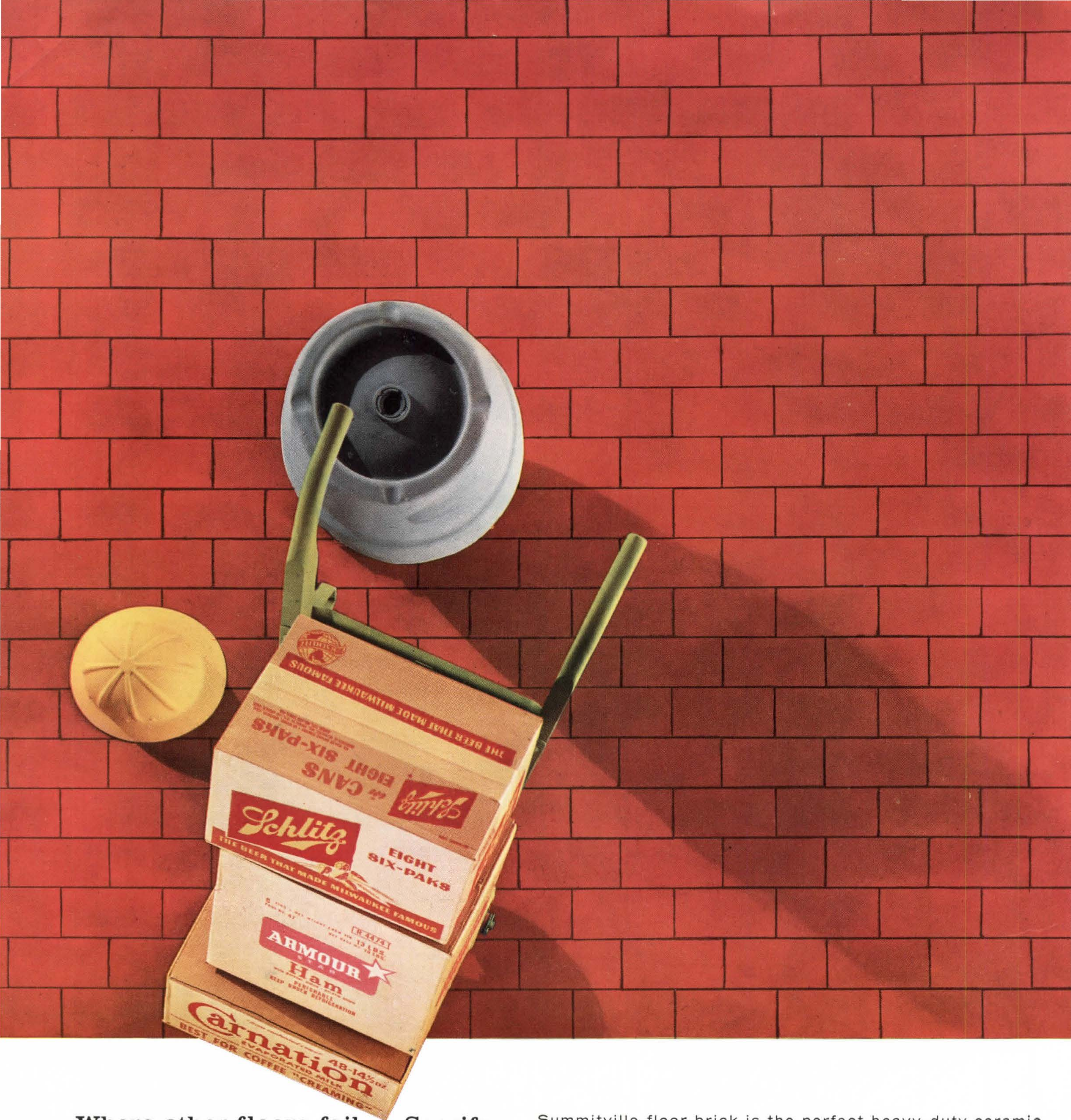
PROGRESSIVE ARCHITECTURE *October 1960*



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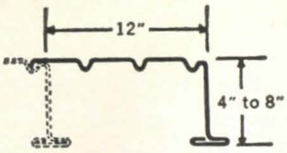
REINHOLD



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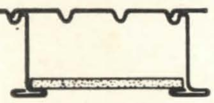
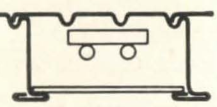
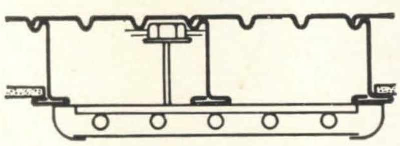
Ceiling *Treatments with* T-Steel Deck



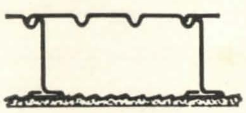
Standard Tile or Board



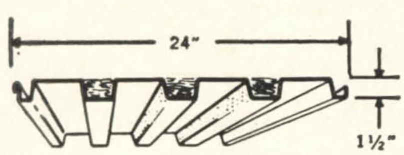
Light Diffuser



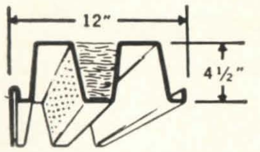
Surface-mounted Fixture



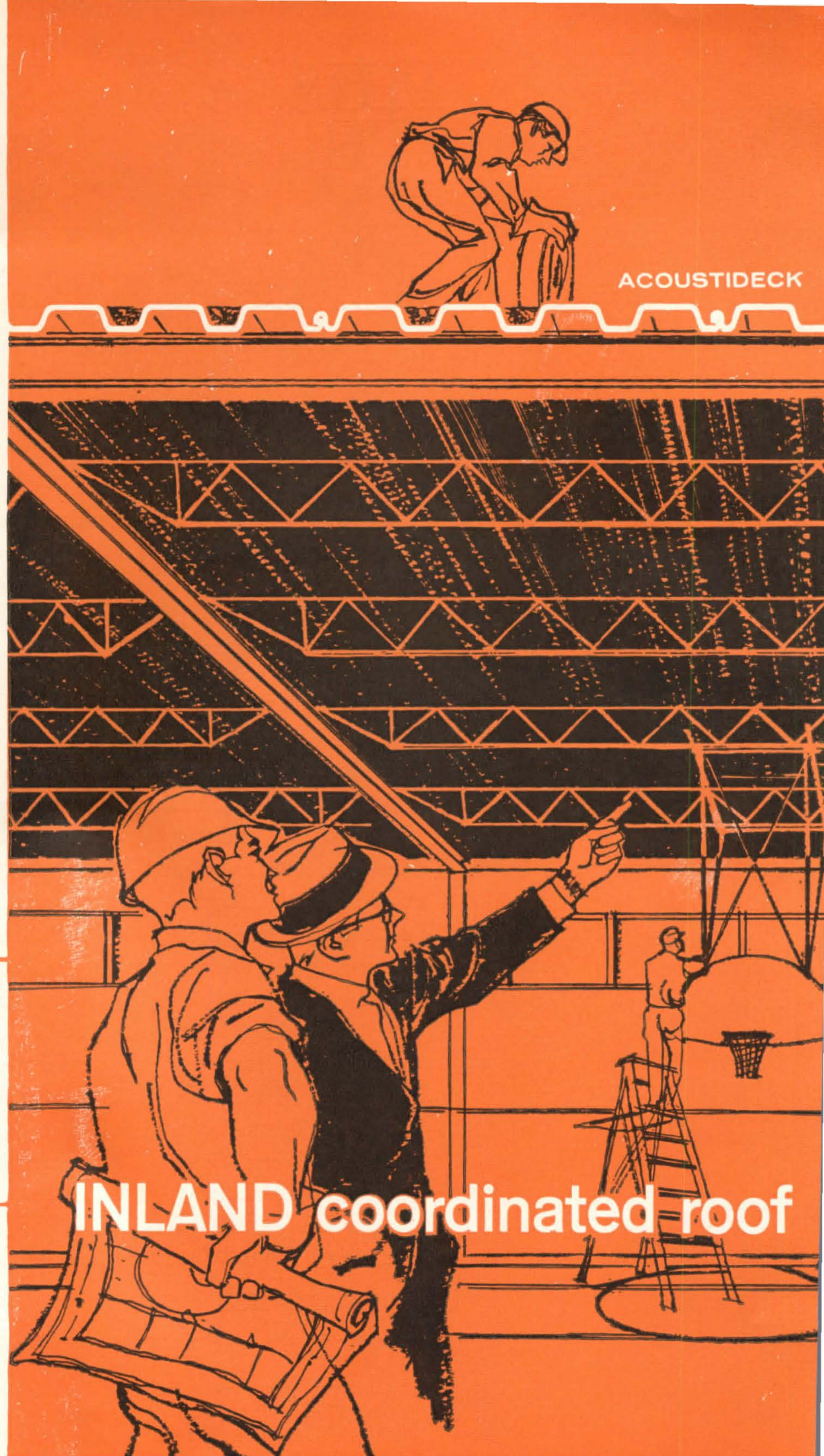
Lath-and-Plaster Fireproofing



TYPE B ACOUSTIDECK — For purlin spacings to 10′. Uses minimum of 1″ rigid insulation board.



TYPE C ACOUSTIDECK — For purlin spacings to 24′. Uses minimum of 1½″ rigid insulation board.



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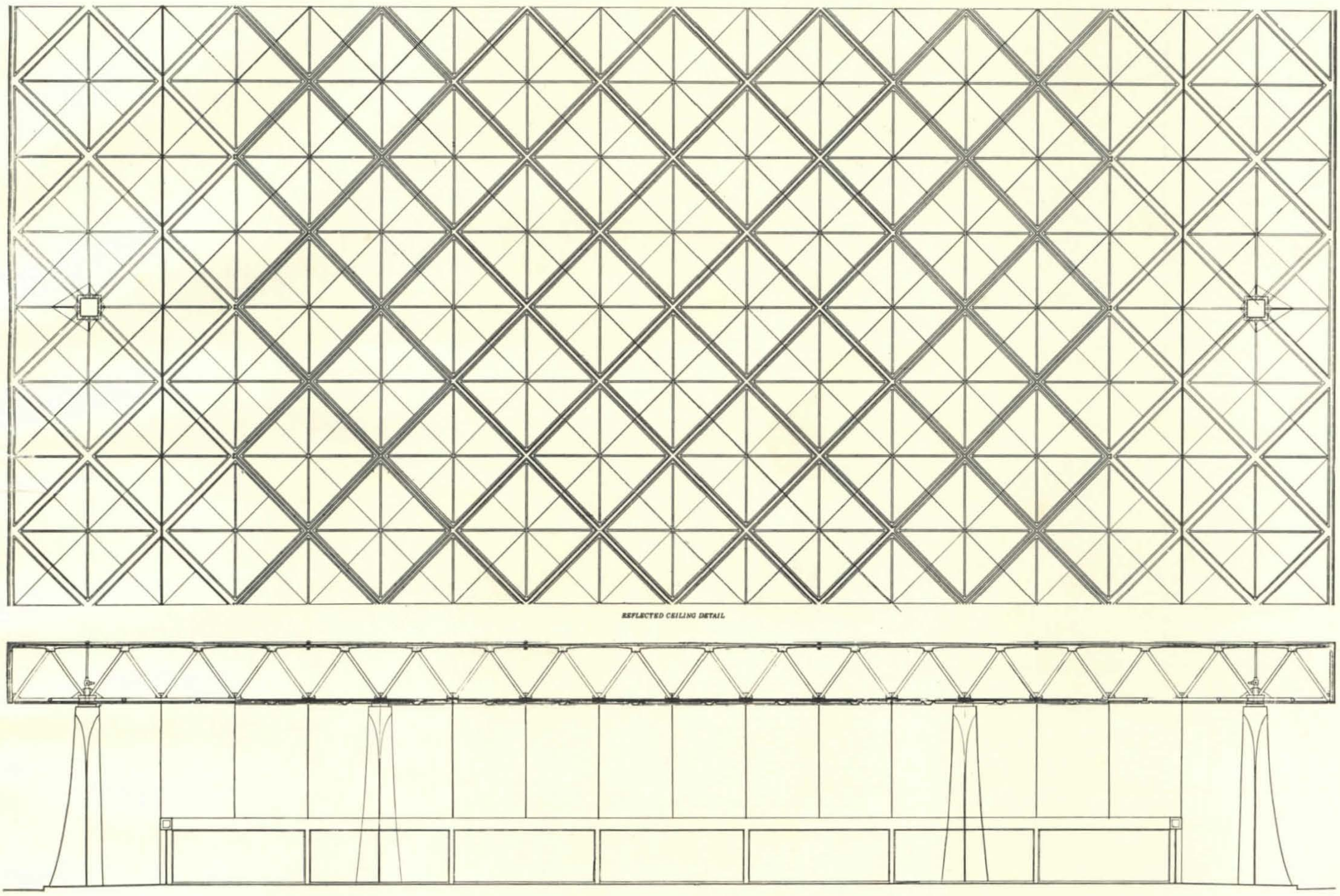
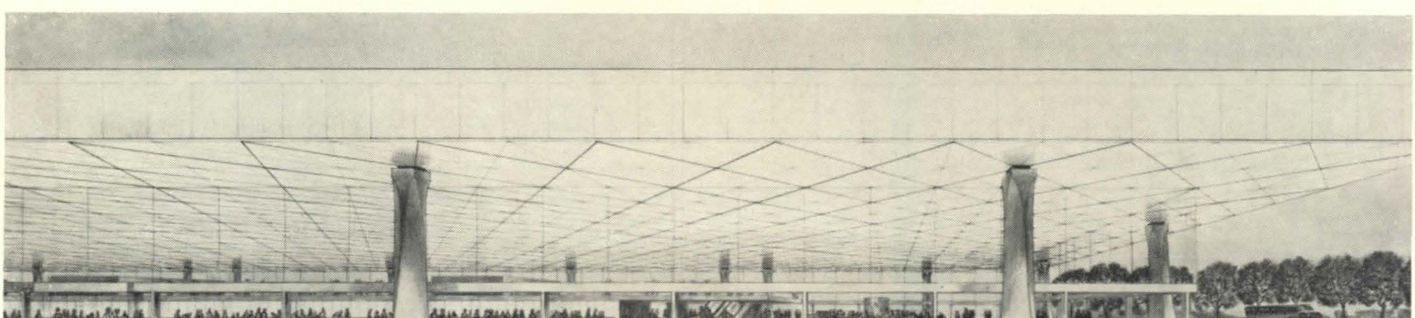
PROGRESSIVE ARCHITECTURE OCTOBER 1960

NEWS REPORT

Architecture's Monthly News Digest of Buildings and Projects, Personalities, New Products

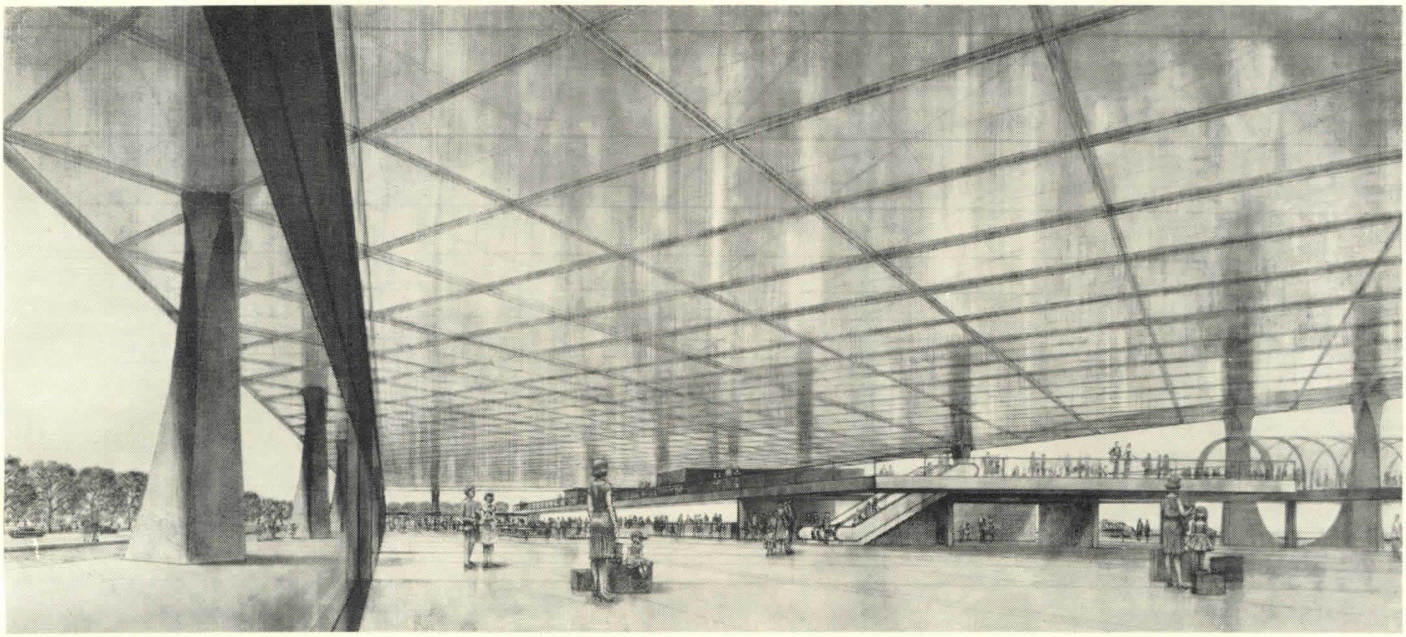




Winner of the invited competition for the design of the multiairline terminal at New York International Airport—I. M. Pei.

For more information, turn to Reader Service card, circle No. 300

Rendering: Ara Derderian

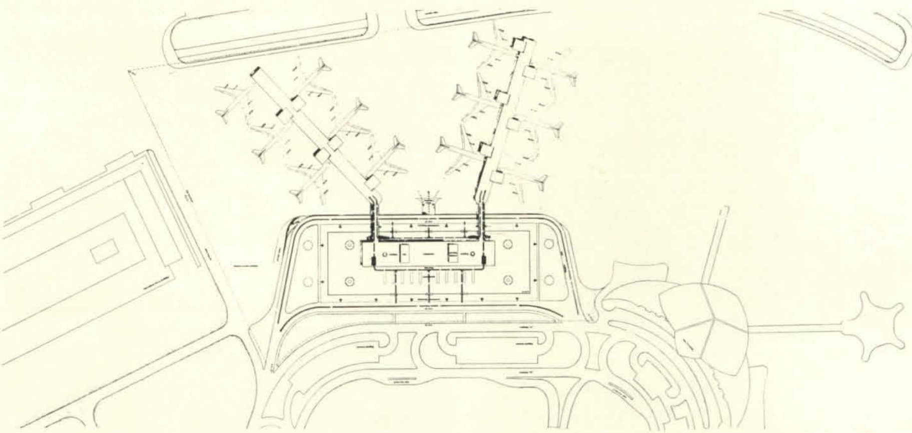


I. M. Pei Wins Idlewild Terminal Competition

Multiairline Building Will Be Glass Pavilion

NEW YORK, N. Y. An invited competition for the design of a new multiairline terminal building at New York International Airport has been won by I. M. Pei of I. M. Pei & Associates. Jury for the five-entry competition, sponsored by the Port of New York Authority, consisted of Wallace K. Harrison, Pietro Belluschi, and L. Bancel LaFarge, with Robert W. McLaughlin as professional advisor. The building will accommodate all airlines not housed in the foreign-flag Airline Wing Building or the six domestic airline unit terminals. Site is next door to Eero Saarinen's TWA Terminal, now under construction.

The Pei design provides a block-long, two-story-high rectangular pavilion glazed on all four sides. A space-frame roof will be supported by free-standing reinforced-concrete pylons outside the glass walls. The main level will contain ticketing desks, baggage check and claim facilities, and waiting areas. The mezzanine will have a restaurant and bar, concessions, and more waiting areas. Baggage handling areas, offices, and mechanical spaces will occur at the subsurface level. The terminal will have two fingers with a total of 12 gate positions.



Site plan for multiairline terminal shows relations to Saarinen's TWA terminal.

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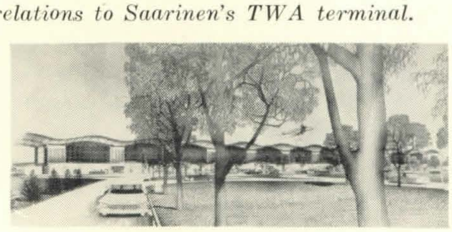

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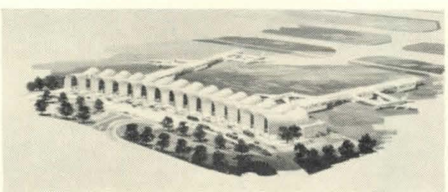

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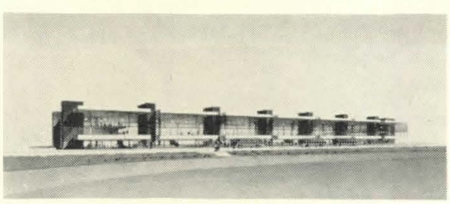

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Pei's submission describes the roof as a space frame composed of steel-pipe tetrahedrons in a checkerboard pattern on a $12\frac{1}{2}$ ft orthogonal grid. They are tied together at top by a reinforced-concrete slab and at bottom by groups of tension cables in the central area, and by steel-pipe compression members at the main supports around the periphery. Roller bearings between the roof and the columns will permit thermal expansion of the roof structure. Henry N. Cobb, Leonard Jacobson, and Kellogg Wong of Pei's office worked with him.

Other designs submitted were by: 1 B. Sumner Gruzen of Kelly & Gruzen; 2 Arvin Shaw, III of Carson & Lundin; 3 Philip Johnson of Philip Johnson Associates; and 4 Morris Ketchum, Jr. of Ketchum & Sharp.

FEDERAL CONSTRUCTION PROGRAM PRODUCES MEDIOCRE RESULTS

Buildings for Capital Reflect "Monumentalese"

WASHINGTON, D.C. The proliferation of new Federal office buildings, buildings to house special agencies and bureaus, and adjuncts of the Smithsonian Institute here has created an architectural spectacle at once fascinating and appalling. Acres of blueprints for the $580-millions construction program show buildings which, for blandness of approach and subservience to official "monumentalese," would be hard to duplicate in the most backward state capital. That the same city could contain such pedestrain future buildings and what promises to be—at least—an exciting architectural project in the Franklin Delano Roosevelt Memorial is a comment on those in the General Services Administration responsible for design approval. GSA, incidentally, characterizes the building program as "not only the largest Federal building program ever authorized for the nation's capitol [sic] but also one of the best co-ordinated in terms of the over-all plans for the city." One advantage of the program is that it has caused and will cause the demolition of numbers of "tempos," or temporary office buildings which have been eyesores. Perhaps the sheer anonymity of much of the new design will provide a neutral backdrop to Washington's more important old and new structures.

Names and architects of the buildings shown are: 1 Employment Security Building (Labor Department)—Clas & Riggs; 2 Department of State Extension—Graham, Anderson, Probst & White, Harley, Ellington & Day and A. R. Clas; 3 Smithsonian Museum of History and Technology—McKim, Mead & White; 4 wings for Smithsonian Museum of Natural History—Mills, Petticord & Mills; 5 Federal Office Building #6—Faulkner, Kingsbury & Stenhouse and Chatelain, Gauger & Nolan; 6 Federal Office Building #8—Naramore, Bain, Brady & Johanson; 7 Federal Office Building #9—Hellmuth, Obata & Kassabaum and Loebl, Schlossman & Bennett; 8 Federal Office Building #10A—Holabird & Root & Burgee and Carroll, Grisdale & Van Alen; and 9 Federal Office Building #10B—also Holabird & Root & Burgee and Carroll, Grisdale & Van Alen.


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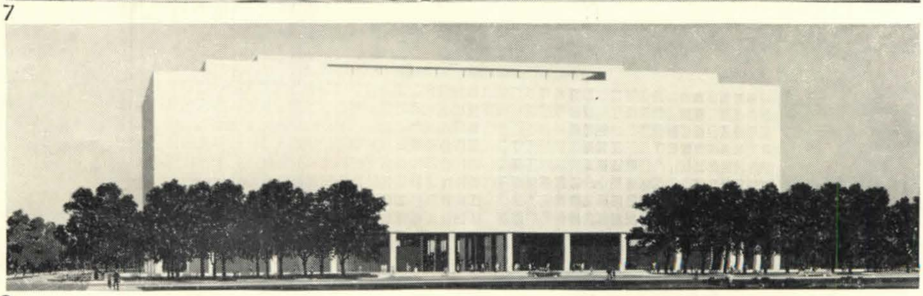
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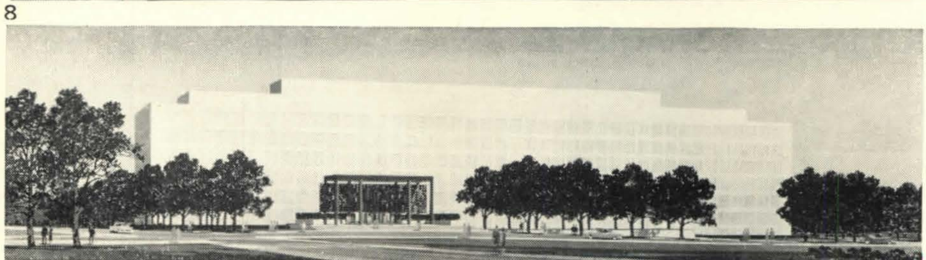
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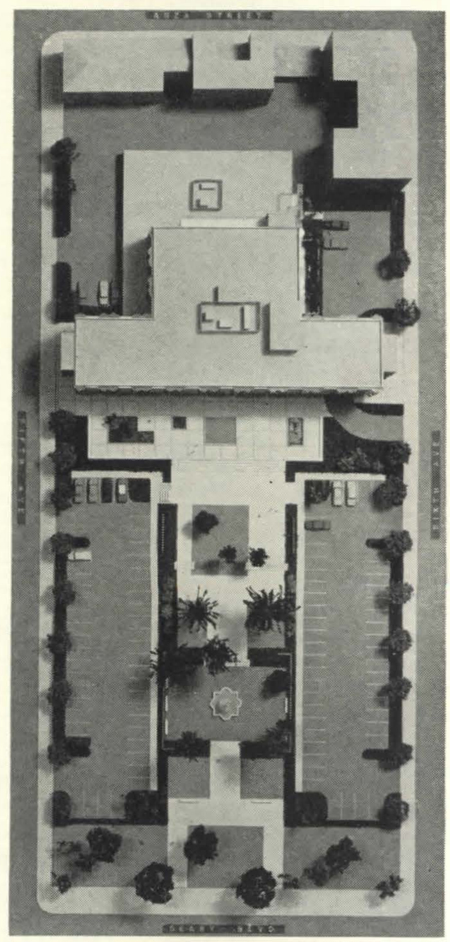
NEW BUILDING SET FOR SAN FRANCISCO'S FRENCH HOSPITAL

SAN FRANCISCO, CALIF. The 66-year-old buildings housing San Francisco's historic French Hospital are scheduled to be demolished soon to make way for a contemporary hospital building designed by John Carl Warnecke & Associates and Rex Whitaker Allen. The first stage of construction for the new building will provide 200 beds; the old hospital contained 196 beds. Surgery, laboratories, and X-ray units will also be built, but left unfinished for completion later.

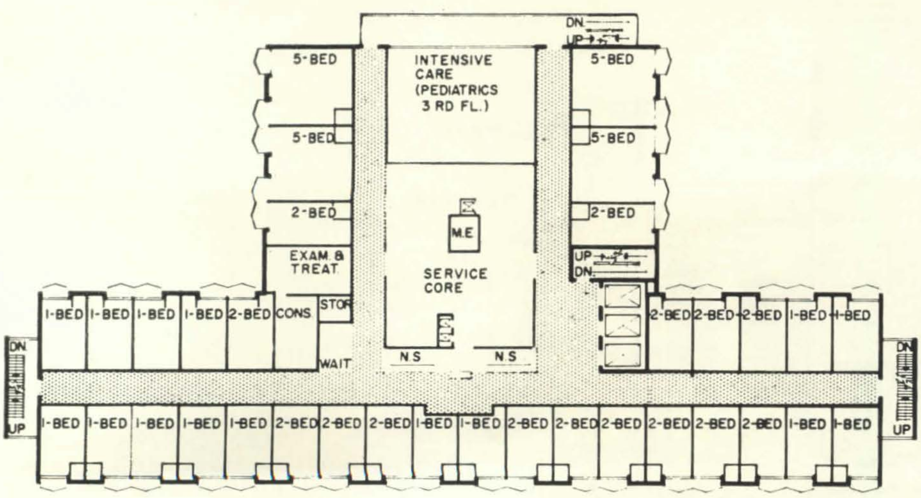
Main façade of the ground floor will be glazed from floor to ceiling, the glass being recessed behind circular columns. A garden court will be seen at the front of the building. The ground floor will contain administrative offices, newsstand, gift shop, and a waiting area, and eventually radiology department, laboratories, and physical therapy units. On the main façade, the three upper floors will have almost floor-to-ceiling windows between which will occur warm-colored, rough-textured precast-concrete panels. Bronze-anodized metal grills above and below each window will act as brise soliels and add to the rythmical treatment of the façade. Floors two and three will be quite similar, containing nursing units, private and semi-private rooms, and five-bed wards. The second floor will include a 10-bed intensive care unit, and the third floor a 12-bed pediatric unit. In the initial stage, the fourth floor will have a medical-surgical nursing unit; eventually it will also contain obstetrical department with maternity beds and nurseries. The T shape of the building was dictated by a desire to have the nurses' stations and service cores at the center of the plan, for ease to access to all rooms and wards. A unique feature of the private and semi-private rooms is the placing of toilets on the exterior wall instead of next to the door. In addition to freeing the entrance side of the room, this creates a small private "solarium".

Landscape architect: Lawrence Halprin; structural engineer: Smith & Moorhead; mechanical and electrical engineer: Kasin, Guttman & Malayan.

Detail indicates façade treatment with precast panels and metal brise soliels.



Site plan shows axial arrangement of hospital facing garden court.



SECOND AND THIRD FLOORS

Plan for floors two and three illustrates placing of toilets on exterior walls.

First World's Fair Design: A Beer Garden

80-Ft Towers to Support Indoor-Outdoor Dining

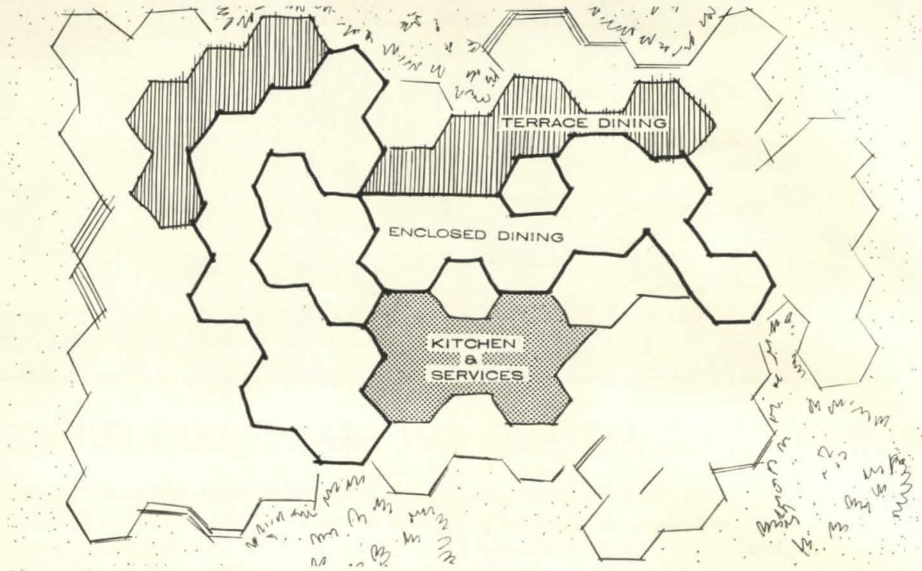
NEW YORK, N. Y. First design announced for 1964-65 New York World's Fair is the "Rheingold Oasis," for Leibmann Breweries. Architect for the malt-and-hops merchant is Kahn & Jacobs.

The pavilion will have two levels, a spacious, 50,000-sq-ft beer garden at ground level, and an indoor-outdoor dining area perched atop columns and a service shaft. The beer garden will be landscaped with pools, trees, and planting, and will seat 1000 imbibers. Strolling musicians will serenade beer enthusiasts both at ground level and on the terraces above. Glass-encased elevator shafts and a "Ferris-wheel lift" will carry visitors up to the tower level, which will have a 500-drinker capacity.

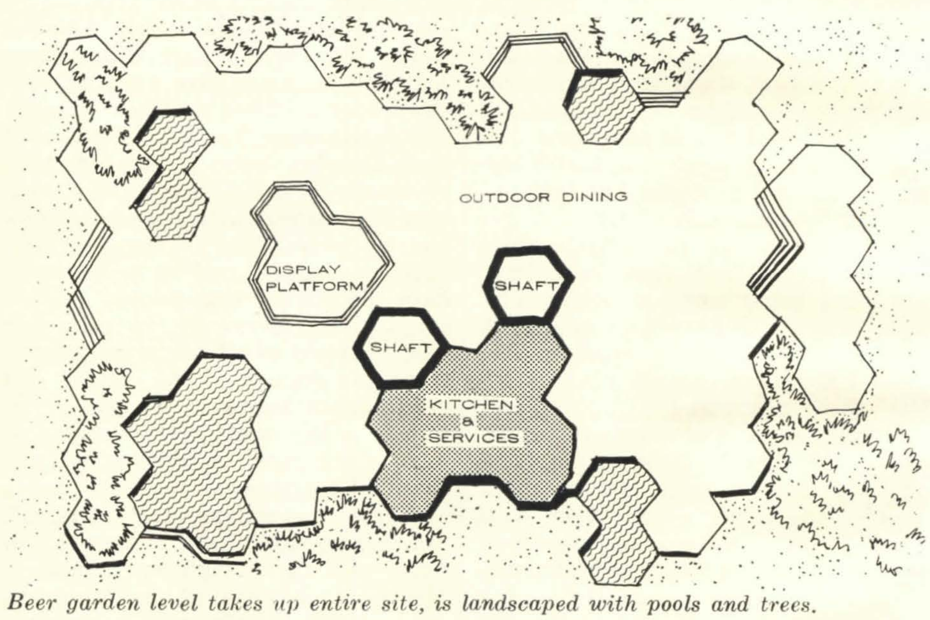
The hexagonal motif of the gardens will be carried up to the dining level, which will be in the form of 32 hexagonal pods, each measuring 630 sq ft. These will be cantilevered from their central columns by means of aluminum outrigger trusses. Seventy percent of the restaurant will be glass-enclosed and air conditioned; the remainder will be an open terrace from which to view Fair activities.

Plans for the Rheingold pavilion have been accepted by the vice president of the Fair in charge of industrial exhibits, who said the project is "in superb taste and in complete harmony with the theme and general architectural pattern of the Fair."

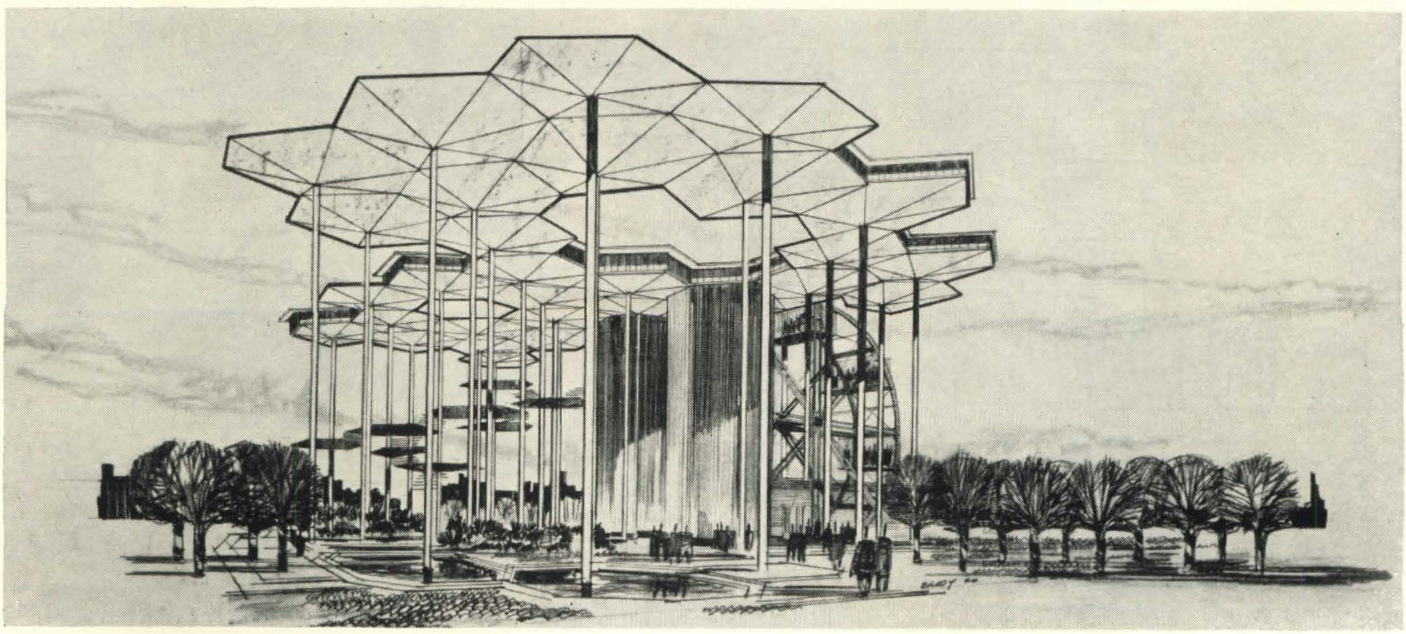
One thing is certain, you won't be able to miss Rheingold.

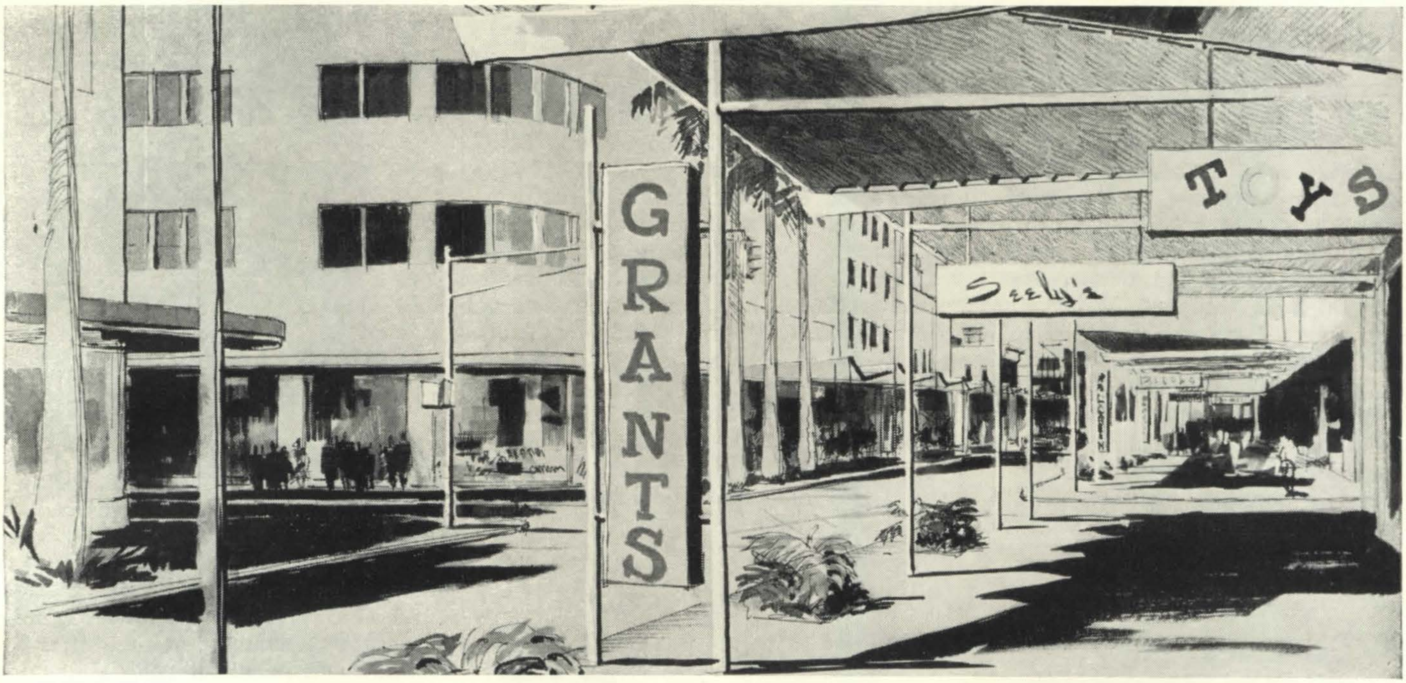


Upper level of pavilion contains service areas, indoor-outdoor dining rooms.



Beer garden level takes up entire site, is landscaped with pools and trees.





Miami AIA Helps Business District Renewal

Three-Phase Program Proposed for Future

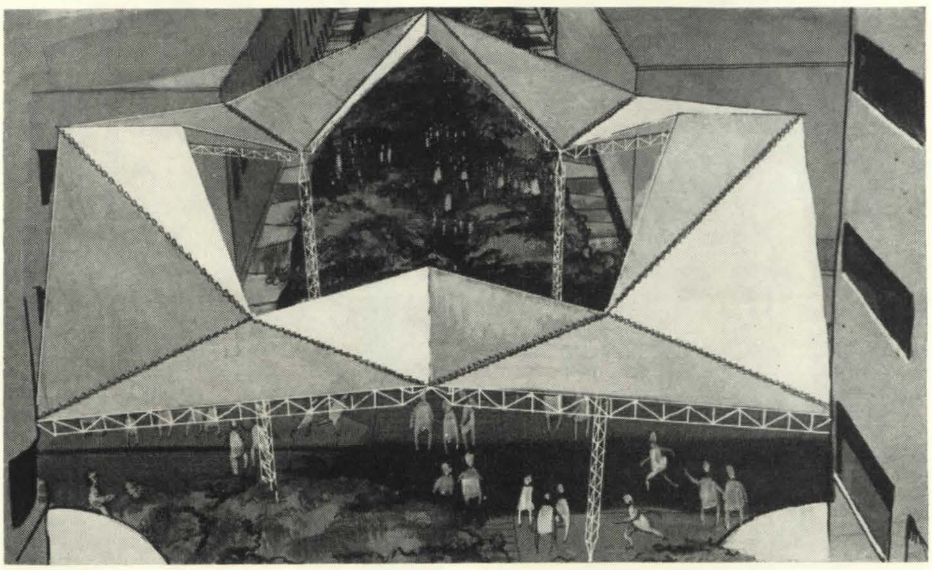
MIAMI, FLA. Florida South Chapter, AIA, which has set up a Community Development Committee to assist in a Miami Central Business District Study being conducted by municipal and county officials, recently held a competition among its members for the redevelopment of a typical block in that city's business district. The winning designs, by Lester C. Pancoast of Pancoast, Ferendino, Skeels & Burnham, attracted a great deal of attention on exhibit and publication in the local press.

Pancoast proposes a three-phase redevelopment program for the area. First phase (*above*) would see the introduction of 20-ft-wide sidewalks protected by glass-fiber "sails" stretched on aluminum frames. Unity of streetfront would be achieved through control of lettering and style of store signs.

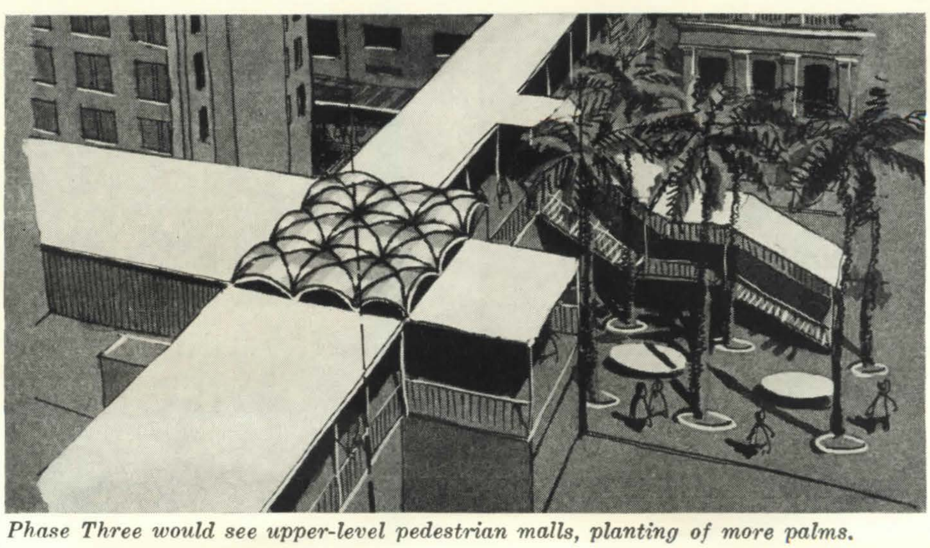
Second phase, for 1970s, would center on creation of dramatic street-intersection malls sheltered by aluminum frame and glass fiber devices connected to the four corner buildings. Royal Poinciana palms would be planted along the malls.

Upper pedestrian malls along and across the streets would be introduced in 1980s. These would feed from garages and bus terminals.

H. Samuel Kruse, AIA committee chairman, states, "We must come to grips with our present problem or we will have a rather ridiculous ruin in the very center of our midst."



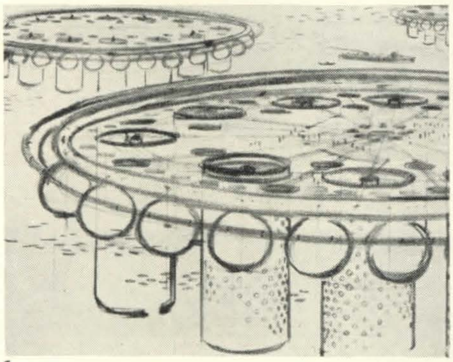
Colorfully-roofed malls at street intersections would occur in Phase Two.



Phase Three would see upper-level pedestrian malls, planting of more palms.

Museum Shows Visionary Design

NEW YORK, N. Y. Current show at Museum of Modern Art, to remain through December 4, is "Visionary Architecture." Exhibition shows imaginative work by many architects which was either technologically impossible to build when conceived, or which society lacked philosophies or programs to support. While almost anything seems technologically possible today, the problem of *what* to build for our society remains a compelling one. The exhibition shows what a number of thoughtful architects and designers would like to build, given society's support. American and European architects and designers shown include Frank Lloyd Wright, Louis I. Kahn, Le Corbusier, Frederick Kiesler, Hans Poelzig, Bruno Taut, Jean-Claude Mazet, El Lissitsky, Kiyonari Kikutake, James Fitzgibbon and C. D. Sides. Examples shown on this page are: 1 Marine City, Tokyo Bay (1959), by Kiyonari Kikutake; 2 City (1950), by Jean-Claude Mazet; 3 Salzburg Festival Hall, by Hans Poelzig; 4 Skyscraper, by Louis I. Kahn; 5 Skyscraper, by El Lissitsky; 6 Bridge City (1960), by James Fitzgibbon and C. D. Sides; 7 Friendship House, Istanbul, by Hans Poelzig; and 8 Philadelphia Civic Center, by Louis I. Kahn.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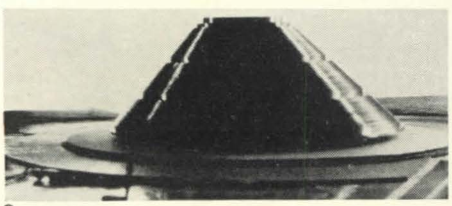
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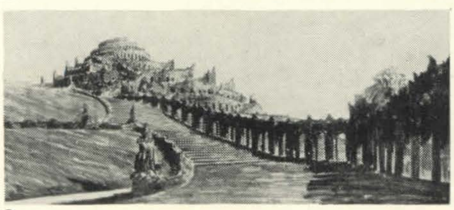
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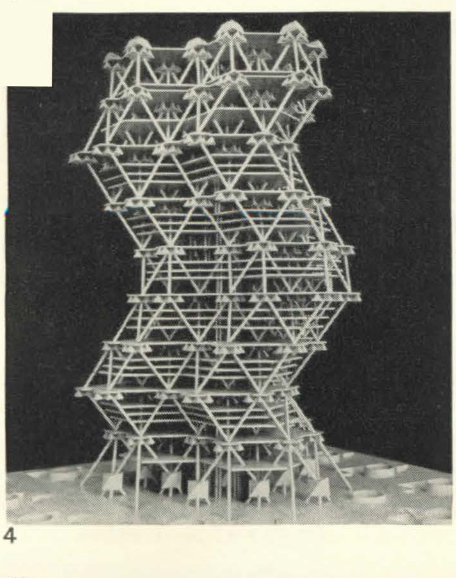
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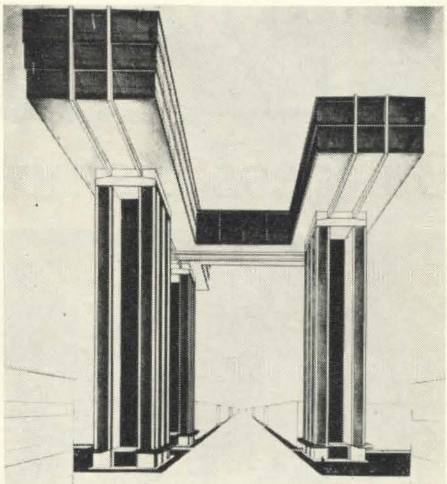
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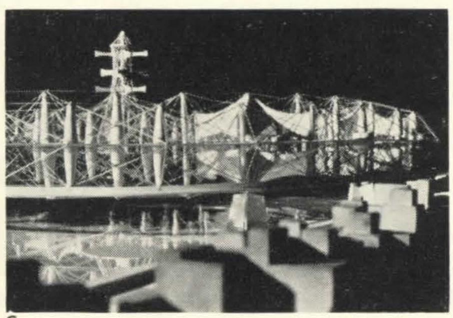
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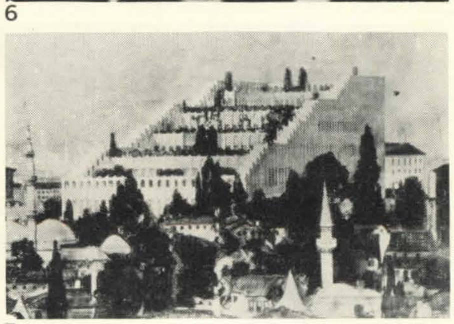
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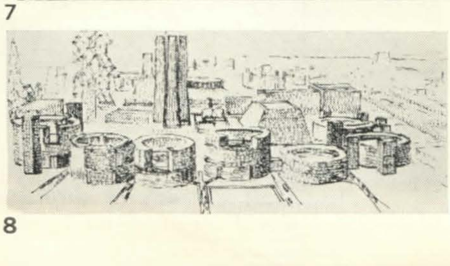
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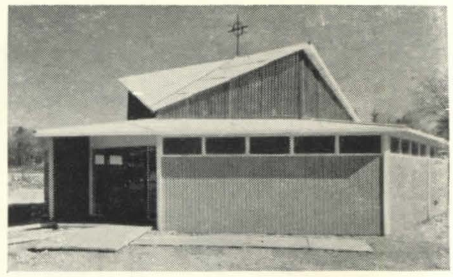
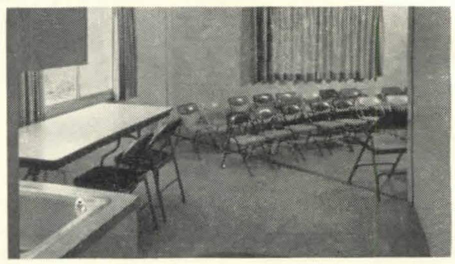
Faith Moves Missions Mobilely In Massachusetts

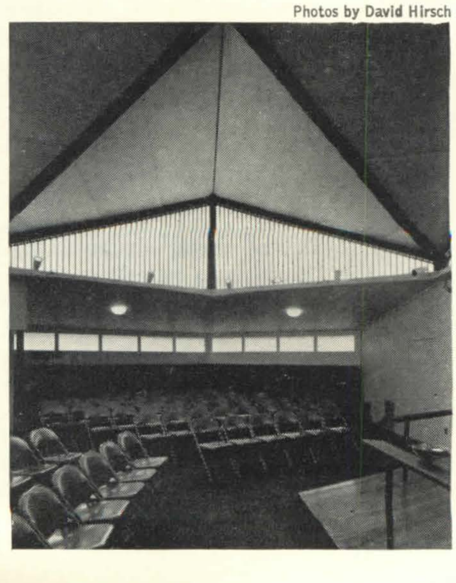


BURLINGTON, MASS. A prefabricated mission house by Carl Koch Associates which looks like a church instead of the usual miniature army barracks has been erected here. Working with Geometrics, Inc., and Acorn Structures, Inc., Koch devised a hexagonal structure surmounted at the center by a high clerestoried "steeple." The mission will be used as temporary worship



space by congregations in the area while permanent churches are being constructed. It has a nave seating 150 people, plus classrooms which can be opened into the main area to provide additional seating. In the area behind the altar is a room for pre-school children, a study, a kitchen, women's and men's lavatories, and, at each side of the building, space for heaters. Spokesmen for the diocese estimate that the mission is good for six or seven moves before needing major renovations.

Photos by David Hirsch



PERSONALITIES

I. M. Pei came to the United States from Canton, China, his birthplace, in 1935 to attend MIT. Graduated from there in 1939, he travelled on an MIT fellowship, did research at Bemis Foundation, and worked briefly for Stone & Webster before going into service with National Defense Research Committee at Princeton in 1942. After the war, he received his M. Arch. from Harvard, where he later taught while working in the office of Hugh Stubbins. More recently, he has done much work for William Zeckendorf. His independent practice has just received a major shot in the arm with the awarding of the multi-airline terminal commission at New York International Airport (see pages 71, 73). Other non-Zeckendorf commissions currently on the boards are the Earth Sciences building at MIT, the U. S. Chancellery in Montevideo, and the 15-acre East-West Center at University of Hawaii.

P/A Editor THOMAS H. CREIGHTON has been appointed consulting editor for the architectural book department of Reinhold Publishing Corporation. He will assist and advise in the development and appraisal of new book projects . . . . R. BUCKMINSTER FULLER receives the Frank P. Brown Medal of the Franklin Institute on the 19th . . . . Four new members of the University of Illinois architectural faculty are STEPHEN TANG, JACQUES COLLIN, NORMAN C. DAY, and WILLIAM ENG . . . . Speaking out against New York's knuckling under to the automobile in the form of municipally sponsored parking garages, VICTOR GRUEN stated to civic officials that "Inasmuch as the space needs for private automobile traffic are insatiable, each step taken to facilitate the movement and storage of private automobiles in an area results in the necessity for additional steps until a point is reached where the major portion of available land in a city core has to be surrendered to automobiles." Needless to say, this expert testimony fell on deaf ears, and Mayor ROBERT F. WAGNER dedicated the first municipal garage a few days later . . . . HARLAND BARTHOLOMEW retired as chairman of National Capital Planning Commission, was succeeded by A. M. WOODRUFF, Dean of School of Government of George Washington University . . . . RALPH COWAN, Dean of School of Architectural and Town and Country Planning at Edinburgh College of Art, and DOUGLAS JONES, Director of School of Architecture at Birmingham College of Arts and Crafts are two Britons who will serve as visiting critics at Cornell University during the 1960-61 session. JEAN ALLPERE, Swedish architect, and SANTIAGO AGURTO-CALVO, Peruvian architect, also will serve. American visiting critics will be A. QUINCY JONES, PAUL HAYDEN KIRK, PETER BLAKE, EDWIN THURLOW, CHARLES WARNER, and ROBERT LITTLE . . . . Re-elected President of Board of Municipal Art Commissioners, Los Angeles, was Architect PAUL R. WILLIAMS.

One of the most varied practices on record is the one conducted by **Marcel Breuer,** born fellow countryman of Zsa Zsa Gabor. Past projects have ranged from UNESCO Headquarters in Paris to a college library in the Bronx, from a major department store in redeveloped Rotterdam to the design of graphics for an East Coast railroad. After studying and teaching at the Bauhaus, Breuer worked for two years in London before joining Gropius in a designing-teaching partnership at Harvard for a decade. Establishing his own practice in New York in 1946, he was for a long while noted mainly for his imaginative houses. His ties to Europe have continued strong, many of his major projects of recent date being there.

Six first-stage winners in Franklin Delano Roosevelt Memorial Competition are: ABRAHAM W. GELLER of New York, associated with DOUGLAS GORDON, DIANA KIRCH, and CLAUDE SAMTON; TASSO KATSELAS of Pittsburgh; ROLF MYLLER of New York; WILLIAM F. PEDERSEN and BRADFORD S. TILNEY of Boston, associated with JOSEPH WASSERMAN, DAVID BEER, and Sculptor NORMAN HOBERMAN; J. EDWARD LUDERS, HIDEO SASAKI, DON OLSON, and ROBERT J. REILLY associated as Sasaki-Walker-Luders of Watertown, Mass.; and JOSEPH J. WEHRER of the University of Michigan, associated with HAROLD J. BORKIN. Each of these winners will receive $10,000 and will prepare detailed drawings and models for submission in the final judging, which will take place Dec. 29-30. Jury is composed of PIETRO BELLUSCHI, THOMAS D. CHURCH, BARTLETT HAYES, JR., JOSEPH HUDNUT, and PAUL RUDOLPH.

A friend of MEYER KATZMAN moved into a new house recently, and described it as being in "Channel style." To Katzman's obvious question, he replied, "Oh, Channel style is half English Tudor and half French Provincial".

"We in the design professions must furnish the senses of the people. We must have the eyes that see, the ears that hear, the nose that smells, the touch that feels, the mind that dreams the dreams of what could be — not what is. Ours is the training and responsibility to imagine what is not there, but what could be. It is up to us to raise the vision of the people above the squalor of accidental development. Ours is the obligation to change the values of the people, picturing more desirable goals—things worth living for." Such were the words spoken by **Robert E. Alexander** at the graduating excercises of Rhode Island School of Design last summer. This philosophy of the architect's function accompanies Alexander into his new phase as head of Robert E. Alexander & Associates. Associated with Richard Neutra for ten years, he includes in his professional dossier many citations to his skill as a planner—he was president and commissioner of Los Angeles Planning Commission from 1948 to 1951, when he resigned to go to India as a consultant on planning and housing for United Nations. He is a founder-member of International Center for Regional Planning and Development in England, and was author of *The Rural City* and co-author of *Rebuilding the City*. Much-honored Alexander has received awards and citations from PROGRESSIVE ARCHITECTURE, AIA, and other organizations, and became an AIA Fellow at 46. He sees an important responsibility facing the design professions—"By the year 2000 only half of manmade America which we know today will still remain, and we will have built new 150% of the man-made enviroment that now exists on this continent. We must dedicate ourselves to making this new America, America the Beautiful!"

Sketches by Romero Corbelletti

In League with Architecture

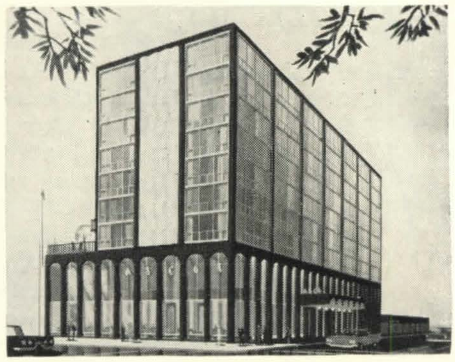
Fall and winter exhibitions for New York's Architectural League have been announced: Oct. 6-Nov. 2, Urban Renewal; Nov. 3-Nov. 16, Members Exhibit of Sculpture and Painting; Nov. 17-Dec. 14, New Dimensions in Architectural Photography; Dec. 15-Jan. 4, Scenic Designers Offstage. League season got off to a dramatic start on Oct. 6 when members of the Senior Dramatic Workshop presented two one-act plays. Theme of formal meetings to come was announced by Program Chairman Ulrich Franzen as "1960 and the Arts."

Stick to Your Standards

John Crosby, in his column for the *New York Herald-Tribune*, contributed a timely, and depressing, paragraph on declining values in today's life: "Rotten TV shows, rotten books, rotten movies—is that as far as it goes? No, it doesn't [sic]. The decline in competence, the decline in standards of performance seem to touch every line of American endeavor. New cars on the roads are so badly put together the door handles start to fall off in the second week. New apartment buildings in New York are so poorly made you can hear the toilets flush on the next floor. There is no pride anywhere in doing things well. Just get it done, get paid, leave town before the suckers catch on."

Awards, Contest, Scholarship

1961 AIA Honor Awards prizes will total $9350 in contest to design mobile home parks. Sponsored by Mobile Home Research Foundation and Rogers Industries, competition has blessing of American Society of Landscape Gardeners. Prizes will be awarded in two categories, professional and student. Students must register by Oct. 15, professionals by Dec. 15. Information from John L. Bloom, Professional Advisor, Mobile Home Park Competition, 20 North Wacker Drive, Chicago 6, Ill. . . . . Applicants for annual Arnold W. Brunner Scholarship of New York Chapter AIA should apply to Peter S. Van Bloem, Secretary of New York Chapter, 115 East 40th St., New York 16, N. Y. Nov. 15 is deadline for submission of subject and outline of program.

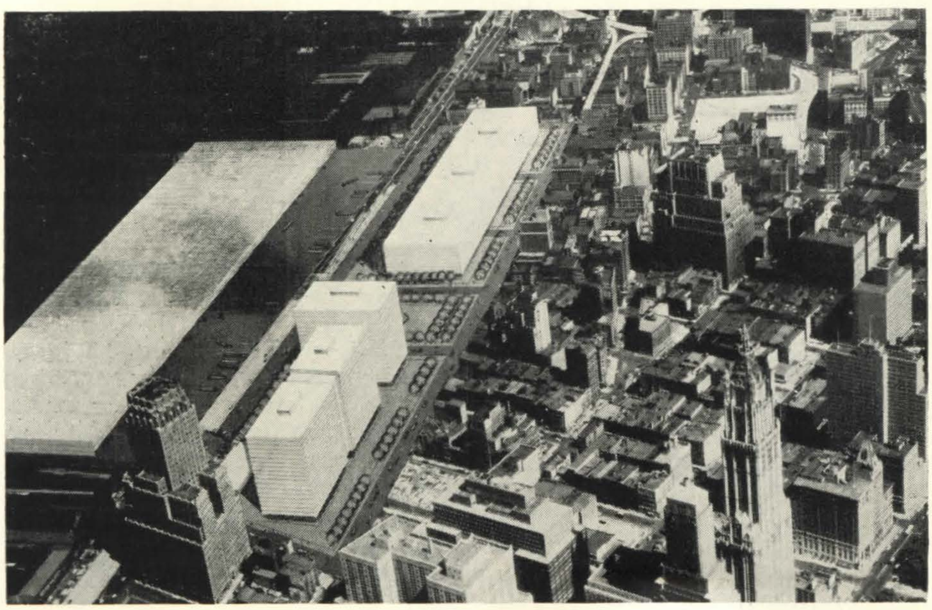


Underneath the Arches On Michigan Boulevard

Ascot Motor Hotel, set for Chicago's Michigan Boulevard, will be distinguished by a façade of two-story high, black-painted concrete arches at its base. Remaining floors of the nine-story structure will be standard aluminum curtain wall except for a wide strip of faceted marble on the east elevation. Hotel, designed by A. Epstein & Sons, will have an exterior swimming pool and a promenade. Bringing continental culture to the Midwest, twelve of the suites will have bidets.

ENGINEERING JOBS

A call for engineering job applicants has been made by the New York District of the U. S. Army Corps of Engineers. Jobs range from $5355 to $8955 per annum. Write to Area Engineer, U. S. Army Engineer District, New York, Plattsburg Area Field Office, P. O. Box 161, Plattsburg, N. Y.



SOM DESIGNS WASHINGTON MARKET RENEWAL

New York's colorful old West Side Washington Market, almost derelict for more than a year, has finally gotten its redevelopment plans. Prepared by Skidmore, Owings & Merrill under the aegis of the city's Housing and Redevelopment Board, the 29-acre renewal program will include three 20-story office buildings in the southern portion of the site, and a quarter-mile long, 10-story warehouse and industrial facility to the north. A system for underground or overhead connections with passenger and vehicular traffic, and facilities for mechanized goods handling and expediting are being studied. Erwin Wolfson has been designated as tentative sponsor of the project, which should get under way in 1962.

AIA Convention Festivities

Non-business events at the 1961 AIA Convention in Philadelphia (Apr. 23-28) will be highlighted by a Monday evening concert by the Philadelphia Orchestra under Eugene Ormandy, followed by a buffet-ball at the venerable Bellevue-Stratford Hotel. Delegates may start the week on a spiritual note by attending Sunday afternoon services at Christ Church, hearing vespers sung by the Old St. Peter's Church Boys Choir, and having buffet supper at the *Gloria Dei Church*, built in 1700. Longwood Gardens and the Winterthur Museum, the two duPont showplaces, will be open for tours, and wives will enjoy tea at the Pennsylvania Academy of Fine Arts, a performance at Playhouse-in-the-Park, and a trip to New Hope in Bucks County. There will be a cocktail party in the Franklin Institute, and architectural tours of all sorts have been planned. Plans for hospitality on the part of individual Philadelphia architects are well along. For tickets to events, write Philadelphia Chapter AIA, 2400 Architects Building, Philadelphia 3.

Sullivan-Adler Building Reprieved in Chicago

Chicago's 68-year-old Garrick Theater building, designed by Louis Sullivan and Dankmar Adler, was recently saved by court order from destruction. The theater, originally called the Schiller, has been a movie house since 1925, recently a non-paying one. Balaban & Katz, the building's owners had leased the site to another concern which intended putting up a combination office building and parking garage. Mayor Richard J. Daley and a citizen's committee, devotees of the structure, received anti-demolition support from the City of Chicago Commission on Architectural Landmarks, the City Planning Department, New York's Museum of Modern Art, and about fifty college and university schools of architecture. Mayor Daley has suggested that the Illinois legislature authorize a bond issue for the restoration of the building, which is in poor repair.

Bells Are Ringing In Philadelphia

The Bell Telephone Company of Pennsylvania has announced plans for a new hearquarters building on Arch St. at the intersection of Benjamin Franklin Parkway and 16th St. The 18-story structure is to be completed in Fall 1962. Walls will be stainless steel with gray tinted windows: bronze-covered structural perimeter columns will provide flat interior walls and give vertical emphasis to the façade. The entrance area will feature two reflecting pools surrounded by decorative fencing. Sidewalks will be equipped with snow-melting facilities. Architect: Maurice Fletcher.

Strongly-Patterned Face For Outpatient Clinic

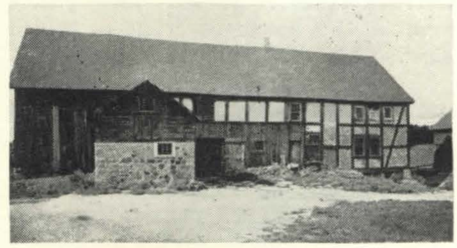
A four-story, reinforced concrete building to be used exclusively for the outpatient services of the Los Angeles County General Hospital has been proposed. It will be equipped to handle

3000 patients a day and also will house related facilities such as laboratories, pharmacy, medical social service, etc. The clinic, believed by the architects to be the world's largest outpatient building for a public charitable institution, will accommodate 15 basic clinics with approximately 65 subspecialties. The windowless design is expected to save on air-conditioning load and maintenance. Architects: Arthur Froehlich, Douglas Honnold, and John Rex.

Wheel-Shaped Co-op Apartments on L. I.

Round Dune, which opened last summer in East Quogue, Long Island, consists of four two-story circular structures with 19 co-operative apartments each. The exterior is redwood accented with colored panels. Living, dining,

and sleeping areas—and separate balconies—are on the fully-glazed view sides so tenants can see Shinnecock Bay or the Atlantic Ocean. A private swimming pool is provided, and landscaping includes beach plums, pines, and other native shrubs. Architects: James A. Evans and Olivier de Messieres. Structural Engineers: Werner-Jensen & Korst. Foundation and Site Engineer: H. F. Bishop. Landscape Architect: Briggeman & Brunner.



Guidebook to Early Wisconsin Architecture

Historic Wisconsin Architecture, by Architect Richard W. E. Perrin has been published by the Wisconsin Chapter AIA to develop an appreciation for the state's disappearing architectural heritage. Among the 76 structures described are Frank Lloyd Wright's complete works in the state and a series of half-timbered houses from the early 1800s said to be found only in Wisconsin (one is shown). Information on each building includes photographs, construction methods, description of materials, history, and a map pinpointing its location. Available from Wisconsin Chapter AIA, 4003 West Capitol Dr., Milwaukee 16, Wis., for $1.00.

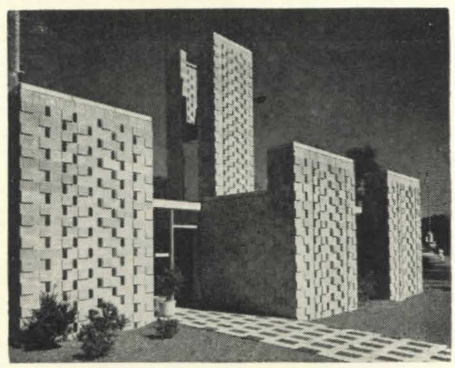


Exhibit Center Set for New Haven Redevelopment

The pacemaking redevelopment activities of New Haven, Connecticut, now are exhibited in an ingeniously designed "Progress Pavilion" by local architects Carlin-Millard. The building stands across from New Haven Green at the gateway to the 700-acre midtown redevelopment area. Displayed inside are architectural models, photographs, and visual progress reports of the renewal project. Erected largely in one day, the pavilion is of structural concrete units made by the Plasticrete Corporation.

DEAR EDITOR:

In your August 1960 issue News Report section I find myself co-starred with Kim Novak.

Though I have nothing whatever against Miss Novak, I have plenty against the house in front of which she is so prettily placed.

Architects seem to have only two problems with regard to credits they receive in connection with projects. The first is that they usually have to fight to get appropriate credit for those structures which they have designed. The second is the problem of getting credit for those buildings which they have not designed. Recent experience with the house which was constructed for the movie "Strangers When We Meet" seemed to point to the fact that the second problem is even more difficult to solve than the first.

It is true that we were asked to design a house by the movie-producing firm. Knowing something about the ways and procedures of the movie industry, we made it part of our contractural agreement that we would permit the use of our name in connection with the project only if our designs were followed and that we would have to authorize specifically the use of our name.

As matters turned out, nothing of our original design was left over after the combined efforts of the crew and the cast of the movie were applied. When we started to see the results, we evoked the condition of our contract that our name should not be used.

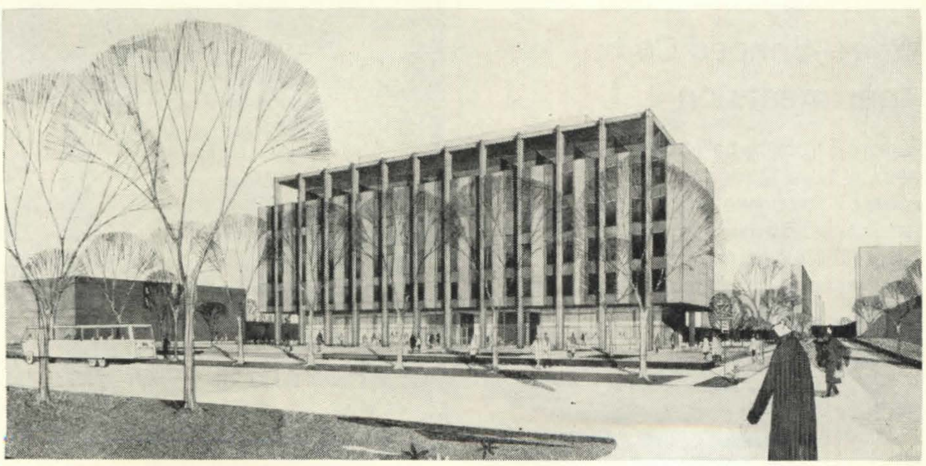
Somehow or other, the matter slipped first into the gossip columns and from there into a professional magazine of such respectability as PROGRESSIVE ARCHITECTURE.

I would personally appreciate it if you would make it clear that Kim Novak and I are not co-starring, and that our firm does not wish to take credit or blame for the design of a house with which we had nothing to do.

Best regards, Victor Gruen.

Campus Planned for Westchester Community College

Working drawings are now in progress on a master plan for Westchester Community College in Valhalla, New York. The "Hartford Campus", set between old trees on rolling land, will consist initially of eight new buildings and three old structures, forming a nucleus for future expansion. The library will be permanent focal point in the center. The dispersed, informal planning is designed to fit in with the natural rolling terrain of the 200-acre site with its plentiful lawns and trees. Architect: Robert A. Green.



Canadian Insurance Building to Sit on Podium

A generous plaza will surround the six-story Monarch Life Assurance Company building, which will be raised on a landscaped podium about three feet above the surrounding sidewalks. The exterior of the steel-framed Winnipeg structure is to be clad in light gray granite with gray glass and stainless steel metalwork, the frame showing outside the faceted walls. Both ends of the building will be cantilevered 11 ft out from the main floor. There will be a 250-seat auditorium in the basement, and the fifth and sixth floors will hold the head office and executive offices of the Monarch Life Assurance Company. Architects: Smith Carter Searle, Assoc.

OBITUARIES

Noted bridge designer Dr. David Bernard Steinman died in New York. He designed more than 400 spans throughout the world . . . . Clayton L. Foster, vice president for international sales of The Austin Company, died August 24.

CALENDAR

Theme of Producers' Council 39th Annual Meeting now being held in Chicago (Oct. 5-6) is "Marketing '60," according to Council 1st Vice President Elmer A. Lundberg, who is also Director of Architectural Sales for Pittsburg Plate Glass. . . . American Institute of Planners has its annual conference in Philadelphia, Oct. 23-27. . . . 1960 Fall Conference of Building Research Institute, Nov. 15-17 in Washington, D. C., will feature a conference on building research, one on structural foams, and a conference-workshop on fasteners for industrial curtain walls. . . . School Building Architectural Exhibits will be mounted at three regional conventions of American Association of School Administrators next year: San Francisco, Feb. 25-28; St. Louis, March 11-14; Philadelphia, March 25-28. Applications from Dr. Shirley Cooper, AASA, 1201 Sixteenth St., Washington 6, D. C. . . . St. Louis will also see 57th convention of American Concrete Institute, Feb. 20-23 . . . . American Society of Landscape Architects will have its 62nd annual meeting at Boulder, Colo., July 10-12.

What Congress Didn't Do

Bills Failed for Many Reasons

By E. E. Halmos, Jr.

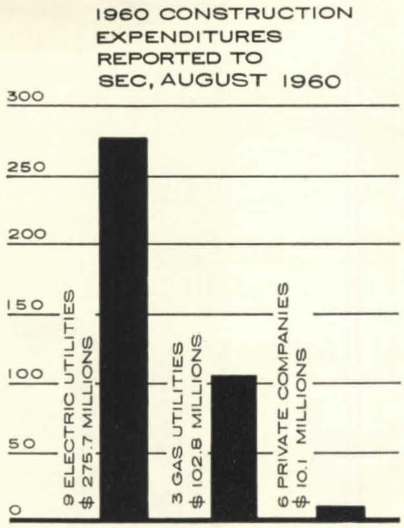
Don't rush to assign purely political reasons for the foundering of three major programs that carried a lot of construction money during the unhappy "bob tail" session of Congress.

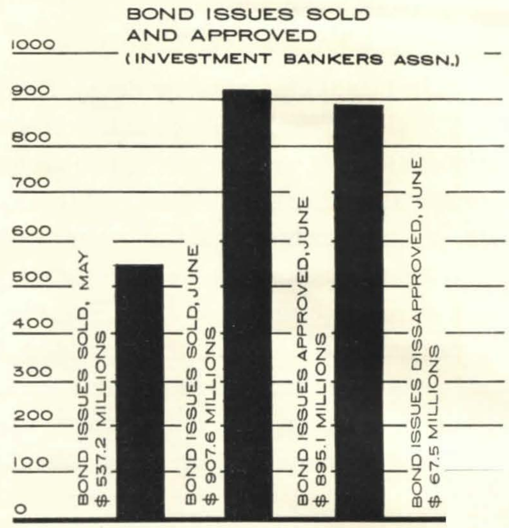
Politics—as P/A has commented often — surely dominated the session, and contributed to the action. But a lot of hard reasoning also went into the defeat of proposals for heavy expenditure in federal assistance to school construction, various schemes to aid housing, and increases in urban renewal programs.

You can say the same thing for the failure of Congress to act on raising the minimum wage floor, and for the flat failure of construction unions to get approval of their much-wanted "common situs" picketing demands.

But it doesn't apply to the fact that aid to individual businessmen through tax deductions for self-financed retirement plans, relief from taxation for out-of-state businesses, and other matters didn't get through. Basic reason here was lack of time.

To recapitulate, take the school construction program: though both political parties agreed that something should be done, the bills really foundered on the fact that nobody has any reliable statistics on just what the shortage of classrooms is, or just how many "excess" pupils there are (and by what standards they are excess). Said a minority report of the House Education and Labor Committee: "All sorts of 'backlog' figures have been bandied around before Congressional committees over the years, and to this day, no one in authority can be sure of the exact total. . . . 'Normal capacity' can vary . . . from 28 pupils or less per classroom . . . to 30 or more . . . if both (areas) have 30 pupils in a class, one has excess enrollment, the other does not. . . . There can be little doubt that a considerable amount of the backlog reported . . . is merely a paper shortage. . . ."





BOND ELECTION RESULTS – JUNE 1960 BY USE OF PROCEEDS

USE OF PROCEEDS	APPROVED		DISAPPROVED	
	AMOUNT	NO	AMOUNT	NO
EDUCATION:				
ELEM. & SEC.	$ 419,756,000	64	$ 35,634,000	31
OTHER	9,325,000	2	450,000	1
ROADS & BRIDGES	3,565,000	4	3,475,000	2
WATER & SEWER	13,448,000	6	3,804,000	7
OTHER UTILITIES	290,000	2	———	0
HEALTH & WELFARE	16,046,000	4	1,050,000	3
RECREATION	2,195,000	4	5,742,000	6
PORTS & AIRPORTS	5,555,000	5	6,000,000	2
INDUSTRIAL	4,150,000	4	300,000	1
VETERANS AID	400,000,000	1	———	0
ADMIN & OFFICE BLDG.	2,450,000	2	525,000	2
UNCLASSIFIED	18,364,000	14	10,548,000	10
TOTAL	$ 895,144,000	122	$ 67,528,000	65

BOND ELECTIONS SCHEDULED AS OF JULY 1, 1960

MONTH	AMOUNT
JULY 1960	$ 69,083,000
AUGUST "	13,600,000
SEPTEMBER "	13,990,000
OCTOBER "	37,545,000
NOVEMBER "	1,198,165,000
FEBRUARY 61	400,000
MARCH "	70,000,000
NOVEMBER "	915,986,000
NO DATE SET	68,760,000
TOTAL	$ 2,387,529,000

USE OF PROCEEDS	AMOUNT
EDUCATION:	
ELEM. & SEC.	$ 326,962,000
OTHER	211,190,000
ROADS & BRIDGES	185,335,000
WATER & SEWER	68,105,000
OTHER UTILITIES	926,248,000
HEALTH & WELFARE	182,880,000
RECREATION	28,080,000
PORTS & AIRPORTS	23,838,000
INDUSTRIAL	1,600,000
REFUNDING	2,000,000
FLOOD CONTROL	———
PUBLIC HOUSING	3,000,000
VETERANS AID	202,000,000
ADMIN. & OFFICE BLDG.	67,000,000
UNCLASSIFIED	159,291,000
TOTAL	$ 2,387,529,000

Take housing: As you know, various proposals were made, ranging from an increase in mortgage purchasing funds for Federal National Mortgage Association (thus injecting about $1 billion in new funds), to numerous direct proposals concerning other aid.

But Congress was heavily swayed by, among other things, the facts developing out of the 1960 Census. And those facts are beginning to indicate that maybe housing is running at about the right rate—in fact, they indicate that production of new housing units has been running con-

Continued on page 90

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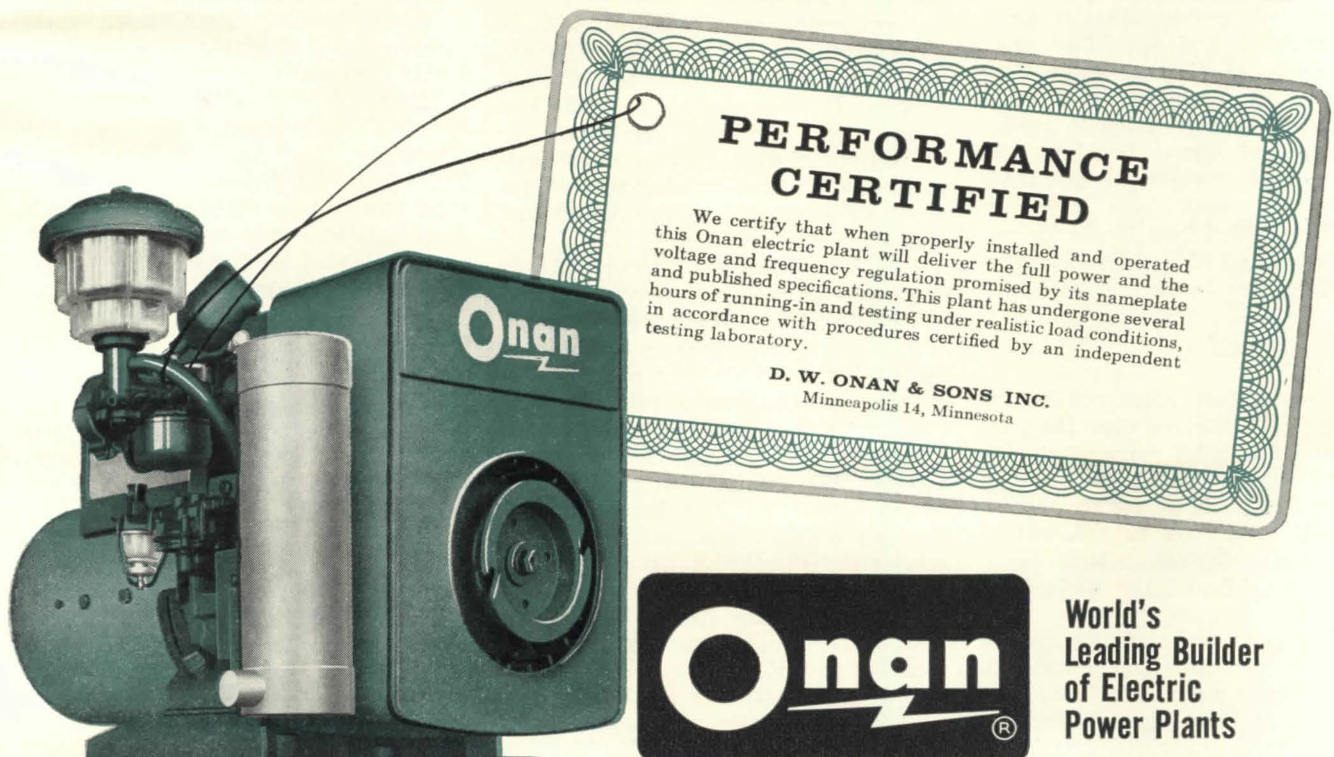

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Continued from page 84
sistently ahead of population increases in most metropolitan areas.

For instance, Census found that his year, out of 42.2 million households of married couples, less than a million contained other married couples without their own homes—2.4 percent to be exact. That compares with 8.7 percent immediately after World War II, and Census says that this shows a significant decline in "doubling up" of families, as result of the great surge of housing construction.

In the Metropolitan Washington area (and in Chicago, according to local newspapers) housing construction has far outstripped population. In Washington, said Census figures, housing has increased at the rate of 47.5 percent, population at 34.5 percent, in 10 years.

In Congress, Rep. E. J. Derwinski undertook to have printed in the *Congressional Record* statistics showing that one Chicago newspaper printed 33 columns of "want ads" one Sunday, offering houses and apartments for rent. Republican Derwinski used this as refutation of need for further public housing units.

Take urban renewal: Congress was obviously affected in taking its somewhat jaundiced view of urban renewal programs by the vast areas of brick and rubble that have been created in Washington's Southwest area—and have remained largely as weed-grown rubble piles while various promoters and city and government agencies have struggled and squabbled over efforts to rebuild. (But note that Congress, on its last day, *did* push through stopgap legislation to permit continuance of three housing programs: a one-year extension of FHA's home improvement loan program, $500 million added loan funds for college housing, and $50 million for community facilities loans.)

For the Record

As a matter of fact, when you look at the record of Congress over the past year, you'll find a lot more of significance in what it didn't do than in what was okayed. (Just for the record, about 1800 bills were passed, out of something like 20,000 introduced in the two-year life of the 86th Congress.)

For architects and the construction industry in general, only a relative handful of bills were introduced that had any direct bearing, and very few of these (mostly appropriation bills) got anywhere.

The minimum wage bills (which would have included architectural offices to some extent) really failed of passage because of a complex, confusing definition of "commerce" that would apparently have included every business enterprise in the U. S.; the "situs picketing" bills never got out of committee, remaining under steady attack by almost every construction organization (including the homebuilders); a proposal for raising the fees of architectural and engineering consultants to the government (from $50 to $100 a day) got nowhere; neither did a proposal to set up special registration for "Federal Engineers." Various bills to form a Department of Urban Affairs got no formal consideration (but they will certainly come up again, in the light of the census figures); nor did numerous other measures aimed at various educational boosts to aid in production of construction technologists.

The Highway Program

The vast Interstate Highway program is certainly due for another round of attention from the House Public Works special subcommittee, even if the investigations are under wraps, probably until after the elections.

The committee itself (the Blatnik committee) is squabbling often and publicly with minority Republicans accusing the Democrats of political coverups. The squabbles, however, are providing a steady stream of "leaks" that keep the press informed of the areas due for scrutiny.

Next round will certainly include irregularities in New Mexico, Florida, and possibly Massachusetts. In New Mexico, Bureau of Public Roads has already withheld some funds because of reports of right-of-way irregularities, what is considered excessive use of consultants, and some evidences of poor construction work.

But the growth of highway systems continued to worry Congress as well as civic planners, from the viewpoint that highway networks are capable of destroying a whole city plan, or reshaping urban growth into areas ill prepared for such a development.

One evidence of this worry was a bill (S. 3877—which died with the end of the Congress) introduced by New Jersey's Senator Williams, calling for more effective coordination of the federal-aid highway system in urban areas. Key to the bill is that it attempts to establish a new policy direction for use of highway funds in urban areas, by setting forth the point that it is the intent of Congress that "a primary purpose" of the highway system in urban areas is "to assist the orderly development of well-balanced communities in which to live and work."

This, as you know, would be a major departure from established highway policy, which considers traffic needs first, community development only as a secondary matter. Williams' point was that a new highway routing —dictated by purely traffic needs— may upset a whole community plan by directing development in an altogether different area than planners had anticipated.

Planning Action

And speaking of planning, there were these additional developments:

Elwood Quesada, head of the Federal Aviation Agency, took occasion to warn county officials in Virginia specifically, but elsewhere by implication, of the need for immediate zoning to prevent development of a honky-tonk area around the new Dulles International Airport at Chantilly, Va.; and Maryland's Highway Director John Funk warned county officials that by neglecting proper zoning along new roads, they were permitting the roads to become obsolescent long before their time.

The Urban Renewal Administration issued Technical Guide No. 1, titled *Selecting Consultants for Project Planning*, as the first in a series of publications to provide guidance to communities engaged in urban renewal activities (price 25 cents, U. S. Government Printing Office).

It will pay a community, said URA, to select carefully the firm to be retained; and it suggests ways to investigate consultant qualifications.

In another action, the Housing and Home Finance Agency said that the Brookings Institution of Washington had accepted a 6-month, $16,452 contract to study the main areas in which more adequate and reliable information is needed on housing needs and desires of the elderly.

New Profession

Photogrammetrists have joined the march toward professionalism. The Washington-based Association of Professional Photogrammetrists has announced that it has adopted a policy that services of its members "should not be bid competitively," urged its members to seek to meet licensing requirements on the basis that they are offering a professional service.

Notes on Materials

There are some interesting points for architects contained in that latest report on highway construction material requirements released by the Bureau
Continued on page 92

KENTILE FLOORS

The makers of Kentile® Floors have doubled the size of their national field service force of Architectural Representatives.

These men, experts in resilient flooring, are available for consultation with architects and decorators, without obligation of course.

And you can be confident of *completely objective* counsel pertaining to the selection, installation and maintenance of the most suitable tile floor for every interior, because Kentile produces *all types* of resilient tile . . . solid vinyl, vinyl asbestos, rubber, cork and asphalt.

Contact the Kentile office nearest you whenever a flooring problem arises. Your Architectural Representative will be glad to consult fully with you.

58 Second Avenue, Brooklyn 15, N. Y. • 350 Fifth Avenue, New York 1, N Y. • 3 Penn Center Plaza, Philadelphia 2, Penn. • 55 Public Square, Cleveland 13, Ohio • 900 Peachtree Street, N.E., Atlanta 9, Ga. • 106 West 14th Street, Kansas City 5, Mo. • 4532 So. Kolin Avenue, Chicago 32, Ill. • 2929 California Street, Torrance, Calif.

of Public Roads.

One point: the usage of structural steel has declined, in favor of prestressed concrete, for highway bridges. Said BPR: in the period 1954-56, the usage factor for structural steel was 260 tons per $1 million of construction costs; in 1957-59, it had dropped to 185 tons.

And architects might want to obtain copies of a study just completed by the Bureau of Standards relating to the effect of high stresses on reinforced concrete beams. Aimed at problems in drawing up building codes, the studies included concrete beams reinforced with different types of deformed steel bars, subjected to stresses of more than 100,000 psi. Studies were conducted by R. G. Mathey and D. Watstein of the Bureau's staff; copies can be obtained from the NBS office of technical information, Washington 25, D. C.

Here's a further note on materials: the Commodity Standards Division of the Department of Commerce has printed copies of a commercial standard for copper drainage tube (price 10 cents), which gives requirements for chemical composition and mechanical properties, dimensions, tolerances and weights for nominal sizes; and a distinctive marking method for each length of tube to insure that even very short lengths may be identified as conforming with the standard.

Architectless Urban Renewal Council

Somewhat in line with comment earlier in this column on city development problems, FHA's Urban Renewal Administration announced formation of a Federal Urban Renewal Council, to be composed of "representatives of industry, city planning, business, and higher education."

Significantly, none of the ten members named to the council is listed as being an architect or civil engineer.

Reason for formation of the group, said Urban Renewal Commissioner David M. Walker, is that: "Urban renewal is already beginning to embrace more and more of the broad concept of community development. . . . Our urban areas must meet the challenge of the 1960s and 1970s not only by clearing slums and refurbishing older structures, but also by preparing for the impact of some 60 million additional inhabitants. . ."

At its first meeting in Washington, the council set up five subcommittees to consider the problems of public and private financing of urban renewal, conservation and rehabilitation, mid-

Continued on page 94

The main corridor of a Fred Harvey Oasis Restaurant on Tri-State tollway near Chicago, illustrating a dramatic ceiling treatment possible with Steeldome construction. The exposed concrete waffle ribs are painted charcoal gray, sounding a new note in decor motif.

Architect & Engineer:
Pace Associates.
General Contractor:
Ragnar Benson, Inc.

For more information, turn to Reader Service card, circle No. 308

dle-income housing, mass transportation needs, comprehensive urban planning, and federal-local relationships.

And, on urban planning, Housing and Home Finance Agency has prepared a new booklet, "The Urban Planning Assistance Program", which explains the federal program and how to take advantage of it. It's available, (for five cents) from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Local News

In Washington itself, Harland Bartholomew—who retired only a short time ago (See SEPTEMBER column) as Chairman of the National Capital Planning Commission—re-appeared on the scene, just as vigorously as ever. This time, he was appointed a member of a five-man advisory commission which will have a lot to do with implementing a long-standing plan for mass transit facilities in the city and its tributary suburban areas.

There were—for once—no outstanding local battles over architecture, but there were several plans announced for construction of motels within the heart of the downtown area.

Wisconsin's Rep. Henry S. Reuss kept the local pots boiling with a charge that the Federal government is "overcentralizing, overcongesting and overbuilding" the District of Columbia, and demanded a new study of this problem. Any such study would be conducted by the House Committee on Government Operations, and there seemed little chance it would act anytime soon.

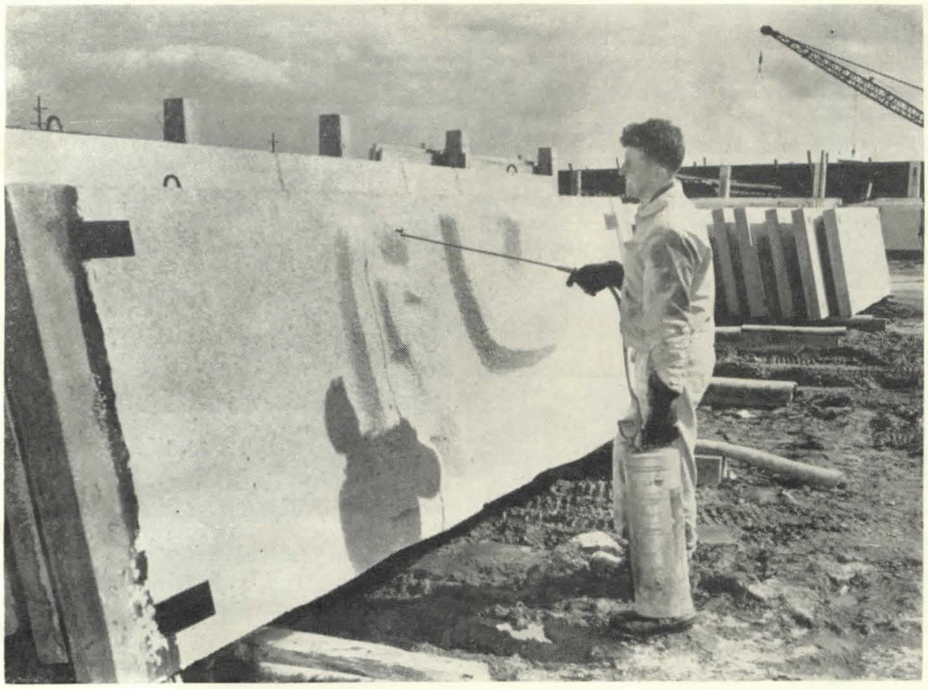
However, Reuss charged that the government has no established decentralization policy (and he'd like to see such decentralization), and that any decentralization that has taken place—such as moving the Bureau of Standards and the Atomic Engery Commission to suburban Maryland—has been done as a matter of expediency, rather than under any proper program.

FINANCIAL

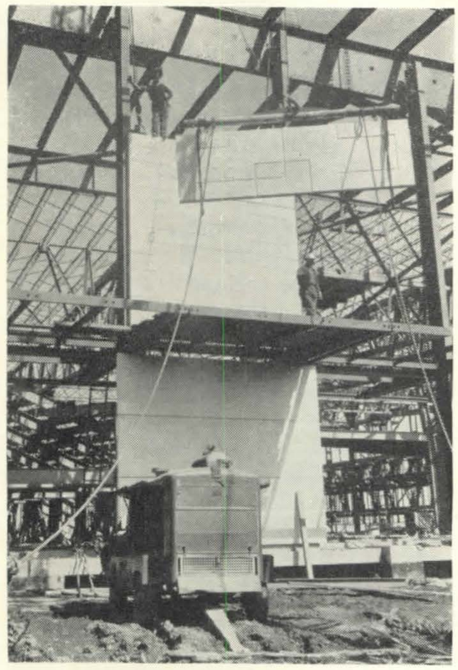
On the financial side, the construction sector of the economy continued to show great strength, despite the tendency of many observers to pick up spotty troubles elsewhere. If you want to follow the long-held belief that Construction is one of the best bellwethers of the general economy, you have to conclude that all continues pretty well.

For instance, during the month of August, public utilities continued to show no slackening in the plans for new construction work to serve a growing economy (see chart on page 84), and voters continue to support bonds for new construction—particularly of schools—at near-record rates and with no sign of slackening. There were other encouraging indicators too: home builders took a poll of their members, decided that there was some cause for optimism; the Department of Commerce estimated that city governments have been spending (as of fiscal year 1959) about five percent more than ever before on all services, much of it being devoted to construction.

However, Commerce's monthly estimate of the value of new construction put in place (for July) indicated that in the first seven months of the current year, expenditures were $30.4 billion—a two percent drop under 1959. But, said Commerce, the seasonally adjusted annual rate indicates a total of $55.5 billion for 1960—practically no change from 1959.



Low pressure spray is used to apply silicone masonry water repellent.



Sculptured panel is hoisted into place after having been sprayed.

Protecting, Bonding Concrete in Two New Buildings

Water Repellent, Bonding Agent Aid Construction

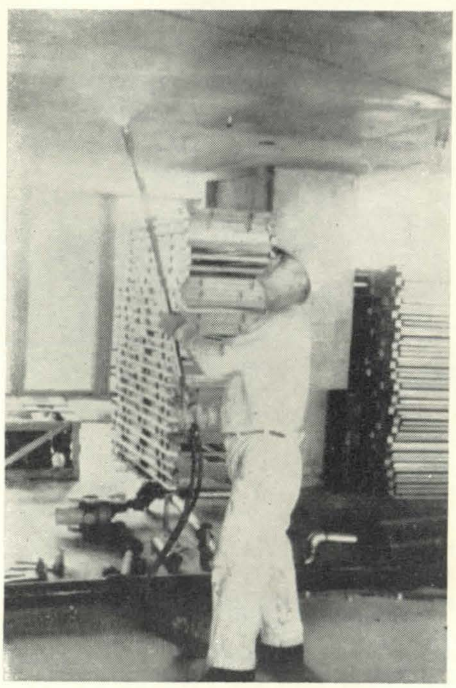
Two important aspects of concrete construction are protection of concrete exterior walls and the bonding of plaster to interior surfaces. Tieing in with this issue of P/A on "Concrete Technology in the U. S. A.," this page shows how a protective coating was used on a large exposition center, and the technique of bonding plaster to exposed concrete in a large hotel.

Exterior walls of the new Chicago Exposition Center (Shaw, Metz & Dolio; Holabird & Root & Burgee; Ralph Burke, Inc.; Edward D. Stone, architects) are embellished with immense sculptured concrete panels by Costantino Nivola. The panels were made with quartz aggregate in sand molds by the American-Marietta Company. For protection against the elements and city dirt, the panels were sprayed, just before lifting into place, with silicone masonry water repellent. While spray-on coating affords 80-90% reduction in water absorption by the walls, it penetrates the pores in a manner which does not seal them, but allows any moisture that might be entrapped to get out. Invisible and non-shiny, the material allows the colors and textures of the concrete to show. Providing protection against spalling and efflorescence, silicones (by Union Carbide) also guard against damage from dirt.

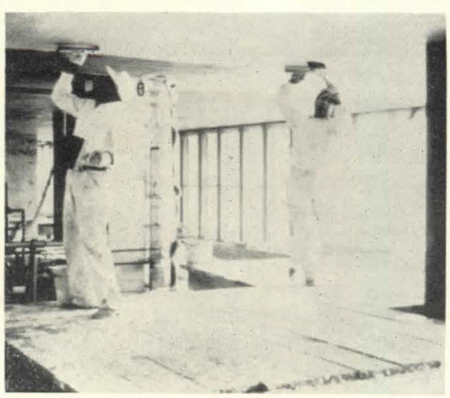
Expense of preparing concrete surfaces was eliminated in the Denver Hilton (I. M. Pei & Associates, architects) by use of Larsen Products' "Plaster-Weld" bonding agent directly over the concrete. Agent was sprayed on before lathing or placing of partitions. White lime-putty plaster was bonded directly to the concrete to produce a finished coat. Partitions were installed after plastering, with no further need for finishing.

Silicones Div., Union Carbide Corp., 292 Madison Ave., New York, N. Y.
On Free Data Card, Circle **100**

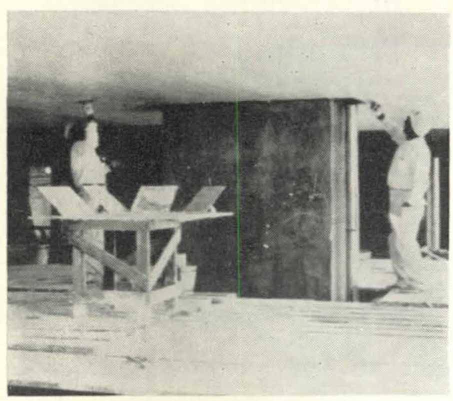
Larsen Products Corp., P. O. Drawer 5938, Bethesda 14, Md.
On Free Data Card, Circle **101**



Workman sprays resinous bonding emulsion directly to concrete slab.



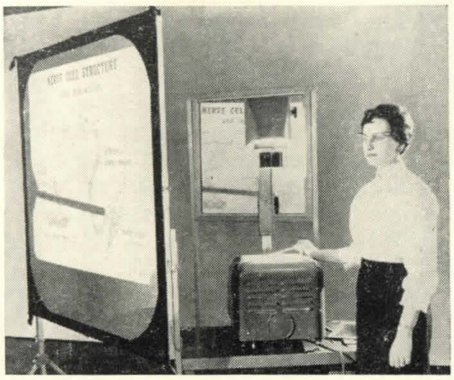
White lime-putty plaster is applied directly over bonding agent.



When applied, surface eliminates need for further finishing.

To Speed Foreign Inquiries

Since the inception of *P/A News Report,* our Reader Service Department has been besieged with a gratifying number of inquiries from readers outside the United States, its possessions, Canada and Mexico. Unfortunately, these requests are received some time after date of issue and, after processing, frequently reach suppliers late. In order to speed receipt of information, therefore, P/A asks readers outside the U.S.A., Canada or Mexico to send requests for information *directly* to the manufacturer. Beginning with this issue, we are including addresses with each Products and Data item. Thank you.



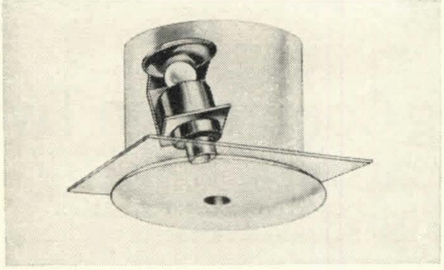
Transparencies Made In Two Minutes

A new method of visual presentation—by two-minute processing and overhead projection—permits the immediate enlargement of any item to a size suitable for viewing by large groups. Previous methods of converting material into transparencies consisted of hand copying or photography, both involving long processes. But new "Diffusion Transfer" negative-to-positive photographic-reflex process requires no materials other than new "Projecto-Printer." Plastic transparencies can be made within two minutes, can be marked with ink, grease pencil, or carbon paper. Projection aspect of machine also offers new versatility — it can be used in a lighted room, or operated by the speaker as he faces the audience. Image is either reflected behind and over the head of the speaker, or in front and above him (when used for rear screen projection). Ozalid Division, General Aniline & Film Corporation, 601 James St., Syracuse 3, N. Y.

On Free Data Card, Circle **102**

Spotlight Can Cast Various Light Shapes

'Projecto-Spot," with four-way, frame-in shutters and a projection lens system, can cast rectangles, squares, and other geometric shapes for the illumination of pictures or specific



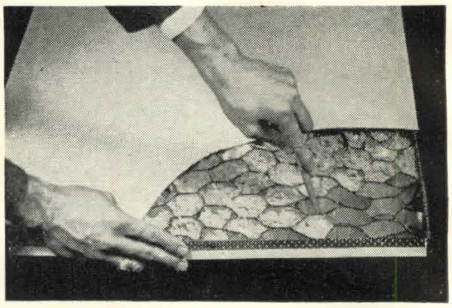
areas. Unit operates on one 100-watt lamp, 6-16-$\frac{1}{2}$ bayonet base, DC. Over-all frame dimension is $11\frac{1}{4}''$; housing dimensions are 10" dia, 10" deep. Adjustments up to 40 degrees from vertical are possible; maximum beam diameter is 63 degrees with an aperture opening of $1\frac{1}{2}''$. Halo Lighting Products, Inc., 4201 W. Grand Ave., Chicago 51, Ill.

On Free Data Card, Circle **103**

Copper Tubing Insulated With Plastic Jacket

New heat-insulated copper tubing "ThermoTube," is designed on a unique principle of heat insulation. A polyvinyl-chloride jacket with an inner profile of star-shaped serrations is factory-extruded over the copper tubing; the tips of these serrations rest on the copper, leaving longitudinal air channels to act as insulation Jacket is lightweight, weighing only a few ounces per foot of 1" tubing. It is suitable for continuous use in temperature ranges up to 212 F, provides unlimited resistance to cold, and does not support combustion. Easily-cleaned jacket can be furnished in different colors, permitting simple color-coding of multiple-line installations. Columbia Technical Corporation, 61-02 31st Ave., Woodside 77, N. Y.

On Free Data Card, Circle **104**



New Design in Metal Lay-In Ceiling Panels

"Soundlock" metal lay-in ceiling panels are said to cost less than other metal ceilings, cut installation costs, require almost no maintenance, and last the life of the building. Perforated metal is backed with honeycomb cells filled with fibrous glass to seal transmission and absorb sound. Surface is textured, flat, baked-on white enamel. Basic size is 2'x4'x1", with special modules available up to 2'x6'. Design makes Soundlock a structural panel with about 480 individual "sound absorbing and attenuating chambers." Average sound transmission loss is 39.3 db. The Kemp Corporation, 124 S. Woodward St., Birmingham, Mich.

On Free Data Card, Circle **105**

Push-Type Fixtures Conserve Water

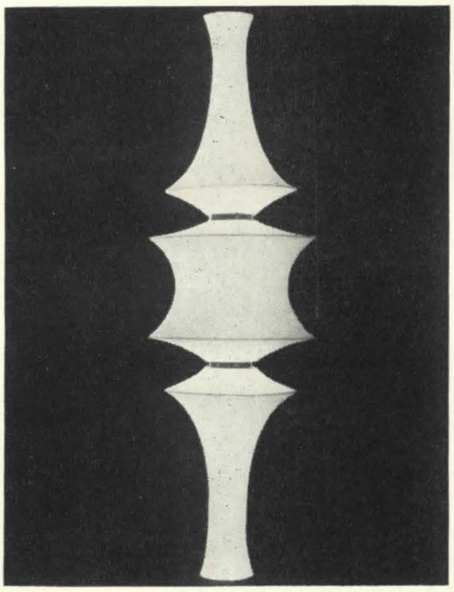
"Easy Push" fixtures for industrial *(shown)* and residential-commercial use reportedly save up to 25% in water consumption. Amounts of water to be discharged—from small to quite large amounts—can be pre-

determined. Fixtures have self-cleaning features and are non-dripping, non-hammering, splash proof, and vandal proof. Both hands of operator are left free, since push valve does not have to be held down during washing. Speakman Company, Wilmington, Del.

On Free Data Card, Circle **106**

Ring Allows Stacking Of Lighting Fixtures

A new Stack Ring Connection permits end-to-end joining of bubble or net lights, designed by George Nelson, into a sculptured assembly reaching a maximum of 48 feet. The stack ring connection is a 3/8"-thick walnut ring with clips held in place by screws, and male and female connector plugs wired into each unit. The ring retails for $6. Howard Miller Clock



Co. National Distributors: Richards Morgenthau, 225 Second Ave., New York, N. Y.

On Free Data Card, Circle **107**

New Finish Fused to Asbestos-Cement Board

Three new panels, featuring an exclusive new finish, are now available for low-cost construction-with-color in institutional, industrial, or commercial buildings. The new surface, "HT-60," is obtained by fusing color to asbestos-cement board by a heat-treating process. The panels incorporate the fire resistance and other advantages of asbestos-cement board with a durable, washable surface. New insulated panel, for partitions and outside walls, consists of 1/8" facings of asbestos-cement board and a core of insulation board laminated to various thicknesses. Another of the new panels features the HT-60 surface on both sides; the third panel features a porcelain-enamel surface on the face, and the new HT-60 surface as a vapor barrier on the other side. AllianceWall, Inc., Alliance, Ohio.

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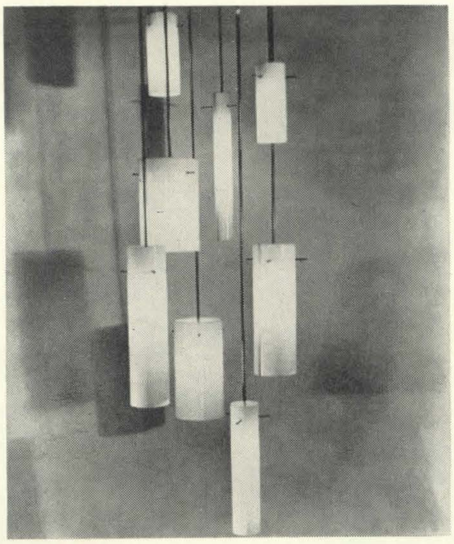


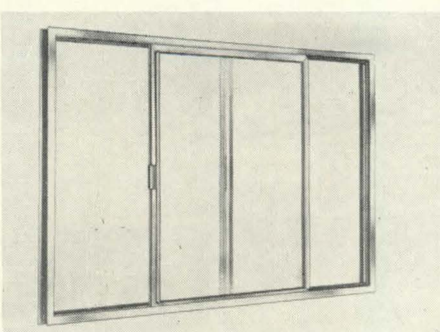
Luminaires Now Available In Plastic

Cylindrical hanging fixtures, so far available in frosted glass, are now made of "Lumacryl," a plastic developed specifically for lighting applications. Light is diffused evenly through translucent white plastic, which is cast in one piece to avoid seams and ensure solidity. Shatterproof Lumacryl fixtures, designed by Paul Mayen, are available in seven stock sizes, up to 12" in diameter. May be had in colors for contract installations. Habitat, 336 Third Ave., New York 10, N. Y.

On Free Data Card, Circle **109**

Neat Aluminum Window for Concrete Block Work

All main frame and vent-section corners are tightly joined by stainless steel screws, and all perimeter openings have vinyl weatherstripping in interlocking grooves which are extruded in aluminum sections, in "Series 750," aluminum horizontal slide



windows designed primarily for use in concerete block construction. Windows have aluminum latch handles which drop into a locking channel for positive protection, and an interlock at the vent bar and meeting rail that holds the members snugly together. Window types in series are single slide, picture slide, and fixed picture. Sizes range from 2' 1/8 x 2' up to 8' 1/8"x4'. Use of anchors permits adaptation to frame, brick veneer, and solid masonry construction. Truscon Division, Republic Steel Corporation, 1315 Albert St., Youngstown 1, Ohio.

On Free Data Card, Circle **110**

Medicine Cabinet Has Double Capacity

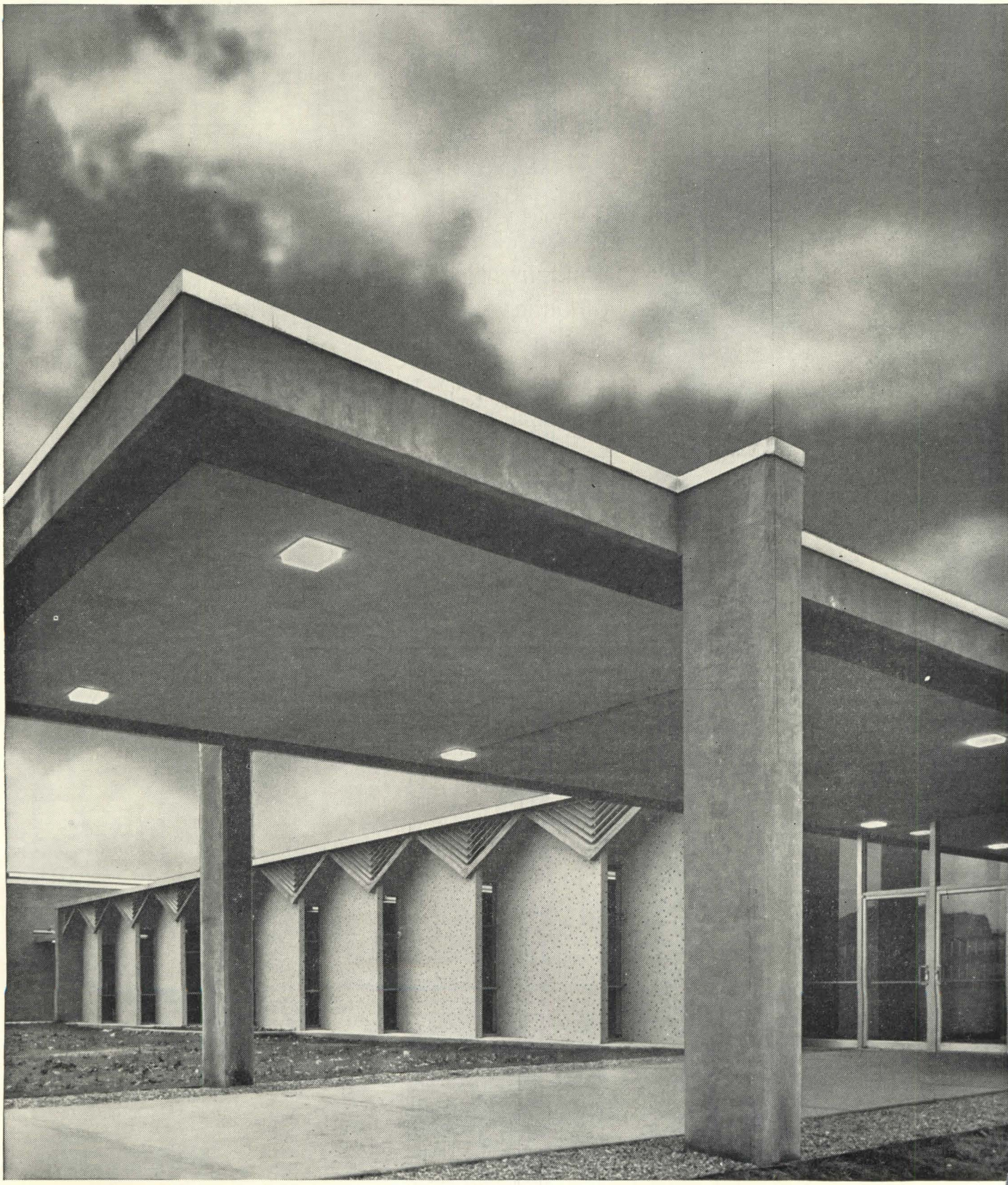
New sliding-door medicine cabinet, "Mercury-Duo Bilt-In Cabinet," provides double the normal medicine-cabinet storage capacity—a total of 4400 cu in. The cabinet is 8" deep, to recess into standard wall and extend 4" from the wall. One side has fixed shelves for linen, the other side has adjustable glass shelves for medicines. Doors of the 20"x30" cabinet are available with mirrors or in clear glass. Jensen Industries, 165 S. Mission Rd., Los Angeles 33, Calif.

On Free Data Card, Circle **111**

Stacking Chairs Double As Side Chairs

An exclusive positive-acting ganging device which folds under "Stak'n'-Gang" stacking chairs allows them to serve also as regular side chairs. Chairs are 20" wide, including ganging device; seat height is 18". Seats and backs are cushioned with bonded latex rubber and covered with U. S. Elastic Naugahyde in a number of colors. Stylex Seating Company, 911 Walnut St., Philadelphia, Pa.

On Free Data Card, Circle **112**



Memorial Student Union Building, Southern Connecticut State College. Architect: Carl R. Blanchard, Jr., A.I.A., New Haven, Connecticut.

CONCRETE

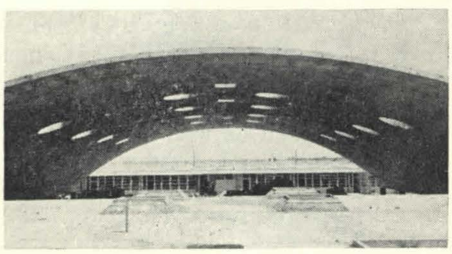
Insulating Concrete Used in Backup Walls

Latest edition of 2-page *Perlite Design News* describes the use of perlite insulating concrete in the backup type of curtain wall. Backup walls are a compromise between heavy masonry walls and lightweight, but non-fire-rated, sandwich-panel walls. Data sheet presents typical application details, cites advantages, and lists noted buildings using this type of construction. Perlite Institute, Inc., 45 W. 45 St., New York 36, N. Y.

On Free Data Card, Circle **200**

Role of Retarder in Lightweight Concrete

The wide use of lightweight-aggregate concrete is featured in new 20-page publication. Photographs and job reports of 13 projects give a broad picture of the use of lightweight concrete as a strong, durable

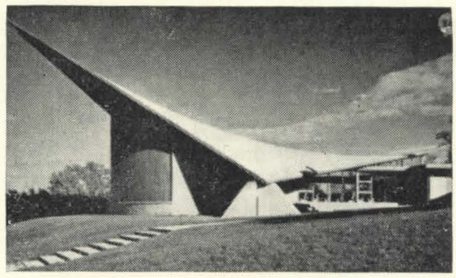


material for floor slabs, columns, beams, thin-shell construction, and bridge decks. Booklet emphasizes the role of "Pozzolith" in providing adequate workability for proper placement while economically maintaining sufficient strength to meet structural requirements. Various projects illustrate Pozzolith's ability to improve quality of concrete, aid in early strength development, produce abrasion-resistant concrete, reduce shrinkage, or aid in concrete placement during hot weather. The Master Builders Company, Cleveland 18, Ohio.

On Free Data Card, Circle **201**

Analysis of H-P Shells Graphically Presented

Elementary Analysis of Hyperbolic Paraboloid Shells, 24 pages, gives a comprehensive discussion of this form in reinforced concrete. Among the aspects treated are surface definition, geometry, sloping and skewed hyper-



bolic paraboloids, unsymmetrical loads, secondary stresses. Several hypothetical examples are solved; actual examples are illustrated in photos. Many diagrams and tables are included. Booklet is one of the Modern Developments in Reinforced Concrete series. Portland Cement Association, 33 W. Grand Ave., Chicago 10, Ill.

On Free Data Card, Circle **202**

Easily-Exposed Aggregate With Chemical Coating

Technical bulletin, 4 pages, describes "Rugasol," a chemical coating used during construction to obtain an exposed aggregate surface. Product is provided in two types: Rugasol-C, for application on freshly-placed plastic concrete, and Rugasol-F, for application on formwork. Retarding action given to the concrete surface enables the soft surface mortar to be easily washed away, exposing aggregate over the treated surface. Bulletin gives specifications and notes on application, penetration, and coverage. Sika Chemical Corporation, 35 Gregory Ave., Passaic, N. J.

On Free Data Card, Circle **203**

Epoxy Material Bonds New Concrete to Old

A New Type of Concrete to Concrete Bonding describes the liquid polymer epoxy concrete adhesive whose bonding strength is greater than the cohesive strength of portland cement concrete itself. General information in 8-page brochure discusses the use of LP/Epoxy adhesive for overlays (new concrete to old concrete), remedial patching, anti-skid surfacing, expansion joints, and shock-absorption joints. Companion literature, 24 pages, is *Handbook of Application Methods*, discussing particular uses, surface preparations, mixing procedures, methods of application, and time required for curing. Thiokol Chemical Corporation, 780 N. Clinton Ave., Trenton 7, N. J.

On Free Data Card, Circle **204**

Weather Forecasts Aid Concrete Construction

A monthly weather-forecasting service, more detailed than that available from the U. S. Weather Bureau, has been initiated. Information on temperature and precipitation expected for major regions and key cities will be particularly useful to those involved in concrete construction. Each bulletin will contain additional general information; current issue carries notes on hot-weather concreting. Alpha Portland Cement Company, 15 S. Third St., Easton, Pa.

On Free Data Card, Circle **205**

High-Density Concrete For Radiation Protection

High-density concrete products widely used for radiation protection are presented in 8-page bulletin. *Catalog 400* gives composition, specifications, and dimensional data on precast blocks, precast slabs, bulk aggregates, special shapes and inserts, and high-density mortars. Ray Proof Corporation, 843 Canal St., Stamford, Conn.

On Free Data Card, Circle **206**

Rubberized Sealer for Concrete Parking Decks

Rubberized sealer for critical high-traffic areas of concrete pavements and parking decks is described in 3-page bulletin. On parking decks, "Jennite J-16-R" produces a wear-resistant, non-skid surface and prevents moisture absorption and subsequent drippage to lower levels. Maintenance, Inc., Wooster, Ohio.

On Free Data Card, Circle **207**

Precast Floor/Roof Decks

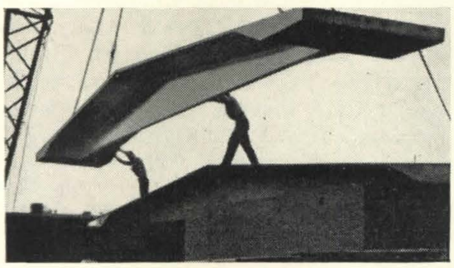
Use of precast-concrete floor and roof decks, with fireproofed-steel columns and beams, enabled construction of a $2 million high school to continue through winter months. Framing details and sectional drawings in 6-page folder show how "Flexicore" precast decks provided lateral bracing for exterior walls, immediate work decks, and permitted the fast, all-weather erection at economical cost. The Flexicore Company Inc., 1932 E. Monument Ave., Dayton 1, Ohio.

On Free Data Card, Circle **208**

Paste Pigment for Darkening Concrete

"A. E. Dispersed Black," a semi-paste pigment for darkening concrete, is discussed in 4-page catalog. Material is used in either air-entrained or regular concrete, either monolithic or topping construction. It does not reduce air content in air-entrained mixes. It offers uniform dispersion and greater color retention; helps to define curbs, islands, and traffic markings; reduces sun and auto-headlight glare; and assists in de-icing of roads and sidewalks. Brochure gives advantages, description, color values, uses, mixing instructions, testing procedures, and quantities. A. C. Horn Company, Division of Sun Chemical Corporation, 2133 85th St., North Bergen, N. J.

On Free Data Card, Circle **209**



Single-Stem Member For Roof Deck

Brochure, 8 pages, describes new "Flex-Tee," a prestressed, single-stem roof deck for schools, churches, offices, industrial and residential buildings. Flex-Tee is an easily-cast element (cast either at yard or site) in span lengths from 25′ to 54′. Width is 6′. Finish is such that insulation and roofing material may be applied directly to it; interior surfaces may be left exposed. Brochure describes appearance of the Flex-Tee; gives technical data on casting details, structural qualities, and limits; and shows representative uses of the member. Flexforms, Inc., 1445 W. Quincy, Englewood, Colo.

On Free Data Card, Circle **210**

Varied Formulas for Permanent Bonding

Folder, 10 pages, describes 7 "Sta-Crete" formulas for patching, resurfacing, filling cracks, protecting against corrosion, grouting, and for bonding anything permanently. Each epoxy-resin formula is briefly described; accompanying sketches illustrate range of uses for the products. Sample tests are included, and complete results are available on any product or problem. Sta-Crete, Inc., 115 New Montgomery St., San Francisco, Calif.

On Free Data Card, Circle **211**

Curing/Sealing Products For Concrete Structures

Products for Concrete Construction, 12 pages, covers wide variety of "Sealtight" products for use in highways, bridges, airports, and concrete structures of all types. Included are expansion joints, joint-sealing compounds, control joints, sewer-joint compounds, waterstops, and curing compounds. Each product is pictured in its suggested application and accompanied by description and specification. W. R. Meadows, Inc., 26 Kimball St., Elgin, Ill.

On Free Data Card, Circle **212**

AIR/TEMPERATURE

Requirements for Kitchen Ventilation

Commercial Kitchen Ventilation claims to be the first and only comprehensive treatment of this important phase of kitchen design. Manual, 26 pages, covers the requirements for effective kitchen ventilation for all types of kitchen and counter cooking equipment, and the effect of cooking appliances and exhaust systems on air-conditioned areas. One of major summary statements is that the type of fuel used in cooking appliances has no bearing on the design of the ventilation system or on the size and operating cost of the air-conditioning equipment. Write (enclosing $.50) to: American Gas Association, 420 Lexington Ave., New York 17, N. Y.

CONSTRUCTION

Data Booklet on Plank-and-Beam Framing

Fourth booklet in new Wood Construction Data series, *Plank-and-Beam Framing for Residential Buildings,* has been published. Manual, 30 pages, gives good coverage of its subject,

with separate sections dealing with general description, principles of design, advantages and limitations of system, construction details, structural requirements, design data for planks and beams, and notations. Many full-page drawings show framing details. Extensive load tables for floor and roof beams are included. National Lumber Manufacturers Association, 1319 18th St., N.W., Washington 6, D. C.

On Free Data Card, Circle **213**

Wall Details for Lightweight Masonry

Suggested Details of Waylite Masonry Wall Construction contains 16 pages of scaled detail drawings. The typical drawings cover such details as footings for foundation walls; head, jamb, and sill for basement openings; floor framing; heating ducts; control joints in walls and pilasters; parapet walls; projected and double-hung windows; cavity-wall floor and roof framing Several pages show wall bonds and surface patterns possible with the lightweight-aggregate masonry units. The Waylite Company, 20 N. Wacker Dr., Chicago 6, Ill.

On Free Data Card, Circle **214**

Grades and Uses of West Coast Lumber

Detailed information on the grades, uses, and specifications of West Coast lumber is available in new 20-page booklet. The species of the Douglas Fir Region—Douglas fir, West Coast hemlock, Western red cedar, Sitka spruce, and white fir—are covered at length, with descriptions and photographs of typical grades and patterns of finish lumber, siding, boards, framing, joists, and planks. Conversion tables are included for both construction and finish lumber. Also featured is the latest information on roof decking and on stress grades for construc-

Continued on page 118

CONCRETE

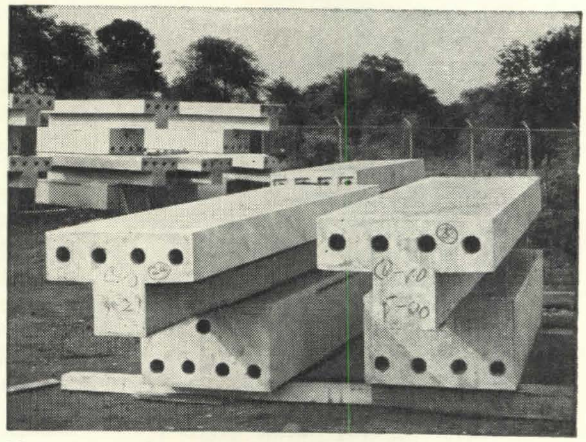
FOR KAHN'S "IVORY TOWERS"

To architect Louis Kahn, the ideal environment for a research scientist is a laboratory secluded from its necessary utility services.

This is illustrated—uniquely—by Kahn's new medical research building at the University of Pennsylvania. Here laboratories occupy three 8-story towers. These connect at each floor with a central structure containing the mechanical equipment, elevators, and other services. Air intakes, exhausts, and fire stairs are housed in tall exterior shafts. The laboratory studios therefore provide a quiet atmosphere, free from distraction.

Concrete contributed intriguing architectural expression to this significant complex. More than 1,000 precast members were manufactured to extremely close tolerances in four specially-designed shapes. At the site, they were interlocked intricately to create the structural frames for the laboratory towers.

Concrete for all these precast members was made with 'Incor'®, America's first *high early strength* portland cement. By speeding the production of such precast concrete members, 'Incor' helps make them economical, helps make this unique type of construction possible.



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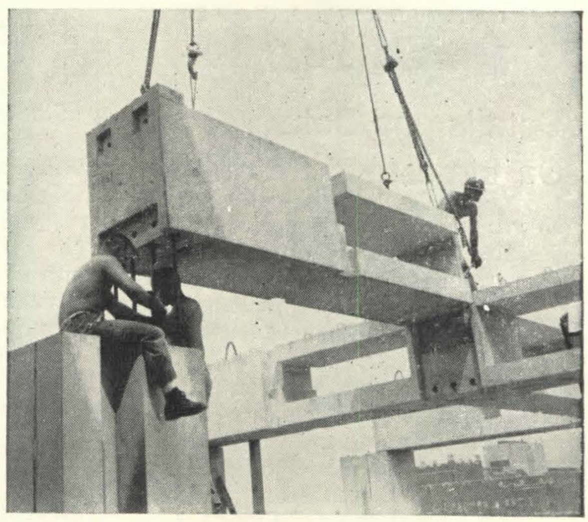

. . . intricately interlocked at the site to form economical multi-story structural frames.

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For more information, turn to Reader Service card, circle No. 321

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tion lumber. West Coast Lumbermen's Association, 1410 S. W. Morrison St., Portland 5, Ore.
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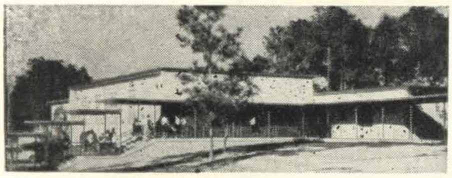

Tile and Brick For Structural Facing

Glazed and unglazed tile and brick, for both interior and exterior applications, are presented in 1960 *Structural Clay Products*. Catalog, 24 pages, emphasizes glazed "Vitritile," a structural facing product in 21 standard colors and 9 accent colors. Many colored and textured facing bricks are also included. Other products in brochure are patio, stair tread, and drain tile, flue lining, sewer pipe, and clay conduit. Natco Corporation, 327 Fifth Ave., Pittsburgh 22, Pa.
On Free Data Card, Circle **216**

Details and Data On Limestone Products

New 28-page catalog provides detailed descriptions, specifications, and photos of various finishes and installations of limestone products, including new insulated spandrel panels, louvers, and screens. Subjects covered by the comprehensive text and charts are physical characteristics, surface finishes, load-bearing requirements, and anchor and support details. Indiana Limestone Company, Inc., Bedford, Indiana.
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Spandrel Glass For Curtain Walls

Details of "Vitrolux" spandrel-glass panels in curtain-wall construction are presented in technical form in new 24-page manual. The booklet contains ten typical curtain-wall installation details—the first five are custom-designed curtain walls derived from actual buildings, while the last five are standard commercial systems typical of those available on the market. Both split-mullion and structural-mullion types of curtain walls are shown, as well as a combination of both. Fixed and operable sash are included, with examples of frames and mullions of extruded aluminum, carbon steel, stainless steel, and bronze. Glazing details and architectural data on Vitrolux are included. Libbey-Owens-Ford Glass Company, 811 Madison Ave., Toledo 3, Ohio.
On Free Data Card, Circle **218**

British Patterned Glass Marketed in U. S.

A new selection of 26 patterns of decorative, rolled, and wired glass is illustrated in small 30-page booklet. Glass is manufactured by Pilkington Bros., Ltd., in Great Britain, and is marketed in the U.S. for the first time. Brochure shows patterns in full-size photographs, and gives nominal thickness, maximum sizes, and approximate weights for each of the distinctive designs. Libbey-Owens-Ford Glass Company, Toledo 1, Ohio.
On Free Data Card, Circle **219**

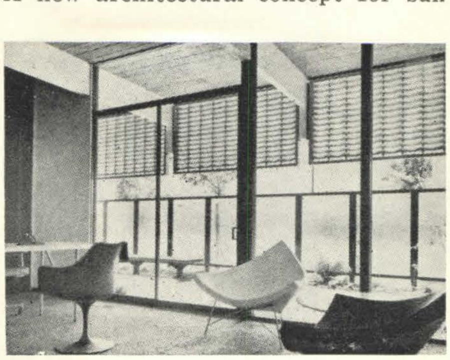
New Design in Structural Wall System

Folder, 4 pages, describes the use of new "Structural Wall System" in construction of single or multistory buildings. System is extremely flexible, and can be integrated with a variety of manufacturer's wall panels. No other structural framing is required for support of roof framing. Brochure describes numerous other advantages and gives detail drawings. Davidson Enamel Products, Inc., 1104 E. Kibby St., Lima, Ohio.
On Free Data Card, Circle **220**

DOORS/WINDOWS

New System for Sun Control

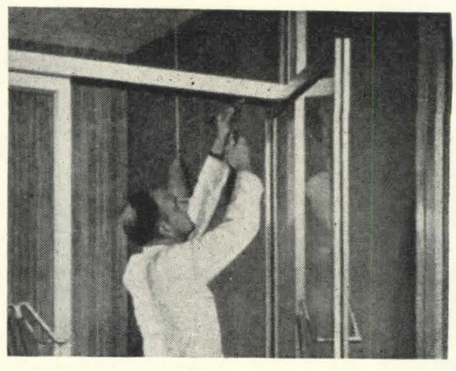
A new architectural concept for sun



control, "Brise-Soleil," is announced in 6-page folder. First design to become available in standardized panels, cell sizes, and finishes, is "Series 40/Parabola," with 4"-wide horizontal blades of parabolic form. Unique principle in blade forming achieves horizontal visibility up to 200 percent greater than conventional louvers. Further standard designs for Brise-Soleil and custom designs can be furnished to architect's specifications. Hardware has been developed for three types of installation—suspended, cantilevered, and supported—all illustrated in brochure. Arcadia Metal Products, 801 S. Acacia Ave., Fullerton, Calif.
On Free Data Card, Circle **221**

Catalog of Builders Hardware

New *Catalog 20*, 20 pages, contains 79 builders-hardware products—a line of friction and magnetic catches for doors and cabinets; a line of track, guides, and glides for sliding glass and panel doors; and a line of pulls for doors and drawers. The diagram for each product is accompanied by a description of its operation and construction. The Engineered Products Company, P. O. Box 118, Flint, Mich.
On Free Data Card, Circle **222**



Award-Winning Booklet On Entrance Packages

A Certificate of Merit Award has been presented by the Producers' Council to Kawneer for its 28-page booklet called *The Second New Idea in Entrances*. A unique insert illustrates entrance-design ideas available with new "Entrance Packages." Panel variations and hardware options are also shown. A perforation allows the insert to be easily removed from the book for use as a wall chart. Kawneer Company, Niles, Mich.
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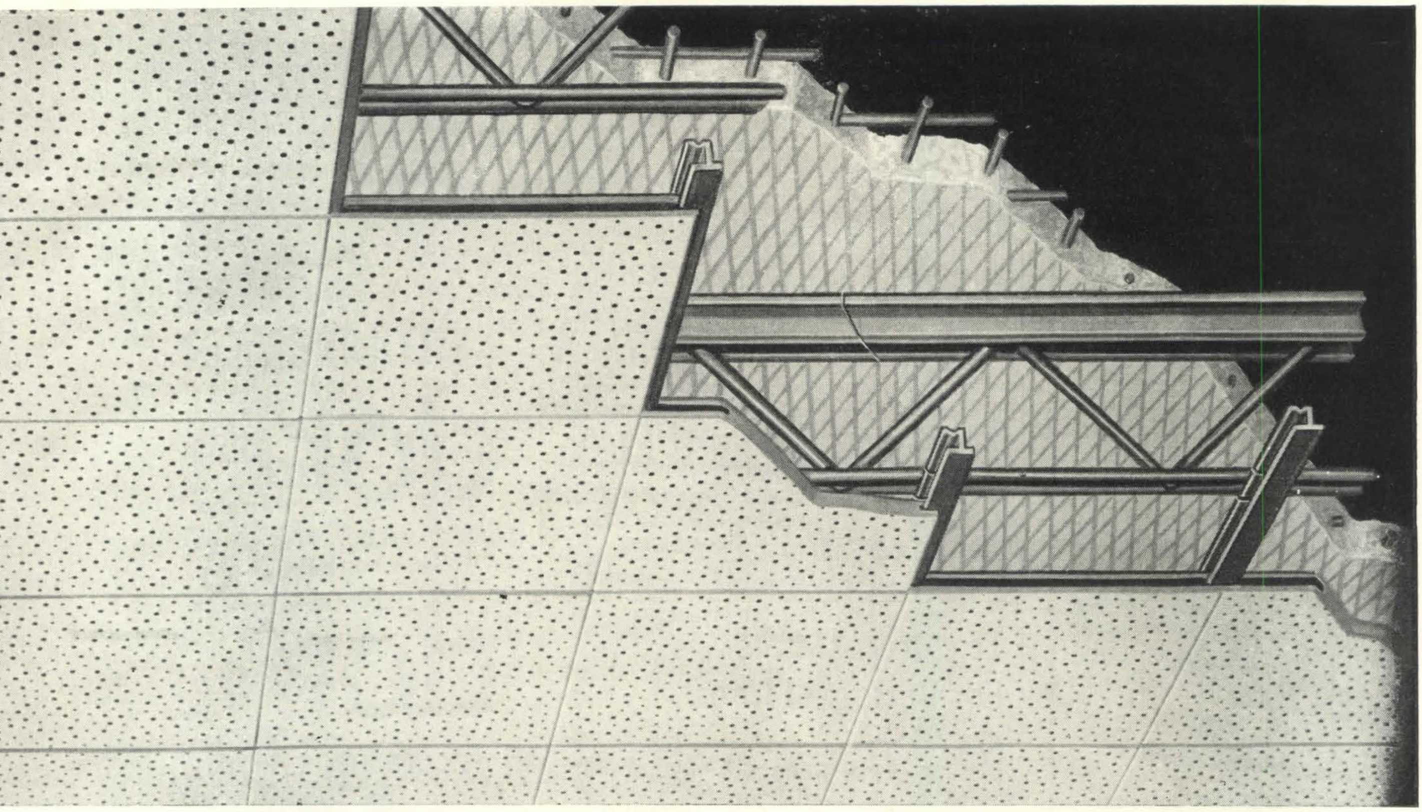

UL-tested Lo-Tone acoustical F/R tile*

In tests conducted by Underwriters Laboratories, Inc., the Lo-Tone Acoustical F/R tile floor-ceiling assembly afforded superior protection against the passage of flame and transmission of heat, yielding a 2-hour time-design rating. The ⅝″ thick Lo-Tone Acoustical F/R mineral tile actually limited the transmission of 1850° F fire-box temperature to the allowable 250° F rise above ambient for more than 2 hours in this grueling test.

Cut new construction costs with this modern fire protection technique. The Lo-Tone Acoustical F/R floor-ceiling system eliminates conventional wet methods of fire protection and provides fast protection to meet building codes.

Speeds remodeling jobs where fire protection is required. Lo-Tone Acoustical F/R tile application is *completely dry*. Permits off-hour work without upsetting stores and offices. No moisture nuisance to slow other trades on the project.

Fire protection is a bonus . . . over and above Lo-Tone Acoustical F/R tile's *enduring beauty of ceiling design* and *excellent acoustical properties.*

Helps trim insurance rates by giving owners bonus fire protection above requirements of many local building codes. Often gives more protection than more expensive alternate methods.

Available in 12″ x 12″ sizes, Lo-Tone Acoustical F/R tile gives you truly enduring protection and enduring beauty for the years to come. Write today for "AIA File 39-B" for detailed information about this new economical floor-ceiling system: Wood Conversion Company, Dept. 67, St. Paul 1, Minnesota.

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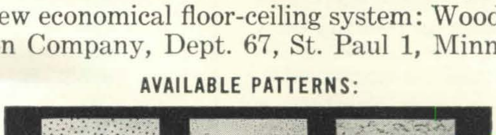


RANDOM CONSTELLATION FISSURED

LO-TONE® ACOUSTICAL F/R

MINERAL TILE

For more information, turn to Reader Service card, circle No. 323

Continued from page 118

SPECIAL EQUIPMENT

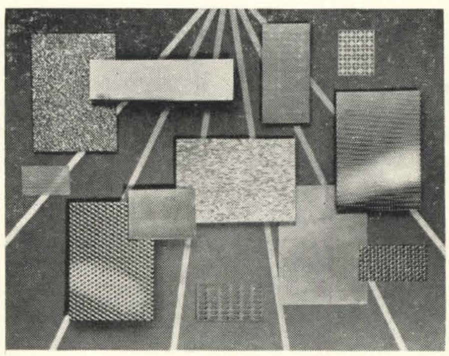
Two Finishes Available In Plastic Panels

Photos of new uses, patterns in full color, and an ordering-guide table are features of new 8-page catalog on "Acrylite." These practical and decorative plastic panels are now offered in two finishes—smooth or textured. Catalog presents full data on size, thickness, and embedments for each of 11 patterns. Wasco Products, Inc., 5 Bay State Rd., Cambridge 38, Mass.

On Free Data Card, Circle **224**

Textured Metals For Variety of Uses

New designs in textured metals are illustrated in 6-page folder. Advantages of the texturing process, over both coining and corrugating, are outlined; representative uses of textured products in various industries are shown. Architectural uses include faceted curtain-wall panels, kick plates, roof panels, perforated duct enclosures. The textured metals are available in a wide variety of finishes, and special textures can be engineered to specifications. Sheets are available up to 52″ in width; continuous coils up to 48″ in width. Ardmore Products, Inc., Aldene Rd. & First Ave., Roselle, N. J.



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PROGRESSIVE ARCHITECTURE
NEWS REPORT

REINHOLD PUBLISHING CORPORATION
430 PARK AVENUE NEW YORK 22, N.Y.

Publisher..........D. Bradford Wilkin
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News Editor.......James T. Burns, Jr.

October 1960 **PROGRESSIVE ARCHITECTURE**

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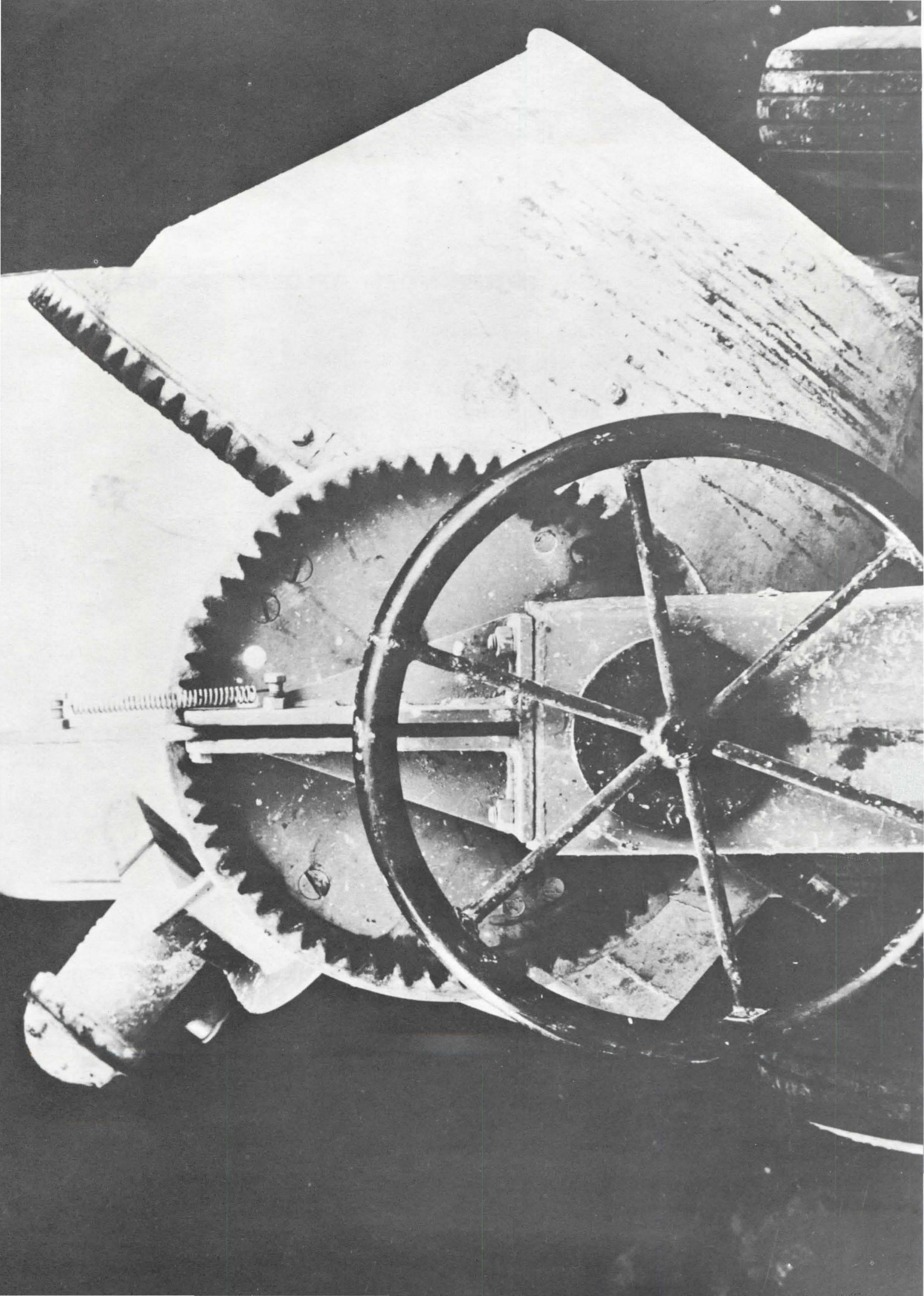
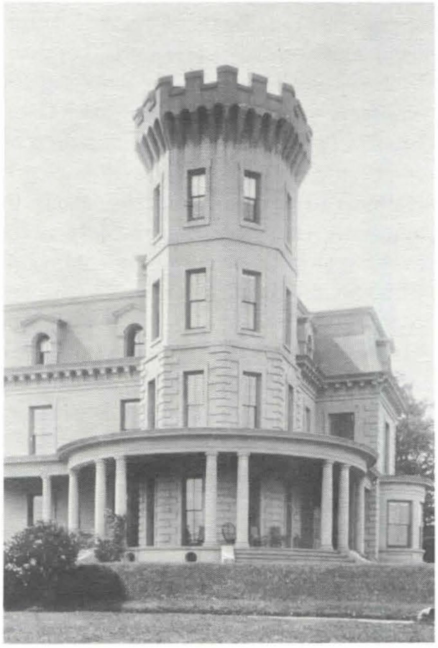
430 PARK AVENUE, NEW YORK 22, NEW YORK



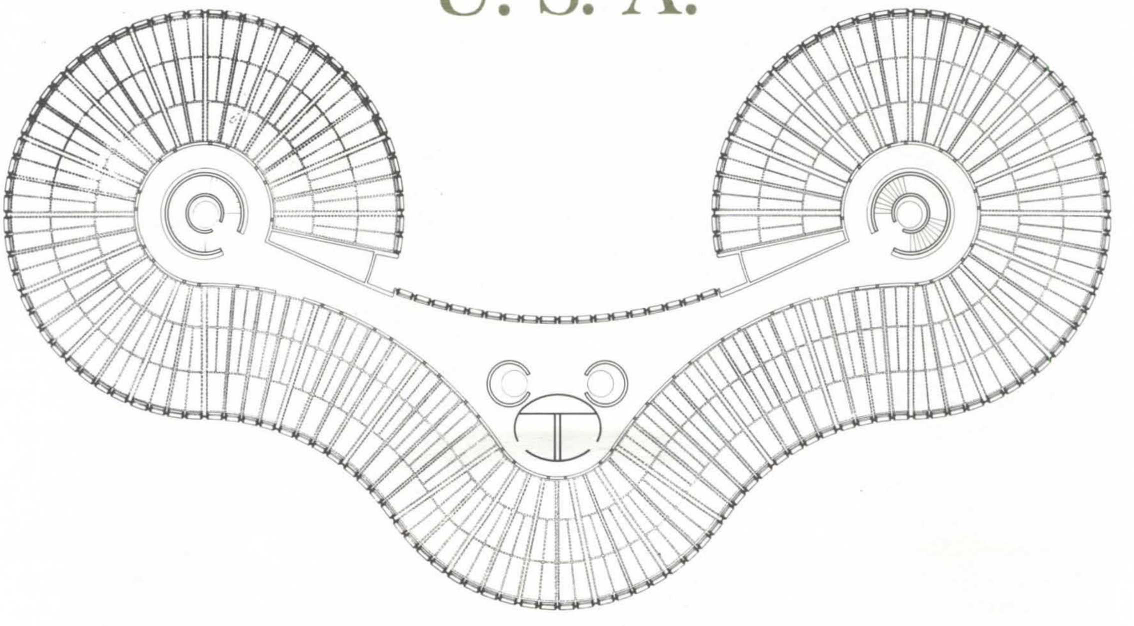
CONTENTS

"And why not, monsieur? You probably think that I should have used marble. Well, it might surprise you, marble would have been cheaper. But what is so good about marble? Every butcher in Paris has his shop faced with this vulgar and perishable material. No, it is concrete which is the most noble of materials—it is immortal: instead of disintegrating with age, it hardens with age. See for yourself; go to Rome and try to break old Roman concrete with an axe; you will only dent the steel." This was the proud answer given me some years ago by the late Auguste Perret when I asked why he was using elaborately finished concrete even for the most luxurious of his buildings. The United States has traditionally been a "steel country." Larger buildings, especially long-span and high-rise structures, have usually been framed in steel and then faced with brick or other masonry units. Concrete was concealed underground as foundations, used as fireproofing, sometimes as structural framing —but nearly always hidden under a protective cloak and seldom considered an "architectural" material. Today, the profession is awakening to the esthetic potential of concrete. Almost every architect with whom we have talked recently has on his boards a design which he hopes to carry out in exposed reinforced concrete. It is difficult to pinpoint the reasons for this sudden interest. There seem to be many: changed economics of construction; impact of structural innovations in shell design; growing popularity of precasting and tensioning methods with their prefabrication possibilities; and—above all—tedium with the monotony of flat curtain walls and a desire for greater plasticity. Concrete is an eminently suitable medium for more personal, three-dimensional expression. Moreover, it is the only structural material which has no stereotyped form and no inherent character of its own—it has to be shaped and given a finish by the designer himself. This freedom to mold a material to suit one's idiosyncrasy has considerable appeal to the more imaginative and ambitious architects. Unfortunately, the profession has little background knowledge in the techniques of exposed concrete construction; there is a feeling of uneasiness and uncertainty which is holding back, frustrating, even thwarting many architects anxious to go ahead with their designs. We have therefore attempted, in this issue of P/A, to bring into focus some of the problems and possibilities of exposed concrete construction: a historical survey analyzes reasons for concrete's demise as anything more than a purely utilitarian material; a contemporary survey scans the scene as it is today; several interior solutions are illustrated; an unusual group of early concrete buildings is described; and one office's use of cast-in-place technique and another's unusual precast building document the devotion, enthusiasm, ingenuity, and thoroughness with which architects are beginning to approach the problem of concrete technology in U.S.A.

J. C. R.



CONCRETE TECHNOLOGY IN U. S. A.



Historical Survey

BY ADA LOUISE HUXTABLE

This article is the result of long and intensive research on the history of concrete construction in the U.S.A. It contains much new information of great interest to our profession.

Mrs. Huxtable is an architectural historian and critic and a contributing editor to P/A.

The history of reinforced concrete in the Twentieth Century is becoming more a documentary of acrobatics than of architecture. While the revolutionary possibilities of this remarkable material continue to open unprecedented horizons of construction and form to create a legitimate new world of building, its structural novelties have received disproportionate attention. For every trend-setting design in which art, science, and utility are properly fused, there are a half dozen shock-structures meant to *épater les bourgeois* and fellow professionals. The result is an overwhelming emphasis on gymnastics and on the exploits of architectural stunt men.

Spectacular shell construction—undeniably today's most significant architectural adventure—is only part of the story of reinforced-concrete design. Exposed-concrete framing, for example, has been used successfully for a handful of landmark structures abroad; notably Le Corbusier's housing blocks at Marseilles and Nantes, the Paris UNESCO headquarters by Breuer, Zehrfuss, and Nervi, and Ponti's Pirelli building in Milan. These buildings prove that the concrete skeleton is as important as the free-form shell. The nature and quality of concrete surfaces, the infinite possibilities of precasting in plastic molds, of site-casting in reusable forms—in short, the development of a complete concrete structural esthetic other than shells and vaults—still provide an open field. These aspects deserve closer attention if we are not to leave one of the greatest materials of our time half-explored, and if we are to achieve a true concrete architecture—perhaps the unparalleled opportunity of our time.

Historically, the subject of reinforced concrete "architecture" has been a touchy one. At the same time that architects and engineers have loudly praised its structural and technical advances, they have been evasive or uneasy about its esthetic effects. A source of acute professional discomfort ever since the material moved on from foundations and drains to more pretentious structures, insecurity about its appearance has been matched only by the general unwillingness to come to grips with the problems involved. There have been good reasons, too, for concrete has earned an unusually bad reputation in a comparatively short span of time. It has been considered shoddy and second-rate, a structurally practical but architecturally ugly duckling best hidden behind veneers and false finishes when viewed by polite society. Developed as a work-horse material in the second half of the Nineteenth Century, it soon became associated with utilitarian installations of a type that no proper Victorian would have admitted into the respectable realm of "art." When it entered the world of domestic and public building, it took on an even more dubious character, as "artificial stone." Only at the turn of the century, with the introduction of practical systems of reinforcement and the need for the large-scale, open-span, fireproof factory created by American mass production, did concrete finally come into its own.

But even admiration for the impressive new plants was tempered with dislike and distrust. Construction without prescribed engineering standards resulted in many accidents and failures. Surfaces, through carelessness or lack of properly developed processes, were subject to rapid deterioration. Concrete became a synonym for streaked, cracked, shabby, decaying construction on the wrong side of the tracks and in the wrong part of town. At its most successful, it had few claims to beauty. As late as 1928, Frank Lloyd Wright denounced concrete as having "neither song nor story; nor is it easy to see in this conglomerate a high esthetic property, because in itself it is amalgam, aggregate, compound." He preferred to call it "Conglomerate."

A unique material, concrete is formed, in the most literal sense, by the architect. Unlike wood and stone, which are handsome in themselves, concrete is a viscous mass turned into substance by design and engineering. Beyond its strictly pragmatic uses, it offers a severe test of architectural imagination and taste.

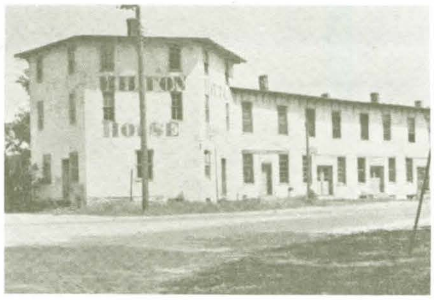
For an extraordinarily long time, there was no recognition at all that this new material might have an esthetic of its own. The development of concrete construction in the United States was fueled largely by the primary American desire to find ways of doing things that were "cheap, quick, and easy." Its story is a characteristic mixture of the immediate, imaginative American recognition of unprecedented technical possibilities and the willingness to do what had never been done before, with the tastelessness of a new middle class society that accepted substitute gimcrackery for traditional materials and ideals.

Concrete construction is found, in isolated examples, over a remarkably scattered area, in surprisingly early years. The colonial architecture of the Spanish Southwest used a kind of concrete—a coarse rubble bound with lime and sand mortar—before the introduction of commercial cements. "Firsts" are constantly replaced by earlier "firsts," but it is certain that concrete structures made of mixtures of gravel, sand and portland cement were already being built in the 1830s. It is quite remarkable, in view of the fact that portland cement had been introduced in England only in 1824, that it should have been so quickly utilized in the New World. It was usually imported, although Robert W. Lesley's *History of the Portland Cement in the United States* claims that natural cement rock was found in New York State in 1818 during the building of the Erie Canal, by a gentleman with the unlikely name of Canvas White, and was used soon after in a native portland cement by Obadiah Parker. *The Journal of the Society of Architectural Historians* reports these facts, and also that the *Mechanics' Magazine and Register of Inventions and Improvements* for August, 1835, describes an interesting little structure of poured concrete just erected in New York City.

By 1844, settlers had introduced the materials and the process to the Midwest. Joseph Goodrich, a trader and inn-keeper, constructed a large building in Milton, Wisconsin—a combined house, store, and hotel—using local stone, gravel, and sand, mixed with portland cement imported from England and hauled overland by wagon from New York 1. The mix was packed in forms to make a long, two-story rectangular structure, with a three-story hexagon at one end. It was a plain, unpretentious building, and what it lacked in architectural elegance it made up in its fortress-like resistance to Indian attack and the house-burning that was its customary consequence. Goodrich's venture was so successful that most of town's buildings were constructed in the same fashion within the next few years. His method was carried country-wide by Orson S. Fowler, the fervent phrenologist who started the simultaneous craze for cranial bump reading and octagonal dwellings by writing one of the most influential little tracts in American architectural history, *A Home for All, or, The Gravel Wall and Octagon Mode of Building*, published in New York in 1849. The material that he recommended for this architectural novelty was poured monolithic concrete. At the same time, patents were being obtained that were to lead logically to developments in reinforcing: one P. Summer received a patent for metal lathing in 1844; in 1854 R. B. Stevenson registered a system for using mortar and sheet metal to form pipes; and in 1860 a S. T. Fowler patented a method of strengthening concrete walls by the use of embedded horizontal and vertical timbers.

From 1850 on, concrete structures, with or without elementary forms of reinforcing, sprang up everywhere. An enterprising New Englander, Benjamin L. Wood, built a flat-roofed concrete house for himself in Taunton, Mass., in 1855 2. In 1862, Trinity Chapel 3 was constructed in Excelsion, Minn. of architectural concrete, a simple, monolithic, peak-roofed structure, without decoration, showing clearly the board marks of the forms 4. Also in the 1860s, a church and a school of mass concrete construction were built near Rosendale, New York 5—the church of natural cement with large, flat stones pressed into its surface 6, the school's concrete bearing walls finished with a smooth, troweled stucco coating 7. Putnam House 8 in Danvers, Mass., built in 1861, is a good example of the still fashionable octagonal concrete house of the period. There were many other examples of buildings of various types and sizes. The material, and its possibilities, already had a strong hold on American imagination.

American enterprise went further. In the late 1860s, "Frear's Patent Artificial Stone, Stucco, Mastic, Cement, etc. and Pressing Machine" was announced, proudly proclaimed as "the best building stone ever yet used." As reported in the *Journal of the Society of Architectural Historians*' "American Notes," George A. Frear had obtained a patent in February 1868 for a "cheap and yet elegant and durable building material," and in that year a house of "Frear Stone" was erected in Chicago. On the West Coast, Ernest L. Ransome, one of the outstanding pioneers in the development of reinforced concrete construction in the United States,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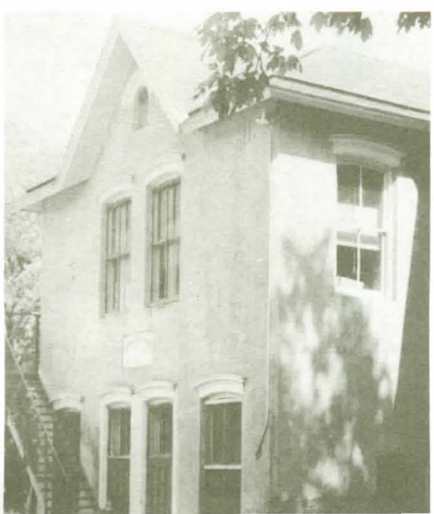

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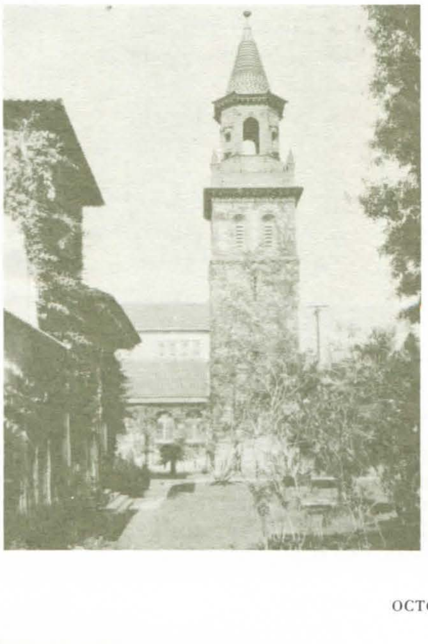

started the Pacific Stone Company in San Francisco in 1870, manufacturing a cement-stone by a process of his father's, originated in England in 1844. In 1872, a San Francisco competitor bought production rights to "Frear Stone" for $80,000, and according to the local papers, "concrete statuary was designed for the new California State Capitol."

The 1870s saw a boom in concrete architecture and the beginnings of scientific research. Ponckhockie Congregational Church 9, built in 1870 in Kingston, New York, its exterior walls scored to resemble stone 10, and the Dwight Place Church of New Haven, Connecticut, completed shortly afterwards, were typical of numerous similar structures throughout the country. The remarkable William L. Ward house 11 in Port Chester, New York, designed by the architect Robert Mook and built in 1875, was a completely reinforced-concrete structure: its exterior and interior walls, cornices, beams, floors, roofs, closets, stairs, porticos, and battlemented tower were all of the new material. Reinforcement consisted of light iron beams and rods. St. Augustine Cathedral 12 was erected in Florida in 1874, of architectural concrete. In 1878, Thaddeus Hyatt took out the most significant American patent to that date, covering almost all practical aspects of reinforced-concrete construction, based on his published paper, "An Account of Some Experiments with Portland Cement Concrete Combined with Iron as a Building Material with Reference to Economy in Construction and for Security against Fire in the Making of Roofs, Floors and Walking Surfaces," recording tests performed for him by David Kirkaldy in England. Interest in the new material was given further impetus by the first serious attempts at standardization by German scientists in the 1880s, and the introduction of the rotary kiln in the United States, about 1890. The use of reinforced concrete became universal with the development of important European systems of construction in the 1890s, notably that of Francois Hennebique in France.

In spite of these advances, concrete architecture still displayed a curiously anachronistic character. It was a mixture of structural daring and stylistic timidity. Contradicting its revolutionary technical capacities, it consistently imitated familiar materials and forms. Until its unique monolithic nature and resultant distribution of stresses was recognized, it was treated as a conventional articulated skeleton. As "artificial stone" it copied the real thing, both in its surface appearance and its frequent use as cement-stone blocks. Like many new substances, it had begun life as a substitute for something else and could not shake its connotations of "second best." Massive concrete buildings were designed as classic or eclectic monuments that used the material in terms of the esthetics and effects of traditional masonry.

In Florida, for example, the esteemed Beaux Arts academicians, Carrère and Hastings, designed Grace Methodist Episcopal Church 13 in St. Augustine in 1887, of portland cement concrete with coquina-shell aggregate, in a completely conventional manner. In 1889, the railroad entrepreneur and Florida enthusiast, Henry M. Flagler, built the even grander Memorial Presbyterian Church 14 in the same city, also of coquina-shell concrete. Immense care was lavished on the molding of traditional details, and stone and terra-cotta trim. Even Ernest L. Ransome, the American whose innovations from the 1880s to 1910 were to establish a new concrete style, built massive monoliths of imitation masonry at this time. Although his Leland Stanford University Museum 15 at Palo Alto, California, about 1890, was constructed with complete wall and floor systems of reinforced concrete, using several of Ransome's newly-patented structural inventions, he recorded that it was "in the classical design originally made for sandstone." In the Girls' Dormitory, erected soon afterwards, he performed the unprecedented feat of completing its three stories in 90 days from the time the plans were ordered, although nothing about its conventional masonry appearance and tooled surfaces suggested its progressive nature. The Graystone Hotel 16 built in 1892 in Buffalo, New York, is a further example of an all-concrete eclectic structure—only the missing vertical joints indicate the nature of the material used in constructing the building.

It remained for the new factories to break the stylistic mold. Pioneered by Ransome, whose patents of 1901 and 1902 covered its basic structural principles, the "factory style" of the early Twentieth Century represents a far-reaching design upheaval. The solid-concrete-slab with small windows characteristic of most examples up to that time were replaced in remarkably short order by an entirely new concept: the exposed concrete skeleton and curtain wall. Of either poured-in-place or precast elements (Ransome also patented a "System of Unit Construction" in 1909), the concrete frame was completely filled with glass, as in Ransome's trend-setting Kelly & Jones Machine Shop, in Greensbury, Pa., and the United Shoe Machinery

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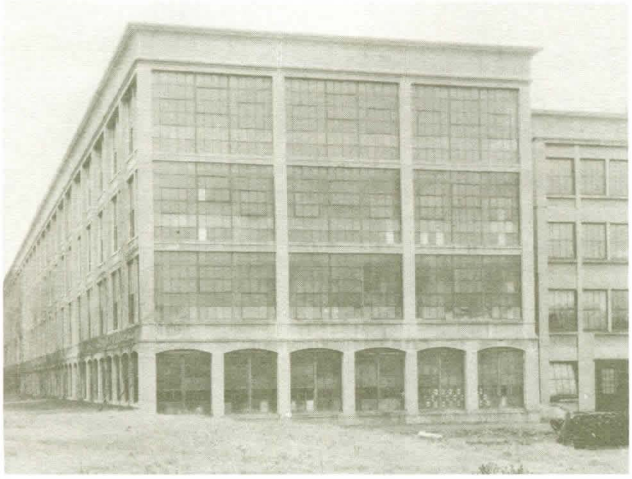

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Company 17 buildings in Beverly, Mass., of 1903-05, or very commonly, with glass and brick. The system, and the esthetic effect, were simple, practical, and revolutionary.

Almost on signal, the new factories sprang up everywhere. The Central Felt and Paper Mill was built in Long Island City in 1904, and in the same year the Robert Gair Company building in Brooklyn, designed by William Higginson and built by the Turner Construction Company, rose to a height of nine stories, with 170,000 sq ft of floor space, one of the largest reinforced-concrete buildings in the United States up to that time. Ransome constructed the five-building Foster-Armstrong piano factory in 1904-05 in East Rochester, New York. In 1905, the Textile Machine Works of Reading, Pennsylvania, used a precast floor and roof system, with poured-in-place columns; the Pugh Power Company in Cincinnati erected a 10-story concrete factory; the Fairbanks Company built a large warehouse in Baltimore. Albert Kahn's reinforced-concrete factories for Packard and Ford began to appear in Detroit. The firm of Ballinger and Perrot constructed numerous plants in the Philadelphia area. From 1905 on, the Reinforced Concrete Company, headed by Brussels and Viterbo, engineers, built extensively in St. Louis, which was also the home of the Unit Construction Company, leaders in factory prefabrication from 1910 to 1916. The Bush Terminal Company of Brooklyn commissioned E. P. Goodrich, architect, to design a tenant-factory community of reinforced concrete from 1906-11, and the Montgomery Ward Company set a record in Chicago in 1906-07 with a concrete warehouse 800 feet long.

However, factory building was not the only side of the story. At the surprisingly early date of 1903, the Ferro-Concrete Construction Company of Cincinnati completed the 16-story, 210-foot high Ingalls Building 18, a daring concrete-framed skyscraper. Of this startling construction, Captain Sewall, engineer in charge of the United States War College Buildings, also of reinforced concrete, observed in 1906 that the tower seemed "a little venturesome in the present state of the art. . . . But in this case, as in war, probably success justifies anything, and the building undeniably stands without the slightest sign of weakness or failure, as far as can be determined by a casual inspection." An equally outsize structure, the Hotel Blenheim, was erected in Atlantic City in 1906, using granite aggregates and cinder concrete in an awesomely eclectic Grand Manner.

The design of these more ambitiously "architectural" buildings indicates clearly that the practical triumphs of the factory style were still mixed with considerable esthetic confusion. *If a building* were not strictly utilitarian, it retreated into academic patterns. Only a few isolated structures attempted to approach concrete on its own terms. The Terminal Warehouse Company Building 19, for example, put up in Kansas City in 1905, sought decorative enrichment through repeated, form-molded detail, reminiscently Victorian in character, but prophetic of contemporary practice. One architect of imagination did appear, who dealt with the material without resource to the customary clichés. In 1906, Frank Lloyd Wright built Unity Church in Oak Park, Illinois, a cast-slab structure planned on seven-foot modules, the surface of wire-brushed, pea-gravel aggregate. In his own words, this was "the first building in America to be cast complete, ornament and all, in forms—and to be 'let alone' as 'Architecture' after the forms were removed."

This unique structure, and even Wright's much later concrete-block designs of the 1920s, however, were notable exceptions. In spite of the popular factories, architectural concrete had earned a thoroughly shady reputation. First, the material still suffered from the stigma of its long Nineteenth Century use as substitute masonry. As Wright commented in retrospect in 1928, "there never was a more 'inferior' building material than the old concrete block unless it was galvanized sheet iron. The block was cheap imitation and abominable as material when not downright vicious. Every form it undertook soon relegated it to the back yard of esthetic oblivion." Second, concrete's phenomenal success in industrial construction worked against it "architecturally," for the public eye saw no "factory esthetic," but only a prosaic, socially inferior kind of building that was not within the accepted definitions of architectural elegance. "Fine buildings" were still placed in a separate compartment of taste established by earlier Victorian conventions. To make matters worse, the urgent need to develop satisfactory surfaces and finishes had been postponed or ignored in the rush of utilitarian construction. Ernest Ransome, writing in 1912 of the common practice of rubbing cement mortar into exposed surfaces forming a thin finishing layer which soon peeled and cracked, noted "there is hardly any locality where samples of this work may not be found, showing the disgraceful results obtained." But the blackest mark of all was the shocking incidence of failures, for standards of construction were not established until after 1916, when test methods and standards for portland cement were developed by the cement industry. Calculations for reinforced concrete were almost totally empirical. Ransome mentions three major failures in the United States in 1906 alone, and the problem was the subject of long and serious discussions at professional meetings, such as those of the International Congress of Architects, and the Joint Committee on Reinforced Concrete, established in 1904 to investigate uniform controls.

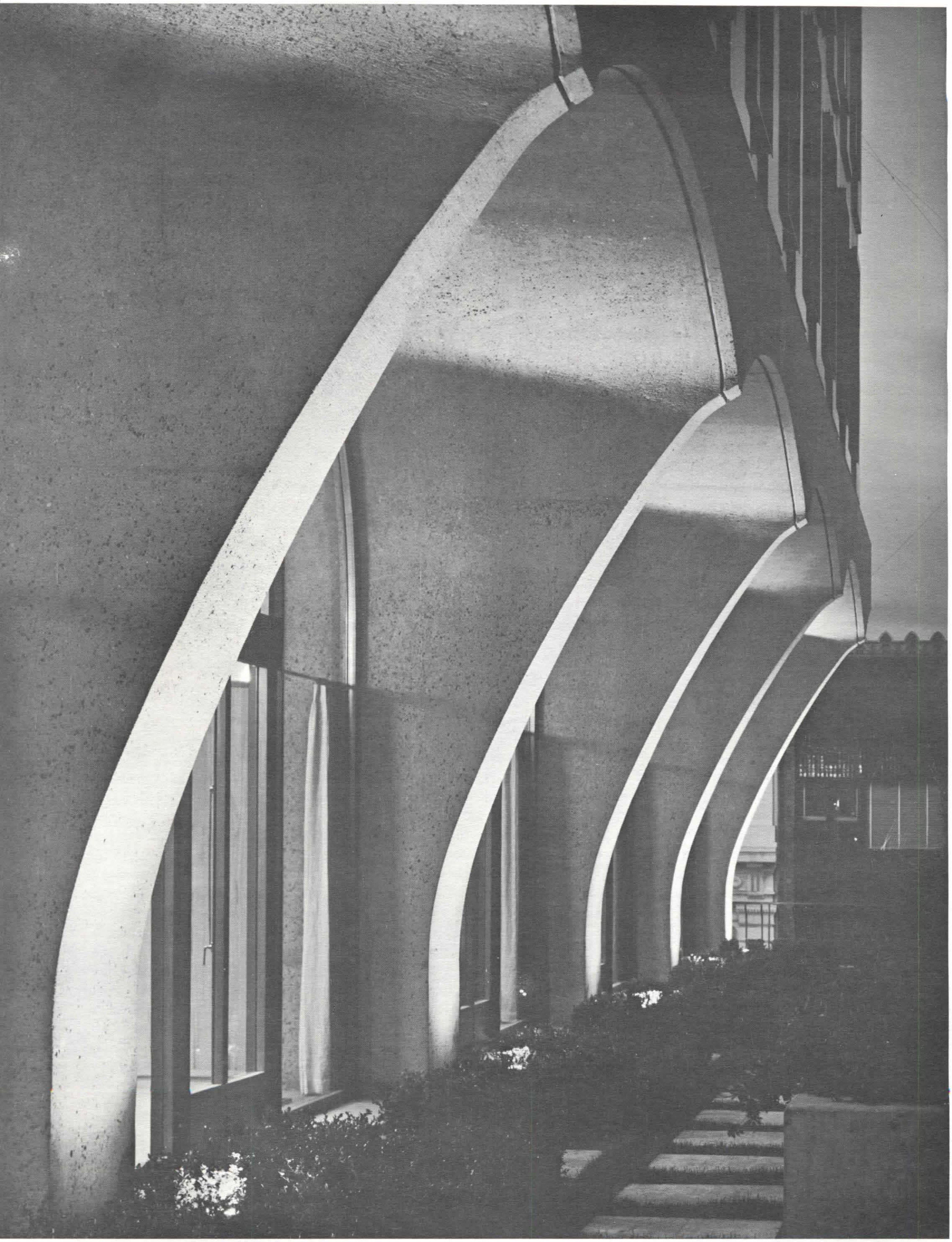
Many were reluctant to use the new material at all. George B. Post, one of the leading New York architects of the time and ex-president of AIA, went on record at the 1906 International Congress in London with the statement that "it might be of interest to the gentlemen present to know that those in large practice as architects in the United States use ferro-concrete with considerable trepidation, from the fact that there are no established constants which can be employed in computing the strains. . . ." Their opinion of the material, he added, "was very much like that of the distinguished Mr. Weller with regard to veal pies—they were 'werry good things when you knowed the lady as made them.' "

Its esthetics, or "architectural effect," was the subject of equally strong debate. Reinforced concrete was considered suitable for "manufacturing premises," but "otherwise it might be desirable to resort to some plastic form of decoration, or applied ornament." While a few spoke out against the idea of placing ornament on the face of the building when it was not part of the structure, it was generally agreed that reinforced concrete would "never eliminate from architectural practice the noble and artistic combinations of masonry work." The brusque summation of the subject by a Mr. Max Clarke was reported by *The American Architect and Building News:* "they were talking about reinforced concrete because a certain number of gentlemen, whom he called 'patentees,' and other people called experts, had put the thing on the market. He thought, as architects, they should not be carried away too rapidly. He would like to add that it was quite possible to stick stuff onto concrete, and he had seen it done abroad. They could cast molds and place them on buildings, but it was not architecture. It was merely sticking a lot of stuff onto a concrete wall. If they were going to descend to that sort of thing in their architecture, it would be very much better if they had nothing to do with reinforced concrete at all. . . ." Obviously, American architects and engineers failed to heed Mr. Clarke's counsel, for the factory building boom went on at an accelerated rate until the First World War, while such redoubtable experts as Albert Kahn continued to adorn their functional structures with ambiguously ornamented façades and decorative entrances of dubious esthetic value. After the War, the reinforced-concrete frame with brick spandrels and factory sash was established as the standard mode.

It remained for the crusading European leaders of the International Style in the 1920s to champion the esthetic use of the material for its own sake. The effects of their crusade were two-fold. The first, and most lasting, was the recognition of the "machine esthetic" based on the unbounded admiration of the younger European architects for the American-factory style, which established the virtues of structural simplicity and modern materials. The second, more transient result was the emphasis on flat white walls, the painterly planes and surfaces of the cubist-inspired architecture of the day (often achieved not with concrete, but with stuccoed brick) as exemplified in the work of Dutch, German, and Austrian architects, and raised to an ultimate, esoteric elegance by Le Corbusier. Unfortunately, visual effect often was sought more diligently than technical soundness, and most of these pioneer buildings deteriorated as rapidly as the earlier industrial structures. Nevertheless, an extremely important objective had been achieved: the esthetic, as well as the structural break with the past was established, and the way was clear for the serious development of contemporary concrete architecture.

Although most concrete-frame buildings of the 1930s, including industrial structures, continued to be clothed in veneers of various materials, cast-in-place concrete details were popular in some parts of the country—especially in the West—and the plastic nature of concrete encouraged both decorative and structural experimentation. Accelerated technical advances, however, laid the basic foundations for the creative designs of the future. Standards set up after World War I by the American Concrete Institute were restudied and formalized. Engineering influences from Europe were strongly felt, particularly in the field of long-span construction for large uninterrupted areas. American architects and engineers were especially receptive to new systems of analysis and reinforcement for thin-shell domes and barrel vaults, since these were not only adaptable to their concepts of mass production and rapid erection, but also lent themselves to experimentation with eye-catching forms. Thoughtful research in the prestressing of concrete—crude work in this field had been performed decades earlier—were fundamental to the post-World War II advances in precast and prestressed concrete.

Today, reinforced concrete is no longer—in the pungent phrase-making of Frank Lloyd Wright—"the ideal makeshift of this, the vainglorious 'Makeshift Era.' " This is the Concrete Era, an age with the promise of architectural greatness.



Bush-hammered concrete arcade, John Hancock Building, San Francisco; Skidmore, Owings & Merrill, Architects-Engineers

Exposed Concrete Today

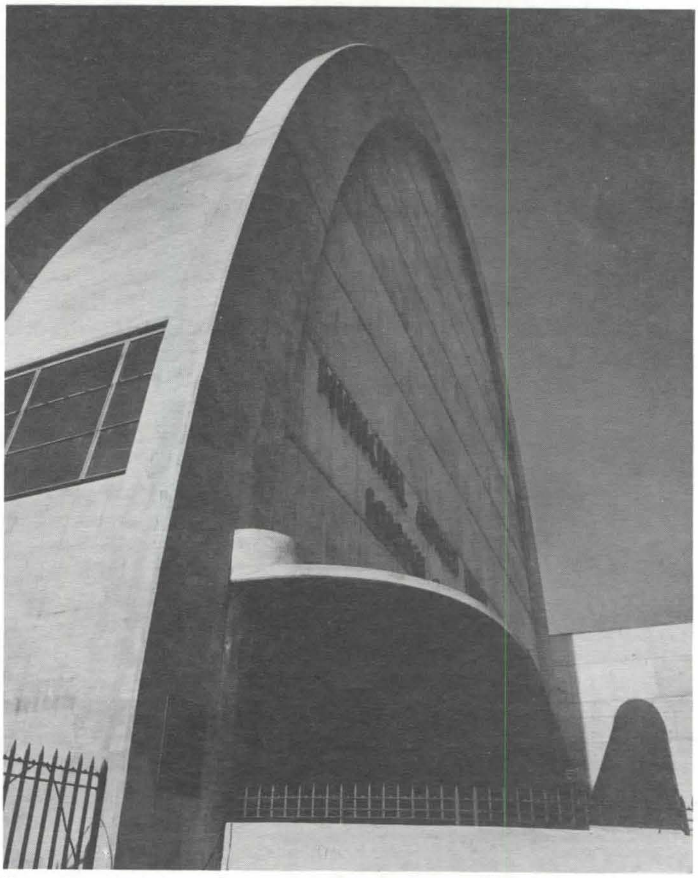
BY BURTON H. HOLMES

After a hiatus of several decades, the last five to ten years have witnessed a tremendous resurgence of interest in the use of exposed concrete. This review, by P/A's technical editor, indicates that many prominent architects are finding greater use for this material —and suggests reasons why it is so rapidly regaining its place in architectural design.

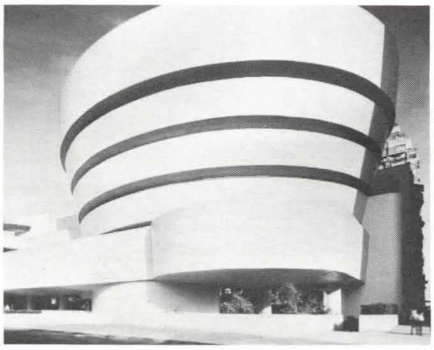
Although the lean economic years of the 1930s saw relatively little construction of any kind, there was some visual evidence of advance in concrete technology during this period in the United States. While governmental projects undertaken by the Bureau of Reclamation and the Tennessee Valley Authority heralded the nobility of concrete as an architectural material, designs meeting standards established by the Public Works Administration invariably concealed the presence of this much maligned material under a surfacing considered more "architectural." For private work, the most significant progress in reinforced concrete was in the field of structural engineering. This became visible with the development of more efficiently and economically designed long-span vaults—made possible by the Zeiss-Dywidag system, first demonstrated here at the Century of Progress Exposition in 1934. While most vaulted structures of this period received a protective roofing material of some kind, one notable exception is the completely exposed, non-air-entrained concrete of the Municipal Asphalt Plant for the Borough of Manhattan in New York, designed by Kahn & Jacobs, and erected in 1941 *(right)*.

In the pre-World War II years numerous design innovations were born in the minds of intuitive, analytical engineers. Discussed only in technical papers, written for the most part by Europeans, these ideas were to provide the origins for new experimental construction methods that were developed during the war years and burst upon private construction of the post-war era.

Although such outspoken proponents of cast-in-place, exposed-concrete structures as Fred N. Severud, New York Consulting Engineer, frequently spoke before architectural groups in this pre-War era, alerting his listeners to its possibilities, there were few takers. Severud's pleas for closer attention to controlled concrete, his counsel to be master of concrete cracks by placing joints where they are known to occur, and other admonishments, all fell upon semi-interested ears. Probably the best and most numerous examples of acceptable exposed concrete were to be found in the bridge designs of the period.



Exposed, non-air-entrained concrete in excellent condition after 20 years.



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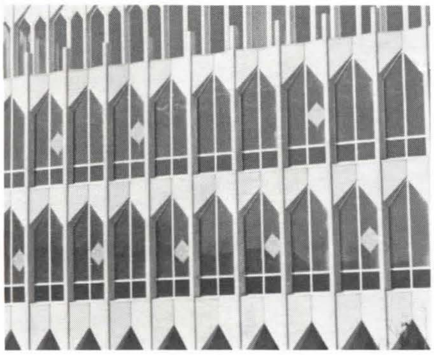

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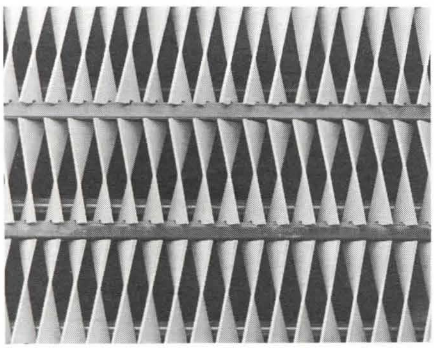

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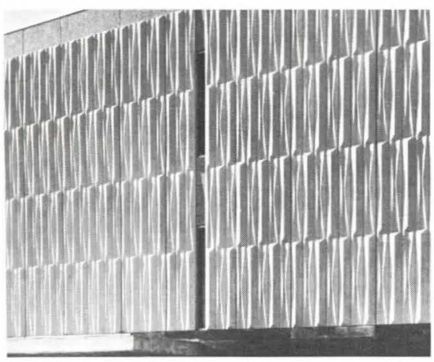

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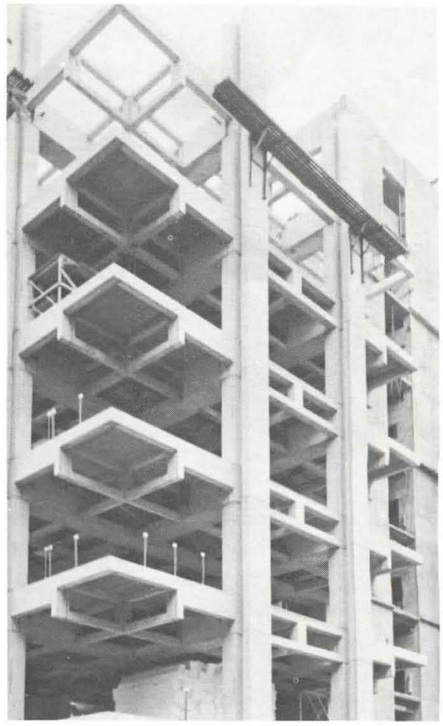
1 Cast-in-place concrete forms monolithic structure of Solomon R. Guggenheim Museum, New York; Frank Lloyd Wright, Architect. 2 Precast-concrete is used for façade of Educational Building, Wayne University, Detroit; Minoru Yamasaki & Associates, Architects. 3 Pure-white hyperbolic-paraboloid sculptural grille envelops Parking Garage at Henry Ford Hospital, Detroit; Albert Kahn Associated Architects and Engineers, Inc. 4 Two-story sculptured concrete panels enliven Maytag Headquarters Building, Newton, Iowa; Brooks-Borg, Architects. 5 Precast, notched spandrels cantilever from precast-concrete framing of Alfred Newton Richards Medical Research Building, University of Pennsylvania; Louis I. Kahn, Architect. 6 Precast units with exposed-aggregate surface enclose Dormitory for Fashion Institute of Technology, New York; de Young, Moscowitz & Rosenberg, Architects. 7 Wachovia Bank & Trust Company Building, Charlotte, N.C. has staggered lightweight panels with white portland cement and white quartz aggregate; Harrison & Abramovitz and A. G. Odell, Jr. & Associates, Architects. 8 Tower of KSTP Offices and Hotel Building, Minneapolis-St. Paul, will be sheathed with glass curtain wall behind grid of precast-concrete structural units having exposed surfaces of granite aggregate materials; Hammel & Green, Inc., Architects. 9 Precast-concrete facets contain chunks of stained glass in First Presbyterian Church, Stamford, Conn.; Harrison & Abromovitz, Architects. 10 Vincent G. Kling, Architect, chose reinforced-concrete frame with precast-concrete curtain-wall panels for Pierre S. DuPont Science Building, Swarthmore College, Swarthmore, Pa.



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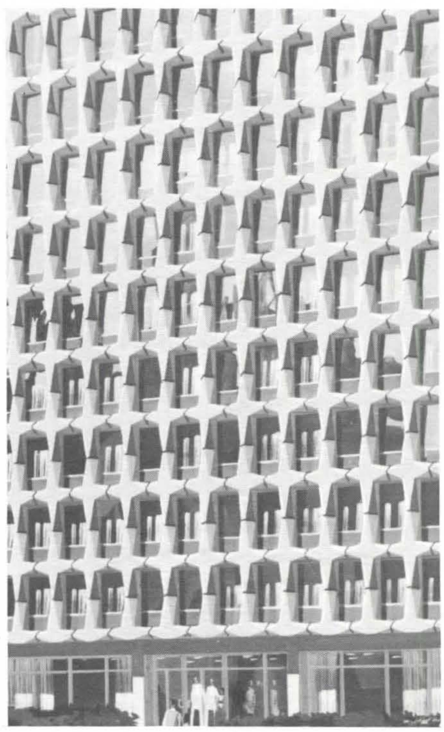

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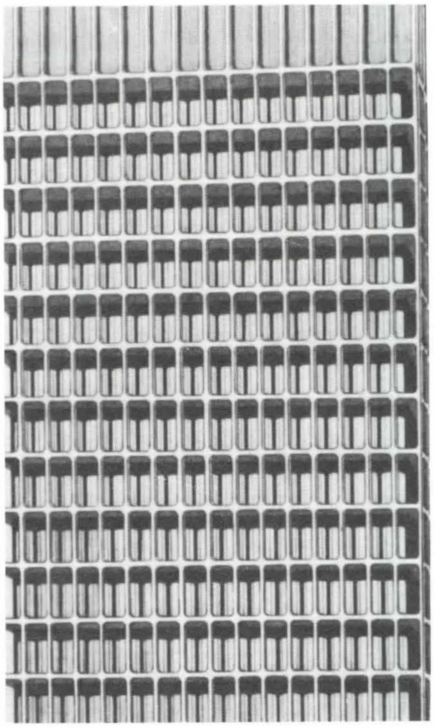

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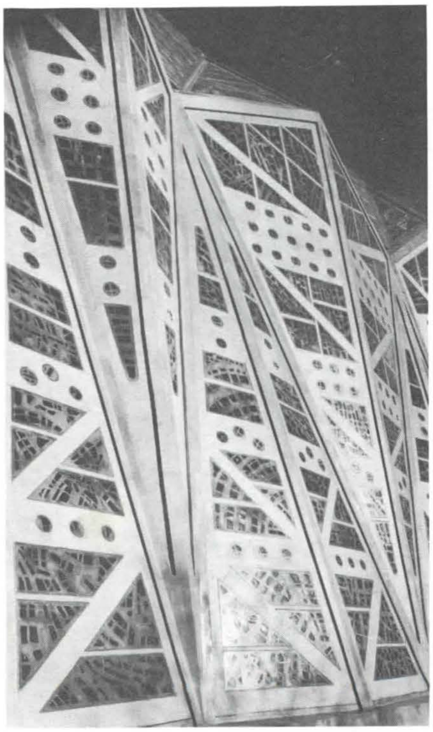

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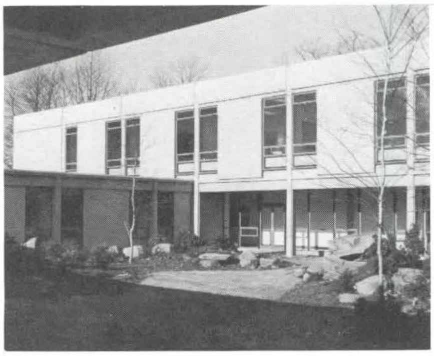

Exterior Forms

The rapid rise in the cost of labor materials, and equipment, which accompanied the post-war inflation, forced a new look at architectural construction techniques. For one thing, the well-established methods of curtain-wall construction were considered from a fresh point of view: the walls had to be lighter, thinner, better insulated, to help meet the soaring construction and operating costs. The potential dollar volume of curtain-wall construction became immensely attractive to the metal industries, and as metal prefabrication was so sell suited to mass production, the race was on for a larger share of this prize market. This plum was equally attractive to the concrete industry, which could offer the designer curtain-wall panels possessing exceptional resistance to wind, rain, and fire at low initial and annual maintenance rates; numerous companies offered prefab panels of different types. It was the architect, however, who discovered for himself the infinite variety of forms possible with precast and cast-in-place concrete. With the plasticity of this substance, he was able to overcome the monotony of many proprietary systems, the confining regularity of masonry units, and the design limitations of materials subject to the shortcomings of dies, brakes, and rollers. With precast and cast-in-place concrete, the designer is in complete control of the ultimate form he may wish, and he is free of any compromise that might be traceable to a manufacturing process.

As seen on these pages, the design freedom offered by the use of exposed concrete is already relieving the monotony observed in much curtain-wall design. In a review of current architectural concrete, precast elements will be found until recently in larger number for such occupancies as commercial buildings, office buildings, institutions, etc., while cast-in-place concrete seems to have been preferred in public buildings. According to some, however, this trend may soon be altered considerably as attractive, over-all reduction in labor costs are realized with carefully studied cast-in-place designs.

To achieve quality exposed concrete, of course, there are specification refinements which must be respected to insure durable surfaces. Air entrainment, lined exterior forms, placing with proper vibration, and uniform cement aggregates are among required additional precautions. Thoughtful consideration of admixtures that permit water reduction—with some slump—and in special cases retardation of set should be made.

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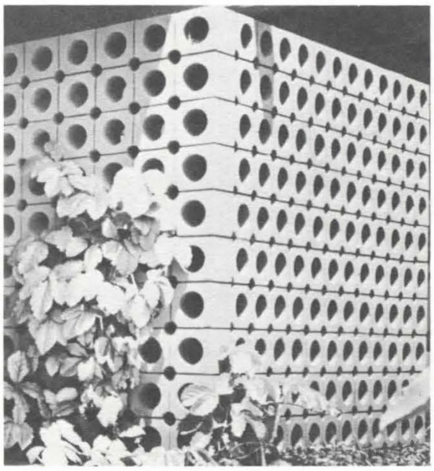

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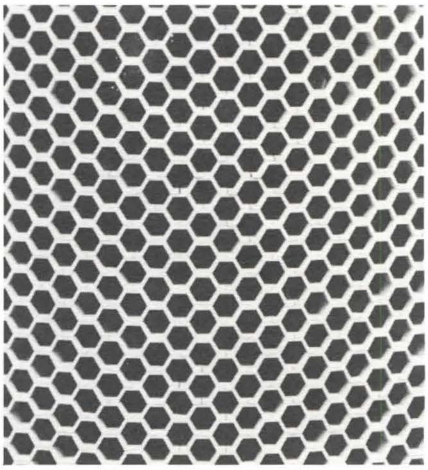

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Grilles and Screens

Grilles, in a host of materials, have fascinated the architectural designer in recent years. Too often, however, the grilles or screens become clichés—performing functions for which they were not originally intended—rather than aids to temperature and ventilation control, privacy, and concealment of items which should not be viewed. Although to some they may be elements of "delight," there are not a few officials responsible for fire security who see them as hazards which can hamper fire-fighting activities. At any rate, they are here in abundance and a fair proportion of them consist of precast-concrete block and concrete tile. To concrete masonry color has been added by use of exposed aggregate, internal coloring, and applied surfaces. Smooth and three-dimensional textures are available in blocks which, in addition to the conventional size, are available in 12" square and 12" x 18" units. Precast-concrete grilles are most often white portland cement and white quartz aggregate. Small panels are made of no-slump consistency concrete and tamped into molds, while larger units requiring reinforcement are made of low-slump concrete vibrated in forms.

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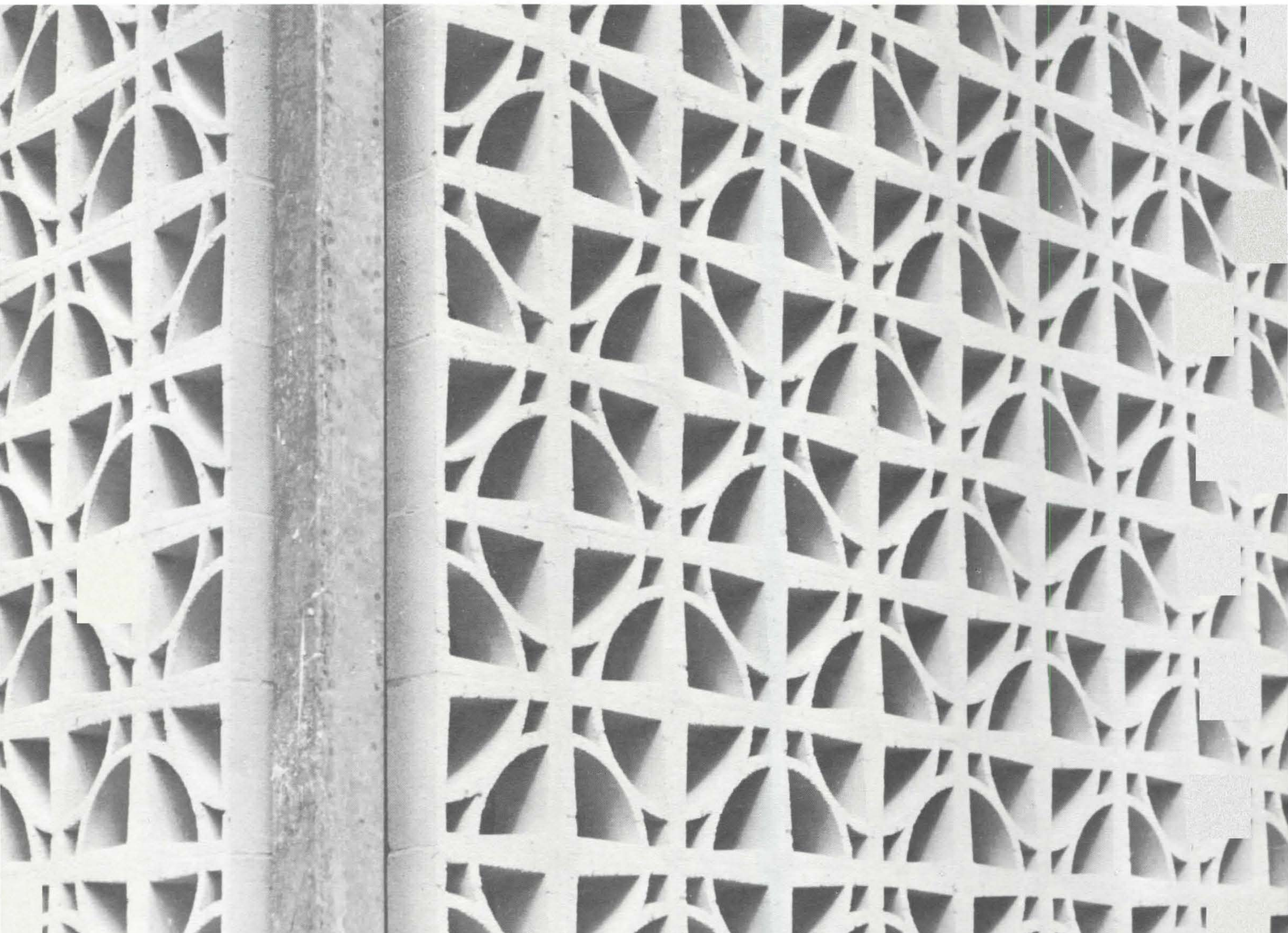
1 *Facade of precast-concrete grilles at Desmond's Store, Santa Ana, Calif.; Burke, Kober & Nicholais, Architects; Charles Luckman Associates, Supervising Architeets.* 2 *Precast-block grille enclosing residence of Architect Edward H. Fickett, Los Angeles.* 3 *Wall composed of reinforced, precast half-hexagonal units laid up in running bond at Temple Emanuel, East Meadow, L. I., New York; Davis, Brody & Wisniewski, Architects.* 4 *Precast-concrete screen at Stanford University Medical Center; Edward D. Stone, Architect.* 5 *Solar screen units of precast concrete at Texas Medical Center, Houston; John H. Freeman Jr., Architect.*



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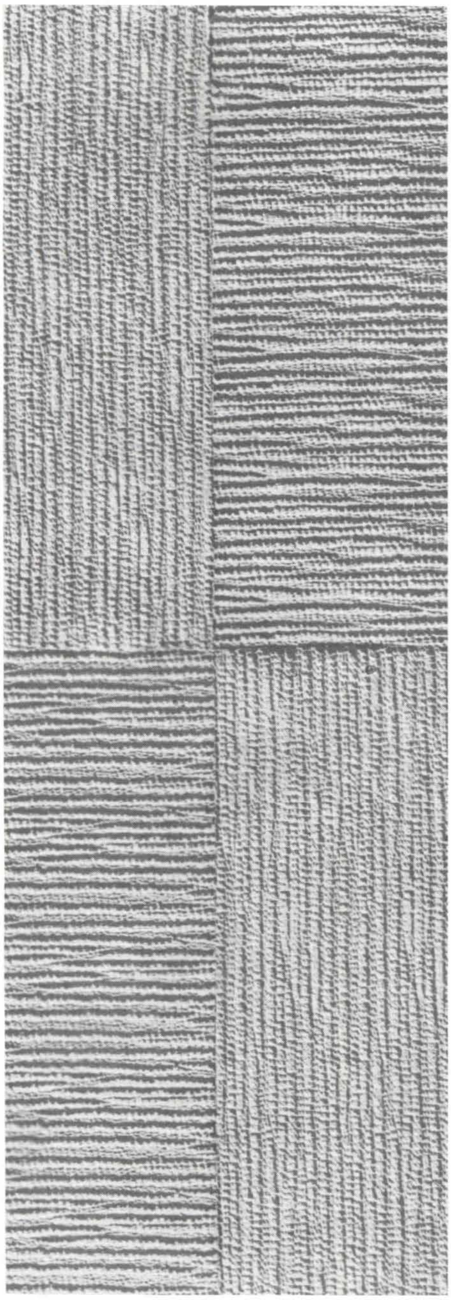

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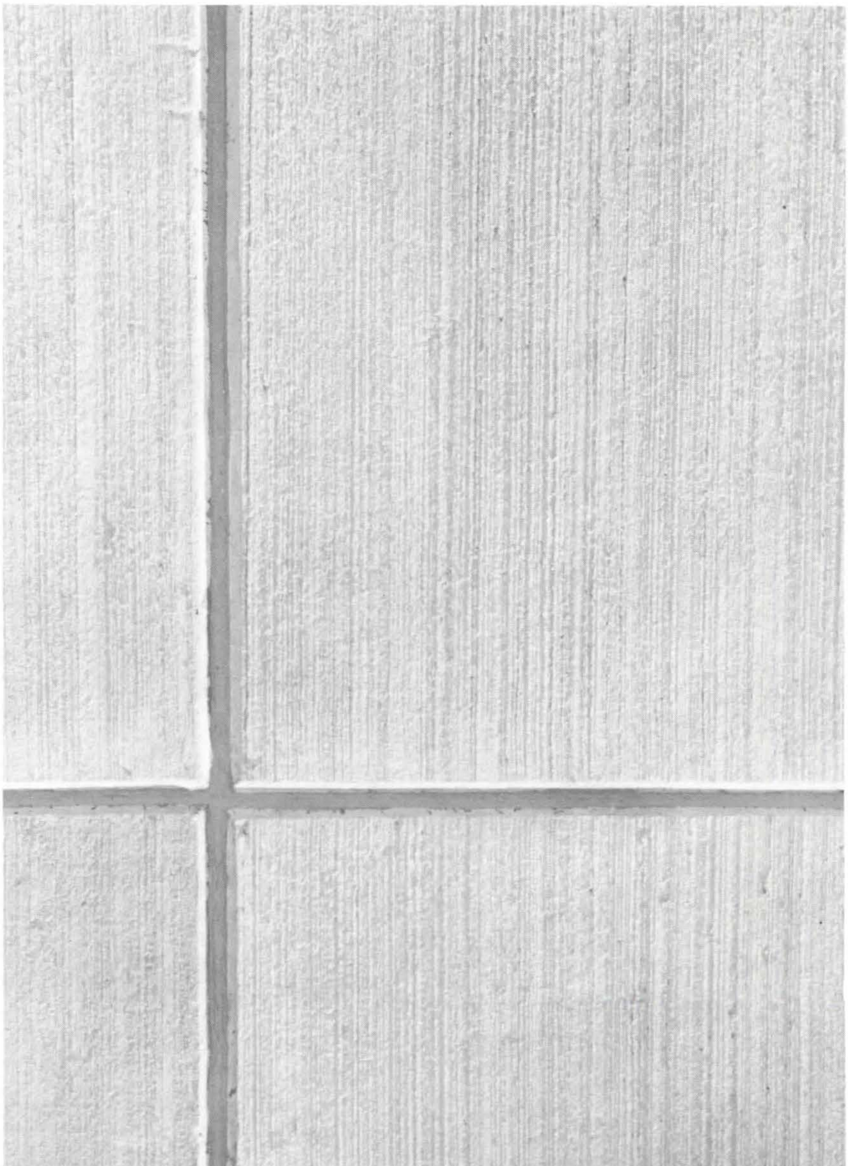

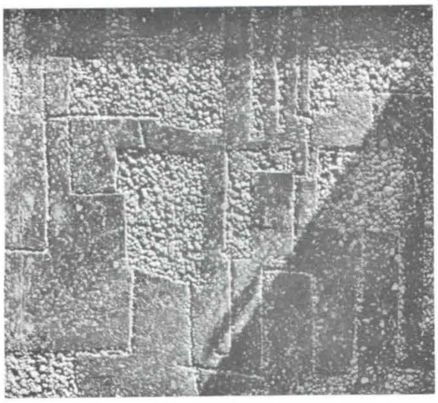

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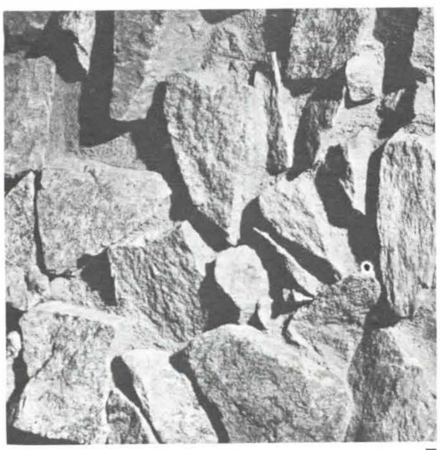

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1 Textured surface is produced by rubber form liner. 2 Exposed-aggregate wall panel of goose-egg-sized pebbles used at Yohannan's Restaurant, Lenox Square Shopping Center, Atlanta; Toombs, Amisano & Wells, Architects. 3 Slash-grain lumber of forms leaves strong grain effect. 4 Broomed finish provides rough texture and reduces hair cracks in concrete. 5 Section of wall is treated with abstract design and cast with black cement. 6 Fragment of exposed-aggregate structural panel by Costantino Nivola is for Chicago Exposition Center; Shaw, Metz & Associates, Architects. 7 Aggregate stones are exposed by high-pressure water treatment removing surface mortar; Morse & Stiles Colleges, Yale University, Eero Saarinen & Associates, Architect.

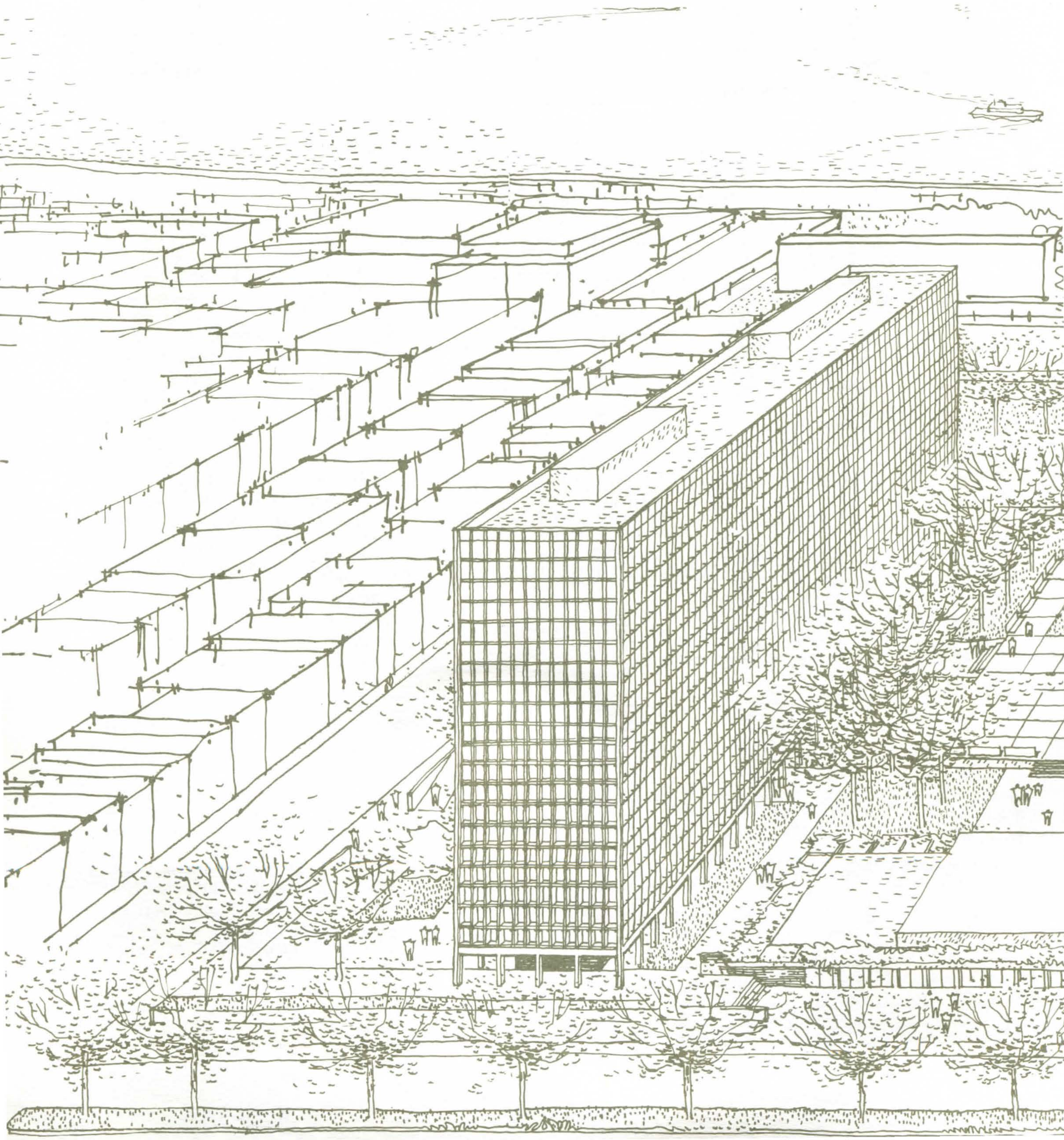
Textures and Color

Whereas earlier attempts to impart texture to concrete surfaces were imitative of other materials, contemporary concrete textures offer the designer a variety of honest effects—peculiar to concrete—that he may consider. Possibilities for texture are extremely varied, ranging from ruggedness to ceramic-like smoothness.

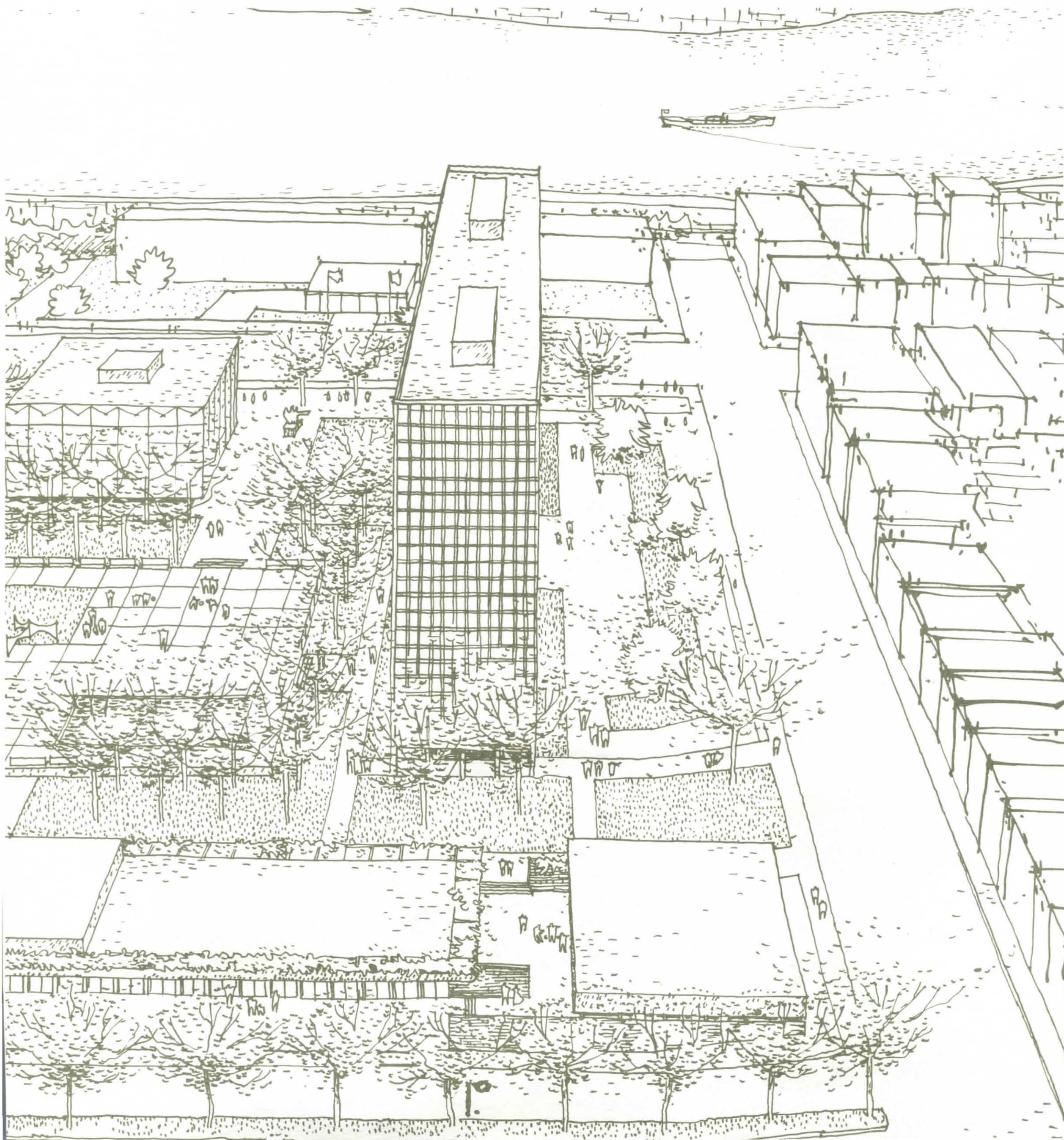
Among the simpler methods of obtaining texture is the derivation of an effect directly from the forming material. Board-marked textures, for example, reveal grain impressions and joint lines of rough or dressed lumber. By using a slash-grain lumber, an even stronger grain effect is possible. Form liners will also impart a pattern directly to a concrete surface; most commonly used liners are of rubber-mat and plastic materials. Before concrete has hardened, a broomed finish will give a uniform appearance; seeing it from a distance the viewer is aware more of a rough texture than of grooves. A variation of this treatment is the swirl finish obtained by rubbing a piece of canvas over nearly hardened concrete. Although both of these finishes are inexpensive, an even more important characteristic is their ability to minimize surface hair cracks. With exposed aggregate panels, the size of the largest aggregate will set the depth of the reveal. Exposed aggregate is often ground smooth to take on a terrazzo-like appearance. With well-seasoned concrete, bush hammering or tooling with pneumatic tools, breaks aggregate particles so that their color and structure are exposed. Bas-relief concrete panels, combining sculpture with architecture, and abstract designs cast with colored cements, are welcome newcomers to the field of textured façades.

A designer has the widest possible choice of colors for exposed concrete walls. Coloring of the matrix is generally accomplished by the introduction of mineral oxide pigments; practically all colors can be obtained in this manner. White portland cement can produce a pure white surface. Intermediate shades are produced by special proportioning of the matrix and aggregate colors. In panels made with colored aggregates, white portland cement is usually used in the facing mix to insure purity of color, even in many of the dark shades.

Cast-in-Place Technique Restudied



I. M. Pei & Associates set themselves a difficult task of finding a construction system, suitable for high-rise apartment buildings, which would be not only economically competitive with conventional methods, but which would also offer a great esthetic potential. The three-year research undertaken by the office, the system evolved, the prototype buildings (Kips Bay Plaza Apartments in New York shown in the sketch below), and a further refinement (Society Hill project in Philadelphia), are explained and illustrated in the following pages.



SEARCH

BY EDWARD L. FRIEDMAN

The architect in charge of I. M. Pei & Associates' research into concrete technology, who is resident architect on the Kips Bay Plaza Apartments, explains the structural and design concept of his office's recent high-rise apartments projects.

Shortly after World War II, the steel shortage, coupled with the appearance of the flat slab, gave impetus to reinforced-concrete construction. Cities where zoning regulations limited building heights, gratefully received the shallower floor-to-floor height of flat-slab construction. An entire floor could be gained, an advantage impossible with the greater floor depth of structural-steel construction. The advantage of flat-slab design was further augmented by "scatter columns" which could be shaped and placed at will according to plan dictates. Taller and more powerful cranes and improved ready-mix concrete service were additional encouragements.

There were drawbacks, but of an architectural character. The freedom allowed to column layout condoned development of floor plans devoid of structural coherence. This did not damage rental attraction. The buildings were cloaked in brick skins which were penetrated by window openings determined by plan only, oblivious to any refinement of façade design. The shame is that this anonymous architecture is today representative of most of the high-rise housing in our large cities 1.

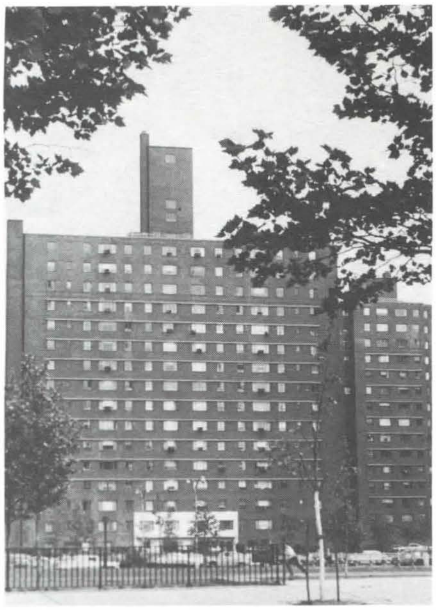
This style, nevertheless, tended to crystallize our thinking. Within our design philosophy, a disciplined column spacing was mandatory, but not achieved at the expense of rooms inferior to those produced by the "scatter column" system. The Kips Bay Plaza structure was developed from a basic 5'-8" window module 2 which creates—in multiples of two and three—room widths, less partition construction, of 11'-2" and 16'-8". This meets FHA and owner property standards for full bedroom and living room count. Because the apartment distribution did not allow a regular design rhythm in the façade, it was decided to split the normal exterior column into equally spaced, load-bearing segments. This was economically justified by the production of a repetitive forming system, and the creation of a structural frame at the façade, which could receive and transmit most of the wind load directly to the ground. Various devices were developed for both functional and architectural reasons. Taking advantage of the plastic quality of the concrete, a radius corner was formed at the typical window head to strengthen the secondary plane which is recessed behind the face of the column nibs. Besides facilitating form stripping, the thickening of the haunch creates a more rigid frame with increased wind resistance. The exterior columns, flush at the building face, are reduced in depth at the fifth and tenth floors to express their diminishing loads. This reduction also produces larger rooms at the more expensive upper floors.

Although preliminary studies favored a precast-concrete construction similar to the system designed by our office for the Denver Hilton Hotel 3, it soon became apparent that, because of cost and local code restrictions governing structural continuity, only cast-in-place concrete could be considered. This technique, although familiar to local contractors, has been restricted to "structural concrete" which is not left exposed 4. Such a performance level, however, was inferior to the demands of the Kips Bay Plaza exposed-concrete design concept 5. It was recognized, therefore, that for the system to be feasible, a comprehensive research program was required to determine the inherent faults of cast-in-place concrete and the actions that could be taken to overcome these defects.

Analysis of Failures

A historical review of related work indicated that the few designs attempted in fair-face, smooth concrete had suffered from inadequate color control, surface spalling in climates of frequent freeze-thaw cycle, and uncontrollable shrinkage and thermal cracks—invariably ending in the application of a stucco coating. By the 1920s a new form of exposed-concrete design, pioneered some two decades earlier, became popular. It consisted of a concrete frame filled in with continuous windows supported on brick spandrels (see "Historical Survey" by Ada Louise Huxtable in this issue of P/A). The economic merit of this design was often, unfortunately, nullified in the field by poor construction. Too frequently builders failed to provide sufficient concrete cover, causing rusting and enlargement of the reinforcing steel's cross-sectional area. This led to bad weathering ability and discouraged further application of the idea. It was not until the early 1940s that governmental building agencies, supported by knowledgeable and intensive concrete field inspection, were able to reintroduce fair-face concrete and create such a satisfactory structure as the Brooklyn Navy Yard Engineering Building. This quality of concrete could not have been achieved, however, without the background of experience gained in highway construction, which pioneered air entrainment and controlled concrete.

We also decided to examine minutely the best contemporary examples, to discover which deficiencies of construction and design most seriously impair over-all appearance and detract from the architect's concept. The prevalent failing of



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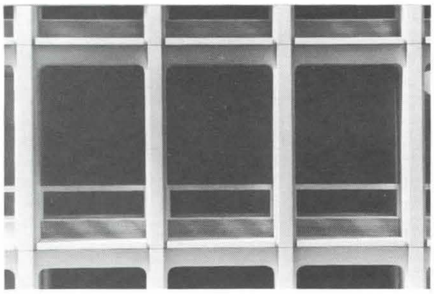

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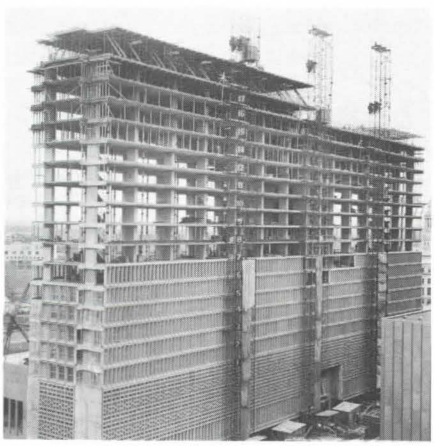

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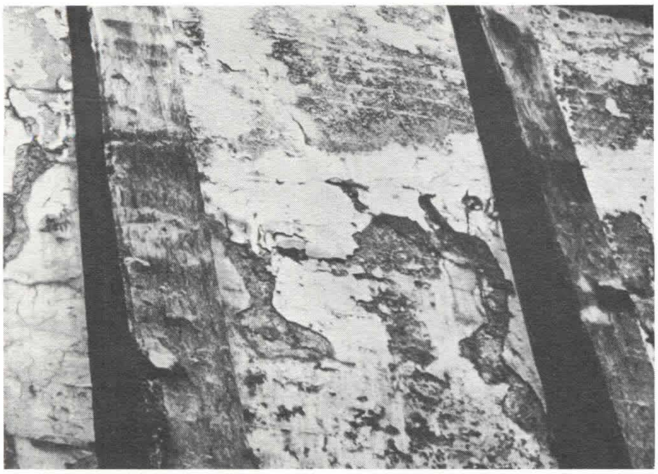

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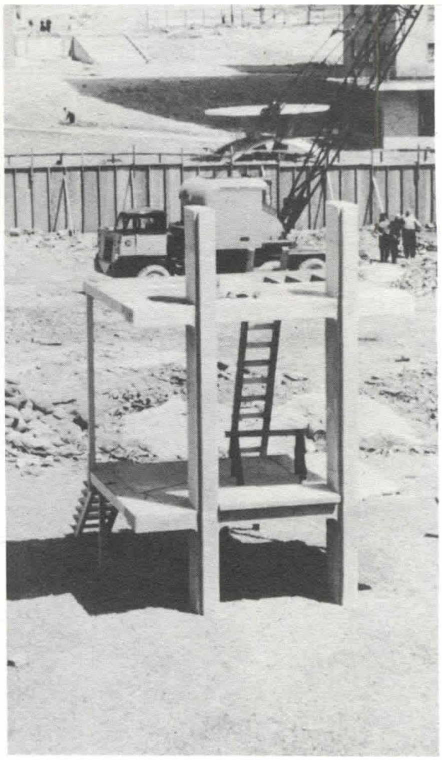

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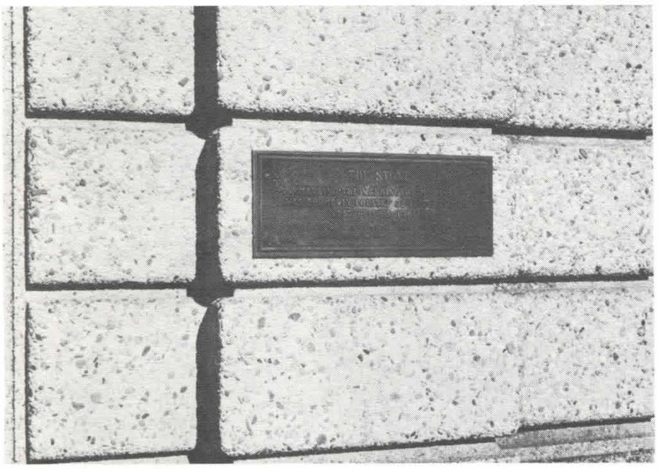

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architectural concrete is surface spalling from moisture penetrating the surface and expanding under freeze action 6. Air-entraining agents, which destroy capillary action at the surface, and silicone water repellents have almost totally eliminated this problem and we consider their use mandatory for exposed concrete. More serious, and less easily resolved, is the formation of cold joints caused by a partial set of the first layer of concrete before the succeeding layer is placed. Protection against this type of failure can be insured by placing vertical and horizontal joints to correspond with concreting field operations; however, rather than a field expedient, this is essentially a part of the design phase. Another common problem arises from form leakage caused by improperly designed molds; this can be rectified only by closer co-ordination of contractor's and architect's design activities, particularly in formwork design. Perhaps the most baffling problem is the control of staining by water run-off, a product of orientation as well as of shape. Although the design of our drips, overlaps, and column profiles attempts to recognize this problem, it is felt that considerably more research is required for a solution of the phenomenon. Other common faults are honeycombing, sand streaking, entrapped air, and alignment, all of which, with intelligent field supervision, may be eliminated. But there are further considerations requiring a solution, such as new methods of maintaining a uniform concrete color, the development of a patching compound, and a technique making it possible to rectify defects in construction.

All of these deficiencies are well known but we were reluctant to accept them as normal properties of architectural concrete.

Surface Treatment

Although much progress has been made toward achieving a cast-in-place concrete of a quality that requires no further finishing, the concentration has been on the *beton brut* or textured variety. One of the remarkable examples is the 30-year old concrete work in Meridian Park 7, Washington, D.C. Cast by an exposed-aggregate technique, it represents a level of craftsmanship virtually impossible to duplicate today. This may be the largest single factor militating against architectural concrete—the high cost of labor. Because of this problem, the most important phase of concreting, that of placing, has been relegated to the least skilled trade. Also, concreting systems which have been highly successful in Europe—such as the sand-blasted/prepack intrusion method, bush-hammering, and built-up sand spraying—have had to yield in most cases to the expedient of texturing with rough formwork or to plastic spray coatings.

The Kips Bay Plaza Apartments represents the opposite direction of textured concrete; a fair-face concrete surface out of the form, free of surface defects, with

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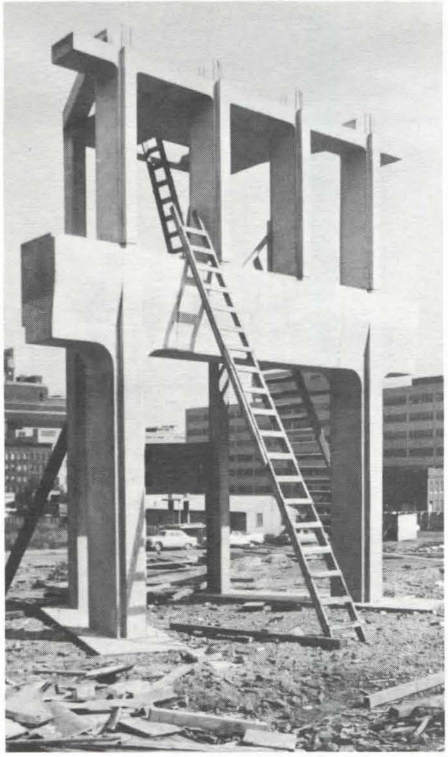

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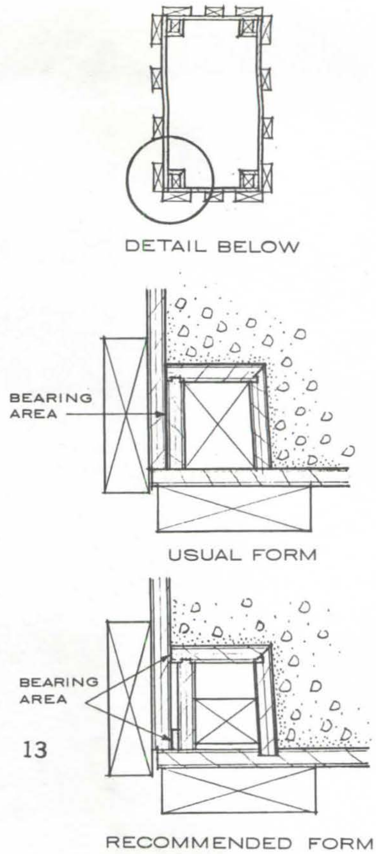

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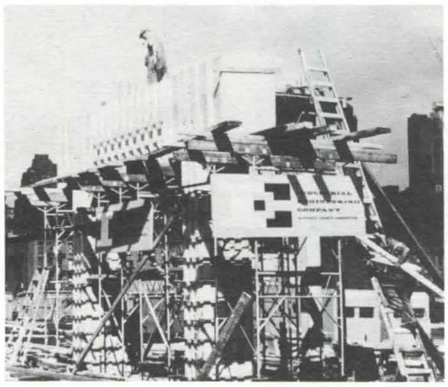

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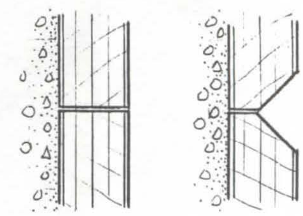


14 USUAL RECOMMENDED

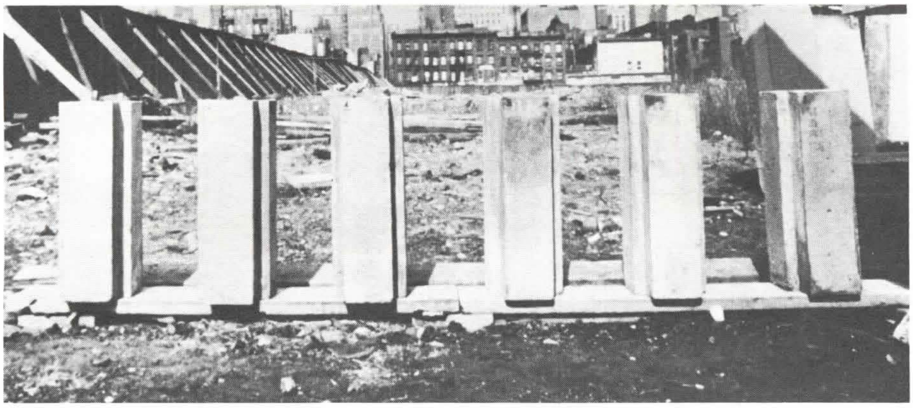
no loss of arris or integrity, and requiring no further surface treatment than a wash down with a detergent, oxalic acid, or muriatic acid as performed on brick masonry.

Formwork

The success of this method is contingent upon the molds, or more commonly, the formwork. To assure maximum re-use of forms, they must lend themselves to easy erection and stripping, and not be subject to damage. For practical and economic reasons, conventional erection, bracing, and clamping methods should be utilized, although it has been found that most forms must be of a quality that requires mill rather than field construction.

As the design of forms is empirical, the forms for Kips Bay Plaza were evolved from a full-size Test Bent program. The first Test Bent 8 was constructed by mechanics of average skill supplied by a local concrete subcontractor. Standard materials and methods were used to determine the extent to which existing procedure had to be modified to meet the exacting requirements of the design. Using this experience as a guide, we built in our model shop a one-quarter inch scale model of a recommended forming system 9 to demonstrate to the contractor not only the forming and stripping problems, but also the feasibility of our concept. This served to equip the contractor with a background of experience in an otherwise unfamiliar area, and materially assisted him in successfully completing a full-size section of the exterior facade 10 which provided a performance level for the actual building. This trial construction also made it possible to resolve other field problems such as joinings and the selection of form materials. Among the form materials tested were plastic-faced plywood, melamine-plastic overlays, steel, and various formulations of fiberglass-reinforced plastic. The successful experiments conducted with fiberglass-reinforced plastic led to its use as the form material 11 for the Hyde Park Apartments, presently being built from our plans in Chicago. The Test Bent program also helped in the selection of the most effective form coatings, release agents, and bracing and scaffolding systems 12. Finally, the program allowed us to determine, from actual field performance, which vibration method and which equipment produced the most satisfactory concrete surface.

There are many critical formwork details which require special attention if one wants to assure tight joints, out-of-wind concrete surfaces, and close tolerances. Generally, our experience indicates that if the meeting surfaces of the forms are reduced to minimum bearing areas, the tightest joints are produced 13; 5/8" thick plywood forms are minimal if bulging is to be prevented; top forms, where used, must be provided with weeps to permit escape of entrapped air; and where splices are necessary due to limited ply-



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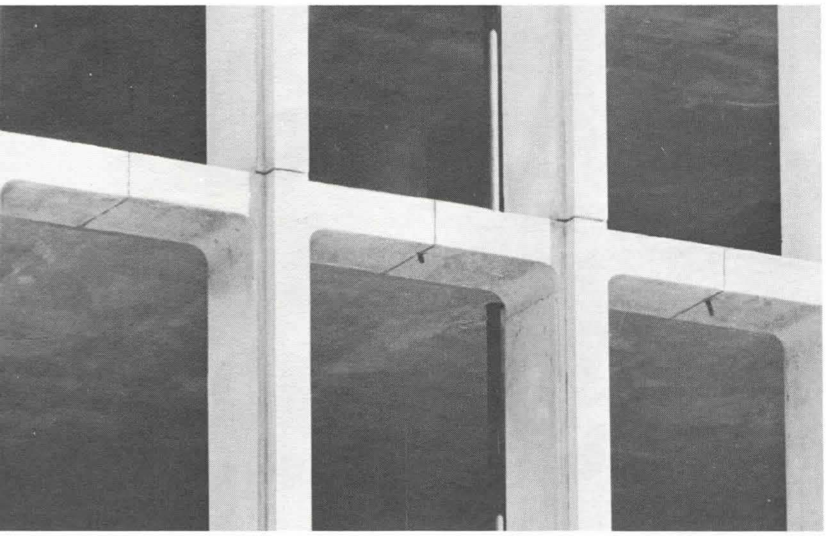

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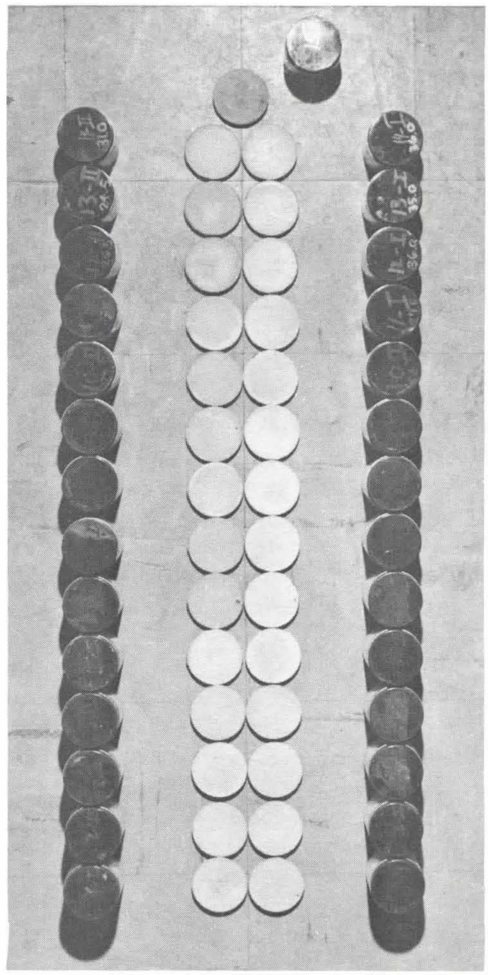

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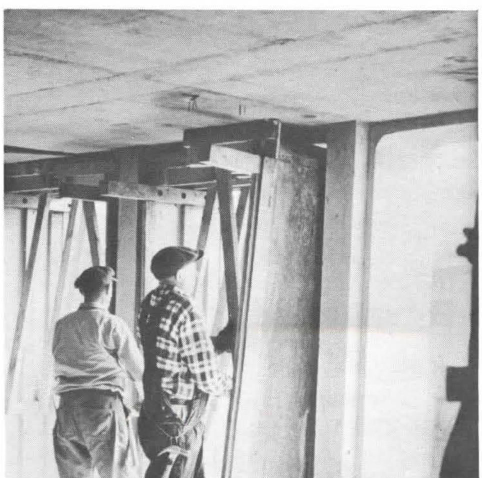


wood sheet dimensions, reduction of bearing areas must again be considered 14. It is not possible to give any rules of thumb for formwork as it is a function of the building profile, shape, and size; the desired concrete surface; the type of erection and stripping, whether manual or mechanical; and, at times, the required schedule of progress. To reiterate, these considerations are best faced during the design phase and an owner's investment in a Test Bent can be expected to return handsome dividends.

Joints

In concrete buildings over 200 feet in length, it is usual to introduce a sliding expansion joint to provide for thermal and shrinkage movement. The obvious disadvantages of sliding plates in the ceilings and floors of the apartments, and the esthetic difficulties presented by double columns, have necessitated the development of a different system. The structural solution we employed recognizes the principle of physics that the shrinkage factor of concrete during drying exceeds the thermal factor. The structure was cast, therefore, in three equal and independent sections separated by 2'-10" wide gaps for the full width of the building. The concrete in each section was then allowed to dry from 28 to 60 days, contingent upon curing and weather conditions, thus permitting the greatest shrinkage to take place before the gaps were filled and structural continuity restored.

To provide for thermal movement, a vertical joint was placed at the center of each bay 15 thus assuring controlled cracking of the structure and producing collection points for dimensional tolerances. This joint should be a minimum of ¾" in depth to be effective.

Finally, since each floor is an independent casting, a horizontal joint was provided to separate concrete pours. Because of shrinkage of concrete, even a smooth, troweled joint might eventually have a ragged edge. Therefore, a reasonably heavy reveal—upward of ½" in each direction—is necessary for concealment. This explains the strong horizontal joint at Kips Bay. Although each design will differ, it is again stressed that jointing is a design rather than a field problem.

Mix Design

Our efforts described above would have been fruitless if a concurrent program had not been effected to develop a mix design which would provide proper concrete color control and necessary workability, and which would satisfy local building-code criteria. With the help of a reliable testing laboratory, various combinations of local aggregates and cement types were tested for color, durability, and strength gain 16. All local cements were then further tested for color 17 and performance to determine the combination of a single cement and aggregate source to be specified for delivery throughout the job. Rigid control of cement and aggregate source is a tenet of architectural concrete.

The finality of cast-in-place concrete makes it advisable to use only one concrete mix and thus avoid possible confusion. All concrete at Kips Bay is 3500 psi stone concrete. Cement is a light buff color Type I, manufactured in the Pennsylvania Lehigh Valley; coarse aggregate is a dark-gray traprock from the Hudson Valley passing a 1" sieve; fine aggregate is a tan-colored bank sand; a maximum water-cement ratio of 6 gallons and a minimum cement factor of 6 bags was allowed. For control, the concrete was air entrained at the batch plant within 4 to 6 percent limits, the lower figure being preferred. The slump of the concrete placed was between 4 to 5 inches which provided the necessary workability. Efficient placement procedure avoided the necessity for retardants.

Workmanship

The quality of concrete is greatly affected by the caliber of field supervision and the craftsmanship of mechanics and foremen. We have found it necessary to ensure our designs by a trained staff of concrete field inspectors who, because of their experience with other architectural concrete projects, are able to supplement the contractor's knowledge and quickly resolve field problems. The field inspectors' responsibilities include such items as checking reused forms where an open joint could create a serious grout leakage, thereby destroying the integrity of a corner; scheduling and supervising placement of concrete and form stripping 18; and the instruction of the mechanics in competent workmanship, particularly in vibration methods.

Good vibration procedure is a matter of selecting satisfactory equipment and determining the points of application and periods of immersion. We have found that internal vibration can rarely be overdone and that concrete surfaces can usually be improved by supplemental external vibration in the form of jolts and shocks produced by electric hammers.

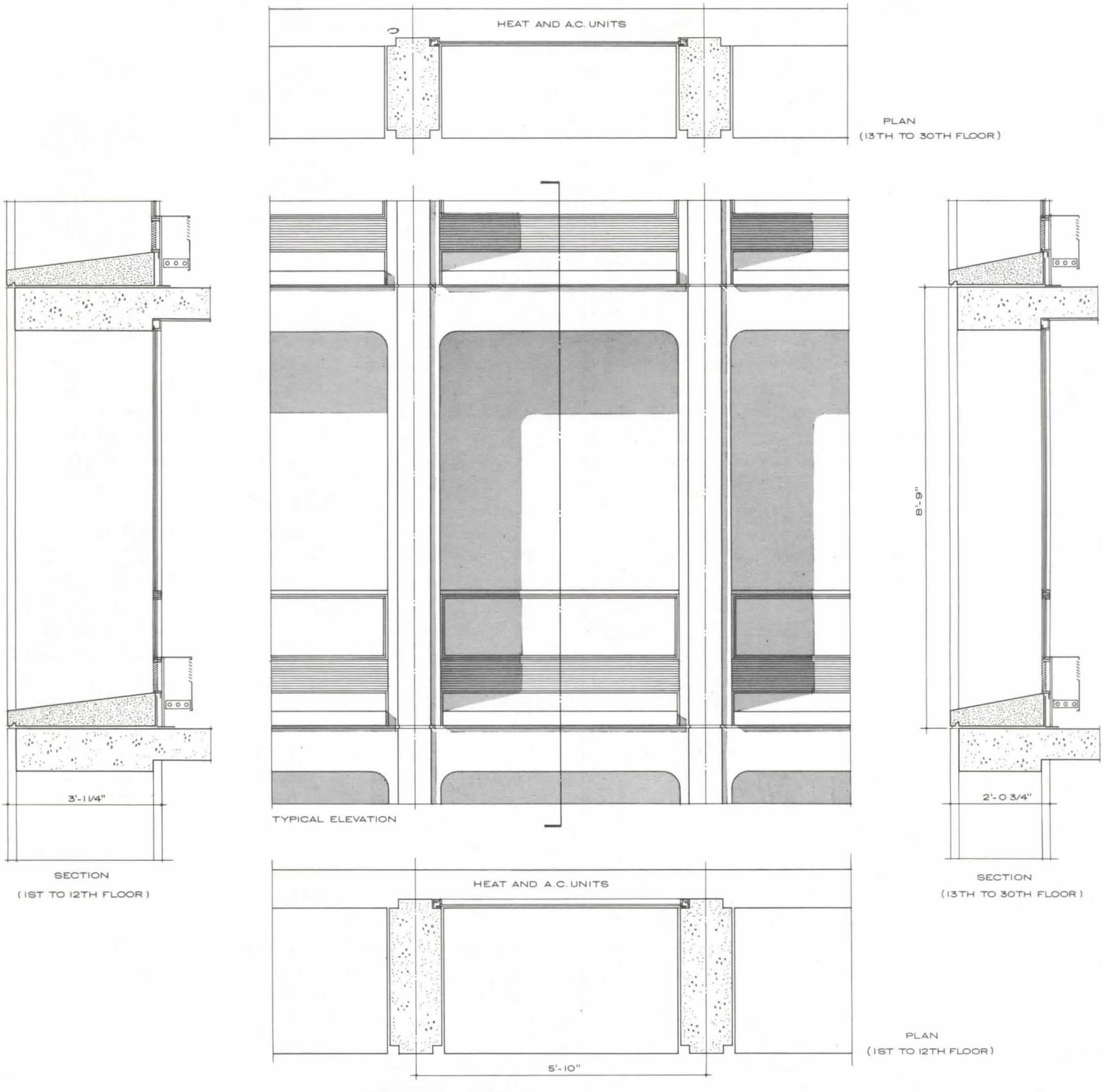
The architect's representative is assisted in the field by a concrete testing laboratory inspector who continually verifies the concrete mix for consistency, for adherence to gradation specification and to the proper air-entrainment percentage, and who co-ordinates mixing-water requirements with the batch plant.

Conclusion

This concrete building system is being employed for projects now under construction in New York, Washington, D.C., and Chicago. It has been accepted as the façade design for Society Hill in Philadelphia, and is being considered for a Pittsburgh urban-renewal project. The economic prognosis is promising and indicates that there may be a saving in ultimate cost to the owner over the conventional concrete-frame, brick-skin apartment house. This is due to the speed of construction which is equal in pace to a conventional structural concrete frame. Therefore, because brick masonry is eliminated, the building can be turned over to the owner from six weeks to two months sooner, which results in considerable savings in financing costs and an earlier return of equity.

More significant is the architectural possibility of a new freedom of form, unbounded by the straight line and the dimensional characteristics of masonry units. Improved techniques of forming and concrete placement will remove a large portion of the risk formerly associated with fair-face, monolithic concrete construction. The horizon is enormous.

SYSTEM

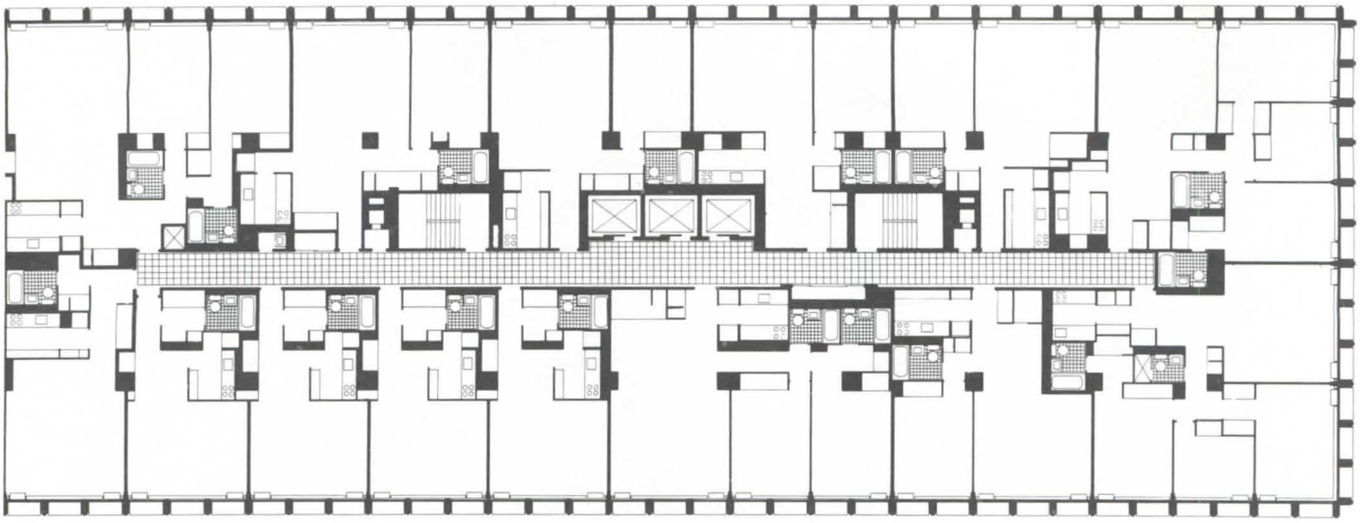


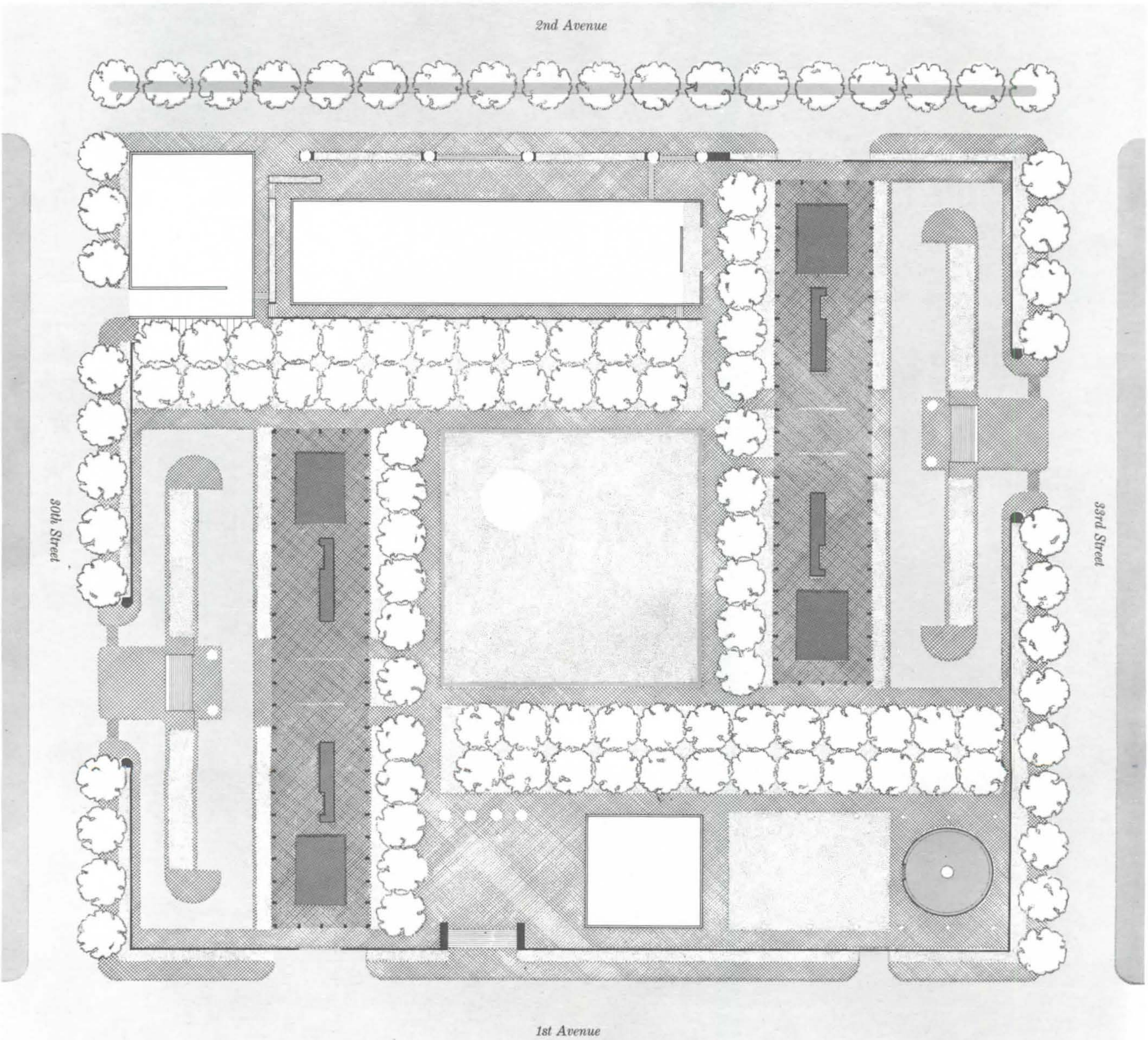
The basic system of treating the façade as a load bearing screen is similar in all of I. M. Pei & Associates' recent high-rise apartment projects. The module and details vary slightly to conform with room-size requirements, forming methods, and esthetic experimentation. Research into the best way of manufacturing and installing windows and mechanical units is still continuing. Drawing (above) *is from a study for the Society Hill project; photo* (acrosspage) *shows detail of the Kips Bay Plaza façade at the time when windows were being installed.*

PROTOTYPE

KIPS BAY PLAZA APARTMENTS · NEW YORK, N. Y. · I.M. PEI & ASSOCIATES, ARCHITECTS · S.J. KESSLER & SONS, ASSOCIATED ARCHITECTS.

This Title I project, consisting of two twenty-one story apartment buildings and a small shopping center (see site plan acrosspage and perspective sketch on page 158), was the first where the exposed concrete system was considered. One apartment building is almost completed (photos above, below, and in other parts of this issue). The ground floor columns, spaced 17'-0" o.c. (i.e. every third mullion) form a colonnaded gallery around the perimeter of the building. The remaining ground floor space contains the lobby, stairs, elevators, and storage. Upper floors (see half-plan acrosspage) have 28 apartments each—a total of 560 per building.

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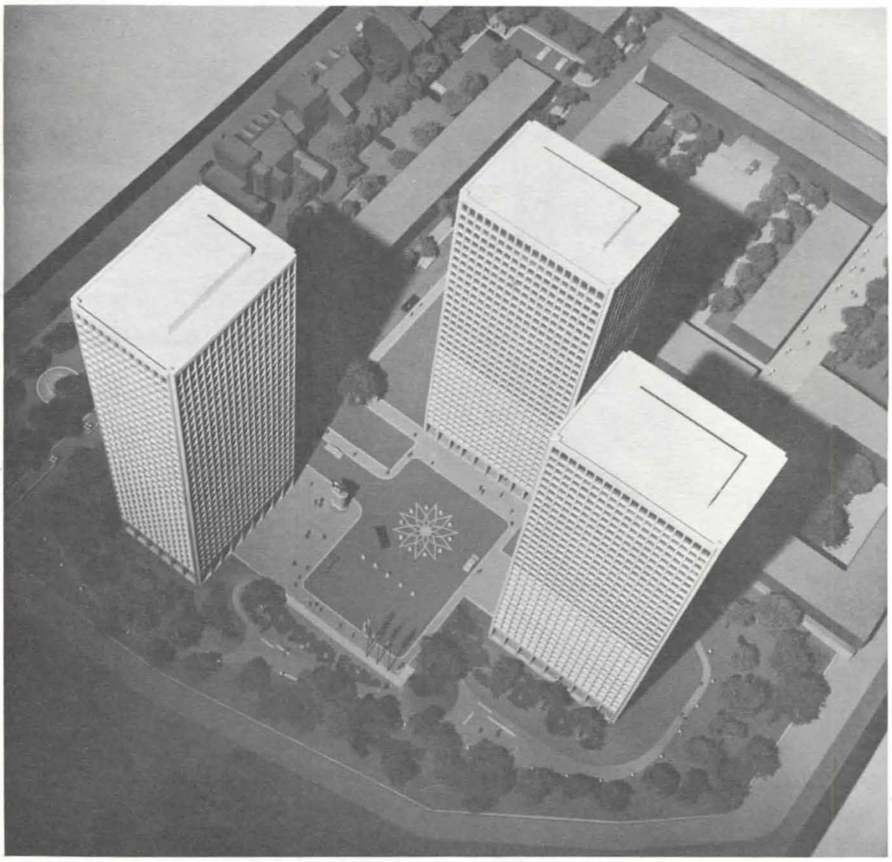
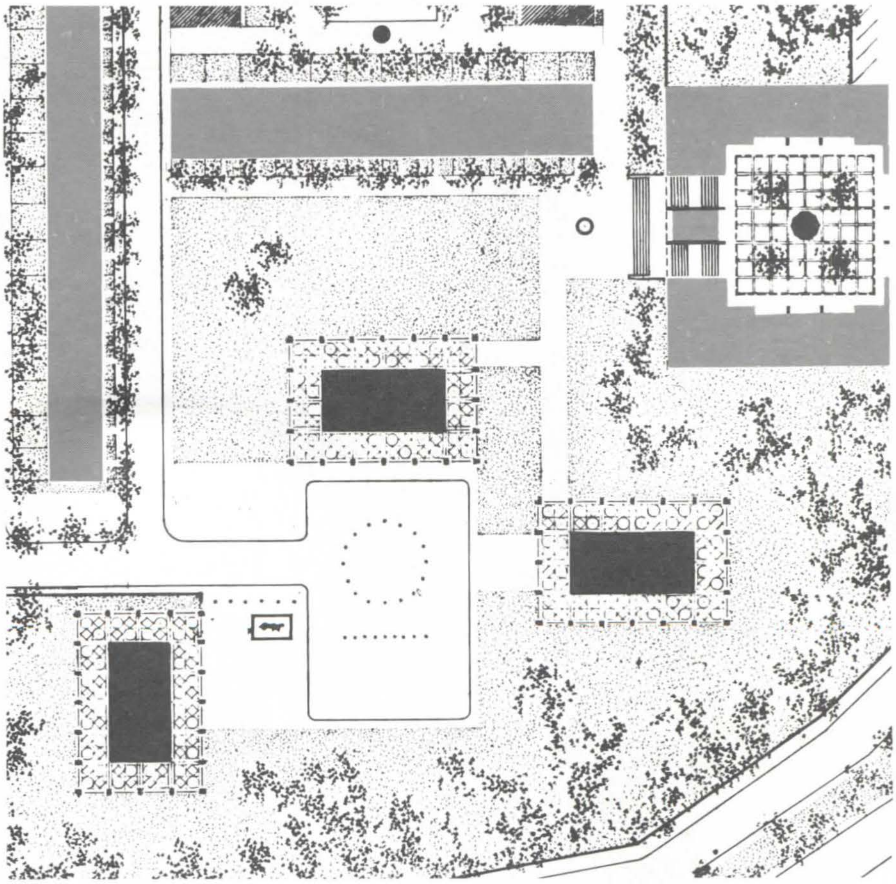
30th Street
33rd Street
1st Avenue



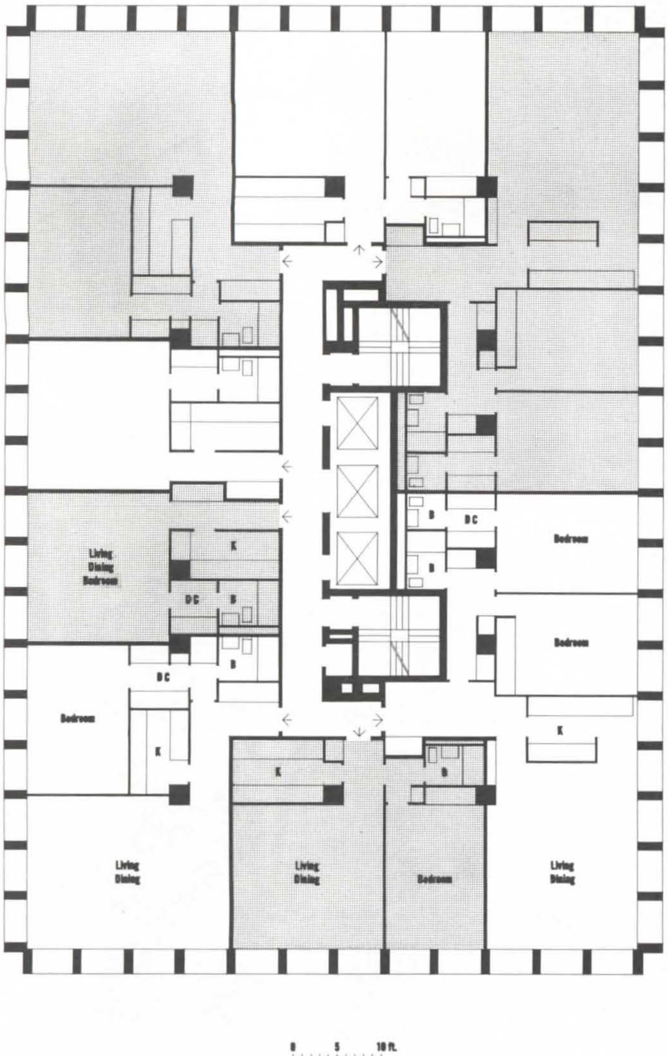
REFINEMENT

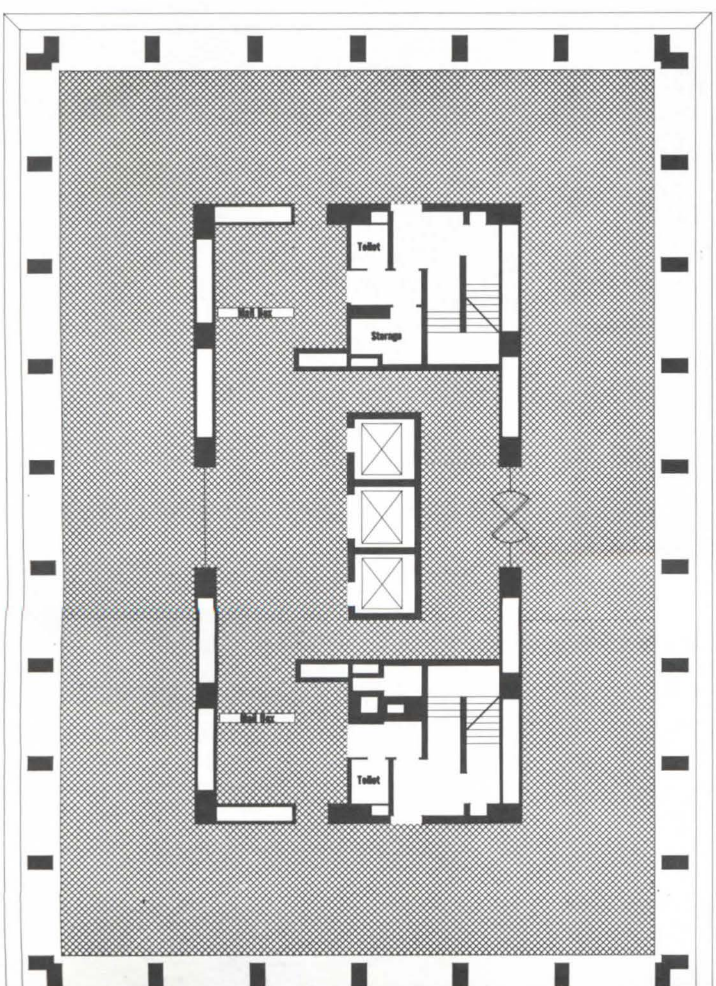
SOCIETY HILL · PHILADELPHIA, PA. · I.M. PEI & ASSOCIATES, ARCHITECTS.



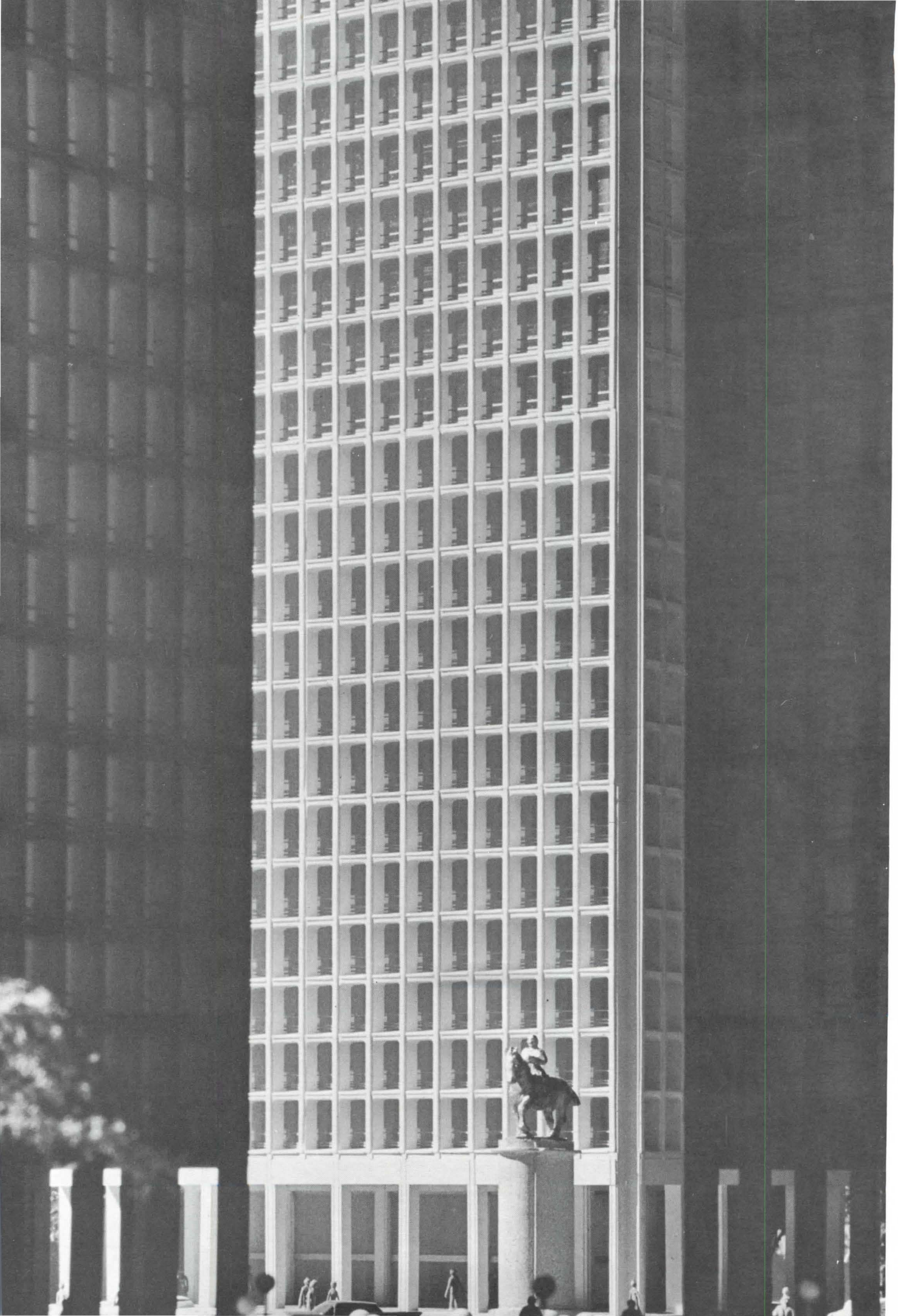
The exposed concrete cast-in-place system proved so successful, not only in terms of economics but also of esthetics, that it will be used for a more generous apartment project now being planned in Philadelphia.

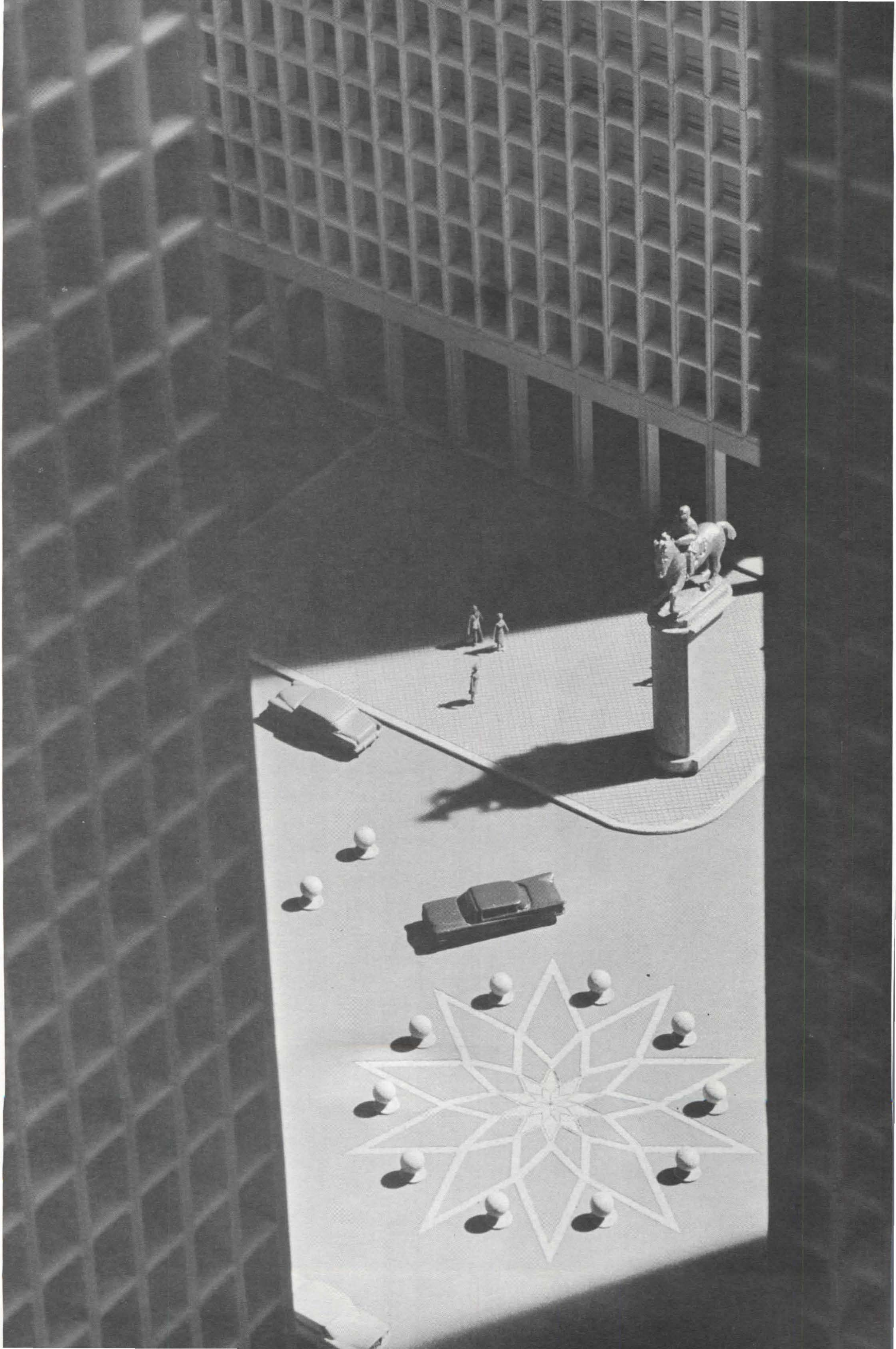
Society Hill is part of a comprehensive urban renewal of the area adjoining Independence Hall, which contains buildings of architectural and historical significance. The program called for retention and rehabilitation of many of the old houses and for sympathetic recognition of more distant buildings and the city's skyline. The solution provides townhouses, harmonious in scale and compatible in design with the existing houses, and a handsome group of three towers (shown here) whose shape and scale were conceived as being least detrimental to the shape and scale of existing and proposed smaller buildings.





Although the basic concept of the Society Hill towers is similar to that in the Kips Bay Plaza project, the proportioning and detailing are more refined. Again, the ground floor (below left), *consists of a central core surrounded by an open, colonnaded gallery. The columns are spaced at 11′-8″ o.c. (at every second mullion—the module is 2″ larger than in the New York project to allow for greater room sizes). Each tower contains 240 apartments (8 per floor) and a typical floor plan* (above left) *indicates that efficient and well proportioned apartments can be achieved within the rigid framework of the 5′-10″ structural module. The depth of the mullions will change at the 13th floor (from 3 ft to 2 ft, see page 166). This difference in the positioning of the glass line will result in a variation of the shadow lines which should add additional life to the façade of the building* (acrosspage).

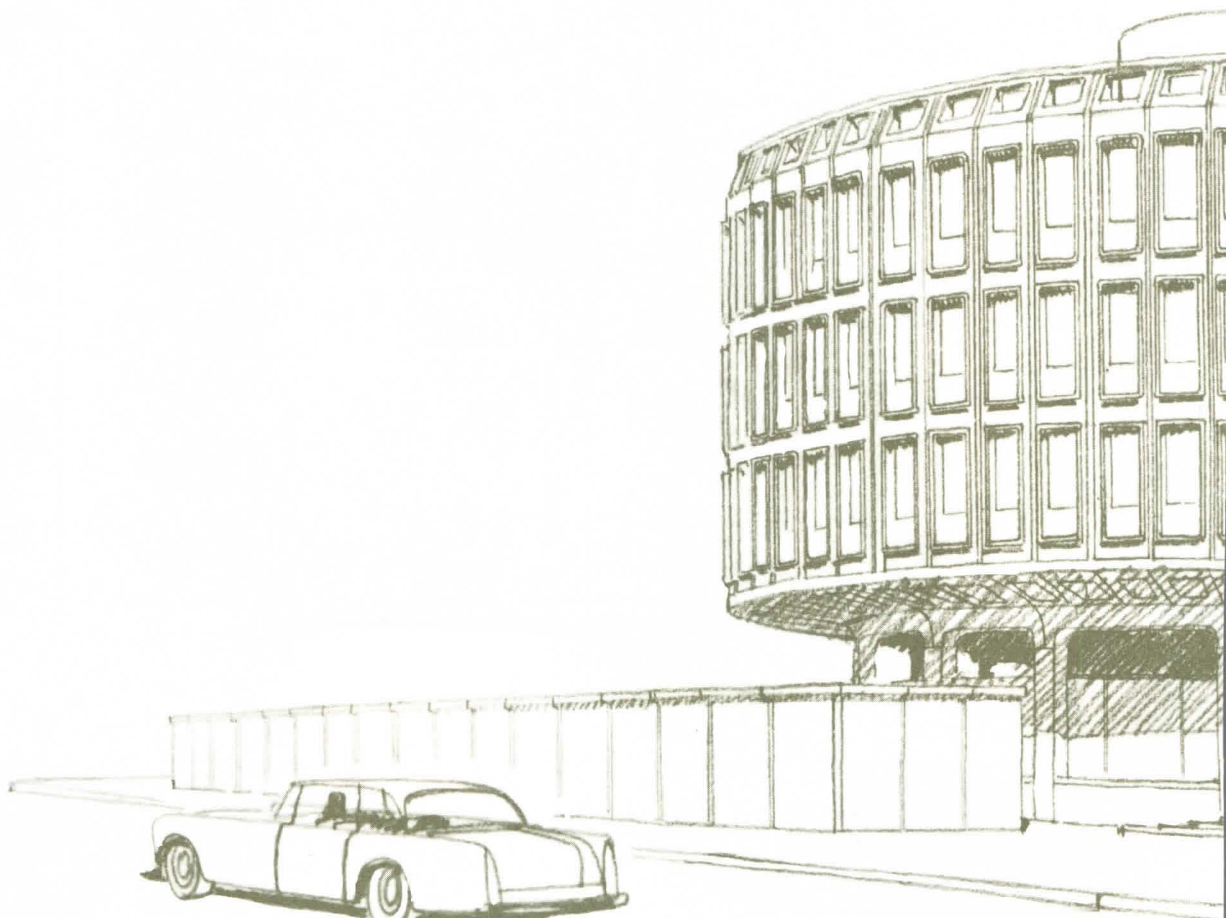




The City agencies require the inclusion—and will supervise the selection—of art objects, costing 1% of the total construction cost, which will be used as accents in the over-all plan for the area. The successfully completed portion of Kips Bay Plaza and the visual impact of this project indicate that concrete—this humble material—will be a substantial contributor to the re-emerging civic dignity in high-density residential design.

Precasting Makes New Strides

Precasting of concrete, coupled with stressing techniques, offers a formidable threat to other architectural construction methods. Not only can it be employed with enviable esthetics and potentially significant economy for exposed architectural concrete, but also it serves well—when individual components are brought to unity by post-tensioning—for both exterior and interior structural framing. In the next article a consulting engineer, who is an ardent enthusiast of precasting, portrays its possibilities primarily from the viewpoint of its adaptability for all sorts of structural condtions. That precasting and standardized parts need not result in conventional design is unquestionably demonstrated in the following presentation of the proposed Philadelphia Police Administration Building sketched below.



POSSIBILITIES

BY AUGUST E. KOMENDANT

There is little doubt that there will be a rapid increase in the volume of precast and prestressed concrete to be used in the future. The author, one of its strongest proponents, is even of the opinion that the "new reinforced concrete"—as he calls it —will largely supplant the use of ordinary cast-in-place concrete within the next five years. Komendant—one-time scientific adviser-investigator and engineering consultant with the European Command Office of the Chief of Engineers, U. S. Army (1945-1950) — currently has a vigorous practice as engineering consultant to architects, engineers, and manufacturers while at the same time teaching post-graduate courses in prestressing and structural systems at the University of Pennsylvania. For all of the structures described or illustrated in this article, the author has acted as structural consultant.

The problems involved in modern structural engineering are extensive and complex. Beside the difficult solutions of theory and construction that are inherent in a specific design, there are steadily growing requirements of both esthetics and economics that must be satisfied. In order to be competitive, therefore, an engineer must frequently abandon his outdated ideas and attempt to discover new and more rational applications. As a result, structural systems change their form and rapidly give way to fresh methods of construction. It is by this approach that we discover the new face of modern engineering.

Basic Principles of Engineering

The basic principle of structural engineering is simplicity—statically-balanced masses and areas arranged in harmony with the over-all structural system and its surroundings. Each structural element should clearly indicate its purpose of transmitting those forces and loads to which it is subjected; each structural system should be appropriate to the material of which it is made. Equally important, construction should be simple and economical. Because of the high cost of labor in the United States, this last requirement can be satisfied only by the utmost simplification and reduction of construction work in the field—a situation suggesting the use of lightweight, prefab structural elements transported to the site for assembly. These principles are limited only by considerations of structural safety and special conditions of a given project, and are influenced by the fact that every structure must convey the nature of our times and our engineering achievements to future generations.

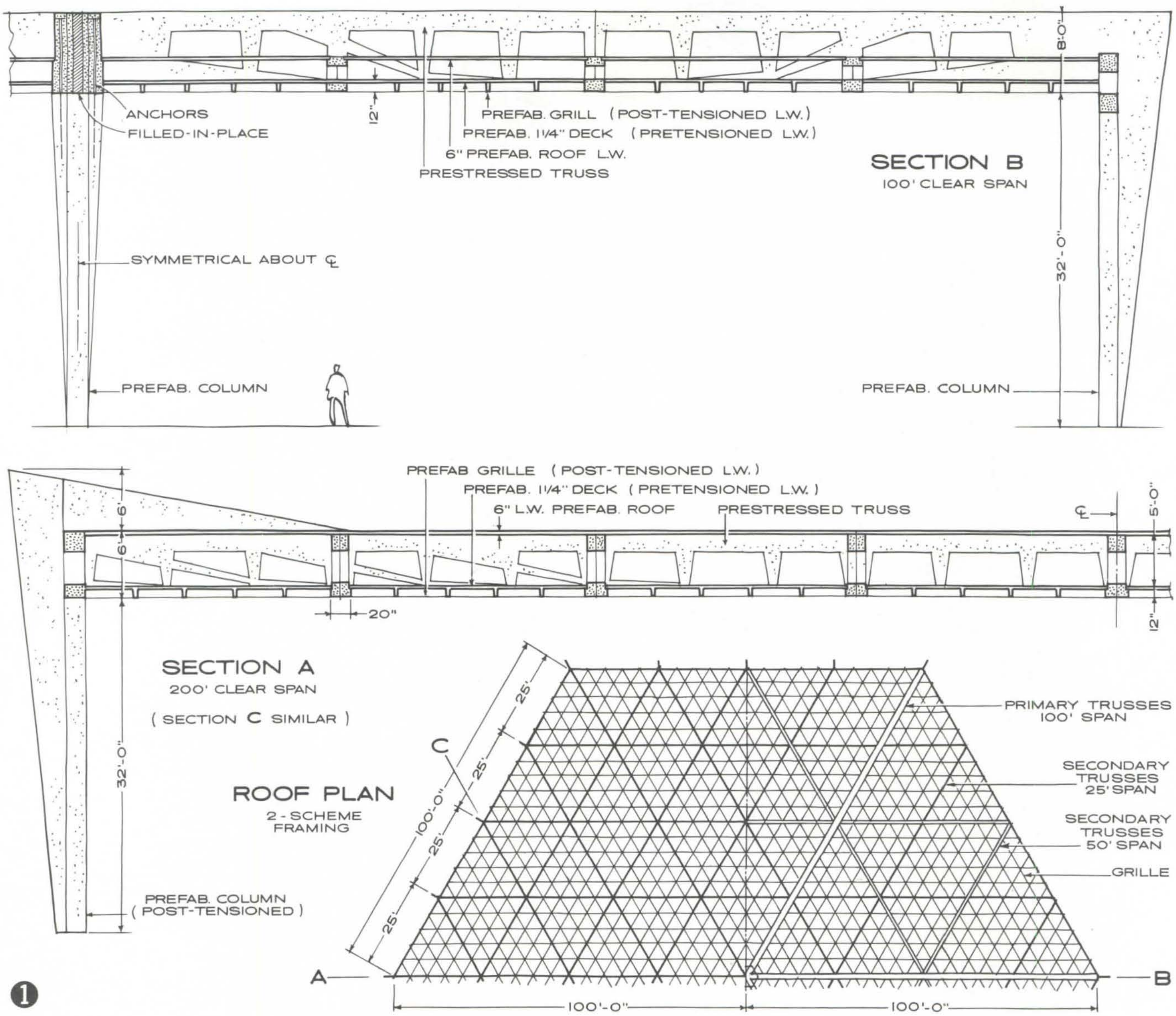
Accepted engineering sciences have advanced steadily and are now at a point where strength of materials, carrying capacity, deformations, stability of structure, etc., can be computed with sufficient accuracy to ensure the safety of any project. But the more advanced theories, on which an increasing number of contemporary structures are designed, are very complex. Applying these to the solutions of structural as well as esthetic and economic problems requires knowledge, experience, and extensive testing in order to produce maximum results at minimum costs.

Concrete and Conservatism

Reinforced concrete has had great success regardless of its many limitations: difficult and expensive formwork, complicated structural shapes and systems, relatively long construction time, difficulties of winter work, cracking, etc. Most of these problems now can be overcome by the use of prefabrication and prestressing—a concept that almost completely frees our architectural and structural imaginations.

Precast and prestressed concrete components offer many opportunities for the realization of the principles enumerated earlier. At present, however, these elements are often little more than substitutes for structural-steel shapes. The special characteristics of this new form of reinforced concrete have been largely ignored and its potentialities neglected. The defense most frequently offered is that since structural prefabrication is a new concept, there is a basic lack of architectural and engineering background, as well as manufacturing and erection experience.

Unfortunately, the real reason for the neglect of precast and prestressed concrete has been an overly conservative approach to its possibilities by architects and engineers. Maintaining the so-called "well-established" structural systems has always seemed desirable, even though any one of these methods may have been developed for different materials or other purposes. At present, where mechanical requirements of a design largely influence (or perhaps entirely control) a structural system, standard shapes are no longer adequate. This is not surprising when it is recalled that air conditioning, for example, was unknown at the time these shapes were evolving. But it *is* surprising that we continue to use these inappropriate systems, despite vastly changed conditions and requirements. Due to the persistence of habit, we often encounter designs where a span-depth ratio, or a



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construction-depth to room-height ratio, is far out of balance. If we are so removed from the basic principles of modern design, this cannot fail to affect the economy of present-day construction.

Methods in Prestressing

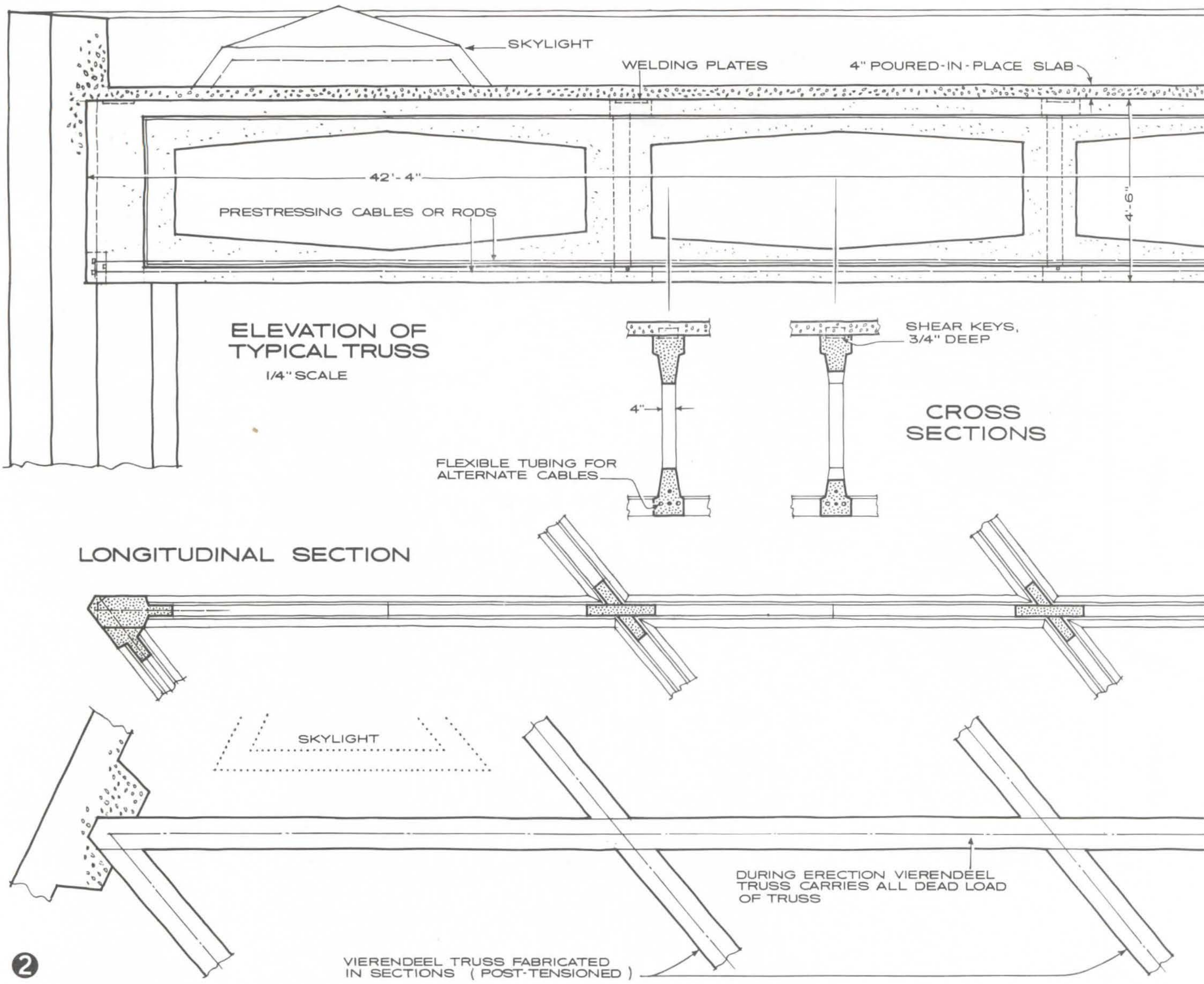
Since the concept of prestressing is relatively new for many architects and engineers, a general review of its meaning and its method of manufacture may be helpful.

The principle of prestressing is the inducing of stresses in a concrete member before the dead and live loads are applied, so that these so-called prestresses act in the opposite direction to those stresses developed by the loading. When the loads are applied, the resulting stress from loading will be superimposed on the prestress, and a more economical stress distribution over the cross section is obtained. Depending on the magnitude of the prestress, the tensile stresses in concrete can be reduced to a great extent or even entirely eliminated.

There are two generally accepted methods for inducing prestress: pretensioning, and post-tensioning.

Pretensioning The members are manufactured in prestressing beds, both ends of which are provided with special anchorage devices. The economical length of a bed varies from 300 to 400 ft, allowing the manufacture of many members in a single operation. As many as 60 seven-wire strands (3/8", 7/16", or 1/2") are pulled from end to end of the bed and tensioned up to 175,000 psi by hydraulic jacks. The side and end forms for each individual member to be cast in one pour are then placed. After the pouring, the bed is covered with canvas and live steam is introduced. The duration of steam curing depends on the size of the members, but generally 12 to 18 hours are required to obtain approximately 80 percent of the standard 28-day strength (5000 to 7000 psi). When the strands embedded in the concrete are cut at the ends of individual members, the bond between concrete and wire prevents the strands from returning to their original length, thus effecting prestress in the member to a value only 10 percent less than the original stretching force of the strands. The location of the strands in cross section is predetermined so that reverse stresses to the anticipated loading stresses will be developed.

Post-tensioning The members are cast in the same manner as ordinary precast, reinforced concrete, and cured in the same manner as pretensioned members. After



the concrete has hardened to a 5000-psi minimum, the post-tensioning cables or rods are puled through ducts or grooves left in the concrete member. (When cables or rods are cast in the concrete, they are surrounded by a sheath of thin sheet metal, before concrete is placed, in order to prevent bond prior to prestressing.) The cables or rods are then tensioned by jacks acting against the end of the concrete member, eliminating the need for the heavy prestressing bed. When the predetermined force is reached, the ends of the cables are anchored by special devices, and are pressure-grouted to establish bond and prevent corrosion.

The post-tensioning method is more flexible than pretensioning, as far as design and handling are concerned, but is more expensive. It is commonly used for long spans and for the assembly of complicated prestressed systems from individual units. Often post-tensioning and pretensioning are used in combination, to obtain economy and to overcome difficulties in handling, transporting, and assembling.

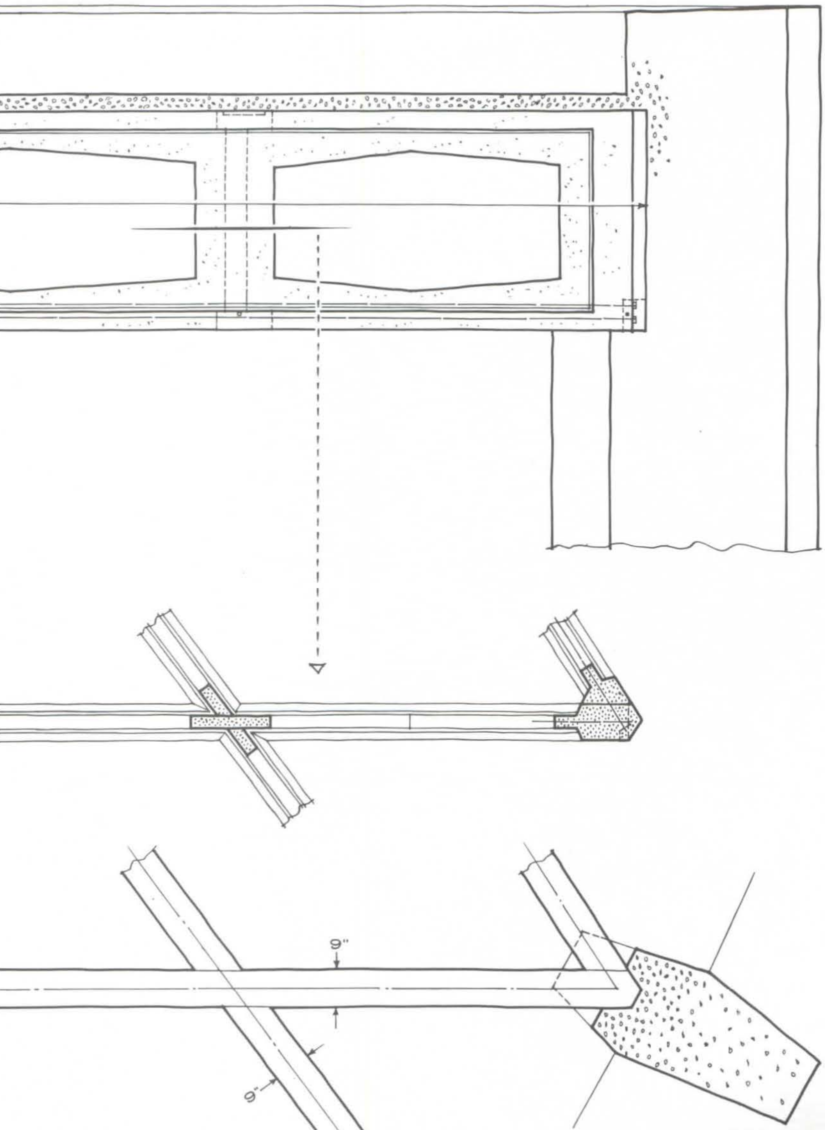
Steam Curing The reasons for steam curing are to achieve large production from a relatively expensive plant, and to obtain more complete crystallization and more stable products.

Steam curing operates in two ways. It balances the differences between the temperature inside cement colloids, due to the hydration heat (approximately 170 F), and the temperature of the mixing water surrounding the colloids that is required to obtain rapid and complete hydration. Steam curing also provides saturated atmosphere (relative humidity of 100 percent) to prevent evaporation of water from the concrete during hydration and crystallization. This evaporation would cause a lack of water for the completion of hydration, and would result in capillary stresses when the concrete did not have enough strength to resist them.

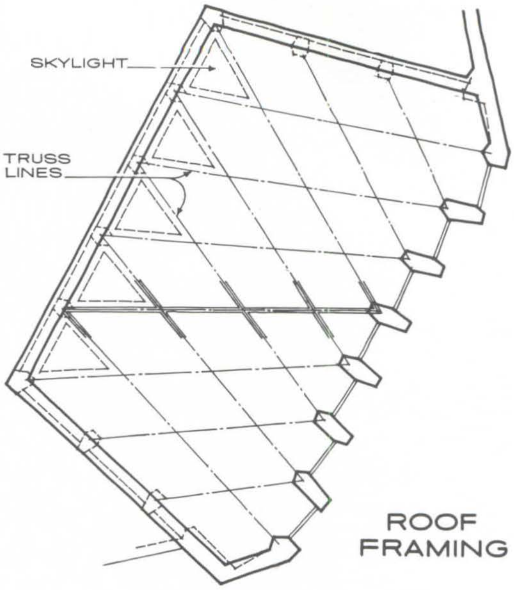
Either steam or hot-water curing could be used for these purposes. The conditions can rarely be met as satisfactorily by air curing of cast-in-place concrete.

In plant operation, steam curing is commonly used, with temperatures varying from 120 to 180 F, relative humidity from 95 to 100 percent. Both temperature and relative humidity are automatically recorded in many places along the bed during curing.

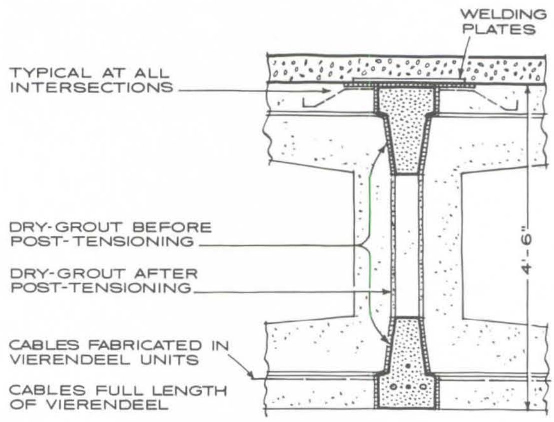
Hot-water curing is rarely used, because of its complexity. The process consists of submerging the concrete under hot water, which is reheated (or steam heated) and



PLAN ABOVE TRUSS



ROOF FRAMING



TYPICAL INTERSECTION

recirculated to secure uniform temperature for all members cast in the single operation. Water temperature is again recorded at several critical locations.

The efficiency of curing depends on the degree of saturation, the temperatures applied, and the extent of concrete surfaces exposed to the steam or water.

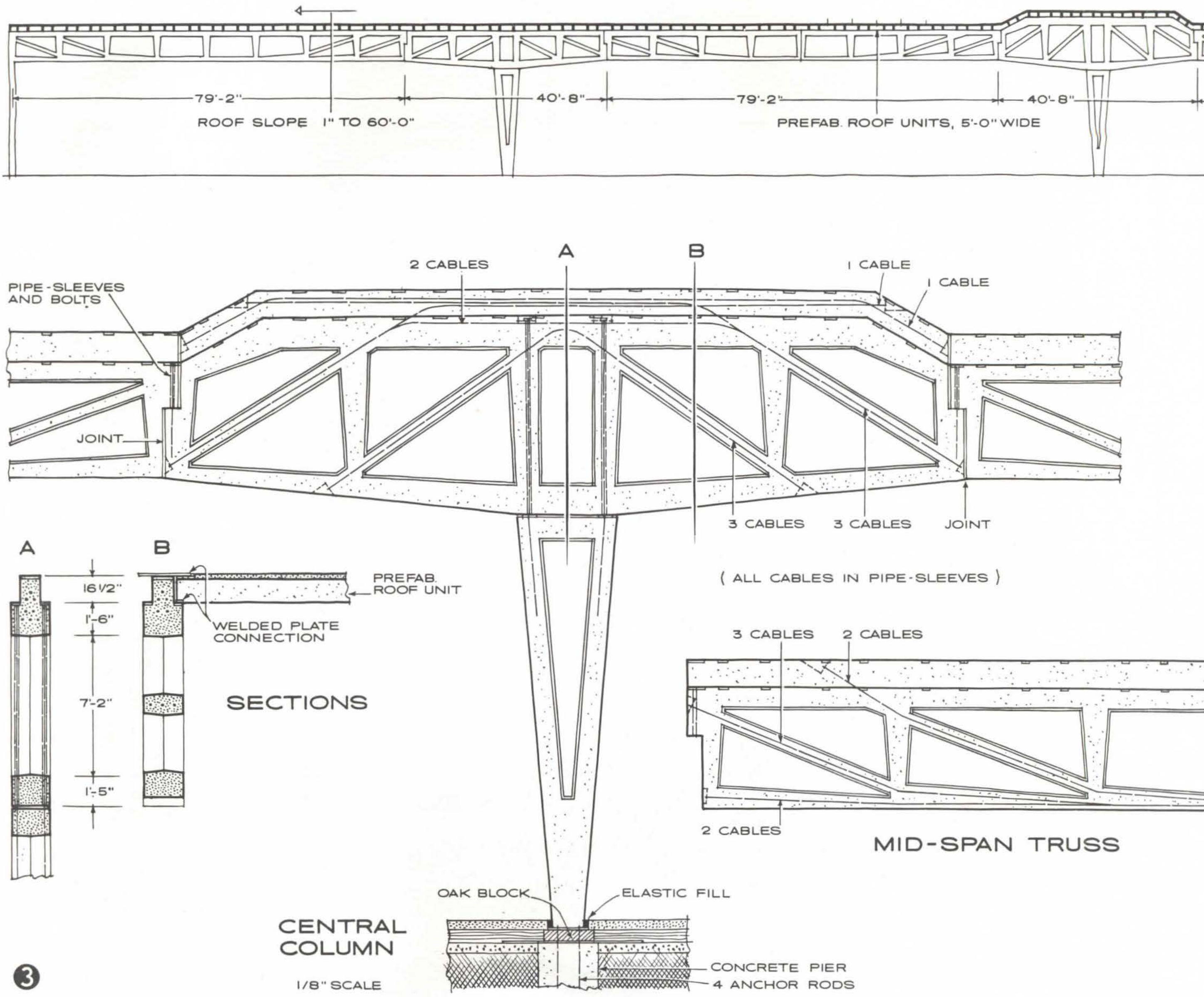
Advantages of New Concept

Prefabrication and prestressing allow the economical use of complex structural shapes and systems, since each casting mold is used repeatedly. A typical example is the complicated shape of the wall panels and the entire structural system of the Police Administration Building in Philadelphia, designed by Geddes, Brecher, Qualls, (*please refer to following article*). This type of construction would be impossible with ordinary cast-in-place methods. By use of molds of concrete, steel, plaster, glassfiber-reinforced plastic, etc., the realization of new architectural ideas becomes economically feasible through precasting and prestressing.

Ordinary reinforced concrete has disadvantages for exposed finished surfaces, because of the leaching out of free lime and magnesium, corrosion, lack of uniformity, and crack formation due to loading, shrinkage, and change of atmospheric temperature or relative humidity. But by steam curing, prestressing, and closely controlling manufacture, these deficiencies can be largely reduced or even entirely eliminated. When cement is hydrated in saturated atmosphere, hydration is relatively rapid, crystallization of cement is more complete, and capillary forces are eliminated until the concrete's strength and modulus of elasticity reach 80 percent of maximum. It is understandable that a product treated in such a manner has qualities superior to a product that is poured during unfavorable conditions and cured slowly, and where equilibrium is established when concrete has only relatively low strength and modulus of elasticity. Under these conditions, large-scale crack formations (especially at the surface where conditions during hardening are most severe) weaken the concrete and corrode its face.

Structural Potentials

Structural possibilities are greatly enlarged with the new reinforced concrete as a result of superior strength and stability (obtained by steam curing) and the elimination of cracks (obtained by prestressing). Examples of this new potentiality are the structural systems used by



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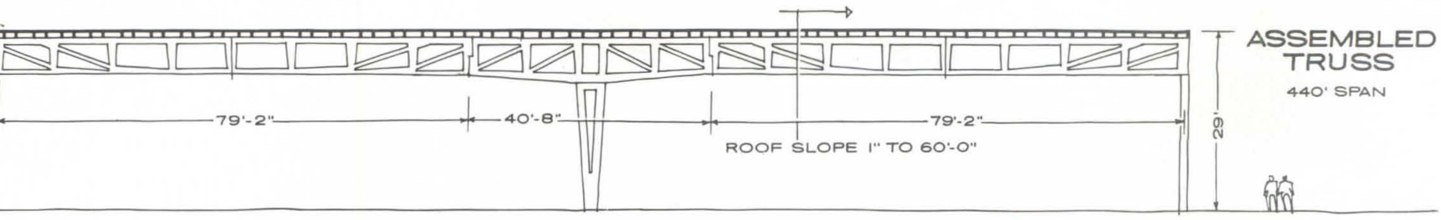
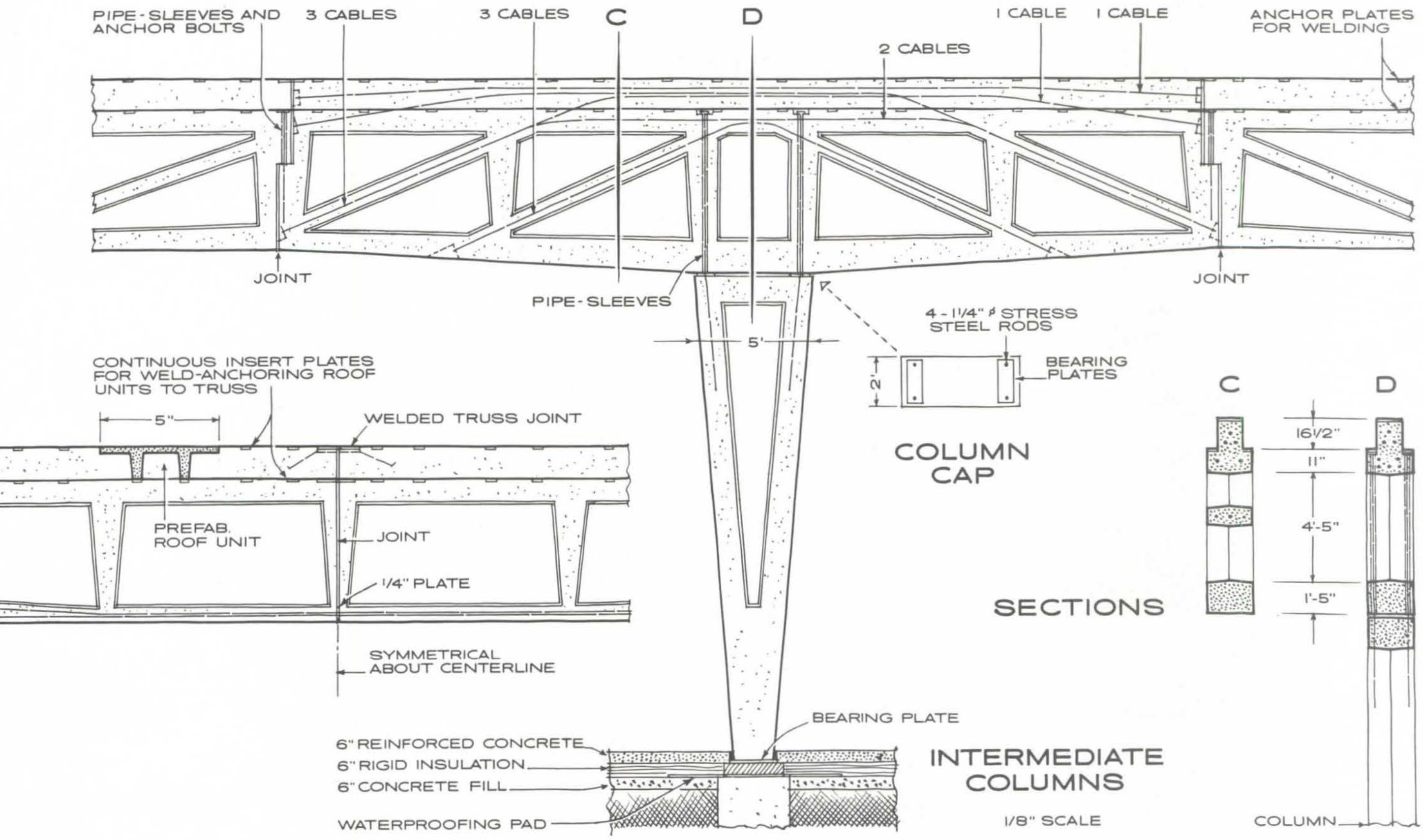
LaPierre, Litchfield & Partners in the Paterson State College Auditorium, Paterson, N. J. 1, and by Eero Saarinen & Associates in the new Stiles and Morse Colleges at Yale University 2. Two- and three-directional structures are almost impossible to carry out in cast-in-place concrete, with requirements of high quality and economy. But in these cases, the system was economically assembled from prefab, precast units that were tied together by post-tensioning. This type of structural system is statically indeterminate to a large degree. If the structures were to be cast-in-place, shrinkage and thermal expansion would make the buildings' structural behavior almost impossible to analyze with acceptable accuracy. With precast units post-tensioned into place, however, this problem is overcome. Structural economy of the system is obvious, since the carrying action of the Vierendeel trusses is two- to three-directional; advantage can also be taken from additional suspension action. As to the construction, only few sets of high-quality molds are required for casting. Scaffolding and shoring is reduced or eliminated, because one set of trusses will be manufactured in lengths as long as can be economically handled, and during erection will support the secondary shorter units. When post-tensioning is applied to the system, the amount of prestress can be computed so that all trusses in each direction are structurally equal in their carrying capacity.

The high structural quality of precasting and prestressing is evidenced by the Vierendeel suspension-type trusses of the Merchants Refrigerating Company Building at Secaucus, N. J., designed by Abbot Merkt & Company 3. These continuous trusses are manufactured in 40-ft units and assembled to an over-all length of 440 ft. They carry a total load of approximately four kips/lin ft, with an expected temperature change of 100 degrees F. The structural system of the building has been designed so that there are no pronounced expansion joints; the volume change will be absorbed by rotations and semielastic joints between individual units. (Original design in steel had 10-ft-deep trusses, with roller bearings to allow thermal expansion.)

In many cases the structural engineer must provide solutions for surfaces resulting from structural systems too complicated and expensive even for precasting; for instance, the circular mushroom-type structure proposed for the Hospitality Center, Philadelphia 4. The three-storied





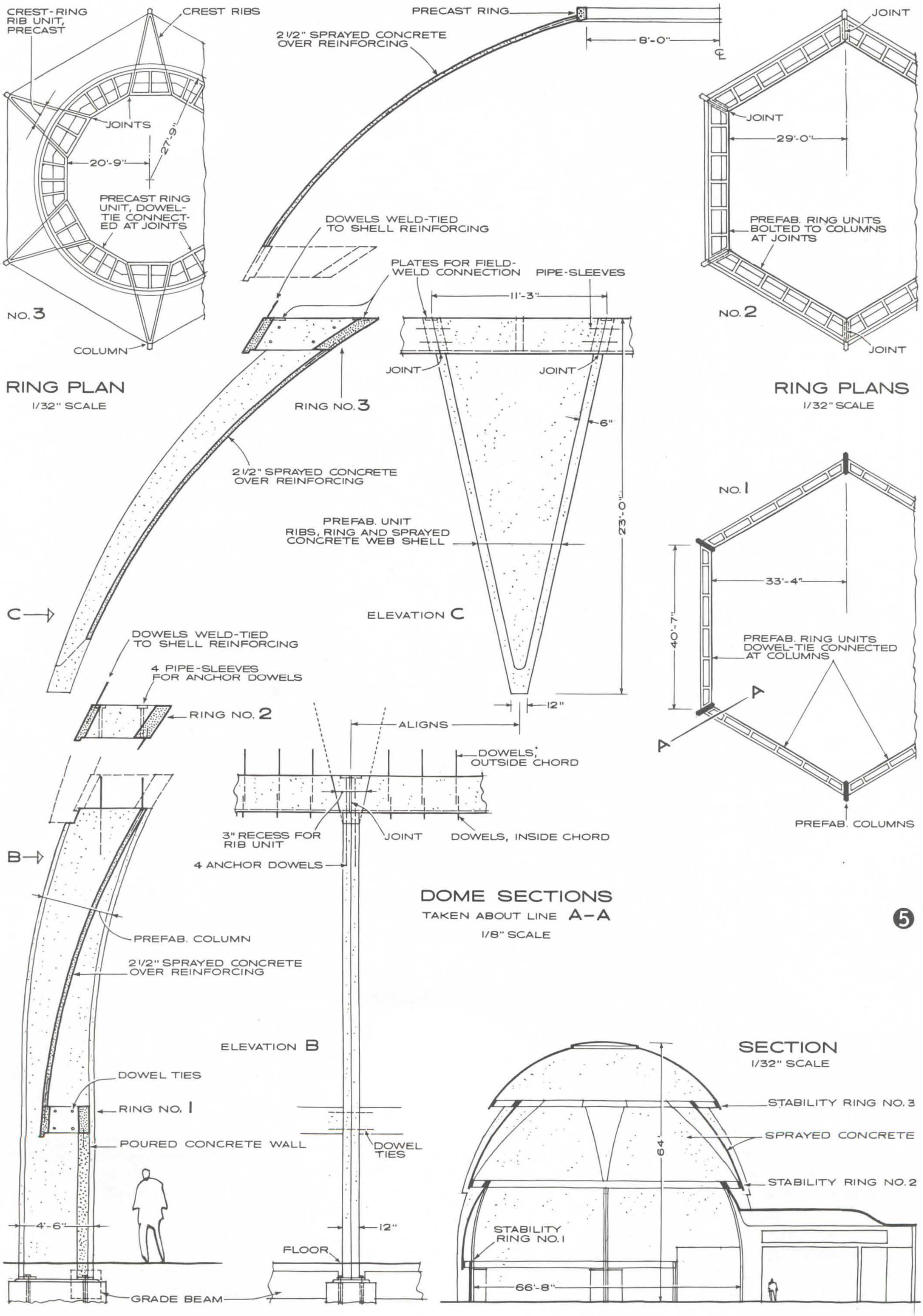
shell of the Del Carmen Church, Cataño P.R., designed by Henry Klumb, is another such example 5. The construction could be accomplished economically only by a combination of precasting and guniting. The corner and stability rings were designed as precast units, the proper shape of the structure being established after the rings and corners were erected and welded. Then reinforcing for the missing curved surfaces was placed and welded to dowels projecting from precast units. To make the use of gunite possible, the reinforcing was covered with two or more layers of wire fabric. Gunite was applied in concentric layers, starting from the bottom stability ring of each individual shell. For such a monumental structure the concrete is usually exposed, since any type of built-up roofing would spoil its appearance. Among the proper protections against leakage are plastic- and rubber-based sprayed coatings. Condensation can usually be eliminated by the use of a lightweight concrete.

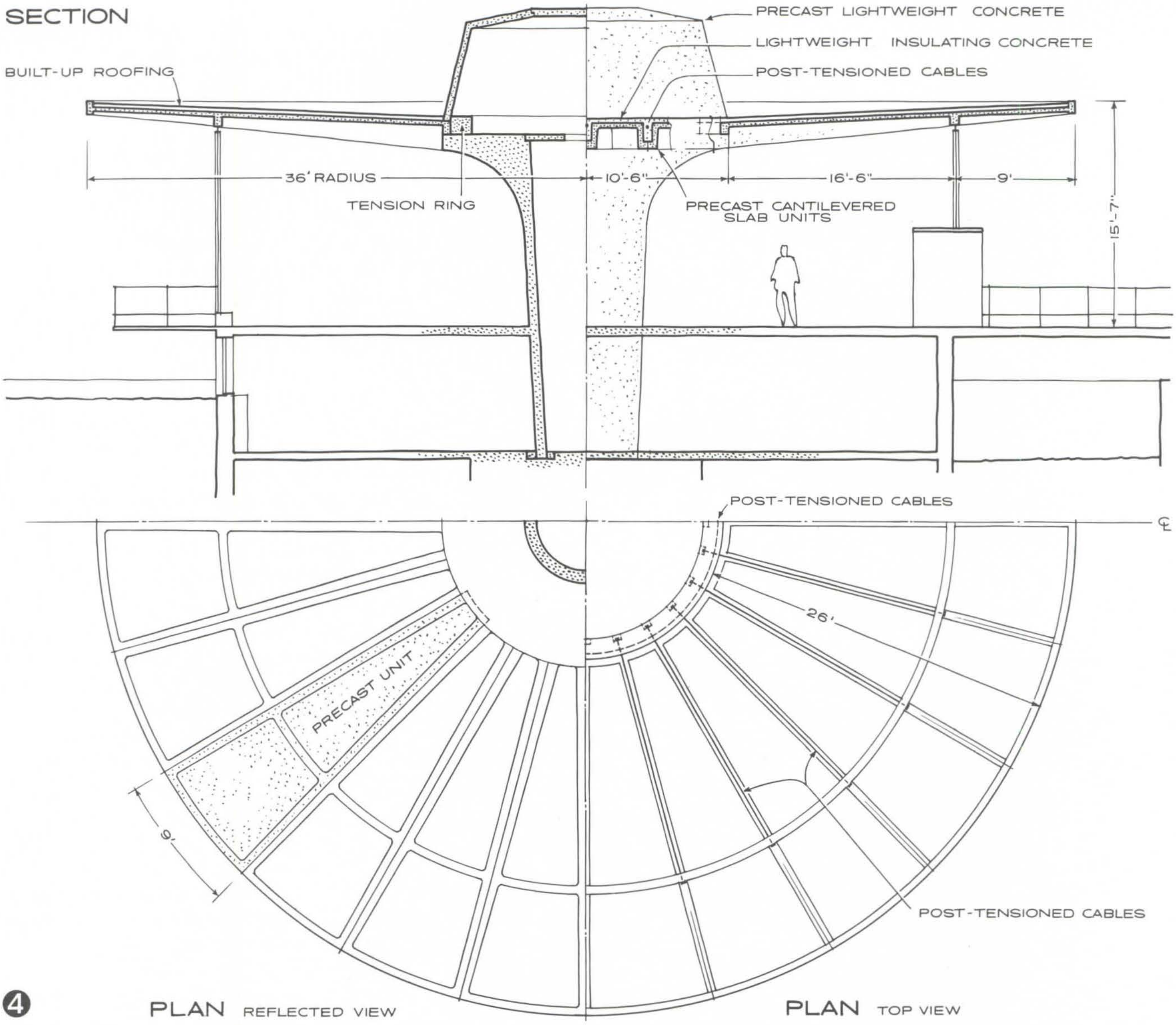
Another instance is the prefab bridge proposed for the Delaware Expressway through Philadelphia. It spans up to 150 ft for I- and box-type girders, and truss types (*as shown in* 3) that are economical up to 400 ft. Bridges are no longer straight, as they used to be; the curvature, especially at intersections, is relatively sharp. To satisfy this requirement, the typical steel design must be abandoned in favor of the more flexible approach of precasting.

Other Considerations

In most cases the structural shapes for buildings can be designed so that the air-conditioning and utility ducts can be installed inside the shape (folded-plate, space girder, etc.) to give easy access and to avoid using valuable space for this purpose under the structural system. This also eliminates need of an expensive hung ceiling for appearance's sake.

As with any new material, the specifications for precasting are relatively more strict than those for a well-proven material or method. Very often, full-scale tests must be made before a design will be accepted, and these will be followed by additional tests after erection. One of the pretensioned Vierendeel trusses of Louis Kahn's Medical Research Building for the University of Pennsylvania (*page 152*) was tested as a simply-supported member. Measurements under various loading conditions indicated that the actual structural behavior was well in accordance with theoretically-computed results. After the


CREST-RING RIB UNIT, PRECAST
CREST RIBS
JOINTS
20'-9"
27'-9"
PRECAST RING UNIT, DOWEL-TIE CONNECTED AT JOINTS
NO. 3
COLUMN
RING PLAN
1/32" SCALE
PRECAST RING
2 1/2" SPRAYED CONCRETE OVER REINFORCING
8'-0"
DOWELS WELD-TIED TO SHELL REINFORCING
PLATES FOR FIELD-WELD CONNECTION
PIPE-SLEEVES
11'-3"
JOINT
JOINT
RING NO. 3
6"
2 1/2" SPRAYED CONCRETE OVER REINFORCING
PREFAB. UNIT RIBS, RING AND SPRAYED CONCRETE WEB SHELL
23'-0"
ELEVATION C
C
DOWELS WELD-TIED TO SHELL REINFORCING
4 PIPE-SLEEVES FOR ANCHOR DOWELS
RING NO. 2
12"
ALIGNS
DOWELS, OUTSIDE CHORD
3" RECESS FOR RIB UNIT
JOINT
DOWELS, INSIDE CHORD
4 ANCHOR DOWELS
B
DOME SECTIONS
TAKEN ABOUT LINE A–A
1/8" SCALE
PREFAB. COLUMN
2 1/2" SPRAYED CONCRETE OVER REINFORCING
ELEVATION B
DOWEL TIES
RING NO. 1
POURED CONCRETE WALL
DOWEL TIES
4'-6"
12"
FLOOR
GRADE BEAM
JOINT
JOINT
29'-0"
PREFAB. RING UNITS BOLTED TO COLUMNS AT JOINTS
NO. 2
JOINT
RING PLANS
1/32" SCALE
NO. 1
33'-4"
40'-7"
PREFAB. RING UNITS DOWEL-TIE CONNECTED AT COLUMNS
A
A
PREFAB. COLUMNS
5
SECTION
1/32" SCALE
STABILITY RING NO. 3
SPRAYED CONCRETE
STABILITY RING NO. 2
64'
STABILITY RING NO. 1
66'-8"



4

erection of the tower, composed of 400 individual units, one entire floor was loaded to D + 2L. The two-way system behaved as a completely rigid frame, also well in accordance with theoretical results. After 24 hours under sustained loading, the recovery was almost complete. Similar results were obtained with the suspension truss of the Merchants Refrigerating Company Building.

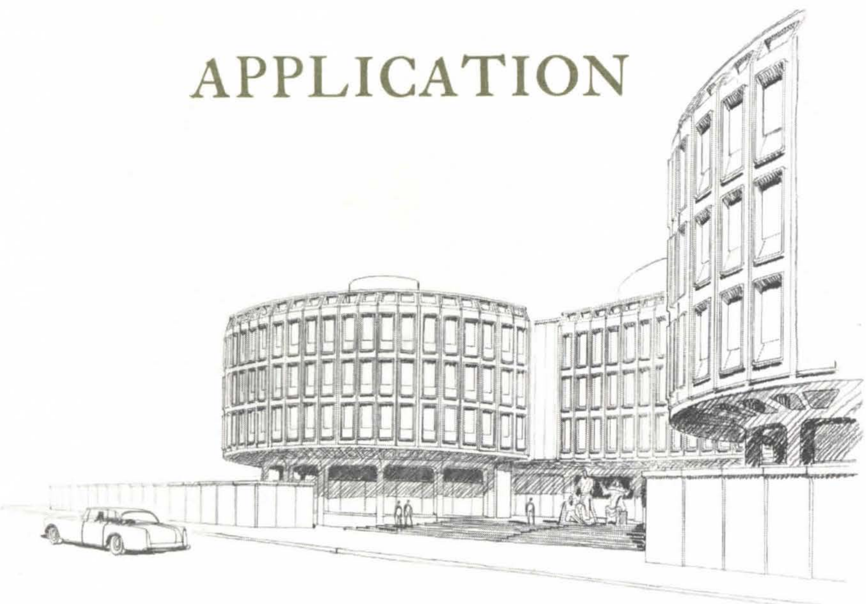
The joints between members, approximately ¼" wide, do not create any difficulties if they are properly designed. Exposed welding is not required, and may be completely eliminated. In special cases, as for the trusses at Yale University, welding plates buried in cast-in-place slabs will be required as safety measures during erection.

Conclusion

It has often been stated that by the use of prefabrication, the most characteristic property of concrete—its monolithic nature—vanishes, that the jointing of large numbers of individual units is difficult, and that structural stability suffers. If this were true, and if precasting were not competitive with other materials and methods, one would expect that precasting and prestressing would be used only for experimental purposes. But at present, the precasting and prestressing industry is growing very rapidly and its position in the building and bridge fields is secure.

These few illustrations show what is possible with the new type of reinforced-concrete structural elements manufactured at far-away precasting plants, transported to construction sites, and assembled and tied together by post-tensioning or by some other means of satisfying the requirements of stability. Considering that the technique is relatively new, and few architects, engineers, and manufacturers are experienced enough to use it, progress has been considerable. Only a fraction of the potentialities of the new reinforced concrete has been utilized to date, though, and there is a promising future ahead. Of the precasting techniques that have been developed, one of the most successful —now being used to prefabricate the standardized panels of Philadelphia's new Police Administration Building—is described in detail in the following presentation.

APPLICATION



POLICE ADMINISTRATION BUILDING • PHILADELPHIA, PA. • GEDDES, BRECHER & QUALLS, ARCHITECTS.

The construction of a new Police Administration Building is part of a plan for the rehabilitation of the Philadelphia City Hall, where the headquarters are now located. Recognizing the potential civic role of the building, the City Planning Commission recommended a site overlooking Franklin Square and the approaches to the Benjamin Franklin Bridge. It includes a city block 300′ by 400′ in a "skid row" neighborhood for which extensive redevelopment is planned.

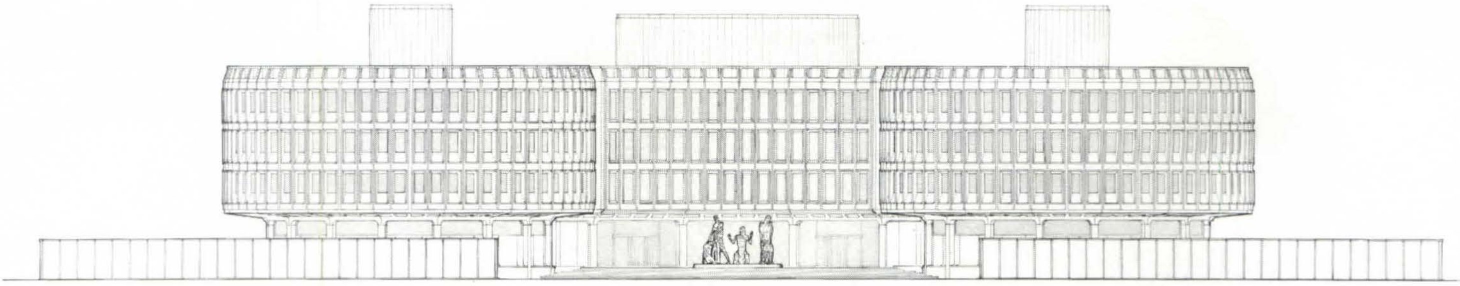
Functions to be housed in the new building included administrative and records offices, headquarters for detectives and special squads, laboratories, communication headquarters, and prisoner processing facilities. Other requirements were staff parking for 150 cars and a protected prisoner receiving area.

The architects approached the problem as essentially that of designing an office building with unusual requirements—controlled access and prisoner security—and special significance as a civic symbol and a nucleus for neighborhood rehabilitation.

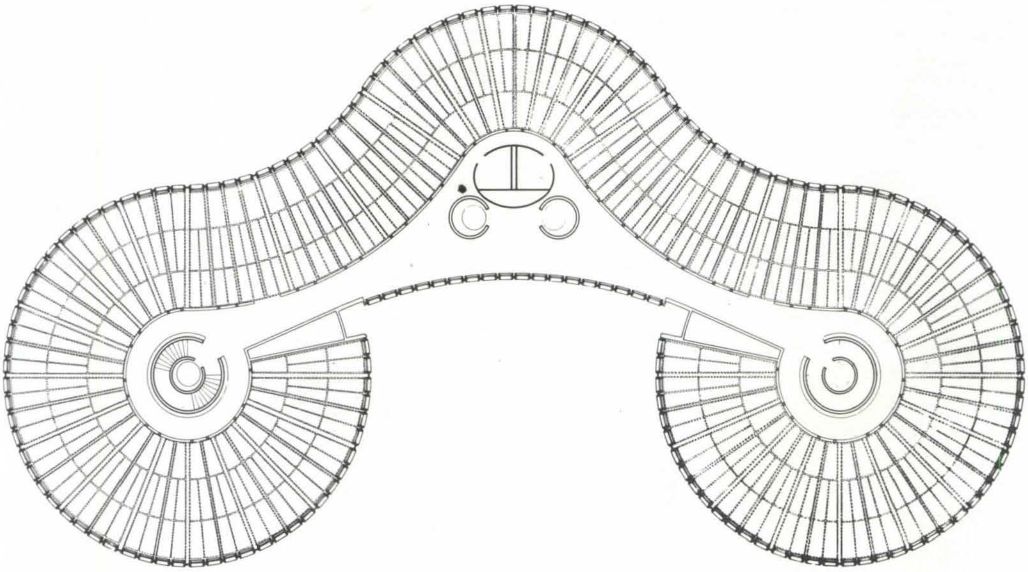
The building is sited directly on the street facing the square, to continue the existing "wall" of buildings. Staff parking occupies the rear half of the site. Auditorium, staff cafeteria, and radio communications center are located on the lobby floor. Prisoner facilities and cells are in the basement. The upper three floors provide approximately 24,000 square feet of flexible office space per floor. Two enclosed yards at the ends of the building shelter the prisoner receiving area and the cafeteria garden, and their rectangular form relates the building to the grid plan of the area.

The plan of the typical floor was developed with several objectives in view: flexibility of office space, high percentage of useable area, and the avoidance of monotonous interior corridors. A plan with highly efficient circular wings at the ends of a less efficient, but spatially exciting, single-loaded corridor proved to be an excellent solution. Continual restudy yielded a plan which, while highly unconventional, still has a geometrical structure of repetitive *units, suggesting the possibility* of prefabrication.

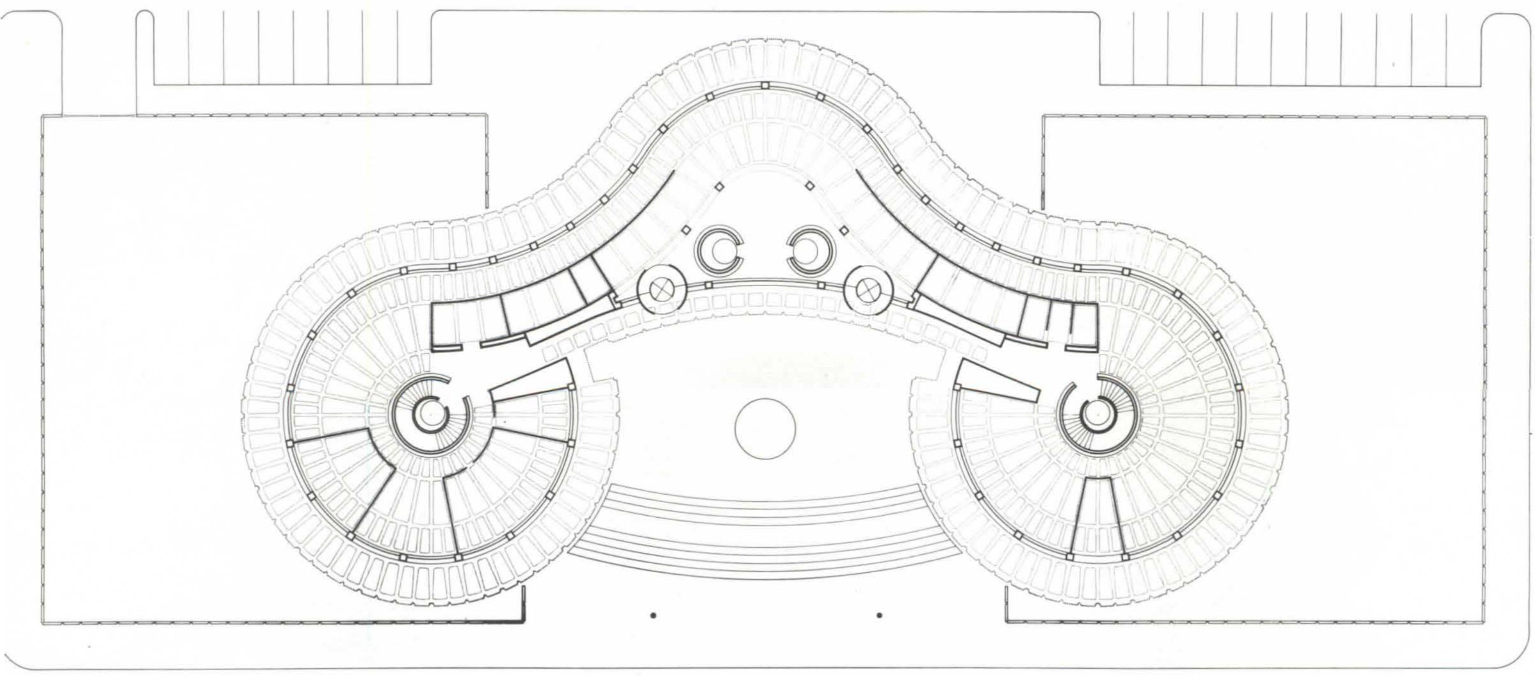
The office space provided is 32 feet deep throughout the entire floor, without columns or other interruptions. The corridor width is tailored to the flow of traffic and affords a sense of location within the building. There are public elevators at the center of the floor and elevator-stair



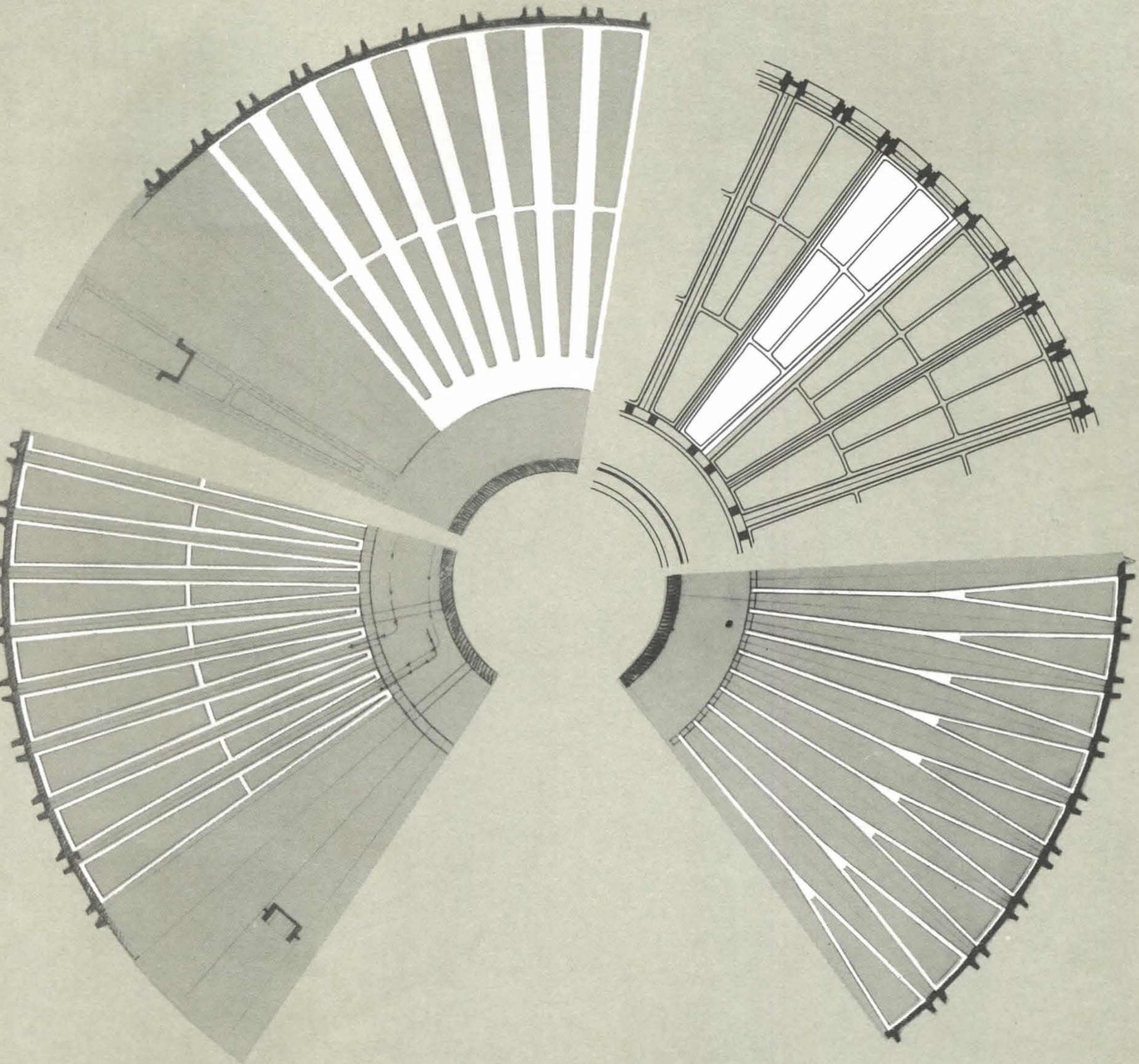
Street Elevation



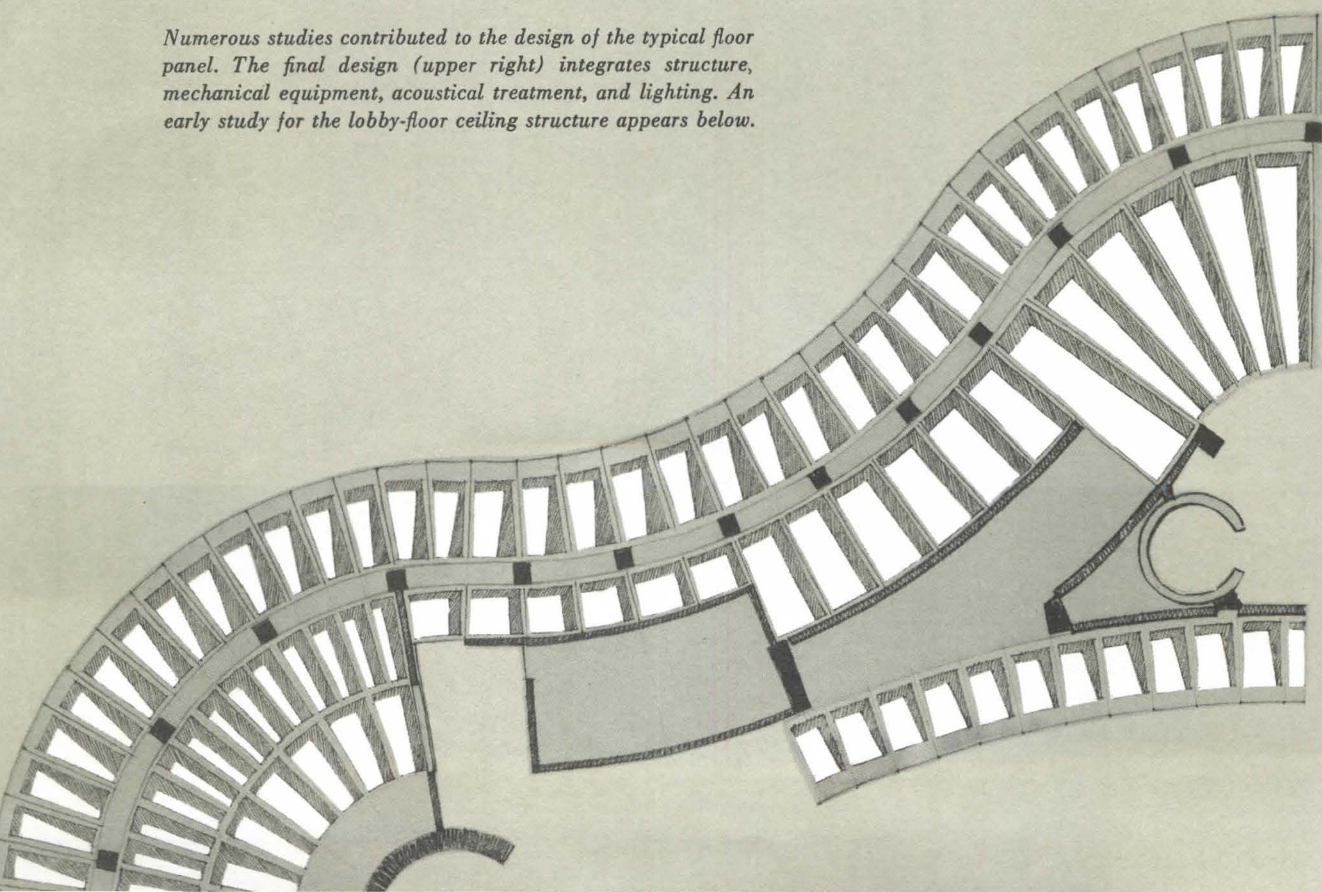
Schematic Office Floor Plan



Schematic Lobby Floor Plan



Numerous studies contributed to the design of the typical floor panel. The final design (upper right) integrates structure, mechanical equipment, acoustical treatment, and lighting. An early study for the lobby-floor ceiling structure appears below.



cores for staff use in each wing. The lobby, accessible from the street or the parking area, contains a central information desk for traffic control.

Once the geometry of the plan was established, studies were made to develop standardized prefabricated panels integrating the functions of structure, shelter, and mechanical space. Although most efforts in prefabrication have been based on the unquestioned use of rectangular elements, the wedge shape proved equally adaptable.

Concrete was chosen for these elements because of its inherent flexibility in both form and finish. The major part of the structure is composed of precast members, either prestressed or post-tensioned depending on structural requirements. Cast-in-place concrete is used only for footings, foundations, and corridor floors, and for the four elevator-stair cores, which act as restraining anchors for the precast structure.

For the upper three floors two basic precast panels were developed—an exterior wall panel and a wedge-shaped floor panel. Following basic structural computations, sections and profiles were designed to provide space within the joints for all horizontal and vertical utility runs. The detail of joints in both walls and floors varies to house different mechanical services.

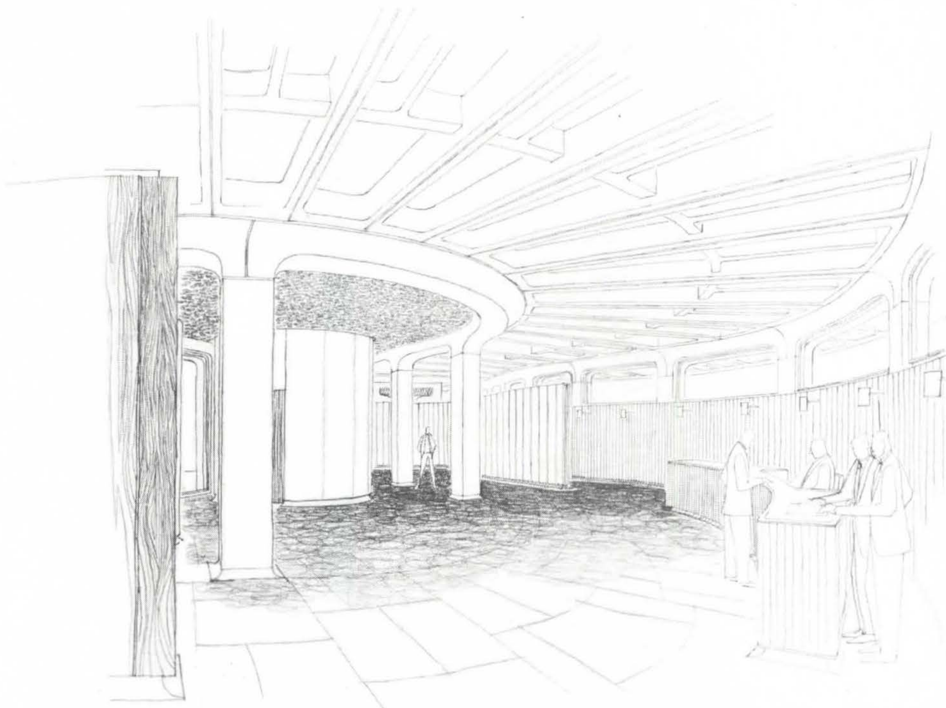
The exterior wall panel is 5 feet wide and 35 feet high and is composed of two columns with spandrels between, acting as a bearing wall. Effects of light and shadow and problems of dirt collection and water run-off were considered in its design.

The floor panels are in the form of modified double-T sections spanning 32 feet, and are adaptable, with minor modification, to convex and concave plan forms. Provision for lighting and acoustics were incorporated in the coffers of the ceiling.

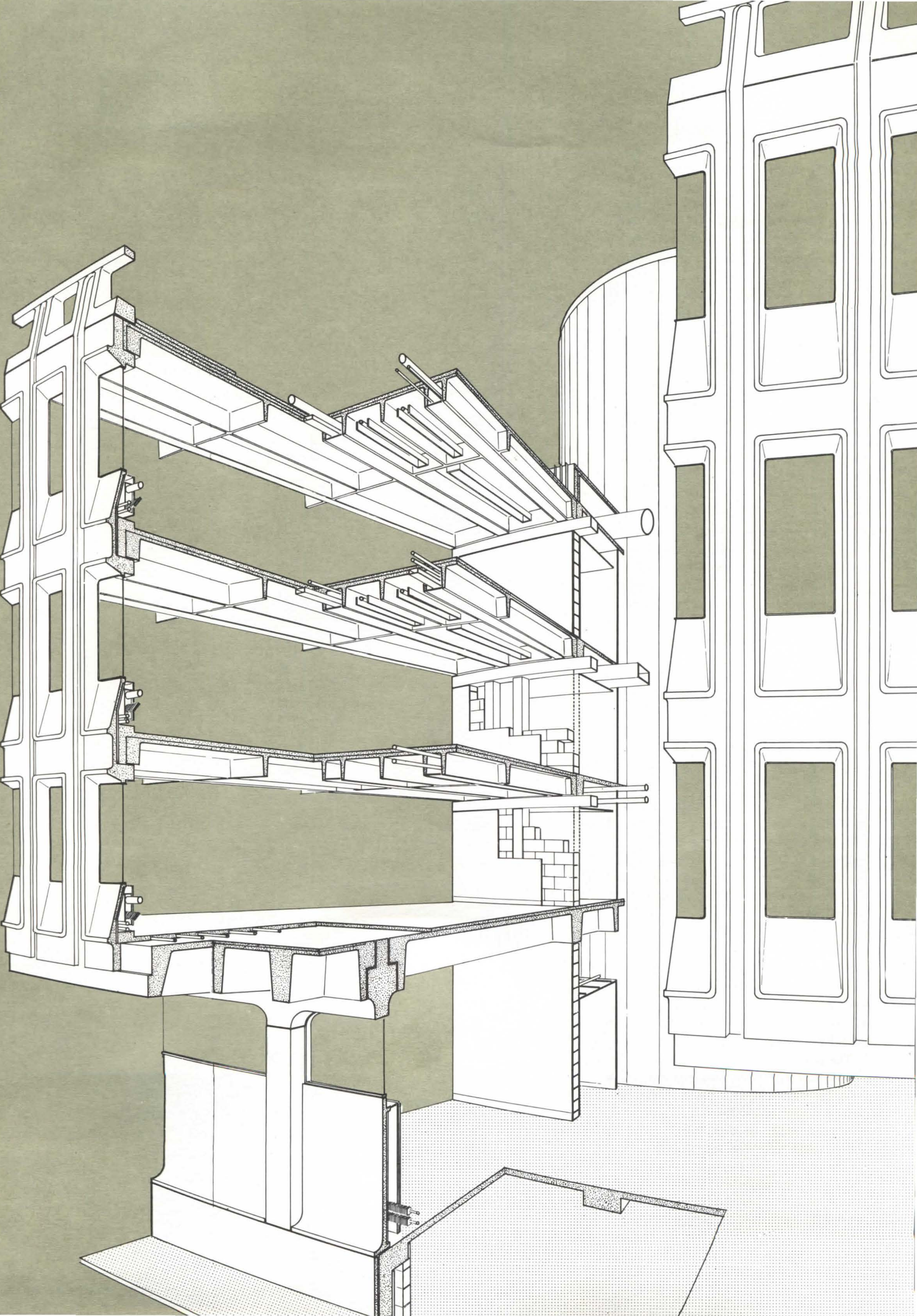
The structure at the first floor level, which is made up of other precast elements, acts as a "bearing platform," cantilevered out to receive the load of the exterior wall panels and carrying the load of the "ladder" columns located along the corridor line on the upper floors.

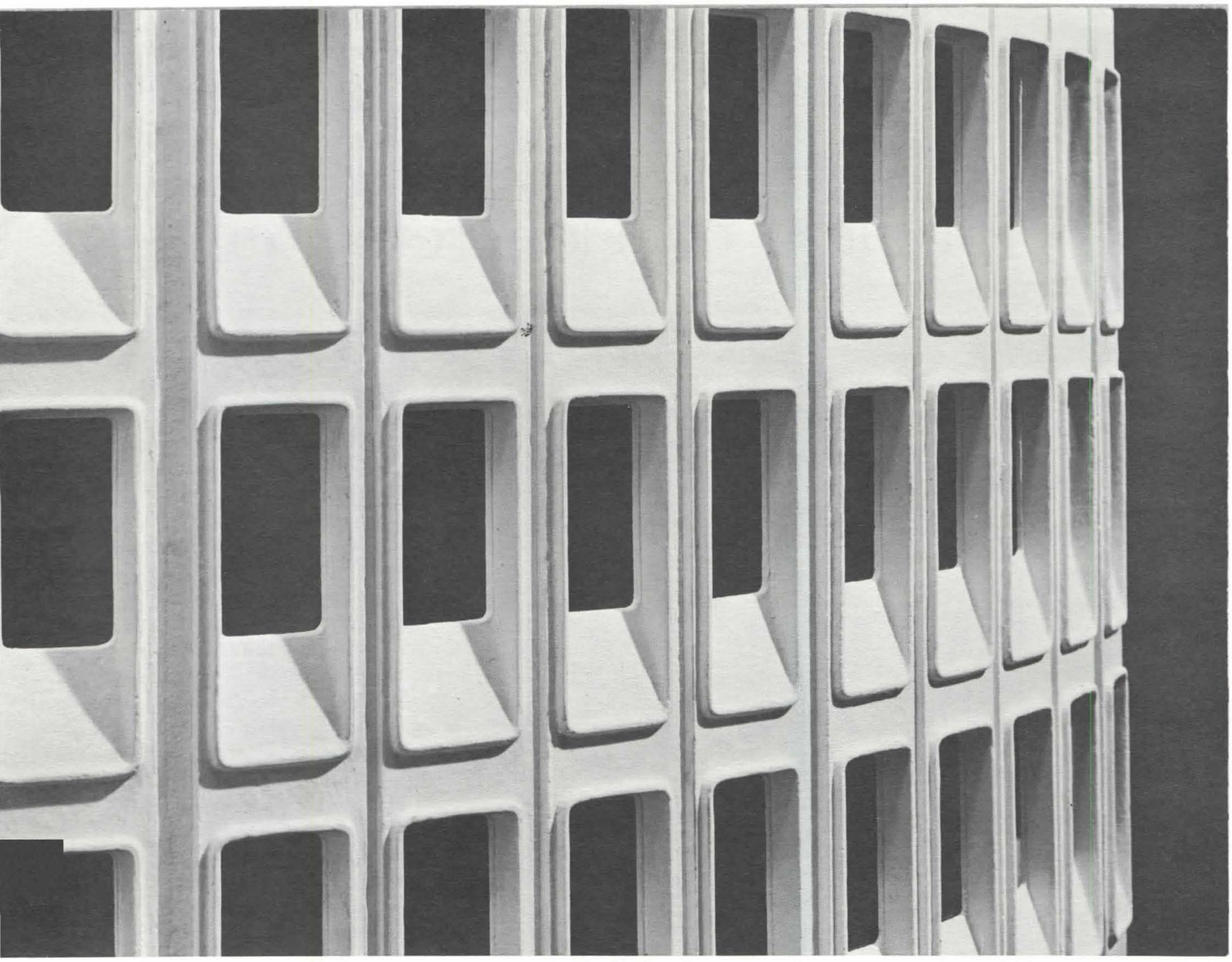
The *schokbeton* system was chosen for the prefabricated elements, because of its adaptability to complex joints, sharp profiles, and controlled finishes. *Schokbeton* is a proprietary process widely used in Europe and recently introduced to the United States.

A no-slump mixture is used, with just enough water to complete the chemical action. The concrete is put on a "shock



Public access will be controlled from the lobby information desk.





table" and raised and dropped with impact at a rate of 250 vibrations per minute. After sufficient treatment of the concrete, *molds are put on the table* and vibration is resumed while the concrete is placed. Air is expelled upward and aggregate is jarred downward; voids are eliminated, bond is improved, and a precise impression of the mold is produced. Molds for the more complex elements of this building are smooth concrete negatives developed from plaster forms; simpler members are formed in demountable steel molds.

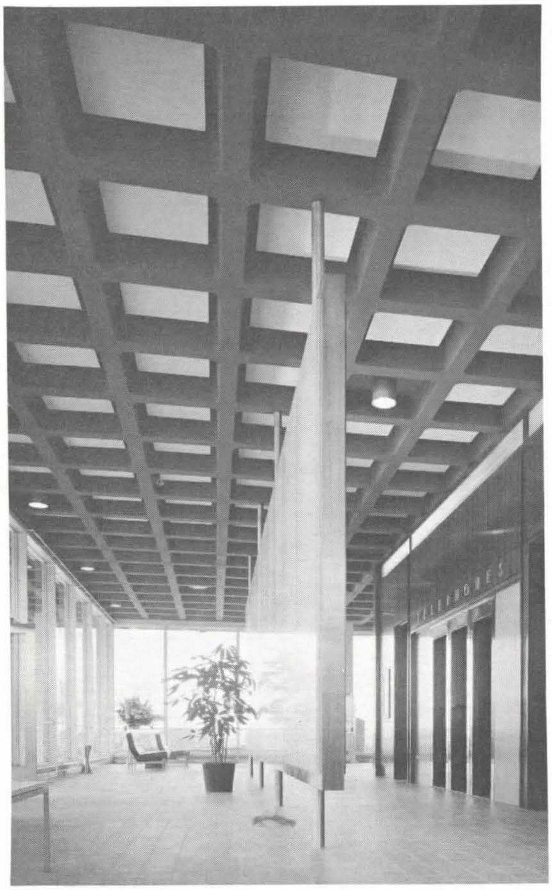
All exposed exterior surfaces will have white cement and white quartz aggregate finish with a field-applied silicone treatment. Interior structural elements will have a smooth gray cement finish to be painted.

The design includes a zoned summer-winter air-conditioning system. The basement and lobby floor are served by an up-feed low-pressure system supplied from the sub-basement. The office floors are served by a high-velocity system feeding down from the penthouses, along the third floor ceiling, and then down through the exterior walls at the wider joints. Two branch run-outs at each floor supply the induction units housed within the spandrels. Supply and return water passes through feeders which run through the second-floor ceiling and then up and down to the other floors through the narrower exterior wall joints.

The dropped corridor ceiling allows for the collection of relief air, which is returned to the penthouses. It also accommodates a separate low-pressure system serving the interior zones adjacent to the corridor wall.

Contractors' bids have confirmed the economic feasibility of the design. Prefabricated elements are now being cast.

Problem of Concrete Ceilings



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Within concrete buildings, the exuberant sculptural forms of molded concrete ceilings and the assertive patterns created by precast elements pose problems which the architect must consider in designing the interiors. If the ceiling has a strong dominant pattern or form, its relationship to every interior element must be carefully planned. More important than the virtuosity of form itself is its relation to the total design—to the human environment created. Especially important are: the scale of the ceiling pattern in relation to each specific interior area; the economy and efficiency of subdividing or partitioning the space; the size, shape, and placement of lighting fixtures; the integration of mechanical equipment and acoustical materials; and the scale and placement of furniture. Several different solutions to the problems of both precast and poured concrete ceilings are shown here.

For highway restaurant buildings 1 in Illinois, Pace Associates, Architects, used a dome pan ceiling system. The exposed areas were ground, spackled, and spray painted with a sand finish. The voids received lighting fixtures or perforated metal and glass fiber acoustical panels, leaving an uncluttered "waffle" ceiling

2

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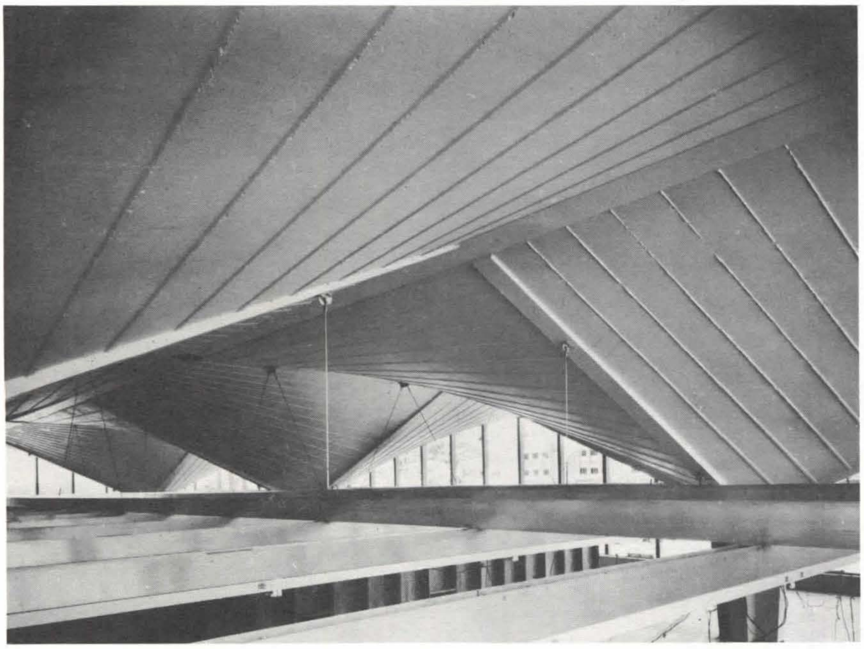

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5

pattern. Low glass partitions were chosen by the architects to enclose the gift shop, allowing the ceiling and lighting pattern to continue uninterrupted; ceiling-high partitions surround only the kitchen and toilet rooms.

Perhaps the classic example of the integration of lighting, mechanical equipment, and acoustical material with the ceiling-floor structure is Yale University's Art Gallery 2, designed by Douglas Orr and Louis I. Kahn, Associated Architects. Complete flexibility in dividing the "loft" space (a design consideration now considered invalid by Kahn) is achieved by partitions which may be placed anywhere along the ribs of the tetrahedral ceiling. The voids contain air-distribution ducts and trolley ducts for lighting units. The trolley ducts are attached to a layer of acoustical material which was used as the form for, and became integral with, the structure.

In Paul Rudolph's Greeley Memorial Laboratory for Yale's School of Forestry 3, precast-concrete columns branch out into tree-like paired capitals supporting the undulating poured-in-place beams to which are attached the precast roof panels. Glass fits around the capitals and between the ceiling and wood partition tops. The dominant capitals and the emphatic ceiling pattern, with its bare fluorescent fixtures and ducts, are left exposed in various laboratory rooms.

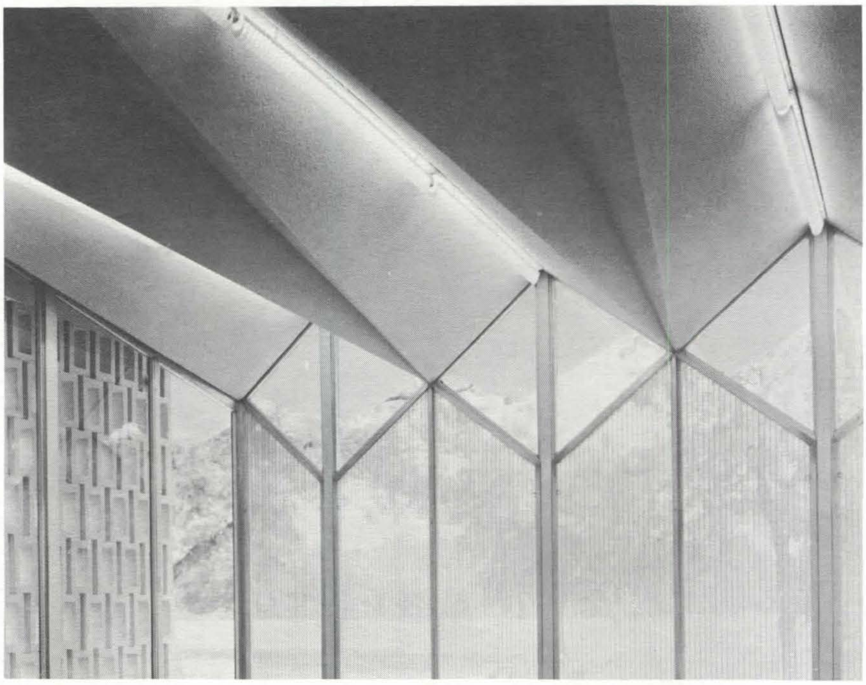
A more expansive feeling of space was achieved in the open 120′ x 180′ interior of Hunter College's library 4 in New York, designed by Marcel Breuer. The library is roofed by six inverted concrete umbrellas, each on a central column. A fluorescent lighting grid of aluminum box sections 7′-6″ o.c., suspended 10 ft above the floor, provides uniform illumination for a completely flexible furniture arrangement. Whether the architects intended this lighting grid as an inconspicuous element which would not interfere with the view of the shell structure, or as a contrasting horizontal element, it becomes, in effect, a suspended ceiling, negating the soaring space molded by the shells.

Precast-concrete ceiling panels span between the steel beams of the circular bank 5 in the Crown Zellerbach building's plaza, designed by the San Francisco office of Skidmore, Owings & Merrill. Conceived as a glass pavilion, the 70-ft-diameter bank has no interior supports; it is roofed with lightweight precast-concrete shells. Lighting is incorporated in the insulating fill. The air-conditioning system was designed so that there would be no supply ducts in the ceiling.

The delicacy of the folded-plate precast-concrete roof at the American Concrete Institute Headquarters Building 6 in Detroit, designed by Yamasaki, Leinweber & Associates, is preserved on the interior. Office areas are illuminated by strips of fluorescent fixtures installed along the apexes of the folded plate and partially recessed in the acoustical plaster. Ducts for the combination heating and cooling system were placed in the floor, leaving the ceiling free of any mechanical equipment. The upper parts of partitions are glazed so as not to interrupt the continuity of the folded planes of the roof.

To shelter diners at an outdoor restaurant 7 in Pine Mountain, Georgia, architects Aeck Associates designed a concrete structure of twenty-one columns, 10′-6″ high, with 30-ft-diameter cones. This construction was made economical by using two forms, moved on wheels. The cones are tied together with additional concrete. All electrical equipment for the suspended lighting fixtures and speakers is concentrated at points between the cones. Mechanical equipment is concealed inside the cones.

In each of these interiors, the architects considered the problems of integrating the lighting, mechanical equipment, and acoustical materials, and of the placement of partitions and other interior elements. They illustrate a variety of solutions, some more successful than others.



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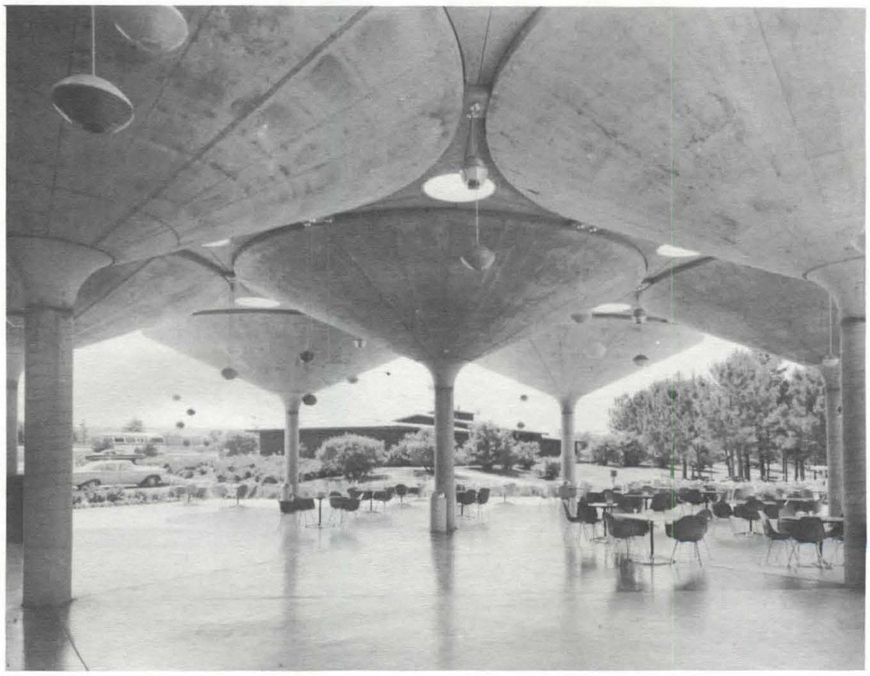


7

Dr. Mercer's Concrete Extravaganza

BY ILSE MEISSNER REESE

Henry Chapman Mercer is hardly known to architects today, although he received the American Association of Architects' gold medal in 1921. Dr. Mercer, an archeologist and anthropologist, designed and built four reinforced-concrete buildings in Doylestown, Pennsylvania, between 1908 and 1916. The plasticity of his works, anticipating recent architectural trends, can be seen in his home, Fonthill (above), *and his Museum* (left *and* following pages). *His design approach and methods of construction are described in this article by a contributing editor to P/A.*

Mercer, Henry Chapman, 1856-1930, archeologist and anthropologist, b. Doylestown, Pa., grad. Harvard, 1879. He was curator (1894-97) of American and prehistoric archeology at the University of Pennsylvania. He is noted for his studies of the archeology of Yucatan and of the Delaware valley. He made a unique collection of the tools and utensils of American colonists and in 1916 built and endowed a museum at Doylestown, Pa., to house it. His writings include works on archeology, *Ancient Carpenter's Tools* (1929), and *The Bible in Iron* (1914).

In this way the Columbia Encyclopedia introduces us to the many talents of Dr. Mercer, a versatile genius of the turn of the century and one of the creative American innovators in the tradition of Jefferson. What has not been recognized among his many accomplishments, and what is not pointed out in his life summary above, is his unique talent as an architect. Though the American Association of Architects bestowed its gold medal on him in 1921, today few, if any, architects know of this remarkable "lay brother."

During the years 1908 to 1916 Mercer designed and constructed in Doylestown four buildings—the Museum mentioned above; his own home, Fonthill; and the Moravian Pottery and Tile Works, where his tile designs are still being executed.

All these buildings are of reinforced concrete—a material in which he seems to have had unshakable confidence and which he loved and understood. Concrete was to Dr. Mercer the ideal material to be molded in large scale, not unlike the way in which he used his other favorite material, terra-cotta, for the smaller forms of his tile designs.

Although Dr. Mercer stated in his notes, on a number of occasions, that his choice of concrete was based on its fire-resistant qualities, there are many indications that it was really the plasticity of the material which attracted him over and over again. It was his firm belief that concrete could be molded to any shape and that it would stand forever. He was remarkably successful in demonstrating this theory with his four buildings, even though he never had architectural training and designed and built these structures without any assistance from an architect, engineer, or even skilled labor.

Fonthill, his chateau-inspired home, was the first of the four buildings. This structure was his residence and also contained his extensive collection of archeological artifacts and Americana. Though it still houses valuable books, furnishings, and an exquisite collection of built-in tiles, his early American tool and implement collection was transferred to the Museum which he began to build in 1914.

Of the four Mercer structures, Fonthill is the most personal and, for the architect, the most fascinating. Everywhere a remarkable spatial order is evident. One stands in awe of the man who could visualize such a complex structure without the help of drawings. How he went about building this sixty-room castle would whet the curiosity of any architect. Fortunately he left among his papers a complete description of the construction procedure for Fonthill, which was the prototype and testing ground for the three subsequent buildings.

"The house was planned by me, room for room, entirely from the interior, the exterior

Henry Chapman Mercer

not being considered until all the rooms had been imagined and sketched, after which blocks of clay representing the rooms were piled on a table, set together, and modeled into a general outline. After a good many changes in the profile of the tower, roofs, etc., a plaster-of-Paris model was made to scale, and used till the building was completed.

"From eight to ten unskilled day laborers at the then wages of $1.75 a day, and under my constant direction, built the house in three summers. I employed no architect to carry out my plans, and there were no skilled laborers employed in the construction proper, though afterwards a carpenter put in the doors and window sash, a mason set the tiles on the vertical walls and a painter put in the window glass. As a single exception to this, a potter set the ceiling tiles which were cast into the building during its construction.

"All cement was mixed by hand and the material lifted either in iron wheelbarrows, or boxes with four handles to be carried by two men, or by a pulley fastened at the vertex of a very simple apparatus, namely a triangle about 10 ft. high, made of three wooden strips balanced with guy ropes so as to swing outward from the brink of the walls, or at a hand pull backward inside the ledge. This inward swing brought the uplifted load within the triangle to the workmen's hands. A horse was trained to pull forward a pulley rope on a counter block.

"Columns rise from the cellar to housetop through several rooms without symmetrical arrangement. Their forms were made by boards set vertically and held together in circles with rope and wire, or in squares with battens. Each was reinforced with three vertical pipes and wire circles twisted by hand and dropped down the forms about 2 ft apart as the work went on. Tiled capitals and bases and cement capitals were put on after construction. Some of the latter in the windroom were taken from very old Byzantine churches in Greece and one, the owlish face in the cellar, from Mont St. Michel in France.

"One column was cut off during construction in the yellow room to make way for a bed. Some of the columns were plastered after construction with lime and sand mortar, others with cement. Some were left untouched and some slightly retouched.

"The interior partitions connected with or supported by the columns were cast about 5 inches thick and reinforced as usual.

"The cement windows were cast in channels cut with wire loop in slabs of clay and were reinforced with iron rods and set in their wall-holes after construction.

"[To avoid serious condensation of moisture] we decided to cast a very porous undercrust on all ceilings (1 pt cement to 6 pt fine sifted cinders)."

Of particular interest is the construction of the many-vaulted and irregularly-shaped ceilings. A platform was erected under the proposed ceiling level; dirt was heaped on it and padded by hand to the desired shape; a layer of sand was placed over the dirt, and rather dry concrete was then poured. Almost all the ceilings at Fonthill are decorated with colorful tiles which were set integrally:

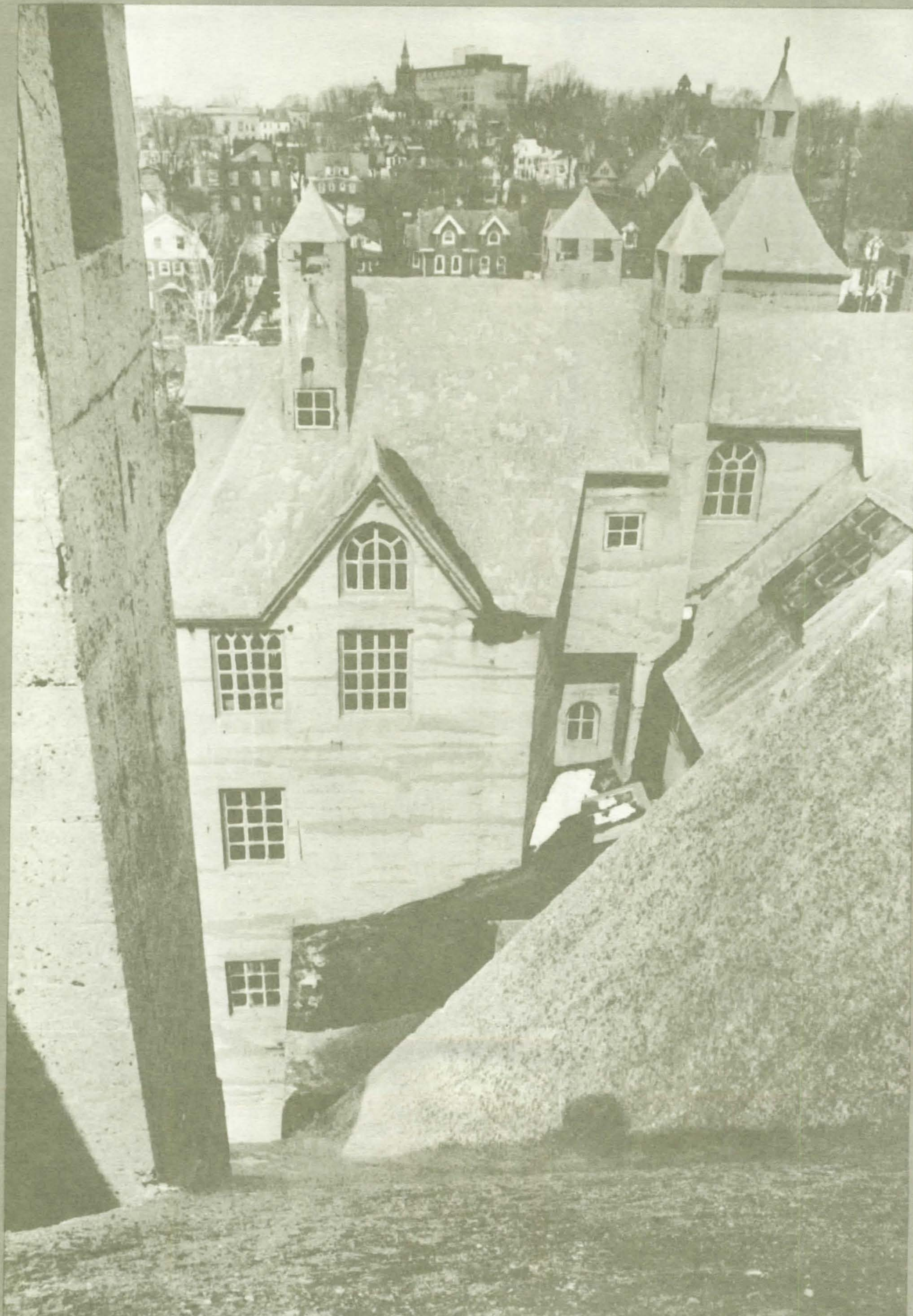
"Decoration tiles were pushed face downwards into the sand crust so as to project about a quarter of an inch on the backs. We feared sagging of the vault forms and the falling of heavy tiles set in this manner, but no such bad results followed. When we pulled out the platform props, the platforms collapsed and tons of earth and sand fell, exposing the tiles, after which the loose sand was washed off with a hose and when dry, brushed and shellaced between the tiles.

"Owing to the color of the Jersey gravel, gray cement, and bluish trap, the outer walls show soft gray-yellow with faint greenish reflections and, owing to the roughness of the forms, board welts, and porous spots not retouched, the texture is very rich as seen at a distance.

"The construction was nowhere concealed. From the first to the last I tried to follow the precept of the architect Pugin: Decorate construction but never construct decoration."

Though the effect is often weird and theatrical, this building, with its unique spatial plan and its frank and bold construction techniques, should establish Henry Chapman Mercer as one of the important forerunners of the modern movement in architecture. His work is particularly *apropos today in the light* of recent architectural trends, and the "discovery" of the plasticity of concrete by modern masters.

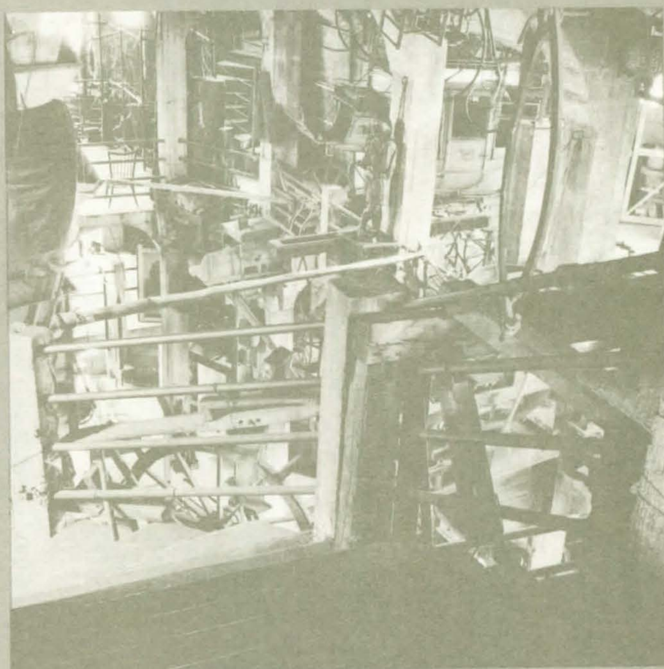
Following Fonthill, a similarly remarkable garage, and the Certosa-like tile factory located not far from the house, Dr. Mercer began to plan a new building to house his collection of Colonial tools



"The waterproof roof about 5 in. thick, also of cement, lacks patent waterproofing compounds . . ."

"Dr. Mercer changed his method of erecting vaulted ceilings from building earth mounds to using wood forms."

"... larger things hang over the balconies of the galleries themselves, in full sight from many points of view ..."



"... glazed alcoves fronting four tiers of galleries opening on a high court ..."

and implements and the related collection of the Bucks County Historical Society. "This," he said at the inauguration, "was to be a museum to fit the collection."

Like Fonthill, the Museum was planned from the inside out; even more so, since large exhibits such as canastoga wagons, fire engines, even a gallows, determined the space requirements. To Dr. Mercer, reinforced concrete was again the ideal material, providing the necessary plasticity, durability, and fire resistance. Several of the large exhibits were first put in place, it is said, and the building then grew around them. In one instance the winch of a ciderpress extends to the gallery above through a hole left for it in the floor.

There is no record of a set of plans of the Museum, not even a rough clay model of the kind prepared for Fonthill. As Henry-Russell Hitchcock called the Catalan architect Gaudí, Mercer can be classified an "action architect," one who designs on the spot in close contact with his construction crew. However, unlike Gaudí, Mercer had no formal knowledge of statics, nor the benefit of a trained crew.

His own description of the building, given during the presentation ceremonies in June, 1916, throws additional light on the structure, the equally unique collection, and the creator of both:

"The building is made of reinforced concrete, that is, stone, cement and sand strengthened with steel rods. The waterproof roof about 5 inches thick, also of cement, lacks patent waterproofing compounds, and that with the galleries and floors rests on vaults rather than beams. The frames and sash of the light-diffusing windows are of concrete and while the sash of small ventilators are made of wood, their frames are also of cement. The bookcases are of concrete and the railings of iron piping. Staircases with low treads sometimes overhang the interior court so as to economize space. In order to allow for the varied size of exhibits the levels of floors and ceilings vary greatly, and there are numerous fireplaces. The windows were placed so as to get the most and best light regardless of outside effect, and when the object of the building was attained, which was entirely a matter of inside arrangement, the pitch of the roof, the position of steeples, dormers and chimneys, and the shape of the mullions of windows, were only then considered from a decorative point of view.

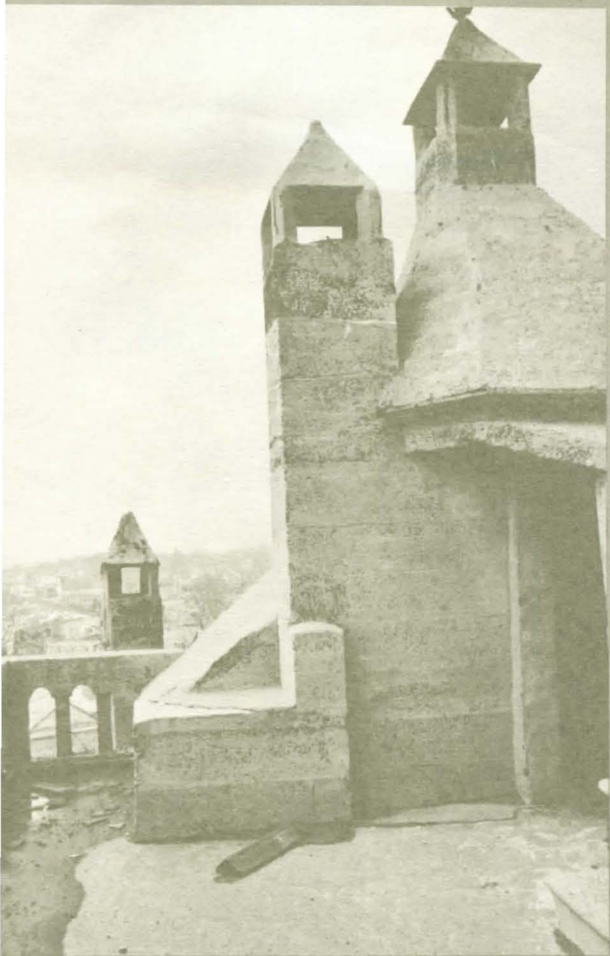
"But the building, which may or may not please the eye, is a secondary matter. It was made for the collection, while the collection was not made for it.

"I call your attention to its great and increasing value and the one and only object of the whole work, which has been to permanently display, preserve and enlarge what might be called a new presentation of the history of our country from the point of view of the work of human hands. You will find the smaller objects guarded from visitor's hands and the threat of fire, locked in fireproof, glazed alcoves fronting four tiers of galleries opening on a high court; while many of the larger things hang over the balconies of the galleries themselves, in full sight from many points of view and so as to occupy no floor space. Many windows light the collection at all points and there are vistas and halting places where the visitors, without deeper study, gets an impressive view of many objects."

The courtyard scheme is not unlike Frank Lloyd Wright's Guggenheim Museum, though Mercer interconnected his mounting galleries by steps rather than ramps. The many irregularities in plan (caused by alcoves off the main court), the random setting of windows, and the variance of ceiling heights and shapes make a walk through the Museum a spatial experience, at least to this observer, more impressive than the evenly spiraling path of the Guggenheim Museum. To carry the parallel further—Mercer's bold and frank exposure of the concrete framework makes Wright's stuccoed version look like papier-mâché in comparison. In 1905, long before most architects realized the potential of the material, Mercer affirmed that "in the new feat of constructing whole buildings out of cement, I would like to speak as though we proposed not to copy stone, or wood, or metal, or anything else, but, as though we intended to let the cement stand upon its own merit, casting itself into any reasonable shape, by and for its own law."

The Mercer Museum, as it is called since Dr. Mercer's death, rises 115 ft and measures 97'x71' in plan. For the structural parts of the building a concrete mixture of 1:2:4 was used, elsewhere 1:2½:5. Spading was simply done with shovels; batches were fairly dry, except for spiraling stairs and other more intricate forms. For the construction of the roof, only inside forms were used and they were

"The windows were placed so as to get the most and best light regardless of outside effect . . ."



"...only then considered from a decorative point of view."

"Window mullions and frames for the Museum were cast in sections."

moved up as the work progressed. Though no membrane waterproofing was applied, there has been no difficulty with water seepage. The roof surface was finished with brooms. Strong evidence of board marks indicates that Dr. Mercer changed his method of erecting vaulted ceilings from building earth mounds to using wood forms. Formwork was primarily of 10" or 12" sheathing though there is evidence of the use of many odds and ends of boards of various thicknesses and widths. Window mullions and frames for the Museum were cast in sections. Small crosses, forming the mullions, were assembled to make a window. The glass was fitted into the corners of the crosses before the whole was bound together by cement mortar. Flexibility in window size, both horizontally and vertically, was achieved by simply varying the size of mortar filler between the crosses.

Particularly close to Dr. Mercer's heart seems to have been his collection of Pennsylvania Dutch stove plates, which are displayed in a tall, well-lighted tower room off the main center court. A balcony, several finely proportioned openings (introduced for the sheer fun of space experimentation, I am sure), winding stairs leading to and from the room, beautiful and colorful examples of his own tile work, and the fine collection of dozens of different black, polished, low-relief stove plates make a visit to this room a memorable experience.

In the much darker main space, one wishes that fewer objects were displayed and that some artificial light would supplement the inadequate daylight on the levels which have no benefit of skylights. Yet, in spite of the great profusion of objects on exhibit and the inadequacy of the lighting conditions, a high sense of order prevails, due entirely to the bold skeleton of the structure which, in a remarkable way, unifies the exhibits and the architecture into one whole.

Dr. Mercer's concrete constructions are not mere curiosities. They are the visions of an imaginative mind and the work of an intuitive craftsman—a combination which is precisely the requisite of a good architect.

What might have happened, had Mercer studied architecture instead of law, makes interesting speculation. Would his imagination have been directed into more conventional channels consonant with the architecture of the early part of the century? Or might this enthusiastic proponent of the concrete material have gone beyond the works at Doylestown to become the Auguste Perret of the USA?

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Exposed Concrete Requires Proper Specs

By HAROLD J. ROSEN

The two types of exposed-concrete surfaces—produced by cast-in-place and aggregate-transfer methods—are discussed by the Chief Specifications Writer of Kelly & Gruzen, architects-engineers.

Concrete can be controlled through proper detailing and specifications, permitting the architect to utilize it as a finish material and thus avoid the additional cost of covering veneers. Cast-in-place architectural concrete can be achieved through proper specifications and enforcement of the provisions outlined in them. In addition, an economical method for obtaining an exposed-aggregate surface finish on cast-in-place architectural concrete can be attained by the aggregate transfer method. Both of these finishes are described more fully in previous issues of this magazine: specifications for cast-in-place architectural concrete are contained in JANUARY and FEBRUARY 1959 P/A; the aggregate-transfer method of surface treatment is outlined in SEPTEMBER 1957 P/A.

To obtain cast-in-place architectural concrete, it is essential that prospective contractors be forewarned regarding what is expected of them by specifying the materials and workmanship in a separate section of the specifications entitled "Architectural Concrete." This alerts the contractor to the fact that there are significant differences between this concrete and that specified for foundations, slabs, and concealed concrete.

Fundamentally, to produce cast-in-place architectural concrete it is mandatory that the cement and aggregates be from the same basic source, since uniformity of color is essential to appearance. Air-entraining admixtures should be incorporated in the concrete mix to protect the concrete from freezing and thawing. The amount of water used should be restricted, since over-wet mixes increase shrinkage and produce less durable and more permeable concrete.

Concrete should be designed so that vertical and horizontal expansion, construction and contraction joints occur at inconspicuous places or are highlighted to accent certain features. Recommended locations and details of joints may be found in the publication entitled "Construction Joints and Expansion Joints in Concrete Buildings" issued by the Portland Cement Association.

Forms may be of plastic-coated plywood, which has a great number of re-uses and has the advantage of smooth-surface large panels with minimum joints, easily erected. Board forms may be used to provide texture and varying widths and depths.

Metal accessories and reinforcement should be placed so that there is a minimum distance of 2″ between the weather side of the concrete and the metal. This is necessary to prevent rusting with resultant damage to the appearance of the concrete. Wall ties for forms should be of a removable type permitting the holes to be completely filled after removal.

The placing of concrete is most important, since then is the time to minimize honeycomb irregularities, air bubbles, and other surface imperfections. Concrete should be placed through suitable hoppers, chutes, or elephant trunks with a free fall not exceeding three ft. Forms should be vibrated and concrete hand spaded to disperse air.

The timing of the stripping of forms is very critical and air temperatures play an important role in this operation. Forms offer the best curing media, but economical re-use dictates removal as soon as practicable.

Exposed surfaces must be cured properly by wetting. Curing compounds should not be used since they inhibit the proper finishing and may cause discoloration.

After removal of forms, defective areas and tie holes should be patched with a mixture of 1 part cement and 2 parts sand. The cement should be a blend of white and gray, so that the mixture will match the shade of the adjoining concrete. After the imperfections have been patched, the entire surface should be cleaned down with a grout that is similar to the patching mortar but of a paint consistency.

In the aggregate-transfer method of surface treatment, expensive aggregates such as marble, granite, or ceramics are confined to the outer surface of the concrete, creating an attractive appearance at reduced cost. The selected aggregate is held in an adhesive on form liners installed in the forms, the concrete is then placed and cured, and lastly the forms and liners are removed. The aggregate becomes embedded in and bonded to the concrete. Pleasing surface textures can be obtained economically without surface treatment by varying the manner in which adhesive and aggregates are placed in the liner. The adhesive is spread by a notched trowel, which gives a light or rough reveal to the aggregate depending upon the size of the notch. In addition a number of textures may be produced by surface treatment after the concrete has cured. Rough textures may be obtained by bush hammering or sand blasting. A smooth or polished surface can be produced by dry grinding.

A pamphlet entitled "Color and Texture in Architectural Concrete by Aggregate Transfer" also issued by the Portland Cement Association describes in detail the entire subject of the system for aggregate transfer.

Discrepancy Found in Sabine Formula

By WILLIAM J. McGUINNESS

Classic reverberation time formula, used in acoustical design of music halls for the last 60 years, incorrectly evaluated absorbing power of audience. New calculation standards, based upon occupied area instead of number of people, as reported here, predict reverberation time within one percent accuracy.

An orchestra conductor or an experienced listener can appraise the acoustical merits of a music hall with surprising accuracy, but the technical analysis and its use in proposed designs is indeed an exact science. As in most scientific endeavors, the major contributions of knowledge are infrequent, often separated by many decades.

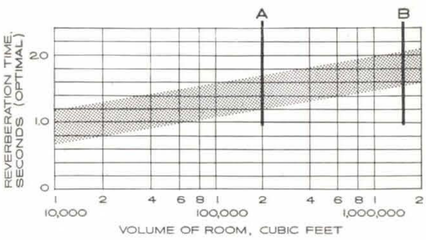
In 1900 Wallace C. Sabine, a young assistant professor at Harvard gave to the science of acoustics his classical reverberation equation. In simplified form this is:

$$T = \frac{0.049\,V}{S\,\bar{a}}$$

In words, this states that the actual time T, in seconds, of the reverberation of a sound in a room is related directly to the volume V of the room, and inversely to the absorptive qualities $S\,\bar{a}$ of the room surfaces including the surface (floor) occupied by the audience. S represents the total area of the surfaces including that of the audience; $\bar{a}$ is the average absorption coefficient of the surfaces including that of the audience. The product $S\,\bar{a}$ may also be calculated as the sum of the products of each surface area and its corresponding absorption coefficient. Approximate coefficients are: plaster .03, drapery .20, and a seated audience .90. It is seen that in the control of reverberation time, a seated audience has $4\frac{1}{2}$ times the effect of drapes. Absorption value of the audience may also be expressed as the value *per seat.*

Reverberation time is defined as the time required for a sound to be reduced to one millionth of its original intensity. It may be calculated by Sabine's equation, as just discussed, or measured physically by instruments.

Of the various acoustical requirements in a music hall, control of reverberation time is the most important. Depending on the volume of the room, there is a reasonably fixed optimal range of reverberation times within which the actual measured time should fall (see chart).



As examples, a 200,000 cf hall (ordinate A) has a range of approximately 1.2 to 1.7 sec and a 1,500,000 cf hall (ordinate B) a range of approximately 1.6 to 2.1 sec. Too long a time causes confusion and lowered intelligibility. Sounds of short duration are flat and insufficiently resonant. It is startling to learn that an experienced listener can distinguish between 1.5 and 1.6 sec (7 percent). The importance of time control becomes evident. The proper evaluation of the effect of the seated audience is, of course, the dominant item.

The great contribution by Sabine in 1900 has been the basis of acoustical design for 60 years. Yet certain inaccuracies have puzzled scientists. Only now, after six decades, have these been investigated and corrected. Sabine stated that the sound-absorbing power of an audience is directly proportional to the number of people. Dr. Leo L. Beranek now states and proves that the absorbing power is directly proportional to the area occupied by the audience, nearly independent of the number of seated persons in that area (uniform distribution of persons is assumed).

For the past five years, Beranek and his colleagues have studied over 50 of the world's most famous concert halls in 15 nations. The *June 1960 Journal of the Acoustical Society of America* carries a 10-page report of these findings of Beranek, who is President of Bolt, Beranek & Newman, Inc. Acoustical Consultants, of Cambridge, Mass.

The music halls ranged in volume from 200,000 cf to 1,500,000 cf. These volumes have been marked (A *and* B *on chart*), so that the optimal reverberation times would be apparent. Reasons for the study appear when it is considered that the Boston Symphony Hall, with a reverberation time predicted by Sabine as 2.31 sec, was actually measured to be 1.8 sec, an error of 28 percent. Another case based on Sabine's data showed an error of 44 percent with a predicted time of 2.3 sec, measured as 1.6 sec. It will be seen that both halls performed better than predicted and are within the optimal range, but errors of this magnitude are hardly admissable. Sabine established his original "per person" data on performance in some Harvard lecture rooms with closely spaced seats. Applying this to the more dispersed seating of a music hall, not enough value was placed on the true absorbing value of the *area* and this resulted in a high predicted reverberation time.

By plotting the measured reverberation times in numerous halls against volume per seat, (Sabine's theory) a very scattered pattern appeared. Plotting it again against audience area per unit volume (Beranek's theory), a straight-line relationship was distinctly apparent in all of the significant frequency ranges. Setting up calculation standards based upon occupied area instead of number of people, new calculations gave predicted times which, in the case of 21 halls, varied less than 1 percent from the measured time as an over-all average and never more than 7 percent in any particular hall.

Since the time the paper was first presented, Beranek has learned from independent scientists that the reverberation time in the pre-World War II Philharmonie Saal in Berlin was nearly unchanged whether the concert attendance was 50 or 100 percent. This lends additional and independent support to the postulate.

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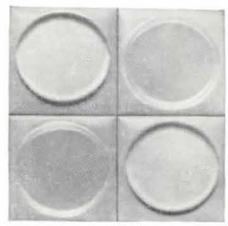

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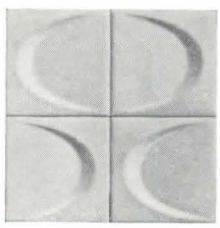

sea shell

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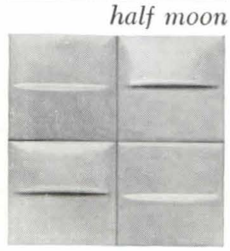

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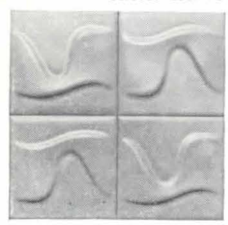

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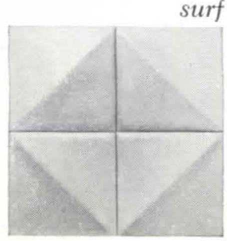


Construction Contracts — Part 4

BY JUDGE BERNARD TOMSON & NORMAN COPLAN

P/A's legal team concludes its discussion of the new AIA construction-contract forms.

In reviewing the architect's status as set forth in the 1958 edition of the "General Conditions" we pointed out that his power to determine or arbitrate disputes involving the contractor's performance, might be subject to differing interpretation. If there are certain subjects relating to the contractor's performance which should be finally determined by the architect, and others which should be subject to further arbitration, the "General Conditions" should be clarified to state expressly so. If, on the other hand, it is deemed appropriate and desirable for the architect to determine conclusively all questions concerning performance under the construction contract, the "General Conditions" would require substantial revision.

The view that the construction contract should provide for the conclusive determination or arbitration by the architect of all matters pertaining to performance under that contract is based upon the belief that the architect is in the best position to determine the extent of the contractor's obligation. The architect, it is contended, is in the best position to determine, for example, whether a delay in the time of performance is justified; whether work performed constitutes an extra; when and how the contractor should be paid; whether the contractor is properly paying the subcontractors; etc. It is further contended that such status for the architect would not only result in quick decisions, thereby saving time and money, but that this power would furnish him with an effective means to fulfill and satisfy his function as supervisor of the project and of the contractor.

A revision of the "General Conditions" to furnish the foregoing status to the architect would require amendment of Articles 20, 31, 37, 38 and 40, and a replacement of Article 39. A suggested clause follows:

"Article 39—ARCHITECT'S DECISIONS. Any dispute, claim, or question concerning the execution of and performance under this contract, including, but not limited to, any matters relating to quantity, quality, and artistic effect, extras, and payments to the Contractor or Subcontractors, shall be submitted to the Architect for determination, and his decision shall be final, binding, and conclusive.

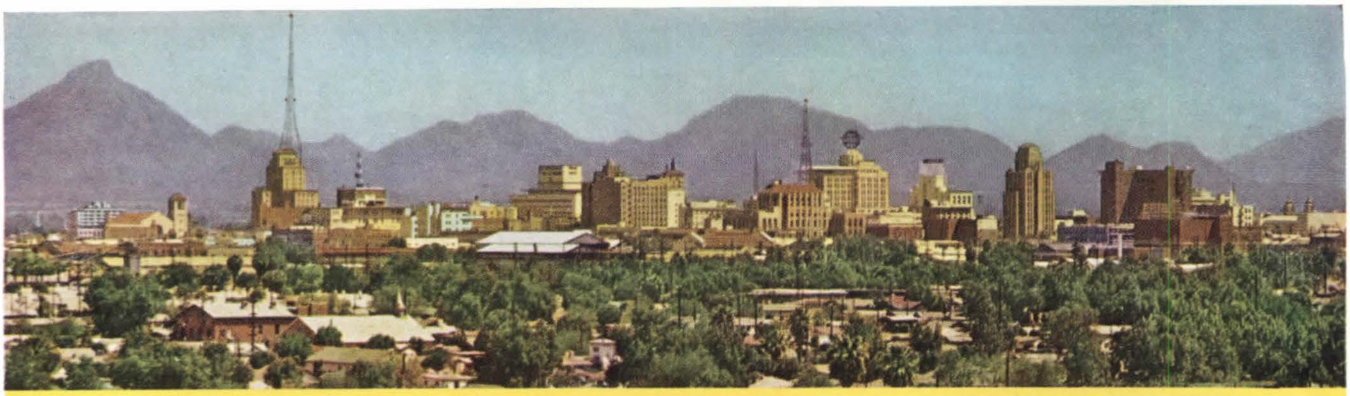
Any dispute, claim or question concerning the interpretation, construction or meaning of the contract documents, the plans, or the specifications, or concerning a breach of the contract, shall be submitted to the Architect for determination, and his decision shall be final, binding and conclusive."

If the "General Conditions" should expand the role of the architect as an arbiter, it is of importance that it also provide a procedure in the event that the architect can no longer render services to the project because of death, discharge, or incapacitation. It would obviously be unfair to permit the owner to discharge his architect and to appoint a new architect with the same powers con- concerning arbitration as the reason for the removal of the original architect may have been related to a dispute between owner and contractor. On the other hand, however, if a new architect has been designated by his predecessor, there would be no valid reason why he should not have the same status. In any event, the construction contract should provide for the status of a successor architect.

Although increase in the status and power of the architect under the construction contract is gaining more widespread acceptance in the industry, the 1958 edition of the "General Conditions," in at least one instance, tends in the opposite direction. Article 37, entitled "Relations of Contractor and Subcontractor," provides that the rights and obligations in all procedures between the contractor and subcontractor in connection with arbitration of disputes shall be analagous to those between owner and contractor. However, this article has been amended in the 1958 edition to provide in this connection that "a decision of the Architect shall not be a condition precedent to arbitration." At least in this area, therefore, the latest edition has limited the architect's status and perhaps weakened his ability to provide effective supervision of the project.

The provisions which relate to the architect's supervision of the project and of the contractor are not significantly amended or revised in the 1958 edition. Apparently, the hazards to the architect in respect to his obligation to issue "Certificates of Payment" are not adequately recognized or understood, for the 1958 edition has not furnished to the architect any additional tools to perform this function. This column has recommended, for example, that the "General Conditions" provide for the audit of the contractor's books and records by the representative of the architect or owner at the owner's expense (see IT'S THE LAW, SEPTEMBER, OCTOBER, and NOVEMBER, 1953). Such audit would insure that subcontractors have been paid as required by Article 37 and place both the owner and architect in a more secure and knowledgeable position. Periodic audits are routine in many other business areas, and such a requirement would be no reflection upon the honesty or responsibility of contractors.

This four-part review of the latest edition of the "General Conditions" was not intended to be all inclusive. Its objective was to indicate that, from the viewpoint of the architectural profession, there are areas for improvement which would result in a more efficient and effective exercise of the architect's function.



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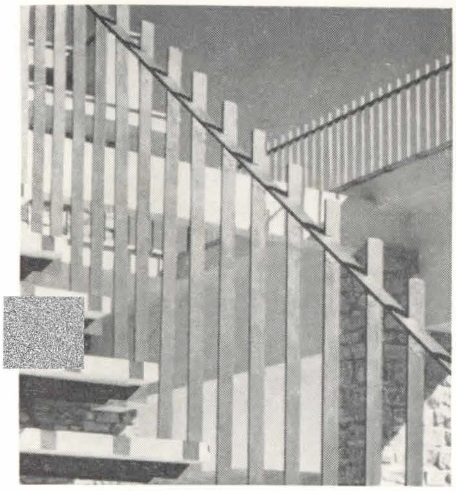

Leonardo Ricci—
Is Involvement *Enough?*

Dear Editor: Your comments about Leonardo Ricci, and about his "involvement" (August 1960 P/A), are pertinent. When has anything worthwhile been done *without* unreserved commitment on the part of the doer? With this I am in total agreement; but the results, in the present case at least, suggest that involvement alone is not enough. What is wrong?

Can it be that the direction of his involvement is wrong? I have long suspected that a preoccupation with painting theory at the expense of a concern with building construction problems and human needs hinders good design. Has it not been the case throughout history that the closer the designer was to the spirit of his time and to the technical problems of building, the better was the work? Witness what evidence we have of prehistoric dwellings, medieval Romanesque and Gothic churches, Cotswold cottages, Swiss chalets, early American architecture, plus anonymous barns and country houses everywhere.

With a few exceptions, whenever theories of painting or archeology have intruded themselves it would seem the architectural standard has declined. This preoccupation with painting may be one explanation of Ricci's work. While he says, "I think we must get away from the bizarre, the experimental, from the urge to be original at any cost . . ." his work seems to this distant observer to exhibit just that tendency. It looks typical of what is being done in so many parts of Europe and by "advanced" architects all over the world as Tom Creighton reported in his article. Tom also says, "No one can deny that he is a creative person," and this may be, but how do his buildings differ from all the other mannered designs which try so hard to be "interesting"?

I say that there is too much "interesting" work being done and too little with that appealing human trait—modesty—so rare in most of us but so often found in the greatest men—Einstein, Schweitzer, Gropius. Nor does modesty preclude verve. Look at Maillart's bridges, the hill towns of Italy, the Swiss houses around Schwarzenburg, Albini's "Museum of the Treasury of St. Lawrence" in Genoa, Maybeck's work in Berkeley, and many other examples.

How do we get away from this tendency? The best statement I know is that remarkable last chapter written by E. B. White for "The Elements of Style." Let every young architect read it—substituting the proper architectural words for grammatical terms—particularly the paragraph where the author has just said, "No idiom is taboo, no accent forbidden; there simply is a better chance of doing well if the writer holds a steady course, enters the stream of English quietly and does not thrash about.

" 'But,' the student may ask, 'what if it comes natural to me to experiment rather than to conform? What if I am a pioneer or even a genius?' Answer: then be one. But do not forget that what may seem like pioneering may be merely evasion, or laziness—the disinclination to submit to discipline. Writing good standard English is no cinch, and before you have managed it you will have encountered enough rough country to satisfy even the most adventurous spirit."

How many of us use the old materials properly, to say nothing of the new?

FRED BASSETTI
Seattle, Wash.

Dear Editor: I read Fred Bassetti's letter and wish to comment further on your article. I like its emphasis on Ricci's spirit and energy rather than his architecture. This is obviously the point. This energy and enthusiasm about his work, his conviction, comes closer to what is noble in a man and is perhaps therefore more capable of creating great architecture than the more humdrum eight-to-five architects of little conviction, those who are apt to drift with the usual architectural-magazine bill of fare, and the cliché.

I have little interest in what a magazine thinks of a man's work. Even in a publicity-conscious, publicity-guided, togetherness-clotted society a magazine fulfilling its duty as reporter should call attention to work being done, attracted or guided by variety and seriousness (humor included), rather than modishness or monetary worth. Your article added a perspective which, like Ricci as a person, is refreshing. Grading his architecture from A to X either by you or by me does not matter one good-goddam. Better to remember those words of Rilke, "Works of art are of infinite loneliness, and with nothing to be so little reached as with criticism. Only love can grasp, hold and fairly judge them."

DONALD M. FROTHINGHAM, JR.
Seattle, Wash.

Dear Editor: Leonardo Ricci in his "involvement" follows man's most productive tradition. His concern with the whole of life compels admiration.

It is easy to carp and criticize. While I am not attracted to portions of Mr. Ricci's architectural philosophy and even less to the results, I certainly affirm with you his right to say and do as he believes. From your article it is clear that he would be a stimulating and vital individual to know.

When you get down to the meat of any architectural matter—the buildings—there is again demonstrated the weaknesses of the split painter-architect personality.

I must add the empathy "involved" in sliding down the Bellandi handrail does smack of brutality. I realize I am laying myself wide open on this one! As for presentation, I have always found lacking those articles which illustrate predominantly the exterior of things and which ignore or give minimum shift to interiors and plans. In Ricci's story you show thirteen exterior photographs to three interior photographs (two of these quite small) and no plans whatsoever. This method of presenting architecture is by no means exclusive with your magazine, but it is one to which I do not *subscribe* (shattering word for any publication!).

ALFRED BROWNING PARKER, FAIA
Miami, Fla.

We had the same anxieties about sliding down the Bellandi handrail, but Ricci points out that a slide down that balustrade might lead to a sorry end at the bottom of the cliff. For the more practical purpose of climbing the stairs, he tells us, the projecting uprights afford an excellent grip. Ed.

In Milano—"Home and School"

The current Milan Triennale, which follows (or attempts to follow) the theme of "The Home and the School," has at-

Plate No. 1094

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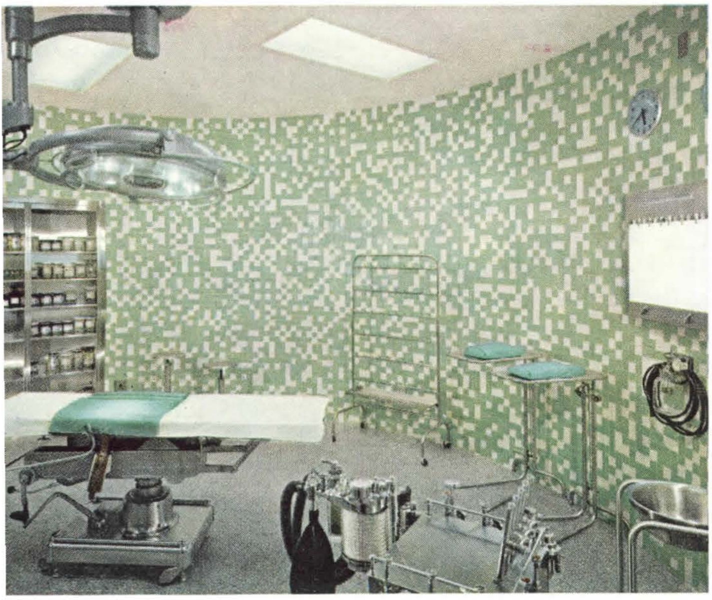

Plate No. 1093

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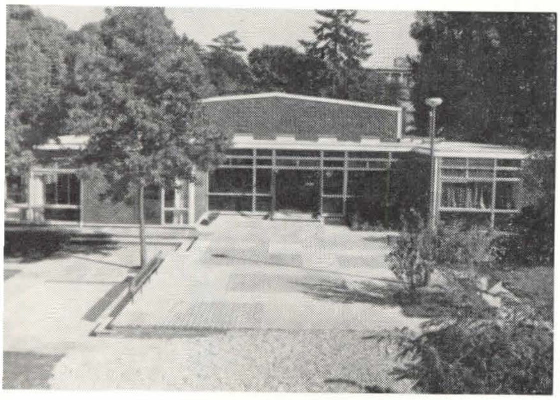
tracted much criticism. Principal exhibits are a house erected by Alcoa and a British prefabricated school. In the following letter Professor John G. Grace of Tulane University, who has spent the past year abroad studying schools, gives us his impressions of the exposition.



Dear Editor: It is pretty much to be expected that old Triennale hands will find Number 12, already dubbed a "flop" in local circles, a bit of a disappointment. It is only fair to state that it must have taken courage on the part of the committee to turn its back on a sure thing and deliberately strive to turn the attention of the public to the solution of more basic social problems.

The previous "fair type" Triennales, housed in pavilions which put the delightful gardens of the Parco Sempiano to good use, emphasized national trends, interior design, furniture, etc. This year the Italians, with only two important exceptions, confined themselves and their guests entirely to the remodeled interior of the Fascist neo-classical Palazzo dell' Arte. The only two buildings actually erected, the British school and the U.S. home, both making use of prefab systems of construction, by their very nature come closer than most exhibits to offering clear-cut interpretations of this year's theme.

The former, completely landscaped and furnished down to the last item for opening day, has created something of a sensation. In a country where cost of construction and speed of erection could play an important part in the implementation of any school building program, it is no accident that this exhibit has stolen the show. It is to be hoped that the Alcoa home (not completed at this writing) will be as confidently assertive. Unfortunately, where the British elementary school is literally typical of many already built and in use today, the benefits of industrial production as *realized through* prefabrication of modular components and mass purchasing remain largely theoretical as far as the American home-buyer is concerned. Is it perhaps accidentally symbolic that whereas the school whose *in situ* (job-poured) floor-cum-foundation slab rests firmly on the ground (no matter what contortions the ground may be subject to, such as subsidence due to mining, earthquakes, etc.), the U. S. home, presently perched on wobbly concrete piers, has to have the ground shoveled in around it.

The big question is how successful the current Triennale as a whole is in developing and exploring the theme it has set itself. Certainly the architects for the remodeling and planning of the exhibit space have been skillful in devising an "itinerary" full of interest and contrast in volume and lighting. Raising the whole floor of the main exhibition to the level of the existing window sills enables the visitor to walk round and peer downwards into the various apartments and classrooms, which have been furnished according to location—whether designed for the country, the suburbs, or more central areas within the city itself.

Just how successful these exhibits are in themselves as progenitors for an ideal environment is open to question. About all one can say is that the nearer one got to the center and the more money (for some reason) one had to spend, the more ghastly did the furnishings become.

As for the vast display of architectural drawings comprising a personal show of eight Italian architects on a rotational basis, none but the most avid student is likely to devote the hour necessary to discover who did what and separate what has been done from what is "projected"

Of the various countries participating with ground floor exhibits the more positive contributions were made by Mexico, Belgium, Sweden, Denmark, and Switzerland. Most of the other exhibitors merely nodded in the general direction of either the home or the school without apparently being aware of anything beyond or in between.

For those who demand nothing more from a Triennale but more of the same—only different—this one may seem to be a flop. But the fact seems to be that Italians are "Triennale-minded;" boys seem to bring their girl-friends as a matter of habit. Perhaps the Triennale is one way to make people aware that the shaping of an environment demands more than pretty furniture. It must be seen in the wider context which links town planning at one end of the scale with interior design at the other. This may be said to be a good start in a positive new direction.

JOHN GRACE
Wimbledon, England

Intuitive Design—Another Advocate

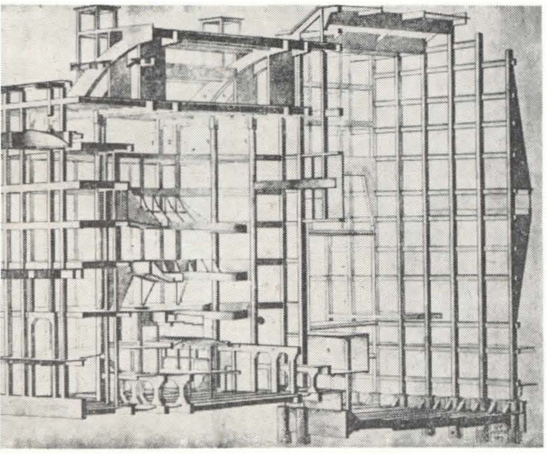
Dear Editor: After many years of "suspenarching"—designing axially-stressed structures—it was a source of great consolation to me to see that these same concepts were so correctly understood by the students at Columbia University, as evidenced in their designs for an Industrial Display Pavilion (AUGUST 1960 P/A). And, all the more so since, as guest critic, the writer refrained from offering architectural suggestions and only assisted the students in clarifying structural principles.

Concerning the motives impelling intuitive structural design, Professor Zuk in the same issue has contributed an illuminating companion discussion based on a profound philosophical comprehension of these motives.

As a "down-to-earth" constructor, I would like to re-emphasize that there must be a clear understanding of the physical laws governing structural behavior in order to create designs of architectural validity. That no training in higher mathematics is required to attain such knowledge has been stressed in a previous discussion (FEBRUARY 1960 P/A). Of particular interest is the section of Professor Zuk's discussion on "The Forces of Structure," as it throws light on the behavior of a homogeneous-section beam stressed beyond its elastic limits—in a phase beginning at the first appearance of cracks and concluding at total collapse (DECEMBER 1957 P/A). Within this phase, ever increasing forces —beyond the ultimate elastic strength that the material is supposed to provide —appear to be needed in the continuously reducing sectional areas, so that when they are combined with smaller and smaller arms they can still produce a balancing resisting moment permitting the beam to be still in service during this phase. A similarity between the concluding equation synthesizing statics in this phase, $Pl = cd^2$, and Einstein's equation for energy, $E = mc^2$, would suggest that a strength of nuclear order is developed during the concluding stage of the beam's life. Professor Zuk's reference to the electromagetic forces governing strength of materials, however, may lead to the correct approach to this problem. Communications regarding the writer's shortcomings in his attempt to contribute a solution to this problem would be welcome.

PAUL CHELAZZI
New York, N.Y.

Photos: Courtesy of Museum of Modern Art.



A Rebel Within the Establishment

Théâtre des Champs-Elysées, Paris, 1913.

BY LEONARD K. EATON
Associate Professor of Architecture, College of Architecture and Design, University of Michigan, reviews Perret. *Bernard Champigneulle. Arts et Metiers Graphiques, Paris, 1959. Distributed by Wittenborn & Co., 1018 Madison Ave., New York 21, N. Y. 159 pp., illus. $6.50*

The last few years have witnessed a spate of books on the history of reinforced concrete and on the contribution of Auguste Perret to the building art.[1] This volume is an interesting contribution to the series. Obviously done in a spirit of deep filial piety, it carefully traces Perret's career from his earliest projects at the École des Beaux Arts through his last city planning schemes and buildings at Amiens and Le Havre. For the most part, the approach is straightforward and chronological. Champigneulle takes up each of Perret's important buildings in turn, illustrating his discussions with excellent photographs and a good series of plans and sections. There is also a revealing number of projects that have not hitherto been published. The focus of the work is entirely upon Perret, and the point of view of the author is completely French. Except for a few references to Hennebique and Baudot, no other architects appear in the book, and there is no attempt whatever to relate the achievement of Perret to other phases of the modern movement. In this regard it is an extremely ethnocentric production. The work was obviously done with the close co-operation of the Perret family.

Like other recent writers on Perret, the author stresses the background in architectural theory and in building construction. The Perrets were skilled masons, and young Auguste literally grew up with a trowel in his hands. He was apparently destined to be an architect from an early age. As to theory, he studied in the atelier of the great Guadet and also read extensively in Choisy and Viollet-Le-Duc. In later years he remarked that these men meant more to him than all the professors at the École. It should also be noted that Perret did not graduate from the École and that quite possibly his failure to do so was deliberate. Under French law he would have been forbidden to engage in the family construction business if he had passed an architectural diploma. Like Nervi and Candela, two other virtuosi in concrete, Perret both designed and built a large number of his most famous structures.

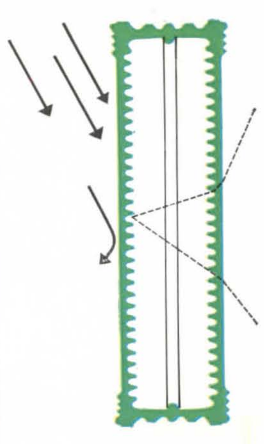
For the American reader, a historical review of Perret's work raises a number of fascinating questions. In recent years we have become much more conscious of our important heritage in the early years of the modern movement. American writers have, quite understandably, concentrated on the work of Sullivan, the young Frank Lloyd Wright, and more recently, on Maybeck, Gill, and the brothers Greene. Many of their buildings in the period 1900-1914, which Walter Lord has significantly named "The Good Years," exhibit to modern eyes an undeniable freshness and vigor. The Perret buildings from this same period strike one as a curiously mixed lot. The famous apartment house at 25 Rue Franklin (Paris, 1903) still seems to be one of the finest buildings of the time, a daring experiment in the articulation of the reinforced-concrete skeleton; much the same comment can be made about the garage in the Rue Ponthieu done two years later. The Théâtre des Champs Élysées (1913), on the other hand, appears to be a vapid performance in a neo-classic vein; Champigneulle's verdict that it is "le plus beau théâtre moderne du monde" is simply nonsense. The author's enthusiasm for the sculptures of Bourdelle, which adorn the façade, is also ludicrous.

Perret's later work likewise shows a remarkably uneven quality. The docks at Casablanca and the Esders and Marinoni factories are fascinating experiments in the use of thin-shell vaulted forms; the churches at Le Raincy and Montmagny must still be ranked among the finest modern works in this difficult building category. The offices for the Ministry of Marine, however, seem to be thoroughly pedestrain performances, in no way worthy of the praise which the author bestows upon them.

What is the reason for this amazing disparity? It lies, I think, in Perret's uncompromising adherence to traditional French academic doctrine, even though he was working with reinforced concrete, a material which could be expressed in an astonishing variety of ways. Thus he finally held that its true nature could only be properly seen in framed and trabeated constructions. The idea that concrete could be treated in an essentially plastic fashion (in the manner of Nervi and Candela) was repugnant to Perret. Moreover, as he grew older, his designs became more and more classical.

Continued on page 218

[1]For example, *Concrete: The Vision of a New Architecture,* by Peter Collins, Horizon Press Inc., New York, 1959; and *Reinforced Concrete in Architecture,* by Aly Ahmed Raafat, Reinhold Publishing Corp., 1958.



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Continued from page 214

Champigneulle goes so far as to term the reconstruction of Le Havre "a Cartesian city," and he is quite right. The photographs, which are excellent, beautifully convey the exceedingly formal quality of the scheme.

In short, Perret was, in the excellent phrase of Reyner Banham, "a rebel within The Establishment." Possessing as thorough an understanding of classical principles as any of his contemporaries at the École des Beaux Arts, he was distinguished from them by his devoted exploration of the possibilities of a single new material: concrete. His basic problem was to find a proper expression for it within the established framework of French academic doctrine. As time went on, he became increasingly the prisoner of his theory. Hence the magnificent wide-span vaults of the Esders and Marinoni factories may well be aberrations in the total body of his work. His utterances at the end of his life are those of a man with strong but narrow convictions; steel construction, he thought, was only "a brilliant episode" in the history of architecture, and he seems to have had small regard for, or appreciation of, the other leaders of the modern movement. It is important that he constantly put his students on guard against being modern—"for nothing else is so quickly outmoded." It is also noteworthy that in the last two decades of his life, Perret received a remarkable number of government commissions, and that when he died he was president of the architects' Registration Council, Grand Officer of the Legion of Honor, Inspector General of National Buildings, and most important of all, a member of the French Academy. Such official honors were never accorded to Frank Lloyd Wright, but Wright, after all, never made his peace with The Establishment.

Seen in the light of the American architectural tradition, the Perret career is of peculiar interest. It is the story of a great innovator whose work yet remained very much within his country's accustomed architectural manner. At the end of his life, his native land rewarded him as though he had never deviated from official practice. How different it is in the United States! Not only have our great innovators not been rewarded—they have also, in their best moments, been violently in revolt against the very principles for which Perret stood so strongly. While waves of formalism have from time to time swept over American architecture, it has always been strongest in its moments of protest against classical ideals. It is significant that during the vital period 1900-1914, when Perret was developing a substantial reputation in Europe, he was almost unknown in this country. While American magazines were devoting a surprising number of pages to the work of Otto Wagner in Vienna and of Berlage in the Netherlands, their editors left Perret strictly alone. The omission is important. The spirit of his work was not in sympathy with that of The Chicago School or of the early West Coast modern architects, the two most vigorous groups in this country. Today it is hard to think of a single building in the United States which has been influenced by his example. Perret was quintessentially French, and in Frank Lloyd Wright's reaction to Paris and what it stood for ("Vienna had always appealed to my imagination. Paris? Never!"), Wright was speaking in a profoundly American vein.

Handbook on Welded Wire

Building Design Handbook for Welded Wire Fabric. *Wire Reinforce-*

Continued on page 223

Continued from page 218

ment Institute, Inc., 1049 National Press Bldg., Washington 4, D. C., 1960. 168 pp., illus, tables, diagrams.

The wire-reinforcement industry, through its national association, is offering a valuable design handbook to all concerned with reinforced-concrete construction. In two parts, the handbook comprehensively presents both general information and design details.

Part I describes welded-wire fabric—its history, structural applications, and effective use. Several case histories show projects in which wire fabric has been used to particular, or unusual, advantage. Part II deals with the actual use of welded-wire fabric, especially the increased use of heavy welded-wire fabric (wires up to ½" in diameter in both directions welded together to counteract stresses in two directions). Design tables, explanatory text, and illustrative design problems cover a number of specific applications: one-way slabs in conventional or lightweight concrete, two-way flat slabs, tilt-up wall panels, vertically-spanned basement walls, cantilevered retaining walls, and individual column footings. Complete ASTM specifications are included in the text.

E.P.

Synthesis of Mind and Emotion

Ideas and Images in World Art: Dialogue with the Visible. *Rene Huyghe. Translated by Norbert Guterman. Harry N. Abrams, Inc., 6 W. 57 St., New York 19, N. Y., 1959. 439 pp., illus. $15*

What are we going to do about the French? They have given us another thick book on art, crammed on the one hand with illustrations, documentation (sometimes merely nominal), and an air of unassailable authority (through their presumption of cultural primacy in the visual arts) and, on the other hand, with a lyrical intellectualism that is conceived as an end in itself. I do not think that this makes the present situation (in painting, at least), more understandable, and I suggest that the current confusion results not only from the fantastic overproductivity of worthless paintings, but also from the effort to explain them, dismiss them, or find a place for them among man's necessary acts by imposing a function upon art that there is as yet no reason to believe it can support. Like Malraux, Huyghe is not so much concerned with art for art's sake as with something more philosophical and religious: art as a form of the highest good, art as a form of salvation. He writes at the end of his study:

"Man, who is forced to witness the crumbling and dissolution of all that he knows and experiences, and who suffers from this universal relativity, aspires to escape from transience and to discover some firm ground, which will at last give meaning to his life, justify it. He finds this meaning in the work of art. . . . To be able to create a work of art, to be able to experience it—is this not one of the reasons why he finds life worth living?"

It is, I should think, something of an accomplishment to maintain this belief when art presupposes a necessity implicit with the awareness of uncertainty. If you take art via prescription and the pain persists, you cannot call your doctor. But Huyghe, former curator of the Louvre and professor of the College de France, elevates art to an inviolable status which he then takes as a sign of its ultimate worth. (As if an artist never doubted himself.)

Continued on page 230

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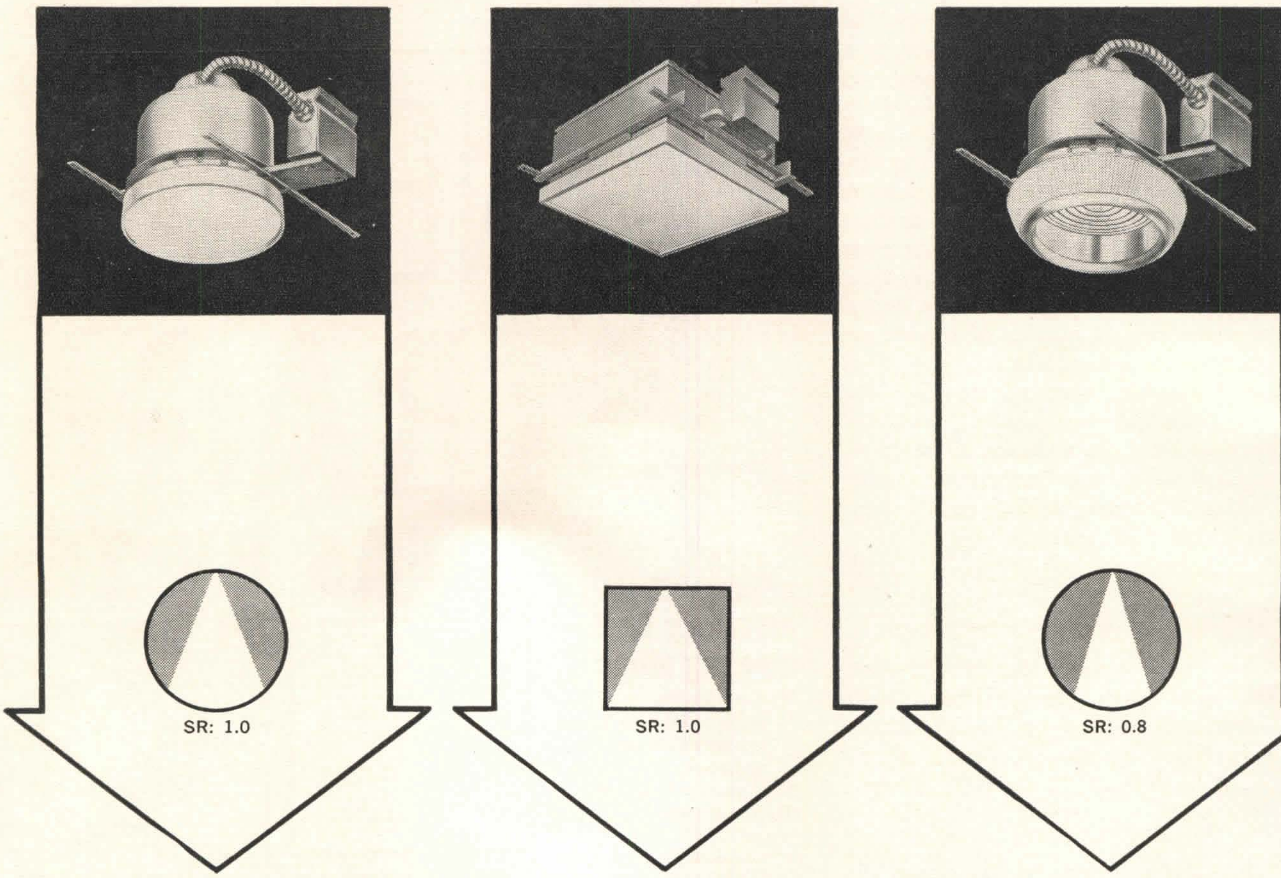

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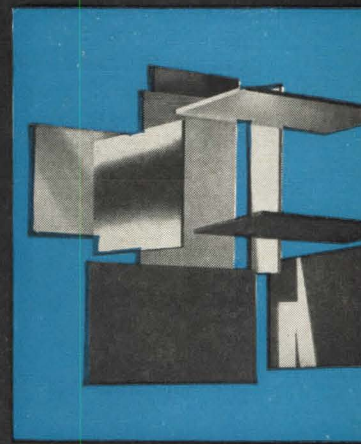

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Photography: Arthur Shay

Continued from page 223

Yet if Huyghe is less a Puritan than Malraux proved himself to be in *The Voices of Silence* (beauty is an important article of his faith and he is no less "engaged" than Malraux despite the non-militant tone in his patient, scholarly style), he is less convincing in the end because his convictions seem to rest solely on a view of art, especially painting, that is slightly old-fashioned if not pedantic in making its connections between past and present. He is treating what he conceives as a world gone—or going—to pot with largely received ideas concerning the mystery, beauty, and "voiceless speech" of art which, by a sort of leap into faith, are endowed with transcendental affiliations. Yet his messianism is curbed by a point of view that derives from the secularism of the French intellectual tradition. Huyghe's Romanticism represents an uneasy marriage of positivist notions about society and fundamentalist notions about "esthetic" belief. The apocalyptic view of art tends to see reality as a conspiracy without realizing that art through its ideality is something of a conspiracy against reality. But where Malraux envisions art, or at least, every masterpiece, as a "human victory over the blind force of destiny," Huyghe would seem to say that art is a mystery informed by human necessity and what results is not so much a triumph over the blind forces of destiny as a successful effort to transform them into Beauty and Poetry. Huyghe rages not so much against a universe of contingency as against the loss of equilibrium in man himself. Chaos in man frightens him more than a universe that "blindly runs." "We must put the tremendous powers of the visual to work," he demands, "in order to preserve the balance of man's inner life."

It must be granted that Huyghe is also proposing that art get a grip on itself, which is a good thing; but it is hardly comforting to know, nor is it even likely, that art alone stands between us and self-destruction. Yet it is odd that Huyghe is not more of a revisionist than he is. He wishes art to lead men back to the good, the true, and the beautiful. At the same time his excellently illustrated volume, after a protracted study of the broad aspects of ideas and images in world art, updated by the contribution of modern psychological research (using woefully inadequate sources), provides a fairly static picture of the relationship between art and the artist, between art and nature. Huyghe sees his task, however, as one of restoration, retrieving art from dogmas and definitions "which we have so completely assimilated that we mistake them for instincts, whereas . . . they are actually a screen between us and our instincts, keeping the latter well hidden." Yet he constantly reassures us that a painting's ultimate "meaning" escapes him (us), and this somehow—after even psychology fails to penetrate the mystery—makes its spiritual function all the more invaluable. It is as if he were half afraid that the uselessness of art, its lack of functional utility, posed a threat to his evaluation of its spiritual seriousness. For he is forced by his scholasticism to acknowledge the insights of reason while his paternal possessiveness doesn't want anything to change, basically. His distortion of the role of art is similar to that perpetrated by social realists. In general he proves his case as to art's inviolability but without much visible sign of encouragement.

The opening sections of this book deal with the "gradual primacy of the visual" and trace the ascendancy of the sign over the word. The "civilization of the book" is born during the Renaissance

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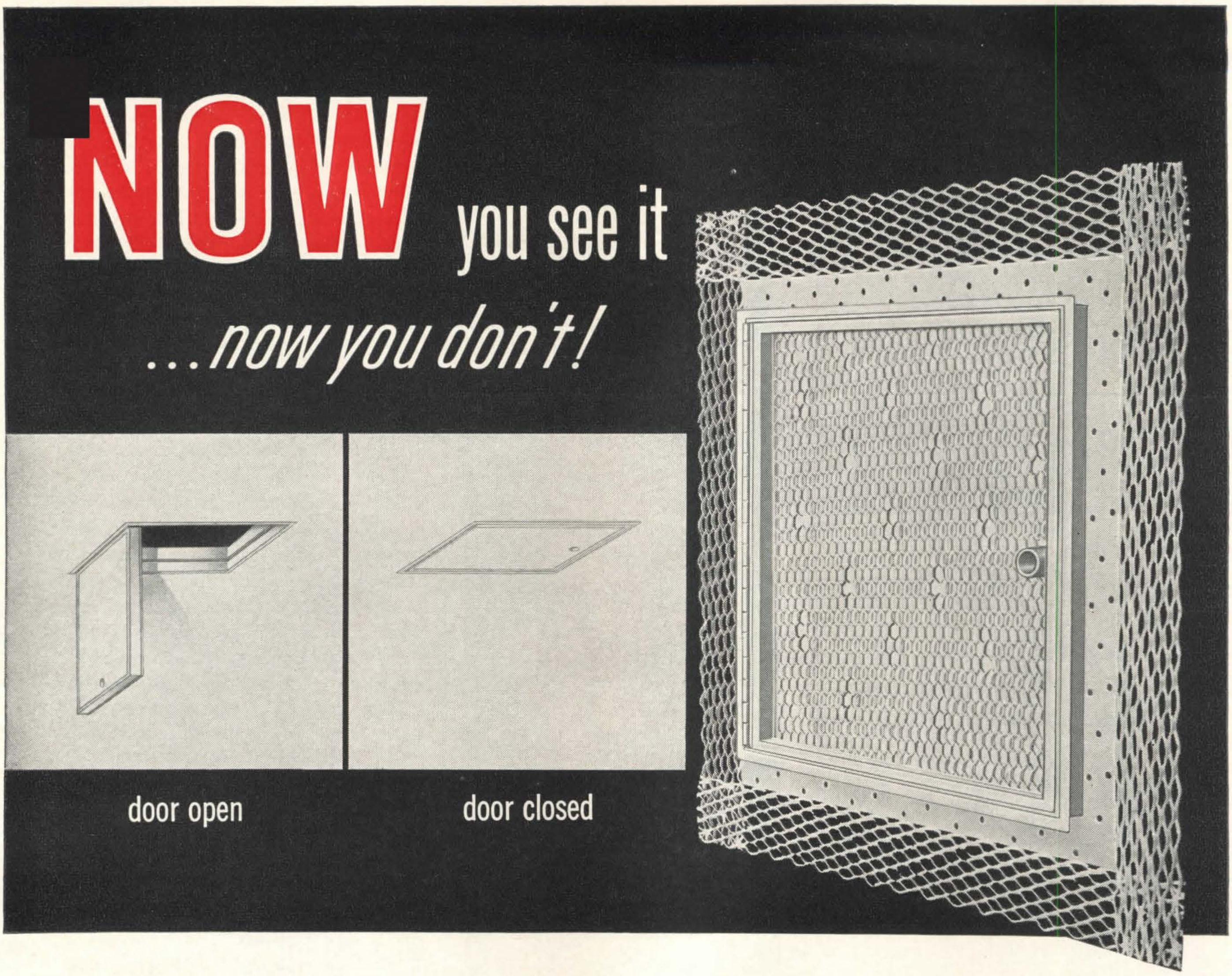

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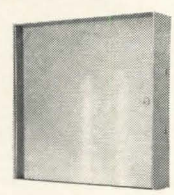

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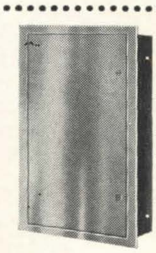

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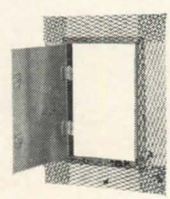

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and ends with the 19th Century and the coming of the "civilization of the image." The machine made thinking "too slow" and in a single, simple illustration Huyghe demonstrates the deprivation of the conceptual faculty by the pressures of modern life: the faucets designated "hot" and "cold" in the Victorian era come to be marked with the initials "H" and "C." The machine, by separating the artist from the artisan, turned the latter into a mere worker, the former into an esthete. "Monstrously, art was reduced to theories of which the work itself became only an illustrative application; esthetics . . . now became a full-fledged system, and even sought to rule the creative act. In the Middle Ages art was still *natural;* from the Renaissance on, it was thought necessary to *think* in order to create." And now it is sensation which threatens ideas. His point is well taken.

Art for Huyghe represents a reconciliation of the natural "inwardness" of man with his ability and necessity to impose form upon the chaos of his sensory life. In considering the ideas and images in world art, Huyghe is seeking to reconcile feeling and thinking in an art extracted (in the words of his significant subtitle) from a "dialogue with the visible." If art is to cope with reality it must first relate to it.

Ideas and images of true art thus communicate a psychological balance (a thorny point which we can't investigate here). "We want to assimilate the outside world; to this end we reduce it to forms, each of which delimits a compact area lifted out of the primal chaos. These forms, for the mind, are ideas; for the eye they are simple geometric figures. The effort to construct ideas runs parallel to that of devising ideas."

This attitude enables him to observe: "The similarities between Fouquet and Piero della Francesca may be accounted for by the fact that in the 15th Century the entire Latin world rediscovered the balance between the impressions of the senses and the requirements of the mind. Four centuries later, reacting against the exaggerations of optical truth demanded by Impressionism, Cezanne was to effect a similar reconciliation between natural appearance and intellectual construction."

The artist's debate with reality is, according to the author, the distinguishing feature in man's application of art to control his environment, but Huyghe would not be a Frenchman if he did not insist that the issue of freedom is bound up in the manufacture of images and ideas. The evidence which he brings to bear on his thesis uses history as a demonstration of man's struggle to attain those means and as frequently his submission to those means once he has attained them. Art, however, is not a variable factor in the struggle; it is a permanent and enduring quality to be rediscovered when civilizations and cultures have regressed to the point of stagnation and decadence. If Art is always "there" so are its dispositions to certain styles. The author begins at the beginning:

". . . among the varieties of art that give a free interpretation to the data of nature, two large categories may be distinguished. One is the product particularly of agriculture and sedentary civilizations, at periods when they depart from realism and aim at imposing a definite and fixed geometrical order on forms. The other, the product of cultures and hunters and nomads, for whom life means constant movement, shifting from place to place, is typified by simplifications and contractions which suggest a coiled spring about to be released."

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These prove to be roughly the differences between the Classic and the Baroque which correspond to intellectual and sensory types, respectively, and a balance of which, within the individual artist, Huyghe insists is desirable. He finds the duality resolved in the person of Eugene Delacroix.

In Delacroix, Huyghe finds an ideal synthesis of mind and emotion which illustrates Valery's statement: "What I call great art is merely an art that requires the use of all of a man's faculties, and that appeals to all the faculties of other men. . . . I believe that a work of art should be the act of the whole man." Huyghe devotes more space and illustration to Delacroix than to any other artist mentioned in the book. The work of the great French Romantic is reproduced in sixteen instances, as opposed to ten for Rubens, eight for Raphael, seven for Rembrandt, and five each for Jan Van Eyck and Vermeer.

But with Delacroix's introduction into the text, Huyghe's book discloses its own duality. Roughly it is that of the intellectual life of the scholar and man of letters versus the connoisseur attempting to place his personal tastes at the service of ideological comprehensiveness. In all of this there is an affecting modesty. Even his most brilliant flights of abstraction seem reserved, for he prepares his ground carefully. But then this book is a sort of *summa theologica* of the visual arts and I rather have the feeling that one of the compelling drives behind it is the fact that modern art (and perhaps modern life) has thrown this sensitive and dedicated man into a state of confusion and uncertainty by forcing him to re-examine the premises of his life work. Rather than rejecting the impostors, he bends his definitions to imitate the sensibility that surrounds him. He is too fair. Misled by the need to preserve the continuity of art, Huyghe has gone wading in a flood. Thomas B. Hess, executive editor of *Art News*, rightly calls him a "naïve participant . . . in recent Parisian activities." This is putting it rather mildly, but emphasizes one of the damnably annoying aspects of this book—its particular cultural bias.

This can be understood only in light of the situation of the arts today in France. There, along lines conceived by Minister of Culture André Malraux, a sort of cultural revivalism is taking place, designed to re-establish French leadership in art which, in its Gaullist context, means placing art at the service of French *gloire*. Thus, as Annette Michaelson has written in *Arts* from Paris, "Pollock's debt to Fautrier and to Wols must be invented and used to support the very real importance of Masson's influence in the interests of establishing, through mere chronology (and faked chronology at that) France's creative supremacy."

While Huyghe gives the impression of being above this sort of thing (there is no nationalist tinge to his affections for Delacroix and his taste in modern French art shows only that he is as susceptible as anyone else to the internal politics of the art world) it seems inconsistent with both the atmosphere of fairness that he projects and the urgency of his discussion to fall prey to what has already been a prolonged form of cultural apartheid by excluding American painting (and the English are given short shrift also) at a time when American abstract art has found eager, if indiscriminate, acceptance the world over, even piercing the Iron Curtain. While the effects have not been necessarily salutary, the phenomenon is un-

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Installation in University Unitarian Church, Seattle, Wash., designed by Kirk, Wallace, McKinley, A.I.A. & Associates.

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deniable. I make the charge with an awareness of the discrepancy between the enthusiasm with which abstract expressionism is being greeted by the painters of Europe and the East and the atmosphere of reappraisal, consolidation, and even counter-revolution that is seemingly in progress at the moment in the United States, where a group of figurative painters recently picketed the Museum of Modern Art, and a number of our established realists, among them Edward Hopper, wrote a letter to the Whitney Museum of American Art protesting its defection to abstract art with the interesting implication that collectors were becoming too influential.

It is far from likely that there is any direct connection between an incipient change of direction in art and the "tremendous powers of the visual" which Huyghe wishes to put to work to "preserve the balance of man's inner life." The psychological and moral life of mankind, while not immune to the blandishments of art, must work out their salvation within their own province. But there may be a connection between an art restored to equilibrium (who will know it?) and men taking a real interest in themselves and their work. There is a feebleness in such presumption but one must risk it an argument. This book makes a sincere and sometimes effective effort to treat a difficult situation, but it seems to me that Huyghe has not only overlooked certain works in history but has failed to allow for all the other countless and anonymous ways in which men express themselves.

SIDNEY TILLIM
Contributing Editor,
ARTS Magazine

Effect of Concrete Admixtures

Symposium on Effect of Water-Reducing Admixtures and Set-Retarding Admixtures on Properties of Concrete. Special Technical Publication 266. *American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., 1960. 246 pp., tables. $7.50 ($6 to members)*

Since the development of water-reducing and set-retarding admixtures for concrete, over 25 years ago, their use has grown continuously. Their present annual use in the United States alone is in the production of an estimated 25 million cubic yards of concrete. Further indication of current interest in these products is the active work of the ASTM Committee on Concrete and Concrete Aggregates (and various public agencies) in drafting standard tests and specifications to govern the purchase and performance of admixtures.

This symposium, an ASTM area meeting held at San Francisco in 1959, consists of ten papers and a summary, with extensive tabular data and references. It is of interest that four of the papers are contributions by principal producers of admixtures; the remaining papers were prepared by representatives of consumer interests, research organizations, and the cement industry. Reports concern the effect of admixtures on plastic and hardened concrete, on structural and lean-mass concrete, in ready-mixed concrete, and in portland-cement pastes.

E.P.

Bibliography on Concrete Fatigue

Fatigue of Concrete. Bibliography No. 3. *American Concrete Institute, P. O. Box 4754, Redford Station, Detroit 19, Mich., 1960. 38 pp. $2.50*

The latest in a series of ACI bibliographies (following two earlier publications that dealt with prestressed concrete and the evaluation of strength tests of concrete) lists 114 significant works on the fatigue of plain and reinforced concrete. No other comprehensive bibliography in this field is available, according to the ACI committee that searched major technical publications of many countries to compile the references.

With references going back as far as 1898, the bibliography reflects historical background as well as desirable current practices in the field of fatigue of concrete. Titles cover a wide range of tests, including the results of studies made in compressive and flexural fatigue loading of plain and reinforced concrete and in the resistance of bond to fatigue loading. (Investigations involving impact are not documented.) Annotations briefly summarize the results of tests described in the references, and author-subject indexes simplify further research.

E.P.

Books Received

Research for Architecture: Proceedings Michigan, March 1959. Edited by Eugene **of the AIA-NSF Conference, Ann Arbor,** F. Magenau. American Institute of Architects, 1735 New York Ave., N.W., Washington 6, D. C., 1959. 127 pp. $3

Evergreens for Every State. Katherine M-P Cloud. Chilton Co., 56th & Chestnut Sts., Philadelphia 39, Pa., 1960. 227 pp., illus. $4.95

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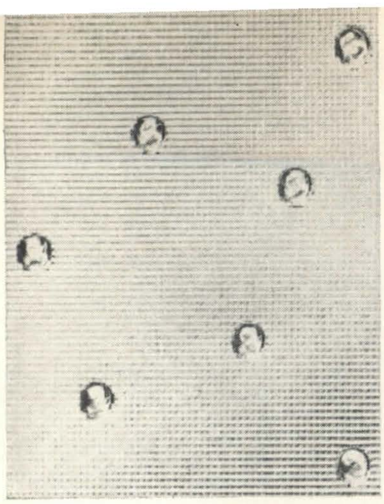
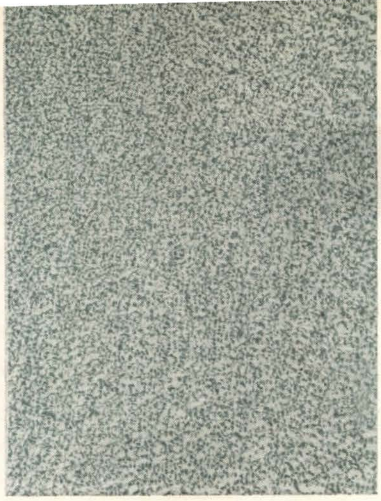
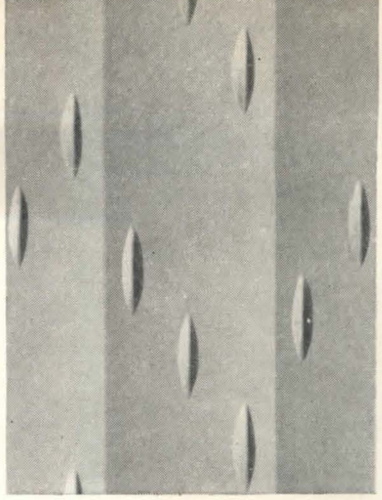
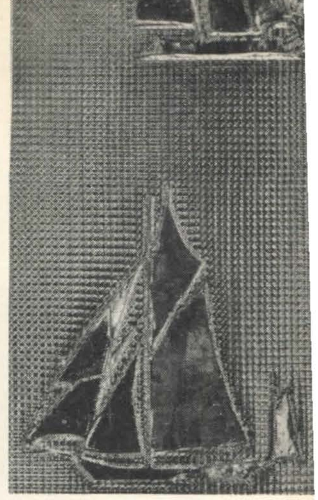

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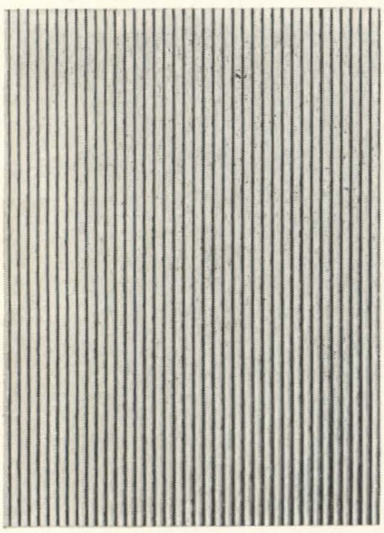
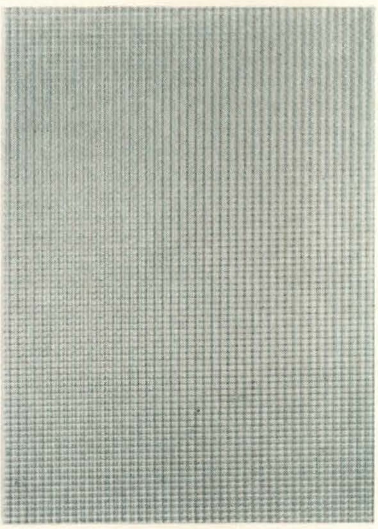

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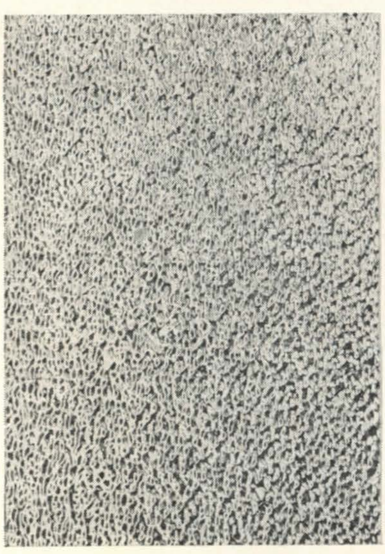


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The Organization of Museums: Practical Advice. UNESCO. Distributed by Columbia University Press, 2960 Broadway, New York 27, N. Y., 1960. 188 pp., illus. $6

Residential Construction Management. Ernest L. Buckley. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 1959. 193 pp., illus. $7.95

Normand's Parallel of the Orders of Architecture: Greek, Roman and Renaissance. Edited by R. A. Cordingley. Quadrangle Books, Inc., 119 W. Lake St., Chicago 1, Ill., 1960. 96 pp., illus. $5

The Print. Edited by Adele Lewis. Illustrated by Bertram Goodman. Adele Lewis Studio, 8 W. 13 St., New York 11, N. Y., 1960. 32 pp., illus. $2

Impact of Design: Recent Outstanding Interior Design. Clive Carney. Architectural Book Publishing Co., Inc., 883 First Ave., New York 22, N. Y., 1960. 248 pp., illus. $12.50

Farmhouse Planning Guides: Household Activity Data and Space Needs Related to Design. A Northeastern Regional Research Publication. Cornell University Agricultural Experiment Station and Housing Research Center, Ithaca, N. Y., 1959. 135 pp., illus. $2.50

Uppercase 3: Peter & Alison Smithson. Edited by Theo Crosby. Whitefriars Press Ltd., 26 Bloomsbury Way, London, W.C. 1, England, 1960. 68 pp., illus. $.70

Motels, Hotels, Restaurants and Bars. (2nd edition). Editors of *Architectural Record*. F. W. Dodge Corp., 119 W. 40 St., New York 18, N. Y., 1960. 328 *pp., illus.* $9.75

The Engineering Index 1959. Edited by Carolyn M. Flanagan. Engineering Index, Inc., 29 W. 39 St., New York 18, New York, 1960. 1532 pp. $70

Zoning Primer. Martin J. Rody and Herbert H. Smith. Chandler-Davis Publishing Co., P.O. Box 36, West Trenton, N. J., 1960. 48 pp. $1 (paperbound)

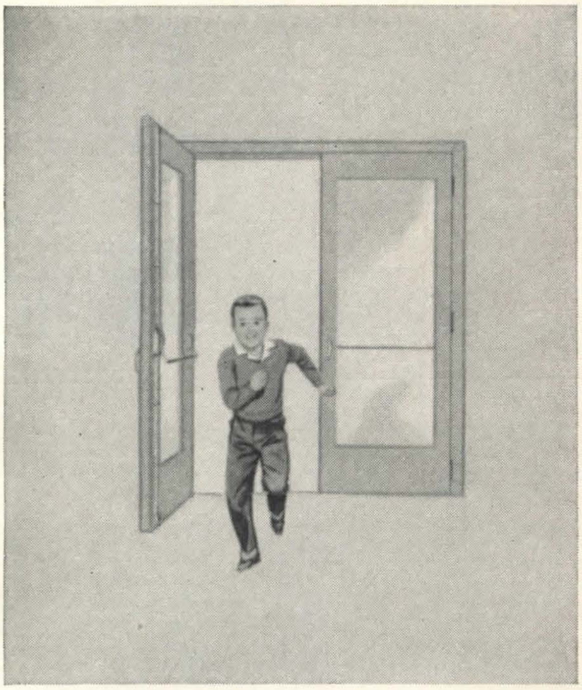
Wooden Synagogues. Marie and Kazimierz Piechotka. The Institute of Polish Architecture of the Polytechnic of Warsaw, Warsaw, 1959. Distributed by Alexander Hertz, 77-05 41 Ave., Jackson Heights 73, L. I., N. Y. 220 pp., illus. $6.50

Nature in the Metropolis. William A. Niering. Regional Plan Association, 230 W. 41 St., New York 36, N. Y., 1960. 64 pp., illus. $3

New Towns: A Selected Annotated Bibliography. Compiled by Jean Viet. UNESCO. Distributed by Columbia University Press, 2960 Broadway, New York 27, N. Y., 1960. 84 pp. $1

Structural Analysis of "Unistrut" Space-Frame Roofs. Paul H. Coy. University of Michigan Research Institute. University of Michigan Press, Ann Arbor, Mich., 1959. 327 pp., 2 vols., illus. $18 (boxed)

Timber Design and Construction Handbook. Prepared by Timber Engineering Co. F. W. Dodge Corp., 119 W. 40 St., New York 18, N. Y., 1960. 622 pp., illus. $12.75



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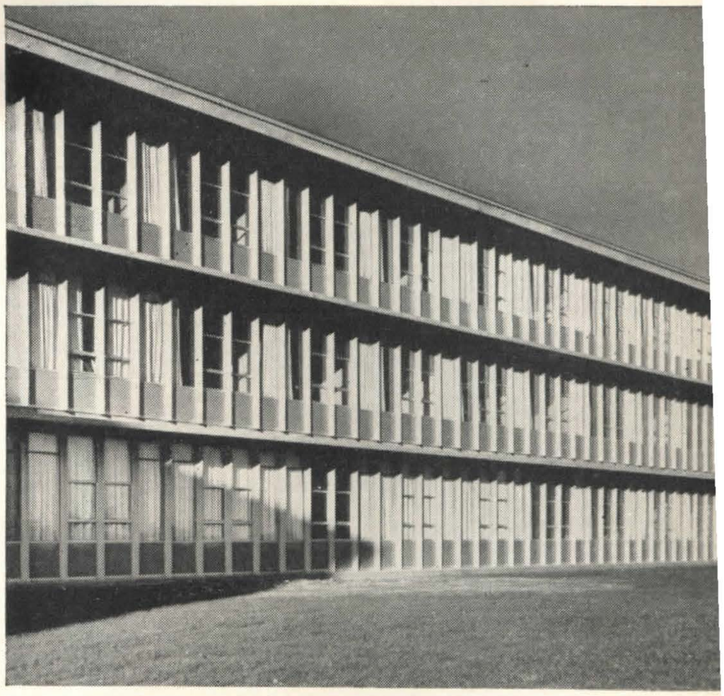

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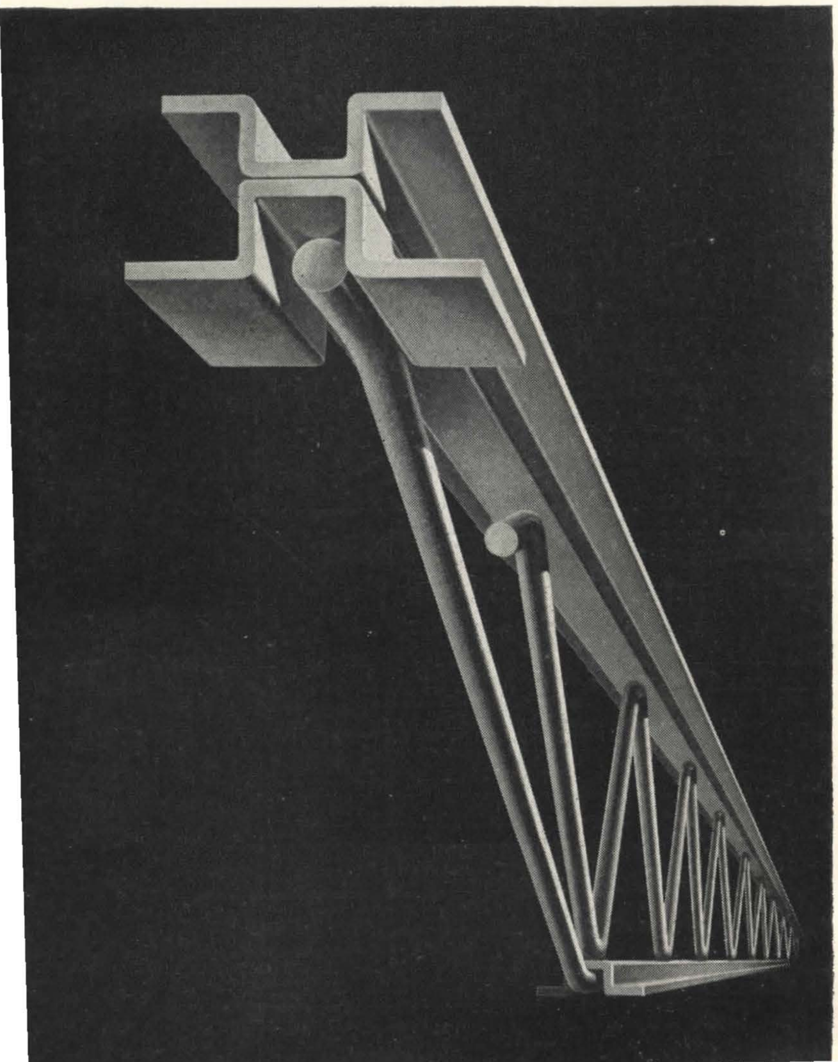

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Kuykendall & McCombs, Architects, 5801 Trowbridge St., El Paso, Tex.

John C. Seward, Architect, 712 Montgomery St., San Francisco 11, Calif.

Wiseman & Bland, Architects, 2600 Poplar Bldg., Sixth Flr., Memphis, Tenn.

Floyd M. Reister, Architect, 609 Insurance Bldg., 831 14th St., Denver 2, Colo.

Samborn, Steketee, Otis & Evans, Architects-Engineers, Libbey-Owens-Ford Bldg., Sixth Flr., Toledo, Ohio.

S. Thomas Stathes, Architect, 3902 Knowles Ave., Kensington, Md.

Sullam & Aehle, Architects, 1519 Fourteenth Ave., Seattle 22, Wash.

Carroll V. Hill & Associates: Community Planners, Landscape Architects, Development Consultants; with offices in Cleveland and Pittsburgh, announce the removal of their Home Office to 4608 N. High St., Columbus 14, Ohio.

New Firms

Richard A. Peterson, Wilbur B. Clark, Jr., and Newton E. Griffith, principals in firm of peterson, clark & griffith, inc., Architects, 39 S. 8th St., Suite 202, Minneapolis 2, Minn.

Donald J. Haulman, Robert E. Dyer, and Stanley B. Faller, principals in firm of haulman, dyer, faller & associates, inc., Architects-Planners, 2809 N. Blackstone Ave., Arlo Bldg., Fresno 3, Calif.

William C. Farrell and Charles H. Randall, principals in firm of farrell & randall, Architects, 1404-C Beck Bldg., Shreveport, La.

Elliott Gitlin and Marvin J. Cantor, principals in firm of gitlin & cantor, Architects, 261 Constitution Ave., N.W., Suite 525, Washington 1, D.C.

Stewart S. Kissinger, Mark T. Jaroszewicz, and Tobias J. Gersbach, principals in firm of kissinger & jaroszewicz associates, Architects, 1310 N. Telegraph Rd., Dearborn, Mich.

Oluf N. Nielsen, Architect, 2535 S. Lowell Blvd., Denver 19, Colo.

Gordon Powers, Architect, 15 W. 44 St., New York 36, N. Y.

Michael D. Schwartz, James S. Gaspari, Sid Dyer, and Sidney Schwartz, principals in firm of michael d. schwartz & associates, Architects, 114 E. 32 St., New York 16, N. Y.

Robert Wilmsen & Charles Endicott, announce the formation of a partnership with De Norval Unthank, jr. The new firm will be known as wilmsen, endicott & unthank, Architects, 863 13th Ave., E., Eugene, Ore.

New Partners, Associates

Renato G. Barreto, made an Associate in the firm of paul rogers & associates, inc., Consulting Engineers, Chicago, Ill.

Jerome Felcher, joins the firm of farkas & barron, Consulting Engineers, New York, as an Associate and Project Manager.

Gordon R. Williams, re-joins the firm of tippetts, abbett, mccarthy & stratton, Architects-Engineers, New York, as an Associate.

Edward H. Wells, William Stevenson Young, and Robert W. Malmros were named Partners; and Donald P. Barner, Edwin B. Bruce, Arthur C. Friedel, jr., and John H. Deierlein, as Associ-

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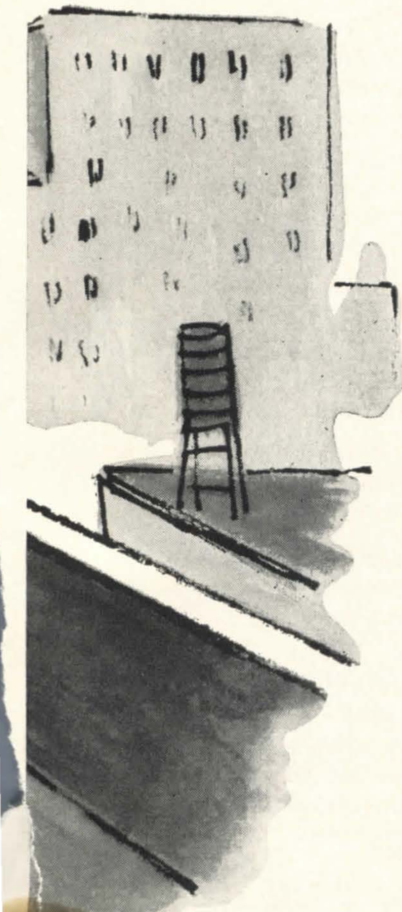

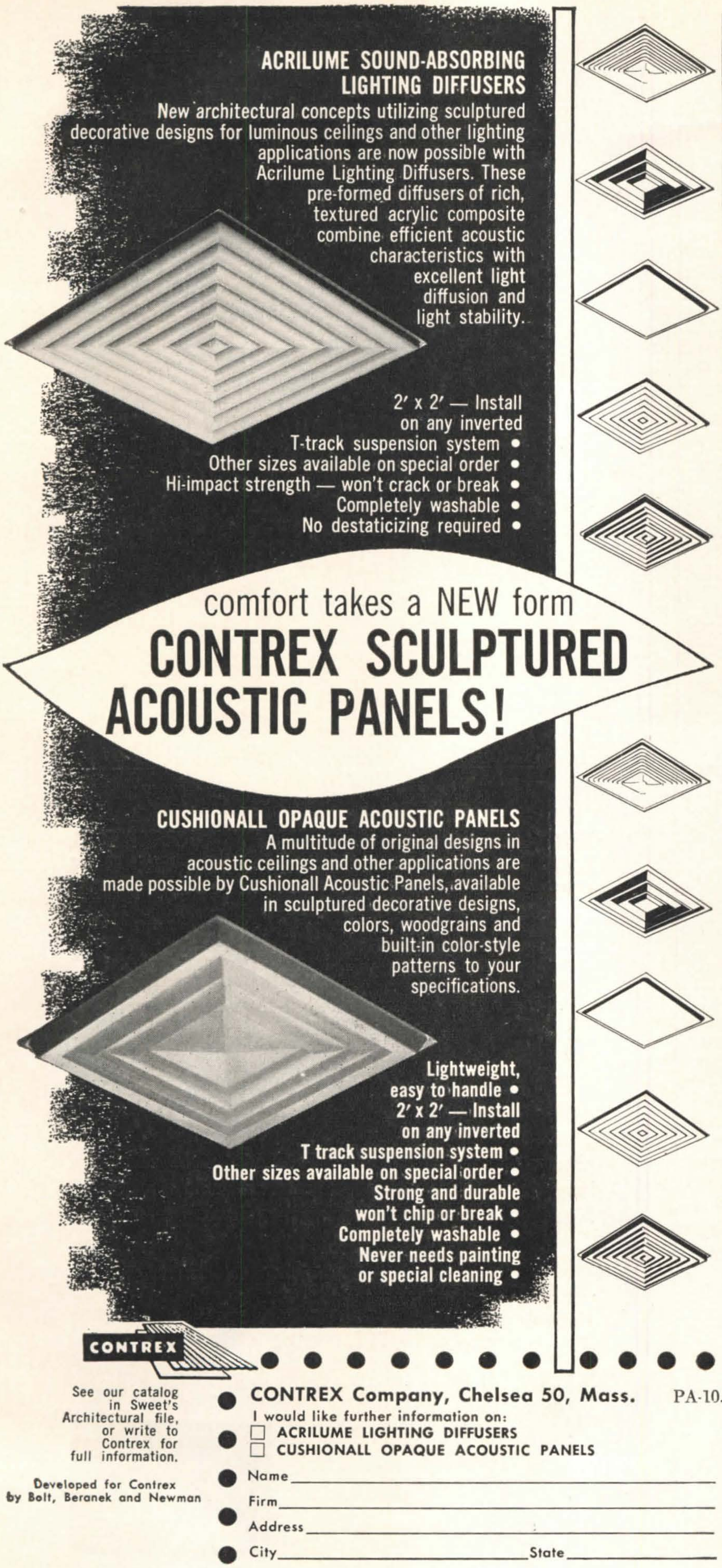

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Name Changes

KIRK, WALLACE, MCKINLEY & ASSOCIATES, Architects, 2000 Fairview Ave. N., Seattle 2, Wash. Formerly, PAUL HAYDEN KIRK & ASSOCIATES.

DAMM, DAUM & ASSOCIATES, Architects, 516 James St., Seattle 4, Wash. Formerly, THEO. DAMM.

LEWIS & BERGHAUSER, Architects, 445 Kressler Ct., Scranton, Pa. Formerly the office of GEORGE M. D. LEWIS.

P/A Congratulates . . .

CARROLL R. JUSTICE, succeeding the retiring WILLIAM I. HANRAHAN as vice-president of U. S. Steel Products Division of UNITED STATES STEEL CORPORATION.

SYDNEY J. MCBRIDE, CHARLES G. SLATER, and EDWARD F. BREEN, made vice-presidents of AMOS PARRISH & CO., INC.

W. H. SMITH, named building products development manager for UNITED STATES PLYWOOD CORPORATION.

Elections, Appointments

GENE A. GESSNER, made associate-in-charge of mechanical engineering in the New York office, and NORMAN D. KURTZ, as administrative engineering assistant at FRED S. DUBIN ASSOCIATES, Consulting Engineers.

DAVID L. LAIRD, made vice-president of INTEGRATED INTERIORS, INC., Camden, N. J.

JOHN HARO, named as chief architectural designer at ALBERT KAHN ASSOCIATED, Architects-Engineers, Detroit, Mich.

RICHARD D. RIEHL, joins the firm of FREDERIC P. WIEDERSUM ASSOCIATES, Architects-Engineers, to represent the firm to school boards in Long Island, and New York State.

New Branch Office

JOSEPH S. WARD & ASSOCIATES, INC., Consulting Soils and Foundation Engineers, 1015 Chestnut St., Philadelphia 7, Pa.

New Computing Firm

THE DACOM CORPORATION, a professional computing service, with headquarters in Buffalo, N. Y., will offer architects and engineers aid in problems of structural analysis.

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