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FORUM

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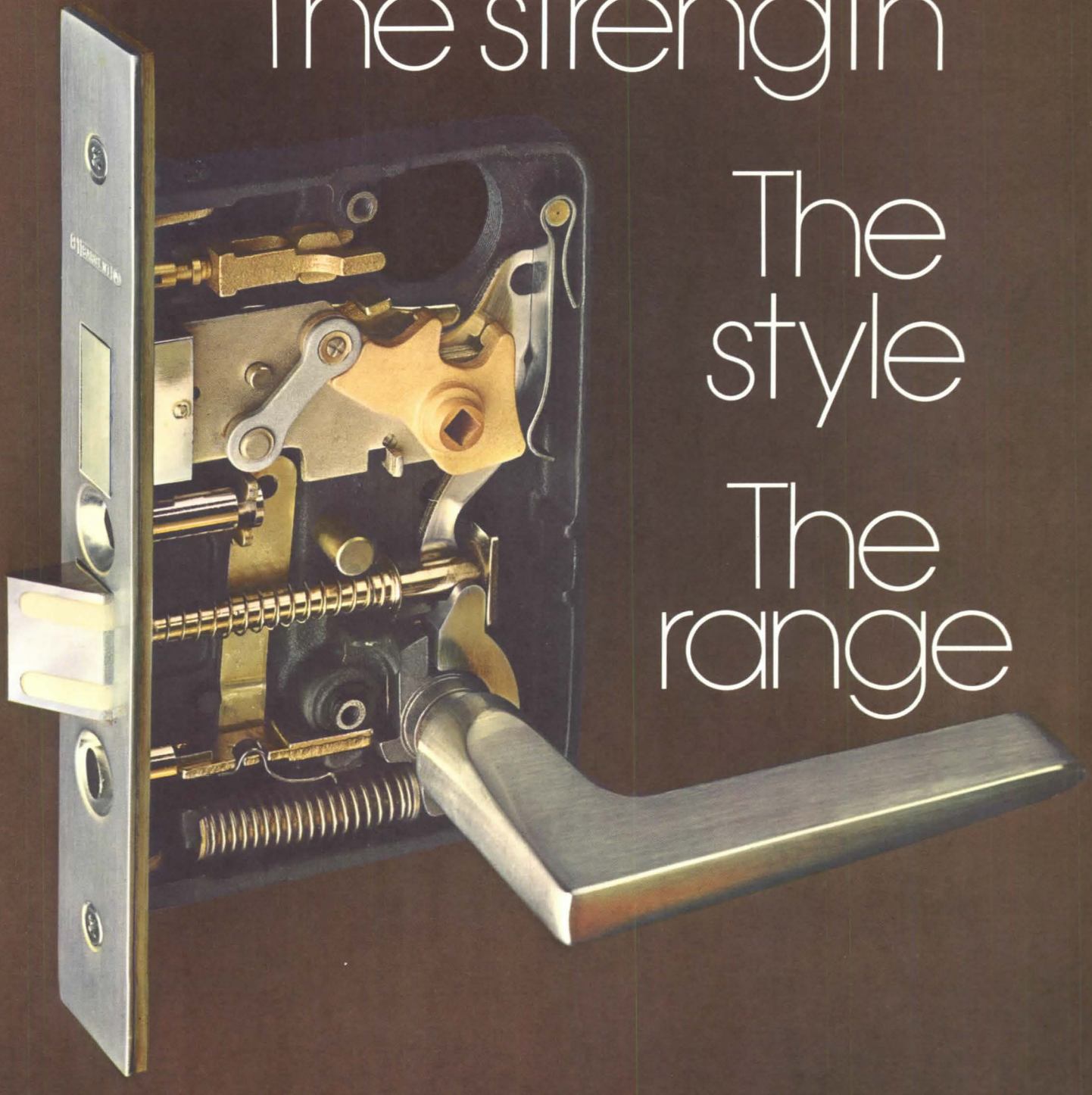

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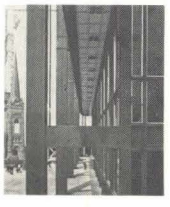

Cover: A photograph by Ezra Stoller of the U.S. Steel Building (page 24).

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Dover Delivers

9 OILDRAULIC ELEVATORS FOR MODERN RESEARCH CENTER

Standard Oil Company (Indiana) Research Center, Naperville, Ill.
Designers, Engineers and Construction Managers: Wigton-Abbott Corporation, Plainfield, N. J.
General Contractors: Ragnar-Benson, Inc., Chicago, Corbetta Construction Company of Illinois, Inc., Des Plaines, Ill.
Nine Dover Oildraulic Elevators installed in various buildings of the complex by Dover Elevator Company, Chicago.
Photographs: Hedrich-Blessing

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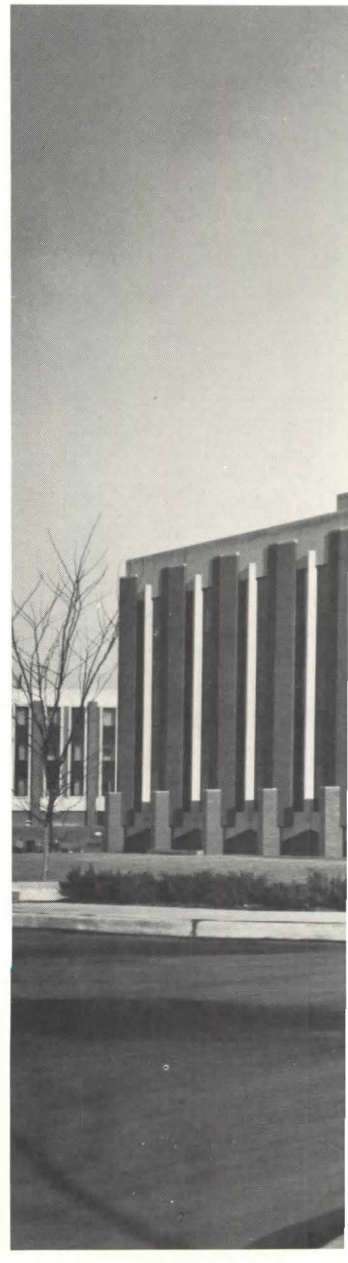

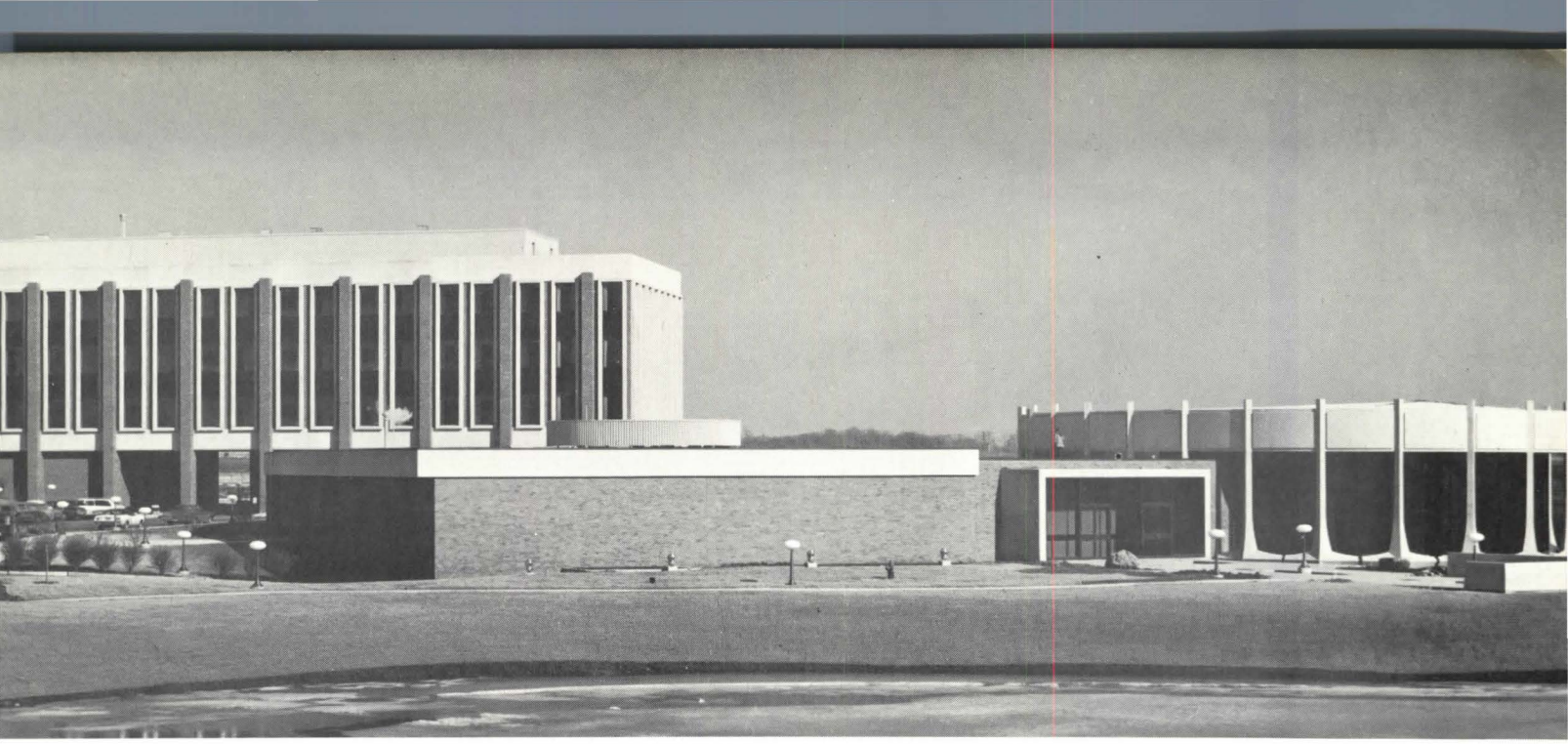

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westminster
designed by
Dickinson / Smith

62-63
designed by
Peter Dickinson

urbino
designed by
Giancarlo DeCarlo

T-100
designed by
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JG auditorium seating

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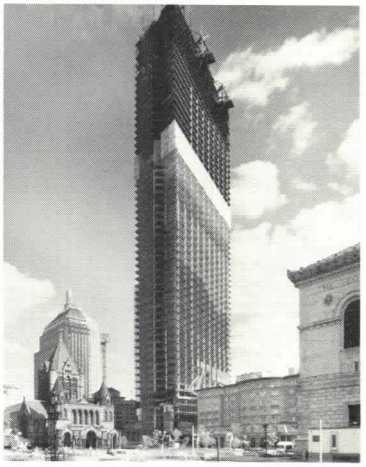
FOCUS

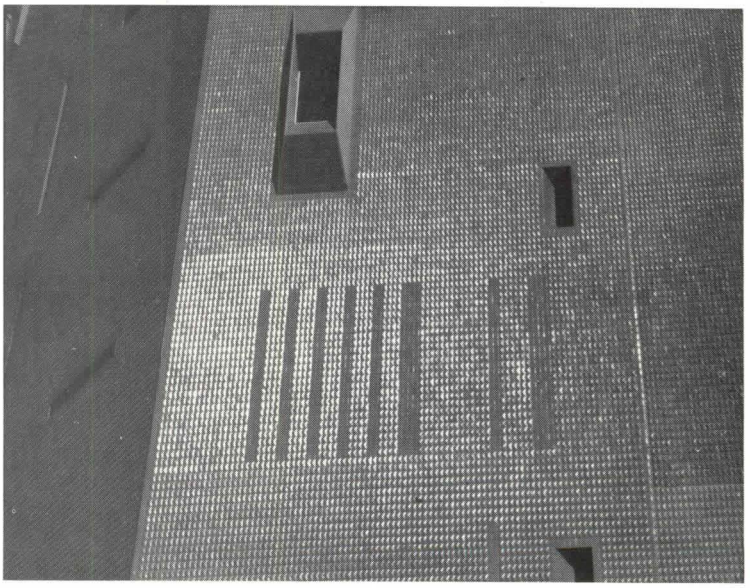
URBAN REFLECTIONS

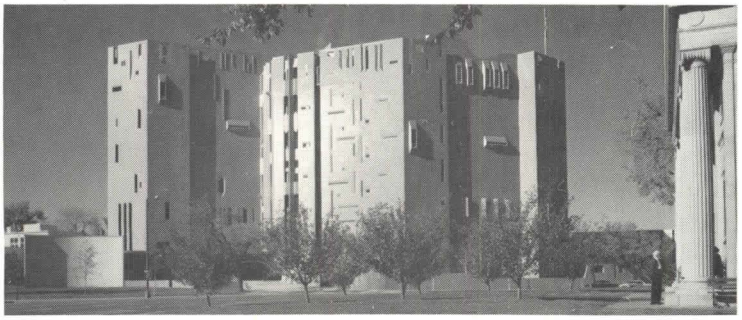
The John Hancock Tower, recently topped out in Boston, is one of the more notable—and certainly the tallest—of current mirror-facade structures. The angular, 60-story skyscraper, designed by I. M. Pei & Partners, reflects surrounding buildings—among them Trinity Church and the Sheraton Plaza Hotel (photo left). A 35,000-sq.-ft. gray granite plaza is planned; the granite is expected to reduce reflections of natural and artificial light. The same granite will be used in the lobby and concourse.

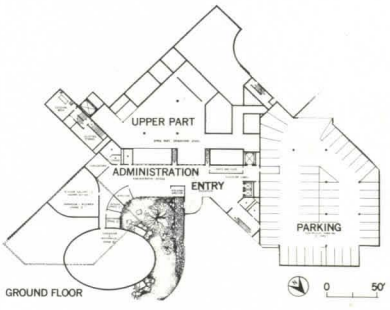


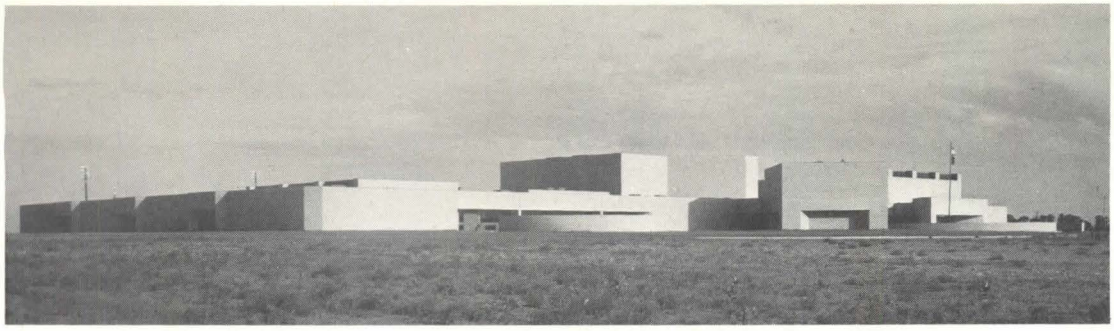
WESTERN CULTURE

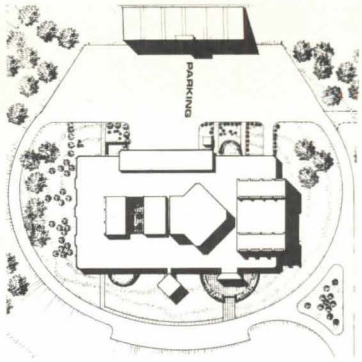
Two six-story cubes, joined like a squared figure 8, comprise one of the largest museums in the West: the Denver Art Museum. The $6-million building boasts 11 galleries, two to each floor and each 10,000 sq. ft. The exceptions to this layout: The first floor has lobby space and a gallery with a moveable ceiling. The mezzanine has a double-height gallery for Indian Arts (including a 28-ft. totem pole). The sixth floor has an open terrace and gallery, with a second terrace above the enclosed gallery portion. Designed by Gio Ponti, of Italy, with Architect James S. Sudler, of Denver, the building has a sparkling facade of pyramidal faceted glass units.





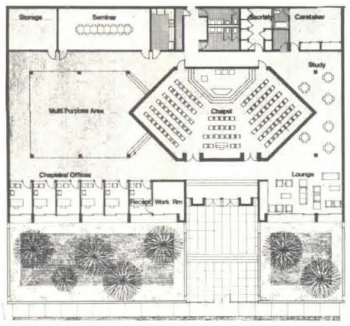






DUAL-CITY SCHOOL

Located on 60 acres of rolling Kansas farmland, the sculpture-like new Chaparral High School serves 600 students and is a community center for the equidistant cities of Anthony and Harper. Facilities include a 900-seat theater, a 2,500-seat gym, and a planetarium-lecture building. Activities are grouped by intensity of use: Gym, theater, cafeteria and main entry surround a common lobby; academic activities surround a library and fine arts core. The architects: Schaeffer, Schirmer & Eflin.



TOGETHER

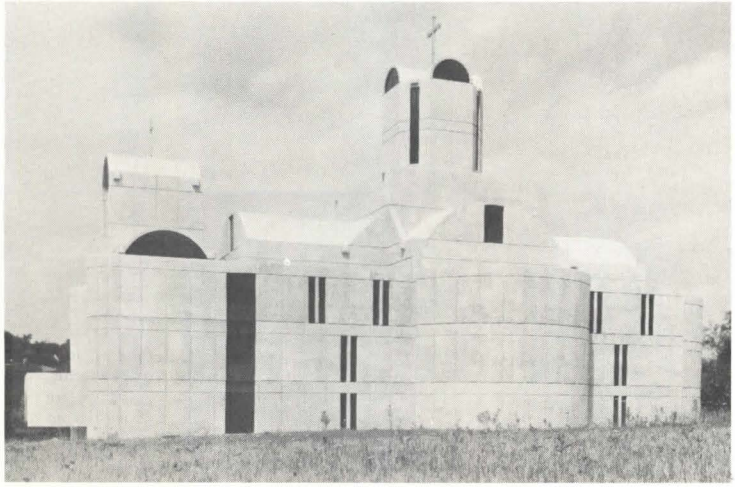
The new University Interfaith Center (University of Tennessee, Memphis) is designed to enhance the group experience of religious activities. With its own private garden views from the classroom wing and social hall, and with clustered seating, the layout promotes intimacy and interaction. The architects: Gassner/Nathan/Browne.

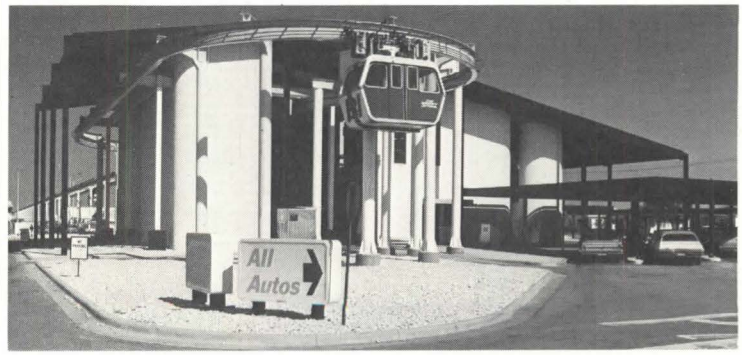
CORRIDOR TERMINALS

Chicago's rapid transit system now extends out on the median strips of the Dan Ryan and Kennedy expressways. The terminals, designed by Skidmore, Owings & Merrill, with engineers Deleuw, Cather & Co., also fit on the median, where they are canopied. Access is through arrival and departure bus stations located on either side of the expressway and connected to the terminals by bridges.

TRADITIONS RENEWED

The Pennsylvania Society of Architects has cited this suburban Pittsburgh church for design excellence. Called Holy Trinity Serbian Orthodox Church, it was designed by John V. Tomich (Aliquippa, Pa.) with structural engineers R. M. Gensert Associates (Cleveland). The reinforced concrete structure is cruciform in plan, with nave seating for 650 persons. It has a shell roof and a dome. The $1-million project also includes an attached school for 250 pupils.





MINI TERMINAL

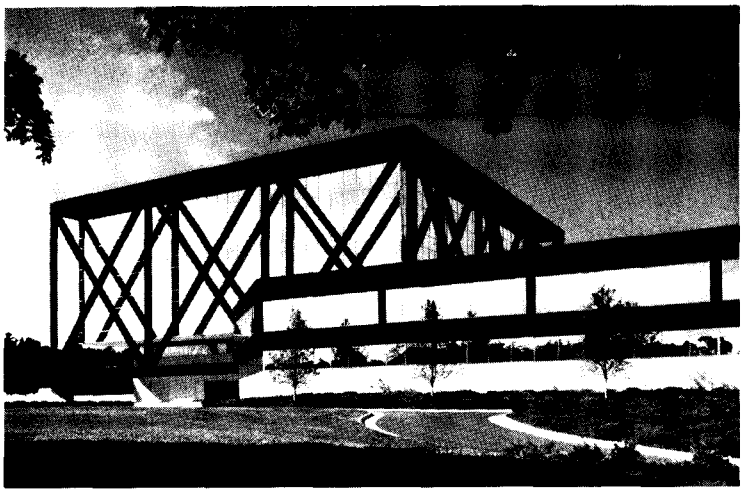
The Braniff Jetrail terminal, at Love Field in Dallas, is helping to reduce congestion in the airport. Located in the middle of a parking lot, the "people valve" is served by a 7,000-ft. overhead monorail that connects it to Braniff's air terminal. The airport will be phased out in seven years, so the facility has a short life. It was designed by Pierce, Lacey Partnership and has an exposed steel frame, which provides an esthetic complement to the monorail.

PYRAMIDS, AMERICAN-STYLE

Bullock's challenges "the static perpendicular and parallel lines" of department store design, says its spokesman, and uses pyramids for "dynamic" power. Designed by Welton Becket & Associates, the San Fernando Valley store is indeed a dramatic dynamo—replete with stage sets, wild signs and colors.

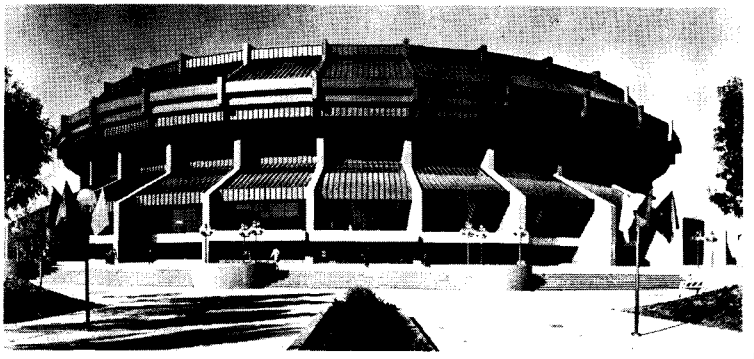
EXECUTIVE ENCLOSURE

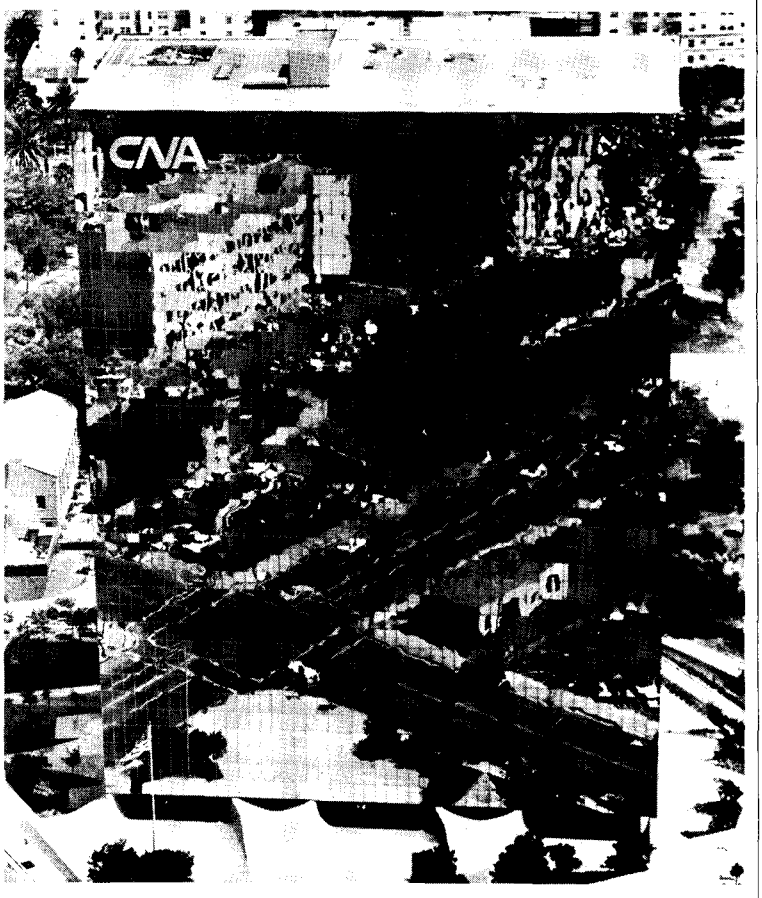
The Burlington Industries office building in Greensboro, N. C., is completed. The building has a six-story central cube with the upper four floors suspended from a steel roof frame supported by four, 300-ton, exposed steel trusses. A three-story, L-shaped wing wraps around the structure for a total of 400,000 sq. ft. of office space. The sable-brown weathering-steel trusses contrast well with the building's topaz-tinted glass walls and the white concrete base. A. G. Odell, Jr. & Associates, of Charlotte, were the architects.



ISLAND IN THE CITY

The elliptical Richmond Coliseum includes an arched ambulatory, a circular seating area (9,000 permanent and 3,000 temporary seats), and a plaza for 12,000 patrons. The arena floor is 26 ft. below street level so that the structure will not dominate the city skyline. The large span roof is a spiderweb of steel trusses, carried on radial concrete piers. Eventually, the coliseum, by Ben R. Johns, Jr. and Vincent G. Kling & Partners, may be the core of new urban development.





MORE MIRRORS

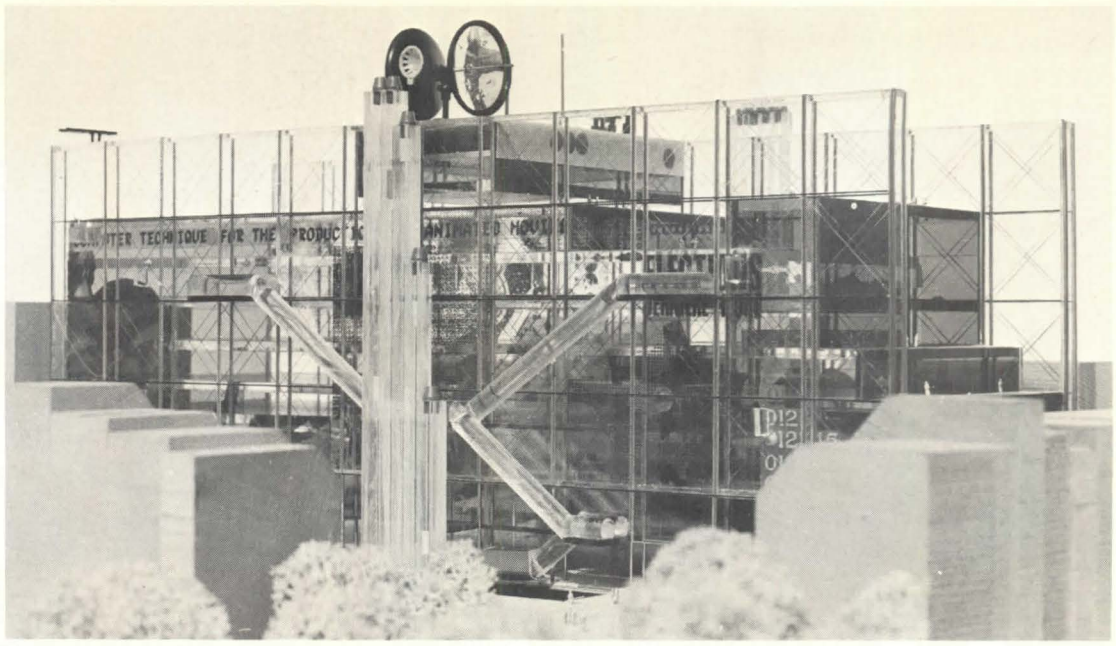
Still another mirrored building—and Los Angeles' first—is the CNA Park Place, headquarters for CNA insurance operations. The building reflects its surroundings so clearly that in the photo above it almost disappears and, in fact, the actual view of it is always changing according to weather, street patterns, etc. The $15-million, 19-story structure has 300,000 sq. ft. of total net rentable space and is distinguished by 10 "sculptured buttresses" rising from its granite plaza to heights of 14 ft. The architects, Langdon & Wilson, placed the building diagonally on its corner site and also worked with the city to landscape a strip of an adjacent city park.

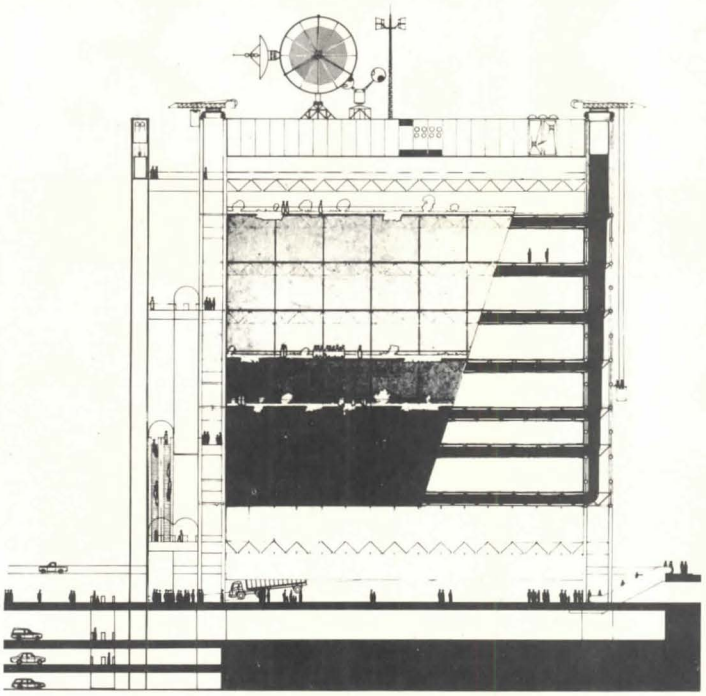
PHOTOGRAPHS: Page 5 (top right) George Cserna; (bottom) Rush J. McCoy. Page 6 (top) Joel Strasser; (middle left) Alexandre Georges; (lower right) Rick Barron. Page 7 (top left) Marvin Rand.

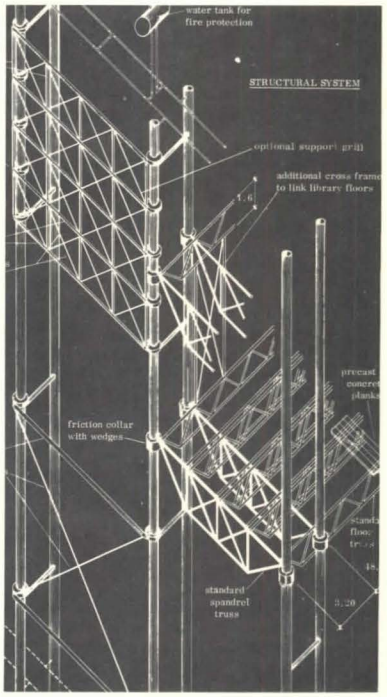
PREVIEW

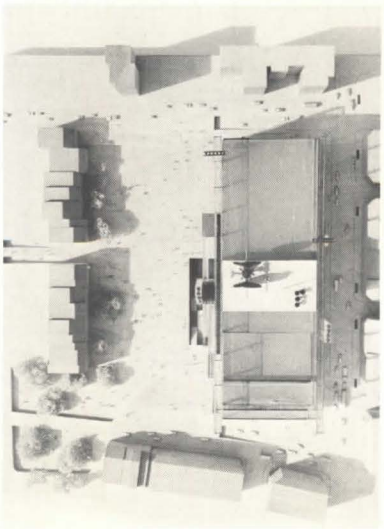
PLATEAU BEAUBOURG CENTER

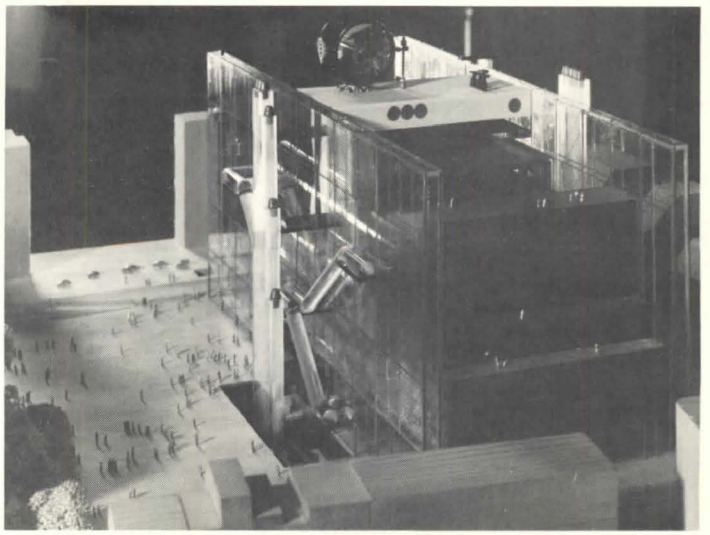
As previously reported, the international competition for the new arts center on the Plateau Beaubourg, near Les Halles, in Paris, was won by the appropriately international team of Piano & Rogers — Renzo Piano being the heretofore Genoa-based engineer/architect (see Mar. '70 issue), Richard Rogers being the London - based, U.S. - educated, part-Italian architect; plus several collaborators including the originally Danish, London-based Ove Arup partnership. So much for that. The design is truly astonishing: taking the incredibly complex program by its horns, as it were, Piano & Rogers presented a large, steel-and-glass box in which just about everything is flexible and can be moved up, down, and sideways to accommodate changing requirements. Information will be presented not only inside this box, but rear-projected also onto the facades so that the building itself will be a constantly changing billboard carrying news about what is happening in Paris at that moment, culture-wise. A British magazine described the proposal as a "cross between Les Halles marketplace, a computerized Times Square, and the British Museum" — which just about sums it up. The building will stand on pilotis on top of an underground garage, and there will be several levels—five to eight, in the original version—to accommodate facilities for the different disciplines in the center. All vertical and horizontal movement systems are attached to the outside of the steel-and-glass box. These systems include elevators, escalators, and cranes (see section at right). What makes this competition winner somewhat different from other, science-fiction winners of the past is that it will, apparently, get built: Piano & Rogers are hard at work refining their plans, for President Pompidou is anxious to have the center completed before his term is up in 1975. An exhibit of the project in Manhattan's Museum of Modern Art opens this month.





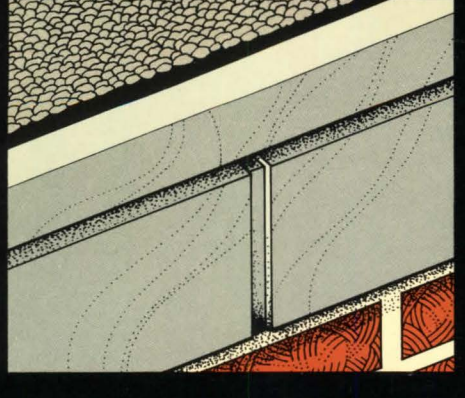


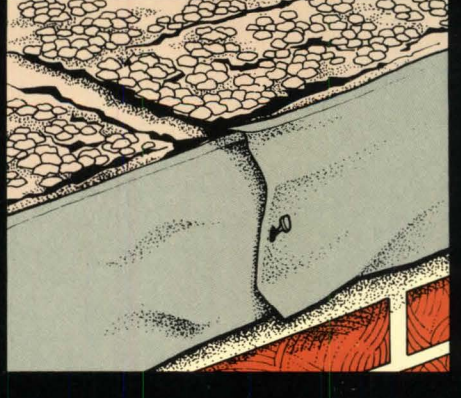




(continued on page 14)

Beauty conquers the beast at the roofline.





The beauty:

Tremline*, a unique roof edging system from Tremco.

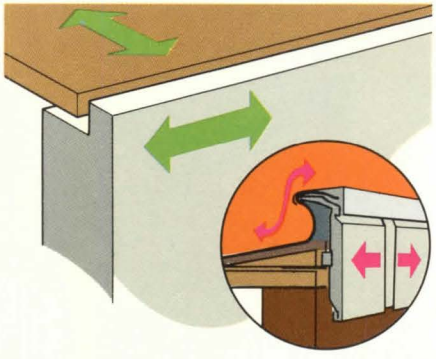
The beast is movement.

It lurks in every building. Just waiting to attack a roof and cause leaks.

Everybody knows that wherever you find two adjoining structural planes, you're going to find movement. Movement in different directions, at different rates.

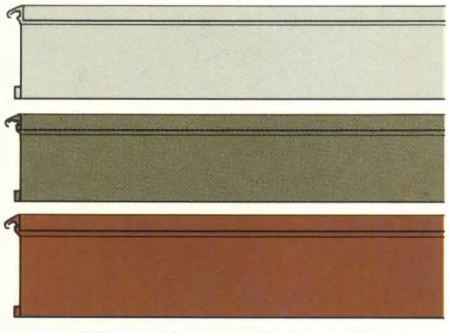
And everybody knows you can't stop this movement.

But the beauty, Tremline, gives you a way to live with it.



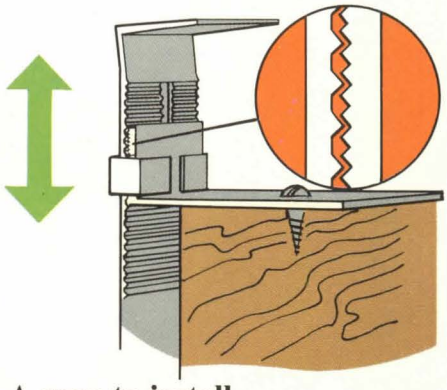
A free-floating beauty.

The Tremline fascia and flashing system is designed to take movement in stride. Components are free to move independently, without exerting strain on each other. And since it's free-floating, the system will absorb thermal shock and roof movement in any direction.



It's architecturally beautiful, too. Its extruded aluminum fascia — available in either custom-painted or anodized colors — gives a beautiful, clean-line appearance to the roof edge. No ugly exposed fasteners. No oil canning.

*Trademark

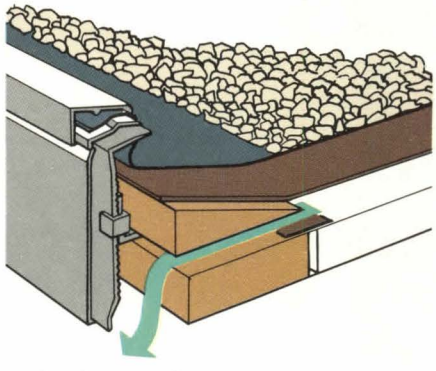


A snap to install.

Tremline is easy to install. It simply snaps together and self-locks.

Adjustments can be made up or down in $\frac{1}{16}$" increments. But that's not its only advantage.

It also installs for less. Makes alignment easy. Compensates for most roof irregularities. And metal components are free to move independently.



Built-in venting, too.

The Tremline fascia system allows perimeter venting of the roofing insulation. Other edgings provide only partial venting, if any.

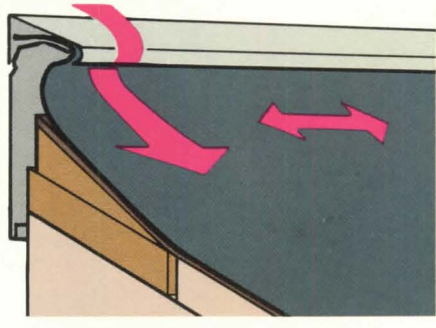
With the elastomeric membrane in position, you have an unbroken weatherproof seal around the entire building edge. Since there are no exposed fasteners, there are no punctures. So these potential leak areas are eliminated.

What's more, the membrane acts as an expansion joint, absorbing all the movement a roof can give it.

The edge on roof problems.

Tremline gives it to you.

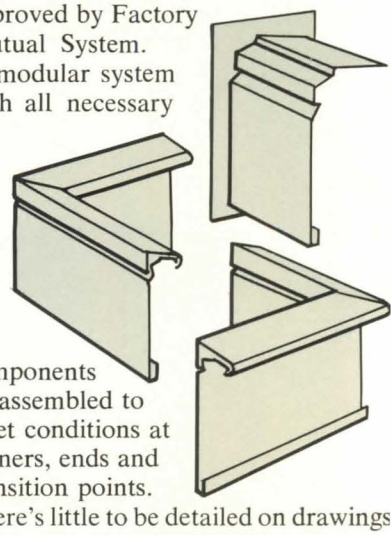
Take, for example, all the abuses that cause roof leakage. Tremline endures them better than any other edging system.



Other systems are static, with very little — if any — give. But since Tremline gives a lot, it can take excessive movement, ice pressure and thermal shock that conventional edgings can't stand. And it requires much less maintenance. No constant repairing and patching.

A complete, modular system.

With Tremline, you can get the complete system, from one responsible supplier. A quality system that meets insurance wind requirements and is approved by Factory Mutual System. A modular system with all necessary components preassembled to meet conditions at corners, ends and transition points.



There's little to be detailed on drawings or fabricated on the job. We even have a system for parapet walls. (See 4th pg.)

PREVIEW

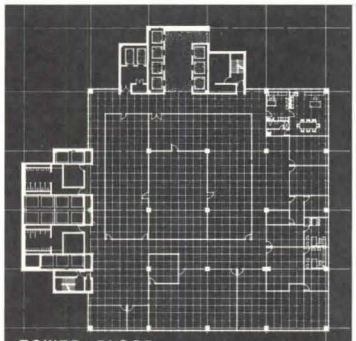
(*continued from page* 8)

SYMBOL OF STATE

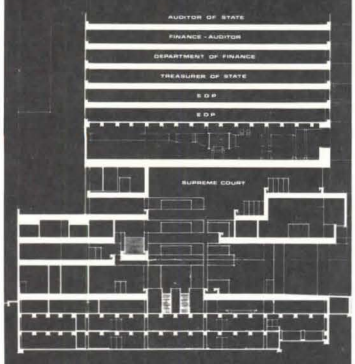
The Statehouse at Columbus, Ohio, a sturdy Schinkelesque landmark of 1839-1861, by Thomas U. Walter, will soon have a 41-story companion—a State Office Building designed by Architects Dalton - Dalton - Little and Brubaker-Brandt. The new tower will have a four-story Supreme Court block above a galleria-like lobby (section, left). The court has been articulated visually and its importance made clear, both from outside and from the lobby. The concourse below the lobby is linked to the Statehouse by a tunnel.

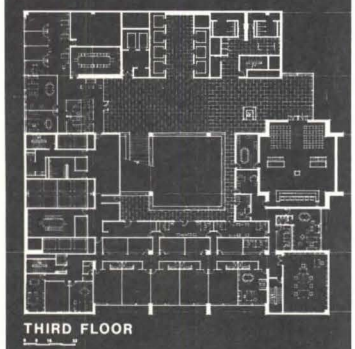
Each of the 34 office floors provides a column-free area 144 ft. square, obtained by placing elevator and service shafts outside the main block.

The architects' task of complementing the Statehouse—with a structure programmed for 1.2 million sq. ft.—was no easy assignment. Some relationship has been established by treating the court as a structure-within-a-structure, by *cladding the whole* structure in limestone, and by making the Statehouse side of the tower portion symmetrical and regular. As the tallest structure in town (at 592 ft.) the tower will identify the Statehouse square on the skyline, which has long since blotted out the great drumlike lantern.

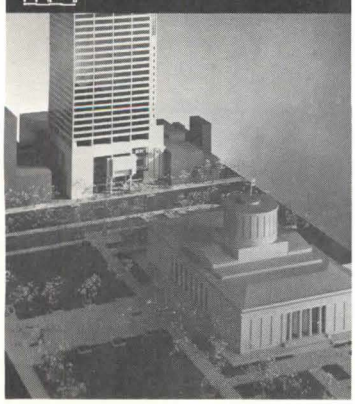


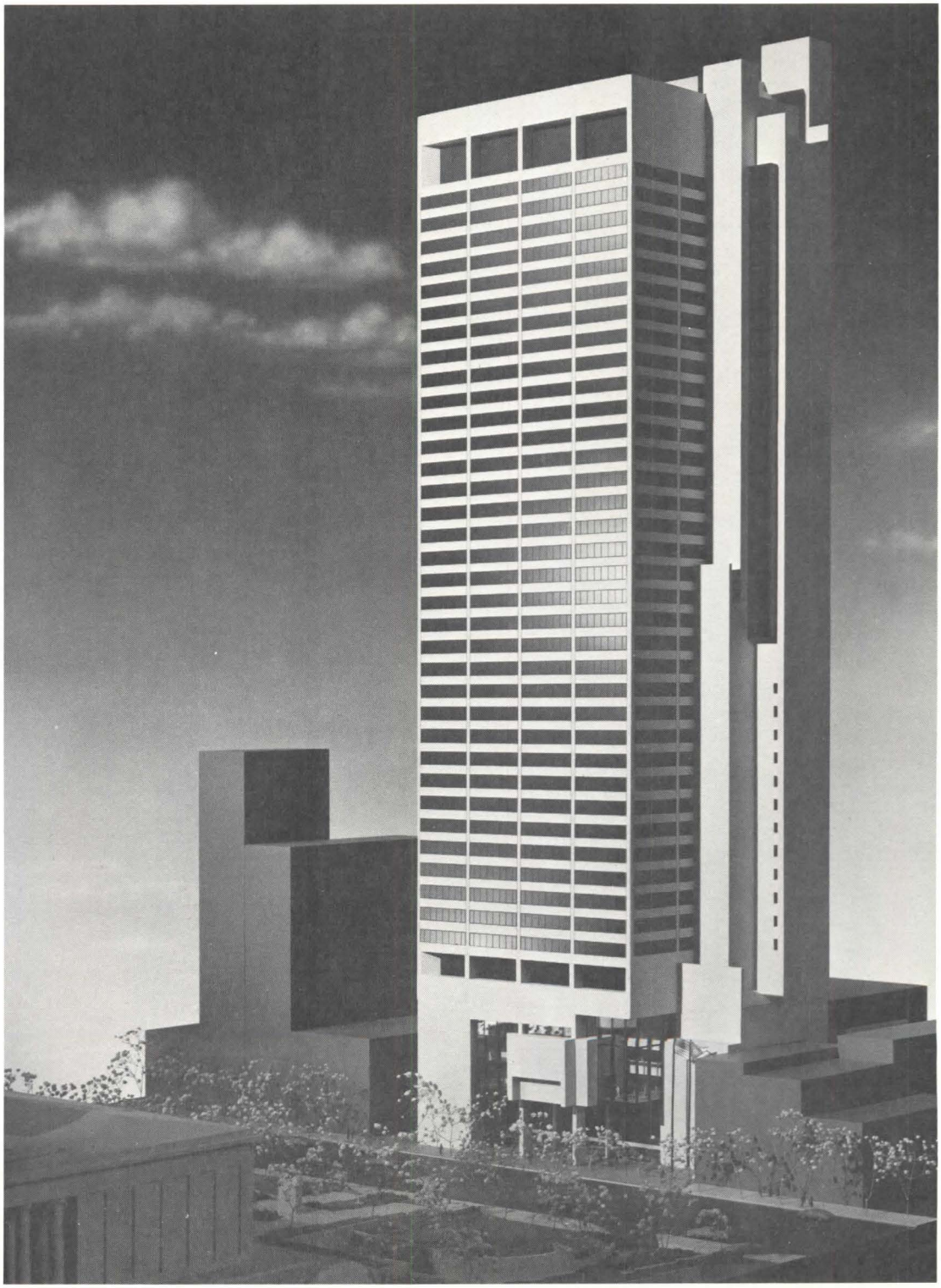
TOWER FLOOR





THIRD FLOOR





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UNITED STATES GYPSUM
BUILDING AMERICA

BOOKS

WITH MAN IN MIND. By Constance Perin. Published by MIT Press, Cambridge, Mass. 6″ x 9″, $7.50.

REVIEWED BY SAMUEL KAPLAN

As corporate and government involvement in planning and building continues to increase through expanded financing programs and politics it is apparent that the role of the architect is diminishing.

How the architect can get back into the design decision making process and revitalize it by a new awareness of human needs and the environment is perhaps the most critical issue challenging the profession today. Architects and architectural schools are aware of the challenge, but with few exceptions are unable to devise an expertise and method to give them credibility among the decision makers. Intuition and sensitivity today just do not have the credence they once had in the days of gentleman architects and gentleman builders now that we are in the age of the new Technocracy, with its deity of computers, CPM charts, cash flows and cost analyses.

How the architect and planner —the so-called environmental designer—can play a more relevant role in the design process is the subject of Constance Perin's *With Man In Mind.* The fact alone that she recognizes that indeed the environmental designer is not necessarily playing a relevant role in the design process makes this an important book. Her concern specifically is to provide the designer with workable principles to bridge the gaps between the designer, the client and the social and behavioral scientists. The subtitle, "An Interdisciplinary Prospectus for Environmental Design" is most appropriate.

She properly focuses her approach on the development of the design program, which she states "should provide the environmental designer with a statement of the inhabitants' requirements, which his work is to satisfy, that has been developed out of research conducted with reference to contemporary theory in personality, culture and social organization". She feels that such a program would "specify so many previously unacknowledged human requirements that the designer is challenged to develop responses going beyond those presently in the vocabulary of forms. The amplification of the imperatives for new environments must inevitably have great impact on the designer's conception".

Simply put, Miss Perin wants the designer to substitute his intuition—his own personal biases —with objective data garnered from the human sciences and translate this into form. To illustrate her thesis, she draws on a variety of studies of the inception process. Unfortunately, at least for me, she also draws upon the somewhat obtuse vocabulary of the behavioral sciences and tries to translate it into the also somewhat obtuse vocabulary of the designer. The result is heavy reading—a cross between a socio-psychological text and a thesis on an eco-environmental form theory.

The way is pointed by Miss Perin to this critical bridge between the human sciences and design, with a lot of stimulating questions in transit, but little is said about how the bridge should be structured—no real formulas, theories or approaches that could be used to help the designer evaluate the stresses and strains, the policies and priorities, the perspectives and prejudices of the respective professions, to say nothing of how to deal with the overwhelming and often irrational influences of the layman, be he a community organizer, corporate accountant, school board member or public administrator. The latter omission is the book's greatest failure. The problem is not whether a marriage of the human sciences and design can be accomplished, but whether our new emerging governmental and corporate construction systems will accept their product.

Miss Perin just briefly notes these harsh realities, only to indulge toward the end of the book in some very wishful thinking of how the new environment will be. Though noting again and again the need to bridge "the conceptual gap between what we do to make and change the environment and what people require from their environment," Miss Perin in the end drifts off into a Consciousness III cloud above the gap, leaving some very disappointed realists, like myself, on the earth below.

Nevertheless, the book is relevant if only to raise questions concerning program input that designers must start asking and setting answers for if they are to presume to play a role in shaping our environment. Only with an expanding input and expertise — gathered by a new methodology that leaves biases behind and takes the designer not only into the human sciences, as proposed by Miss Perin, but also into politics, economics and administration—can we expect to have the doors of decision makers opened again to architects and planners.

Mr. Kaplan, a member of our Board of Contributors, is Director of Development of the New York City Educational Construction Fund and Adjunct Professor at the School of Architecture, City University of New York.

DESIGN ESSENTIALS IN EARTHQUAKE RESISTANT BUILDINGS. Edited by the Architectural Institute of Japan. Published jointly by Architectural Institute of Japan, Tokyo and Elsevier Publishing Company, Amsterdam, London and New York, 1970, 295 pp. (in English) $20.

REVIEWED BY WILLIAM J. McGUINNESS

When a book appears that assembles well established but hard-to-find information about a subject as vital as anti seismic design of buildings, it is a distinct service to the professions of architecture and structural engineering.

Research and study, world wide, but especially active in Japan and California, had served to enhance an already large fund of seismic knowledge. One finds it, well documented, in the libraries of the engineering societies. Surprisingly scarce, however, is its assembly into books that can direct the practitioner to the solution of any seismic problem he may encounter. The book here reviewed is a valuable answer to this need.

Twenty-five writers and seventeen chapters attest to its completeness. The contents cover everything from general considerations to temporary structures. Space limitations preclude a listing of the authors but their names can be found on many of the principal papers assembled in recent years in the records of the American Society of Civil Engineers.

The book in its impressive scope evaluates and classifies a great many actual earthquakes. It sets up the means by which the probable lateral and vertical forces on a proposed building may be established. Following in sequence, the effect of these forces on ground conditions and foundations is discussed. Anti seismic design of a wide variety of superstructure types is seen in the foregoing list of contents.

For architects especially, it is comforting to find a book that is written by an architectural association. In contrast, the ten pages on earthquake regulations of the Uniform Building Code, a California publication, though highly correct and relevant, are presented in engineering terms that are a bit difficult to digest.

It should not be said that anti seismic structural design will over-ride architectural considerations, yet it is inescapably a strong influence on the architecture. A building in which the center of mass is too distant from the center of rigidity is subject to massive torsion. Large unbalanced elements of construction can result in a center of mass that will need to be met on both horizontal axes by the rigidizing effect of suitably positioned stiff frames or shear walls.

There has been a marked increase in the responsibility demanded of architects for a knowledge of structural design against earthquakes. This reviewer who is a consultant to the structural examination committee of the National Council of Architectural Registration Boards has noted an increasing number of questions on seismic design asked of candidates for a license. They now comprise about 10 to 15 percent of the total examination in structural design. This knowledge is asked of all those who take the examination regardless of whether they will practise in areas of light hazard such as Texas, (seismic zone 0) or in southern California, (seismic zone 3).

Mr. McGuinness, FASCE, is Senior Partner of McGuinness and Duncan, Engineers, Adjunct Professor of Architecture at New York Tech and a member of the Examination Committee of the National Council of Architectural Registration Boards.

p/a

Simply stated: Plia by Giancarlo Piretti. Produced by Anonima Castelli of Italy. Distribution solely by Krueger / Green Bay, Wisconsin. Chromium plated steel and Cellidor® in colors of: blue, yellow, rose, smoke, clear. An auxiliary chair that folds, stacks and hangs.

SUPERFRAMES

Forum: It is quite fitting that Mr. Swenson's "Technology" article (Sept. issue) begins with reference to building products of the 1880's—an era in which his ideas might have been deemed, at least, appropriate.

That his structures *could* be built seems to be the part of his proposal least in need of proof, yet fully two-thirds of his article is devoted to that end.

More pressing are the questions of why anyone would or should bother to consider such a solution to the problem of "crowded business centers," if indeed the problem exists (mightn't it be a problem of poorly utilized existing centers?)

The myth of the "fireproof" building should not need to be introduced to a man connected with the city housing McCormick Place. Nevertheless: centrally air-conditioned, ultra-highrise buildings are proven to be the least satisfactory from a standpoint of occupant safety.

Perhaps, as Mr. Swenson suggests, a "new architectural character" for the skyscraper may emerge as a result of his work. The role, however, remains the same: that of solving an ill-defined problem poorly.

THOMAS VONIER
School of Architecture
University of Wisconsin
Milwaukee, Wis.

Forum: I should like to make a clarification to my article published in the September issue.

This project was made at the Illinois Institute of Technology, where I am an assistant professor of Architecture, with the assistance of three of my students, Ali Afshar, Winston Poon, and Bradford Rabinowitz.

ALFRED T. SWENSON
Assistant Professor of Architecture, IIT
Chicago, Ill.

URBAN FIELD SERVICE

Forum: I am commenting on the article by Chester Hartman in your September issue, which I think is an excellent evaluation of the Urban Field Service at Harvard University.

It is quite true that there was some resistance by the faculty for reasons which Chester Hartman explained very well in the text of his story. I think that his reference to this resistance is grossly exaggerated and I would suggest that the following would be more in accordance with the facts. The majority of the faculty was reluctant to give UFS a central place in the curriculum because in many instances it did not contribute sufficiently to the student's education in his chosen field. These views ranged from those who would see in the UFS potentially a valuable input to those who had no use for it.

Otherwise I consider the article a very sober evaluation which illuminates the problems which a community program will encounter in an academic setting.

WILLO VON MOLTKE
Graduate School of Design
Cambridge, Mass. *Harvard University*

DOCTORAL PRECEDENT

Forum: Sorry to negate Mr. Chaffers distinction of being the first to receive the degree of D. Arch. However, congratulations to him for his graduate accomplishments. Also, Michigan was not the first to grant the degree.

The Catholic University of America instituted the degree D. Arch. in 1933. I was its first recipient. This was to be followed by twelve others. At present we have two candidates working toward completing their dissertations during 1972-1973.

PAUL A. GOETTELMANN, FAIA
Chairman of the Department and Assistant Dean for Architecture and Planning, Catholic University of America
Washington, D. C.

OCEANOGRAPHY CREDITS

Forum: The Oceanography Research Building at the University of Washington credited to me Oct. issue p. 5 was designed with Robert M. Jones, within our partnership of Liddle & Jones.

ALAN LIDDLE, FAIA
Tacoma, Wash.

ERRATUM

In the discussion of the rehabilitation projects of Priorities Investment Corporation ("Newark: Bellwether City," Sept. issue) credit was erroneously given to Ralph E. Jefferson as the architect for all work done by Priorities Investment Corp. We neglected to mention that Halevy H. Simmons of East Orange is the architect for a substantial number of units known as Amity Village II-A.

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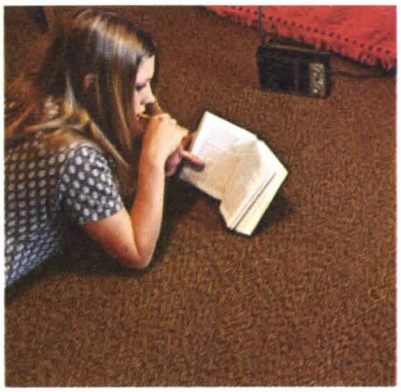

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FORUM

In the final issue of LOOK magazine, there appeared a lengthy piece by Alan Drury on certain aspects of the current Washington scene. In the course of numerous interviews, Drury talked to the U. S. Deputy Attorney General, Richard Kleindienst, about the Nixon Administration's attitude toward dissident blacks and whites, and Kleindienst brushed off their dissent by saying (according to Drury) "they can't threaten us because they vote against us anyway."

Now, that strikes me as one of the most interesting statements to have come out of the present Administration in some time. I had thought, in my innocent way, that problems of social or racial or economic injustice were being discussed by our public servants in fairly responsible terms —for example, whether such injustices were real or imagined, and (if real) whether something might not be done to advance our system toward the ideals which we profess to hold —"equal justice for all" being one.

Mr. Kleindienst has certainly clarified things for idiots like myself. It seems that the Administration won't spend appropriated funds for housing the poor "because they vote against us anyway." It won't talk sense about Amchitka with concerned scientists and conservationists "because they vote against us anyway." It won't spend money on mass transit or pollution control or model cities programs or anything else advocated by eggheads, longhairs, or potential beneficiaries of such schemes "because they vote against us anyway."

I used to think that Mr. Kleindienst was a figment of Vladimir Nabokov's imagination. (How could *any* public servant, except a Nabokov character, be called Deputy Attorney General Richard Mini-Service?) Well, I know better now, and so do you. And the conclusion one must draw is (to coin a phrase) perfectly clear: all of us who believe in public housing, mass transit, environmental control and conservation, racial equality, public works, bicycle paths, pure waters and pure air, national parks, no cracks in the earth's crust, and free milk for Hottentots should, of course, join Mr. Kleindienst's party. The dues are nominal, and the membership rolls are wide open.—PETER BLAKE.

LANDMARKS

ARE LANDMARKS FOR SAVING?

Western civilization is, of course, crumbling; and so are its symbols: Venice is tottering, Piero della Francesca's frescos are peeling, Paris and London are being devoured by greed. There seems to be an almost endless demand for funds to save this landmark or that—while funds are needed, even more urgently, to save thousands of children from Bengla Desh and other trouble spots.

In recent weeks, the following landmarks have been threatened and/or destroyed: St. Paul's Cathedral in London is apparently on the verge of collapse—ravages of time, weather, bombing, unwise excavations nearby, pollution, and traffic vibration being some of the causes. The Dean of St. Paul's is touring the States, hoping to raise $1 million to fix up the place. Louis Sullivan's Stock Exchange in Chicago is being torn down, and pieces of it are being claimed by the Chicago Art Institute and by New York's Metropolitan Museum. James Bogardus' first prefabricated cast iron and glass building (in the Washington Market area of Manhattan, and constructed in 1848) is being painstakingly disassembled and put into mothballs. And Grand Central Station in Manhattan seems again in peril because its owners (the Penn Central) are bankrupt and the creditors are demanding cash for all of Penn Central's assets.

Architects sympathize, of course. But since all architects are poor, their sympathy is rarely translated into cash. And so these appeals for funds go unanswered, and Les Halles and Sullivan's buildings and Grand Central tend to bite the dust.

It is sad, but just exactly *how* sad? In the 19th century, there was such a dearth of debris that people actually built it from scratch. Now that we are loaded with actual or potential ruins, we should, perhaps rejoice. Not long ago, one of our friends paid his first visit to Colonial Williamsburg, and reported that it was a kind of 18th century Disneyland—really nice, and almost convincing. Would conservationists be willing to offer St. Paul's to the Disney Corporation? We are sure that the Disneys would be delighted to shell out a million bucks, motellize the place and rename it Jesusland. That may very well be the only realistic alternative. How about it, and why not?

St. Paul's in distress

AIDA'S BIRTHPLACE BURNS

The Cairo Opera House was totally destroyed by fire October 28, and with it the priceless collections of antique costumes, jewelry and musical instruments which it housed. Designed in 1869 by the Italian Architects Avoscani & Rossi, this graceful white rococo building was built by the Khedive Ismail for the

premiere of the opera, "Aida" which Guiseppe Verdi had been commissioned to write. The celebration was to mark the opening of the Suez Canal, and was attended by much of the world's royalty, including the French Empress Eugenie.

This most-famous landmark of Cairo's colonial heritage was doomed in any case. According to the Ministry of Culture, the designs for a new opera house have been finished for several years.

GIFTS

SHOPPING LIST

In the event that this issue reaches you before you have exchanged your Christmas gifts, here are some last-minute suggestions keyed to you or your friends' hobbies:

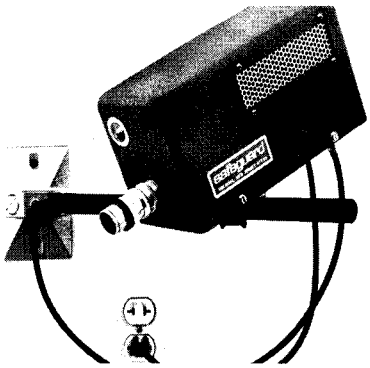
• For your favorite art collector: a painted sculpture measuring 2 ft. wide and 1,600 ft. long, and made up of 200 panels of plywood, by the Artist Patricia Johanson, who originally exhibited this work (called "Stephen Long") on some abandoned tracks of the Boston & Maine

Artist Johanson's 1,600 feet

RR, with the plywood panels (striped in 8 in. wide bands of blue, yellow, and red) supported on concrete blocks. (Come to think of it, this particular painting now belongs to someone we know; but other wonderful works are in progress and may become available.)

• For your favorite G.I.: a piece of the Maginot Line at Hestroff, in France (and presumably, but —in the light of history—not assuredly, facing the German border). One spacious bunker was recently bought at auction by a hairdresser called Serge Stepanian, for only $2,450, and he seems (inexplicably) at a loss over what to do with it.

• For your favorite hold-up victim: a decoy TV camera made by an outfit called Safeguard Security Systems and designed to resemble the real McCoy in every detail—it scans, has flashing lights that signal "on-the-air," and looks as quietly men-



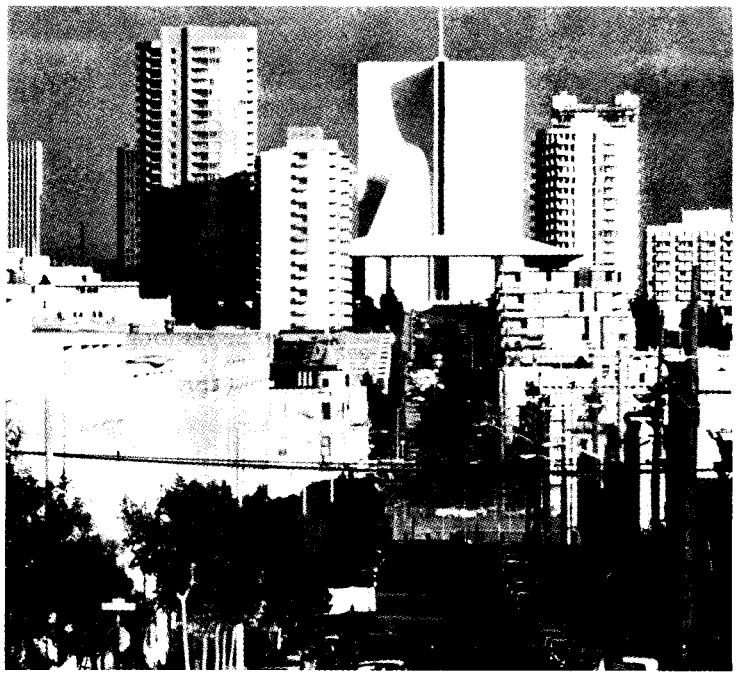
Big brother isn't watching

acing as a deathray gun. Only it doesn't do anything at all—it just scans and blinks, and costs $99.

• For your favorite whirling dervish: an $80,000 carousel built with loving care more than 40 years ago, and now surplus because its old home, the Palisades Amusement Park in Cliffside Park, N.J., has been sold by the carousel's owner to the Centex-Winston Corporation which will put up 3,800 highrise apartments.

• For your favorite alcoholic: a prefabricated, electric "fireplace" made of simulated red brick or fake fieldstone, with a hidden

Plug-in cheer



San Francisco's Cathedral overtowered

"entertainment unit"—a mantel that lifts up to convert the fireplace into a home bar. The manufacturer, Cavrok Corp., is pining away in Vernon, Conn., waiting to hear from you.

• For your favorite city planner: a little electric car made by Electrodyne, Inc., of Seal Beach, Calif., and which sells for $1,725. It doesn't pollute anybody or anything, cruises at about 25 mph, makes no noise whatsoever, and runs on batteries that you recharge by plugging them into the nearest outlet. The juice costs about $1.50 a month.

• And for your favorite child: a "play-as-you-grow" ecology game boxed by an outfit called Urban Systems. The little tykes can play CLEAN-UP! for $5; POPULATION for $10. But LITTER-BUG costs only $5. The games, as described by their promoters, will drive any self-respecting child into an orphanage.

CITIES

THE BAN IS DEAD . . .

San Francisco voters got a chance last month to defeat one of their pet threats, highrise buildings, at the ballot box. By a margin of 85,000 to 140,000, they voted against a height ban, which would have imposed a six-story limit on new construction.

In any other major U. S. city, banning highrise buildings would be unthinkable. Even in San Francisco, it seemed ridiculous when dress manufacturer Alvin Duskin started a campaign last year to put highrise to a vote. But his supporters gathered the required 45,000 signatures, and the question appeared on this year's ballot as Proposition T (the last of a stupefying list of 20 issues put before the voters).

Proposition T did not propose an outright ban; instead, it called for submission of any project of more than six stories (or 72 ft.) to a popular vote. (Just think of the ballots *that* might have produced!)

Supporters of Proposition T claimed that it would turn back the "Manhattanization" process and save the city's cherished views and sunlight. "The little cable cars that used to cling to the sides of sunny hills now move through dark canyons," mourned a campaign coloring book. (Incidentally, voters approved Proposition Q, which prevents further reductions in cable car routes or prohibitive increases in fares.) Figures were published showing that highrise buildings cost the city more for services than they yield in taxes.

Opposition to Proposition T, which included all labor leaders and elected officials, plus most business leaders, claimed that the ban would cost the city jobs, lower its property values, and raise its tax rates. Even iconoclastic mayoral candidate Dianne Feinstein (who lost to incumbent skyscraper fan Joseph L. Alioto) did not support Proposition T, although she recognized that

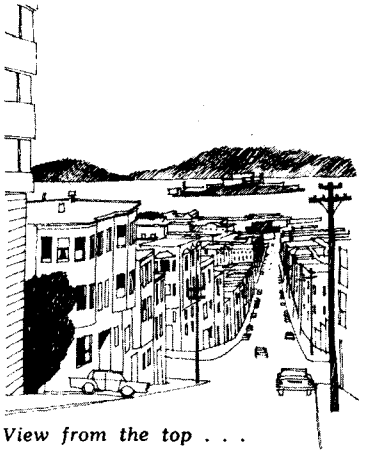
"more and bigger is not better."

The city's Planning Commission objected that Proposition T would actually *raise* the height limit in some areas where it is now set at four stories to preserve views. The commission also contended that Proposition T would invalidate "a monumental amount of work" by its staff and consultants. Anywhere else, that might have sounded like a lame bureaucratic complaint, but this commission has just completed a document that is monumental in its potential effect, not just in its bulk.

LONG LIVE THE PLAN

The Planning Commission's Urban Design Plan for San Francisco, adopted as official policy in August, is the result of a painstaking, block-by-block study. It places high priority on preservation of views and open space (well landscaped and lighted, and uncluttered by cars). It proposes limits on bulk (measured by maximum horizontal dimensions) as well as height of structures. Height limits are adjusted to local conditions—preserving views from existing freeways, for instance, or minimizing building shadows on public parks.

In adopting the Urban Design Plan, the commission also adopted a set of "emergency zoning laws" to cover the year or more of public hearings and revisions before a new zoning law can take effect. These rules will prevent construction of any more blockbusters on the scale of the Bank of America building. Planning Director Allan B. Jacobs denies allegations that the emergency rules amount to a "freeze" on major building projects, saying they just provide "refrigeration to keep things from being spoiled."



View from the top . . .

. . . must not be spoiled

No more round houses

EDUCATION

GAMING IN GHANA

A game played in English in Cambridge, Mass., has been translated into Twi and Dagbani in Ghana, reports a professor at Washington University in St. Louis. The three-dimensional vocabulary would seem to make a universal language.

When Frants Albert was teaching architecture and urban planning at the University of Science & Technology at Kumasi, he came upon Neal Mitchell's "game" in the Forum (Dec. '68 issue) and developed a game-kit out of bamboo and other materials for his students to use in Ghana's Northern Region. "The task was to elicit directly," says Albert, "without applying any preconceived bias, the desires of people." He recognized the difficulties of triggering the responses of people "who by the restrictions of their traditional and economic existence have never had occasion to make significant choices."

The game was played at three levels—first the complete compound was studied, then the individual spaces with their openings and furnishings, and finally the groupings of compounds. A game would start by making an inventory of the requisite spaces, then setting them out on a board, then arranging them. Rapid interpreting went on "via English from the instructor to a student, who would repeat in Twi to a wife from Ashanti, who would translate in Dagbani"—and so on, in return.

"It is interesting to note that no one wanted either a round hut or a round compound," says Albert. "Progress and prestige are rectangular, and if possible two-story. Happiness is a corrugated metal roof." He reports too that although the gaming experience yielded good programmatic information, the game findings were "not always directly applicable" to the student problem later devised—a multilevel, multifamily project aimed at giving students "sufficient complexity in design."

Happiness is a rectangle

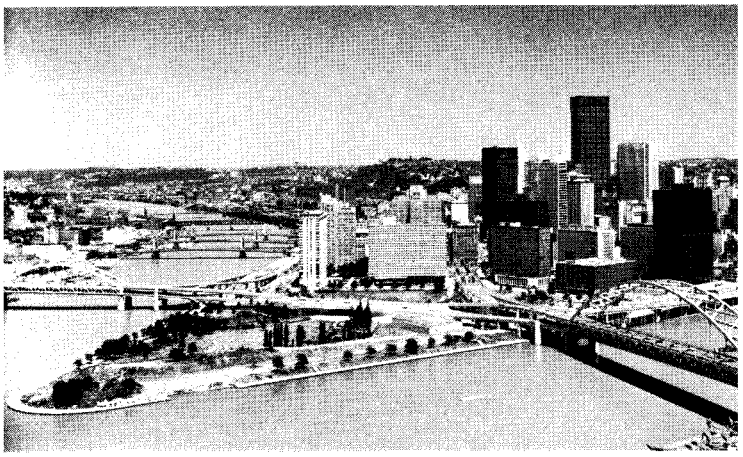
1920 REVISITED

The School of Art and Architecture at Manhattan's Cooper Union, under the impassioned di-

(*continued on page 65*)

BIG STEEL SPIKE

The U.S. Steel Building is a symbol of both an industry and a city



The triangular shaft of the U.S. Steel Building rises 841 ft. above the street, overshadowing an earlier Harrison & Abramovitz landmark, the 1951 Alcoa Building (right edge of U.S.S. in aerial); H. H. Richardson's magnificent 1888 courthouse is nearby (far left). The notched corners of the triangular plan eliminate inconvenient space and reduce wind loads. The flat roof is used as a pad for helicopters, which shuttle between the corporation's headquarters and its many plants in the Pittsburgh area. Seen from across the Monongahela (above), the dark tower forms an apex for the city's bristling skyline.

Steel made Pittsburgh. But Downtown Pittsburgh has shown little visible evidence of the fact since the notorious smoke from the mills was banished back in the 1950's. Now U. S. Steel, the biggest producer of them all, has put steel emphatically on the downtown skyline, with a 64-story headquarters that is far-and-away the city's tallest structure and its biggest office building.

In such a situation, we might have expected a flamboyant corporate symbol. What we got, from the hands of Architects Harrison & Abramovitz & Abbe, is a symbol of another kind, representing the earnest, technology-minded management of the giant corporation. The building is sturdy in proportion and blunt-topped. Its exposed skeleton and infill walls show all their joints with erector-set directness and are in the unrelieved, somber brown of weathering steel.

The most obvious peculiarity of the building is, of course, its triangular plan. A triangular structure of this scale would be destructive on most urban sites. But here, at the point where a dense commercial district gives way to a no-man's-land of expressway loops and parking lots, the tower makes an effective gatepost for Downtown. It is, of course, no mere coincidence that the district it guards is known as the Golden Triangle; the relationship is apparent from the tower's upper floors, where its walls are seen to parallel the rivers that bound the district.

The architects maintain, however, that the plan is no symbolic gimmick. They point out that it produces an eminently sensible, compact working floor of 37,000 to 41,000 sq. ft. (see next page).

The really significant departure in the U. S. Steel Building is its fluid-fireproofed structural frame. The exterior columns of the tower, which stand 3 ft. outside the walls, are not swathed in conventional fireproofing and encased in a weatherproof skin. Instead, they are rectangular steel tubes, filled with a salt solution. For the first time in a highrise building, the steel you see is the steel that is holding up the structure.

Water-filled columns are not a new invention; they were patented back in 1882. And since U. S. Steel announced its plans back in 1967, the device has been applied in several other buildings in the U. S. and in France.

The system involves no moving parts. It depends solely on the currents induced wherever heat is applied to circulate cooling water.

The 500,000-gallon fluid system had to be divided into four zones, vertically, to keep water pressure from exceeding the strength of the tubular columns. Fabrication of the columns demanded unusual accuracy, especially since some of the waterproof welded joints are 3 in. thick. Extra fabrication costs were offset by elimination of the usual fireproofing and cladding.

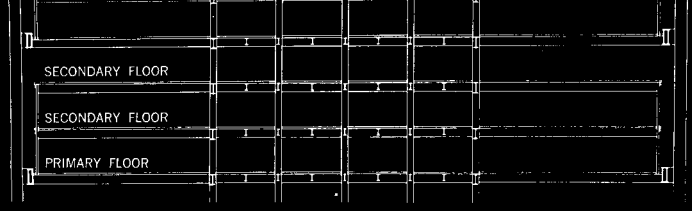
Because we are not used to the appearance of exposed, unclad columns — of this high-strength steel—the whole frame of the building looks rather spindly from a distance. It is only at close range that we realize its massive scale.

Demonstrating the product

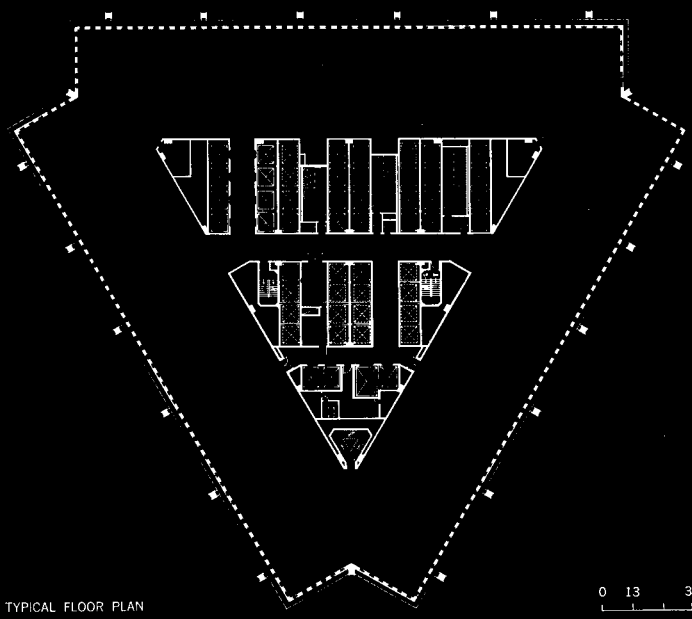
The fireproofing system is only the most innovative of many applications of steel worked out for the building. From the time the corporation began planning for a larger headquarters, back in 1965, the building was intended to demonstrate new ways to use steel—not far-out, one-of-a-kind devices, but methods that could be applied to other buildings of reasonable cost. (U. S. Steel has not divulged the cost of this building, but it is reported to be about $35 per sq. ft.)

From the outset, planning involved an "innovations committee," in close touch with the corporation's product, engineering, and construction divisions. The architects were brought into the process at the same time as the engineers, the building managers, and the contractor (who worked on a negotiated bid basis). The structural innovations can be attributed largely to Engineers Skilling, Helle, Christianson & Robertson, whose structural audacity can also be seen in New York's World Trade Center and the Federal Reserve Bank of Minneapolis (June issue, p. 5).

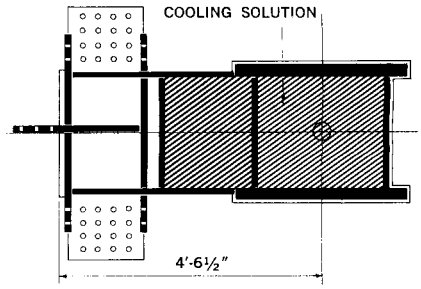
Here, the engineers worked out a scheme concentrating wind bracing in the core of the tower, but adding a rigid "hat" at the top so that the strength of the outer framing is used to reduce deflection. The hat also restrains thermal expansion of the ex-



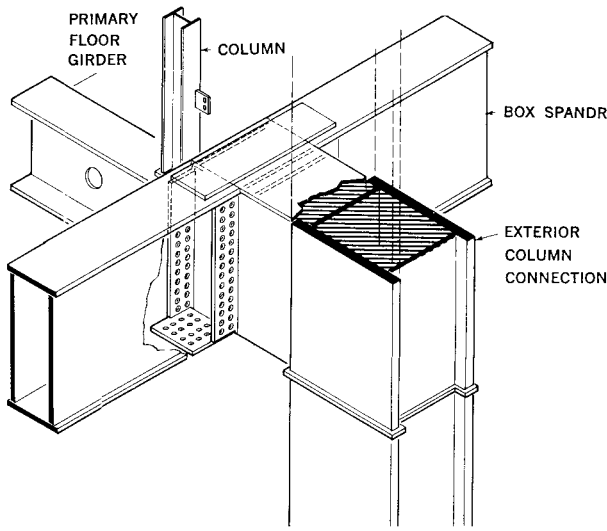
TYPICAL CROSS SECTION

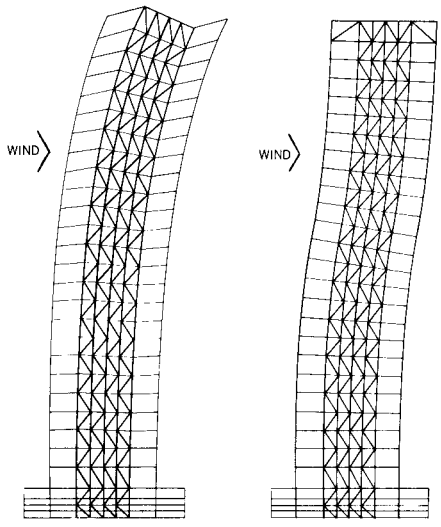


TYPICAL FLOOR PLAN



PLAN AT COLUMN





CONVENTIONAL FRAMING

FRAMING WITH HAT

In section (top left), the tower is like a stack of lowrise buildings, connected to the exterior frame at every third floor. The 18 outer columns (plan, above left) are welded steel tubes (section, top), filled with a solution of potassium carbonate, which will circulate when heat is applied, limiting steel temperature to 650 F. on the exposed face, 370 F. on the inner face. Tubular stubs that transfer building loads to the columns (isometric) also contain fluid. Spandrel beams running along the walls —conventionally fireproofed—mark off the three-story layers on the exterior (left). A stiff structural "hat" at the top of the tower reduces wind deflection (diagrams above). Each office floor has three column-free areas, each 45 ft. by 210 ft. (top right). Ceilings adapt to movable partitions (section, above right) with light fixtures that can be moved without tools and linear air diffusers that can serve both sides of a partition placed under them; the steel partitions contain no wiring and rest on cleats that do not mar the carpet. In the lobby (right), core bracing is expressed on walls and crosses elevator corridors, encased in painted steel. Surfaces between diagonals are of palladiano terrazzo, made with red marble.

posed outer columns, which could otherwise have extended by as much as 5 in. vertically.

Since a horizontal diaphragm at every third floor was sufficient for structural bracing, the two floors between are designed as "secondary" floors and their loads transferred by light steel columns to the next "primary" floor below, where all connections to the exterior columns are made. The tower is thus, in effect, a stack of three-story buildings. The frame as a whole is remarkably light for a structure of this height, weighing less than 30 lbs. per sq. ft.

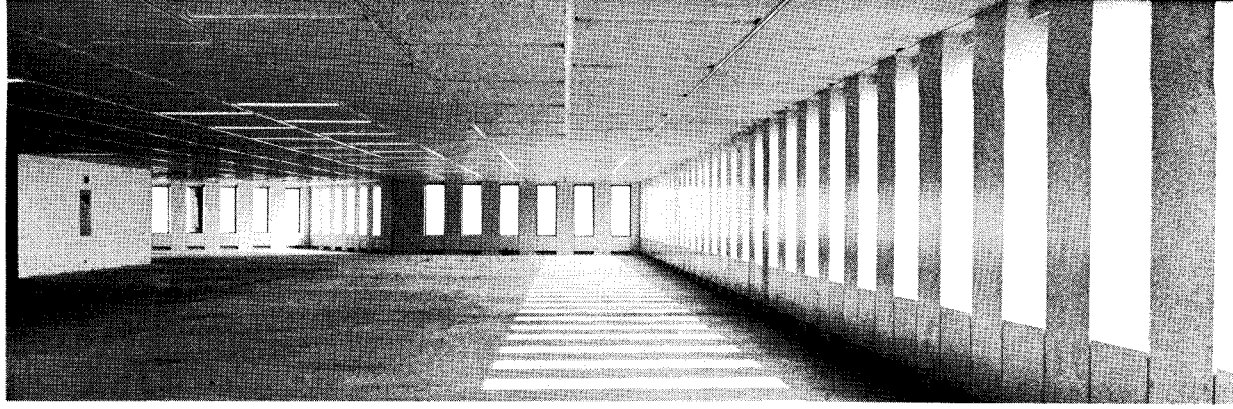
Offices subject to change

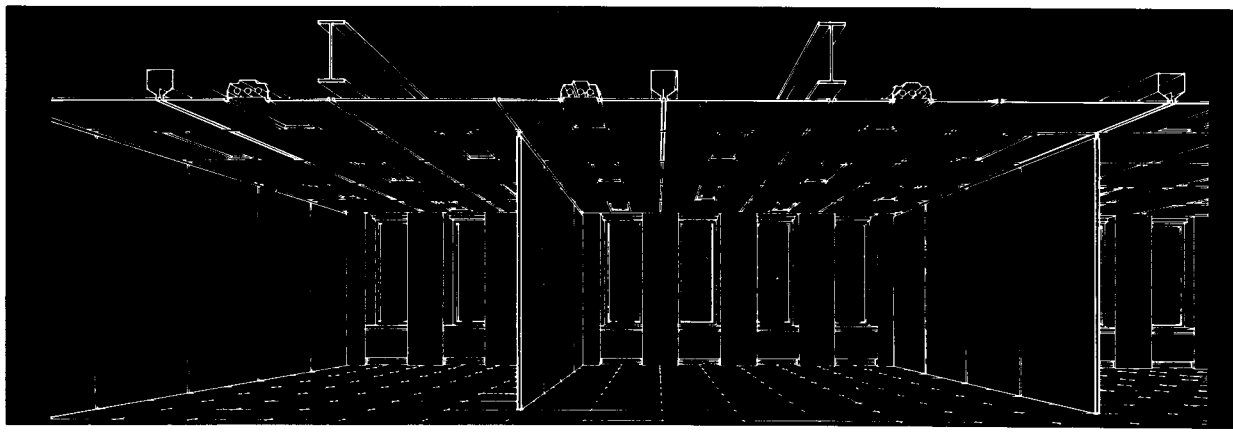
U. S. Steel wanted truly flexible office space—not open planning, but partitioned offices that can be rearranged easily by building personnel. Past records showed that 20 per cent of partitions were relocated per year. The triangular plan gave them plenty of column-free space, three 10,000-sq.-ft. blocks per floor. Within these areas, enameled metal partitions can be located along any 4 ft. 4 in. module line.

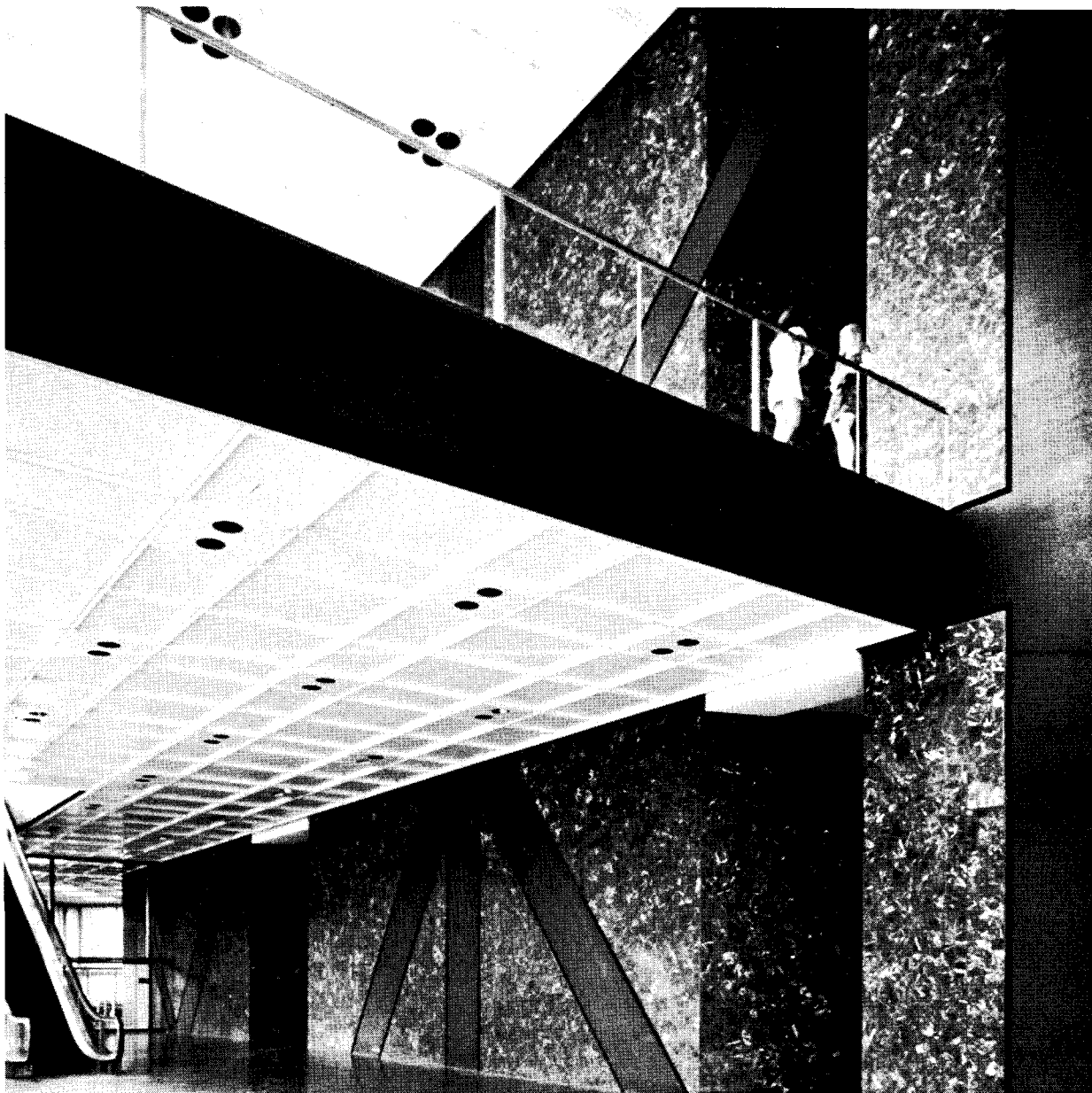
The key to easy rearrangement is the ceiling, which has newly developed, variable-volume slot diffusers every 13 ft. These are designed so that partitions can go directly under them (or not), and air flow can be adjusted on either side independently. Convolutions and insulation inside the diffusers minimize sound transmission between spaces.

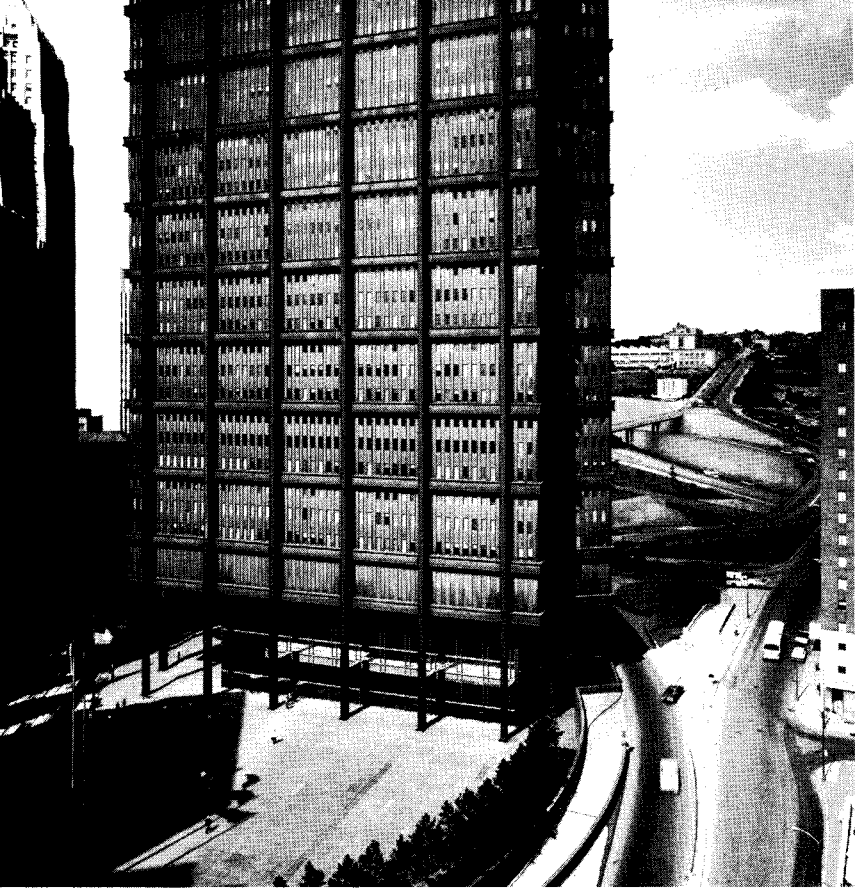
Because of its durable finishes, its acoustically tight connections, and its many adjustable parts, the wall-and-ceiling installation is relatively expensive, but U. S. Steel puts a high value on it. (The same system is offered on the 21 floors that will be leased out until the corporation needs them.)

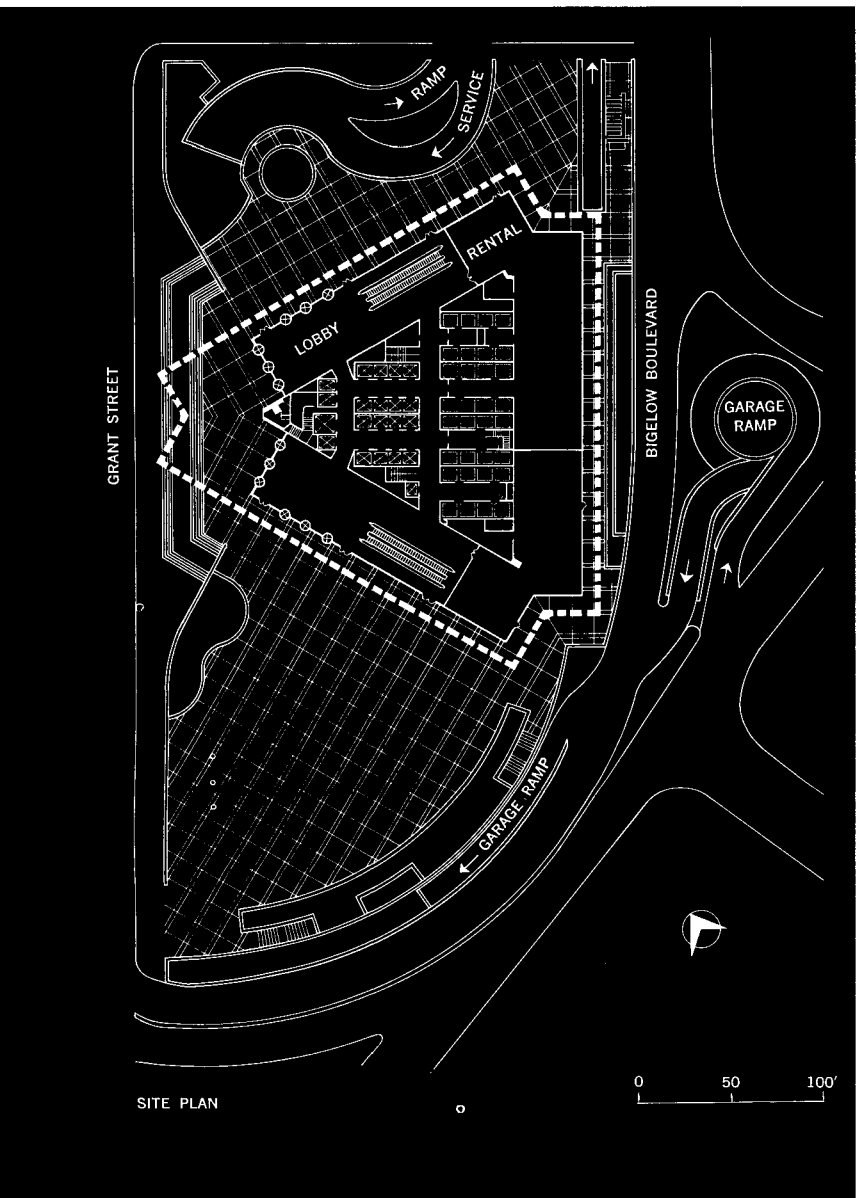
The exterior wall here serves merely as a weather curtain, recessed behind the frame. For this, the architects adapted a standard, lightweight metal system produced by U. S. Steel—a snap-together system designed for utilitarian structures. Here, for the first time, the exposed parts were made out of weathering steel. The bronze-tinted windows (11,000 of them!) are framed in stainless steel—since the company advises against setting glass in weathering steel—and each one pivots vertically for cleaning from inside.











At the top of the tower is the virtually inevitable Top of the Triangle restaurant (tricked out with heavy "timbers" and brick to look like a cellar in the sky). Above that is a rooftop heliport, strong enough, due to the stiffness of the structural "hat", to take the thrust of vertical take-off jet craft.

Design of the floors at the base was complicated by obstacles below grade. The site, which was assembled out of 21 parcels plus some closed streets, had the usual problems of landfill sites. (It was once a pond.) It also had an active railroad tunnel under it, one that may someday be part of a transit system. The rebuilt tunnel passes under the core, so close to plaza level that half the elevator banks have to start from mezzanine level. The mezzanine turns out to be an advantage here, adding needed circulation space.

Below the lobby, extending out under the plaza, is a "concourse" floor, with auditorium, cafeteria, bar, shops, and exhibition space; a truck dock is on the same level. Below that are three levels of parking for 650 cars. There is much more going on below grade than the rather featureless plaza suggests.

U. S. Steel management considers its new building to be "a facility—as much a facility as any mill or mine." They have spent generously on a fine-tuned air-conditioning system, movable partitions, and a thoroughly equipped heliport, but allowed almost nothing for nonfunctional flourishes (not even a steel sculpture!).

There is, of course, a richly appointed executive floor, laid out by Peter Muller-Munk Associates and furnished by Maria Bergson (see this month's *Industrial Design* and *Interiors*). But all executives below top rank have the same serviceable carpet and spartan partitions as the typing pool.

As a functional facility, the building is quite efficient. Esthetically, its main virtues are in the nature of restraints: it is not flashy, or monumental, or visually dishonest in any way. It may lack the inspired concept or the precise proportions of great architecture, yet Pittsburgh and U. S. Steel are fortunate to have such a sound building to represent them.

—JOHN MORRIS DIXON

The 2.7-acre building site (top left) includes parts of six earlier city blocks. A widened boulevard curves around the site (plan, left). Spiral ramps to the garage beneath the building are located across this boulevard. The need to raise elevator pits above a railroad tunnel dictated the two-level lobby; the lobby ceiling was raised to bring it above eye level of travelers on the boulevard, which is 20 ft. above plaza level. The plaza (right) is paved with rough, dark-aggregate terrazzo, which hardly shows stains from the weathering steel frame.

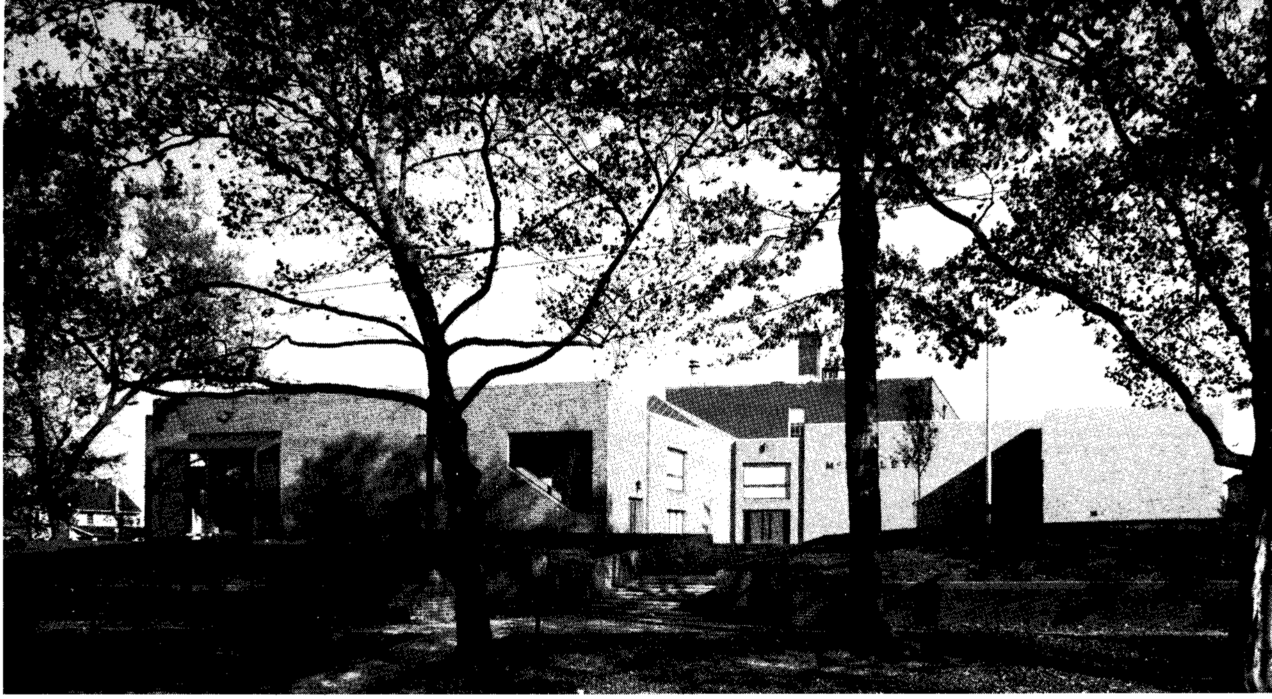
FACTS AND FIGURES

U. S. Steel Building, Pittsburgh, Pa. Architects: Harrison & Abramovitz & Abbe (Charles H. Abbe, partner in charge; J. R. Hayes, job captain). Engineers: Skilling, Helle, Christiansen & Robertson and Edwards & Hjorth (structural), Jaros, Baum & Bolles (mechanical), Ebner-Schmidt Associates (electrical). Landscape architects: Clarke & Rapuano. Interior designer: Maria Bergson. General contractor: Turner Construction Co. Building area: approximately 3,000,000 sq ft. total. Costs: not available.

(For a listing of key products used in this building, see p. 76.)

PHOTOGRAPHS: Ezra Stoller (except p. 24, p. 25, and p. 27, top, courtesy of U. S. Steel).

SCHOOL BUILDINGS



ONE BIG CLASSROOM

Two floors of undivided teaching space do the work of 20 classrooms

From the edge of the skylighted central well at McKinley School (below left), you can see almost all of the 14,000 sq. ft. of space where 400 students and 20 teachers do their work. Except for an adjoining multipurpose gym and some special-purpose rooms in an older wing, McKinley is virtually a one-room school.

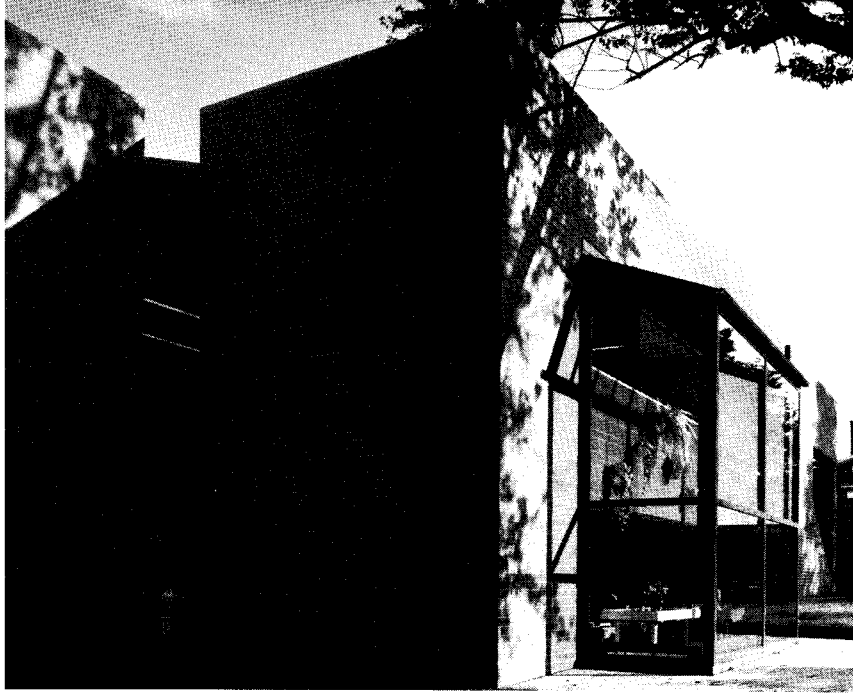
McKinley's principal and teachers worked as a team to draw up an open-plan, "cooperative teaching" program calling for totally flexible space—where the sizes of groups and teams could be varied freely. Architects Don Hisaka & Associates have given them that space, in an envelope of deceptively simple design.

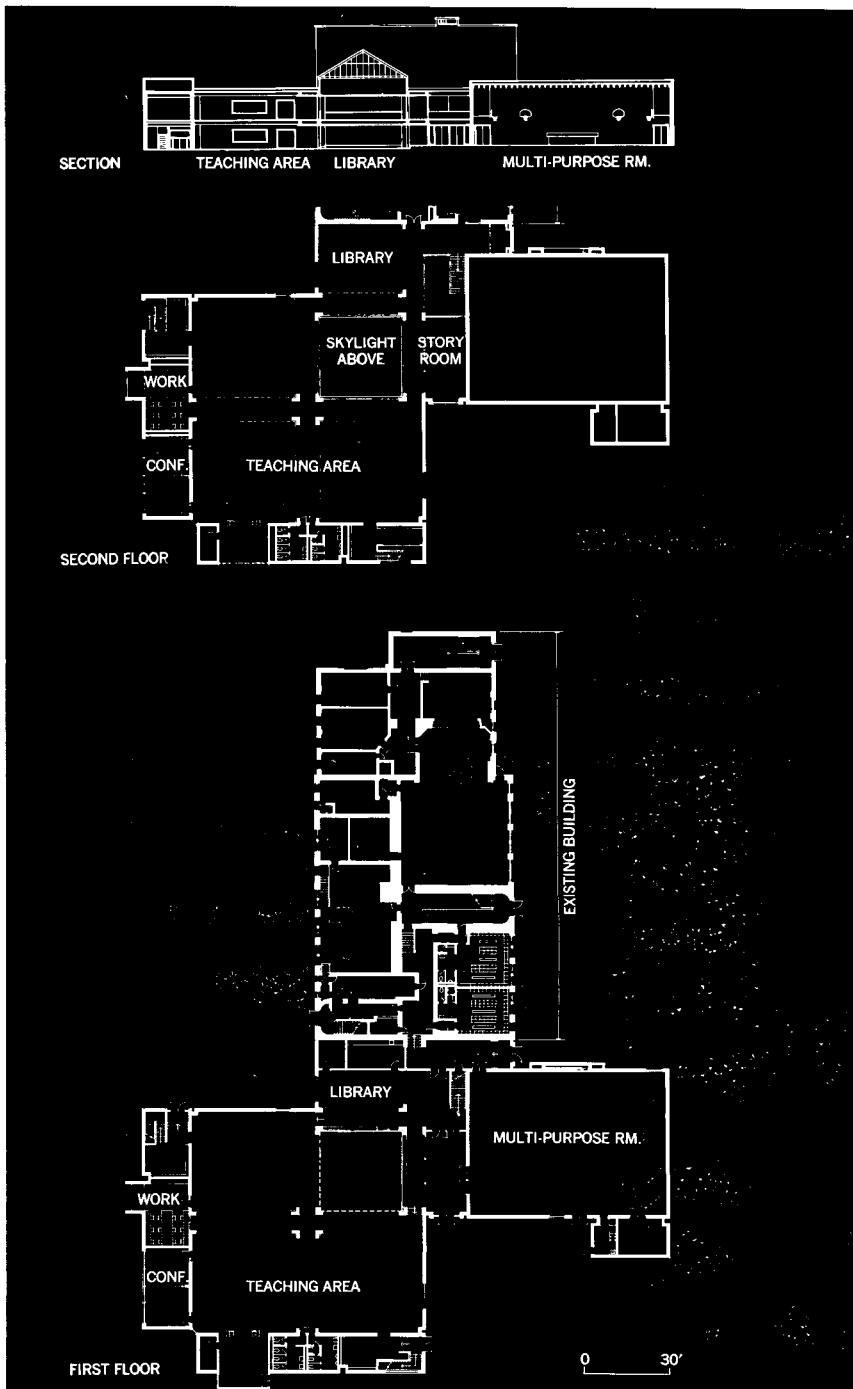
The new portion of McKinley replaces a tall 1890's schoolhouse and is linked to a three-story 1920's wing. Both the site and the relation to the existing wing demanded a two-story solution. The skylight well is the device that unifies the two levels—the upper one for six- to eight-year-olds, the lower one for eight- to ten-year-olds—into the single space the client wanted.

Teaching areas on both floors are oriented inward toward the well. For informal meetings, all 400 students can gather comfortably in the central well and at the railings around it.

Windows have been kept to a minimum to leave wall space for chalkboards and tackboards. Around the perimeter of the open teaching areas are special small-group rooms for activities that make noise (singing) or need isolation (testing). At two corners are entrance stairwells equipped with coat hooks and boot racks, through which students enter and leave the corridorless teaching areas. (The "one fault" that the principal finds with her school is that these entry spaces are not quite big enough.)

McKinley, reports the principal, needs much tighter discipline than a conventional school "to avoid chaos". Each fall, she starts the year with a program on "living at McKinley."





The brown brick walls of McKinley School are notched to indicate functional blocks (top left) and punctured with a few large openings, such as the angular stairwell windows and the two-story greenhouse bay (above right). The individual study area under the central skylight (left) has orange carpet, yellow and green seating. Reflective coating on the skylight reduces heat gain. The 84-ft.-square teaching areas (plans, right) are spanned by precast concrete T's, carried on massive U-beams (section), which house air ducts feeding down from rooftop air-handling units.

FACTS AND FIGURES
McKinley Elementary School, Lakewood, Ohio. Architect: Don M. Hisaka & Associates (Robert A. Barclay, associate in charge). Engineers: R. M. Gensert Associates (structural); Evans & Associates (mechanical), William B. Ferguson (electrical). General contractor: Sam W. Emerson Co. Building area: 28,000 sq. ft. Construction cost: $700,000; site development: $30,000. PHOTOGRAPHS: Thom Abel.

LEARNING CENTERS PLUS

Open-classroom school rambling down a slope is an educator's dream

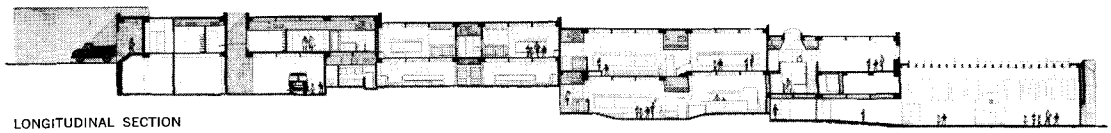
At first view, from the top of its hillside site, Hamden's Ridge Hill School looks somewhat forbidding. Its red brick walls have many angular projections and, apparently, few windows. But inside its hard shell the school reveals expansive spaces, full of light from many sources and equipped in a way that can only be described as lavish.

Ridge Hill started out with a forward-looking, ungraded, team-teaching program, and with a budget large enough ($7,820 per pupil) to give the concept a favorable test. Design was entrusted to a promising young hometown firm, Harold Roth & Edward Saad (Oct. '69 issue).

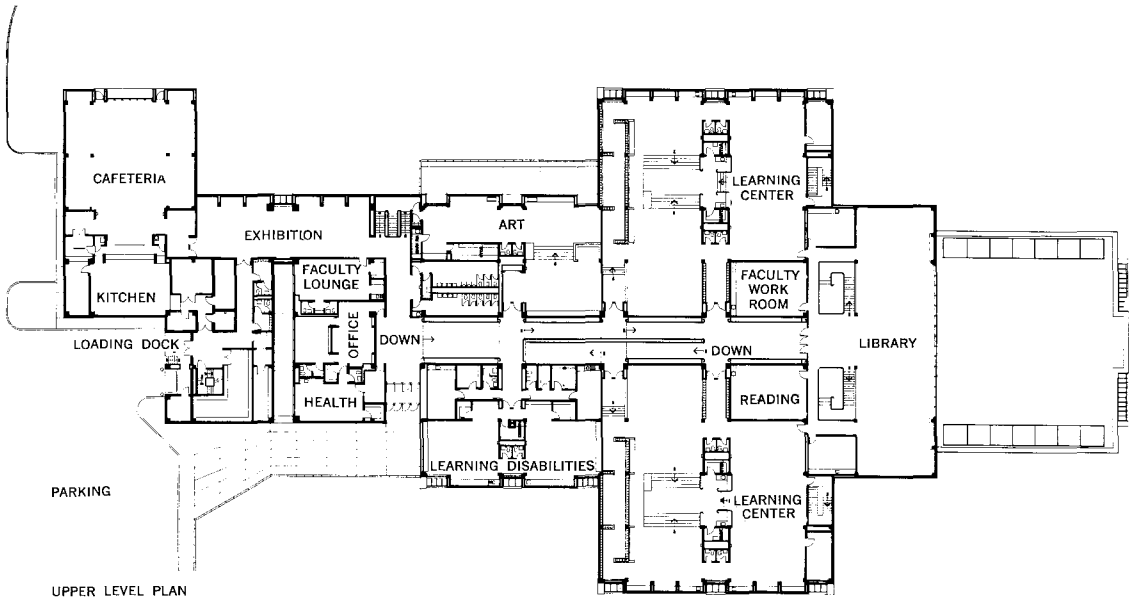
The one difficulty at Ridge Hill was the site—a rocky, landlocked hillside, bypassed by developers. The only useful automobile access was through the end of a cul-de-sac to the west, on the uphill side of the tract, where the architects carved out the slope to provide a truck dock, staff parking, and a bus loop. From this access point, the school runs straight down the slope, between an uneven, wooded area to the north and terraced playing fields to the south.

The plan of Ridge Hill has a geometrical order that is by no means apparent from outside. Most of the spaces are laid out symmetrically about the 170-ft.-long "interior street," a two-story high passage with switch-back ramps reaching eleven different floor levels. In one grand gesture, this spine takes care of most of the school's circulation, vertical and horizontal. And, not so incidentally, it meets a state requirement for accessibility by wheelchair.

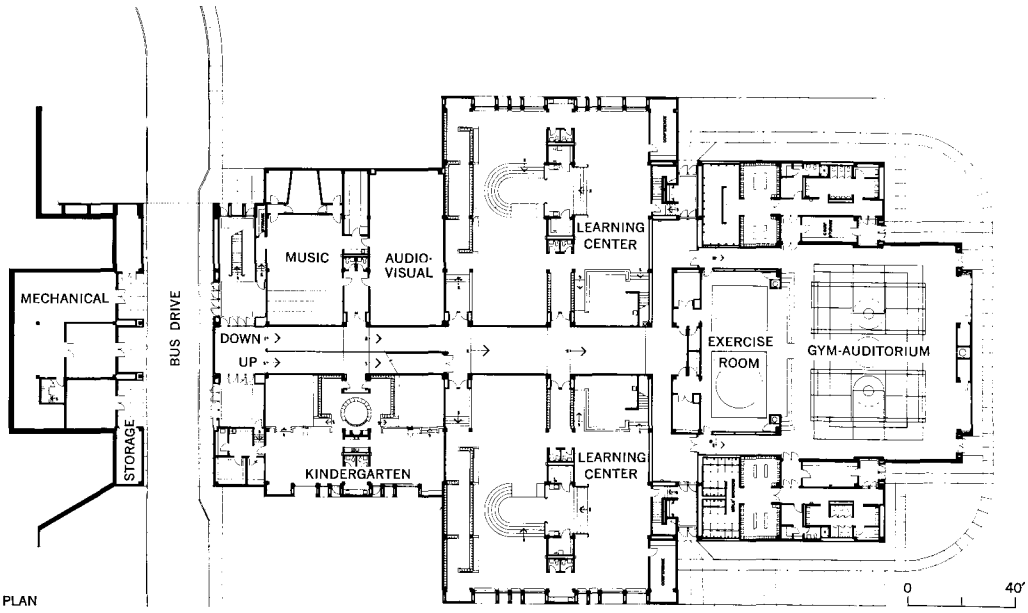
The layout of spaces *along*



LONGITUDINAL SECTION

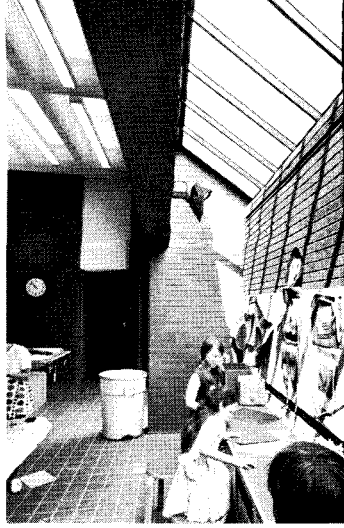


UPPER LEVEL PLAN



LOWER LEVEL PLAN

From playing fields to the south (left) the school can be seen as a long row of brick blocks, stepping down the slope (section, top). The lifeline of the interior (plans above) is a system of ramps that run from the upper entrance down to the library and double back to the lower entrance, then run down to the gym. From the parking area (right), buses can be seen entering the covered dropoff area under the main entrance.



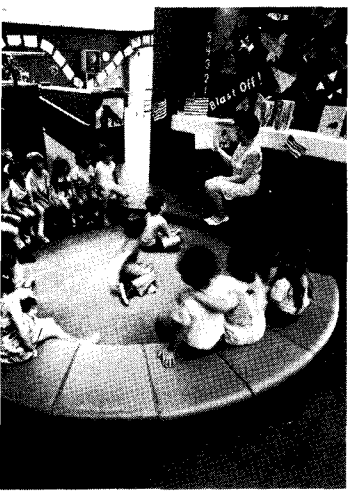
The ramped "interior street" (above) has strips of skylight on either side. Skylights are also used (right, top to bottom) in an art project area, in the gym, and in learning center alcoves. Special facilities include (opposite page, left) exhibition space with movable panels and lighting, and a kindergarten story circle with fireplace. Classes in a learning center (opposite page, right) sit on carpet and use movable cabinets as chalkboards.

this axis follows a modular pattern worked out collaboratively by the architects and the engineers. Alternating structural spans of 10 ft. and 30 ft. are keyed to the rhythm of the ramps, which rise 32 in. in the 30-ft. run between landings. The 30-ft. bays are spanned by ribbed slabs, with fluorescent lighting suspended between the ribs. The 10-ft. bays have flat slabs and suspended ceilings, with duct space for decentralized heating and air-conditioning units. This sequence of bays was useful as a set of ground rules, but it was not considered inviolable.

Ridge Hill's 625 students are distributed among four "learning centers," each with 125 students and five teachers, plus an aide. Two of the centers mix children who would ordinarily be in grades one through three; the other two serve fourth- through sixth-graders. The paired kindergartens accommodate 100 children (in two sessions), and about 25 students with learning handicaps meet in a special suite.

Each of the learning centers is an unpartitioned space about 80 ft. square, but by no means just a loft. Carefully placed lavatory - utility cores divide the centers into acoustical zones (muffling the sound of a movie, for instance). Changes in level and rows of individual storage "cubbies" define areas, without dictating their use.

Lighting is directed so that a projector can be used in one area while children read nearby. Adjustable spots and light valances can focus attention on tackboards or on white chalkboards. Since wall space is scarce, windows are few and placed where views count.



There are no assigned desks, just movable tables and individual work-boxes, which students carry with them. Specially designed rolling book cabinets are used as space dividers, chalkboards, and projection screens; pull-out desk-tops convert them into teachers' work stations.

The kindergartens are designed as scaled-down learning centers, with direct access to their own small playground. The art suite also has an indoor-outdoor link—to a shaded work deck.

Ridge Hill School is obviously expensive, but there is nothing pretentious or frivolous about it. Hamden officials—concerned about the operating expenses of earlier schools in the system—asked for maintenance-free materials such as the hard brick walls. They were also ready to pay for amenities such as fine wool-loop carpet, skylights with automatic supplementary lighting, and a sheltered bus-loading platform. By offering parts of the school to the community for after-hours, weekend, and vacation use, they were able to justify a decentralized, all-electric heating and air-conditioning system, as well as many special facilities rarely found in K-6 schools—a kiln and a darkroom in the art department, sound-isolated music-practice rooms, gym lockers and showers, and an exercise room with ballet bar and mirror.

Not surprisingly, in the face of rising costs, Hamden's next two elementary schools — now under construction — have been stripped of most of these special features. But the learning center, team teaching program introduced at Ridge Hill is being enthusiastically retained.

FACTS AND FIGURES

Ridge Hill School, Hamden, Conn. Architects: Harold Roth & Edward Saad (William Moore and John N. Calvert, project managers). Engineers: Associated Engineering (structural), Hubbard, Lawless & Osborne (mechanical and electrical). Landscape architects: Peter Rolland & Associates. Consultants: Sylvan R. Shemitz & Associates (lighting), Bolt, Beranek & Newman (acoustics). General contractor: Fusco-Amatruda Company. Building area: 97,141 sq. ft. Construction cost: $3,300,000 (plus $760,000, land and site development; $445,000, furnishings and equipment; $385,000, fees.)

(For a listing of key products used in this building, see p. 76.)

PHOTOGRAPHS: Robert Perron.

SCHOOLS BY TEAMWORK

Two architects use the same system and specifications to build uniquely different schools fast

Florida's Broward County (which includes Ft. Lauderdale) requires an aggressive school construction program to serve its burgeoning 100,000 - student school population. The normal construction time in the area, from design award to occupancy, is three years. Or it used to be three years.

The county now has six new schools, either well into construction or newly occupied, that have cut this construction time almost in half—without exceeding the traditional range of sq. ft.-costs of the area. Including two elementary, two middle and two high schools, the six schools are not only the fastest in the area, but may very well be the finest—especially if the students, administrators and teachers already occupying some of them are to be believed.

But the schools are different. They are (or were) built with the SCSD building system; they involved large, out-of-state architects (controversial in an area with an unusually high number of practicing architects); their speed is the result of sophisticated program and staff management. Visually, they are also different—from each other and from the schools in the area.

The two architectual firms which developed and worked from common design specifications and prebidding techniques are Heery & Heery, of Atlanta, and Caudill, Rowlett & Scott, who are headquartered in Houston. Both firms brought special experience to the Broward County job: Heery & Heery, their reputation for fast, accurate scheduling and costing techniques; and CRS, a reputation for school and campus design, as well as sophisticated project management. Each firm was assigned three schools, one on each education level.

Why these particular architects were brought in for these six schools is a question under- or unemployed architects in Florida ask themselves. But there is no question in the mind of Benjamin Willis, the Broward County (and former Chicago) school superintendent who made the decision. Willis, who is known for progressive school programming and for his ability to implement his ideas, was not willing to wait the traditional three years to get these schools, and he had consulted enough with Heery & Heery and CRS to believe that they had the experience and ability to shorten this time without sacrificing budget control or good design. (Willis has engendered strong criticism from many people in the area for his methods and beliefs in such exotic concepts as systems building and prebidding. His contract expires this year; he is past retirement age; and his contract will not be renewed.)

The architects on the schools have also come in for criticism, especially from the local press, which has labeled the "systems schools" bad news. Charges have not been substantiated, but include articles noting that the schools are taking too long (some are a few months behind early schedule estimates, but will still be completed in about one-half the time for a conventional project); that they cost too much (adjustment on previous per-sq.-ft. costs of county schools proves the schools are in the same price range—some a little lower, some a little higher); that the architects and Willis were "old friends". (Heery & Heery had never even heard of Willis before Willis asked them to consult with them in Florida; the school assignment followed.) The most serious charge concerned a beam failure in a Heery & Heery school. The roofing subcontractor piled gravel on one beam and when the load passed five times the design load of the member, it failed. The subcontractor had been warned not to stockpile the gravel in one place and the insurance investigation named him as responsible. When the beam was repaired, however, extra shoring was added to calm the situation (the papers were printing that the schools must be unsafe). This shoring led some to believe the beam must have been underdesigned in the first place and more controversy resulted; the matter will now be arbitrated.

The local suspicion concerning "systems schools" is an interesting and not uncommon phenomenon. SCSD was chosen as a practical and flexible alternative to prepackaged schools, the only other way then available to hasten school construction. But of all systems, so-called, it is among the least identifiable as a system; it is an open system and not a neat package of a proprietary engineering company. It is more a management and bidding rationale than an imposed substitution for "regular" construction.

The system itself

The SCSD (School Construction Systems Development) concept provides a uniquely flexible building process. Unlike proprietary systems or the materials-oriented systems common to European construction, SCSD does not result in recognizable structures and does not limit design to a list of rigid alternatives. It does, however, help to organize design and construction and to coordinate the many facets of both operations, from design concept through occupancy of the building.

Essentially, SCSD is a modular concept based on components developed according to performance specifications. The system originated in California; initial development and implementation of the system and its criteria were in 1962 to 1966; the first project was for 13 schools for ten California school districts, a $30-million program. Ezra Ehrenkrantz (now president of Building Systems Development) led the program to develop and use SCSD; EFL (Educational Facilities Laboratories) provided financial support.

The SCSD module is 5 ft., although it may be reduced to 2.5 ft. sq. or to 2.5 by 5 ft. The performance standards for the system were established after research not only with construction and school design experts, but with teachers, students and school administrators. These interviews revealed to Ehrenkrantz that products currently on the market would not satisfy the system's performance or modular requirement and he approached industry, convincing some companies that the potential new market was worth the cost of new product development.

The initial SCSD projects resulted in the development of six new building subsystems. These included structural framing (long - span prefabricated steel trusses and roof decks), moveable and demountable partitions, lighting and ceiling systems, HVAC (heating, ventilating and air conditioning) equipment, and flexible ducts for air conditioning, etc. (The flexibility allows service personnel to adjust the

ir conditioning system to hanges in partition configura- on by just moving the end of ne duct to a new and appropri- te position.)

The materials and the manu- acturers are not dictated by he system. For any SCSD proj- ct, any supplier may bid, pro- ided his product is compatible vith the grid and performance equirements of the system. And, he more the system is used, n school and other construction, he more suppliers are finding its narket worth supplying with ompatible products. Today there s great flexibility for an SCSD roject designer, who may select rom a wide range of compatible ubsystems. The Heery & Heery chools, for example, represent he first attempt by the concrete ndustry to become involved with SCSD structures. The concrete idder won this project in open ompetition with steel bidders; Heery & Heery believe this may e the beginning of more and nore participation by the con- rete industry in SCSD - type uilding.

Applied to the Broward County rogram, the SCSD system has worked well. It involves no limi- tation on the exterior skin (these six schools use stucco), the uilding configuration, or the floors. There are almost no limi- tations on ceiling heights, bay sizes, partition finishes. And where the system is incompatible with a design, it may be aban- doned for that area of the build- ng—as it was in the sloping roof portion of the Heery & Heery Middle School.

The system helps solve the usually complex problems of component interface. There is no worry that the lighting and HVAC clearances are not com- patible or that the partitioning system will not work with the ceiling grid. A contractor bene- fits from the system by knowing that the electrical and mechan- cal systems will not conflict, for example. And the system does not interfere with normal trade divisions, so the jobs may observe traditional union juris- dictions.

The SCSD system also proved uniquely adaptable to changing teaching methods and piloso- phies. The schools designed by both architectural firms are de- signed for almost limitless in- terior flexibility; initial layouts vary from one school to another and within each school from open, semi - open, or enclosed classroom plans. When the in- evitable changes in teaching methods and philosophies occur with time, these schools will be able to change with them. Serv- ice personnel can move or install partitions over a weekend to make the required changes. (If the partitions are not available, they may be ordered with little lead time, since they are stock items.)

Schedule

By combining SCSD with care- fully organized scheduling tech- niques, both architectural firms were able to prepare bidding documents within a month after their design contract awards. Bidding occured after the sche- matic phase and included four basic systems components: HVAC, structure, lighting and ceiling systems, and demounta- ble partitions. CRS and Heery & Heery staffs worked from the same specifications, yet produced entirely different buildings.

Both firms devoted the major portion of early staff efforts to the high school projects. These became, in effect, the prototypes for the middle and elementary schools, which are less complex projects. Both design and con- struction started first and lasted longest on the high schools, with staff time for the smaller proj- ects reaching its peak as the larger ones neared finality.

Heery & Heery and CRS both started design work in Septem- ber 1970. The systems portion of the buildings (about 40-50 percent of construction) were specified and bid documents pre- pared in October. Beneficial oc- cupancy for the schools is ex- pected to be in January for Heery & Heery's elementary and for CRS's elementary and mid- dle school. The high schools of both firms already have bene- ficial occupancy and Heery & Heery's middle school had clas- ses in full swing in October.

For a look at the schools themselves, turn the page.

The CRS schools are the steelframe structures traditionally associated with SCSD systems construction. The prefabricated steel beams and columns (top) fit together much like a giant erector set project. The Heery & Heery schools, on the other hand, have a concrete frame (bottom), a first for SCSD and, the architects believe, the beginning of new participation by the concrete industry.

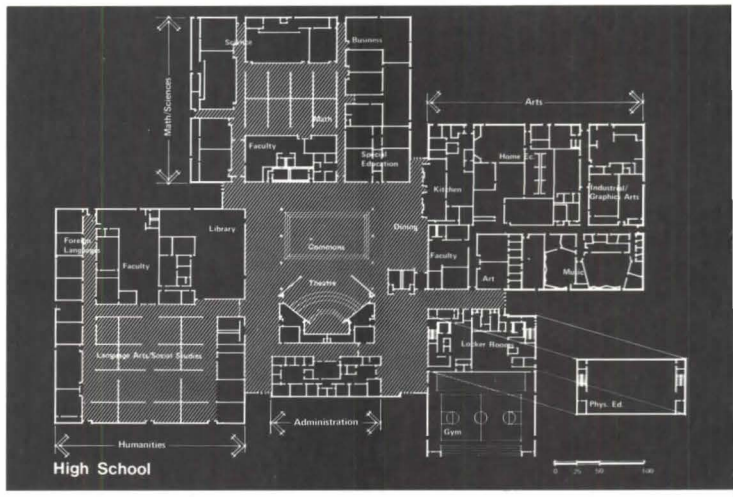
The Heery & Heery schools are strongly sculptural in exterior appearance, reflecting their concrete structure (the first for an SCSD school) and the sandy, flat landscape. The high school, in particular, is so appropriate to the site that it seems entirely possible for it to have been formed from the land.

The high school is warm, colorful and lush inside, with golds, burnt oranges and Indian reds the most striking colors. As constructed, it has a large commons area with a stepped theater or free activities space in the center. Theatrical lighting and other equipment is available. Other activities surround this space. The humanities wing is semi-open in plan, with a large open space partially divided by moveable partitions. The science and lab area to the rear of the building is mostly closed in plan. Less strictly academic activities, such as industrial arts, music and locker rooms, are grouped behind the gymnasium.

The middle school is open in plan, with a central, second-level administrative and office area. Here, the structure departs from the SCSD grid and there is a sloped, windowed roof area. The first of the schools to be occupied, it features a learning resources center (or library) at the front entrance of the building — students can no longer avoid the school library, but must often walk through it. The classes are held on one side of the learning resources center, with special activity areas, such as laboratories, home economics, art, music and visual communications located on the periphery of the school. Opposite the open classroom area is a large commons with foldout tables for cafeteria use and a stepped free (or theater) stage for classes, informal lunches, etc. The interior is very cheerful and bright, with graphic accents.

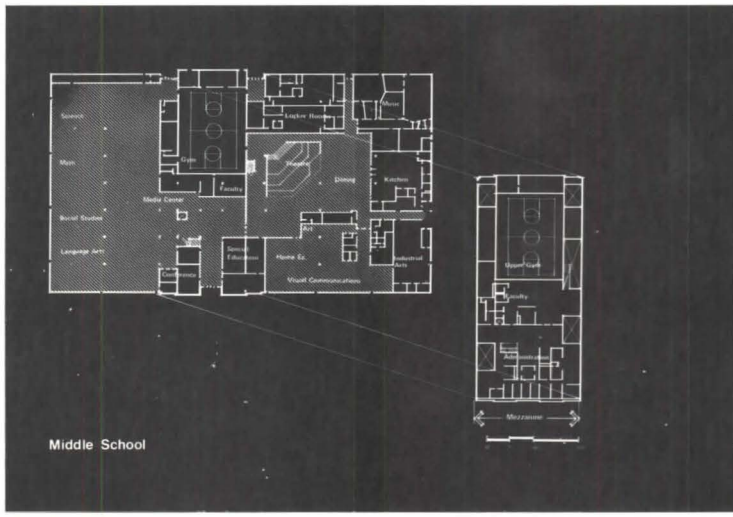
The elementary school is also completely open in plan, with special-use facilities grouped on one side of the building. In the center of the open space are small conference rooms and free-standing facilities for laboratory and art work. A special feature is an enclosed landscaped area in front of the building, where students (who otherwise may see only flat land) may slide and play on steep little hills and knolls created just for them.

The exterior of the Heery & Heery high school is a subtle combination of sand hues that enhance the site and placement of the building. Two covered walkway/bus platforms provide entrance to the building (top) on either side of the main commons area (plan), which also contains facilities for stage and theater productions. Inside, the building is presently arranged in a semiopen plan layout (far right), with partitions extending partially into large spaces earmarked for various academic activities. The colors inside are bright; the school is fully carpeted.



High School

The middle school (far right), for grades six, seven and eight, is highlighted by bold blue graphics on its sand-colored exterior. It features a second-level administration and office area with a fenestrated sloping wall/roof. The elementary school (bottom) has a blue racing stripe to define its roof line; a wooden fence (partially erected in the photo) encloses the play area at the front entrance.

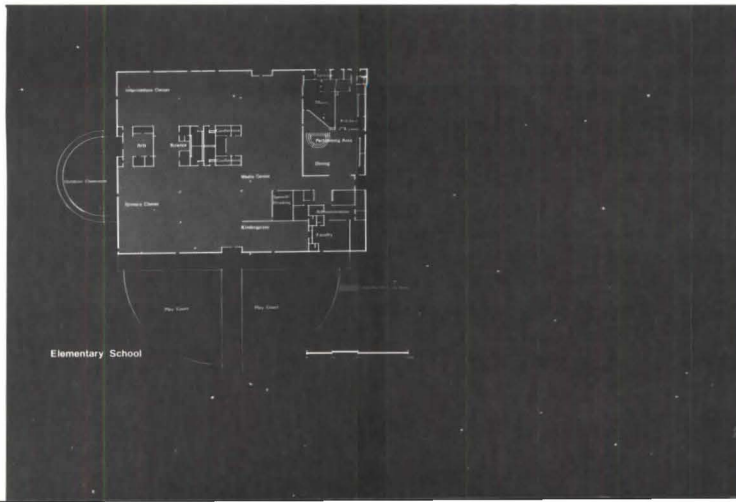


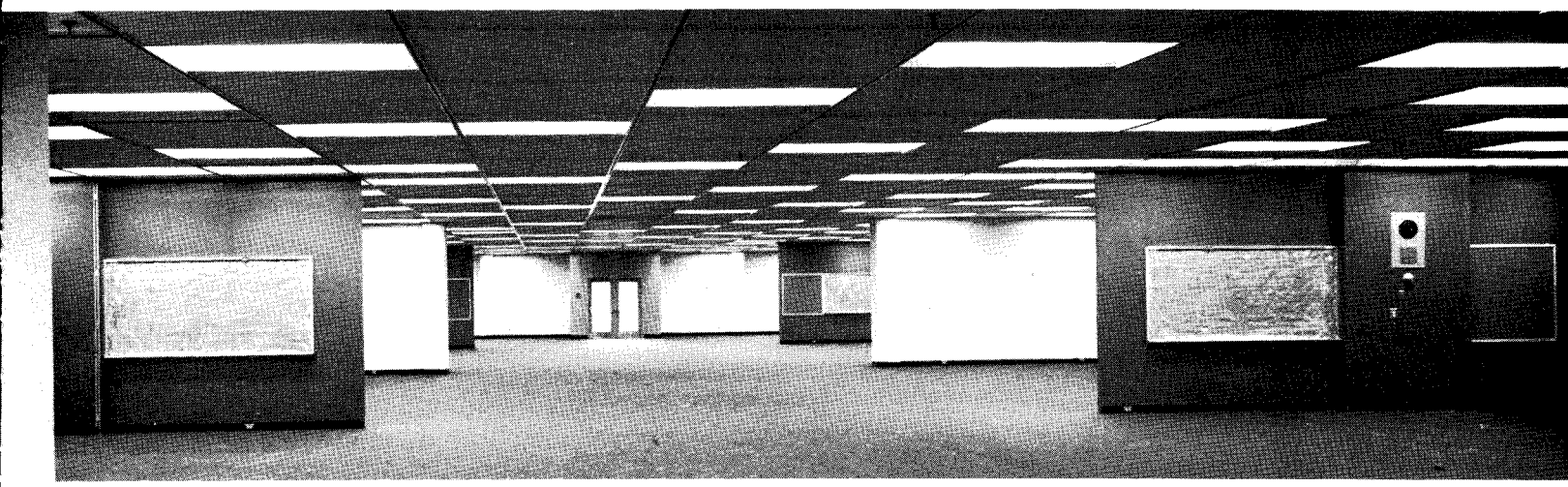
Middle School

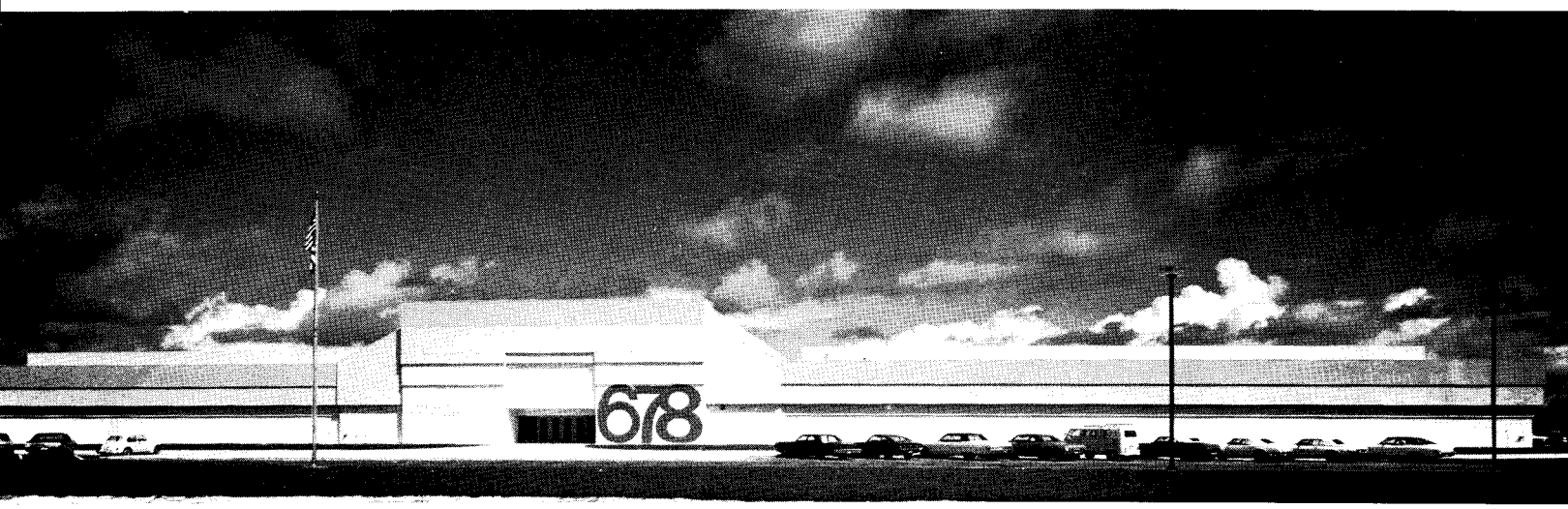
FACTS AND FIGURES

Piper High School (Sunrise Golf Village); Crystal Lake Middle School (Pompano Beach); Park Ridge Elementary School (Pompano Beach). Owner: School Board of Broward County, Fla. Architects & engineers: Heery & Heery (Wilton Ferguson, director). Associate architect: William G. Crawford. General contractors: Apgar J. Markham Construction Co. (high school); Frank J. Rooney Inc. (middle); Edward L. Nezelek (elementary). Building area and cost (inclusive): $5.7 million, 224,500 sq. ft. (high); $2.8 million, 118,000 sq. ft. (middle); $1.1 million, 45,600 sq. ft. (elementary).

PHOTOGRAPHS: Kurt Waldmann.


Elementary School

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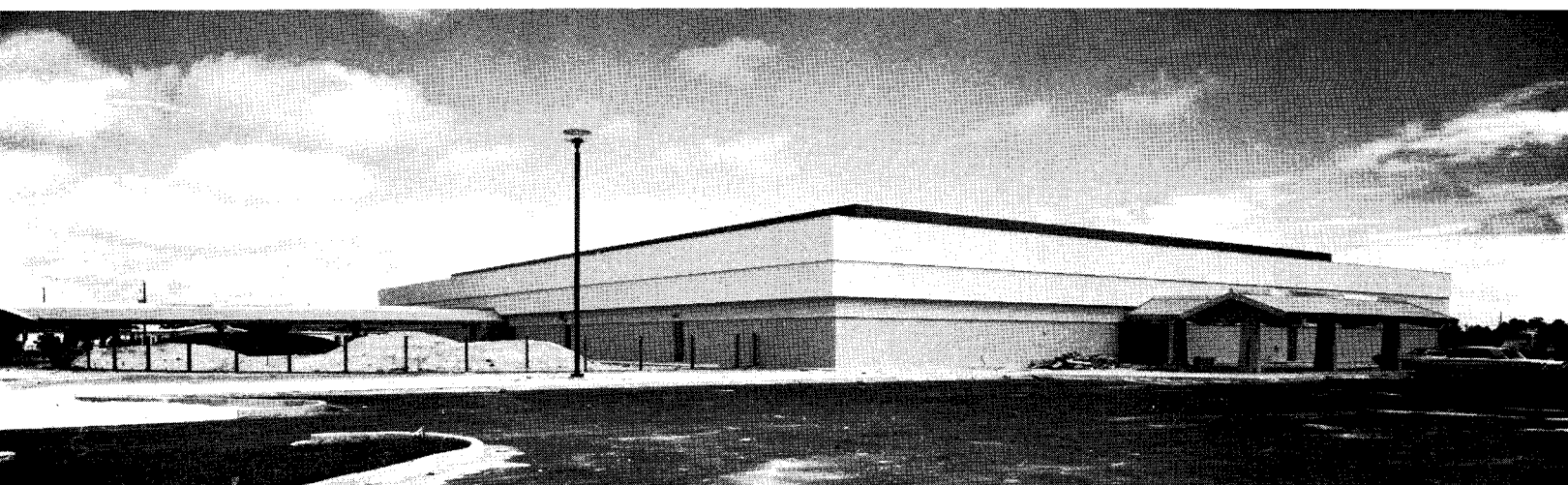


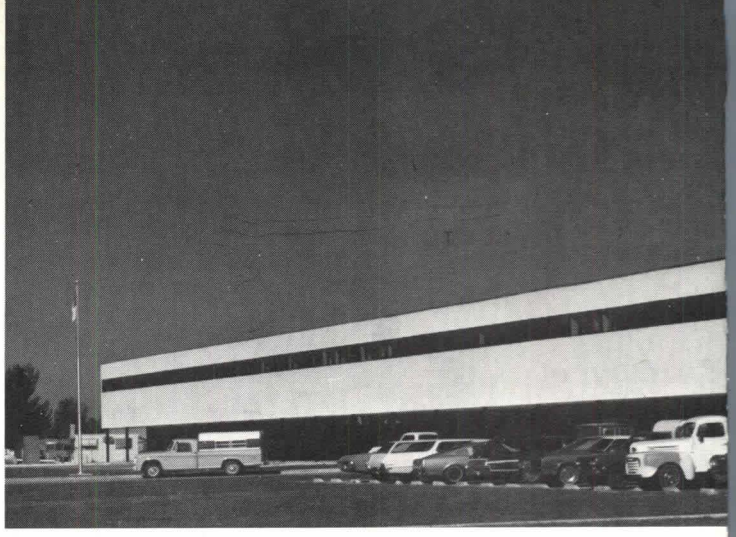
The schools designed by Caudill, Rowlett & Scott are almost constructionist in appearance; their lineal clarity almost reminiscent of Mondrian. They appear both massive and light in mass, with a constant and intriguing interplay of closed and open spaces, structure and changing natural light.

The first impression of the high school is that it is very white, clean, and bare (except for a strip of windows). But this impression gives way to fascination when one enters the building and stands beneath a huge, canopied, open, linear space accented by the prow of a large, freestanding staircase leading to a second-level promenade. The core of the school plan is this "open air street," with flexible classroom, cafeteria, administrative and other partitioned spaces in the front of the building. On the other side of the street (which runs the length of the building on two levels) are activity suites that project backward from the building to present a rear view of complex box arrangements that strongly contrasts with the simplicity of the school's facade. The activity suites include a gymnasium, theater facilities, art and music rooms, etc. The "street" is on two levels, with the second level narrowed so that strollers can look down on students below; access to the activity areas from the second level is across bridges. A lid-like canopy runs the entire length of the building, covering the walkways but leaving clear views of the sky and the feeling of outdoor light.

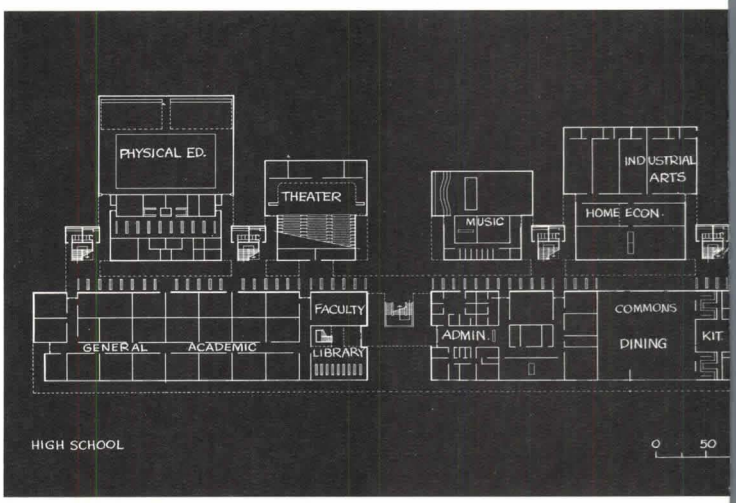
The middle school is a smaller, one-level version of the high school, with a similar "street" plan. Flexible classroom, cafeteria and administrative areas again line the front of the building, with special activity areas spaced along the rear.

The elementary school is basically a square in plan, with the center designed as a large, unpartitioned learning area for the primary and secondary levels. A skylit library is at its hub. The open space is bounded by fixed facilities for kindergarten, administrative, science, service and other special functions. The entrances are cut deep into the building so that they can double as enclosed play areas in bad weather.

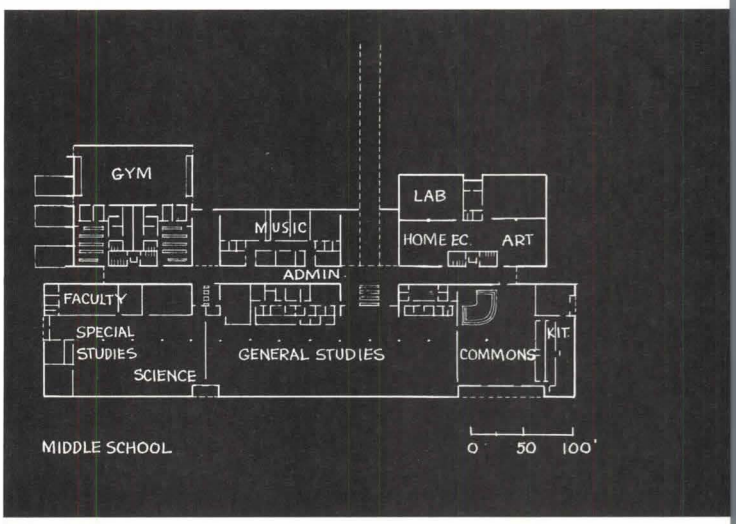
—MARGUERITE VILLECCO

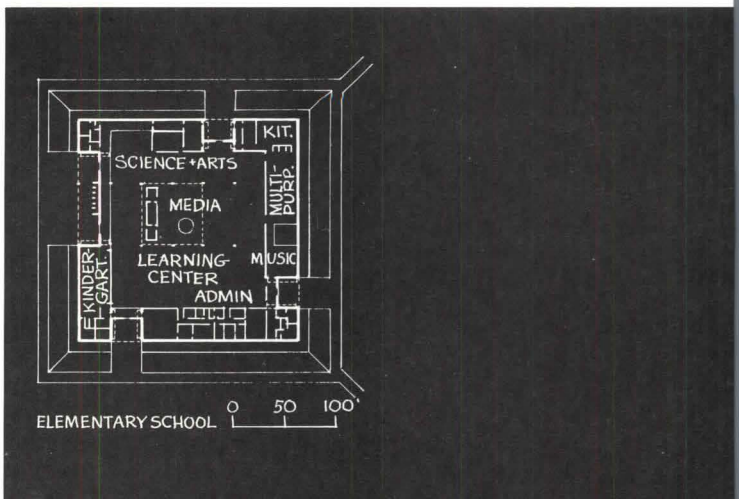


The high school exterior (top) hides an open and free interplay of outdoor and interior spaces under its lid-like roof. Beneath the lid is a two-level walkway. The second level (middle right) narrows the walkway so that it is bound by classrooms (left side) on one side and by a waist-high row of lockers that help provide a balconied barrier, yet provide a view of the first level below (in what looks like a well in the photo). Access to the second-level street area is by a free-standing staircase in the center of the building (far right) which also highlights front or rear entrance to the building.



The middle school, still under construction, is similar to the high school, but contains only one level. Sixth, seventh and eighth graders will enjoy here the same indoor/outdoor strolls (right) between classes. The elementary school (bottom) also is still under construction, but features a skylit central library as its indoor/outdoor experience.

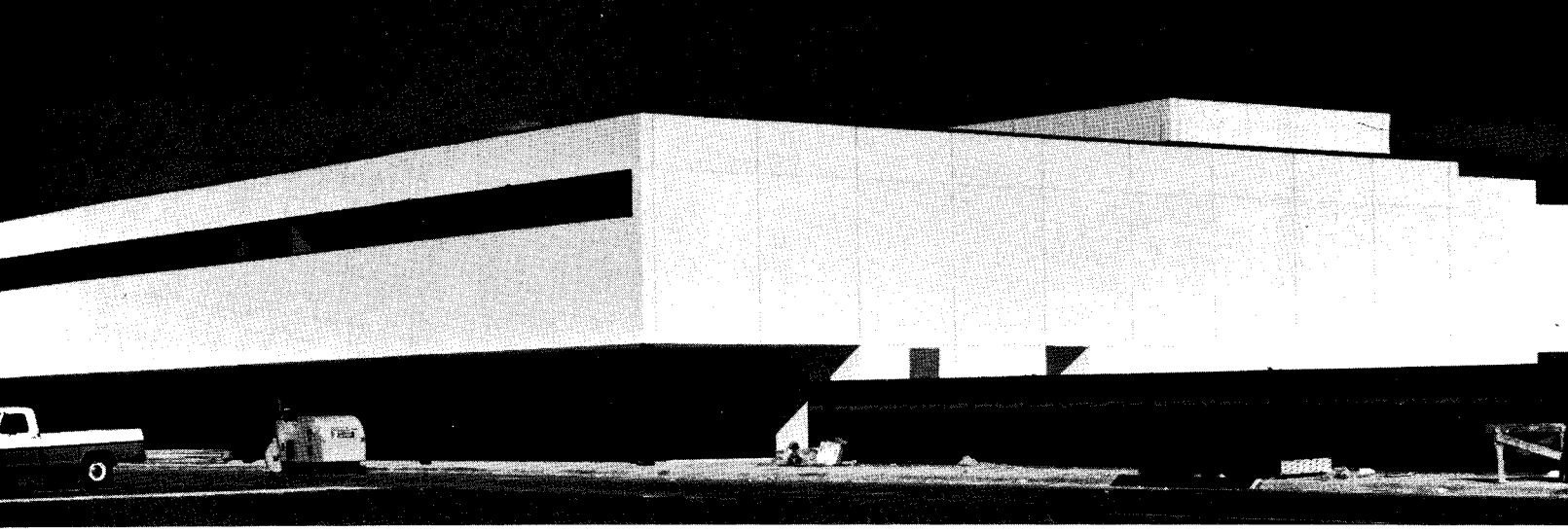


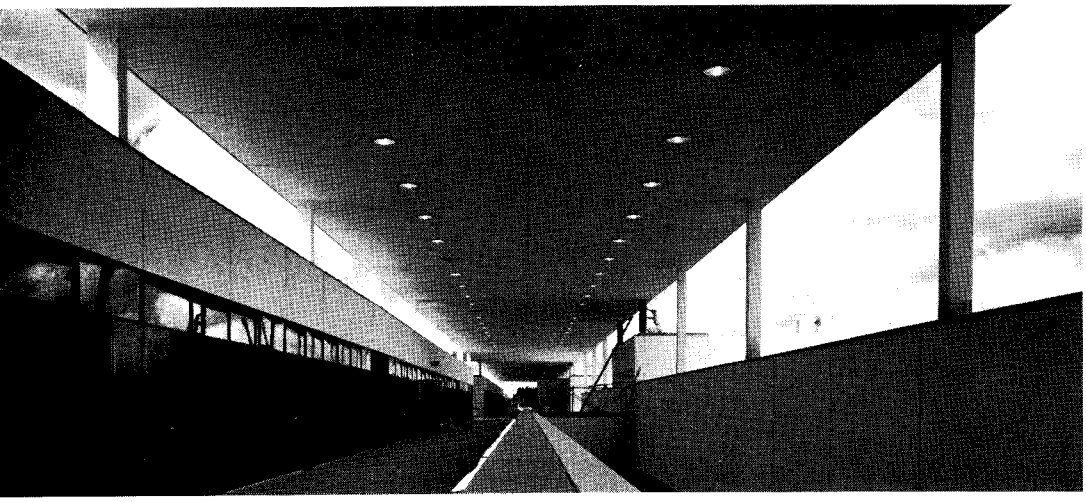


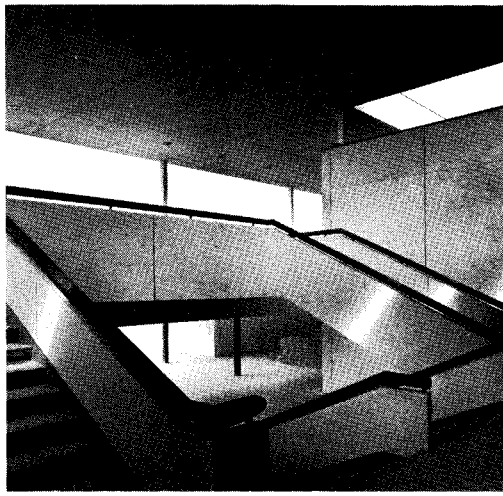
FACTS AND FIGURES

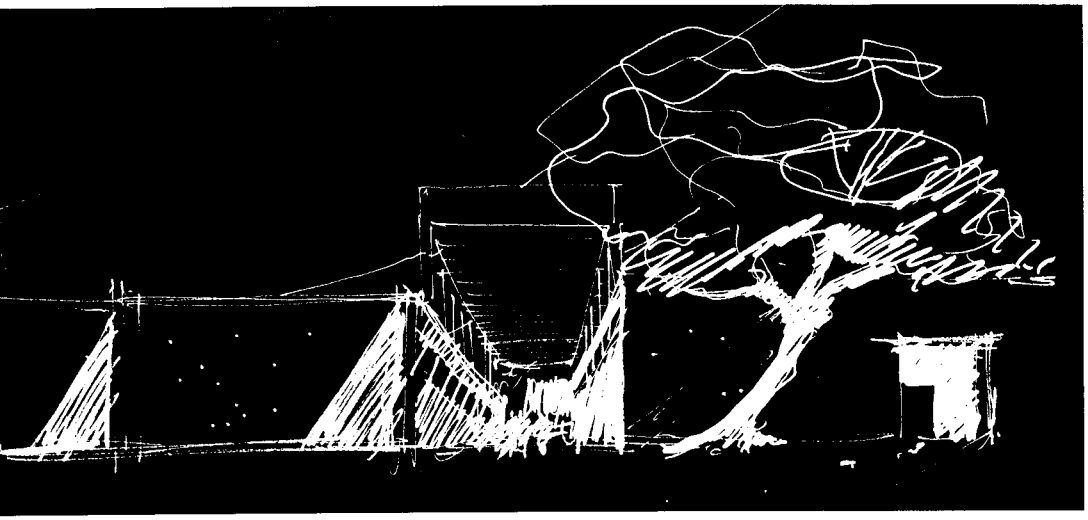
Cooper City High School; Pembroke Pines Middle School; Royal Palm Elementary School (Lauderhill, Fla.) Owner: School Board of Broward County. Architects: Caudill, Rowlett & Scott (Joseph Scarano, associate-in-charge). Associate architect: James M. Hartley. Engineers: Structural Steel Fabricators (structural, high school); Romac Steel (structural, middle and elementary); Lennox Industries (mechanical). General contractors: Van der Linde & Jackson Construction Inc. (high); Rooney Construction Co., Inc. (middle); Snead Construction Co., Inc. (elementary). Building area and cost (inclusive): $4.7 million, 194,812 sq. ft. (high); $2.2 million, 100,197 sq. ft. (middle); $907,000, 43,144 sq. ft. (elementary).

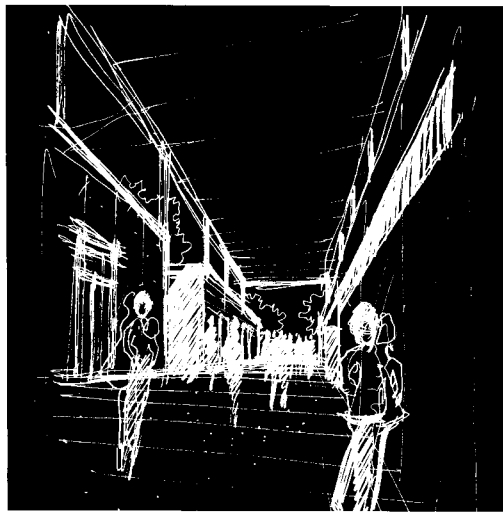
PHOTOGRAPHS: James Brett.











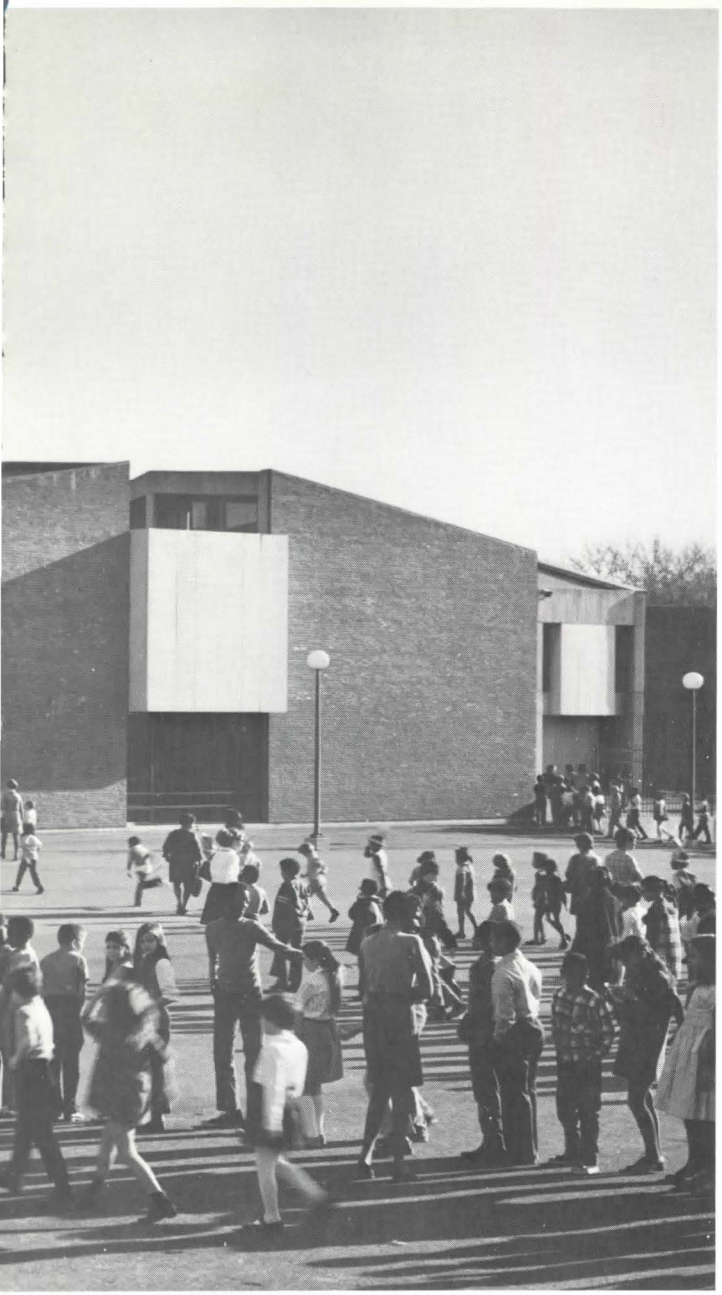
HEXAGONAL MODULES

Learning laboratories at the center of each cluster offer a chance for imaginative teaching

This elementary school in a black area of Boston is so attractive in its physical plant and in its program that parents in white areas of the city are trying hard to get their children admitted to it. (The Boston public school system requires a 50/50 mix in this district, with white pupils—all of them volunteers—brought in by bus. There is now a waiting list of such volunteers!)

The physical plant that is attracting all this attention is a two-story building made up of five more-or-less hexagonal modules. The hexagonal shape is not arbitrary: it works well for auditorium and classroom spaces alike, and it subdivides easily into smaller classroom and playroom areas. Further, the hexagonal modules can be linked together to form entrance courts and semi-enclosed outdoor play areas between them.

The typical, hexagonal module consists of six classrooms grouped around a central "learning laboratory." Each group of two classrooms can be turned into a single, large space by folding away the operable wall that divides them. The central learning laboratory, into which all classrooms open, is equipped with all sorts of audio-visual gadgetry — projectors, recorders, etc.—and there are study carrels equipped with headsets for individual work. Since the classrooms (24 in all) are located

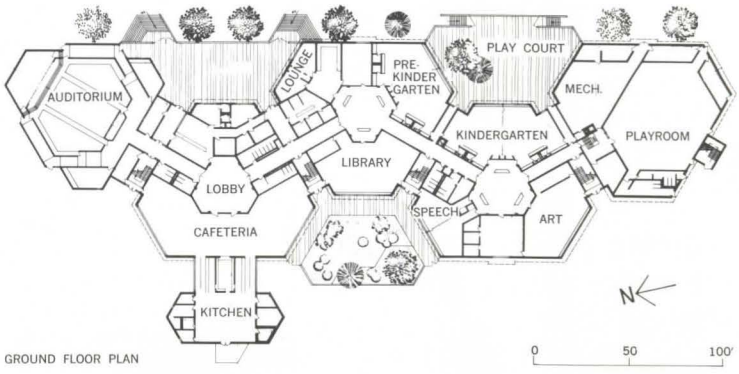


Five more-or-less hexagonal modules, connected by narrow links that contain the vertical circulation, make up this school and create its pleasantly comfortable scale. The views above show how the modules create protected courts between them. The plan, below, is of the ground floor. See next page for a typical module.

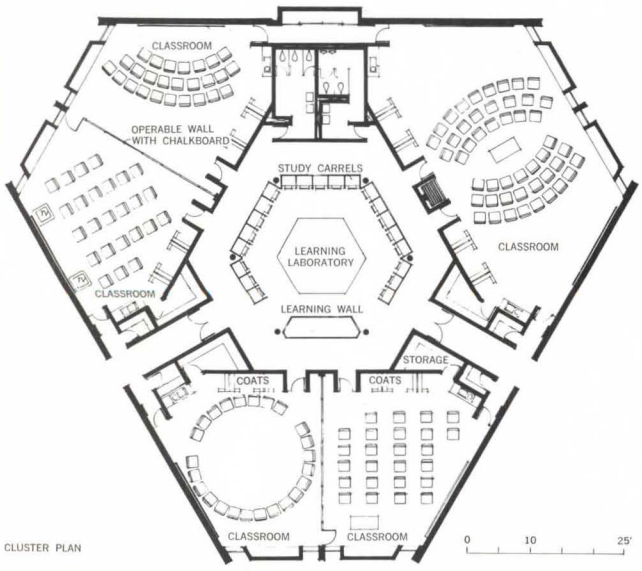
on the second floor, the learning laboratories could be lit through clerestories in the roof structure. The ground floor contains kindergarten, playroom, library, auditorium, cafeteria and other facilities—all of which fit very neatly into the hexagonal configuration. All vertical circulation is handled in the narrow links between hexagonal modules.

Obviously, a somewhat similar plan could have been squeezed into a rectangular box. What this cluster of hexagonal modules does for the scale of this school, however, would have been difficult to achieve within the configuration of a single rectangle. For this building is really quite large—the capacity is about 750 pupils—and, yet, by fragmenting it into separate but connected modules, the architects gave it a scale appropriate to a school for small children.

The nice handling of exterior and interior details—alternating



GROUND FLOOR PLAN



CLUSTER PLAN

The so-called "learning laboratories," shown in the two views above, are central to each hexagonal cluster of classrooms (three, divisible into six—see plan). These labs are located on the upper floor, and lit through clerestory windows. They are equipped with various kinds of audio-visual facilities, and carrels for study.

exterior surfaces of brick, concrete, glass, etc.; interior surfaces of vertically striated pumice block—further breaks down the scale of the building to that of its principal users.

Yet this is not an expensive building. With all its elaborate equipment, the school came to only about $27 per sq. ft.—and this in an area not known for its low building costs.

But the most significant aspect of this building is, of course,

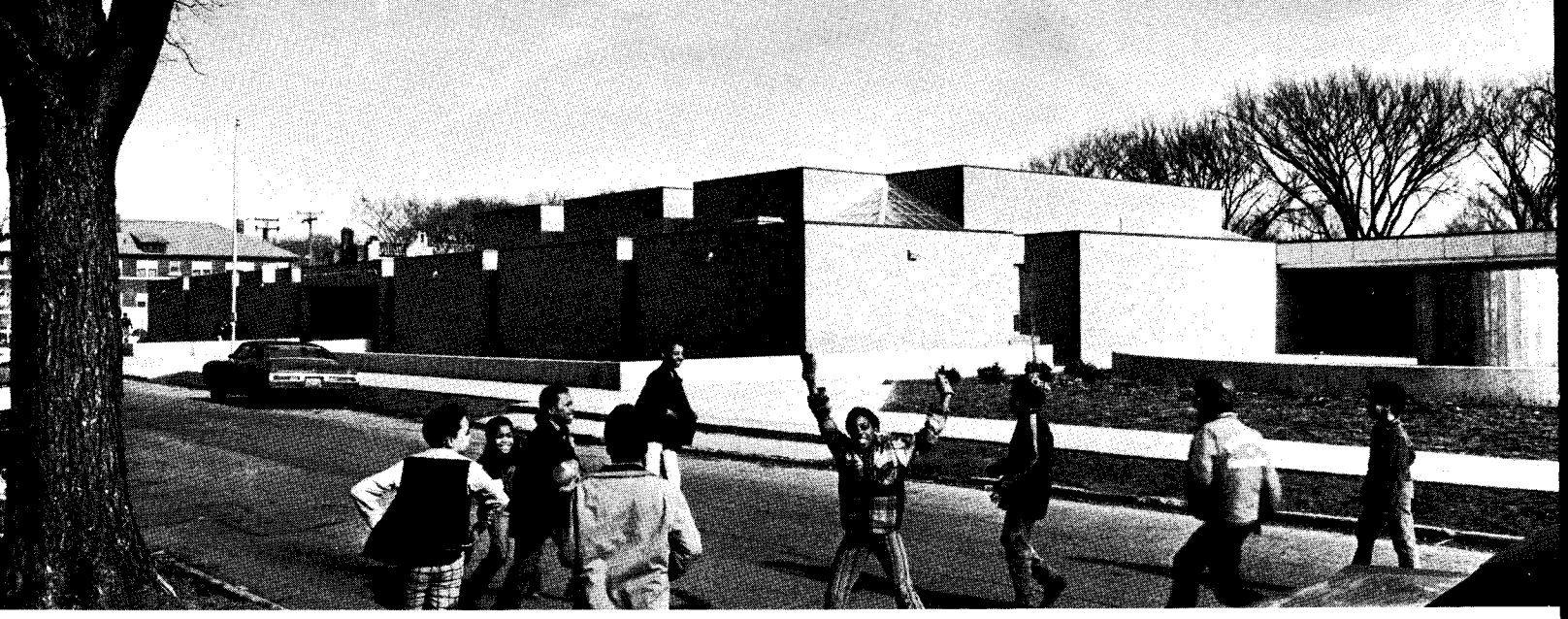
its role as a social catalyst in a city that has recently managed to survive some highly unpleasant racist assaults. "The building houses a wealth of areas to support the school program: offices for guidance and adjustment counselors, a health room, hearing, speech, dental, remedial reading and other facilities," says Leo Howard, the school's principal (and the assistant director of Boston's Model Demonstration Subsystem, which was responsible for the programming of the building). These facilities—especially the auditorium — are used by the community as well. What all this suggests, of course, is that a really fine building—"a school," according to Mr. Howard, "that is meeting the needs of these bright-eyed youngsters, and challenging their imagination" — can help a little to overcome prejudice.

When this school—the William Monroe Trotter School, named after an early, militant civil rights leader in the black community in Roxbury — was opened a couple of years ago, the City of Boston issued a kind of press release (really a manifesto of sorts) written by Mr. Howard: It was headed: TO WHOM IT MAY CONCERN. This school, and the lessons that it teaches, are of concern to an audience much larger than those 750 black and white kids who are privileged to enjoy it.

FACTS AND FIGURES

Wm. Monroe Trotter Elementary School, Roxbury, Mass. Architect: Drummey, Rosane, Anderson Inc. (David W. Anderson, partner in charge; Mortin Pitt and Terrance McCormick, project architects). Engineers: Nichols, Norton & Zaldastani (structural); Francis Associates (mechanical and electrical). Food service consultant: Crabtree, Dawson and Michaels. Contractor: C. A. Batson. Building Area: 79,600 sq. ft. Cost: $2,610,066 (incl. construction, land, site development and fixed equipment costs).

PHOTOGRAPHS: Leon Kunstenaar.



CLASSROOMS ON A LOOP

An elementary school is tied together by a skylighted corridor loop

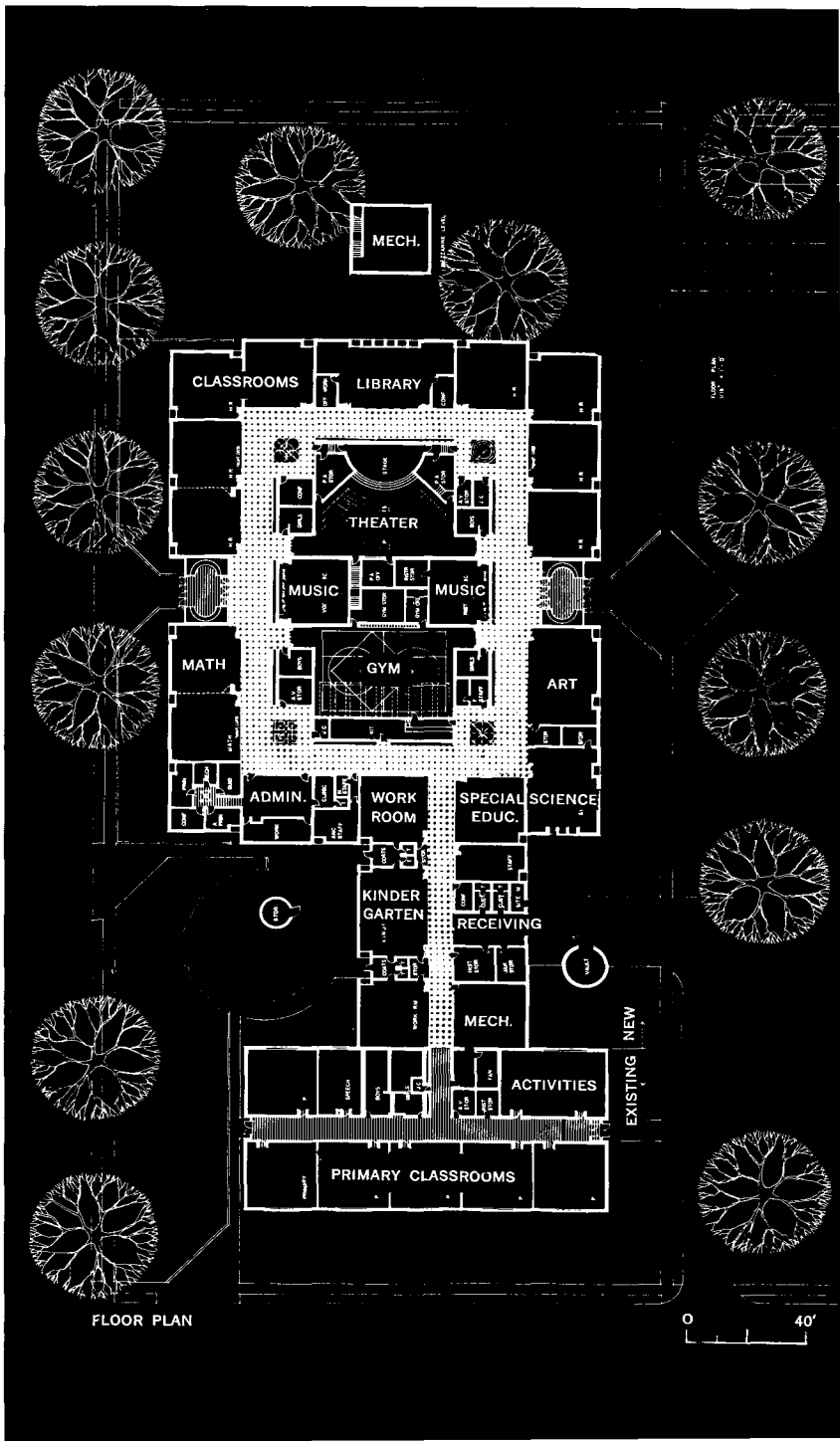
A perennial problem of schools in lower-income neighborhoods is how to make them secure against vandalism without making them seem like fortresses—either from the outside or the inside. In Detroit's Birney Elementary School, Architects Tarapata - MacMahon - Paulsen have solved this problem within the limits of a conventional program and a modest budget.

Their portion of the Birney School is actually an addition, but an addition much larger than the original building. Like the older block, the new structure is one story high, in keeping with the scale of the neighborhood and the parklike character of the school grounds.

The face that the school presents to the community is in fact almost entirely of brick walls, with few openings. But convolutions in these walls break down their scale, and make the orderly organization of the building readable from outside. The higher blocks of the central gym and theater are seen rising above the perimeter of classrooms, which are measured off on the facade by deep window niches.

Most important, the view from the street reveals the band of sloping skylights over the interior "student street" between the higher core and the classroom ring. Even from outside, it is apparent that this "street" is high and sunlit, and that it widens at points to form larger "meeting places" along the loop.

These nodes are designed for displays of educational objects or student projects; on permanent display at each node is the spidery framework of the skylight itself. Two layers of glazing—an outer one of plastic and an inner one of wired glass—made skylights feasible in this "vulnerable location," according to Architect Glen Paulsen. "They have already been subjected to considerable abuse," he reports, "without damage."



FACTS AND FIGURES

Birney Elementary School Addition, Detroit, Mich. Architects: Tarapata-MacMahon-Paulsen Corp. (Glen Paulsen, principal in charge). Engineers: Holforty, Widrig, O'Neill & Associates (structural); Hoyem, Basso, Adams & Martin (mechanical and electrical). General contractor: Markward & Karafilis, Inc. Building area: 44,892 sq. ft. Construction cost: $1,036,256. Total cost (except for movable furnishings): $1,176,868.

(For a listing of key products used in this building, see p. 76.)

PHOTOGRAPHS: Balthazar Korab.

Skylights over Birney School's loop corridor can be seen from the street (above left), sloping up toward the tall brick walls of its core spaces. Different arrangements of concrete platforms at each corner of the "street" allow for display of student projects (left) or casual meeting (above right).

UGLY AND ORDINARY ARCHITECTURE OR THE DECORATED SHED

2. Theory of ugly and ordinary and related and contrary concepts

BY ROBERT VENTURI AND DENISE SCOTT BROWN

Let us describe our own experience as architects to explain how we came to ugly and ordinary architecture. After the appearance of *Complexity and Contradiction in Architecture,* we began to realize that few of our firm's buildings were complex and contradictory, at least not in their purely architectural qualities of space and structure as opposed to their symbolic content.

Most of the complexities and contradictions we relished thinking about we didn't use because we didn't have the opportunity. Venturi and Rauch didn't get big commissions whose programs and settings justified complex and contradictory forms, and as artists we could not impose on our work inapplicable ideas that we liked as critics. A building should not be a vehicle for an architect's ideas, etc. Also our budgets were low, and we didn't want to design a building twice —once to fit some heroic idea of its importance to society and the world of art, and after the bids come in, a second time, to reflect the client's and society's restricted idea of our architecture's value. Whether society was right or wrong was not for us at that moment to argue. Therefore our Brighton Beach Housing entry did not turn out a megastructure for living in, nor our Fire Station in Columbus, Indiana, a personalized essay in civic monumentality for a pedestrian piazza by the side of the highway. They turned out "ugly and ordinary," as two such divergent critics as Philip Johnson and Gordon Bunshaft have described our work. "Ugly" or "beautiful" is perhaps a question of semantics in this context, but these two architects did catch the spirit, in a way.

Architecture may be ordinary — or rather, conventional — in two ways: in how it is constructed or in how it is seen, that is, in its process or in its symbolism. To construct conventionally is to use ordinary materials and engineering, accepting the present and usual organization of the building industry and financial structure and *hoping to insure* fast, sound and economical construction. This is good in the short run, and the short run is what our clients have largely retained us architects for. Architectural theories of the short run tend toward the idealization and generalization of expediency. Architecture for the long run requires creation, rather than adaptation, and response to advanced technology and sophisticated organization. It depends on sound research that may perhaps be promoted in the architect's office but should be financed outside of it because the client's fee is not adequate for and not included for that purpose. Although architects have not wished to recognize it, most architectural problems are of the expedient type, and the more architects become involved in social problems the more this is true. In general the world can't wait for the architect to build his utopia and in the main, the architect's concern ought not to be with what ought to be, but with what is—and with how to help improve it now. This is a humbler role for architects than the Modern movement has wanted to accept; however it is artistically a more promising one.

Ugly and Ordinary

Artistically, the use of conventional elements in ordinary architecture — be they dumb door knobs or the familiar forms of existing construction systems— evokes associations from past experience. Such elements may be carefully chosen or thoughtfully adapted from existing vocabularies or standard catalogs rather than uniquely created via original data and artistic intuition. To design a window, for instance, you start not only with the abstract function of modulating diurnal light rays to serve interior space, but with the image of window—of all the windows you know about plus others you find out about. This approach is symbolically and functionally conventional, but it promotes an architecture of meaning, broader and richer if less dramatic than the architecture of expression.

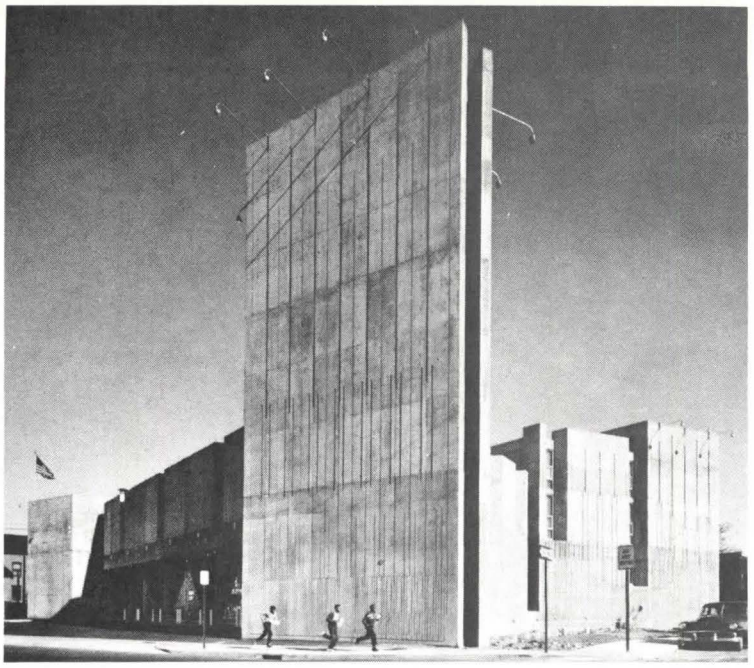
We have shown how heroic and original (H&O) architecture derives dramatic expression from the connotative mean-

These are excerpts from Learning from Las Vegas by Robert Venturi, Denise Scott Brown and Steven Izenour, to be published shortly by the MIT Press. An earlier portion, "A Significance for A & P Parking Lots, or Learning from Las Vegas," was published in our March '68 issue. The first excerpt appeared in the November issue. Robert Venturi and Denise Scott Brown are partners and Steven Izenour is a member in the firm Venturi and Rauch, architects and planners of Philadelphia.

ings of its "original" elements: it gives off abstract meanings—or rather, expressions—recognizable in the physiognomic character of the architectural elements. Ugly and ordinary architecture (U&O), on the other hand, includes denotative meanings as well, derived from its familiar elements; that is, it suggests more or less concrete meanings via association and past experience. The "brutalism" of an H&O fire station **1.** comes from its rough texture; its civic monumentality comes from its big scale; the expression of structure and program and "truth to materials" come from the particular articulations of its forms. Its total image derives from these purely architectural qualities transmitted through abstract forms, textures and colors, carefully composed. The total image of our U&O fire house **2.**—an image implying civic character as well as specific use—comes from the conventions of roadside architecture that it follows; from the decorated false facade, from the banality through familiarity of the standard aluminum sash and roll-up doors, and from the flag pole in front—not to mention the conspicuous sign that identifies it through spelling, the most denotative of symbols: FIRE STATION NO. 4. These elements act as symbols as well as expressive architectural abstractions. They are not merely ordinary but represent ordinariness symbolically and stylistically; they are enriching as well because they add a layer of literary meaning.

Richness can come from conventional architecture. For 300 years European architecture was variations on a Classical norm: a rich conformity. But it can also come through an adjusting of the scale or context of familiar and conventional elements to produce unusual meanings. Pop artists used unusual juxtapositions of everyday objects in tense and vivid plays between old and new associations to flout the everyday interdependence of context and meaning, giving us a new interpretation of 20th century cultural artifacts. The familiar which is a little off has a strange and revealing power.

We uphold the symbolism of the ordinary via the decorated shed over the symbolism of the heroic via the sculptural duck, because this is not the time and ours is not the environment for



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heroic communication through pure architecture. Each medium has its day, and the rhetorical environmental statements of our time—civic, commercial or residential—will come from media more purely symbolic, perhaps less static and more adaptable to the scale of our environment. The iconography and mixed media of roadside commercial architecture will point the way.

Symbolism and Association

Basic to the argument for the decorated shed is the assumption that symbolism is essential in architecture and that the model from a previous time or from the existing city is part of the source materials, and the replication of elements is part of the design method of this architecture: that is, architecture that depends on association in the perception of it depends on association in the creation of it.

We have approached the justification of symbolism in architecture pragmatically using concrete examples, rather than abstractly through the science of semiology or through *a priori* theorizing. However, other approaches have rendered similar results. Alan Colquhoun has written of architecture as part of a "system of communications within society" and describes the anthropological and psychological basis for the use of a typology of forms in design, suggesting that not only are we not "free from the forms of the past, and from the availability of these forms as typological models, but that, if we assume we are free, we have lost control over a very active sector of our imagination and of our power to communicate with others."

Colquhoun argues against the proposition of Modern architecture that form should be the result of the application of physical or mathematical laws rather than of previous associations or esthetic ideologies. Not only are these laws themselves human constructs but in the real world or even the world of advanced technology, they are not totally determining; there are areas of free choice.

The viewing of physical laws and empirical facts as the fundamental source of form in Modern architectural theory, Colquhoun calls "bio-technical determinism." The limitations inherent in this approach even for technical en-

gineering problems were acknowledged—obliquely—in Modern theory, but they were to be overcome through the integrating magic of intuition and without reference to historical models. That form results from intention as well as deterministic process was acknowledged in the writings of Le Corbusier, Laszlo Moholy-Nagy and other leaders of the Modern movement in their descriptions of the "intuition," "imagination," "inventiveness," and "free and innumerable plastic events" that regulate architectural design. What resulted was, Colquhoun says, a "tension of two apparently contradictory ideas—biological determinism on one hand, and free expression on the other," within the doctrine of the Modern movement. Through excluding a body of traditional practice for the sake of "science," a vacuum was left that was filled ironically by a form of permissive expressionism: "What appears on the surface as a hard, rational discipline of design, turns out rather paradoxically to be a mystical belief in the intuitive process."

Firmness + Commodity = Delight

Vitruvius wrote (via Sir Henry Wootton) that architecture was Firmness and Commodity and Delight. Gropius (via the biotechnical determinism just described) implied that Firmness and Commodity *equal* Delight: that structure plus program rather simply result in form, that beauty is a by-product, that—to tamper with the equation in another way — the process of making architecture becomes the image of architecture. Louis Kahn in the 1950's said that the architect should be surprised by the appearance of his design.

Presumed in these equations is that process and image are never contradictory and that Delight is a resultant which comes from the clarity and harmony of these simple relationships, untinged, of course, by the beauty of symbolism and ornament or by the associations of preconceived form: Architecture is frozen process.

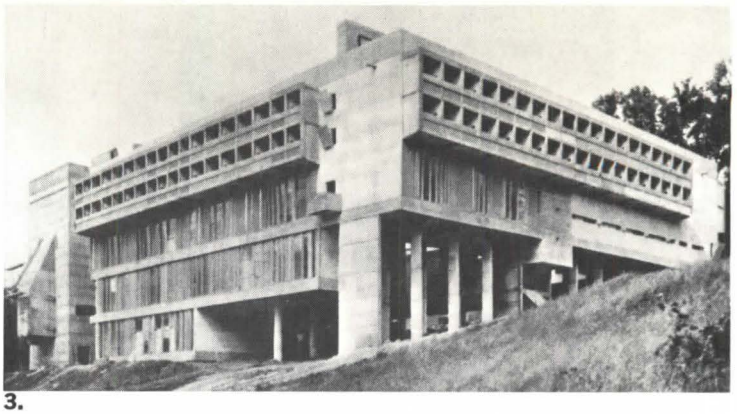
The historians of the Modern movement concentrate on the innovative engineering structures of the 19th and early 20th centuries as prototypes for Modern architecture, but it is significant that the bridges of Maillart are not architecture and the hangars of Freyssinnet are hardly architecture. As engineering solutions, their programs are simple and without the inherent contradictions of architectural programs: To traverse a ravine directly, safely and cheaply or to protect a big space from the rain without intervening supports is all that is required of these structures. The unavoidable symbolic content of even such simple, utilitarian constructions, and the unavoidable use of what Colquhoun calls typologies was ignored by the theorists of the Modern movement, although the ornamentation of utilitarian superstructures is typical of all times.

Industrial Iconography

More important than forgetting the decoration was copying the shed, that is, deriving associations from the body of the building rather than from its facade. The architecture of the Modern movement, during its early decades and through a number of its masters, developed a vocabulary of forms based on a variety of industrial models whose conventions and proportions were no less explicit than the Classical orders of the Renaissance. What Mies did with linear industrial buildings in the 1940's, Le Corbusier had done with plastic grain elevators in the 1920's, and Gropius had done with the Bauhaus in the 1930's imitating his own earlier factory, the Faguswerk, of 1911. Their factory-like buildings were more than "influenced" by the industrial vernacular structures of the then recent past, in the sense that historians have described influences among artists and movements. They were explicitly adapted from these sources, and largely for their symbolic content, because industrial structures *represented,* for European architects, the brave new world of science and technology. The architects of the early Modern movement, in discarding the admittedly obsolete symbolism of historical eclecticism, substituted that of the industrial vernacular. They employed a design method based on typological models, and developed an architectural iconography based on their interpretation of the progressive technology of the industrial revolution.

Symbolism Unadmitted

A contradiction between what was said and what was done was



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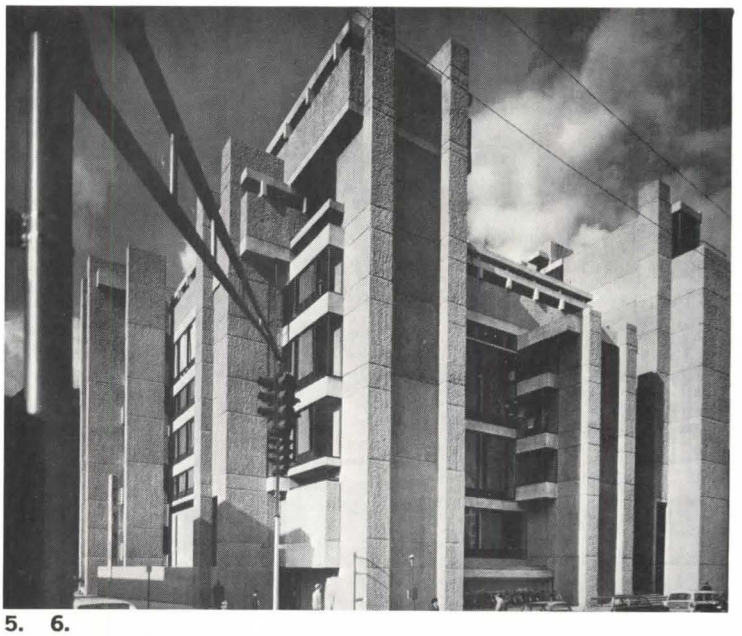

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typical of early times in Modern architecture: Walter Gropius decried the term "International Style" but created an architectural style and spread a vocabulary of industrial forms that were quite removed from industrial processes. Adolf Loos condemned ornament yet applied beautiful patterns in his own designs, and would have erected the most magnificent, if ironic, symbol in the history of skyscrapers if he had won the Chicago Tribune Competition. The later work of Le Corbusier started a continuing tradition of unacknowledged symbolism, whose indigenous-vernacular forms, in varying manifestations, are still with us: from La Tourette **3.** to Boston, **4.** New Haven **5.** and Houston's Westheimer Strip. **6.**

But it is the contradiction—or at least the lack of correspondence—between image and substance, that confirms the role of symbolism and association in orthodox Modern architecture. As we have said, the symbolism of Modern architecture is usually technological - functional, but when these functional elements work symbolically they usually don't work functionally, for example Mies' symbolically exposed but substantively encased steel frame, and Rudolph's *beton brut* in concrete block or his "mechanical" shafts used for an apartment house rather than a research lab. Some latter-day Modern architectural contradictions are the use of flowing space for private functions, glass walls for western exposures, industrial clerestories for suburban high schools, exposed ducts which collect dust and conduct sound, mass produced systems for underdeveloped countries, and the impressions of wooden formwork in the concrete of high-labor-cost economies.

We catalog here the failures of these functional elements to function as structure, program, mechanical equipment, lighting or industrial process, not to criticize them (although on functional grounds they should be criticized), but to demonstrate their symbolism. Nor are we interested in criticizing the functional - technological content of early Modern architectural symbolism. What we criticize is the symbolic content of current Modern architecture and the architects' refusal to acknowledge symbolism.

Modern architects have substituted one set of symbols (Cubist - industrial - process) for another (Romantic-historical-eclecticism) but without being aware of it. This has made for confusion and ironic contradictions that are still with us.

Slavish Formalism and Articulated Expressionism

Substituting non - functioning imitations of a deterministic process for preconceived form has resulted not only in confusion and irony but in a formalism that is the more slavish for being unadmitted. Those architects who decry formalism in architecture are frequently rigid and arbitrary when the time comes for committing their projects to form. They adopt the fashionable shapes of the architectural leader who is fancied at the time, whether or not this leader's formal vocabulary would be more relevant to the problem than some other formal vocabulary.

The substitution of expression for representation through disdain for symbolism and ornament has resulted in an architecture where expression has become expressionism. Owing perhaps to the meager meanings available from abstract forms and unadorned functional elements, the characteristic forms of late Modern architecture are often overstated. Conversely, they are often understated in this context, as with La Tourette or the Westheimer Strip. Louis Kahn once called exaggeration the architect's tool to create ornament. But exaggeration of structure and program (and, in the 1950's and 1960's, mechanical equipment, i.e., ducts equals decoration) has become a substitute for ornament.

Articulation as Ornament

To replace ornament and explicit symbolism, Modern architects indulge in distortion and overarticulation.

On the one hand, consider those residential, civic and institutional buildings whose thin complexities (stepped terraces; accordion sections, or plans or elevations; cantilevered clerestories; diagonal zoots; textured striations and flying bridges or buttresses) almost parallel the strident distortions of a McDonald Hamburger stand but lack the commercial program and distracting setting that justify the stridency of Strip architecture.

On the other hand, consider sensitively articulated structural frames and cantilevered bays that modulate a facade, define interior spaces, or reflect variations in the program. These busy bumps and subtle dents are put there for scale and rhythm and richness too, but they are as irrelevant and meaningless as the pilaster bas-relief on a Renaissance palace (which they resemble) because they are mostly seen in big spaces (often parking lots) and at high speeds.

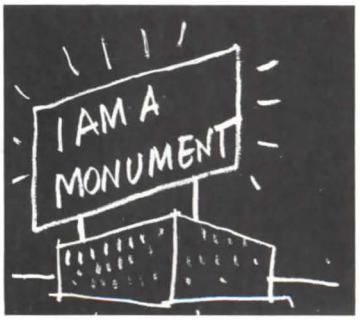
Space as God

Perhaps the most tyrannical element in our architecture now is space. Space has been contrived by architects and deified by critics, filling the vacuum created by fugitive symbolism. If articulation has taken over from ornament in the architecture of abstract expressionism, space is what displaced symbolism: space dramatized by an acrobatic use of light. Our heroic and original symbols, from *carceri* to Cape Kennedy, feed our late Romantic egos and satisfy our need for spectacular, expressionistic space for a new age in architecture. Today, however, most buildings need reasonably low ceilings and windows rather than glass walls for light, to contain the air conditioning and meet the budget. Therefore our esthetic impact should come from sources other than light and space, more symbolic and less spatial sources.

Megastructures and Design Control

Recent Modern architecture has achieved formalism while rejecting form, promoted expressionism while ignoring ornament, and deified space while rejecting symbols. Confusions and ironies result from this unpleasantly complex and contradictory situation. Ironically we glorify originality through replication of the forms of Modern masters. There is little harm in this symbolic individualism except for its effect on the budget, but there *is* harm in imposing on the whole landscape heroic representations of the Modern masters' unique creations. Such symbolic heroism is the source for the megastructure and for "Total Design." Architects who demand evidence of process in the forms of individual buildings reject it in the form of the city where it is arguably more defensible. Total design is the opposite of the incremental city that grows through the decisions of many; total design promotes the messianic role for the architect as corrector of the mess of urban sprawl, that is, for the city dominated by pure architecture and maintained through "design review": that is for the architecture of Urban Renewal and of the fine arts commissions. The Boston City Hall and its urban complex are the archetype of enlightened Urban Renewal. Its profusion of symbolic forms that recall the extravagances of the General Grant period and the revival of the Medieval *piazza* and its *palazzo publico* is, in the end, a bore. It is too architectural. A conventional loft would accommodate a bureaucracy better perhaps with a blinking sign on top saying "I AM A MONUMENT." **7.**

However, no architecture is not the answer to too much architecture. The reaction of the antiarchitects **8.** of *Architectural Design* is perhaps as futile as the endless fondling of irrelevant subtleties at the other extreme in the other magazines, though it is possibly less harmful because it seldom gets built, plugged in or inflated. The world science futurist metaphysic, the megastructuralist mystique, and the look-Ma-no-buildings environmental suits and pods are a repetition of the mistakes of an-



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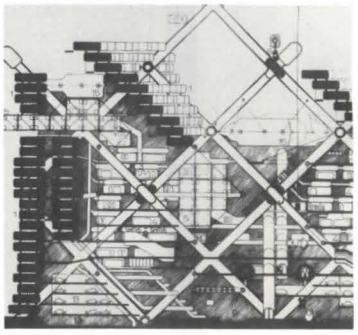


other generation. Their overdependence on a space age, futurist or science fiction technology parallels the machine estheticism of the 1920's and approaches its ultimate Mannerism. They are, however, unlike the architecture of the 1920's, artistically a dead end and socially a cop-out.

Meanwhile, every community and state is appointing its design review board to promote the architectural revolution of the last generation and corrupt its members through rule-by-man rather than rule-by-law procedures. "Total Design" comes to mean "total control" as confident art commissioners, who have learned what is right, promote a deadening mediocrity by rejecting the "good" and the "bad" and the new they don't recognize, all of which, in combination and in the end, make the city.

Misplaced Technological Zeal

Part of being "heroic and original" is being advanced technologically. The discrepancies between substance and image in Modern architecture's technological *machismo* and the costliness of its frequently empty gestures emerged earlier than architects would admit. Methods of industrial production turned out to be largely inapplicable to the construction of buildings. Many elegant structural systems—space frames, for instance—although they were highly efficient in relating stress to material and economical for spanning large industrial structures, failed decisively to work within the program, space and budget of the more prosaic and usual architectural commissions. As Philip Johnson said, you can't put a door in a geodesic dome.

Furthermore, architects who concentrated on engineering forms, tended to ignore those aspects of the building industry that involve financing, distribution, existing trades and conventional materials and methods; these are aspects that, as the developers have known, are highly subject to the improving effects of technology, including managerial technology, and affect the final form and cost of architecture substantially more than does innovative constructional technology. Architects have contributed little to the crucial building needs of this country—especially in housing—partly because their predilections for advanced technology of the symbolic and visionary kind have impeded their effectiveness within the going systems of construction.

While focusing on their favorite form of technological voodooism over the last 40 years, that is, researching industrialized methods of prefabrication, architects have discovered the mobile home industry. This industry, without the architects' help and using a traditional technology, essentially carpentry which is then related to innovative methods of distribution, is now producing one-fifth of the annual output of housing in this country. Architects should forget about being great technical innovators in housing construction and concentrate on adapting this new and useful technology to more broadly defined needs than it serves today and on developing a vivid mobile home symbolism for mass markets.

Which Technological Revolution?

The relevant revolution today is the current electronic one. Architecturally the symbol systems that electronics purvey so well are more important than their engineering content. The most urgent technological problem facing us is the humane meshing of advanced scientific and technical systems with our imperfect and exploited human systems, a problem worthy of the best attention of architecture's scientific idealogues and visionaries. For us the most boring pavilions at Expo '67 were those that corresponded to the progressive structures of 19th century World's Fairs celebrated by Sigfried Giedion; while the Czech Pavilion — an architectural and structural nonentity, but tattooed with symbols and moving pictures—was by far the most interesting. It also had the longest lines of spectators: The show, not the building, drew the crowd. The Czech Pavilion was almost a decorated shed.

From LaTourette to Levittown

What architects now call anonymous architecture comes close to what we are calling ordinary architecture, but it is not the same because it eschews symbolism and style. While architects have adapted the simple forms of vernacular architecture, they have largely ignored the complex symbolism behind them. They themselves have used the vernacular vocabularies symbolically, to suggest association with the past and simple, deterministic virtue, that is, as early examples of a correspondence between structural methods, social organization and environmental influences, paralleling at a primitive level the benign processes that shape the industrial vernacular. Yet ironically architects have—except for Aldo van Eyck in Africa and Gunther Nitschke in Japan—discounted the symbolic values that shape these forms and dominate, so anthropologists tell us, the artifactual environment of primitive cultures, often contradicting function and structure in their influence on form.

It is a further irony that Moddern architects, who can embrace vernacular architecture remote in place or time, can contemptuously reject the current vernacular of the United States, that is, the merchant builders' vernacular of Levittown and the commercial vernacular of Route 66. This aversion to the conventional building around us could be an exotic survival of 19th century Romanticism, but we think it is merely that architects are able to discern the symbolism in the forms of their own vernacular; they are unable to discern, either through ignorance or detachment, the symbolism of Mykonos or the Dogon. They understand the symbolism of Levittown and don't like it, and they are not prepared to suspend judgment on it in order to learn and to make subsequent judgment more sensitive. The content of commercial hucksterism and middle-middle class social aspiration is so distasteful to them that they are unable either to investigate openmindedly the basis for the symbolism or analyze the forms for their functional value; indeed they find it difficult to concede that any "liberal" architect could do so.

Architects who find middle-middle - class social aspirations distasteful and like uncluttered architectural form see only too well the symbolism in the suburban residential landscape; for instance, in its stylish "bi-levels" in the Regency, Williamsburg, New Orleans, French Provincial or Prairie-organic modes, and its ornamented ranchers with carriage lanterns, Mansards and antiqued brick. They recognize the symbolism, but they don't accept it. To them the symbolic decoration of the split-level suburban sheds represents the debased, materialistic values of a consumer economy where people are brainwashed by mass marketing and have no choice but to move into *the ticky - tacky*, with its vulgar violations of the nature of materials and its visual pollution of architectural sensibilities, and, therefore, the ecology.

This viewpoint throws out the variety with the vulgarity. In suburbia, the eclectic ornament on and around the relatively small houses reaches out to you visually across the relatively big lawns and makes an impact that pure architectural articulation could never make, at least in time, before you have passed on to the next house. The lawn sculpture part way between the house and the curving curb acts as a visual booster within this space, linking the symbolic architecture to the moving vehicle. So sculptural jockeys, carriage lamps, wagon wheels, fancy house numbers, fragments of split rail fences and mail boxes on erect chains, all have a spatial as well as a symbolic role: Their forms identify vast space as do the urns in Le Notre's *parterres*, the ruined temples in English parks, and the sign in the A&P parking lot.

But the symbolic meanings of the forms in builders' vernacular also serve to identify and support the individualism of the owner. For the middle class suburbanite living, not in a medieval street, a Regency terrace or even an antebellum mansion but in a smaller version lost in a large space, identity must come through symbolic treatment of the form of the house, either through styling provided by the developer (for instance, split-level Colonial), or through a variety of symbolic ornaments applied thereafter by the owner (the Rococo lamp in the picture window or the wagon wheel out front).

The critics of suburban iconography attribute its infinite combinations of standard ornamental elements to clutter rather than variety. This can be dismissed by suburbia's connoisseurs as the insensitivity of the uninitiate. To call these artifacts of our culture crude is to be mistaken concerning scale: it is like condemning theater sets for being crude at five feet, or condemning plaster *putti*, made to be seen high above a Baroque cornice,

for lacking the refinements of a Mino da Faesole bas-relief on a Renaissance tomb. Also, the boldness of the suburban doodads distracts the eye from the telephone poles that even the silent majority doesn't like.

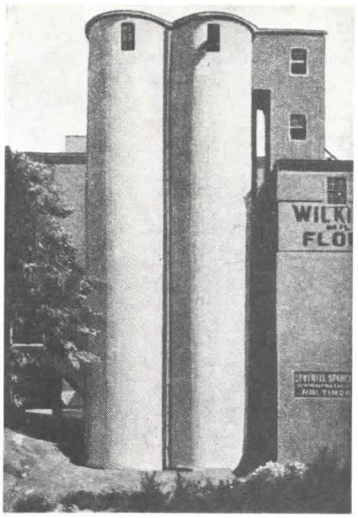
Many people like suburbia. This is the compelling reason for learning from Levittown. The ultimate irony is that although Modern architecture from the start has claimed a strong social basis for its philosophy, Modern architects have worked to keep formal and social concerns separate rather than together. In dismissing Levittown, Modern architects, who have characteristically promoted the role of the social sciences in architecture, reject whole sets of dominant social patterns because they don't like the architectural consequences of these patterns. Conversely, by defining Levittown as "silent-white-majority" architecture, they reject it again, because they don't like what they believe to be the silent white majority's political views. These architects reject the very heterogeneity of our society that makes the social sciences relevant to architecture in the first place.

If analyzing suburbia's architecture implies that one has let the Nixon regime "penetrate even the field of architectural criticism" then the field of urban planning has been infiltrated by Nixonites for more than 10 years —such as Abrams, Gans, Webber, Dyckman, Davidoff. For our critique is nothing new; the social planners have been making it for more than a decade. But in this Nixon - silent - majority critique, especially in its architectural, as opposed to its racial and military dimensions, there is a fine line between liberalism and old-fashioned class snobbery.

Social Architecture and Symbolism

We architects who hope for a reallocation of national resources toward social purposes must take care to lay the emphasis on the purposes and their promotion rather than on the architecture that shelters them. This reorientation will call for ordinary architecture, not ducks.

Meeting the architectural implications and the critical social issues of our era will require that we drop our involuted architectural expressionism and our mistaken claim to be building



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outside a formal language and find formal languages suited to our times. These languages should incorporate symbolism and rhetorical applique. Revolutionary eras are given to didactic symbolism and to the propagandistic use of architecture to promote revolutionary aims. This is as true for the African symbolism of the militants and for the ultra-middle-class symbolism of the non-militants in rebuilding the ghetto as it was for the Romantic Roman republican symbolism of revolutionary France. Ledoux was a propagandist and symbolist before he was a formalist. He saw, as we must see, architecture as symbol in space before form in space. To find our symbolism we must go to the suburban edges of the existing city that are symbolically rather than formalistically attractive and represent the aspirations of almost all, including most ghetto dwellers and most of the silent white majority. Then the archetypal Los Angeles will be our Rome and Las Vegas our Florence; and, like the archetypal grain elevator **9.** some generations ago, the Flamingo sign will be the cylindrical model to shock our sensibilities towards a new architecture. **10.**

High Design Architecture

Finally, learning from popular culture does not remove the architect from his status in high culture. But it may alter high culture to make it more sympathetic to current needs and issues. Helping this to happen is a not reprehensible part of the role of the high-design architect.

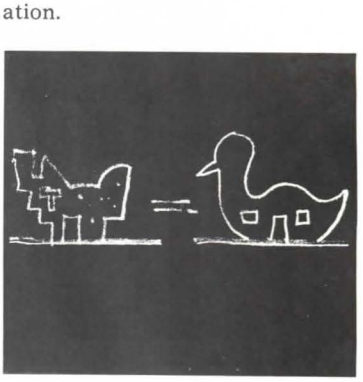
Irony may be the tool with which to confront and combine values in architecture for a pluralist society and to accommodate the differences in values that arise between the architect and his clients. Social classes rarely come together, but if they can make temporary alliances in the designing and building of multi-valued community architecture, a sense of paradox and some irony and wit will be needed on all sides.

Understanding the content of pop's messages and the way that it is projected does not mean that one need agree with, approve of, or reproduce that content. If the commercial persuasions that flash on the strip are materialistic manipulation and vapid sub-communication, which cleverly appeal to our deeper drives but send them only superficial messages, it does not follow that the architect who learns from their techniques must reproduce the content or the superficiality of their messages. (But he is indebted to them for helping him recognize that Modern architecture too has a content and a vapid one at that.) On the other hand, the interpretation and evaluation of symbolic content in architecture are an ambiguous process: the didactic symbolism of Chartres may represent to some the subtleties of medieval theology and to others, the depths of medieval superstition or manipulation. Manipulation is not the monoply of crass commercialism. And manipulation works both ways: it serves commercial interests and the billboard lobby, but also, through the intimidating prestige of cultural lobbies and design review boards, it promotes anti - sign legislation and beautification.

The progressive, technological vernacular, process - oriented, superficially socially concerned, heroic and original content of Modern architecture has been discussed before by critics and historians. Our point is that these qualities are not abstract manifestations or vague analogies imputed after the fact to the intentions of architects; rather they are explicitly there in the iconography of Modern architecture and manifest through a language—several languages—of form, and that formal languages and associational systems are inevitable and good, becoming tyrannies only when we are unconscious of them. Our other point is that the content of the unacknowledged symbolism of current Modern architecture is silly. We have been designing dead ducks.

We don't know if the time will come for serious architectural oceanographic-urbanism, for example, as opposed to the present symbolic offshore posturing of the world futurist architectural visionaries. We suspect that one day it may, though hardly in the forms now envisioned. As practicing architects in the here and now, we don't have much interest in such predictions. We do know, however, that the chief resources of our society go into things with little architectural potential: war, electronic communication, outer space and, to a much lesser extent, social services. As we have said, this is not the time and ours is not the environment for heroic communication via pure architecture.

When Modern architects righteously abandoned ornament on buildings, they unconsciously designed buildings that *were* ornament. In promoting Space and Articulation over symbolism and ornament they distorted the whole building into a duck. They substituted for the innocent and inexpensive practice of applied decoration on a conventional shed the rather cynical and expensive distortion of program and structure to promote a duck: mini-megastructures are mostly ducks. It is now time to reevaluate the once - horrifying statement of John Ruskin that architecture is the decoration of construction; but we should append the warning of Pugin, it is all right to decorate construction but never construct decoration.



ROBIN BOYD

who died in his hometown of Melbourne, Australia, on October 19th at the age of 52, was best known as a brilliant critic, writer, and commentator on architecture around the world. And he was, indeed, a prolific author: a biography of Kenzo Tange; a more general book on New Directions in Japanese Architecture; a fascinating, theoretical study of current directions in modern architecture, worldwide, entitled The Puzzle of Architecture, and reviewed in these pages by his friend, Philip Johnson, in June 1966; and much more.

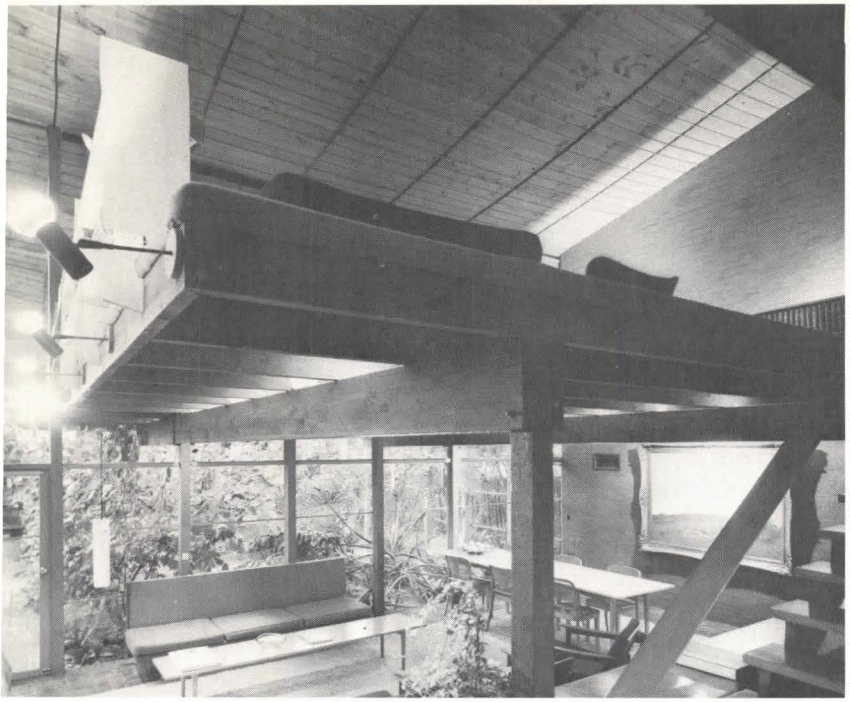
But Robin Boyd was also an extremely good architect, as any visitor to Australia—or any visitor to the Boyd's own, beautiful house in a Melbourne suburb—would be quick to discover. Boyd built this house for his family in 1959; it is only one of many houses and larger structures designed by him that grace Melbourne and environs. Not that they were easy to find, for Boyd was so self-effacing that he had to be insistently pressed to show off *any* of his own work to a visitor. And he was so greatly concerned with the quality of living that some of his houses were almost invisible from the outside: it was the quality of the space inside that counted, not some heroic architectural gestures toward an impressionable world.

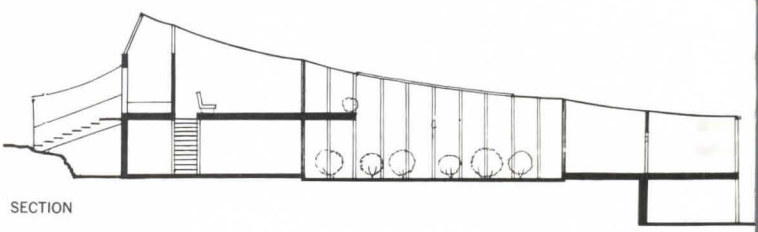
We worked with Robin Boyd over a number of years, for he was a frequent contributor to the FORUM, and a reliable correspondent from the Pacific area which he knew intimately. He seemed to be everywhere: in Montreal, where he designed the interior of the Australian Pavilion at Expo 67; in Osaka, where he designed a fascinating "exhibition machine" next to the Australian Pavilion at Expo 70; in London, where he was one of three jurors for the Houses of Parliament competition this fall, and where he caught the virus infection that killed him; and, luckily for us, in the U. S., which Boyd visited frequently, and where he taught at MIT and elsewhere.

Unlike most of his contemporaries, Robin Boyd rarely advanced his own cause. Instead, he was a valiant champion of others and of public causes. He fought for Joern Utzon and Utzon's Sydney Opera House; he wrote impassioned pamphlets assailing what he called "Australian Ugliness;" and he served on innumerable committees and agencies dedicated to the improvement of urban life through better planning and better design. It was, in a way, extraordinary that a country so relatively remote and sparsely populated produced a figure of such international stature and effectiveness.

Above all, Robin Boyd was a charming, sensitive and gentle intellectual. His father, Penleigh Boyd, was a famous Australian artist, and his paintings hang in this house—a house that is, itself, the work of a fine artist. It is customary, in tributes of this sort, to end upon a note of sadness and to say that the subject of the tribute will be missed. Of course Robin Boyd will be missed. But to all the many architects and artists and writers around the world who knew Robin it is a lasting pleasure to have had him as a friend.—THE EDITORS.

The house Robin Boyd built for his family and himself in South Yarra, a suburb of Melbourne in 1959 has a roof carried on ¾-inch cables spaced 4 ft. apart, and draped over supporting walls and girders. The view at left shows the highest point of the roof, at the entrance side. A "floating" platform at this end of the house serves as the parents' sleeping area.





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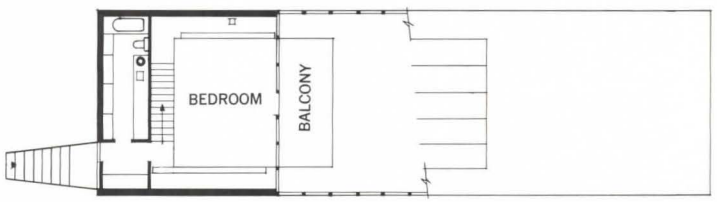
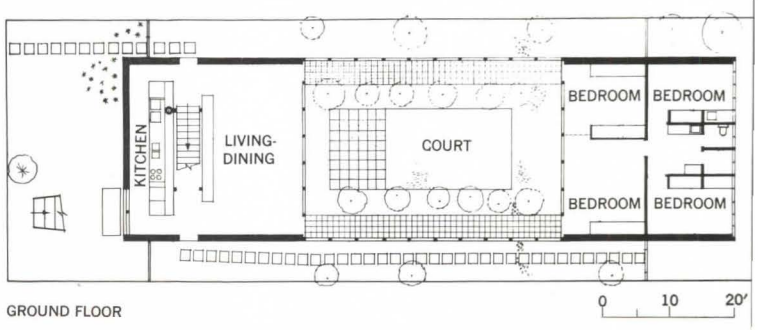


SECOND FLOOR



GROUND FLOOR

Section through the house is the key to its design, and explains the catenary curve of the cable-supported roof. The house is in two parts: the two-level living- and parents' sleeping-area at the west end, and the children's rooms at the east end of the property. The two elements are separated by a lushly planted garden court, whose sides are screened from neighboring properties by a translucent glass "fence." Pictures at left show the west end of the house, with its "floating" platform that projects out over the garden court. At right is a view of the living area located under that platform. Paintings are by Robin Boyd's father, a well-known Australian artist. Photos are by Mark Strizic.

ZONING LAWS: THE CASE FOR REPEAL

BY DAVID J. MANDEL

"Who are you going to believe, me or your own eyes?" Marx

"If it looks like a herring and it smells like a herring and it tastes like a herring, it's a herring." E. Smith

It is my argument that an analysis of our experience with zoning laws since the passage of New York City's comprehensive zoning code of 1916, the model for most of the zoning codes of the United States, compels the conclusion that zoning laws do not accomplish what they were supposed to accomplish, that their premises are faulty, that zoning is an irredeemable failure, and therefore, that zoning laws ought to be repealed. The argument is made with special reference to New York City but without limitation to it or to metropolitan areas.

A proposal to repeal any 20th century social regulatory legislation is usually greeted with a sharp intake of breath and then the muttered pejorative, "laissez-faire." Zoning codes, an expression of our desire to act rationally and to use the tools of modern science to respond to human needs, have until quite recently been generally regarded as immune from fundamental attack. In the last few years even the most passionate admirers of the idea of zoning have noticed that zoning laws are not entirely benign. The time is ripe to consider afresh the premises of zoning and its effects.

A modern comprehensive zoning code draws a map dividing the area into separate use zones, commercial, residential and industrial, usually further broken down into subzones. (The latest New York City zoning code, 1960, establishes 41 types of commercial zones, 12 types of industrial zones, and 13 types of residential zones.) Besides establishing use zones, zoning codes set formulas regulating the bulk and height of structures within each zone and subzone.

The social value of legislating separate use areas is open to serious question. To be sure, separation of land uses is a natural process that occurs in the absence of zoning. It is natural for businesses to cluster, for heavy industry to occupy certain terrain, for single-character residential areas to develop at certain places at certain times. To the extent that zoning simply recognizes the natural process, it changes nothing and causes no loss. Wherever zoning has operational effect it mandates a use that is not natural (i.e., one that would not occur in the absence of zoning) and perforce it mandates an unnatural allocation of resources that tends to impoverish the total community. In contemporary terms, it is bad ecology.

It is bad ecology partly because it regards the interest of some proximate land users as the equivalent of "the general interest." The entire organism, the total community, is thrown out of balance for what is presumed to be the interest of a local part. Assume, for instance, that an area is zoned for one-family homes, minimum lot size one-half acre, and that a builder proposes to build a highrise apartment building on a part of that area. The proximate land users, or even only a majority of them, want zoning restriction as protection for their interest in maintaining "the character of their community." But protection of their interest means a loss to the owner of the land, an injury to his interest; it deprives workmen of jobs; it deprives the potential apartment dwellers of the opportunity to rent or buy quarters that they might want and be willing to pay for. It prevents concentrated use where concentrated use is indicated by the willingness of someone to risk his money and consequently condemns a greater quantity of land to development in order to house the same population.

One may also question the fundamental fairness of allowing the residents of subdivisions to use the political process to insure that their neighbors will not live in apartment houses or be less affluent than they, or will not construct homes appreciably smaller than theirs, or build a factory. In effect, zoning grants to a local majority the right to exclude which is the essence of ownership.

The rationale for allowing B to exercise rights of ownership over A's land ought to be found in the impact to B of A's proposed use of A's land. Any use that A puts his land to will have some impact on B. On one end of the scale are those uses that palpably impact on B, those uses that may be thought of as "overflowing uses." When A creates noxious smells that waft over to B's land or A creates noises that substantially disturb B, A is really using not his own land but B's. The fairness of allowing B or a governmental agency as representative of B, to restrain A from overflowing use seems clear. Traditionally such conduct is controlled by the law of nuisance, civil and criminal.

The case is otherwise where A's proposed use has "minimal" impact on B's enjoyment of his land. Then the Common Law is neutral, confessing its inability to judge, absent overflowing use, whether there is greater merit in A's proposed use or in B's demand that it be restrained. Since in this example it is impossible to discern rationally whether there is more merit in one course or the other, the basis for zoning's claim to fairness must rest elsewhere than in its ability to balance competing interests fairly.

It is in the employment of the political process, the will of the majority as expressed by a fairly conducted vote, on which zoning's claim to fairness must rest. But to equate "majority rule" with "fairness" or "democratic process" is terribly inexact. We may assume that "majority rule" is fair when applied to the political process (although its best justification is practicality, not fairness). But we are bound to conclude that the hallmark of the democratic state is its restraint in applying the political process to the activities of its citizens.

Since zoning is only one of a host of forces shaping land use it is difficult to measure its practical effects. There certainly is no evidence that the introduction of comprehensive zoning has improved the amenities of cities and substantial evidence that it has reduced them.

The draftsmen of the 1916 zoning code of New York City began their work in 1913 and it lasted without substantial revision until 1939. Like all zoning plans it was drawn in the light of technology generally available some years earlier and it was addressed to problems set in motion decades or centuries earlier and then apparent. The decent motives of those draftsmen and their competence are unquestioned but their forward vision had to be small. Their image of the ideal city was heavily tinted by their memories of a

Mr. Mandel is a practising lawyer in New York City. He is a former policy consultant to the Hudson Institute.

more bucolic and less populous city of their youth. They were constrained to project the future as a virtually straight-line extension of the past. They simply could not (nor could anybody else) anticipate and plan for the tumultuous events of the next 23 years: United States entry into World War I, the virtual cessation of immigration after 1924, the Great Depression, the ubiquitous and ferocious automobile, airconditioning, the supermarket, penicillin.

The planners' cloudy crystal ball, focused on the presumed unhealthiness of the towering office building, engendered the zoning ziggurats, the wedding-cake buildings that mar the horizon without lessening congestion in any meaningful way or adding to the comfort of office workers. The zoners' fondness for and familiarity with row houses and their evident antipathy to tenements promoted the construction and the retention of smaller houses. Dwellings adequate according to the standards of 1919 or 1925 but decrepit and dilapidated 30 or 40 years later often cannot be restored to livability and economic usefulness because of zoning restrictions. Inner city areas are thus condemned to total devastation before rebuilding can begin. Neighborhoods that might have survived in changed but recognizable form are totally obliterated, their diversity and their humanity trucked away with the rubble.

The consequences of the inherent lack of flexibility of zoning are multifarious. Some land stays idle awaiting industrial use that never arrives. The assemblage of economically buildable parcels is made unnaturally expensive because builders must pay not only for the inherent value of land but also for the value conferred by zoning. Tax rolls are permanently maimed and the economic viability of the city endangered because tax concessions can be extracted for large scale development where small scale and piecemeal rebuilding is hampered by zoning restrictions. Long after neighborhoods have been thoroughly run down and all but abandoned they continue zoned for residential use, the nonresidents thereof protected from industrial incursion. Where zoning's mortmain prevails, sound residences now too large for single-family occupancy will often decay to total uselessness before a new use as shop, store or multi-family residence is permitted by grant of variance or rezoning. The hub city stagnates while green areas at the city's fringe or in the suburbs are paved over. Multitudes are condemned to commuter trains who, but for zoning, might have lived in comfort close to their work.

One of the goals of zoning was a better-looking city. Sadly, the goal remains unrealized. Zoning provokes monumental errors. Dissatisfied with the wedding-cake structure induced by the previous code, misled by the fortuitous excellence of Lever House and the Seagram Building, the 1960 code draftsmen granted height premiums for deep, ground-level setbacks. The result: Sixth Avenue, lined with surly, remote towers disdaining mere commerce, without a drug store or a delicatessen, inhumanly neat, without shelter or human scale for three-quarters of a mile.

Repealing zoning is no guaranty of architectural excellence. One thing is certain, ugly buildings will continue to be built. But architectural excellence is encouraged by freedom not by conformity to stale committee judgment.

Variances and rezoning are insufficient remedies for zoning's rigidity, its basic conservatism. Both do add some flexibility; both are objectionable. Proceedings for variances from zoning's rigors, limited in scope to begin with, are expensive and time-consuming. They are a potent source of graft and neighborly extortion. Spot rezoning is so patently unfair it is unconstitutional. Comprehensive rezoning has to be so infrequent that it adds only minimal flexibility. "Discretionary zoning" is undisguised tyranny.

Has zoning increased the amenities of the city by legislating the separation of residential, commercial and industrial use zones? In much of New York City an observer uninformed of the existence of such zoning would be hard pressed to discover it for most areas exhibit a blend of uses. In much of Manhattan, for instance, the separation is a matter of a few feet, around the corner, across the street. Even so, Park Avenue between 59th Street and 95th Street is no more pleasant and a lot duller without stores and offices than Madison and Lexington with them. In mid-Manhattan and for certain people, at least, the quality of life is not diminished by proximity to commercial activities and may even be enhanced by it. Vertical separation is sufficient for comfort. Indeed, the City of New York has recently begun to encourage the construction of buildings with offices and stores below and apartments above, an arrangement that zoning restricted for 50 years.

The minimum conclusion is that a blend of commercial and residential uses does not by itself make for unpleasant living.

The compatibility of residential and industrial use turns entirely on the question of overflowing or nuisance use. There is otherwise no categorical answer to the question of whether the operation of a factory at any spot on a map will diminish the amenities of a nearby residential area. Zoning treats the problem of overflowing use in the grossest terms, quarantining the patient instead of trying to cure the disease and coincidentally creating enormous traffic problems by confining factories to remote areas. To assert that this quarantine approach of zoning has contributed to the intensity of our present pollution problems is not wrong. Governmental coercion ought to be directed at compelling factories to confine their business to their own land so that they are unobjectionable neighbors wherever they are. The quality of life is not and ought not to be dependent upon legislative separation of residential and industrial areas.

Zoning's bulk and height limitations turn out to be equally irrelevant to the quality of life. People can live and work in very large buildings in great comfort and in smaller ones in squalor; the contrary is also true.

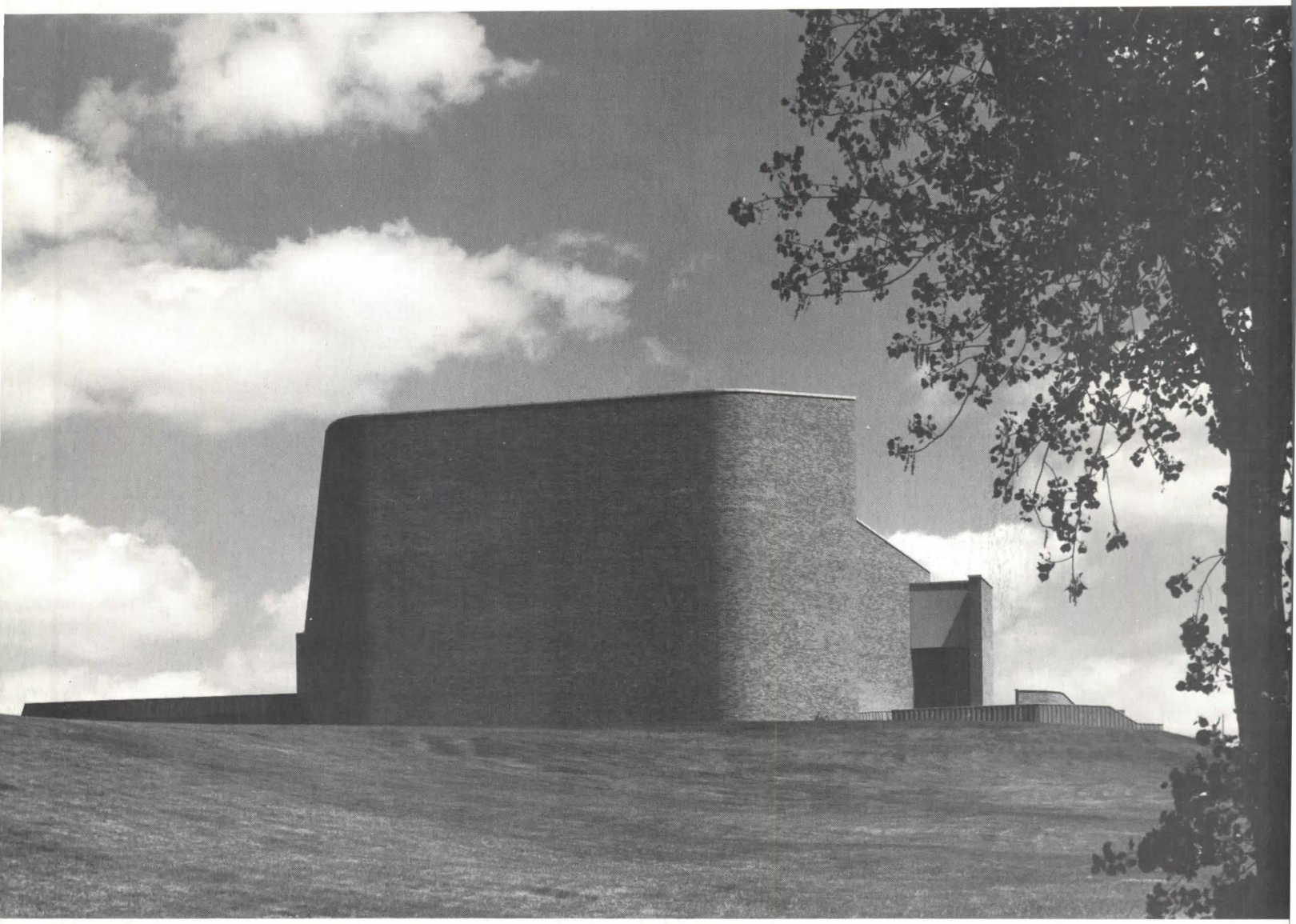
From these conclusions one further conclusion can be drawn. The unlovely city is not caused by a lack of zoning and is not helped by zoning. Zoning simply creates a new set of problems.

No zoning plan can be devised that does not exhibit the deadly defects of the zoning plans dealt with here. Zoning plans face the problems of the future with the full confidence that they can prevent 1915 or 1938 or 1959 from ever coming back. They are and have to be drawn in the light of old technology, old resources, old problems and old ideas. They are inherently inflexible, unable to adjust to new technology, new resources, new ideas, new needs. Zoning plans can confer order, but the order is the order of the cemetery or Williamsburg. Zoning, like all ecosystem modifications, itself produces effects unforeseeable when the plan is made. The greater zoning's scope the greater the chance that these unforeseeable effects will cause monumental and persistent harm. To argue that the huge size and complexity of modern cities make imperative the imposition of zoning is quite untrue. The larger and more complex the ecosystem the less likely that it can be controlled by plans set years before.

After a half-century of comprehensive zoning in an era of increasing regulation it may be somewhat hard to accept the idea that places can flourish without zoning, but they always have and they do so now.* For all these reasons I conclude that the most acceptable order of land use will arise without zoning just as the public press will have its most acceptable order without censorship.

*Though my grandfather warned me that "'for example' is no proof," interested readers are directed to examine Houston, Texas, which has never been zoned and which is the subject of an admirable article by Bernard H. Siegan, "Non-Zoning in Houston," Journal of Law and Economics, April, 1970.

NEW SHAPE FOR NEW WORSHIP



The new liturgy of the Catholic Church takes esthetic form on a South Dakota bluff

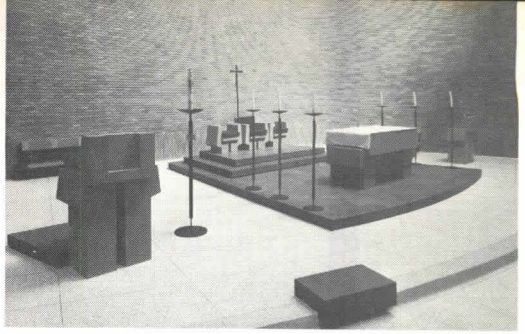
A new shape with a purpose. This is the Holy Name Church in Watertown, So. Dakota, designed by The Spitznagel Partners Inc.

Built for the Sioux Falls diocese, the new church form is the logical enclosure of an interior space designed to express the new liturgy of the Catholic Church, as defined by Vatican II. The fan-shaped form represents a one-room concept of worship, where the physical and psychological barriers between priest and parishioners are minimal and as many people as possible are brought close to the altar.

One enters the church through a courtyard under a low porch. At the entrance is the baptismal font, symbolizing, like the sacrament, entry into the Kingdom of God. The brick walls then curve around to the altar space, where the ceiling is highest and accented by a light-scoop that floods the altar area with natural light. To the left of the altar, with a separate entrance, is the Blessed Sacrament Chapel. This sacred area is bathed in warm, colored light shining from a window above.

The new liturgy is evident in more than the spatial forms of the church. There is no communion rail, but stations where the congregation lines up to receive the sacrament. The choir is not seated in splendid isolation above the masses, but in the midst of the congregation. The altar is placed so that the priest can maintain eye contact with his audience.

Outside, the form of the church both makes it clear that the structure is a church and takes full advantage of the church's

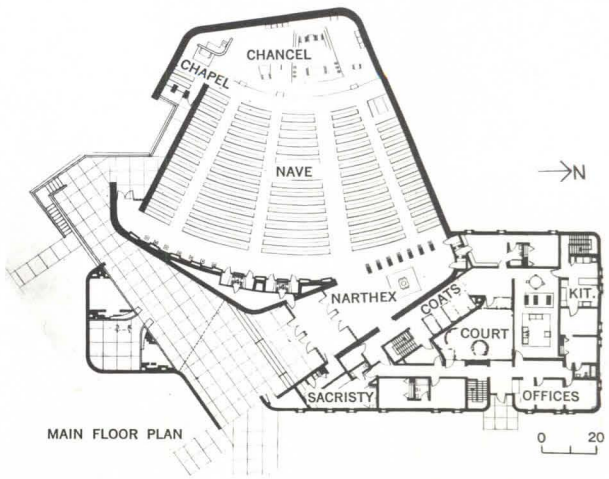


dramatic setting atop a bluff on the Dakota plains. The church, which is part of a complex that includes a school where services were held over the past 15 years, is visible across the plains for over 15 miles. The building has loadbearing brick walls, with a bar joist frame and a warped roof surface that rises to present a strong Fortress of God appearance in silhouette.

The diocese felt strongly about the new forms of architecture necessary to express the new forms of Catholic Worship and was willing to experiment to find a new one that would be appropriate. The architects fully and successfully exercised this rare freedom.

FACTS AND FIGURES

Holy Name Church, Watertown, South Dakota. Architect: Spitznagel Partners Inc. (W. S. Steele, partner in charge; Marvin L. Peterson, job captain). Engineers: TSP Inc. (structural, mechanical & electrical). Consultants: Bolt, Beranek & Newman (acoustical); Frank Kacmarcik (liturgical). General contractor: Gray Construction Co. Building area: 21,115 sq. ft. Cost (including site work): $500,112. PHOTOGRAPHS: Joel Strasser.



MAIN FLOOR PLAN

TECHNOLOGY

New components provide efficient and attractive hospital interiors

A new system of containers, frames, carts and rails promises to improve and simplify hospital furnishings and operational design. Called *Co/Struc* (for Coherent Structures), the system was developed and tested over the last ten years by the Herman Miller Research Corp., a subsidiary of Herman Miller Inc., under the direction of Robert L. Probst.

Instead of designing more and more complex structures to serve a variety of needs independently (which can result in costly overdesign), Probst and his group designed simpler units that perform common functions in a variety of situations. There are only about 20 elements, including size variations and accessories, in *Co/Struc*. Yet the components can be combined to fulfill almost any service role in a hospital, including in a patient room, nurse's station or dispensary unit, administration area, supply, laundry or kitchen service facility, laboratory, emergency room or treatment unit.

The system is designed to make use of spaces normally ignored in hospital planning. Most of the components either hang from wall-mounted rails or are mounted on moveable carts or frames (easing maintenance by removing most floor obstructions). Composite units are easily disassembled for removal, replacement, cleaning or repair.

The system can also simplify the architectural requirements of a hospital interior. In a laboratory, for example, *Co/Struc* can eliminate most fixed walls and cabinetwork. Because the units may be installed and changed when and how needed, obsolescence is improbable. Also, since the units can all be washed, the lab can enjoy almost clean room conditions.

A prototype installation of *Co/Struc* is in the 150-bed Monmouth Memorial Hospital, in Monmouth, Ill. The idea came from the architect, John Hackler & Co. The hospital notes that the staff must be trained to use *Co/Struc* efficiently, but that benefits include improvements in sanitation, customized service demands, transport and supply, flexibility for staff and patients, and appearance.

There may well be some criticism of the individual design of some *Co/Struc* units. But the concept is so logical it is surprising we had to wait this long for it.

The basic container, frame, cart and rail elements of the *Co/Struc* system are extremely simple, lightweight forms. They are of seamless, cornerless, drainable construction, designed to withstand the high temperatures of commercial dishwashing systems and to stack for easy storage and transportation. The primary material is General Electric's Lexan, a self-extinguishing, nondripping plastic with a 12,800-psi flexural strength. All of the elements may be separated for cleaning, replacement, removal or interchange, so that if the surface of a storage unit, for example, wears out, it alone can be replaced without disturbing the rest of the unit. Figures 1 & 5 illustrate *Co/Struc's* basic con-

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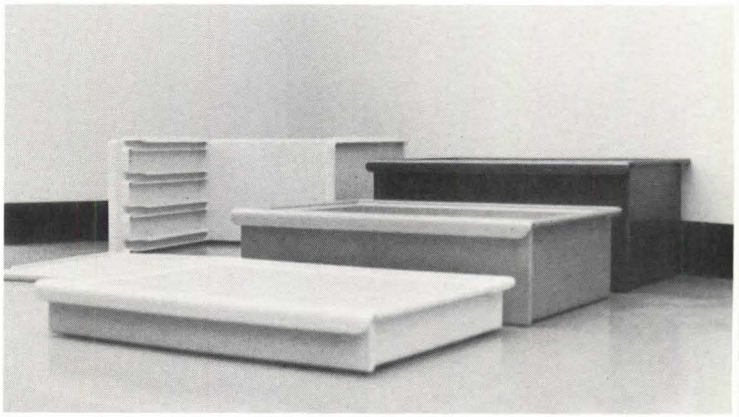

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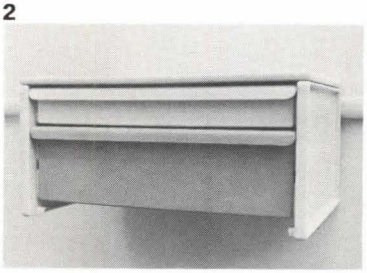

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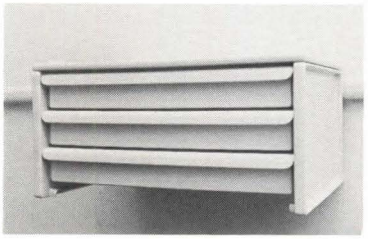

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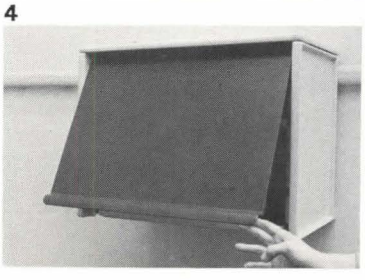

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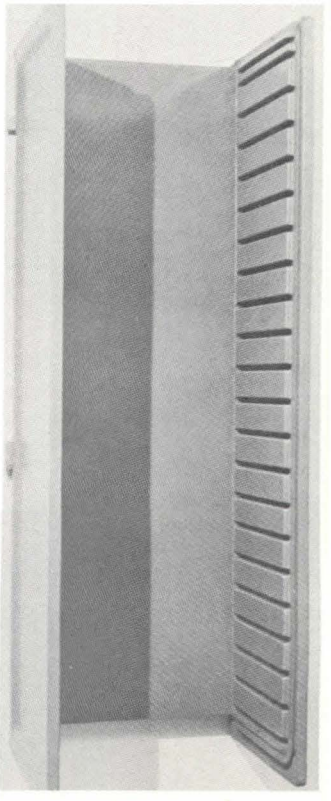

tainer and frame elements, which are available in several size variations and may be assembled in a variety of configurations. Drawers comprise the basic container unit and may be mounted in the C-frame, either on a wall rail or L-cart (8 & 9), or in the locker unit (5), which is also available in two size variations. The C-frame may also be used as a conventional bedtable alone, or may be wall mounted with a door piece (4) for enclosed wall storage or as the head of a linen or disposal bag, which may hang from it. The tray (1) may be used for medications or food as a tray, but is also designed as a tough work surface for C-frames (2 & 3), on an L-cart (8) or as a simple shelf for a locker or C-frame. Other basic *Co/Struc* components include the self-locking rail system (6 & 7) and the locker cart (10 & 11). This cart is designed to link with others in tandem, so that one employee can drive a train of them around the hospital corridors. He might, for example, take a group loaded with fresh linens to local dispensary points in the hospital, leaving them off and picking up empty versions in order. The carts are designed with a foot lever that lifts the locker units onto and off the wall rails (12). An H-cart (13) may be used to gang six lockers for loading or unloading away from a wall. The lockers feature flexible door sections that roll down the front and up the back.

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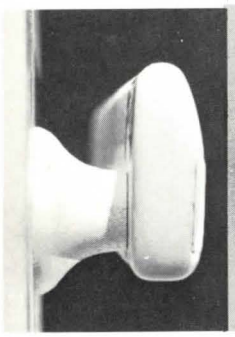

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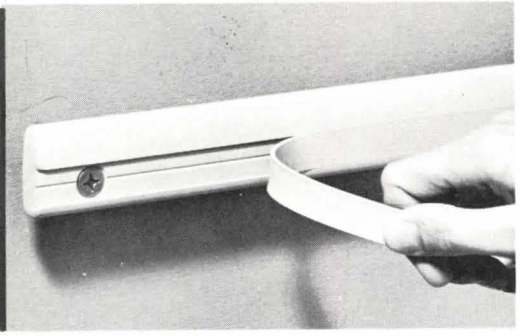

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The flexibility of the individual *Co/Struc* components is almost limitless and this is perhaps the single greatest beauty of the system. In the pictures below, the same elements are used to comprise a nurse's station (14), a laboratory (15), a storage unit and work surface area (16), and various patient room facilities (17). It is not difficult to see the repetitions of elements. The C-container forming the nurse's overhead storage cabinet frame, for example, is also used for her desk drawers, the laboratory's instrument storage units on cabinet and wall; the wall-mounted, three-part storage unit; and, in the patient's room, could be turned for use as a conventional bed table. The drawer units, which are also used as mobile containers, may be changed (prefilled with new supplies if desired) as needs require. They will fit into various configurations of the frame elements of *Co/Struc,* including the L-cart (17 foreground), where they are used as bedside tables or as a mobile dispensary and treatment cart. The tray surface of the arm-mounted bed table illustrated is also usable as a detached tray, tabletop surface, or work surface. Further, all of the components are detachable and may be circulated through a commercial dishwasher system for thorough cleaning and freshening (18). Monmouth, for example, uses *Co/Struc* to provide fresher patient rooms faster than ever before. When a patient is discharged, the staff replaces all of the room furnishings (except bed and chair) with clean *Co/Struc* components from central supply. The soiled units are washed, then sent to new uses elsewhere in the hospital.

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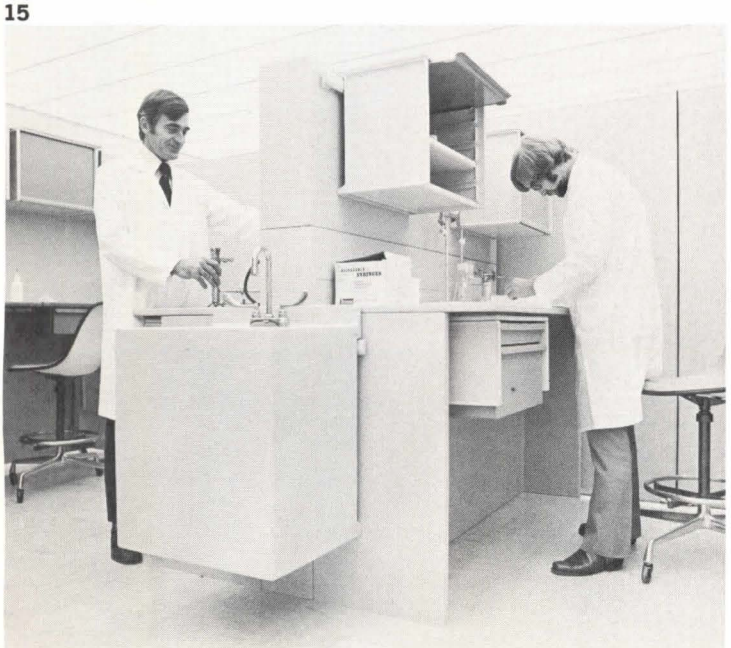

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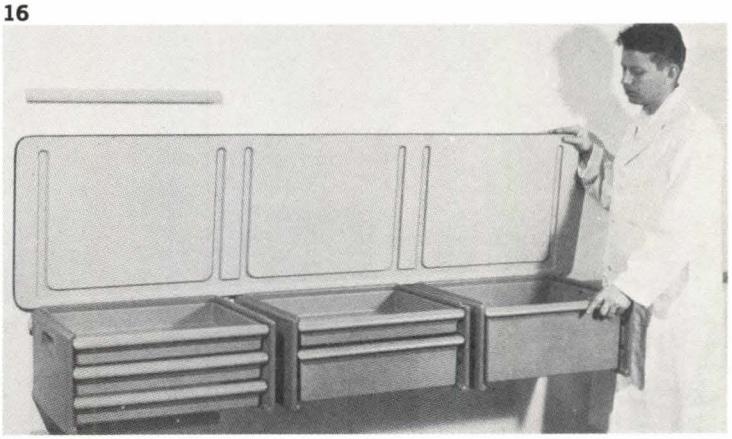

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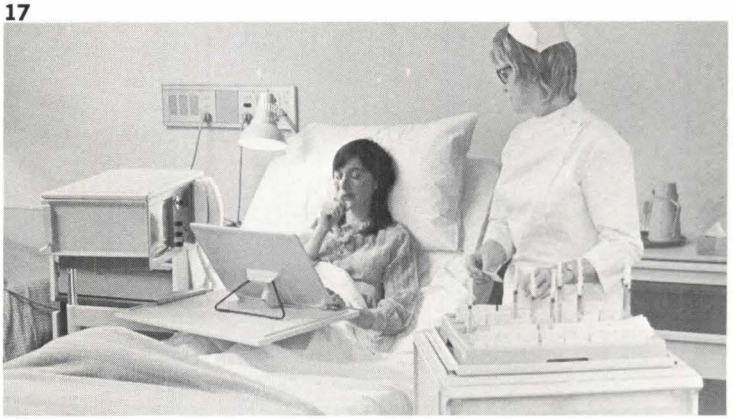


18

FORUM

(continued from page 23)

rection of George Sadek and John Hejduk, has long been a mystery to all. To end the mystery, Messrs. Sadek and Hejduk, with assists from the Museum of Modern Art, the Architectural League, and the Graham Foundation, last month put on a dazzling display of their students' work. Result: the mystery is deeper than ever.

But dazzling the show certainly was. Not since the shiningest hours of the Ecole des Beaux Arts has there been a student body so brilliantly trained in draftsmanship; and not even the purest of the Purists could have arranged a more elegant display of the results of that training.

The works displayed, with a few, notable exceptions, were predictably eclectic: who, in his right mind and in the 1970's, would be inclined to redraw, with infinite precision the earliest works of Gerrit Rietveld or Le Corbusier (which, incidentially, were never drawn by their originators with any precision whatsoever)? Who, indeed? Sadek's and Hejduk's students, that's who, and bless their little hearts; in a time when just about every architecture school is going off half-cocked after "relevance" (i.e. non-architecture), it is wonderful to see the Beaux Arts revived so tastefully.

It won't stay tasteful much longer, of course: even in this highly disciplined show, there are the first signs of rebellion: what on earth would Vantongerloo have thought of a student who made a subway entrance out of two tilted shells of subway cars, driven at 30 degrees into the bowels of Astor Place? So the show may really be George Sadek's and John Hejduk's swan song; but what a beautiful way to go.

The show is called "Education of an Architect — A Point of View," and will remain at the Museum of Modern Art through January 10.

ART

CAMPUS QUEEN

Princeton's new girl is 15 feet tall, weighs ten tons and is the most popular coed on campus. Pablo Picasso thought her up, and Norwegian sculptor Carl Nesjar cast her. She sits impudently in front of McCormick Hall which houses the Art Museum and the Art & Archeology Departments.

Picasso's latest

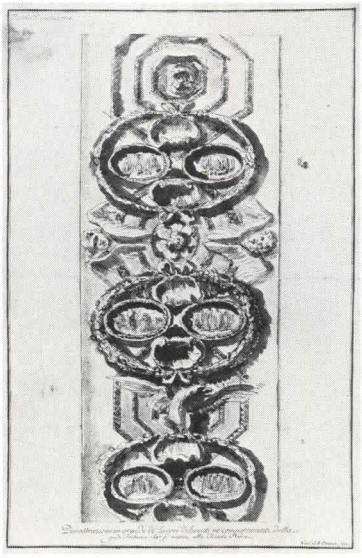
Known as "Head of a Woman", she is the latest addition to Princeton's ambitious sculpture program (made possible through an anonymous $1 million bequest) which began in 1968 and possibly has made the Princeton campus the most impressive outdoor sculpture show in the United States.

Other sculptures already installed include works by Henry Moore, Louise Nevelson, Alexander Calder, David Smith, Tony Smith, Jacques Lipchitz, Gaston Lachaise, Jacob Epstein, Isamu Noguchi, Reg Butler, Arnaldo Pomodoro and Kenneth Snelson.

PIRANESI DISCOVERIES

Twenty-four original architectural drawings by Giovanni Battista Piranesi have been discovered by Columbia University which has been searching for them since 1968 when their existence was briefly mentioned in a scholarly journal.

Detail of a vaulted ceiling



Art collector Arthur Sackler recently purchased them and gave them to Columbia in memory of art historian Rudolf Wittkower who died in October (Nov. issue). Dr. Sackler has contributed many other Piranesi etchings to Columbia's Avery Architectural Library.

These newly found drawings, which had been in the possession of a European family for more than 50 years, show Piranesi's plan for remodeling Rome's ancient Basilica of S. Giovanni in Laterano, one of the oldest and most important churches in Christendom.

"We know very little of Piranesi as a practicing architect," says Adolf Placzek, head of Avery Library. "The drawings are bold and subtle, certainly highly original and imaginative, almost to the point of playfulness."

OF MICE AND MOORMAN

Artist Geoff Hendricks, in white tie, sat on a mound of dirt in The Thinker posture, ignoring the white mice running in and out of his pockets and tails.

John Lennon's "Wind Peace" for strings was performed by musicians, as a battery of fans turned pages capriciously.

"Red Rapid Growth", by Otto Piene, consisted of four 35-ft-high inflated structures swaying tulip-like to and fro.

The Eighth Annual New York Avant Garde Festival captured and held the 69th Regiment Armory for 12 hours November 19 in an electronic media bash. Countless mindboggling t.v. screens beeped and screeched

as one ploughed through the exhibits of the 200 artists.

One was encouraged to write down bad memories on a small yellow card which was then placed in an opulent coffin to be buried forever at the end of the day.

And where was cellist Charlotte Moorman who conjured it all up? She entered through the top of a two-story mostly-fake birthday cake, throwing fistfuls of frosting and goo at the people, the balcony, the walls.

This happening was made possible through the cooperation of Governor Rockefeller (he lent the Armory) and the support of the New York State Council on the Arts. *Why?*

UPS & DOWNS

BUT NOT NEXT DOOR

Forest Hills in New York's sprawling borough of Queens is a "community" of about 100,000 people, split down the middle by the Long Island Railroad. On one side of the tracks is Forest Hills Gardens, a model community established in 1913. On the other side is the new Forest Hills, a forest of hulking high-rises built for the aspiring middle class of the 1950's — most of whom were fleeing from urban decay in other parts of the city.

Last month the law-abiding citizens of the new Forest Hills were throwing rocks and lighted torches at a construction trailer, in a demonstration that Mayor John V. Lindsay termed "deplorable." The target was the site of a new public housing project to be built at the edge of their high-density Eden. The outcry of the protest leaders was that the estimated 3,000 residents of the project would impose an intolerable burden on schools and other municipal services.

Jerry Birbach, head of the most vocal opposition group, accused the city of "transplanting malignant tumor to a healthy, viable community." Ironically, the city has taken its first steps toward dispersal of low-income housing outside of ghettos only after prodding from HUD in Washington. It may have irked Forest Hills residents that efforts to place public housing in other middle-class parts of Queens have been quietly thwarted. And an 840-unit project on only 8.46 acres, with towers up to 24 stories high, is too dense—even by Forest Hills standards.

The Mayor refused to budge, claiming the project had long since cleared all the required community-approval hurdles. Conservative Senator James Buckley took the issue to HUD Secretary Romney, who reviewed the project, then reaffirmed HUD's approval. Rebuffed by Romney, Buckley took his appeal straight to President Nixon, who must be busy with other problems.

MAGIC TWO MILLION

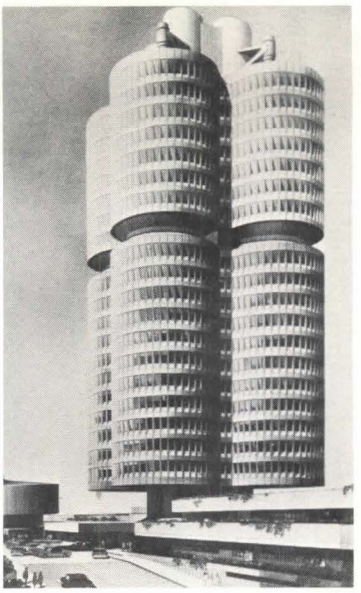
Construction was begun on a total of 1,541,000 homes and apartments in the first nine months of 1971, 300,000 of them Federally subsidized. That was more housing starts than in 14 of the last 15 *full* years (1963 was the exception, with 1,582,000). This year's housing boom may well top the two million mark. This information is brought to you courtesy of the Advance Mortgage Corporation's Economic Research Bureau in Detroit.

HIGH COST OF UPKEEP

While HUD was resisting pressure to scrap a low-income project in New York, it was imposing a freeze on several hundred units of low-income housing in San Francisco. One reason was the alleged exorbitant cost of managing public housing there. One of HUD's objections was that maintenance, performed strictly in accordance with union rules, is too costly. Union plumbers are not needed just to change a toilet seat, claims HUD, or electricians to change a light bulb. We wonder who changes George Meany's bulbs.

DER BAYRISCHE MOTOR

Among the sights at the 1972 Munich Olympics will be a four-cylinder corporate symbol of Bavarian Motors Works, best



Made in Germany

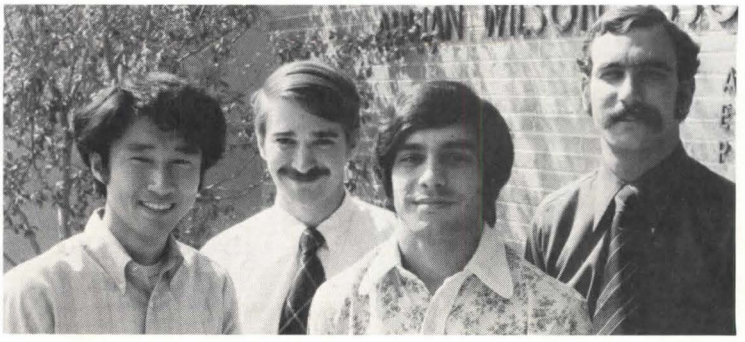
known worldwide for its trim little BMW sedan. The company's Oldenburgian headquarters tower will be assembled out of one-story-high discs, clad in aluminum, which will be continued on the ground, then suspended (top floor first) from a central mast. The architect for this automotive monument is Karl Schwanzer.

PEOPLE

WINNERS ALL

The Los Angeles architectural firm of Adrian Wilson Associates includes four UCLA architecture students, each of whom has won the firm's annual $3500 scholarship. The awarding of the scholarship is left to the UCLA Department of Architecture and it is just a happy coincidence that all of these recent winners (some of whom are still students) have been employed there. Left to right: Ik Jae Kim of Korea, current winner; David Betounes, 1970 winner; Luis Ortega, 1969 winner; and Michael Pearce, 1967 winner. Not pictured is Evangelia Venianaki, 1968 winner, who also was employed there for a summer and is now working on a doctorate.

Wilson's winners



WHAT PRICE HONOR?

Chicago Architect Stanley Tigerman, assigned by the World Bank in 1966 to work on five polytechnic projects in East Pakistan, has terminated his contract.

The $66 million institutes, now 70% complete, at Barisal, Bogra, Pabna, Rangpur and Sylhet were abandoned because Mr. Tigerman found it "logically, technologically and moralistically impossible to work there."

DIED

Architect and city planner Eugene Henry Klaber, 88, died in Pennsylvania November 6. From 1934 to 1942, he was director of architecture for the Federal Housing Administration. He joined the faculty of Columbia School of Architecture in 1944 as director of planning and housing. He had graduated from both Columbia and the Ecole des Beaux Arts in Paris.

Mr. Klaber was a consultant to the Philadelphia Planning Commission and did some of the early studies which led to the rehabilitation of Society Hill. His book, *Housing Design*, published in 1954, was widely used as a textbook and was translated into many languages. He wrote many articles for magazines including the FORUM (April '66).

An ardent foe of the new town, Reston, Va., Mr. Klaber warned that families below the upper middle class would be priced out causing domestics and garbage collectors to live in shacks on the periphery.

Mrs. Cloethiel Woodard Smith, newly appointed by Nixon to the Commission of Fine Arts in Washington, worked with Eugene Klaber during his FHA period. She commented: "One of the most human and creative of the architectural humanists, he saw the city large as the whole city, and he saw it small as a sunny room, a garden, a tree. Brilliant but gentle and always generous, he gave young architects new directions, but he always let them have a piece of the action."

PHOTOGRAPHS: Page 21, Bill Mackenzie. Page 22 (bottom) Kupper/Grant. Page 65 (top) Leonard H. Kane; (bottom) Jay Cantor.

UNITED STATES STEEL'S
Pittsburgh Headquarters Building

Table shown conforms to the shape
of the oval executive conference room.
Table seats thirty comfortably.
The top is American Walnut
and the table base is stainless steel.
Design by Peter Muller-Munk Associates
–Industrial Design.
SAUER manufactures in accordance
with the design specifications
submitted by interior planning firms,
combining wood, metal, marble, plastics,
to create executive areas for corporations
and institutions.
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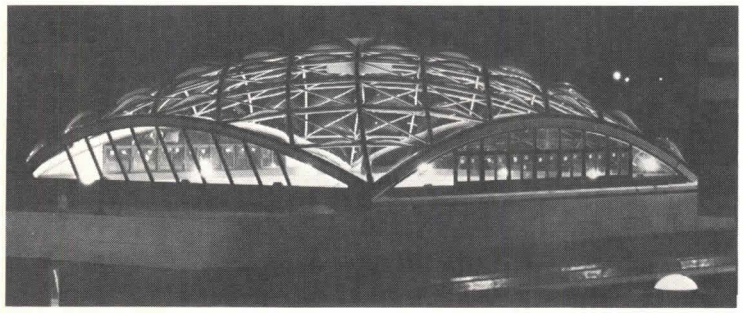
SINCE 1907 RECOGNIZED CRAFTSMEN IN FINE CUSTOM MADE FURNITURE AND INTERIOR WOODWORK

PRODUCT REVIEW

This month's Product Review concentrates on new developments in glazing, windows, doors and security systems.



GLAZING SYSTEM

Butler Manufacturing Co. has introduced a new acrylic panel glazing system especially designed for the company's Triodetic building system. The panels are available either clear or shaded and can be left flat or blown into bubbles. Manufactured by Rohm and Haas, the panels are attached to the triodetic system by means of main and secondary glazing bars that also act as condensation gutters. The new glazing adds a skylight or see-through feature to space-frame construction.

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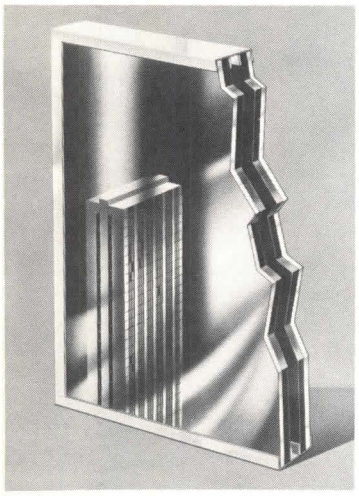

ALL-PURPOSE WINDOW

PPG Industries has developed a new window that warms itself, muffles unwanted sound, insulates against cold or heat, and screens out solar glare. The double-glazed window has an edge-seal construction similar to PPG's Twindow insulating units; the design incorporates two glass panes of different thicknesses, separated by a 2-in. blanket of air. An electrically conductive reflective coating on one airspace surface is thermostat-controlled to maintain indoor glass temperatures within a desired range.

On Readers Service Card, circle 102.

PVC WINDOW LINE

A new line of steel-reinforced, semi-rigid polyvinyl chloride windows, by the Compro Division of Alumiline Corp., comes in a variety of window types, including project, hopper, fixed, casement, pivot and others. Eight architectural colors are provided. Welded corner construction gives watertight joints; improved balance between the PVC and the steel substructure permits a minimal cross-section thickness, saving space.

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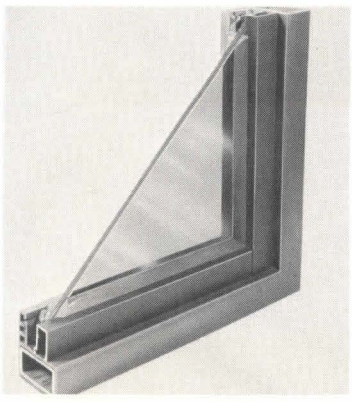

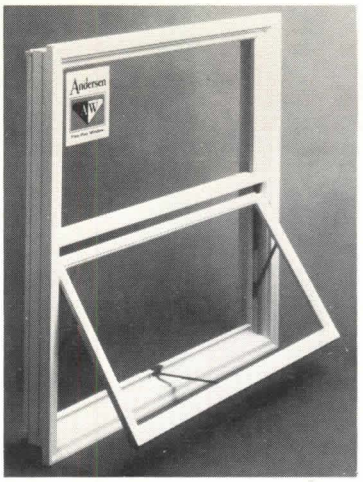

TURNABOUT WINDOW

FLEX-PAC is a new window, introduced by Anderson Corp., that can be installed either as an awning unit or as a casement simply by turning it 90 deg. The hinged window is factory-finished inside and out with a white pigmented primer and one finish coat of paint applied electrostatically. Installed as an awning and fitted with removable grills for multiple light effects, five of the nine sizes available resemble a double-hung window.

On Readers Service Card, circle 104.

THERMAL BREAK DOOR

A new foam core steel door provides a thermal break for residences. Developed by the Ever/Strait Division of the Pease Co., the new door has an exterior and interior steel skin bonderized to the core. The two skins must never touch to protect against cold, so the company has devised a thermal break, or built-in slot, that separates the interior from the exterior, stopping thermal transfer.

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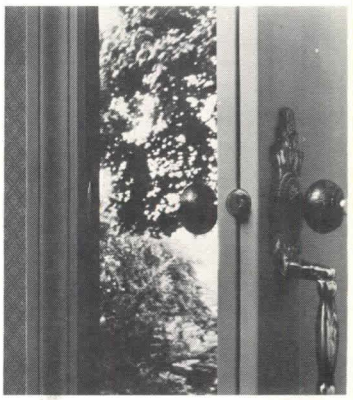
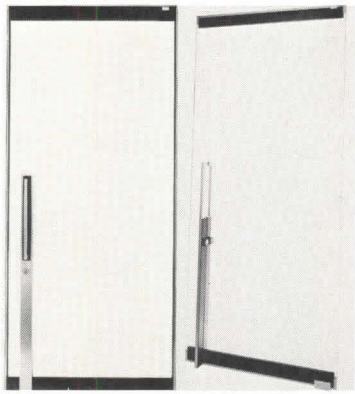




GLASS DOORS AND SIDELIGHTS

A series of three ½-in. tempered glass doors and sidelights is available from Blumcraft with a large selection of interchangeable push/pull hardware. The company manufactures its own rolling locks and panic devices, using stainless steel ball bearings to reduce operational friction. Maximum security is attained with the locking mechanism mounted on the interior side of the door.

On Readers Service Card, circle 106.

STEEL DOORS

A new line of doors, manufactured by Republic Steel Corp., has been designed to withstand the hard abuse of school and other installations requiring strength and durability. Made with a sturdy honeycomb inner structure, the steel doors come in standard flush models and are sold at standard prices. Special light and louver treatments are available with no delay in delivery; the doors and frames arrive on site ready to install. The units are available in 36 standard sizes.

On Readers Service Card, circle 107.

(*continued on page* 71)

On Readers Service Card, Circle 310→

Electric Space Conditioning Systems Permit Tenant Control of Temperature In 144-Unit Apartment Complex

Mark VI Apartments in Houston, Texas, is built around six decorative courtyards.

PROJECT: Mark VI Apartments, Houston, Texas. ARCHITECT: Bernard C. Brady, Houston. CONSULTING ENGINEER: S. F. Atlas, Houston.

DESIGN CHARGE: To design a low-rise apartment complex with 88 one-bedroom, 32 two-bedroom and 24 three-bedroom units. Each unit was to have a combination living room and dining area, a kitchen, and a bathroom and be convenient to laundry, parking, and recreational facilities.

DESIGN RESPONSE: Mark VI Apartments, designed by Architect Bernard C. Brady, is comprised of six buildings built around the perimeter of a rectangle. The buildings are separated by 10-foot passageways but joined to each other by a common roofline. Each building is entered through its own courtyard which contains a fountain, trees, garden furniture and lawn area. All six courtyards and two swimming pools take up the interior of the rectangle. The covered passageways between the buildings lead to streets and parking facilities.

All six buildings are constructed of multi-hued antique brick with black, white and beige predominating. Each building contains 24 apartments and each apartment has an L-shaped living/dining area, kitchen, bathroom and one, two, or three bedrooms.

When it came to selecting a space conditioning system for the buildings, the owner expressed a preference for a system that would permit each tenant to control the temperature in his apartment the year-round. A study indicated that an electric system would not only meet this requirement but would cost less to buy, install and maintain than equivalent flame-fuel systems, and it was decided to space condition the apartments electrically.

Each apartment is heated and cooled by a packaged split-system air conditioner rated at 1½, 2, or 2½ tons, depending on the size and location of the apartment. The equipment does not detract from the floor area available to the tenants because the compressors are mounted on the roof and the air handling sections, which contain the direct expansion coils and electric strip heaters, are concealed in furred-down portions of the ceiling. Tenants regulate the temperature by means of wall-mounted heating/cooling thermostats.

With three full heating and cooling seasons behind them, the electric systems have lived up to all expectations regarding comfort, convenience and economy, Mr. Brady reports, and are popular with the tenants and owner alike.

SEE REVERSE SIDE FOR DETAIL INFORMATION

ELECTRIC HEATING ASSOC. INC.
437 Madison Avenue
New York, N.Y. 10022

Gentlemen:
Please send the complete series of Electric Heating Case Histories as they become available to me at the following address:

Name and Profession:
Firm, University or other affiliation:
Address:
Zip Code:

1 CATEGORY OF STRUCTURE:
Garden Apartments

2 GENERAL DESCRIPTION:
Area: 128,776 sq ft
Volume: 1,030, 208 cu ft
Number of floors: two
Number of occupants: 295
Number of units: 144
Types of rooms: living/dining rooms, kitchens, bathrooms and one, two or three bedrooms

3 CONSTRUCTION DETAILS:
Glass: single
Exterior walls: 4" brick veneer, 1" air space, ½" gypsum sheathing on wood frame, 3" glass fiber batts (R-11), ½" gypsum board; U-factor: 0.066
Roof or ceilings: built-up roof on ⅝" plywood deck, 6" glass fiber batts (R-22), ½" gypsum board; U-factor: 0.0377
Floors: concrete slab
Gross exposed wall area: 78,406 sq ft
Glass area: 13,130 sq ft

4 ENVIRONMENTAL DESIGN CONDITIONS:
Heating:
Heat loss Btuh: 2,200,000
Normal degree days: 1396
Ventilation requirements: none
Design conditions: 20F outdoors; 75F indoors
Cooling:
Heat gain Btuh: 3,000,000
Ventilation requirements: none
Design conditions: 95F dbt, 80F wbt outdoors; 75F, 50% rh indoors

5 LIGHTING:
Levels in footcandles: 20-50
Levels in watts/sq ft: 1-2
Type: fluorescent and incandescent

6 HEATING AND COOLING SYSTEM:
Each apartment is furnished with an independent electric packaged split-system air conditioning unit. The compressor sections, rated at 1½, 2 or 2½ tons depending on apartment size, are roof-mounted. The fan/coil units, which are equipped with strip heaters, are installed in a furred-down portion of the ceilings in the bathrooms or hallways. The fans run continuously while the heaters and compressors are cycled by wall-mounted heating/cooling thermostats.

7 ELECTRICAL SERVICE:
Type: overhead
Voltage: 120/240/7200/12,470v, 3-phase, 4-wire, wye
Metering: primary

8 CONNECTED LOADS:

Heating & Cooling (251 tons)	900 kw
Lighting	194 kw
Cooking	1440 kw
Other	150 kw
TOTAL	2684 kw

9 INSTALLED COST:*

General Work	$1,312,500	$10.19/sq ft
Elec., Mech., Etc.	247,500	1.92/sq ft
TOTALS	$1,560,000	$12.11/sq ft

*Building was completed 11/68

10 HOURS AND METHODS OF OPERATION:
24 hours a day, seven days a week.

11 OPERATING COST:
Period: 12/69 through 11/70
Actual degree days: 1853
Actual kwh: 1,716, 930*
Actual cost: $20,447.78*
Avg. cost per kwh: 1.19 cents*
*For total electrical usage excluding non-electric water heating

Month	Degree Days	Demand	kwh	Amount
12/69	304	477	132,750	$ 1,563.34
1/70	579	441	130,500	1,583.07
2/70	309	400	86,850	1,088.43
3/70	252	400	97,050	1,305.48
4/70	51	400	104,760	1,362.82
5/70	12	474	135,600	1,657.71
6/70		463	138,120	1,666.71
7/70		551	170,520	1,985.62
8/70		582	208,080	2,283.97
9/70		601	203,040	2,268.57
10/70	72	562	176,820	2,042.22
11/70	274	477	132,840	1,639.84
TOTALS	1853		1,716,930	$20,447.78

12 FEATURES:
The selection of electric split-system air conditioning units with compressors mounted on the roof and fan/coil sections installed in the ceilings made additional floor space available for tenant use.

13 REASONS FOR INSTALLING ELECTRIC HEAT:
A feasibility study indicated that it would cost less to buy, install and maintain electric systems than equivalent systems using a flame fuel for heating, and would permit tenants to control the temperature in their own apartments.

14 PERSONNEL:
Owner: William J. Morgan
Architect: Bernard C. Brady
Consulting Engineer: S. F. Atlas
General Contractor: Globe Const. Co. and M. & G. Const. Co.
Electrical Contractor: Wheeler & Stacey Elec. Co.
Mechanical Contractor: Atlas Air Conditioning Co.
Utility: Houston Lighting & Power Company

15 PREPARED BY:
Jack M. Cobb, Manager Sales Promotion and Research, Houston Lighting & Power Company.

16 VERIFIED BY:
Bernard C. Brady

Bernard C. Brady, Architect

S. F. Atlas

S. F. Atlas, P.E.

NOTICE: This is one of a series of case histories of buildings in all structural categories. If you are an architect or consulting engineer; an architectural or engineering student; an educator; a government employee in the structural field; a builder or owner, you may receive the complete series free by filling out the strip coupon at the left and mailing it to EHA. If you are not in one of the above categories, you may receive the series at nominal cost.

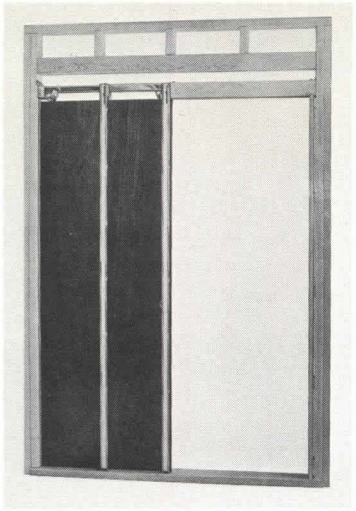
ELECTRIC HEATING ASSOCIATION, INC. 437 Madison Avenue, N.Y., N.Y. 10022

PRODUCT REVIEW

(continued from page 68)

POCKET DOOR SET

The 880 Pocket Door Set, by the National Manufacturing Co., is designed for one-man installation and for strength. No cutting of metal rail is required; a premarked wood header nailing strip is easily cut to desired door width. The set is adaptable to any wall construction and sturdy enough to support even a tile wall. One frame fits all door sizes. Each set contains all necessary hardware and



all components come in one package.

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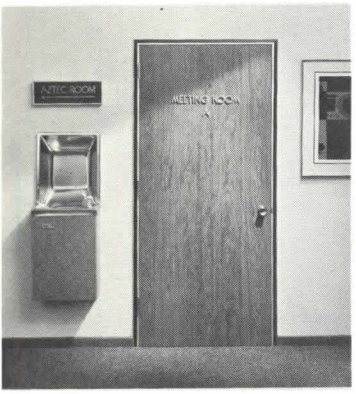


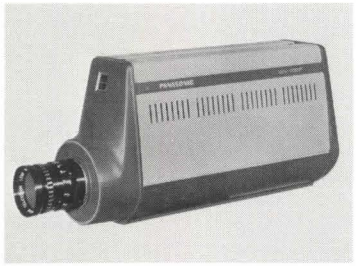
PREHUNG DOORS

Marlite Paneling is marketing an adjustable door frame and prehung door assembly that reduces installation time to 30 minutes, says the company. The new frames adjust to most wall thicknesses and are available in three architectural finishes: aluminum, bronze and black. The doors are especially designed for the frames and are available in five different core constructions.

On Readers Service Card, circle 109.

SURVEILLANCE CAMERAS

Panasonic has introduced a new line of video products that includes a surveillance camera that can take pictures in as little as 2 ft. candles of illumination. Model WV-200P is therefore ideal for night intensive care wards, warehouses and other low-illumination applications. It has an advanced FET circuit for unusually clear, sharp black and white pictures; a



tough, diecast frame; and a device to prevent ghosting.

On Readers Service Card, circle 110.

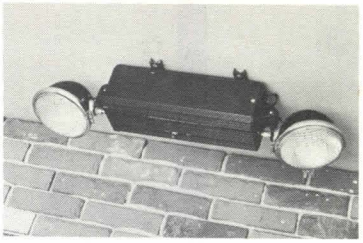
HOME SECURITY

Westinghouse Electric Corp. is marketing electronic home security systems that may easily be expanded for greater protection as the homeowner wishes. The heart of the system is a small, individual digital computer that receives and interprets information fed to it from various sensors in the home. If an intrusion is detected, the computer processes the information and an audio alarm is sounded. The system can be activated and deactivated with a key; the homeowner can also check the system with a test circuit.

On Readers Service Card, circle 111.

EMERGENCY LUMINAIRE

A theftproof and vandalproof incandescent emergency luminaire has been introduced by Holophane Co., Inc. Called Big Eye, the luminaire lights instantly if there is a power failure and does not require any maintenance for 8 years. The new fixture features sealed spacecraft-type batteries, which provide very long life, and self-contained mounting brackets that permit

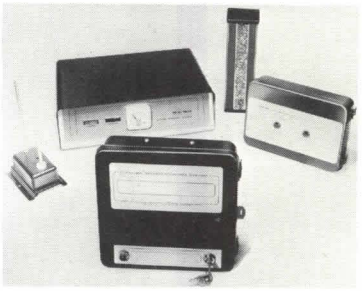


the unit to be mounted at any angle, including upside down, inside or outdoors.

On Readers Service Card, circle 112.

ELECTRONIC SECURITY

A new electronic master control for security purposes, from Detectron Security Systems, provides wide area coverage and concentrated protection. The low-cost, solid-state master panel controls numerous types of detection devices, including radar sensors, ultrasonic sensors and others. It also will activate any of the standard signaling devices, such as bells, sirens and automatic phone dialers. Called Series 110 Controls, the new systems use the latest integrated computer circuitry and, says the manufacturer, are competitively priced with far less sophisticated alarm controls.

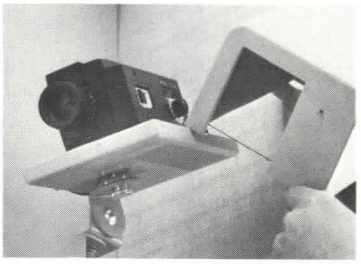


They are completely transistorized and incorporate such features as delay circuits, internal rechargeable standby power supply that keeps alarms active even if power fails, and special circuitry to protect against tampering.

On Readers Service Card, circle 113.

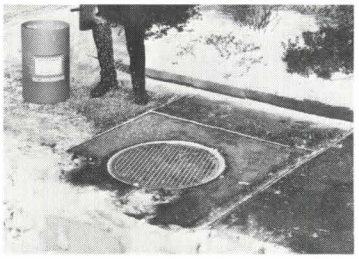
TIME-LAPSE CAMERA

The Kodak Analyst super 8 camera, which with accessories sells for about $240, has been introduced by Eastman Kodak Co. It can be preset to take pictures at rates from one frame every 1¼ sec. to one frame every 90 sec., making it particularly useful for security, research and time-and-motion studies. The camera debuts with a new film: Kodak MFX film in 100-ft. cartridges. This is a high-speed panchromatic super 8 film on a thin Estar-AH base, so that 100 ft. of film will fit in a standard-size super 8 cartridge.



The film can be processed either negative or positive. Kodak MFA film may also be used in the camera, which is equipped with a zoom lens, builtin electric eye controls, and an end-of-roll indicator light.

On Readers Service Card, circle 114.



ICE REMOVER

A new biodegradable (X-73) ice remover has been introduced by The Monroe Co., Inc. The compound, which generates its own heat to melt ice and snow, contains no harmful pollutants, is completely biodegradable, and is harmless to humans, animals and vegetation. It also leaves no residue to be tracked into buildings. Sprinkled on a slippery surface, the pellets start melting instantly and continue up to 24 hours. They are suitable for driveways, parking lots, stairs, sidewalks, sewers, pipes, railroad tracks, etc.

On Readers Service Card, circle 115.

(continued on page 76)

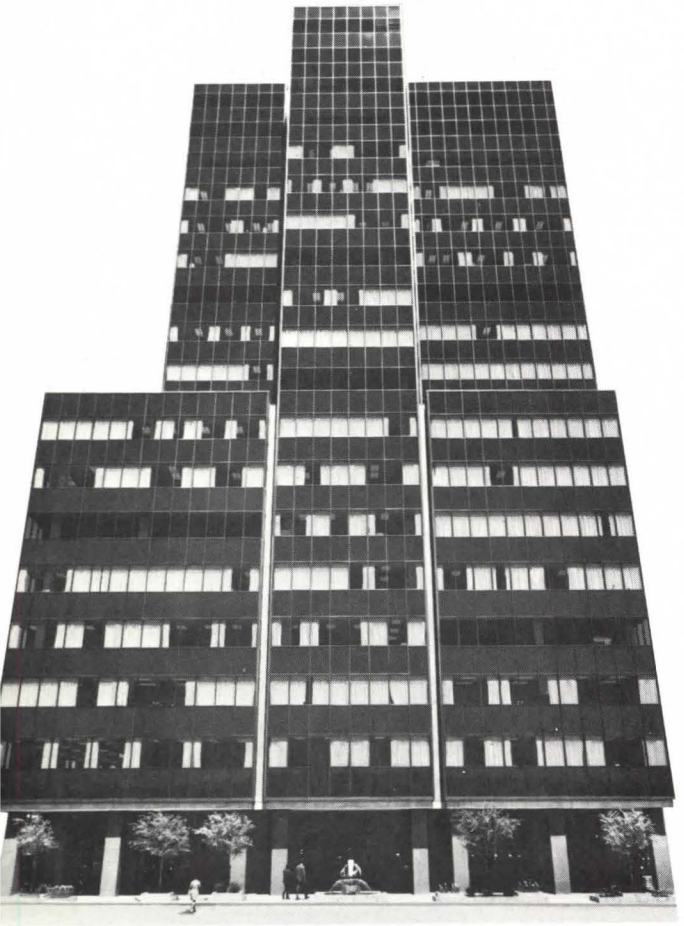
Carrier cools without be

The Towers in San Jose is 18 stories of new offices. Mostly glass outside. Cooled all over inside by Carrier's Dual Moduline® all-air system.

The only system with 3″ wide li diffusers that virtually hide in the ceiling. Straddle partitions to cool t offices at once. Independently.

Building Contractor & Mechanical Contractor; Builder-Owner: Pittsburgh-Des Moines Steel Company/Fred Sahadi, Joint Developers, Architect: Walker & Moody, Mechanical Engineer: Samuel A.

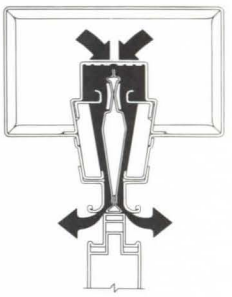
a glass tower
ng obvious.



They know when to add or cut
ack the cool. And they handle
he Towers' heavy load of up to 3
fm/sq. ft. With no strain.

The Dual Moduline plenums are
nterconnectable. Have all controls
uilt-in. So there are no wires or
hermostats to put in the walls.

This is a one-duct system, too. Saves space. Its unique efficiency even helped add a rentable floor to The Towers by using less mechanical equipment and shaft space.



The modular make-up of these dual-cooling units also cuts moving-in costs as much as 50 cents a square foot. Allows changing office interiors with few (if any) system changes. Ideally benefits both tenant and building owner.

See how the Dual Moduline System can work into your plans. Without being obvious. Just contact our nearest office. Or write us. Carrier Air Conditioning Company, Syracuse, N.Y. 13201.

Carrier®

We keep on inventing air conditioning.

Architecture's most respected prophet: R. Buckminster Fuller

Join his world in Forum's first issue on its 80th year.

Going on 80

The Architectural Forum is due for an anniversary. And you are invited to join a celebration that will be refreshingly free of the dreary formalities so often reserved for senior citizens' birthdays. This will be no time for smug congratulations, no time for prideful looking back at editorial exploits of the past.

No looking back. For eight decades the Forum's look has been forward. And on this anniversary, the Forum will view the skylines of present and future through the visionary trifocal lenses of R. Buckminster Fuller.

In a lifetime almost identical with the Forum's (Fuller is just 3 years younger) he has exercised an extraordinary genius for keeping two decades or so ahead of his time. The broad span of his visions and structures has inspired a multitude of youthful Americans. He is the man to celebrate with. And the Forum will salute Dr. Fuller in a major editorial celebration at the start of an anniversary calendar that hopefully will be the magazine's finest editorial effort.

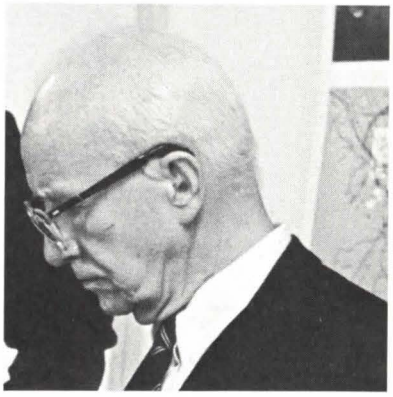
Special January/February Double Issue

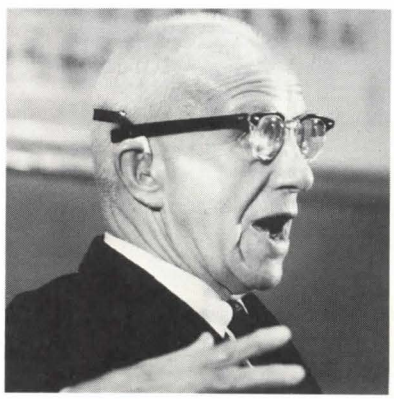
The Forum will open the year, 1972, with a full-issue report on the latest adventures of this architect-engineer-scientist-philosopher whose busy career carries him around the earth at the rate of 100,000 miles a year. An attempt to keep up to date with Fuller may seem to be the height of futility. But the Forum's writers and cameramen are rather fast travellers themselves. And they are keeping a close watch on his worldwide outlay of projects and plans:

He has covered the South Pole with an aluminum dome engineered and constructed by Temcor to house a U.S. weather station.

He has planned a mammoth geosphere for the Port of New York.

He has engineered the design for a floating city in collaboration with Charles Haar.





He has contracted to design three airports for India.

He has worked with students on a proposal for a half-mile-high tetrahedronal city for East St. Louis.

He has designed a religious center now under construction at Southern Illinois University.

He has watched the progress of his new auditorium, soon to be completed in Israel.

He has designed a tower two miles high.

Out of Fuller's wide world the Forum editors will produce an issue of high excitement and significance. Readers will keep it for reference and refreshment, for it will put them intimately in touch with one of the world's most fascinating minds.

An anniversary 12 months long

This turn-of-the-year publication will be the opening event for a celebration that will continue, issue after issue, all the way through 1972. The Forum's staff has everything it needs to keep the celebration going. Their antenna is out. The editors are in communication with the architectural offices and building sites throughout the nation and the world where important news is soon to break. And even at a time when economic tides are low, the field of architecture is alive with construction activity and fresh, influential ideas.

Memo to Advertisers:

Advertising forms for the January/February issue of The Architectural Forum, featuring the world of R. Buckminster Fuller will close on January 14.

The Architectural Forum

130 East 59 Street / New York City 10022
(212) 751-2626

PRODUCT REVIEW

(*continued from page 71*)

The following is a listing of the key products incorporated in some of the buildings featured in this issue:

U.S. STEEL BUILDING
ARCHITECTS: Harrison & Abramovitz and Abbe. (Materials & Manufacturers as submitted by the architects). FOUNDATION WATERPROOFING: Western Waterproofing. PILING: USS Interlocking Z Piling. WATERPROOFING: Monroe Waterproofing. CONCRETE & CEMENT: Duquesne Slag, USS Universal Atlas Cement. BRICK, BLOCK & STONE: Cost Brothers, Massaro Brothers, Pittsburgh Marble, Port Morris Tile & Terrazzo. STRUCTURAL STEEL: USS American Bridge. CURTAIN-WALL: USS Architectural Products. FLOOR & DECK SYSTEMS: Warren-Ehret Linck Co., H. H. Robertson. THERMAL INSULATION: Mirawall. ACOUSTICAL MATERIALS: U.S. Gypsum, Soundlock, Inc. GLASS: PPG. INTERIOR PARTITIONS: Virginia Metal Products. ELEVATORS: Westinghouse. DOORS: Overly Mfg. Co., Superior Fireproof Door. HARDWARE: Stanley, Sargent. TILE, PLASTIC: Sanitary Tile, Inc. PAINT: PPG, Mobay Chemical. ELECTRICAL DUCTS & WIRING: Ebner-Schmidt & Assoc. STANDBY EMERGENCY POWER: Caterpillar Diesel. LIGHTING FIXTURES, LAMPS: Duquesne Light, Sylvania. PLUMBING FIXTURES, TOILET SEATS: American Standard, Sauer, Inc. PIPING: USS Piping. BOILERS, UNIT HEATERS, VENTILATORS: Wolff - Munier - Nass. HEATING VALVES, PIPING, CONTROLS: Honeywell, Inc., Aerofin. AIR CONDITIONING: Carrier. INTERCOM SYSTEMS, AUDIO VISUAL EQUIP.: Gray Sound & Communications. PNEUMATIC TUBES, CONVEYORS: Olson Vertical Conveyor Co. SPRINKLER SYSTEM & FIRE PROTECTION: Automatic Sprinkler, Wilson-Snyder Pumps. WATER COOLERS: Halsey - Taylor. MAIL BOXES & CHUTES: Cutler Mail Chute. VENETIAN BLINDS & SHADES: Carey-McFall. KITCHEN, LAUNDRY, LABORATORY EQUIPMENT: Curran-Taylor, Inc. FINISH FLOORING & CARPETING: Lees. DRAPERY HARDWARE: A. Mamaux.

RIDGE HILL SCHOOL
ARCHITECTS: Harold Roth, *Edward* Saad. (Materials & Manufacturers as submitted by the architects). BRICK, BLOCK, & STONE: Belden-Stark, Plasticrete, McCormick-Longmeadow. FIBERGLASS FORMS: Toby Form Service, Inc. ROOF MATERIALS: Bird & Son. THERMAL INSULATION: Owens Corning. ACOUSTICAL MATERIALS: Gold Bond, Tectum. FENESTRATION & GLASS: PPG. DOORS: Atlantic Metal Products, PPG. HARDWARE: Sargent, Stanley, Brookline, Rixson, Precision. PAINT: Glidden. THEATRICAL LIGHTING & DIMMERS: Kliegl, Theatre Techniques. ELECTRICAL EQUIP.: Federal Pacific. EMERGENCY LIGHTING: Dual-Lite. LIGHTING FIXTURES, LAMPS: Guth, Silvray, Century, Omega, Moldcast, G.E. PLUMBING FIXTURES: American Standard, Sloan, Elkay. TOILET ACCESSORIES: Bobrick, Nibroc. ROOF TOP MULTIZONE UNITS: Nesbitt. DIFFUSERS: Anemostat, Titus. CLOCKS & INTERCOM SYSTEMS: Simplex, Bogen, Altec Lansing. RADIO & TV SYSTEMS: Jerrold. AUDIO VISUAL EQUIPMENT: Da-Lite, EFI. FIRE ALARM EQUIPMENT: Bliss-Gamewell. FIRE PROTECTION EQUIPMENT: Keane. CEILING MATERIALS: Gold Bond. WATER COOLERS: Halsey-Taylor. MOVABLE PARTITIONS: Coil - Wal. KITCHEN EQUIP.: Cockle, Koch, Hobart, G.E., Marget Forge. FINISH FLOORING & CARPETING: Summitville, Armstrong, Gullistan. FURNITURE & SEATING: Thonet, Monitor, Stendig, Buckstaff, Samsonite. FABRICS: UPHOLSTERY & DRAPERIES: Thortel, Naugahyde. DRAPERY HARDWARE: Kirsch. OUTDOOR PLAY EQUIPMENT: Neidermeyer-Martin. METAL LOCKERS: Penco. RUBBER FLOOR MATS: Pirelli. TOILET & SHOWER PARTITIONS: Flush Metal. SKYLIGHTS: Naturalite. GYMNASIUM EQUIP.: Nissen. STAGE CURTAINS: Baron.

BIRNEY ELEMENTARY SCHOOL
ARCHITECTS: Tarapata - MacMahon - Paulsen Corp. (Materials & Manufacturers as submitted by the architects). CONCRETE & CEMENT: S&H Construction Co. BRICK, BLOCK & STONE: Goshen Brick #1951. STRUCTURAL STEEL: Bethlehem Steel Corp. ROOF MATERIALS: Johns - Manville Corp., J. M. Asbestase, Expand-O-Flash, Revere Copper & Brass. ACOUSTICAL MATERIALS: U.S. Gypsum. FENESTRATION: Kawneer. GLASS: Misco-Mississippi Glass, L.O.F. INTERIOR PARTITIONS: General Partitions. DOORS: Pon-Craft. HARDWARE: Corbin. PANELING: Micarta-Westinghouse. PAINT: Glidden. LIGHTING FIXTURES, LAMPS: Smithcraft, Kurt Versen, Marco-Marvin Elec. Mfg. Co. PLUMBING FIXTURES: American Standard. HEATING BOILERS: American Standard. HEATING VALVES, PIPING, CONTROLS: Honeywell, Inc. AIR CONDITIONING COMPRESSOR, FAN UNIT, UNIT AIR CONDITIONERS: Trane Co. DIFFUSERS, SPECIAL FANS & VENTILATORS: Baley Blower Co. RADIO AND TV SYSTEMS: Industrial Communication Co. FIRE PROTECTION EQUIP.: National Time & Signal Corp. CEILING MATERIALS: U.S. Gypsum. WATER COOLERS: American Standard, Filtrine Mfg. Co. VENETIAN BLINDS & SHADES: Levolor Riviera - Levolor Lorentzen. KITCHEN, LAUNDRY, LABORATORY EQUIP.: Precision Metal *Products* Co. FINISH FLOORING & CARPETING: Kentile, American Olean Tile Co., Keystone Ridgeway Co. DRAPERY HARDWARE: Grant. LOCKERS: Lyon Metal Products. FOLDING IN WALL TABLES: Schreiber Mfg. Co. FOLDING PARTITIONS: Equipment Mfg. Co., Inc. SKYLIGHT GLAZING: Lexan by G.E. SKYLIGHTS: Fisher Skylights. FIRE EXTINGUISHER CABINETS: Seco Mfg. Co. GYM ACCESSORIES: Porter Athletic Equip. Co. CHALKBOARD & TACKBOARD: Peninsular Slate Co.

READERS SERVICE FILE

PRODUCT LITERATURE

To order material described, circle indicated number on self-addressed Reader Service Card, facing page 70.

AIR CONDITIONING
A self-contained air-conditioning unit for large spaces, such as classrooms, is well illustrated in a brochure from The American Air Filter Co. On Readers Service Card, circle 200.

BOOKS
"Contract Design." A programmatic guide to the planning, designing, and furnishing of commercial and institutional interiors. A comprehensive new book from Contract Books, Inc. On Readers Service Card, circle 201.

CONCRETE
Architects are offered design flexibility through the development of custom plastic forms by the Symons Manufacturing Co. These durable, high-impact liners are illustrated in a brochure. On Readers Service Card, circle 202.

A 16-page brochure describing the new Interform liner system for poured concrete is now available. Remarkable effects have been achieved with this system. On Readers Service Card, circle 203.

DOORS/WINDOWS
Industrial and cold-storage doors, manual and power-operated, with galvanized steel, aluminum or Kayon (TR) plastic skins, over urethane cores. Clark Door Co. On Readers Service Card, circle 204.

DRAWING DEVICES
Over 200 drawing devices are illustrated in a 44-page catalog, now available from the C-Thru Ruler Co. On Readers Service Card, circle 205.

106 new styles of preprinted lettering for photographic reproduction have been added to the Graphic Products Corp. A new catalog is available. On Readers Service Card, circle 206.

DRINKING FOUNTAINS
A 24-page catalog illustrates drinking fountains, plumbing fixtures trim; and includes drawings, special application data from the Halsey W. Taylor Co. On Readers Service Card, circle 207.

ELECTRICAL
A timesaving slide-rule guide to Nema electrical wiring device requirements is being made available at no charge by Bryant, a division of Westinghouse. On Readers Service Card, circle 208.

Many innovations which increase life expectancy in switches and wiring devices are shown in a new catalog from Slater Electric Co. On Readers Service Card, circle 209.

ELEVATORS
Series of six color brochures shows elevators for many different types of buildings. Cab designs, dimensions, freight elevator information are all part of the package. Dover Elevator Division. On Readers Service Card, circle 210.

FAUCETS
A colorful brochure from Delta Faucet shows a new line of washerless faucets. There is no metal-to-metal contact and no washers to wear out. It is claimed that this dripless faucet is completely trouble free. On Readers Service Card, circle 211.

FLOOR COVERINGS
"Antron 11 the 'no-show' carpet fiber fights dirt not profits." A three-color brochure to guide specifiers in selection of carpet. E. I. du Pont de Nemours Co. On Readers Service Card, circle 212.

Complete catalog file in true color reproduction is available for LATCO featuring specialty and popular mosaic tile such as: Venezico, Valencia, Granada, Candysticks, many others. Latco Products. On Readers Service Card, circle 213.

FURNISHINGS
1971 condensed catalog. Twenty-page catalog describes full line of advanced architectural hardware including specifications and function charts. Sargent & Co. On Readers Service Card, circle 214.

FURNITURE
Krueger Metal Products offers catalogs of chairs designed by G. C. Piretti. Full-color catalogs introduce a new modular dimension for wherever people come together. Krueger Metal Products. On Readers Service Card, circle 215.

An illustrated brochure detailing the J. G. Furniture line of commercial seating for 1971 is now available. On Readers Service Card, circle 216.

GLASS
Four colorful six-page brochures describe a glass-ceramic facing material for buildings now available from Corning. Physical properties, design data, and installation techniques are covered. On Readers Service Card, circle 217.

HEATING/COOLING
A complete line of heating, ventilating, and air-conditioning equipment is described in a 40-page booklet from Modine. Graphs and load charts are given to aid in the selection of appropriate equipment. On Readers Service Card, circle 218.

Carrier Airconditioning Company's Volumaster system for apartment buildings is described in a brochure. It is a variable volume fan-coil system with solid-state controls and a unique outlet assembly. On Readers Service Card, circle 219.

Ventilating and circulating fans with automatic shutters and variable speed devices are illustrated in a new brochure from Hunter Div. Robbins and Myers, Inc. On Readers Service Card, circle 220.

HOSPITAL EQUIPMENT
Completely furnished hospital rooms, a total package, are now offered for the first time, by Bigelow. A colorful brochure illustrates the many suites which are available. On Readers Service Card, circle 221.

METAL IN BUILDING
A 24-page booklet from Republic Steel describes pre-engineered components for steel buildings. It is possible to construct many types of buildings with these components. On Readers Service Card, circle 222.

A new 32-page brochure from Elwin G. Smith Company, shows finishes and cross sections of standard metal wall systems, along with load factor tables. On Readers Service Card, circle 223.

OFFICE EQUIPMENT
A colorful brochure is available from the Plan Hold Corporation which shows the semi-automatic features of the new Designer II Drawing Table. On Readers Service Card, circle 224.

ROOFING
Brochures explaining installation of metal roofing are available from the Overly Manufacturing Co. On Readers Service Card, circle 225.

The Gacoflex Liquid and Sheet Elastomeric Roofing System is explained in a set of brochures available from the Gates Manufacturing Co. On Readers Service Card, circle 226.

Leak-free decking is claimed by the Tremco Systems Co. A descriptive booklet showing many applications of this system is available. On Readers Service Card, circle 227.

A complete guide to fiberglas builtup roofing systems, is offered by Owens/Corning. Design factors and flashing requirements are discussed, together with material specifications. On Readers Service Card, circle 228.

SECURITY
Decorative security grilles for shopping centers, etc., are colorfully illustrated in a new brochure from Dynaflair Corporation. Automatic operation is optional. On Readers Service Card, circle 229.

Automatic fire doors for all openings are shown in a comprehensive brochure from Kinnear Corporation. On Readers Service Card, circle 230.

SNOW-MELTING SYSTEMS
A factual brochure, which describes the design and installation of snow-melting systems, is available from the Revere Co. On Readers Service Card, circle 231.

WALLS/LAMINATES
Spec information on all panels. Includes Marlite Plank and block, Korelock and firetest panels. Marlite Div., Masonite Corp. On Readers Service Card, circle 232.

A four-page brochure lists performance of 15 typical sound-barrier systems using Thermafiber. Included with description of dry wall and plaster assemblies are fire rating tests, and relative cost index. Four systems are illustrated. FHA standards for partition forms are listed. U.S. Gypsum Co. On Readers Service Card, circle 233.

WATER COOLERS
More than 46 different models are shown in the 1972 catalog of Water Coolers, now available from Oasis, manufacturers of water coolers. On Readers Service Card, circle 234.

WINDOWS
A 36-page catalog is available from Marvin Windows. Wood windows in all shapes and sizes are generously illustrated. Installation details are shown. On Readers Service Card, circle 235.

WOOD IN BUILDING
A four-color, 12-page booklet shows how the "outdoor room" can be added to an existing house. Suggestions and 16 plans come with this new booklet. On Readers Service Card, circle 236.

MISCELLANEOUS
A brochure on a new Econoline of Vertical Style Mailboxes, designed especially for apartment buildings, is now available from Auth Electric Co. On Readers Service Card, circle 237.

Pneumatic Communications Tubes and Information Transfer devices are described in an eight-page brochure from Transitube Systems. On Readers Service Card, circle 238.

ADVERTISING INDEX

ADVERTISING SALES STAFF

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Vice-President/Marketing
BEN P. MARCHETTO,
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Chicago, Illinois 60611
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Chagrin Falls, Ohio 44022
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404-261-6002

The Dawson Co.
5995 S.W. 71st St.
Miami, Fla. 33143
305-666-4684

EDITORIAL INDEX

JANUARY/FEBRUARY THROUGH DECEMBER, 1971 VOLUMES 134 AND 135

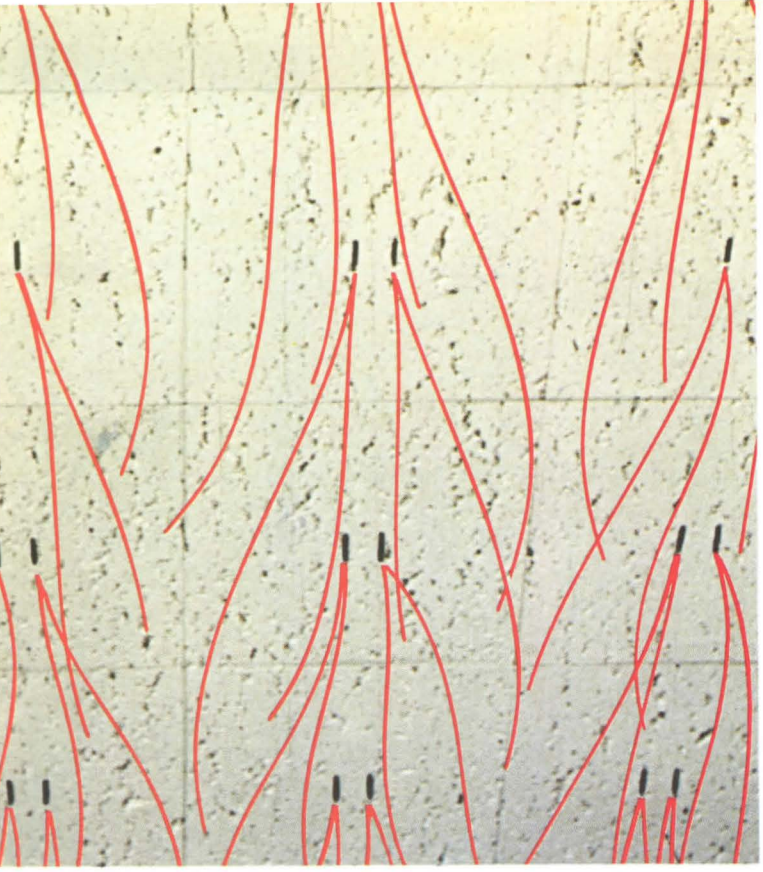
ARCHITECTS, DESIGNERS, PLANNERS

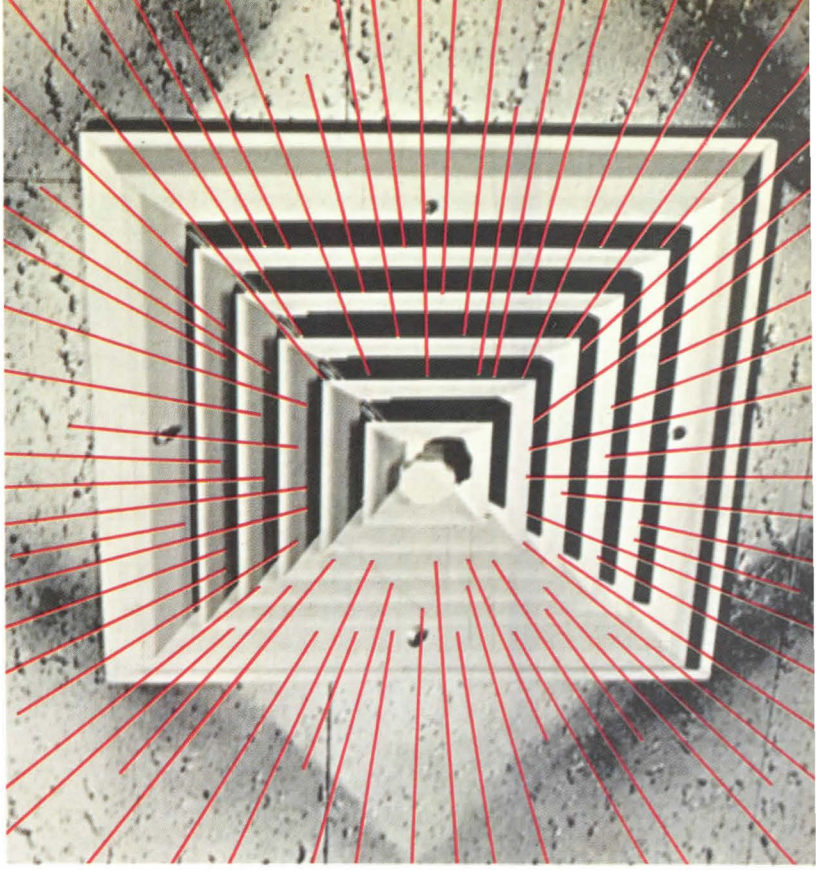
EDITORIAL INDEX JAN./FEB. THROUGH DEC. 1971

BOOKS

COMMERCIAL

EDITORIAL INDEX JAN./FEB. THROUGH DEC. 1971





AIRSON* Air Distribution System.

It doesn't blast air-it "whispers!"

AIRSON gently distributes warmed or cooled air through many small openings throughout the ceiling. Unlike a system with a few high volume diffusers, AIRSON *breathes* air into a room evenly, quietly, without drafts. The atmosphere is ideal at every level.

AIRSON Air Distribution System permits pinpoint climate control because the supply from each ceiling tile is adjustable from underneath. Air movement into the room can be perfectly balanced and adjusted when desired to individual comfort. The ceiling *is* the diffuser.

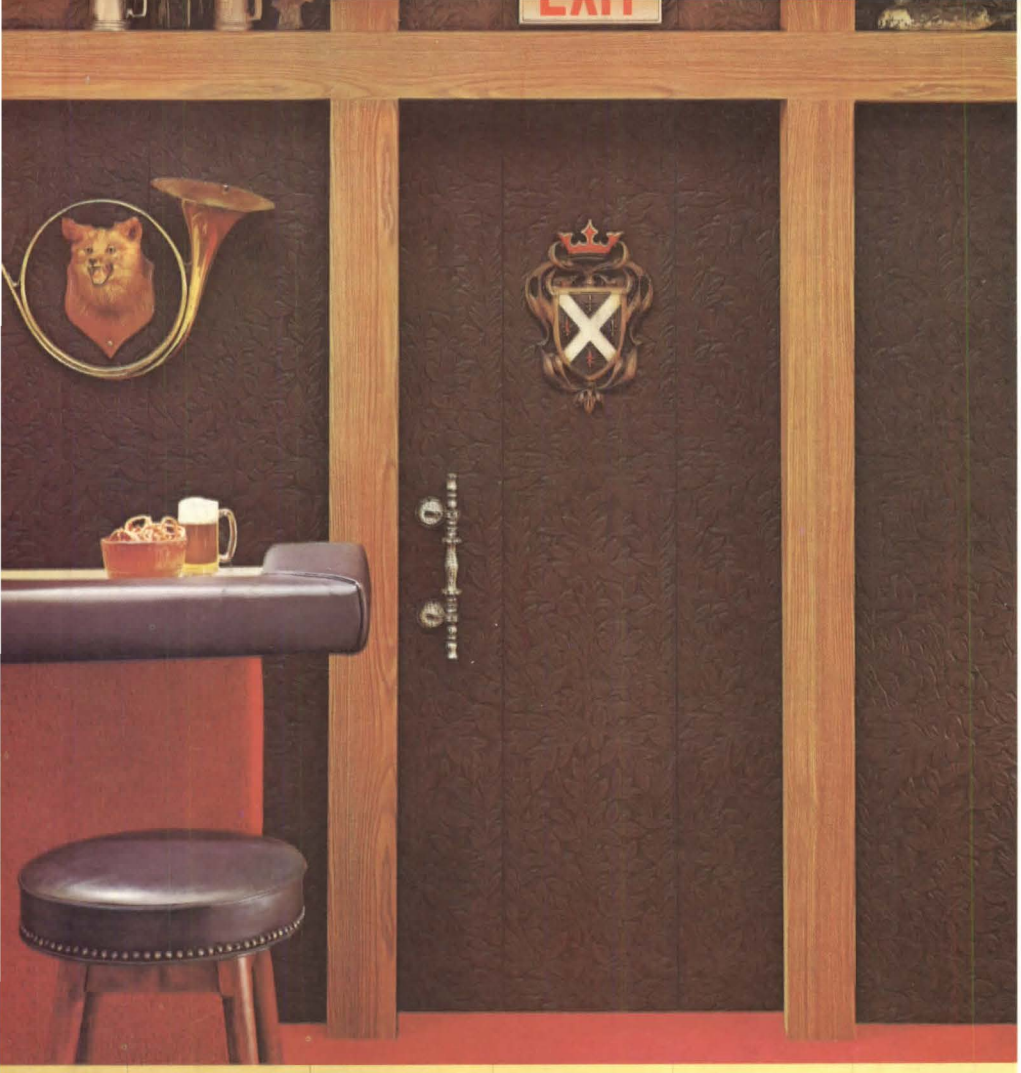
Patented AIRSON systems are available in two positive control supply systems: A-2 tiles with two center-spaced jet slots which provide deeper penetration of air. A-5 tiles with five jets to supply larger volumes of air.

See your U.S.G. Architect Service Man. Or write to us for case histories of AIRSON system installations, large and small. 101 S. Wacker Dr., Chicago, Ill., 60606, **Dept. AF-121**

*Reg. U.S. Pat. Off.

UNITED STATES GYPSUM
BUILDING AMERICA

On Readers Service Card, Circle 316



Marlite makes a door.

Now there's a door to match the care-free beauty of the Marlite interior. The Marlite door.

Because it's made with Marlite, you know it will stand up to all the rough treatment an interior door has to take. And the only maintenance required is an occasional once-over with a damp cloth.

What are your choices? Five varieties of hollow and solid cores. More than 40 beautiful textures, colors and designs. Made to your specifications in all standard sizes.

As for installation, Marlite doors are available pre-hung with the new 30-minute start-to-finish aluminum adjustable frame. Adjust quickly to fit almost any wall thickness.

For complete information and color literature, write Marlite Division of Masonite Corporation, Dept. 1207, Dover, Ohio 44622.

MASONITE CORPORATION

Marlite®
prefinished doors

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On Readers Service Card, Circle 317