pont Film Dept., Box 125A, Wilmington, Delaware 19898.

Transit Building, Department of Port Authority, Cleveland, Ohio
Architect: Alexander A. Papesh, Cleveland, Ohio
Engineer: Osborn Engineering Co., Cleveland, Ohio
Contractor: Geo. A. Rutherford, Inc., Cleveland, Ohio

*Du Pont registered trademark for its polyvinyl fluoride film.

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*



ARCHITECTURAL RECORD

Published by McGraw-Hill, Inc., 330 West 42nd Street, New York, New York, 10036.

SEMI-ANNUAL INDEX

VOLUME 136
JUNE-DEC. 1964

Readers using the index will find buildings, with only a few exceptions, entered in three ways: by architect's name, by owner's name, and by building type (apartments, hospitals, schools, etc.). Still other categories cover the special subject dealt with in the magazine's engineering section (concrete, lighting, prefabrication, etc.).

ABBREVIATIONS: BTS—Building Types Study; AE—Architectural Engineering; TSS—Time-Saver Standards; BC—Building Components

Q

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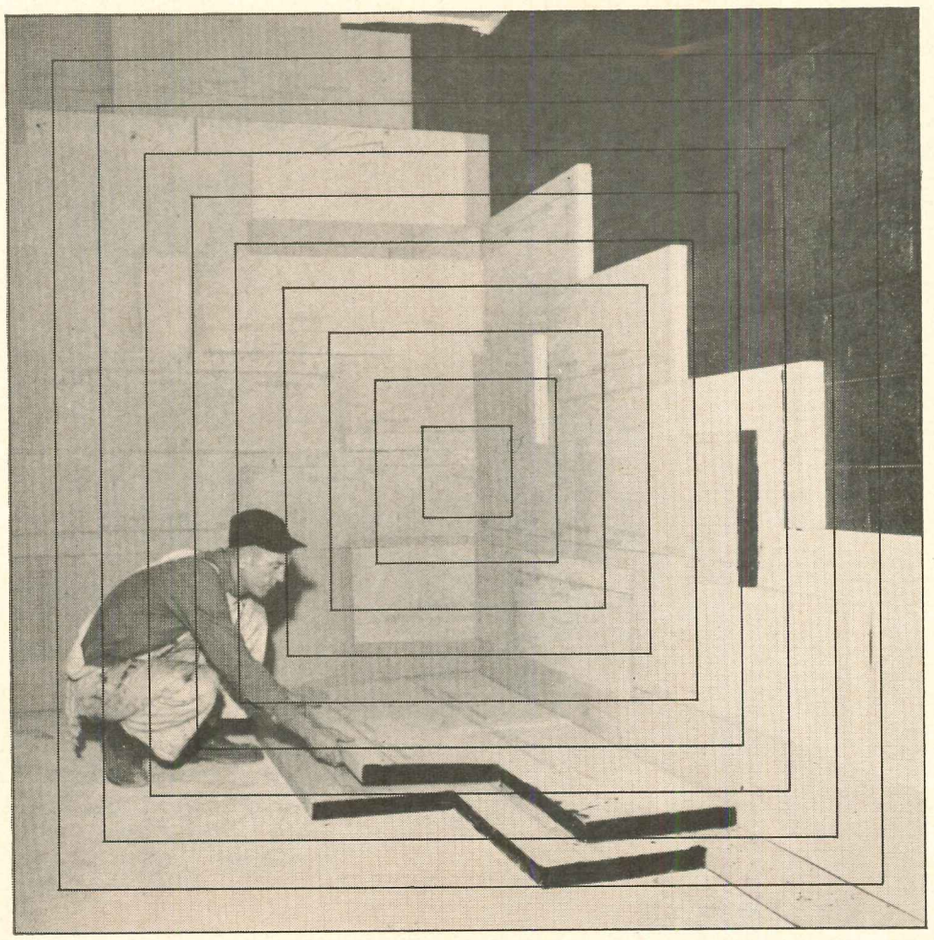
XYZ

Required Reading

Index to Advertising

PRE-FILED CATALOGS of the manufacturers listed below are available in the 1964 Sweet's Catalog File as follows: (A) Architectural File (green), (IC) Industrial Construction File (blue), (LC) Light Construction File (yellow).

NEW YORK—James E. Boddorf, Advertising Sales Mgr., Sam H. Patterson, Promotion Mgr.; Joseph R. Wunk, Advertising Production Mgr., 330 W. 42nd St.; NEW YORK SALES OFFICE—John I. Howell, James B. Ryan, Donald T. Lock, 500 Fifth Ave.; ATLANTA—Shelden F. Jones, 1375 Peachtree St., N.E.; CHICAGO—Robert T. Franden, James A. Anderson, Robert Kliesch, 645 N. Michigan Ave.; CLEVELAND—John C. Jackson, Louis F. Kutscher, 55 Public Square; DALLAS—Bradley K. Jones, Vaughn Building; DENVER—John W. Patten, 1700 Broadway; DETROIT—Louis F. Kutscher, 856 Penobscot Bldg.; LOS ANGELES—Robert L. Clark, 1125 West Sixth St.; PHILADELPHIA—Michael J. Davin, John A. Teefy, 6 Penn Center Plaza; PITTSBURGH—John C. Jackson, Four Gateway Center; ST. LOUIS—Richard Grater, 7751 Carondelet Ave.; SAN FRANCISCO—Tom Tredwell, 255 California St.



Zer-O-Cel insulation, based on a Hetrofoam polyol system, saves space in this built-in freezer at Revere Smoked Fish Company.

He's building space into a freezer

This built-in freezer must maintain temperatures as low as −20° F.

Yet look how thin the insulation is! It's Zer-O-Cel,* a polyurethane foam based on Hetrofoam.® It is so efficient, a four-inch thickness does the job of eight inches of ordinary insulation.

It adds 626 cubic feet, or 17% more storage space, to this freezer.

Uses hot asphalt, eliminates the need for the more expensive cold mastics and adhesives. Double layers of asphalt-coated, two-inch-thick slabs are installed against asphalt-primed walls and set into hot asphalt on the flooring.

Nontoxic. It has been approved by the U. S. Department of Agriculture as a nontoxic material for use in food processing and storage.

Retards fire. It has been rated nonburning by ASTM-D-1692 test conducted by the Pittsburgh Testing Laboratory.

We'd like to tell you more about the properties that make Hetrofoam-based polyurethane foam an ideal material for many architectural and construction applications. Please write Durez® Plastics Division, Hooker Chemical Corporation, 8012 Walck Road, North Tonawanda, N. Y. 14121.

**Zer-O-Cel is a registered trademark of National Gypsum Company.*

HOOKER CHEMICALS® PLASTICS

DUREZ PLASTICS DIVISION

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For more data, circle 150 on Inquiry Card ➔

Installation: Britt's Department Store, Alhambra, Calif.

Architect: Carl Maston, Los Angeles

Floor shown: V-423 Autumn Haze

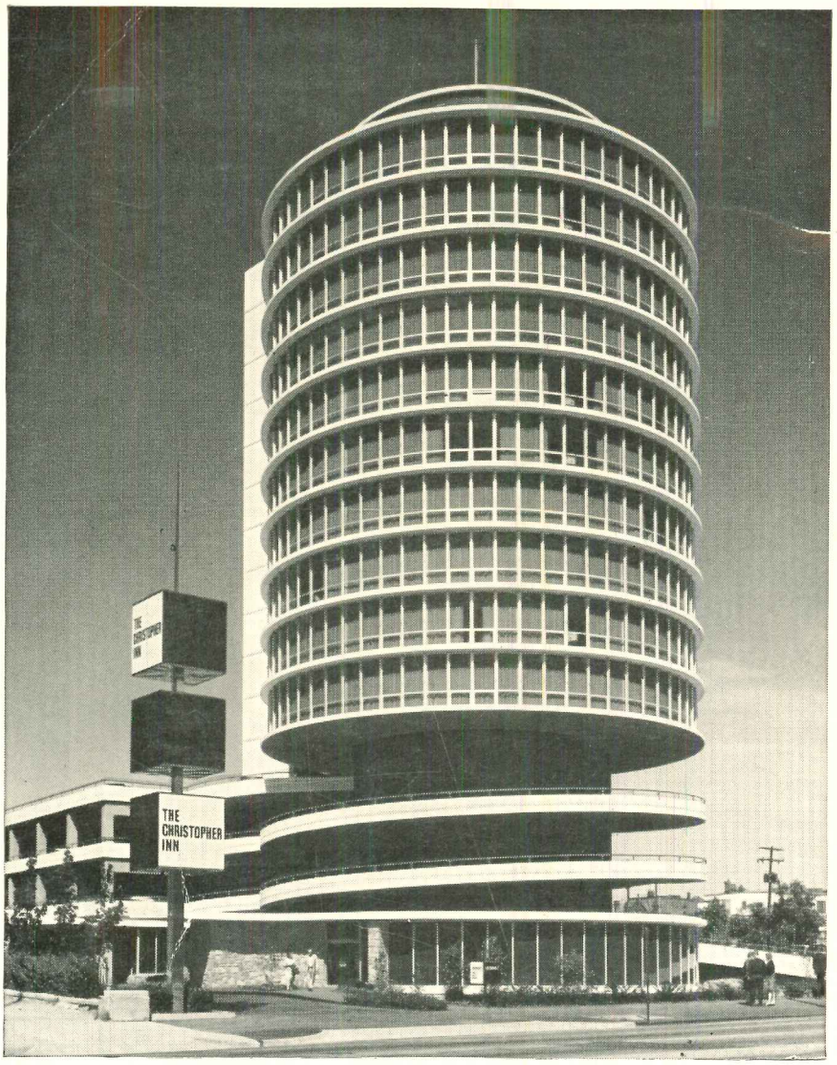
Creative styling: an inherent quality of Azrock floors.

Good floor design need not be sacrificed for superior performance under heavy traffic, as demonstrated by the Azrock vinyl asbestos floors* in service at Britt's Department Store, Alhambra, California. Scientifically planned for shopper convenience, Britt's has floors of Azrock Premiere Series — the high-performance resilient flooring with patterning through the thickness of the tile. For styling and durability, there's nothing quite like Premiere.

an exclusive floor by **AZROCK**®

Consult Sweet's Catalog or write for samples. Azrock Floor Products Division, Uvalde Rock Asphalt Company, 523A Frost Building, San Antonio, Texas 78206.

**Also known as Vina-Lux*



The Christopher Inn, Columbus, Ohio's first downtown motor hotel, is a striking 16-level circular cantilevered tower. The Inn has 140 rooms, beginning on the fifth level. Parking for 110 cars is provided on second, third and fourth levels. High speed elevators provide rapid service to all floors. Central core houses utility shafts and stairwell. To rear of tower is a 5-story rectangular building with meeting and dining room accommodations for up to 500 people.

LOUIS F. KARLSBERGER & ASSOCIATES
architects

HEAPY & ASSOCIATES
mechanical engineer

ELFORD, INCORPORATED
general contractor

PIPING CONTRACTORS COMPANY
plumbing contractor

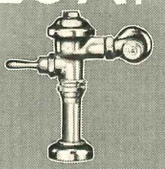
AMSTAN SUPPLY DIVISION
plumbing wholesaler

AMERICAN STANDARD
fixture manufacturer

The Christopher Inn

—*a luxury motel selects* SLOAN FLUSH VALVES

■ Flush valves, like the "brick and mortar" of a building, can be a one-time investment if carefully selected. Sloan Flush Valves have that kind of reputation—millions of them are in dependable daily service—and have been for years and years on end. As in the Christopher Inn, Sloan Flush Valves are installed in the vast majority of the nation's fine buildings. They are one product for your new building you can specify with absolute confidence—and we assure you, with pride, most people do.

SLOAN

FLUSH VALVES

SLOAN VALVE COMPANY • 4300 WEST LAKE STREET • CHICAGO, ILLINOIS 60624

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