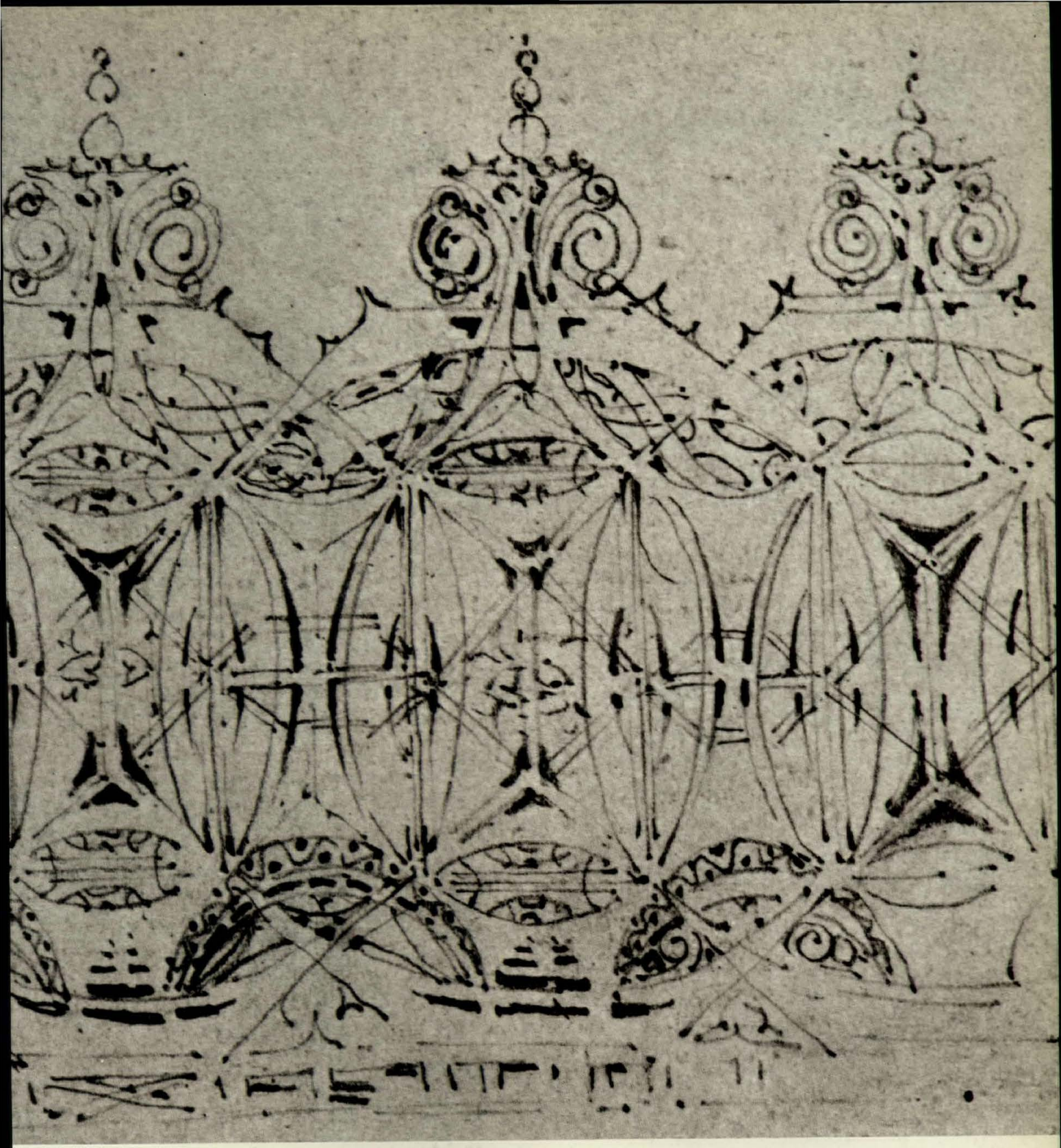

DRAWINGS BY LOUIS H. SULLIVAN

M.I.T. STUDENT CENTER BY EDUARDO CATALANO

MORETTI AND NERVI'S PLACE VICTORIA

BUILDING TYPES STUDY: HOSPITALS

FULL CONTENTS ON PAGES 4 AND 5

ARCHITECTURAL RECORD

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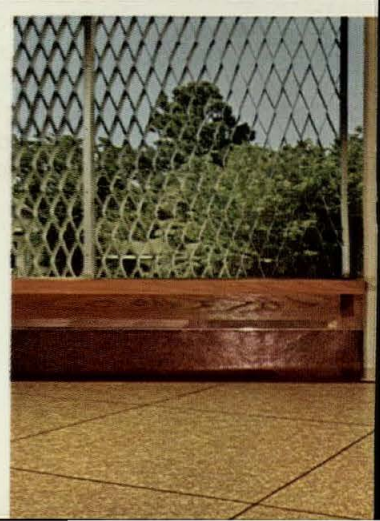

Armstrong offers the widest variety of resilient floors. The best is the one that suits your design.

Queensborough Baptist Church, Shreveport, Louisiana. **Architect:** Frey Associates—Shoemaker-Colbert-Brodnax, Architects-Engineers, Shreveport. **General Contractor:** Southern Builders, Inc., Shreveport. **Flooring Contractor:** Stephenson Floor Covering, Inc., Shreveport.

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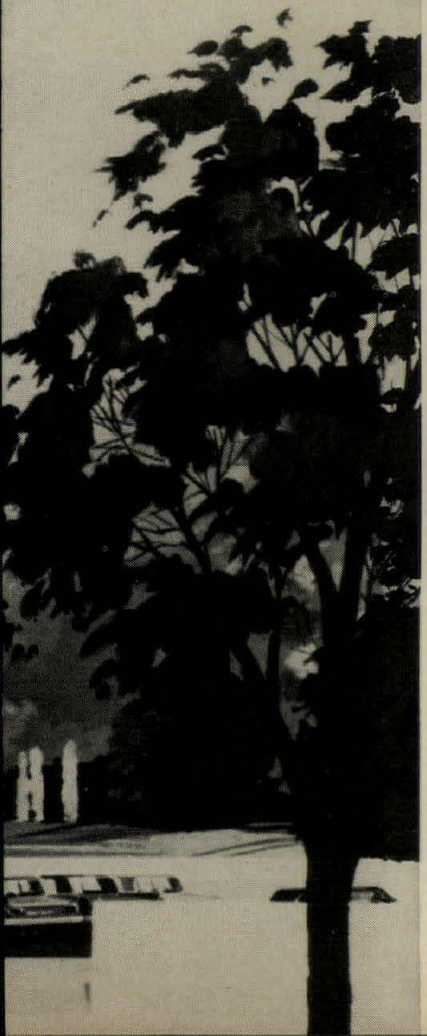

EMBASSY HOUSE, DENVER

Architect: De Gette and McMichael. General Contractor: Irwin Horwitz

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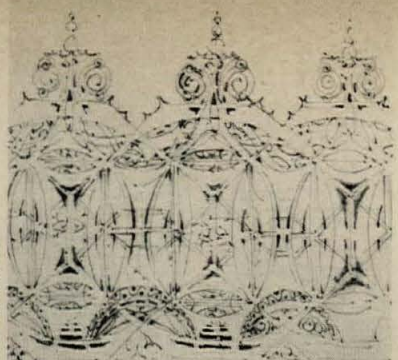


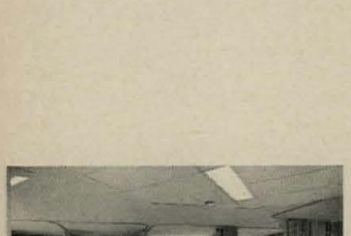
Joseph W. Molitor

Drawing by Louis H. Sullivan for border design, ceiling of Banquet Hall, St. Nicholas Hotel, St. Louis, Missouri, July 31, 1894.

FEATURES

Hutchins Photography, Inc.

BUILDING TYPES STUDY 356



Karl H. Riek

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ARCHITECTURAL RECORD

CONTENTS: MARCH 1966

COMING IN THE RECORD

NEW WORK OF MARCEL BREUER

The architecture of Marcel Breuer has been a continuing response to the needs, the conditions and the technology of modern architecture. From the skeleton-and-skin construction of earlier years, he turned—earlier than most—to exploration of the possibilities of concrete. The drawings of his most recent work, to be published in next month's feature, offer new testimony of his mastery of concrete as a truly architectural material.

DESIGNING FOR CHANGING RETAIL NEEDS

Next month's Building Types Study will take an intensive look at architecture for retailing as it is evolving to meet such current problems as the increasing cost of land, the worsening problem of parking, and the growing pressures to make the shopping center an integral part of the community. Examples will include the great new enclosed-mall shopping center, Northpark, near Dallas, and Macy's new department store in Flushing, Queens, an important approach to the concentrated, in-town retail center.

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VEST-POCKET PARKS, OR PIAZZAS UP-TO-DATE

It is a great pleasure to read something about "the city" that is written in lyric prose. It is a great pleasure to read anything about the city that everybody seems to agree upon.

The New York newspapers have been quite poetic recently about the "vest-pocket park" which is being donated to New York City by William S. Paley, chairman of the board of CBS. The once-great Stork Club, at 3 East 53rd Street, is being torn down, and Mr. Paley has been showing models of a minuscule park which he is to build, at his own expense (maintenance included), as a sort of memorial to his father, Samuel, businessman and philanthropist. The news reporters, those supposedly hard-nosed cynics, are raving about "a highly sophisticated concept for a shoppers' and strollers' oasis."

Well, this old piazza-putterer (this column last month) feels a bit ecstatic too. Surely a bit of greenery, a few trees, a view of blue sky and perhaps some comfortable seats, are among the necessities of the congested city of the future. Perhaps the park will be graced —as is the plaza at the Seagrams Building—with some beautiful secretaries, absorbing the admiration of the passing crowd. Maybe a few little parks or plazas or piazzas might just make the girls a bit more attractive, at least for a few lunch-hour moments, and I am sure that the future city can use some of this result.

Says Mr. Paley: "While the primary purpose of this plaza will be to provide an attractive outdoor resting place in the midst of a huge city, I hope that it will have equal importance as an experiment in a new kind of small urban park."

One can hope also that it will speak emphatically to others as to the need for such environmental additions to the city. When a businessman spends a cool million on such a humanitarian idea, surely it must say something about the extent of the need. The site is said to be worth $750,000, and Mr. Paley may be out another $250,000 before the park reaches fruition. Not that such oases should properly be thought of as philanthropic projects: I mean only that one man had a million dollars worth of conviction about their need.

Having added that bit to the lyricism, perhaps I can mention that it does not represent blanket endorsement of all park schemes or open spaces. I could not, for example, join all those architects and others who once insisted that a park was the only permissible use for the Pan Am Building site. The open spaces or plazas that have been sacred cows in the last 20 years or so, may be anything from wonderful "oases" to hangouts for juvenile delinquents. The city certainly needs open spaces and parks, and will need them much more in the future, but they have to be thought out and planned with exactly as much thought as other uses for city land. Parks can add greatly to values of surrounding land, or can damage them. They can be a great boon to the serfs in the city offices, or a kind of dump for the city's derelicts.

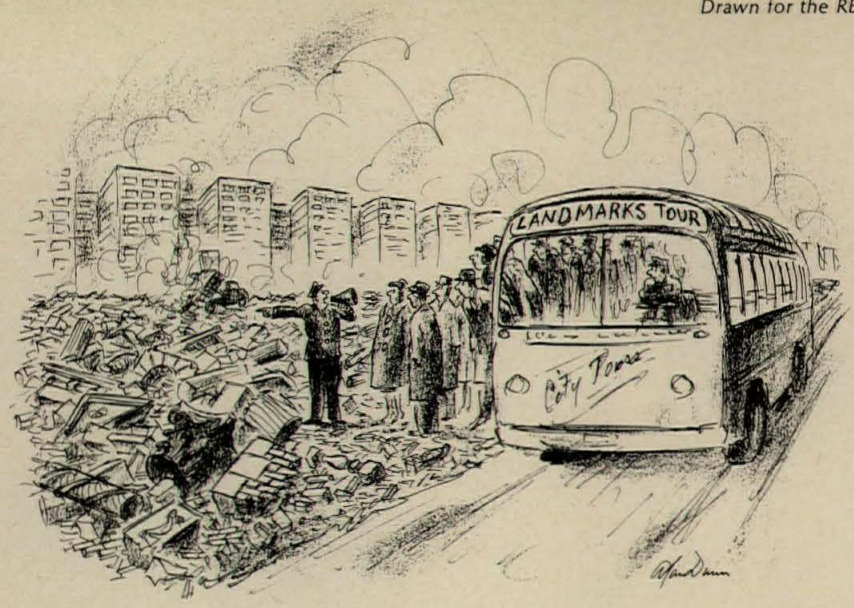
Architecturally, they can represent pluses or minuses. There has been seemingly endless discussion of the visual effect on Park Avenue of the several plazas around new office buildings. Some architects have contended that they have ruined the visual discipline of a once-great street. At any rate, the quick assumption of a few years ago that a great office building should leave some open space around it is now less readily assumed.

For more up-to-date plazas or piazzas we have those of the later development, the downtown complex or group of buildings, as in Hartford, Boston, Montreal, Houston, etc. So far one could not give a blanket endorsement to them, either, but they do have the virtue of being planned. Planned as integral parts of their surrounding entity. They are certainly more successful architecturally, even if they don't all turn out to be so wonderful in environmental terms.

At any rate, as I was insisting last month, the planning of piazzas, plazas, parks, big or little, is one of the real problems of city improvement. And when in doubt, put in the park.

—Emerson Goble.

Drawn for the RECORD by Alan Dunn



That bogeyman again: the real estate lobby

While reading happily about vest-pocket parks (preceding page) I was interrupted by seeing a phrase that always annoys me: "the real estate lobby." This is a convenient cliché, with the bogeyman connotation. It hints of exploitation of the masses by an organized group of wealthy bandits, silently but powerfully exercising control of all governmental bodies so that idealistic politicians haven't a chance.

Well, I'm not for exploitation of the masses. And I don't need to protect wealthy real estate operators—they're doing all right. I just get annoyed at sweeping generalizations with nothing behind them.

I happened to have had the chance to be close to some groups in the real estate field. I watched the organization of the Washington office of the National Association of Real Estate Boards, for the avowed purpose of staying close to legislators, and speaking up on all possible occasions. This represents, I suppose, a real estate lobby. But it is a group of real estate brokers; most offices are smaller than architectural offices; and few of them are wealthy or powerful. As a lobby, I should say that they are little more effective than the American Institute of Architects, which has committees watching legislation and representatives appearing "on the Hill." There is also a National Association of Building Owners and Managers. Anybody who used the word "lobby" in connection with this group would surely be joking. There is the Mortgage Bankers Association, and the National Association of Home Builders, and what not.

Those great speculator builders who make all that money, at the expense of the masses, may have some closely guarded mafia that I don't know about but just imagine a group of building speculators trying to fight a labor union in Washington.

Well, that's not really the point. The point is that, powerful or poor, real estate interests are a heterogeneous group. You may hate real estate interests if you want to, and charge them with sinful self-interest, but you really can't call them a "lobby."

Criticism again, or yes, no, or maybe

In a stately fashion, the American Institute of Architects comes out in favor of architectural criticism. The Board of Directors "authorized the exploration of programs" for educating the public, and so on. The committee "is to investigate the possibility" of Institute fellowships to promising critics, and possibly awards to working critics.

The report gets a little double-talkish when it gets around to criticism of one architect's work by his fellow architects. "Good architecture cannot be created in a vacuum; the reaction to an architect's works by his fellow practitioners . . . may be considered an integral part of the function of a building as a work of art."

But: "Criticism by an individual architect of fellow architects' work is limited by the A.I.A.'s professional code of ethics. The authors of the report believe that effective criticism may be conducted within the framework of the mandatory rule stating, 'An architect shall not knowingly injure or attempt to injure falsely or maliciously the professional reputation, prospects, or practice of another architect'."

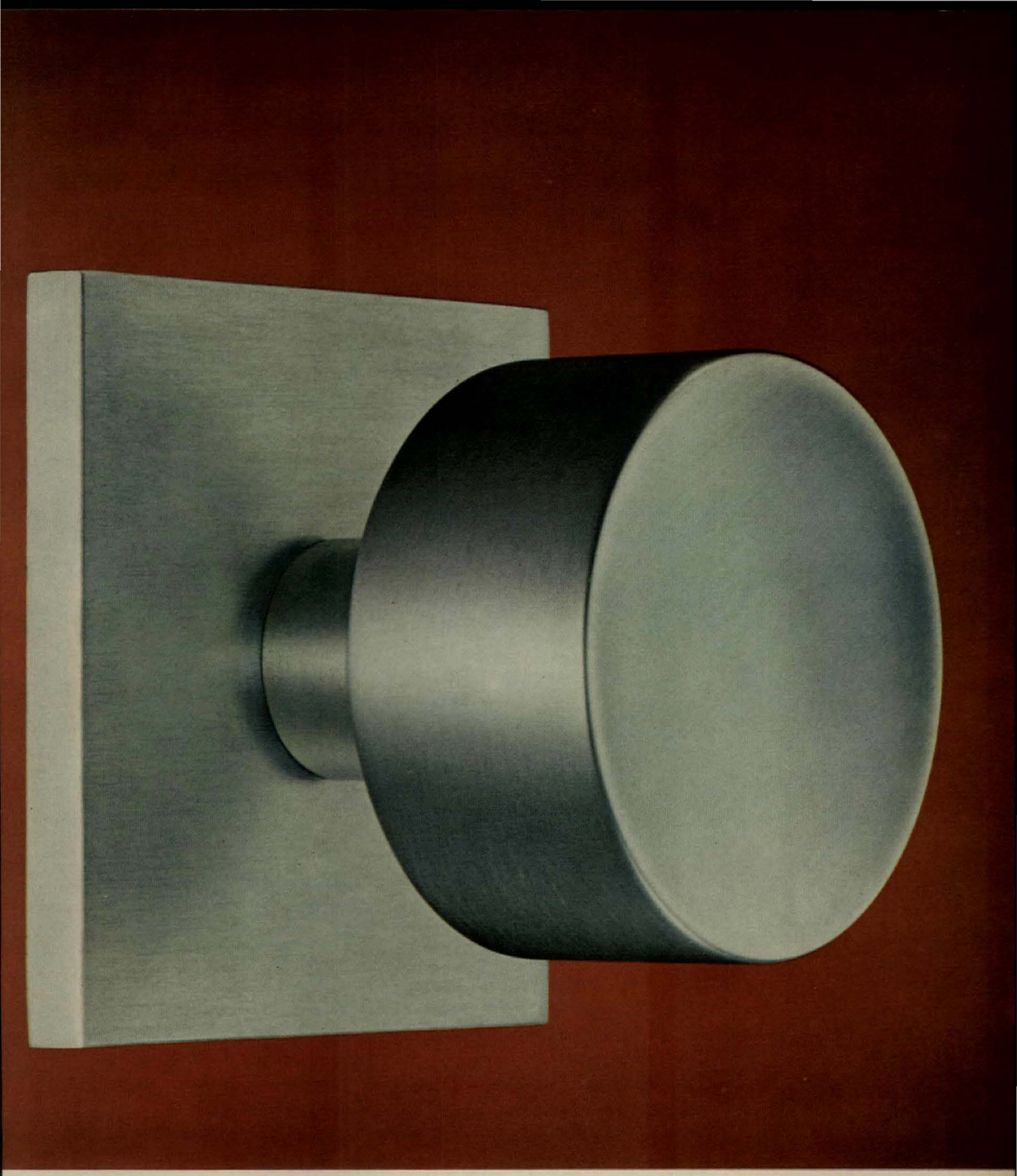
Criticize your fellow but forget his client

When reading the report of the esthetics committee of the A.I.A. on criticism I noticed what I considered a strange omission. The report went on for several pages about criticism of an architect's work by his fellows, and about possible damage to his reputation and his practice. It said not one word about the effect of that criticism on the value of the building, or the fortunes of the client who owned it.

One supposes that the esthetics committee simply made the tacit assumption that architecture is just art, and as art it is vulnerable to criticism, let the blows fall where they may. Who is the owner to object?

Well, I'll tell you who he is; he is the one who raises all the hell with the publication that prints the criticism which he considers damaging. He is the one who does the same thing with the architect who sounded off to the detriment of his property. He is not the only one, of course; the architect whose work is negatively attacked charges just as hard. An editor can pretty well predict when he (or his superior) is going to get a nasty letter Not that he lets it bother him too much; you would be surprised at how welcome nasty letters are to publishers.

I am merely remarking that the nastiest letters, the ones threatening suit, come from the owners of the criticized building. They have the deplorable habit of thinking of their buildings as investments, not as works of art, and they don't relish any drop in value.



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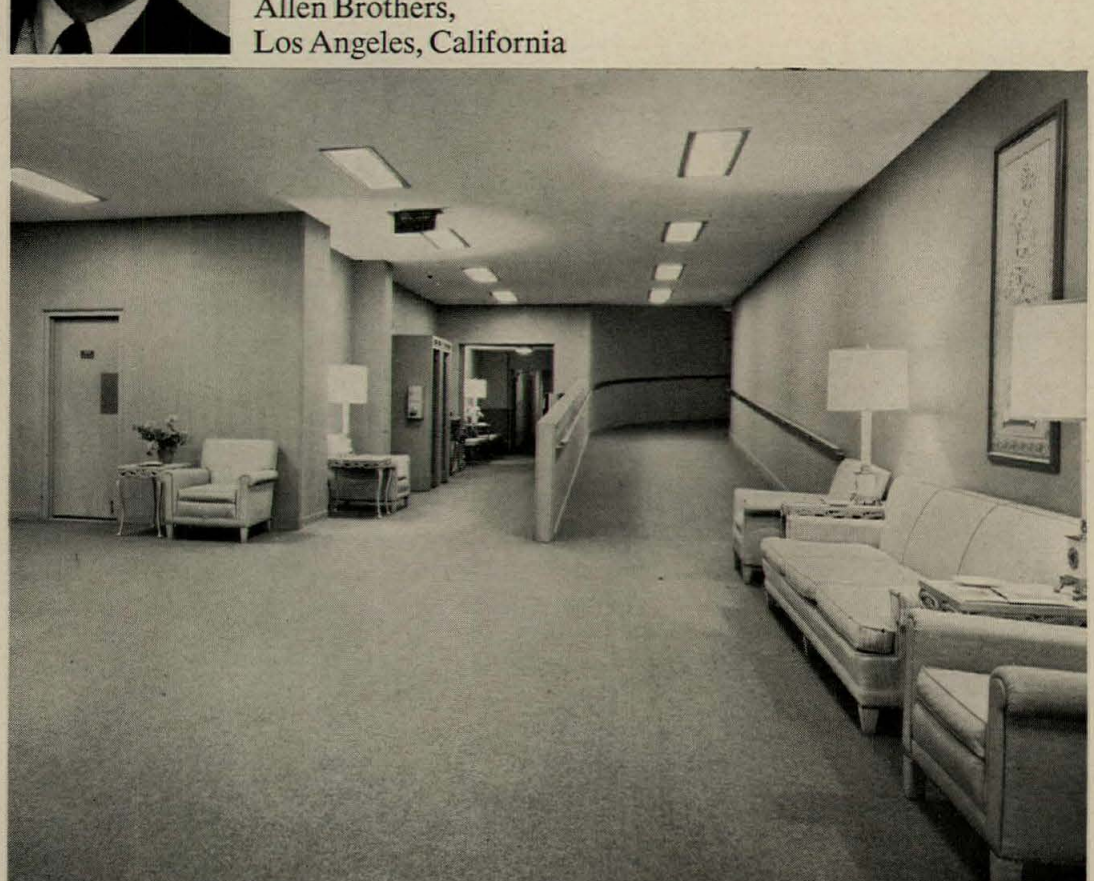

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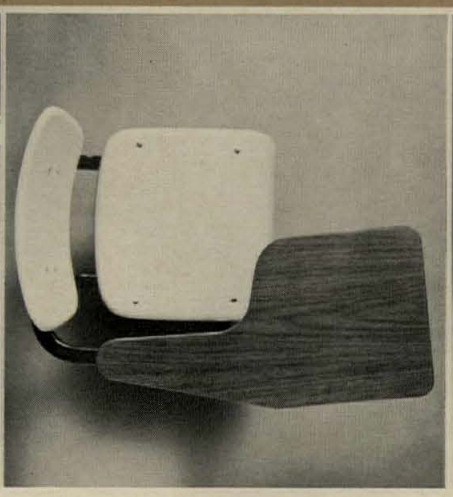

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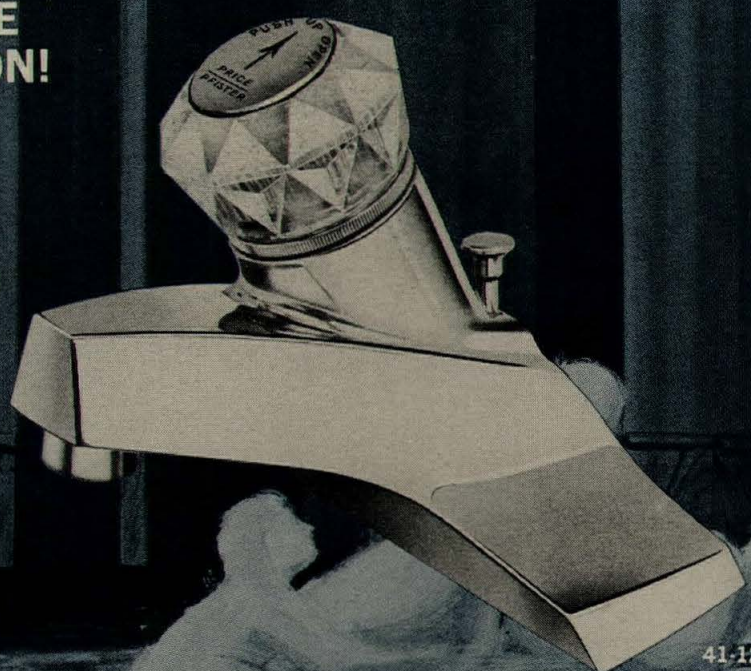

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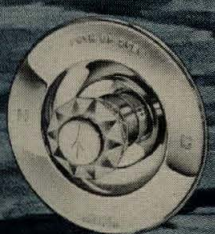

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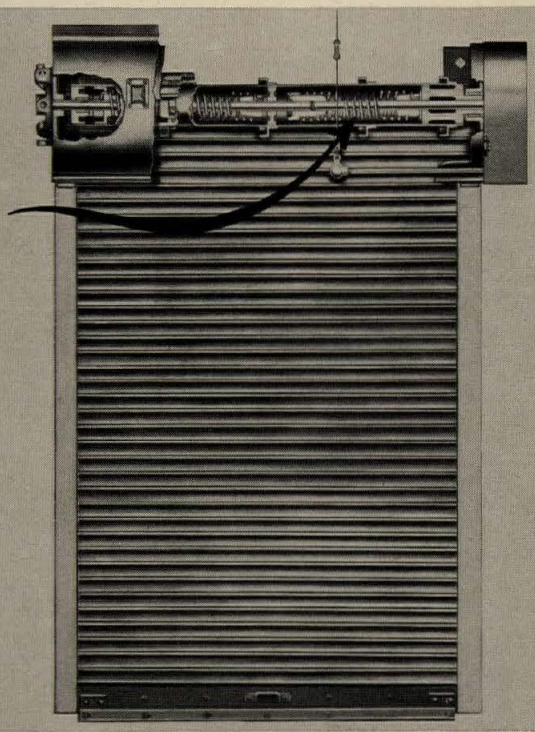

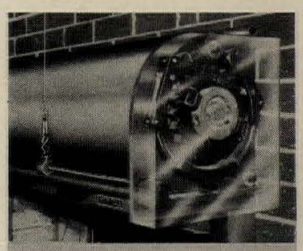

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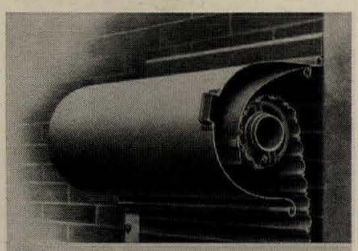

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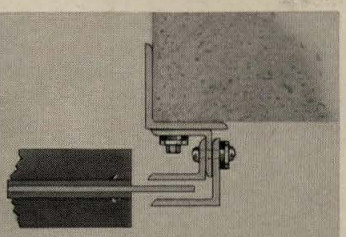

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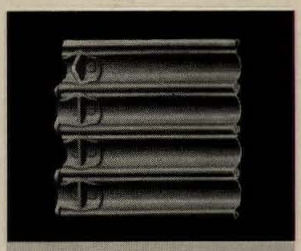

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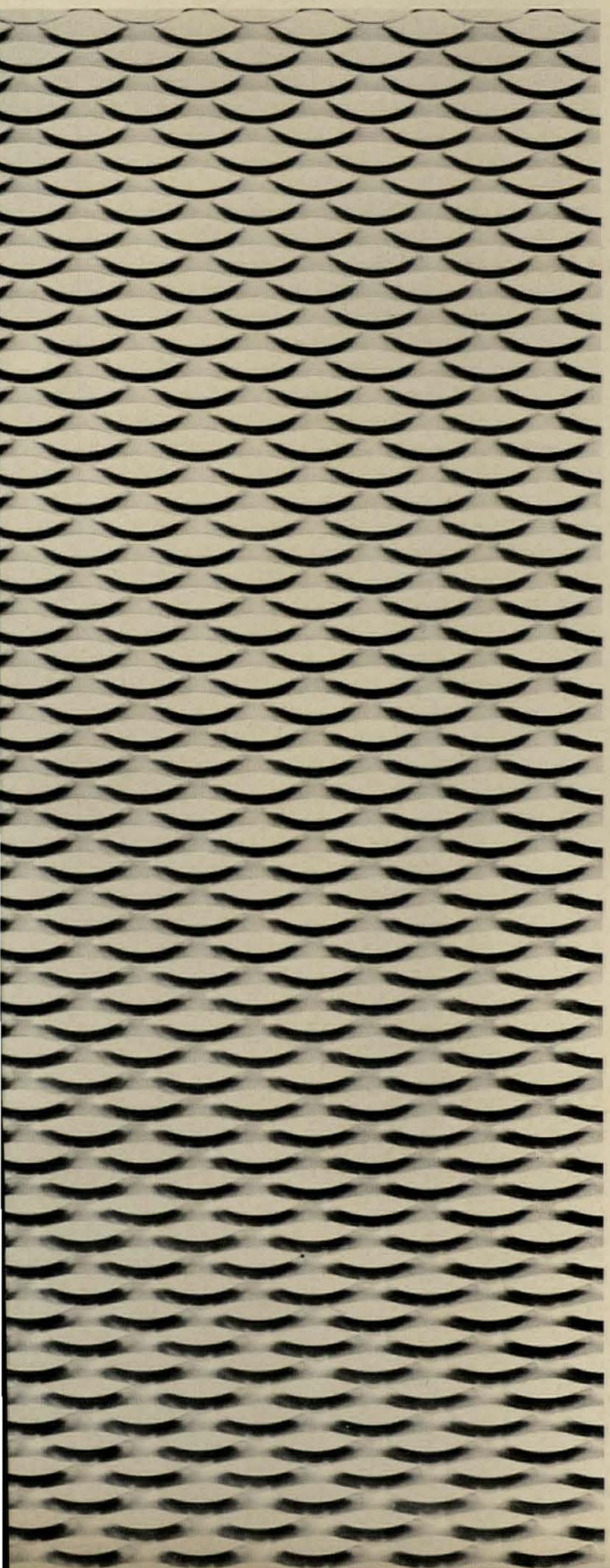

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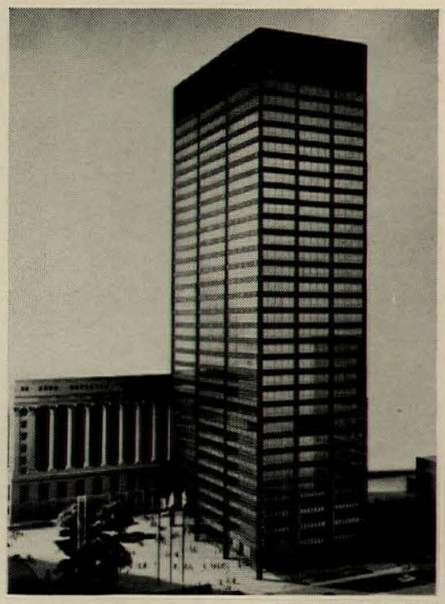

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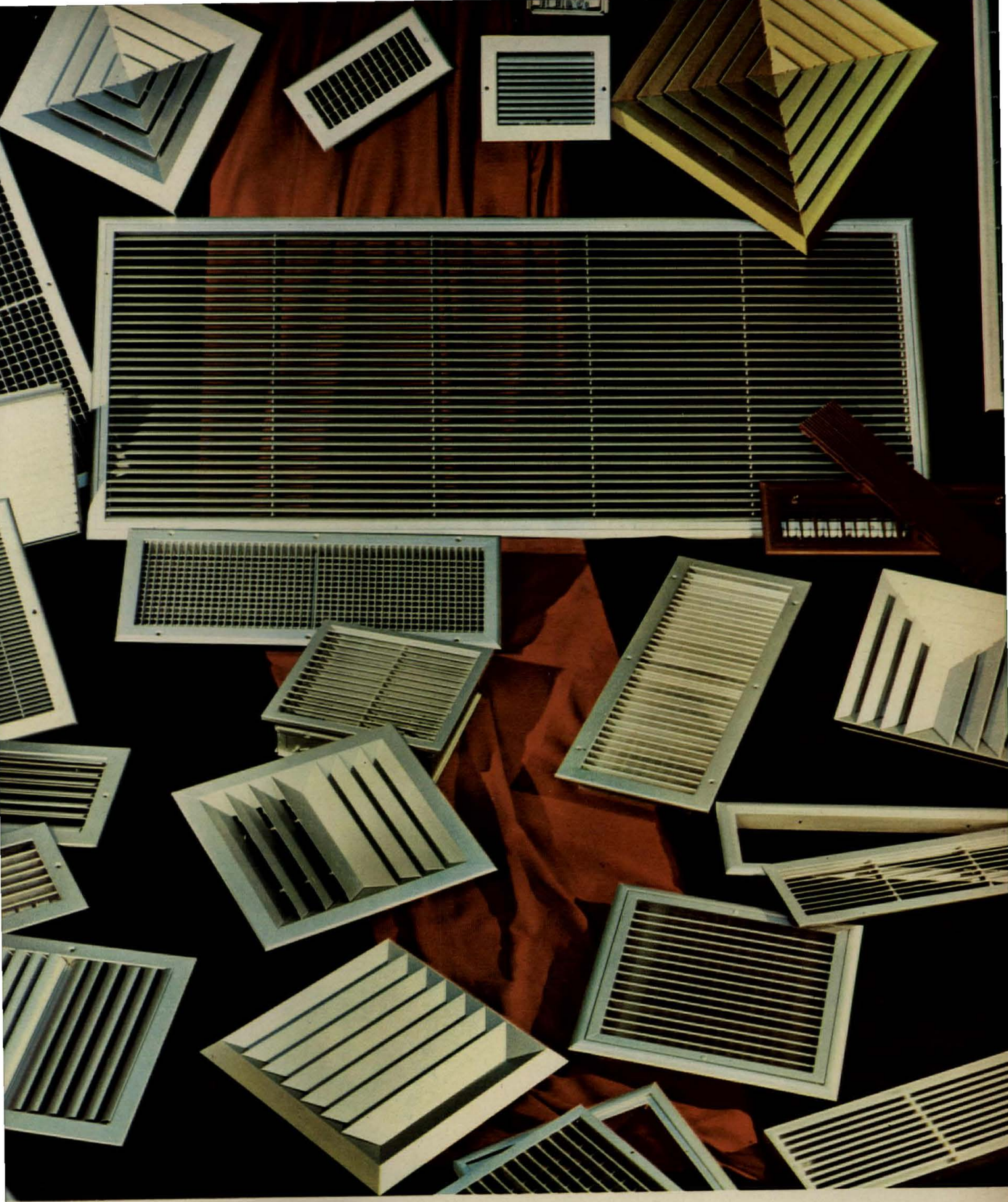

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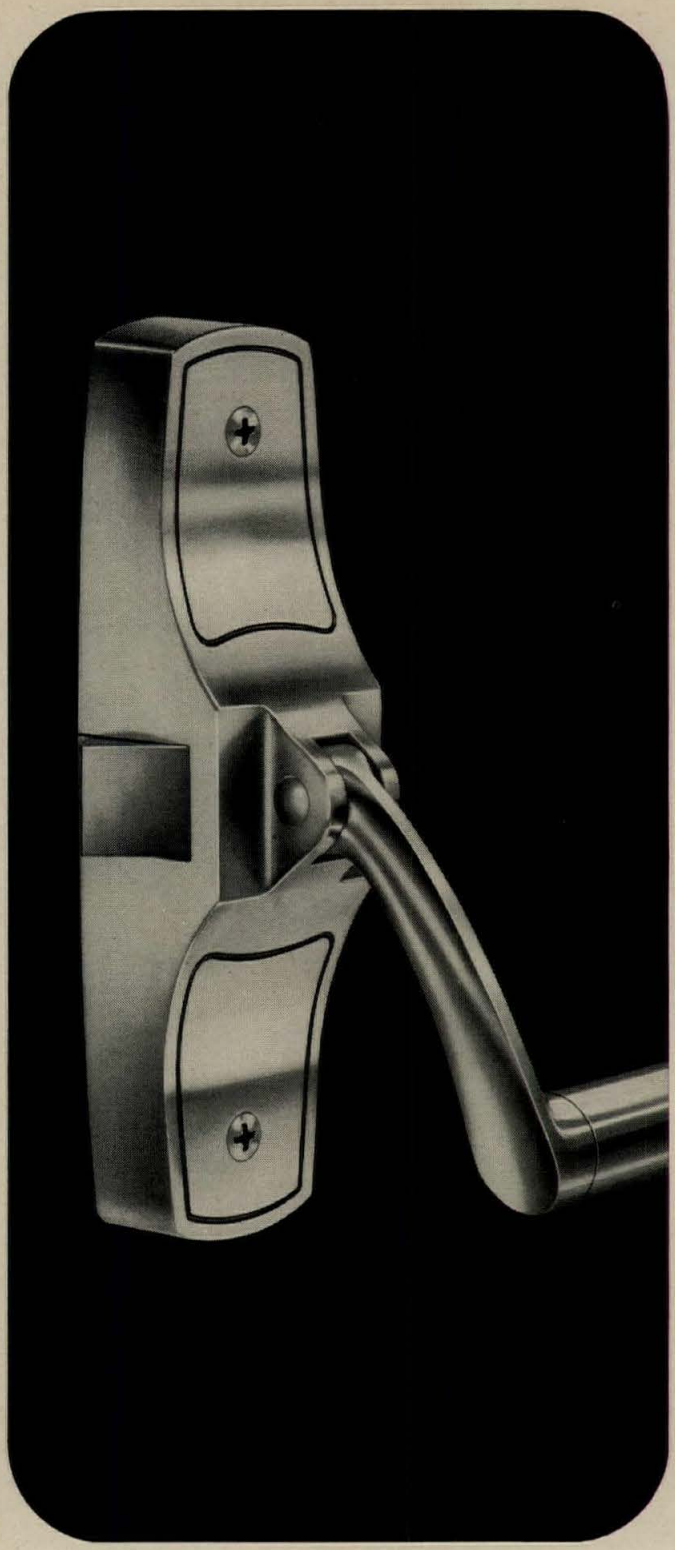

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raceful, curving ribs of concrete roof a modern tropical garden. In the new Boettcher Con-ervatory of Denver's Botanic Gardens, concrete achieves a striking departure in design and construction. ☐ Ribs of reinforced concrete are used to create the 450-window roof. Rising in a 50-foot high curve, they ere entirely cast in place with integral condensate reglets and glazing channels. ☐ Boldness of the concrete ccentuates the transparency of the unique pyramidal plastic lights. Progressing upward in diminishing size, e linked window shapes produce a new and pleasing visual experience. ☐ Throughout the structure, even to the balconies for high-level viewing of the plant exhibits, concrete brings aesthetic rewards – along with minimized maintenance in the humid, tropical atmosphere. Across the nation, today's most imaginative structures of every ype and size demonstrate the unequaled versatility of modern concrete.

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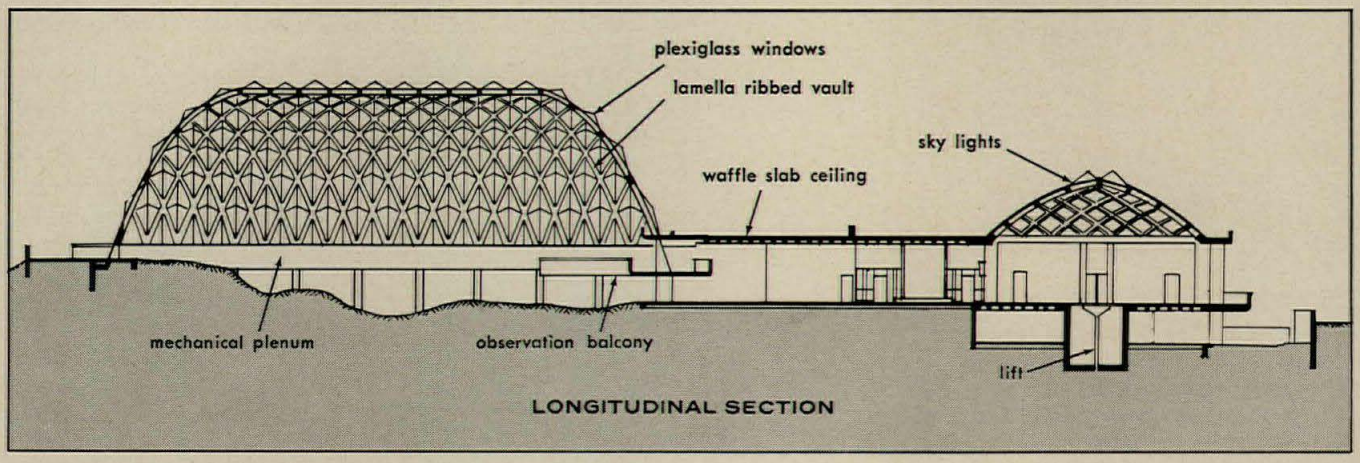
organization to improve and extend the uses of concrete, made possible by the financial support of most competing cement manufacturers in the United States and Canada 33 West Grand Ave., Chicago, Ill. 60610

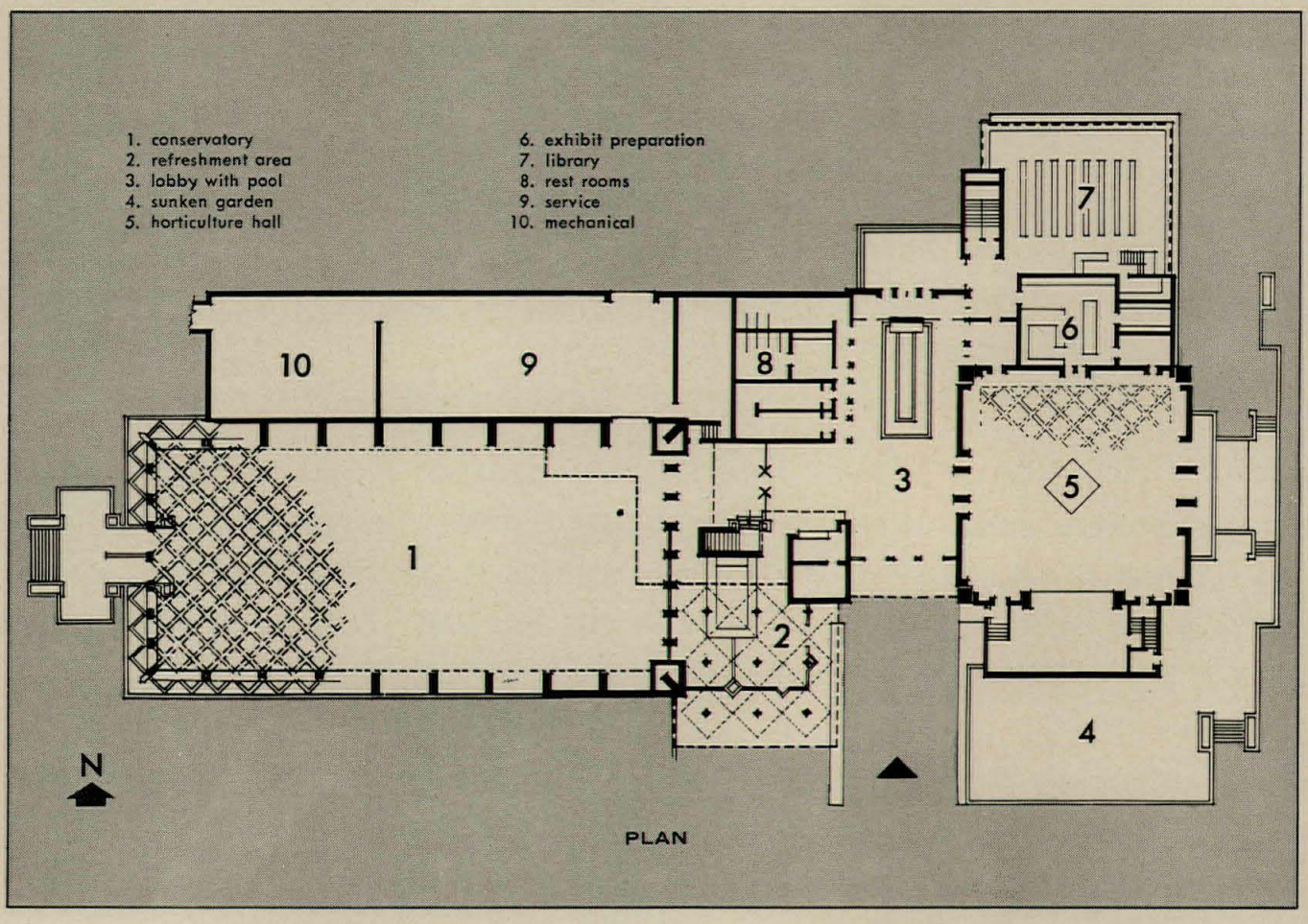


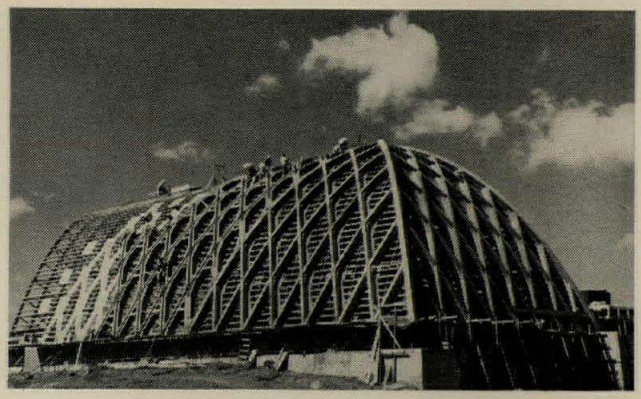
Architects exploit esthetic potential of concrete in Denver Botanic Gardens

Designed to an educational function, as well as for public enjoyment, the new Denver Botanic Gardens are located on an 18-acre site with a view of Colorado's Rocky Mountains. When completed, the Gardens will embrace a complex of integrated building units for the study and exhibition of plant life, as shown above and below in the longitudinal section and plan drawings.

Dominating the Gardens is the recently completed Boettcher Conservatory. More than a full year of study and design went into its planning. Problem solutions for the 72-ft. by 160-ft. facility are projectable to similar structures many times its size.

Esthetic potential was a vital factor in the choice of concrete. However, concrete also offered the low maintenance characteristics and durability that met important owner requirements.





Conservatory frame designed to translate full load into compressive force

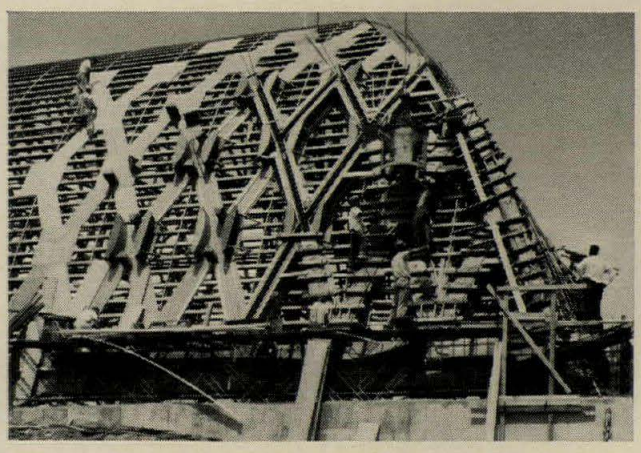
The Conservatory's lamella-type vault is designed as an inverted catenary curve and intersects with half catenary end sections.

The frame is based on an 8-ft. module. When projected in plan, frame ribs intersect at 45 degrees to form diamond-shaped openings of nine different sizes. These openings, square at the peak of the vault, become progressively longer toward the bottom. Alternate ribs bear on narrow concrete buttresses spaced 16 ft. apart, while intermediate ribs are carried on a continuous grade beam.

Theoretically, there is no bending in the 10-in. by 16-in. rectangular frame members. They carry only compressive forces.

The required frame strength was readily achieved with a structural lightweight concrete of the following mix proportions:

Portland cement, Type I	658 lb. per cu. yd.
Expanded shale, #8 max.	720 lb. per cu. yd.
Expanded shale, ⅜ in. max.	885 lb. per cu. yd.
Water	333 lb. per cu. yd.
Entrained air, average	11 percent
Slump	5 inches
Unit weight, average	92 lb. per cu. ft.
Strength at 28 days	5200-6200 psi

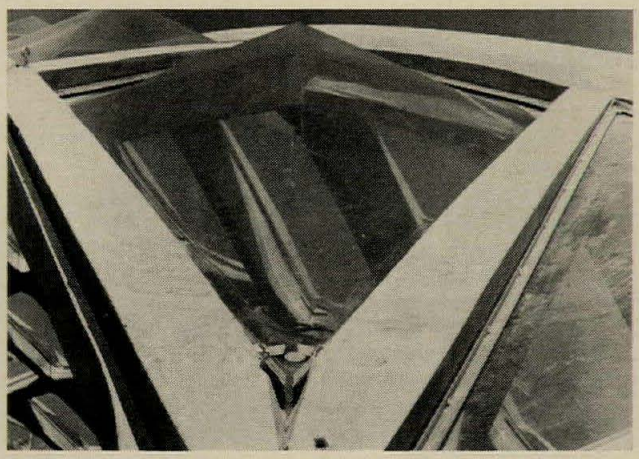


Rib members constructed without use of detailed drawings

Formwork for casting the Conservatory frame was supported on a series of bow-string trusses, acting in pairs and hinged at the top. Outlines for the arch ribs were drawn on plywood panels, as shown in the photo, and the formwork for each rib was built up from the bottom.

No detailed shop drawings were used. Instead, the architect worked closely with the contractor from the beginning of the project to develop an efficient system of construction.

Concrete was placed in 10- to 15-yard increments permitting repeated reuse of the forms. Ribs in the lower portions of the vault required cover forms to retain concrete during placement. Each rib was filled in 16-in. increments, and the concrete was vibrated through access holes in the cover forms, which were later plugged.

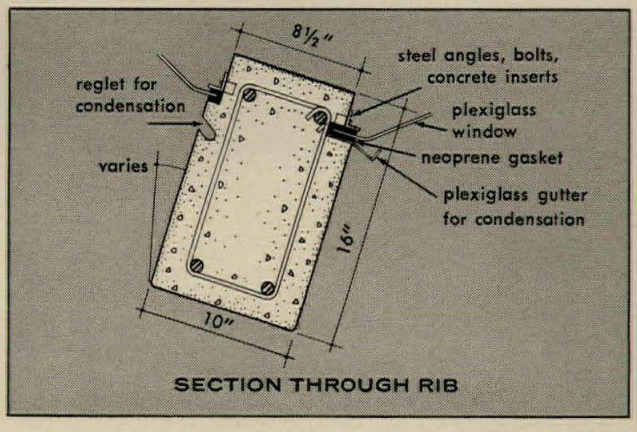


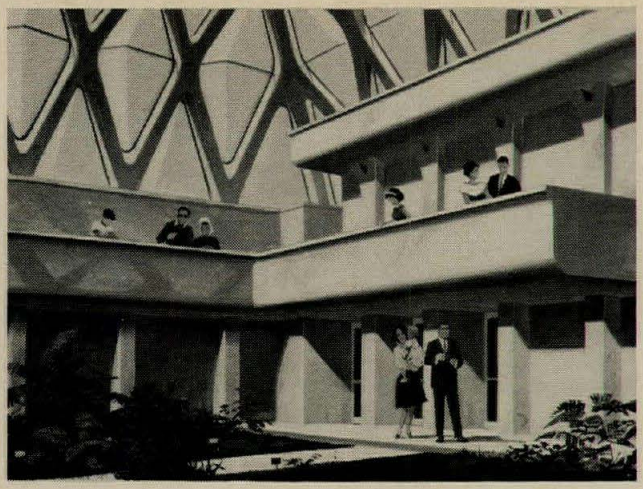
Unique tetrahedronal windows include miniaturized gutter system to prevent condensation drip

Glazing of the diamond-shaped frame openings is ¼-in. clear plexiglass, shaped as tetrahedrons of varying height. (See photo above.) Each is formed from a single sheet, except for the larger units in the bottom two rows. Setting in neoprene gaskets, as shown in the detail below, provides a permanently tight seal.

The system devised to collect condensation from the windows and prevent drip is both effective and inconspicuous. Small reglets have been cast into the concrete on the upper side of the ribs; plexiglass gutters are mounted on the lower side. Condensation collected then drains to the outside through weep holes at the lowest corner of each diamond.

Full-scale mock-up panels of the window units were constructed and tested to check gasket seal retention and efficiency of the condensate handling system.

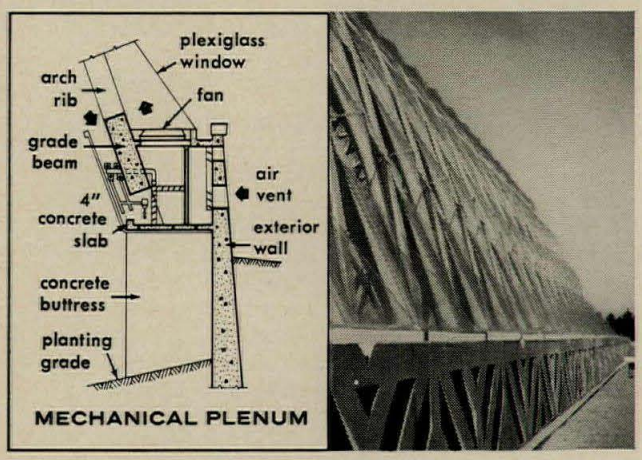




"Hilltop view" achieved with multi-level balconies

Recognition that indoor gardens, just as outdoor scenes, take on an added dimension in beauty when viewed from above made high observation points a prime requirement.

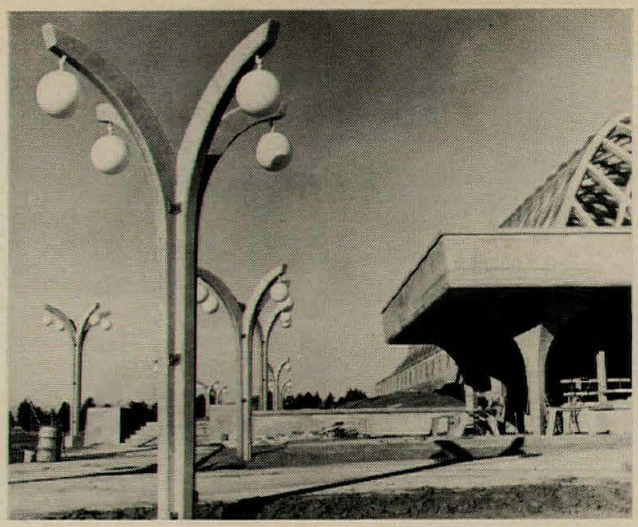
Varied viewer perspective has been provided in the Conservatory by cantilevered balconies at approx. 8-ft., 12-ft. and 17-ft. levels. 8-in. reinforced slabs of structural lightweight concrete are used, with integrally cast railings. Integration of the balconies with the garden scene was enhanced by Colorado red quartzite stone overlays for floors and trim for copings.



Mechanical plenum integrated into concrete design

Mechanical equipment for heating, cooling and ventilating is concealed and integrated into the structural system forming a continuous plenum at the base of the ribs. Fresh air intakes in the exterior walls of the Conservatory are concealed behind a decorative chevron design (see photo above). Fresh air or recirculated air can be forced upward from the plenum by 32 propeller fans around the base of the Conservatory.

In the summer, cooling is accomplished by evaporation making use of air vents at the base of the Conservatory and 11 ventilating skylights at the top of the vault. In the winter, fans blow air through steam fin tubes to heat the Conservatory.



Precasting permits custom-designed lamp posts at low cost

Specific design ideas in lighting fixtures for the Gardens were made possible by concrete. The architect wanted an atmosphere of a park at night. 15-ft. tree-shaped lamp posts, comprised of four identical sections bolted together, were cast on the site.

Use of a single form shape for all sections speeded reinforcing, casting and handling, resulting in economy. Posts have a smooth hand-rubbed finish. Bolted connections will be concealed with bronze-plated cover boxes.

Lamp posts inside the Conservatory are of the same design but also serve as ventilators. Fans in boxes at the base of the posts force air up through the center of the posts.

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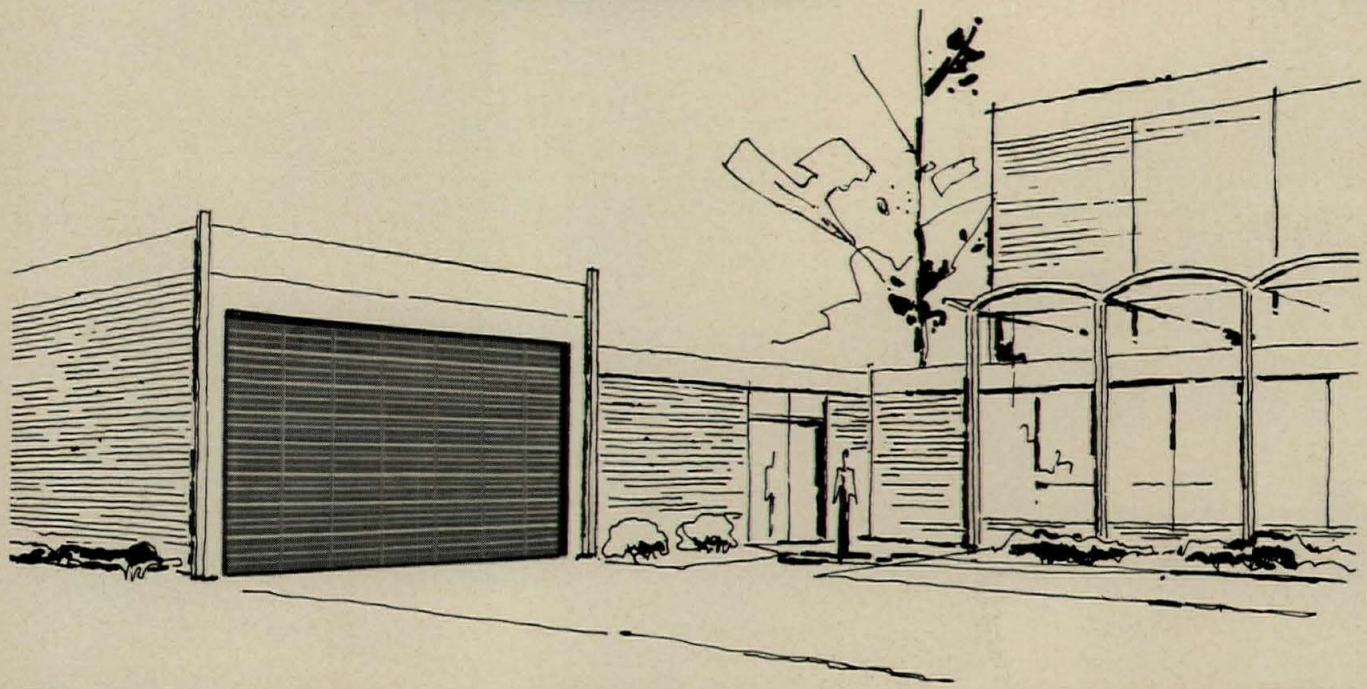

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The stepped-up search for new ways to make better cities

Four Governor's Conferences on Beauty have been held in as many western states in the last six months, bringing to the regional level of public consciousness the already nationally expressed concern for the human environment of the U.S.A. Few new ideas were presented at these conferences; that wasn't their purpose. What they did do was to popularize the idea of beauty, to make it a goal of possible achievement, to put it in the public eye.

What these conferences didn't do was to hang specific responsibility for specific accomplishment on specific groups. Recommendations stated that "the governor should . . ." or "the legislature should . . ."

But neither the governor nor the legislature can (or is willing to) effect such reforms, if such they are, without strong assurance of public support.

What needs to be done now is to pick up the battle-cry and carry-on the crusade. The national A.I.A.'s "war on ugliness" is, fortunately, already in swing, and gradually more and more chapters are finding ways in which they may wage the campaign. Oregon's Lewis Crutcher with his satirical slide presentation has for some years been a one-man crusade against ugliness: the California Council has commissioned a comparable slide presentation. And there are increasing numbers of "community beautiful" committees. And art commissions, state, county, and city.

All these are good. But they are limited in their nature. The slide shows catch the attention. But who carries the ball from there on? Community Beautiful plants trees—and hides ugliness. But who—or what—can forestall ugliness in the first place? Art commissions deal with stipulated concerns.

Why not a commission on the environment, charged with leadership, and manned by professionals, in the field of environmental design? Such a group, at whatever level, would seem to be a logical extension of the motivations of the new HUD. And it would permit persons of competence in a highly specialized area of public concern to contribute to the over-all benefit.

A soul-searching by industry

Within the same period of time, a smaller conference with a potentially wider influence was also held in the West. This was the symposium held jointly at Riverside, California by American Concrete Corporation and ACTION (now Urban America, Inc.) as part of the dedication of A.C.C.'S new technical research center in Riverside. The three-part program explored the future American city, through a panel made up of representatives of industry; sought a response to the challenge, with another group of similar representative panelists; and reached for proposals for action with a third panel. What industry was asking, not only of its own people but of others as well, was: "What can industry do to make American cities good places to live?"

THIS MONTH'S WESTERN REPORTS:

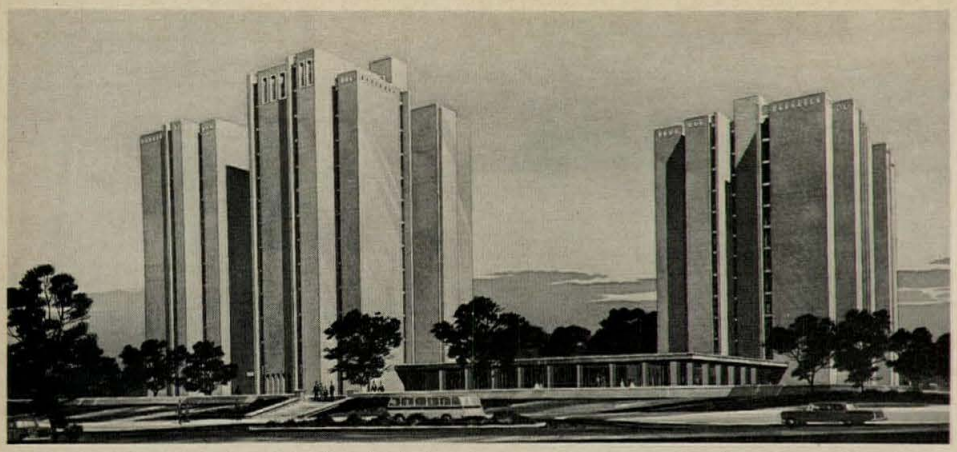
Money for planning, government help, technological innovation, tax reform, codes revision, public leadership: these were the most frequently mentioned requirements for the means of making better cities. Taste leadership, too, was mentioned, and the need for its demonstration by architects, business leaders and civic officials. But when it came to proposals for action—for actual, specific action by industry itself—the one strong recommendation was that companies and corporations establish a new corporate office, a secretary of civic affairs, to provide an overview of the whole community and to act as spokesman for the company in community concerns.

An excellent suggestion. One which some forward-looking companies have already put into effect, and which could be well extended. But proposal for action much closer to home was never mentioned.

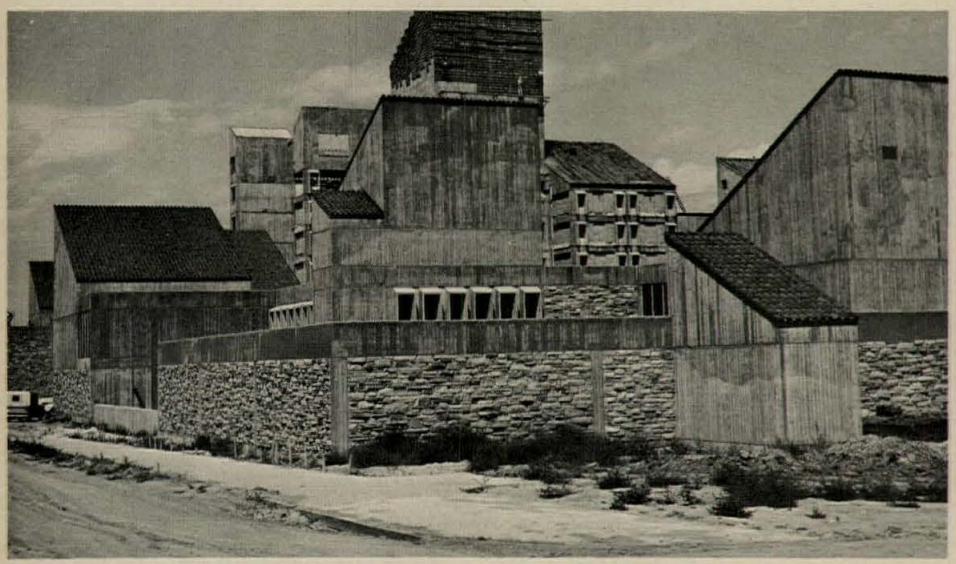
One of the chief causes of urban ugliness is the design of products which must be used on the streets of a city and in the buildings which line the streets. If industry wants to do something immediate and long-lasting and necessary, it could appoint, in addition to the secretary for civic affairs, a consultant on the esthetics of its products. A few industries have, with signal success, done just this. But if more industries would seek and abide by the continuing advice of top-level design professionals, they could influence for good the appearance of cities as no other segment of today's society can do. For as one of the panelists—Lyle Fitch, of the Institute of Public Administration—said, "The public wants are restricted to what the public can see on a shelf." But first it has to be there to see.

—Elisabeth Kendall Thompson

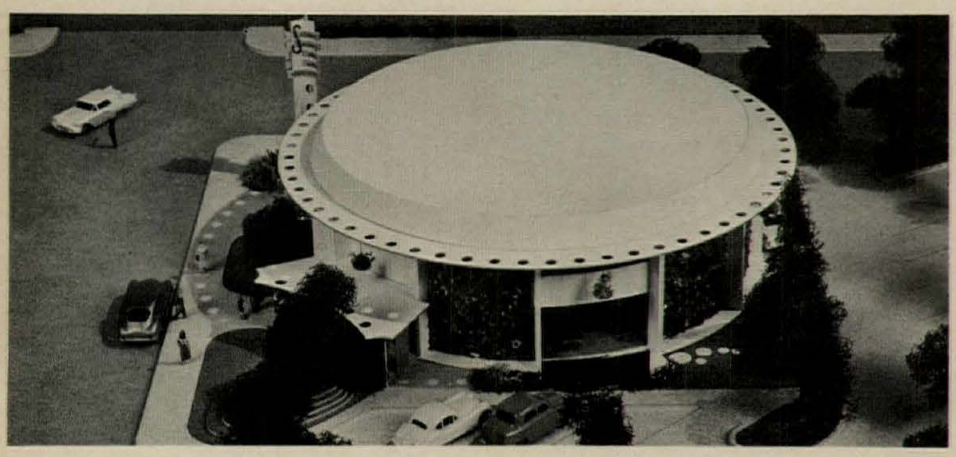
WESTERN BUILDINGS IN THE NEWS



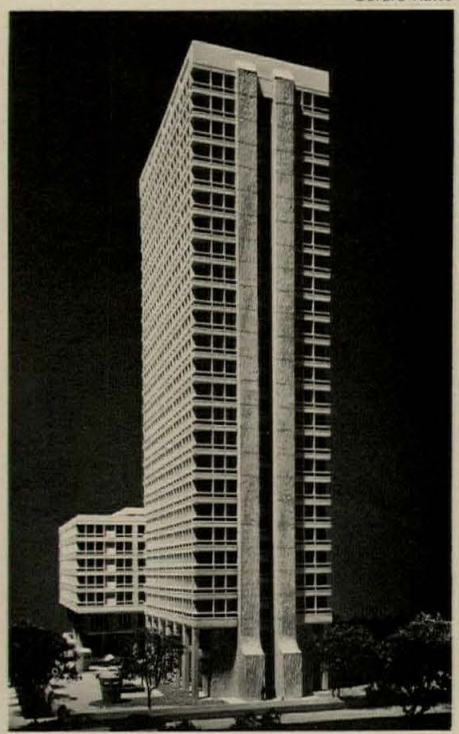
The University of Colorado's first high-rise residence halls will be completed this fall at a cost of $5.4 million, and will house 425 women in one of the two towers, 425 men in the other. Both towers contain single and double rooms and, in addition, three floors of apartments for from two-to-four students each. In the woman's tower, the 13th floor is a snack room in the men's, a library. These two towers are the first phase of Williams Village, a complex which will eventually house 6,000 students in a variety of housing types, each determined by density requirements. Phase 2 will be ready by fall 1968; phase 3, by fall 1969. Williams Village is financed by revenue bonds to be repaid by rentals. Architects: Hobart Wagener & Associates; contractor: Weaver Construction Co.



The Engineering Center at the University of Colorado will be the largest building on campus when it is completed late this spring. Within its walls—and, despite the variform elements of the Center, under one roof—will be 10 acres of space for laboratories, classrooms and faculty offices. The towers, containing offices, range from six to 11 stories in height; laboratories are in the six wings which connect with the towers. Architects: Architectural Associates of Colorado; general contractor: Dan R. Ponder Company.



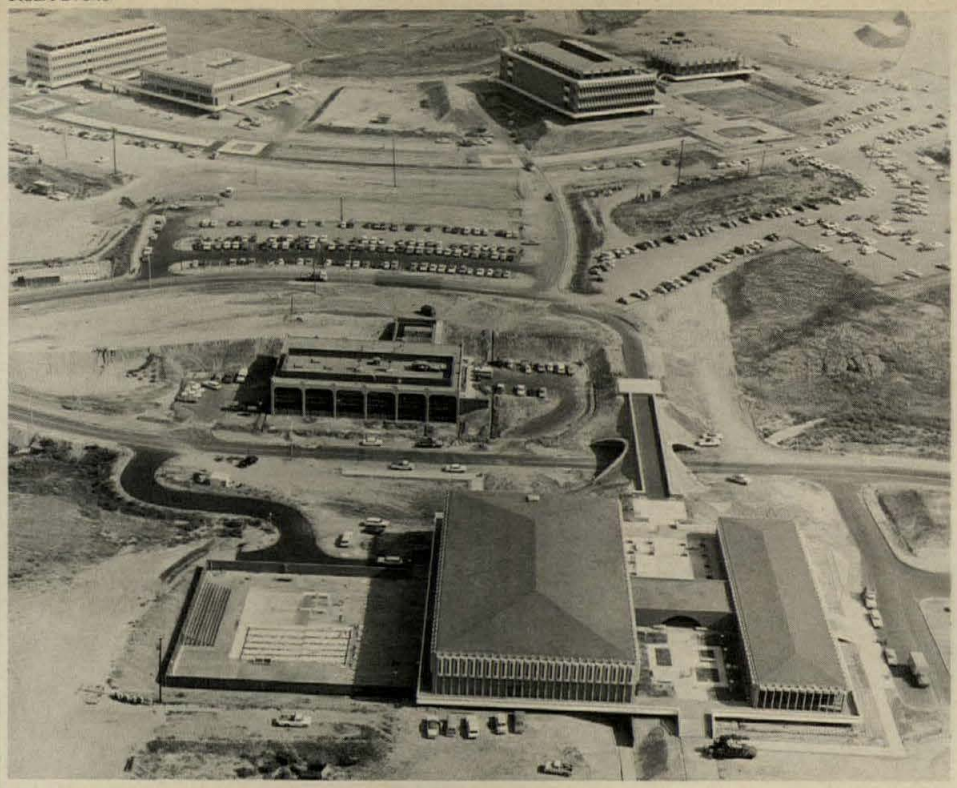
Gerald Ratto



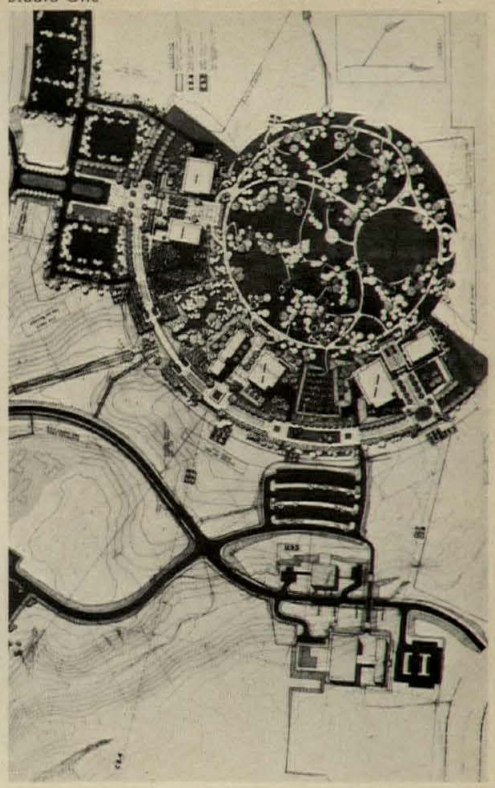
This 25-story tower—The Sequoias—is a retirement complex to be built by Northern California Presbyterian Homes, Inc. on Cathedral Hill in San Francisco's Western Addition redevelopment area. Between ground floor administrative offices and first-floor apartments is a mezzanine floor containing a 49-bed health-care unit. Parking is below grade. A special feature is the glass-roofed enclosed court six stories high—around which are grouped the communal facilities on the lower levels. Architects: Stone, Marraccini & Patterson; structural engineer: T. Y. Lin; mechanical engineer: Eagleson Associates; electrical engineers: Edward Shinn and Associates; managing contractor: Robert Chuckrow Construction Company.

Security Savings and Loan Association's new building will soon be under construction in Billings, Montana. Usual savings and loan association public functions are located on the main floor, with the company's loan department on the second floor. Below grade are a community meeting room, employes' lounge and storage. The estimated cost is $400,000. Architects: Drake, Gustafson & Associates.

Stuart Droker

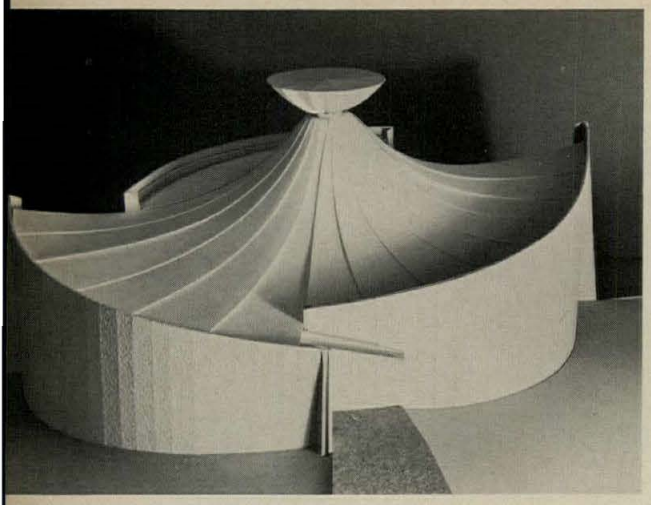


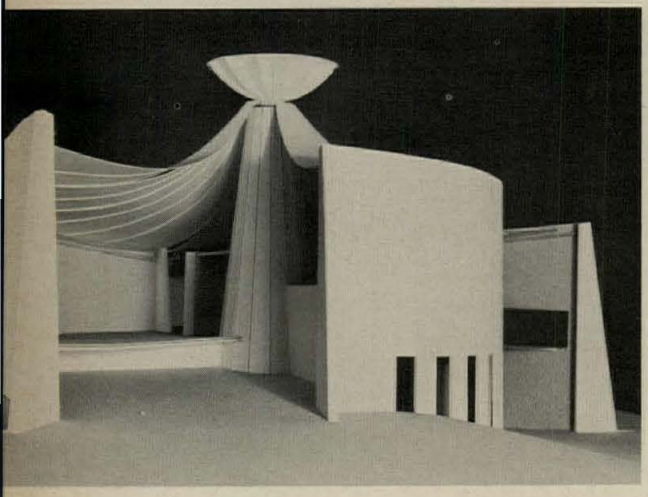
Studio One

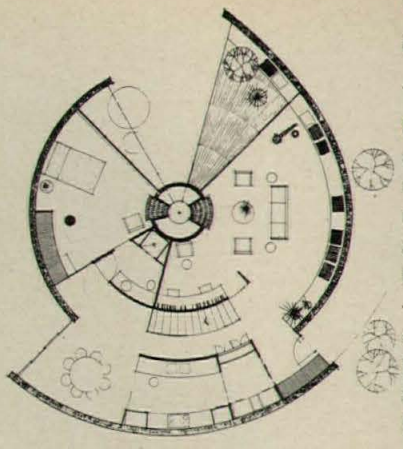


The Irvine campus of the University of California, rising from the bare rolling hills of Orange County in the southern coastal region of the state, is one of the university's three completely new campuses. When it opened last fall to its first students, Irvine campus was ready with all of the buildings scheduled for its first phase: Campus Hall (foreground); Central Plant, housing maintenance facilities, etc. (center); and in a semi-circle around what will be the campus focus (see master plan at right), Humanities-Social Sciences, Fine Arts, Natural Sciences-Engineering, Science Lecture Hall and (not shown) Mesa Court residence units. Architects: William L. Pereira & Associates, Jones and Emmons & Associates, and Blurock Ellerbroek & Associates; master plan architects: William L. Pereira & Associates.

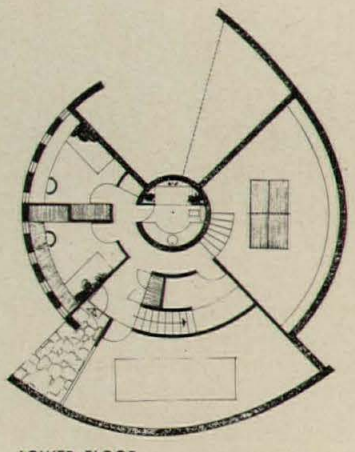
Avondale, Denver's first major redevelopment project, is providing both high-and low-rise apartment units and town houses. Just completed in the area is Avondale shopping center (left, center). A park, a school addition, a church and a business building have already been added to the project. More high-rise units and further commercial development are planned for the future.







FIRST FLOOR

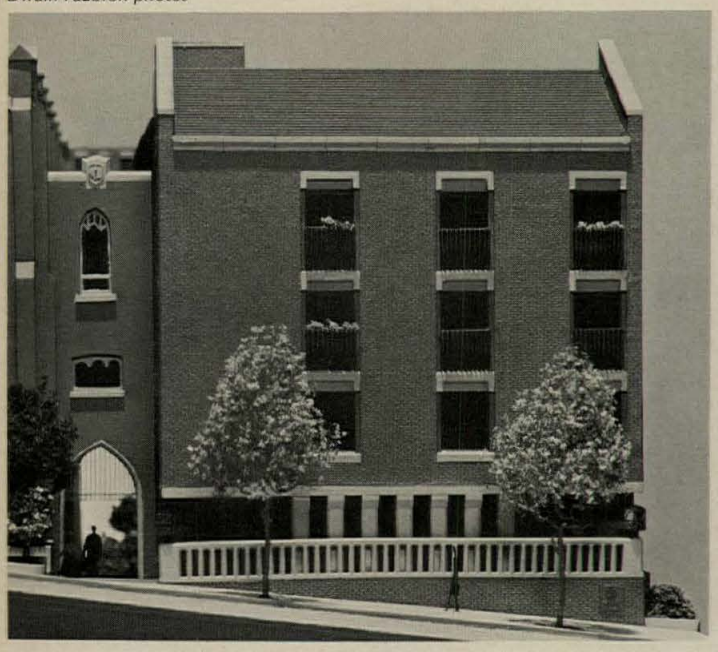


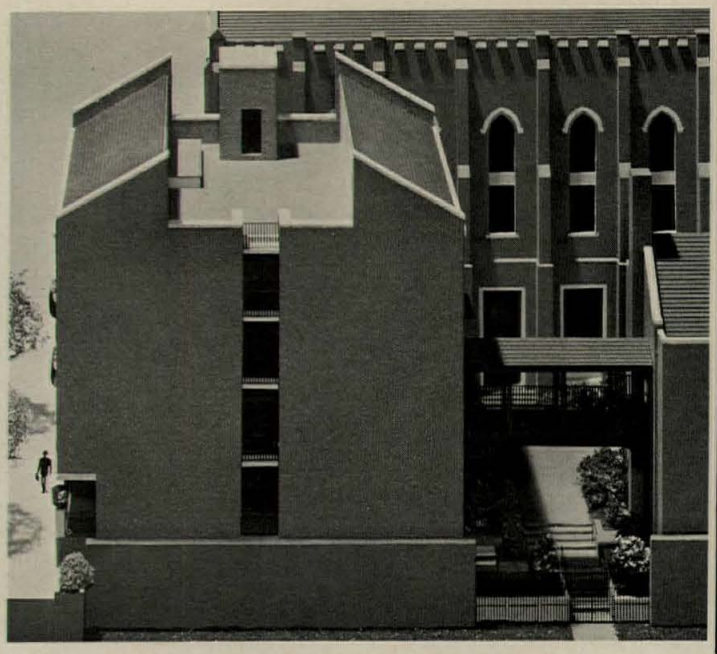
LOWER FLOOR

Curving walls: for a family, a gym horse and a Bugatti

The curving walls and catenary roof of the Frank R. Ross house, now under construction in Araphoe County, Colorado make an unusual solution to unusual requirements: the clients wanted a free-form house—"as free as cloud forms or drifting snow," they suggested—and they wanted it as non-rectilinear as possible. It had to be done on a tight budget, and it had to provide for a family of four, a leather gymnasium horse *and* a 1929 Bugatti in process of restoration. The curving walls, of poured concrete with sprayed-on finish, sweep around the site to lead the eye to a dramatic view of the Rocky Mountains. At the center of the house is a conical mast, containing all vertical services, surmounted by a concrete bowl, 10 feet in diameter, which provides for separation of services. The roof is hung from the mast. The house has two levels: living and dining areas, and master bedroom are on the main floor; the girls' bedrooms, exercise gymnasium and the automobile restoration room are on the lower level. Architect: James T. Ream; structural engineers: Ketchum, Konkel, Fleming and Ryan, and Michael Barrett, partner; general contractor: Payne Construction Co.

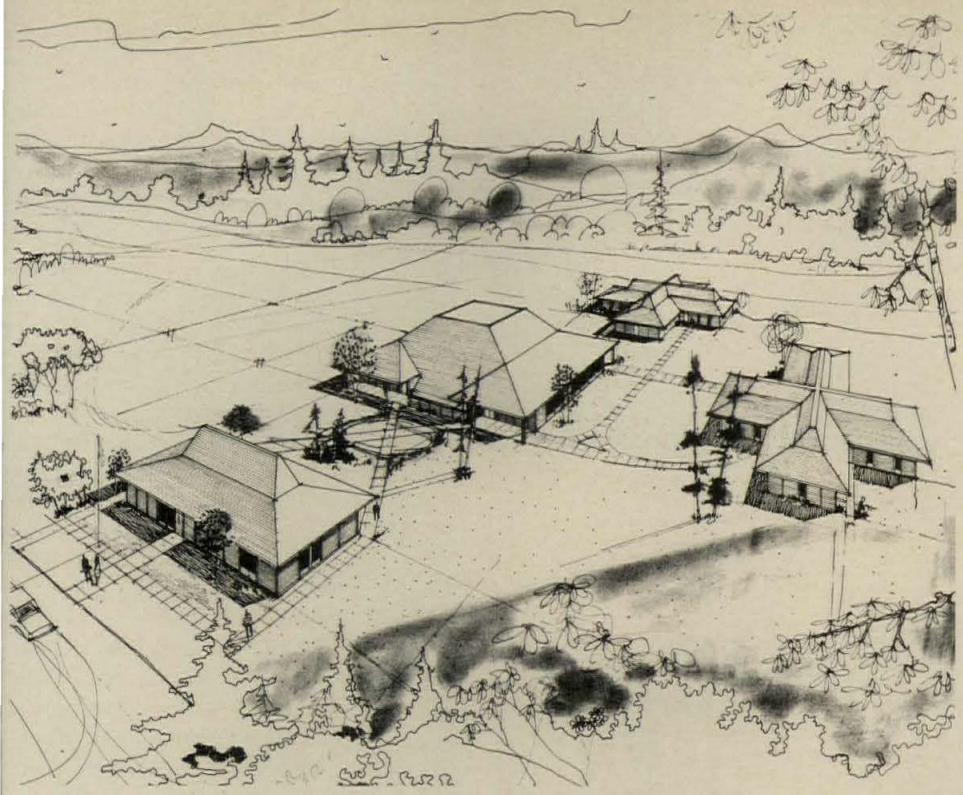
Dwain Faubion photos





A low-rise to be surrounded eventually by high-rises

The Paulist Center of the West, under construction in San Francisco between the 35-story Hartford Building and Old St. Mary's, a brick Gothic survivor of the 1906 earthquake and fire, has been designed by the same architects who did the Hartford. The loggia of the latter, and the garden court of the former, form mutually pleasant vistas, though the court is private. The Center provides a chapel; dining room; and visiting rooms. Its five stories replace a 57-year-old building whose disrepair made restoration unfeasible. When the 55-story Bank of America building is built, the Paulist Center and Old St. Mary's will be surrounded by tall buildings. Architects: Skidmore Owings and Merrill.



Alcoholics Treatment Center under way near Seattle

The first buildings for an Alcoholics Treatment Center are now under construction near Maple Valley, southeast of Seattle. Largest of the five initial buildings is the dining and recreation building. Others provide administrative offices and medical examining rooms, shop building and two dormitories with four eight-man sleeping units. Wood siding and shingle roof for exteriors, and wood paneling on the interior, are used to give the buildings a residential character. The King County Commission will administer the Center. The architects for the center are Johnston-Campanella & Company.

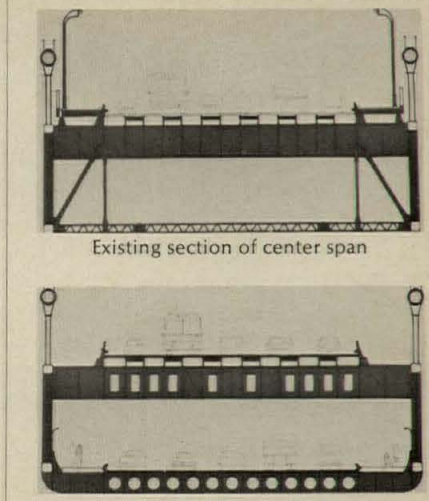
High costs trouble Bay Area Rapid Transit

In the wake of two shocks dealt by high bids on subway contracts for the Bay Area Rapid Transit system, some second looks are being taken not only at costs, but at the whole system. Rapid transit was none too popular an issue at best—the bond issue which put it through barely passed—and the recent bidding has not endeared it further to the public.

Although the $89,874,815 bid for construction of the under-Bay tube was high, the district board decided to accept it, hoping to get the state to provide the additional funds it will require. But it balked at accepting the bids on the two Oakland subway stations, first to be let. The low bid, $61,497,701, was some $13 million over the district engineers' estimates, and after a cliff-hanging finish to the debate on the bids, the board voted to reject the two bids it had received, and directed the engineers to redesign and take new bids.

The news continued bad, however. The city of Berkeley, due to have one subway station and two aerial stations within its limits, got the stunning news that the downtown subway station was now estimated at $8.5 million, in contrast to the 1964 estimate of $2.5 million. And the aerial structures would cost $10.6 each—up $7 million from the 1964 estimates.

Berkeley's interest in costs is underscored by its hope that all parts of the system within its boundaries can be put underground. Its City Council is so anxious to keep the city free of elevated structures that it has put-up $100,000 of city funds for alternate designs for the Berkeley line. These designs will be let to bids at the same time that the district engineers' combined subway-aerial system is bid. If the difference is what the city's mayor estimates it will be—based on the experience of Toronto—a bond issue will be proposed to permit full undergrounding of the Berkeley route.



Existing section of center span

Proposed section of center span

Lower deck to Golden Gate

Traffic capacity of the Golden Gate Bridge at San Francisco could be doubled by adding a lower deck, according to a proposal by Norman C. Raab, retired chief of the California State Division of Bay Toll Crossings, and Tudor Engineering Company of San Francisco. Their design would not increase present dead load and could—depending on requirements—actually lighten the structure's weight by using today's high strength steels. Further, they estimate that the five-lane lower deck could be added at one-tenth the cost of constructing a new bridge between San Francisco and Marin County to the north. A feasibility study of the proposed design has been authorized by the Golden Gate Bridge and Highway District.

WESTERN EVENTS

MARCH

6-27 Fourth Annual Southern California Exhibition. Long Beach Museum of Art, Long Beach, California.

11-April **24** All California Art Exhibition. Fine Arts Gallery, San Diego, California.

APRIL

4 Seminar Series, "Construction Documents, Preparation through Supervision," sponsored by Construction Specifications Institute and College of Architecture and Urban Planning, University of Washington, Seattle.

24-29 28th Annual Convention National Association of Architectural Metal Manufacturers. Mark Hopkins Hotel, San Francisco.

26-28 27th National Conference on Religious Architecture. Sheraton Palace Hotel, San Francisco.

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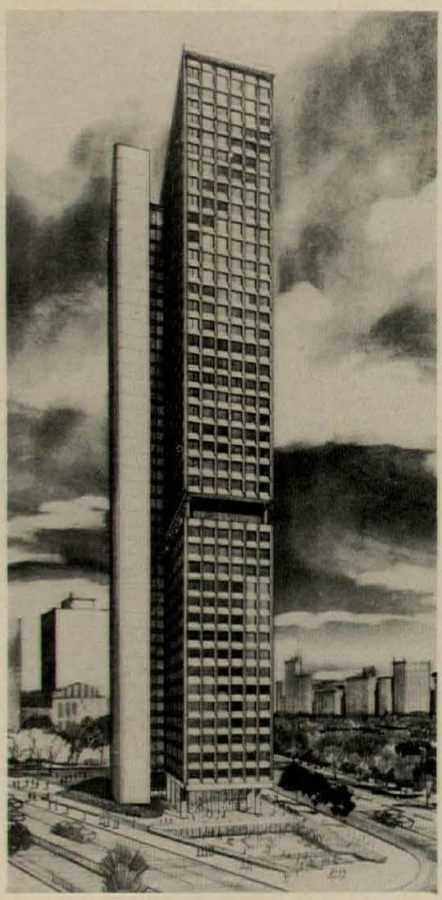

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Architect
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So did more than 800 others in Southern California last year.

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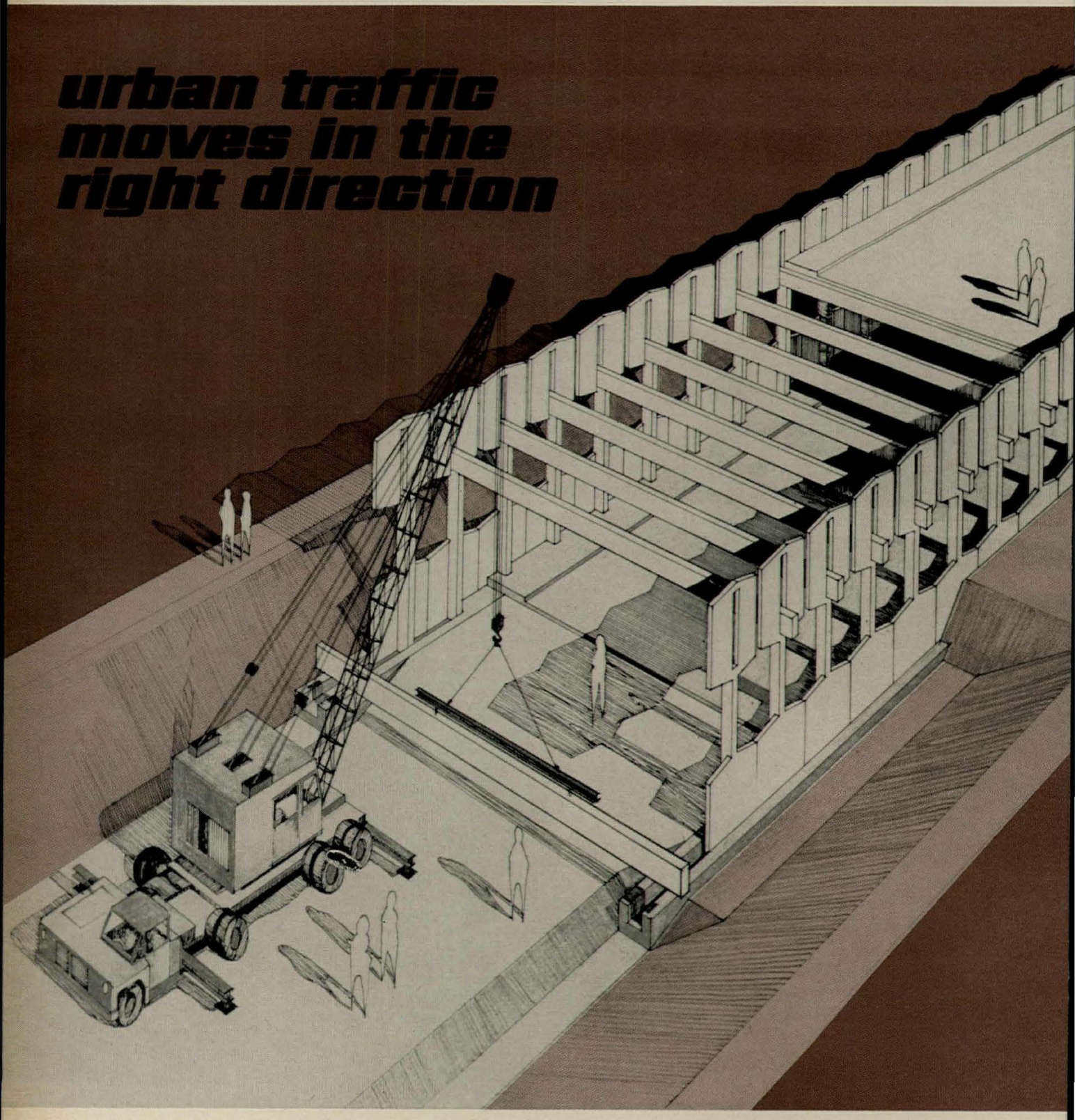
NEW DIMENSIONS IN CONCRETE

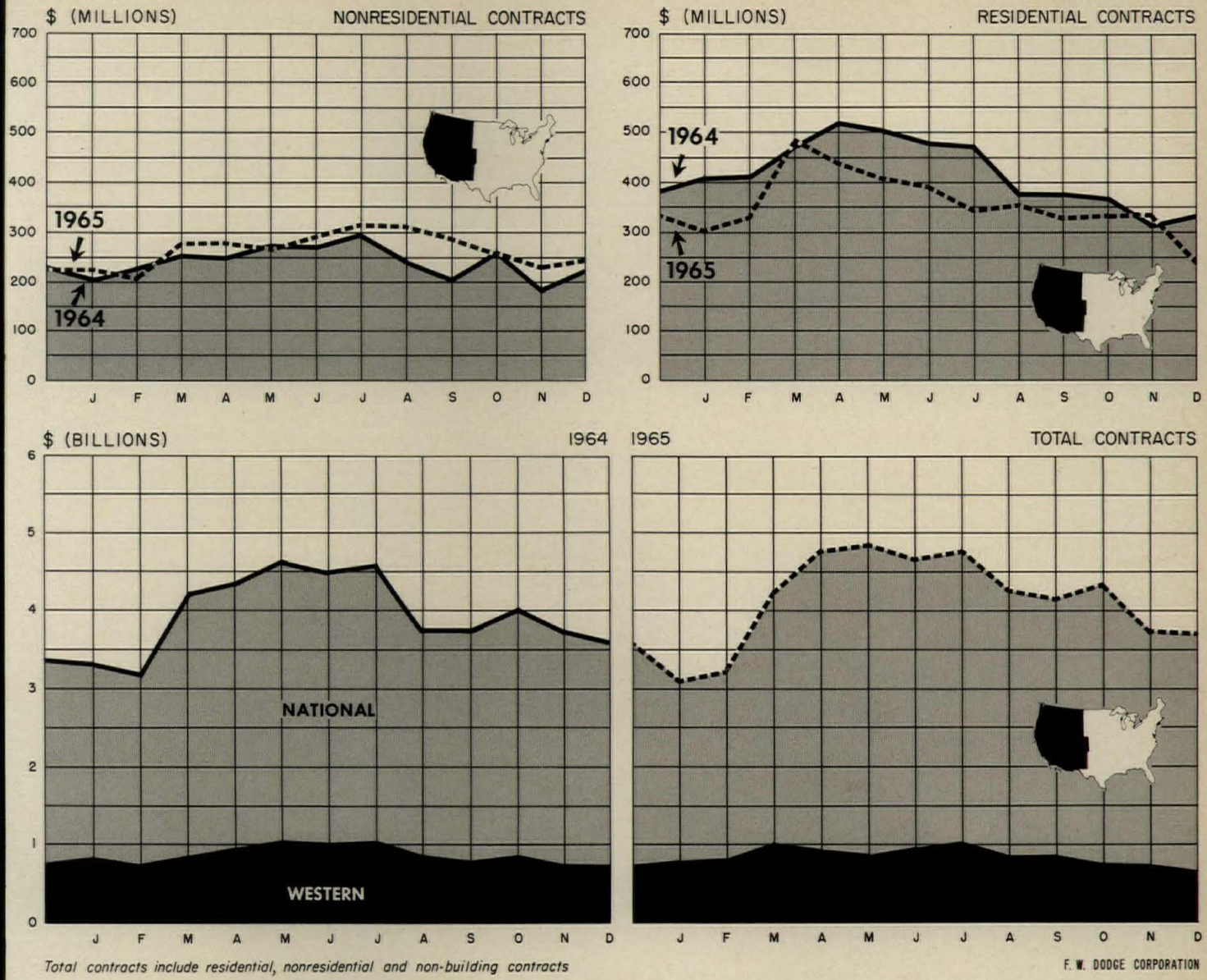
This double-deck viaduct, a hypothetical design, is engineered to reduce the objectionable bulk and high cost of urban freeways. With its lower deck running below surface, its height can be restricted well under a single story building. And its two-level design conserves space to cut the high cost of downtown land acquisition. As described by Yee: "Construction requires two basic elements, a precast, prestressed concrete deck stringer and a precast, prestressed concrete supporting wall. The wall element is shaped like a double lollipop with the bottom panel acting as a retaining wall for the freeway structure, and the upper panel as a guard rail for upper deck traffic. The stringers are rectangular or single or double tee in cross section to eliminate the need for deck forming." Through bold design and advanced engineering concepts, concrete is helping to revolutionize the landscape of expanding metropolitan areas. The spirit of this revolution is illustrated in our colorful brochure, "New Dimensions in Concrete." You may get a copy by writing: Dept. 2481, 300 Lakeside Drive, Oakland, Calif. 94604.

urban traffic moves in the right direction



Futuristic space-saving transportation viaduct: Alfred Yee, Engineer; F. Sutter, Designer

PERMANENTE CEMENT
Kaiser Cement & Gypsum Corporation



Total contracts include residential, nonresidential and non-building contracts

F. W. DODGE CORPORATION

Western construction trends

FOR ANALYSIS OF CONSTRUCTION TRENDS NATIONWIDE SEE PAGE 44

The December tally of construction contract value in the 11 Western states supplied a logical ending to a year that provided little in the way of excitement as far as growth is concerned. Despite a record first quarter, the total value of Western contracts weakened during spring, tracing a pattern of fair-to-poor performances that kept the cumulative figure in the red for nearly all of the succeeding months. Contracts for December totaled only $630.4 million, 11 per cent below the December 1964 amount, and, on a *seasonally-adjusted* basis, the worst month of the year. These facts served to underline what was already painfully obvious. 1965 was *not* the year of the comeback for Western construction.

The total figure is primarily a reflection of the troubled housing picture, however. It is not an effective means of judging the achievements of the other two major categories, nonresidential and nonbuilding. Each of these set records in 1965, ending the year 10 per cent and 13 per cent above their respective 1964 tallies.

Although the West's economy felt the effects of last year's military base closings, and regional shifts and cutbacks hampered the growth of its critical aerospace industry, the rapid expansion in the economy during 1965 proved more than sufficient to carry the business-oriented building types, commercial and manufacturing. Together, these categories pushed ahead 13 per cent for the year. School construction, the recipient of increased Federal aid, was up 7 per cent, while public building and the social and recreational category surged ahead 24 per cent and 27 per cent respectively.

The nonbuilding category was aided considerably by the large volume of repair and replacement work that resulted from last winter's floods in the Northwest. This was especially true of roads, but more so of bridge construction, up 32 per cent for the year. The construction of water-related facilities loomed largest in this category, however, with river and harbor development ahead by 58 per cent and water supply systems by by 43 per cent.

The fact that the achievements of the nonresidential and nonbuilding categories, responsible between them for more than 55 per cent of total construction contract value, did not inject any buoyancy into the total figure is a measure of the deep impact that the current sag in housing has had on Western construction activity. Although this huge category—down 15 per cent for the year—has, when correction is made for seasonal variation, shown some signs of improvement in recent months, definite confirmation that a recovery is in the making must wait until the 1966 results begin to arrive.

James E. Carlson, Economist
F. W. Dodge Company
A Division of McGraw-Hill, Inc.

Estimator's Guide: Denver and the Mountain States

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

EXCAVATION

MACHINE WORK IN COMMON GROUND

Large basement	CY .80-1.10
Small pits	CY 1.40-1.90
Trenches	CY 1.75-2.50

HAND WORK IN COMMON GROUND

Large pits & trenches	CY 8.00-12.00
Small pits & trimming	CY 11.00-15.00

Hard clay or shale, 2 times above rates. Shoring, bracing & disposal of water not included.

SEWER PIPE MATERIAL

VITRIFIED

Standard 4"	LF .30
Standard 6"	LF .41
Standard 8"	LF .59
Standard 12"	LF 1.11
Standard 24"	LF 4.78

CLAY DRAIN PIPE

Standard 6"	LF .24
Standard 8"	LF .37

Rate for 100 LF FOB Warehouse

CONCRETE & AGGREGATES

GRAVEL, all sizes	TON 3.75
TOP SAND	TON 4.00
CONCRETE MIX	TON 4.10

CRUSHED ROCK

¼" to ¾"	TON 4.00
¾" to 1½"	TON 4.00
Expanded Clay or Shale	CY 6.30
Expanded Perlite	30# Sack 1.45
ROOFING GRAVEL	TON 4.10
SAND (#1 & 2)	TON 5.00

CEMENT

Common, all brands (paper sacks)		
Small quantities	Per Sack	1.40
Large quantities	Per Bll	4.45
Atlas White	Per Sack	3.70
Concrete Mix		
6 sacks in 5-yd loads	Per Yd	15.65
Lightweight Concrete Mix		
6 Sacks 105# CY	Per Yd	21.25

CURING COMPOUND

Clear, 5-gal drums	Per Gal	1.45

STEEL MATERIALS

SHEETS

Hot rolled	LB .125
Cold rolled	LB .135
Galvanized	LB .14
PLATE	LB .125
STRIPS	LB .145
STRUCTURAL SHAPES	LB .125

BARS

Hot rolled	LB .125
Cold finished	LB .135
Reinforcing	LB .11

REINFORCING MESH

6 x 6" #10 x #10	SF .04
6 x 6" #6 x #6	SF .07

2000# FOB Warehouse

STRUCTURAL STEEL

$370.00 and up per ton erected when out of mill.

$390.00 and up per ton erected when out of stock.

BRICK & TILE

COMMON BRICK

Common 2¼ x 3⅝ x 7⅝"	M 35.00
Select 2¼ x 3⅝ x 7⅝"	M 43.50

FACE BRICK

Standard 2¼ x 3⅝ x 7⅝"	M 48.00- 75.50
Roman 1⅝ x 3⅝ x 11½"	M 74.00- 80.50
Norman 2¼ x 3⅝ x 11½"	M 87.00-125.00

HOLLOW TILE

12 x 12 x 3"	M 152.00
12 x 12 x 4"	M 168.00
12 x 12 x 6"	M 229.00

FIRE BRICK

2½ x 4½ x 9"	M 110.00

GLAZED STRUCTURAL UNITS

2 x 6 x 12" Furring	SF .62
4 x 6 x 12"–1 side	SF .94
6 x 6 x 12"–1 side	SF 1.36
4 x 6 x 12"–2 sides	SF 1.04
Add For Color	SF .25

CONCRETE BLOCKS

4 x 8 x 16"	EA .18
6 x 8 x 16"	EA .24
8 x 8 x 16"	EA .28
12 x 8 x 16"	EA .39
Add for color	EA .02

AGGREGATE

Idealite	CY 6.50
Clalite	CY 5.75

MODULAR FLUE LINER

8" x 8"	LF .54
8" x 12"	LF .76
12" x 12"	LF 1.09
12" x 16"	LF 1.49
16" x 16"	LF 1.79
20" x 20"	LF 2.51
24" x 24"	LF 5.10

BRICKWORK & MASONRY

COMMON BRICKWORK, REINFORCED

8" walls	SF 2.35
12" walls	SF 3.30

SELECT COMMON, REINFORCED

8" walls	SF 2.60
12" walls	SF 3.55

CONCRETE BLOCK, REINFORCED

6" walls	SF 1.20
8" walls	SF 1.30
12" walls	SF 1.50

BRICK VENEER

4" Select Common	SF 1.35
4" Roman	SF 1.80
4" Norman	SF 1.55

BUILDING PAPERS & FELTS

BUILDING PAPER

1 ply per 1,000-ft roll	4.45
2 ply per 1,000-ft roll	6.60
3 ply per 1,000-ft roll	9.10
Sisalkraft, reinforced, 500-ft roll	9.50

SHEATHING PAPERS

Asphalt sheathing, 15-lb roll	3.35
30-lb roll	3.80
Dampcourse, 216-ft roll	3.30

FELT PAPERS

Deadening felt, ¾-lb, 50 s.y. Roll	3.00
1-lb, 50 s.y. Roll	3.50
Asphalt roofing, 15-lb, 324 SF	2.17
30-lb, 216 SF	2.93

ROOFING PAPERS

Standard grade, smooth surface

432-ft roll,	
Light, 45-lb	2.30
Medium, 55-lb	2.63
Heavy, 65-lb	2.95
Mineral surfaced 216-ft Roll	3.50

LUMBER

DOUGLAS FIR

Construction 2x4-2x10 MBM	115.00-120.00
Standard 2x4-2x10 MBM	110.00-115.00
Utility 2x4-2x10 MBM	90.00- 95.00
Economy 2x4-2x10 MBM	75.00- 80.00
Clear, air dried	MBM 200.00
Clear, kiln dried	MBM 230.00

REDWOOD

Foundation grade	MBM 160.00
Construction Heart	MBM 175.00
A Grade	MBM 290.00
Clear Heart	MBM 320.00

PLYWOOD (DOUGLAS FIR)	**MSF**
¼" AB	MSF 97.00
¼" AD	MSF 75.00
¼" Ext. waterproof	MSF 85.00
⅜" AB	MSF 110.00
⅜" AD	MSF 100.00
⅜" CD	MSF 75.00
½" AB	MSF 150.00
½" AD	MSF 130.00
½" CD	MSF 100.00
⅝" AB	MSF 165.00
⅝" AD	MSF 150.00
⅝" CD	MSF 117.00
¾" AB	MSF 185.00
¾" AD	MSF 165.00
¾" CD	MSF 145.00
⅝" Plyform	MSF 200.00

SHINGLES	**Square**
Cedar #1	Square 17.50-19.50
Cedar #2	Square 14.50-18.00

SHAKES

Cedar	
½" to ¾" butt	Square 19.00-22.00
¾" to 1¼" butt	Square 21.00-24.00
Redwood	
¾" to 1¼" butt	Square 22.00-25.00

INSULATION & WALL BOARD

FOB Warehouse

FIBRE GLASS INSULATION

foil backed	**Per M SF**
1½" thick	40.75
2¼" thick	48.75
3⅝" full thick	58.75

SOFTBOARDS–wood fiber

½" thick	60.00
¾" thick	128.50

ALUMINUM INSULATION

35# Kraft paper with alum. foil

1 side only	24.00
2 sides	30.00

GYPSUM WALLBOARD
⅜" thick 57.00
½" thick 64.00
⅝" thick 87.00

HARDBOARDS—wood fiber
⅛" thick, sheathing 67.00
3/16" thick, sheathing 82.00
¼" thick, sheathing 111.00
⅛" thick, tempered 89.00
3/16" thick, tempered 120.00
¼" thick, tempered 152.00

CEMENT ASBESTOS BOARD
⅛" flat sheets 145.00
3/16" flat sheets 190.00
¼" flat sheets 255.00

ROUGH CARPENTRY

FRAMING
Floors .....BM .28-.33
Walls .....BM .33-.38
Ceilings .....BM .35-.40
Roofs .....BM .30-.35
Furring & blocking .....BM .40-.60
Bolted framing, add 50%

SHEATHING
1 x 8" straight .....BM .28-.33
1 x 8" diagonal .....BM .30-.35
5/16" plyscord .....SF .20-.25
⅜" plywood CC .....SF .28-.33

SIDING
1 x 8" bevel .....BM .45-.52
1 x 4" V-rustic .....BM .50-.60
Bolted framing, add 50%

DAMPROOFING & WATERPROOFING

MEMBRANE
1 layer 50-lb. felt .....SQ 10.00
4 layers dampcourse .....SQ 15.00
Hot coat walls .....SQ 9.00
Konset added to concrete..per gal. 2.45
Anti-Hydro added to concrete
per gal. 2.45

ROOFING

STANDARD TAR & GRAVEL **Per Sq**
4 ply 17.00-23.00
5 ply 19.50-26.00
White gravel finish—Add..... 2.00- 4.00
Asphalt compo. shingles 20.00-24.00
Cedar shingles 24.00-28.00
Cedar shakes 32.00-38.00
Clay tiles 55.00-80.00

SHEET METAL

ROOF FLASHINGS
18 ga galv steel .....SF .80-1.20
22 ga galv steel .....SF .70-1.10
26 ga galv steel .....SF .60-1.00
18 ga aluminum .....SF 1.25-1.75
22 ga aluminum .....SF 1.05-1.20
26 ga aluminum .....SF .95-1.10
16 oz copper .....SF 1.80-2.30
20 oz copper .....SF 2.10-2.50
24 oz copper .....SF 2.40-2.80

26 ga galv. steel
4" OG gutter .....LF 1.10-1.35
Mitres and Drops .....EA 2.00-4.00
22 ga galv. louvers .....SF 3.00-4.00
22 oz copper louvers .....SF 3.50-5.00

CHIMNEYS, PATENT

6" .....LF 1.45
8" .....LF 2.05
10" .....LF 2.85
12" .....LF 3.45
Rates for 10-50 LF

MILLWORK

All Prices FOB Mill
D.F., clear,
air dried S4S.....MBM 240.00-265.00
D.F., kiln dried S4S...MBM 250.00-300.00

DOOR FRAMES & TRIM
Residential entrance .....18.00 & up
Interior room entrance ..... 9.00 & up

DOORS
1⅜" hollow core ..... 8.00 & up
1¾" solid core .....19.00 & up
1⅜" Birch hollow core.....10.00 & up
1¾" Birch solid core.....22.00 & up
Prefit hollow core doors .....12.00 & up

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

WOOD CABINETS
¾" D.F. plywood with
¼" plywood backs:
Wall hung .....LF 10.00-15.00
Counter ..... LF 12.00-17.00
Birch or maple, add 25%

FINISH CARPENTRY

EXTERIOR TRIM
Fascia and molds .....BM .60

ENTRANCE DOORS & FRAMES
Singles .....60.00 & up
Doubles .....100.00 & up

INTERIOR DOORS & FRAMES
Singles .....35.00 & up
Pocket sliding .....45.00 & up
Closet sliding (Pr.).....50.00 & up
Prefit doors & frames.....16.50 & up
Bi-fold Closet doors .....SF .80 & up

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

SHELVING
1 x 12 S4S .....BM .45-.65
¾" plywood .....SF .50-.70

STAIRS
Oak steps, D.F. risers
Under 36" wide .....Riser 14.00
Under 60" wide .....Riser 19.00
Newel posts and rail extra

WOOD CASES & CABINETS
D.F. wall hung .....LF 16.00-22.00
D.F. counters .....LF 19.00-26.00

HARDWOOD FLOORING MATERIALS

OAK 5/16" x 2" STRIP
Clear .....M 245.00
Select .....M 233.00
#1 Common .....M 220.00

OAK 5/16" RANDOM PLANK
Select & better .....M 292.00
#1 Common .....M 228.00

OAK 25/32" x 2¼" T&G
#1 Common .....M 230.00

MAPLE 25/32" x 2¼" T&G
#1 Grade .....M 355.00
#2 Grade .....M 280.00
#3 Grade .....M 245.00

NAILS—1" FLOOR BRADS ....KEG 18.00

HARDWOOD FLOORS

Select Oak
Filled, sanded, stained and varnished
5/16" x 2¼" strip.....SF .55- .60
5/16" random plank .....SF .65- .70
25/32" x 2¼" T&G .....SF .75- .90

MAPLE
2nd grade and better
Filled, sanded, stained & varnished
25/32" x 2½" T&G ..... SF .85-1.00
Wax finish, add.....SF .10

RESILIENT FLOORING MATERIALS

Linoleum, standard gage ....SY 2.85-3.10
Linoleum, battleship .....SY 3.20-3.40
⅛" Asphalt tile, dark .....SF .10- .11
⅛" Asphalt tile, light .....SF .14- .16
⅛" Rubber tile .....SF .45- .50
.080 Vinyl tile .....SF .55- .65
.080 Vinyl Asbestos tile.....SF .09- .11
⅛" Vinyl Asbestos tile .....SF .11- .15
4" Base, black .....LF .11
4" Base, colored .....LF .15
Rubber treads .....LF 1.60-2.30
Linoleum paste .....GAL .90

FLOORS

⅛" Asphalt tile, dark colors..SF .18- .22
⅛" Asphalt tile, light colors SF .20- .24
⅛" Rubber tile .....SF .60- .70
.080 Vinyl asbestos tile .....SF .34- .40
.080 Vinyl tile .....SF .80- .90
Linoleum, standard gage....SY 3.75-4.25
Linoleum, battleship .....SY 5.25-5.75
4" Rubber base, black.....LF .25- .35
Rubber stair treads .....LF 2.25-2.75

DRYWALL CONSTRUCTION

METAL STUD PARTITIONS FOR DRYWALL
1⅝" .....SF .28
2½" .....SF .31
3⅝" .....SF .37

GYPSUM BOARD FINISH
On Wood ½" .....SF .125
⅝" .....SF .155
On Metal ½" .....SF .145
⅝" .....SF .18
Taping .....SF .05
Metal Beads Extra.

LATH & PLASTER MATERIALS

METAL LATH
Diamond 3.4# copper-bearing....SY .49
Ribbed 3.4# copper-bearing .....SY .53

ROCK LATH
⅜" thick .....SY .36

METAL
¾" Standard channel .....LF .038
1½" Standard channel .....LF .053
3¼" Steel studs .....LF .088
4" Steel studs .....LF .098
Stud shoes .....EA .026

PLASTER
Browning, hardwall .....Sack 1.40
Finish, hardwall .....Sack 1.40
Stucco .....Sack 2.50
Expanded Perlite .....30# Sack 1.35

LATH & PLASTER WORK

CHANNEL FURRING
Suspended ceilings .....SY 2.85-3.10
Walls .....SY 2.90-3.25

METAL STUD PARTITIONS
3¼" studs .....SY 3.00-3.35
4" studs .....SY 3.20-3.50
Over 10-0 high, add .....SY .25- .35

3.4# METAL LATH & PLASTER
Ceilings .....SY 4.40-5.15
Walls .....SY 4.50-5.25
Keene's cement finish, add..SY .45- .65

ROCK LATH & PLASTER
Ceilings .....SY 3.40-3.90
Walls .....SY 3.50-4.00

WIRE MESH & ⅞" STUCCO
Walls .....SY 4.60-5.50

STUCCO ON CONCRETE
Walls .....SY 3.40-3.90
Metal accessories .....LF .25- .55

TILE MATERIALS

FOB Warehouse

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

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

TILE & TERRAZZO WORK

CERAMIC TILE, stock colors
Floors .....SF 1.85-2.25
Walls .....SF 1.90-2.40
Cove base .....LF 1.10-1.35

QUARRY TILE
6 x 6 x ½" floors .....SF 1.70-2.10
9 x 9 x ¾" floors .....SF 1.85-2.25

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

WINDOWS

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

ALUMINUM SASH
Under 10 SF .....SF 2.80 & up
Under 15 SF .....SF 2.30 & up
Under 20 SF .....SF 1.85 & up
Under 30 SF .....SF 1.35 & up
Above rates are for standard sections and stock sizes, FOB Warehouse

GLASS—CUT TO SIZE

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

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

GLASS & GLAZING

SSB Clear .....SF .60
DSB Clear .....SF .80
Crystal .....SF .95
¼" Plate.....SF 2.00
⅛" Obscure .....SF .80
⅛" Heat absorbing .....SF 1.45
¼" Tempered plate .....SF 4.75
½" Tempered plate .....SF 9.00
¼" Wire plate, clear .....SF 2.90
¼" Wire plate, rough .....SF 1.50

PAINT MATERIALS

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

PAINTING

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

INTERIOR
Primer-sealer .....SY .45
Wall paint,
1 coat .....SY .54
2 coats .....SY .98
Enamel,
1 coat .....SY .65
2 coats .....SY 1.14
Doors & trim .....EA 14.00
Sash & trim .....EA 16.00
Base & molds .....LF .18
Old work, add 15-30%

VENETIAN BLINDS

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

PLUMBING

Lavatories .....EA 200.00-250.00
Toilets .....EA 250.00-310.00
Bath tubs .....EA 270.00-370.00
Stall shower .....EA 150.00-200.00
Sinks .....EA 180.00-240.00
Laundry trays .....EA 120.00-180.00
Water heaters .....EA 115.00-350.00
Prices based on average residential and commercial work. Special fixtures and excessive piping not included.

HEATING

Furnaces—Gas-Fired, Average Job

FLOOR FURNACE
25,000 BTU .....EA 120.00-140.00
35,000 BTU .....EA 128.00-150.00
45,000 BTU .....EA 145.00-165.00
Automatic control,
add .....EA 27.00- 37.00

DUAL WALL FURNACE
25,000 BTU .....EA 136.00-160.00
35,000 BTU .....EA 147.00-170.00
50,000 BTU .....EA 174.00-195.00
Automatic control,
add .....EA 43.00- 55.00

GRAVITY
75,000 BTU 420.00-510.00
85,000 BTU 450.00-530.00
95,000 BTU 500.00-650.00
Forced Air Furnace, add.... 85.00-150.00
Automatic Control, add 20.00- 30.00

HEAT REGISTERS
Outlet 13.00-28.00

ELECTRIC WIRING

Per Outlet
Knob & Tube .....EA 11.00
Armor .....EA 18.00
Conduit .....EA 23.00
110-V Circuit .....EA 29.00
220-V Circuit Range .....EA 108.00

ELEVATORS & ESCALATORS

Prices vary according to capacity, speed and type.
Consult elevator companies.
Slow speed apartment house elevator including doors and trim about $3,500 per floor.

For more data, circle 25 on inquiry card

High rise costs fall when you specify ELECTRIC HEATING...

Economical, clean and efficient electric heating effects economies in design construction and maintenance costs. Low first costs of electric heating add to profits . . . provide reasonable future maintenance . . . and contribute to a higher percentage of occupancy.

Chromalox
Electromode—Climate Control Division
Emerson Electric
Federal Pacific
Gar Wood
General Electric
Hotpoint
Hunter Division
Johns-Manville
Martin
Mineral Wool Insulations
Ramco
Thermador
Wesix

For information on low first costs of electric heating write:

MEDALLION HOME
LIVE BETTER ELECTRICALLY

NORTHERN CALIFORNIA ELECTRICAL BUREAU

1355 MARKET STREET

SAN FRANCISCO 94103

For more data, circle 26 on inquiry card

It's easy to air condition your building if you have a gas-fired boiler.

You can cool your building efficiently and at reasonable cost if you have a gas-fired boiler. Simply put it to work in the summer with an absorption-type cooling system which is energized by steam or hot water. There's no added strain on your building's electric capacity. You save on installation costs, and it uses low-cost natural gas. What's more, absorption air conditioning is virtually vibration-free. You can even put it on the roof. So if summer makes your tenants simmer—look into gas absorption air conditioning. See your architect or engineer, and ask us for the free booklet, "Why Absorption Air Conditioning?"

PG and E
Pacific Gas and Electric Company

For more data, circle 27 on inquiry card

For more data, circle 28 on inquiry card

Architect-*wise*, it's DURAFLAKE
. . . the *engineered* board
to assure smooth results.
***Wise* architects specify DURAFLAKE**

DURAFLAKE is the core stock for fixtures and cabinets of every description. Workable and strong, it holds screws firmly on edge and face. In a wide variety of sizes and thicknesses. DURAFLAKE UNDERLAYMENT assures smooth surfaces for laying any floor covering. DURAFLAKE EXTERIOR SIDING helps insulate and deaden sound, easily exceeds commercial standard UM-32. Start specifying DURAFLAKE now!

Get more information about Duraflake today. Clip and mail to:
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Box 428, Dept. AR
Albany, Oregon
Phone: 503/928-3341
TWX: 503/967-0608

Name_____

Firm_____ Title_____

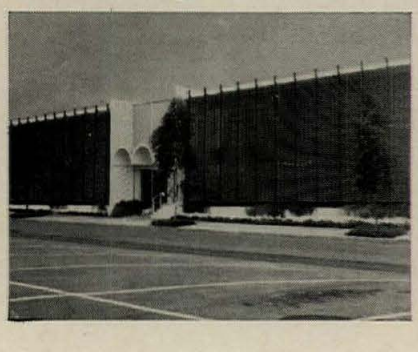
Address_____

City_____ State_____ ZIP_____

12¢/SQ. FT.

The annual operating cost of heating and cooling the A. A. & I. Building electrically

A. A. & I. Building
3610 Long Beach Blvd.
Long Beach, Calif.
Architect
Richard O. Prior, A.I.A.
Engineer
Kocher, Bradford and Nishimura
Consulting Engineers



That 12¢ isn't an isolated case.

It's typical of electric space conditioning.

Edison keeps tab on operating costs in hundreds of buildings throughout Southern California.

You're welcome to check the figures for yourself.

Southern California Edison SCE

For more data, circle 29 on inquiry card

Art and Titanaloy on permanent exhibition

Fast-becoming the "western architect's metal" for design, diversity, dependability: the zinc-base alloy, TITANALOY. Practically-priced, considerably lower than copper. No streaks; no stain: weathers to a subtle grey/black beauty—a distinctive patina compatible with any building style, material. Highly corrosion-resistant to west coast environment. TITANALOY forms easily, solders and welds in the shop or on-site for the added dimension of economical installation. Specify TITANALOY—the titanium-copper-zinc alloy of unquestionable taste and test. Available in unlimited quantities for prompt delivery from west coast stocks.

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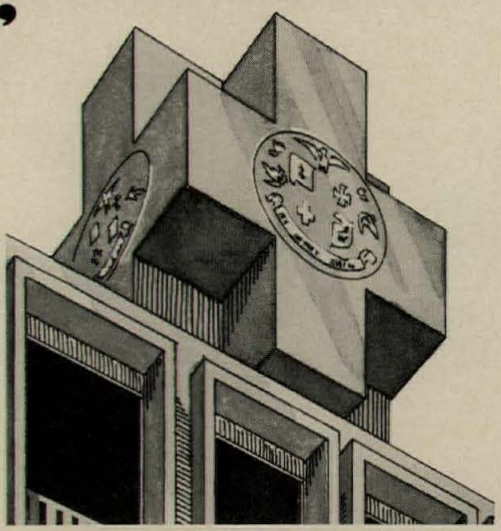
Los Angeles County Museum of Art
Architect: William L. Pereira & Associates
James H. Langenheim, partner in charge

For more data, circle 30 on inquiry card

WITH GAS ABSORPTION AIR CONDITIONING:

"NO ACOUSTIC OR VIBRATION PROBLEMS...SAVES VALUABLE BASEMENT SPACE"

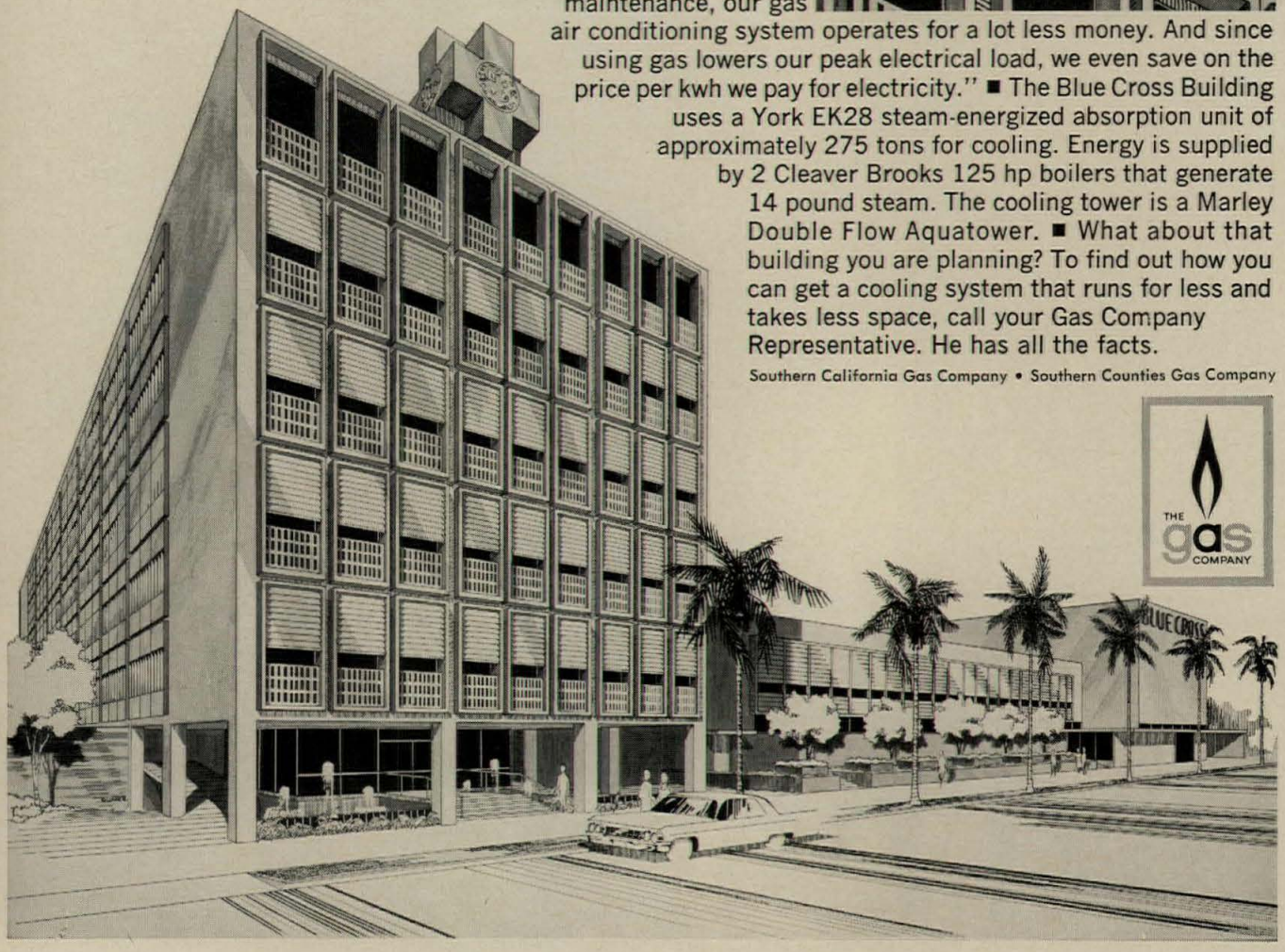


...says Building Supervisor Bernard L. Probert

"Our gas-energized air conditioning equipment changes the air in our 200,000 sq. ft. building every 7 minutes, 24 hours a day, 7 days a week, quietly and without a quiver," says Bernie Probert, Building Supervisor for the Blue Cross Building in Los Angeles. ■ "Because this equipment creates no acoustical or vibration problems, we were able to put the chiller on the roof, saving valuable basement space. That's partly why the owners switched to gas absorption air conditioning when they put up this building." ■ The other reason? "Operating economy," Mr. Probert answers. "Including energy cost and maintenance, our gas air conditioning system operates for a lot less money. And since using gas lowers our peak electrical load, we even save on the price per kwh we pay for electricity." ■ The Blue Cross Building uses a York EK28 steam-energized absorption unit of approximately 275 tons for cooling. Energy is supplied by 2 Cleaver Brooks 125 hp boilers that generate 14 pound steam. The cooling tower is a Marley Double Flow Aquatower. ■ What about that building you are planning? To find out how you can get a cooling system that runs for less and takes less space, call your Gas Company Representative. He has all the facts.

Southern California Gas Company • Southern Counties Gas Company

THE gas COMPANY



For more data, circle 31 on inquiry card

Brulé it

Brulé waste systems reduce costs by eliminating the boxes, cans, garbage, bottles, scraps, crates, packing, clippings, that clutter, crowd and confuse, that invite fire and theft, that destroy a cleanliness-image. Write for "How to Solve a $300,000,000 Crime—Pilferage."

Brulé incinerators, can and bottle crushers, garbage can washers and sterilizers, balers also save man-hours, conserve floor space, reduce fire risk and improve customer-community relations. Brulé C. E. & E., Inc., 13928 So. Western Ave., Blue Island, Illinois 60406. ®

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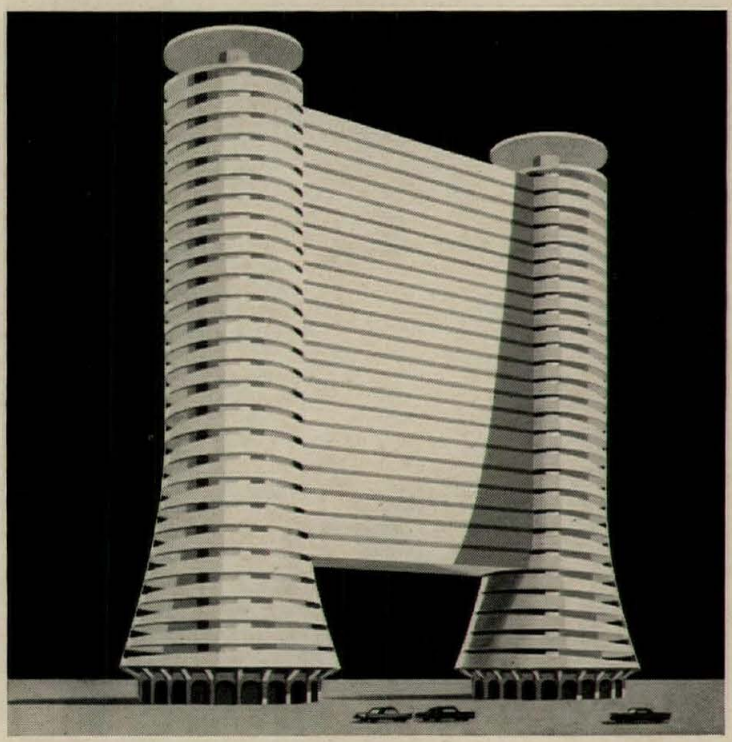


A modern hospital needs modern communications: nurse-patient interphone, closed circuit TV, teletypewriter services, data transmission services.

These complex communication services are essential not only in hospitals but in all types of major buildings—plan for them in the blueprint stage and avoid costly alterations and unsightly wiring later.

Just call your Bell Telephone Business Office and ask for the Architects and Builders Service.

Bell System
American Telephone & Telegraph
and Associated Companies

For further information on communications planning,
see Sweet's Architectural File 33a/Be
and Sweet's Industrial Construction File 19f/Be.

FDR commission once again is seeking a Memorial architect

A new design for the long-stalled Franklin Delano Roosevelt Memorial will be developed by an architect who is yet to be selected by the FDR Memorial Commission.

Not only the Pedersen, Tilney, Hoberman, Wasserman and Beer design —which five years ago won that famous two-stage national architectural competition—but the designs of the other five finalists were formally rejected by the Commission at a meeting January 18.

Now the Commission will invite some 40 architects, including the six competition finalists, to be considered for the job. The Commission itself will then select the architect to design the Memorial; there will not be another competition.

The list of architects to be invited has been prepared by the Commission in consultation with the American Institute of Architects and the National Capital Planning Commission.

Representative Eugene Keogh of New York, who has succeeded Francis J. Biddle as chairman of the Commission, last month expressed regret that circumstances had forced rejection of the results of a national competition.

The united opposition of the Roosevelt family is generally regarded as having decided the issue, though in Congress, which must approve the design, there had always appeared to be doubts about the competition designs as well as respect for Roosevelt views.

President's messages emphasize regional planning

The concept of regional planning on a nationwide scale has emerged as one of President Johnson's most potent weapons in the fight to realize the "great society." In his messages to Congress on rural life and American cities, great stress is laid on the importance of planning for whole communities and of coordinating the efforts of local, state and Federal Governments with those of private organizations, to achieve an environment which would give "every man the right to... become whatever thing his manhood and his vision can combine to make him."

There are still 4.4-million impoverished rural families throughout the country and in order to improve their lot, to assure the continued existence of small rural communities and to "bring us closer to the achievement of a more beautiful, more livable rural America," the President has proposed the establishment of a number of "Community Development Districts" in which broad-based comprehensive planning can effectively be carried-out. Recognizing that it is not possible to provide each small community with all the facilities necessary for the good life, the President evidently feels that by establishing and planning for such community districts, it will be possible to make the advantages of 20th-century America available to everyone living within a defined area. Community Districts would include rural areas and towns and would in general correspond to the "normal commuting or trading patterns of the rural and city residents." Each district would be responsible for coordinating resources within the area, and Federal grants would be available to supplement local facilities and aid in coordination and planning activities aimed at improving the standard of what is presently available and making sure—presumably by such means as improved transportation – that everyone within the area is able to take advantage of community services.

While community planning of this kind is aimed at keeping rural America alive, the drift to the cities continues, and on present prediction by the year 2,000 four-out-of-five Americans will live in urban areas. In an effort to boost existing Federal housing and urban renewal programs, the President has proposed a $2.3-billion "Demonstration Cities Program" which will offer qualifying cities the chance to eliminate large areas of slum dwellings and to create in their place a new and better environment. Cities qualifying for Federal aid under this program would have to demonstrate that their proposals had sufficient magnitude to arrest blight and decay in entire neighborhoods, that every available local resource had been sought-out and made use of, that inequality of housing opportunities and standards would be substantially reduced, and that the environment would provide—besides better housing—medical, social and educational benefits for the whole community.

What is particularly interesting about these messages is that they represent a significant move towards a concept of national planning presented in a way that is not easy to quarrel with. By offering Federal aid as a reward for creative local endeavor, by calling for the voluntary coordination of government and private organizations, by dividing the country into planning districts and neighborhoods small enough to give a sense of individual identity, but large enough to make a considerable contribution to the improvement of American life, by relating urban and rural areas, the President has shown that planning on a national scale need in no way interfere with, but rather enhances the freedom, identity and opportunity of the individual. Although the rural and American city messages were sent separately to Congress, they read as two parts of one total concept whose underlying theme is the case for large-scale planning as a positive means for individuals to participate in the realization of a common ideal. Planning in this context is seen as "an affirmative act, which signifies the willingness of men and women to make their part of America a place of hope."

THE RECORD REPORTS ON:

Architectural League announces $7500 fellowship

A new fellowship of $7,500 to help a teacher of architecture finance his final year of study for a graduate degree in architecture has been announced by the

Architectural League of New York as its first J. Clawson Mills Fellowship in Architecture.

A unique condition of the fellowship, intended to help relate education and practice, will require the recipient to spend not less than three months in a full-time position with an architectural firm selected or approved by the League, and to write a report relating this experience to his studies and to the teaching of architecture.

Candidates must be on the faculty of an accredited school of architecture, and the proposed year's study must be planned to lead, by the end of the Fellowship year, to an advanced degree in architecture from an accredited school.

Application blanks are available from the heads of all the accredited schools of architecture. Applications should be submitted, for arrival not later than April 1, to the Architectural League of New York, 115 East 40th Street, New York, New York 10016. The recipient, to be selected by the League on the recommendation of the Committee on the Collaborating Arts of the American Institute of Architects, will be advised not later than May 1.

League President Ronald Allwork has also announced that the League hopes to offer J. Clawson Mills Fellowships in Landscape Architecture and in Sculpture later this spring. In 1967 and succeeding years, the League will be offering J. Clawson Mills Fellowships in the other arts with which the League is concerned—mural painting, engineering, and design and craftsmanship.

Academic appointments

San Francisco architect Gerald M. McCue has been appointed chairman of the Department of Architecture at the University of California campus at Berkeley. Announcing the appointment, Martin Meyerson, dean of the College of Environmental Design at Berkeley, drew attention to Mr. McCue's reputation as a designer of research facilities, among which are the building housing the 88-inch cyclotron at the U.C. Lawrence Radiation Laboratory in Berkeley, the Chevron Research Laboratories and Stauffer Research Center at Richmond and the Dow Chemical Research Center in Walnut Creek. Professor McCue has been a lecturer in architecture at the Berkeley Campus since 1954.

Keith McPheeters, for 10 years a faculty member of the School of Architecture at the University of Arkansas in Fayetteville, will become dean of the School of Architecture at Rensselaer Polytechnic Institute July 1. Mr. McPheeters replaces George A. Dudley who resigned a year ago to accept a post as dean of the new School of Architecture and Urban Planning at the University of California at Los Angeles.

Glen Paulsen, head of the Department of Architecture, has been named the new president of Cranbrook Academy of Art in succession to Zoltan Sepeshy, well known painter in tempera, who has been associated with Cranbrook since 1931 and is expected to return as a painting instructor after a year's leave. Cranbrook Academy's first president was the late Eliel Saarinen, in whose private practice Paulsen at one time worked.

Pockets of open space planned for midtown Manhattan

Somewhere to sit in the shade and eat a sandwich—long cried for in New York, particularly by visitors from Europe—is being donated to the City by CBS Chairman William S. Paley, in memory of his father. The Samuel Paley Plaza, the first such public park in the city to be privately financed, will be constructed on the East 53 Street site formerly occupied by the Stork Club, and will contain trees, a waterfall, tables, chairs and a kiosk for refreshments. The plaza, which will cost about $1 million, should be completed by early summer.

Dr. Pusey will deliver Purves lecture at A.I.A. convention

Dr. Nathan M. Pusey, president of Harvard University, will give the second annual Purves Memorial Lecture at the 1966 A.I.A. Convention to be held from June 26 to July 1 at Denver. Dr. Pusey's lecture, which will be delivered on Wednesday June 29 at the Air Force Academy, will be on the general theme of the convention: technology, environment and man. More information on the convention will appear in the RECORD as it becomes available.

Awards, honors, citations

New York's Governor, Nelson A. Rockefeller, has been awarded an A.I.A. Citation of Honor for his leadership in "furthering architecture, planning and the visual and performing arts." The Citation, which is the highest tribute given by the Institute to a non-architect American, was presented to the Governor by Morris Ketchum Jr., national president of the A.I.A., at an invitation dinner at New York City's Metropolitan Club. Emphasizing the importance of having an enlightened and "inspired client" if architects and planners were to succeed in improving our environment, Morris Ketchum said that in Nelson Rockefeller the State of New York was fortunate to have "just such a client."

This year's Pan Pacific Design Citation, given annually by the Hawaii Chapter of the A.I.A. to an architect from a Pacific Basin country, has been awarded to Howard Ashley of Kuala Lumpur, Malaya. The selection of Mr. Ashley—formerly of Edinburgh, Scotland—for this award was in recognition of his design ability, outstandingly represented in his work as head of the design team responsible for the $3.3-million National Mosque in Kuala Lumpur.

José Luis Sert, architect and Dean of the Harvard Graduate School of Design is one of nine new members recently elected to the National Institute of Arts and Letters.

The A.I.A.'s annual Architectural Photography Medal will be presented at the June Convention to Morley Baer, west coast photographer, whose specialties are architecture and the natural scene. A former chairman of the Photography Department at the San Francisco Art Institute, Baer is well known to architects through the frequent appearance of his photographs in almost all the professional journals.

Directors of the American Society of Civil Engineers have nominated Launch Complex 39, Kennedy Space Center Florida as the winner of the 1966 Outstanding Civil Engineering Achievement Award. Among projects nominated to receive Awards of Merit are the Trans Sierra Freeway Project and the Sewerage Program in Seattle.

Obituaries

James Ruderman, civil engineer and structural designer of many of New York's major office buildings, including the Pan American Building, The American Tobacco Building, the Sperry Rand Building and the New York Hilton Hotel, died on January 27 at the age of 67.

Wells Ira Bennett, dedicated educator in the fine arts and architecture and dean emeritus of the Department of Architecture, University of Michigan, Ann Arbor, died on January 6, at age 77.

Wood windows vs. metal windows:

here are the facts about condensation.

In winter a metal window frame is cold. Cold to touch. Cold to be near. It's the nature of metal, caused by what heating engineers call excessive thermal conductivity. This chart gives you the cold, hard facts.

Findings listed below show heat loss of various materials 1" thick, 12" square, with only 32 degree difference between inside and outside temperatures:

HEAT LOSS	Wood . . . 25 BTU's per hr.
	Glass . . 186 BTU's per hr.
	Steel. . . 9,984 BTU's per hr.
	Aluminum . . . 45,312 BTU's per hr.

Data derived from: ASHRAE Guide and Data Book 1965. Chapters 4 and 24. By permission.

These figures stated another way mean that wood used for window frames is over 1770 times as effective as aluminum in preventing costly heat losses through radiation. When you consider that windows are 30-70% of a home's exterior it's pretty important to the home owner to have the right windows.

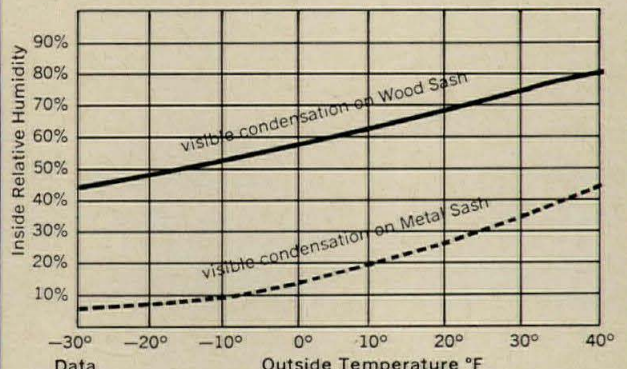
What happens to the *inside* of all these windows can be costly, and aggravating, too. Condensation! It's caused by the same excessive thermal conductivity. When interior humidity—even below average humidity—touches a freezing metal window frame, it condenses.

Condensation can build up with amazing rapidity on metal window frames . . . even form ice. And . . . water drips . . . all over the sill, the moulding, and the wall. This type of condensation is impossible with quality wood windows. A look at the chart below will show you why.

The undiluted facts on condensation

Visible Condensation on Inside Surfaces.
Room temperature 70°. Outside wind velocity 15 mph.

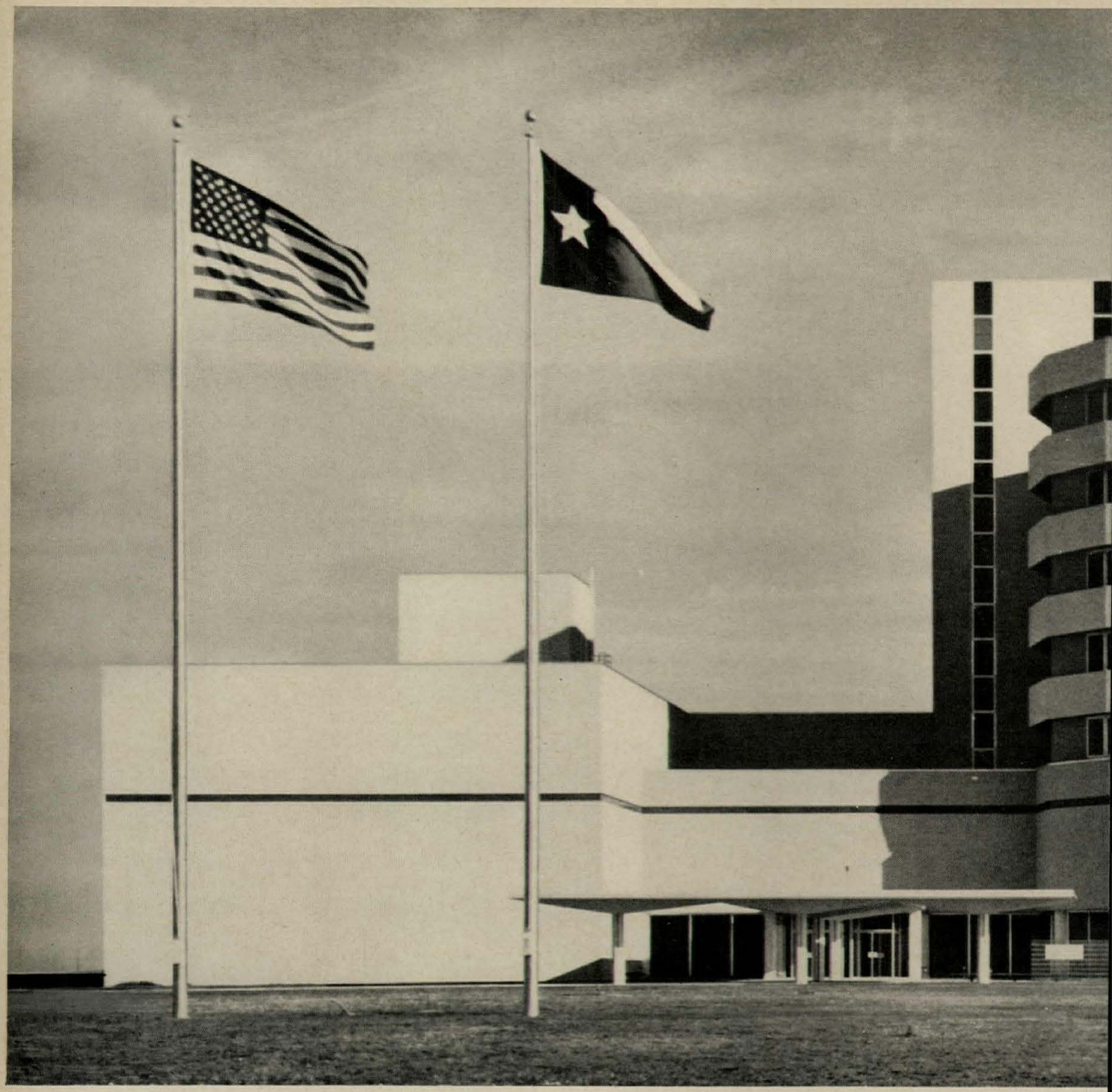
Chart shows comparative condensation on inside surface as outside temperature drops. Example: when outside temperature is 20° it would take as much as 69% inside relative humidity before condensation would appear on wood sash—but condensation will form on aluminum sash with just 22% inside relative humidity (and, most homes average 30-35%).



Data derived from: ASHRAE Standard Psychrometric Chart. By permission.

Free Window Condensation Calculator: first time available. Helps you avoid condensation problems before they happen. Send request on your letterhead to:

PONDEROSA PINE WOODWORK
and the Western Wood Products Assn.
Dept. AR2, 39 South La Salle Street
Chicago, Illinois 60603



Four kinds of air filters in Scott and White Memorial Hospital

...all by AAF

Scott and White Memorial Hospital—Architects and Engineers: Wyatt C. Hedrick, Fort Worth and Ellerbe & Company, St. Paul, Minn.; Engineer in Charge: Burt Hiller; General Contractors: H. A. Lott Co. and Johnson, Drake and Piper, both of Houston, Texas.

No *single* air filter can effectively and economically perform the complete air-cleaning job in the modern hospital. That's why four types were selected from AAF's complete line for Scott and White Memorial Hospital, Temple, Texas.

Eight Roll-O-Matic automatic, renewable-media units and one Rollotron electronic precipitator were chosen as primary filters for the hospital's nine air-conditioning systems. The surgery suites are served by Roll-O-Matic pre-filters followed by 136 high-efficiency DRI-Pak filters providing an over-all efficiency of 97%. AAF PL-24 unit filters do the heavy work in the hospital's laundry facilities.

For more information on AAF's complete line of hospital filters, call your local AAF representative. Or write directly for Booklet 249-P3. Address: Robert D. Moore, American Air Filter Company, Inc., 389 Central Ave., Louisville, Kentucky 40208.

AAF **American Air Filter**
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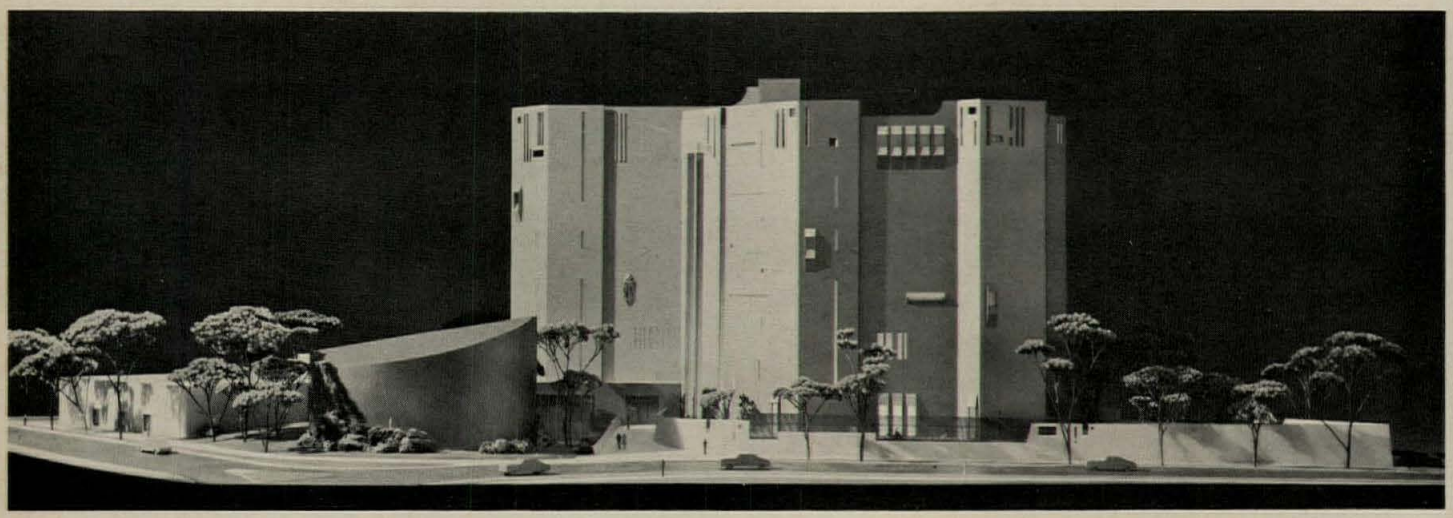
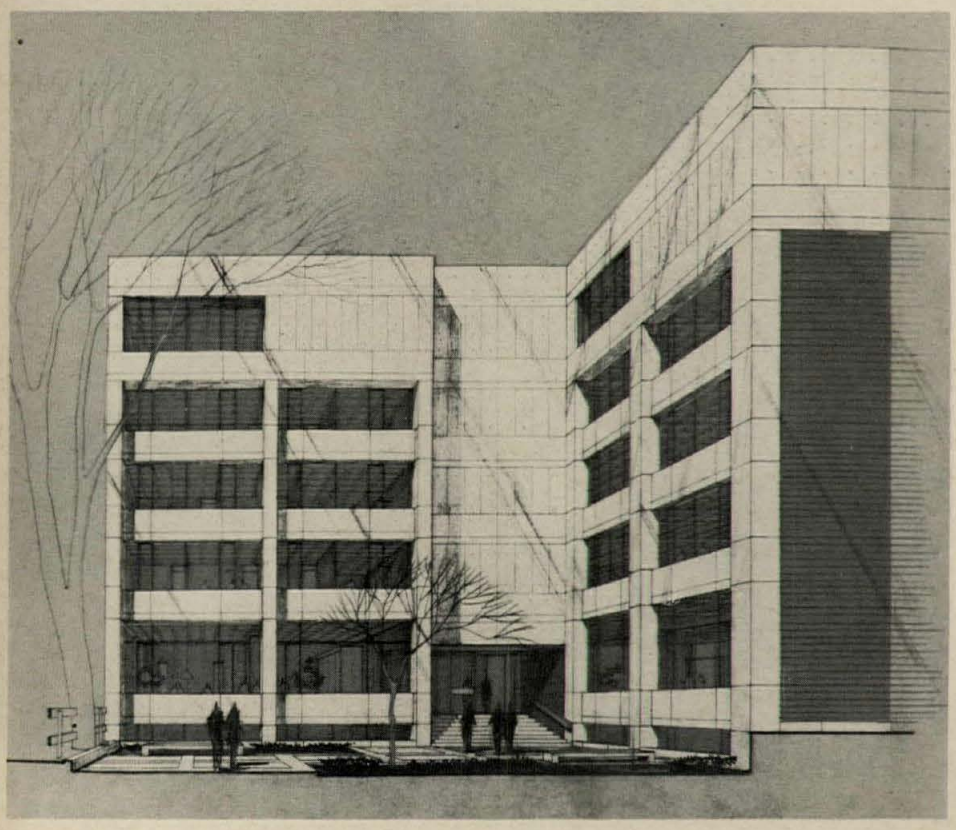
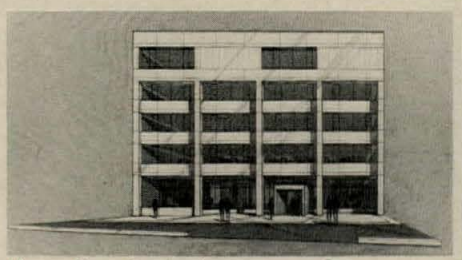


Denver Museum will have 100,000 square feet of exhibition space on six floors

The $5.5-million Denver Art Museum, which will be constructed in two phases, will be located adjacent to the existing civic center and museum. Architects for the structure are James Sudler Associates in collaboration with Italian architect Gio Ponti. Included in the $3.8-million first phase is completion of the entire six-story building, with the interior finishing of the first three floors. The second phase will include a 300-seat auditorium (which will be housed in the eliptically shaped structure located to the left of the museum), seminar rooms, and the finishing of the top three floors of the museum—providing a total of 100,000 square feet of almost unobstructed exhibition space.



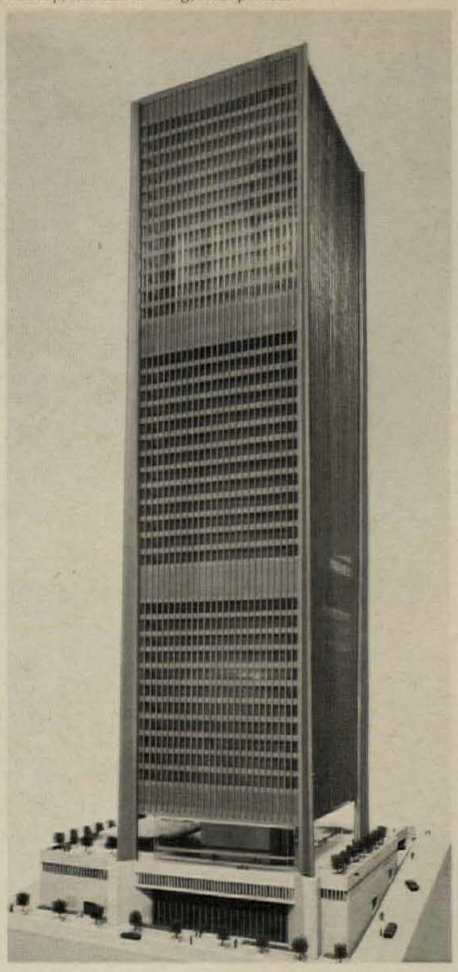


Above: Story Street elevation.
Left: Brattle Street elevation with courtyard.

TAC's new office building: new face for old Brattle Street

The Architects Collaborative design for its own office in Cambridge, Massachusetts is set well back from line of old frame houses on historic Brattle Street. A courtyard of traditional Boston paving bricks and a warm, brown-brick-with-dark-mortar wall face the street. The five-story building has a reinforced concrete frame with waffle-pan floor construction, and a two-foot interior module. The 27,824 - square - foot, $535,000 building will be completed in November. Contractor: George A. Fuller.

Dudley, Hardin & Yang, Inc. photos

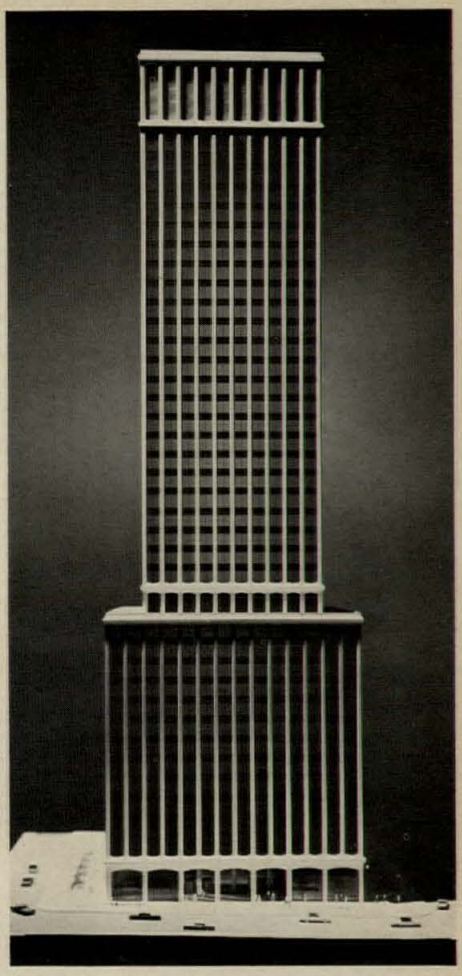


50-story office building has tapered supporting columns

The 566,400-square-foot Seattle First National Bank Building, left, will have support columns tapering from 18 feet in diameter at ground level to four feet in diameter at top. The building, which will be clad in bronze-tinted anodized aluminum, was designed by Naramore, Bain, Brady and Johanson. Consulting architect is Pietro Belluschi. Construction on the $28-million building will start this summer with completion set for August, 1969.

New York office building will create a new plaza

A 40-story office tower, right, which will occupy the site of the New Weston Hotel in New York City, is set back to provide a 13,500-square-foot plaza. The structure, designed by Emery Roth & Sons, has a 14-story base and a 26-story tower, and will have 632,725 square feet of rentable area. The facade combines precast concrete masonry and bronze-tinted aluminum and glass. Owners and builders are the William Kaufman Organization/Weiler & Swig.



Pictorial Parade photos

Massive Yugoslavian museum contains many levels

The recently completed building of Contemporary Yugoslavian Art in New Belgrade, consists of three massive elements topped by prismatic skylights opening to the main galley areas. The multi-level structure of concrete, steel and glass, is fully glazed at street level for effective display of sculpture. Architects: Ivan Antic and Ivanka Raspopvic.

Frank Lotz Miller

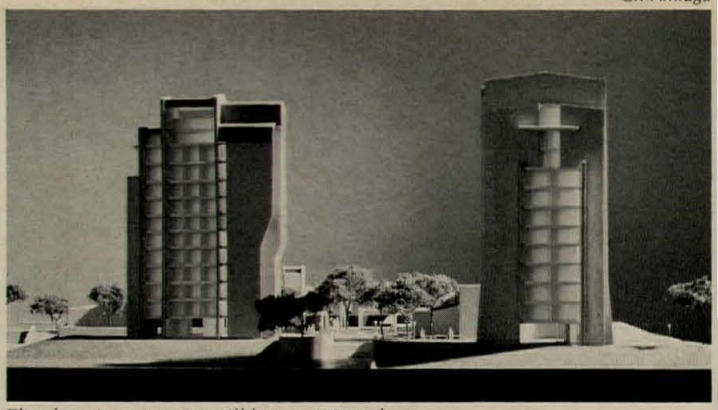
Supporting columns strongly expressed on office facade

The concrete-faced Louisiana National Bank Building in Baton Rouge will have a three-story bank floor topped by a 21-story tower, and will contain 376,390 square feet. Architects: Curtis and Davis; structural engineers: Worthington, Skilling, Helle and Jackson; mechanical engineers; Gregerson, Gaynor and Sirmen; Contractor: Henry C. Beck.

Louis Checkman

Left to right: dormitories, student center, pedestrian overpass and library.

Gil Amiaga



The dormitory towers will house 450 students.

Hofstra campus expansion made possible by building bridge over turnpike

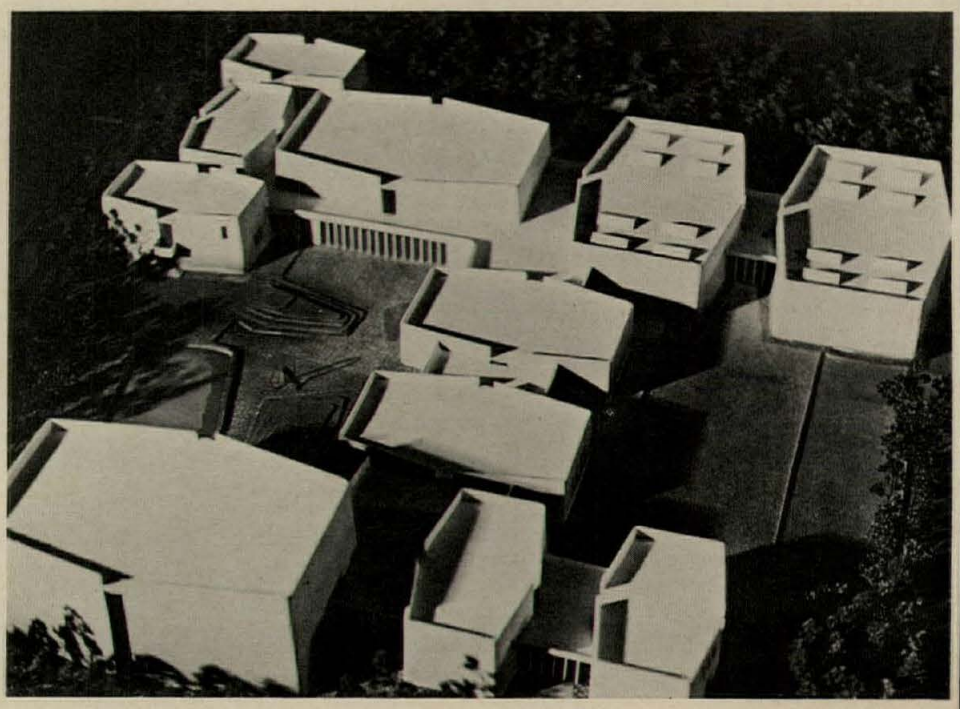
The expansion program at Hofstra University, Manhasset, Long Island, New York, financed by the Dormitory Authority of New York, includes a 360-foot-long double-cantilever footbridge which will connect the old campus with the new 88-acre north campus. Architects for the project are Warner Burns Toan Lunde and the contractors are Gerace & Castagna. The library is a 12-story tower of prestressed reinforced-concrete construction which will accommodate approximately 300,000 volumes. The student center is a two-story building composed of two wings separated by a courtyard, containing dining facilities and meeting rooms. The residence towers each have 12 stories.

Library by Mies is his first building in Washington, D.C.

The proposed District Central Library in Washington, D. C., the first building designed by Ludwig Mies van der Rohe for that city, is a four-story, black-painted steel and bronze-gray glass structure that will hold up to 2,000,000 volumes. The building is raised on stilts, opening the ground level for lobby and reading areas. Underground parking will be provided for 100 cars. Construction cost: $10 million; completion: by January, 1970.

Fine arts complex designed for variety of functions

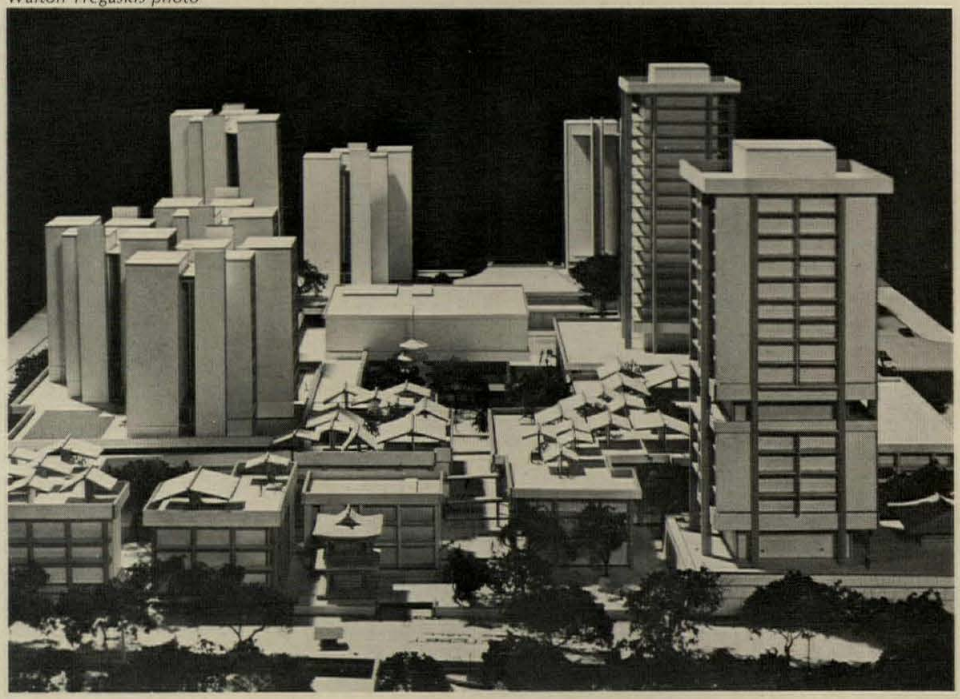
The complex of Fine Arts Buildings for the University of Rhode Island is planned so that buildings can be added while maintaining a unity of relationship. So far the first phase of four buildings has been completed. When the complex is complete there will be 10 buildings. The structures will house a concert hall, performing arts center and administrative center. The project, which will cost $3.15 million, will provide 130,000 square feet. The buildings are constructed of poured-in-place concrete with pumice aggregate. Architects are Millman and Sturges with Pietro Belluschi as consulting architect. Contractor is A. DiOrio & Company.



College building has plaza serving as focus for new area

The $3.9-million Humanities and Social Sciences Building at the University of Tennessee's Knoxville campus has a 12-story tower containing offices for 400 to 500 faculty members which will serve as a "symbol of the new campus area," and will serve as a companion to the traditional Ayers Tower which is in the heart of the existing campus. Also included in the project is a large four-story section containing classrooms and a large paved and landscaped plaza with parking for 300 cars underneath. Architects are Painter, Weeks and McCarty. Contractor is Rentenback Engineering Company. Completion of construction is expected late this year.

Walton Tregaskis photo



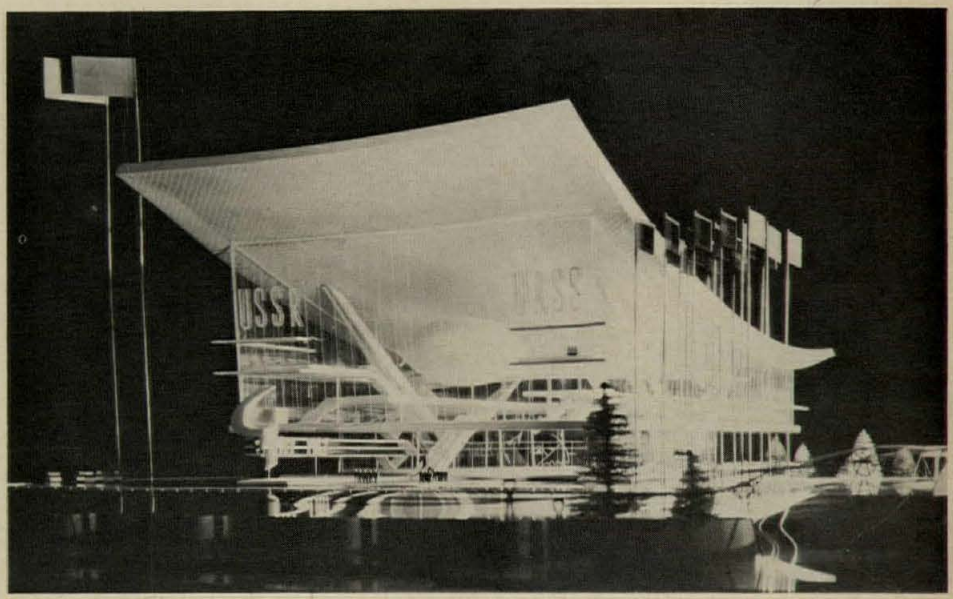
Honolulu project will be focus for downtown redevelopment

The 10-acre Cultural Plaza redevelopment project in downtown Honolulu was designed by John Carl Warnecke and Associates as a city block with a complete urban community of residential, commercial and cultural uses, so related that each has its own specific environment. The project was sponsored by five Chinese societies and will serve to reestablish the cultural focus for the Chinese community. Architecturally the area will combine a few specimen authentic Oriental buildings with the cosmopolitan character of contemporary multi-use structures.

Left foreground: shops and societies; left rear: apartments; center: commercial plaza and theater, behind which is community hall; right foreground: hotel; and right rear: office building, with more apartments behind it.

Russian pavilion at Expo '67 will contain "Cosmos Hall"

The Russian pavilion at Expo '67, the Universal and International World Exhibition which will be held in Canada in 1967, will be a cantilevered steel-glass structure. It will be prefabricated and assembled on site this fall. After the exhibition it will be dismantled and reassembled in Moscow. The structure will contain a 600-seat theater, restaurants, bars, terraces and a "Cosmos Hall" where the visitor can experience a sense of weightlessness. Architects are R. R. Kliks; A. A. Mndoyants, and A. N. Kondratiev.



Regional analysis of construction activity reveals wide variations from national average

BUILDING IN 1965: Part 2

Last month's roundup of the 1965 building and construction markets showed that the year's gains were found principally among the *nonresidential* building types. Because of this, 1965 was a year in which architect-designed construction work was booming along at a rate roughly twice that of the total for all new contract construction.

If one big part of the construction story of 1965 concerns *what kind* of building was being done, then certainly the other half of the story concerns *where* it took place. And as is usually the case, there were marked differences in the behavior of the nation's regional construction markets last year.

Out of the eight regions by which F. W. Dodge classifies its data, only three showed a pattern that even remotely resembled the national gain of 4 per cent in contract value in 1965. These were: New England, with a 5 per cent increase; the Midwest, with a gain of 3 per cent, and the South Central states, ahead by 6 per cent.

The Middle Atlantic and the North Central states were the country's fastest growing regions in 1965, both with gains of 12 per cent. In the Middle Atlantic area, last year's increase was right across the board with better than 10 per cent advances in all three construction categories — nonresidential building, residential building, and nonbuilding construction. In the North Central region, a 20 per cent spurt in housing was the source of most of the gain as Detroit, Chicago, and Milwaukee all showed unusually large increases in residential building value last year.

Only one region, the Southeast, showed a significant decline in construction contract value in 1965. The 6 per cent loss for that group of states was confined entirely to the nonbuilding category where the heaviest impact of the national declines in utility contracts and missile and space construction was felt. In addition, the Southeast showed a substantial drop in street and highway contracts.

The two remaining regions — the Southwest and the West—both finished 1965 within 1 per cent of their respective 1964 totals. But while these two adjacent regions just about broke even in aggregate construction contract value last year, their individual strengths and weaknesses were quite different.

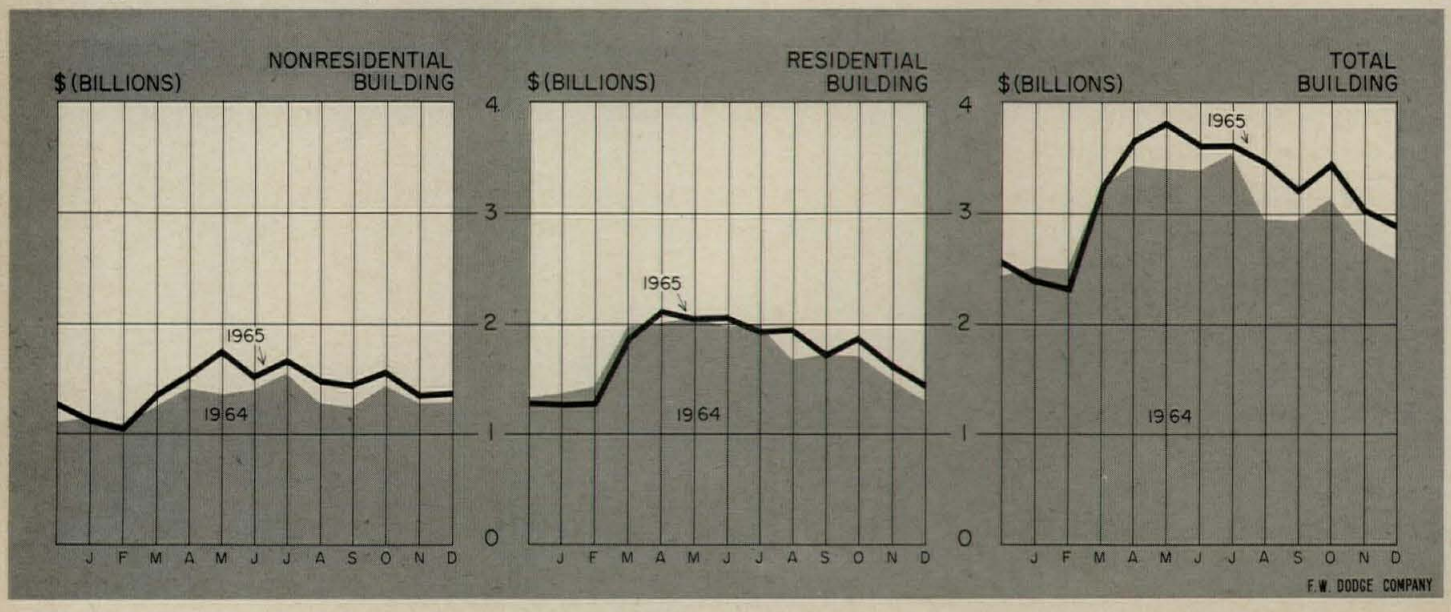
The West, struggling through the last stages of a severe housing correction, showed a 15 per cent loss in residential contract value last year. However, almost all of that large decline was balanced off by a 10 per cent gain in nonresidential building and a 13 per cent increase in heavy construction.

In the Southwest, housing declined only slightly last year, but nonbuilding construction slipped 10 per cent. Compensating gains were made in the region's nonresidential building values, where both commercial and educational contracts scored increases of better than 20 per cent in 1965.

Once again, the conflicting directions shown in the year's *regional* data seem to bear out the fact that construction is essentially a local business. Because of this, it's the local trends that tell you what's really happening.

George A. Christie, *Chief Economist*
F. W. Dodge Company
A Division of McGraw-Hill, Inc.

Building activity: monthly contract tabulations



Architect: James E. Ferguson & Assoc., Coral Gables, Fla.

BORDEN DECOR PANELS: DECA-GRID

The aluminum sun screens on the school building above are Deca-Grid style Borden Decor Panel. The lightweight panels were furnished with tilted spacers to provide the proper degree of shading.

The tilting of the Deca-Grid spacers is known as the slant-tab variation, in which the slant-tabs (spacers) may be mounted at angles of 30°, 45°, 60° or 90°. The slant-tabs may be specified in various lengths as well, depending on the chosen angle of mounting. With the Deca-Grid style, specifications for spacings and spacer bar positions may be varied almost indefinitely.

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LETTERS

Congratulations—it is a pleasure to be able to sincerely compliment you and your staff on the new format and graphic excellence of the RECORD. Actually, my enthusiasm is as much a result of the increasing quality and rational exploration of pertinent subject matter as it is from the graphics. Still, I am awed by the poetry of the article and photographs by Ben Thompson. . . . I hope you will continue the excellent articles on current techniques relating to the design process, such as the two-part series by Jonathan Barnett.

Richard R. Whitaker, Jr.
Director, Educational Programs
The American Institute of Architects

It was a wonderful surprise to see the RECORD step out into the new year with a new type face and such fine layout. It gives more dignity to the work shown and helps enjoyment of the material immensely.

Ulrich Franzen
Ulrich Franzen & Associates, Architects
New York City

The RECORD was always my favorite as far as contents were concerned, spanning the entire spectrum from discussions of far-out esthetics to the most practical architectural details. Now that you have added the fabulous color in the editorial material and changed to a modern sans-serif type I believe that you are producing one of the best architectural magazines in the world.

Gustave R. Keane, A.I.A.
Eggers and Higgins, Architects
New York City

My own sincere thanks to you that you opened these new 12 months with your beautiful and wise publication of Mr. Thompson's program.

Richard J. Neutra, F.A.I.A.
Los Angeles

On the new format for the ARCHITECTURAL RECORD, my views can be summed-up in one word—"knockout"! All architects are prone, when confronted with problems of design, whether they be structural or graphic, to look for ways and means to improve upon what has been suggested. In the case of the new RECORD, I find practically nothing that I could suggest as an improvement. Your editorial pages reflect my idea of a magazine for professional architects, which is complete coverage of as many different buildings as possible, especially with complete plans so that the design and concept is intelligible. This I think is a great improvement over one or two dramatic close-ups of textured concrete or the leaf of a sugar maple.

Noland Blass, Jr., A.I.A.
Erhart, Eichenbaum, Rauch and Blass Architects
Little Rock, Arkansas

The January issue is definitely a step forward in architectural journalism. The new type style is attractive and easy to read. The cover design is in excellent taste; a fine esthetic achievement. The introduction of more color is a welcome addition. The architectural detail brochure is beautifully drawn. But, most of all, the over-all scope of the issue is outstanding.

I would also like to commend Ben Thompson on his courageous statement regarding coordinating architectural training with "real" architecture. It is interesting to note that several years ago when we were researching on architectural education with the Building Industry Design Group, composed of Sert, Holm, Larsen, Sanders and others, we received a report on architectural education in pre-World War II Czechoslovakia, in which they described how the government assigned a group of projects each year to the architectural school and these projects were designed, developed through working drawings, details, specifications and built under the supervision of the professors and students as part of their training. It is a pity that this concept has never been tried here. Certainly our government agencies should have enough projects so that a certain amount could be assigned to various schools each year to get this suggestion of Thompson's in motion.

This step would go a long way to eliminating the black hole of ignorance most graduating students face on entering an architect's office for the first time.

As professor of architectural design at Pratt Institute and a practicing architect, I would like to urge Thompson to seek A.C.S.A. and A.I.A. support for this important and most worthy contribution to the betterment of architectural education. Furthermore, I feel all architects and educators in this field should come-out now with letters of support to Thompson so that their respective national bodies A.I.A. and A.C.S.A. would recognize the need for this step forward.

Sidney L. Katz, F.A.I.A.
Katz Waisman Weber Strauss
New York City

Your article on Ben Thompson was one of the best articles that an architectural magazine has ever published. Thank you and congratulations.

Neal B. Mitchell, Jr.
Structural Engineer
Lexington, Massachusetts

It is the combination of sophistication and zip that one would hope to find in an architectural publication.

Earl R. Flansburgh, A.I.A.
Cambridge, Massachusetts

For all the years that I can remember, the format and contents of the ARCHITECTURAL RECORD have pleased me; more so now. And as I have repeatedly told you, you organize pertinent information for the architect, and as such the magazine is invaluable as a reference tool. As I look back to its general contents through the years, the RECORD also reflects better than any other the story of the architectural achievements of this epoch.

George Fred Keck
George Fred Keck-William Keck, Architects
Chicago

Your January issue of the RECORD is indeed handsome; the type face, Optima, I consider to be both elegant and architectural and altogether fitting for the RECORD. The page layout—its hairline border, sometimes in color, complements the type face... the quality of color reproduction is exemplary. . . . I have always looked forward to the arrival each month of the RECORD and now with more cause than ever.

Hugh Newell Jacobsen, A.I.A.
Washington, D. C.

continued on page 286

New hospital offers year-round personal climate control for patients and staff, thanks to Carrier and Gas.

Patients may choose the room temperature they find most comfortable in the new St. Joseph's Hospital in Orange, Calif. Carrier Weathermaster® air conditioning units are located throughout for individual room temperature control. And central heating and cooling are more economical than ever because both are supplied from the same Gas-fired boiler source.

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Assoc. Architect: Rex Whitaker Allen, San Francisco, Calif.
Consulting Engineer: Bouillon Christofferson & Schairer, Seattle, Wash.
General Contractor: Gust K. Newberg, Los Angeles, Calif.
Mechanical Contractor: Murray Company, Gardena, Calif., Western Air & Refrigeration

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Steel for Strength

STRUCTURAL DESIGN **NEWS**

FROM BETHLEHEM STEEL No. 13

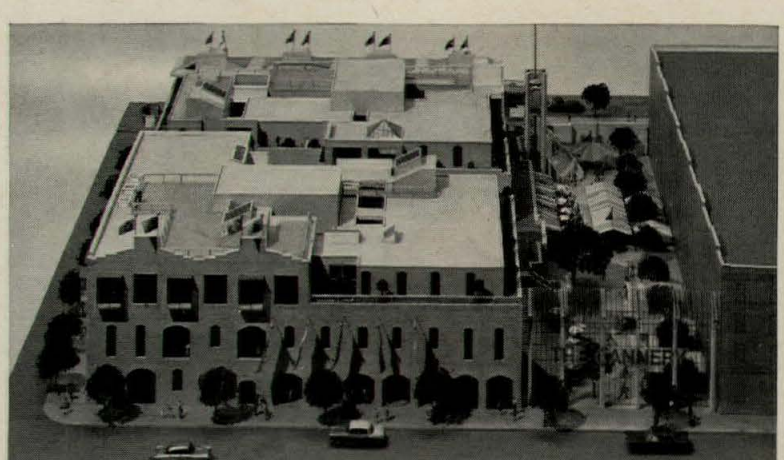
ONE CENTER PLAZA IN BOSTON. The initial design of this new office building called for a framing material other than steel. But the owners and builders changed to a steel frame in order to allow for easy modification of tenant space (additional stairways, increased floor load capacities, etc.) after completion of the building. The eight-story structure will have 600,000 sq ft of space, with underground parking for 400 cars. Bethlehem Steel is supplying some 5,000 tons of structural steel for the framework, which is recessed at the first floor level to provide a pedestrian arcade.

Owner: Beacon Construction Company
architect: Welton Becket and Associates
consulting engineer: Wayman C. Wing
steel fabricator: West End Iron Works

WHY PENNEY CHOSE STEEL FRAMING. Final design of J. C. Penney Company's 200,000-sq-ft retail store in Ventura, Calif., was preceded by a detailed analysis of the relative merits of steel framing versus reinforced concrete. Disclosed were significant savings in the choice of steel. Because of the low load-bearing capacity of the soil, foundation piles were required. Since the steel frame was much lighter, fewer piles were required. The lightness of the steel framing also permitted utilization of exterior masonry walls as shear walls. Considerable savings resulted from the simplicity of the steel frame for vertical and lateral loads. Further economy was achieved by designing with uniform bay spacing.

Owner: Gordon L. MacDonald & Associates; architect: Mazzetti/Leach, Cleveland & Associates; structural engineer: Samuel Schultz; general contractor: Monitor Construction Company; steelwork: Bethlehem Steel Corporation.

OLD BRICK, NEW STEEL. Civic-minded San Franciscans are enthusiastic about a restoration project near famous Fisherman's Wharf. There the brick shell of a circa-1903 fruit cannery is being braced, divided into two buildings, and filled in with three levels of steel framing to house a potpourri of restaurants, pubs, shops, and galleries.



Owner: Leonard V. Martin; architect: Joseph Esherick and Associates; structural engineer: Rutherford & Chekene; general contractor: Greystone Builders; steelwork: Bethlehem Steel Corporation.

BETHLEHEM STEEL

BETHLEHEM STEEL CORPORATION, BETHLEHEM, PA.

For more data, circle 37 on inquiry card

For more data, circle 38 on inquiry card

Persian architecture

PERSIAN ARCHITECTURE. *By Arthur Upham Pope. George Braziller, Inc., One Park Ave., New York, N. Y. 10016 288 pp., illus. $20.00.*

This book, the result of years of scholarly research, combines Arthur Upham Pope's vast knowledge of facts with his sensitive description, sober interpretation and impressive writing skill. The result is a lively, readable, almost poetic history of Persian architecture which, should, in addition, be commended for its organization.

Dr. Pope traces the development of the architecture according to styles and techniques, and explains the influential cultural and spiritual trends from 5,000 B.C. to the Qajar dynasty in the 19th century. Marginal reference numbers make easy the association of the 404 illustrations to their related paragraphs, and 33 magnificently reproduced color photographs could not help but assert the tremendous significance of color and decoration in Persian architecture. Says Dr. Pope in "The Meaning and Function of Persian Decoration," one of his most interesting chapters, ". . . important structures of all periods in Persia have been aglow with color, often resplendent with gilding and mural painting or enriched by carved stucco or ingenious patterns in brick or tiles." He goes on to study in detail the development of brick, stucco and tile and to discuss the use of intricate decorative patterns.

To make the book complete, Dr. Pope has included notes, map, historical summary, and selected bibliography.

Houses

MODERN HOUSES OF THE WORLD. *By Sherban Cantacuzino. E. P. Dutton and Co., Inc., 201 Park Avenue South, New York, N. Y. 10003. 160 pp., illus Paperbound, $1.95.*

Although written primarily for the layman, here is a good collection of examples of modern house architecture. Many of the classics which have acted as receptacles of new ideas are included. The houses are from many parts of the world and most have been seen in some published form before.

The author, a practicing architect, has included a thoughtful introduction to his subject which he has set in the wider context of architecture in general. The text, though brief, is intelligently written and there are many photographs to be enjoyed.

Churches

MODERN CHURCHES OF THE WORLD. *By Robert Maguire and Keith Murray. E. P. Dutton and Co., Inc., 201 Park Avenue South, New York, N. Y. 10003. 160 pp., illus. Paperbound, $1.75.*

Most of the churches presented in this attractive paperback are the results of the conjunction of the Liturgical Movement in the church and the Modern Movement in architecture. The author makes clear that without this connection between liturgy and architecture, new churches could be only superficially modern in style, lacking the essential character of the Modern Movement—Functionalism.

Therefore, though some of the churches are apparently traditional in style, they are modern because of their concern with the needs of the developing liturgical life—and are fundamentally more modern than the number of churches with the "exciting" modern forms. Here is a plea for aptness.

Critical path techniques

MANUAL CRITICAL PATH TECHNIQUES FOR CONSTRUCTION. *By F. Thomas Collins. Know How Publications, P.O. Box 7126, Landscape Station, Berkeley, Calif. 94717. 193 pp., illus. $9.80.*

This publication deals with new simplified manual techniques for the planning, scheduling and control of construction projects using CPM (Critical Path Method). The techniques outlined require no mechanical or electronic equipment.

Emphasis throughout is on possibilities for better project control starting with new graphic models of the Gantt chart and proceeding through the refinements of CPM.

Pre-Imperial Rome

THE ARCHITECTURE OF THE ROMAN EMPIRE. *By William L. MacDonald. Yale Publications in the History of Art, 17. Yale University Press, New Haven, Conn. 211 pp., illus. $17.50.*

This scholarly volume serves as an introduction to the original architecture of Imperial Rome. The study is self-contained to A.D. 60-130 and the stylistic and historical problems of this period.

Four buildings which "record or foreshadow the chief characteristics of specifically imperial architecture" are analyzed: the Esquiline wing of Nero's Domus Aurea; the palace of Domitian on the Palatine; Trajan's Markets beside his Forum; and Hadrian's Pantheon.

The emphasis throughout is upon the buildings as they stand today. New plans and reconstructions and an abundance of new photographs parallel the discussion. The architects, structural technology, and decoration are investigated and an attempt is made to evaluate the meaning of their forms.

continued on page 74

THIS MONTH'S BOOKS

REVIEWS

Corning Glass Works

New Research and Development Laboratories

Eugene C. Sullivan Science Park
Corning, New York

Research Space Quadrupled in Ten Years

Harrison & Abramovitz
Architects

Jaros, Baum & Bolles
Mechanical Engineers

George A. Fuller Company
General Contractors

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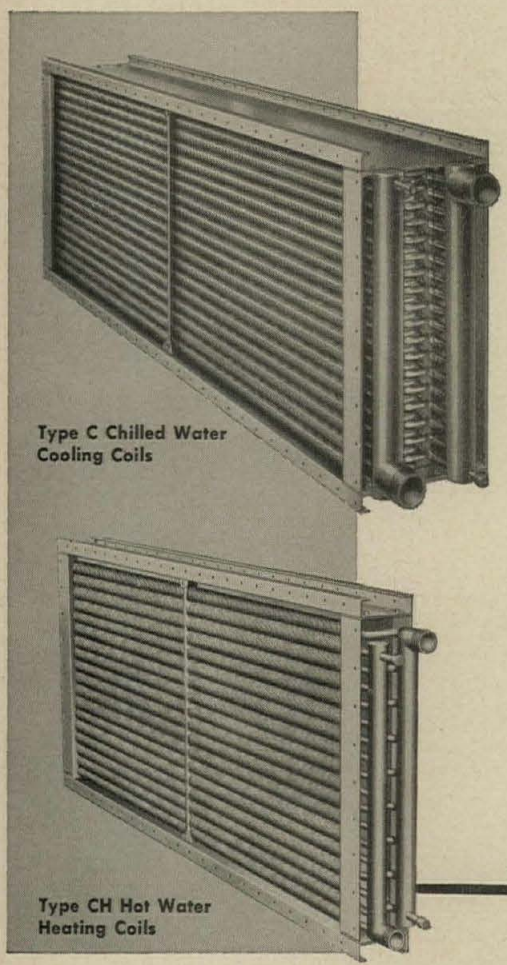

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Terrazzo installation made with ATLAS WHITE portland cement. The Chas. V. Weise Co., Colonial Village Store, Rockford, Ill. **Architect:** Harold Shafer & Associates, Berkeley, Ill. **Contractor:** John Frich & Sons, Inc., Rockford. **Terrazzo Contractor:** Rockford Central Tile & Terrazzo Co., Inc., Rockford.

This store floor of jointless terrazzo can ring up maintenance savings of $32,500 a year

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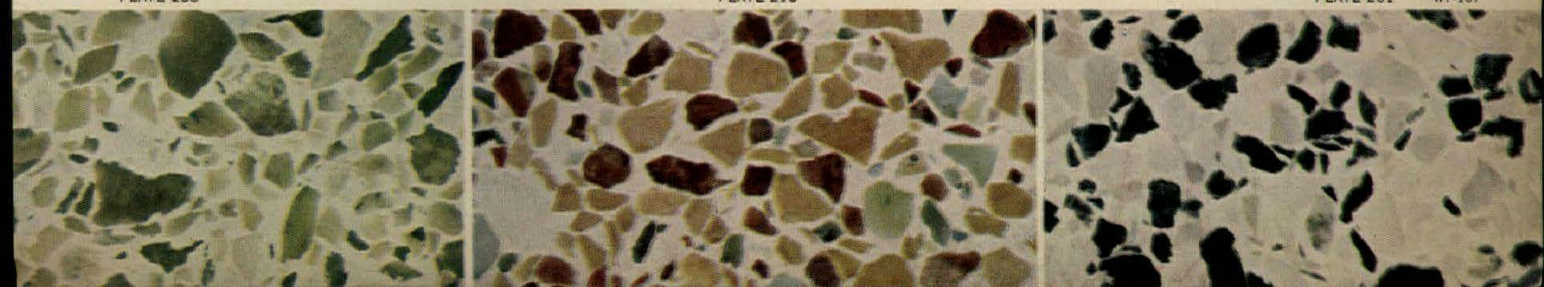
PLATE 238 PLATE 216 PLATE 201 WT-107



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For details, see your Bradley representative. And write for latest literature. Bradley Washfountain Co., 9109 Fountain Drive, Menomonee Falls, Wis. 53055.

Bradley

Urban design

URBAN DESIGN: THE ARCHITECTURE OF TOWNS AND CITIES. *By Paul D. Spreiregen, A.I.A. McGraw-Hill Book Company, 330 W. 42nd St., New York, N. Y. 10036. 243 pp., illus. $12.50*

The history of urban design from ancient times up to the industrial-technical era and from that era to the present is discussed in this book which is a revision of a series of 12 articles appearing originally in the A.I.A. Journal (December, 1962 to November, 1964). Also, the basic principles and techniques of urban design are outlined, including visual presentations.

The book is profusely illustrated with sketchbook examples and plans. The esthetics of urban form; the design of residential areas; circulation and design; and techniques of design controls are presented. The role of the government in urban design and the future possibilities of urban design are examined in the concluding chapters. This study reflects the profession's concern for the pressing problems of our urban environments.

Early Christian architecture

THE ORTHODOX BAPTISTERY OF RAVENNA. *By Spiro K. Kostof. Yale University Press, New Haven, Conn. 171 pp., illus. $15.00.*

This highly researched and well documented book—revised from a dissertation by the Department of the History of Art at Yale—covers the history, the architecture, the decorative program and the significance of the Orthodox Baptistery of Ravenna. The text, with extensive footnotes, is organized so as to first orient the reader to the Baptistery in general and then to focus closely on every detail of the exterior and interior.

There are approximately 147 plates of sections, elevations, plans and photographs in an adjoining section illustrating the text appropriately, while appendices include a section on furniture and furnishings, and quotations from documents relating to the history.

Construction

CONSTRUCTION ESTIMATING AND JOB PLANNING. *By George E. Deatherage. McGraw-Hill Book Company, 330 W. 42nd St., New York, N. Y. 10036. 307 pp., illus. $14.50.*

continued on page 96

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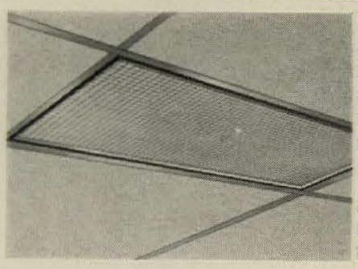

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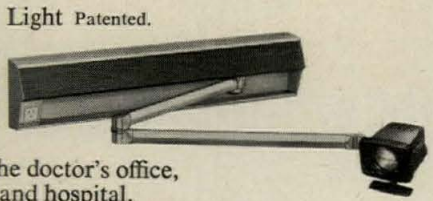

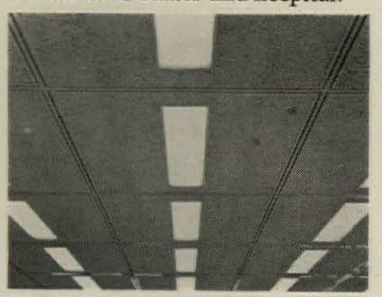

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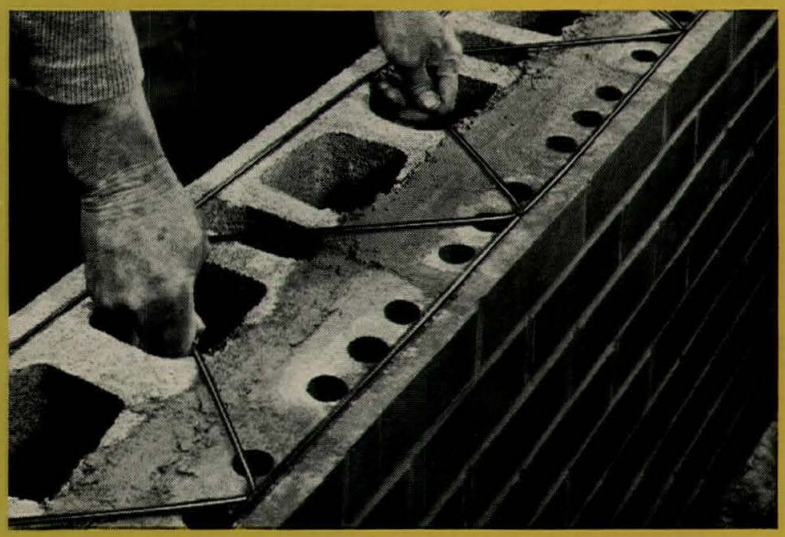

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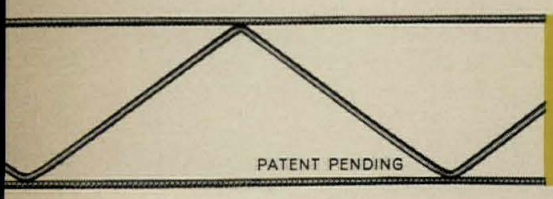

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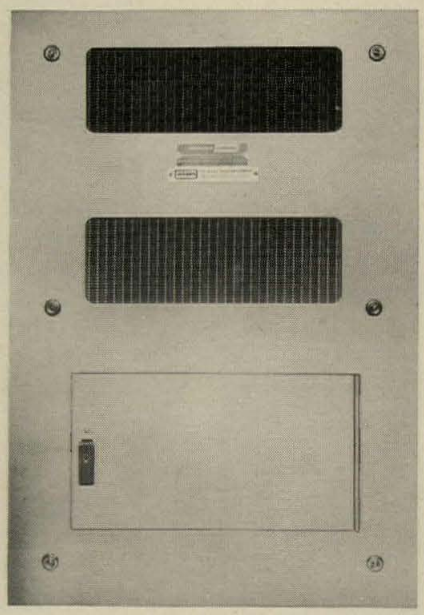

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continued from page 74

CONSTRUCTION SCHEDULING AND CONTROL. By George E. Deatherage, McGraw-Hill Book Company, 330 W. 42nd St., New York, N. Y. 10036. 316 pp., illus. $15.00.

These are the last two of four books which Mr. Deatherage has written on modern construction management under the general heading of "Practical Construction Management." The previous two volumes are "Construction Company Organization and Management and Construction Office Administration."

The introduction of CPM—the critical path method of scheduling — has caused a minor revolution in construction management processes and has compelled the construction industry to do more exacting preplanning and scheduling. The author questions the use of the CPM technique—based on mathematical predeterminations — when the construction methods selected to perform the work are not, in themselves, the best and subject to mathematical proof. "Construction Estimating and Job Preplanning" presents in detail this entirely new perspective in estimating. Construction estimators will find several new approaches to the estimating and cost-keeping functions.

"Construction Scheduling and Control," the final volume, is an attempt to cover the functions missed in previous works. These are: project scheduling, purchasing, materials expediting, traffic management, tools and equipment safety, labor relations, job management and control, and administration. Again emphasis is given to the critical path method and its related functions.

Maintenance

DETERIORATION, MAINTENANCE, AND REPAIR OF STRUCTURES. *By Sidney M. Johnson. McGraw-Hill Book Company, 330 W. 42nd St., New York, N. Y. 10036. 373 pp., illus. $10.50.*

This book considers primarily the cause and repair of defects—not those resulting from errors in design but those which occur in structures proportioned without error. Many such structures develop problems of maintenance which seem to recur in similar structures and similar conditions of exposure, suggesting inadvertent but repeated use of unsuitable details and/or practices.

The book acquaints designers with potential problem areas that may occur after construction. The text makes self-study and easy reference possible.

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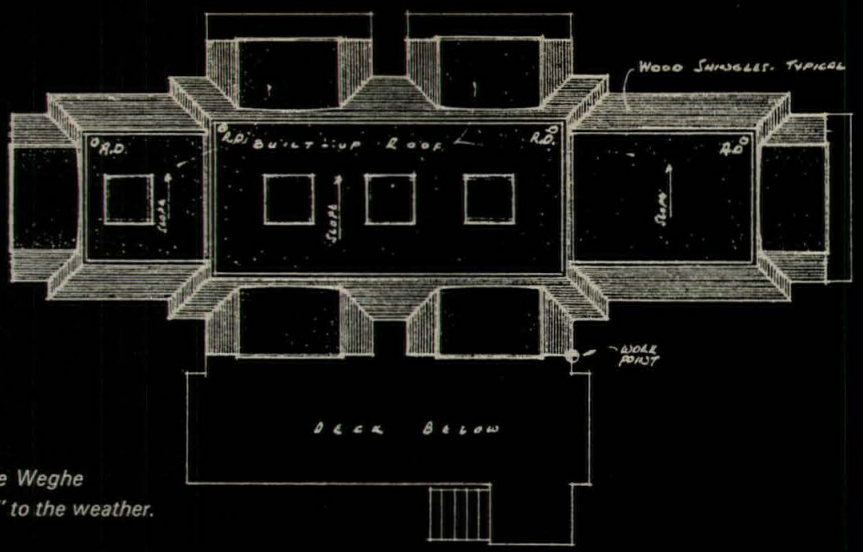

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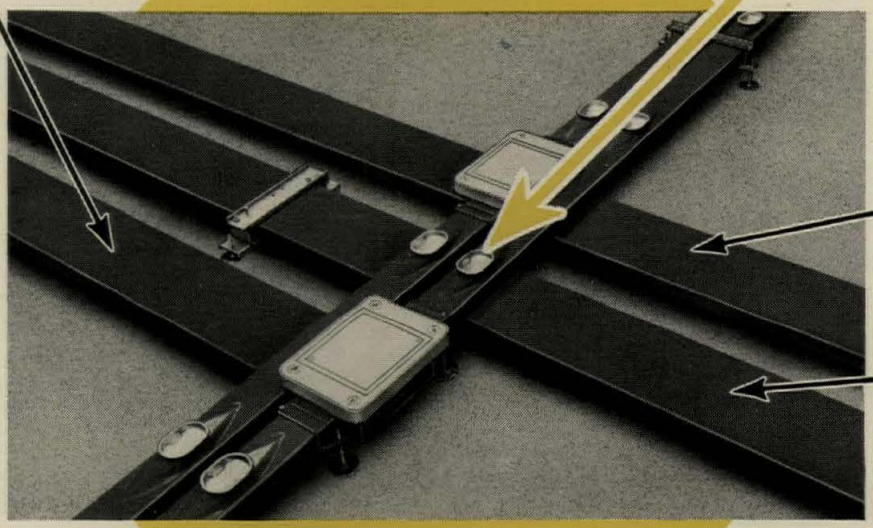

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Architectural scale

ARCHITECTURAL SCALE. *By Heath Licklider. George Braziller, Inc., One Park Ave., New York, N. Y. 10016. 232 pp., illus. $5.00.*

The primary purpose of the author is "to place in the hands of architectural students a description of scale that will help them to discover the complex relationship between the lines that they draw on paper, the same divisions as they stand full-size upon the site, and the experience that they may afford an observer." He begins by examining separately physical, proportional, and human scale and develops the conception of human scale further, as the proper basis for an understanding of architectural scale.

The text is lively and comprehensive. Supporting drawings appear throughout.

BOOKS RECEIVED

SUCCESS AND FAILURE OF PICASSO. *By John Berger Penguin Books Inc., Baltimore, Md. 210 pp., illus Paperbound, $2.25.*

THE REVIVAL OF THE ORGAN CASE. *By Joseph Edwin Blanton. Venture Press, Albany, Tex. 127 pp., illus. $7.50.*

THE NEW MUSEUM. *By Michael Brawne. Frederick A. Praeger, 111 Fourth Ave., New York, N. Y. 10003 208 pp., illus. $20.00.*

SOUND CONTROL AND THERMAL INSULATION OF BUILDINGS. *By Paul Close. Reinhold Publishing Corp., 430 Park Ave., New York, N. Y. 10022. 502 pp., illus. $17.00.*

THE ITALIAN TOWNSCAPE. *By Ivor de Wolfe. Reissue. George Braziller, Inc., One Park Ave., New York, N. Y. 10016. 280 pp., illus. $12.50.*

THE HIDDEN DIMENSION. *By Edward T. Hall. Doubleday & Company, Inc., 277 Park Ave., New York, N. Y. 10017. 201 pp., illus. $4.95.*

NEW ARCHITECTURE IN THE WORLD. *By Udo Kultermann. Universe Books Inc., 381 Park Avenue South, New York, N. Y. 10016. 208 pp., illus. $10.50.*

THE CITIES AND THE FEDERAL SYSTEM. *By Roscoe C. Martin. Atherton Press, 70 Fifth Ave., New York, N. Y. 10011. 200 pp. $6.95.*

MODERN SCHOOL SHOP PLANNING. *Fourth Revised Edition. Prakken Publications, Inc., 416 Longshore Drive, Ann Arbor, Mich. 256 pp., illus. Plasticbound, $4.50.*

CONSTRUCTION AND PROFESSIONAL MANAGEMENT, *An Introduction. By Harry Rubey and Walker W. Milner. The Macmillan Company, 60 Fifth Ave., New York, N. Y. 10011. 306 pp., illus. $8.95.*

THEORY OF ARCH DAMS, *Proceedings of a Symposium held at the University of Southampton. Edited by J. R. Rydzewski. Pergamon Press Inc., 44-01, 21st St., Long Island City, New York 11101. 786 pp., illus. $40.00.*

CHEMISTRY AND BIOLOGY LABORATORIES. *By Werner Schram. Pergamon Press Inc., 44-01, 21st St., Long Island City, New York. 255 pp., illus. $17.50*

CONTEMPORARY THEATRE ARCHITECTURE. *By Maxwell Silverman and Ned A. Bowman. The New York Public Library, 5th Ave. & 42nd St., New York, N. Y 10018. Unpaged, illus. $10.00.*

BRASILIA. *By Willy Staübli. Universe Books Inc., 381 Park Avenue South, New York, N. Y. 10016. 199 pp., illus. $15.00.*

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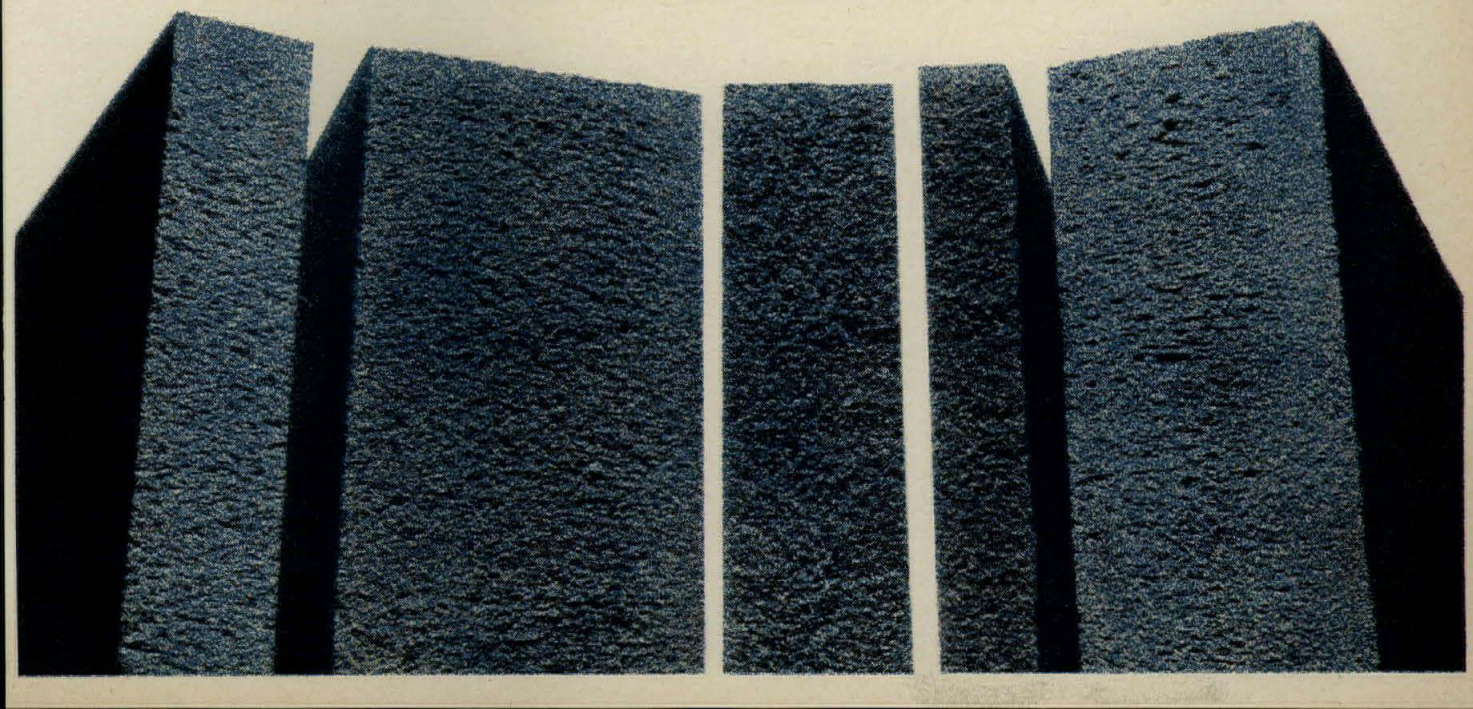

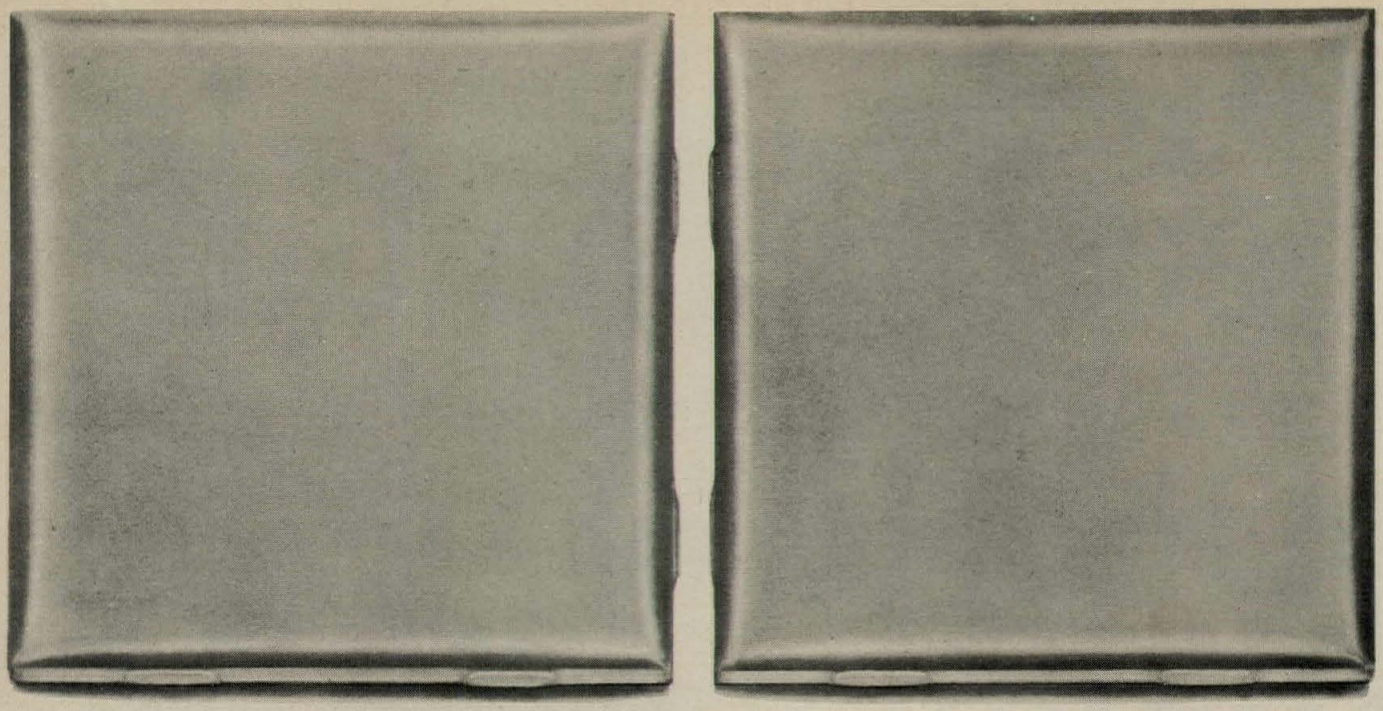

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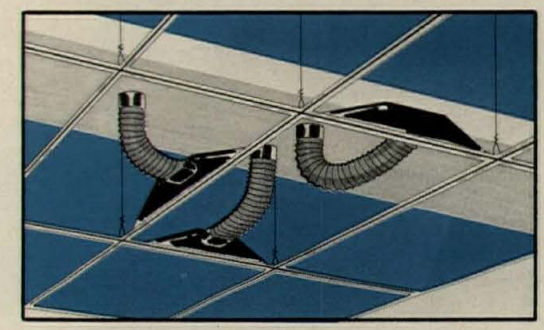

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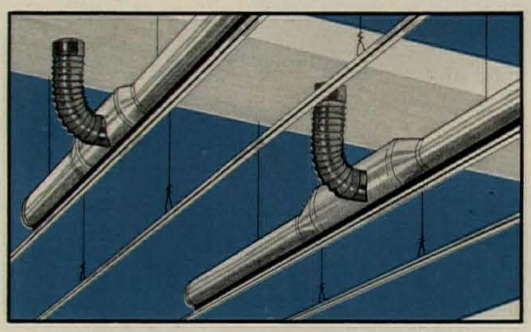

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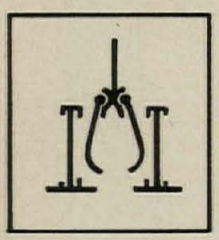

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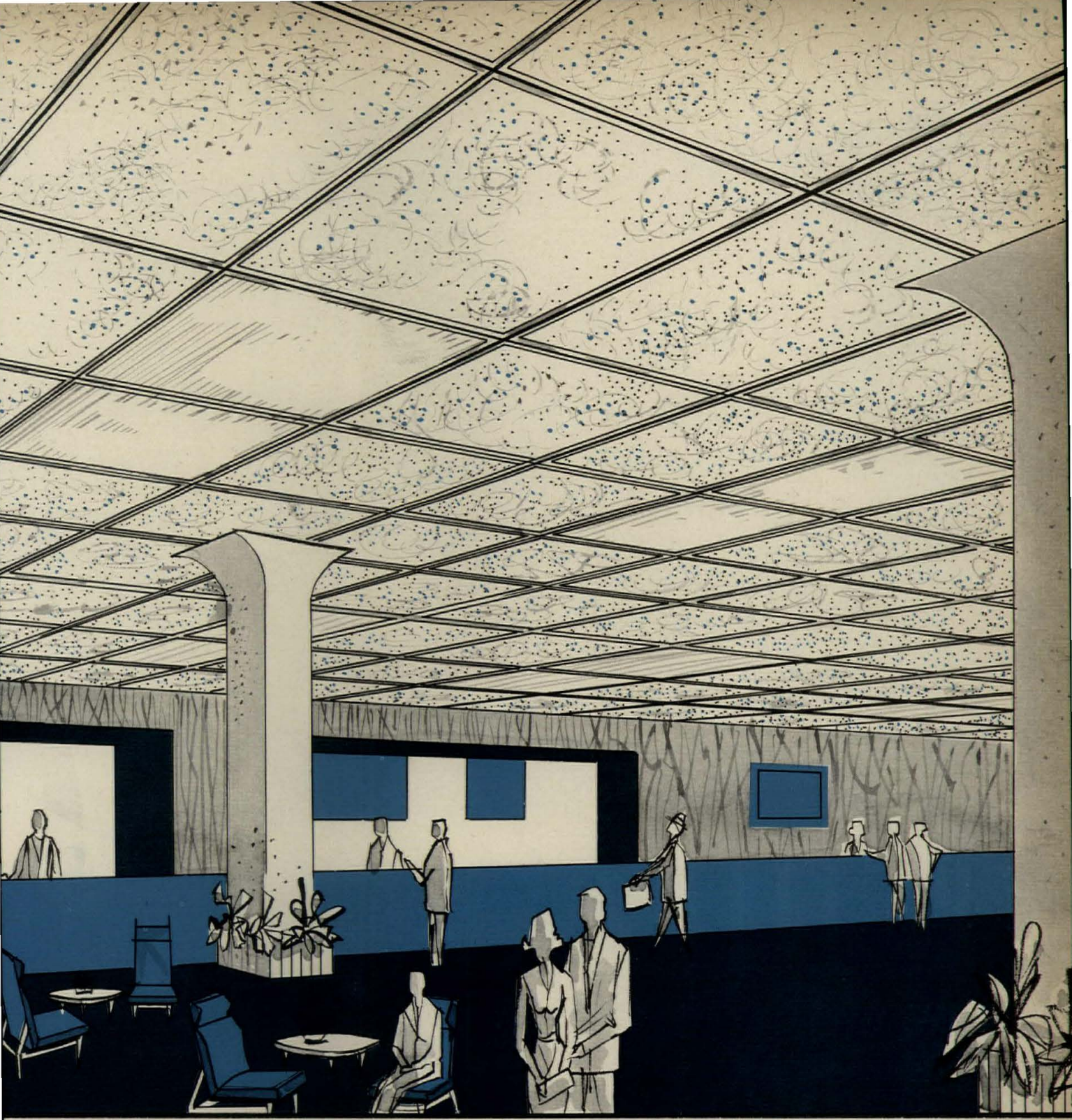

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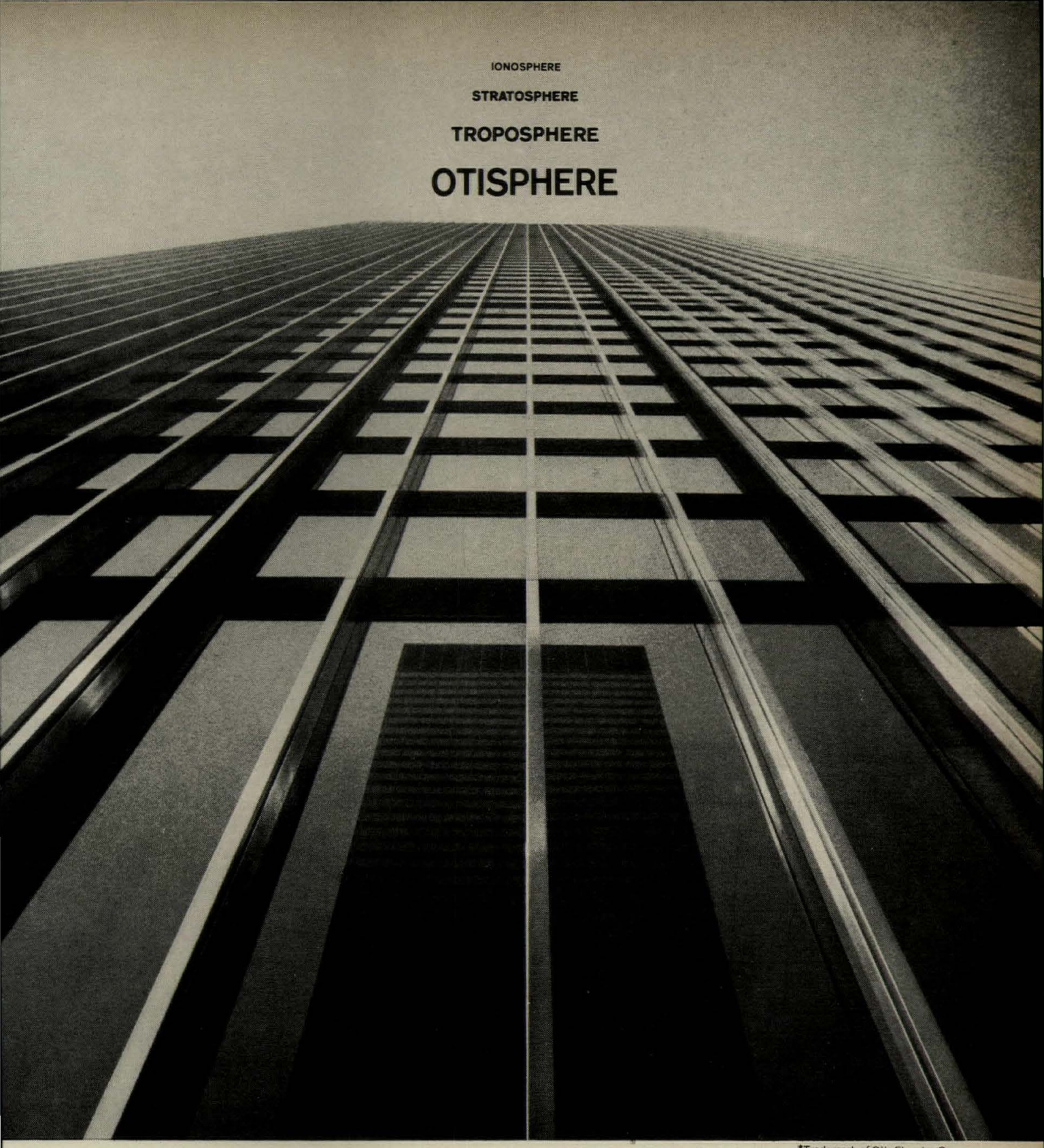

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ON THE CALENDAR

MARCH

1-3 Fourth Electric Heating and Comfort Conditioning Systems Conference and Exposition, National Electrical Manufacturers Association—Washington

7-11 62nd Annual Convention, American Concrete Institute—Benjamin Franklin Hotel, Philadelphia

7-11 22nd Annual Technical Conference, Society of Plastic Engineers—The Queen Elizabeth Hotel, Montreal, Quebec

20-23 Second Annual Meeting, Solar Energy Society—Somerset Hotel, Boston

21-24 Industrial, Institutional & Commercial Building Conference—Public Auditorium, Cleveland

29 Fifth Annual Technical Meeting and Exhibits, American Association for Contamination Control — Shamrock Hilton Hotel, Houston; through April 1

29-30 Symposium on Performance Concept in Building, Building Research Advisory Board—Jung Hotel, New Orleans.

APRIL

17-21 Second North American Conference on campus planning and college building design—University of Illinois, Urbana, Ill.

24-29 Annual Convention, National Association of Architectural Metal Manufacturers—Mark Hopkins, San Francisco

30 Sixth Annual Conference, U. S. Institute for Theater Technology, Inc.—University of Toronto, Ontario, Canada; through May 2

MAY

4-6 Tenth Anniversary Convention, Consulting Engineers Council USA—Civic Center Assembly Hall, Tulsa, Okla.

8-12 66th Annual Meeting, American Society of Landscape Architects—Yosemite National Park, Calif.

8-14 28th World Congress for Housing and Planning—Tokyo, Japan

10-12 Annual Conference of the American Society for Church Architecture—Conrad Hilton Hotel, Chicago

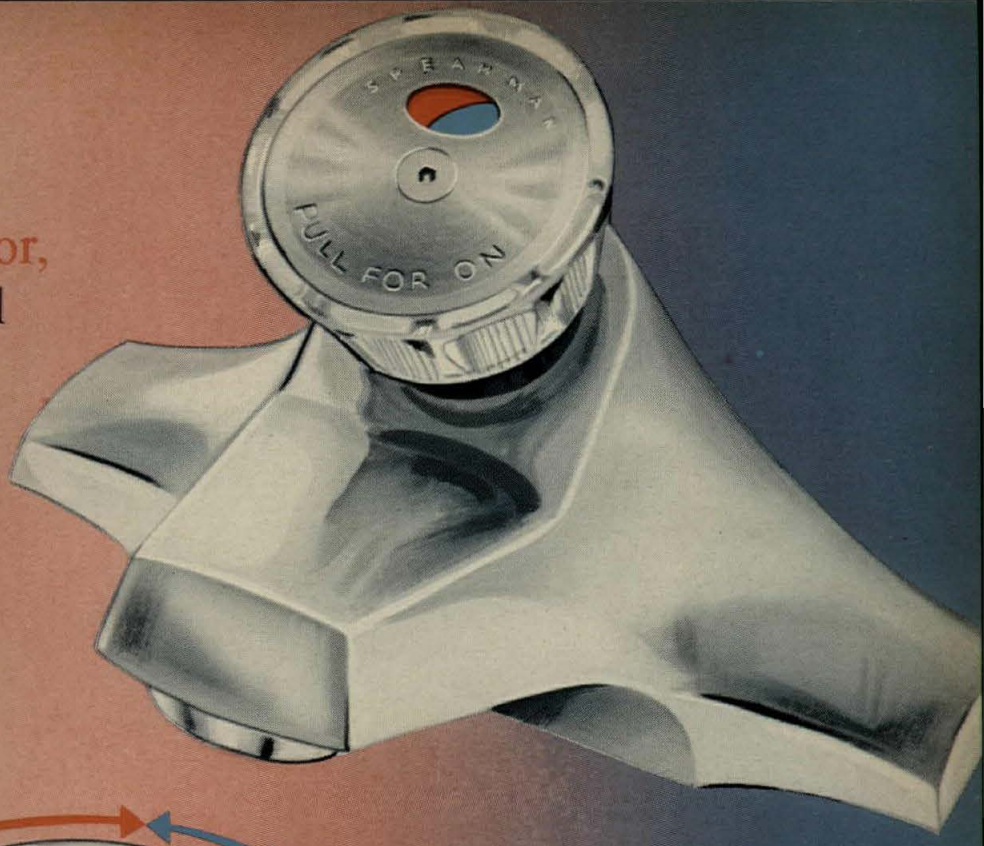
12-13 Third Annual National Colloquium on Information Retrieval—University of Pennsylvania, Philadelphia

15-21 Mid-Pacific Conference on Landscape Architecture and Urban Design—Princess Kaiulani Hotel, Honolulu.

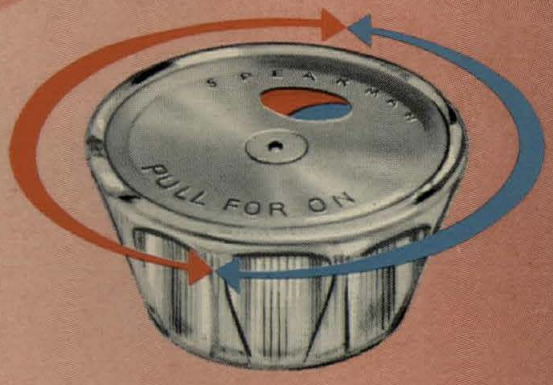
continued on page 120

SPECIFY EXCITEMENT!

This exciting new way to control water, with color, makes other single control valves old-fashioned!



LEFT FOR HOT



RIGHT FOR COLD

SPEAKMAN

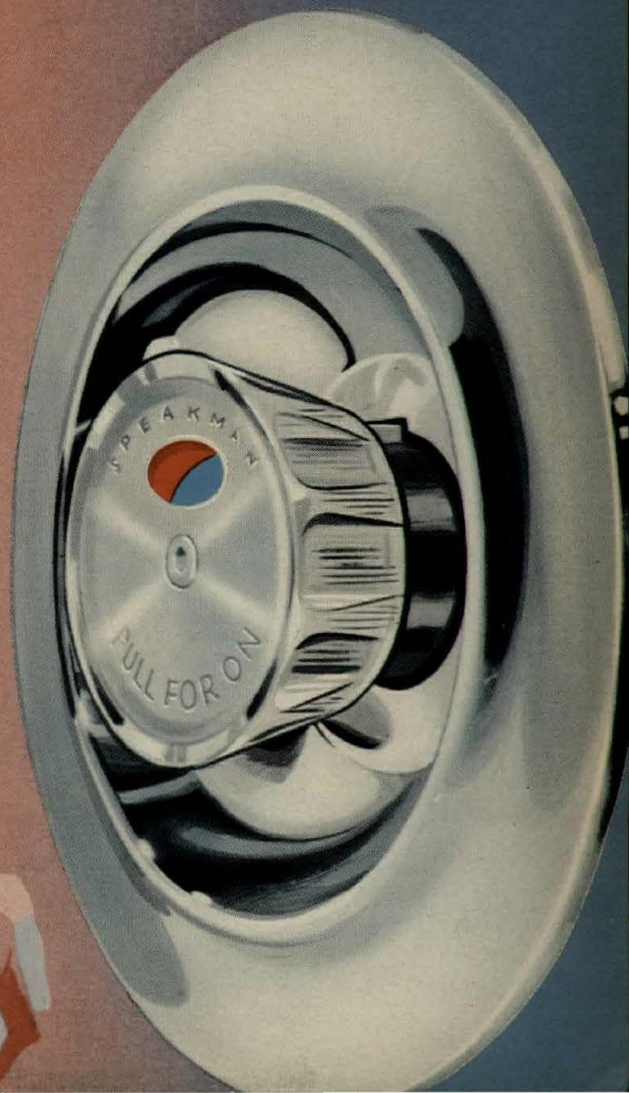
colortemp®

for lavatory, shower and bath

Dial left to full red for hottest water. Dial right to full blue for coldest. In-between for exact temperature desired.

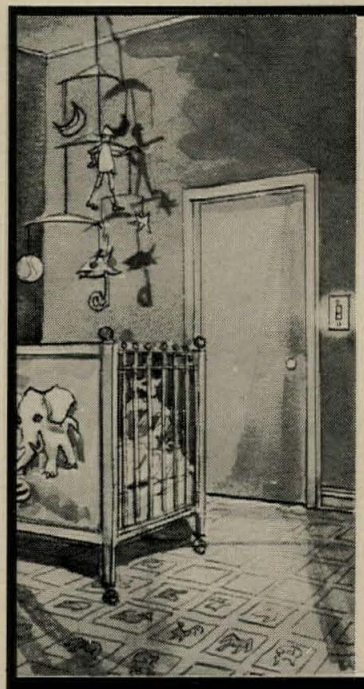
This remarkable push-pull faucet brings new beauty and functional luxury to the lavatory, bath or shower. The Colortemp dial, a Speakman exclusive, shows water temperature *in color* merely at the turn of the dial. The cartridge push-pull faucet controls water flow so easily children never forget and leave the water running. An extra plus is the advanced styling in solid brass with beautiful chromium finish.

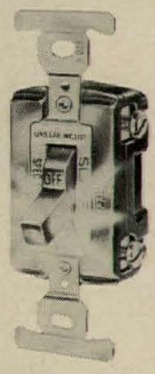
When you specify Colortemp faucets you specify a new cartridge concept that eliminates lubrication needed by ordinary gliding cylinders. Yet Colortemp gives longer wear . . . after one-half million "on-off" tests the patented Speakman cartridge cylinder still operated with smooth silent ease. One reason is Du Pont "Teflon" at friction points, the same remarkable material that prevents sticking in cooking utensils. For complete details and specifications see the new revised Speakman master catalog.



SPEAKMAN® COMPANY
Wilmington, Delaware 19899

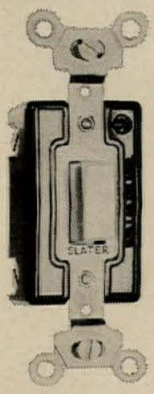
If you're specifying switches that only turn lights on and off...





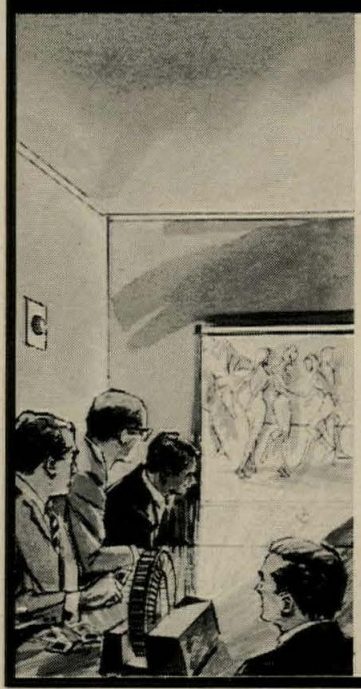
LIGHTED HANDLE AC QUIET SWITCH #700LH

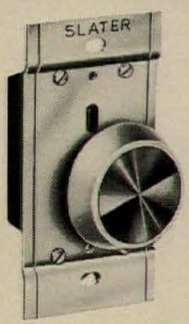
Neon lamp in the ivory handle glows softly when current is off. Baby has a friendly light to comfort him . . . without a click to disturb him. Useful as night light or off-indicator. Also available as red handle pilot light to indicate power on. A convenience and safety feature.



TOUCH PLATE SWITCH #780

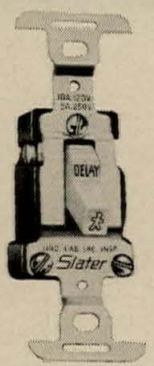
A light tap or a mere brush with the shoulder or elbow and this switch is activated. Handy when someone has an armload of parcels. Spec grade, heavy duty design permits convenient control of motors and machines that are turned on and off frequently during operation.





ROTARY DIMMER #RDCP-600

Adjust room lighting to suit the activity... or create atmosphere with lighting that can change the mood of a room. Slater offers a complete line of electronically controlled dimmers—in full range 0 to 100% adjustment—that mount in standard boxes. For residential or commercial applications. Incandescent and fluorescent, single pole and 3-way models.



TIME DELAY SWITCH #TD-100

You can turn off the switch in the garage and walk into the house before the lights go off. Or you can turn off the bedroom light and be in bed before the lights are out. Time delay activates switch automatically. A convenience and safety feature for halls, stairways, bathrooms, basements, exits, etc.

they're doing only half the job!

Slater
MANUFACTURER OF MEDALIST

SLATER ELECTRIC INC. • GLEN COVE, N.Y.

For more data, circle 82 on inquiry card

8f
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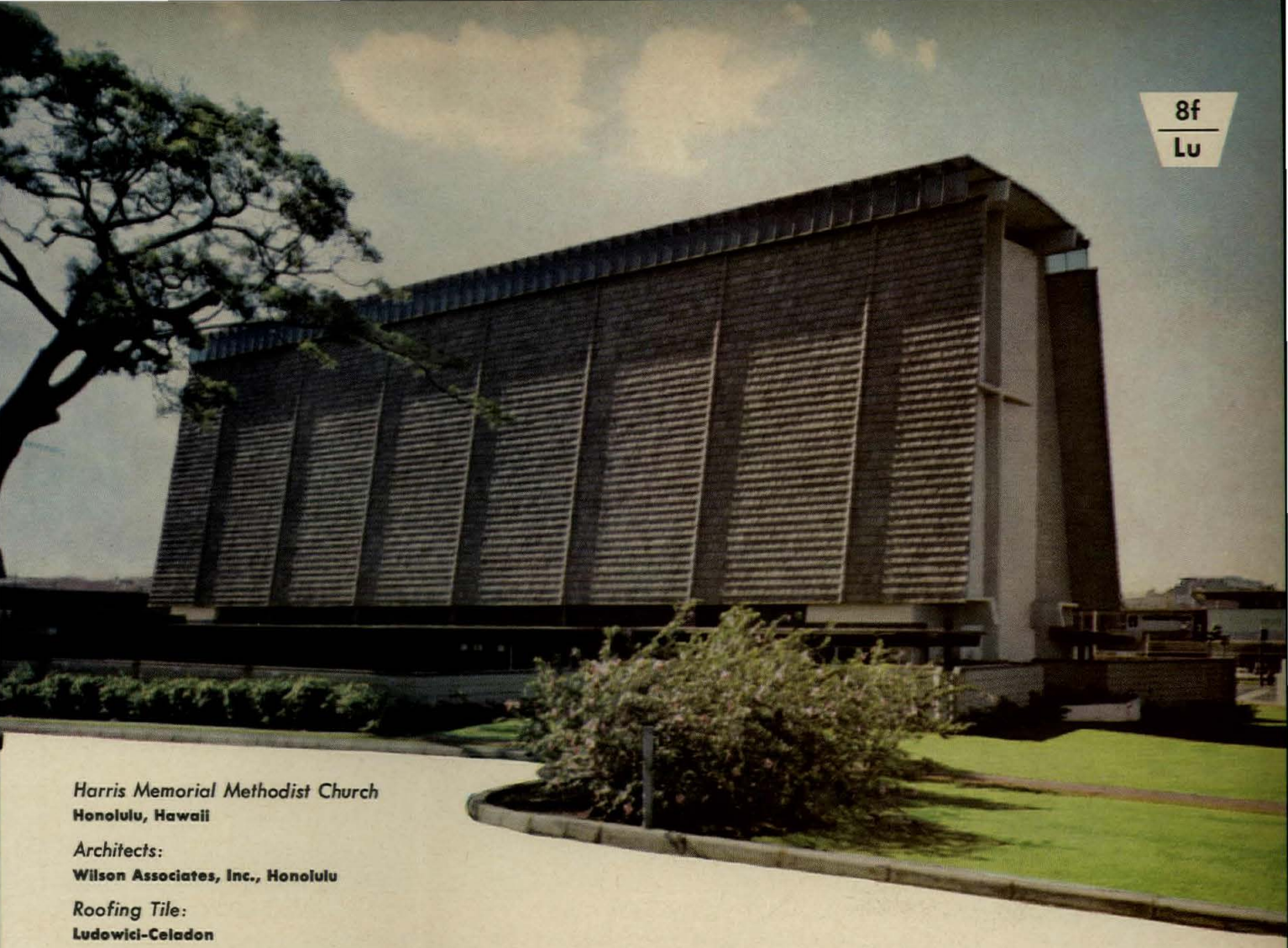
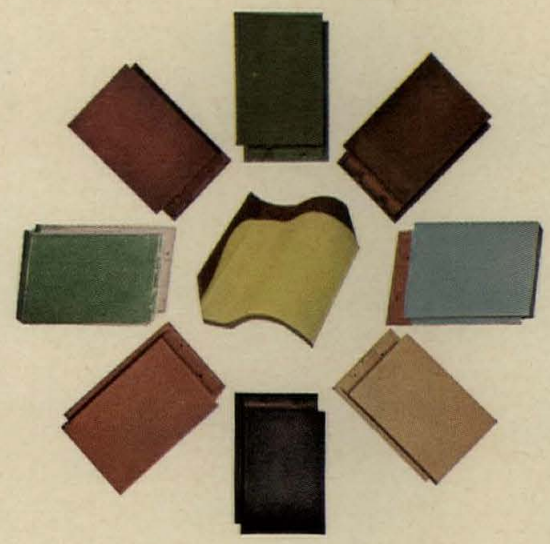


Harris Memorial Methodist Church
Honolulu, Hawaii

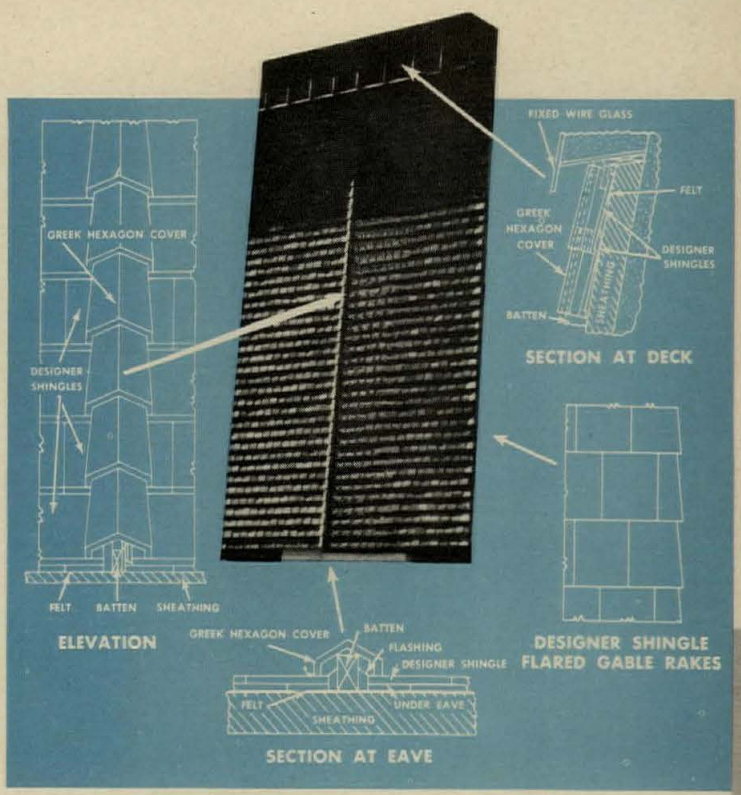
Architects:
Wilson Associates, Inc., Honolulu

Roofing Tile:
Ludowici-Celadon

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



WIDE SELECTION OF OTHER
PATTERNS, TEXTURES & COLORS



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

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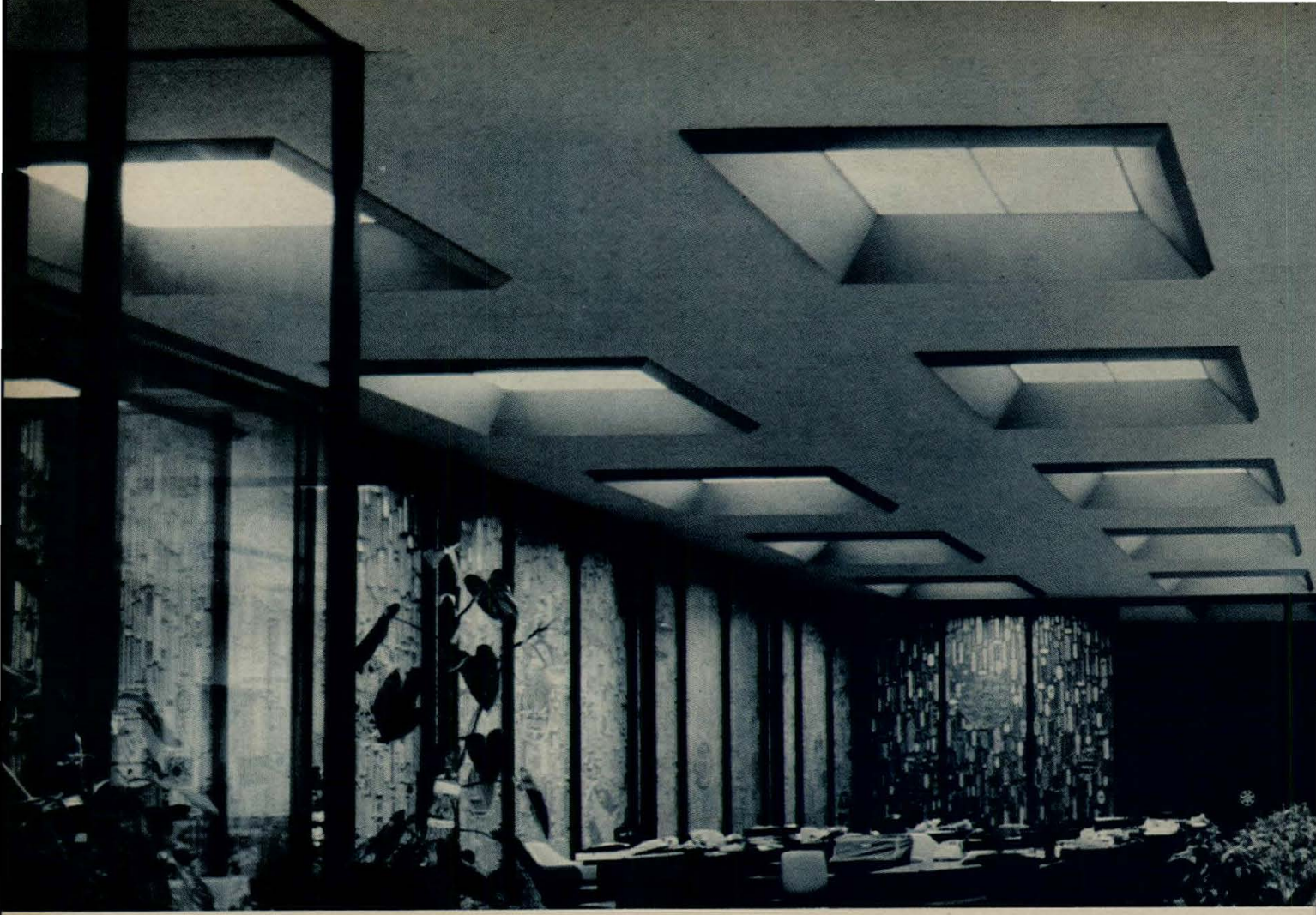
A.I.A. FILE 12-E



The First National Bank of Hialeah
Architect: A. Herbert Mathes • Consulting Engineer: H. J. Ross Associates, Inc. • Acoustical Contractor: Acousti Corp. of Miami, Florida

Performance proved on job after job

CELO-FLOW®

Air Distribution System by Celotex

The First National Bank of Hialeah, Florida, is just one of hundreds of highly successful Celo-Flow System installations throughout the country.

The Celo-Flow ceiling was installed in this magnificent new building because of its proven cost savings, efficient air distribution, high acoustical qualities and the classic beauty of Natural Fissured pattern.

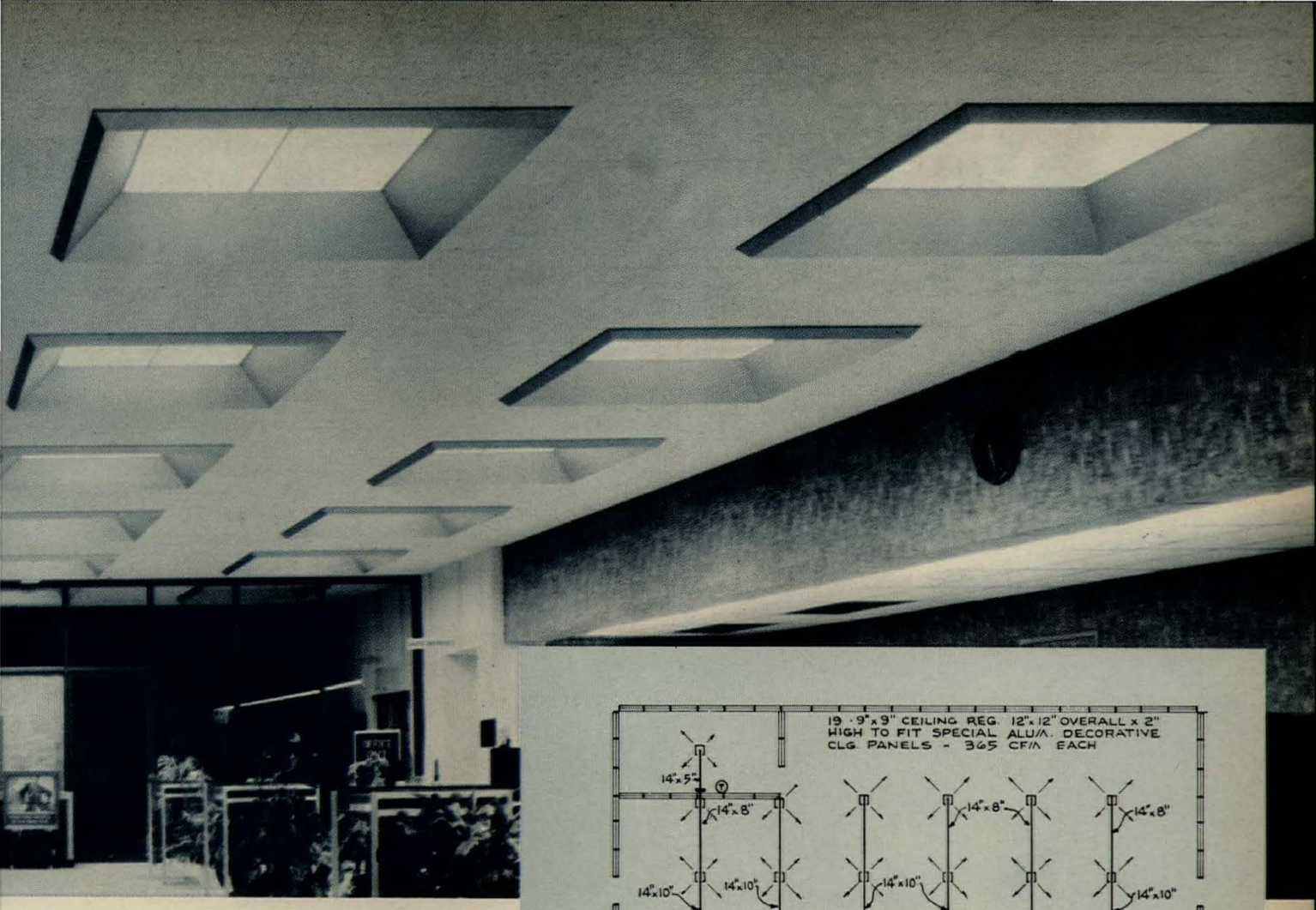
When the Celo-Flow System is specified, tenants get these documented benefits:

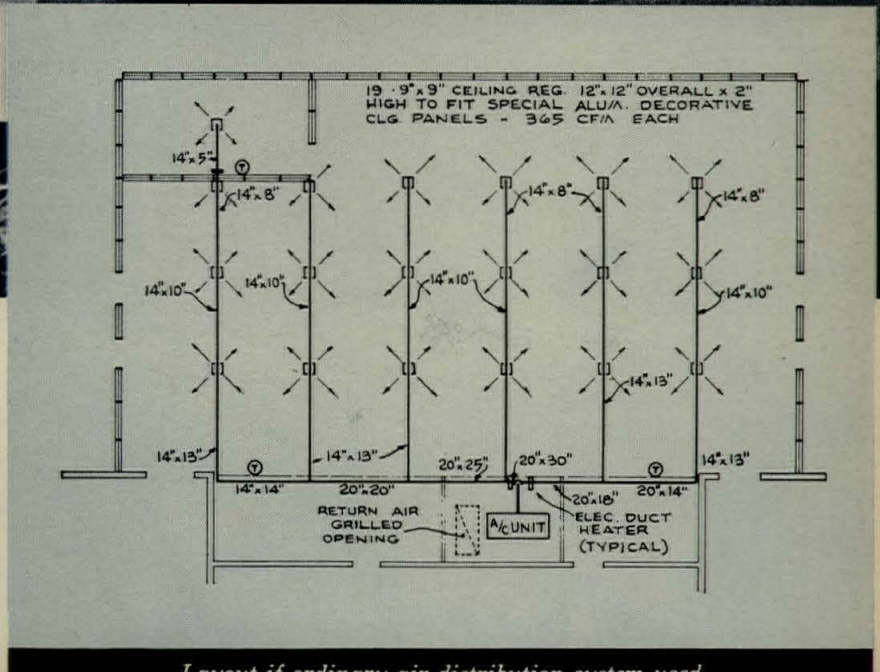
Draft Free Operation — uniform blanket of air; Noise Free Operation — eliminates diffuser noise; Reduced Maintenance — no diffuser or slot "streaks" or unsightly ceiling stains; Space Flexibility — partitions may be relocated without modification of the ventilating system.

Exclusive patterns — miniature perforated and fissured mineral fiber tile and lay-in panels. Identical patterns in both Safetone® Class A incombustible and Protectone® UL time rated products.

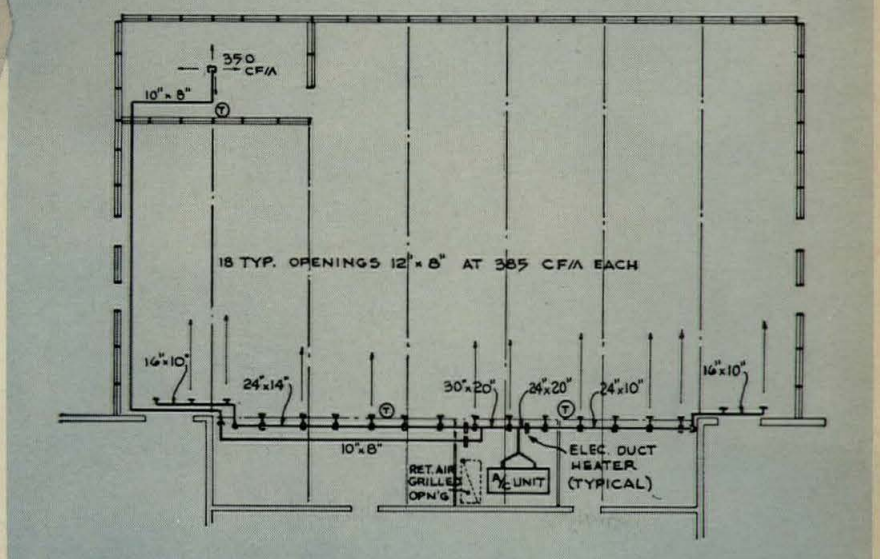
Matching appearance of Celo-Flow clear-thru perforated and surface-perforated units achieves a "single pattern" effect, regardless of the number and location of the ventilating panels or tile.

FOR YOUR FILES — Comprehensive Guide Specifications, Design Procedures and Air Dispersion Test Report. Write The Celotex Corporation or call your Acousti-Celotex distributor (see the Yellow Pages "Acoustical").





Layout if ordinary air distribution system used



Layout for Celo-Flow air distribution system

$2,472 SAVINGS IN THIS ONE AREA

These air conditioning take-off drawings show the ceiling of the bank's 3,465 sq. ft. main public area: (top) if ordinary air distribution system had been used, and (bottom) using the Celo-Flow system. The savings in ducting, insulation and installation amounted to $2,472.

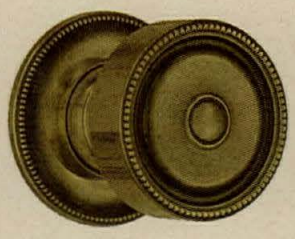
ACOUSTI-CELOTEX
REG. U.S. PAT. OFF.
PRODUCTS

THE CELOTEX CORPORATION
120 North Florida Ave., Tampa, Fla. 33602

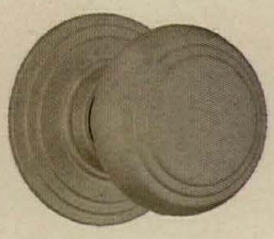
101 DIFFERENT LOCK DESIGNS

23 DIFFERENT FINISHES

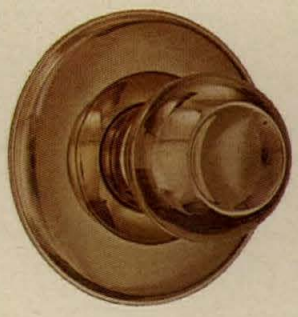
CROWN
Polished Brass Oxidized
Knob, 2-1/4";
rose, 2-9/16"



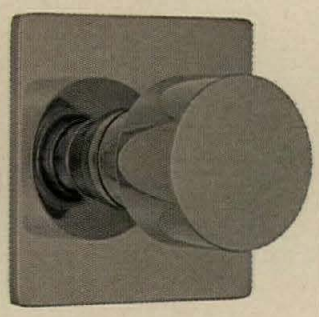
NOVO
Satin Aluminum
Knob, 2-1/4";
rose, 2-9/16"



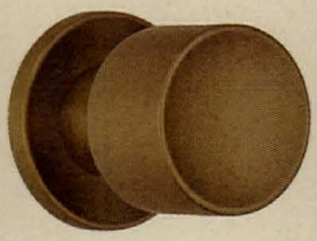
MERCURY
Polished Bronze
Knob, 2";
rose, 3-5/8"



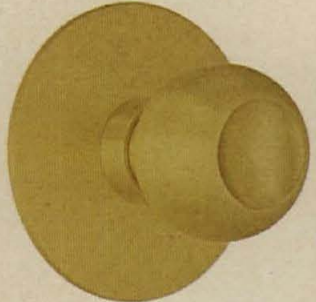
CENTURY
Polished Chromium
Knob, 2-1/8";
rose, 3-5/8" square



LUNA
Oil Rubbed Bronze
Knob, 2-1/8";
rose, 2-9/16"

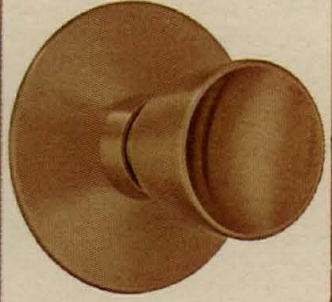


VISTA
Satin Brass
Knob, 2-1/16";
rose, 3-5/8"

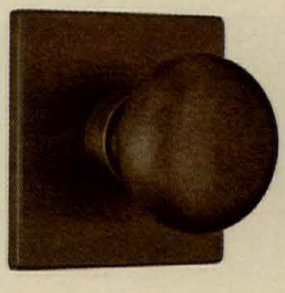


CUPRA
Satin Chromium
Knob, 2-1/2";
rose, 2-9/16"

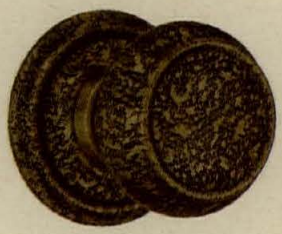
MAGNOLIA
Satin Bronze
Knob, 2-3/32";
rose, 3-5/8"



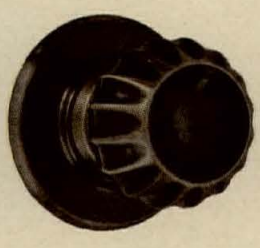
HANOVER
Oil Rubbed Bronze
Knob, 2-1/4";
rose, 3-1/4" square



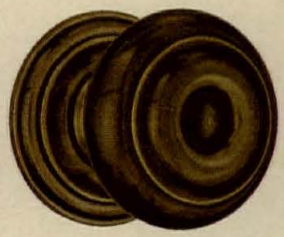
CLAREMONT
Oxidized Bronze
Knob, 2-1/4";
rose, 2-9/16"



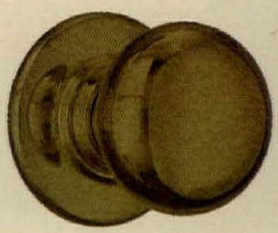
LOTUS
Satin Nickel Oxidized
Knob, 2-3/32"
rose, 2-9/16"



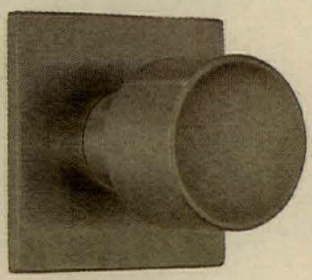
COLONIAL
Polished Brass Oxidized
Knob, 2-1/2";
rose, 2-9/16"



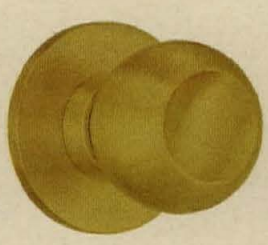
PLYMOUTH
Polished Brass
Knob, 2-1/4";
rose, 2-9/16"



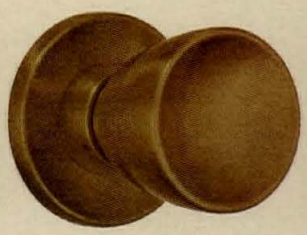
METEOR
Satin Chromium
Knob, 2-1/8";
rose, 3-1/4" square



SATURN
Satin Brass
Knob, 2";
rose, 2-9/16"



TULIP
Satin Bronze
Knob, 2-3/32";
rose, 2-9/16"



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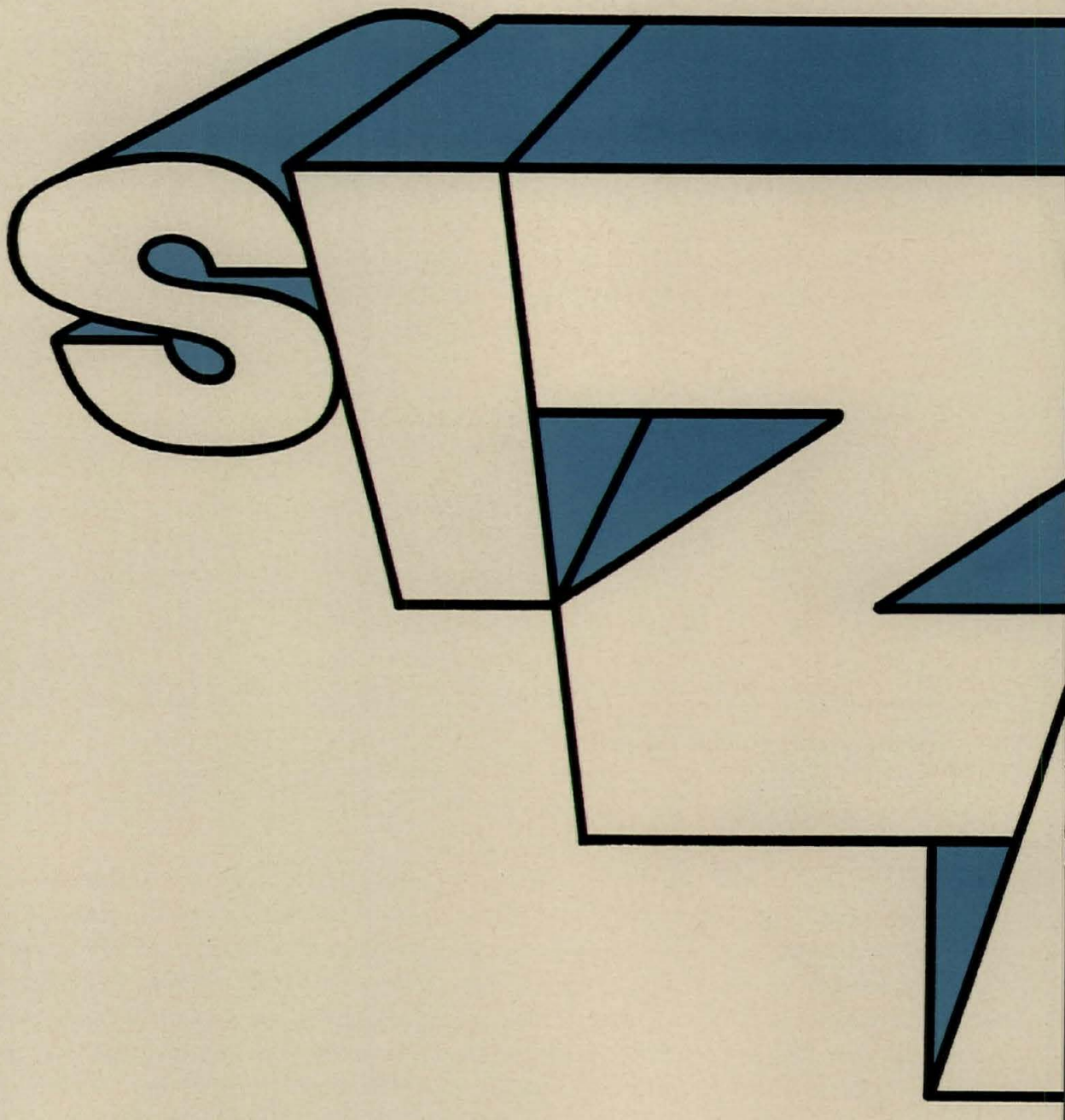

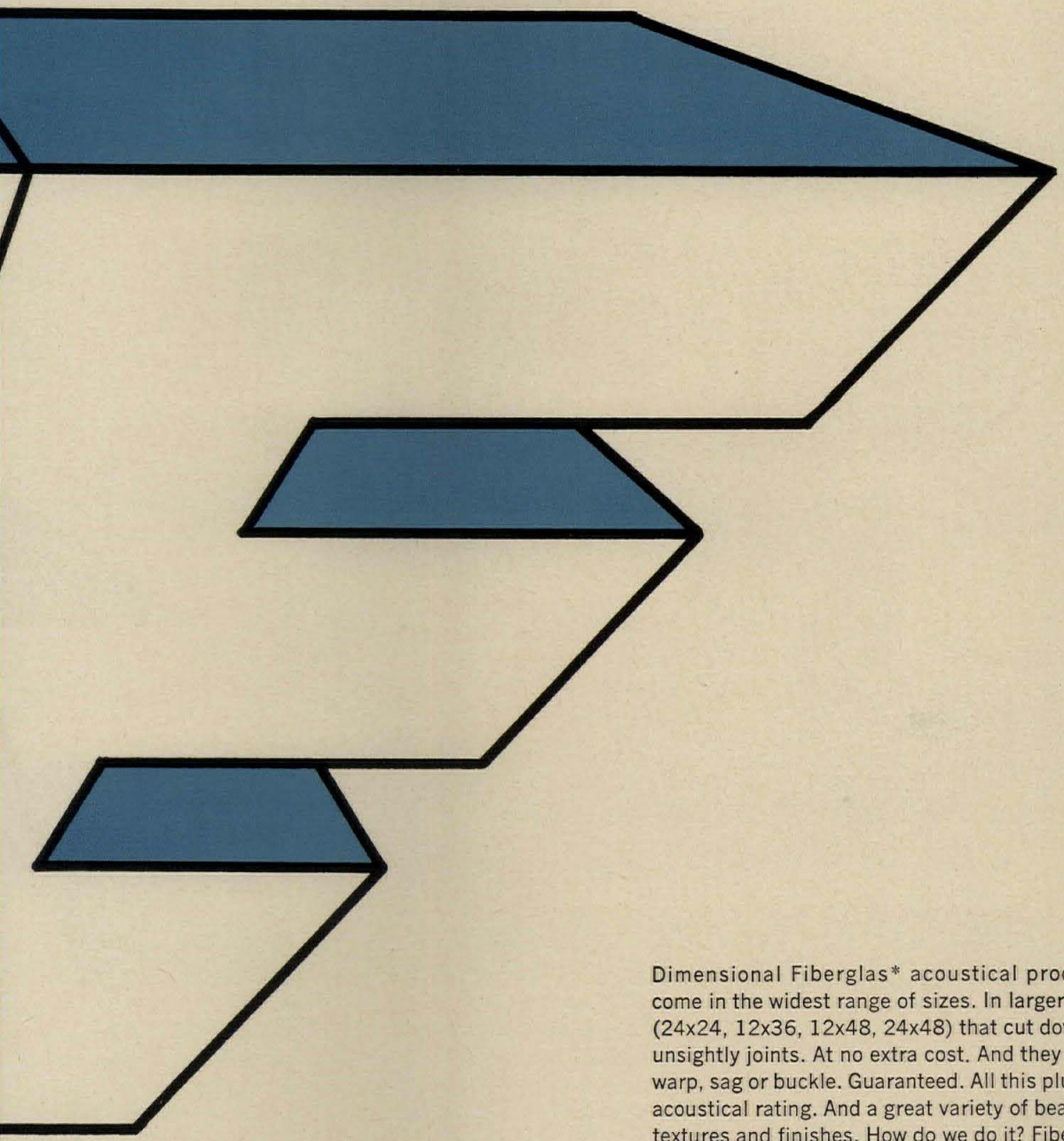

Dimensional Fiberglas* acoustical products come in the widest range of sizes. In larger sizes (24x24, 12x36, 12x48, 24x48) that cut down on unsightly joints. At no extra cost. And they won't warp, sag or buckle. Guaranteed. All this plus top acoustical rating. And a great variety of beautiful textures and finishes. How do we do it? Fiberglas makes the difference. It'll make one in your job, **too.**

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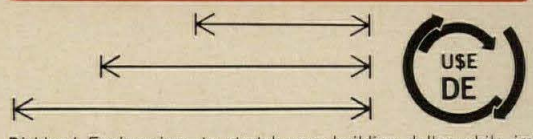

Dividend Engineering—to stretch your building dollar while improving building performance. *T-M (REG. U.S. PAT. OFF.) O-C. F. CORP.

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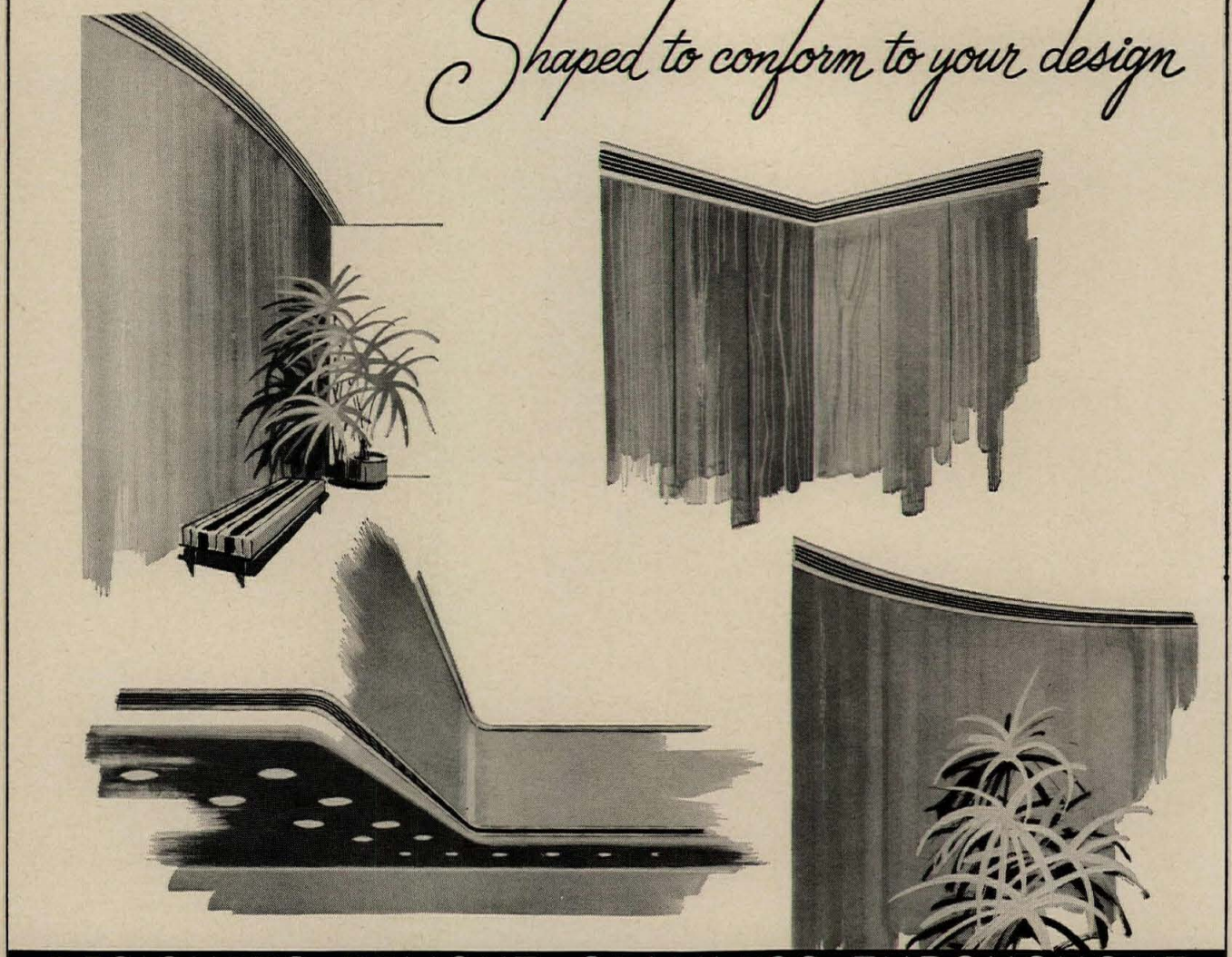
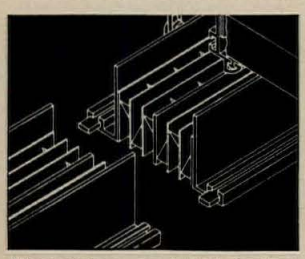
STRIPLINE

Shaped to conform to your design



DESIGNERS DELIGHT...SEAMLESS THROUGHOUT



When sections are butted together for a continuous run, inter-locking tabs assure perfect alignment—result is a decorative inconspicuous slot.

Architects and interior designers agree there is practically no limit to where and how decorative functional Stripline slot-type diffusers can be utilized. Regardless of the desired placement, Stripline's slim-trim conformation can be incorporated to blend in with the general scheme without calling attention to the mechanical installation.

When desired as a straight-line decorative border, curved, arched, or shaped to accommodate a slight contour, you can depend upon the versatility of a seamless continuous unit regardless of length.

Stripline slot-type diffusers are made of aluminum extrusions, designed with a slim-trim styling . . . no visible attaching screws . . . seamless appearance regardless of length . . . separate plaster frames . . . removable core . . . design eliminates complicated and expensive duct connections . . . simplified installation . . . built in diffusing vanes for engineered air distribution.

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Look!..

Beneath the surface beauty is the "Hidden Value" of Southern Pine...

Architects know the importance of quality in framing lumber for integrity of design and security. That is why so many are specifying Southern Pine. Pre-shrunk to *full* American Lumber Standard sizes, with engineered strength, Southern Pine is rigidly graded under highest standards of the lumber industry. It lets you plan boldly, with assurance of economy in construction and minimum maintenance during years ahead. All-purpose grading permits use of standard grades for trussed rafters, cantilevered or continuous beams without special grading. Southern Pine lumber also lends visible distinction to your designs in many intriguing forms—durable decking, striking patterns of paneling and siding, exquisite trim.

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For more data, circle 68 on inquiry card

continued from page 108

21-27 5th International Congress of the Precast Concrete Industry—Royal Garden Hotel, Kensington, London

OFFICE NOTES

OFFICES OPENED

Joseph F. Murtha, R.A., A.I.A., 35 Cypress Drive, Scotia, N. Y. 12302.

John B. Parkin Associates, architects and engineers of Toronto, Montreal and Sault Ste. Marie, California offices at 1801 Avenue of the Stars, Los Angeles.

Robert Silman, consulting engineer, 45 West 34th St., New York City 10001.

Whiting S. Thompson, Architect, 427 West 5th St., Suite 720, Los Angeles.

Wallace A. Wendell, Architect, A.I.A., Cedar Crest, New Mexico.

NEW FIRMS, FIRM CHANGES

The new name for Allison and Rible, Architects of Los Angeles is **Allison, Rible, Robinson and Ziegler, Architects.**

Fred Bassetti & Company/Architects, Seattle, have appointed **Paul R. Dermanis** an associate.

The firm of John L. Briscoe Architect A.I.A. is now **Briscoe & Berry Architects A.I.A.,** Eugene, Ore.

Deeter Ritchey Sippel Architects, Pittsburgh, have named **Leander H. Minnerly** an associate.

Harley, Ellington, Cowin and Stirton, Inc., architects-engineers-planners, have appointed **Henry William Ruifrok, A.I.A.** project administrator and **Charles P. Stapleton, A.I.A.** chief of the architectural department.

Bernard P. Harris, A.I.A. and **William D. Jones, A.I.A.** have formed **Harris and Jones, Architects,** 3240 McCullough Ave., San Antonio, Tex.

Earl Heitschmidt & Associates Architects is the new firm at 3300 Temple Street, Los Angeles 90026.

Wesley J. Dolginoff has joined **Jackson and Smith,** architects of Kansas City, Mo. as vice president for contract administration. The firm has named **Mrs. Jan M. Conley** comptroller and office manager.

Ketchum, Konkel, Ryan & Hastings is the new name of the Denver consulting engineering firm previously Ketchum, Konkel, Ryan & Fleming.

Steve A. Luckman has become assistant to the general manager of **Charles Luckman Associates,** architects with headquarters in Los Angeles.

Smith Haines Lundberg & Waehler, architects, N.Y.C. announce as associates **Ettore S. Coiro** and **Arnold D. Hackel.**

James B. Hughes, A.I.A. has joined **Smith, Hinchman and Grylls Associates, Inc.,** architectural, engineering and planning firm, Detroit, as assistant to the president.

Walsh and Oberg Architects A.I.A. is the new name for Stephens, Walsh, Emmons & Shanks of Phoenix, Ariz.

NEW ADDRESSES

Jensen and Halstead, architects, 600 South Michigan Ave., Chicago 60605.

Dolores Miller, A.I.A., **Dolores Miller and Associates,** interior designers, 21 East Superior Street, Chicago 60611.

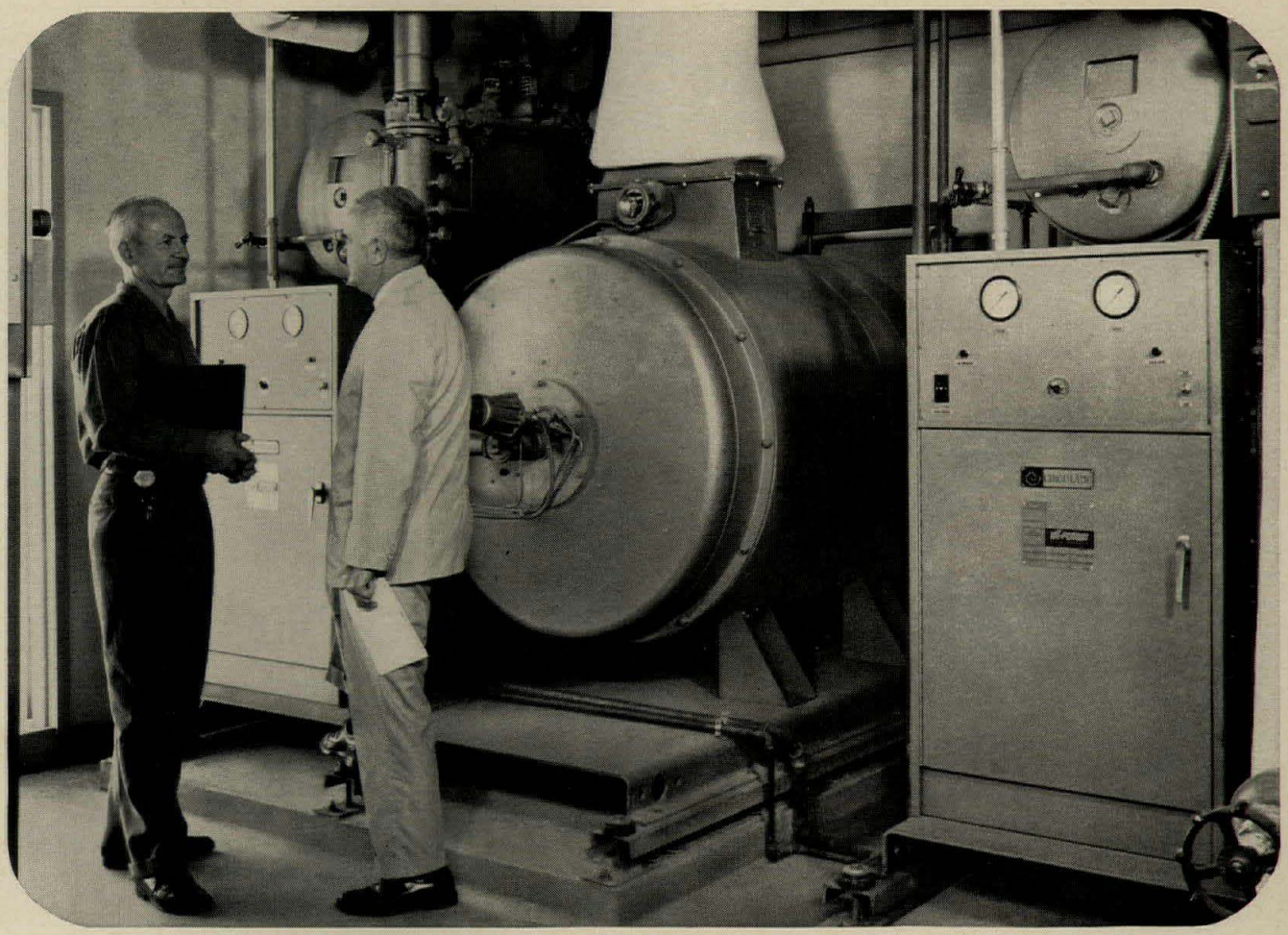
Pearce and Pearce, Inc., architects and engineers, 812 Olive St., St. Louis.

Eberle M. Smith Associates, Inc., architects and engineers, 950 West Fort Street, Detroit.

Clyde M. Stauffer and Associates, architects, engineers, planners, 3920 East Indian School Road, Phoenix, Arix.

Richard G. Stein and Associates, Architects, 588 Fifth Ave., New York City.

Why does it cost Corona Community Hospital less to own and operate Vā-Power boilers?



Chief Engineer, John O. Dalke discusses with an interested visitor, the fast recovery and quick cut-back capabilities of his two 75 hp Vā-Power Circulātic boilers.

Because "instant steam" at all times is imperative for their services... that's why!

In constructing the new Corona Community Hospital, Corona, California lightweight, compact design, rapid recovery capability and quiet operation of the steam generating equipment were of utmost importance. To meet these critical requirements, Edward F. Wehlage, Consulting Engineer, Whittier, California, designer of the utilities for the hospital, chose two 75 hp Vā-Power Circulatic boilers. These boilers (one is used as a stand-by) accurately and instantly follow highly fluctuating steam load requirements for space heating, hot water and general clean-up on a 24-hour basis.

Ease of installation was of equal importance for both immediate and future use. The two Vā-Power boilers plus the air-conditioning unit and the central electrical control panels are housed on the roof of this two story structure. In the plans drawn up by Heitschmidt & Thompson, architects, Los Angeles, provisions were made for a future addition of a third floor. The light-weight, compact design of the Vā-Power boilers, together with a minimum requirement for piping and electrical requirements, helped to make this long-range planning possible.

Mr. Dalke reports that fuel consumption is well within their forecasted expenditures and that maintenance has been nothing more than the normal, preventive-type.

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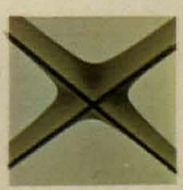

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COLUMBIA PRESBYTERIAN MEDICAL CENTER GARAGE, New York, N.Y. Architects and Engineers: EDWARDS & KELCEY, Newark, N.J. General Contractor: W. J. BARNEY CORPORATION, New York, N.Y. Precast, Prestressed Concrete: BLAKESLEE PRESTRESS, New Haven, Conn.

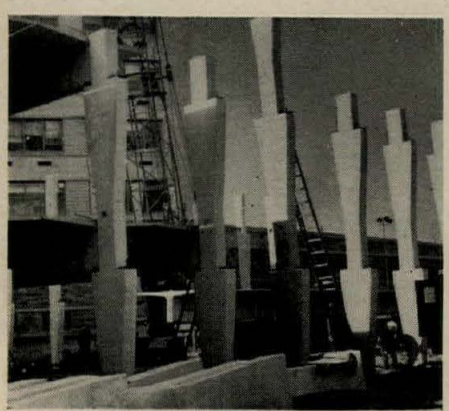
Prestressed trail blazer in New York City

When New York's Columbia Presbyterian Medical Center decided to build a self-parking garage, prestressed concrete construction was chosen. Why? Because prestressed would permit longer beams, fewer columns, greater parking efficiency and a 15% greater capacity. There would be a saving in construction time and cost, too, since precasting could be completed while the foundation work was still in progress.

However, New York's building code did not yet provide for prestressed concrete, even though this type of construction had already won acceptance in most other parts of the country. The Department of Buildings of the City of New York compared the Medical Center's garage plans with established concrete industry standards—and granted its first exception to permit prestressed construction within the city.

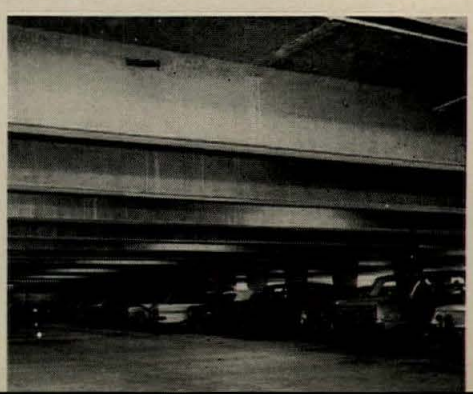
Once approval was obtained, the 3-level, 428-car fireproof garage was erected swiftly and economically.

Lone Star's dependable "INCOR"® high early strength portland cement was used for both the precast and cast-in-place concrete on this pace-setting project, and helped speed its successful completion.



Standardized precast, prestressed concrete members were ready for rapid assembly the moment the foundation was

A 63-foot beam span provides flexibility; allows space between columns for two 18-foot cars plus 25-foot center aisle for backing and turning.



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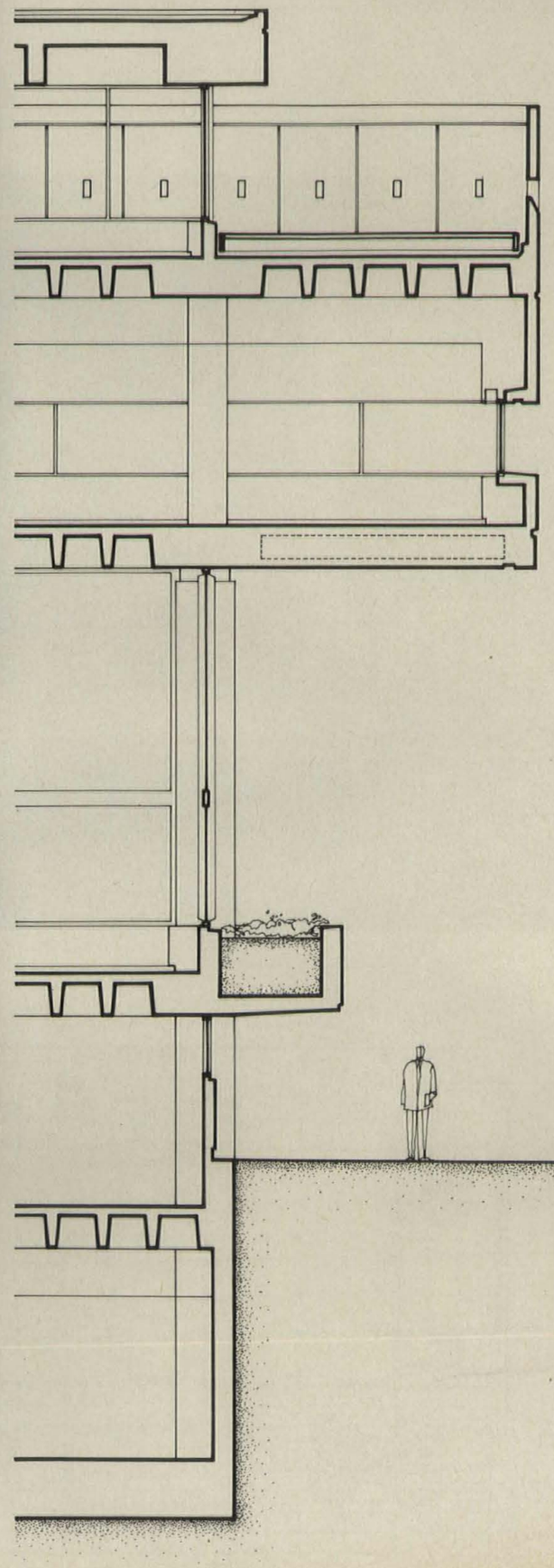
ARCHITECTURAL RECORD
MARCH 1966

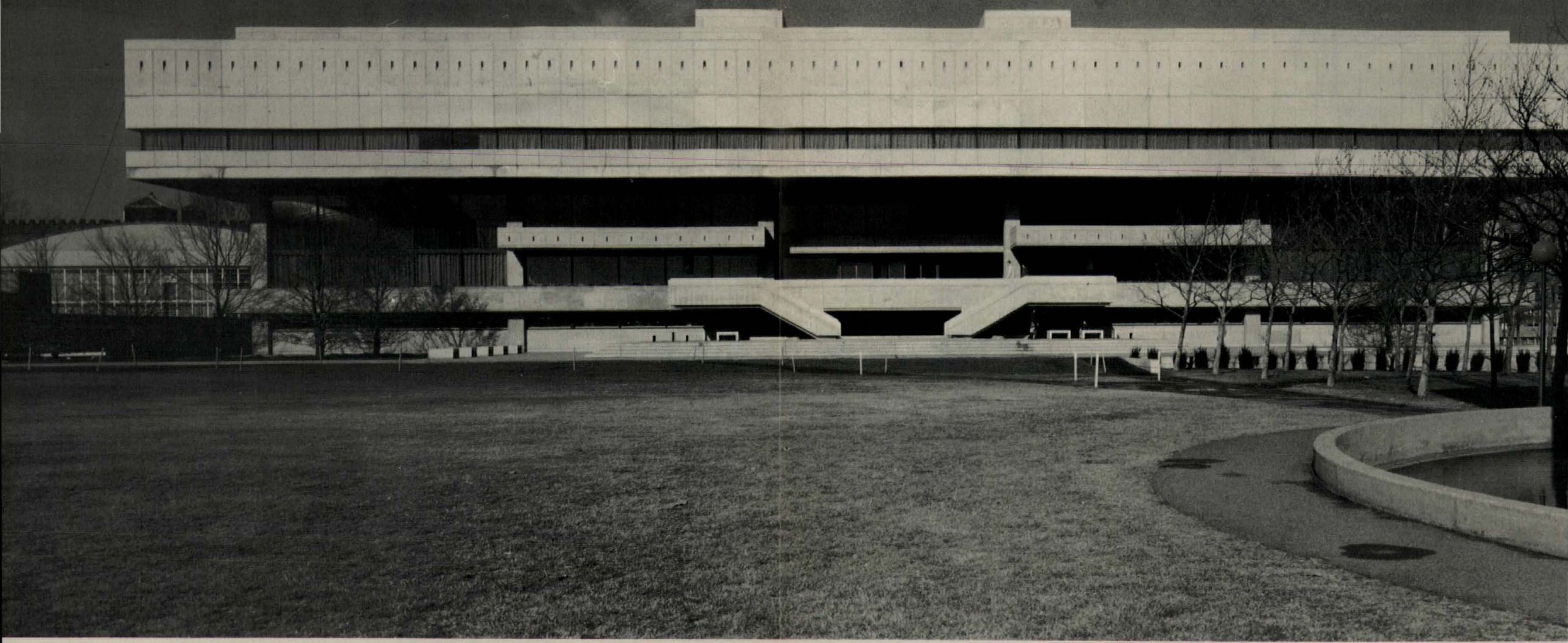
M.I.T.'S STUDENT CENTER: EDUARDO CATALANO STARTS WITH SYSTEMS AND CREATES ARCHITECTURE

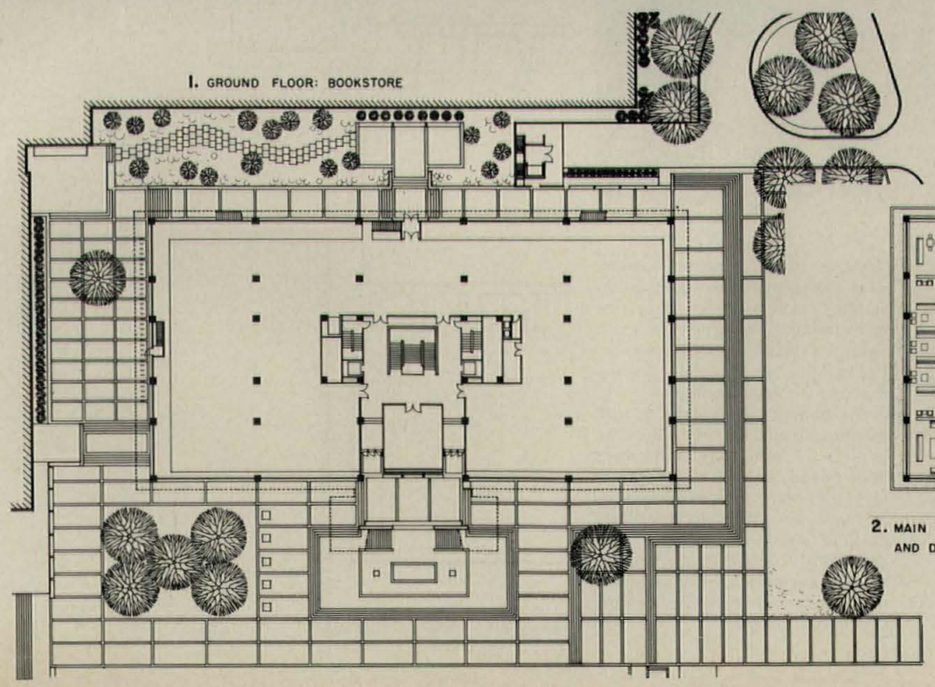
"The transformation from custom-made design to systematized design and industrialized construction is still happening only in the smallest degree in the most advanced countries. . . .This transformation needs to be accelerated—and it must be controlled by architects to assure that we are not at the mercy of a process, but a responsible force in shaping such a process. . . .The architect is not a sculptor, but a designer and builder of systems who finds unlimited freedom within systems."

Until Catalano began to build major buildings, his statement could be accepted as definitive of his own goals and efforts to reach them. But now—in Cambridge on the M.I.T. campus and at Technology Square—completed structures suggest that he is an architect who handles with great skill the *existing* building technology while he continues to work to extend its boundaries into the future. His latest work, M.I.T.'s new Student Center, is his most successful design yet completed. Systems designer Catalano is the first to assert that it fails to prove his theories; but architect Catalano might admit that, as a work of art, it transcends them.

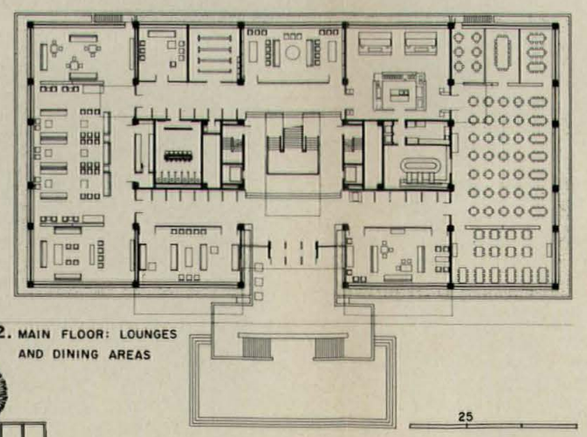


Elements of the structural system were specially designed for the new building and cast in place. The superstructure consists of a lineal system of ribs and pan construction. The building is completely symmetrical and the broad cantilever shown in the photograph extends 16 feet, 6 inches on all four sides. The cast-in-place wall above the cantilevered floor extends upward to become an eight-foot-high parapet conceived in the design stage to conceal a possible expansion of space. This expansion occurred in the form of a reading lounge which became a requirement six months after construction had begun.



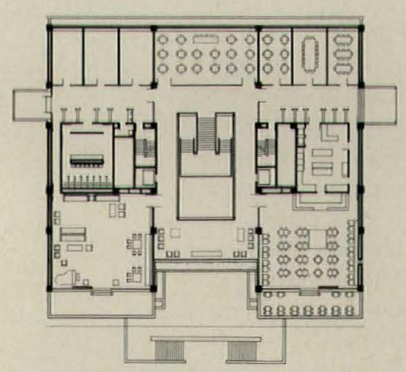


1. GROUND FLOOR: BOOKSTORE

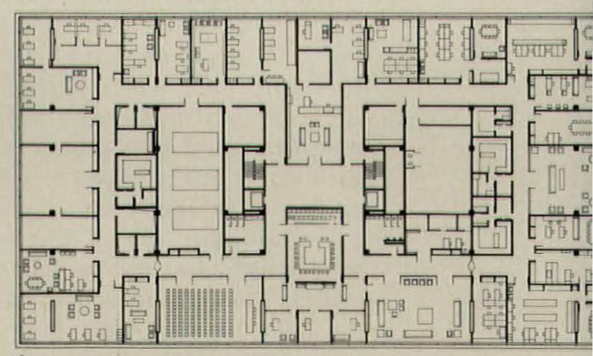


2. MAIN FLOOR: LOUNGES AND DINING AREAS

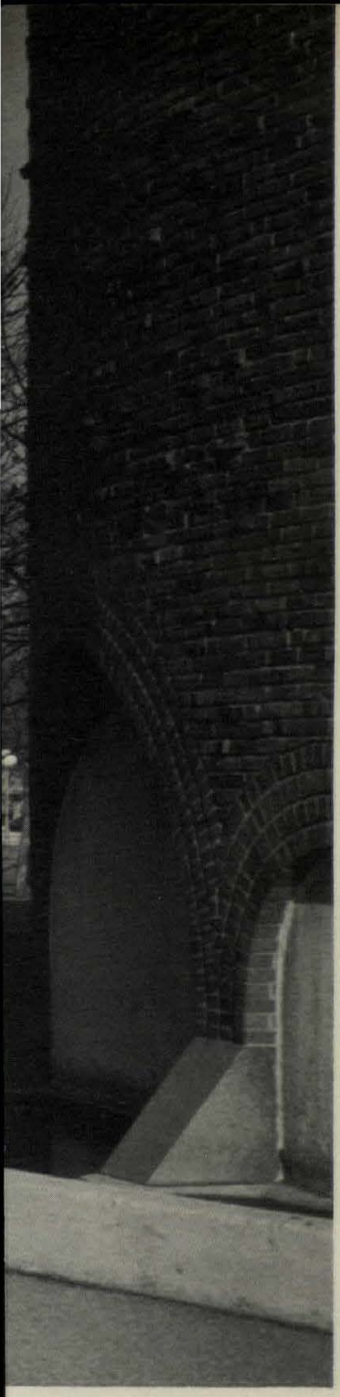
25



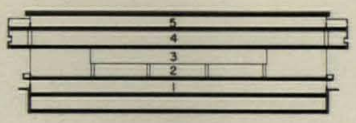
3. MEZZANINE: LOUNGES AND DINING AREAS

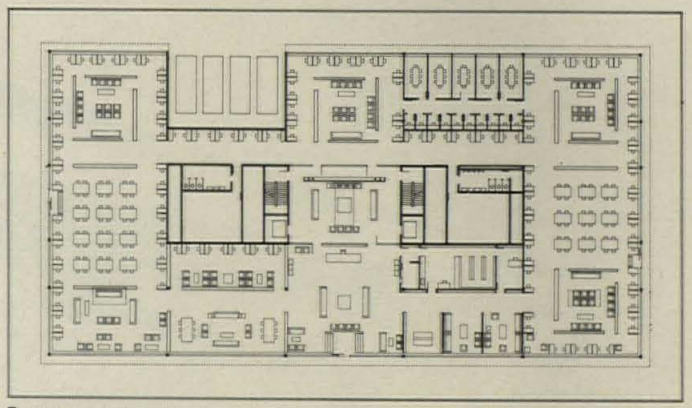


4. SECOND FLOOR: STUDENT ACTIVITIES



The building's varied levels house facilities for a broad program of commercial, social and educational activities. In the basement are bowling alleys, game rooms, barber shop, post office, tailors' shop, kitchen and mechanical rooms. The ground floor, with approximately 26,000 square feet of uninterrupted space, houses the Technology Co-op, a store offering the largest collection of technological books in the country. Clearly detached from this level, its "piano nobile"—containing the main and mezzanine floor—has two large rooms, 22 feet in height at both ends, which house a 300-seat dining room and a multipurpose room. The rest of the area, which is single-height, contains lounges, private dining rooms, grill rooms and servery. Distributed on the 40,000-square-foot cantilevered floor are offices for M.I.T.'s newspaper, technical and general interest magazines, and religious organizations, as well as art rooms, dark rooms, music practice room, music and drama societies, fraternities, and the like. Above this floor are 26,000 feet of uninterrupted space used for reading lounges for reserve book collections.





5. THIRD FLOOR: LIBRARY

Catalano is widely known as an architect and teacher who has spent many years—first at the University of North Carolina and now at M.I.T.—in a quiet search for what he describes as the "laws of organization, behavior and construction leading to a more rational and systematized design and building technology." His work has included the development of a number of prototype building elements, ingenious in form; some proposed for industrial manufacture, others for fabrication on the site by various construction processes of his own devising. Since the building industry is a conservative one, new design and structural engineering developments receive slow acceptance. Very little of Catalano's research is being implemented, and none of it widely.

Not all of his effort, however, has been directed toward the building of systems of the future. His latest structure for M.I.T. reveals him as a master of the systems of the present. Monumental in concept, it is a powerful, craftsmanlike design for the specific purposes of an institutional client. Catalano is undoubtedly correct when, taking another look ahead, he asserts that architects must begin to direct their endeavors "toward a total system of urban organization and construction as opposed to the present approach of designing isolated buildings shaped by individual needs and the visual mannerisms of the designers." Still, as long as isolated buildings are built, Catalano should do as many as he can, for *his* visual mannerisms are successful exploitations of the expressive possibilities in the not-so-new structural systems made available to him by building technology at its present level.

The Student Center and its surroundings

According to Catalano: "...M.I.T., as the result of random planning during the emergency period created by World War II, presents a paraphernalia of buildings hardly related to each other. In this respect, the Student Center endeavors first to establish a dialogue with the main building, the visual symbol of the Institute. This main building has a voice of seniority—by age, dimensions, simplicity and location. Its large dome, a symbol of compression, represents the elder brother, heavy-shouldered, thoughtful, downward-looking, a witness of the past; while the structure of the Student Center, with its large cantilevers, a symbol of tension and defiance of gravity, represents the younger brother, looking upward, optimistic, witness of the present. They represent two ages, two needs, two aims, separated by two generations of spatial and technological developments, sharing a common room, yet able to maintain a dialogue through their common height, massiveness, generosity of dimensions, simplicity of form, visual strength and unity in the uses of materials." The main building was designed by Wells Bosworth in the neoclassic style. It should be added that two of the late Eero Saarinen's most famous buildings, the circular chapel and the domed auditorium are in the immediate vicinity of the Student Center, but have not been included in the dialogue.

The design concept: classic but unorthodox

The building's visual expression contradicts the viewer's ordinary assumptions of structure and suggests a new esthetic in which broad areas of concrete no longer suggest weight, but lightness. The thin mullions in the window strip above the cantilevered floor obviously don't support the wall and parapet

above; it is clearly a thin concrete curtain attached to projecting floors. The rectangular holes in each parapet panel indicate a concrete membrane, rather than a concrete mass. Long acquaintance with older methods of construction—in which masonry has great weight, rests on the ground and supports a light superstructure—may cause the observer to initially react to this building with the disquieting sense that it is upside down. Catalano asserts that it is time all visual prejudices were reexamined. Anyone wishing to analyze and get rid of some of his own visual prejudices could well begin by contemplating this building.

The structure: systematized, but special

Except for the roof extension constructed in light structural steel, the Student Center is built in reinforced concrete.

The dimensions of the building and the characteristics of the soil allowed the design of the foundation as a rigid hull, floating 15 feet below ground level, and based on a three-foot-deep mat. It provides a safe and very economical solution to the soil bearing problems which are so critical near the Charles River.

The superstructure is based upon a lineal system of ribs and pan construction spanning 46 feet, 6 inches. The dimensions were set up by the requirements of the large rooms of the Center.

The pans built with fiberglass were specially designed for this project because of their non-standard height. They are 30 inches square and 23 inches deep, carrying a special molded edge to provide a recess and a shadow to visually conceal the joints between the pans.

The structural ribs are seven inches thick while the non-structural ones are only four inches thick. Coffers formed by the pans are used as small cells for the placement of acoustic tiles, lighting fixtures, loudspeakers, and air diffusers.

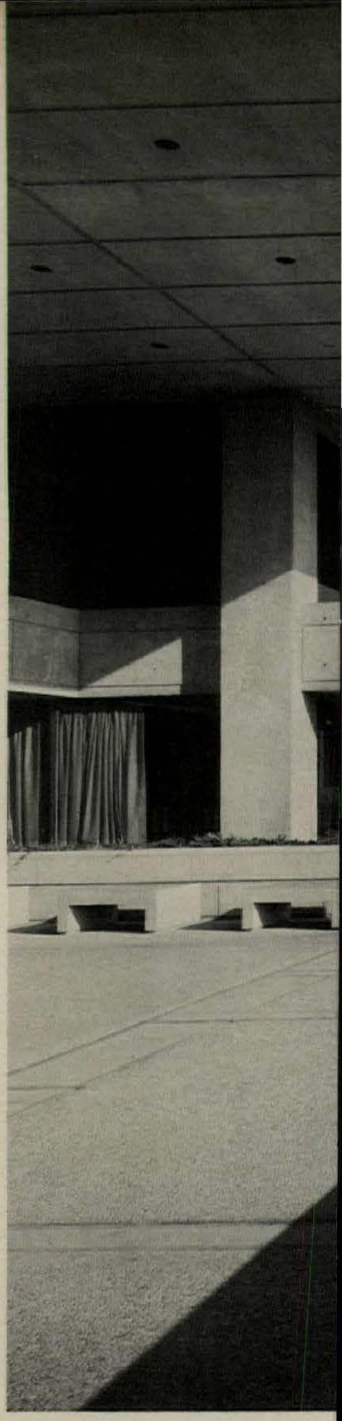
The two slabs that belong to the student activities floor cantilever 16 feet, 6 inches on the four sides of the building. Each is separated from the other to allow for differences in their future deflections. Eighteen-inch-diameter sonovoids are placed inside the cantilevered portion to reduce the weight. The soffit is solid providing more concrete mass, required by the cantilever. All the rustication joints shown were placed to visually minimize differences in the settlement of the formwork or in the deflections of the plywood boards.

The roof parapet, six inches thick with a perimeter length of 828 feet, was cast in alternated portions to allow for partial shrinkage of each.

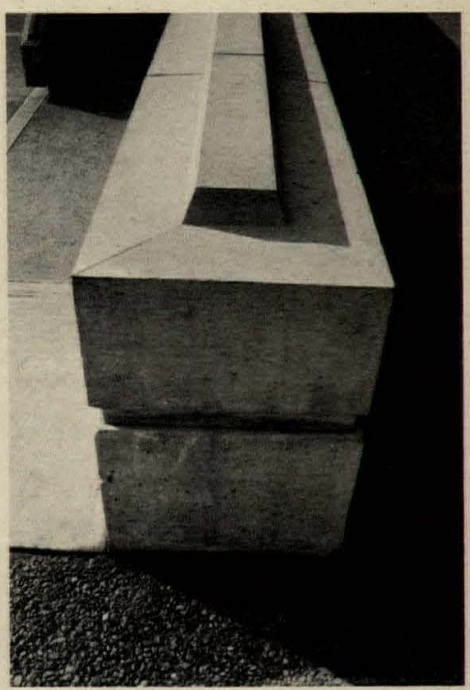
For slabs and beams where weight is critical, a 4,000-pound lightweight concrete was used, while columns and vertical and horizontal surfaces exposed to the harsh New England weather were built with stone concrete of the same ultimate strength.

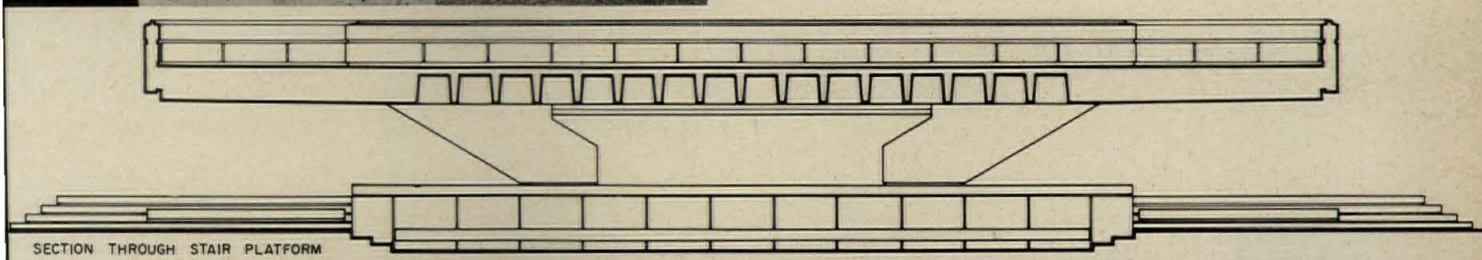
The future of the systems approach

Paul Weidlinger, who was the structural engineer for this building, has pointed out that words such as *systems* and *systems design* are part of a new structural engineering terminology originating in other scientific and technological disciplines, which have produced in addition such combinations of words as: *optimalization, value engineering, cost effectiveness study, failure-effect analysis* and *critical path method.*

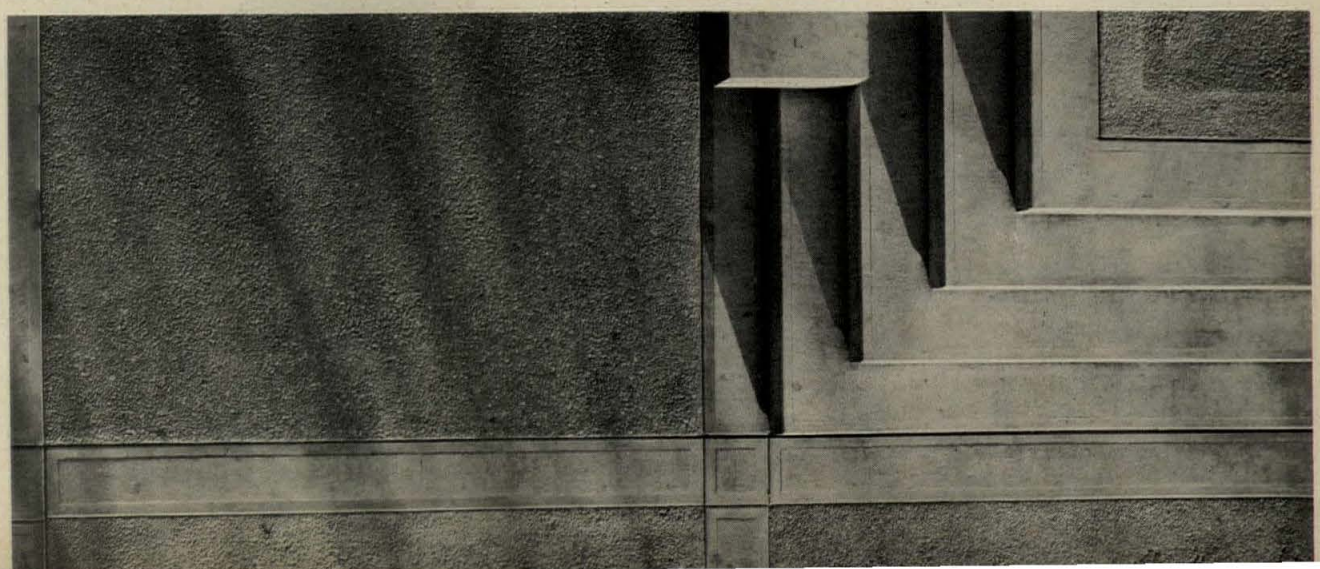


Catalano's exterior detailing in the cast-in-place-concrete idiom is as studied and careful as was Wells Bosworth's in cut stone. Bosworth's extensive building, part of which is shown in the background of the photograph on the right, forms M.I.T.'s main campus, which is neoclassic in style. The color of the cement in the new building is light and warm to harmonize with the stone of the older structure. The color was determined by the type of cement and aggregate, but the use of plastic-coated-plywood formwork contributed to the color effect. Catalano states that his experience shows that normal plywood or board, treated with any lubrication or spray, produces a green finish color, while steel or fiber glass formwork produces a light grey, much colder color. The outside main stair, shown in section on the opposite page, is built on an independent foundation. It is supported by its inner balustrade, which acts as a rigid frame. A hinged expansion joint between the building and the stair will prevent cracks in the slabs as the result of unequal settlement.





SECTION THROUGH STAIR PLATFORM

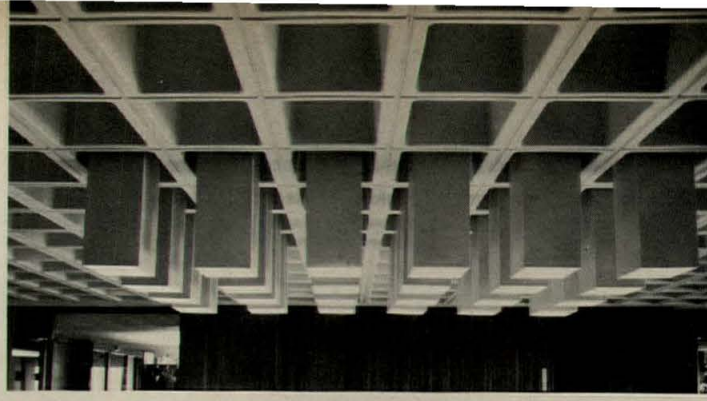


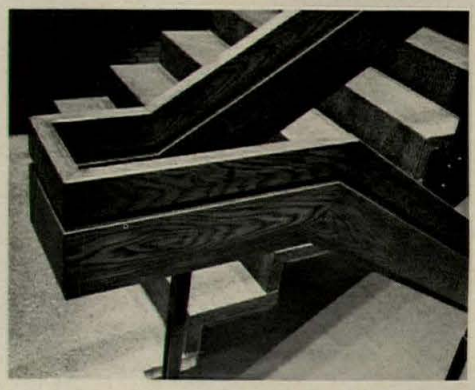
These words define both new concepts and old. The fashionable usage, however, implies a growing awareness of the importance of these concepts and suggests that the design professions and the building industry will begin to make a wider use of approaches which are common practice in other fields.

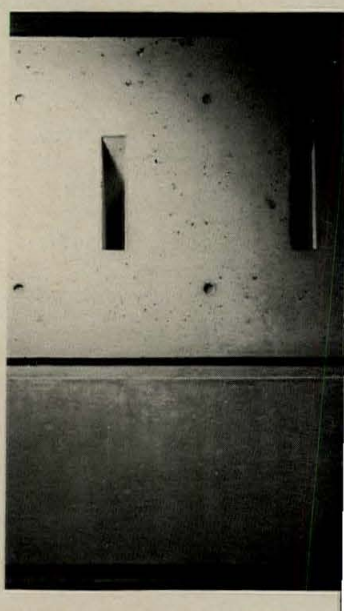
Catalano believes that architectural firms, at least, will be slow to take advantage of these approaches. Says he: "Small private offices, because of their confined technical resources, limited amount of work and misunderstanding of their role in society, produce highly individualistic designs and cyclic work which is a product of the master's whims. Large offices, because of their more generous technical resources and repetition of subject matter, could produce an architecture interpreting more faithfully collective human needs through a more advanced building technology. Yet they are failing to do so. Some of the very competent offices in the traditional sense are merely juxtapositions of smaller offices, with all of their handicaps and none of their advantages.

"The hope then lies in the universities and their coordinated work with industry. Schools of architecture could have at their disposal tremendous physical and human resources: workshops, laboratories, libraries, teachers, students providing experimentation, cross-fertilization and continuity in the development of ideas and accumulation of experiences year by year." In the meantime, until the architectural offices and the schools, in collaboration with the building industry, make better methods available, Catalano's concern with the long-range development of systems design has indeed—as the Student Center shows—contributed positively to the degree of order and clarity in the buildings he actually constructs.

THE JULIUS ADAMS STRATTON BUILDING, Massachusetts Institute of Technology, Cambridge, Massachusetts. Architects: *Eduardo Catalano in association with Robert C. Brannen and Paul S. Shimamoto;* structural engineer: *Paul Weidlinger;* mechanical and electrical engineers: *Syska and Hennessy Inc.;* acoustical engineers: *Bolt Beranek and Newman Inc.;* landscape architects: *Sasaki and Walker.*







Principal interior finishes are exposed concrete, or concrete block plastered and painted in dark colors. Paneled walls are of cherry. The photograph at the top of the page shows the deep reveals of the waffle slab in which are inserted the necessary lighting fixtures, acoustical treatment, air diffusers, and loudspeakers. The main stair is located within a central shaft which connects the ground floor, main floor and mezzanine. The mezzanine parapet shown in the photograph below and to the right has rectangular perforations which, like those on the roof parapet, indicate its thinness and lightness. All woodwork—such as the stair railing shown above and the student council chamber bench in the photgraph at the lower right—was designed and detailed by Catalano.

CALIFORNIA APARTMENTS MAKE SKILLFUL USE OF HILLSIDE SITES

It's an old California tradition—especially in the San Francisco Bay area, where the apartments on the next seven pages are located—to make the utmost use of what is at hand, tangible or intangible. Custom, climate, materials, site: each, fully exploited, produced the still vital work of the early Bay Area architects 75 years ago.

Today, customs have changed, materials have multiplied in variety, climate is controllable. But the site—unchanging and best left unchanged—is more than ever a determinant of design.

For the once-plentiful, easy-to-build-on, level or nearly level site is harder and harder to find, not only in California but elsewhere, and even the steep and difficult lot is farther-out from the center of town. Today the economics of scarce real estate are replacing the single-family house—once the most likely candidate for the difficult but interesting lot—with apartment projects of varying sizes, and the difficult lot has achieved feasibility and acceptance by the developer because it can be used for multi-occupancy.

To get the most from a difficult site requires skill and imagination and a little daring, but the returns can be high—in both dollars and quality of environment—and developers around San Francisco Bay, like those whose projects are shown here, have been quick to take note of how these four apartment projects, all on hillside lots, show some of the special and unique advantages of the steep lot, once passed over by the developer and the builder as "too difficult."

First of all, the outlook. As William Wurster said long ago, "When the view is so magnificent, the emphasis is on what you look at, not what you live in." So even a luxury apartment can be basically simple, provided it is well designed.

Second, the hillside site can mean access to individual units by no more than one flight of stairs even in a three-story building, as in Mariner Oaks and Harbor Hill on pages 134 and 136.

And third, the hillside site makes possible a desirable domestic scale and privacy, as these examples attest, which could not otherwise be achieved with the same density.

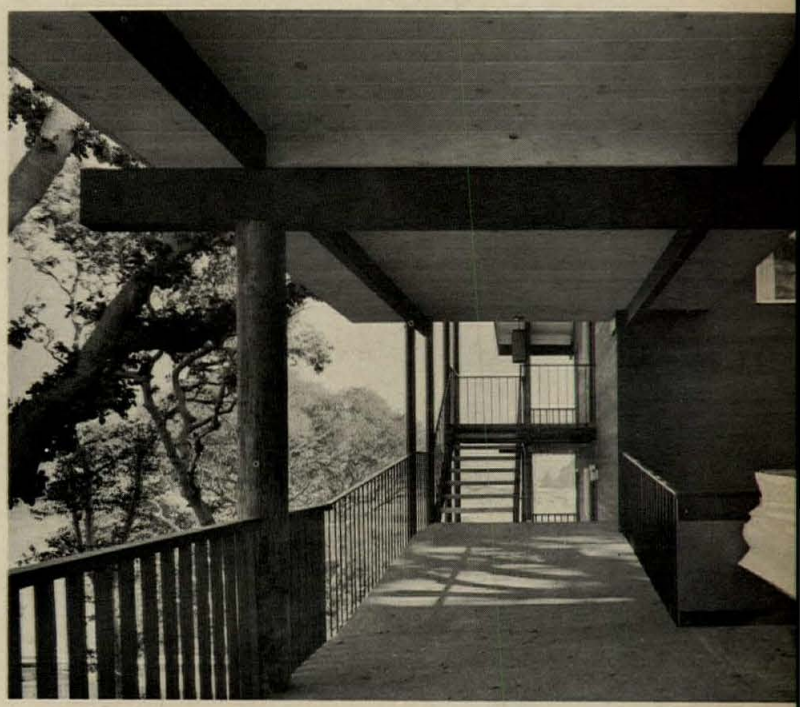
Mariner Oaks: Decks enhance a splendid view, extend living space to outside

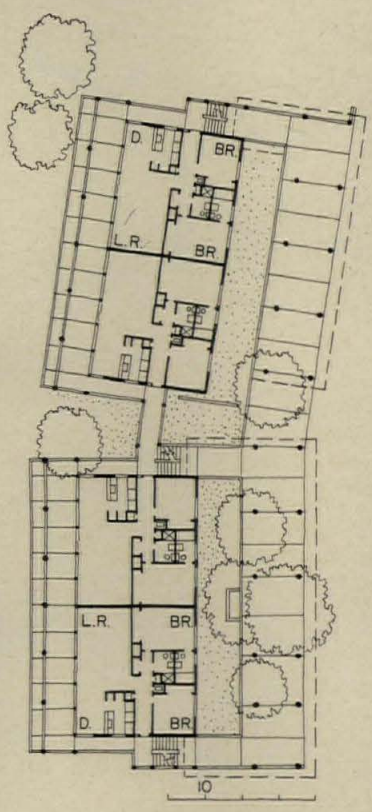
This oak-studded hillside site in Tiburon, a bayside community in Marin County north of San Francisco, affords beautiful views toward Belvedere Island and the bay. Twin buildings use the 35-degree slope to provide easy access (most of the 12 units can be reached by no more than one flight of stairs) from carport to stairway. Each building contains six units based on the same two-bedroom plan, two to a floor. The spacious balcony decks wrap-around three sides of the building so that each unit has cross ventilation, important in summer when the weather is very warm, and views in two directions. The fine old trees on the site were retained with advantageous results wherever possible, even to the extent of the building carport roof and deck around one tree. The buildings won an Honor Award in the last Honors program of the Bay Region A.I.A. Chapters and were cited for their "extremely straight-forward simple solution, fine scale and charm, normally not developed in rental units; and their economical construction which makes good investment property and still retains the privacy of the individual."

MARINER OAKS APARTMENTS, Tiburon, California. Architects: *Hooper, Olmsted & Emmons;* structural engineers: *Erik B. Tryde;* landscape architect: *Casey A. Kawamoto;* contractor: *Ronald Antonioli.*

Photos: Gerald Ratto

A group of tall oak trees were saved by the decision to build two buildings instead of one, and now serve as screen between the two parts of the property. Covered carport at street level connects with stairs to apartment entrances by footbridges across the hillside slope which repeat the balcony rail of the deck.



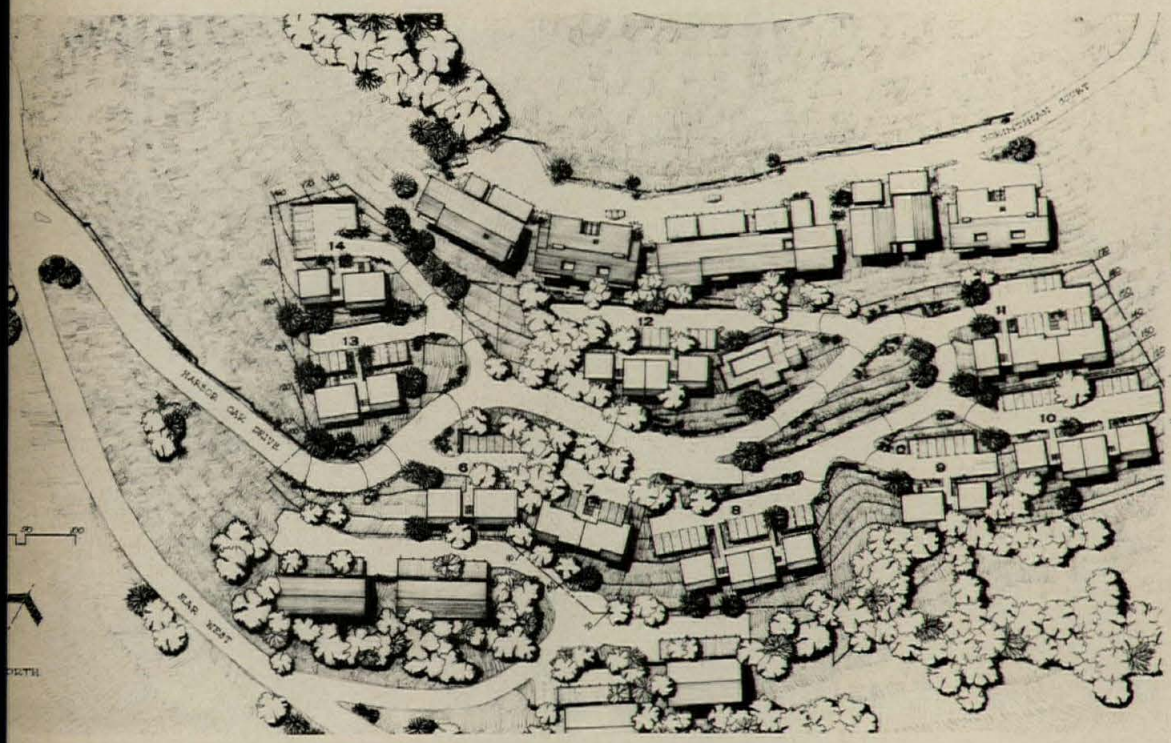


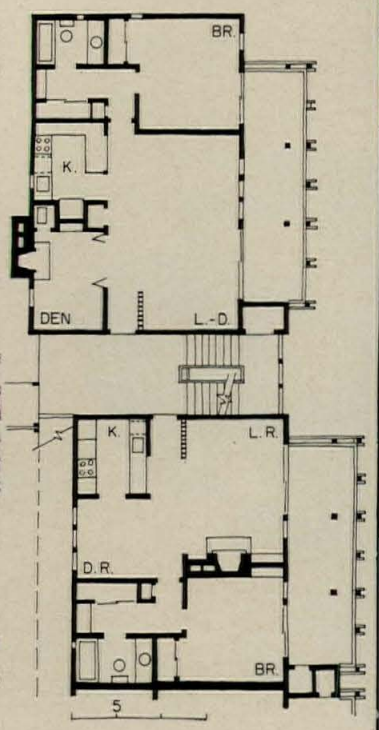
At the lowest level, the deck is wider than at the upper levels, compensating for a less spectacular view. In some places, trees pierce the deck and provide an almost ground-level effect. Balconies are supported by pressure-treated poles located outside the main structure of the building.

Harbor Hill: Even a large development can provide warmth, scale, variation

Still under development, Harbor Hill opened not quite three years ago with 36 apartments in six low-rise buildings, each slightly different from the other, and with varied sizes (from 700 to 1,700 square feet) and unit plans. Since then, some 75 units have been added on the seven-acre site, and six more are under construction. Each apartment has a panoramic view of the harbors at Tiburon and Belvedere and of San Francisco Bay, framed by the handsome oak trees which cover the property. All major rooms face this view to the southeast; large decks on this side of the buildings, nine-foot ceilings and floor-to-ceiling glass walls and sliding doors extend the apparent size of the rooms and open them to the full sweep of the view. Entrances are on the middle of three levels, so that no entrance is more than one flight up or down from the street. Parking is in carports along private streets, adjacent to or integral with buildings. Redwood siding is used on the exterior of some buildings, cedar shingles on others.

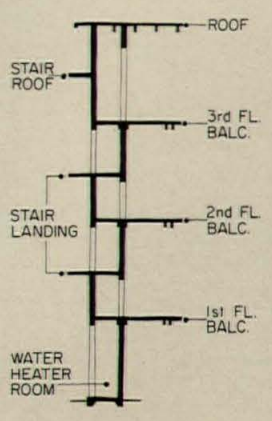
HARBOR HILL, Tiburon, California. Architects: *Goetz & Hansen—Robert Goetz, project architect;* structural engineer: *W. B. Clausen;* soils engineer: *Harding Associates;* landscape architects: *Eckbo, Dean and Williams;* general contractor: *Gordon French Construction Company.*

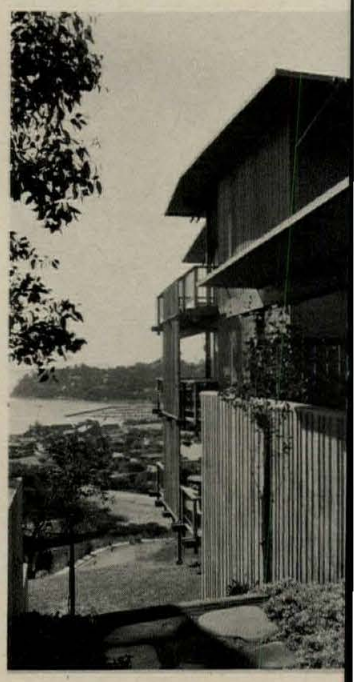




Photos: Ricco-Mazuchi

There are no "typical" plans at Harbor Hill; each building reflects its particular location, the contours of the lot, and the potential for fine views. Each unit has its separate entrance reached from the street level by a short flight of steps. Individual balconies provide private outdoor living space.



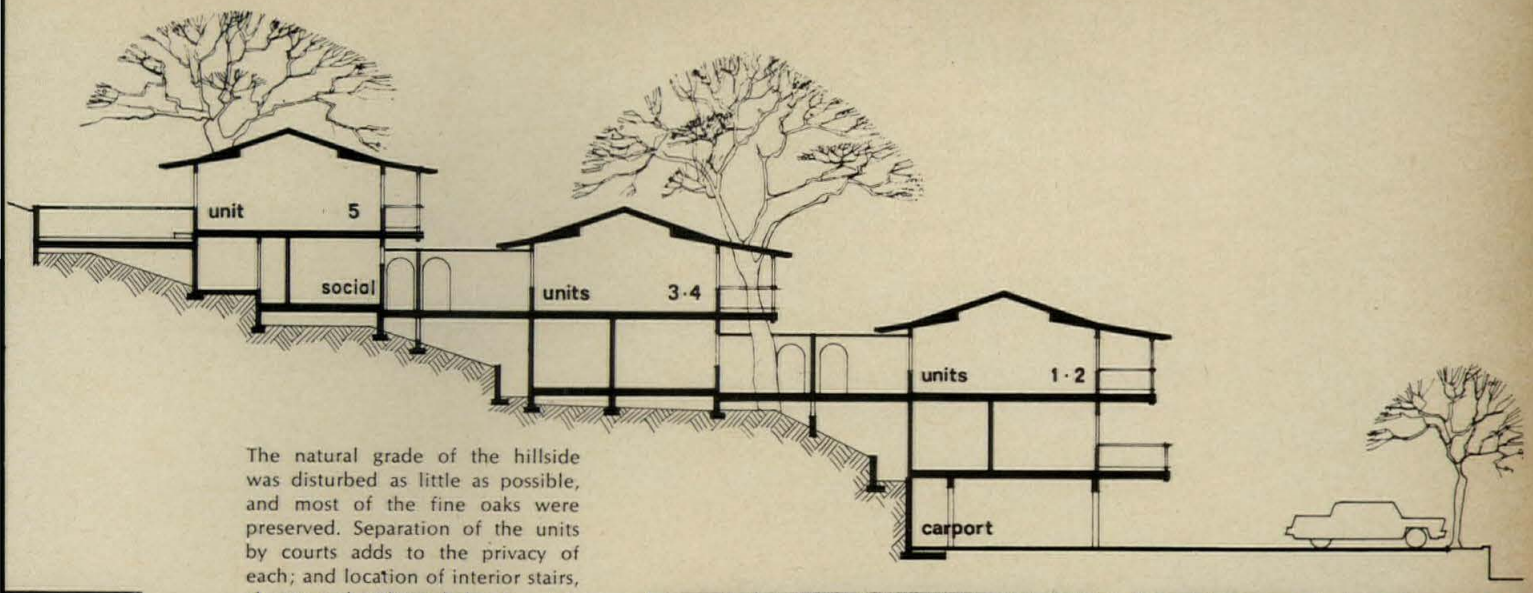


La Casa de Alegria: Ingenious planning gains privacy and individuality on a hill

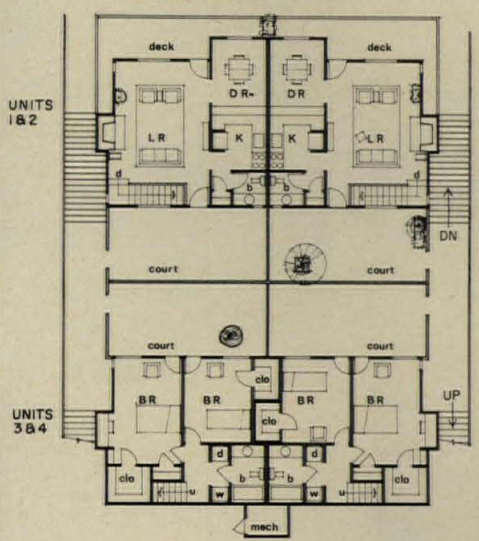
The five units in this group of rental duplexes are so cleverly arranged on the steep hillside site that they achieve a rare sense of isolation from the neighboring houses which crowd-in on both sides of the property. Each unit has its own entrance off a landing on the outside stairway: its own private enclosed courtyard on the lower (bedroom) level; and a fine view of the Santa Clara Valley from the upper (living) area. The plan puts the lower level of one unit on a plane with the upper floor of the unit below, a simple expedient which minimizes the amount of hillside cutting required for construction. The upper unit is a flat, and the space below it contains a sauna bath, recreation room and storage, for all tenants' use. By separating the units into three buildings, with the courts between, each unit has a distinct domestic scale which is appropriate to the neighborhood and to the setting. The magnificent old oak trees enhance both site and buildings, but the buildings are made a part of the natural environment with unusual skill. Two additional units are to be built on an adjoining lot, which is also just 60 feet in width.

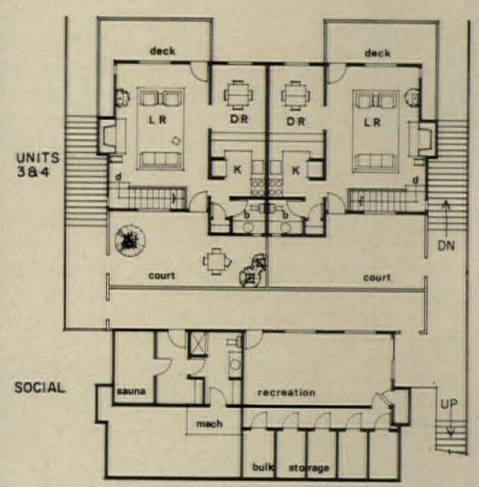
LA CASA DE ALEGRIA, Las Gatos, California. Architects: *Frank Laulainen & Associates;* structural engineers: *Lloyd McVicker;* builder: *Frans A. Laulainen.*

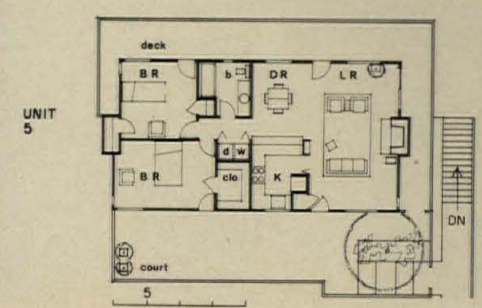
Photos: Ricco-Mazzuchi



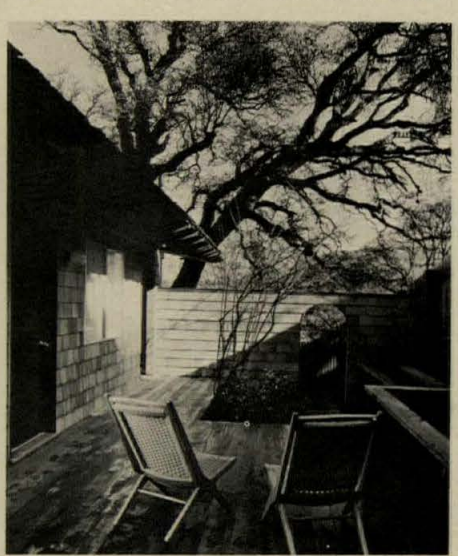
The natural grade of the hillside was disturbed as little as possible, and most of the fine oaks were preserved. Separation of the units by courts adds to the privacy of each; and location of interior stairs, closets and utilities helps to minimize noise between units.

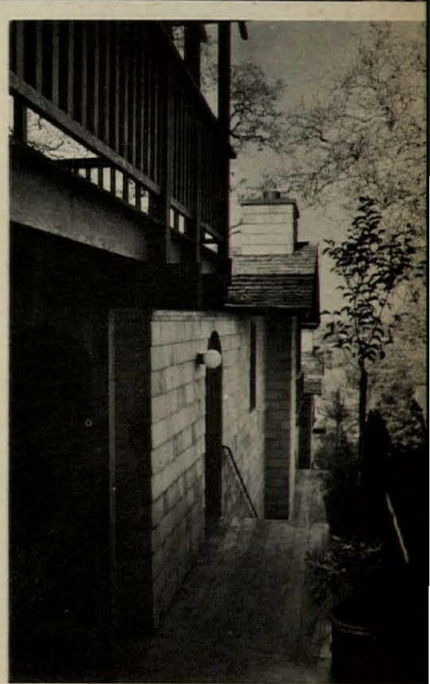






Materials used—red cedar shingles for exterior walls, cedar shakes for roof, redwood decking for courts and exterior stairway—give the buildings an affinity with the natural environment.

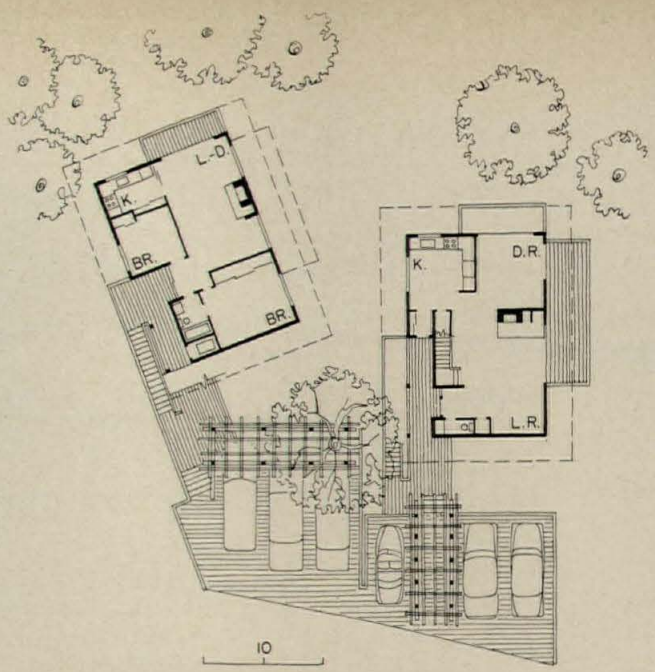


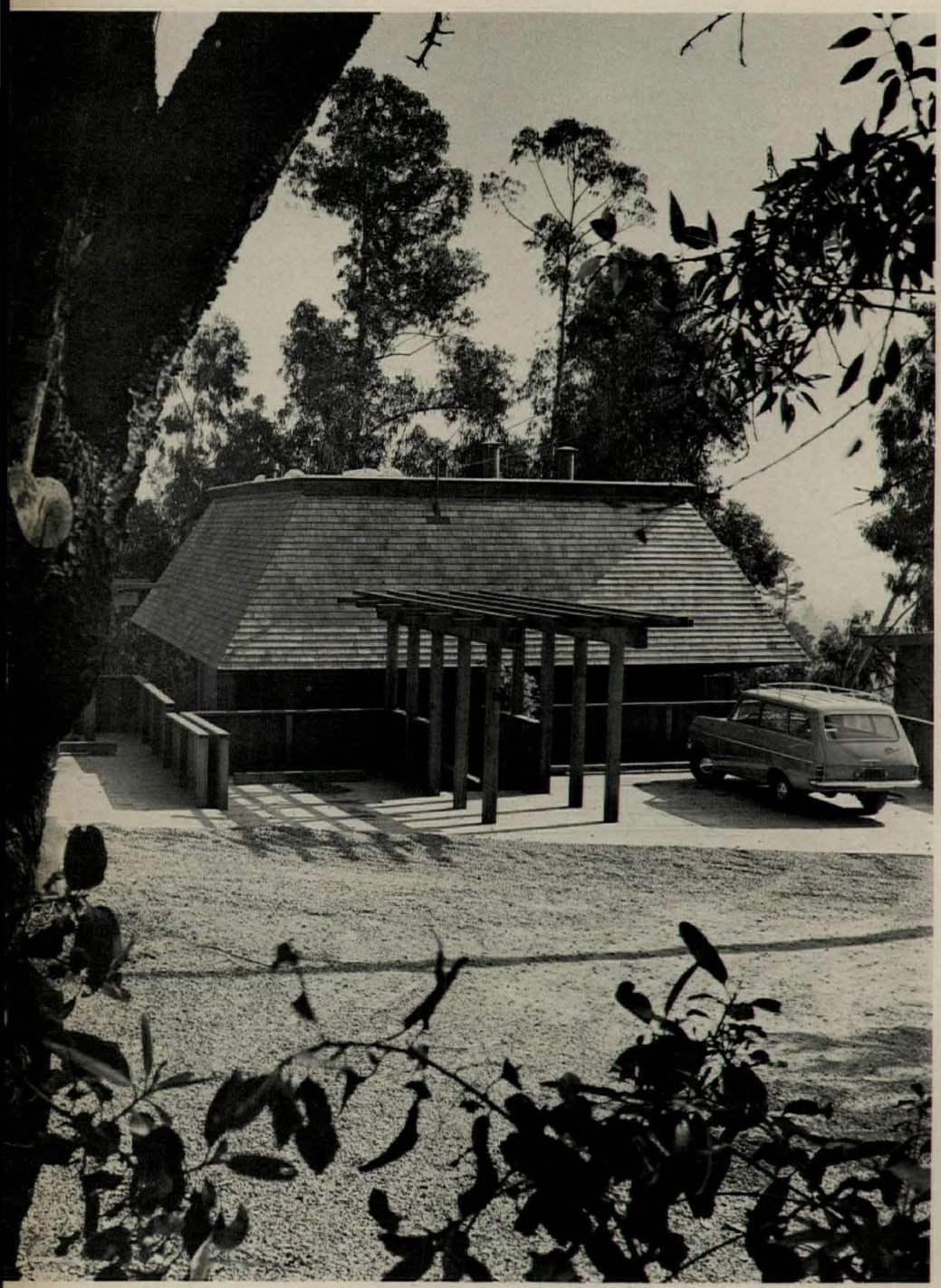


Special zoning permits duplexes in R-1 area

The two upper floors of each of these three-story "houses" are the main unit: a three-bedroom single-family unit. Beneath, in each case, is a 700-square foot, two-bedroom rental unit, allowed in this part of Berkeley under a special zoning provision which permits such units in this district but limits their size severely in the hope of discouraging further congestion. However, Panoramic Way is a picturesque hill just south of the University of California campus, and a rental unit there is a gold mine.

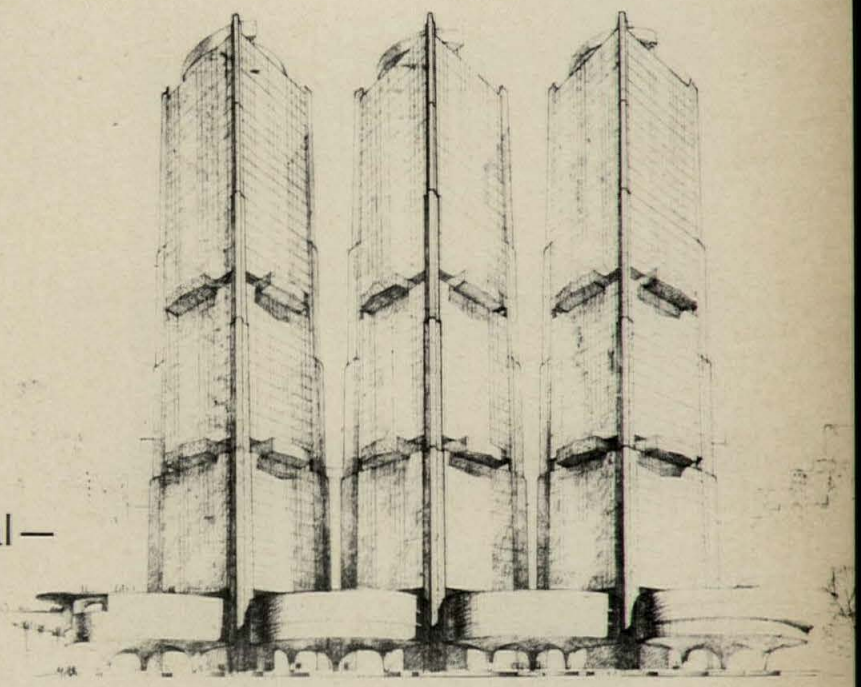
PANORAMIC WAY DUPLEXES, Berkeley, California. Architects: *Tucker, Tuley and Harms;* civil engineer: *Jack Kositzky;* contractor: *Conrad Ambrose.*





Each of the duplexes has its own entrance steps, reached across the wood deck of the street-level carport. The trellis marks the stairs to the unit on the right: stairs for the other unit are to the left. Each rental unit has its own separate outside entrance, reached by steps down the hill. Bedrooms of the main units are in the space covered by the shingled roof, seen behind the carport deck. In the plans shown above, the main floor of the main unit is shown on the right: on the left is the plan for one of the rental units. The wide deck off the principal rooms of the owner's unit opens to a fine view of Berkeley and San Francisco Bay beyond.

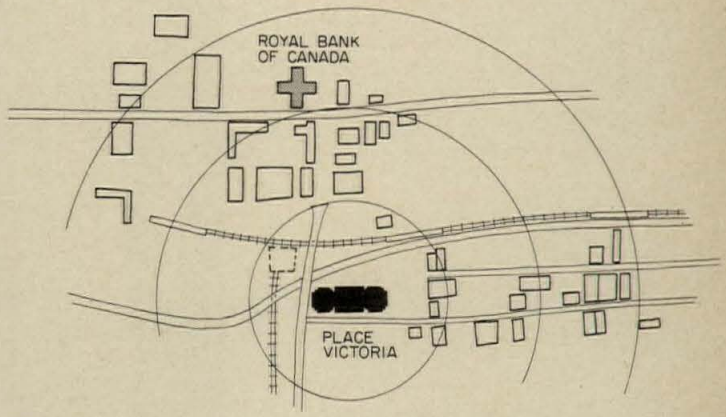
A bold first concept
has evolved
into a more conventional—
but still distinctive—
urban office building



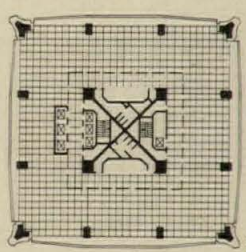
MORETTI AND NERVI'S PLACE VICTORIA

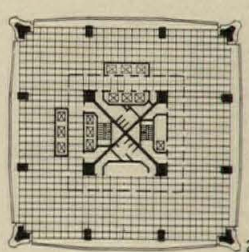
When Luigi Moretti began to design the Place Victoria office towers in Montreal, he sought to make them express a concept of the city as he thought it should be. By turning the towers 45 degrees from the street, he was able to bring them together in a much denser relationship than is commonly found downtown; and, by freeing the lower floors from the structure of the towers, he gained the ability to enclose varying types of space at ground level and to bridge over streets. The building as executed, however, is significantly different from the initial concept. The rental market in Montreal apparently would not sustain three new office towers, so only one was built, with a second projected for the future. With only two towers, there was less reason to have them so close together or out of parallel with the street, and both the towers and the lower floors now follow the building line. Only the curving steps suggest the original configuration. The strong articulation of lower floors and corner columns has thus lost its original reason for being, but it still gives the building its distinctive appearance.

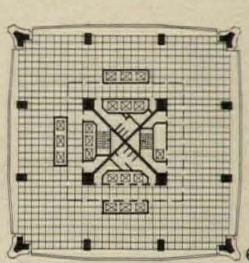
Joseph W. Molitor photos

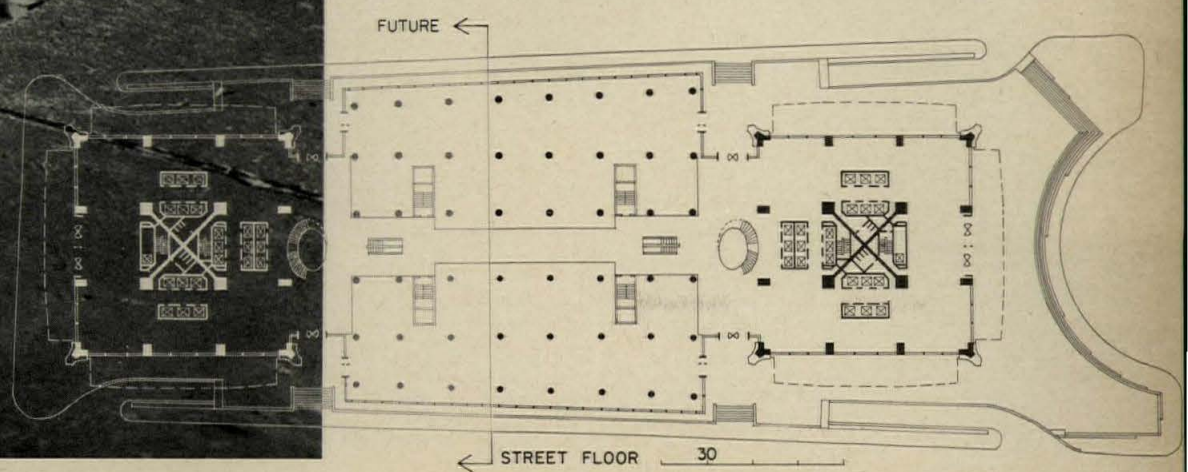


The Place Victoria Tower is situated in a renewal area which occupies a pivotal position between Montreal's financial district to the east and the commercial core on the north. The building has immediate access to the new Victoria Square metro station and will also be connected to an underground pedestrian system extending to the Place Ville Marie and beyond. (I. M. Pei's Royal Bank of Canada Building on the Place Ville Marie can be seen in the upper-right-hand portion of the photograph.) The top of the 47-story tower is 624 feet high, which allows it to be billed as the tallest reinforced-concrete building ever constructed: four feet higher than the Australia Square Building in Sydney, 44 feet taller than the 60-story Marina City towers in Chicago. The gross floor area is 1,461,700 square feet, of which 1,118,000 square feet is rentable. The Montreal and Canadian Stock Exchanges have taken space in the connecting link part of the building for their new trading floor.

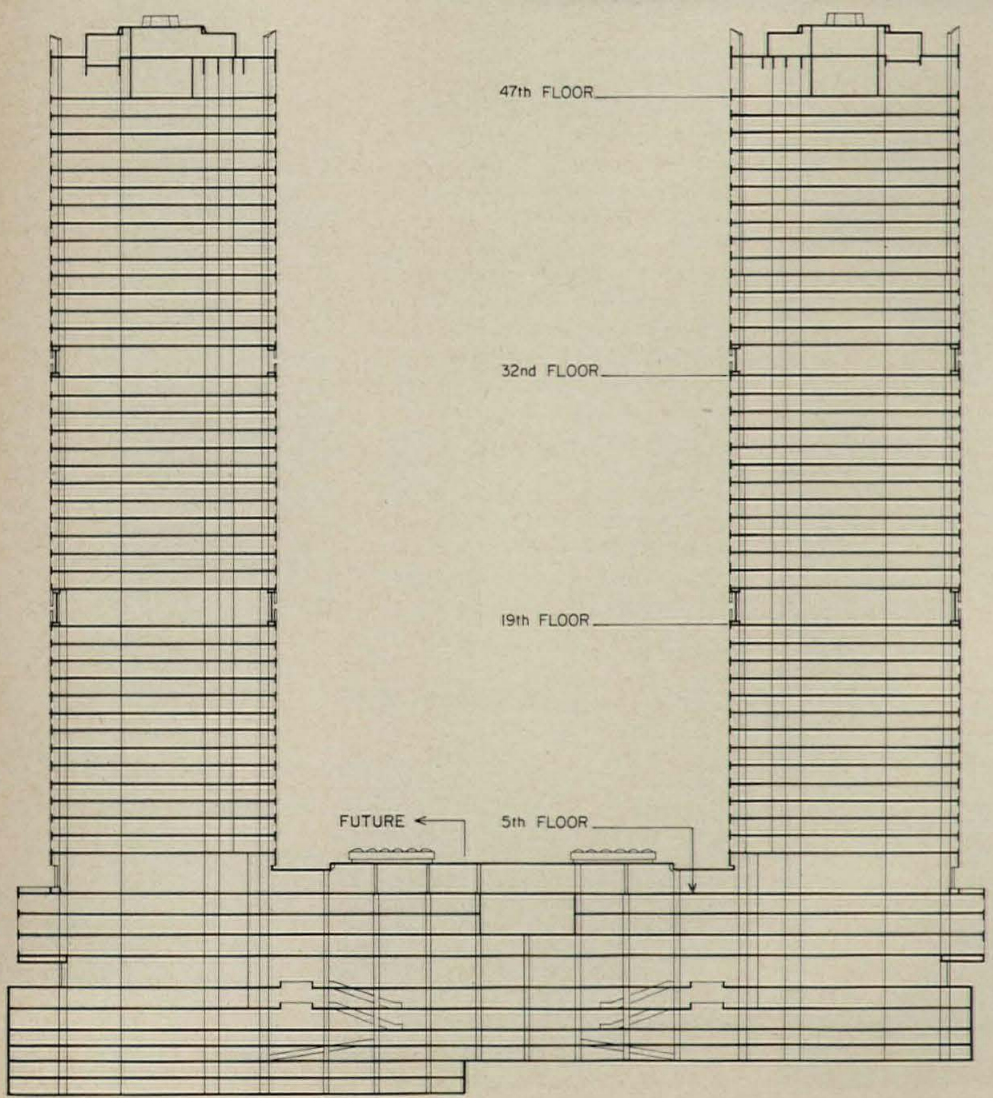








PLACE VICTORIA



On ground floor, balcony, and concourse levels there is room for 35 stores, five restaurants and a 530-seat theatre.

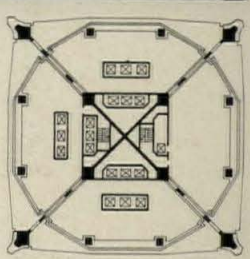
Although Nervi was responsible for the original structural concept, many of the unusual construction problems caused by building such a large structure in reinforced concrete had to be solved on the spot by the local architects, Greenspoon, Freedlander and Dunne, and their engineering consultants, D'Allemagne and Barbacki.

Concrete diaphragm walls were carried down 50 feet to bedrock around the perimeter of the property, in order to provide a clear and uncluttered construction site for the tower footings and the complicated concourse levels.

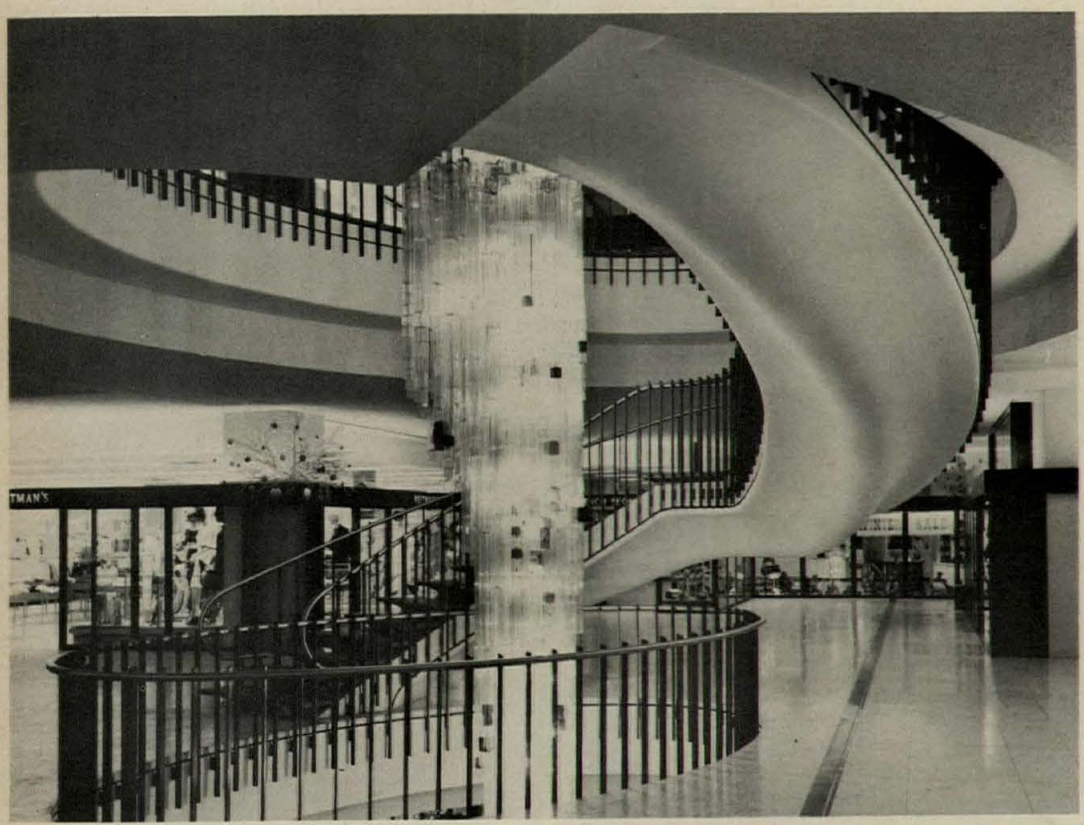
The cast-in-place, reinforced-concrete walls of the central core and the heavily reinforced corner columns are rigidly joined at three mechanical floors by massive floor-to-floor concrete trusses, giving the needed protection from wind and earthquake stresses.

The floor structure was held to an 18-inch depth, consisting of a three-inch slab and a 15-inch, two-way rib system.

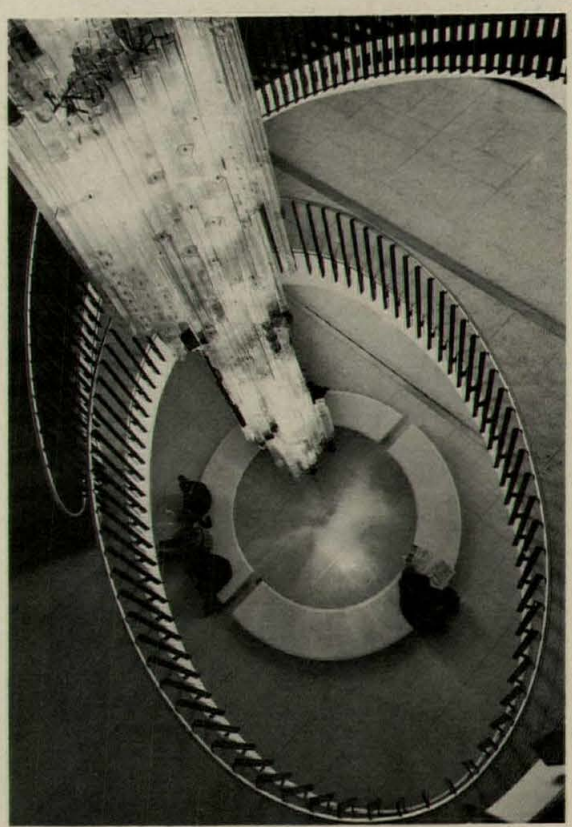
The corner columns are protected from temperature variations by precast concrete cladding and a heated air space.



TYPICAL MECH. FLOOR



Prismatic chandelier of Murano glass extends down the oval stairwell which connects the Place Victoria lobby with the concourse levels.



STOCK EXCHANGE TOWER, PLACE VICTORIA, Montreal, Quebec. Architect: *Luigi Moretti;* structural engineer: *Pier Luigi Nervi;* associated architects: *Greenspoon, Freedlander & Dunne;* associated engineers: *D'Allemagne & Barbacki;* architectural consultant: *Jacques M. Morin;* architectural consultant: *Studio Gabor ACS, Societa Generale Immobilare;* engineering consultant: *Letendre, Monti & Associates;* mechanical engineers: *Jas. P. Keith & Associates;* general contractor: *E. G. M. Cape & Co. (1956) Ltd.*

Part of clock frame, National Farmers' Bank, Owatonna, Minnesota, June 12, 1907.

DRAWINGS BY LOUIS SULLIVAN

FROM THE FRANK LLOYD WRIGHT COLLECTION, AVERY LIBRARY, COLUMBIA UNIVERSITY

Buildings—even those designed by Louis H. Sullivan—are vulnerable to the speculator, the wrecking ball, and the shifting tides of development. Sullivan lived to see many of his buildings destroyed, but his delicate, poetic drawings live on; treasured and preserved as an important part of a great American architectural heritage. The largest collection was acquired in 1965 by Avery Library at Columbia University and first exhibited publicly in January of this year. In these eight pages we present selected drawings from that collection.

The drawings chosen show one aspect of his architecture that particularly entranced Sullivan—its ornamentation, which became in his hands the ultimate expression of his ideas. Frank Lloyd Wright asked, "Where . . . was there ever a man who *out of himself* devised a complete, beautiful language of self-expression as complete in itself as . . . the period ornamentation of any of the great styles which took so many ages to perfect?"

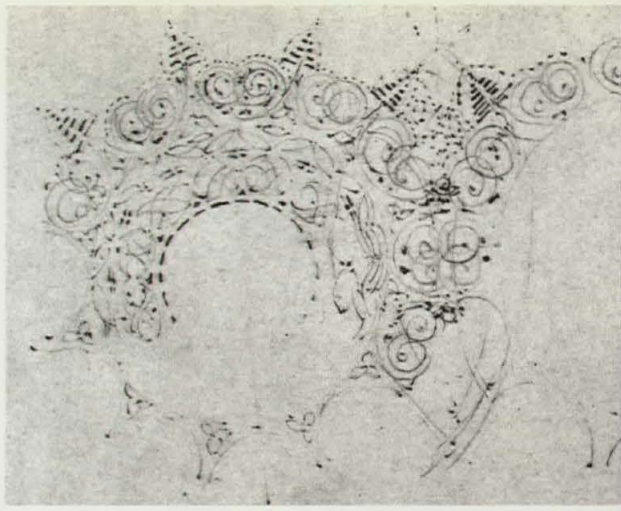
Frank Lloyd Wright: "These drawings were the dearest treasure of his heart."

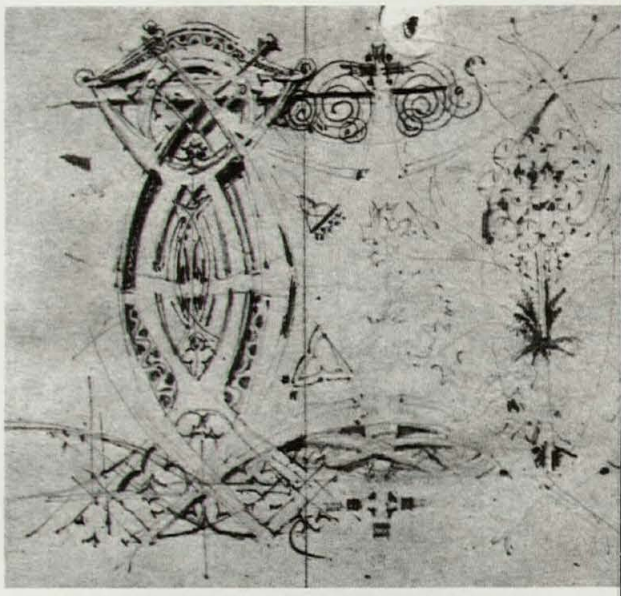
Wright, once Sullivan's student and chief draftsman, was given the 122 drawings—a collection covering the master's entire career from his Beaux Arts days through his masterpieces and on to the small banks of the early 20th century—when he visited the desperately ill Sullivan on April 11, 1924. Wright described them as "the dearest treasure of his [Sullivan's] heart." Sullivan died three days later, and the drawings became in turn, one of Wright's most treasured possessions.

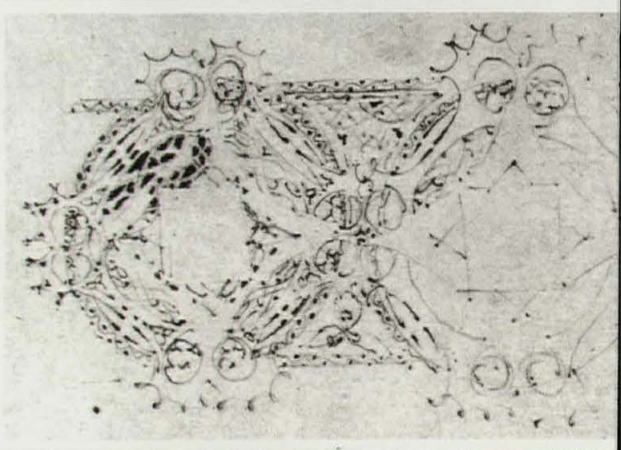
The collection includes many of Sullivan's original freehand drawings for architectural ornament, and several first sketches of building exteriors. There are detail sketches of terra cotta, painted wood, gilded plaster, carved granite, bronze, and cast iron; for nearly all of Sullivan's most famous buildings. In Avery Library at Columbia University, the Wright Collection joins other drawings, manuscripts and books to form the largest collection of Sullivania in the world. Adolf K. Placzek, Avery librarian, describes the Wright collection as "perhaps the library's finest acquisition."

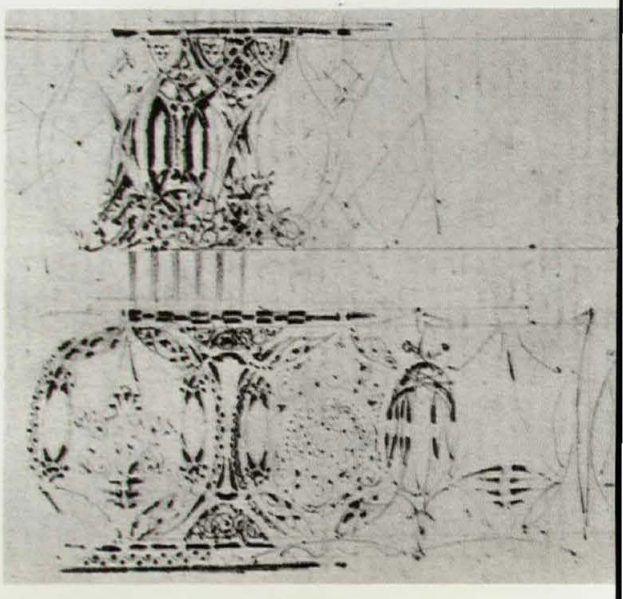
Louis H. Sullivan, brilliant architectural pioneer and leader of the Chicago School of the late 19th century, lived to see his ideas and buildings discredited in favor of the spreading eclecticism of the early 20th century. In the wake of the 1893 World's Fair, efforts to express the steel frame and glorify the tall building as a "proud, soaring thing"—problems so important in Chicago in the eighties and nineties—were dead issues. Thus, Sullivan did not become the great prophet of the new century but, within his life-span, master of the old. Following his temporary eclipse in the early 20th century, Sullivan is now recognized as one who can speak out of the past to architects of following generations in the timeless language of poetic form.

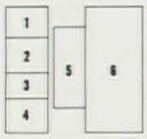
Wright's quote from *Genius and the Mobocracy*, Duell, Sloan and Pearce. 1949.











1 12-inch border, St. Nicholas Hotel, St. Louis, Missouri, July 28, 1894.

2 Unidentified study, November 13, 1893.

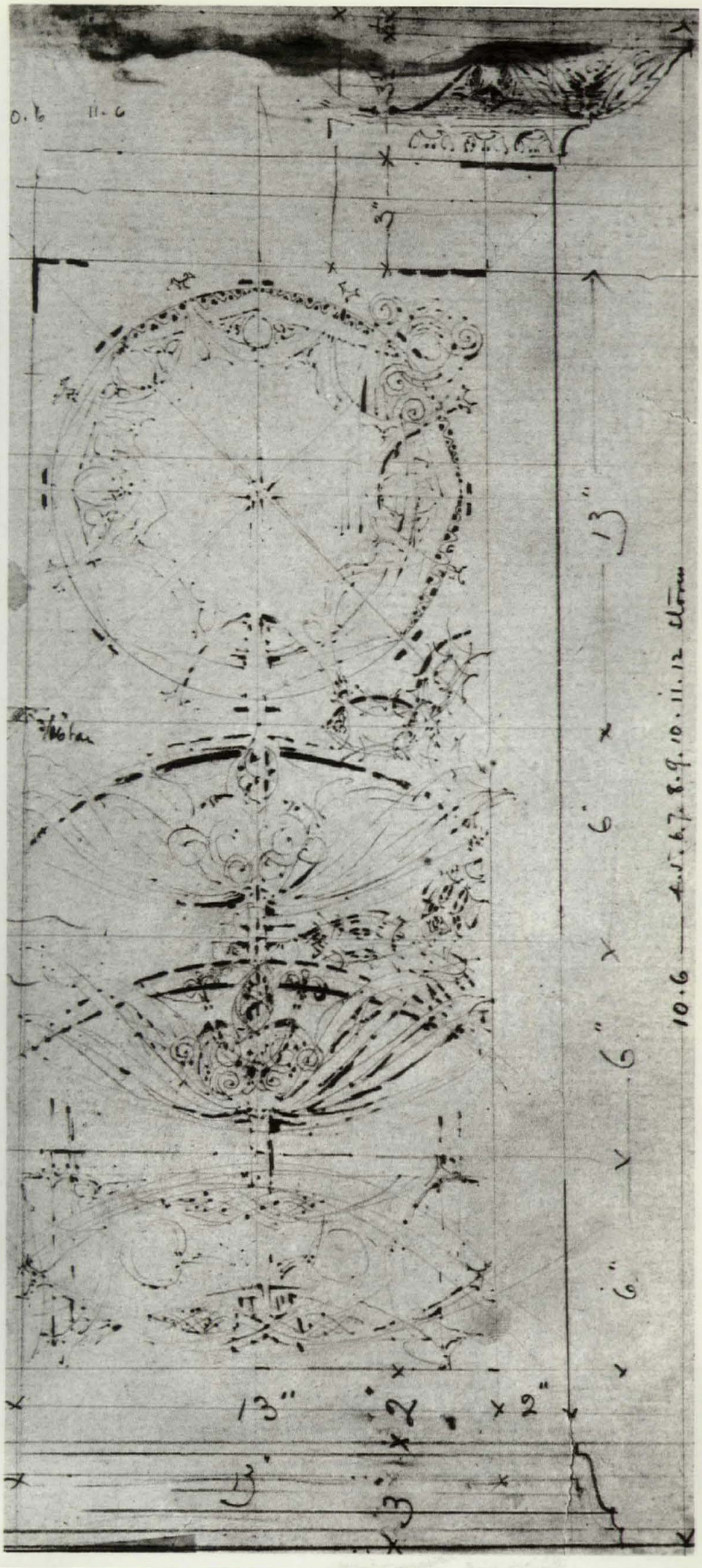
3 12-inch border, St. Nicholas Hotel, St. Louis, Missouri, July 28, 1894.

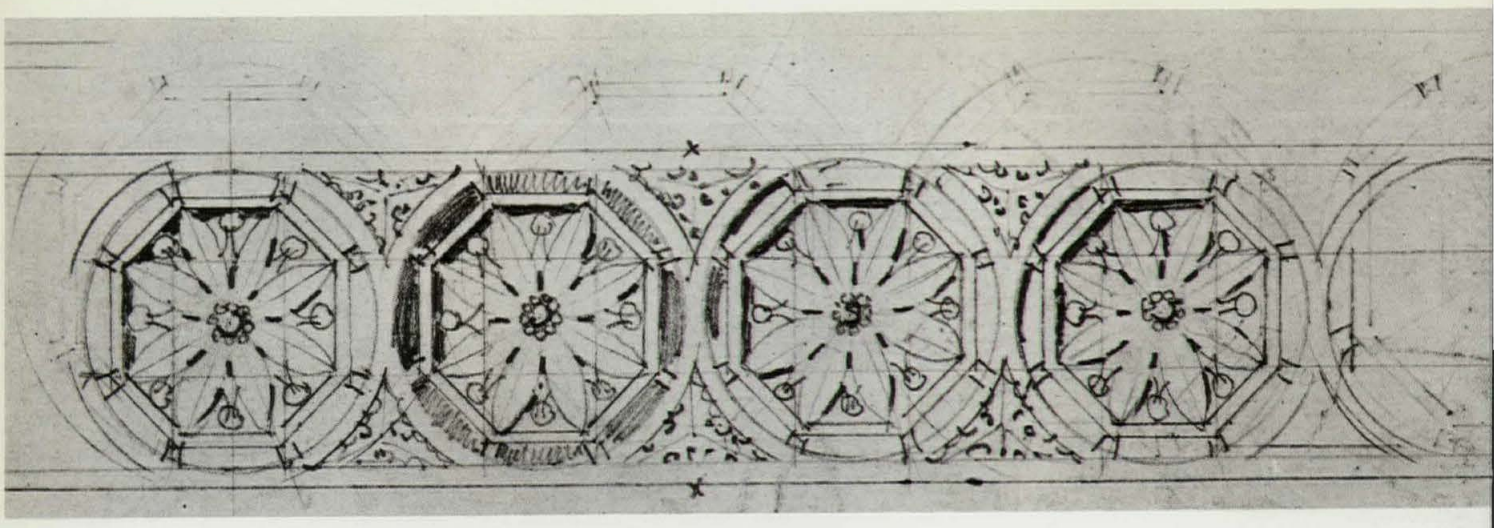
4 Elevator screen, Taylor Building, July 10, 1894.

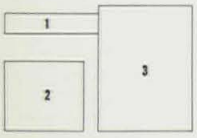
5 Plaster soffit, Transportation Building, 1893 World's Fair, Chicago, 1892.

6 Decoration of column in stairway, Guaranty Building, Buffalo, New York, July 13, 1895.

Joseph W. Molitor photos





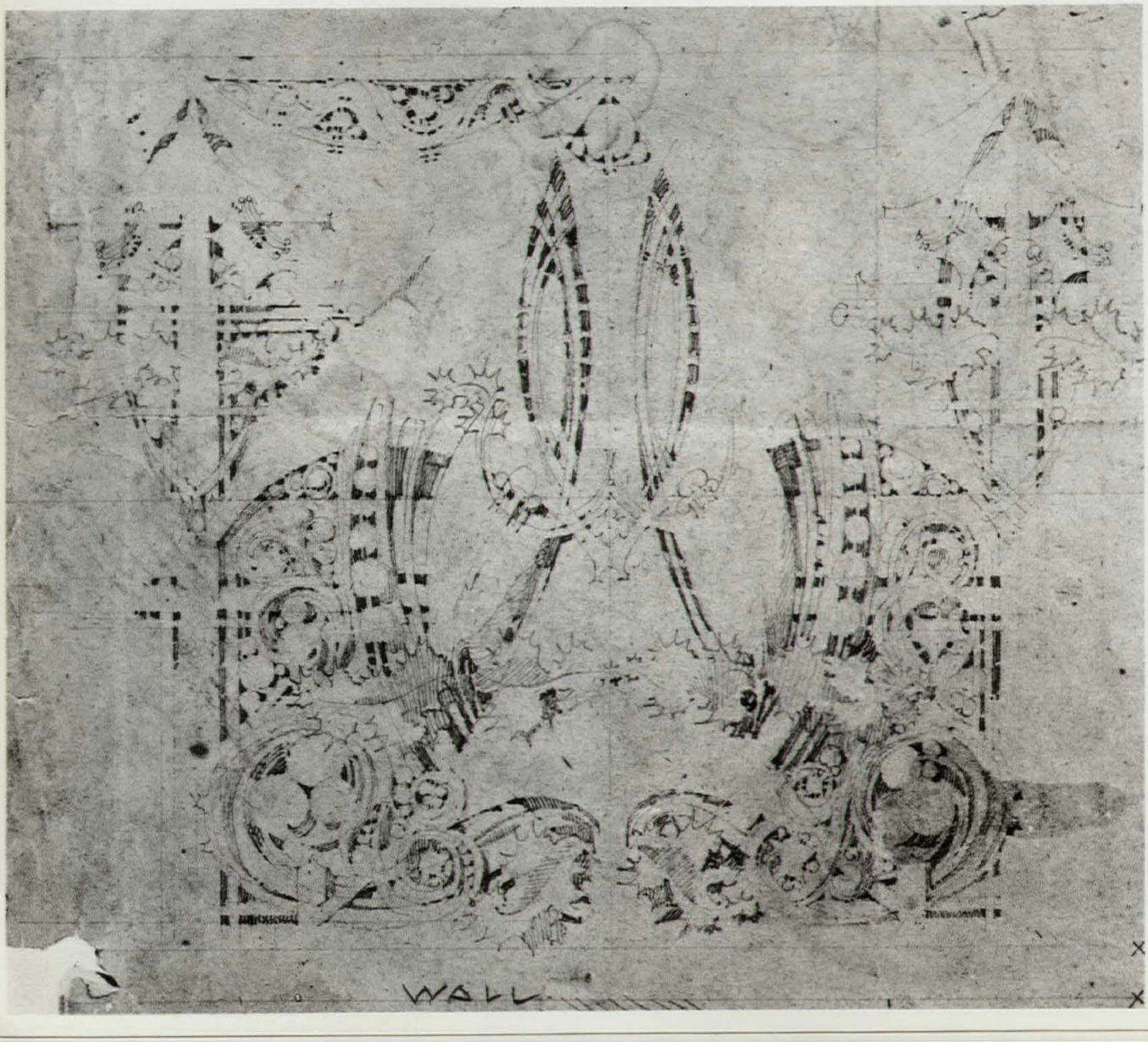


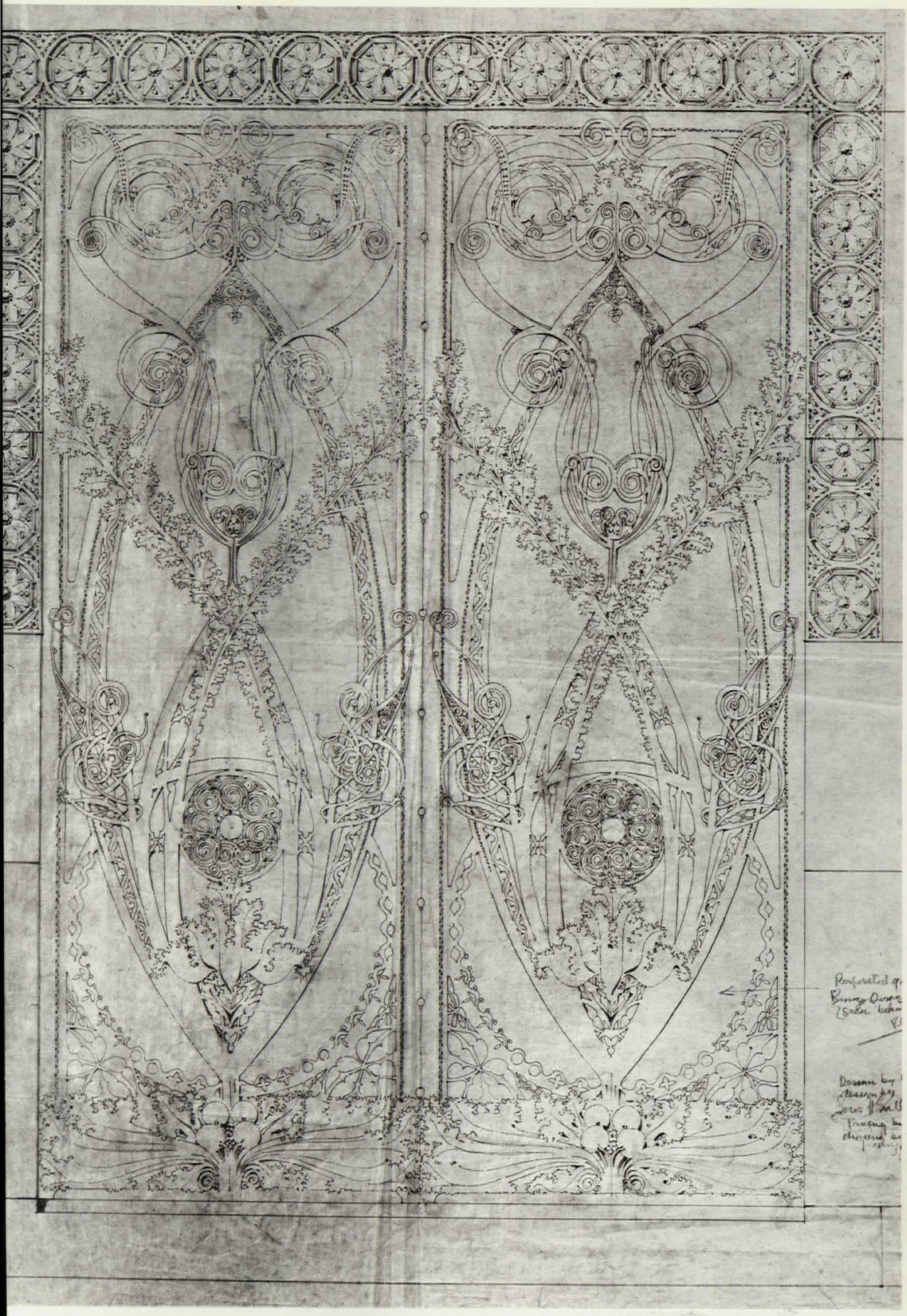
1 Study of ornamental frieze for bronze gates, Getty Tomb, Chicago, no date.

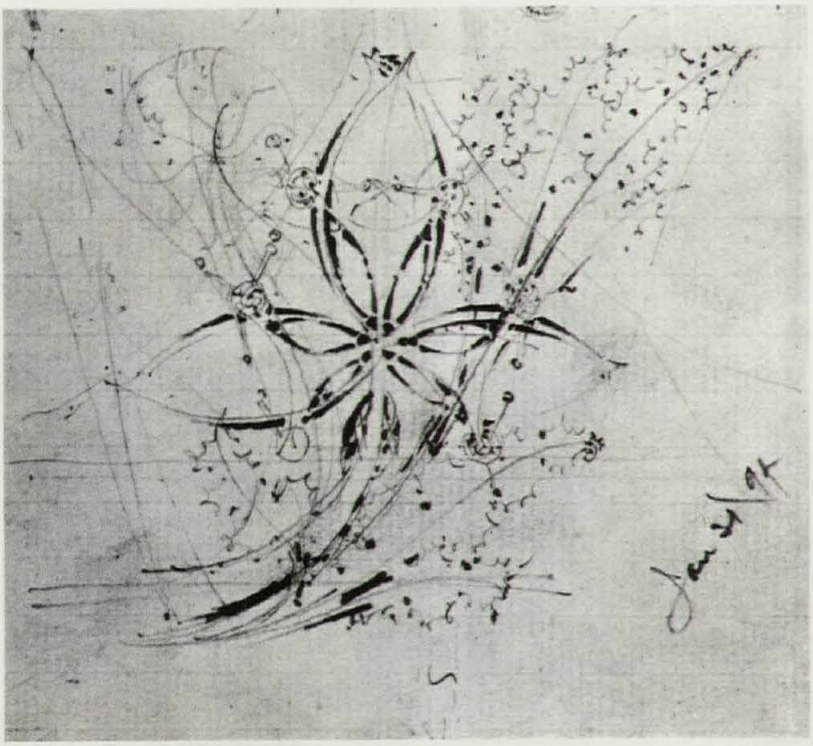
2 Plaster ceiling ornament, National Farmers' Bank, Owatonna, Minnesota, March 21, 1907.

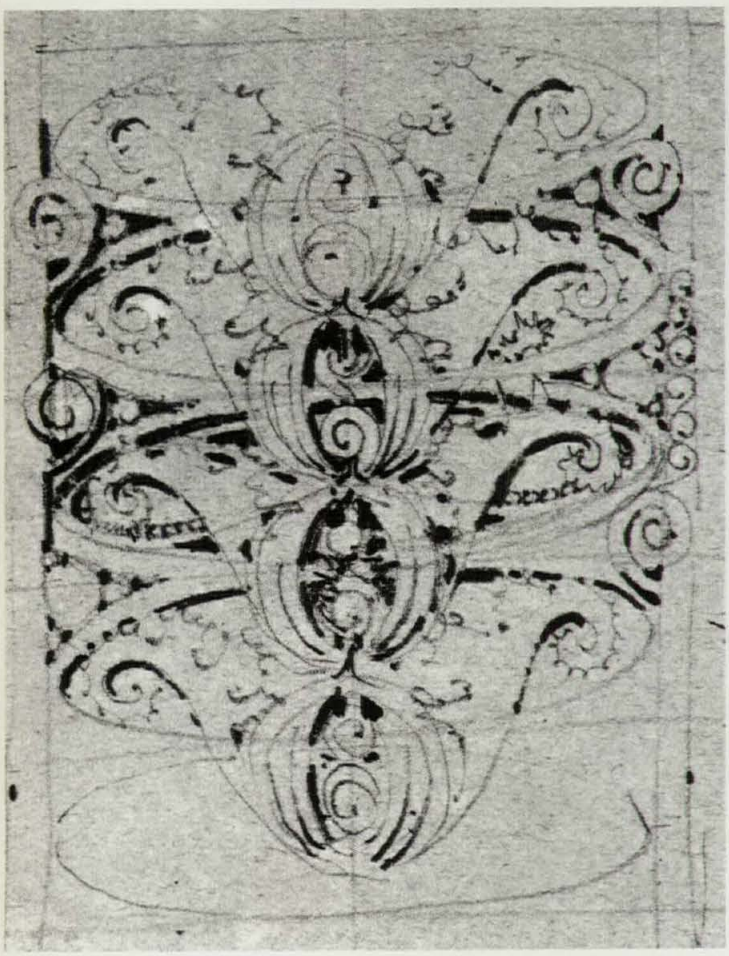
3 Ink drawing by Frank Lloyd Wright over design drawing by Louis Sullivan, bronze gates, Getty Tomb, Chicago, 1890.

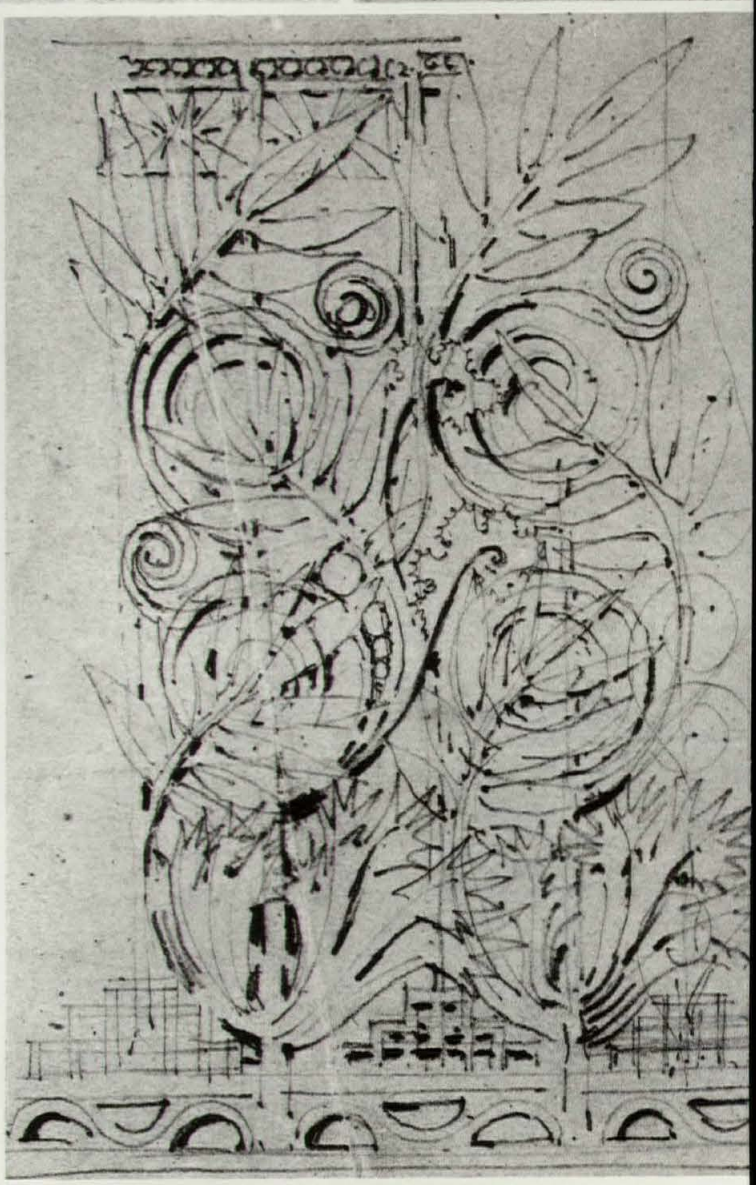
Sullivan: "The vision of the free spirit . . . sees within the commonplace the elements of sublimity. Thus the architect who combines . . . the powers of vision, imagination, intellect, and sympathy for human need . . . shall create poems in stone."
From ARCHITECTURAL RECORD, February 1923

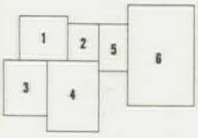












Study for terra cotta, January 31, 1894.

Study in plasticity, August 28, 1885.

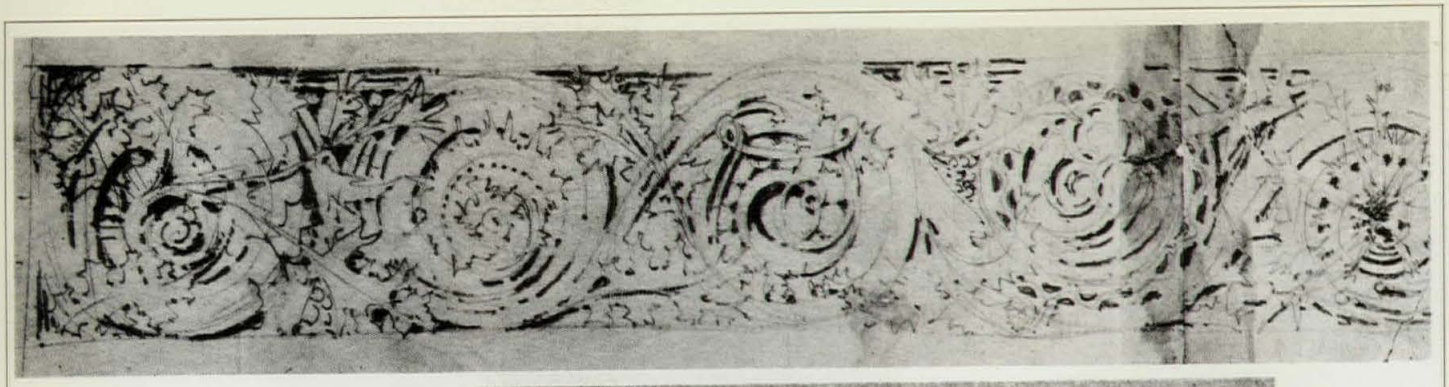
Plaster soffit, Transportation Building, 1893 World's Fair, Chicago, 1892.

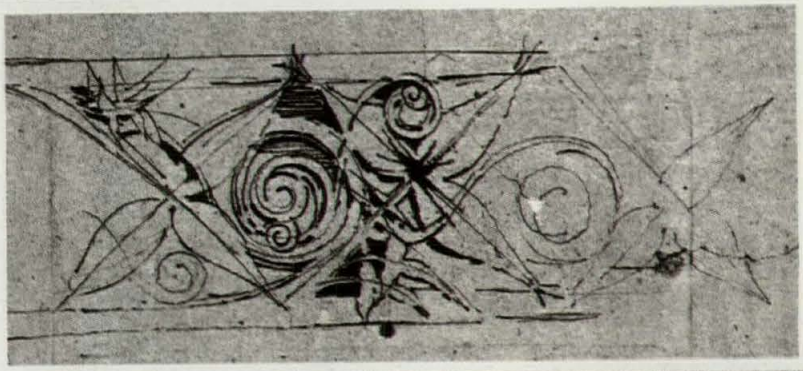
Frieze in foyer, McVicker's Theater, Chicago, no date.

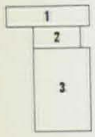
Study of plasticity, August 23, 1885.

Ornamental detail, gilded plaster, first McVicker's Theater, Chicago, May 6, 1884.

Sullivan: "Ornamental design will be more beautiful if it seems a part of the surface or the surface that receives it than if it looks 'stuck on'."
From ORNAMENT IN ARCHITECTURE.



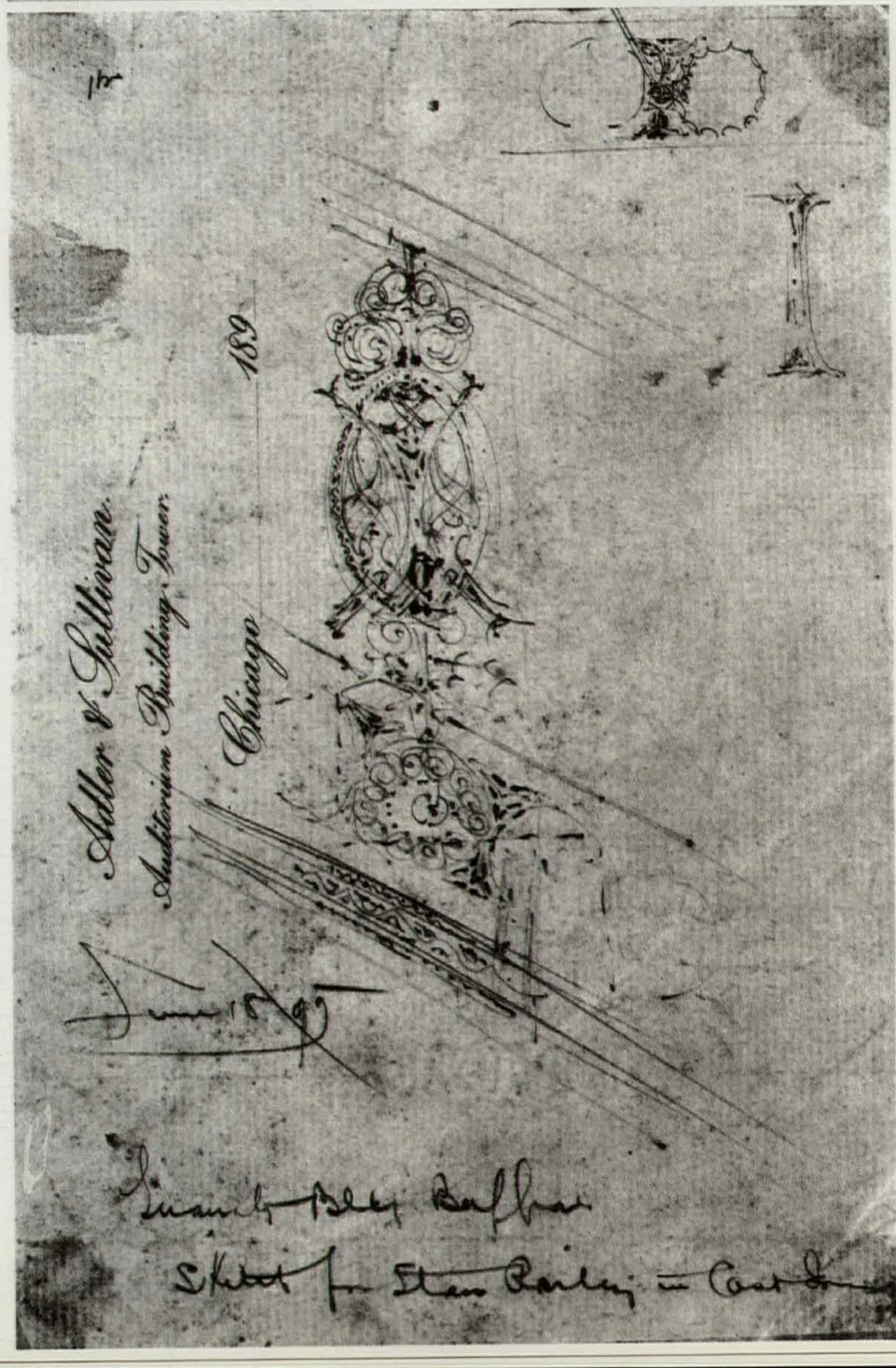




1 Carving of lower edge of granite arch, Getty Tomb, Chicago, October 16, 1890.

2 Rib ornament, McVicker's Theater, Chicago, January 27, 1891.

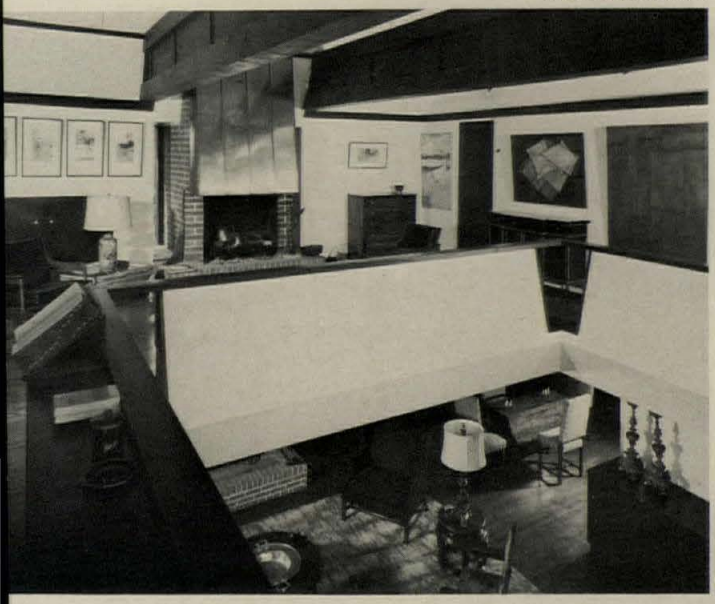
3 Sketch for cast iron stair railing, Guaranty Building, Buffalo, New York, June 18, 1895.

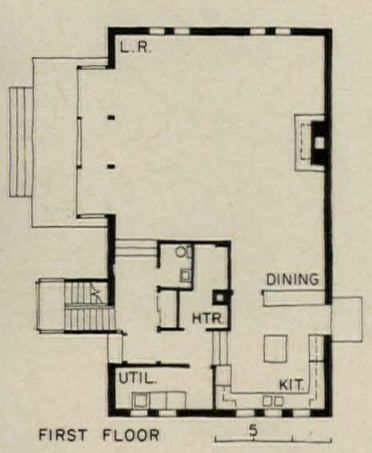


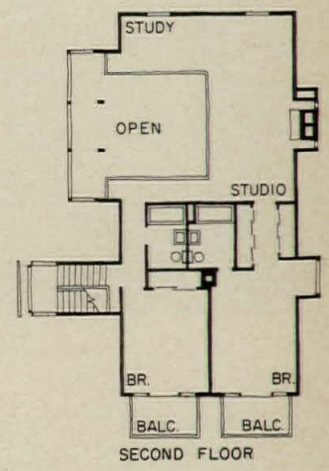
REMODELED HOUSES SOLVE MANY PROBLEMS

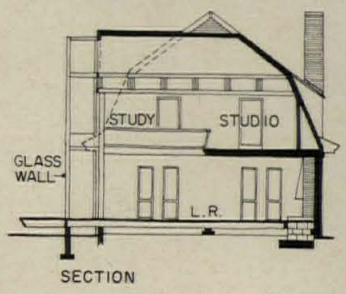
Interest in remodeled houses is very much alive today—for a number of reasons. Perhaps the most significant is that remodeling townhouses is an excellent way of providing a particular type of urban renewal while preserving the charm and character of period neighborhood design. Many people, notably architects, find that living in remodeled houses gives them the best of two worlds, often at a very reasonable cost. Moreover, how many successful architects have started and are still starting their careers with a remodeling commission? House remodeling then is of concern to all architects, and the four examples shown here represent various types of excellence in this field.

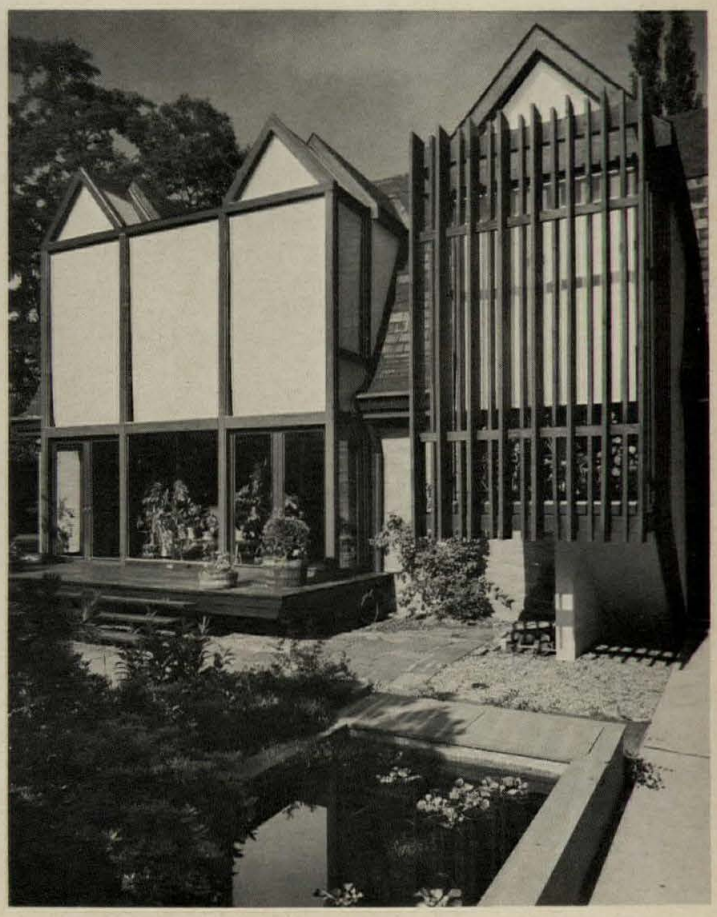
Marc Neuhof photos





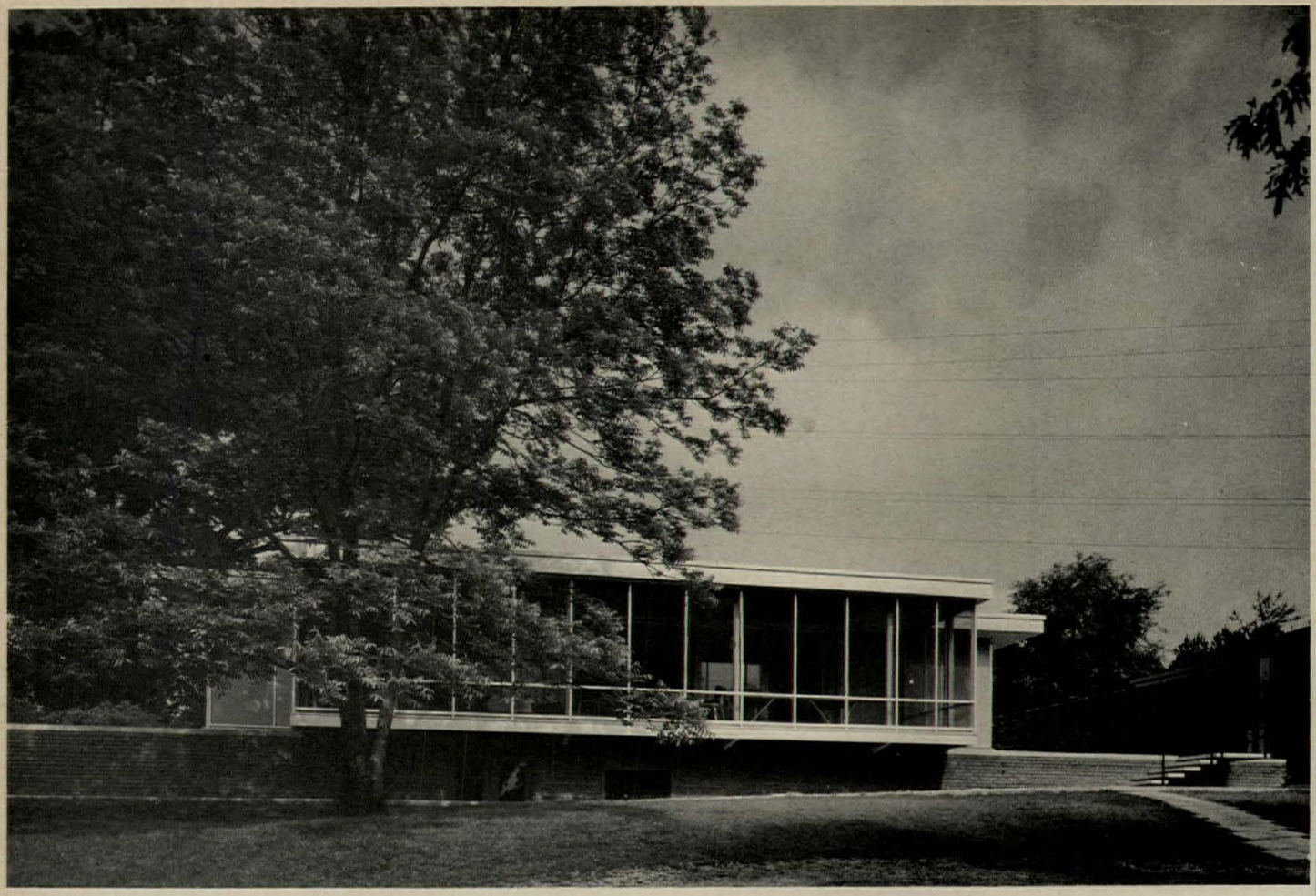


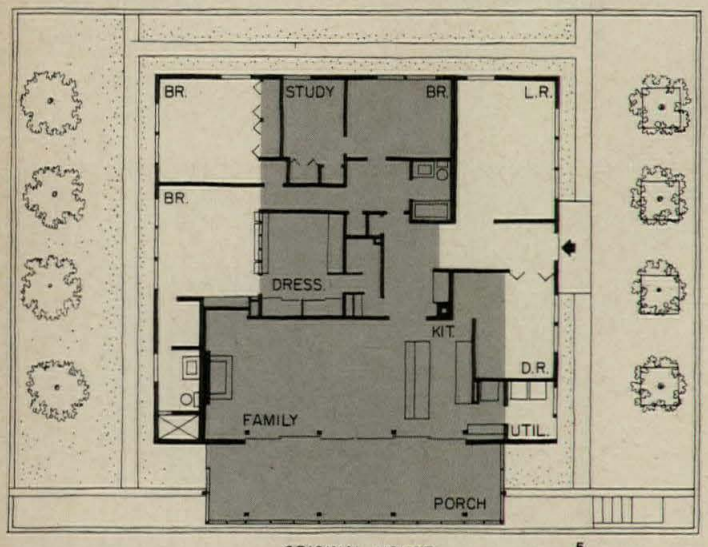




PITTSBURGH The fine old brickwork and timbered gables of this barn were the main impetus for the redesign and have been preserved and emphasized in the final scheme for the Alfred Bermans. The architect treated the existing elements as a basis for the extensions which were achieved by means of simple cantilevers, balcony projections and exterior structural elements. The result is a spectacular two-story space surrounded by an unusual balcony-studio. Architect: Tasso Katselas.

Joseph W. Molitor photos





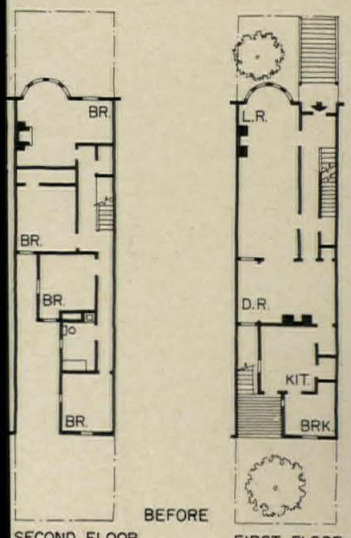
ORIGINAL HOUSE 5

RALEIGH When Milton Small built his original house (photo directly above from June 1954, p. 168) he was working on a very limited budget, and the three bedrooms, large family room and screened porch then provided were quite livable for a young family. As spatial needs grew, by adding a parlor and dining room to one side of the house and similar space on the other side for two new bedrooms and bath (and by changing two of the existing bedrooms into dressing rooms and closets) the architect managed to transform a compact budget house into a comfortably spacious family residence, without sacrificing any of the balance of the original design. Architect: G. Milton Small.

Morley Baer photos

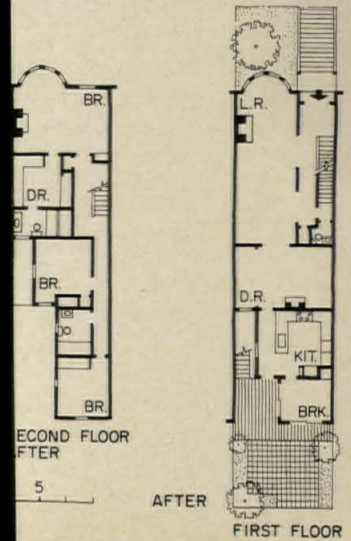
SAN FRANCISCO

In remodeling this essentially elegant row house for his own family, John Field's chief concern was to maintain the feeling of the spaces, details and proportions of the original house, but to open the rooms to one another to make the house seem more spacious. The architect says "all the changes in the walls are designed to look as if they might have been the 1893 design." For example, by raising and widening the doorways to the living room, the character of the main floor with separate entrance and dining room is preserved, but visually the house is much enlarged. Architect: John Louis Field.



BEFORE

SECOND FLOOR FIRST FLOOR



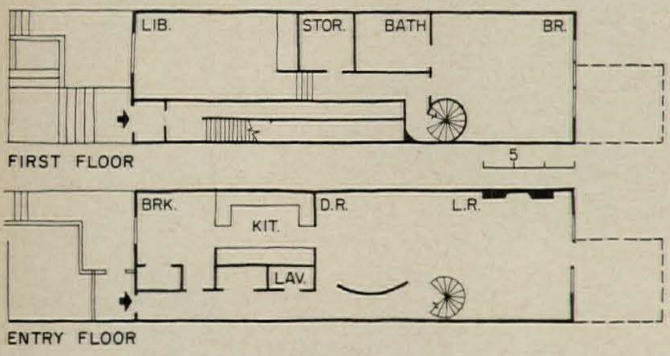
ECOND FLOOR
FTER

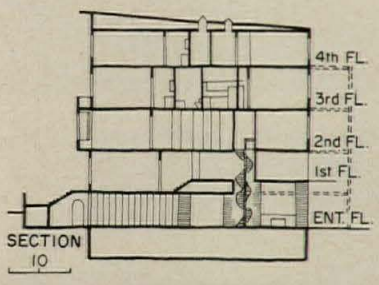
5

AFTER

FIRST FLOOR

New York Times photos





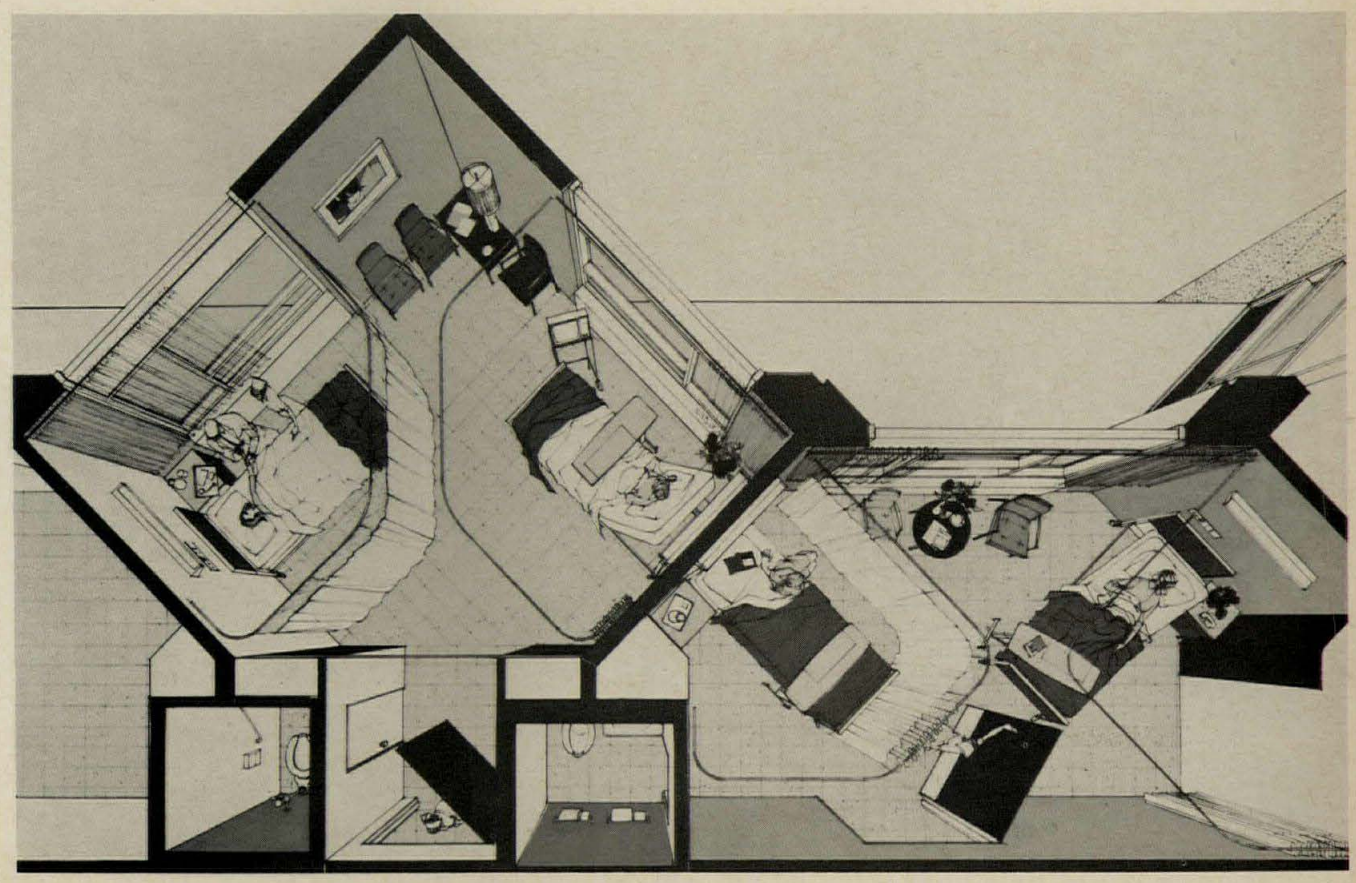
NEW YORK This townhouse in Manhattan remodeled for the William Shaws is an outstanding example of the way in which the standard brownstone plan can be adapted to create a really impressive interior space, and contemporary furniture and materials successfully married to the architecture of the previous century.

In this house, the ceiling of the living room was raised by lowering the height of the space directly above. The 10-foot by 10-foot wing at the rear of the house was removed to let in daylight. Walls were stripped down to expose the rubble brick, and now classic modern furniture arranged in contemporary groupings. Architect: Hugh Newell Jacobsen.

HOSPITALS

Innovations in systems and configurations mark the accelerating pace of hospital design and construction. Burgeoning technology in medicine, communication, education, transport—and in the building process itself—is generating obsolescence in medical facilities nearly as fast as the design process can update them. Hospital additions are no longer tacked-on new wings with more beds—although more beds are a constant need. Teaching facilities must provide new opportunities for interchange among disciplines formerly consigned to isolated university departments. Even today's patient, more affluent and more knowing, is making his demands for privacy and excellence felt against the counter-influence of labor shortage and convention. All of these are pressures for change in the architecture of hospitals; and there is much Federal, state, and insurance money available to implement them. The following study outlines the sources of money and demonstrates current architectural applications.

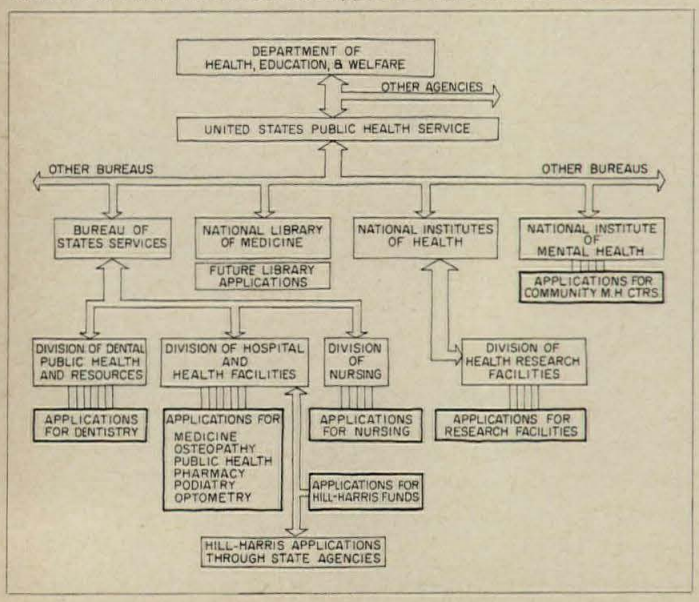
William B. Foxhall



FEDERAL SUPPORT FOR CONSTRUCTION OF HEALTH-RELATED FACILITIES

By Thomas H. Klausmeyer, Associate
Smith, Hinchman & Grylls Associates, Inc.

Channels of Public Health Service support for medical construction



The remarkable record of the 89th Congress has resulted in at least a dozen key acts that affect medical care and medical construction. Health is now listed as the nation's fourth largest industry. This Congress has certainly taken a giant step toward placing this industry on a public footing. The major health problems of the next decade are more likely to be related to a shortage of trained manpower than to a shortage of construction funds, so the importance of health education can hardly be overemphasized.

Several of the current legislative acts are important in their secondary effect upon construction but are primarily concerned with medical service. Among these are: Medicare; Older Americans Act; Community Mental Health Centers Act Amendments of 1965; Community Health Services Extension Amendments of 1965; Appalachian Regional Development Act of 1965; Civil Rights Act; Nurse Training Act of 1964, and Heart Disease, Cancer and Stroke Amendments of 1965. There are likely to be more in 1966.

A second group of these acts is either concerned exclusively with construction or concerned equally with construction and operation of facilities. These are:

a. Health Research Amendments of 1965,
b. Hospital and Medical Facilities Amendments,
c. Health Professions Educational Assistance Amendments of 1965,
d. Medical Library Assistance Act of 1965.

Health Research Facilities in most categories are supported under item "a." This act is the continuation of a long-standing program. Facilities are normally supported to 50 per cent of the construction cost. Support is authorized for $280 million over a three-year period. The act is administered by the National Institutes of Health.

The familiar Hill-Burton program with its Hill-Harris amendments is represented by item "b." The current act authorizes a total of $1.34 billion in grants and loans over a five-year period through June 30, 1969. Of this, modernization has been supported to a total of $160 million, with the remaining $1.18 billion allocated to new construction and remodeling. New construction is subdivided into the four familiar categories: (1) long term care; (2) diagnosis and treatment; (3) rehabilitation; and (4) hospitals, including public health centers. The program is administered by the Bureau of State Services of Public Health Service through regional and state centers. A number of significant detailed changes have been made in this act which should be carefully investigated through various state offices by persons with specific projects in mind. This program is the grandfather of all health facilities support. Its extension and refinement at this time is truly important.

The Health Professions Education Assistance Act (item "c") started with the introduction of H.R. 12 in 1963, and became law as P.L. 88-129. This act, with its extension during the 89th Congress, has already become the backbone of expansion of professional schools. It supports schools of medicine, osteopathy, public health, pharmacy, dentistry, nursing, podiatry, and optometry. The current extensions run through June 30, 1971. Approximately $160 million per year is authorized for support of construction. New schools and major (over 20 per cent) expansion of existing schools are supported on a 2 : 1 basis. Minor expansion of existing schools is supported on a 1 : 1 basis. Only that proportion of a project which contributes to major expansion can be eligible for 2 : 1 matching funds. Schools of public health are

supported on a 3 : 1 basis. This program is also administered by the Bureau of State Services of the Public Health Service, except for dentistry. Dental school projects are administered by the Division of Dental Public Health and Resources.

With this program there can be important interactions to each of the other three acts. This is particularly true with a major expansion of a school of medicine. It would be difficult to imagine expanding a medical school today without expanding research. This implies application for research facilities support. There are very few medical schools which have truly satisfactory teaching hospitals by modern standards. While the teaching act does support teaching hospitals, these institutions must first be denied Hill-Burton aid. The medical library must also be expanded. So an application must be processed in this area also.

The Medical Library Act (item "d" is the most recent legislation, having been cleared for the White House on October 12, 1965. It provides $40 million for a four-year period starting July 1, 1966. The act will probably be administered through the National Library of Medicine. Many of the administrative aspects of this act are yet to be released.

Applications under the research, teaching or library acts are processed and administered by the various bureaus. However, definitive review is given by the consulting professional councils. Several facets of each of the professions are represented on these councils.

A special note must be added at this time: The amounts authorized in each of the acts may or may not be actually appropriated. Funding and expenditure are and will certainly continue to be carefully regulated and perhaps restricted to accommodate the needs of the war in Viet Nam. While the priorities accorded this construction are very high, no portions of the federal establishment can expect to be freed of restriction so long as this or similar crises continue.

There are three important conditions:

As stated from the floor at the A.A.M.C. convention in November, 1965, "The implementation of major Federal support will mean the justification of all facilities before grants are awarded, and a continuous accounting after construction." What are the implications for the architect in terms of the range of his services? And what is the effect upon the design procedure and the design itself?

The answers to these questions lie in three major areas: (1) the specific nature of the client; (2) the characteristics of the facility to be designed; and (3) the process required for Federal submittal.

1. The specific nature of the client

Medicine is the central profession of the group now called the health professions. It is the husband of the life sciences and the father of clinical teaching. This latter subject is one of the major forces in the great strength of education in the health professions. The tutorial systems of clinical experience would roughly parallel an architect's experience if the student architect were required to design and develop several small buildings for specific clients under the direct tutelage of one of the leading professionals. In order to complete the parallel, this work would be accomplished under the auspices of a school which included most of the other building-design professions under the same dean. This unique combination of qualities provides the first precondition of the health professions as a client.

There are two general problems with which the architect must cope when dealing with academically oriented health facilities. The first of these is language. Each of the health professions has its characteristic vocabulary. It is normally based on medical vocabulary and varied as needed to suit each specialty. There are many intriguing considerations for the architect who does become acquainted with this precisely expressive language.

A second and perhaps more fundamental problem exists for the architect dealing with the doctor-scientist. This might best be described as direction of thought. The architectural method of dealing with a problem is normally to consider the largest aspects first. This approach is often extremely annoying to the scientist and especially to the doctor-scientist. These persons deal in a realm wherein minute differences are vital. Dealing with the general, before thorough study of the specific, can produce a peculiar form of trauma in the life-scientist. Resolution of the problems produced by these contrary thought patterns can be one of the most intriguing and difficult collateral problems of architectural work in health facilities.

2. The characteristics of health facilities

As a general rule, health-facilities projects can be characterized in a word: complex. The buildings are generally fireproof, multi-storied, interconnected, and composed—in terms of the budget—of approximately one-half mechanical and electrical systems. And in recent years project size has been growing, with costs often running in the tens of millions of dollars.

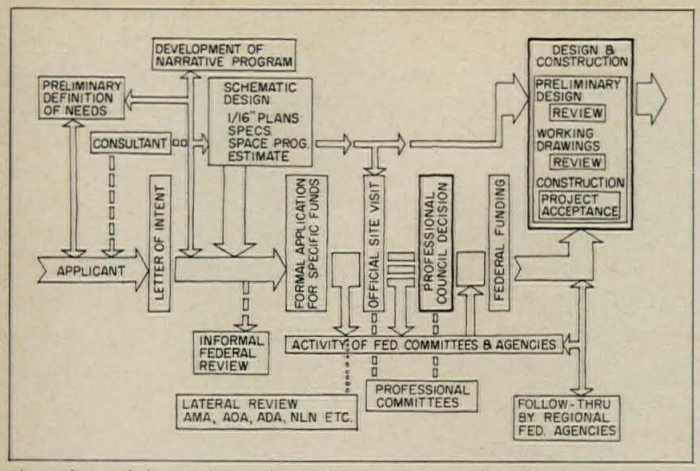
Because of the complexity of health-related work, it is in many respects leading other areas of architectural work. It is in this area, for instance, that architects are first using computers for program development. The promise of this approach is great. If carried to its logical conclusion it may even return the architect to the drawing board. It should be possible to turn all of program production over to the computer leaving humans once again in the position of conceiving ideas and making decisions.

3. The submittal process

The process of a Federal submittal is often referred to as "Grantsmanship." The procedure is quite reasonable and the various agencies are normally quite cooperative, once the basic need or justification is accepted. Certain basic ground rules should be understood. The most general among these is that the initiative rests with the applicant. Although this seems a simple proposition, the implications are manifold.

The applicant should address himself to his real needs rather than the imagined requirements of the Federal agencies. His program should reflect these needs. Competition for program quality results from comparison with programs of other institutions rather than Federal regulation.

The applicant must address himself to his own problems of staffing the new facility. The program for staff is related to operating funds as well as programs of function and space. The extent to which these elements must relate varies with different categories of funds. Research funds require the tightest correlation with educational funds allowing somewhat more flexible relationships of staff and facility. Research support is based upon the researcher as an individual or as part of a highly structured team. These grants are guided by the principle of "backing the horse rather than the track,"



Flow-chart of the project submittal process through Federal agencies.

PROGRESS OF A THREE-PHASE MEDICAL SCHOOL
(Eight years from concept to completion)

1965	Outline program Develop long-range plans Develop administrative staff Prepare submittal, first phase Obtain reasonable assurance of local funds
1966	Make submittal to Federal agency Have dean and executive committee available Visit site with Federal representatives preliminary to Medical Council approval Start preliminary design, first phase (six months) Submit for Federal review
1967	Start working drawings, first phase (10 months) Prepare second and third phase submittal Appoint key department chairmen Submit first phase working drawings for Federal review Visit site for second and third phases for Council approval Let contracts for first phase construction
1968	Start first phase construction (30 months) Submit for Federal review Appoint all department and division chairmen Assure additional local funds Start working drawings, phase 2
1969	Preliminary design, phase 3 (six months) Submit for Federal review Submit phase 2 working drawings for Federal review Set up core faculty Assure additional local funds Start working drawings, phase 3 (12 months) Let contracts, phase 2 Select first class for phase 1 facility
1970	Start phase 2 construction (30 months) Assure local funds Finish construction, phase 1 Activate phase 1 and start first class Submit phase 3 working drawings for Federal review Let contracts for phase 3
1971	Start construction, phase 3 (30 months) Appoint clinical faculty Assure local funds
1972	Fund, activate and start first class in clinics, phase 2
1973	Fund, activate and start first class on bed floors, phase 3

to use the expression of one N.I.H. offical. Educational facilities are much less susceptible to rigid staffing analysis due to complex student and faculty scheduling.

The applicant should prepare himself with his own construction funds. These are the funds which are *matched* by the Federal Government. It is surprising how often this situation is reversed in the collective mind of the applicant institution. Another area of funding which is often treated too lightly is provision for operating funds. As a representative taxpayer, the Federal agency is required to determine that the applicant can indeed operate the new facility once it is completed and activated.

In summary, the applicant should take the initiative in defining his own organization in terms of its responsibilities and objectives and from these policies develop a narrative functional program. This program should relate to present and proposed staffing of the facility and its operating budgets. From this, the program of spaces and equipment can be drawn, plans developed, and construction costs estimated. Lastly, the applicant should arrange for his portion of construction and operating funds. At this point an application can be made for Federal support.

These comments should not be interpreted to mean that application time should be the first contact with the granting agencies. The contrary is true. Aside from the normal procedural times for review, many questions arise with regard to federal policy, regulation and schedules which can only be answered by Government officials. Personal contact with individuals in the various agencies can be very helpful and should be developed.

Other ground rules to keep in mind:

The status of the Federal agencies varies during the course of project development and execution. There are three stages to this, although the change from the first to the second stage is the most critical. Before application, the applicant is in the position of the citizen applying to his government for direction in understanding its laws. In this case his government, through its agencies, can and does assume a helpful, non-partisan stance. Upon application, however, the relationship is altered. At this point, the applicant is applying to his fellow citizens for special consideration. The agency is the representative of the general citizenry with the function of screening and setting priorities among several applicants each of whom represents a special interest.

This is not literally true since law has already established the public value of the applicant. Those who practice first-rate Grantsmanship are not unaware of this subjective point.

The third stage of this applicant-government relationship occurs during construction when actual money is being expended and the agency is in the role of public administrator. The major effect is to produce the necessarily complex accounting which relate local with Federal expenditure.

Federal funds are related to specific fiscal years and may come from any of several Federal pockets. While many architects have experienced the tyranny of funding over construction, the complexity of many health facility projects can make this especially capricious. It is quite possible for one project to be supported by medical research, medical teaching, medical library, and dental funds. This list might even be augmented by Hill-Harris funds. The realities of funding may produce illogical construction procedure, especially with re-

gard to central mechanical facilities, utilities, and site development. This must be accepted from the start and considered during design. The various agencies will normally try to accommodate construction with funding but it is not always possible for them to produce an entirely reasonable situation.

Certain other variables of funding need to be considered early in the project. Most of the programs supporting health facilities projects are based upon buying a gross building area with a reasonable net program. The net program is allowed a reasonable variation during the design process. However, the majority of the programs administered in this manner are funded to a specific dollar amount. If the project runs over the estimate, it is the responsibility of the applicant to provide the needed additional funds. Generally, this approach is taken by programs administered by the Bureau of State Services of the Public Health Service.

An important exception to this procedure is that of the N.I.H. The Health Research Facilities Division of that agency buys net usable area. A critical eye is cast upon the net-gross ratio but this ratio is normally not so important as the over-all cost versus net area. On the other hand, H.R.F. funds in the past have been subject to some reasonable variation if such variation can be justified.

Specific steps of submittal

The process starts with the applicant directing a "letter of intent" to the appropriate Federal agency. This letter should state:

1. Nature and scope of project,
2. Estimated first-year enrollment increase,
3. Estimated costs,
4. Status of architectural plans,
5. Resources available for construction and operation,
6. Estimated construction dates.

The inclusion of this information would suggest that a consultant and/or especially qualified architect would have accomplished considerable work before this letter is sent. Objectives, policies and master planning should certainly be defined before sending the letter of intent. Surprisingly, this is not always the case. All too often the applicant institution proceeds to this point without sound professional advice. Happily, this practice is decreasing.

Following the letter of intent, the next formal step is submittal of schematic plans with accompanying functional and space programs, equipment lists, outline specifications, estimates, survey, site plans and space prorations where necessary. There is obviously a considerable amount of work concerned with this package. The process often requires a year or more unless much of the work has preceded the letter of intent.

The form of the submittal has been undergoing considerable change during the past year. The basic body of the submittal is the narrative program which includes:

1. History and background,
2. Functional program,
3. Narrative description of activities,
4. Listing of spaces showing net square footage with all fixed and movable equipment priced,
5. Summary of space lists and prorations,
6. Outline estimate,
7. $\frac{1}{16}'' = 1'\text{-}0$ schematic plans, and
8. Site survey and site plans.

While these items as a list are familiar to previous programs such as the HHFA Dormitory programs, Hill-Burton programs, etc., the extent of detail of the narrative descriptions is considerably greater than before. Definitive development of equipment at the schematic design stage is also a growing tendency.

The program and schematic design phase should be accompanied by several review meetings with the personnel of the appropriate agency. This might include an informal site visit by agency personnel.

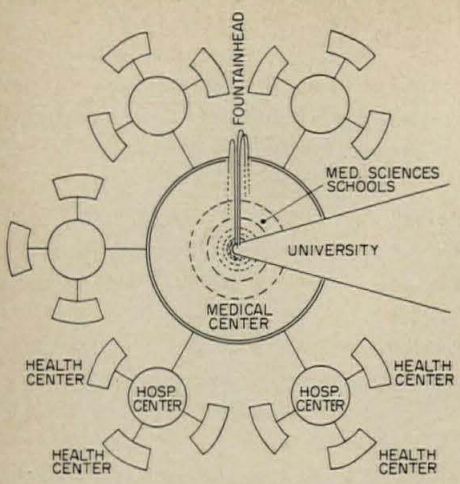
If the project involves a single submittal intended for one area of support, the submittal package is relatively simple. However, most medical school projects and some dental school projects involve multiple submittals. The requirements of the various programs for submittal documents are somewhat different. Combining the different requirements into a single package can sometimes be an exceptionally difficult problem.

Following submittal, an extremely important and intricate series of steps occurs. After a formal acknowledgement of receipt of the submittal, the project is given a definite number. The submittal documents are duplicated (as many as 200 copies for a complex submittal) and sent to the various working review committees. These represent the scientific disciplines and medical services which might be involved, plus administrative and architectural personnel.

After a minimum of six to eight weeks, the site visit is arranged. More than any other step, the site visit is the key to the success of the submittal. The presentation is made by the professional leader of the applicant's organization. The consultant or architect-engineer are only used for reference purposes. A hard look is given to many details of the applicant's organization, often in somewhat greater detail than is included in the submittal documents. The conclusions of the site visit team must represent the applicant to the reviewing committees and the appropriate professional council.

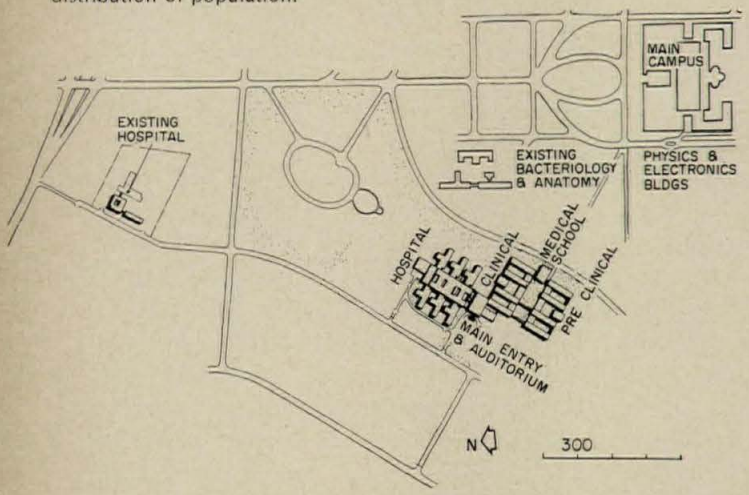
The definitive step is taken by the reviewing professional council which must accept or reject the project and give it a relative priority. Following this step, the administrative processes of the Federal agencies take over and funding is determined. This may involve other agencies of the Federal Government including the Bureau of the Budget. During this period, informal contact by telephone and correspondence should be maintained at frequent intervals. Formal notification of acceptance of the project will occur following preliminary funding. Funding involves a commitment to design and construction schedules on the part of the applicant. The administrative process which follows this phase and includes approval of preliminary design, the contract documents, contractual accounting arrangements for construction, supervision of construction, etc. will be familiar to those who have gone through the process with any agencies of the Federal Government.

While this process may seem immensely complex, it is a natural outgrowth of the need for justification previous to commitment of Federal funds and accounting following their employment. The order of procedure is logical except for the period in which the funding is committed. At this time the actions are necessarily pragmatic. Major difficulties tend to occur when the applicant has attempted to side-step one or another important consideration in the development of this project. Eliminating such miscues before trouble develops is one of the principal functions of the review process.



"The fountainhead of medicine...The medical teaching facility is shown as the core of a regional network of health care facilities, extending its vitalizing influence throughout the fabric of the region.

This functional concept of the medical school giving the impetus to regionalization is in contrast with the usual schemes for regional planning of medical facilities which seem to have as their primary aim an equitable distribution of beds and facilities to fit the geographic distribution of population."



Stanford Medical School—Palo Alto. Schematic study by Isadore and Zachary Rosenfield with Rex Whitaker Allen, integrating medical school, university and community hospital, shows the sequence of elements; pre-clinical facilities, clinical facilities, and teaching hospital. (In final plans by Edward D. Stone, the scheme has been considerably modified, although not violated in principle.) The schematic study accorded with the conviction that buildings with elements in horizontal relationships are more flexible in use and economical in cost.

THE BROAD APPROACH TO PLANNING FOR MEDICAL EDUCATION

By Isadore and Zachary Rosenfield
Architects and Hospital Consultants

The medical teaching institution is constantly outgrowing the shell that houses it but, unlike the chick or the lobster, can rarely afford to discard an outmoded shell that may thwart its development. Orderly and supple growth cannot be planned if the school is seen as an isolated entity. A medical school is an essential part of the health-care system, the source of knowledge and skill—and of progress. To support these functions, a complex of interrelated elements is required, and these must be made to work in an integrated manner if the most productive use is to be made of the limited supply of money and talent available.

The need for new schools

Medical schools are being planned and built all over the world to cope with a dire shortage of doctors. The deficiency is made worse by uneven distribution. According to a 1960 WHO report there are 780 inhabitants per physician in the U.S., 550 in the U.S.S.R., 400 in Israel; while in Brazil there are 2,500, in India 5,000, and in some African countries 100,000 and over. Population explosions everywhere and growing demands for better health service will call for continuing investment in medical education. In the U.S., merely to supply the physicians needed to keep up with population growth on the basis of the present proportion, a program of 20 or more new medical schools was urged in the 1959 report of the Surgeon General's Consultant Group on Medical Education, which estimated a need for 50 per cent

Excerpts from a paper delivered by Isadore Rosenfield at the 14th International Hospital Congress, Stockholm, Sweden, June, 1965.

Puerto Rico Medical Center. The School of Medicine of the University of Puerto Rico is not to be on-campus, though it will be within three miles. In context with the dramatic progress taking place in Puerto Rico there was more to be gained by making the medical school an integal part of the regional medical center, which was planned to serve the research and teaching needs of the entire island as well as the comprehensive treatment needs of the local area.

On a 107-acre site (excluding an adjoining 2,000-bed psychiatric hospital not shown in the illustration), a complex of general and specialized facilities with an aggregate capacity of about 1,650 beds is now nearing completion. The individual hospitals have divested themselves of their diagnostic and therapeutic departments and of much of their administrative and ancillary services, and these are integrated into one central building, left, which becomes the working core of a variety of appended hospitals, district, municipal, pediatric, industrial, etc.

The Medical Sciences Building, at right, will house the science teaching and research facilities of the Schools of Medicine, Public Health and Dentistry with resulting economies in the use of staff and plant as well as pedagogic advantages.

more graduates per year by 1975, or 3,600 more graduates per year than are now being produced by medical schools.

Ten to 12 new medical schools were reported by A.M.A. in 1963 as being in various stages of planning, while 58 of the 87 existing U.S. schools reported expansion programs. Federal assistance for construction and rehabilitation of accredited medical and dental schools is being made available under the Health Professions Educational Assistance Act of 1963 which authorized a total of $175 million in grants to be made over a three-year period against varying percentages of matching funds.

Expansion of this scale and the concurrent evolution in the philosophy and methods of education are comparatively recent developments. After the Flexner Report of 1910, which helped establish the standards of medical education, there was a period of consolidation with the number of schools reduced. During the following decades relatively few medical schools were established and little imaginative thinking on medical education was generated. Teaching methods were formalized. Most schools had similar curricula, stressing acquisition of quantities of facts. The buildings that were constructed in response to this pedagogical outlook have proved difficult to adapt to newer demands. In their planning, there was little consideration of the relationship between the medical school, its teaching hospital, the university, and the community.

Physical disarray

Under these conditions, universities located in the countryside generally have their medical schools in big cities. An interesting extreme example of this is the University of Texas, which has two medical schools, one in Dallas 200 miles north of its academic campus, which is in Austin, and one in Galveston 200 miles south of the campus. Medical school and campus are sometimes divorced even when in the same city. Frequently, makeshift quarters are improvised for science teaching, and their physical relationship to the teaching hospital not considered. Staff and students lose much time and energy shuttling back and forth between school and hospital. Facilities for teaching and study are either duplicated at some cost, or are not provided at one or another of the institution's components. Planning was on an opportunistic basis; one aspect of the school's requirements, usually the need for patients, was allowed to throw its other relationships into disarray physical and functional.

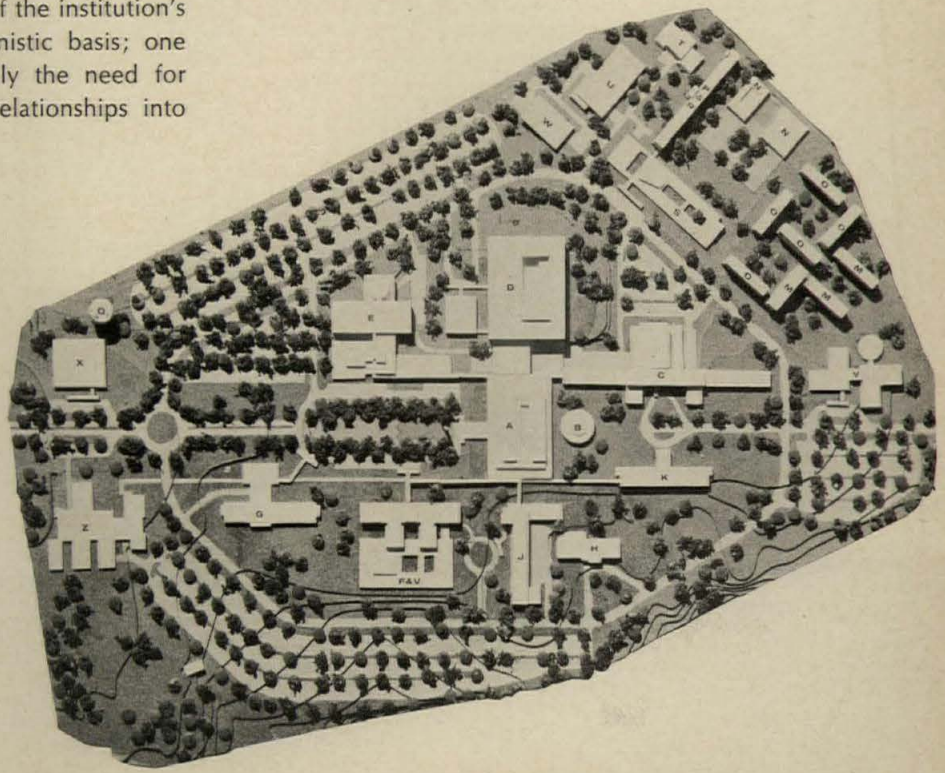
Changing techniques affect planning

In the atmosphere of change and ferment after World War II a number of medical educators recognized that change is, and will continue to be, the prevalent mode in medicine—as it is in science, education, and the structure of society. Growing specialization within medicine, radical expansion of research using ever more sophisticated techniques, increasing necessity for collaboration with diverse branches of knowledge, and newer approaches to prevention and healing that treat the patient as a whole being in his family and in society —all these required a rethinking of the process of medical education.

In general, the trend is towards small-group teaching and student self-education in contrast to formal didactic methods. The educational process is seen as a continuing one, less fragmented into rigidly separated phases of premedical, basic sciences, clinical science and so on. Teaching is coordinated between departments and disciplines, including not only the health sciences and professions but any branch of knowledge that can contribute to the complex process of healing or to the student's understanding of his role in society.

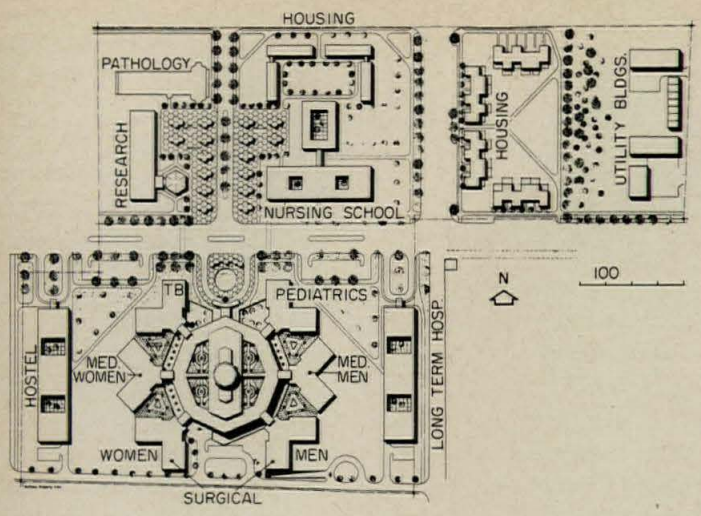
What integration means

In other words, medical education is increasingly an integrated endeavor with stress on a school's capacity to respond flexibly to change. The literature of hospital planning and medical education abounds in references to "interrelationships," "coordination" and all the vocabulary of integration, yet integration is not a verbal fetish nor does it happen of itself. There are natural frictions among the various institutions and interests. At least in the U.S., the practitioner, the full-time academic clinician, the researcher, all have differing points of view. It is axiomatic that specialists in all fields are increasingly dependent on communication with other specialists, but, if coordination is to be successful, it must be worked-at. It is the job of the architect to provide the physical relation-



Legend

A. Central building
B. Central cafeteria
C. District hospital
D. Medical sciences building
E. Municipal hospital
F. Industrial hospital
G. Nursing home facility
H. Bio-medical research and training building (A.E.C.)
J. Dr. I. G. Martinez Oncologic Hospital
K. Pediatric building
M. Medical student dormitories
N. Gymnasium, pool and recreation
O. Medical student apartment buildings
P. Student nurses dormitory
Q. Water tower
R. Graduate nurses dormitory
S. School of Nursing
T. Power plant
U. Central laundry
V. Rehabilitation center and school for training rehabilitation technicians
W. Garage and warehouse
X. Health center (For local population)
Y. Long-term diseases hospital
Z. Community rehabilitation center



Medical Center and Teaching Hospital, Khyber Medical College, University of Peshawar, West Pakistan. Architects: Isadore and Zachary Rosenfield; consulting engineers and architects: Noon Qayum & Co., Karachi and Lahore. However modest the initial program, the planning of a teaching hospital must look forward to more comprehensive development. In order to do a workman-like job of designing the main teaching hospital of Khyber Medical College it was necessary to work out a master plan indicating the future growth into a medical center as well as the relationship of the hospital to the two existing buildings of the medical school, one of which is as shown at the top of the plan.

There is to be a long-term hospital and rehabilitation center with training facilities for psychiatrists and physiotherapists; a hospital for self-care patients, for relatives, and visitors; a school of nursing; an auditorium for the entire center; residential groups; and a service area.

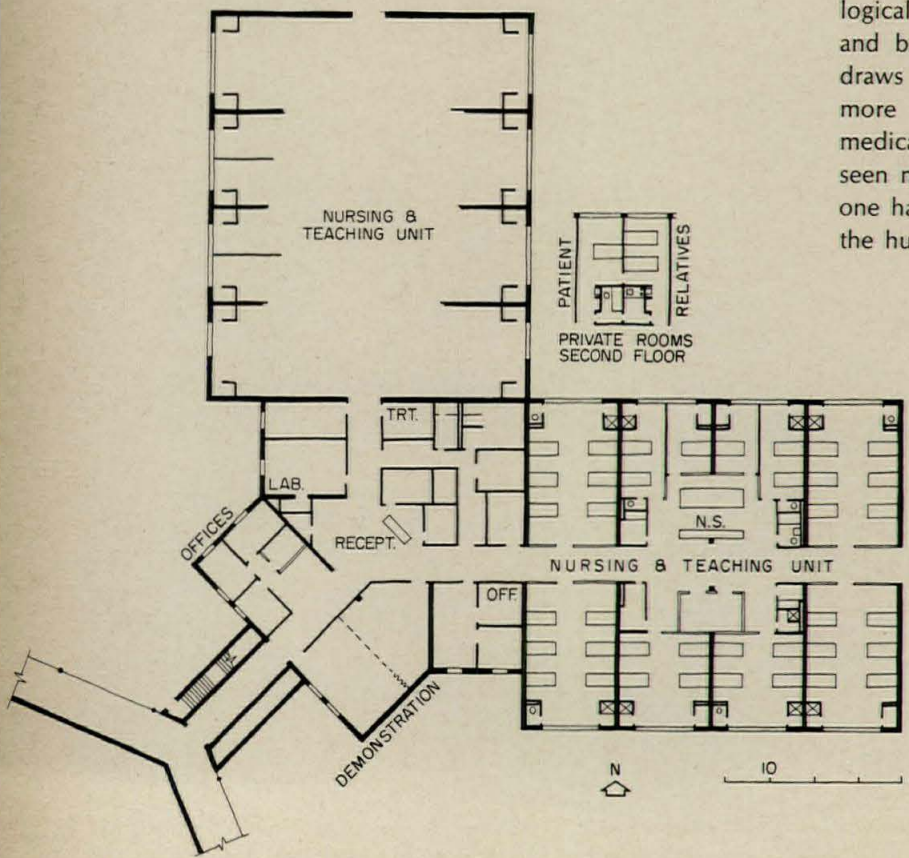
ships and environment that will make it easy and natural for busy men to consult and interact as they go about their work.

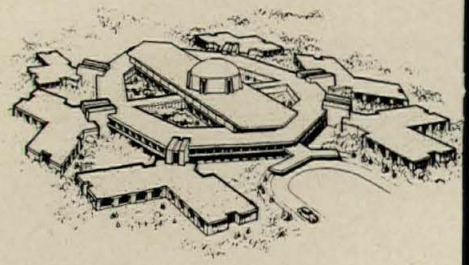
That is what is actually involved in integration of facilities. It is a matter of coordinating elements for the sake of economy in cost and the more effective use of buildings and equipment. But, more than that, it is a concept of planning to make it possible for much needed and highly skilled professionals to work at their highest productivity. With this objective—promoting the effective use of professional resources—in mind, and, in the context of the role of medical education in promoting the health and welfare of society, what would be *the ideal physical situation for a medical school?*

1. *The comprehensive elements that make up a school should be logically integrated* into a contiguous group or complex. These include, briefly, the basic-science teaching facilities, the teaching hospital, the patient-care facilities where staff members carry on their private practice, and the research facilities. Any travel by staff or students is a waste of time and energy. Duplication of facilities, inevitable when there are separate plants, wastes money. But most important, teaching, treatment, and research are interdependent functions. They need each other.

2. *The complex should be located on a university campus* to make use of the diverse skills, knowledge, and equipment available there, not to mention the savings on utilities, roads and the like. Teachers of other sciences may teach in the medical school while, in reverse, medical staff may teach other professionals, as in graduate programs in the sciences. Medical researchers increasingly collaborate with other disciplines. Also, medical students may benefit from the general intellectual atmosphere and be less isolated in their outlook.

3. *On campus, the medical group should be situated close to the science and technology components* of the university which in turn are contiguous to the humanities. Medical people need contacts beyond the closely related biological sciences. There are now specialties like bio-physics and bio-engineering, and the use of quantitative methods draws on the skills of mathematicians. Frequently, work in more advanced or esoteric branches of science can have medical implications. The university site, then, must not be seen merely as a somewhat desirable cultural asset. On the one hand, medical curricula are calling on the assistance of the humanities and the social sciences to equip the student





The research building represents the future growth of the medical school in the direction of the hospital group. The highway, which is the historic road coming down from the Khyber

with the human insights once characteristic of the family doctor; on the other, there is an increasing unity of the concepts underlaying all the biological and medical sciences—including veterinary medicine—so that the borderline between disciplines become less rigid.

4. *Medical teaching facilities should be part of an integrated medical center.* The whole spectrum of specialized treatment facilities that are presumed to make-up the medical center presents the staff with a wealth of challenging clinical problems and opportunities. There is less need for affiliations with remote hospitals for specialized clinical teaching material, and the broad medical scope of the student's surroundings during his formative years may be of great value in stimulating his imagination with respect to his future career.

5. *The medical center should be integrated into a regional system of health care,* and should cover the consultative, referral, and research needs of the region. Though area-wide systems are rare in the U.S., the attraction of the services available at a university medical center can generate working relationships with the peripheral institutions that would add up to a *de facto* regional system. It should be noted that when the President's Commission on Heart Disease, Cancer, and Stroke (1964) proposed a program to attack these diseases, it was based on a system of *regional medical complexes* that would "link every private doctor and every community hospital to a national network," all components of which would be teaching and training centers for transmitting the latest research developments.

As the fountainhead from which medical knowledge and talent flow, the school can undertake a variety of responsibilities, for helping doctors keep up to date, maintaining standards, and, in general, giving vitality to the regional system so that integration actually works. In turn, the teaching and research center would receive the stimulus of the problems fed back from the periphery.

It may not be possible in every case to achieve all of the conditions for an ideal situation. For example, integration with the main body of the university may not always be feasible, since the clinical facilities are tied to the logistics of the supply of sick people and the available transport to the teaching hospital.

In a recent case a mid-western university decided to build its medical school on its campus, located, as so many American university campuses are, in a rural area. Since the local population cannot supply sufficient clinical material, patients are transported from 200 miles around. Forced as it may seem, this solution is not necessarily all bad for the patients. For much better care generally prevails in hospitals affiliated with medical schools. Staff and facilities are generally of higher quality, and the clinical staff when training students must, of necessity, maintain high professional standards and ethical attitudes towards the patient.

Principled planning and diversity

In our experience, the identical principles, applied to the different medical teaching projects, will generate widely different physical and organizational forms. Medical schools, universities, communities and social systems are not all the same. Nor, to say the least, are the individuals who staff them. When they collaborate to serve their diverse as well as common interests, the project in each case must develop into a very special and differentiated organism. This is all to the good. The application of planning principles or of ideal concepts does not stultify creative thinking, but, on the contrary, alerts the planner's imagination to discover what productive relationships can be evolved from a particular set of circumstances surrounding the project.

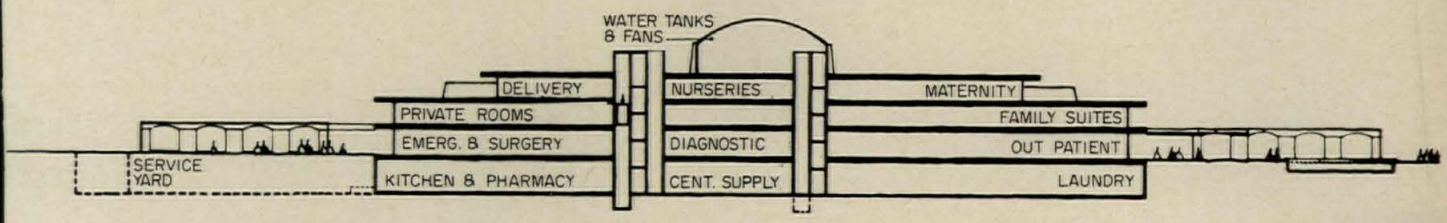
To sum up:

The teaching hospital does not exist by itself. Complex as its internal functions are, the teaching hospital is but one component of what should be an integrated mechanism for carrying-out the multiple services society has a right to expect of its medical teaching institutions.

If adequately up-to-date health service is to be provided, each country or region should have a medical teaching center to serve as a fountainhead from which a continuous stream of medical knowledge is sent out to the local hospital and the individual doctor.

The university environment gives the intellectual support needed to sustain the medical teaching and research functions of the hospital complex.

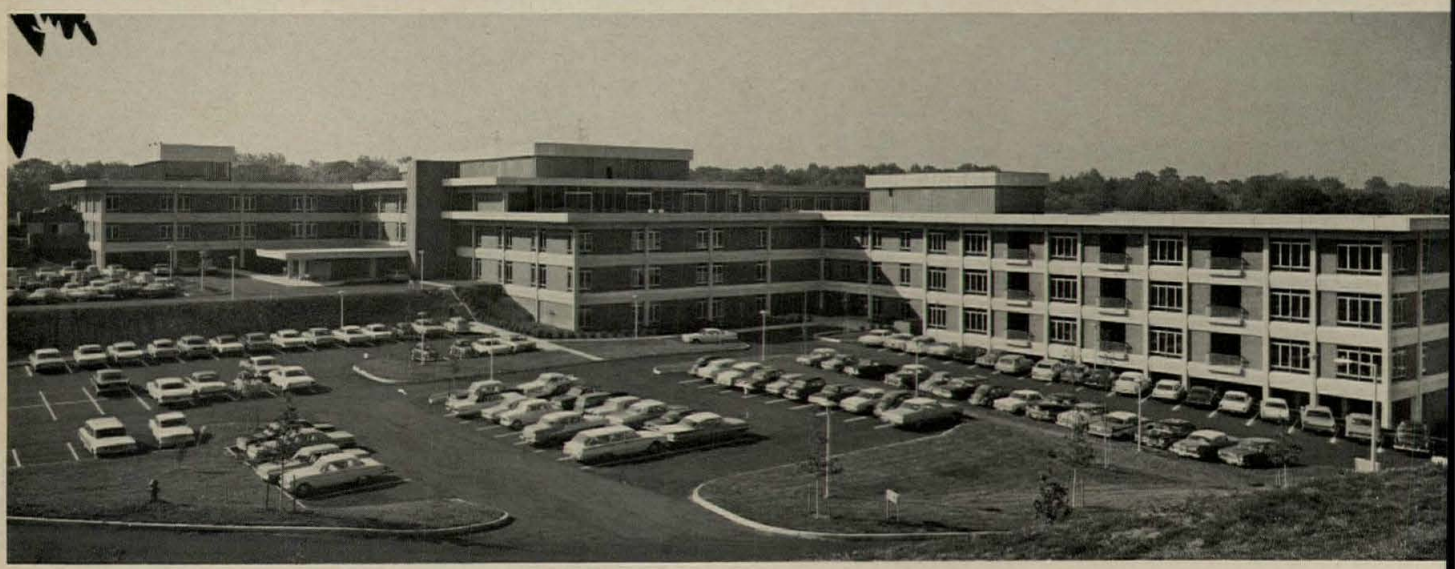
The chief objective of integrated planning is not so much economy of plant or proper distribution of facilities, although those are important aims, rather it is the better utilization of the human resources represented by teachers, scientists, and clinicians—and the utilization of these very valuable resources in promoting the well-being of the people.



SECTION LOOKING WEST

Pass, cannot be moved, but underpasses will link the hospital with both school and university.

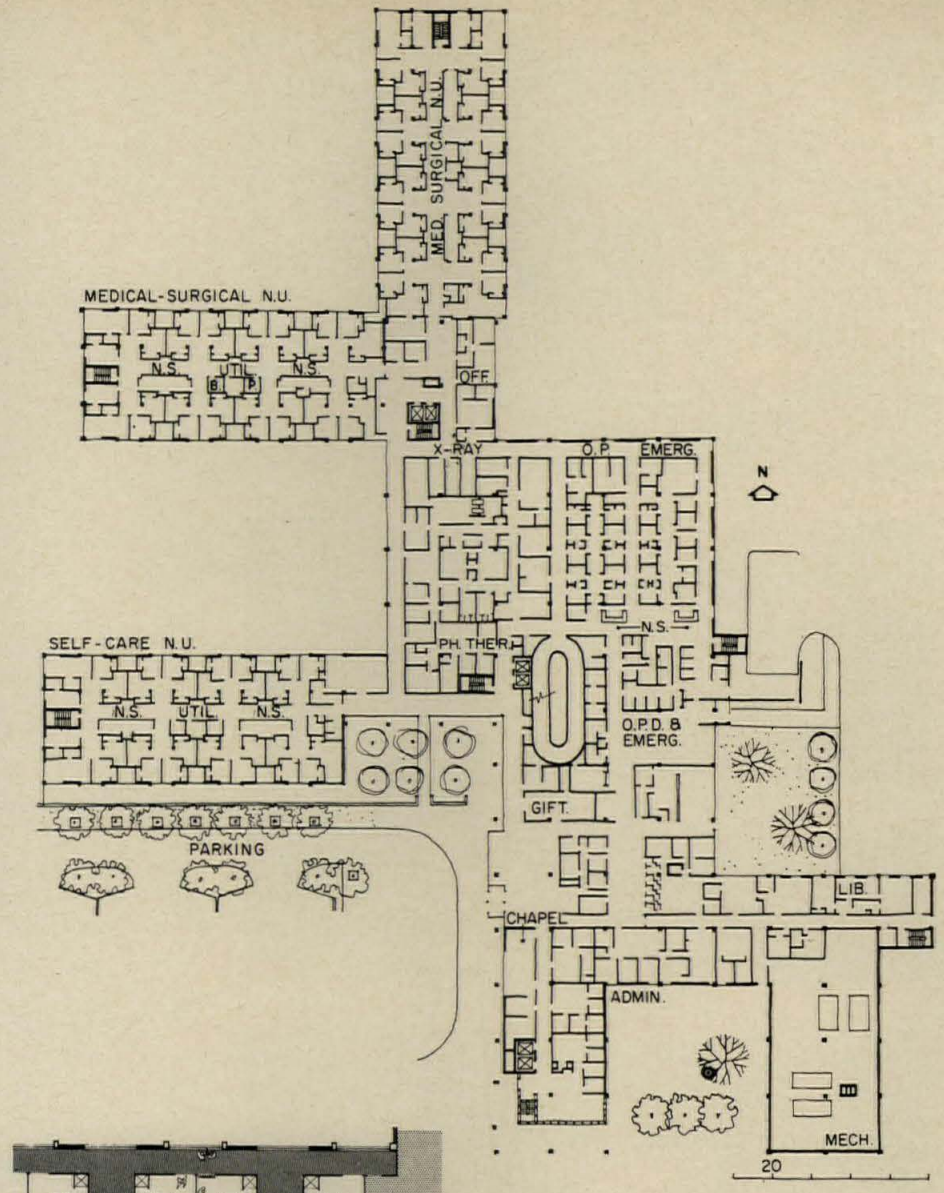
There is an additional set of factors that are extramural yet their influence penetrates into all the details of planning and of building, and they have a determining effect on the success of a project—both functionally and esthetically. These are the social and cultural factors. The planning of this hospital is in many ways a demonstration of this, since the problems presented are characteristic of parts of the world that are in the process of development.

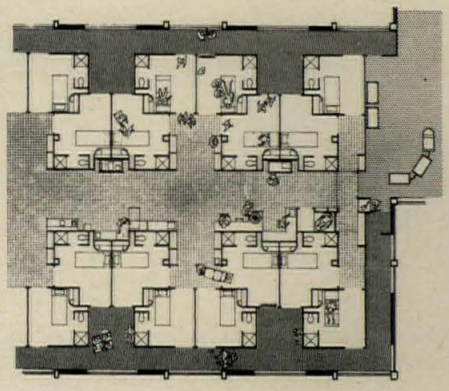


BALTIMORE'S INVENTIVE SPLIT-LEVEL MEDICAL CENTER

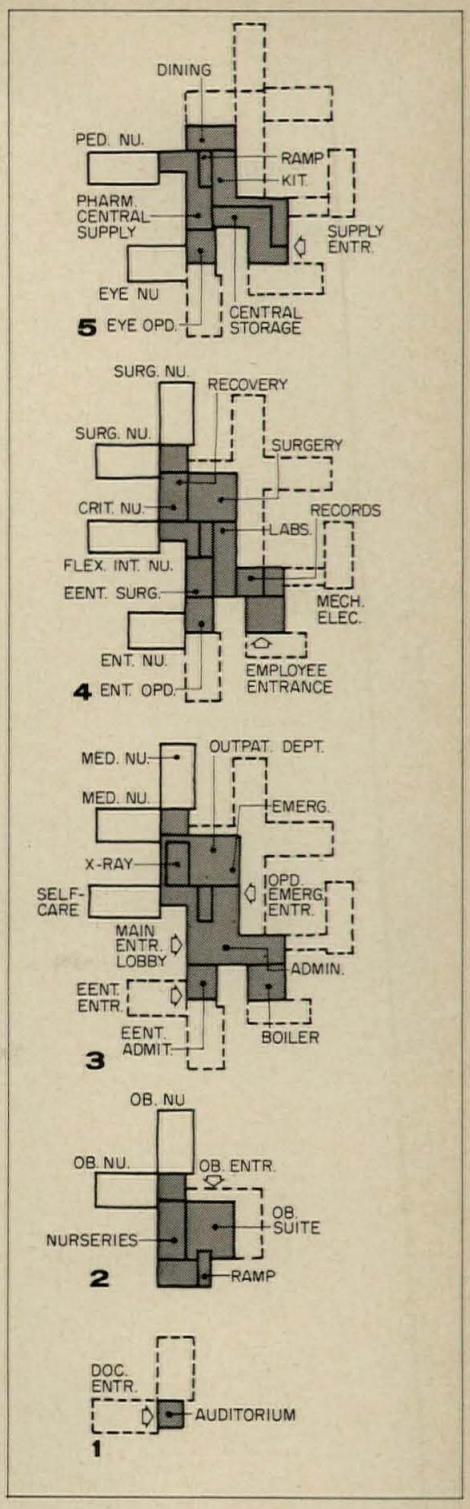
The Greater Baltimore Medical Center is a thoughtful solution to the ever-present hospital problems of traffic separation, distribution of meals and supplies, flexible efficiency of nursing areas, contiguity of functionally related areas and, above all, patient privacy. The architects took advantage of a sloping site in developing a five-level horizontal complex with grade-level access at all floors. This permits kitchen, storage and central supply areas to be housed at the top, served by loading docks at that level. Distribution within the hospital, then, is more or less by gravity via a spiral ramp at the core of the building. An electric truck pulls a train of specially designed carts up and down the ramp making scheduled deliveries to nursing units and supply stations throughout the hospital. Interim deliveries of small items and papers are made by an overhead basket conveyor electronically controlled from a fifth-level center.

This 400-bed hospital (soon to be expanded to 600 beds) operates on a progressive patient-care system, with intensive, intermediate and self-care categories. All beds are in single rooms except in pediatrics, recovery, and critical-care rooms near the surgical suite on the fourth level. Otherwise, degrees of care are achieved through flexibility of bed assignments on the nursing floors (see plans, opposite). In general the assignment to self-care is made on the nursing wing





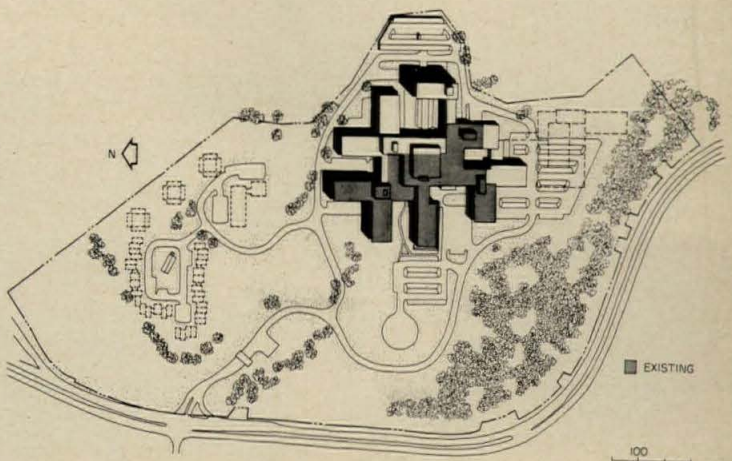
Nursing floors are of two configurations: one with central corridor for all traffic, above; the other with perimeter corridor for visitors and central professional area (as in E.E.N.T. wing, fourth and fifth level, in larger scale at left). Four-room clusters in both schemes develop storage-service alcoves, shorten nurses' travel. Train turn-around is at nursing unit entrance. Two nurses stations per 34-bed floor permit flexible assignment of beds for optimum care.



adjacent to the main entrance at the third level. This gives ambulatory patients access to public areas and outside.

A great step-saver is the computer system with input terminals at every nursing station and other key points for ordering, recording and billing lab tests and medications.

GREATER BALTIMORE MEDICAL CENTER, Towson, Maryland. Associated architects and planners: *Rogers, Taliaferro, Kostritsky, Lamb, with Wilson, Christie, Niles & Andrews;* structural engineers: *Van Rensselaer P. Saxe;* mechanical-electrical *engineers: Henry Adams, Inc.;* site engineers: *Rummel, Klepper & Kahl;* landscape architect: *E. Bruce Baetjer;* general contractor: *Consolidated Engineering Co. Inc.;* cost and CPM consultants: *McKee-Berger-Mansueto, Inc.*



Duane Suter

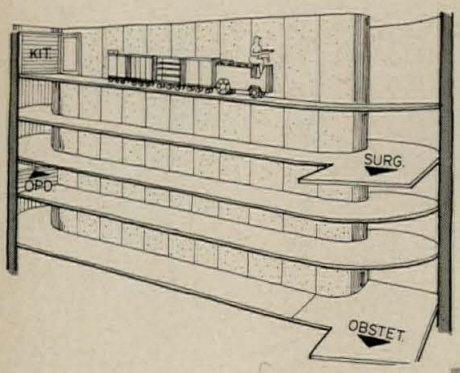
GREATER BALTIMORE MEDICAL CENTER

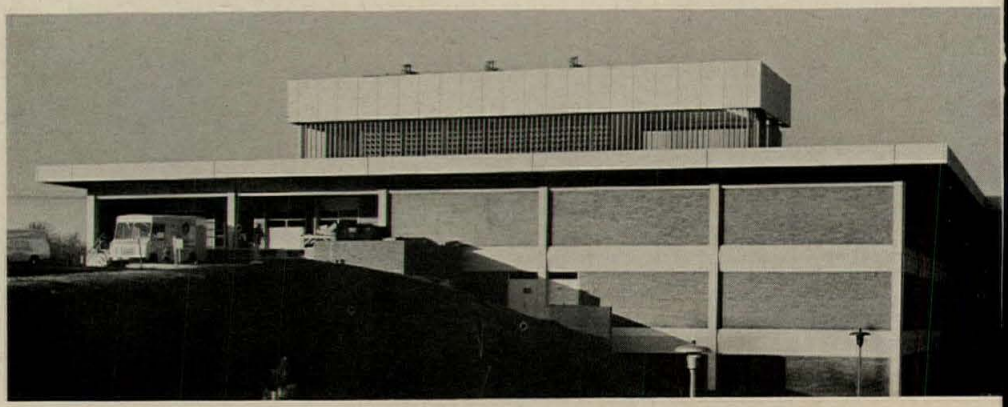
Duane Suter

Special, fail-free train on ramp works 18-hour day of 90-minute round trips throughout hospital. Ramp for goods saves elevators for people, would speed evacuation in case of fire. Top-level truck delivery, below right, permits design of "upside-down" hospital.

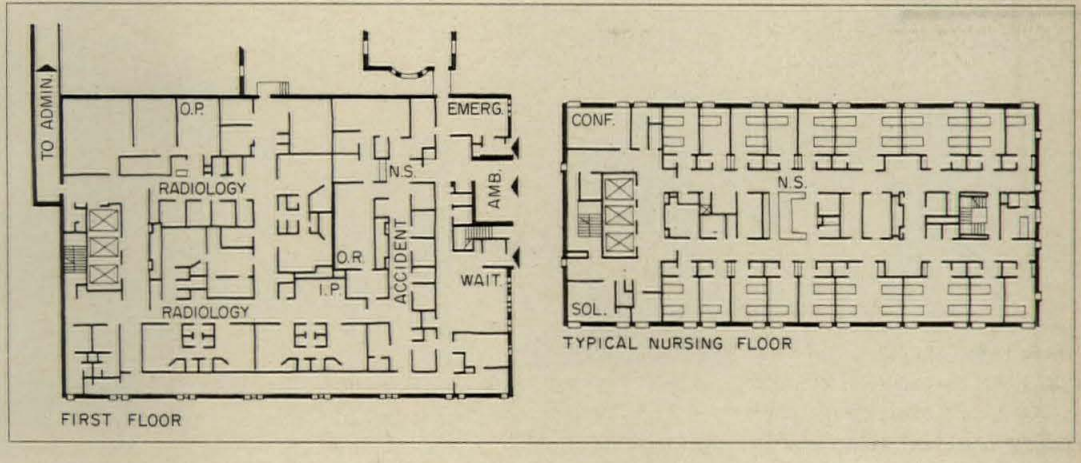
Duane Suter

Bedside console has washbasin, locker, cabinet and pull-out electronic controls for radio, TV, drapes, nurse call, etc. Within reach are grab bars to toilet two paces away.





Louis Reens photos

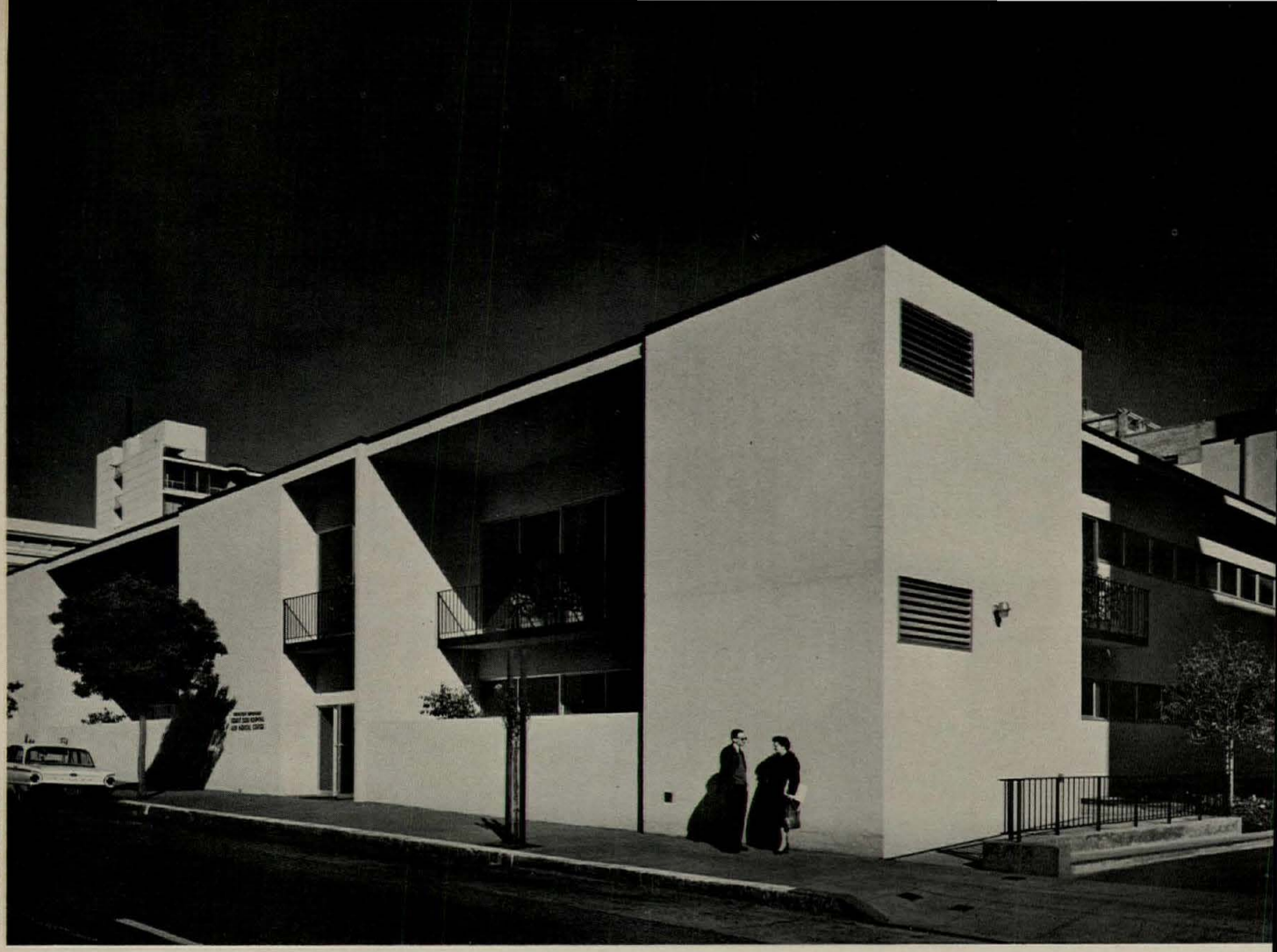


RECONSTRUCTION AND CONSOLIDATION OF A GROWING COMPLEX

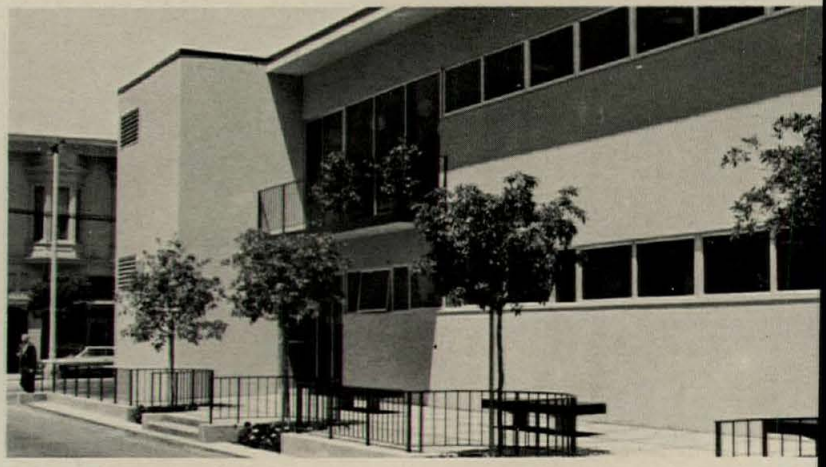
This building is the first phase of a four-step program to replace a sprawling series of older hospital buildings on a fairly generous urban site. It will raise Pawtucket Memorial's bed count from 151 to 314, and provide space for revising the occupancy of existing buildings in anticipation of demolition and replacement, which will begin after a phase-2 addition to this first new building.

The new building provides 4,300 square feet of mechanical equipment in the basement, and the entire third floor is a setback area of 7,200 square feet providing walk-in access to mechanical and electrical equipment, and air handling equipment for both air conditioning and the pneumatic-tube system. According to the architects, it was located at this level to effectively separate the wide lower floors, which house dietary and supply services, radiology and emergency departments', from the narrower nursing floors above. It shortens the lines of mechanical distribution, simplifies the roof line and raises the patient floors above the level of adjacent houses.

HAROLD W. WOOD BUILDING, MEMORIAL HOSPITAL, Pawtucket, Rhode Island. Architect: *Donald Ritchie—project architect: Lawrence Partridge;* structural engineer: *George M. Levinson;* heating & ventilating engineer: *Buerkel & Company;* electrical engineer: *Frank J. Sullivan;* acoustical consultant: *Bolt, Beranek & Newman.*



Phil Fein & Associates



Phil Fein & Associates

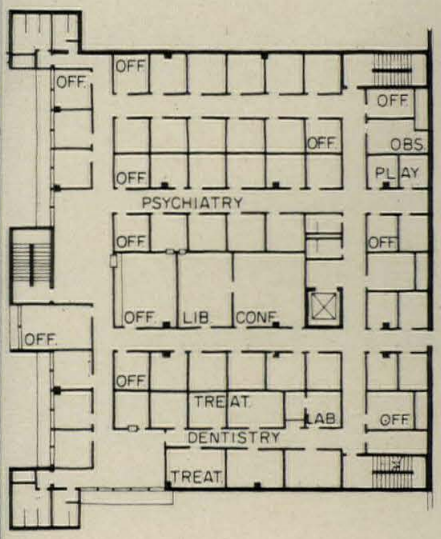
INDEPENDENT OUTPATIENT ANNEX LOOKS TO THE FUTURE

The new outpatient building at Mt. Zion Hospital in San Francisco represents a separation of function that anticipates the shift in outpatient loading generated by Medicare and advances in ambulatory treatment and psychiatric techniques. The building is attached to the main hospital but contains all necessary equipment for its own functions in spite of the fact that there may be some duplication of certain kinds of minor operating facilities.

Outstanding among facilities provided is the Claire Zellerbach Saroni Memorial Tumor Institute located in the basement of the building. This facility will be staffed by specialists in therapy and research, including an electronic engineer and technicians responsible for operation of a 25-million-electron-volt medical betatron and other major equipment including units for handling cobalt-60 and cesium-137, a hyperbaric oxygen system, and laboratories for radio-isotope and chemo-therapy. The program of the institute includes diagnosis and treatment of cancer patients and training of professionals in this field.

The need for pleasant environment in such a facility is acknowledged in the carpeted floors and wood-lined walls—with attention to materials, color and lighting that avoids the usual clinically antiseptic appearance that is characteristic of so many hospital areas.

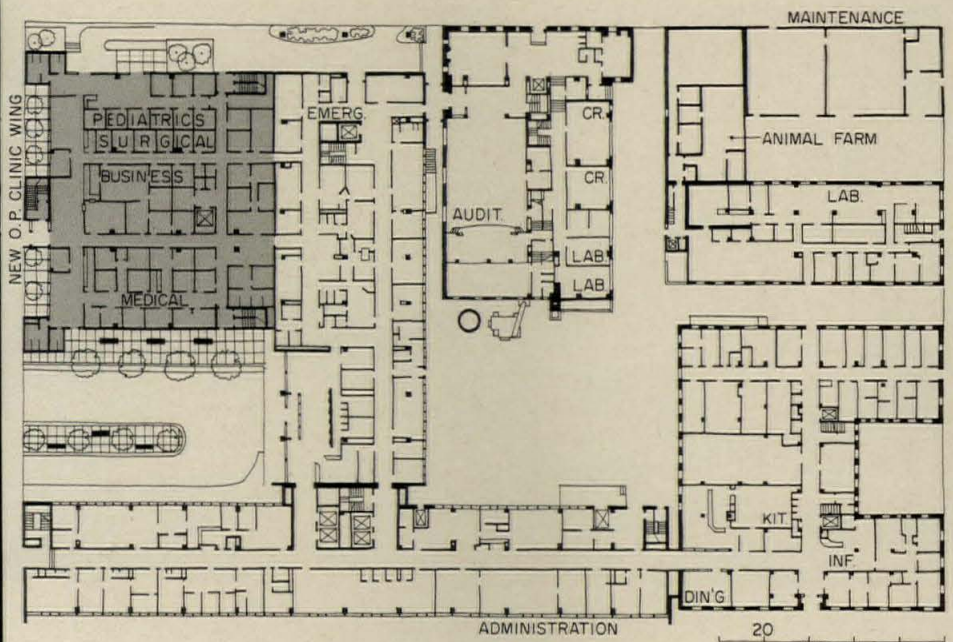
Phil Fein & Associates

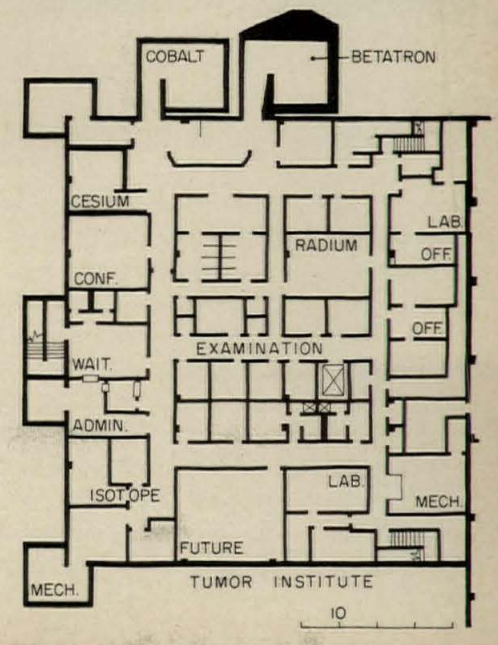


Pediatrics waiting area, above, has adjacent outdoor play area. Basement, below right, houses exceptionally equipped tumor institute. Second floor, left, has psychiatric and dental suites.

Vano-Wells-Fagliano

Vano-Wells-Fagliano



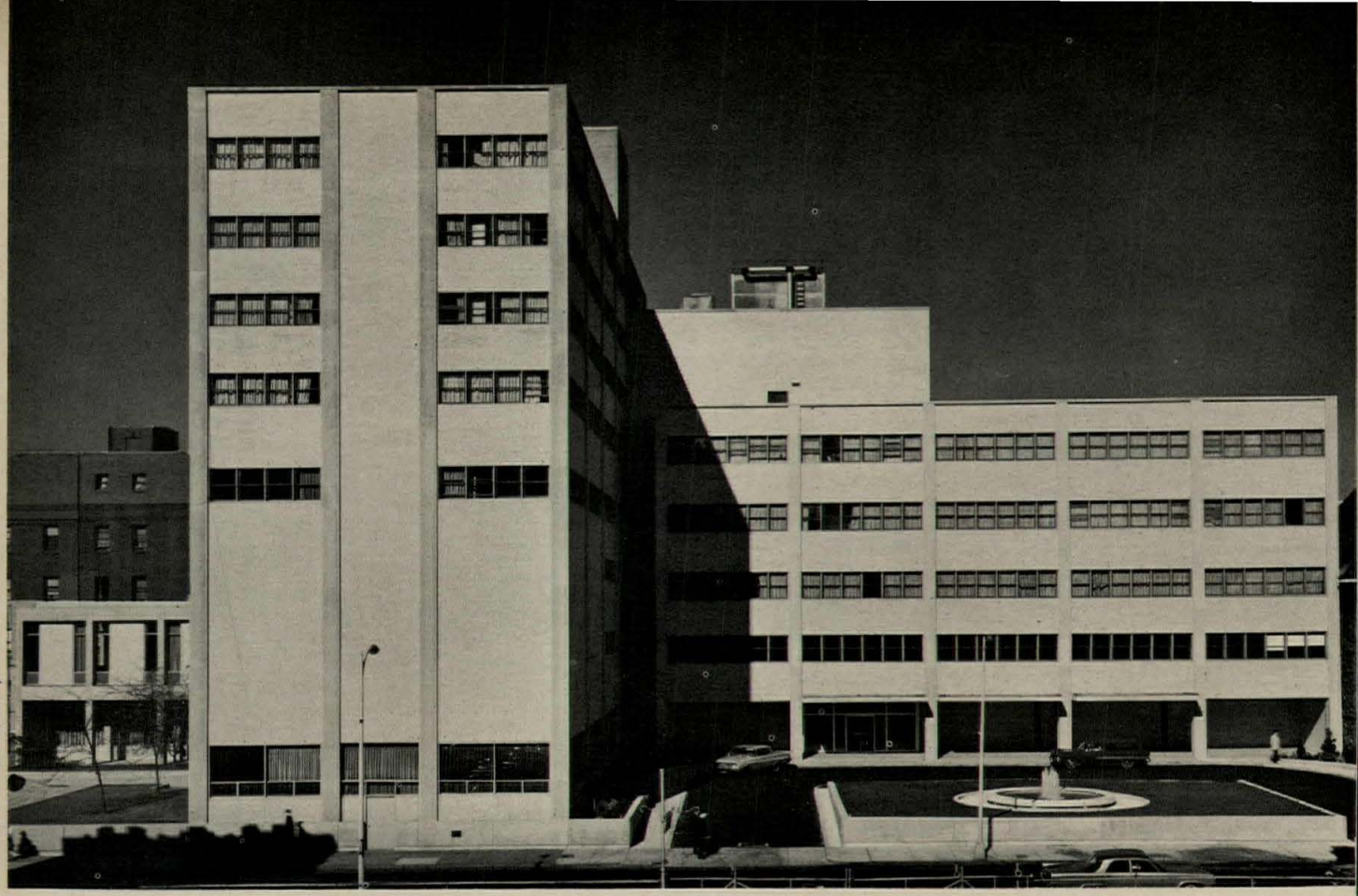


Waiting rooms on the first floor are placed around the perimeter or near courts with views of the outside. There is an outdoor play area next to the pediatric waiting area.

Office and treatment areas are internal, because they are occupied for briefer periods and the objective has been to alleviate endless waiting and shunting about that has been the bane of so many outpatient departments.

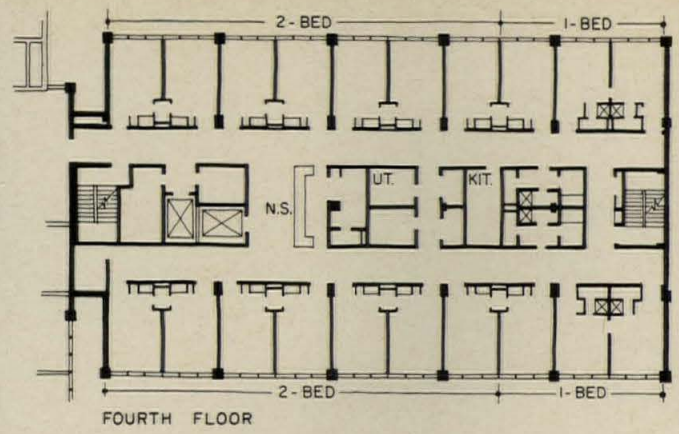
OUTPATIENT DEPARTMENT, MT. ZION HOSPITAL AND MEDICAL CENTER, San Francisco. Architects and planners: *Schubart and Friedman;* structural engineer: *Isadore Thompson;* mechanical engineers: *Kasin & Guttman;* electrical engineers: *Smith & Garthorne;* general contractors: *M & K Corporation* and *Rothschild, Raffin & Weirick.*

Lawrence S. Williams, Inc. photos

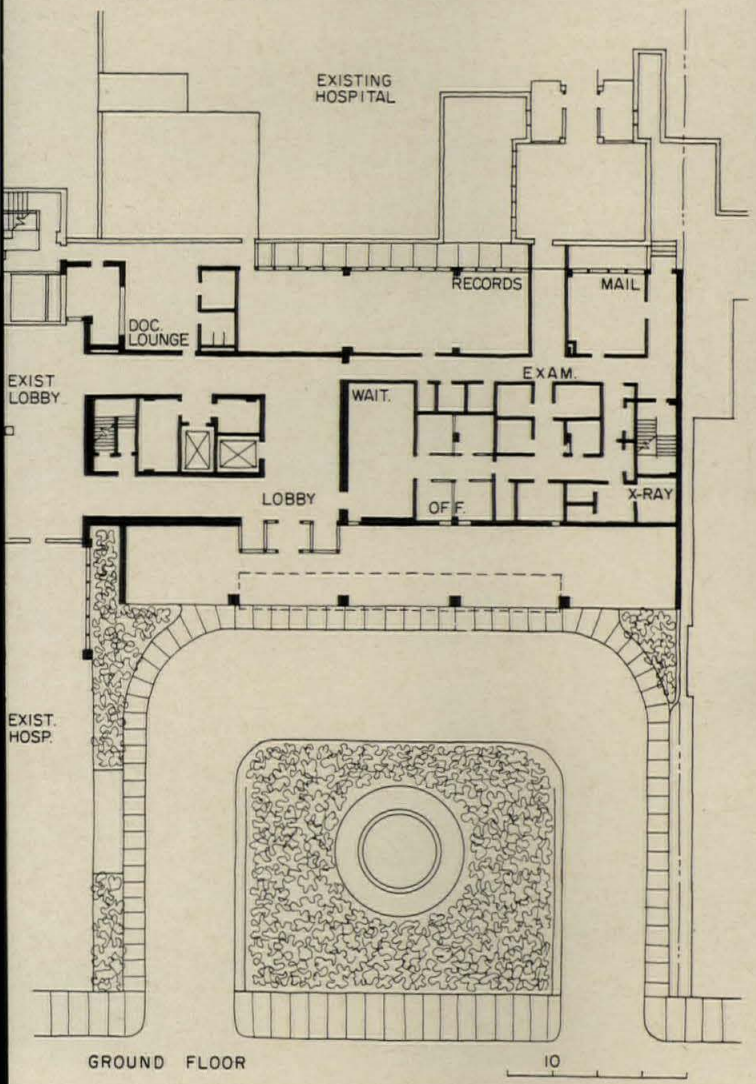


GROWTH AND REPLACEMENT COMBINED ON AN URBAN SITE

Expansion and replacement of a busy urban hospital on a restricted site is always an exercise in planning and logistics. This is especially true when there can be no interruption of service although demolition is a part of the program. Atlantic City Hospital has been growing on its tight little island for many years. It has kept pace not only with increasing population but with changes in technology and philosophy of treatment. The new five-story wing is designed not only to increase bed capacity and to provide a focus for the main stream of hospital traffic and administration; it also introduces a concept of self-care for patients who are able to move about and tend to most of their personal needs. In line with that concept of self-care, the scale and aspect of the new wing are residential in character. Pale salmon brick articulated by the concrete structure provides a contemporary link with the older surrounding structures of conventional brick. The structure is designed to carry three additional future floors. In keeping with the residential context and with current trends in maintenance, floors of the new wing—including the nursing floors—are carpeted. A central dining facility for ambulatory patients, which doubles as a recreation area, is established on the third floor. Also on the third floor: a lounge for ambulatory patients and visitors where relatives can wait during surgery or labor and delivery.

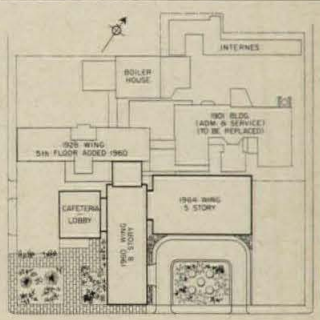


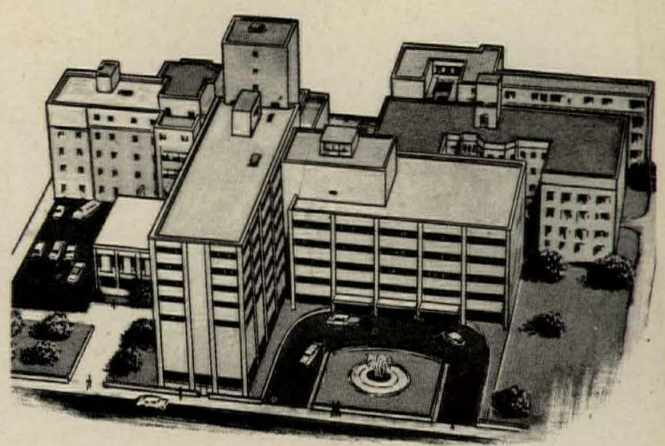
FOURTH FLOOR



GROUND FLOOR

Progressive replacement of older buildings and additions to newer ones are shown in plot plan, right. Casual sitting and snack areas for staff, above, and patients (as in third-floor lounge, opposite) have materials and finishes chosen to soften the clinical hospital atmosphere. Motel-like housing for internes and their families at the rear is linked physically and by phone to the main hospital



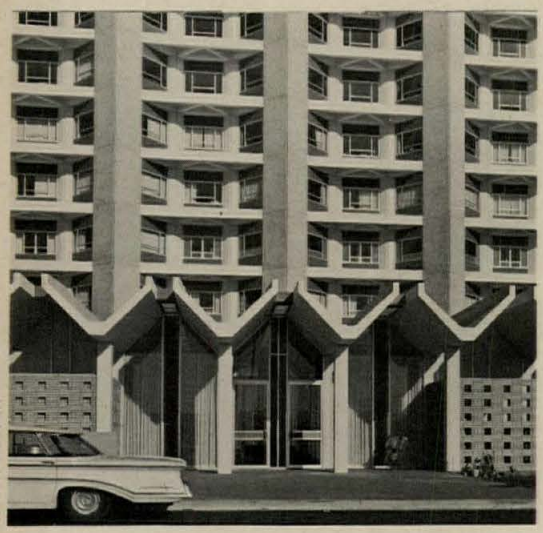


Laboratories for both testing and research are on the second floor, as is a blood-donor center located away from laboratory traffic. A pneumatic-tube system serves the entire complex distributing papers and small packages.

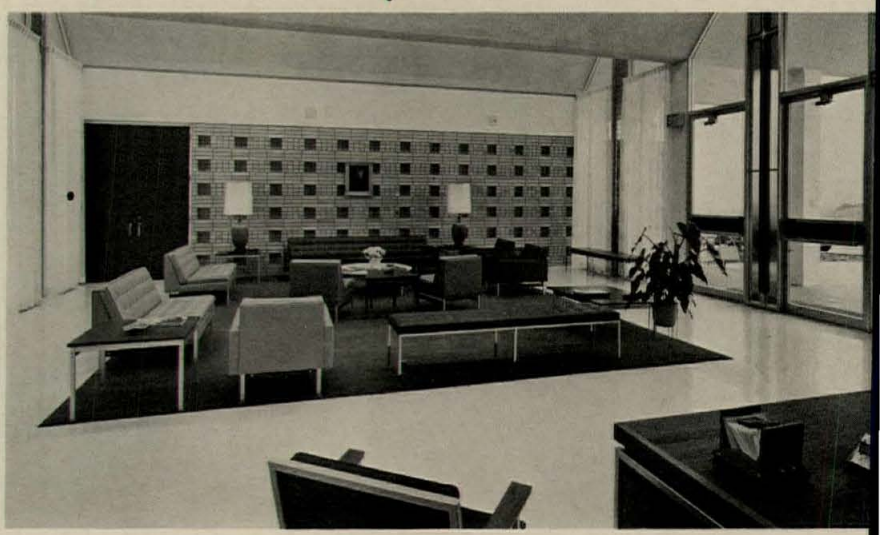
Both of the nursing floors—the fourth and fifth—have 20 rooms: 14 doubles and 6 singles. Patients on the south side can look over the new entrance court and a few city blocks to the Atlantic Ocean.

ATLANTIC CITY HOSPITAL ADDITION, Atlantic City, New Jersey. Architects: *Vincent G. Kling and Associates;* mechanical and electrical engineers: *Pennell & Wiltberger;* structural engineers: *Keast & Hood;* general contractor: *R. A. Prendergast & Son.*

Herbert C. Shaw



Herbert C. Shaw



Karl H. Riek

FOLDED FLOOR PLAN WITH A VIEW FOR ALL PATIENTS

Each of the 250 beds in Mary's Help Hospital has an unobstructed view of the countryside surrounding its 11-acre hilltop site. This is accomplished by turning alternate bedrooms along the corridor to a diagonal position so that each bed can be placed by a window. The diagonal position also permits more patients to be housed in a given length of corridor, so that distances from the nursing station to bedside care are correspondingly shortened. Further, it provides opportunities for more privacy in the examination and treatment phases of care. The hospital is a 10-story structure in which the top three floors have been "shelled-out" to allow an additional 150 beds to be introduced in the future without further construction. Structure is reinforced-concrete frame with precast exposed-aggregate corner panels and window-wall alcoves.

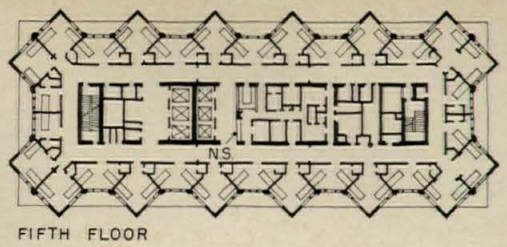
Administration, chapel and a convent for 20 sisters of the order of the Daughters of Charity of St. Vincent de Paul are arranged in a single-story annex which also serves as a main entrance and waiting space. At the same level on the first floor of the main building are outpatient, emergency, X-ray and surgery departments. The second floor is occupied by kitchen and dining areas, library and small apartments for the chaplain and for guest housing. The third floor is obstetrical; the fourth has 28 beds for pediatrics, including a play terrace at the rear; and a 12-bed intensive care unit

Karl H. Riek photos

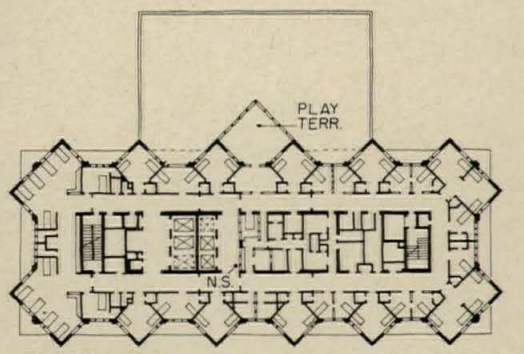
All beds in both exterior rooms, top, and interior, above, are arranged to give patients unobstructed view through windows. Spectacular countryside is also visible through glass wall of cafeteria, below.

which is separated from the pediatrics area and has its own waiting room and consultant space. The fifth through the seventh floors are general, medical and surgical. Each nursing floor has a maximum capacity of 56 beds. Service and control are from a central nursing complex which overlooks the public elevator lobby.

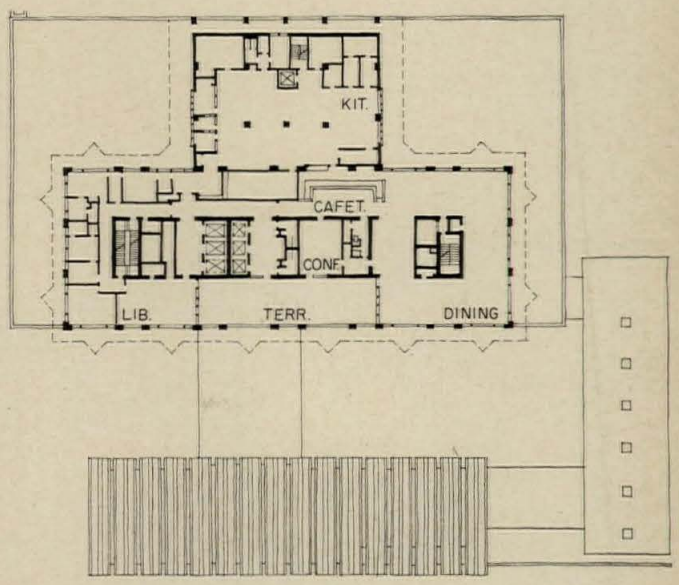
MARY'S HELP HOSPITAL, Daly City, California. Architects: *Stone, Marraccini & Patterson;* structural engineer: *Arthur B. Smith;* mechanical engineers: *Kasin, Guttman & Associates;* electrical engineer: *Mel Cammisa;* landscape architects: *Osmundson & Staley;* hospital consultant: *Anthony J. J. Rourke, M.D.;* contractor: *F. P. Lathrop Construction Company.*



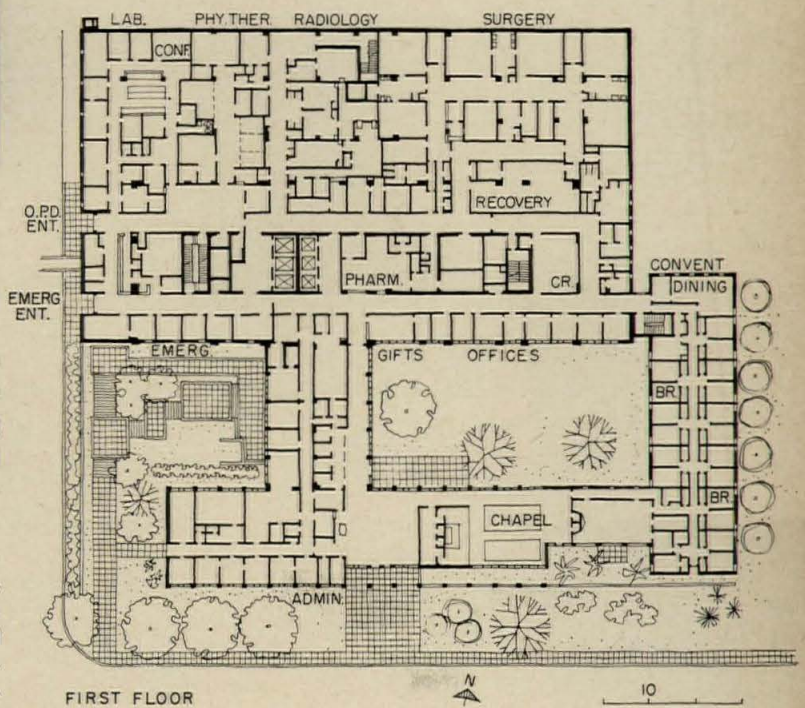
FIFTH FLOOR



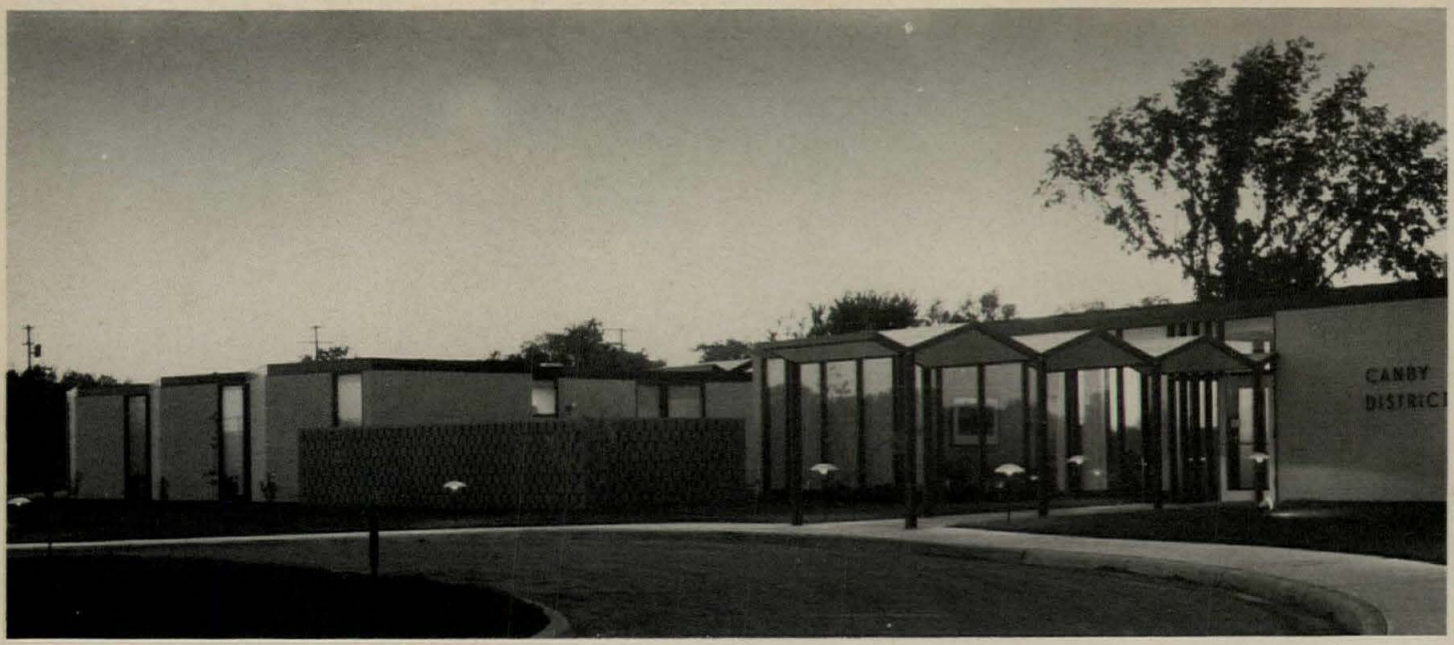
FOURTH FLOOR

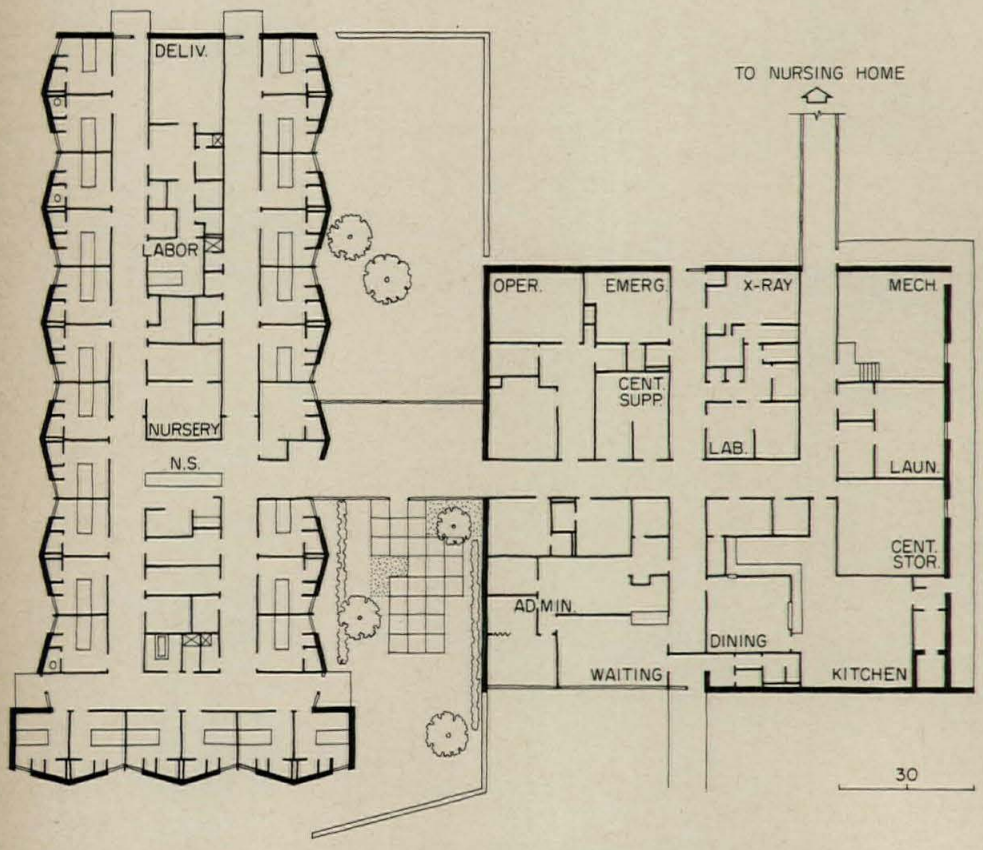


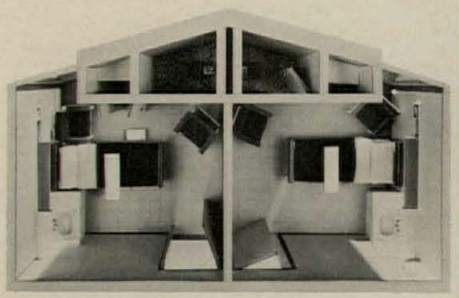
SECOND FLOOR



FIRST FLOOR







Model of patients room, above, shows concept of accessible toilet at perimeter. Floor-to-ceiling window enhances adjacent sitting area. Bedside control of a two-tier drape would seem desirable. Executed concept is below.

COMMUNITY HOSPITAL PROVIDES PRIVACY FOR ALL

This small community hospital in Canby, Minnesota, is another based entirely on the private-room concept. The nursing floor is separated from the administrative and service areas by an entrance and waiting lounge. The service core is also connected to—and furnishes dietary, laundry and mechanical services for—a remodeled older building housing extended care patients and elderly residents.

The new nursing wing contains 27 private patient rooms in a double-corridor configuration with central nurses' station. The outside wall of the nursing wing establishes a series of V-shaped bays in which a toilet and adjacent window is provided for each room. Six of the rooms are assigned to obstetrical care, with labor and delivery rooms located in the central area. Other rooms are variously assigned to medical and surgical patients. The use of single rooms permits flexibility of room assignment without regard to compatability and increases the average occupancy—in this case, so far, to 70 per cent of maximum capacity.

Total construction cost was $505,570 or $18,750 per bed. Total area of the building is 21,233 square feet. The building is fully air conditioned. All patient rooms have piped oxygen, central suction and NO_2 systems.

CANBY COMMUNITY HOSPITAL, Canby, Minnesota. Architects: *Fasth, Hillstrom & Horty, Inc.;* structural engineers: *Meyer* & Borgman.

ARCHITECTURAL ENGINEERING

Why do scientists get all the glory?

The engineering profession "has not been in touch with the people, and by default has permitted a working partner [science] to capture the imagination of the nation to such a degree that all science and technology is covered under the umbrella of science." This reason for lack of better public relations results for the engineering profession was offered by Richard D. Blanchard of the American Society for Engineering Education at a seminar for the engineering profession on public relations sponsored by the National Society of Professional Engineers.

More reasons why the scientists get more attention in communication media were given by Julian Scheer of NASA: "If you are an organization about to solicit support for a cause, you have to give something in return." He said that the scientist has very little trouble getting recognition. He's willing to sit down with the people that will make the image. He's willing to talk, to discuss, to write, to communicate—and he finds time. He's willing to write for journals and publications.

"It's what you do that counts; not what you say about it," in the view of John Cox, who helped develop the "Mr. Novak" TV program as part of his work at the National Education Association. "So many associations want to conduct one kind of policy and want the press to think that they're conducting another, instead of trying to realize that the public reaction to what you are doing is directly related to what you are doing—and that there's no middle-ground of publicity that's going to change that. If you want to get anywhere, I would think—in a public relations program—you have to become some kind of social force or get involved in social issues today. I think a professional association should really stand for the things it proclaims."

Fire spread is simulated by an analog computer

An "Electronic Mass Fire Simulator" has been developed by Southwest Research Institute as a guide to the adoption of better methods of fire control. The simulator, consisting of a number of electronically controlled analogs, each representing a building susceptible to fire, recreates the movement and intensity of flames during an actual fire history. Successful programing of the fire simulator requires data on the characteristics of actual fires. The data has been obtained from two sources. The first source was historical data: After 40 major U.S. fires had been reviewed, eight were selected for intensive review and three were chosen as suitable for on-the-scene study and data collection. The second source of data to determine fire characteristics is being obtained from the burning of models.

The first actual fire selected for programing the simulator was a mass fire which burned down 17 wood-frame residences in South Boston on May 22, 1964. Simulation of the Boston fire was based entirely on data gathered from the scene. Each of the 17 houses were drawn on a map and simulators were wired to a position repersenting the center of each house. Later tests will be of a more sophisticated nature to involve correlation of data from experimentation with models.

Development of the simulator was sponsored by the Defense Atomic Support Agency, which plans and coordinates the Defense Department's nuclear weapons program.

THIS MONTH'S AE SECTION

Play shelter for schools can vary with the seasons

Students of the College of Architecture and Design at Kansas State University hope to develop an economical, easily erected, semi-enclosed outdoor structure for games and sports which, under most weather conditions, "will be superior to fully enclosed space."

The experimental shelter is envisioned as a cage-like frame supporting closure elements which can be varied as to location and type of material. Translucent, opaque, rigid, flexible, heat-reflecting enclosure materials could be tested along with the need for seasonal changes of their arrangement. The shelter would cover a paved area incorporating electric heating cables. The cage-like frame could serve as support for radiant heating elements, distributed without regard to the need for enclosure or openess.

The project, under the direction of Henry Wright, Regents' Distinguished Professor of Environmental Technology, will receive initial support from the Butler Manufacturing Company of Kansas City.

Small-scale models to cut cost of fire research

A study to develop basic information on the use of small-scale models in fire research has been initated by the

Institute for Applied Technology at the National Bureau of Standards. Scientists at the Institute have found scaling relationships between three different sizes of model enclosures which may be useful in relating the models to full-scale structures.

The three models, which were 5½-, 18- and 56-in. square, responded similarly to increasing ventilation rates. The first reaction was essentially a smoldering one with little visible flame, because ventilation was not sufficient to permit flaming within the enclosure. The burning rate increased with increased ventilation until the transition zone was reached, at which point the burning rate, in some instances, actually decreased. Ventilation rates were changed by varying the size of window openings.

Study to explore effects of the thermal enviroment

A research study, involving an $18,000 preliminary program investigating the effect of thermal environment on productivity and learning, has been initiated by the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. Purpose is to obtain objective information on optimum thermal conditions for commercial, industrial and educational buildings. Most of the present data on human productivity in relation to thermal environments, A.S.H.R.A.E. points out, are based mainly on laboratory studies of fit young people doing military or artificial tasks, often under extreme thermal conditions.

The $18,000 contract for Phase I of the project has been awarded to Dunlap and Associates, Inc. of Darien, Connecticut to develop detailed plans and to establish a program of studies for future phases. This program is expected to include several industrial and commercial field experiments, as well as laboratory-type learning studies at the A.S.H.R.A.E.-K.S.U. Environmental Laboratory at Kansas State University in Manhattan, Kansas.

Components approach for housing U. of C. students

Building Systems Development, Inc., headed by Ezra Ehrenkrantz, is working on a components approach to provide single- and married-student housing for from 4,500 to 6,000 at the University of California. The total cost of the development project is expected to be about $600,000, to be funded jointly by the Educational Facilities Laboratories, Inc. and the Regents of the University of California. An initial feasibility study costing $30,000 has already been conducted by Ehrenkrantz, well known for his direction of the School Construction Systems Development project headquartered at Stanford University.

Research program set to boost plastics in construction

Although at present the construction field accounts for only about eight per cent of the total product output of the plastics industry, (with pipes and fittings accounting for another four per cent), considerable and rapid growth is forseen in this area. Discussing the present position of the plastics industry and its future prospects at a recent meeting, Mr. William T. Cruse, executive vice president of the Society of the Plastics Industry, gave these figures and announced that in order to promote the application of plastics to the building industry, a Plastics and Building Construction Council had been set-up within his society. The broad aims of this new council would be: to conduct research; to inform architects and builders on the possibilities of plastics in the construction industry; and to establish a building codes committee. An agreement has already been reached between the Society and Illinois Institute of Technology to carry-out research projects on the performance of organic materials within an environment.

Focusing attention on plastics in buildings will be the National Plastics 11th Exposition due to open at the New York Coliseum on June 6th, 1966, and The National Plastics Conference which will take place simultaneously at the Americana Hotel.

Overloading causes collapse of cast-iron supported structure

A 100-year-old, cast-iron building at Broadway and Grand Street, New York City collapsed in a heap of debris last month; miraculously no one was critically injured. A preliminary report of the Buildings Department inspectors attributes the collapse to serious overloading. A 1,635-foot area of the fifth floor, the point of origin of the drop, is reported to have groaned under a live load of 480 psf—four times that for which the wood joists were designed. The fact that metal runners were used as tracks for one-ton fork lift trucks, in order to protect the wood floors, was probably a contributory cause, according to the Building Department. Vibrations transmitted from the runners apparently triggered the collapse which has been attributed to the shearing of bolts which connected a cast-iron bracket to the cap of a cast-iron column. The brackets carried two 12-in. I-beams framing a lightwell opening which had been covered over 20 or 30 years ago in an unauthorized alteration.

To those who are anxious to preserve such cast-iron structures, this incident is a timely warning.

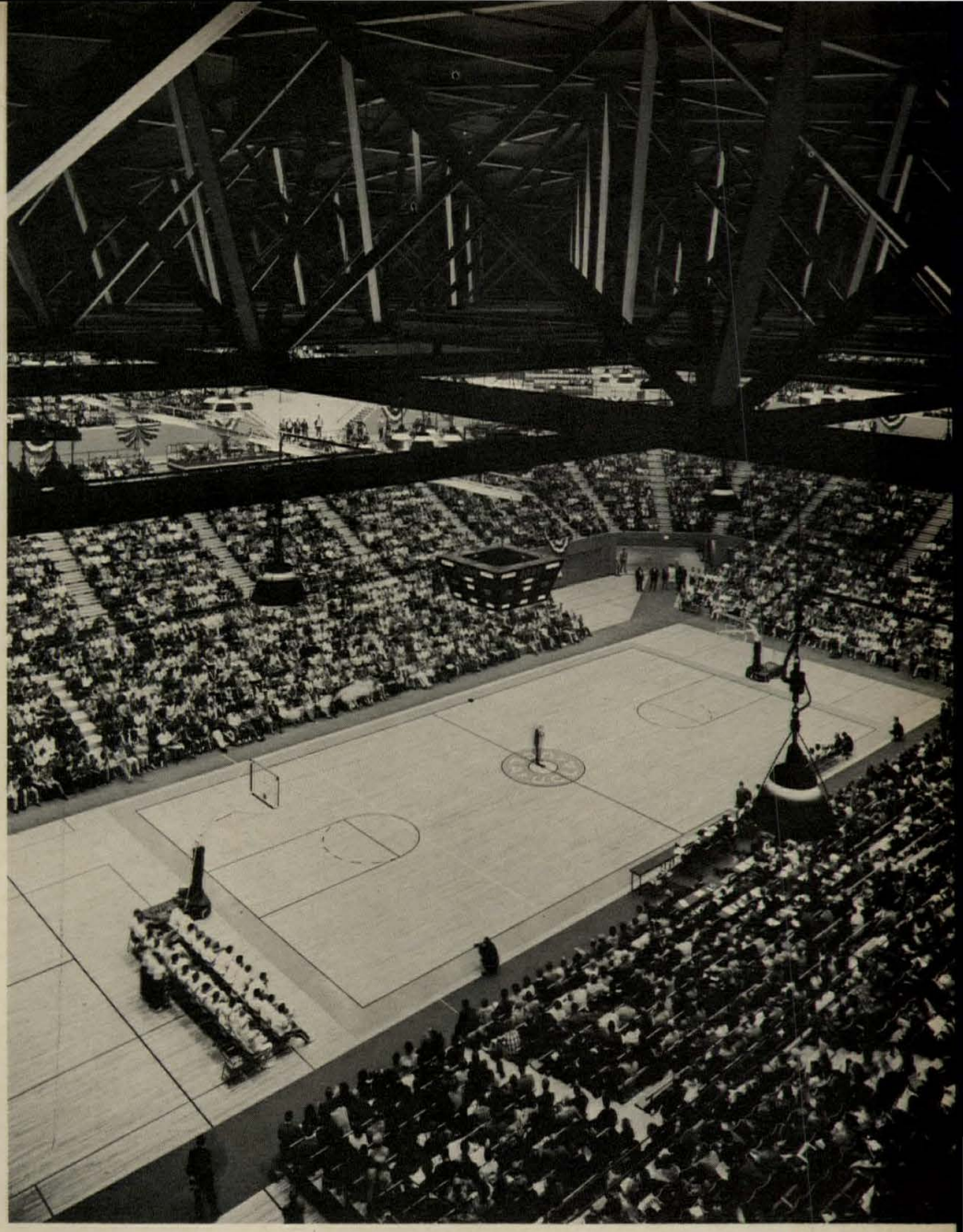
Removable stops needed in flush-type curtain-wall glazing

Performance of glass in curtain-wall construction is greatly dependent upon how it is glazed, says Otto Wenzler, manager of technical sales services for Libbey-Owens-Ford Glass Company. L-O-F opposes "flush" type of glass setting unless removable stops are used around the entire perimeter of the frame. While flush-type settings have been specified with pocket glazing rabbets at jambs and head in order to get clean sight-lines, such sash should be avoided, according to Wenzler, because it is almost impossible for the glazier to avoid chipping the edge of the glass during installation. The reason is that the glass must be inserted first into one jamb, then up into the end, then down onto setting blocks at the sill, and finally slid-over into the other jamb for alignment. The small clearances involved make the installation very tedious. Wenzler points-out that glaziers must work with the accumulated tolerances of all the trades and materials that have preceded them. And with the architect and owner pushing to have the building closed-up, the glazier is practically forced, often against his better judgement, to install glass in sash or under conditions which he knows are not right.

Improving the performance of air-curtain entrances

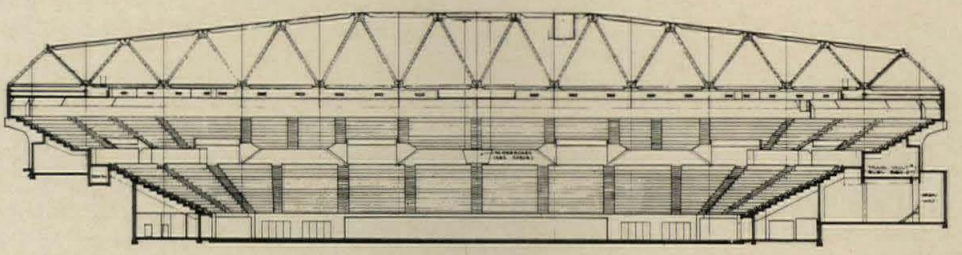
Engineers at the University of Illinois are trying to determine design principles for air-curtain building entrances which will be even less penetrable by the weather. The engineers want to find out just how much wind pressure the air curtain can withstand so they can suggest how turning vanes can be used to counterbalance the pressure caused by wind or warm or cold air.

For supermarkets and department stores, the air curtain is provided by a fan over the entrance directing a low-velocity jet of air three- to four-feet thick over the entire width of the doorway. For warehouses the air jet velocity can be more than doubled and compressed to eight-inches thick.



Economy resulted more from attention to ease of construction than to high theoretical refinement of structure. This largest horizontal steel space frame to date provided 120,000 square feet of clear space for the Pauley Pavilion at U.C.L.A.

Marvin Rand



SPACE FRAME COSTS LESS THAN $4 A SQUARE FOOT

The largest steel horizontal space frame yet built in this country provides a 300- by 400-ft clear span area for a 13,500-seat auditorium-sports pavilion at the University of California at Los Angeles.

Architectural, engineering and cost considerations all had their effect on the space-frame design. First, the outer bay of the space frame was exposed to express the structure, and the way in which the tops of the columns were exposed affected design for lateral bracing. Second, the space frame was sloped to provide drainage and to increase the depth of the space frame to resist bending moments. Third, a special connection detail was developed to reduce over-all space-frame costs.

After considering a number of different spanning methods, the architects —Welton Beckett and Associates—chose the space-frame roof structure as an economical—yet architecturally attractive—way to create an expansive, column-free area within a limited budget. Cost of the space frame, which weighed 15 lb per sq ft, was $448,000 or $3.73 per sq ft. Cost of the roof joists added another $.35 per sq ft.

A band of precast panels encloses the upper exterior of the auditorium, covering the structural columns from the top of the bents to the base of the

space frame. Panels are supported on the cantilever ends of the bents. Upper level concrete risers are exposed below the panels.

An interior soffit, extending around the balcony level, permits exposure of the perimeter of the space-frame structure, rising 63 ft above the center floor, while enclosing a portion of the auditorium interior. A sloping plaster wall running from the base of the interior canopy to the roof line encloses the rest of the space frame.

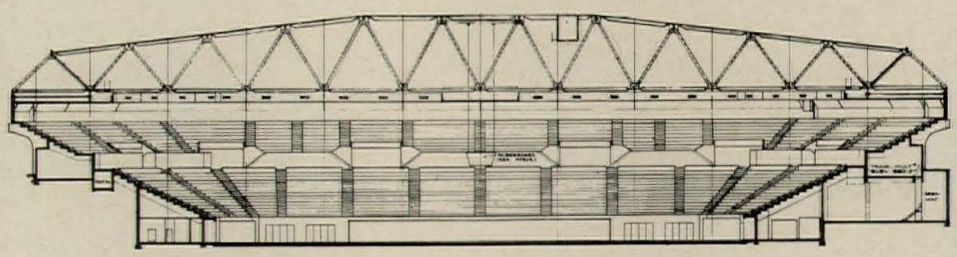
Basically the space frame is a series of steel H-sections, interlaced to form 108 interconnected pyramids. Although the pyramids are identical in plan, they vary in height so that the upper chords of the pyramids form a hip-roof configuration.

The real key to success of the space frame, according to the engineer, Richard Bradshaw, was the design for connections at joints. The framing consists of 10WF to 14WF members; to avoid congestion at the joints smaller-sized stubs were used at the ends of the H-sections for attachment to a three-dimensional gusset plate with high-tensile bolts (see details, page 184).

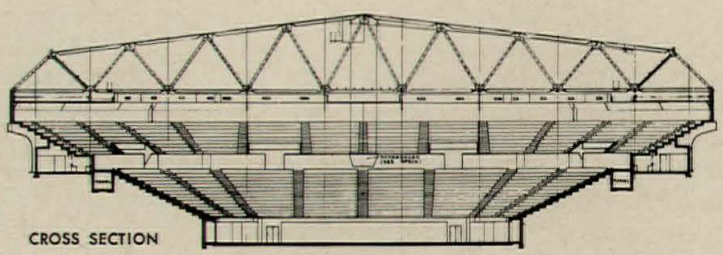
The structural engineers used a computer to process the complex data involved in the analysis of the space frame, which has 238 connections. Since the structure is indeterminate, it was necessary to assume member sizes before making a structural analysis. The first approximation of the member size was done by considering the space frame as a flat plate simply supported on four edges. From this approximate analysis, member sizes were estimated. Then actual analysis was done by a computer. This gave a set of stresses based on the estimated member sizes. From these stresses, new member sizes were determined and the process repeated. Before obtaining the desired accuracy, data had to be furnished to the computer three times. Since the stiff space frame acts as a diaphragm for earthquake and wind forces from any direction, these forces were also incorporated in the computer analysis. The lateral loads are transferred to the precast concrete shear panels by means of a spandrel strut (see column detail, page 184).

All bays in the auditorium are square and 33 ft, 4 in. on a side, so there are nine bays in the 300-ft width and 12 in the 400-ft length. The space frame is 17 ft deep at the perimeter and 30 ft deep at the center. Some of the space-frame members are rolled sections while others are built-up of three plates. Economy determined the choice. Direct tensile members in the lower chords and upper-chord compression members are made of rolled sections. Web members and some of the upper chords are made of three plates. All connections are of welded plates. Lower chords are made of three plates. All are A-441 steel. All other steel is conventional A36.

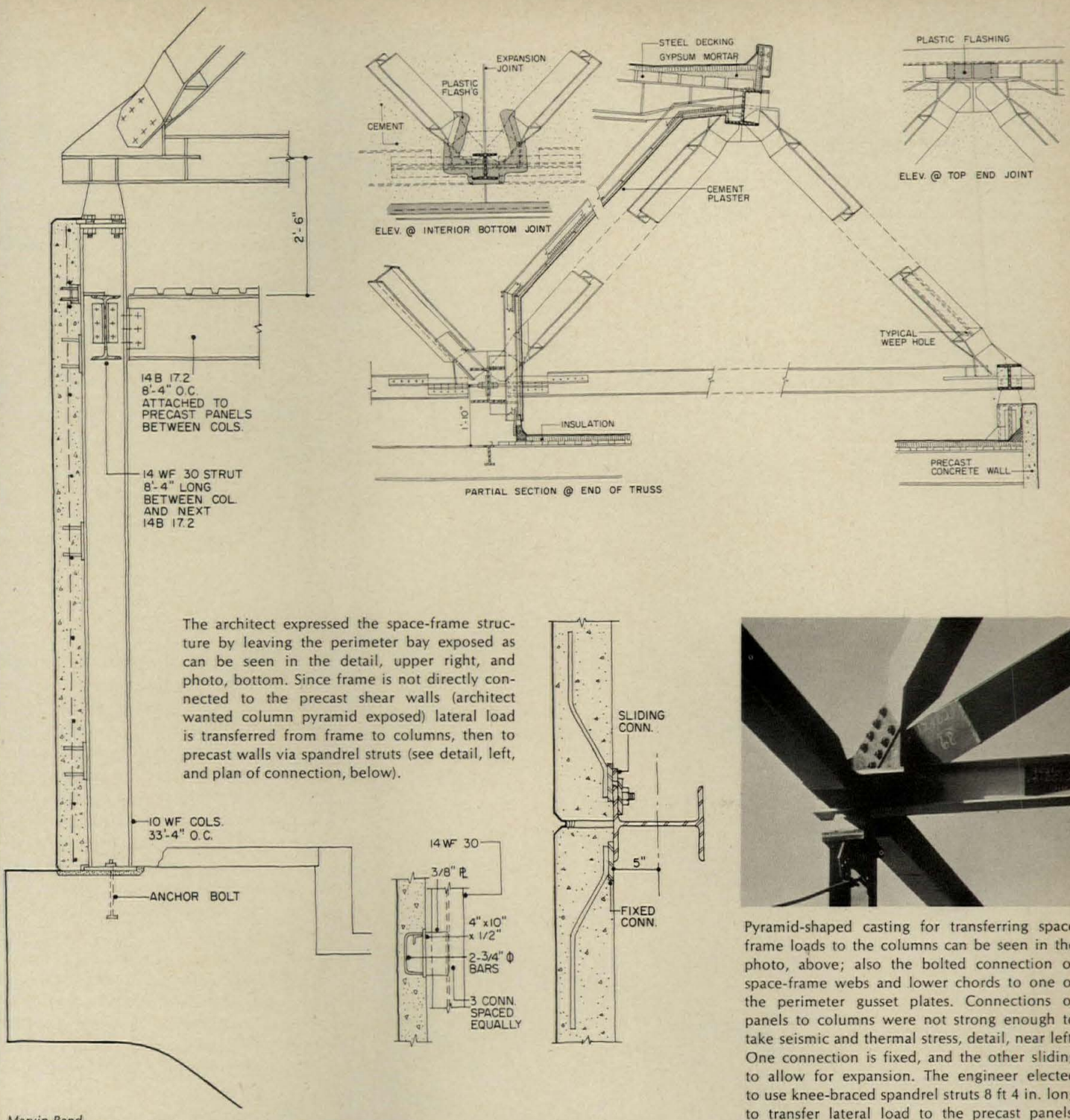
In building the space frame, temporary towers were first erected at the third points of the 300-ft direction of the



LONGITUDINAL SECTION



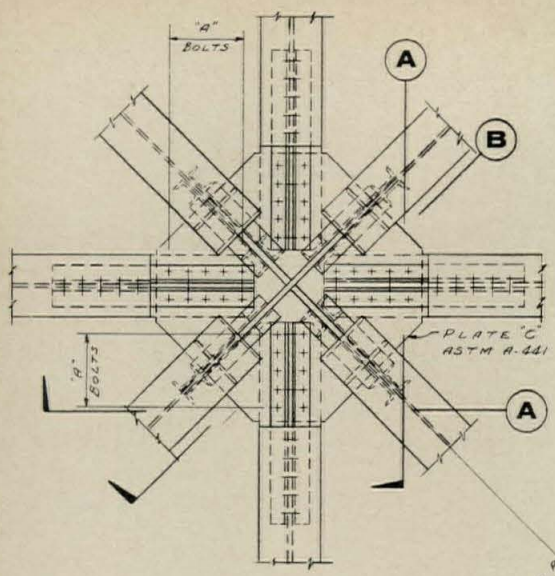
CROSS SECTION

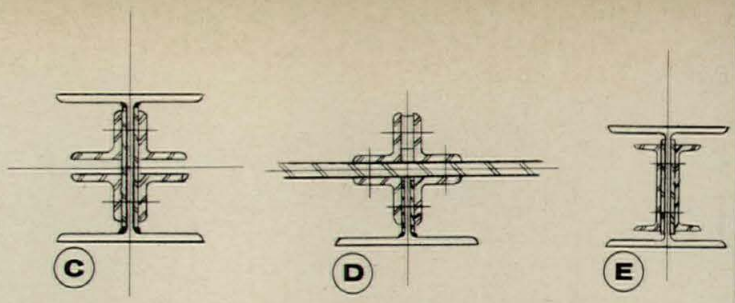


The architect expressed the space-frame structure by leaving the perimeter bay exposed as can be seen in the detail, upper right, and photo, bottom. Since frame is not directly connected to the precast shear walls (architect wanted column pyramid exposed) lateral load is transferred from frame to columns, then to precast walls via spandrel struts (see detail, left, and plan of connection, below).

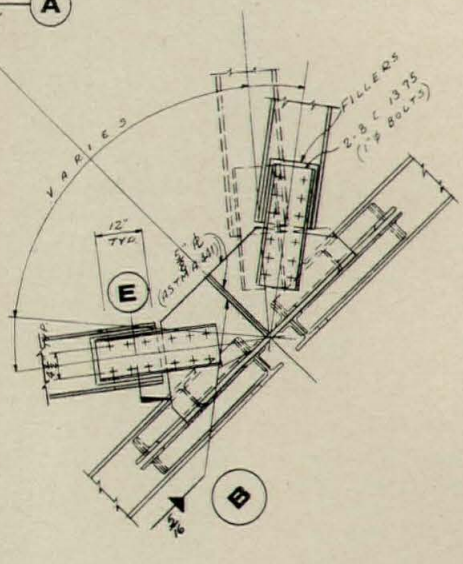
Pyramid-shaped casting for transferring space frame loads to the columns can be seen in the photo, above; also the bolted connection of space-frame webs and lower chords to one of the perimeter gusset plates. Connections of panels to columns were not strong enough to take seismic and thermal stress, detail, near left. One connection is fixed, and the other sliding to allow for expansion. The engineer elected to use knee-braced spandrel struts 8 ft 4 in. long to transfer lateral load to the precast panels.

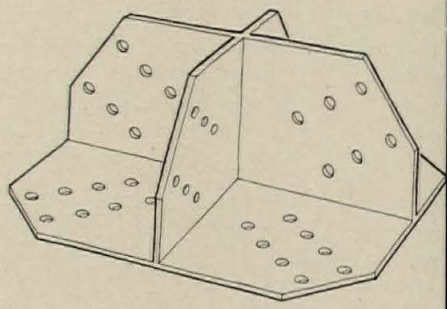
Marvin Rand

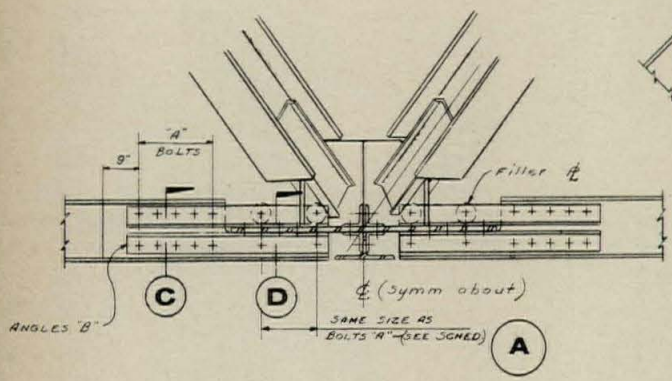




Prime reason for low cost of the space frame, according to the engineer, was the use of a three-dimensional gusset plate, sketch below, for connecting the members at joints. Connection details shown left and above.







frame (i.e., 100 ft apart). Triangular trusses for the two outside thirds of the 300-ft span were then erected outside the building. These trusses were picked-up and placed on the exterior columns and the temporary towers. Members for the middle third of span were then erected piece by piece. After the 300-ft trusses had been set in place, the remaining members in the 400-ft span were erected piece by piece between the 300-ft trusses. After this the temporary towers removed. The space frame deflected only 2½ in. at this time.

The space frame is expected to expand and contract with temperature changes. In doing so, it will make the columns on which it rests expand inward and outward, with the columns rotating about their bases.

The pavilion has 10,300 permanent theater-type seats on two levels separated by a central concourse, which continues around the entire arena. The concourse is at ground level so that direct access is provided, with lower level seats below ground level.

In addition, 2,500 collapsible bleacher seats are provided, installed so that they completely recess into coves on the four sides of the floor and can be pulled-out as needed.

Access to the space frame ceiling is provided by a portable, traveling scaffold.

General contractor is Miller-Davis Company, and steel fabrication and erection were done by U.S. Steel's American Bridge Division.

Part 2 of 2

PLANNING FOR RELIABLE ELECTRIC POWER

By F. J. Walsh, Consulting Engineer

Because of the recent power blackout, much more thought is being given to the need for standby power provisions —not only for hospitals but other building types as well. To a large extent, attention has been focused on standby power plants and the independent distribution systems they serve. Unfortunately, particularly in the case of existing buildings, not nearly enough emphasis has been put on checking the reliability of building electrical distribution systems themselves.

The engineer must exercise intelligent judgment as to design alternates or upgrading alternates to achieve building system reliability, rather than merely relying on some suggested standard.

It is mandatory for all emergency loads to be served by a separate, small segregated system supplied from multiple power sources. The reason that such loads should be segregated, even if extensive re-wiring and changes must be made in an existing system, is that the possibility of power loss through arcing faults in power feeders will be practically nil—if equipment is upgraded and emergency loads are restricted to a number of small blocks of electrical power.

Supply of power to less critical, but still essential loads will need to be considered somewhat differently. The extent to which new segregated wiring systems should be installed for essential loads will depend on how reliable the normal electrical distribution systems are which would serve these loads and how much upgrading is necessary of obsolete equipment.

When the demand for emergency power to critical loads is substantial, and these loads are scattered throughout the building, the engineer can save considerably on cost by feeding power to loads through the main switchboard. Such arrangement should always be considered for buildings such as hospitals and laboratories.

The economy of this approach is obvious when it is realized that it is far less expensive to increase the capacity of a standby electric power plant than it is to extensively rewire a building to supply a somewhat smaller load. When power is fed through the main switchboard, non-essential loads will be dumped during the power outage to reduce the demand on the standby power system.

For example, a particular hospital might require an increase in standby plant of 25 per cent over that required with all emergency loads segregated, if the power is to be fed through the main switchboard. But, the total cost for the 25-per-cent-greater capacity plant, and the even more flexible installation, can actually be less than half that when all loads served by the standby system are segregated as called for in the National Fire Protection Association's Bulletin 76, "Essential Electrical Systems for Hospitals."

Planning responsibilities

Decisions as to which equipment must be kept in operation during an emergency is primarily an administrative responsibility of the owner. The needs will have to be spelled-out by various department heads, but with guidance by various technical advisory groups and regulatory agencies.

These decisions should be reviewed by the architect and his consultants in terms of how they affect electrical system design, budget and conformance with code requirements.

We know that individual judgments among hospital administrators on criticalness of power needs vary as widely as do hospital procedures and functions, and N.F.P.A. Bulletin 76, was ostensibly prepared to promote greater uniformity of practice.

The engineer's responsibility

The consulting engineer's role is to design the emergency standby power plant and electrical distribution system for a building, based on evaluation of:

1. Reliability of the existing electrical distribution system to insure continuity of service;
2. Total electrical load, which determines size of standby power plant, and the quality of current required by lighting for critical seeing tasks and by special equipment (X-ray, laboratory, computers, etc.);
3. Emergency power plant reliability, and
4. Budget.

In evaluating the power reliability of an existing building, the engineer should first of all make sure that mandatory emergency systems meet present code requirements.

For the balance of the electrical system, the equipment should be upgraded to meet code requirements on maximum short-circuit-interrupting capacity.

The engineer must work-out a feasible plan for upgrading the electrical installation for protection against arcing faults.

Sequenced opening of protective devices should be provided to limit circuit interruptions to the circuit on which the short occurs.

The engineer must make provisions so that both normal and standby emergency installations can be easily expanded or altered.

What protection do codes afford?

Frequently, it is incorrectly assumed that various code, inspection and insurance requirements are adequate safeguards to electrical power continuity. The fact that "lights light" and "machines run" reinforces this widely held misconception.

But codes are merely minimum requirements based on a record of past failures. As such, they do not anticipate probability of failure related to today's actual design and operation conditions. And the extent to which electrical inspection can assure compliance with codes is highly variable.

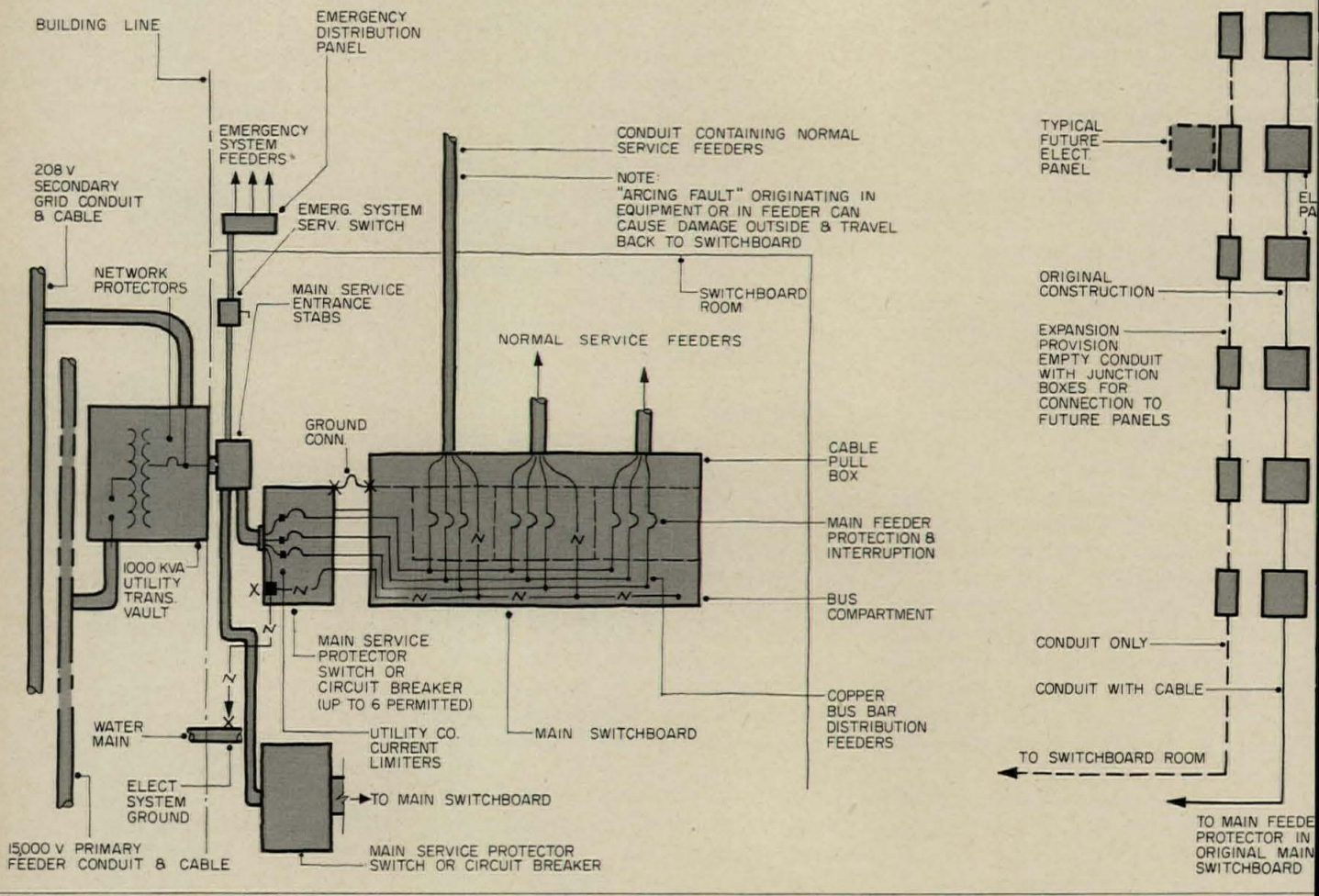
Furthermore, electrical code requirements are never intended to specify design details, and obviously provide no control over coordination.

One of the most serious problems of electrical system design for reliability and safety is that of arcing faults.

Arcing faults originate with a breakdown of insulation on equipment or feeders. They are lower-current short circuits, and may involve only 50 per cent of the current of a maximum direct short. Experience has proved that maximum short circuits rarely occur. The arcing fault begins with a small leakage current through the insulation on defective or partially grounded equipment or feeder cables. Upon further deterioration of the insulation, a very high temperature arc is drawn which becomes an arcing fault of rapidly expanding

TYPICAL ELECTRICAL SERVICE—UTILITY TO BUILDING SWITCHBOARD

NOTES: (1) Maximum-fault and arcing-fault short circuit currents decrease with distance from the service entrance because of the increased resistance of feeders and equipment; (2) Maximum let-through current is reduced by use of smaller current capacity service switches, circuit breakers and feeders. This splits the loads into safe modules, and provides a form of segregation in the initial design; (3) Unless the service switches and service feeders are limited in size, the feeder protective devices will not be able to prevent arcing fault flashover; (4) Both main feeder conductors and normally bare copper bus can be protected from current arc-over by suitable insulation. Main feeders should always have high-temperature-rated insulation; (5) New fuses have a low resistance and operate much cooler than in the past. Little or no de-rating is required due to ambient heat within the switch enclosure.



magnitude. While the initial current value of the arc may be small, it will gradually increase as the heat develops, extending the destructive effect back to the main feeder protective device, switchboard and main service switch or breaker.

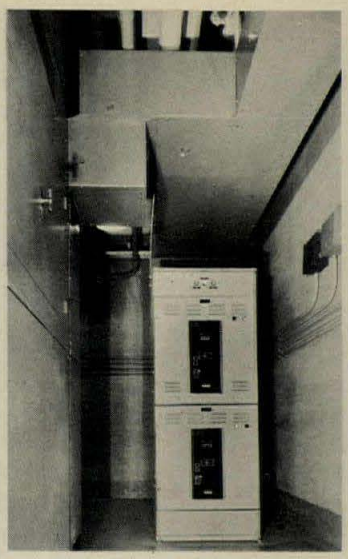
An incipient arcing fault can be detected in only two ways: (1) excessive current passing through the main feeder protective device; and (2) abnormally high current to ground (this suggests a single ground fault detecting relay in the main system ground conductor).

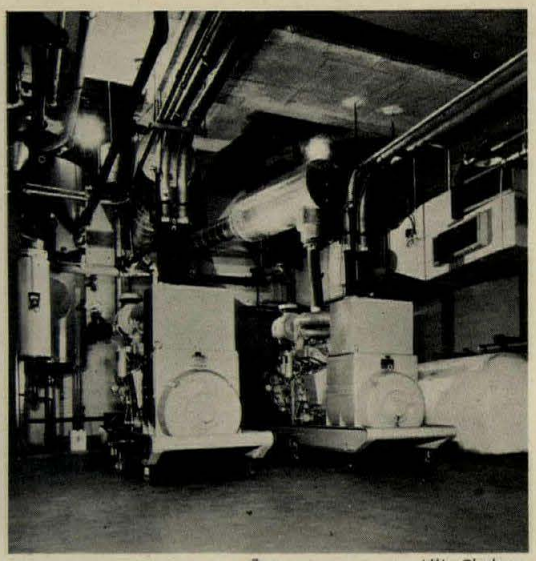
The first method of detection introduces the hazard of loss of feeder power due to false tripping. The second method can be somewhat unreliable due to uncertainties in today's grounding design practice.

Electrical codes do not have provisions covering arcing-fault short circuits, but only requirements for safe interruption of maximum short-circuit current through main service protective equipment and switchboard protective devices.

The engineer is pretty much on his own with this part of the design. Experts agree that there is no absolute protection against faults in large-size feeder circuits and their protective equipment as supplied by today's high-capacity utility networks. But at least the utility companies should be responsible for advising their customers whenever they increase network capacity, as to the "let-through" capability of their network at the point of service entry to the customer's electrical system.

The conservative approach to the problem is to segregate all essential loads as well as emergency loads (as per N.F.P.A. 76) and keep each load small. However, a more economical—and valid—approach is to upgrade building distribution systems by providing multiple service switches and switchboards of as large a size as is safe—



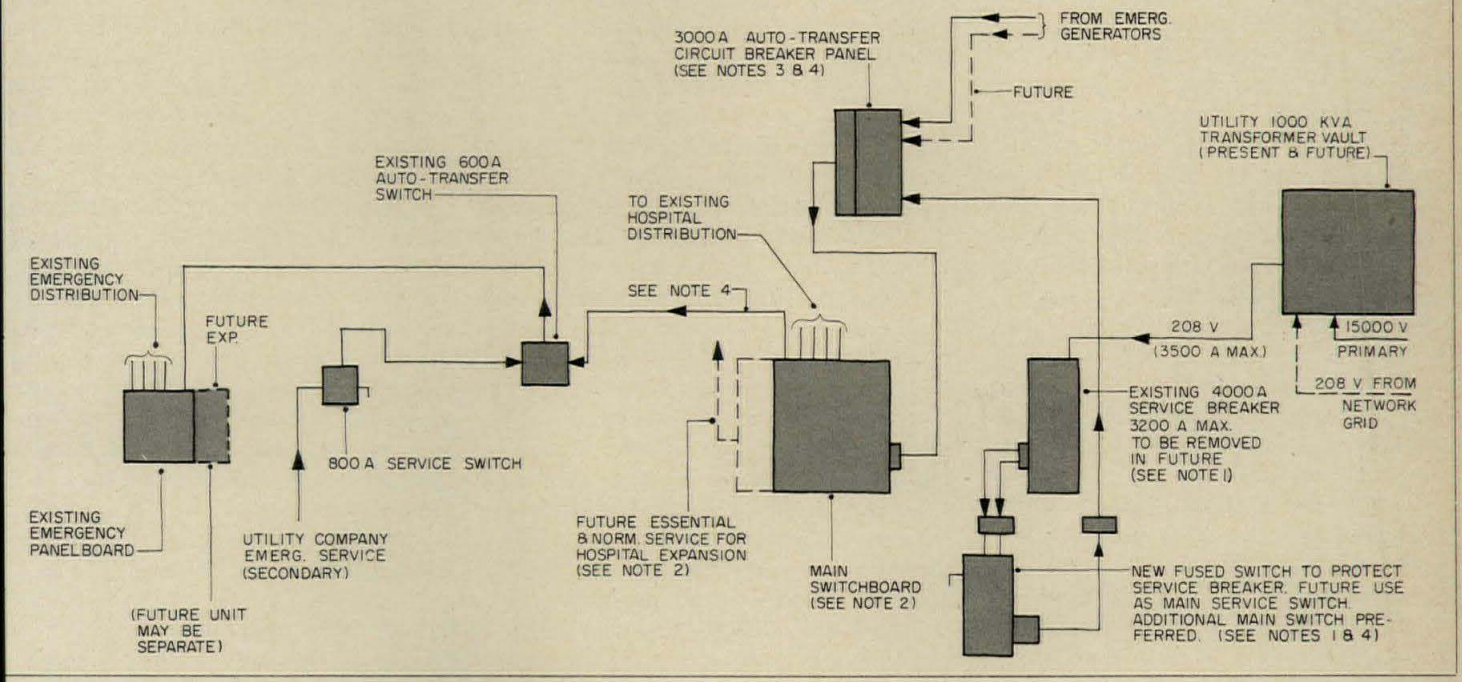


Allis-Chalmers

BEEKMAN-DOWNTOWN HOSPITAL EMERGENCY STANDBY SYSTEM

The unique features of this installation are: (1) automatic paralleling of the engine-generators and; (2) concept of feeding emergency loads through the main switchboard. The two engine-generators are 200 kw each. Photo at far left is the automatic transfer circuit breaker panel; photo at near left, the two engine-generator sets. Architect: A. Gordon Lorimer; consulting engineer: F. J. Walsh; electrical contractor: Lowy & Donnath; engine-generator installer: Rudox Engine & Equipment Company.

NOTES: If hospital is expanded: (1) 4,000 amp service breaker replaced by two switches; (2) main circuit breaker switchboard replaced by two switchboards; (3) additional panel required if there are two switchboards; (4) separate service switch for emergency may be tapped-off ahead of normal service switch(es).



without changing existing feeder distribution throughout the entire building.

If the engineer followed N.F.P.A. 76 to the letter, for a hospital he would upgrade only a part—from 15 to 20 per cent—of the system. But the approach just described will upgrade 100 per cent of the system, as far as emergency power is concerned.

Knowledgeable engineers design for multiple service switches rather than for a single one since, aside from the improved basic design, the cost very often is less because of the need for fewer switches in the main switchboard.

Common sense dictates that building electrical systems be designed for minimum maintenance. The simplest possible devices—for example, fuses, instead of relays—should be used wherever possible. Equipment and materials should be selected which will not deteriorate or change characteristics within a reasonable length of time. The emergency standby power plant, of course, must be operated automatically with the use of relays in order to achieve fail-safe performance.

Various types of sensing and measuring relays may be required elsewhere in the system to achieve flexibility and safety. Test and maintenance of relays and circuit breakers by outside specialist firms is highly recommended.

Reliability of older on-site plants

Some older large hospitals have steam-operated on-site electric generation to furnish part of their power needs. Since large steam plants were required in any case for considerable process steam, it seemed advantageous to generate electricity as well, and recover exhaust steam from steam engines for process use.

However, these older steam plants usually do not have back-up standby electric power to assure continued operation of oil burners and various boiler auxiliaries in the event of utility company electric power failure. Also, unless modern steam turbine generators have

been installed, the electric plants are on the verge of becoming obsolete. While such on-site generating plants will operate satisfactorily with steady-state and slowly changing loads, they cannot be made to pick-up sizeable, rapidly changing and shifting loads without the hazard of total system collapse. This would hold true even if such plants were automated and set-up for maximum load-following response — which would involve considerable expense.

Many loads require fairly precise quality power, and motor-generator sets or static-type stabilizing devices may be required.

On the other hand, where a high-pressure steam supply is considered reliable, as from a district steam company, a steam turbine could be used to drive an emergency electric generator. The turbine could be kept spinning on the line at part-load, with exhaust steam being utilized for process heating. The steam supply would have to have the capacity for taking large surges within a short period of time. Most hospital steam plants, however, would not be able to provide the large amounts of standby emergency electric power demanded today, because of the excessive cost involved to modernize the plants and the likelihood that the exhaust steam could not be utilized efficiently.

By far the most economical solution to providing standby power within the 10-second code requirement is a modern high-speed-diesel, gas-engine or gas-turbine plant.

Additional economies may be realized by using such engine units for multiple purposes. For example, any of these plants could normally be used for driving a refrigeration compressor, and switched-over to standby power when an outage occurs. This approach is not without complications, however, since the engine is working a large part of the time, accumulating operating hours and thus requiring maintenance and down-time.

Standby for in-the-building outages

A vital characteristic of the standby plant is that it must be able to generate and maintain voltage to clear faults within the building distribution system. For example: Suppose that a short circuit occurred within a feeder which caused a main service switch fuse to blow or breaker to open, but allowed the affected feeder protective device to remain closed. When supply to the main switchboard is interrupted, the standby generator automatically feeds the main switchboard. Enough short-term high output would have to be available from the standby generator to make the protective device clear the fault.

With an arcing fault, clearing of the fault could be done safely because of the very low maximum energy capability of the standby plant as contrasted to the utility network.

Failure of a standby power unit to start or to perform under load can be mitigated if the system has multiple units in parallel. With an optimum plant design, failure of one unit would merely put a slight overload on remaining units and affect voltage stability slightly. With less than optimum design, a selective "dumping" of part of the load would have to be arranged for in advance of a failure.

Reliability concepts applied to Beekman-Downtown Hospital

A firm decision to proceed with an emergency standby power plant for New York's Beekman-Downtown Hospital was made in early 1962, following an extensive blackout of several Consolidated Edison network areas in upper Manhattan. The possibility of defraying part of the installation cost through matching funds from the Office of Civil Defense Mobilization was investigated, but not followed through, because certain restrictions made this approach unfavorable: The hospital would have lost control of design, specification and contracting for the installation, and title to the engine-generator sets.

The plan first considered was to handle emergency system loads, including elevator load, but to allow only for minimum essential loads elsewhere — customary practice at the time. Size of generator required would have been 300 kw, which would have assured a ±5 per cent voltage stability (needed for X-ray and other critical equipment). Later, it was intended that a 300-kw generator would be paralleled with the first. Lower initial reliability of a single generator was offset in part by increased back-up with battery power.

But after the problems associated with providing for future expansion, and the annoyance involved in running new electrical risers, were discussed, it was decided to feed standby power directly to the main switchboard. This arrangement allows easy future addition of load and eliminates the need for new risers.

Budget had to be increased by 10 per cent to allow for two 200-kw units instead of one 300-kw unit, plus other incidental costs. To trim the budget somewhat, a unique cooling system was designed for the diesel engines. The remote (roof-located) air-cooled radiator was omitted, replaced for the time being by a tempering tank which uses city water. Even though there might be a failure of city water supply, the engines can operate, but at reduced capacity, with cooling being obtained by boiling-off water from the tank. Later on, when the radiator system is installed, the tempering tank will hold the radiator water when the plant is not in operation, eliminating the need for anti-freeze.

Two 200-kw units rather than one 400-kw unit, were selected for several reasons: (1) a multiple-unit plant should use units of the same size (it was assumed that future capacity would be added in 200-kw units); (2) a 400-kw unit would have presented foundation and vibration problems; (3) specification of a 400-kw unit would have limited competition, precluding some of the better units on the market.

Plant operation

If utility power fails, both engine-generator sets start simultaneously, are paralleled and take switchboard load within 10 seconds. Power is fed through the emergency service circuit breaker in a 3,000-ampere automatic transfer panel.

Automatic selective load-dumping features are provided and unnecessary lighting is shut-off. (All lights are automatically re-energized; the operating suite already had battery source power.)

Surge current problems are avoided in several ways. For example, in the case of elevator motor-generator sets, sequenced restarting is provided through the use of adjustable time-delays. Also surges from pumps and compressors are avoided by lock-out relays and provision for manual restarting.

Fail-safe plant operation

Present steady-state load on the generating plant is 160 kw. Possible failure of one engine-generator while in operation will not cause overload and failure of the second set remaining on the line. In case one of the units fails to start, the second unit will go on the line and take over the load after a certain time delay.

Since standby power is also fed to the main switchboard, the hazard of utility power loss by "false tripping" is minimized. Low-trip settings are sometimes used to offer greater protection against arcing faults, but the difficulty with this is that possibility of false tripping is increased.

The standby unit is run on a weekly test-run schedule for 30 minutes to one hour. A minimum load of 25 per cent is imposed though a dummy electrical load to avoid fouling the engine. Full simulated power failure test is run quarterly.

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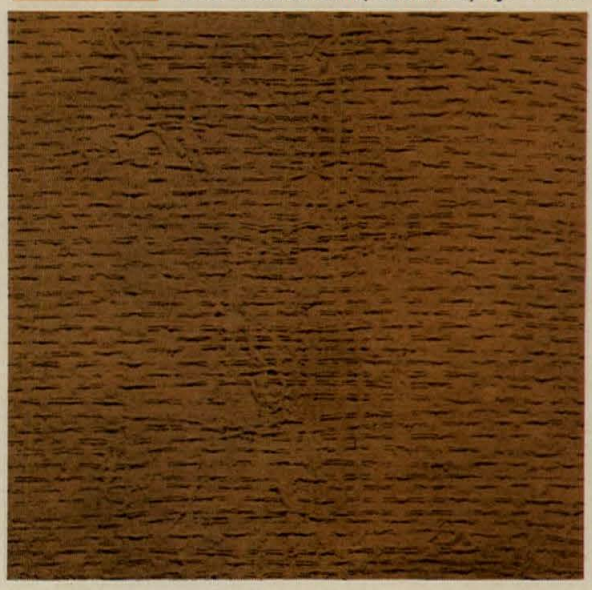

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Neoprene sheet for waterproofing structures

This article is based on information from the Elastomer Chemicals Department, E. I. du Pont de Nemours & Company, Inc.

Neoprene sheet is being increasingly used as an efficient and durable waterstop for construction. As a membrane, neoprene is most effectively applied in the form of sheets, approximately 1/16-in. thick. Liquid application is possible, but at present does not provide such good results. A neoprene adhesive is normally used to adhere the sheet to the substrate.

Neoprene membraning has a wide range of applications for both building and non-building purposes: it has been used to encase a buried building; to protect a railroad bed from damage caused by wet, soft subsoils; as the waterproofing element in a new weather deck system for institutional and residential use; and to waterproof complex surfaces under terrace and plaza areas, where underground buildings require protection.

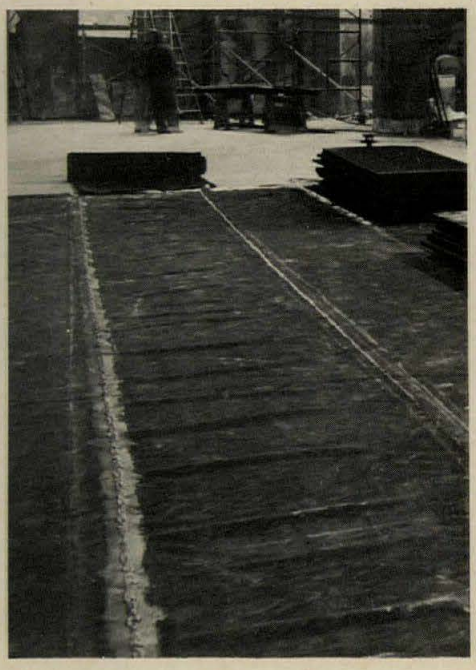
Sheathing for buried computer center

An underground computer center, designed by Charles A. Maguire Associates for the Industrial National Bank of Rhode Island, is completely encapsulated in neoprene waterproofing membrane. On a site where the water table at high water is only 1 ft below the existing ground surface, and where 20 ft of the 25-ft-high building are below original grade, with the remaining 5 ft covered by 3 ft of earth sloped-down to ground level, it is easy to see why a "failure-proof" over-all waterproofing system was essential.

The floor system combines a sheath of 1/16-in. neoprene sheet with a foundation waterstop based on a neoprene-and-metal system. As the structure was designed to meet the possibility of nuclear disaster, concrete footings were used to tie reinforced concrete walls directly to the bedrock, in order to provide maximum stability against the force of shock waves. The structural floor, a floating slab on-grade designed to eliminate dampness on the finished floor surface, consists of: a top surface of 8-to 12-in. concrete slab; a plastic vapor barrier; a layer of 2-in. rigid insulation board; a 1/16-in. waterproofing neoprene membrane; a 3-in. concrete leveling slab; and a plastic sealing membrane—all resting on crushed stone over the bedrock.

Although the initial concept for protecting this building was based on a continuous sheath of neoprene sheet, the decision to bond the structure to bedrock through footings and columns meant that it was impossible to maintain complete continuity of the neoprene sheet. Accordingly, a system utilizing a proprietary neoprene-copper expansion joint was incorporated in the waterproofing system. As modified for waterstops at the base of walls (inside and out) and of columns, the installation consisted of 4-in. wide strips of neoprene mechanically and chemically bonded to 4-in. strips of copper by crimping and a special neoprene adhesive. When the special densified concrete footings for walls and columns were poured, the copper was imbedded permanently, leaving the neoprene flap free for bonding to the 1/16-in. neoprene sheet used on the built-up floor and on walls and roof. Special care was exercised in finishing the concrete walls

Floor, walls and roof of underground computer center are sheathed with neoprene membrane. Walls are primed, and a neoprene bonding agent is used.



to assure a suitable base for application of the neoprene sheet. After curing, the concrete was primed and then coated with bonding agent, also of neoprene, to ensure chemical compatibility. The rolls of neoprene were applied like wallpaper to the outside of the walls, and laid unbonded on the roof with edges butted. Each joint was protected with a cap strip secured with bonding agent, with caulking at the edge of the strip—all three of neoprene. Neoprene adhesive was used to bond the wall sheathing to the neoprene flap of the waterstop around the outside perimeter of the building. The sheet incorporated in the built-up floor was similarly bonded to inside-perimeter and column-base waterstops.

Waterproofing an underground library
Approximately one acre of neoprene sheet has been used to waterproof a two-story science library at Brandeis University, designed by Harrison & Abramovitz and located beneath the central plaza. To protect this building, 1/16-in.-thick neoprene sheet has been used to isolate the plaza and adjoining areas. The roof of the buried building is structural slab covered with glass-foam insulation, over which there is another concrete base to form a flat surface for installation of the neoprene. Prior to installation, 10- by 20-ft neoprene sheets were made-up in the shop by adhering and sealing neoprene panels with overlapping seams of 3 in. On the site, 10- by 20-ft, modules were outlined using 4-in.-wide strips of neoprene adhered to the concrete with primer and neoprene adhesive. The rectangles of sheet neoprene were rolled out so that edges were in the center of the 4-in. strips. Neoprene was then adhered to neoprene, and the gaps between the abutting sections sealed with a two-component neoprene putty. A triple seal was thus afforded at the seams and a network of "dams" was formed against spread of accidental entry of moisture.

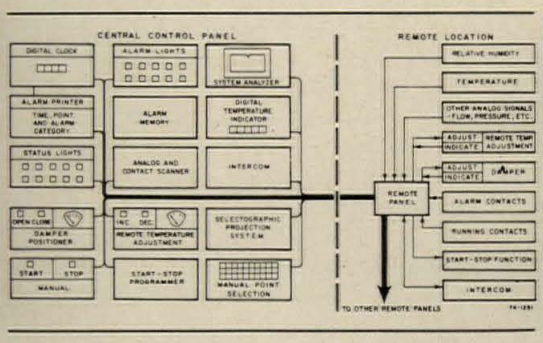
At the point where plaza and buildings meet, the neoprene sheet is only one part in a three-component waterproofing system that includes flashing and expansion joint seal. A 2-in. sponge neoprene seal acts as a filler between precast concrete edge piece and curb. Flashing extends from the membrane, up the face of the curve and paving. Neoprene flashing was also used around a parapet surrounding a daylight opening in the center of the plaza, and at spots where drains occur. A hot asphalt bed was poured over the neoprene membrane and a 2¼-in. brick laid as pavement.

Protection for underground kitchens
Saarinen's Stiles and Morse dormitories at Yale are part of a complex that includes two master's houses and a cooperative store. Although apparently completely separate, several of the buildings are, in fact, joined underground by a series of kitchens and related areas. Blue-stone terraces top the roofs of these below-grade structures. These buildings were opened in 1962, and the weather-resistant neoprene membrane installed during construction is still proving an effective leak-proof covering for the sub-surface areas. For this job, some 10,000 feet of neoprene membraning was used. Rolls of 1/16-in. neoprene sheet in 42-in. width were attached to the concrete surfaces by means of neoprene adhesive. Seams were lapped 6 in. and neoprene adhesive was used as the sealant.

Waterproofing a promenade deck
Besides below-grade applications, neoprene sheet is also being used as a waterproofing membrane in an above-ground, promenade-deck system designed especially for areas subject to a combination of heavy pedestrian traffic and exposure to weather. The components of this system are: an elastic base sheet of 15-mm-thick neoprene laminated to elastomer-bonded asbestos felt—total thickness of the laminate is .035 in.; neoprene primer which serves to seal concrete decks and establishes an elastic bond with other components of the system; neoprene contact adhesive; resilient weather deck tile and flashing color coating. The base sheet provides weatherproofing for the sub-decking which may be plywood, concrete, asbestos-cement board or metal. One of the advantages claimed for this system is that it maintains effective waterproofing even if there is movement of the deck surface beneath. Expansion and contraction of decking due to changes in temperature and humidity is frequently the cause of leaks, as rigid surfacing materials may crack and swell or separate at the joints permitting water to enter. In this system, however, the asbestos backing to the neoprene sheet allows expansion and contraction to take place without tearing or puncturing of the sheet. As the deck moves, the asbestos backing splits, allowing the neoprene membrane to stretch and bridge any minor cracks.

Approximately one acre of neoprene sheet covers this plaza and waterproofs the library building below. Neoprene putty reinforces seams.

for more information circle selected item numbers on reader service inquiry card, pages 259-260



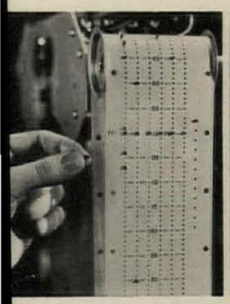
Computer systems for centralized building control

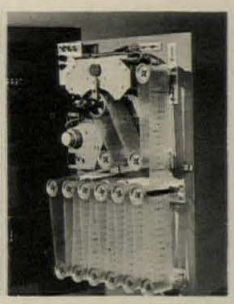
Honeywell's four new building centralization systems offer a wide span of selective control ranging from simple push-button operation for smaller buildings to computers capable of running whole building complexes.

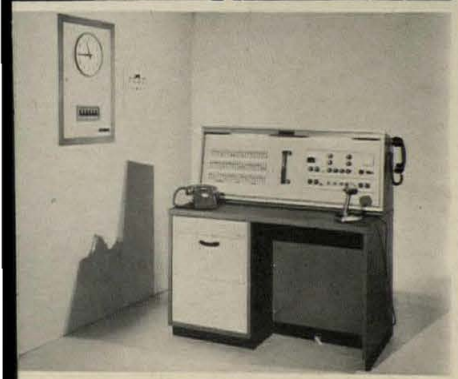
All four systems are similar in that they handle data and control from one point, but they differ widely in concept, complexity and cost. The basis of each system is a modular, desk-sized control console which can handle up to 100 mechanical systems. A translucent screen on the console enables the operator to view any of 100 color-coded schematics; simple push-button mechanisms can be used to control variables such as temperature, humidity, pressures and flows, to open and close dampers, adjust temperatures and start and stop machines in remote locations. A built-in intercom provides contact with building personnel.

In addition to the basic *Datacenter, System 10* incorporates a solid state scanner which can check 1,000 points in approximately two seconds and sound an alarm to warn of mechanical abnormalities. *System 11* includes all the features of *System 10,* plus an "electronic memory" which recalls parameters for variables — such as temperatures—and blows a whistle if any go off-normal. Details of off-limit variables and mechanical malfunctions are marked down by an alarm printer. *System 20* incorporates an "electronic timetable" which turns mechanical units on and off according to a predetermined program, digital computers for high-speed data acquisition, a scanner capable of scanning 10,000 points every minute, and two mechanical printers. This system can be expanded to the full capabilities of *System 30,* the most complex of all, featuring direct on-line control with a computer which analyzes actual performance, compares it with the ideal by use of a memory drum and makes the necessary adjustments. ▪ Honeywell, Inc., Minneapolis, Minn.

Circle 300 on inquiry card







Coordinated electronic control and communication system simplifies school administration

Servo-com is the name of a new electronic system which coordinates all major school communication systems, clocks and utility control into a single consolidated operating unit. The system provides synchronized clocks and programing, inter-com, closed-circuit private automatic telephones, broadcast distribution, public address facilities, fire evacuation instruction, start-up and shut-down of power and utilities, a number of safety devices and built-in protection against vandalism. Since wiring for all services is combined in a single conduit, extra functions or buildings can be covered without rewiring.

The central element of the system is a master clock controlled by patented Mylar "peg tape" on which can be programed instructions to people and/or machines for any minute of each day over the whole school year. Alterations in scheduling can be quickly and easily absorbed. In addition to the control and synchronization of clocks and classroom break signals, heating, ventilating, lighting and other utilities can be controlled by impulses from the master clock. A positive built-in readback reports whether or not instructions to remote machinery have been carried-out. Facilities for shut-down of circuits and lock-out of remote key operated switches on hazardous equipment give protection during unsupervised hours. ▪ DuKane Corporation, St. Charles, Ill.

Circle 301 on inquiry card

More products on page 202

OFFICE LITERATURE

for more information circle selected item numbers on reader service inquiry card, pages 259-260

COOLING AND HEATING COILS / A 60-page catalog covering water cooling and heating coils and direct-expansion cooling coils gives details of construction, installation, application and maintenance. The text is illustrated with photos, diagrams, charts and curves. Thirty pages are devoted to performance data tables on various direct-expansion coils. ▪ Westinghouse Sturtevant Division, Hyde Park, Boston, Mass.*

Circle 400 on inquiry card

STONE AND MARBLE AGGREGATES / A new directory of exposed aggregates and terrazzo chips includes full-color reproductions of a number of different blends. The terrazzo section consists of 8 in. by 8 in. color patterns, on the back of which are printed record forms for architects' job data. These sheets are perforated in such a way as to provide a series of small terrazzo swatches. Aggregates in marble, granite and quartz for exposed aggregate precast units are also illustrated in color. ▪ Willingham-Little Stone Division, The Georgia Marble Company, Atlanta, Ga.*

Circle 401 on inquiry card

GLAZED MASONRY / *Spectra-Glaze,* glazed concrete masonry units in a wide range of sizes, colors and finishes, are presented in a new catalog. Approximate color samples are shown with corresponding light reflectance values. Dimensional details are given for stretcher, jamb and base units in 2-in. to 12-in. thicknesses and 4-in. to 8-in. heights. ▪ The Burns & Russell Company, Baltimore, Maryland.*

Circle 402 on inquiry card

ARCHITECTURAL ACOUSTICS / A 20-page, two-color brochure discusses the interrelationship between acoustics and building elements, the control of noise and vibration in buildings, and ways in which acoustical planning can be used to complement architectural design. Photos and drawings of projects in which the firm has participated—including the Union Carbide Building in New York and the TWA Terminal at Kennedy Airport—illustrate the text. ▪ Bolt Beranek and Newman Inc., Cambridge, Mass.

Circle 403 on inquiry card

LIGHTING / Twenty-eight different lines of anodized cast aluminum wall, ceiling and post-mounted units for outdoor and indoor, heavy-duty application in commercial, industrial and public buildings are illustrated in a new catalog. Dimensional drawings, photos, specifications and photometric data are given for all units. A series of exit and directional lighting units are shown in a section at the end of the catalog. All information is cross-referenced to complete specification sheets included in the company's general catalog. ▪ McPhilben Manufacturing Co., Inc., Melville, N. Y.

Circle 404 on inquiry card

CURTAIN WALLS / Insulated metal curtain walls, UL-rated fire walls and non-insulated single-sheet interior and exterior siding are described and illustrated in technical information bulletin, No. W-66. The 16-page booklet presents principal design characteristics, basic construction features and cost and performance data. Load tables, specifications, cross-sectional and cut-away illustrations are supplemented by a range of application photographs showing different types of wall treatment in industrial, commercial and service buildings. ▪ R. C. Mahon Company, Detroit, Mich.*

Circle 405 on inquiry card

PLYWOOD CONSTRUCTION / The use of plywood in non-residential applications is detailed in a new 49-page booklet. The subject matter is divided into roof systems; wall systems; and floors. Sections are also included on building requirements, inspection and specifications. ▪ American Plywood Association, Tacoma, Wash.*

Circle 406 on inquiry card

BALLAST INFORMATION / Answers to questions on fluorescent lamp ballasts frequently asked by architects, electrical contractors and those involved in lighting maintenance are concisely and clearly given in a booklet which is illustrated by a series of diagrams. The questions dealt with are based on inquiries received by the company. ▪ Certified Ballast Manufacturers, Cleveland, Ohio.

Circle 407 on inquiry card

PLYWOOD SIDINGS / This 24-page four-color catalog gives comprehensive information on a complete line of sidings and accessories. A guide at the front of the booklet gives important information in condensed form; complete details of size, installation, application and finishing instructions, technical data and guarantees are given on later pages. Color photos are included of actual installations of the *PF-L* siding, which is guaranteed against chipping, cracking, blistering, flaking or peeling. *Duraply,* weatherproof siding, hardboard and textured sidings are also shown in actual installations. ▪ US Plywood Corporation, New York City.*

Circle 408 on inquiry card

CERAMIC TILE / Textured crystalline ceramic tiles in a range of pastel colors for walls and floors are a special feature of the 1966 catalog, which also introduces a new range of ceramic mosaic patterns. All of the company's regular lines are displayed in this brochure which includes a color palette of 136 glazed, ceramic mosaic and Murray quarry tile colors as well as trim shapes, specifications and installation details. China bathroom accessories, the *Master-Set* mounted glazed tile series, and ceramic tile for swimming pools are some of the other products illustrated in the catalog, which also includes details of the company's color coordination service. ▪ American Olean Tile Company, Lansdale, Pa.*

Circle 409 on inquiry card

STORAGE EQUIPMENT / A wide range of steel shelving units, storage cabinets, single and multiple lockers and locker room accessories are described in catalog No. 66, which also includes a section on work benches, desks, tool stands and other shop equipment. Dimensions for some 1,000 items covered by the catalog are set out in the form of tables. Drawings and application photos are used extensively to demonstrate the versatility of the company's standard lines. ▪ Penco Products Inc., Oaks, Pa.*

Circle 410 on inquiry card

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

more literature on page 25

"VIM" goes High...Wide...and LAMSON with Selective Vertical Conveyors

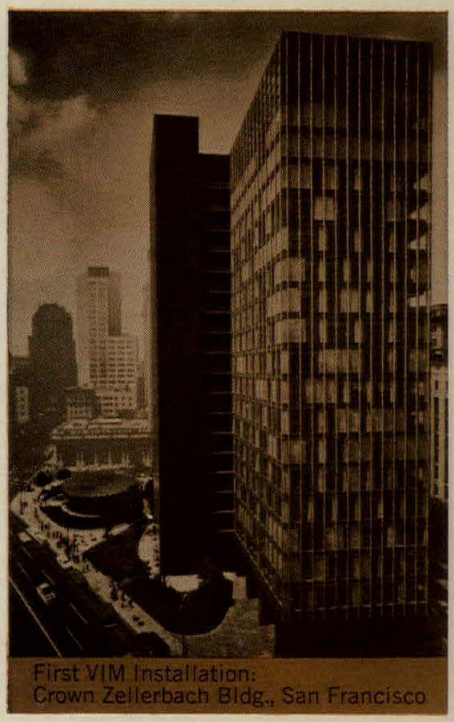
The Post Office has developed a farsighted Vertical Improved Mail (VIM) System for fast, continuous service in high-rise buildings. At the heart of this system is the selective vertical conveyor.

LAMSON, pioneer in mechanized communications systems, has designed, built and installed a large majority of the world's vertical conveyors, including the highest and largest systems.

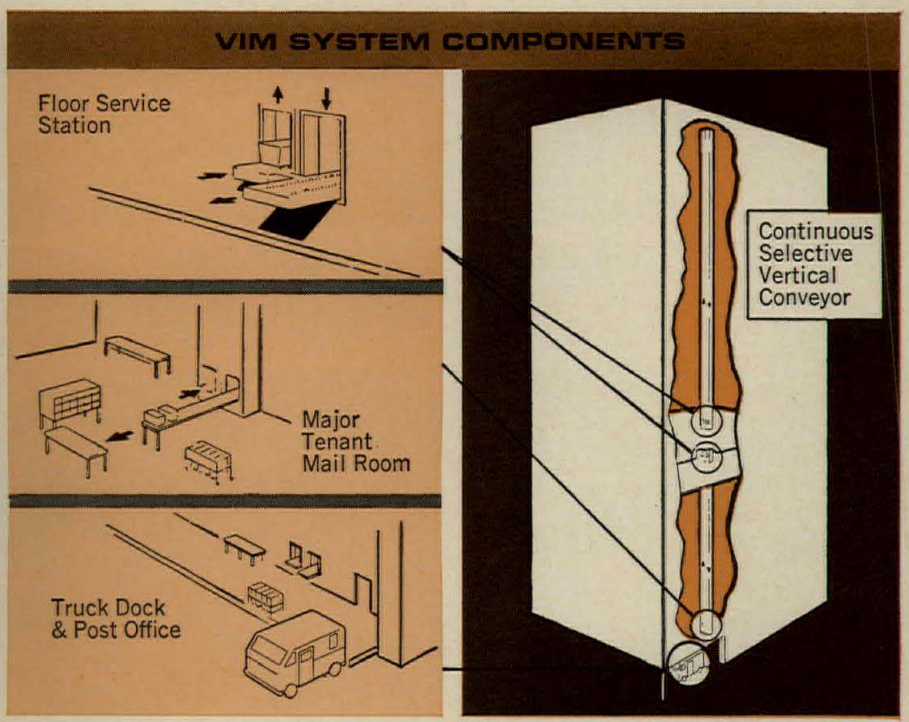
In addition to the selective vertical conveyor, a VIM System also includes a truck dock and a Post Office operated mail room at street or basement level. Here, incoming mail is sorted and locked in tenants' trays for automatic dispatch to all floors via the conveyor. Tenants pick up trays at floor service stations. Outgoing mail may also be sent down to the Post Office mail room from these points.

VIM offers many advantages: mail is delivered early to all floors . . . security is improved . . . congestion from bags and carts in building is relieved . . . day-long mailing permits faster processing to and through the main Post Office . . . contract messenger service is reduced. Equally important: major tenants occupying several floors can use conveyors for their own interoffice distribution of mail, supplies, EDP tapes and cards, etc.

Continuous, high-speed mail service is the lifeline of any business. In building or moving to new office space, carefully evaluate provision for VIM facilities. For additional details on selective vertical conveyor systems, consult your architect or write to: LAMSON CORPORATION, 183 Lamson Street, Syracuse, New York 13201.



First VIM Installation:
Crown Zellerbach Bldg., San Francisco



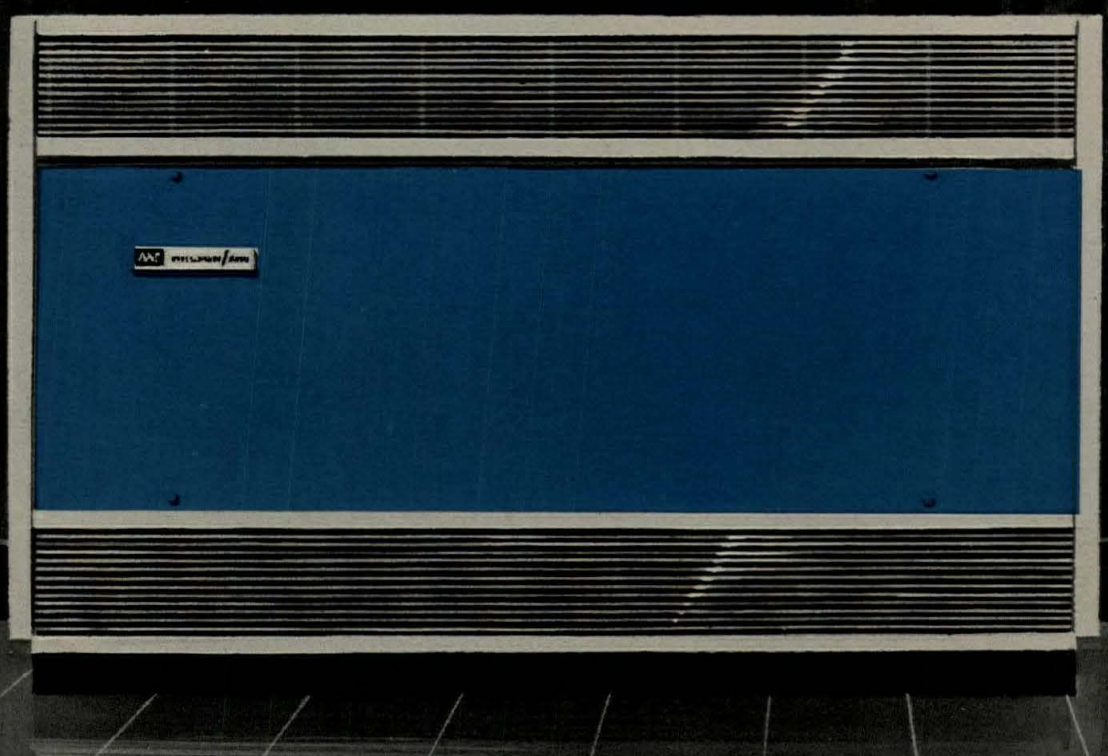
LAMSON CORPORATION
A DIVISION OF DIEBOLD, INCORPORATED

Lamson Street, Syracuse, New York
Also: San Francisco and Toronto, Canada
Offices in All Principal Cities

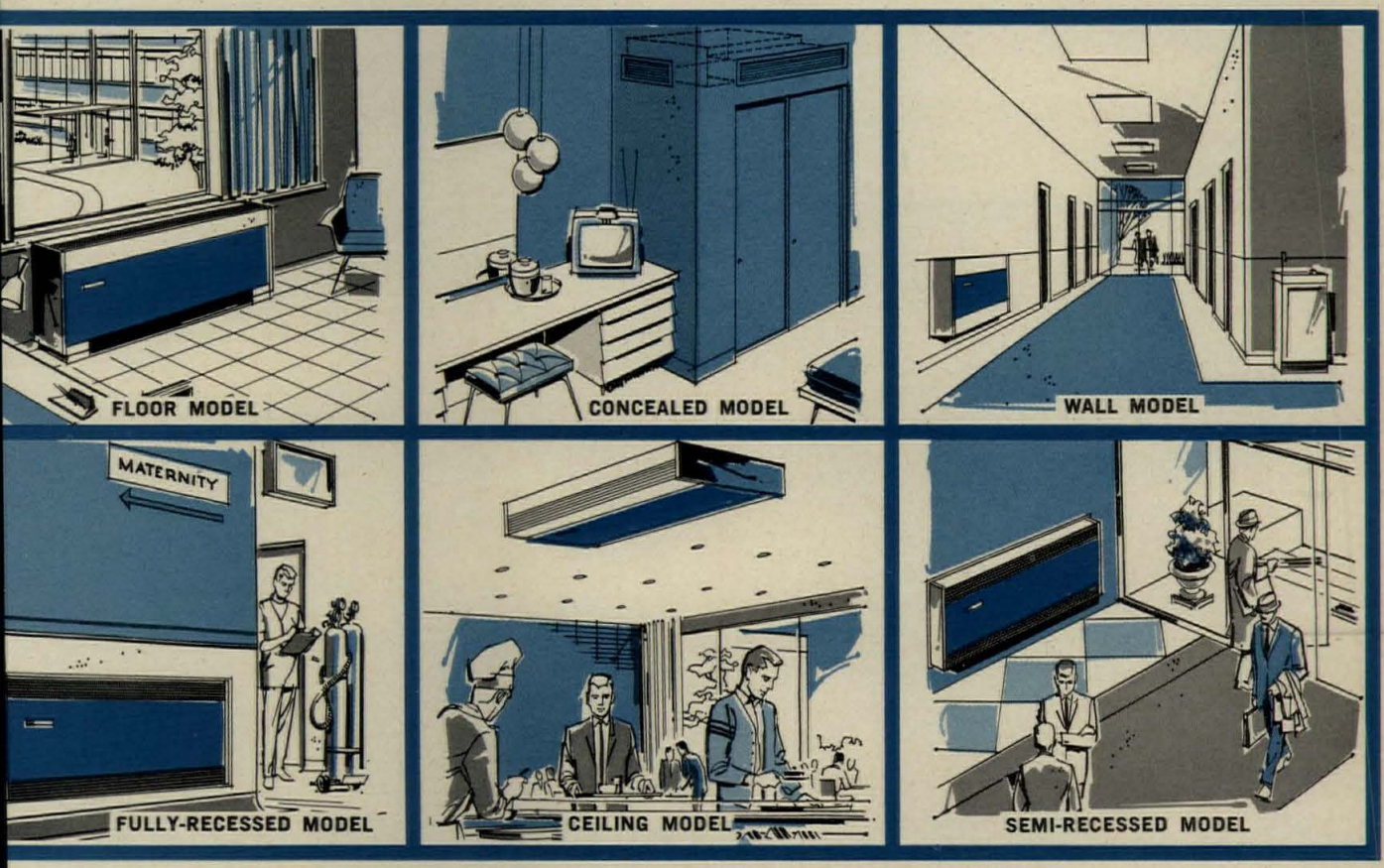
For more data, circle 97 on inquiry card

AAF NELSON/aire means . . .

unsurpassed DESIGN FREEDOM



There are 289 ways to design the NELSON/aire cabinet unit into your buildings. Here are 6 of them.



There's virtually no end to the ways you can design this NELSON/aire heating, ventilating, and air conditioning unit into your buildings. It's part of the flexibility we build into *all* our products.

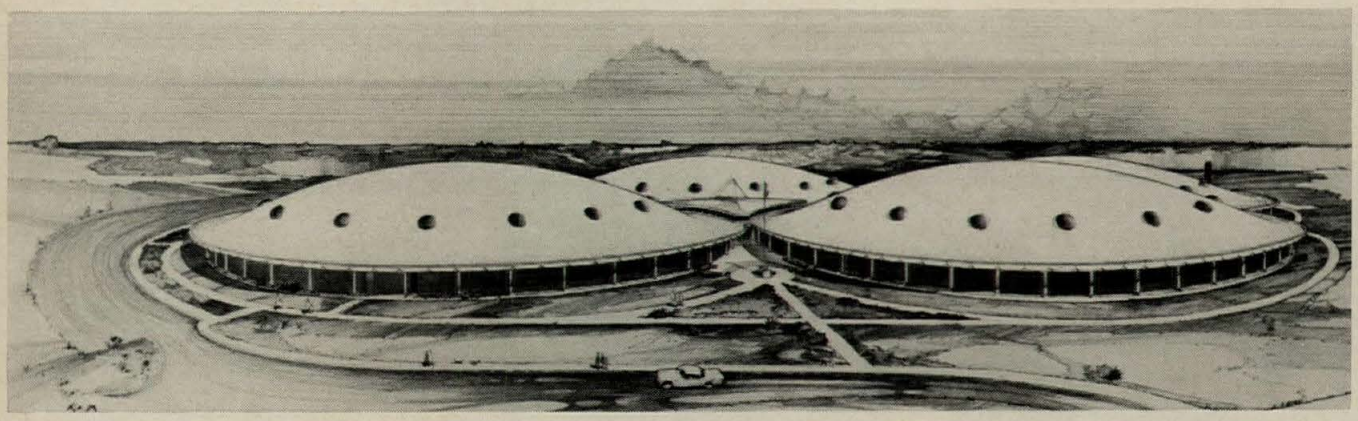
But we don't stop there. This particular unit also offers industry's thinnest profile (all models only 9¾″ deep), six decorator and four base colors to choose from, baked-enamel finish, option of two fresh-air ventilating dampers (25% and 100%), from 200 through 1350 cfm in eight sizes, precise temperature regulation through Damper-Guard face and by-pass control, plus a "through-the-wall" unit featuring self-contained refrigeration.

Ask your AAF/Herman Nelson man about the NELSON/aire or write: American Air Filter Company, Inc., 215 Central Avenue, Louisville, Kentucky 40208. Available in Canada.

AAF **American Air Filter**

BETTER AIR IS OUR BUSINESS

A DISTINCTIVE CONCRETE SCHOOL DESIGN that combines space, esthetics and economy



Coleman Junior High School in Wichita, Kansas will contain facilities for 1200 students. Two of the four domes have three floors of classroom space. One houses the girls' and boys' gymnasiums. The fourth contains auditorium, shop facilities and art and music rooms.

USING LEHIGH CEMENT

This new public school is composed of four huge, thin-shell concrete domes with a roofed over section for a "Commons" area. The design provides maximum teaching space within the confines of the real estate. And concrete was chosen as the material which would yield the most graceful and pleasing appearance consistent with structural economy.

Concrete for the project had to be placed by bucket crane and by pump. A crane could reach only half the roof area. Thus, extremely exacting slump requirements had to be met to facilitate pump placement of the concrete. And here, as in important construction projects throughout the country, Lehigh Cement contributed to the quality concrete required for smooth, on-time completion. Lehigh Portland Cement Company, Allentown, Pa.

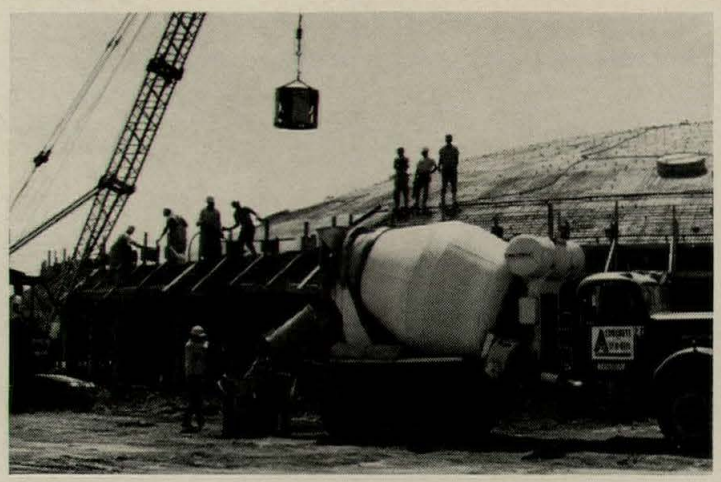
Owner:
Wichita Board of Education, Wichita, Kansas

Architects:
McVay, Peddie, Schmidt & Allen, Wichita, Kansas

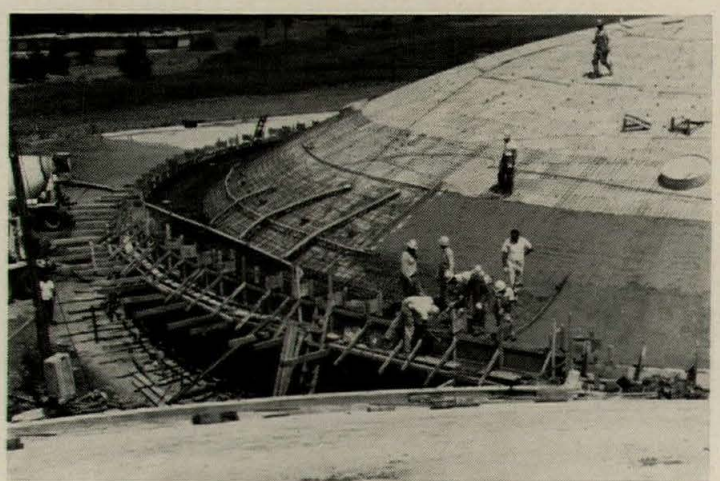
Prime Contractors:
Coonrod, Walz and Vollmer Construction Company, Inc., Wichita, Kansas

Ready-Mixed Concrete:
A-One Concrete, Inc., Wichita, Kansas

LEHIGH CEMENTS



Concrete was placed over cement excelsior sheets which, in most areas, will be left exposed. Wherever possible crane and bucket were used for placement. In those areas which could not be reached by this method, concrete was placed by pump.



The thin-shell roofs range from 4″ thick at top to 8″ thick at the base and 16″ thick at the tension ring. Domes are 33′ high at center and 180′ in diameter.

Get maximum protection on fire barrier doors with U.L. listed Corbin FIRE EXIT HARDWARE

...plus easy exit when required

UL LISTED:
Labeled as Fire Exit Hardware for all classes of labeled doors.

. . . for openings up to 7'4" wide x 7'2" high

heavy duty / solid vertical rod / drop forged lever arms / nylon bearings / brass, bronze, stainless steel / specify No. 3220U

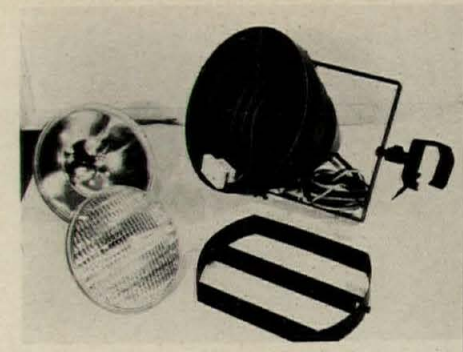
it pays to make it Corbin throughout!

CORBIN

P. & F. CORBIN
DIVISION OF EMHART CORPORATION
NEW BRITAIN, CONNECTICUT 06050

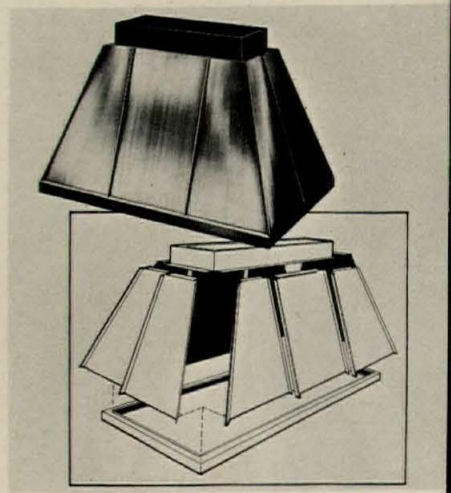
For more data, circle 99 on inquiry card

continued from page 195



BACKLIGHTS FOR QUARTZ IODINE AND PAR LAMPS / The *73-20 backlight* series is being offered for operation in variable beam spreads with 300 quartz or PAR 300 and 500 lamps. Although this unit is primarily designed for the television broadcast industry, it can be used in loading platforms, show-rooms, small theaters and other industrial areas. Features of the *L/E 73/20* include: adjustable yoke with a steel pipe clamp, steel housings, and a removable louver to reduce television camera lens flare and to accommodate various beam spreads. ▪ Lighting & Electronics, Inc., Brooklyn, N. Y.

Circle 302 on inquiry card



RANGE HOODS / Modular interlocking panels, in three sizes, are used to assemble range hoods in any length, width or design configuration for standard island, corner, or peninsula installation. The factory-assembled hoods are available in six stock metals. ▪ Monk Manufacturing Company, Addison, Ill.

Circle 303 on inquiry card

ACRYLIC LOUVERS / The company's now familiar bi-planar louver design has been executed in molded acrylic plastic to produce the *Acrycel* lighting louver which is said to have very good light diffusing qualities. Louvers are manufactured in 3 sizes. ▪ Wilson Research Corporation, Erie, Pa.

Circle 304 on inquiry card

more products on page 22

THE PRESCON MEMO NEWS

THE PRESCON CORP.: 502 CORPUS CHRISTI STATE NATIONAL BUILDING — CORPUS CHRISTI, TEXAS 78401

SPACE—THE RESULT OF ELIMINATING 211 COLUMNS IN WEBB BUILDING BY POST-TENSIONING

More rental space, greater space flexibility, reduction of number of required columns, and shallow floor depth were considerations analyzed before selecting post-tensioning for the Webb Building in Arlington, Virginia. Three structural systems were evaluated before a decision was made. In the final design, the few columns required allowed such space management efficiency that the owner, M. T. Broyhill & Sons Corp., reported requests for office space totaling 212% of rentable space!

The structure was originally designed for 70 psf live load, but was later changed to 125 psf live load for the first five floors above grade, and 100 psf live load for the remaining four floors. The load factor was changed to accommodate heavy office equipment.

The roof slab and the nine floor slabs above grade were post-tensioned using PRESCON positive end anchorage tendons. The slabs were 8½″ thick, cast of 3500 psi regular weight concrete. Each slab was divided into three pours.

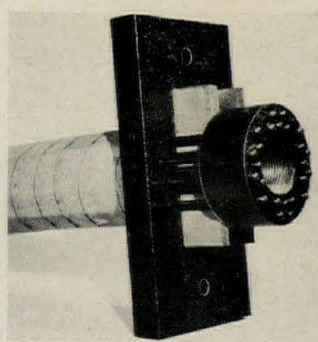
Floor slabs measure 123′8″ x 153′8″ with approximately 19,000 square feet to each floor. Slabs were designed as rectangular flat plate panels spanning 20 feet in the N-S direction and 25 feet in the E-W direction between column centers. All main reinforcement in slabs was Prescon post-tensioning tendons except for the addition of conventional reinforcing bars over the columns. The total structural frame cost was $3.28 per square foot, including all structural change orders.

Conduits were not included in the floor but with the Prescon post-tensioned slab, telephone and electrical outlets could be placed within a 2″ point desired by the tenant without fear of cutting steel reinforcing. Another advantage of post-tensioning the slabs was the elimination of deflection in the slab which reduces problems in the placement of partitions.

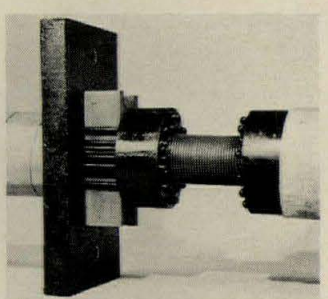
The Webb Building in Arlington, Virginia.

Prospective tenants were particularly impressed by the speed and ease in placing partitions and the higher floor loadings possible.

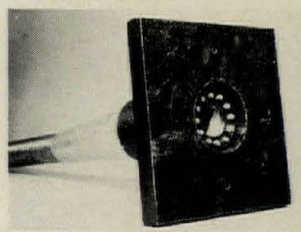
The Webb Building is a joint venture of M. T. Broyhill & Sons Corp., and Dr. Clifford A. Webb, Sr. The Architect is Michael G. Kasen, Annandale, Va.; structural engineers—Ellers & Reaves, Consulting Engineers, Memphis, Tenn.; Contractor—Allen Bros. & O'Hara, Inc., Memphis, Tenn.; tendon placement and stressing—East Coast Steel Placing Co., Arlington, Va.



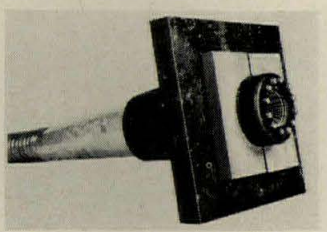
Example of the stressed end of a coupled tendon.



Here two tendons have been coupled. In final stage the ends and threads are mastic coated and covered with a sleeve.



With limited working area and/or coupled tendons, the donut hardware is used. This is the unstressed condition.



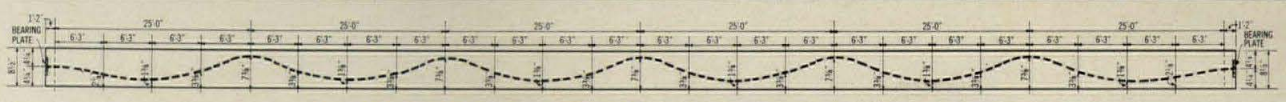
The donut washer and bearing plate in a grouted tendon with split shims in place after stressing.

The Prescon System offers numerous advantages.
For the owner it means graceful, functional construction with maximum space utilization, and long spans with minimum material usage. For the architect and consulting engineer it means assistance with design and engineering when needed, and assurance that Prescon can be specified with confidence. For the contractor it means tendons delivered to the job site, completely assembled, clearly identified and ready for the forms, plus a Prescon representative to instruct his men in tendon placing and stressing procedures, using stressing equipment provided by Prescon.

Prescon tendons are available in two types: the grouted type and the mastic coated type. Either can be used in cast-in-place or in precast structural members. Your Prescon representative can show you many examples of applications in foundations, compression rings, cast-in-place slabs, beams, girders, as well as precast tees, girders, etc., in structures designed for many different uses.

If you are not already receiving the PRESCON NEWS, a tabloid paper, which discusses many of the structures using the Prescon System, write PRESCON to include your name on our mailing list. Other Prescon publications include general and technical brochures, and one devoted entirely to applications in parking garages.

The Prescon Corporation
General Offices: 502 Corpus Christi State National Building
Telephone: 512-882-6571 Corpus Christi, Texas 78401



Typical Tendon Profile Utilizing "Load Concept of Prestressed Concrete Design"

A66

HAYDEN PLANETARIUM, BOSTON, MASS.

STATE BANK & TRUST CO., CHICAGO, ILLINOIS

Until today there were only two ways to cover a floor.

The hard way.

The soft way.

Now here's the right way- Densylon

LOFINO'S SUPERMARKET, DAYTON, OHIO

PENN JUNCTION SCHOOL, PATTONVILLE, MISSOURI

SMITHTOWN HOSPITAL, SMITHTOWN, NEW YORK

JEWEL TEA COMPANY, CHICAGO, ILLINOIS

STATE UNIVERSITY OF IOWA, IOWA CITY, IOWA

With Densylon, made with ACE nylon, you can specify carpet where carpeting was never practical before.

And with complete assurance. You can carpet every square inch of every floor in any building. Office buildings. Hospitals. Schools. Banks. Supermarkets. Public buildings. Even automobile showrooms, elevators, and loading ramps.

You can do all this with Densylon*—and only Densylon. Densylon is the only carpet that keeps every promise other carpets can't because it's different from any other carpet. Densylon is carpet turned upside down; tough on top, soft on bottom. ACE™ nylon, Allied Chemical's specially engineered contract nylon in a tightly-twisted, high-density pile is bonded to a 3/16" backing of sponge-rubber. You don't get that with any other flooring.

Densylon's unique pile is so dense that dirt can't sink in. So tight that the pile can't be pulled up. So tough that furniture legs and spike heels can't mar it. No Densylon installation has ever worn out. Not even the Densylon in the General Electric Pavilion at the New York World's Fair, walked on by more than 15 million persons.

And the biggest pay-off: Densylon actually pays for itself with savings in maintenance alone. Costs at least eighty cents a square yard *less* to maintain in showcase condition *than any other flooring—hard or soft.* Vacuums clean in half the strokes ordinary carpets need. Spots and stains—even grease, sponge-mop right off the ACE nylon pile. No scrubbing, waxing, stripping ever.

Densylon's wide spectrum of colors and patterns makes it easy to add prestige, beauty, quiet, warmth and comfort to *every* floor — with confidence and economy. There are endless applications for Densylon. Send for complete information.

CCC
10 West 33rd St., Dept. AR-3
New York, N. Y. 10001
Attention: Mr. Oliver A. Wyman

Check Here

Please send complete information about Densylon. ☐

Please send your representative to give us cost estimates on approximately ..... square yards ☐

Name _____

Address _____

City _____ **State** _____

**CCC's trademark for its sponge-bonded, high-density nylon carpet.*

Densylon WITH **ACE** NYLON BY Allied Chemical

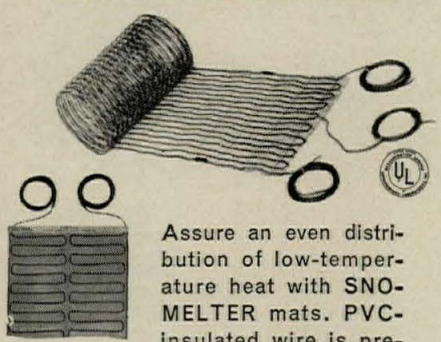
Manufactured by CCC • Commercial Carpet Corporation, New York City, Chicago, Los Angeles; Canadian Affiliate: C. C. Carpet Co., Ltd., Ontario

TO MELT SNOW OUTDOORS OR HEAT CONCRETE FLOORS

specify

EASY-HEAT* *and* ***Sno-Melter**** *electric heating cable products*

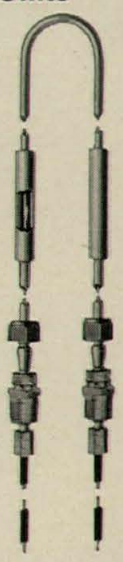
Wire Mesh and Fiber Mesh SNO-MELTER Heat Mats



Assure an even distribution of low-temperature heat with SNO-MELTER mats. PVC-insulated wire is pre-assembled and anchored in place on wire or fiber mesh. Mats roll out fast, save time and money to install. Embedded in concrete or asphalt, they operate unseen, *automatically.*

Mineral Insulated Heating Cable Units

Select from over 1000 EASY-HEAT M. I. Cable units. Pre-assembled, 24 to 3782 feet long, 10 to 50 watts per lineal foot. Choice of 120, 208, 240, 277, 480 V. Single or dual conductors, completely insulated with magnesium oxide and a waterproof, gas-tight copper sheath. Has 7′ cold lead, 12″ insulated pigtail, explosion-proof UL-listed threaded glands.



Fiber Mesh Concrete Floor Heat Mats

Wherever warm slab floors are desired—factories or schools, etc.—EASY-HEAT Electric Floor Heat Mats, embedded in concrete, offer great flexibility at lowest cost. Factory assembled, PVC heating wire bonded to Fiberglas mesh to provide 10 or 20 watts per sq. ft. of heated area. Mats can be fitted around corners, and curves, columns, fixtures.

Write for illustrated spec folder and cost data on the COMPLETE line.

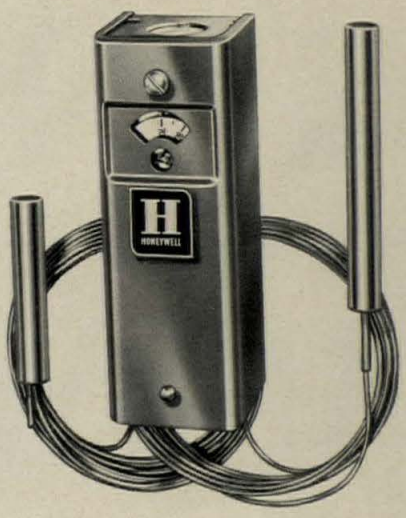
*A Trademark of THE SINGER COMPANY

CLIMATE CONTROL DIVISION

THE SINGER COMPANY, DEPT. AR-36, AUBURN, NEW YORK

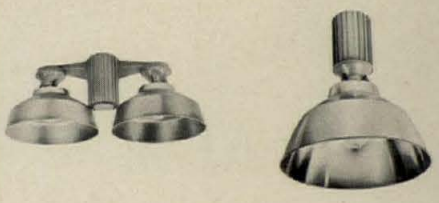
For more data, circle 115 on inquiry card

continued from page 202



DUAL-BULB TEMPERATURE CONTROLLERS / Honeywell introduces two new dual-bulb temperature controllers which they claim automatically reset interior temperature supply systems in predetermined ratios as outdoor temperatures change. The controllers, available in proportional and two-stage models, modulate water or air supply temperatures or operate gas valves or electric resistance elements in sequence. According to the manufacturers, the liquid-filled sensing elements are not affected by elevation. Both models are available with an averaging indoor element for hot-deck application. ▪ Honeywell Inc., Minneapolis, Minn.

Circle 305 on inquiry card



MERCURY VAPOR FIXTURES / Entering the industrial mercury vapor field is a full line of fixtures, the *Industra* group, available in 175-, 250-, 400- and 1,000w single units and a twin 400w mercury or combination mercury-incandescent unit. The company states that these units are designed for easy maintenance and installation without handling heavy components. The power packs are said to operate in 104 deg. F. ambients. High-temperature models are available for ambients up to 131 deg. F. Accessories include louver kits, uplight shields and wire guards. ▪ Emerson Electric Company, St. Louis, Mo.

Circle 306 on inquiry card

more products on page 232

For more data, circle 116 on inquiry card ▸

When you're i
Wheeling know
three choices

Quit.

Never. We're steelmen. We've been in the business so long we know there's no percentage in quitting. No profits, either.

Alibi.

That's too easy. And it gets you in the
We'd rather fire up the right furnaces (
oxygen). Hire the right people. And get t
deliveries to their destination. On time.

a tight spot there are just

Hustle.

ve aside. We knew what we needed to do we're doing it.

We're expanding our line of expanded als. Architectural mesh. Flattened mesh. orative mesh. In a greater variety of ges and finishes.

We're making more roofdeck, more galva- d SofTite®, more metal lath, more grat- And more farm roofing and siding.

nd more.

ike the fact that all of Wheeling's new lities—including the mills where that orig- steel comes from—are geared to a qual- evel that'll guarantee consistency from r to order.

o if you want to decorate a new building or renovate an old one, or if you want to specify a load of pre-engineered roofdeck or simply install a sure-footed catwalk, or if you're in any kind of a tight spot—you now know just the place to come to.

A hustling steel company.

Wheeling's in the right spot to lay it on the line with you and for you.

So. When you choose us, you give us no choice. We'll hustle.

Have you looked at Wheeling lately?

Wheeling

Wheeling Corrugating Company, Wheeling, West Virginia

For more data, circle 117 on inquiry card

NEW ART METAL RECESSED & SURFACE ELIPTICONES

Seamless one-piece fixtures of handsome brushed aluminum, in four popular sizes for surface mounting. Plus four sturdy steel recessed fixtures in matching sizes, for flat or sloped ceilings. Elipticone reflector with minimum face trim is a one-piece unit available in your choice of clear anodized aluminum, gold or black to complement any decor. Use with a range of general service reflector lamps for a variety of expressive lighting effects.

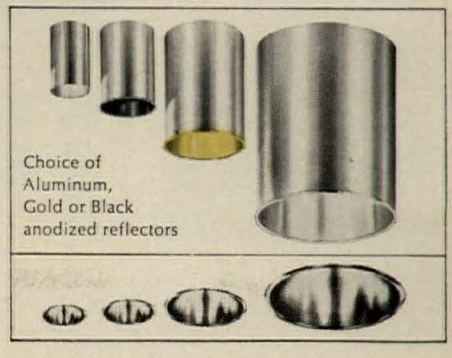
Here's a fresh approach to functional downlighting, with a complete size range from 4¼" to 15¼" diameter, and wattages from 30 to 500. Think what you can do with **this** line. Then contact your Art Metal Representative or write for full-color Elipticone bulletins.

WAKEFIELD CORPORATION

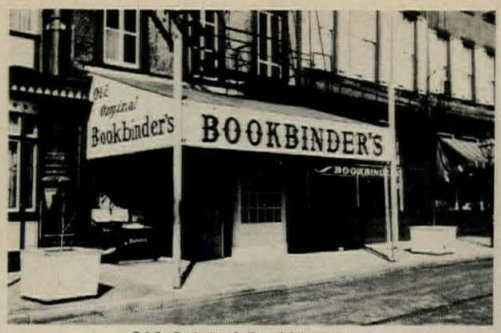
ART METAL

Lighting Division, 1814 E. 40 St., Cleve., O. 44103

In Canada, Wakefield Lighting Ltd., London, Ontario

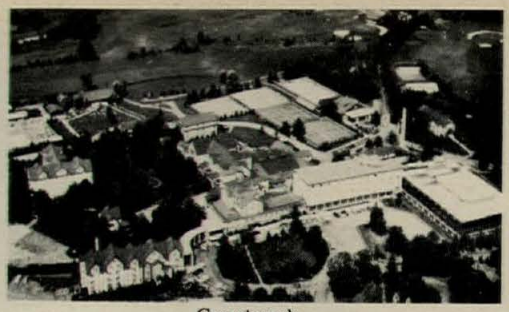


For more data, circle 121 on inquiry card



Old Original Bookbinder's
Philadelphia, Pennsylvania

Palmer House
Chicago, Illinois



Grossinger's
Grossinger, New York

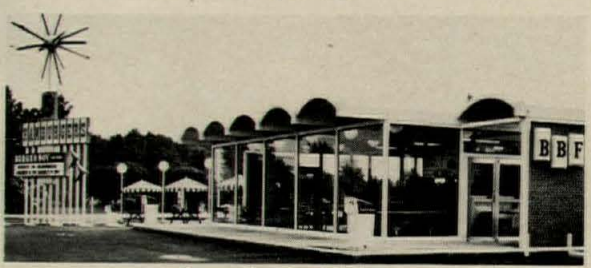
for hotel, motel, restaurant or drive-in

Holiday Inns of America, Inc.
Memphis, Tennessee

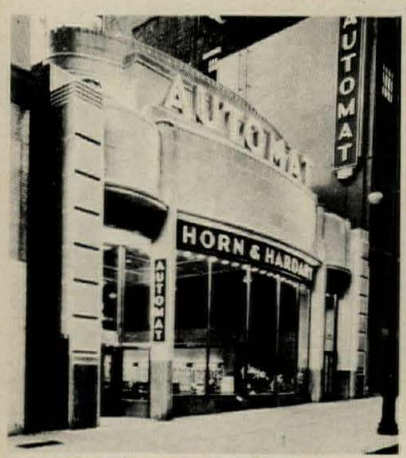
Sheraton-Belvedere Hotel
Baltimore, Maryland

Hotel Quito
Quito, Ecuador

South of the Border Restaurant
Dillon, South Carolina



Burger Boy Food-O-Rama
Columbus, Ohio



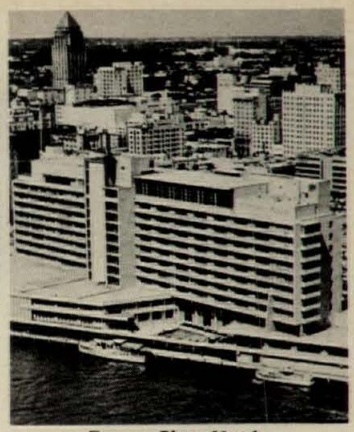
The Horn & Hardart Company
New York, New York

Sky Chefs, Inc.
Phoenix, Arizona

Mammy's Kitchen
Myrtle Beach, South Carolina

Marriott-Hot Shoppes, Inc.
Washington, D.C.

Boar's Head Inn
Charlottesville, Virginia



Dupont Plaza Hotel
Miami, Florida

refrigeration needs... specify Bally prefabs

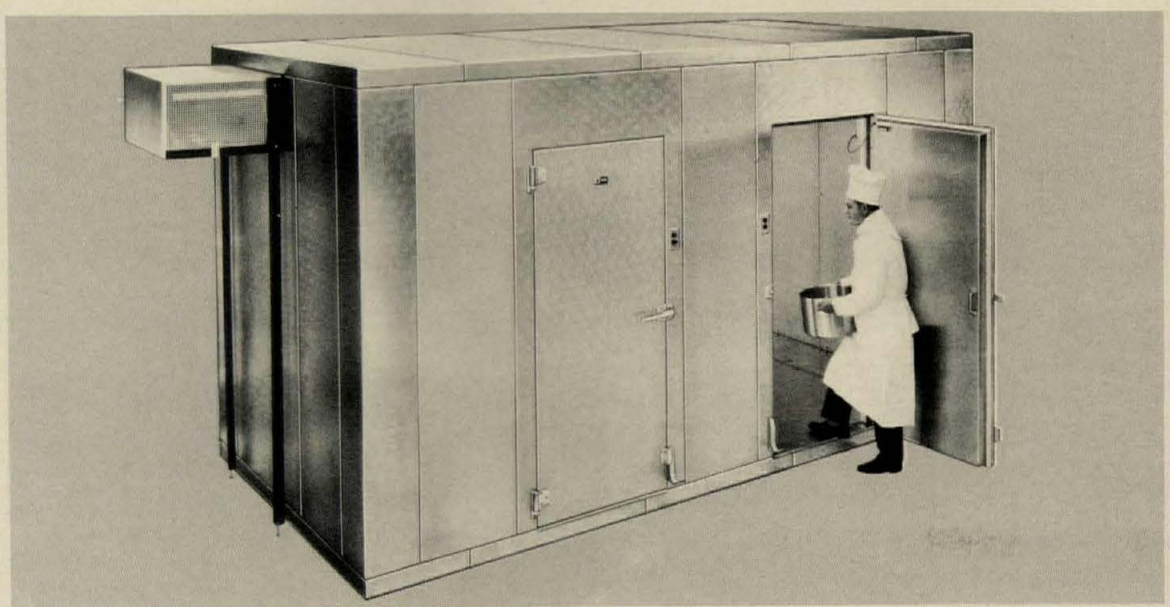
These hotels, motels, restaurants and drive-ins, like many other institutions and places of business, are benefiting from Bally Walk-In coolers and freezers with revolutionary construction techniques and design features. Bally has set a new high in refrigeration efficiency.

When you specify Bally you can be sure that your clients will get many advantages not found in conventional prefab Walk-Ins... never available in on-the-site "built-ins"... and at far lower cubic foot cost than "reach-ins". There is never a need to accept an "or equal" or a substitute. Bally Walk-Ins are available to all dealers everywhere at uniform published prices. *Write for Fact File with new brochure, specification guide and sample of urethane wall.*

See Sweet's File 25a/Ba.

Bally

Bally Case and Cooler, Inc.
Bally, Pennsylvania



For more data, circle 122 on inquiry card

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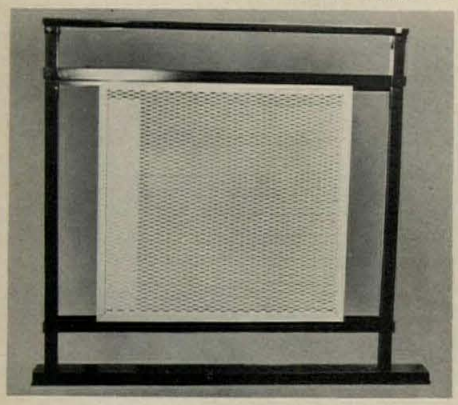


BALCONY RAILINGS / A wide range of aluminum railings for apartments, hotels and motels can be manufactured to suit individual requirements. Acid etching and an electrostatically applied, baked acrylic finish are standard to the line. ▪ Rainbow Aluminum Industries, Miami, Fla.

Circle 307 on inquiry card

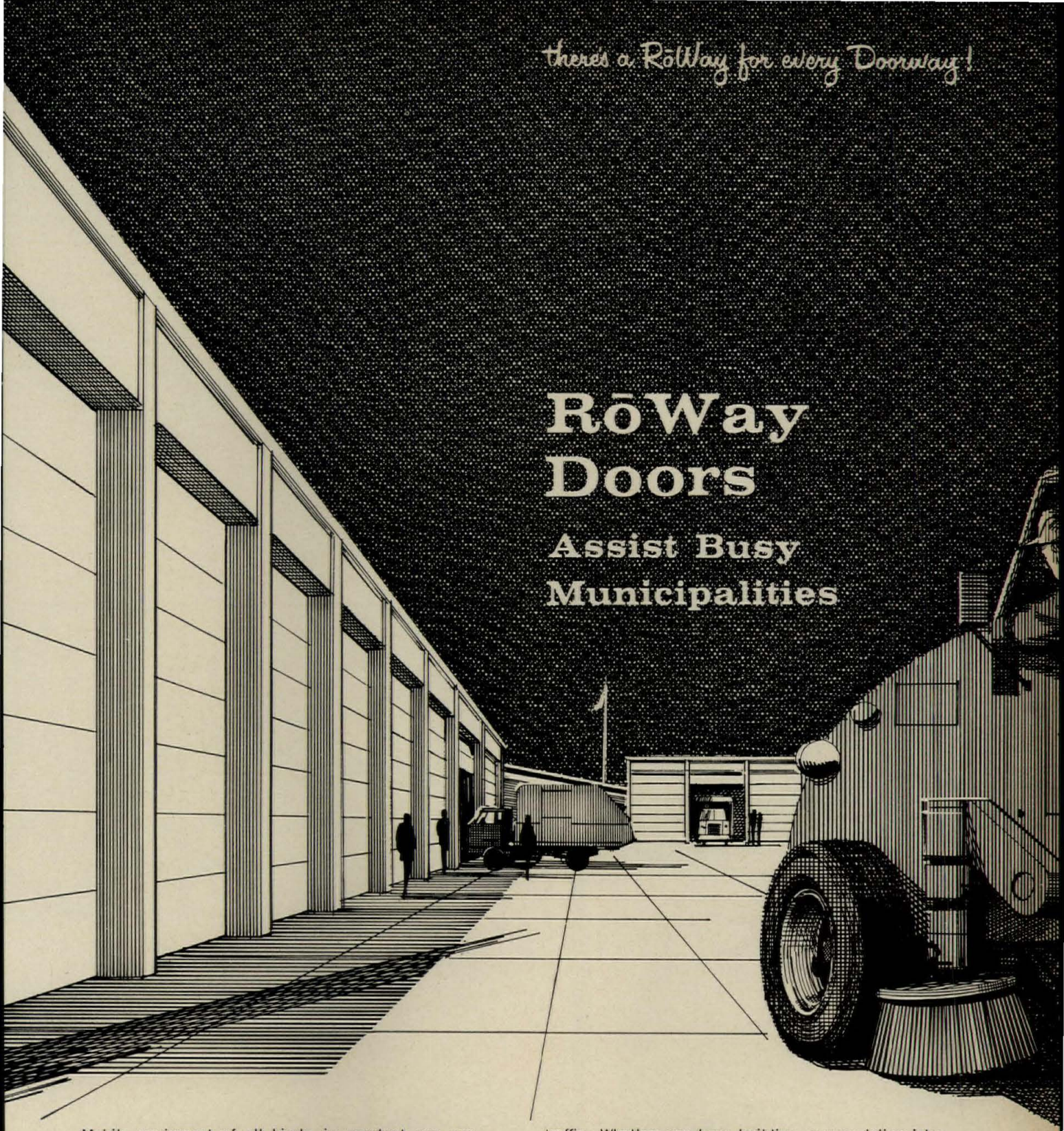
MODULAR WALK-IN REFRIGERATION / A new line of pre-fabricated coolers, freezers and cooler-freezer combinations incorporate *Froth Foamed* urethane insulation, and the *Lock-a-Line* panel locking system which assures a positive foam-to-foam seal between modular walk-in sections. The use of urethane foam insulation with its high density and low K factor is said to give complete protection over a 120 deg inside-outside temperature range with walls only 3⅝-in. thick. Units can be converted from normal to low temperature by simply changing the refrigeration unit rather than the wall sections. Modular panels are available in wall, door, corner, floor and ceiling sections and combine to meet individual size requirements for finished units within 2-ft increments. Erection is said to be quick and simple. ▪ Schaefer, Division of Studebaker Corporation, Minneapolis, Minn.

Circle 308 on inquiry card

AUTOMATIC DOOR OPERATOR / The "thin-line" design of the *Hydra-Swing* operator permits it to fit within a 1¾-in. by 4-in. header and to be completely concealed from view. Hydraulic power is supplied through flow lines which pass inside the door frame to an electrically operated power unit. The power unit can be placed as far as 50 ft away from the operator. The new unit, which is described as having unusually smooth operation, can be completely adjusted for opening and closing speed and opening check. A special panic device is available to allow an "in" door to open out to a full 90 deg. Manual operation obviates difficulties of possible power failure. Self-sealing-coupling and flow lines allow the operator, power unit and connecting lines to be prefilled with hydraulic fluid at the factory. Ronan & Kunzl Inc., Marshall, Mich.

Circle 309 on inquiry card

more products on page 240



Mobile equipment of all kinds, in constant use, presents a problem in traffic flow adjacent to garages and storage areas. With efficient RōWay Doors assisting in the daily routine of municipal administration, vehicles entering and leaving these areas will be able to do so, effortlessly, quickly. Dependable RōWay Doors are faithful municipal employees, working in every kind of weather, without complaint and with no time off for holidays or vacations.

Performing an additional time-saving value to municipalities is the RōWay Electric Operator. Teamed up with RōWay Doors, they help keep buildings warmer in winter, cooler in summer, as well as speed vehicle traffic. Whether you have building or remodeling jobs on the drawing board, RōWay Doors have a style that you will like because they are designed to blend in with any type of building plan you have in mind.

RōWay Doors are completely fabricated under one roof, using quality materials placed in the hands of experienced craftsmen. During the past 36 years RōWay has developed a complete line of wood, steel, aluminum or fiberglass doors from which to choose. Your nearby RōWay Distributor will be happy to assist you on your next job, whether it be a municipal building or any other type of industrial or commercial job. Specify RōWay and you solve your door problems.

INDUSTRIAL / COMMERCIAL / RESIDENTIAL

RōWay OVERHEAD DOORS

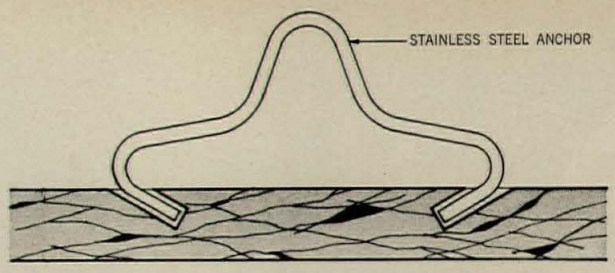
ROWE MANUFACTURING COMPANY

Find Your Nearest Distributor in the "Yellow Pages"

SEE OUR CATALOG IN SWEET'S OR WRITE FOR COPY

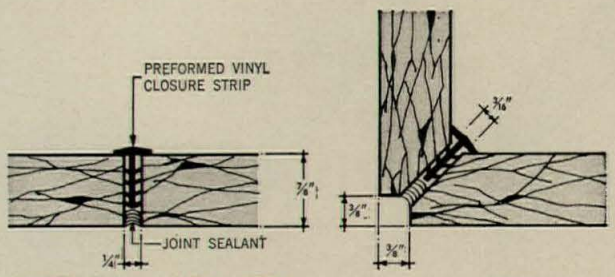
Galesburg, Illinois
Dept. AR 36

For more data, circle 124 on inquiry card



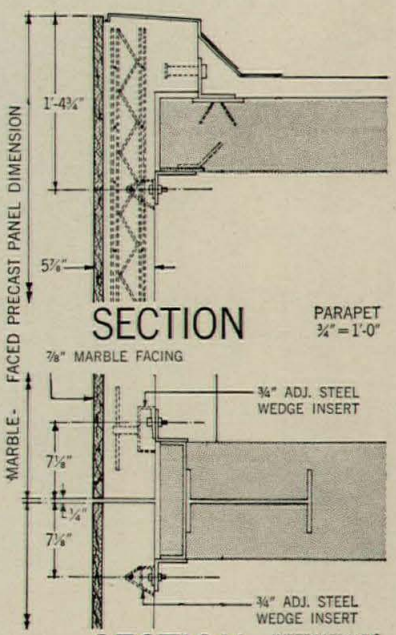
TYPICAL ANCHOR

MARBLE-FACING
HALF FULL SIZE



TYPICAL JOINTS

MARBLE-FACING
HALF FULL SIZE

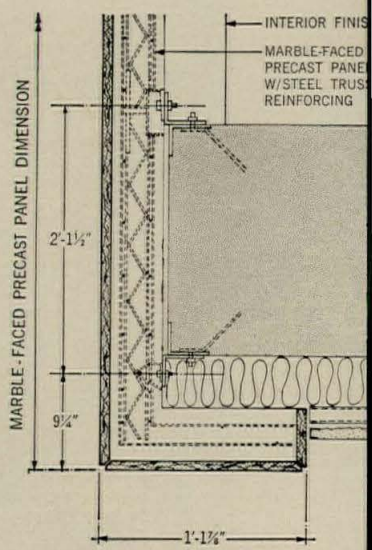


SECTION

PARAPET
3/4"=1'-0"

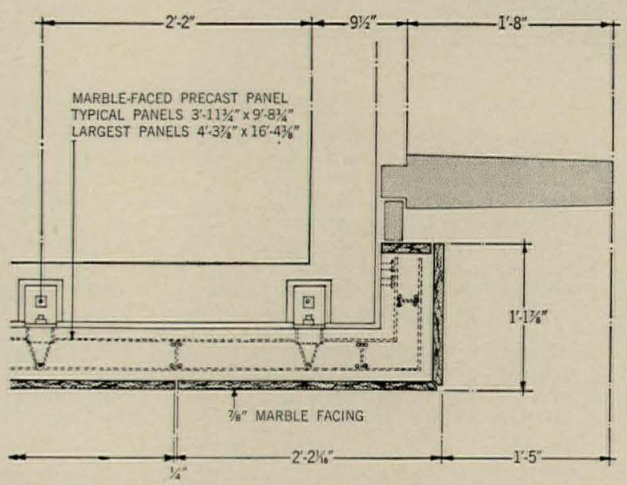
SECTION

INTERMEDIATE
3/4"=1'-0"



SECTION

SOFI
3/4"=1'



PLAN

END PANEL
3/4"=1'-0"

marble-faced precast

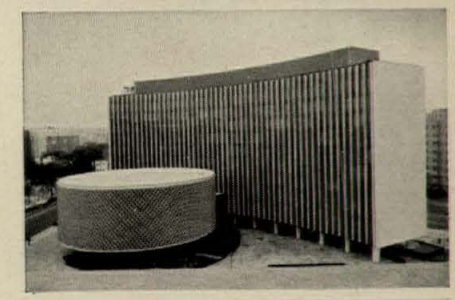
adorns award-winning design for the headquarters for hemisphere health.

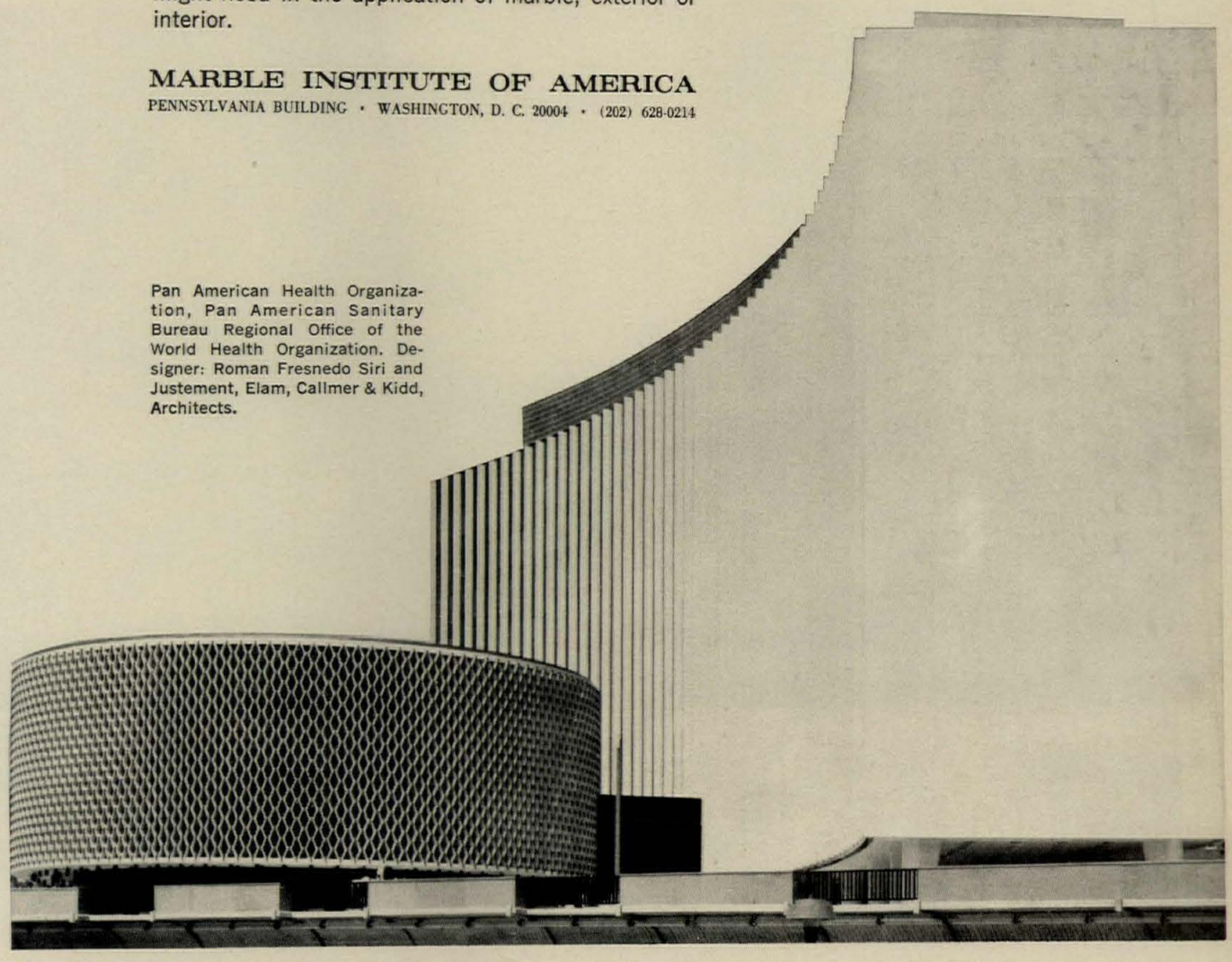
It's an outstanding addition to the panorama of the Foggy Bottom area of Washington. It houses both the Pan American Health Organization and the regional office for the Americas of the World Health Organization.

This design, featuring an unusual application of American-quarried marble, won the competition which solicited designs from all countries throughout the Americas. The end walls of the curved Secretariat Building are distinguished by marble-faced precast panels up to 4 x 16 feet in dimension.

Marble helps good design come to life . . . at a surprisingly small percentage of any building budget. Members of the MIA are ready to assist you with design counsel, technical assistance or any information you might need in the application of marble, exterior or interior.

MARBLE INSTITUTE OF AMERICA
PENNSYLVANIA BUILDING • WASHINGTON, D. C. 20004 • (202) 628-0214

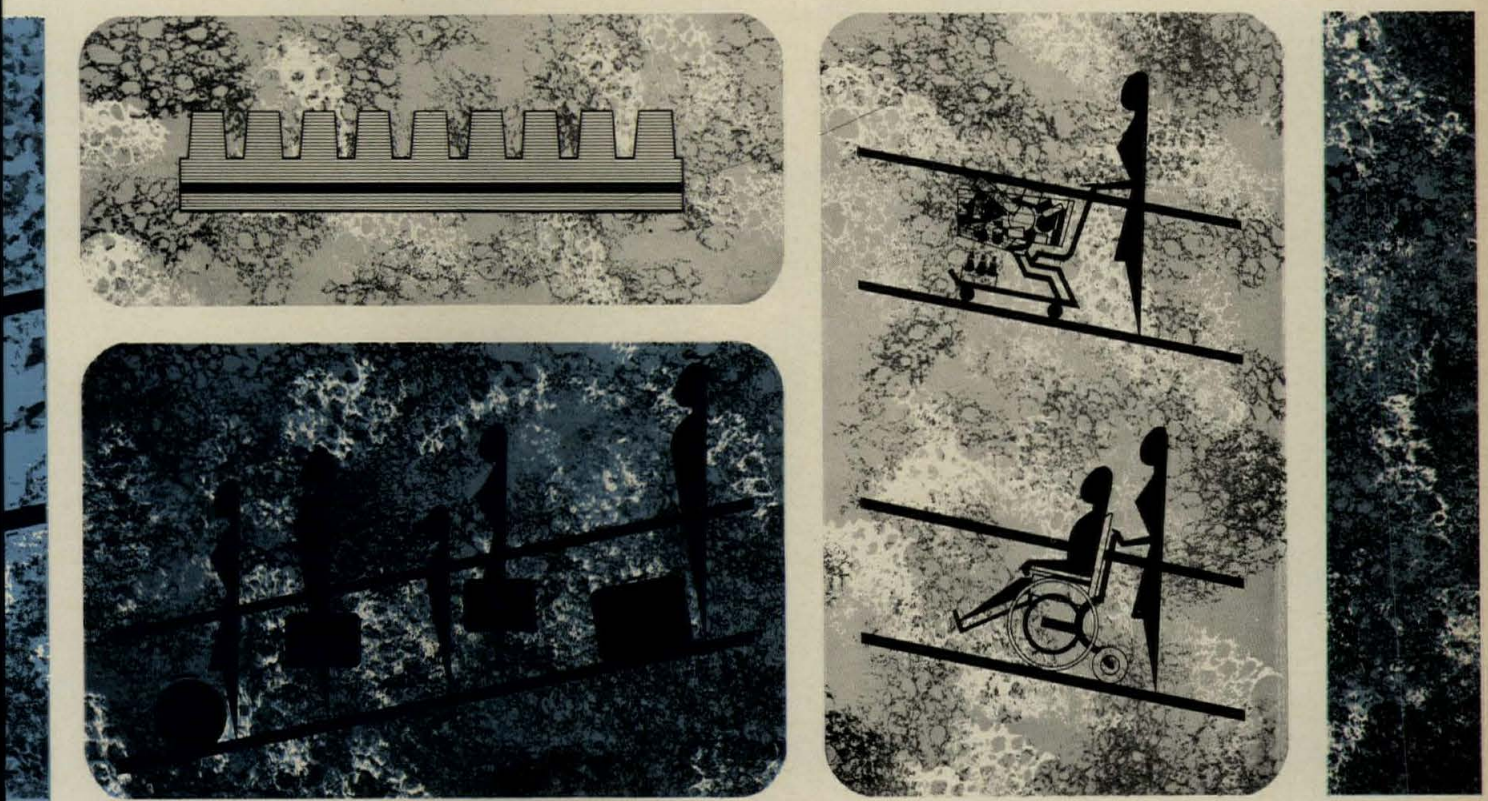




Pan American Health Organization, Pan American Sanitary Bureau Regional Office of the World Health Organization. Designer: Roman Fresnedo Siri and Justement, Elam, Callmer & Kidd, Architects.

For more data, circle 126 on inquiry card

100,000 Frenchmen per day ride a SANDVIK MOVATOR in the Paris Metro. In Sydney, Australia, a 700 ft. SANDVIK rubber-covered belt — the world's longest moving walk — carries shoppers from stores to parking area. In a modern department store at Vaxjo, Sweden, people and shopping carts glide smoothly from floor to floor on a SANDVIK MOVATOR. ■ These are just a few examples of the successful design and engineering experience which the Sandvik Movator Division can apply to your requirement anywhere in the U.S.A. *now*. ■ Over the past ten years, architects and owners around the world have selected Sandvik to solve traffic flow problems via moving walks. There are two basic reasons for this continuing success: The design, manufacturing, installation and service experience of the world's leading manufacturer of moving walks featuring rubber-covered steel belts. The inherent advantages of the SANDVIK cold-rolled steel belt with grooved rubber covering, shown below. This combines non-slip safety with the rigidity to assure a smooth, safe and comfortable ride. ■ Write for SANDVIK MOVATOR booklet.



SANDVIK

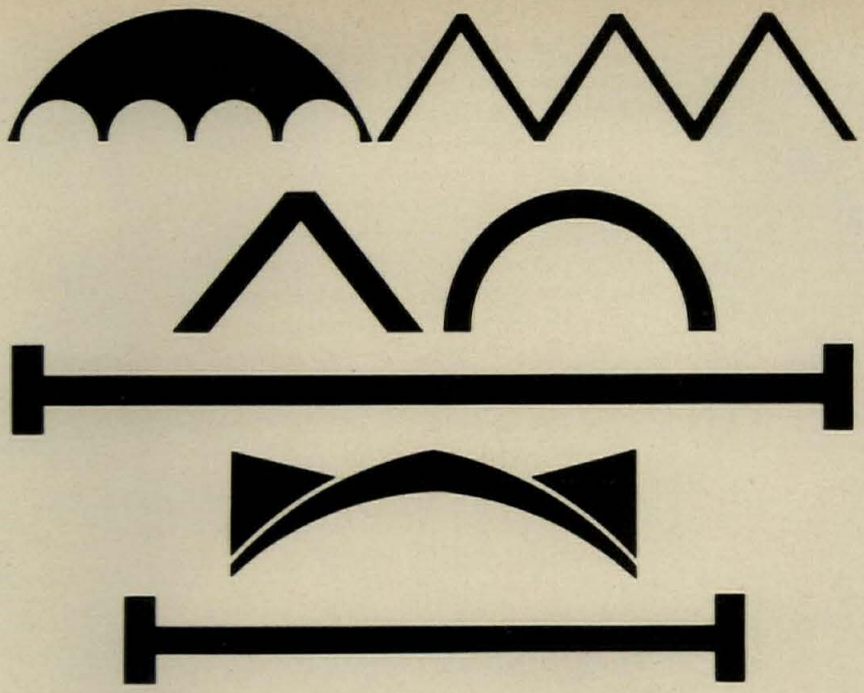
SANDVIK STEEL, INC., Fair Lawn, New Jersey
MOVATOR DIVISION

Branch offices: Cleveland. Dallas. Detroit. Chicago. Los Angeles.
Sandvik Canadian Ltd.: Montreal. Toronto. Vancouver. Winnipeg.

SS-8661

For more data, circle 127 on inquiry card

Fire ratings sale.



Zonolite® lightweight insulating concrete roof decks can now be applied with amazing speed. The result; you can get the fire rating you need at surprisingly low cost.

Over 50% of the cost of any roof deck is the cost of labor. But now Approved Zonolite Roof Deck Applicators have cut that cost.

They have developed methods that allow four to six men to pour and level 30,000 square feet of roof deck per day.

That's fast. So fast that Zonolite Roof Deck Applicators are able to submit low bids. Low bids on a roof deck with a combination of features no other roof deck can offer.

1. **Lightweight** . . . Zonolite concrete has as little as 1/6th the weight of ordinary concrete, so supporting structures can be considerably lighter in weight and cost.
2. **Specified insulation value** can be obtained by simply varying the thickness of Zonolite vermiculite concrete.
3. **Permanent** . . . composed of completely inorganic materials; won't rot or decompose, lasts the life of the building.
4. **Monolithic** . . . continuous surface; no seams to allow tar drip and combustion in the event of fire.
5. **Incombustible** . . . vermiculite concrete is all mineral, cannot possibly burn.
6. **Flexible** . . . can be used with form boards, paper-backed wire lath, galvanized metal decks or structural concrete.
7. **Slopes for drainage** . . . as prescribed by the built-up roofing industry, are easily and economically provided.
8. **Economical** . . . original cost is low, maintenance costs are nil. Insulation efficiency can allow use of smaller heating and cooling units.
9. **Certified application** . . . the approved Zonolite applicator maintains a continuous log of the job; day by day mix proportions, water content, densities and weather conditions. Deck specimens are taken periodically and tested for proper dry density and compressive strength at our labs in Skokie, Illinois.

   All that and low cost, too.

For complete specifications and data file, have your secretary drop us a note at 135 S. LaSalle Street, Chicago, Illinois 60603.

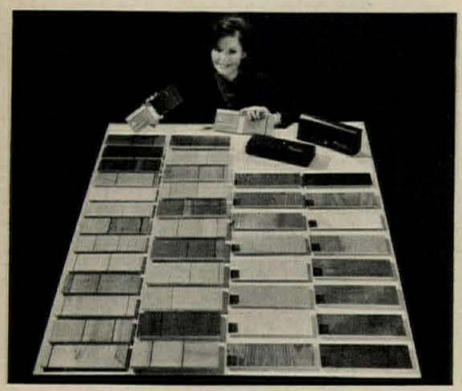
ZONOLITE

GRACE

ZONOLITE DIVISION W. R. GRACE & CO.
135 SO. LA SALLE ST., CHICAGO, ILL.

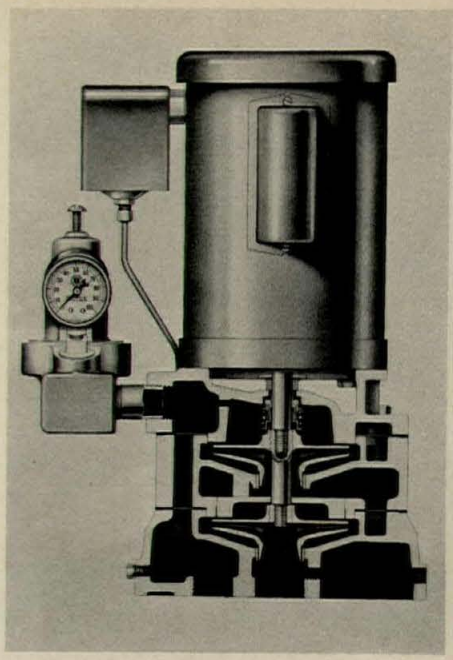
For more data, circle 128 on inquiry card

continued from page 232



DOOR PREFINISHING STANDARDIZED / Forty-two choices of natural and stain finishes for hardwood flush doors are now available to architects and other specifiers. New standardization adds 16 custom finishes—six variations on birch flush doors, four on red and white oak, and two on walnut—to the 26, matching the firm's *Craftwell* and *Forestglo* hardwood panelings. This standardization is said to save time in selection and shipment of prefinished doors. ▪ Weyerhaeuser Company, Tacoma, Wash.

Circle 310 on inquiry card



VERTICAL JET WATER PUMPS / A two-stage pump, the series *VT*, is available in ½, ¾ and 1 hp sizes for deep wells. The series offers capacities to 950 gph, will pump to depths of 150 ft, at which depth the 1 hp unit will pump nearly 300gph. Features include a mounting ring that allows piping beneath the pump, a NEMA standard motor with threaded shaft, a bolt-on adapter and automatic pressure control valve. ▪ Goulds Pumps, Inc., Seneca Falls, N. Y.

Circle 311 on inquiry card

STAINLESS STEEL CHAIRS / The *Sabre* series, of stainless steel chairs and multiple seating units for office and institutional use, is said to be designed for both durability and comfort. The 3-in.-thick seats are made of ⅞-in. thick wood frames with heavy gauge springs attached, and covered with molded polyfoam. These chairs may be obtained with various types of upholstery and finishes. Less expensive frames in chrome or enameled steel can also be supplied. For added structural strength, all joints are welded. ▪ Milwaukee Chair Company, Milwaukee, Wis.

Circle 312 on inquiry card

more products on page 244

TWO NEW SISALKRAFT® PRODUCTS NOW PROVIDE

THE SUREST WAY KNOWN TO PROTECT ROOF INSULATION AGAINST MOISTURE DAMAGE

PyroKure® 600

For Class I Metal Decks

This extremely low permeance vapor barrier (0.25 perms) offers three times the protection given by plastic film conventionally used on metal decks. PyroKure 600 is Factory Mutual Approved for use with asphalt and has rugged toughness that resists abrasive damage. Its non-wrinkle roll-out and easy application by customary roofer equipment give you added assurance that the roof insulation will be completely protected against moisture damage.

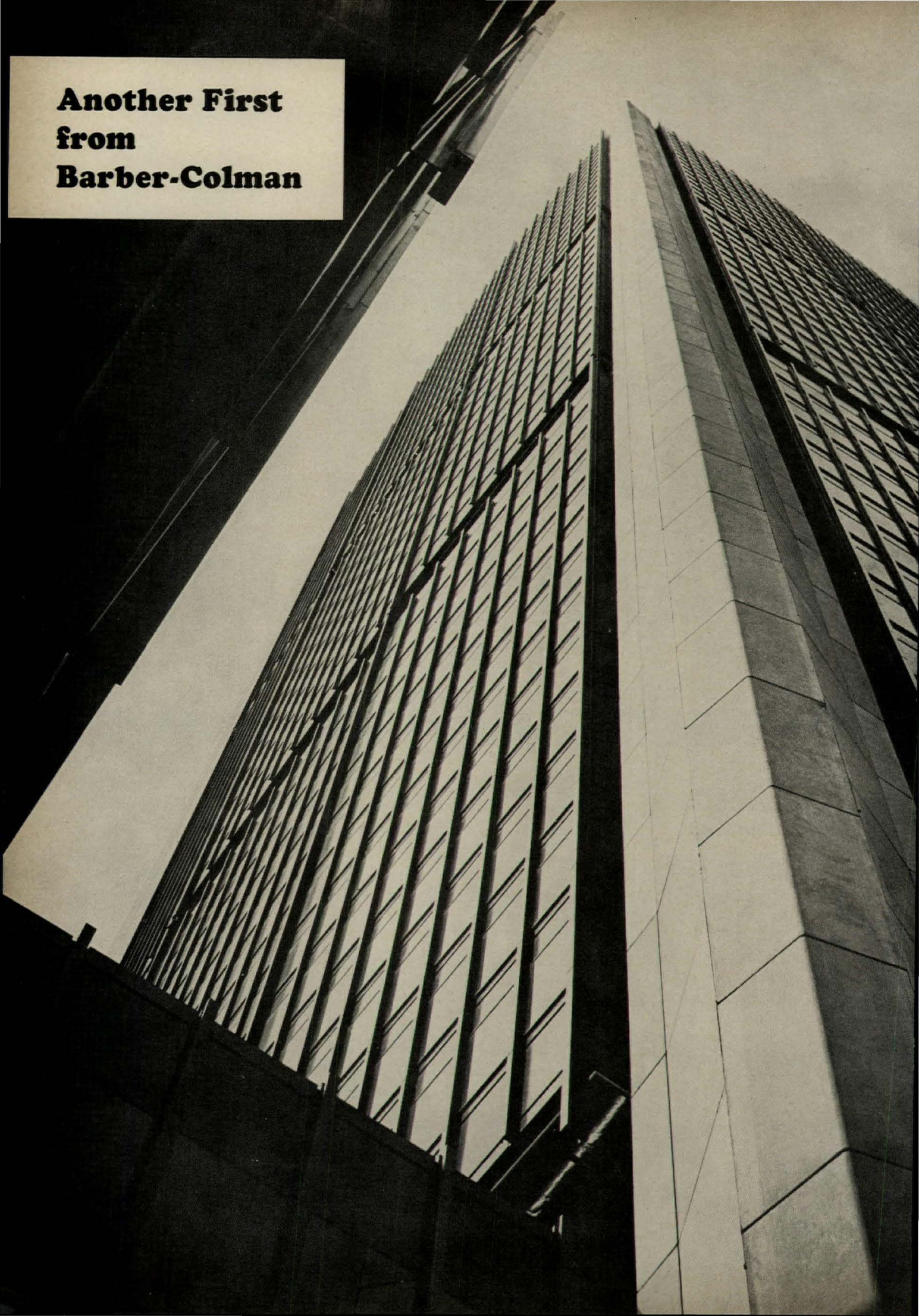
VaporStop 710

For Concrete, Gypsum and Wood Decks

Just **one** layer of VaporStop 710 does the job vs. two layers of felt. Application costs are sharply lower; roof load is 85% less. 47 lbs. of VaporStop 710 per 10 squares vs. 325 lbs. of felt. In addition, VaporStop 710 is a **complete** vapor barrier **before** it is laid down. Unlike felt, protection of the insulation against moisture damage is controlled in the factory not on the job.

Write for samples and more facts. Sisalkraft, 73 Starkey Avenue, Attleboro, Mass.

ST REGIS
SISALKRAFT DIVISION


Another First
from
Barber-Colman

Place Victoria

for more than a million square feet, which is best: electronic or pneumatic controls?

UNTIL recently, almost all "big job" comfort control systems have been one-type installations—all electronic or all pneumatic. But when the first tenants began moving into Montreal's new Place Victoria in May, 1965, a new era opened in the design of environmental control systems.

The environmental control system for this new Canadian Stock Exchange Tower is the first ever installed which selectively combines the most desirable features of four different types of controls along with new concepts in air distribution equipment and building automation—all designed, manufactured, and installed by a single manufacturer.

Because compatibly designed Electronic, Pneumatic, Electric, and Hydraulic controls are standard Barber-Colman lines, our application engineers were able to select the exact controls best suited to Place Victoria's various requirements. And with nineteen different fan systems, the requirements are bound to be varied. For instance, five systems furnish air for perimeter system induction units. Nine supply Barber-Colman Jetronic Single Inlet Mixing Units for interior zone comfort. Three condition the five below-ground garage and utility levels. Two serve the lobby.

Pneumatic Controls are installed on the 4700 induction units and Barber-Colman Jetronic Single Inlet Mixing Units. These controls are most economical where there is no local source of electricity, and they are ideally suited to simple multiunit sequencing control.

Electronic and Electric Controllers and Actuators control all central fan systems. They are best for this application because of the ease and simplicity with which they provide desirable features such as these: Resetting of hot and chilled water temperatures to match outdoor weather conditions; remote selection of space temperatures; recording and retrieval of building automation data at the Selectronic Control Center.

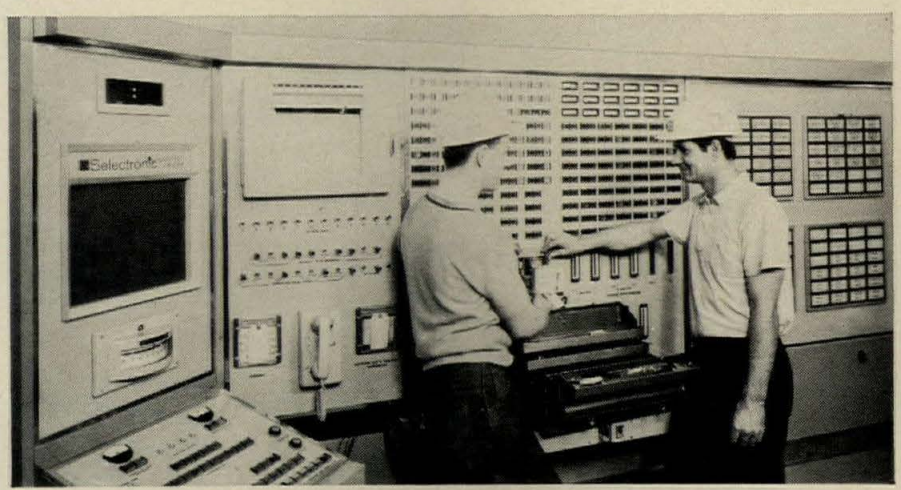
Hydraulic Controls are used selectively in shopping and store areas to control radiators and wall-type convectors. These compact controls combine the advantages of Electronic, Pneumatic, and Electric Control in a unit-mounted system that offers excellent accuracy for smaller air conditioning and heating units.

All systems are tied together at a Barber-Colman Selectronic Control Center located on the fifth floor. From here, all fan systems can be monitored and controlled by a single building operator. Because electronic and electric controls are used on the various fan systems, temperature can be read out and analyzed "Selectronically" without intermediate conversion of signals.

From the time that this project began, a Barber-Colman engineering and installation "Task Force" worked closely with Place Victoria's owners, architects, engineers, and contractors. Result: A *complete* environmental control system that fulfills exactly the descriptions of operation required in the final specifications.

Today, Barber-Colman is the only company with the experience and staff to design, manufacture, install, guarantee and service *all types* of comfort control systems and air distribution products. This unique capability enables Barber-Colman to offer important installation and service benefits on your next building.

For more details on the ultimate in fully integrated automatic controls and engineered air distribution systems, contact the Barber-Colman field office nearest you. Or write for our five new booklets outlining the features and advantages of Barber-Colman Electronic, Electric, Hydraulic, and Pneumatic Controls, and Selectronic Control Centers.



This Barber-Colman Selectronic panel controls the climate on all 52 floors of Place Victoria. It provides 42 points of remote indication control and reset on fan and secondary water systems. With it, the operator can read temperatures at each of these points and change the thermostat set point without even leaving the 14' x 20' Selectronic room. A television-like screen at left enables the operator to see equipment layouts for the various systems he is monitoring, simply by pressing a button. (In addition to the Selectronic panel, there are also 14 Barber-Colman graphic control subpanels located throughout the building. These show local system temperature readings and indicate when air filters in the system need changing.)

BARBER COLMAN

BARBER-COLMAN COMPANY

Rockford, Illinois 61101

In Canada:
BARBER-COLMAN OF CANADA, LTD.
Toronto, Ontario

. . . where originality works for you

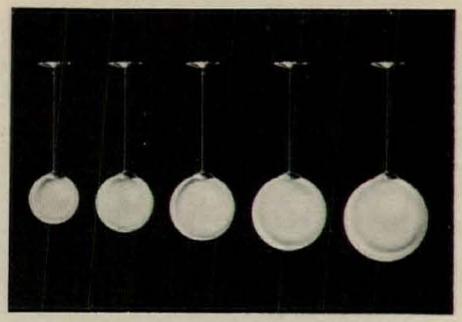
Place Victoria — *Architect:* L. Moretti, Rome. *Associate Architects:* Greenspoon, Freedlander & Dunne, Montreal. *Consulting Structural Engineers:* P. L. Nervi, Rome; D'Allemagne & Barbacki, Montreal. *Associate Consulting Engineers:* Letendre & Monti. *General Contractor:* E. G. M. Cape & Co. (1956) Ltd. *Reinforced Concrete Frame Contractor:* Janin Construction Ltée.

For more data, circle 131 on inquiry card

continued from page 240

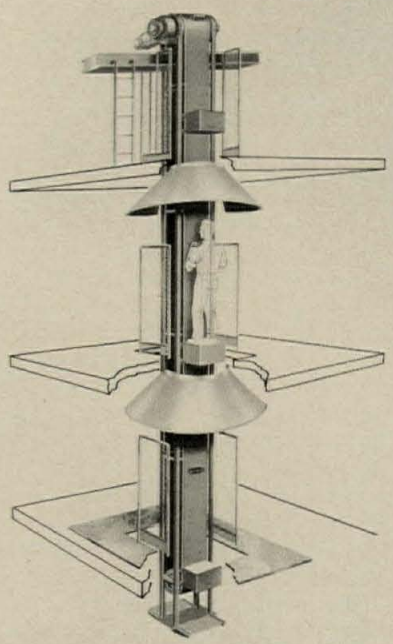
NEW MODULAR SWITCHBOARD LINE / G.E. has announced a new modular switchboard line rated 600 volts and less for industrial and commercial applications. The company attributes the high standard of safety and reliability of *AV-Line switchboards* to reinforced bolted corners on the steel structure and effective isolation and insulation of the bus structure. ▪ General Electric, Plainville, Conn.

Circle 313 on inquiry card



DECORATIVE SPHERES / Five sizes of new spherical lighting fixtures are now featured with a self-centering globe holder for easier relamping, and a rigid stem and swivel arrangement to permit "hang-straight" mounting on a ceiling slope of 35 deg. These fixtures include seamless, white blown opal glass globes, available in diameters ranging from 10 in. to 28 in. with wattages of 75 to 300, a canopy and housing of brushed aluminum and a polished chrome stem. ▪ Wakefield Corporation, Cleveland, Ohio

Circle 314 on inquiry card



PERSONNEL ELEVATOR / This new elevator, said to save space and delay, provides rapid floor-to-floor transport for workmen and supervisors in all types of multi-story buildings whether completed or under construction. For maximum protection the *Man-Lift Manveyor* features a safety cone, specially constructed enclosed handholds which are easy to grip, automatic safety limit switch devices, solid spring loaded frames, a non-skid step surface. Optional equipment includes a wide selection of power and clutch type motors, brass "fireman's" slide poles, photo-electric sensing devices and a choice of main belt widths from 12 in. to 16 in. One of the unit's advantages for use in buildings under construction is its reported ease of installation, enabling it to be quickly transferred and relocated on other job sites. Automatic safety limit devices are provided which shut off power instantly to safeguard workmen against by-passing upper and lower safety limits. A convenient pull cable allows safe stopping at any point in the elevator's travel. ▪ Man-Lift Corporation of America, Woodside, N. Y.

Circle 315 on inquiry card

Here's a COMPLETELY AUTOMATIC SOLID-STATE constant-pressure pumping system!

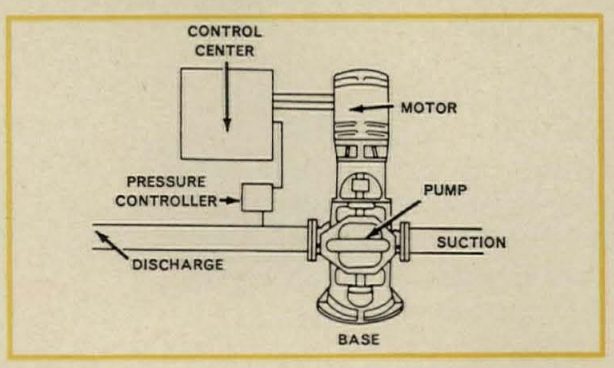
The AURORA® APCO-MATIC

Here's another first from Aurora—a solid-state, fully automatic, constant-pressure pumping system. The system consists of a standard A-C squirrel-cage type, open drip-proof, NEMA D motor; an Aurora centrifugal pump; a solid-state controller; and a pressure transducer which monitors the discharge pressure and activates the motor speed controller.

Laboratory tested and field proven, the Apco-Matic is an ideal system for installation where a constant pressure or liquid level must be maintained—high-rise apartment, hotel and office buildings, hospitals, chilled water service, municipal booster stations, sewage treatment plants, and golf courses.

Here are the advantages:

- **Automatic.** All-electric operation automatically keeps output pressure constant. The Apco-matic reduces power consumption by taking advantage of available suction pressures. You simply mount in place, provide power, and you're in business.
- **Quiet.** Exclusive solid-state system and reduced motor speeds assure quieter operation.
- **Space-saving.** The system eliminates pressure and storage tanks, unnecessary piping and special valving, hydraulic or mechanical variable drive devices between the pump and motor, and in some cases, unnecessary pumps. It further saves space when it incorporates Aurora's *vertical* series of OJV pumps.
- **Tailored to your requirements.** Your choice of Simplex, Duplex or Triplex models . . . vertical or horizontal pumps. Capacities to 7000 gpm; speeds to 3100 rpm; heads to 450 ft.

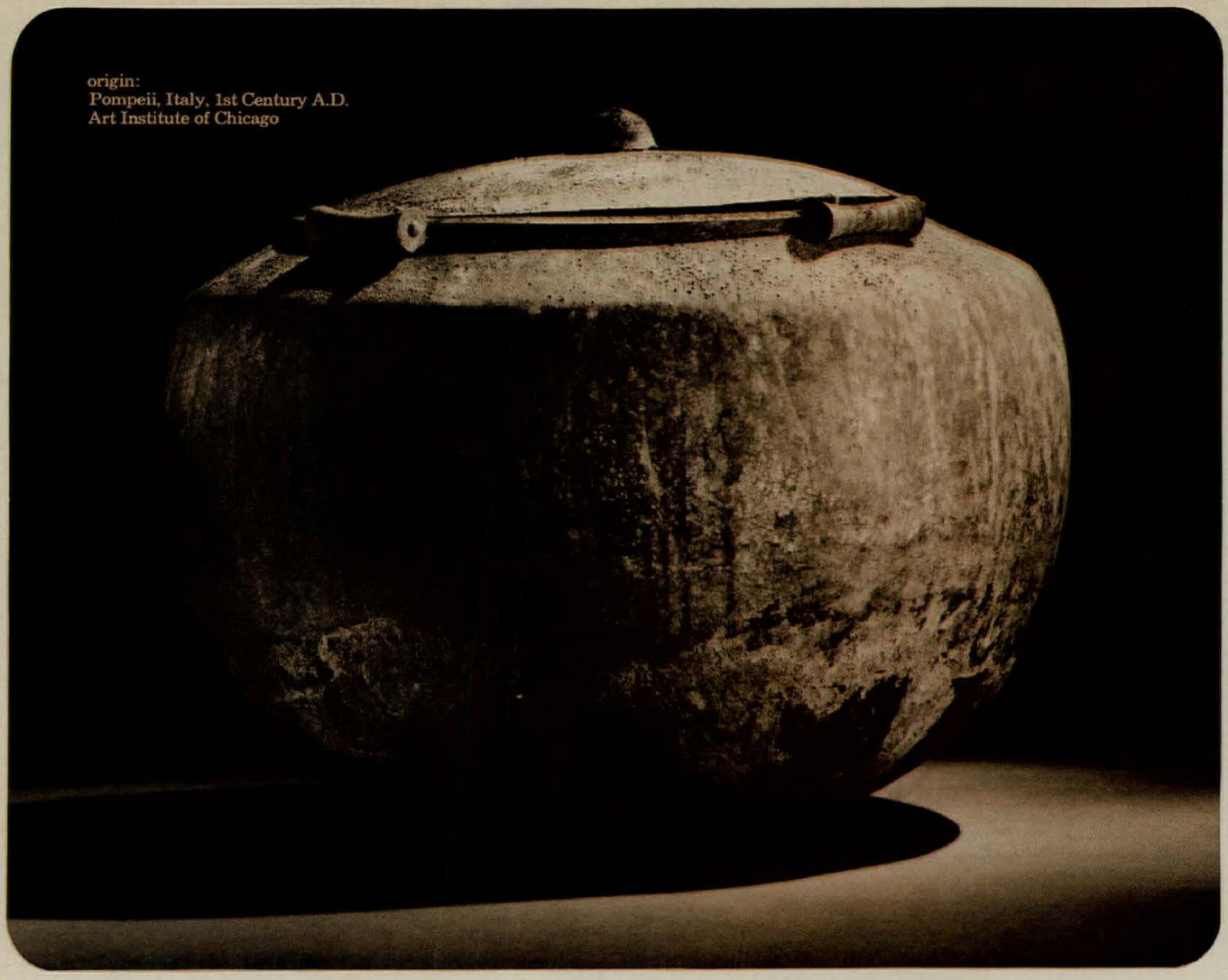


For complete information write for Bulletin 710.

AP-102

AURORA® PUMP DIVISION
THE NEW YORK AIR BRAKE COMPANY ®
937 N. LOUCKS • AURORA, ILLINOIS
LOCAL DISTRIBUTOR IS LISTED IN THE YELLOW PAGES OF YOUR PHONE BOOK

For more data, circle 133 on inquiry card

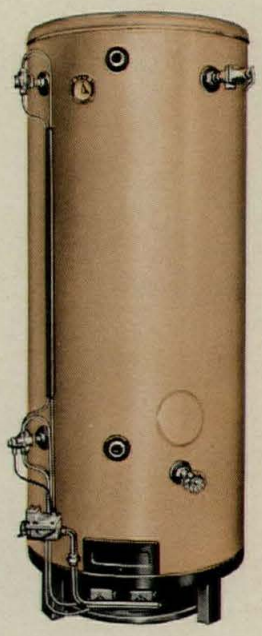


water heaters haven't changed much in nineteen hundred years

The best water heaters are *still* made from copper—the talented metal that water won't rust or corrode. Copper is the reason this ancient cauldron from Pompeii still brings water to a cheerful, crystal clear boil after more than nineteen centuries.

We know a good thing when we see it, so we make sure that copper is the only metal water touches in a Ruud Copper Sanimaster commercial gas water heater.

We will admit to a few departures from classical water heater design. For one thing, Ruud Copper Sanimaster commercial gas water heaters are bigger. Plenty big enough to handle hot water requirements for motels, restaurants, apartment houses – any place where large volumes of hot water are needed. Special sizing guides make sure you get the proper installation for your requirements. If you need more hot water than our biggest unit supplies (300 gallons per hour), Ruud Copper Sanimasters link together with manifolds. Every Ruud Copper Sanimaster is compact enough to fit through standard doorways and slip neatly into small spaces.



We have some nice accessories, *too*. Like a special mixing valve that delivers 180 degree water and lower temperature general purpose hot water at the same time. And there's a circulator that holds the temperature constant at hot water outlets.

And remember, all of our units have a heart of copper – secret ingredient of the world's best water heaters for thousands of years.

RUUD

YOU GET MORE IN THE LONG RUN FROM RUUD.

see our catalog in Sweet's S

RUUD MANUFACTURING COMPANY • A division of Rheem Manufacturing Co., Dept. AR-3, 7600 S. Kedzie Ave., Chicago, Ill. 60652

For more data, circle 135 on inquiry card

Can you stand by a specification that will save your client maintenance money for years?

If you can, we have windows that are right down your alley.

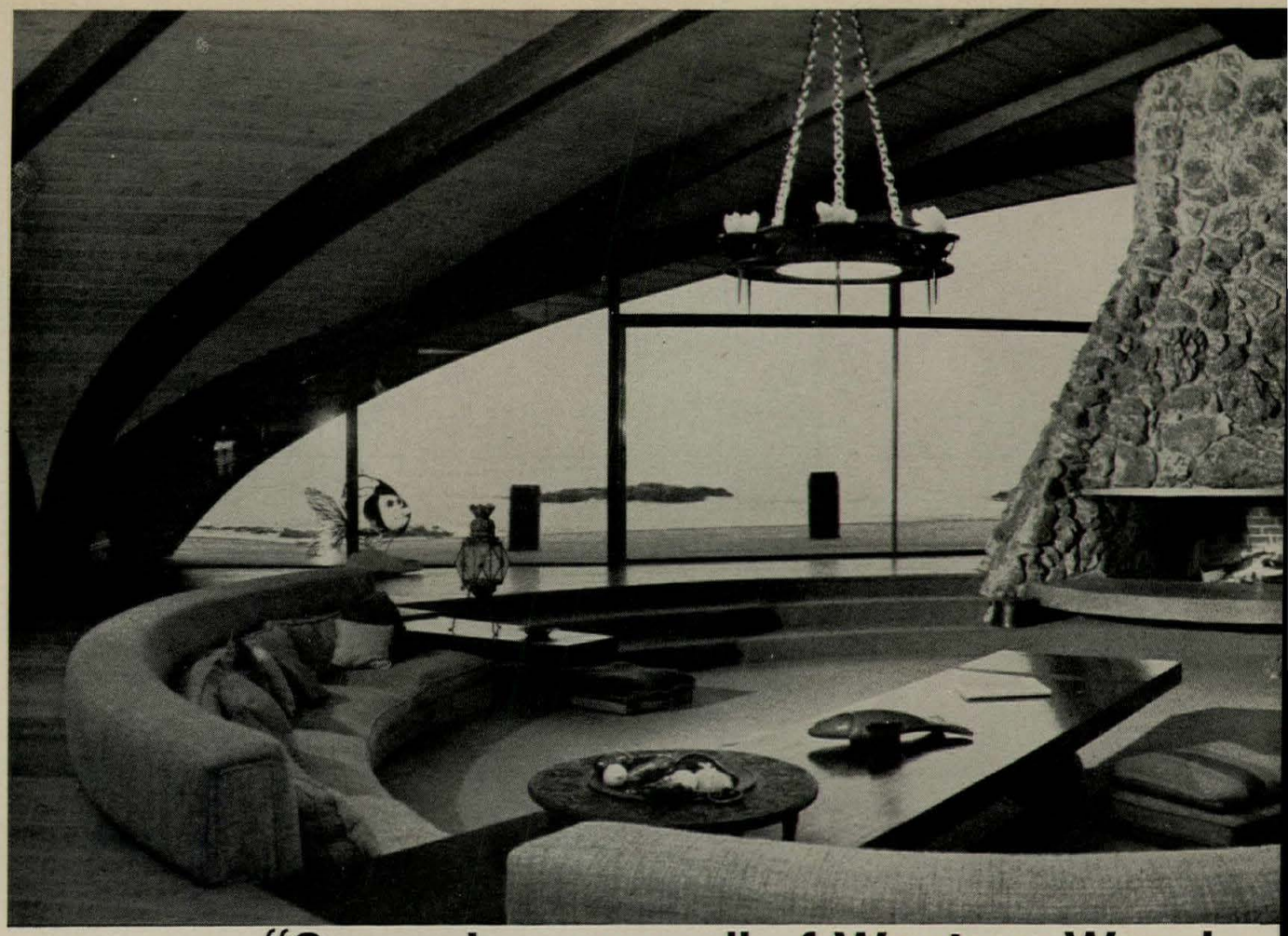
These are Cecoclad steel windows. They are finished in polyvinyl chloride, which is impervious to moisture. They won't rust.

Your client won't ever have to paint these wondrous windows, as he would ordinary windows. You save him up to $10 per window every four years. You save him a lot of inconvenience, too.

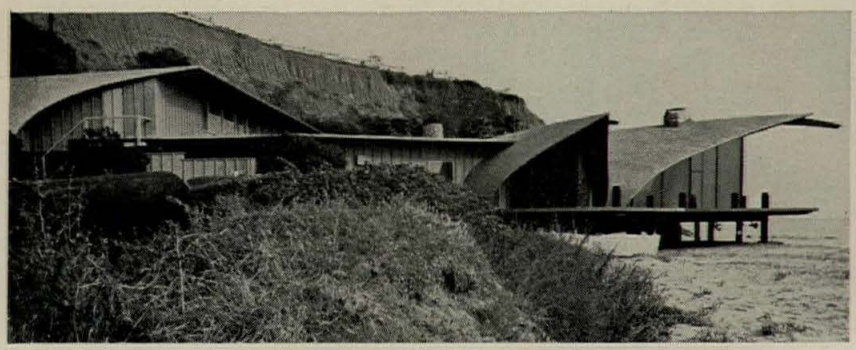
Will he like that? Ask him. Ask us for colors, cost data, test data, specifications and samples. The Ceco Corporation, general offices: 5601 West 26th Street, Chicago, Illinois 60650. Sales offices and plants in principal cities.

CECOCLAD
STEEL WINDOWS

For more data, circle 136 on inquiry card



"Sweeping waves" of Western Wood... designed to withstand 100 mph winds with beauty and grace.



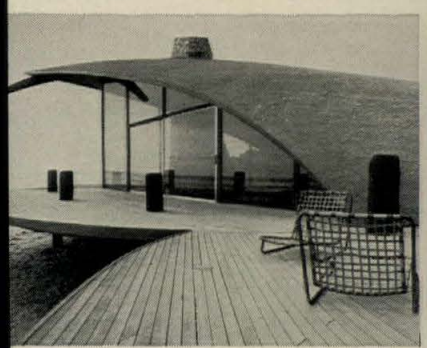
Blending man-made with nature
These roof forms were designed to be viewed from any angle, to suggest the waves that are ever present and to blend with and compliment their total environment—the sand, mountains, rock walls and ocean—all incorporated into a house totally integrated with its surroundings.

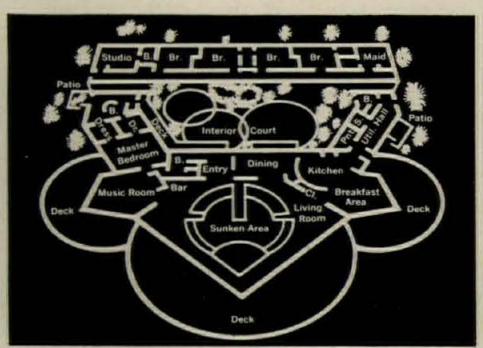
Clear spans give space and beauty
The striking interior features a ceiling spanning 57 feet of clear space, achieving an ultimate height of 18 feet. Graceful Douglas Fir glued-laminated beams support 3-in. knotty Red Cedar decking, over which built-up roofing was laid.

Residence for Mr. and Mrs. William Cooper—Designer: Harry E. Gesner—Builder: Robert Zukin

"The site selected is a beautiful area, surrounded by ocean, sand and mountains. The big drawback comes from occasional winds—Santa Anas—that build up on the Mojave Desert. When they come, they can hit with hundred-mile-per-hour force. Streamlined frames of Western Wood gave me the structural strength needed and permitted the desired suggestion of waves sweeping out to sea."

—Harry Gesner, Designer





Please send the Western Lumber Technical Manual to:

Name_____

Firm_____

Address_____

City_____

State_____ Zip_____

Western Wood Products Association
Dept. AR-366, Yeon Building, Portland, Oregon 97204

High winds roll over formed roof
The interlocking frames put their back to the strong winds and send them harmlessly out to sea. The roof's glued-laminated Western Wood beams curve to the foundation where they are secured to treated wood pilings sunk in solid bedrock, eighteen feet below the surface.

Contiguous deck extends living space
High, wide glass doors lead to a contiguous perimeter walking deck of 2 x 3 Douglas Fir, laid as plank and spaced ½" apart. This frees both deck and house from tracked-in sand.

Versatility of Western Wood
There are twelve Western Woods for your use. They offer versatility, flexibility, durability, rel'ability, beauty . . . and . . . freedom of design. Species: Douglas Fir; Engelmann Spruce; Idaho White Pine; Incense Cedar; Lodgepole Pine; Sitka Spruce; Sugar Pine; Western Hemlock; Western Larch; Western Red Cedar; White Fir.

To get a complete picture of their uses and specifications, send this coupon for your free copy of the Western Wood Technical Manual.

For more data, circle 137 on inquiry card

continued from page 196

GLASS / A 16-page catalog contains information on many types of glass, including laminated safety glass, patterned glass, spandrel glass and heat-absorbing and light-diffusing glass. The catalog provides descriptions, uses, glazing information and dimensions. An additional 13-page sketchbook shows how designers of commercial interiors have used glass to solve some of their design problems. ▪ American Saint Gobain Corporation, New York City.*

Circle 411 on inquiry card

ACRYLIC PAINT / An eight-page booklet reports that 100 per cent acrylic emulsion can be used in formulating both primers and topcoat paints. Primer formulations for bare wood (both staining and non-staining) are said to be easy to apply, to adhere well under damp or dry conditions, and to dry rapidly to produce films with long-term flexibility and grain-crack and blister resistance. Several illustrations show the results of exposure test. ▪ Rohm and Haas Company, Philadelphia, Pa.*

Circle 412 on inquiry card

METAL DOORS / An eight-page catalog No. 16b0v, presents the 1966 line of standard and U/L approved solid core and hollow metal doors and frames. A series of special tables is included giving details of construction of labeled hollow metal units. Specifications, and construction data on frames and solid core doors is also given. The 91 basic door designs are shown on the front cover of the brochure; detail and profile drawings illustrate the rest of the catalog.

A four-page catalog, No. 16p0v, contains descriptions, specifications, fabrication and design criteria of a range of doors designed for protection against blast, pressure and radiation. An assembly diagram is given on the back cover. ▪ Overly Manufacturing Company, Door and Frame Division, Greensburg, Pa.*

Circle 413 on inquiry card

OVERHEAD PROJECTOR / The communicative advantages of this machine and pointers on its effective use in typical classrooms and meeting rooms are the subjects of a 7-page brochure. There are recommended arrangements for seating, and for placement of projection equipment, windows and lighting controls. Individual layout suggestions are also given. ▪ 3M Company, St. Paul, Minn.

Circle 414 on inquiry card

BUSINESS FURNITURE / In a 36-page color catalog, chairs to fill numerous business needs range from leather-upholstered swivel models in imaginative colors for executive offices to simple, light-weight models for institutions, restaurants, libraries, etc. Sofas and tables are also pictured. The catalog describes the materials and lists the dimensions of each model. ▪ Boling Chair Company, Siler City, N. C.

Circle 415 on inquiry card

AIR CONDITIONING / A through-the-wall unit with push-button controls for individual temperature selection features initial installation for heating with a separate cooling section that can be installed at any time. A 16-page illustrated bulletin suggests that the unit would be especially convenient in hotels, motels, offices, apartments, hospitals and churches. Complete descriptions, information on installation, standard and optional controls and control systems and performance are available. ▪ American-Standard, Industrial Division, Detroit, Mich.

Circle 416 on inquiry card

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

more literature on page 282

For more data, circle 139 on inquiry car

AMERICAN FLETCHER NATIONAL BANK, INDIANAPOLIS.

Quartette's wall-to-wall installation covers 35,000 sq. ft. second floor of Operations Center. All-electric building utilizes heat-of-light for space heating. Provides uninterrupted "outdoor sky" of glare free, 450 footcandles lighting over all general office areas, data processing enclosures and private offices; efficient exchange of cooled or heated conditioned air in each office space; finest overall acoustical absorption and attenuation.

Architect: Reid, Quebe, Thompson & Associates, Inc., Indianapolis, Ind. Engineer: Scharres & Associates, Incorporated, Chicago, Ill.

This is Quartette, the total integrated ceiling system. Lighting of 450 footcandles without glare. Complete air exchange. Unbelievable acoustics. And full partition support. All packed in custom-sized modules to fit your next job. There's no ceiling in the world to compare with it. Write for details. Be amazed.

QUARTETTE, THE TOTAL INTEGRATED ENVIRONMENT CONTROL CEILING, SECOND ONLY TO NATURE.

Luminous Ceilings Inc.
3701 North Ravenswood Ave.
Chicago, Illinois 60613
Telephone, (312) 935-8900

Gentlemen: Please send us all available information on the Quartette total integrated ceiling.

Name Title

Company

Address

City State Zip

For more data, circle 144 on inquiry card

For more data, circle 145 on inquiry card

Permalite Sealskin Roof Insulation offers us what?

The Permapak System:

Measurable savings are available in insurance, heating-cooling, and maintenance costs when the Permapak system is employed in Class 1 metal roof deck construction. Three Permalite elements are involved, all carrying U.L. and F.M. label identification, and offering single-source responsibility for delivery and performance.

1. PERMALITE SEALSKIN mineral roof insulation, with a new self-surface that prevents bitumen soak-up, and insures a uniform, skin-tight bond of board to roof membrane.
2. PERMALITE high-strength aluminum PVC vapor barrier.
3. PERMALITE cold adhesive.

Write for samples and literature.

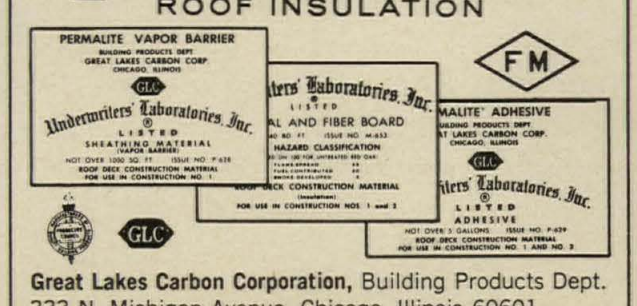
Request "THE GLC STORY," a brochure covering the many products, services and facilities of Great Lakes Carbon Corporation.

A preferred insurance position. It carries both U.L. and F.M. listings for Class 1 metal deck construction.

PHYSICAL DATA:
Permalite Rigid Insulation Board

C (Conductance Value) 1″ Nominal Thickness . 0.36
Water Absorption (% by Volume)
. . . 1.5 @ 2 Hrs. Total Immersion (No Capillarity)
Vapor Permeability
. . 25 Perms @ 73° F. and 51% Relative Humidity
Concentration Load Indentation . 1/16″ @ 77 lbs.
Compression Resistance 185 PSI (50% Consolidation)
Fungus Resistance . . . . . Complete
Flame Spread . . . . . 25 (Non-combustible)
Smoke Developed 5
Wt./Sq. Ft./1″ Thick . . . . 0.8 lbs. Approx.

RIGID
Permalite®
ROOF INSULATION

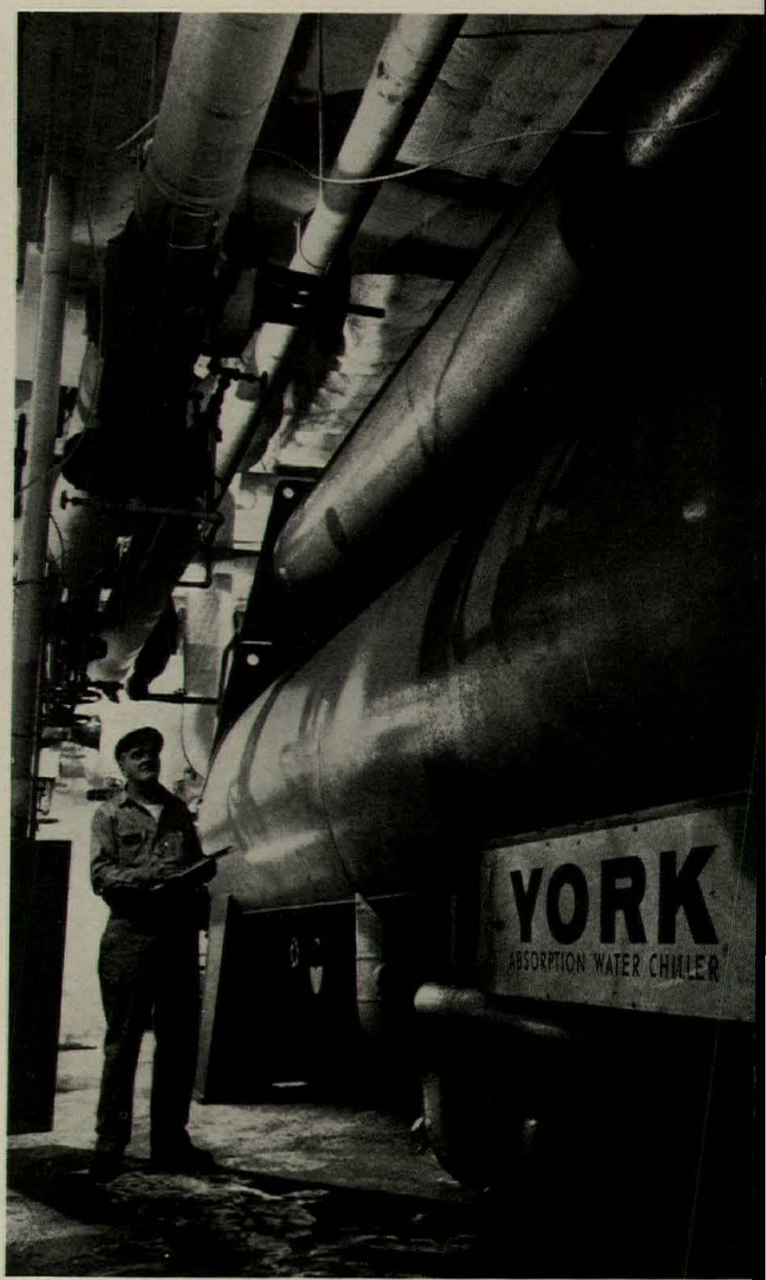


Great Lakes Carbon Corporation, Building Products Dept.
333 N. Michigan Avenue, Chicago, Illinois 60601

For more data, circle 146 on inquiry card

YORK AIR
DOES MORE

Lincoln Towers East, New York, New York. This modern community of five high-rise apartment buildings is air conditioned by York equipment, including five York absorption type machines and 4,389 individual York fan-coil room terminals. Owner, Alcoa Residences, Inc.; Architect, S. J. Kessler & Sons; Consulting Engineer, Edward A. Sears, Associates; Mechanical Contractor, Jarcho Brothers; General Contractor, ARI Construction Corp.



Five York absorption type units, with a total capacity of 3,312 tons, provide chilled water for the five buildings that make up the Lincoln Towers East group.

CONDITIONING THAN COOL-LOTS MORE

Individual comfort control for each occupant! The York fan-coil room terminals are easily regulated to meet personal temperature requirements, in every season of the year.

At Lincoln Towers East, in midtown Manhattan, a York central air conditioning system assures each occupant the climate he wants, in every season of the year. Five York absorption type units provide the chilled water for cooling; 4,389 York fan-coil room terminals assure individual comfort control. And York air handling units are employed to air condition the lobby areas of the five apartment buildings.

Plan ahead with York when you plan air conditioning for an apartment, hotel, office building—or any type of building! Recent York technical advances in sound and odor control can help you design air conditioning systems that assure superior performance, greater comfort. Contact your nearby York Sales Office for specification data on York equipment. Or write York Corporation, subsidiary of Borg-Warner Corporation, York, Pennsylvania. In Canada, contact National-Shipley Ltd., Rexdale Boulevard, Rexdale, Ontario.

YOU CAN DEPEND ON YORK

YORK®

air conditioning and refrigeration

BORG WARNER®

For more data, circle 147 on inquiry card

Hustle strikes again.

nd Wheeling's hustle policy got ll there two weeks early. That's tling!

Vhat makes our roof deck super? control the quality from ingot to allation, have a real tough rib de- for maximum strength, and use ctural Grade "C" steel.

Our lengths are longer, too. Up to eet.

n addition, Wheeling roof deck rs greater variety.

Galvanized, painted with a primer coat (or unpainted), and non-galvanized primer-painted. For normal to extra-heavy weight loads.

And gauges from 16 to 22.

We even make a type which absorbs sound.

Like Pratt & Whitney Aircraft you'll find what you need for your job.

Other facts.

Wheeling roof deck is pre-engineered to your specifications.

Easier to handle on site—easier and quicker to install.

Provides work surface for other building trades and it's more durable.

Why are we telling you all this? Frankly, we want your business.

To try Wheeling roof deck for yourself, just give us the word:

"Hustle!"

Have you looked at Wheeling lately?

Wheeling
Wheeling Corrugating Company
Wheeling, West Virginia

CHARLES DU BOSE—ARCHITECT; JAMES S. MINGES & ASSOCIATES—ENGINEERS; GEORGE A. FULLER—GENERAL CONTRACTOR; NATIONAL STEEL FABRICATORS INC.—STRUCTURAL STEEL

For more data, circle 148 on inquiry card

Jim can be conned

Into writing up your paint specs from Alkyds to Zinc.

Into mixing you a custom batch.

Into showing your painters the fine art of putting on epoxies.

Jim can be conned.

But he knows you can't be.

Which is why he won't specify three coats for a two-coat job.

Or vice versa.

Which is why he'll tell you exactly what a glaze coating can do.

And what it can't.

Which is why he doesn't waste your time with sweet talk—when you want facts.

That's our Jim. And Hank. And Larry.

And every man at Devoe.

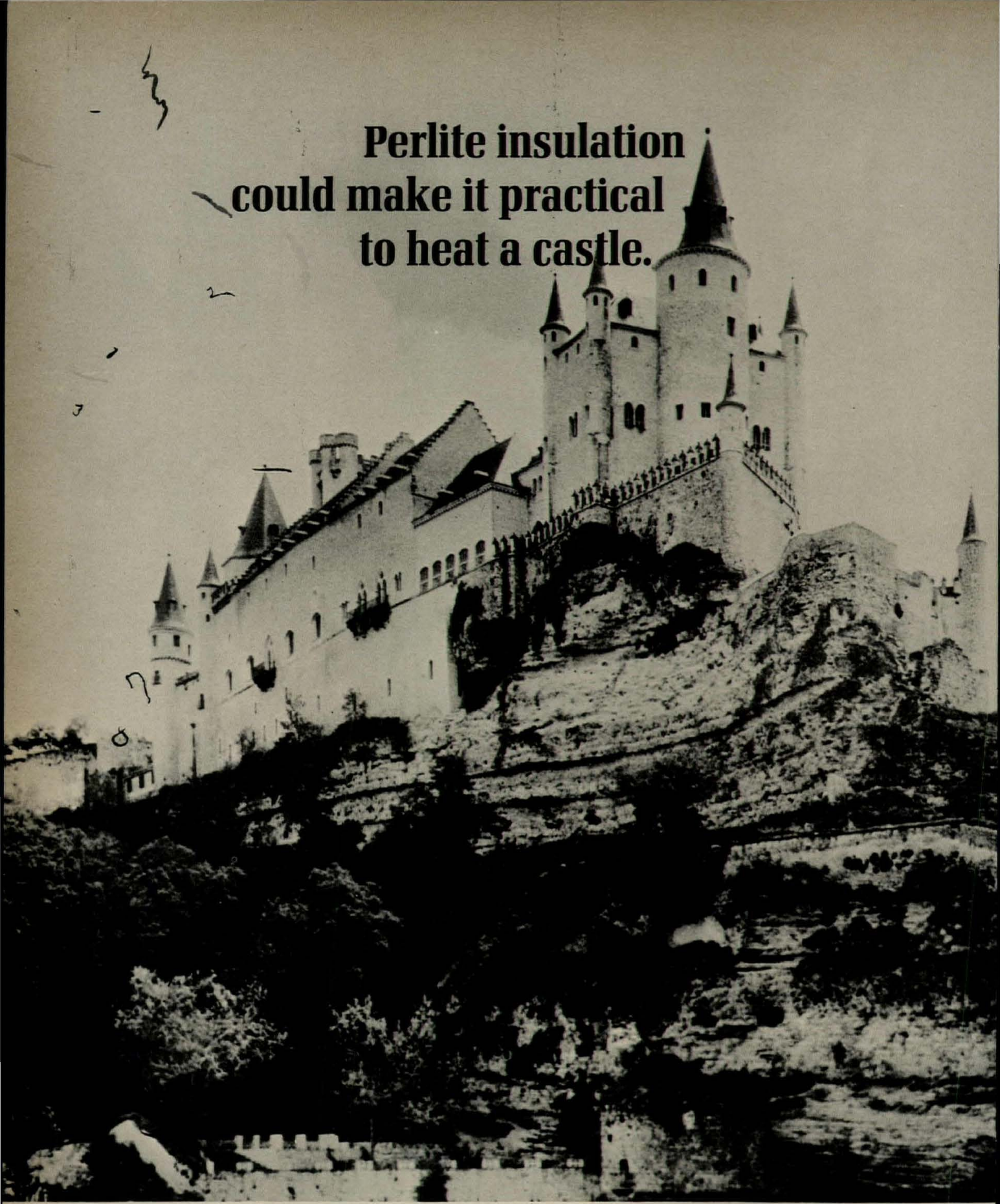
They know which side their bread is painted on.

You can depend on the **Man from Devoe.**

DEVOE

A MEMBER OF THE CELANESE GROUP

Perlite insulation could make it practical to heat a castle.



Castle building has fallen apart in recent years, but anyone setting out to design one today would have the answer to every castle owner's complaint. How to get enough heat.

The development of Silicone Treated Perlite provides the insulation needed to control heat loss and gain through masonry walls. By filling concrete block and masonry cavity walls with perlite the contemporary designer improves insulating efficiency more than 50% and savings in heating and cooling costs are considerable. Other savings are realized, when smaller less costly mechanical equipment is used. Silicone Treated Perlite also provides low cost installation. It pours easily into masonry walls without special equipment or skills. Moisture does not impair its insulating efficiency and tests prove its water repellency lasts indefinitely.

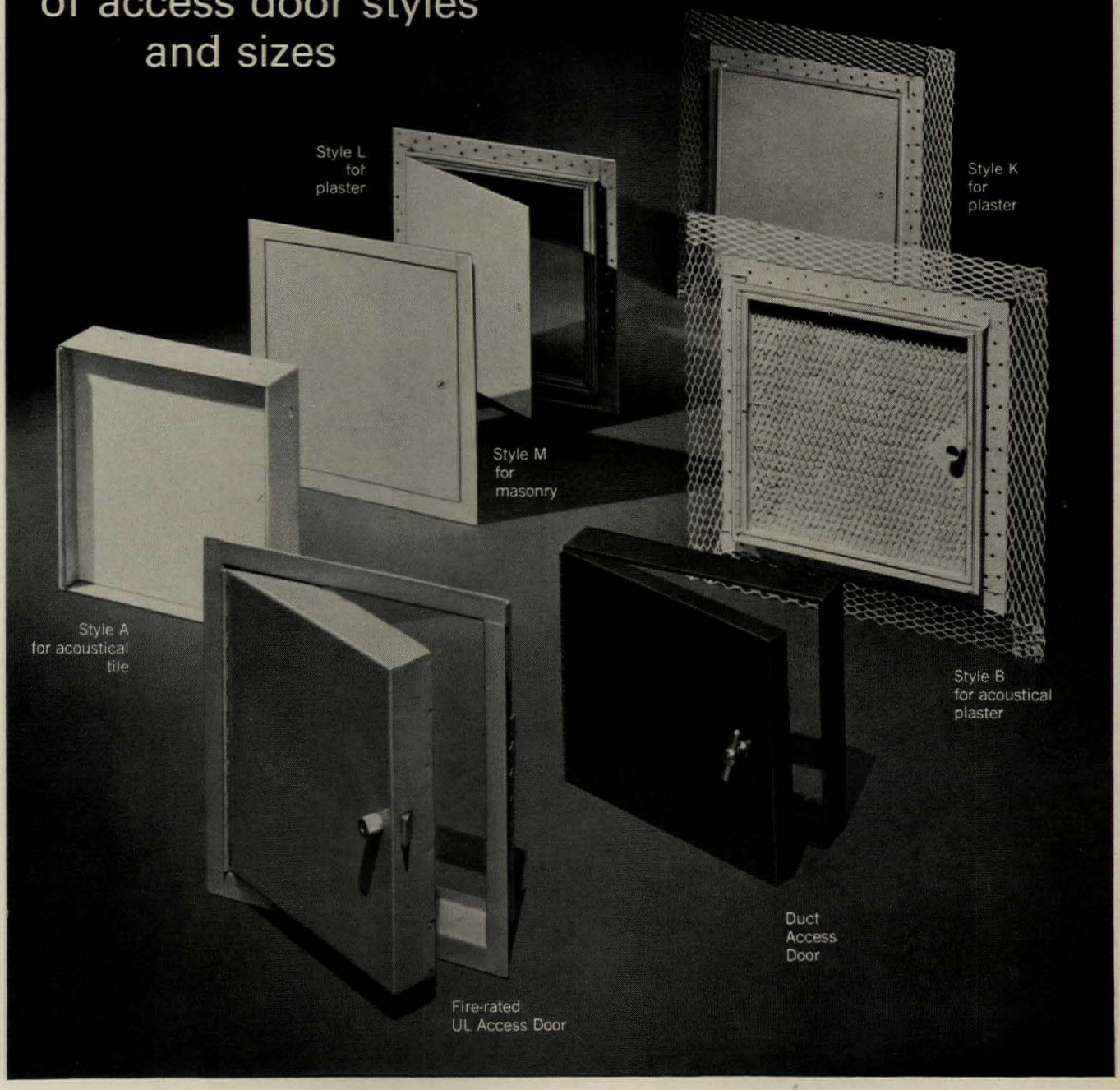
For technical data write to PERLITE INSTITUTE, INC., INTERNATIONAL ASSOCIATION OF PERLITE PRODUCERS, 45 WEST 45th STREET, NEW YORK, N.Y. 10036.

For more data, circle 149 on inquiry card

For more data, circle 150 on inquiry card

COMPLETE SELECTION

of access door styles and sizes



In buildings everywhere, Milcor Steel Access Doors provide service openings in any surface without encroaching upon design. They are carefully made and rigidly constructed for minimum maintenance—economically installed, without on-site cutting and fitting—readily available in seven styles and a wide range of sizes. See Sweet's, section 16K/In. Write for catalog 210-6.

MILCOR®

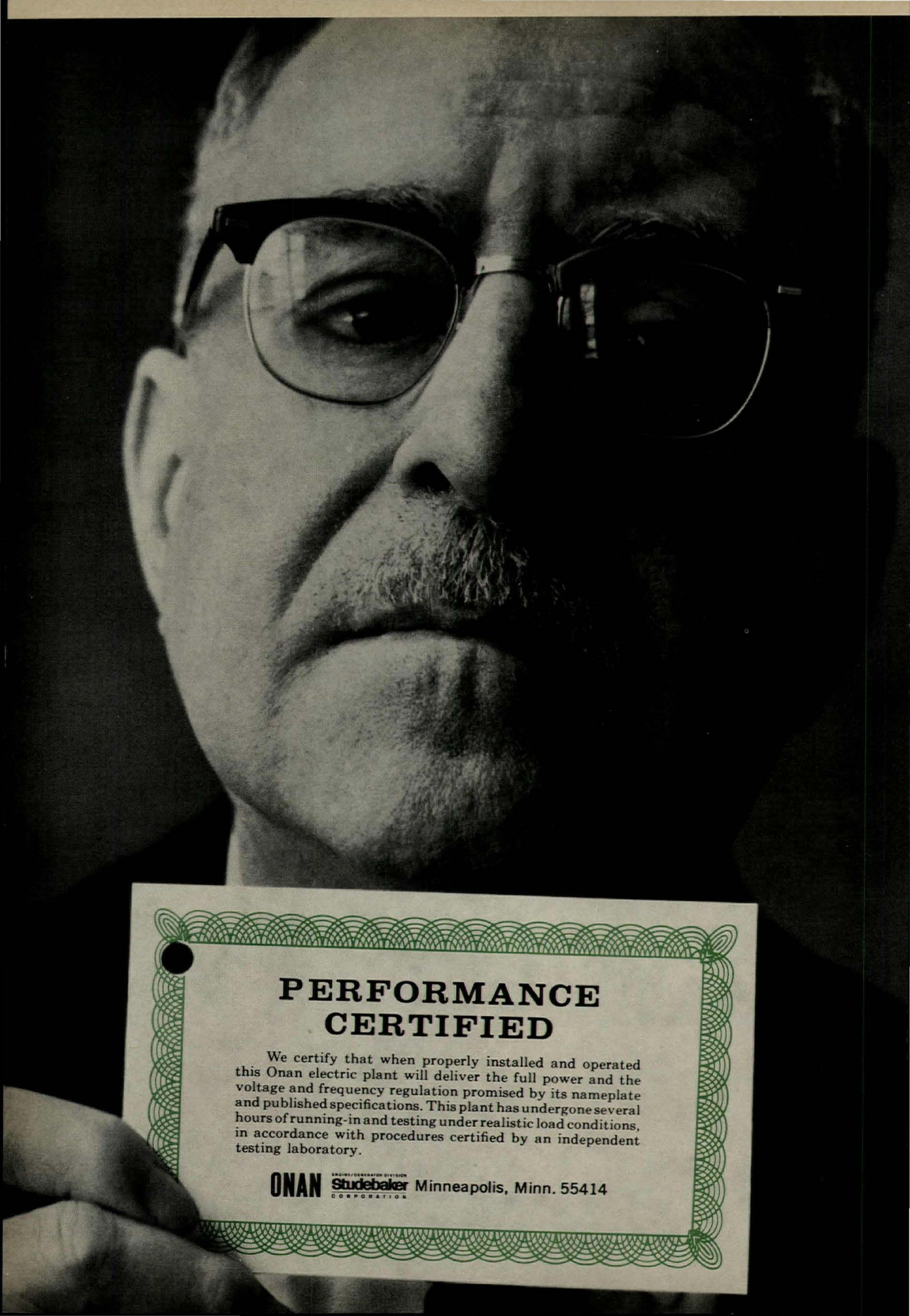
STEEL ACCESS DOORS

INLAND®

INLAND STEEL PRODUCTS COMPANY, DEPT. C, 4033 W. BURNHAM ST., MILWAUKEE, WIS. 53201
BALTIMORE • CLEVELAND • KANSAS CITY • LOS ANGELES • NEW YORK • SAN FRANCISCO

BS-18

For more data, circle 151 on inquiry card


PERFORMANCE
CERTIFIED
We certify that when properly installed and operated this Onan electric plant will deliver the full power and the voltage and frequency regulation promised by its nameplate and published specifications. This plant has undergone several hours of running-in and testing under realistic load conditions, in accordance with procedures certified by an independent testing laboratory.
ONAN
ENGINE/GENERATOR DIVISION
Studebaker
CORPORATION
Minneapolis, Minn. 55414

We call Mr. Onan "Bud"

But we call Mr. Calva "Sir!"

Because he's the one who puts the teeth in Onan's exclusive Performance Certification. But don't get the idea that we take our president for granted. Bud Onan invented the Performance Certification idea for our electric plants.

But Mr. J. B. Calva is an outsider . . . the independent testing authority that makes it meaningful to you. And keeps us on our toes. And keeps the Performance Certified tag (one goes on every Onan plant) something that has to be earned; not just a gimmick.

You can understand why we might be just a little uneasy when he's around.

It isn't as if the world's leading builder of electric plants had to depend on somebody else's judgment. Our test setup and personnel don't have to take a back seat to anybody.

In our block-long testing wing, we can gear for check-out of 9,000 units a month. That's a lot of testing. Because every Onan plant is run-in under full load for 2-8 hours before it's okayed for shipping.

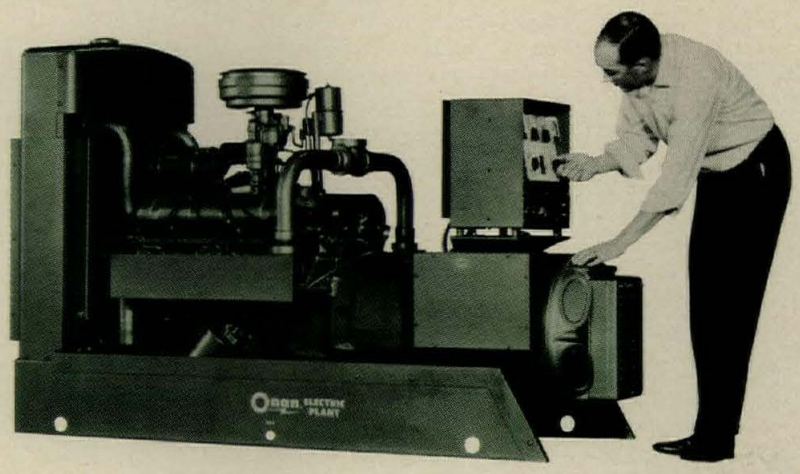
Having stringent quality control procedures and strict component selection standards doesn't hurt either. Because an Onan generator set rarely flunks its "under-load" test.

But it's still nice to have J. B. Calva & Company double-checking us and our testing procedures.

The uneasiness is worth it. Gives us the confidence to say "We certify that when properly installed and operated, every Onan electric plant will deliver the full power and the voltage and frequency regulation promised by its nameplate and published specifications."

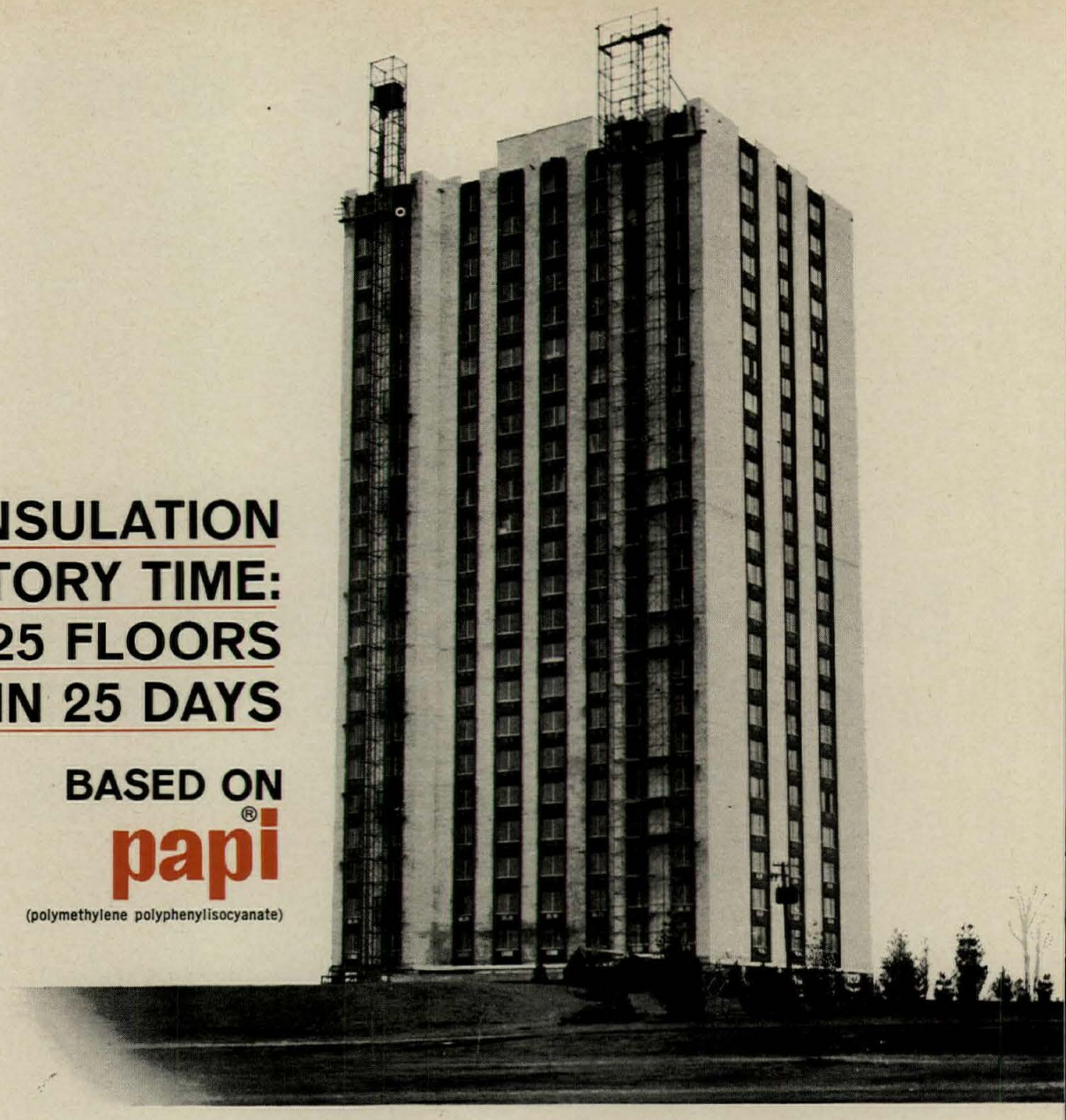
And you . . . *Sir?* You have to settle for nothing less than absolute assurance that you get every watt of power you pay for with Onan.

We build our future into every Onan® product



◀ J. B. Calva and Company put the teeth in the Performance Certified tag that goes on every Onan electric plant by periodic unannounced inspection testing and review of product performance tests.

ONAN ENGINE/GENERATOR DIVISION Studebaker CORPORATION
2515 UNIVERSITY AVENUE S.E. • MINNEAPOLIS, MINN. 55414



INSULATION STORY TIME: 25 FLOORS IN 25 DAYS

BASED ON papi®

(polymethylene polyphenylisocyanate)

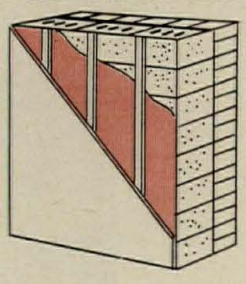
PROBLEM:

Insulate high-rise exterior walls with low-cost efficiency (when conventional materials would not adhere).

SOLUTION:

Sprayed-on urethane foam insulation with Upjohn's PAPI® as an incomparable component.

By using Upjohn's PAPI®, Bilton Insulation and Supply Co. of Arlington, Va., tailored their own "Bilt-Foam" urethane system for the specific insulation requirements of The Washingtonian Towers. "Bilt-Foam" went on and stayed on, at the amazing rate of a floor a day, providing a permanent, air tight, water resistant seal with the best thermal value in insulation today. An extra feature was Bilton Thermal Furring, pre-coated on the masonry side with urethane to insure even insulation for the entire dry-wall.



Let Upjohn tailor a urethane foam system for *your* requirements or supply an Upjohn, ready-to-go ISONATE® system.

Upjohn *Polymer Chemicals Division*

THE UPJOHN COMPANY

KALAMAZOO, MICHIGAN

PAPI® • PAPI®-50 • ISONATE® FOAM SYSTEMS • CARWINATE® 125M • CARWINATE® 136T • CARWINATE® 390P

For more data, circle 153 on inquiry card

Will the Cleanout you choose cost $23 or $2300?

Shown above—

No. Y-400-XFB
Brass cover secured to internal plug.

No. Y-620
Cut-off Ferrule Type with internal plug.

No. Y-120-B
Wall Plate with Tapered Ferrule.

No. Y-310-FB
Cut-off Ferrule Type with internal plug.

No. Y-710-XFB
"Leveleze" Adjustable Head with internal plug.

No. Y-1350-B
Hinged Cover Access Box with tapered ferrule.

No. YL-1560
Lead seal cleanout "T" with flush cover.

When a drainage line suddenly becomes jammed . . . and needs clearing out in a hurry to prevent damage and inconvenience, your choice of a cleanout may determine whether it has cost you $23 or $2300 because of unforeseen difficulties.

The main purpose for installing a cleanout in the drainage system is to provide a means of access into the piping for rodding and clearing stoppages that may occur during the life of a building. Cleanouts must be selected so that plugs or covers can be readily removed and clearance provided so there is ample space in which to use the necessary tools. Access covers may be required for gaining entry to valves and other fittings which must be concealed.

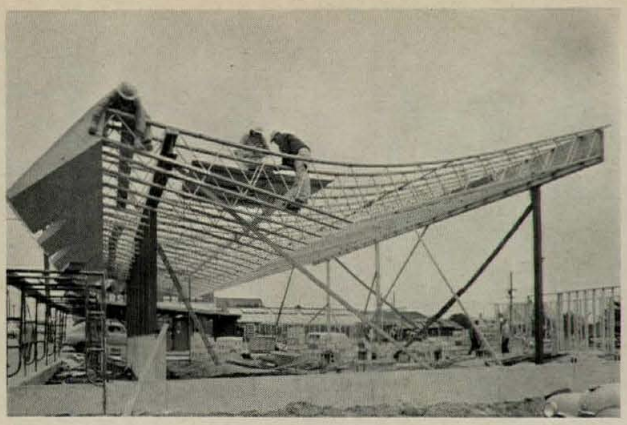
How do you determine which is the right cleanout for each of hundreds of different locations in a building? Get acquainted with the Josam line of cleanouts — the best and most complete in the field. Costs no more in the beginning . . . saves a lot more in the long run! Write for free Cleanout Selection Chart.

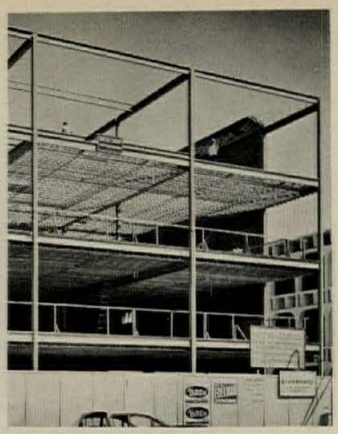
JOSAM

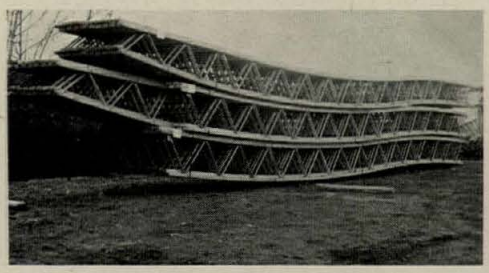
JOSAM MANUFACTURING CO.
Michigan City, Indiana

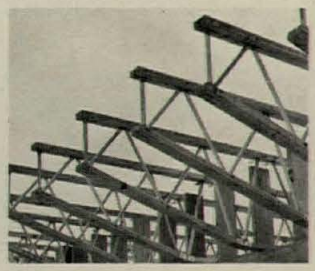
JOSAM PRODUCTS ARE SOLD THROUGH PLUMBING WHOLESALERS

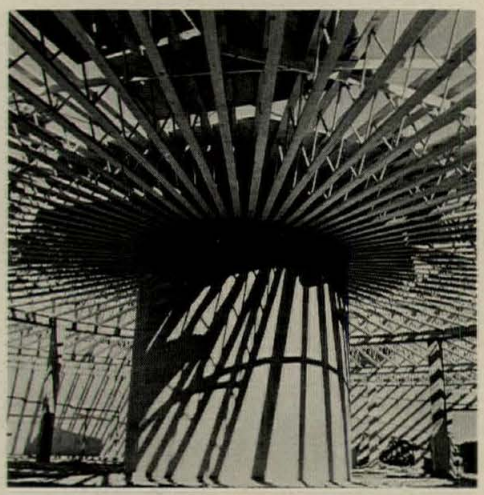
For more data, circle 154 on inquiry card



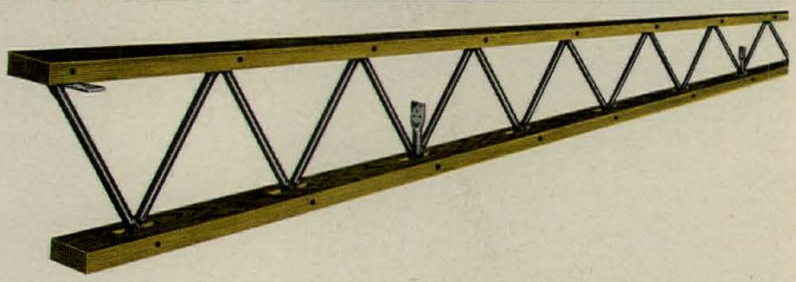








...NEW SYMBOL OF DESIGN FREEDOM



Curves, tapers, crescents, pitches, even S shapes ...all are possible with Trus Joist. Choose from twelve standard profiles or design your own. What's more, every joist is custom made to your specifications and can be delivered to the job just three weeks after approval of shop drawings.

TRUS JOIST's perfect blend of wood and steel offers unique design freedom with economy. That blend provides much more too... light weight for easy erection and for savings in foundations, footings and bearing walls ...nailable top and bottom chords for the attachment of low cost roofing, ceiling and flooring materials... open webs for duct work and wiring... minimal deflection in spans up to 100 feet.

Trus Joist's structural integrity, precision engineering, economy and versatility have been proven in more than 4,000 commercial buildings including 300 schools.

You'll find complete details in our free design manual and service minded distributors in most major cities.

More information?
Just drop us your card.

trus Joist

Pats. No. 3,137,899 & 3,019,491

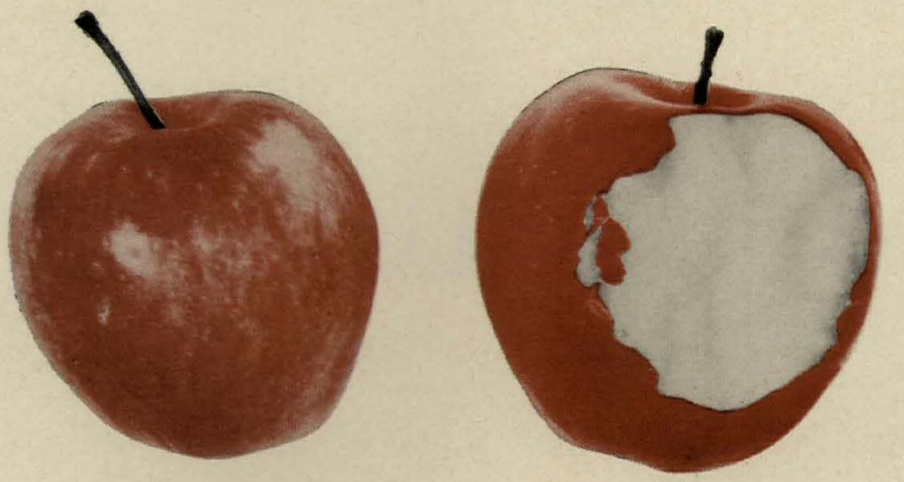
General Offices
Rt. 1, Hiway 20
Boise, Idaho
Ph. 208 375-4450

SEE US IN SWEET'S S 2b Tr

PLANTS AT:
BOISE, IDAHO
PORTLAND, OREGON
DUBUQUE, IOWA
SAN FRANCISCO, CALIFORNIA
LOS ANGELES, CALIFORNIA
PHOENIX, ARIZONA

For more data, circle 155 on inquiry card

People may buy apples on looks alone . . .

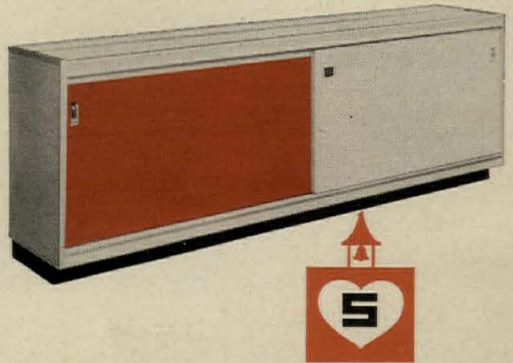


BUT IT TAKES PERSONAL AND ACTIVE INTEREST TO DETERMINE THE TASTE AND QUALITY!

PERSONAL INTEREST/INVESTIGATION are also necessary in evaluating Classroom Unit Ventilators. You can't leave vital equipment decisions to others and still do right by the client. Our product *realistically contributes* to your own image of professional competence and good judgement by its beauty of design, true economy of operation and in the attention given to details that mean something to the user. But such engineering progress can benefit only those individuals who are *willing to investigate* product differences. By insisting on *separate prices* from the heating contractor the serious-minded architect is able to evaluate and choose wisely. *What do you do?*

Basic Data For Decision-Makers

Schemenauer Unit Ventilators are for steam, hot water, electric heating and chilled water cooling. Twelve architectural colors *plus* a wood grain finish. Matching accessories of various lengths *and* heights offer utmost design freedom. Numerous engineering exclusives provide for peak long-term economy, trouble-free performance and ease of installation. Nationwide sales and service. Field help.



SCHEMENAUER

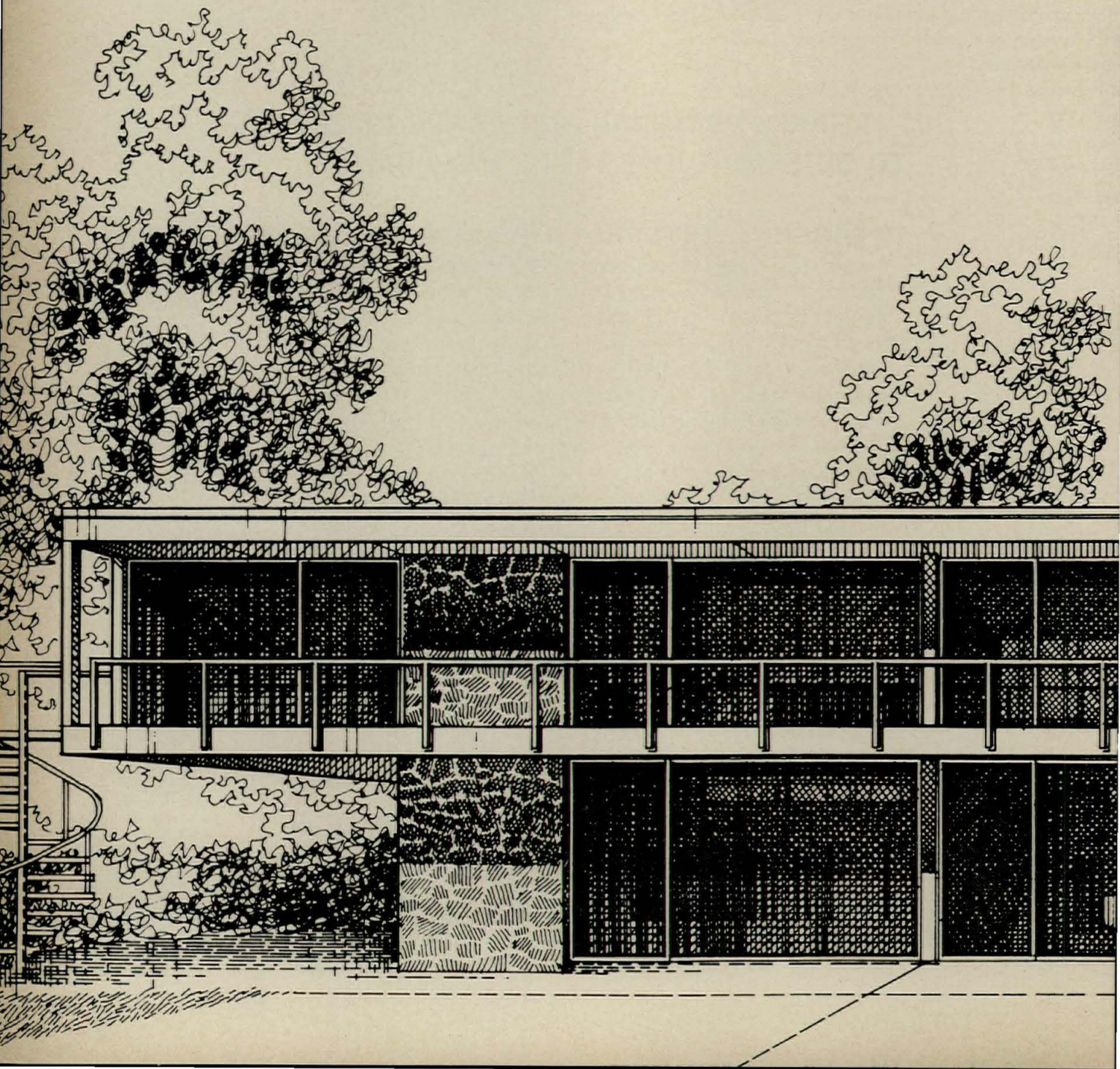
H O L L A N D , O H I O

"Designer-manufacturer of a complete line of heating-cooling-air handling apparatus for institutional, industrial and commercial applications."

the heart of the school classroom

For more data, circle 156 on inquiry card

RECORD HOUSES OF 1966



the best place to sell residential building products

..because architects, builders and consumers alike are looking forward to this 11th annual presentation of the best in contemporary house design...

architects who are responsible for over 75 per cent of the dollar volume of all architect-designed houses—the largest architect subscriber audience available...

builders who are responsible for over 85 per cent of the dollar volume of all professionally-built houses—the nation's 23,000 foremost builders as qualified by F. W. Dodge's Sweet's Light Construction Catalog Service on the basis of annual building activity...

consumers who pay $2.95 per copy for "Record Houses" in bookstores across the nation—over 6900 sold in 1965. This extra distribution to the home building public costs you nothing.

These readers say they refer to "Record Houses" for months—even years. Of those architects who received RECORD HOUSES OF 1956 (the first "Record Houses") 50 per cent referred to it again in 1965 some nine years later.

RECORD HOUSES OF 1966...the best place to sell residential building products...Your Record representative has the details.

ARCHITECTURAL RECORD

A McGRAW-HILL PUBLICATION

330 West 42nd St., New York, N.Y. 10036

continued from page 252

STEEL FOR RESIDENTIAL CONSTRUCTION / Six fact sheets offer data on siding, doors, windows, gutters and downspouts, duct-work and plumbing fixtures. Each sheet features the testimonial of a builder who has used the steel products. ▪ American Iron and Steel Institute, New York City.

Circle 417 on inquiry card

STONE IN BUILDINGS / *Featherock* stone veneer in a wide range of interior and exterior applications is the subject of a new eight-page brochure. The booklet gives specifications and a summary of various laboratory tests carried out on the material. ▪ Featherock, Inc., Los Angeles, Calif.

Circle 418 on inquiry card

HIGH-RISE WALL BEARING APARTMENTS / Two Dayton, Ohio buildings are the result of wall bearing construction using both filled and hollow concrete block. A new 16-page brochure featuring these buildings gives details and reports on construction economy and quiet apartments. Floors and roof are of high-stress precast concrete slabs, and transverse walls between apartments are also of concrete block. Illustrations show hollow concrete cells used as hot and cold air conditioning ducts, conduits for combination and exhaust air, electrical wiring and coolant pipes. ▪ The Flexicore Co., Inc., Dayton, Ohio.*

Circle 419 on inquiry card

WINDOWS / Reversible, double and single hung, top hung, projector, venetian blind and slider window units are collected in a 27-page booklet with explanations and diagrams for each. There is additional information on curtain wall, hardware and locks, rails for double glazed windows, recommended glazing procedure and vertical pivot and stainless steel windows. ▪ The Adams & Westlake Company, Elkhart, Ind.*

Circle 420 on inquiry card

ALUMINUM COLUMNS / A neo-classical appearance for buildings can be painlessly achieved by the use of *Classic* aluminum columns, which are manufactured in straight sections each one having a curved hook which interlocks permanently to the adjoining section. Flange type ornamental caps and bases can be fitted over the columns to complete the unit. Details of types and sizes available are given in an illustrated brochure, as well as notes on assembly and installation. ▪ Columns Inc., Houston, Tex.

Circle 421 on inquiry card

STEEL FRAMES / Two new brochures describe the company's 1⅜-in. and 1¾-in. standard steel frames with 2-in. faces suitable for almost all types of wall construction, and the *Fab-A-Frame* method of custom assembling these standard components to suit individual building requirements. The *Fab-A-Frame* brochure shows a series of 12 photos of buildings in which this type of frame assembly has been used. ▪ Amweld Building Products, Niles, Ohio.*

Circle 422 on inquiry card

MASONRY REINFORCING / "Masonry Reinforcing Bond & Ties for all Masonry Wall" features the complete 1966 wire flush-welded products line with diagrams of application as well as specifications for partitions, single-wythe and glass-block walls, corners, intersections and faced or veneer masonry walls. ▪ AA Wire Products Company, Chicago, Ill.*

Circle 423 on inquiry card

**Put this good-looking unit in a patient's room, and what do you get?*

**Immediate air conditioning for one thing (...a better heating system for another).*

AAF's remarkable new SC NELSON/aire cabinet heating and air conditioning unit features self-contained refrigeration. Simply plug it in for instant, silent air conditioning. No piping required; no central refrigeration system needed.
What's more, the SC NELSON/aire fits into any existing heating system (hot water, steam or electric resistance). (The 20 per cent fresh air ventilation is just about perfect for patients' rooms.)

Other outstanding SC NELSON/aire features:

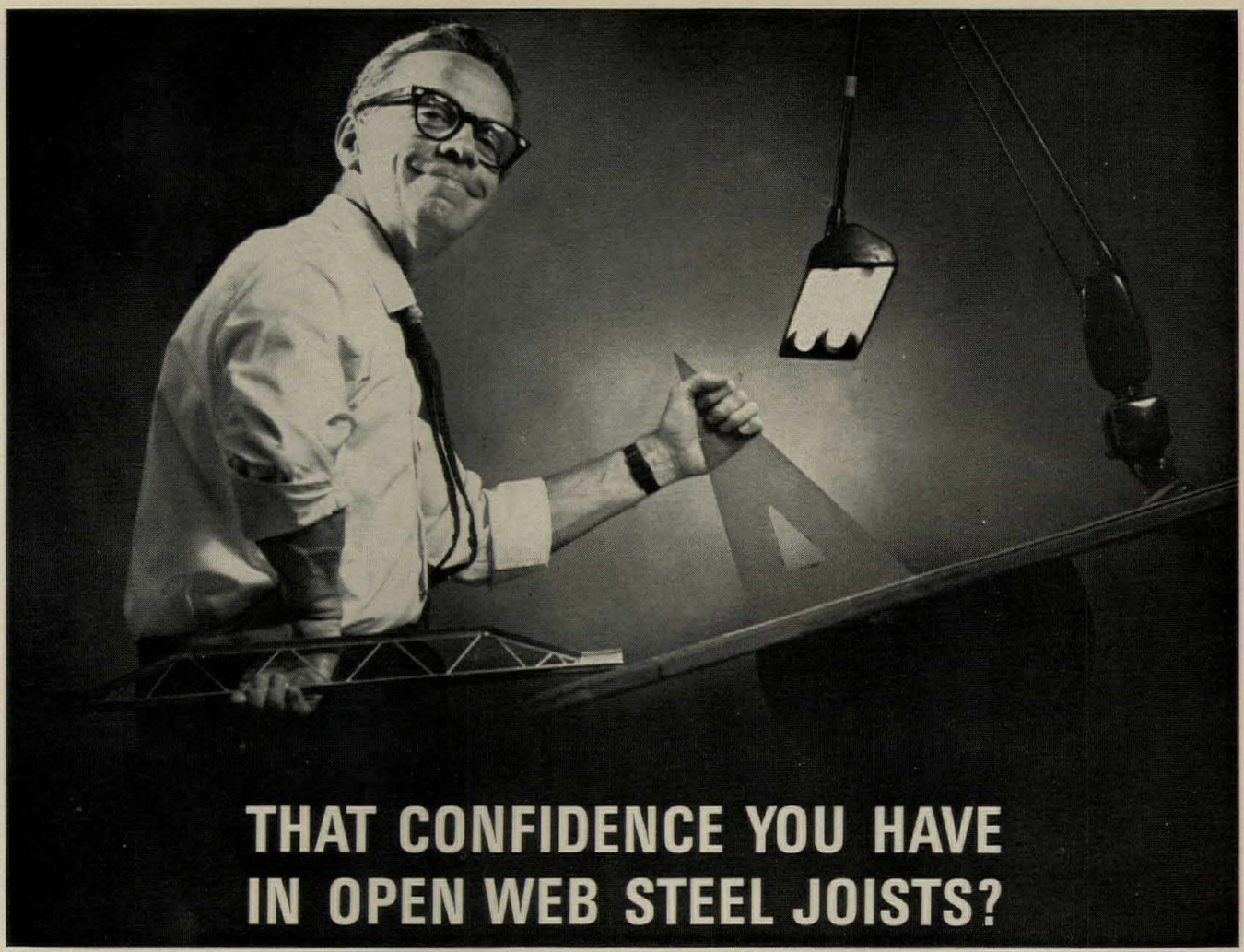
- **Allows air conditioning room-at-a-time or for an entire building. Cooling unit can be installed now or later.**
- **Just one point for periodic maintenance —only the filter requires changing.**
- **Units available for 9,000, 12,000 and 15,000 BTU/hr. operations.**
- **Attractive decorator models (your choice of six colors) as well as standard models available.**
- **Easy-to-use push-button controls for individual room temperature levels.**
- **Convenient floor-mounted, through-the-wall installation.**
- **Heating and air conditioning air handling units also available for operating room suites and central systems. Complete line of high-efficiency filter components available for these units.**

Write for bulletin 215 E4A or contact your local AAF representative. American Air Filter Company, Inc., 215 Central Avenue, Louisville, Kentucky 40208.

AAF American Air Filter
BETTER AIR IS OUR BUSINESS

For more data, circle 157 on inquiry card

*Additional product information in Sweet's Architectural File.



THAT CONFIDENCE YOU HAVE IN OPEN WEB STEEL JOISTS?

Chalk a lot of it up to the Steel Joist Institute!

Since 1928, a hard-working organization of dedicated men has been quietly helping to elevate the standards of a multi-million dollar industry.

The organization: the Steel Joist Institute.

Its purpose: to expand knowledge of open web steel joists; to encourage their use in modern building practice; to establish design and performance standards among joist manufacturers.

You benefit directly from this work by the Steel Joist Institute. You can feel a justified confidence when specifying open web steel joists, knowing that the researched design and simplified members that have improved joist performance are yours from many dependable sources.

Complete technical information on high strength open web steel joists is contained in the 1966 edition of specifications and load tables, just published.

1966 Edition, Specifications and Load Tables for High Strength Open Web Steel Joists

FREE! 32 pages of technical information; all you need for fast, accurate specification of joists to carry uniform loads on spans up to 96 feet. Covers J-Series, LA-Series, H-Series, LH-Series joists. Send coupon today.

6510

STEEL JOIST INSTITUTE

DuPont Circle Bldg., Washington, D. C. 20036

Please send a copy of the 1966 Specifications and Load Tables to

NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____ ZIP CODE_____

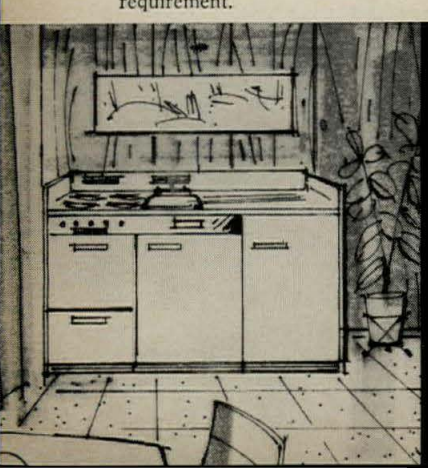
STEEL JOIST INSTITUTE

DuPont Circle Bldg., Washington, D. C. 20036

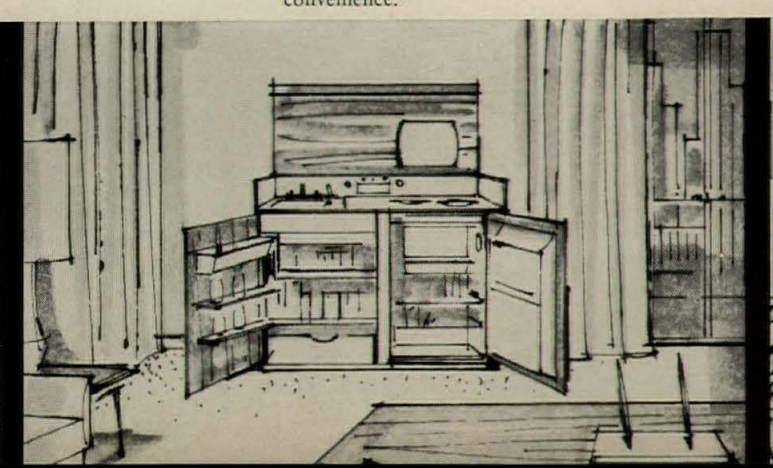
For more data, circle 158 on inquiry card

Crane Chef Model 872
A complete compact kitchen. Includes gas or electric range with oven and broiler; sink; 8 cu. ft. self-defrosting refrigerator with 40 lb. freezer; storage compartment. Disposer optional.

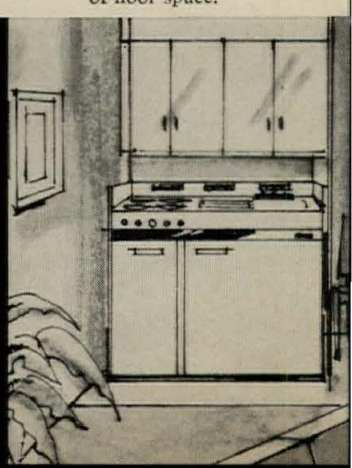
Studio Efficiency Apartments
Model 872 (photo above). This complete kitchen is easily designed into any apartment decor and space requirement.



Executive Offices
Crane Chef Executive I enhances beauty and efficiency of any office. Luxurious real wood cabinet in popular finishes. Hinged top for console convenience.



Married Students' Housing
Model 554. Complete compact kitchen for tight space requirements of college dorms. Needs only 9 sq. ft. of floor space.



Crane Chef® announces the most complete line of compact kitchens—ever!

40 all-new models to solve your space problems.

With a choice of 40 models, the all-new Crane Chef line gives you a flexibility of design and choice never before available in compact kitchens.

Look at design. New, clean, straight edge profiles are keyed to complement contemporary taste for attractive simplicity in decor. Choice of colors, white, wood grains, copper tones—or even luxurious real wood.

Look at space. Largest, *complete* kitchen needs only 15 sq. ft. of floor space. And Crane Chef gives it to you eight different ways—complete to refrigerator, freezer, range, oven/broiler, storage, sink and drainboard. Disposer available in most models—plus all kinds of other options.

Look at flexibility. If you're thinking smaller, choose from compact refrigerators or ranges—singly or in combination—with or without worktops or sinks. Ranges and ovens: either gas or electric.

Here's even more flexibility. If the various Crane Chef ideas shown here don't match yours—we'll help you with custom-designing.

The new Crane Chef line is the biggest innovation to hit compact kitchening in many and many a year. Get all the details now. Contact Crane Showrooms in New York, Chicago, or Los Angeles; distributors in most cities; or write Crane Co., 4100 South Kedzie Avenue, Chicago, Illinois 60632.

THE NAME IS

CRANE

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

Second Homes
Model 529-GS has gas or electric counter-top range, sink and built-in refrigerator with full-width freezer.

Game Rooms
Model 529 is an under-counter or free-standing refrigerator with full width freezer compartment.

Motels & Hotels
Model 548. This complete kitchen provides full utility where space is at a premium. Takes only 8 sq. ft. of floor space—total.

Crane Co.
Crane Chef—Dept. 008
4100 South Kedzie Avenue
Chicago, Illinois 60632

Rush me a copy of your brochure on the all-new line of Crane Chef compact kitchens.

Name_____

Company_____

Address_____

City_____ State_____ Zip_____

For more data, circle 159 on inquiry card

continued from page 46

The new format, new type and new printing process have produced a very welcome, clean, fresh look. Your use of color and the improvement in reproduction of black-and-white photographs are also to be commended.

Robert F. Hastings, F.A.I.A.
Smith, Hinchman & Grylls Associates, Inc.
Detroit

I was particularly impressed by the manner in which you present photographs and editorial material in the magazine. The relation of printing to open spaces on the sheet and the composition of the sheets themselves are excellent. You have done the profession a real service by making the vehicle itself one of outstanding design and freshness.

Arthur F. Sidells, A.I.A.
Warren, Ohio

I think the new design of the RECORD is really something. . . . The new type face is splendid, and certainly reads much more easily than sans-serif while still preserving the latter's clean, crisp character. . . . The new layout combined with the sharp pictures and line drawings makes reading both easy and pleasant.

Harold D. Hauf, A.I.A., A.S.C.E.
Professor of Architecture
University of Southern California

This is an example of disciplined sobriety yielding a richness appropriate to the aims of the RECORD. . . . I particularly commend your choice of Optima type.

Thos. J. Biggs, F.A.I.A.
Biggs, Weir, Neal & Chastain
Jackson, Mississippi

The new graphic design and type face for RECORD are in excellent taste and make reading the "new" magazine a more pleasant experience.

Kenneth C. Naslund
The Engineers Collaborative
Chicago

I was very impressed with the new look of ARCHITECTURAL RECORD, especially "Let's Make It Real" by Benjamin Thompson. I would like to see more of the magazine expanded toward this type of presentation. The layouts were good and the color reproductions were magnificent.

Gene Leedy, Architect
Winter Haven, Florida

I think the new format and typographic redesign are excellent.

Arvin Shaw III
Carson, Lundin & Shaw Associates
New York City

It is a superb job from the point of view of design and content.

Max O. Urbahn, A.I.A.
New York City

The new direction is a refreshing improvement, particularly the type style and color quality; and if this were not enough, Thompson's article was by far the best one "you all" have put together. Like significant architecture, each part contributed to the total.

Donald L. Williams
McCulloch-Bickel, Architects
Louisville, Kentucky

You and all your associates have made a hell of an issue for January—It's great! Keep on!

Richard Bennett
Loebl Schlossman Bennett & Dart
Chicago

I am delighted about the new layout of the RECORD . . . a lucid, well-ordered arrangement . . . it reads much better, and the type is fine. Congratulations!

Walter Gropius
The Architects Collaborative Inc.
Cambridge, Massachusetts

DAP Flexiseal®... The polysulfide polymer sealant proved by time and the Thiokol* seal of security

TESTED* AND APPROVED SEALANT BASED ON Thiokol® LP® POLYSULFIDE POLYMER MANUFACTURED BY LICENSEE OF THIOKOL CHEMICAL CORPORATION

* Trademark of Thiokol Chemical Corporation

DAP is proud to display the Thiokol Seal of Security as tangible recognition of DAP Flexiseal's superior performance. The seal is added assurance that Flexiseal meets the most exacting requirements for extreme conditions of expansion and contraction, wide temperature ranges and severe exposure.

Flexiseal gives a positive, flexible bond year after punishing year. Field installations of polysulfide and laboratory tests indicate that Flexiseal installed today will still be delivering watertight, airtight protection years and years from now . . . far beyond the life of most other types of sealants. The reason: Flexiseal's balanced modulus. Adhesion is always greater than cohesion.

Specify Flexiseal for critical installations like these: expansion joints, curtain walls, swimming pools, porcelainized metal panels, tilt-up panels, skylights, channel or stop-glazed sash, and others. Thiokol's security seal standard is an extension of Fed. Spec. TT-S-227b.

With 10 strategically located plants throughout the nation, DAP assures you prompt on-site delivery anywhere, anytime. And remember: only the DAP Technical Service Department offers you laboratory assistance in specifying the architectural sealant that best meets your specific needs. Write us or check Sweet's File 3c/Da.

DAP® ARCHITECTURAL SEALANTS

DAP INC., DEPT. AR, GENERAL OFFICES: DAYTON, OHIO 45431 • SUBSIDIARY OF *Plough, Inc.*

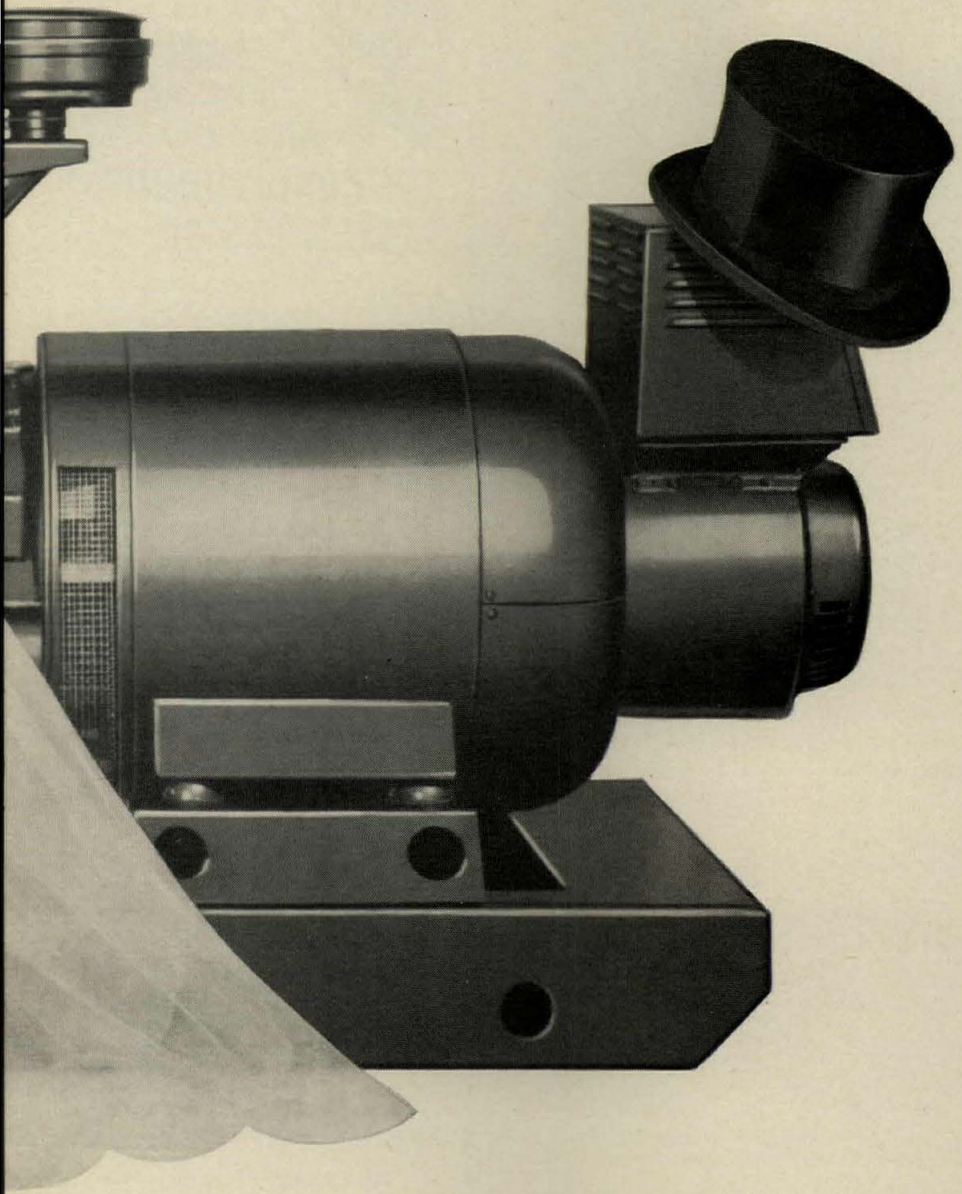
For more data, circle 161 on inquiry card

Kohler guarantees happy marriages

(It's <u>your</u> guarantee of reliable standby power should regular sources fail)

Unitized design does it. Two little words that are your assurance of trouble-free performance. That's because Kohler engines and generators are completely assembled and tested at our factory. This results in a stronger team of engine and generator in every Kohler electric plant...with no faulty alignment problems! You might say Kohler engines and generators were meant for each other!

Because we build complete electric plants! Kohler assumes complete responsibility and offers a full year's warranty. For full information, contact your Kohler Electric plant distributor or write Dept. EP 6-503, Kohler Co., Kohler, Wisconsin.



for engines and generators

KOHLER

MARKS OF VALUE

- ✓ **Nationwide sales and service.** Performed by Kohler-trained mechanics.
- ✓ **Unitized design.** Plants are completely assembled, run in and fully tested under load at factory.
- ✓ **Experience.** Kohler is the oldest manufacturer of a complete line of electric plants.
- ✓ **Built-In vibro-mounts.** For quiet, smooth operation.
- ✓ **Automatic voltage and speed regulation.** Maintains power at even level.
- ✓ **Gas, Diesel and Gasoline** fuel options.
- ✓ **Integral exciter starting.** Quickest, simplest, most positive, trouble-free engine starting available.

KOHLER OF KOHLER

Kohler Co., Established 1873, Kohler, Wisconsin

ENAMELED IRON AND VITREOUS CHINA PLUMBING FIXTURES • ALL-BRASS FITTINGS • ELECTRIC PLANTS • AIR-COOLED ENGINES • PRECISION CONTROLS

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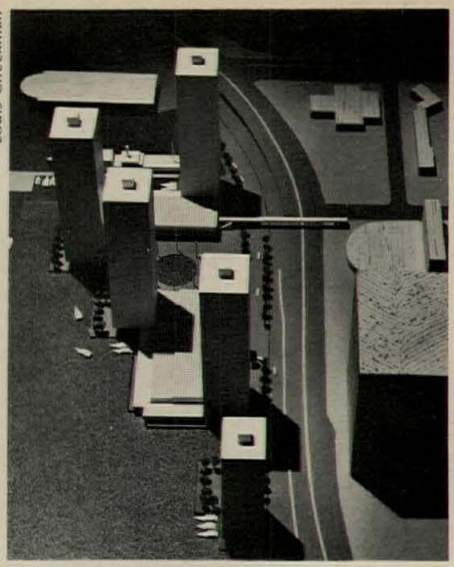
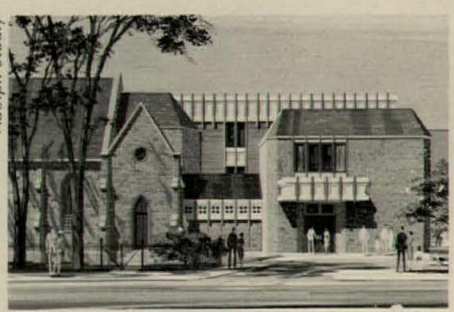
Louis Checkman



Co-op in New York groups five buildings

Riverbend Apartments, a $14-million, five-building, middle-income cooperative in New York City, will have structures of eight, nine and eleven stories comprising 200 duplex apartments and two towers of 16 and 19 stories containing 424 conventional apartments. Exterior materials are a specially designed brick, and the concrete floors extend beyond their support columns to become a visible band at each floor level. Architects are Davis Brody and Associates; structural engineers are Weisenfeld and Leon; and contractor is the H.R.H. Construction Corporation.

Adolph Studly



Addition complements 100-year-old church

The Grace Church (Episcopal) in White Plains, New York chose to remain in its central location—instead of moving to the outskirts—and retained architect Edgar Tafel, who has designed a three-story addition which has matching stone and brick to complement the original structure. The $450,000 addition will contain sacristy, common rooms, auditorium, offices and classrooms. The mechanical engineers are Wald & Zigas, and the structural engineer is Robert Rosenwasser.

Greatest column since 426 B.C.

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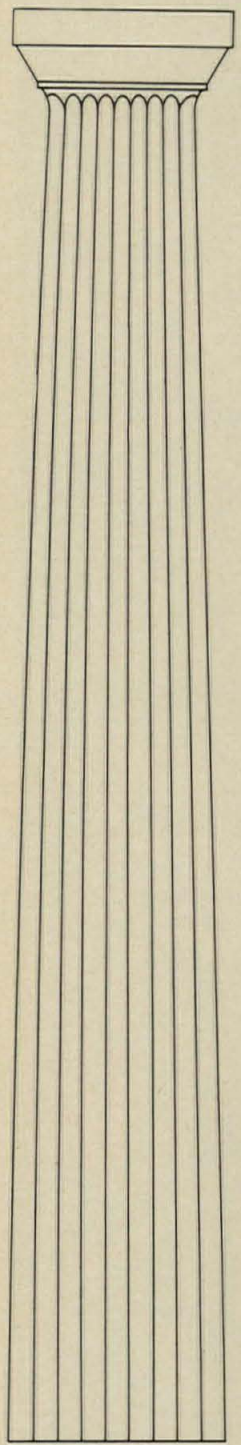

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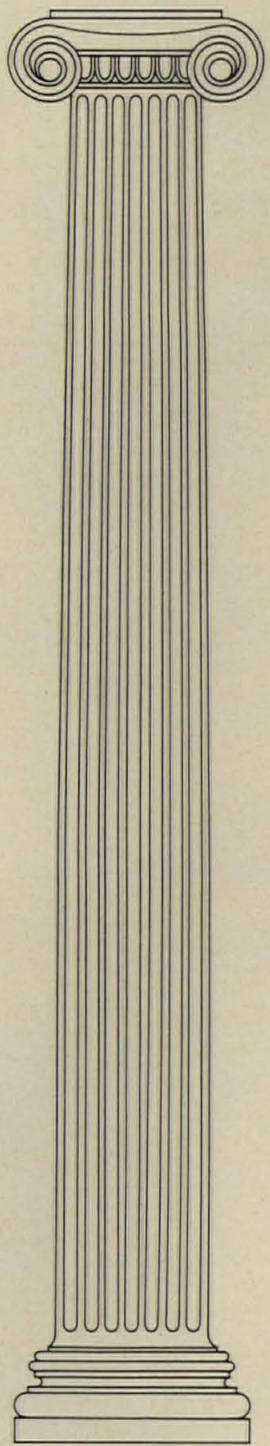

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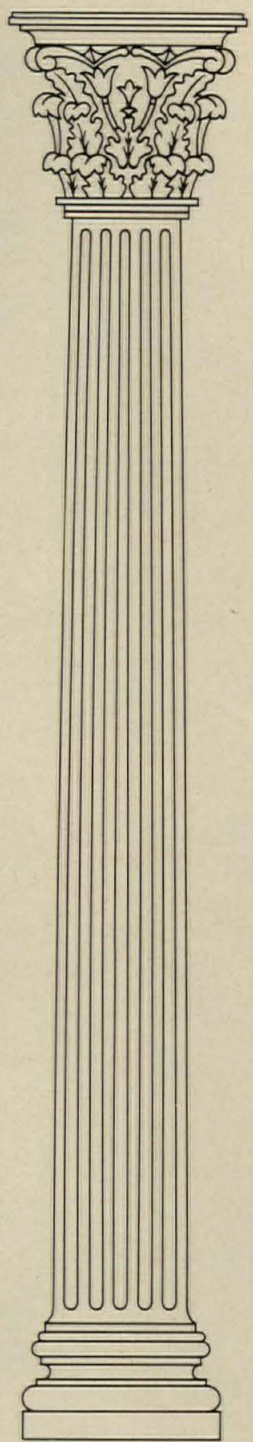

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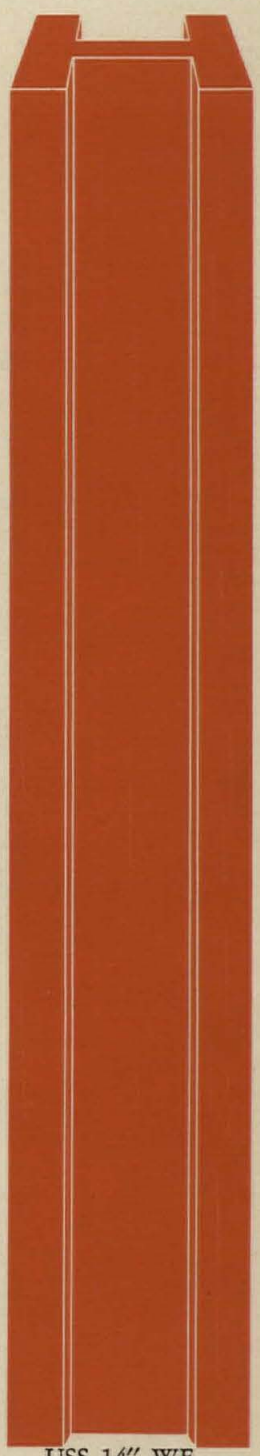

USS 14″ WF

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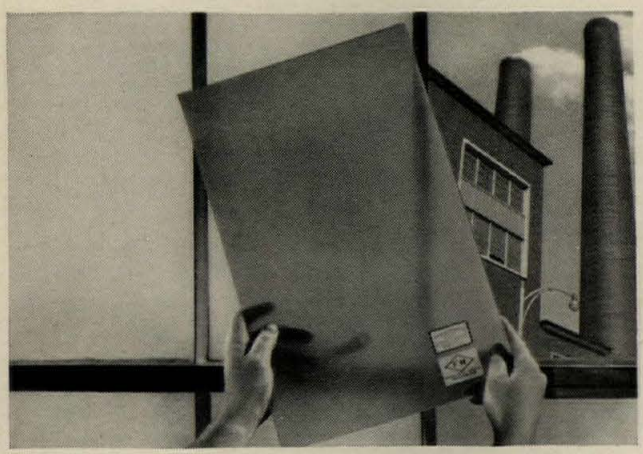

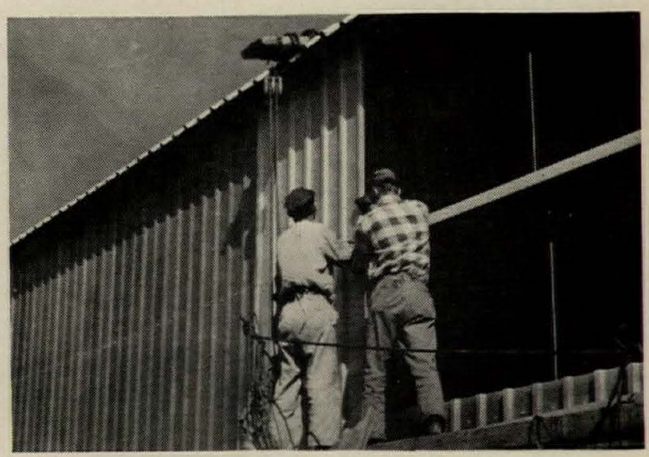

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St. Louis bandstand will be restored

Contributions totaling $5,000 from a local bank and gas company will make possible the restoration of the 94-year-old Henry Shaw Music Stand in Tower Grove Park in St. Louis. The architectural firm of Schwarz & Van Hoefen will direct and supervise the work as a contribution to the project. The Rallo Construction Company will provide work at cost. The structure was used continuously for band concerts for 50 years following its construction in 1872. In recent years it was considered unsafe and was barricaded to the public.

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Petite *Compact*

CISSELL®

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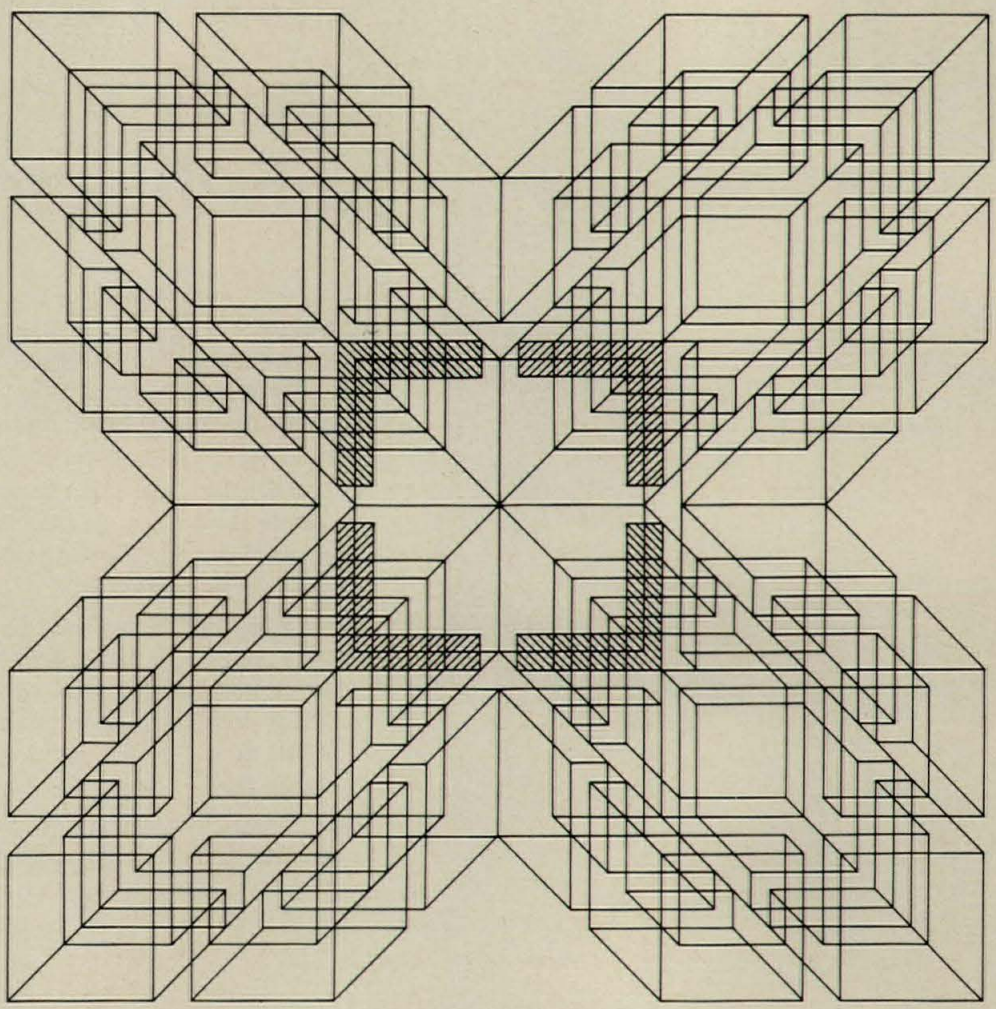
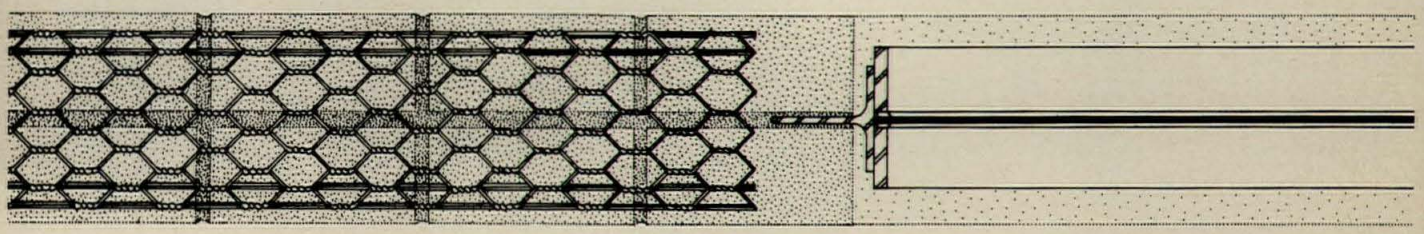
The formal generators of masonry structure:



The square, the lozenge, the cruciform, the rectangle, the pinwheel and the linked form . . . these basic orthogonal shapes are the formal generators of masonry structure.

Keystone Steel & Wire Company commissioned architect Stanley Tigerman to study these basic shapes and their logical extensions. The result, we believe, provides a unique view of architecture.

Mr. Tigerman projects a basic shape into three dimensions and marries it to a basic method of enclosure, support and division. The resulting parti becomes a floor plan, then a



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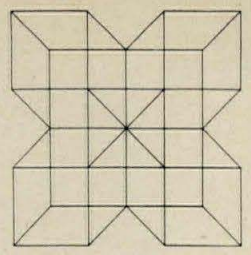
the square



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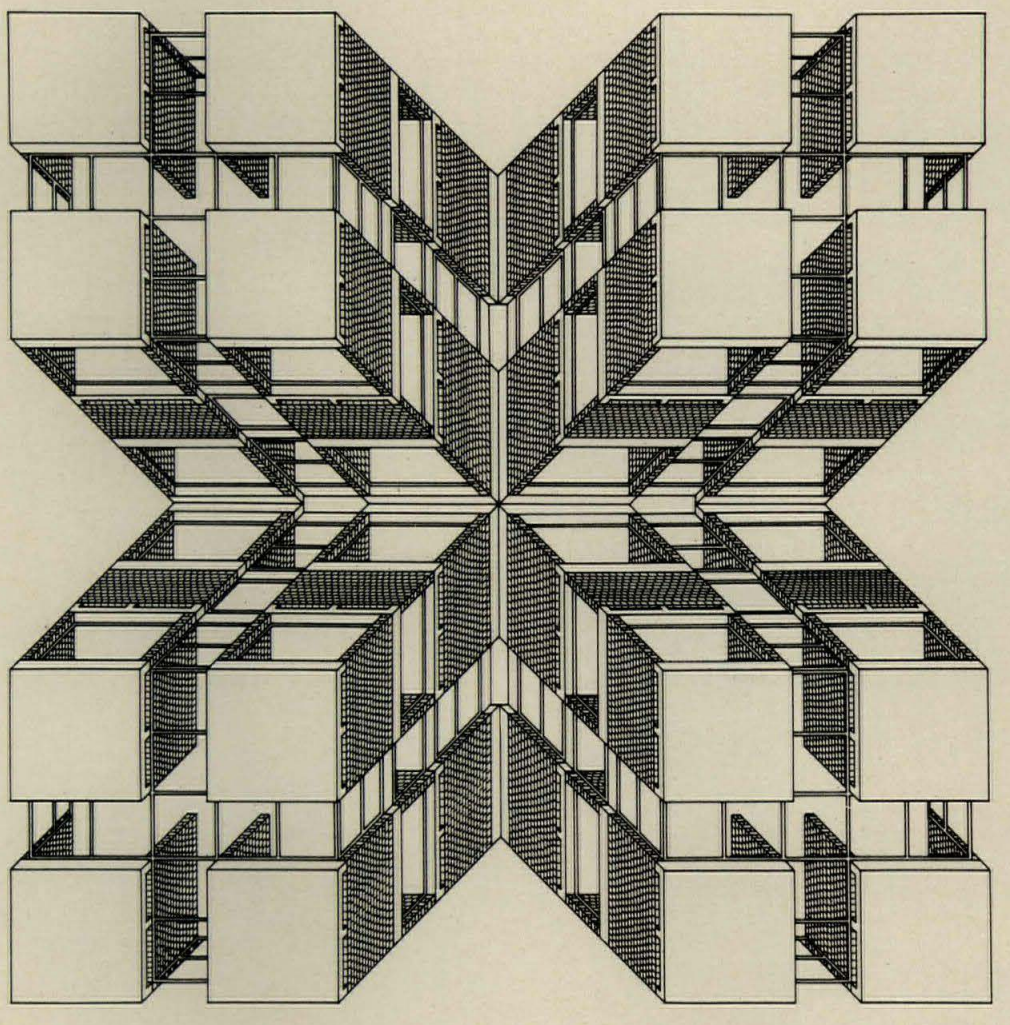

STANLEY TIGERMAN ARCHITECT

structure with details. It should come as no great surprise that the details include our Keywall® masonry reinforcement, both rod and roll.

In this example, the square becomes cubes, which are married to load-bearing walls to create the parti.

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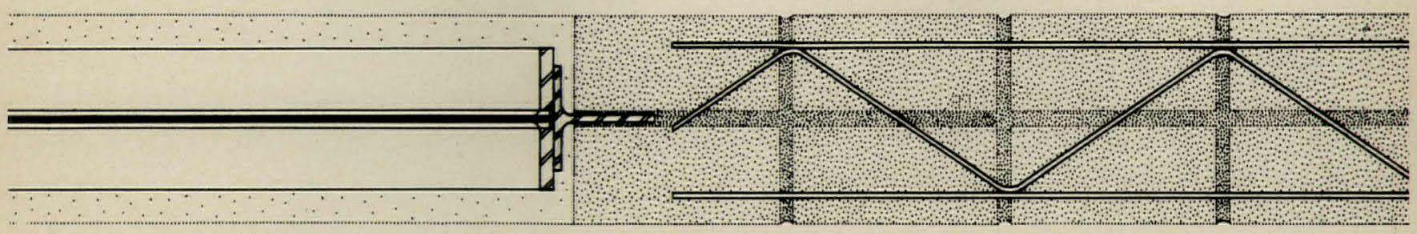

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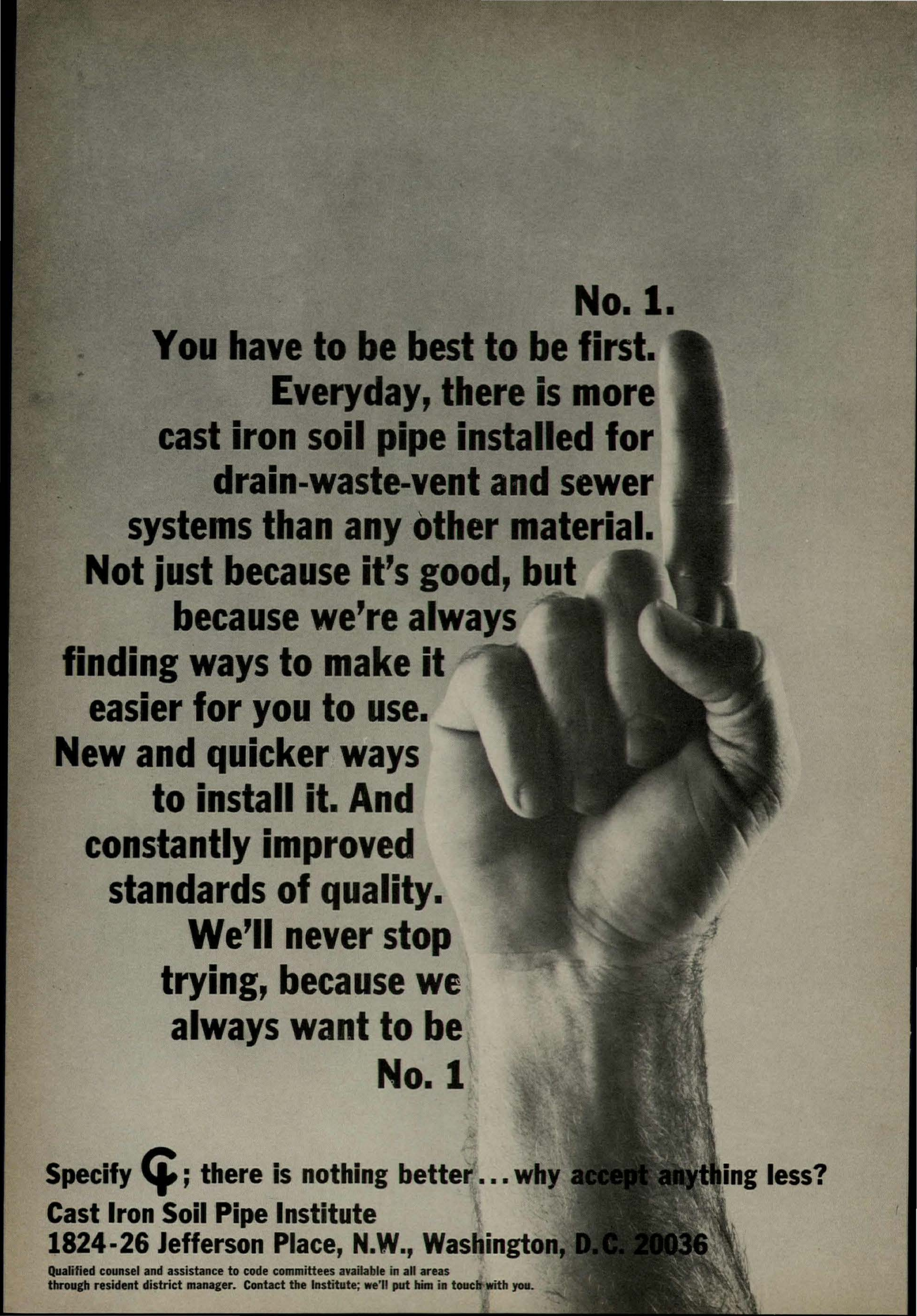
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Bill Gray—Regional Manager, Detroit. He is a veteran of the control systems business, and typical of the managers in Robertshaw offices throughout the country who direct trained personnel to handle jobs such as this University of Michigan Events Building.

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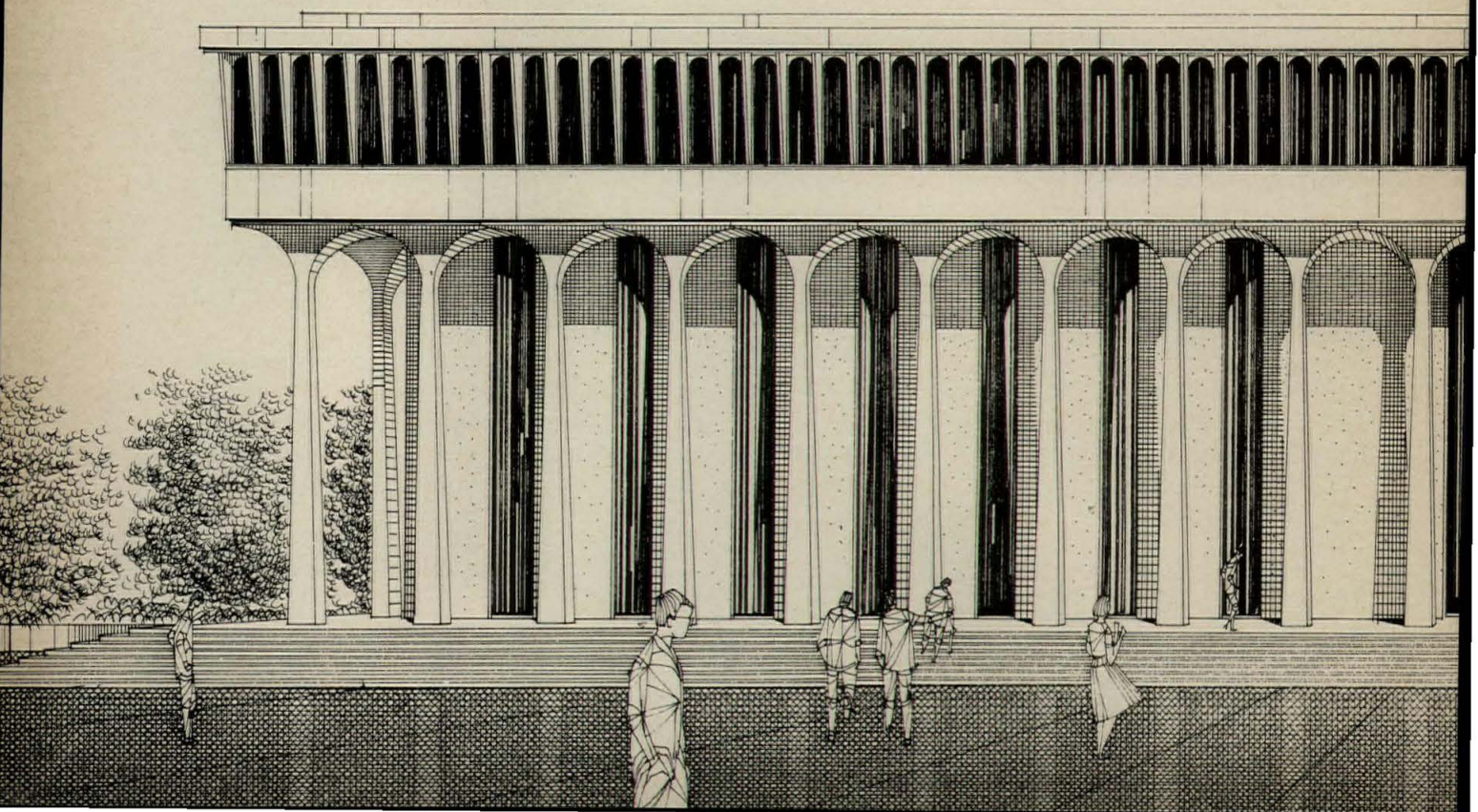

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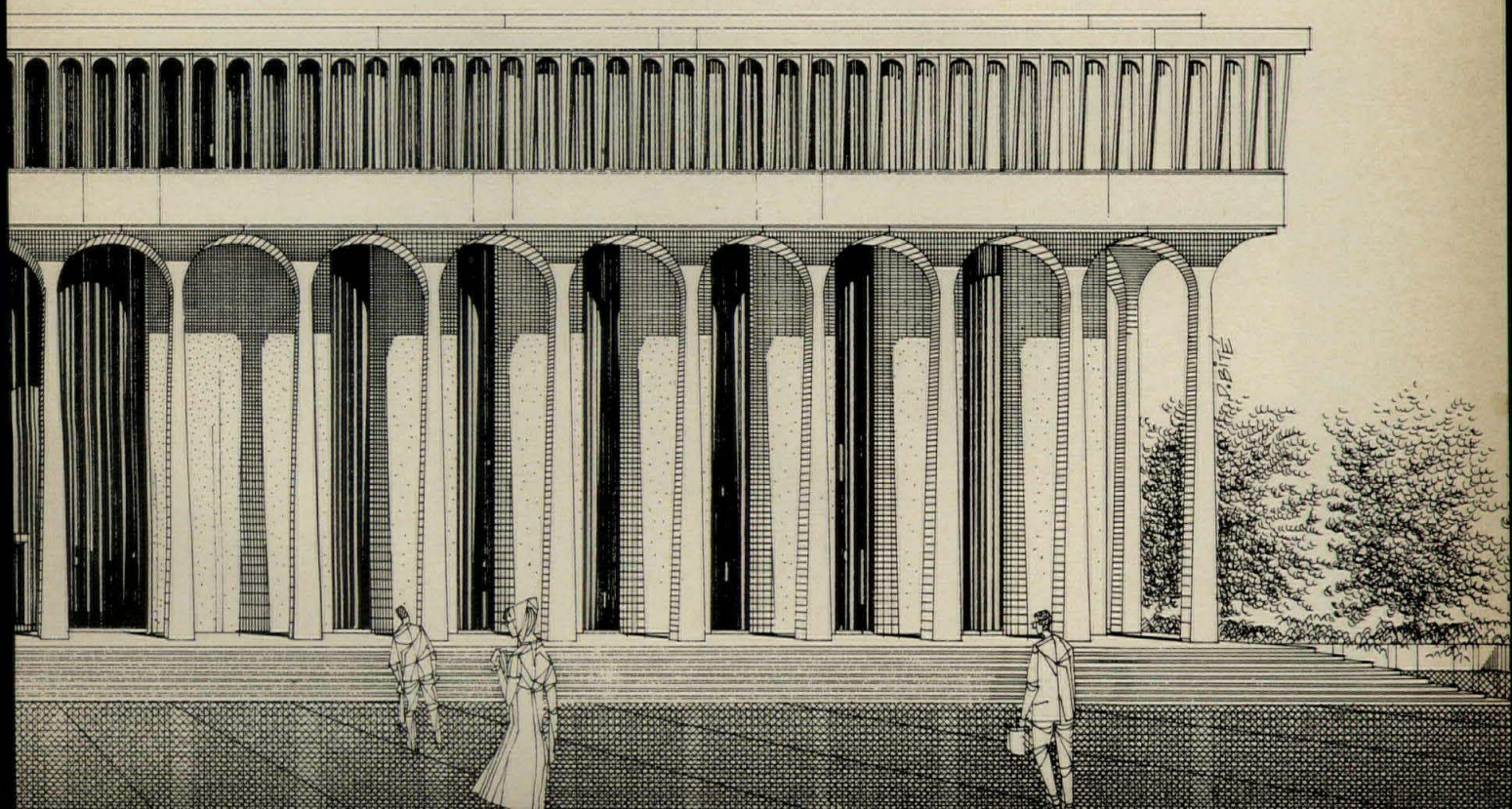
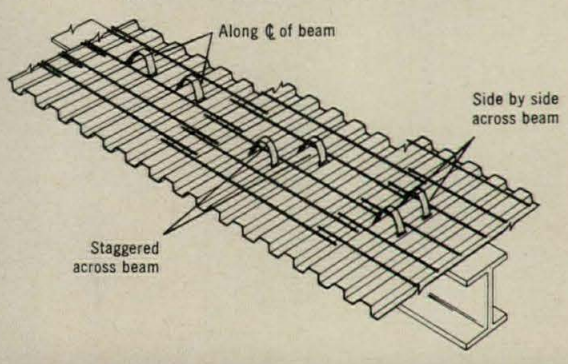
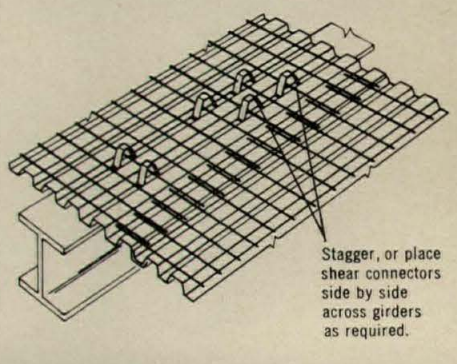


Typical Placing Patterns on Beam



Typical Placing Patterns on Girder



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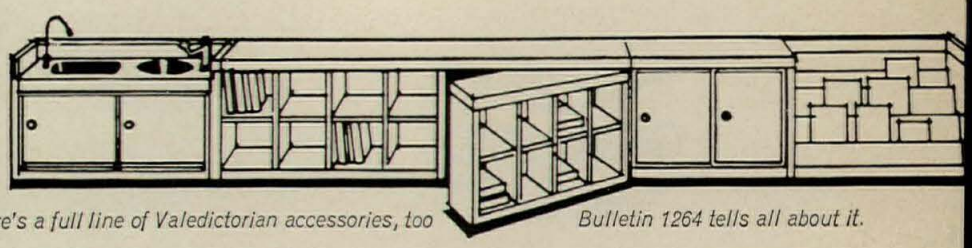

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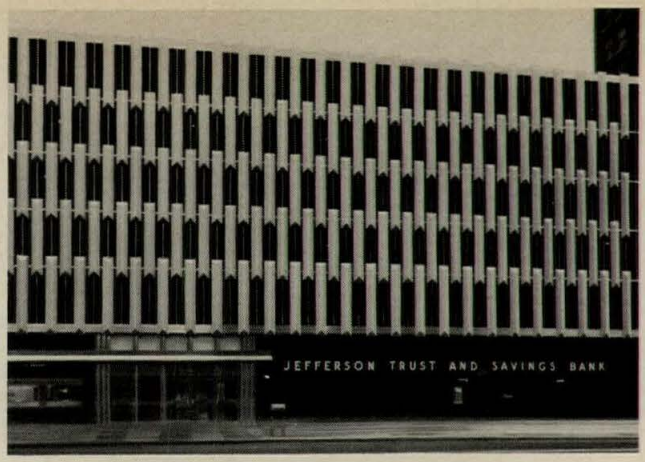

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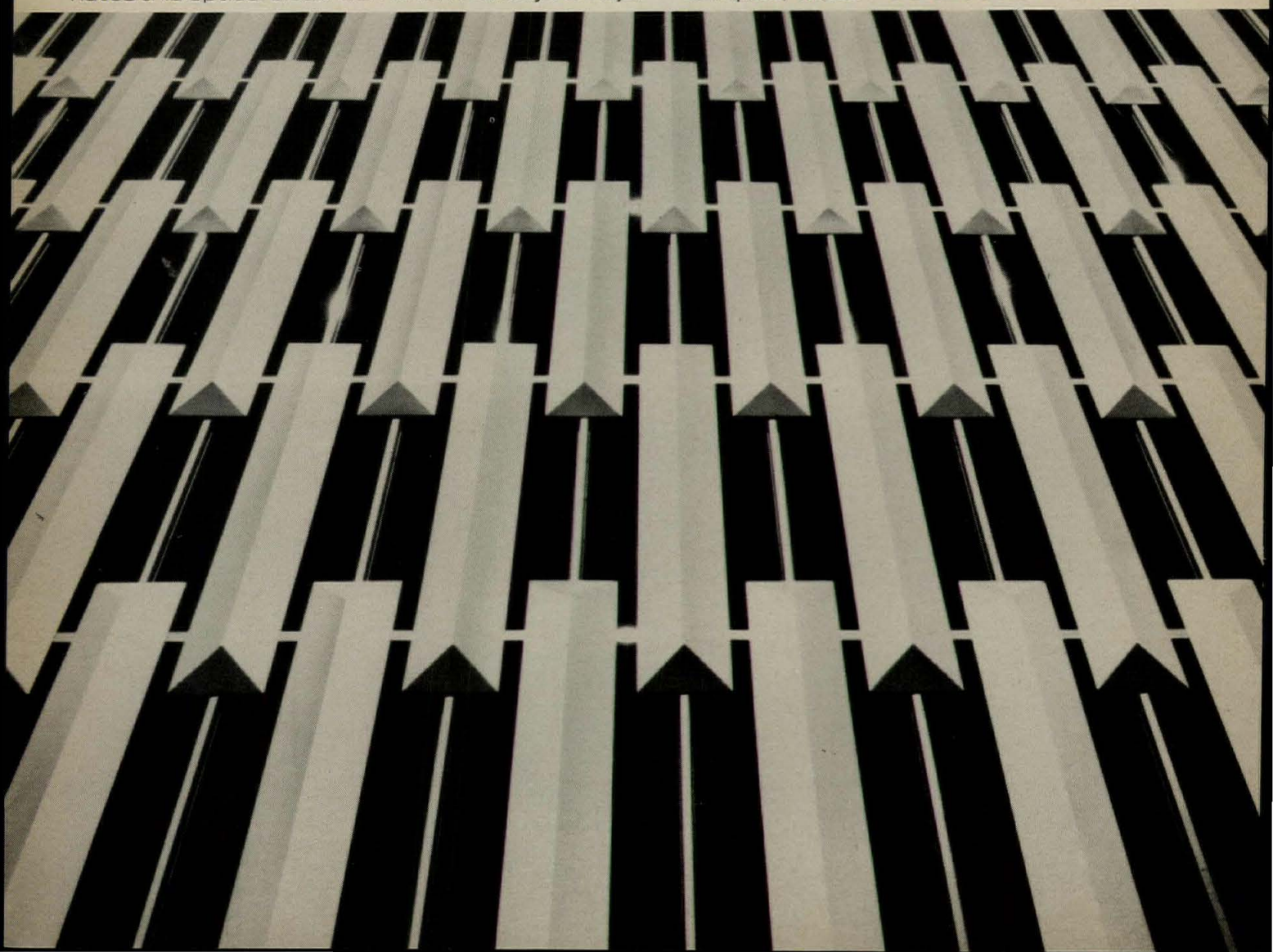

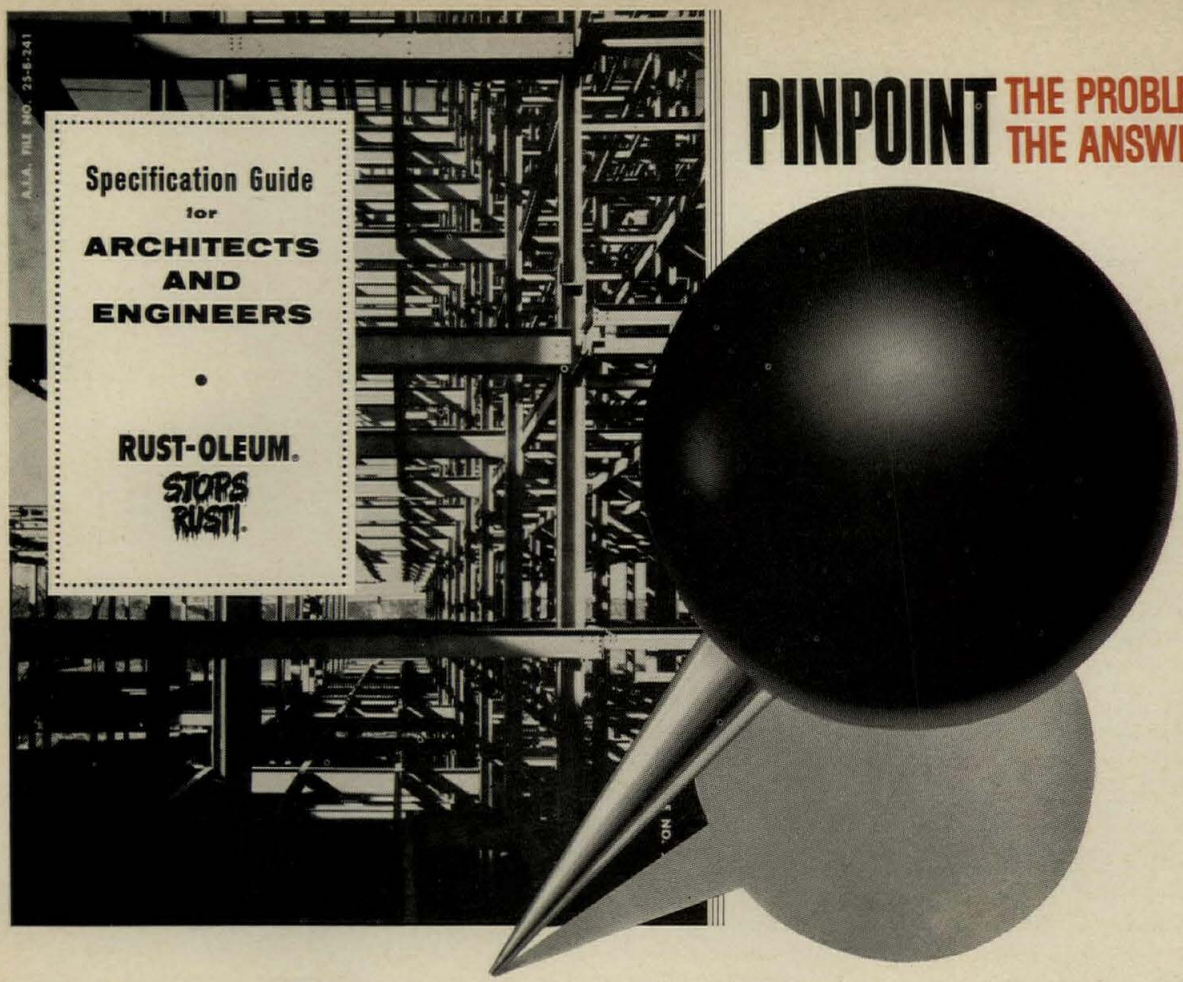

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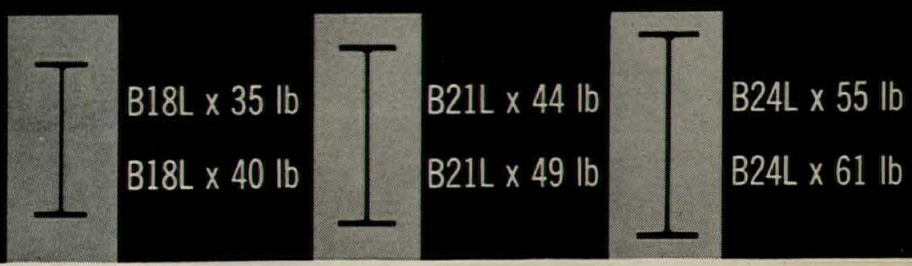

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