

ARCHITECTURAL FORUM / JULY-AUGUST 1971



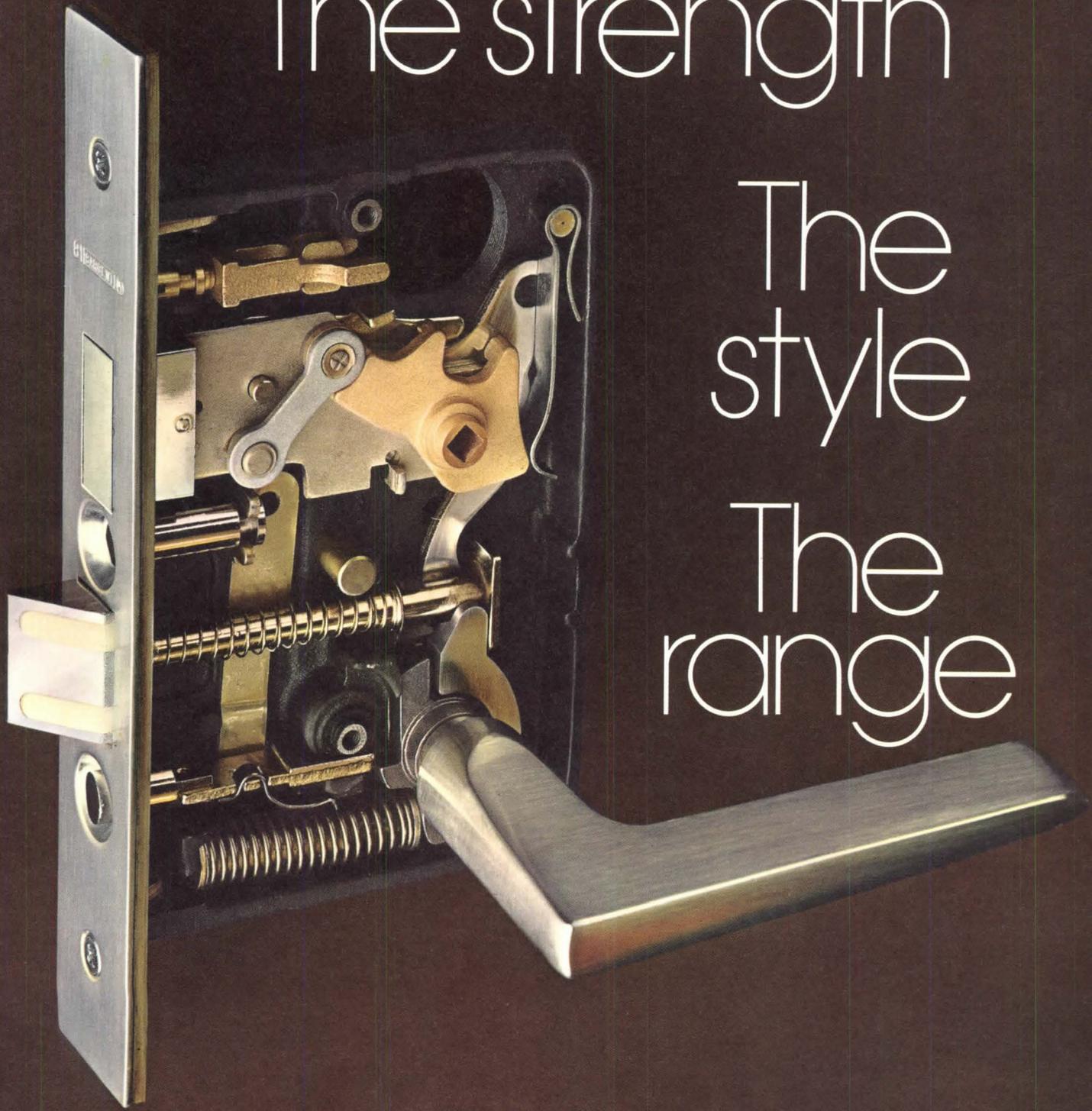
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Cover: a photograph of Ontario Place (p. 30) by P. Wakayam

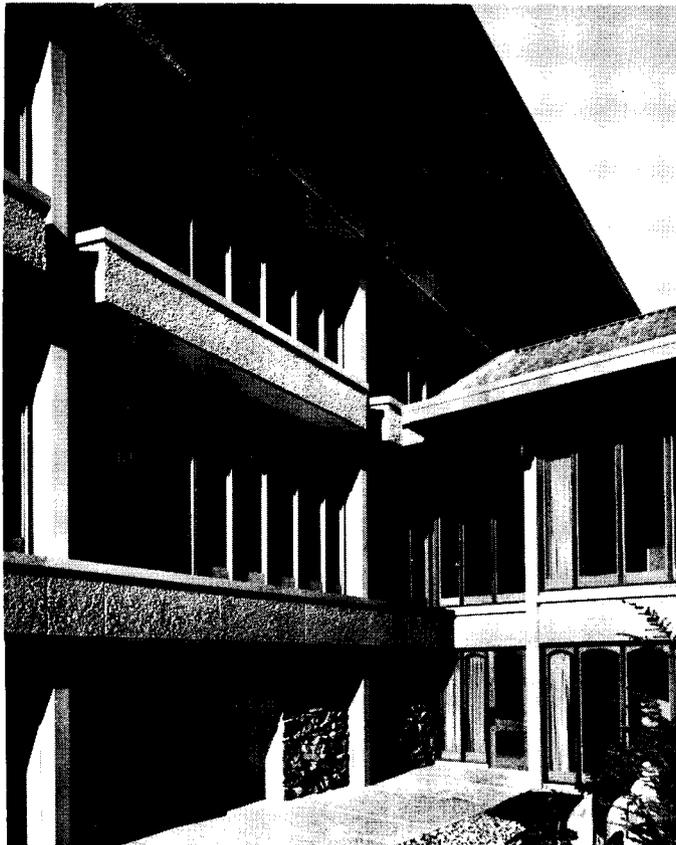
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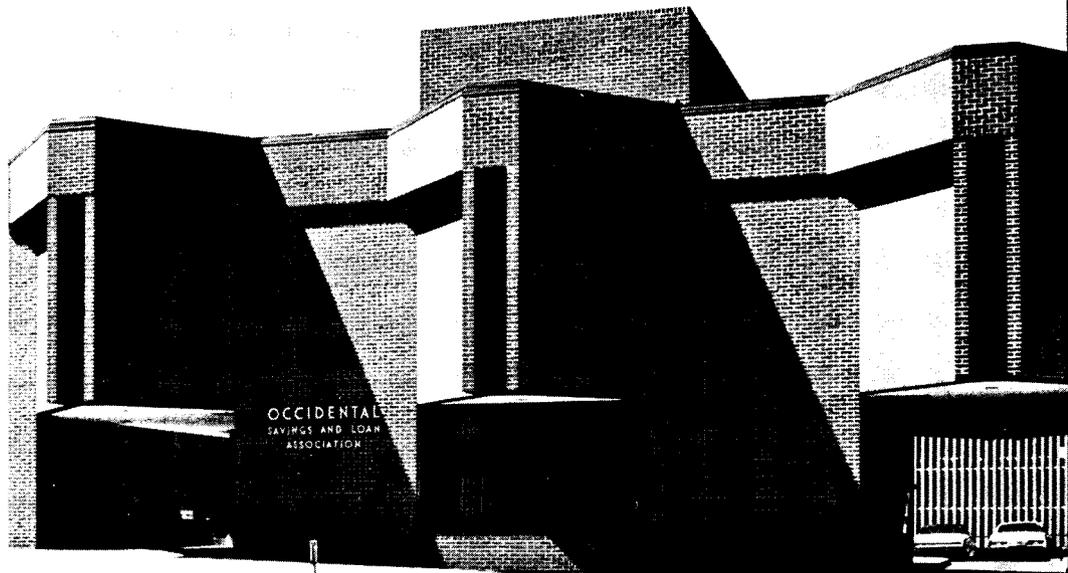


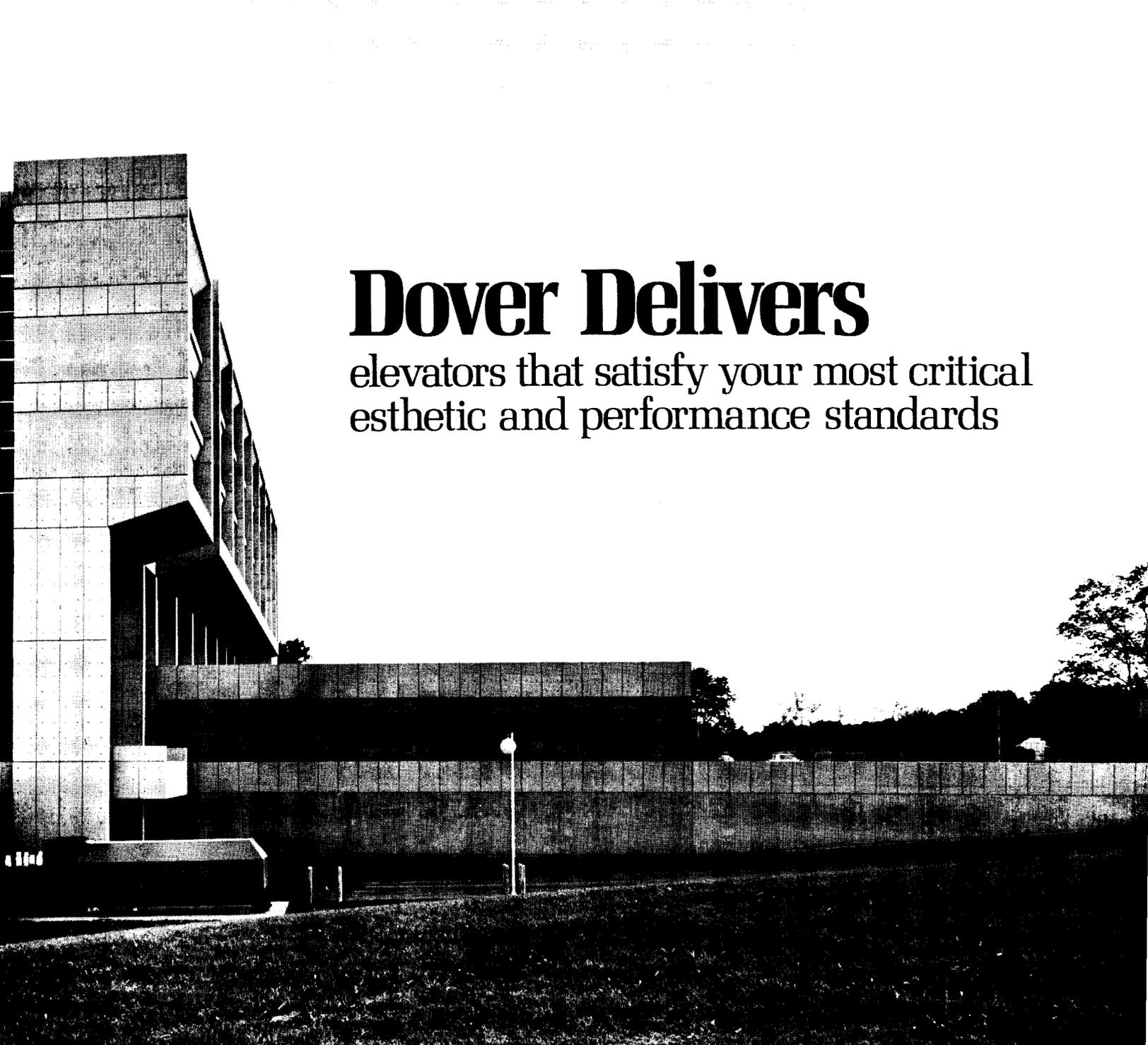
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 Meyers Construction Co., Inc., Cincinnati. Dover traction elevators
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Above: NORTHWEST BUILDING, Bellevue, Washington. ARCHITECTS: Jack Woodman and Associates, Bellevue. GENERAL CONTRACTOR: Swanson-Dean Corporation, Bellevue. Dover Oildraulic Elevator with speed of 200 f.p.m. installed by Sound Elevator Company, Seattle.

Right: OCCIDENTAL SAVINGS & LOAN ASSOCIATION, Omaha, Neb. ARCHITECTS: Leo A. Daly Co. GENERAL CONTRACTOR: Lueder Construction Company, Omaha. Dover pre-engineered Oildraulic Elevator installed by O'Keefe Elevator Company, Inc., Omaha.





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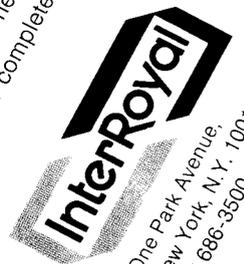
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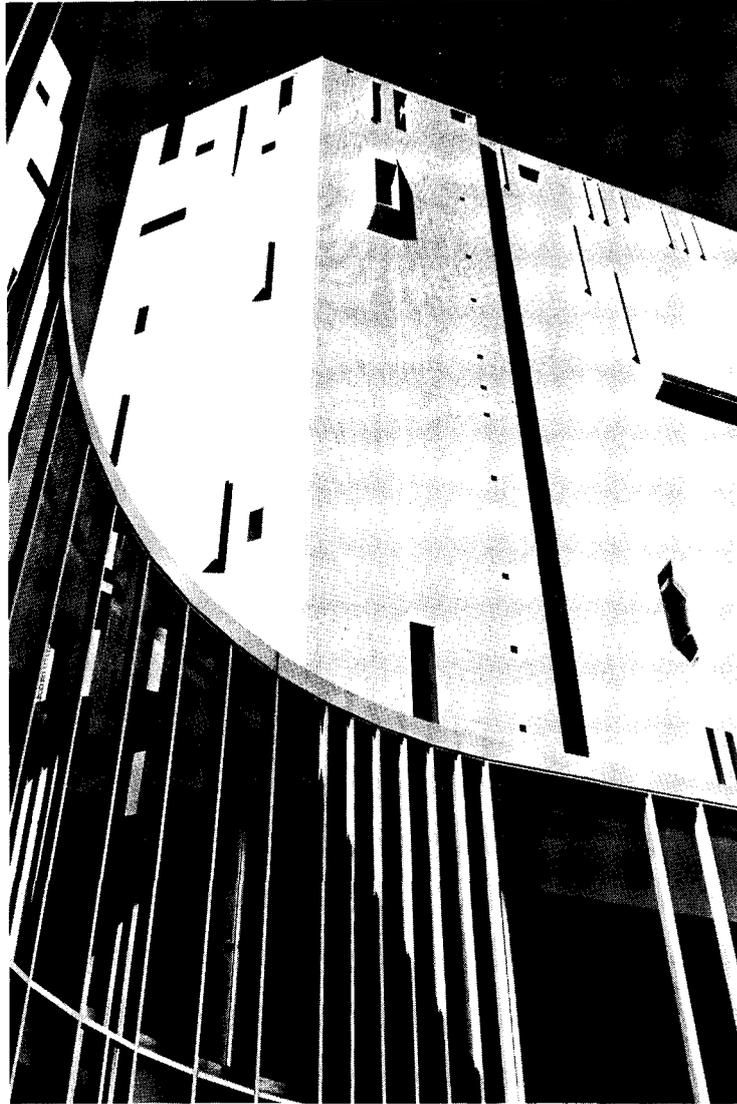
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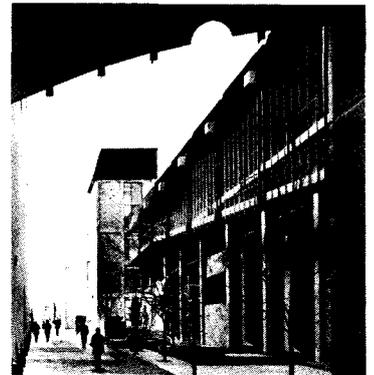
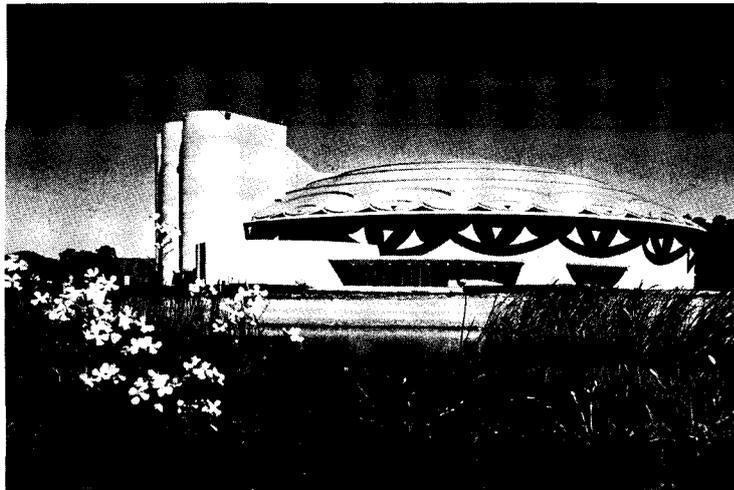
Two six-story cubes, joined like a squared figure 8, comprise one of the largest museums in the West: the new Denver Art Museum. The \$6-million building boasts eleven 10,000-sq.-ft. galleries, two to each floor, except the main, mezzanine and sixth floors. The main floor has a lobby, dining facilities and gallery area with a moveable grid ceiling. The mezzanine has a double-height gallery for such artifacts as 28-ft. totem poles. The sixth floor is a terrace on one side, surrounded by a pierced wall with views of the city and the Rockies. A second terrace sits atop the enclosed gallery portion. Where the cubes join is the main entrance, lobbies and utility core. Designed by Denver's John S. Sudler and Italy's Gio Ponti, the museum has a sparkling glass chip facade.



PARASOL FOR THE ARTS

Its distinctly scalloped roof dominates the \$2.5-million Veteran's Memorial Auditorium, the latest addition to the 140-acre Marin County Civic Center. Part of the original complex designed by Frank Lloyd Wright, the auditorium was designed by William

Wesley Peters of the Taliesin Associated Architects of the Frank Lloyd Wright Foundation. The structure has a 2,000-person seating capacity, with 850 seats stationary and the rest designed to rise from beneath a level floor area otherwise used for conventions and banquets.



ALLEY RENAISSANCE

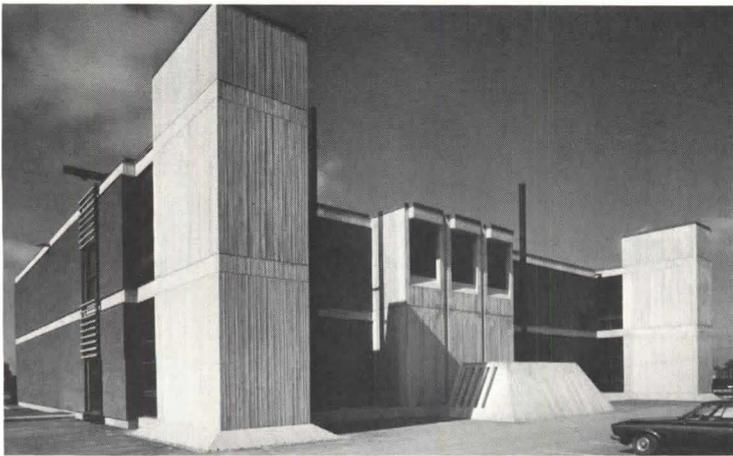
This pedestrian mall was an alley between a parking lot and commercial blockfront before it was widened and landscaped as part of the new downtown plan for East Lansing, Mich. The parking lot has been replaced by a four-level garage (left) connected by bridges to a new department store; both structures are designed by Begrow & Brown Architects, Inc. The mall designers: Johnson, Johnson & Roy.



PRESCRIPTION FILLED

Exterior circular utility shafts corrugate the facade of the new teaching and research center at Washington University School of Medicine in St. Louis. Designed by Murphy, Downey, Wofford & Richmond (formerly Murphy & Mackey), the building is nine

stories high and a full block long, with labs for either teaching or research, classrooms and offices. The labs are mechanically flexible for present and future demands. Three floors of the building are largely open and may be adapted to developing disciplines and research.



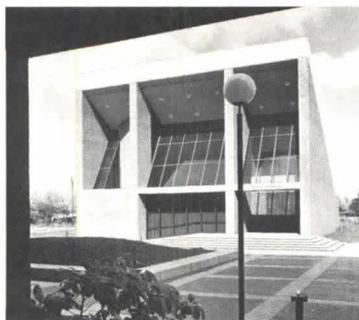
MANIPULATION OF FORM

The Bell Canada switching building, by Shore & Moffat & Partners, is basically a large rectangular two-story block. But the building's scale and impact are more subtle than the plan would suggest. The service elements of the building, including stairwells,

stacks and mechanical shafts, have been variously massed to reduce scale; floor lines are expressed to further cut scale and also to provide for the future integration of vertical expansion. The structure is made of concrete and has warm-toned cast brick walls.

CITY CHAMBERS

One of four buildings in the \$4-million Civic Center complex of Fairfield, Calif., the City Council Chamber will be used for public meetings and has a seating capacity for 108 people. The entire center is sited on 33 acres dominated by a man-made lake, with the buildings grouped around it. A design competition for the center was won by Robert Wayne Hawley & Associates.



FINANCIAL SWINGER

A thoroughly modern structure is the Mark Twain Northland Bank, in St. Louis. Pictured is the "Terminator," a sound environment for the entryway. Composed of solid-state electronic components, exposed through glass, Terminator reacts to the movement of passers-by with sounds that vary in pitch, timbre, attack and decay. The rythmical pattern depends on the number and speed of people. The designers: Scott-Thompson Architects, Inc.



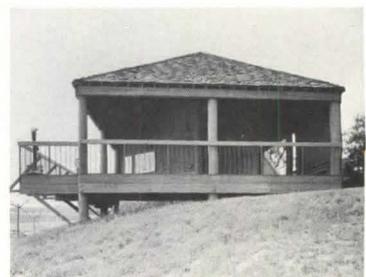
STEPPING OUT

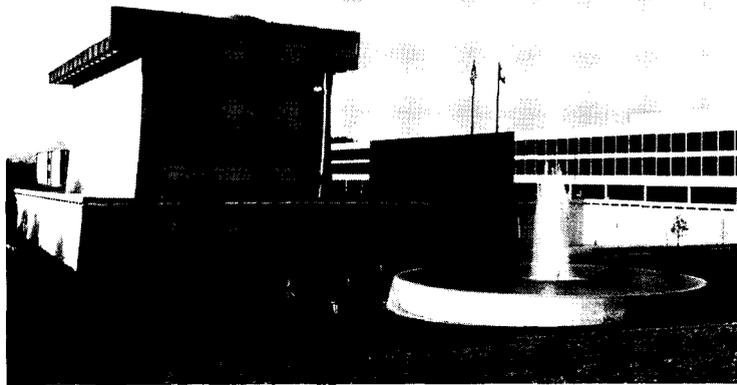
Based on the theory that a university library should orient its readers, while providing various spatial experiences, the Central Library of Toronto's York University is essentially L-shaped in

plan, with a stepped infill corner that corresponds to a sunken plaza nearby and encloses a covered courtyard. The design consortium: Gordon S. Adamson & Associates; Parkin; and Shore & Moffat & Partners.

VISITORS WELCOMED

The Overlook is designed as a visitor and educational center for the \$300-million Calvert Cliffs Nuclear Power Plant below it, which is now under construction by the Baltimore Gas & Electric Company on the Chesapeake Bay. Opened in the summer of 1969, the Overlook was designed by Kamstra, Abrash, Dickerson & Associates. It was one of four buildings awarded an honor citation by the AIA Mid-Atlantic Regional Conference, whose judges called it "a beautiful building—exciting, yet not contrived—enchanting." The exhibits inside the building include background on the BG&E Co., fossils exhumed from the plant site and antique farm equipment formerly used on this location.





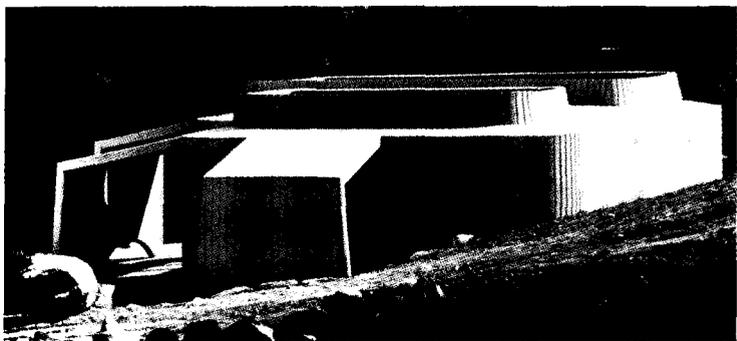
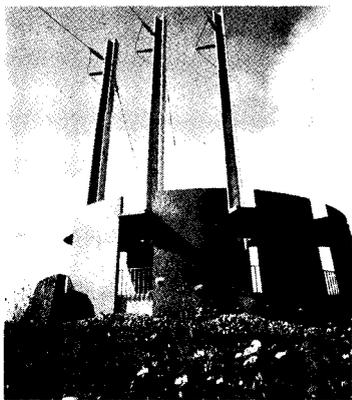
HONORARIUM

The new Lyndon Baines Johnson Library was designed "to express through monumentality the importance of its historical treasures." Two great parallel walls, 200 ft. long, 65 ft. high and 90

ft. apart define the main mass of the library building, which sits on a podium. The architects were Skidmore, Owings & Merrill, and Brooks, Barr, Graeber & White. SOM's Gordon Bunshaft was partner in charge.

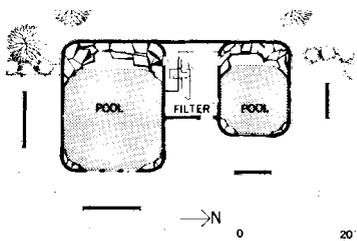
MINUS TO PLUS

What was clearly an environmental eyesore has been replaced by an award-winning structure that combines a formerly objectionable transmission facility with a vista house for local park development. The structure continues the spiral of the access road with a ramp that winds past view portals to an upper deck. Owned by the Bonneville Power Administration, the facility was designed by Stanton, Boles, Maquire & Church.



FOR OTTERS ONLY

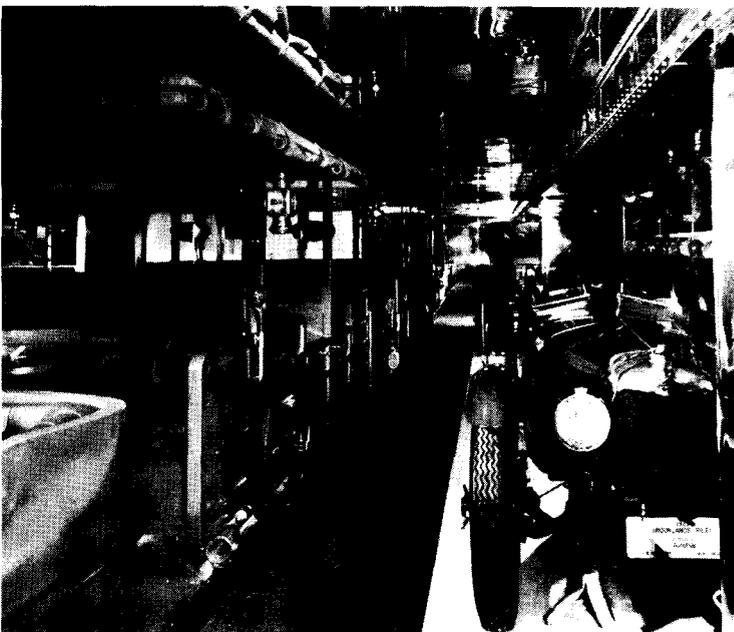
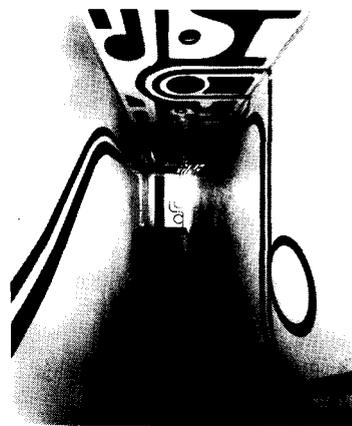
Designing a series of pools for a public park display of sea otters is not as simple as it sounds. The otters are an endangered species who must be protected—and that includes safety from vandals. Architect Alan Liddle's solution was to enclose the pools with concrete, pierced by glazed and baffled portholes for viewers. The water is open to the sky, but a screen overhead protects the animals from people trying to throw foreign objects into the pools.



PHOTOGRAPHS: Page 5 (lower left) Dandeleit Photographs (lower right) Daniel Bartush. Page 6 (top left) Herb Weitman (middle left) Roger Jowett (top right) Roger Pettus. Page 7 (lower left) Art Hupy (top and middle right) Louis Reens.

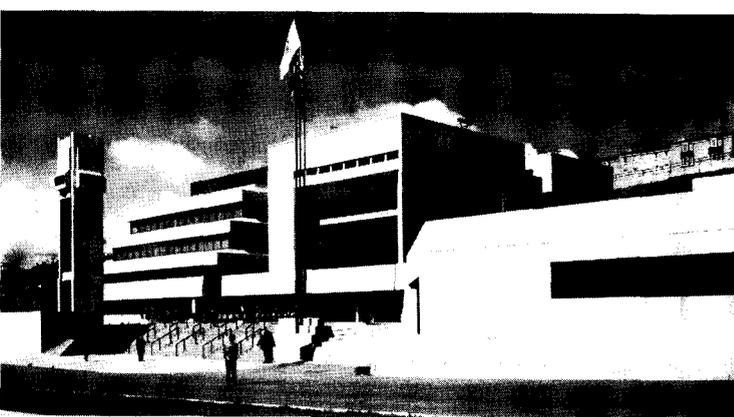
UNREAL

Eating booths of old car replicas, a "drive-in" movie theater interpretation of tables for two, a dimly lit Lovers Lane of simulated back car seats, endless boutiques, noise and people make the Auto Pub scene. Located underneath the General Motors Building, the Auto Pub is the second New York venture of M. Slavik (who designed the French Le Drugstore) and C. K. Chang of the firm of Paul K. Y. Chen. They started with a Manhattan Le Drugstore. Next?



CIVIC HEADQUARTERS

St. Johns (Newfoundland) new City Hall, overlooking the city and harbor, is an integral part of a plan that includes stores, theater, hotel, bus terminal and apartment units. Designed by John B. Parkin Associates, City Hall is concrete, striated vertically. The windows are bronzetinted and, inside, the building uses wood, wool and bright colors to contrast the concrete.



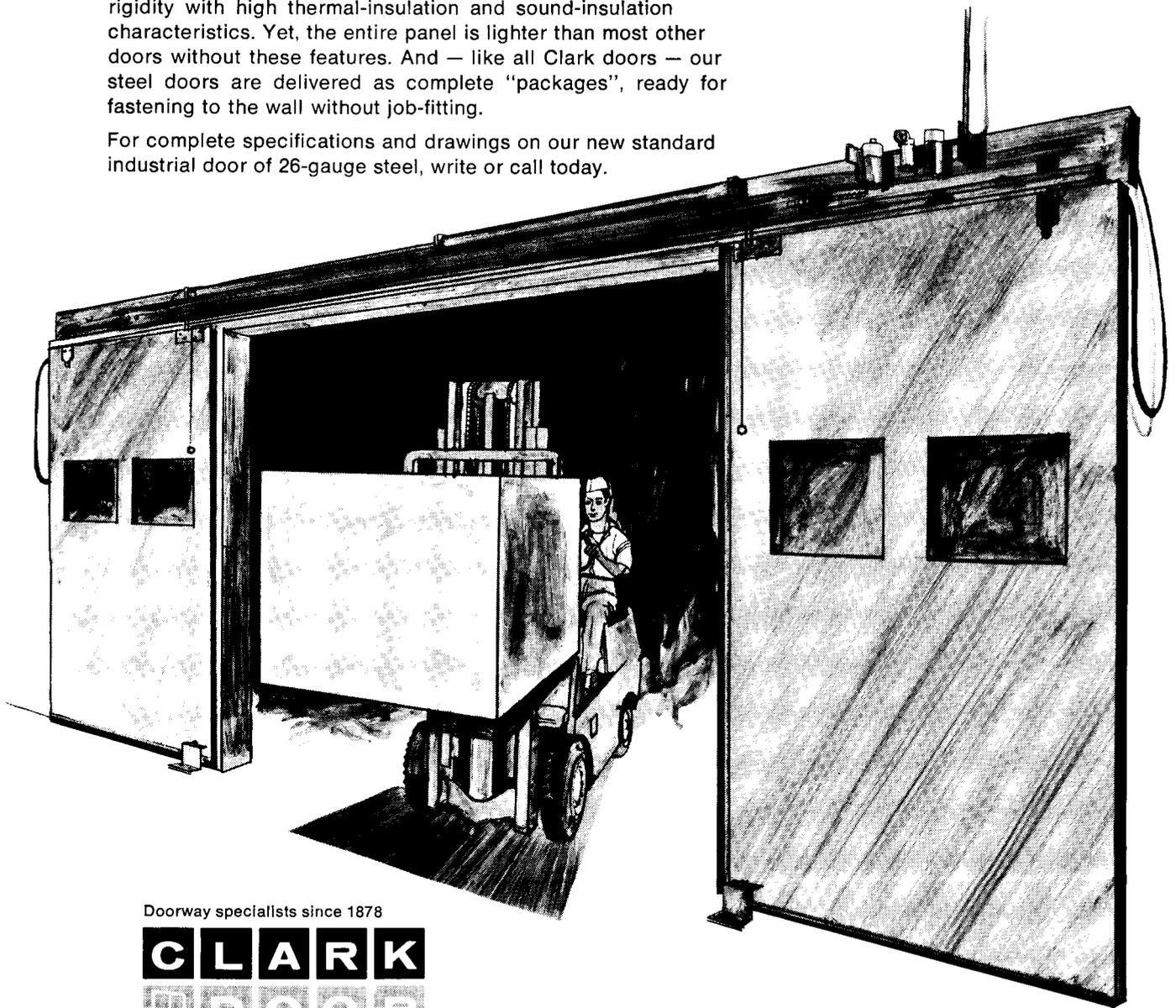
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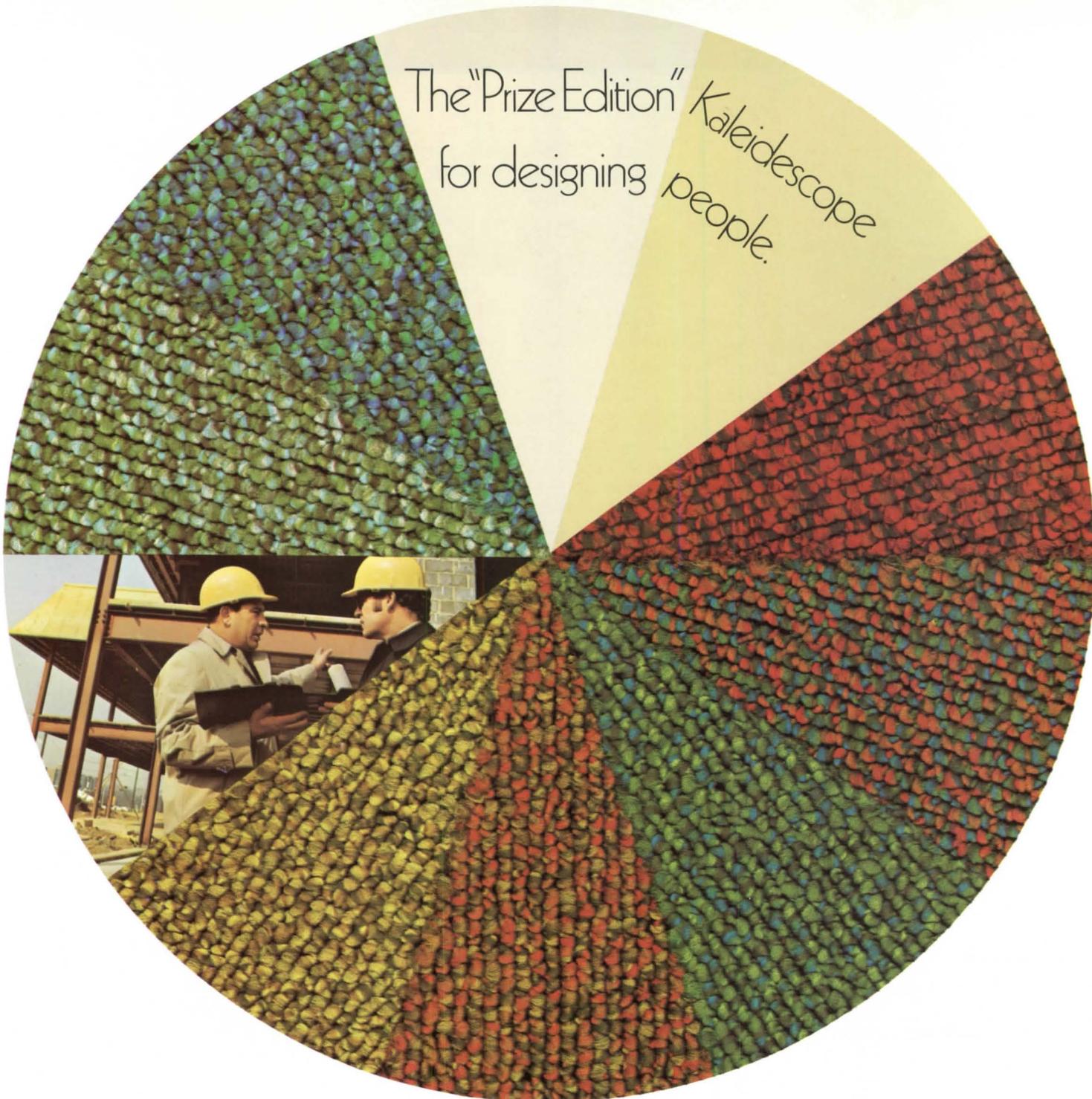
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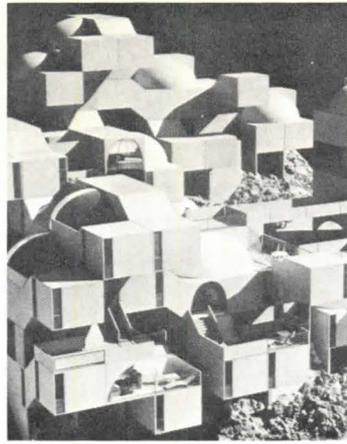
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most impracticable dreams of the creative temperament come true.

So, on behalf of second-year students here in London who had been sweating through the intricacies of getting service-runs in and out of habitable boxes in only edge-to-edge contact, I put a question to Safdie at a public lecture: how had he coped with the problem? "Well, it's true that the pipes always seemed to come through at points where we had critical structural conditions . . . but we had a very good engineer to take care of all those things! *O Tempora*, I thought, *O Komedant*, among the self-stifled groans of the aforementioned students, who had been firmly told to deal with "all those things," themselves.

Safdie's new book may appear to be an account of the designing of Habitat, and its derivatives from San Francisco State College to Jerusalem, but what it is really about (I suspect) is architectural education in general, and in North America in particular. Safdie emerges pretty well from this depressing morass; his *chutzpah* and opportunism have been rewarded with the luck and opportunities they deserve. His own text, combined with the memoirs (unpublishable!) of survivors of the mid-Sixties Montreal scene, record an exemplary mixture of timely acquiescences in the realities of power and reassertions of personal integrity.

Of course, you learn all that stuff at the maternal knee, not at architecture school—and the picture that emerges of what he learned at McGill is not encouraging. One anecdote, from page 53, will have to stand for the

whole: "But then Jane Drew came from England to visit the school . . . and went round looking at the sixth-year projects. She stopped by my desk and said 'That's fantastic! There's nothing I can tell you; you know what you're doing. I wish you the best of luck.'"

Now Safdie recounts this as the first real understanding that was shown of his ideas, but what kind of understanding was it? Jane Drew of all people could have told him a bundle about residential design that he patently hadn't learned, and practically a third of the book is a record of how he found out that he didn't know much of what he was doing. The whole thing is a shaming record for all of us in the teaching profession, because Habitat and associated mega-structures were, above all, a product of the schools (quite as much as of the architectural magazines) and one could see dozens of thesis projects of this type in schools around the world in the middle-sixties. Indeed there are disappointed and prematurely graying architectural assistants in up-country Argentina, downtown Stuttgart, and other wild scenes, who are firmly convinced that their thesis designs were either plagiarised by Safdie, or were panned because they appeared to have been cribbed from Habitat.

Now it seems, in retrospect, that the reason for this global unanimity was the equally global and unanimous inability of architectural pedagogues to think in any but the most simplistic black/white terms, so that if they identified an evil in the environment they simply reversed its polarity, designed the opposite, and supposed all would be well. This mode of thought (Unsympathetic Magic, perhaps?) clearly rubbed off on Safdie; the lengthy table of "environmental requirements" (pp 158-163) that he drew up when designing Habitat is peppered with "criteria" that were simply the negative of what was supposed to be going on all around.

Again, one instance must stand for many: the last criterion reads "New construction in an existing city must achieve physical and social continuity with existing construction." What does he mean "must"? What (if anything) is "social continuity"? Then you look at

the adjoining "Comment" column and read "Most urban renewal and public housing developments of the past twenty years have ignored this criterion." In other words, it being received opinion that urban renewal and public housing had gone wrong, architects must do the opposite of whatever urban renewal and public housing had been doing, and unsympathetic magic would put all right.

In spite of Safdie's standard sneers at the Establishment, his achievement was to realise the fantasies of the middle-aged Establishment in education and journalism. And as to the nature of those fantasies, it is difficult to do better than the dust jacket and quote from the very pages of the *Architectural Forum* itself: "There is one thing stronger than all the armies in the world (said *Forum* in May 1967, mangling Victor Hugo) and that is an idea whose time has come . . . the idea of Habitat seems to have come." (Eh?)

That, learned Sirs, was a load of sentimental old architectural codswallop. The time when the idea of Habitat came had been forty-five years before, when Le Corbusier designed his multiple-stacked *Immeuble-Villas* project, and avoided most of the "many shortcomings" *Forum* recognised in Habitat. And how, if Corb had avoided these shortcomings, was Safdie unable to profit from Corb's wisdom? Well, it looks like "education" again—according to Safdie, his Professor of History had told the students that "The work of Le Corbusier is totally irrational."

No, the idea whose time had come in 1967 was that of the radical alternative, the refusal to accept the categories of established architectural culture, even when re-styled in mod boxes. As the pages of the *Architectural Forum* record, the advocacy planners were already abroad in Harlem, the Venturis were adrift in Las Vegas, and the new communards were beginning to drop cities into the deserts of the West. And the fact that Drop City and Habitat share the same patron Saint—Bucky Fuller—is an alarming measure of the shackles with which a conventional architectural education can lumber the talents of a natural stirrer and mover like Safdie.

BEYOND HABITAT. By Moshe Safdie. Published by M.I.T. Press, Cambridge, Mass. 244 pp. 6¼" x 9". Illustrated. \$10.00.

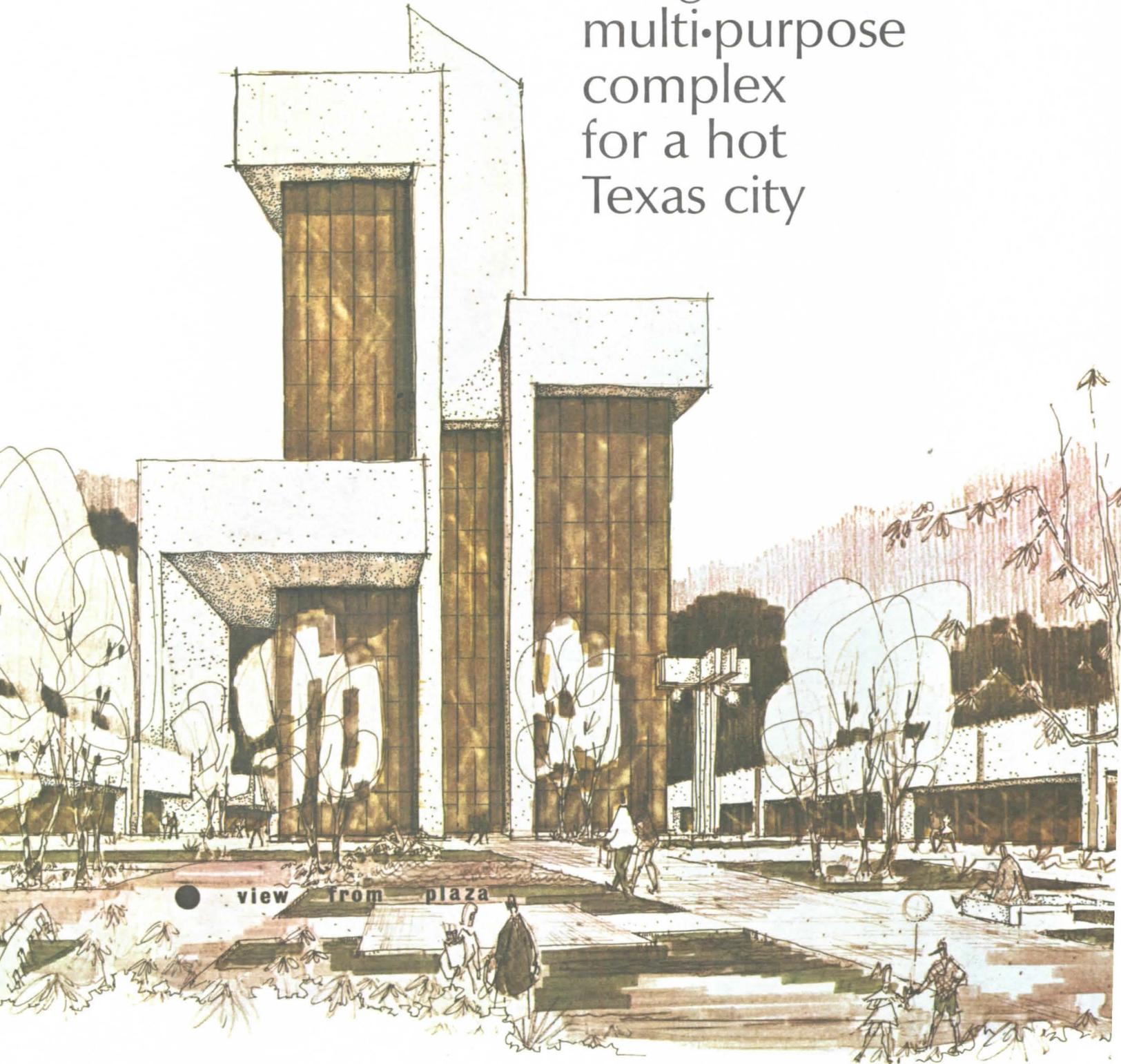
REVIEWED BY REYNER BANHAM

If Paul Rudolph's Art and Architecture Building at Yale is a "curriculum poured *in situ*," then Moshe Safdie's Habitat at Expo 67 in Montreal was, with equally concrete certainty, the "final year thesis that got built." It has all the marks: arrogance and innocence, much missing of the obvious in pursuit of the recondite, the datedness that comes from being right up to the minute, and the unshakable belief that Technology (i.e., some lowly gnome with middle-aged expertise) can make the

Dr. Banham is a professor of History of Architecture at the School of Environmental Studies at University College in London.

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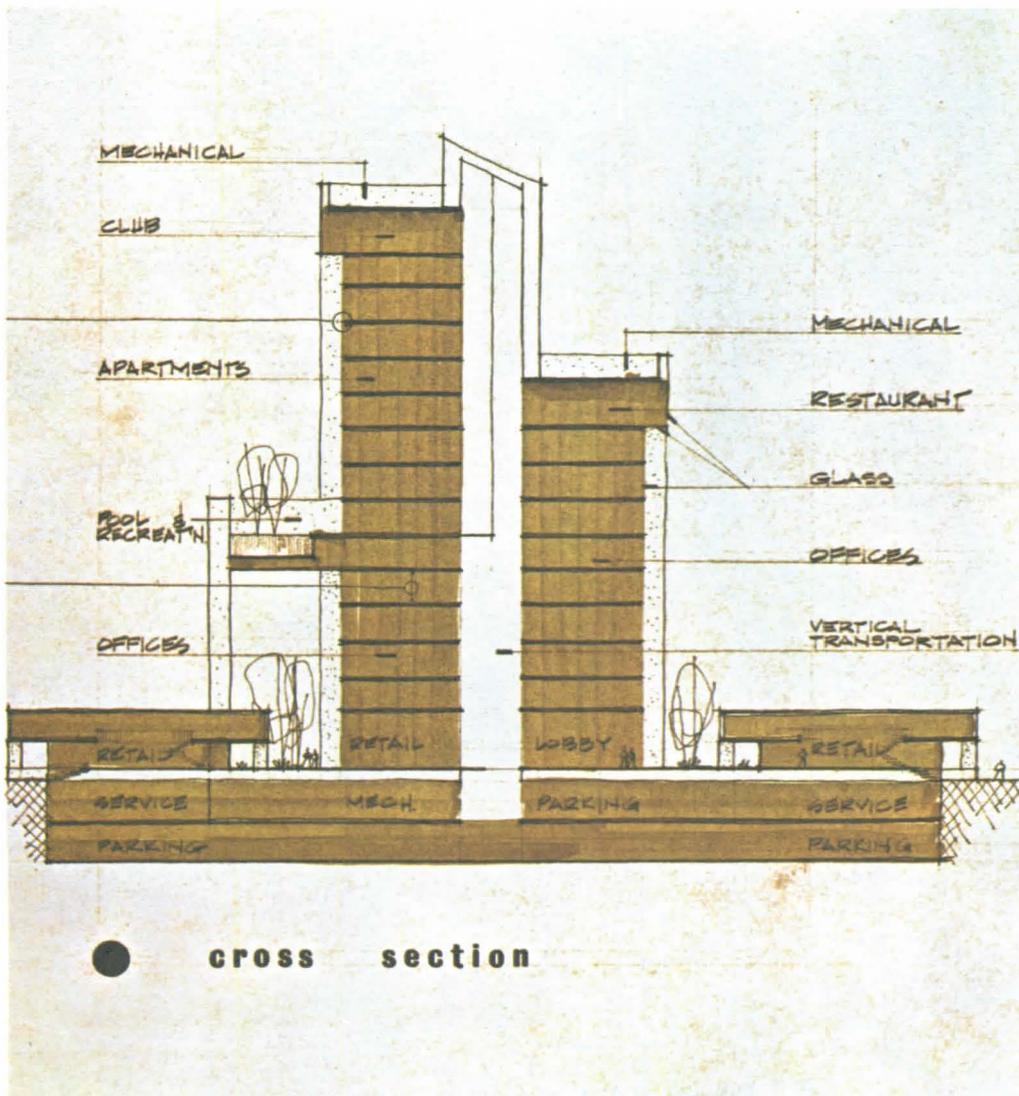
view from plaza

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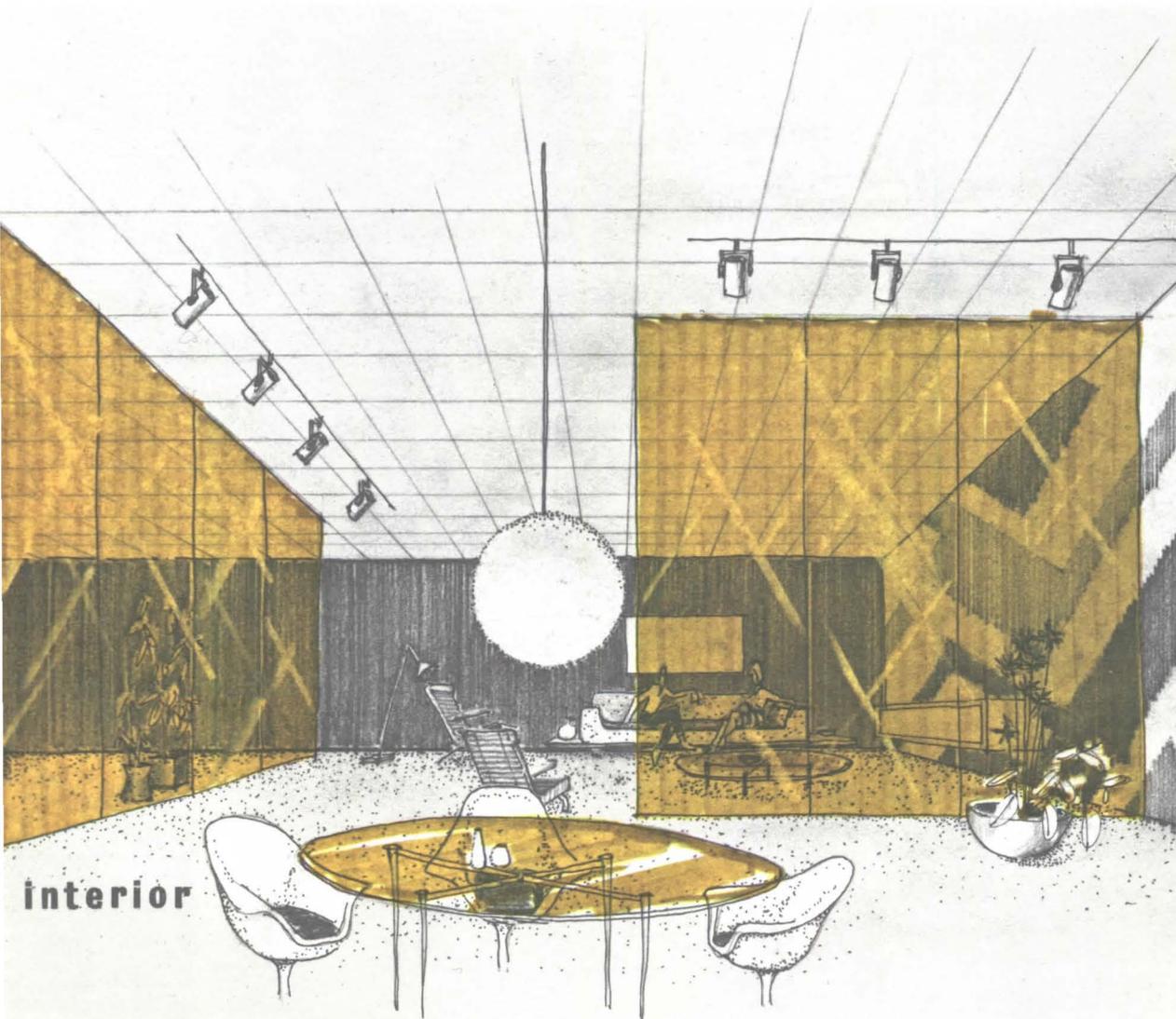
Large overhangs will protect the clear glass used in the display areas of the retail mall.



All parking will be below ground with high speed elevators to serve the office and apartment tower from a central service and mechanical core. Escalators can be utilized to distribute pedestrian traffic to the retail stores and plazas where sculpture, fountains, trees and shrubs grace the area.

George H. Loving of the architectural firm of Tittle, Luther, Loving & Lee, Abilene, Texas, also envisions use of glass screens in apartment and office interiors to share the light and add to the feeling of spaciousness. These to be L-O-F ½" tempered glass mounted top and bottom in neoprene lock strip gaskets so the glass partitions can be removed and replaced with ease. Privacy can be obtained by the use of draperies or lower artificial light intensity.

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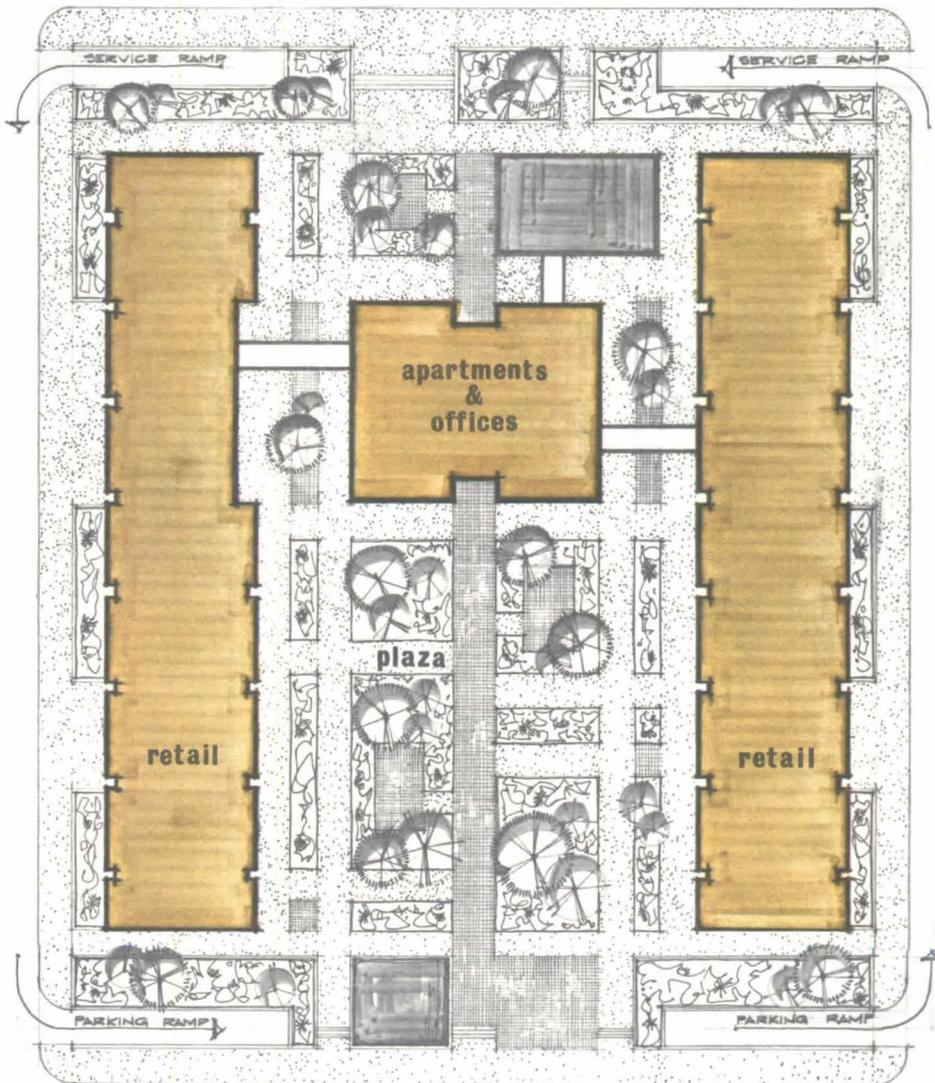
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is going to require two things available today only in very embryonic form:

1. Massive Federal subsidies—without them, the economics of housing are impossible for either public or private enterprise; and,
2. Adoption by the housing industry, on a large scale, of effective systems building and factory production of housing such as is common in every other relatively advanced civilization that is, in fact, doing a housing job for its people.

Government must be effective even then in many other areas. It must break the zoning log jam through which the suburbs try to insist that lower income people, regardless of race or color, must live in ghettos. It must do something effective about the rapid rise of construction costs, for the economics of housing—public and private—go from bad to impossible as increases in construction costs outstrip advances in the general price levels by better than 2:1. The public sector must do something about taxation policies which, in effect, put a 40 per cent sales tax on rentals, penalizing an owner in the form of higher taxes if he improves or even maintains his property, and rewarding him if he lets it slide.

Most importantly, all concerned with housing must recognize that the national problem of housing cannot be solved as if it were an isolated problem. Unless we simultaneously make progress in the fields of education, of equal opportunity in employment that is in fact equal, of transportation, of municipal finance, of complete restructuring of our welfare system, of providing improved medical care, and particularly of stamping out of drug traffic, no approach to housing—public, private, or partnership between the two—can possibly be effective.

We need, in short, a total approach to all our urban problems if we are to be effective in solving any of them. When we get such an approach—and efforts to this effect are starting in Hartford and perhaps elsewhere—I am convinced that we will accomplish the most socially and economically if private enterprise is permitted to be the doer and to carry the ball, with the full powers of all levels of Government being devoted to the multiple and essen-

tial down-field blocking tasks to clear the path to the goal line. In the meantime, I would like to suggest that Mr. Harrington call James W. Rouse of the Rouse Company and arrange to spend a day at Columbia. It might be risky for him, because it might shake his conviction that private enterprise inherently cannot operate in the public interest.

BRUCE P. HAYDEN
West Hartford, Conn.

MICHAEL HARRINGTON REPLIES:

Mr. Hayden says that we need a "total approach" in which the government will, among other things: provide "massive subsidies"; correlate tax policies with social purposes; restructure the welfare system; break the zoning stranglehold; reorganize the transportation system; and much more. He chooses to call this a free enterprise strategy as contrasted to my leftist and socialist proposals. From Adam Smith to Milton Friedman the spirits of *laissez faire* would, I suspect, be appalled at this defense.

But something more than a quarrel over words is involved. Mr. Hayden's metaphor reveals the basic difference between us as much more than semantic. He wants the government that carries out all of these varied, and integrated, functions to be designated as a football lineman carrying out down-field blocking assignments. The private sector is to be the backfield star and, presumably, the quarterback.

I disagree. First of all I think Adam Smith and Wilbur Mills are right to argue that the risker of money should make the decisions about how it is spent. If Washington is, as Mr. Hayden proposes, going to play a major role in making it possible for the private sector to act—including putting up large sums—then it is not going to be a humble lineman, nor should it be.

Second, I don't think private business has the democratic competence to make decisions determining the very social design of the society. The democratic process is the proper instrument for such determinations.

Thirdly, I believe the current record indicates, on balance, that the private sector has not demonstrated the technical ability to make the right social decisions. Columbia is better than

most of the new towns in terms of its class composition but, as I showed at some length in *Toward a Democratic Left*, most of the profit-making attempts to build communities have exacerbated, rather than solved, our problems.

I don't believe this has happened because businessmen are, as individuals, anti-social plutocrats or anything like that. I believe that when the calculus of private profit is applied to the basic decisions in building a city or town—and the private sector must employ this calculus in order to survive—some of the most important considerations of social gain and loss are inevitably ignored. A society can decide to "waste" money on public spaces, children, the aging, the poor, the minorities because it can figure a long run social profit on such investments. An entrepreneur or a corporation cannot.

I propose, in short, that the public sector has the economic, ethical, political and social responsibility to be the quarterback. I am happy to have the private sector doing some of the hard work of the linemen and am willing to pay a moderate, but not speculative, profit to that end. The public sector will, to be sure, make errors and Pruitt-Igoe is certainly one of them. One of the reasons for the failure of public housing is the inadequate vision of the planners (there are Edsels in government, too). Another factor, not unrelated to this exchange, is that land use policies in this country so favored white, middle- and upper-middle class home builders and operated on private priorities that public housing was in part forced to resort to those segregated, high-rise enclaves. We can do better. The private sector has done far worse.

CONSTRUCTION COST SNOB APPEAL

Forum: As a designer, I was quite pleased with the April 1971 issue because, among other things, it showed a building by Lou Kahn. However, as an architect, the issue upset me enough to feel compelled to comment.

With the influx of such as the pre-engineered manufacturers, design-builders, and the conglomerates who are in the

continued on page 18

WHO CARRIES THE BALL?

Forum: Michael Harrington's article on "Housing and the Public Sector" (May issue) properly admits the author's strong leftist and socialistic orientation; it is equally important that I concede that my political and economic bias is in the other direction.

Having established this, my comments on Mr. Harrington's arguments start with the fact that he chooses to ignore completely the outstanding success of Columbia which is accomplishing—brilliantly, we think—through the means of private enterprise, exactly what he proposes. It seems a bit odd that he points to Reston whose problems are well known but conveniently overlooks its near neighbor, Columbia, which has accomplished so much.

Even more importantly, our national record of public housing has been a dismal one. Here in the Hartford area, the public housing project which was the pride of the area and even of the national administration when it was opened in the late 30s is today the heart of the worst of our slum, drug, and crime problems. Our experience is certainly not unique—it can be seen in the Pruitt-Igoe Project in St. Louis and in many others coast to coast. In fact, I know of very few of any political persuasion who don't recognize that "public housing is not the answer."

My studies of housing, both here and abroad, lead me to the strong conclusion that our problems will not be solved without a very strong and effective combining of both public and private enterprise. I think the evidence is unmistakable that proper housing in America



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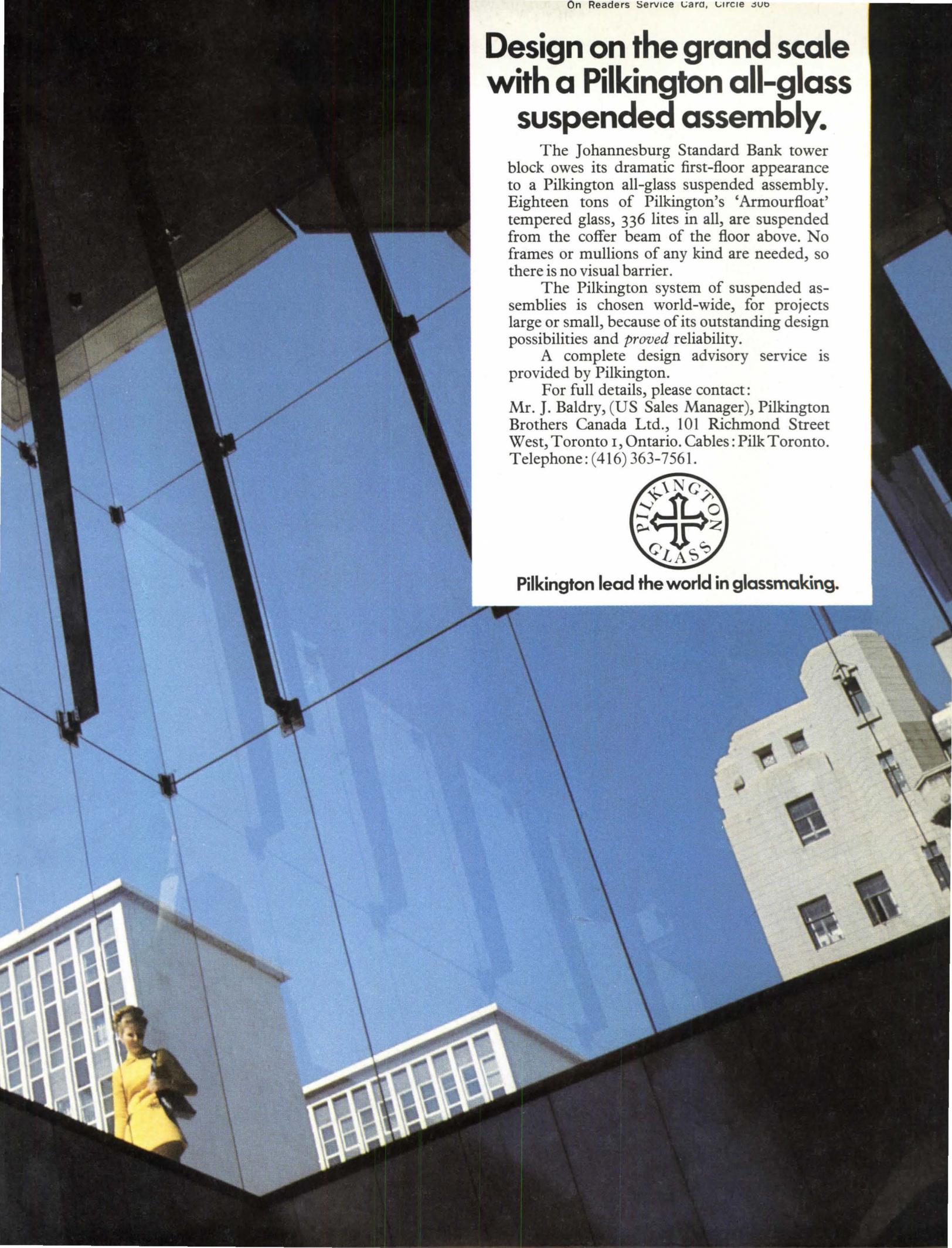
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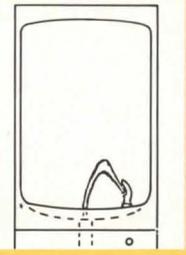
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LETTERS

continued from page 15

building systems business, it is crucial for architects to finally get the message. The client wants an **ECONOMICAL** building, built at the kind of rapid pace that only a single-responsibility organization can produce. They want confirmed prices early in the game (what were working drawings?).

The article on Lou Kahn's Olivetti plant says in the back, "Cost: not available." Here's a building with many innovative ideas, such as exposed ductwork treated as architecture and a very thoroughly worked out concrete structural system. Tremendous ideas for a company considering its own plant building program. How can any company, in business for a profit, relate its needs to such ideas as the Olivetti plant when approximate costs are "not available"?

The glass factory in Germany seems to be a very nice building that cost \$20.55 per square foot. Yet, the *Means Building Construction Cost Data—1971* lists the median total project cost for manufacturing buildings at \$12.50 per square foot. Maybe buildings cost more in Europe than in the U.S.A.

Further on in the April '71 issue: Of course, a college campus must have a good looking boiler house (I've designed two). The power plant for the University of Minnesota has lovely recessed cantilevered corners, which don't come free and which don't make the equipment work any better. Costs, again, not published.

One more crit before proposed solution: The private school shown is, in my opinion, an excellent piece of architectural design, but as the \$39.50 per square foot cost indicates . . . quite expensive. It's nice that they could afford single loaded corridors, so much cubage in the library, a waffle slab for the group instructional room under it and all that perimeter wall. However, this building would not pass the New Jersey Code without considerable revisions if it were a public school, and it's strictly conjecture whether or not it would have gone through a public bond is-

sue referendum with its cost.

Solutions. First, I think would be appropriate for Forum to also publish the economical buildings with costs broken down into prime trades. To implement set maximum per square costs on projects that you would publish in certain issues. Maybe even set up a competition among low-cost buildings (another magazine has an annual design awards competition). Perhaps ask each subscriber to send a set of prints of his best looking low-cost job regardless of building type. Publish the work of community design centers, especially in the inner cities. They need to spread their gospel, can't afford to. Cut down publishing mansions (with students' quarters). Interview prefab people to find out why they so often bypass the architect when they sell to a prospective client. Finally, include quoted statement by the client on each published project that he has a chance to say why he, the person served, likes the building. Or what he would have done to make it even better.

In my opinion, the architectural magazines have just abandoned as a sales tool to prospective building client because the mags have degenerated into photography contests and construction cost surveys. Because bigness, wealth, prestige and impressive book counts seem to impress editors so much, the small architect and small client—are just represented nor can they possibly relate.

SIDNEY SCOTT SMITH
 Architect
 Murphy & Smith, Architects Planners
 Moorestown, N. J.

REASON ENOUGH?

Forum: In the December 1971 issue of the Forum you stated that the Australians for Architect Joern Utzon out of a picture in the completion of the Sydney Opera House "for reasons best known to themselves." In your November issue (page 22) you reported, with regard to the same building, "The cost originally estimated at \$7.8 million, is now expected to reach \$95.2 million".

Is not an escalation to 1,200 per cent of the original estimate a pretty good reason?
 ISAAH EHRLICH
 New York, N. Y. Architect

Versatile Electric System in New Administration Building Heats and Cools Simultaneously, Economically



The new administration building for Kentucky's Pike County Board of Education is all-electric.

PROJECT: Administration Building, Pike County Schools, Pikeville, Kentucky. **ARCHITECTS:** Chrisman, Miller & Wallace, Lexington, Kentucky. **CONSULTING ENGINEERS:** Guy Carter Consulting Engineers, Inc., Frankfort, Kentucky.

DESIGN CHARGE: To design, on a five-acre tract, an administration building for Pike County's Board of Education with offices, work areas, meeting rooms, and storage facilities for the board's business, training and administrative staffs.

DESIGN RESPONSE: Architect Norman Chrisman, Jr., designed an imposing structure of textured red brick containing 20,160 square feet of floor space on two levels. The first floor has offices, training rooms, a large lobby, and an assembly room capable of seating 150 people. Sliding partitions permit the assembly room to be divided into four conference rooms, each accommodating 25 people. The assembly area is used for board meetings, staff conferences, and civic or community activities.

The second floor contains offices, work areas, storage facilities and an audio-visual studio and control room for television-radio-movie production. This area can also be divided, by means of sliding partitions, into small conference rooms.

Because of the compact design of the building and its high lighting levels, the interior zones require cooling even when the perimeter zones are on heating. The space conditioning system selected for the structure, therefore, is designed for simultaneous heating and cooling. It consists of an electric double-duct, high velocity system which delivers warm and cool air to mixing boxes in each of 50 independently controlled zones. The principal source of heat is a 252-kw multi-step duct heater in the hot deck. A 69-ton reciprocating chiller supplies water to the cold deck of the system. Air from the mixing boxes enters most spaces through ceiling diffusers and ventilating troffers in the fluorescent lighting fixtures. Ventilating type ceilings in the meeting rooms provide uniform air distribution at low velocity and, consequently, minimum sound levels. Wall convectors supply supplementary heat as needed.

The electric space conditioning system was selected after a feasibility study indicated that it would cost less to buy and install than an equivalent system using a flame fuel for heating and would cost approximately \$6000 a year less to operate. The electric system has lived up to all expectations, Mr. Chrisman says, including those of cleanliness and economy.

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Firm, University or other affiliation: _____
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E _____
Zip Code: _____

1 CATEGORY OF STRUCTURE:
Educational—Administration Building

2 GENERAL DESCRIPTION:
Area: 20,160 sq ft
Volume: 206,880 cu ft
Number of floors: two
Number of occupants: 48
Number of rooms: 36
Types of rooms: private and general offices,
meeting rooms, storage rooms for educational
materials and equipment, audio-visual studio

3 CONSTRUCTION DETAILS:
Glass: single
Exterior walls: 4" brick, 2" expanded polystyrene
(R-7), 6" block, vermiculite fill; U-factor: 0.10
Roof and ceilings: built-up roof on 3" light-
weight concrete deck, steel joists, suspended
acoustical ceiling; U-factor: 0.12
Floors: concrete slab
Gross exposed wall area: 9000 sq ft
Glass area: 2000 sq ft

4 ENVIRONMENTAL DESIGN CONDITIONS:
Heating:
Heat loss Btuh: 855,000
Normal degree days: 4900
Ventilation requirements: 4600 cfm
Design conditions: 0°F outdoors; 75F indoors
Cooling:
Heat gain Btuh: 830,000
Ventilation requirements: 4600 cfm
Design conditions: 95F dbt, 78F wbt outdoors;
75F, 50% rh indoors

5 LIGHTING:
Levels in footcandles: 75-100
Levels in watts/sq ft: 3-4
Type: fluorescent and incandescent

6 HEATING AND COOLING SYSTEM:
A double-duct, high velocity system delivers
warm and cool air simultaneously to mixing
boxes in 50 zones of the building. The mixing
boxes, controlled by independent wall-mounted
thermostats, regulate the temperature of the air
entering each zone independently. Heating is
provided by a 252-kw multi-step heater in the hot
deck staged in accordance with outdoor tem-
perature and fully energized at 0°F. Supplemen-
tary heating is supplied by wall convectors. Cool-
ing is obtained by means of a 69-ton reciprocating
chiller supplying chilled water to the cold
deck.

7 ELECTRICAL SERVICE:
Type: underground
Voltage: 277/480v, 3-phase, 4-wire, wye
Metering: secondary

8 CONNECTED LOADS:

Heating & Cooling (69 tons)	354 kw
Lighting	95 kw
Water Heating	36 kw
TOTAL	<u>485 kw</u>

9 INSTALLED COST:*

General Work	\$365,370	\$18.12/sq ft
Elec., Mech., Etc.	239,350	11.87/sq ft
TOTALS	<u>\$604,720</u>	<u>\$29.99/sq ft</u>

*Building was completed 3/68

10 HOURS AND METHODS OF OPERATION:
8 a.m. to 6 p.m., five days a week

11 OPERATING COST:
Period: 8/20/69 to 8/20/70
Actual degree days: 4221
Actual kwh: 539,550*
Actual cost: \$5642.33*
Avg. cost per kwh: 1.05 cents*
*For total electrical usage

Billing Date	Degree Days	Demand	kwh	Amount
9/19/69	10	125	28,050	\$ 286.11
10/21/69	226	329	39,000	399.75
11/19/69	592	320	52,650	537.03
12/19/69	892	255	55,650	575.98
1/20/70	1012	306	69,300	713.79
2/18/70	724	299	59,400	614.79
3/30/70	547	254	52,650	550.19
4/21/70	176	269	45,450	474.95
5/20/70	42	239	39,450	422.12
6/19/70		210	38,100	409.58
7/21/70		239	33,000	361.35
8/20/70		237	26,850	296.69
TOTALS	<u>4221</u>		<u>539,550</u>	<u>\$5,642.33</u>

12 FEATURES:
The system operates year around with the same
percentage of outside air because calculations
showed that it would be more economical to
operate the chiller during the intermediate sea-
sons than to provide the additional heating re-
quired by an economizer air cycle. The chiller
operates until outdoor temperature drops to 34F
at which point the ventilating air is sufficient to
supply the requirements of the cold deck. When
the building is unoccupied the outside air damp-
ers are closed, the chiller is off, the mixing boxes
are in full heating position and the supply air fan
and electric heater cycle in response to a night
thermostat.

13 REASONS FOR INSTALLING ELECTRIC HEAT:
A feasibility study indicated that the electric
system would cost less to buy and install than
an equivalent system using a flame fuel for heat-
ing. In addition, the study showed that the elec-
tric system would provide savings of almost
\$6000 in yearly operating costs.

14 PERSONNEL:
Owner: Pike County Board of Education
Architects: Chrisman, Miller & Wallace
Consulting Engineers: Guy Carter
Consulting Engineers, Inc.
General Contractor: Goodman & Preston
Electrical Contractor: Elliott Glass & Electric Co.
Mechanical Contractor: JPC Contracting Co.
Utility: Kentucky Power Company

15 PREPARED BY:
Herbert J. Stapleton, Jr., Commercial and Power
Sales Representative, Kentucky Power Company.

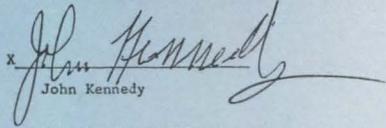
16 VERIFIED BY:
Norman Chrisman, Jr., AIA *Norman Chrisman, Jr.*
O. Guy Carter, P.E. *O. Guy Carter*



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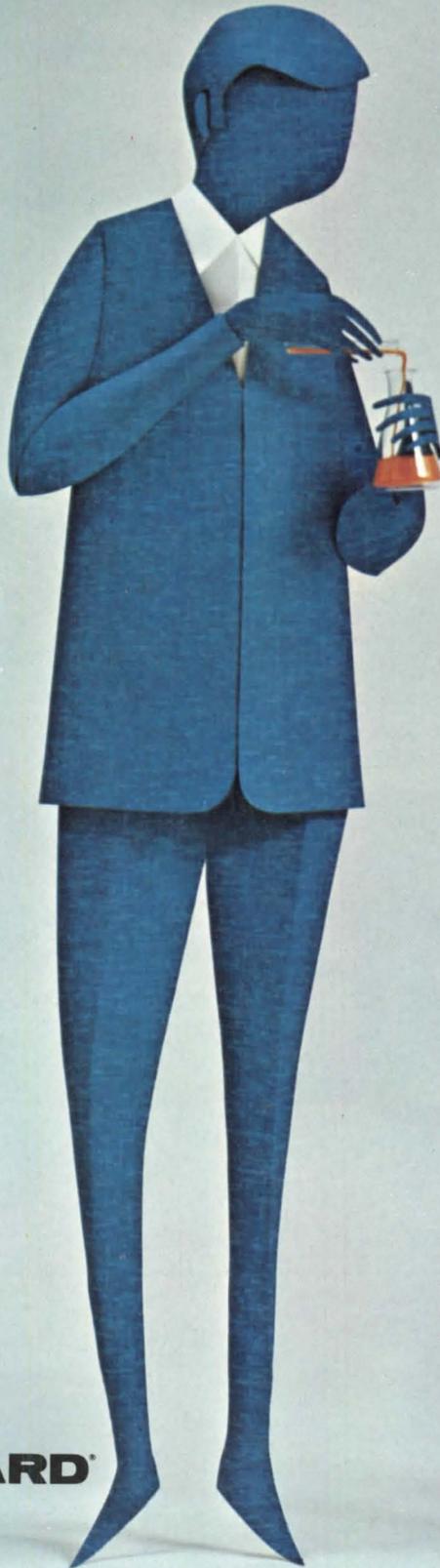


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*You can offer
practicality to a
hospital lab with
stain-resistant
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*You can offer
good taste
to a restaurant
with spirited
"Bourbon Street"
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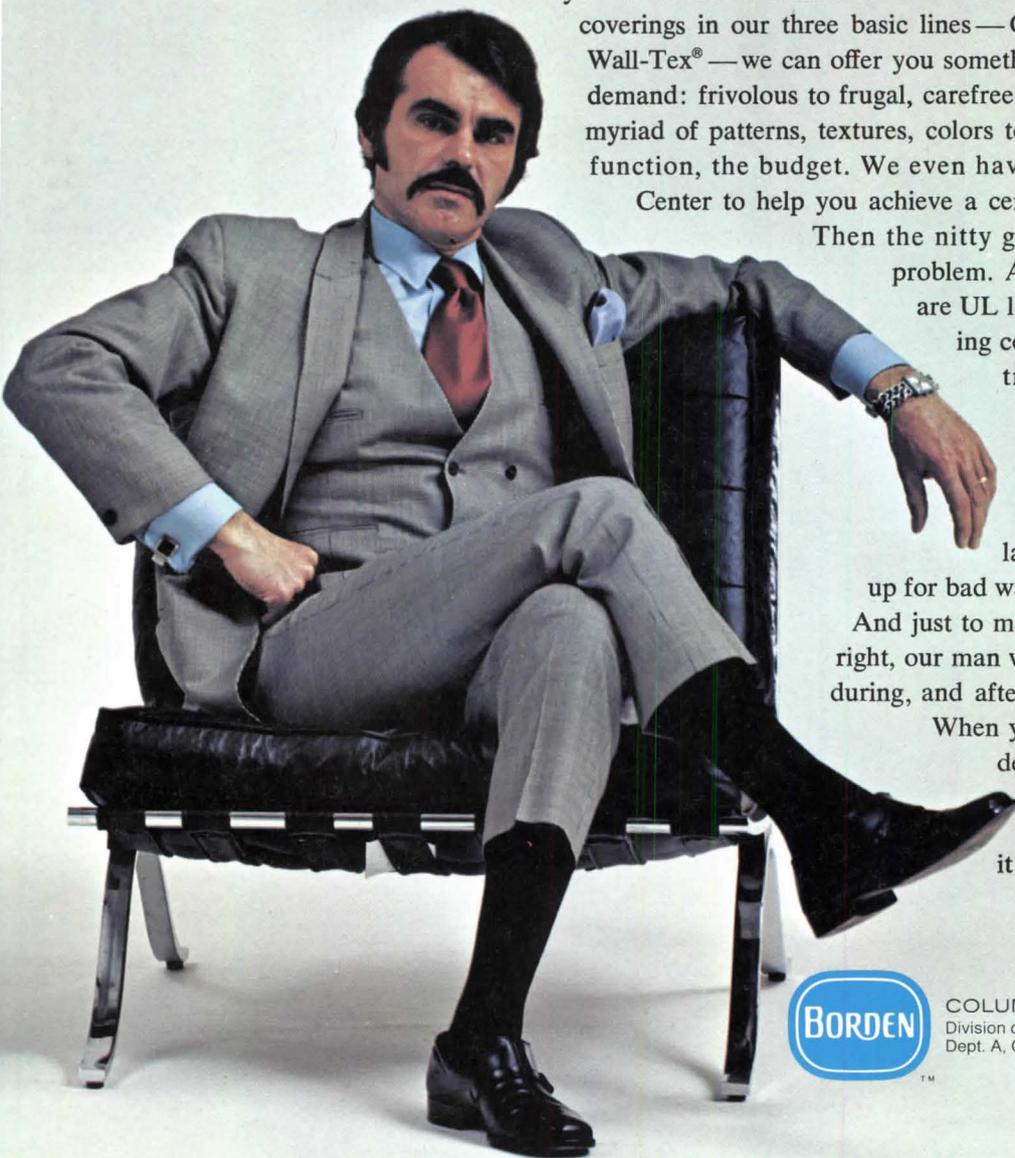
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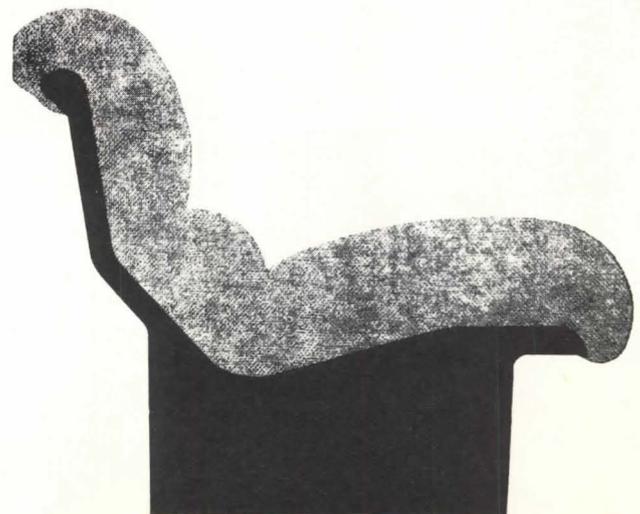
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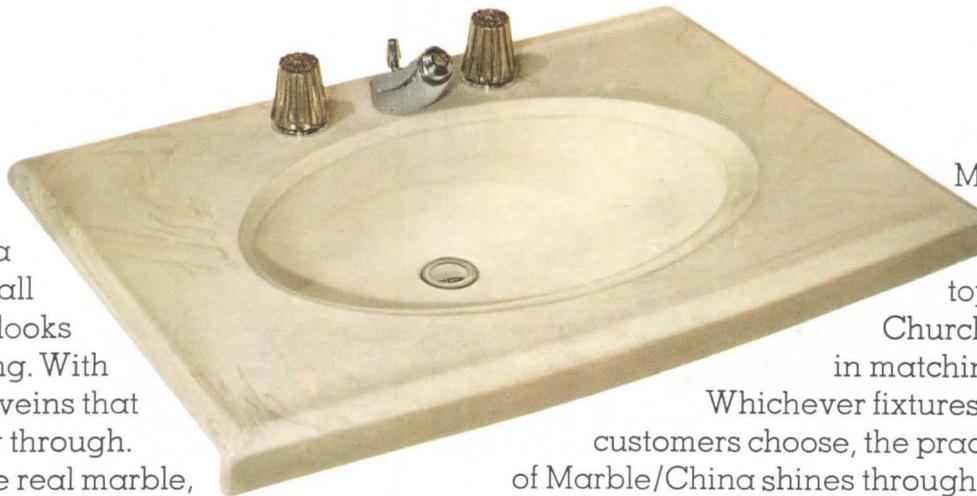
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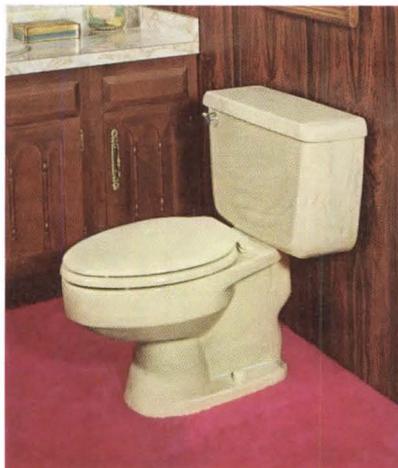
Richly rounded, the Aqualyn lavatory, at left, is another effective use of Marble/China. A generous 20" by 17", it is seen here with polished chrome Aquarian lavatory faucet.

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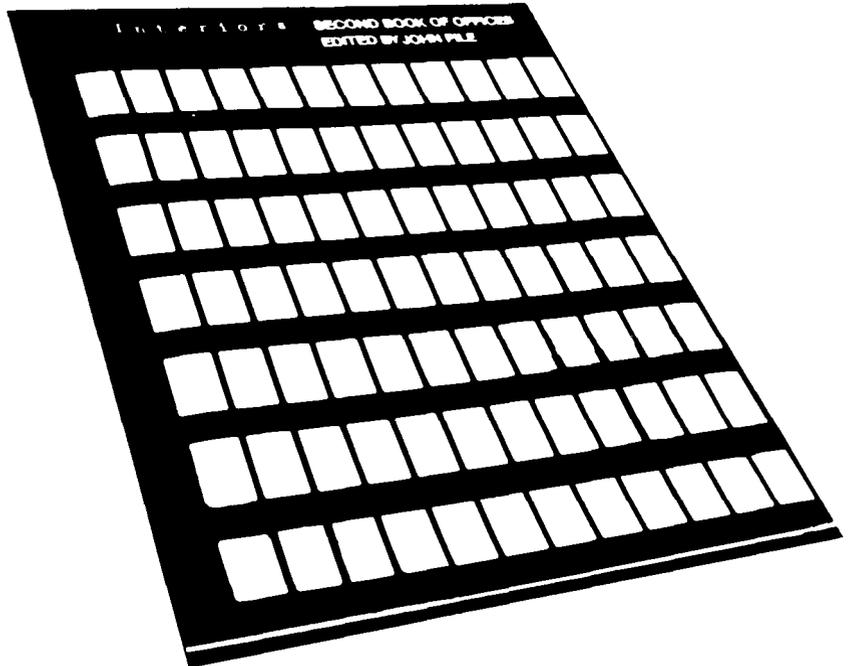
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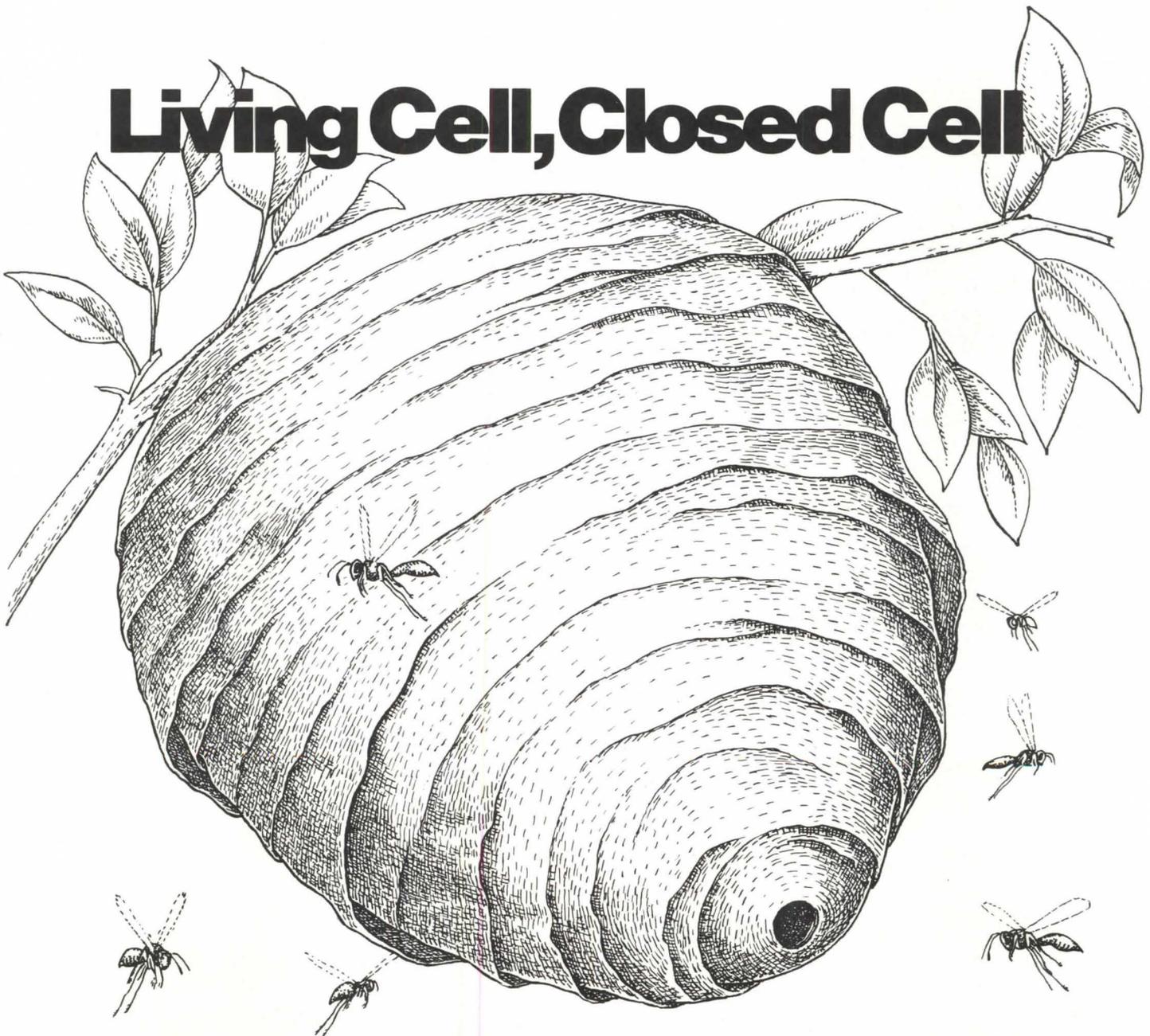
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FORUM

We happy, demented few who live in Manhattan have recently witnessed one of the most brazen raids on record by suburbia upon an inner city: our Governor, whose name escapes me at the moment, and who lives in a Belgium-sized suburb all his own in Erewhon, N. Y., decided to pay off some of his political debts to upstate cronies by (a) bankrupting the city administration, (b) unfrocking the Mayor, and (c) reducing the city's inhabitants to penury. He did this by pushing and then signing legislation which, simultaneously, raised the rents for us poor slobs, while controlling those of his upstate and suburban cronies.

That was not all: the inner city slobs were also dealt a few more taxes (so as to enable them to clean up the mess left by suburbanites who make their living in Manhattan); the upstate cronies were given raises; welfare payments to the inner city poor were cut back; and the cronies were thus spared commuter taxes, bridge tolls, etc. etc.

It was a neat trick, and it almost worked. Then along came District Council 37, American Federation of State, County and Municipal Employees. District Council 37 had negotiated a pension plan a year ago, and now the upstate cronies were refusing to honor the contract. So District Council 37 decided to keep suburbia out of Manhattan.

They did this by opening drawbridges that normally lead into Manhattan, and by abandoning trucks (with flattened tires) on major arteries. Result: the most spectacular traffic jam since Napoleon retreated from Moscow.

It was, of course, "unconscionable"—a word invented by the *New York Times*. It was also "wicked, criminal, and conspiratorial," according to the *Boston Globe*. In short: District Council 37 oughtn't to have done it.

Nor do I think that District Council 37's motives were of the highest order. They acted, in fact, like thugs.

But what a pleasure they gave us! All of a sudden, those freeloaders from suburban Erewhon, who had been milking the city while cussing it out, found themselves stranded on our borders. Manhattan was really quite lovely that day—pleasantly warm and sunny, very few suburban cars, very few imported suburban pollutants. Suburbia just stayed out there, radiators steaming, exhausts fuming; and those of us who had persevered through all these years began to live it up.

It was a coincidence, of course, but an appropriate one: presumably to celebrate the occasion, and to mock the ostracized suburbs, the management of General Motors chose that lovely day to unroll a vast new front lawn of jungle-green plastic grass in the plaza of Edward Durell Stone's shaft of marble and glass opposite The Plaza. To demonstrate, I suppose, that we can (if we wish) manufacture our own Scarsdale right on Fifth Avenue.

—PETER BLAKE

HOUSING

"PASSIVE" SEGREGATION . . .
On June 10, the U. S. Commission on Civil Rights, chaired by

the Rev. Theodore Hesburgh, issued its report of a one-year investigation into the racial and ethnic impact of the government's first large-scale program for low-income housing. The report dealt

a hard rap to the FHA, which administers the program, for "abdicated its responsibility" in failing to require the real estate market to comply with civil rights laws which bar discrimination in federally supported programs, and for, in effect, "delegating this responsibility to members of the private housing and home finance industry."

The FHA has taken a "passive role," said the report, and "failed to take even minimal steps to change" practices that have perpetuated segregated patterns.

HUD Secretary George Romney attacked, rather feebly, the Commission's findings as "sensational" and "largely unfounded." He then defended FHA as "traditionally structured and administered to respond to the private market."

The program in question, Section 235 of the Housing Act of 1968, permits families with incomes of between \$4,000 and \$10,000 to purchase housing up to \$21,000 by paying at least 20 per cent of their income toward monthly payments of principal, interest, taxes, insurance, etc., while the feds pay the rest.

Four cities—Denver, Little Rock, Philadelphia and St. Louis—were studied. Said Howard A. Glickstein, staff director of the commission: "We found a dual marketing system so pervasive, so entrenched and so commonplace that most real estate brokers described it openly to the commission staff without any sense of wrongdoing." In Denver and Little Rock this simply meant that new subsidized housing was being sold only to whites. In Philadelphia and St. Louis, minority-group buyers were being shown only old, dilapidated housing in ghettos or "changing" neighborhoods.

Romney also called the Commission's findings "outdated." Presumably, he was referring to a long-awaited major policy statement from the White House. The wait had kept civil rights lawyers in the Justice Department immobilized and Romney's own department muted, for months. The White House "clarification," in 8,000 words, was released the following day.

. . . "FORCED" INTEGRATION

The President's statement setting down federal policy on equal housing was largely a definition of terms: . . . "The terms 'poor' and 'black' are not interchangeable

able . . . and those who would treat effectively with race and poverty must take care to maintain the distinction."

. . . "By 'equal housing opportunity' I mean a condition in which individuals of similar income levels in the same housing market area have a like range of housing choices available to them regardless of race, color, religion or national origin."

. . . "I interpret the 'affirmative action' mandate [Title VIII of the Civil Rights Act of 1968, which not only prohibits discrimination in housing but urges all agencies of government to administer their programs 'affirmatively' to achieve desegregated housing] to mean . . . that in choosing among the various applications for federal aid, consideration should be given to their impact on patterns of racial concentration. . . . It does not mean that housing officials in federal agencies should dictate local land use policies."

. . . "The federal role is essentially one of responding to local or private initiatives, rather than one of imposing its programs on state and local governments."

Having repeatedly distinguished between "racial" and "economic" segregation, Nixon promised strict enforcement against the former and nothing against the latter beyond "encouragement" of communities to "take into account the broad needs of the various groups within them."

He did, however, acknowledge that economic measures might be used as a subterfuge for racial discrimination. And it was here that his strongest commitment was made: "When such an action is called into question, we will study its effect. If the effect is to exclude Americans from equal housing opportunity on the basis of their race, religion or ethnic background, we will vigorously oppose it by whatever means are most appropriate. . ."

In the following days, the Justice Department, brought suit against Blackjack, Mo. (March issue, p. 28) and eight smaller suits against real estate agents, developers, and owners. And Father Hesburgh's Civil Rights Commission held four days of open hearings, in which Secretary Romney, while insisting that his department had only "marginal" capacity to induce integration in suburban housing, defended the Nixon policy state-

ments. But Robert L. Carter, whose National Committee Against Discrimination in Housing has been very effective in the courts, denounced it as "nothing less than an open endorsement of apartheid in the United States."

The U. S. Conference of Mayors, meeting in Philadelphia on June 16, voiced "great concern" over the implications of the President's policy. They passed, unanimously, a resolution recommending, instead, that federal funds for "such projects as, but not limited to, highway appropriations, public works projects, FHA mortgage loan guarantees and community development projects" be cut off from all communities refusing to provide low-and middle-income housing.

CONFABS

PARADOX AT 8,600 PLUS

Last year's International Design Conference in Aspen (IDCA) was a spectacular disaster: disruptions, confrontations, ant farms, and a bitten Chief of Police (July/Aug. '70 issue). This year's IDCA could hardly help but be an improvement, and it was: the form of the conference was more participatory than it had ever been before in its 21-year history; and the content (while almost 50 per cent preposterous) was, at least almost comprehensible—and even old-hat to a good many of the younger conferees.

The theme, this year, was PARADOX—a fine theme, especially if your precise objectives appear clouded, as whose are not? Dean Richard Farson of the California Institute of the Arts, and his minions, assembled the conference hardware and software. The hardware was video-

tape (instantly replayed) and cassettes to take home with you; the software was Esalen, consciousness-expansion, sexual politics, the revolution in communications and in the Third World, and the next revolution—plus R. Buckminster Fuller and the Future of Man.

Well! The only trouble with Californians is that they are still trying to find our Last Frontier; and so they either run into the sea, like lemmings, or they turn to Esalen and LSD while keeping their feet dry and going stir-crazy at Big Sur.

So far as the consciousness-expansion and drug-culture bit was concerned, it was mostly the stir-crazies—very sweet people, running seminars as if they were Hollywood Game Shows, and smiling big, white-toothed TV smiles. So far as sexual politics were concerned, that was mostly Caroline Bird, that very intelligent Women's Liberator, who made her points and charted her ambitions a bit too conservatively. One of the stars of the conference was Nicholas Johnson, long-haired and outspoken member of the FCC. Broadcasting does to the mind, says Johnson, what private enterprise does to the land. "A lot of people already think like New York City already looks." He got a standing ovation. Two days earlier, some 2,500 people, the largest number ever crowded into the tent, gave Bucky a similar tribute.

In the midst of all this feverish nirvana, twelve foreign guests from Britain, Germany, France, Italy, Roumania, Sweden, Finland, the Netherlands and Spain stood in total nonplus: what on earth was going on? Encouraged by the IDCA Board, they took possession of their senses and put on a series of improvised or guerrilla symposia, presenting

their work with varying intelligibility.

The conference wound down on a less-than-revolutionary note, despite the easy use of those terms during the first few days. Conferees gave only grudging approval to the various final pleas that they accept the hard realities of reform over the fuzzy illusions of revolution.

The problem with a Design Conference that deals almost wholly in abstract ideas is, of course, how to apply it all to concrete problems of design. In this, 1971's IDCA was none too successful. George Nelson, the architect and industrial designer, after attending one of the consciousness-expansion-interpretation seminars, said that the seminar's guru had not only re-invented the wheel, but was trying to take out a patent on it. Others felt that the lemmings were inadequately informed on matters that tend to influence design—like how to make things that work and that people need and want. (There was, of course, a fairly neat generational split on the question of *what* people need and want.)

But, on the whole, IDCA '71 was a massive success; nothing really functioned terribly well, except perhaps the elliptical dome that was designed from a computer program by Peter Calthorpe, funded by the Graham Foundation, and went from hope to fact in a bare two weeks. No questions were answered very adequately. The giant balloon (below) came almost to life, then rolled over and died. Still everyone who had confronted his brother or sister with epithet and epaulet, only a year ago, was feeling much more relaxed now; much happier; and much more unscrewed-up. And prospects for IDCA 1972, Ricky Wurman in charge, looked fairly bright.

Aspen balloon: brief ascent and sudden death



HARD CHOICES IN MOTOWN

Delegates to the AIA Convention in June got a subliminal lesson in outer-space survival. Isolated nodes of human activity were scattered along the inhospitable corridors of Detroit's Cobo Hall like base camps on a sterile planet.

This convention's theme—The Hard Choices—ostensibly referred to the allocation of space and resources (to avoid any recurrence of Cobo Hall, we hope). But we found out, as we tried to map a strategy for covering the convention, that "hard choices" actually referred to the three or more things going on at the same time through most of the four-day meeting.

Those who could forego the subtle parliamentary exercises of the business sessions could sit in on a rival "Building Team Conference" down the hall. At



The long, gray Cobo haul

this meeting, co-sponsored by the Producers' Council, social commitment took a back seat to getting buildings built. Roger Blough—formerly chairman of the U. S. Steel Corp., now chairman of something called Construction Users Anti-Inflation Roundtable—blasted the building trades unions in particular, but had hard words for everyone concerned with the construction process. Other conferees explained—with the help of eye-popping organizational charts—how the whole problem can be licked by restructuring the "team."

The students, meanwhile, were holding their own meetings. They were not there in great numbers this year, and they did not storm the rostrum (the only way they could have impressed survivors of the past two conventions). They did, however, succeed in getting the president of the Associated Student Chapters a vote on the AIA Board of Directors. They also passed the hat on the convention floor, asking delegates to show their commitment to slow-starting social action programs with cold cash or pledges. (Net proceeds:

\$1,100 in cash, plus individual pledges as high as \$5,000.)

Student favorites did well in elections for institute vice-president (three elected out of a field of five): Robert J. Nash, AIA's first black officer, was elected to a second term; Louis DeMoll of Philadelphia will add a full beard to the Board, complementing Nash's Afro; Archibald Rogers of Baltimore will be fresh from his chairmanship of AIA's National Policy Task Force. S. Scott Ferebee, Jr., of Charlotte, N. C. was elected First Vice-President, hence President-Elect, without a contest.

Panel discussions on the Hard Choices involved some interesting personalities—John Gardner of Common Cause, Ed Logue of the New York State Urban Development Corporation, Mayor Kenneth Gibson of Newark, N. J.—but the material all seemed a bit familiar.

In a session called "Will Americans Accept a National Program for Urban Growth", Mayor Gibson asserted that we already have a national program,—made up of FHA rules, mortgage credit policies, highway programs, etc.—which he characterized as "malignant and calculated neglect." Ed Logue agreed, but warned that "there are those who are determined to defend it." Even those who understand the need for change can tire of hearing about it. Said one weary delegate, as an after-hours "rap session" on housing took a turn toward group guilt, "I am going home sufficiently chastised for all the ills of America."

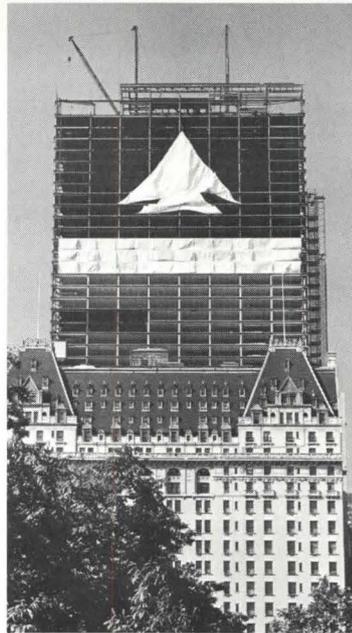
The architects wound up their four-day catharsis by giving Louis I. Kahn an overdue Gold Medal. Kahn had some profound things to say about the meaning of rooms, but he had to admit that the Grand Ballroom at Cobo Hall, where the award was made, had no meaning at all.

SCULPTURE

HIGHRISE ART

Building construction sites can be a hassle for already hassled pedestrians. But some New York City builders are evolving a way of relieving the discomfort: they are turning their steel-frame skeletons into mountings for giant art and super graphics displays.

Sheldon Solow, builder of a



Great arrowhead in the sky

Gordon-Bunshaft-designed office building on 57th Street, started on the sidewalk, with a building-wide op-art announcement of the building's address and his own name, designed by Ivan Chermayeff (Oct. '70 issue, page 25). In June, he "topped-out" with two seven-story-high yellow arrowheads designed by fabric sculptress Anne Healy, who loves "the graceful way that sails blow in the wind." To complete the collaboration of art and architecture, says Solow, "we hope to display the work of aspiring young artists as well as famous works once the building is completed." He means, we assume, on the inside. Or perhaps not.

Meanwhile, two artists who helped organize the nonprofit City Walls Inc., which has conceived and executed over 20 exterior wall paintings around the city—Nassos Daphnis and Tania—have been commissioned by the Arlen Realty and Development Corp. to transform its building at 1500 Broadway into an 18-month-long "art environment." We will follow their progress in these columns.

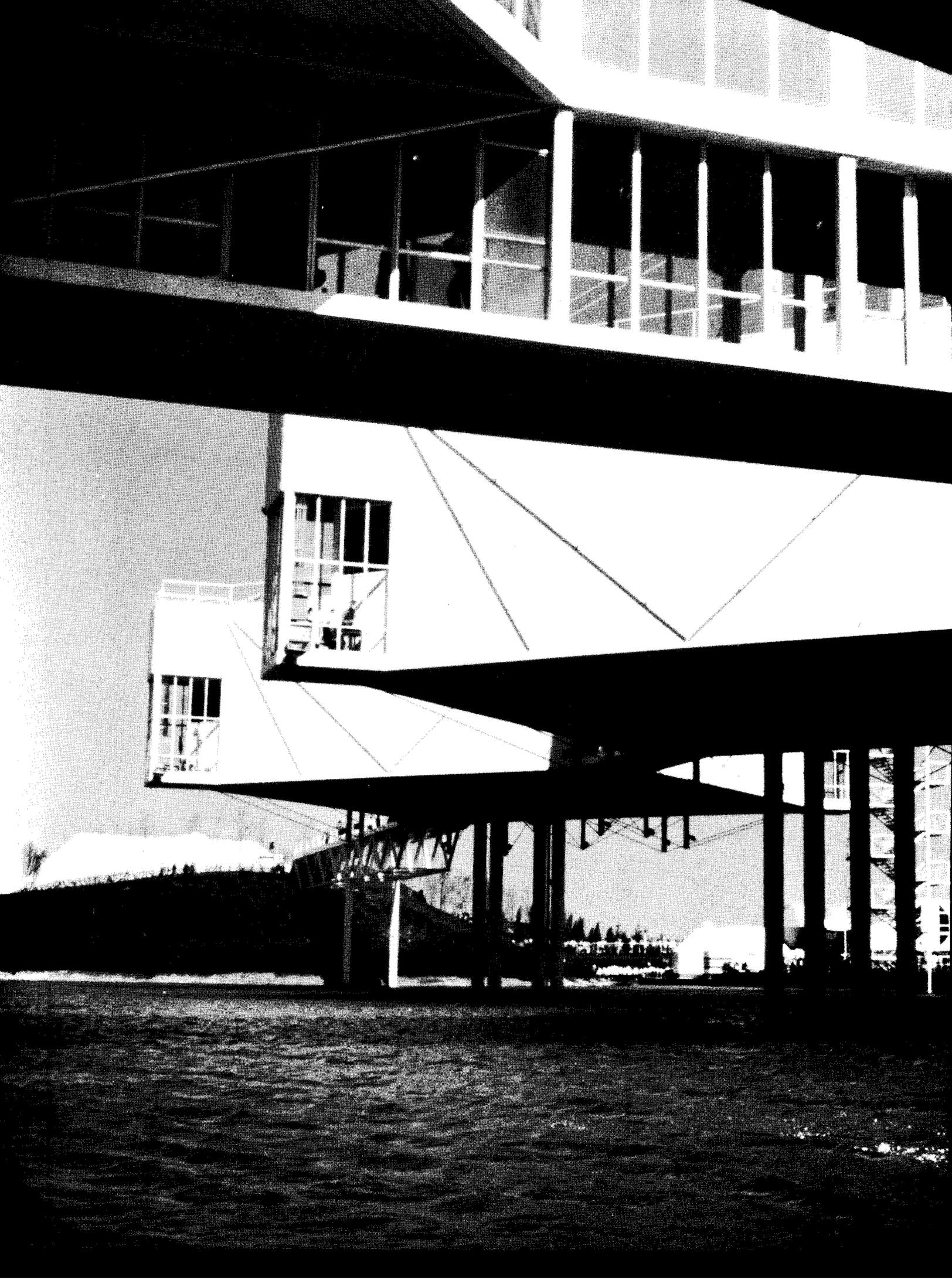
BICENTENNIAL BUST

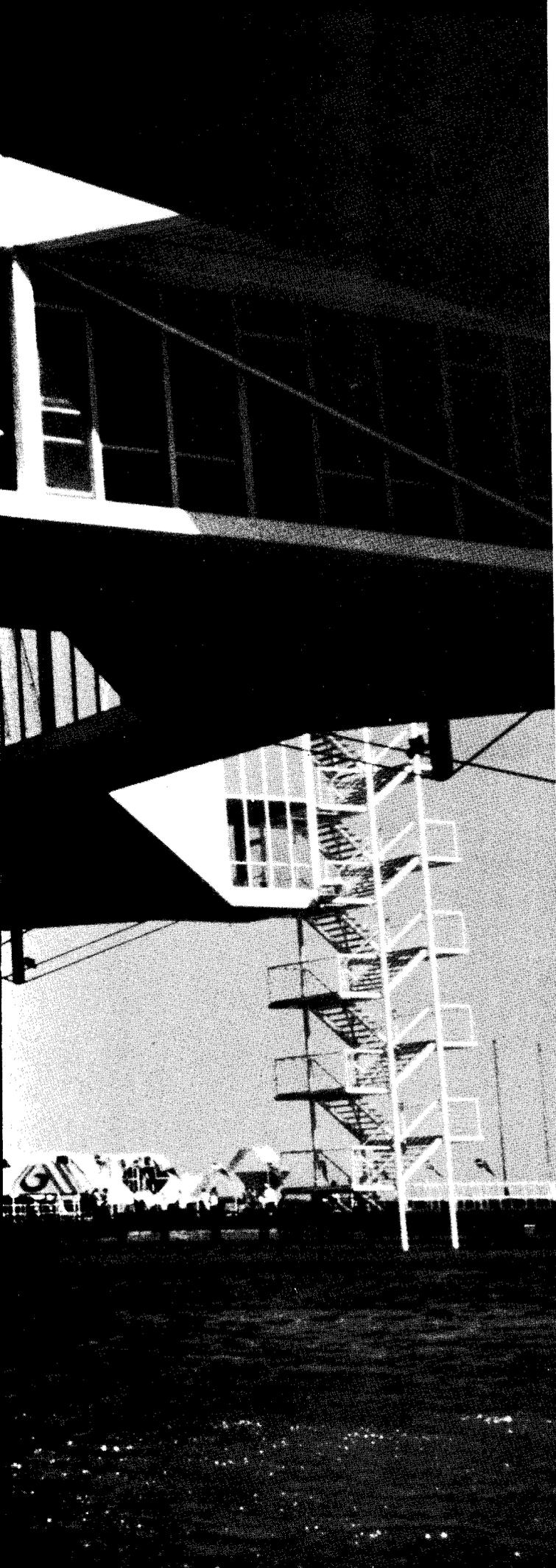
Back in 1967, one Reginald Beauchamp, assistant to the president of the Philadelphia Evening Bulletin, made one of the first suggestions for how the city should celebrate the nation's bicentennial: build a 14-story-high bust of Benjamin Franklin that would cost \$5 million, house a museum of

(continued on page 71)

BUILDINGS FOR RECREATION

A 22-page portfolio of vacation-time structures in Canada, Japan and the U.S.





WATER WONDER LAND

Ontario Place, Toronto's new fair and pleasure ground, covers 96 acres of lake and landfill

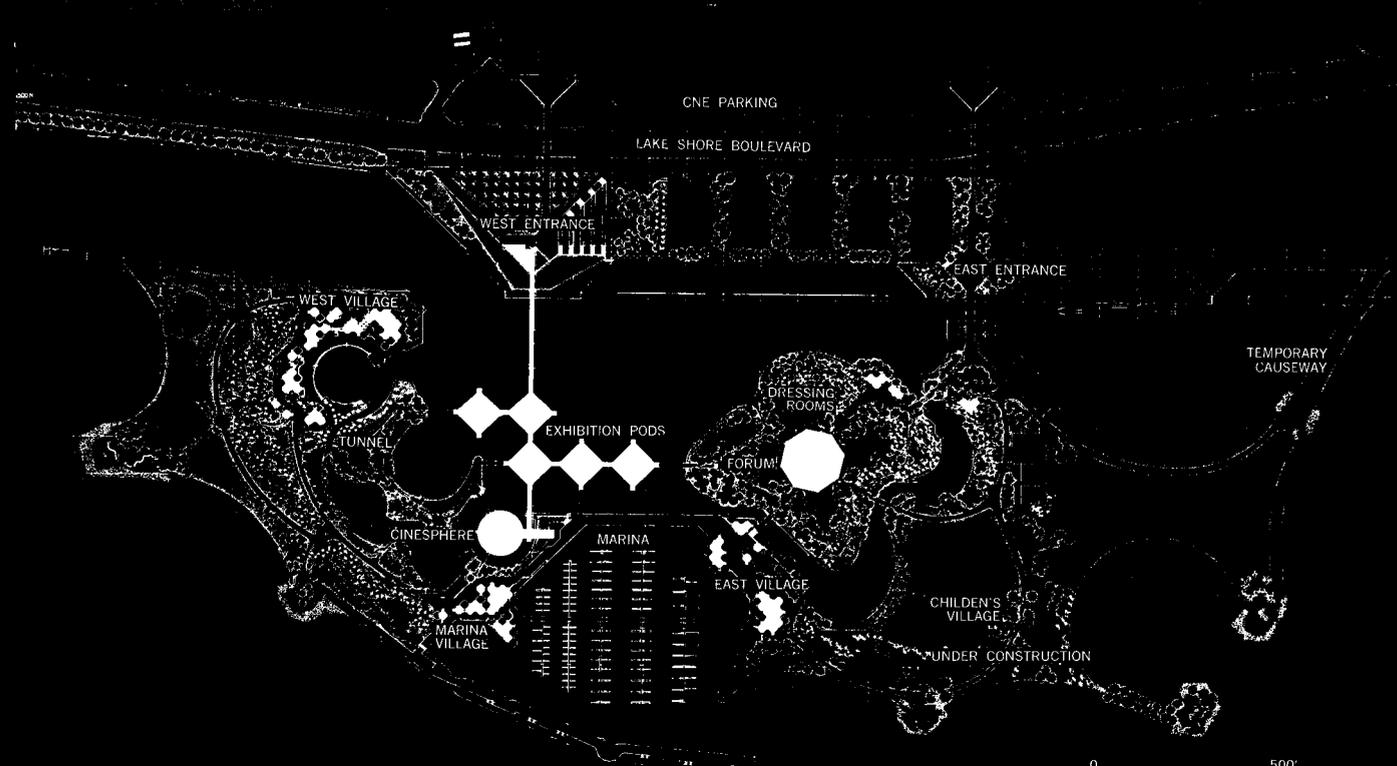
Poised above the waters of Lake Ontario on 35-ft.-tall legs, the main pavilion of Ontario Place combines the fantasy of a 19th-Century amusement pier with the pragmatism of a 20th-Century deep-sea oil rig (Oct. '70 issue). In this centerpiece of Toronto's new exhibition and recreation complex, Architects Craig, Zeidler & Strong have summed up their approach to the entire development.

The initial concept of building Ontario Place out in the lake was partly hard-headed, partly visionary. The scheme was actually a shrewd way to replace the old provincial pavilion on the adjoining Canadian National Exhibition (CNE) grounds, building outside both the physical boundaries and the operating rules of this huge annual fair. On this lake site—outside even the city's jurisdiction—the province could program an all-year attraction and derive a reasonable economic return on a \$23-million investment.

The equally strong, less tangible, objective was to bridge the highway barrier that separates CNE from the water—to bring the public into intimate contact with the lake and generate enthusiasm for reclaiming more of the lakefront. Ontario Place, it was hoped, might be the first step toward the proposed offshore community of Harbour City (also planned by Craig, Zeidler & Strong).

The form of the big exhibition pavilion originated in the practical needs of the multimedia exhibits programmed for Ontario Place, which demanded areas of 2,000 to 8,000 sq. ft. and heights of about 30 ft. Volumes of this size, simply standing on landfill, would have looked "like a row of warehouses," says Architect Zeidler. "Obviously," he continues, "something more than a functional solution was required." His solution: stand the exhibition spaces in the water, high enough for small craft to sail underneath, and make the feat of holding them up part of the show.

The exhibition pavilion is only the center of a richly varied environment of islands and lagoons. The five modular "pods" of the pavilion—one of which contains restaurants—and the adjoining 800-seat "Cinesphere" form the all-weather, all-year core of Ontario Place, linked to the mainland by an enclosed bridge.





On the islands surrounding the pavilion are three "villages" combining snack bars, boutiques, and indoor-outdoor cafes. The "Forum," a summer concert hall on one island, seats 2,000 under a big, translucent canopy—plus thousands more on the grassy banks outside (Mar. issue, p. 65). Clashed between two islands is a 300-boat marina.

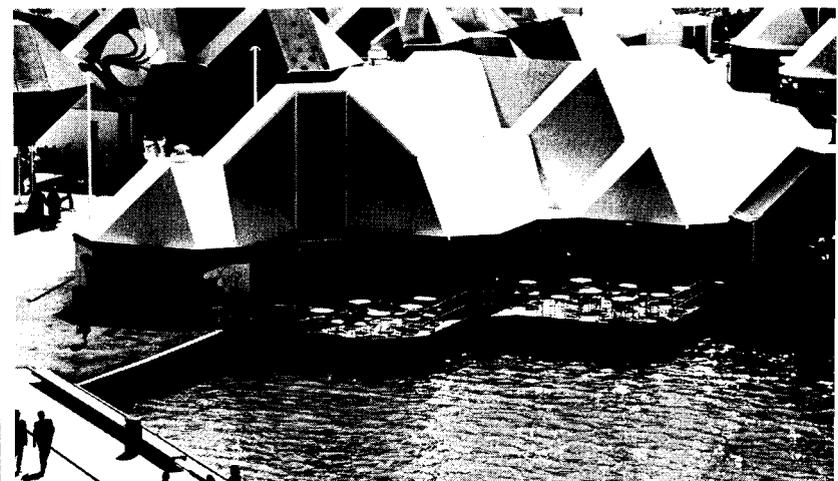
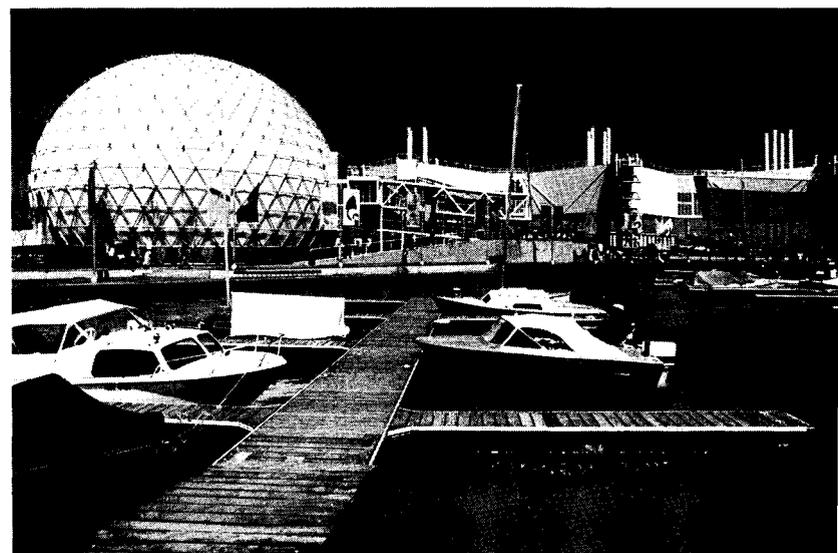
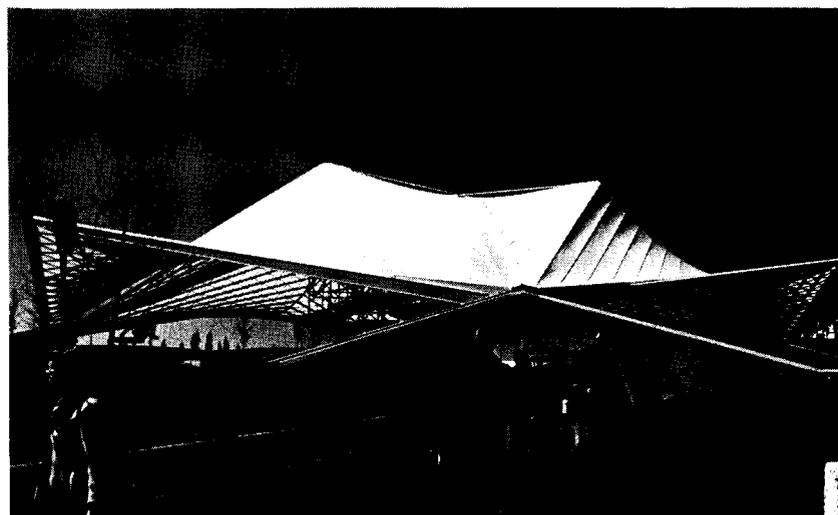
All of the widely varied structures on the site are rigorously direct, economy-of-means constructions. Their silhouettes are dramatic and their exposed framing has a spidery delicacy. Still, the whole effect might have been too severely mechanical, were it not for the spanking white coatings (paint, baked enamel, and plastic roofing) on just about every structural part. Added to the overall whiteness, splotches of color in readily changeable elements—canvas canopies and banners, paddleboats, and small areas of painted graphics—produce an exhilarating color effect reminiscent of ocean liners and sailing regattas.

Stilling the waters

There are some practical, engineering reasons for the layout of the main pavilion and the islands. By deflecting winds and absorbing the power of lake waves (which can reach a height of 18 ft.), the islands reduced the required mass—and cost—of the pavilion structure. (Three sunken freighters, forming the leading edge of the landfill, got construction off to a fast start.) The islands have been carefully shaped—and the ridges planted with dense evergreens—to shield the "villages" from winds and to make the central lagoon safe for paddleboats.

Another critical function of the islands is providing landfalls for emergency exits from the main pavilion. These connections have been made as inconspicuous as possible to maintain the image of a structure over water.

The hovering effect of the pavilion is not just an illusion. Each 85-ft.-square structural "pod" is suspended from a central mast—made up of four pipe columns—that rises 110 ft. above the water. Pairs of trusses running out from the central mast to the corners of the pod hold up the floors and make a firm connection to the adjoining pod. The long spans of the main floor are braced by strut- and cable systems that are clearly visible



Located just off the shore of downtown Toronto, adjoining the Canadian National Exhibition grounds (far left, above), Ontario Place includes a variety of exhibition and recreation facilities, shops and dining places, built on 96 acres of water and landfill (plan, left). The major elements include (right, top to bottom): the main exhibit pavilion, suspended from tall masts, and the adjoining "Cinesphere" dome; a concert arena under a structurally puzzling, tension-compression canopy; a public marina; and several clusters of modular structures housing cafes and boutiques.

on the undersides of the pods (below right).

Inside, the big volumes are interrupted only by the four columns clustered in the center. The hangar-like interiors are adaptable to almost any kind of walk-through exhibition, and shows are expected to change many times over during the life of the structure.

Depending on internal use, the walls of the pod can be either glass or prefabricated panels, surfaced in enameled, corrugated aluminum. The visitor experiences a sequence of controlled interior environments, alternating with wide-open views. For the widest view of lake and city, he can follow a suspended ramp up to the roof, which serves as an 1-acre, uncrowded observation platform.

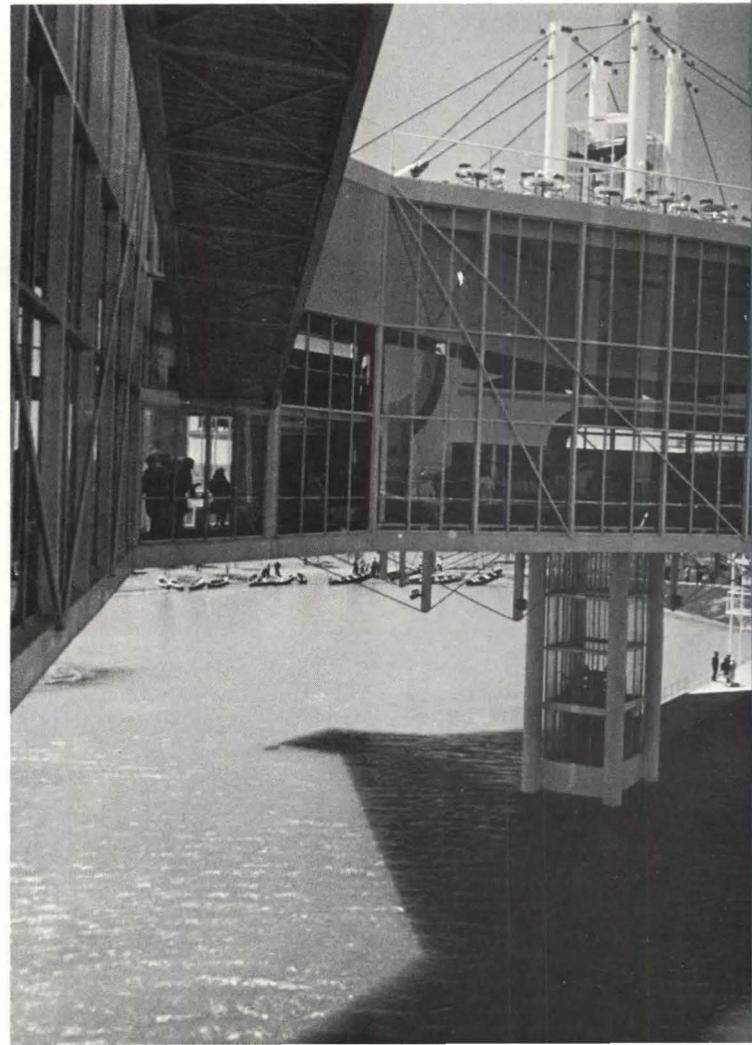
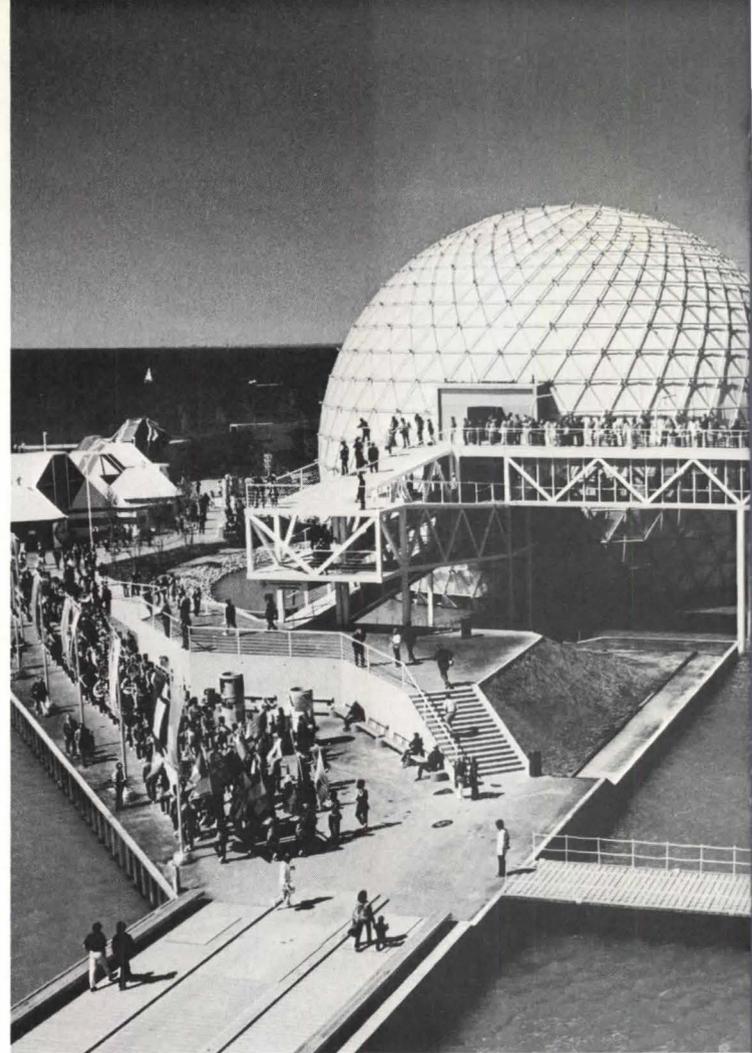
Bubble in the lagoon

One portion of the exhibition demanded a different kind of enclosure, and the Cinesphere is the answer. Inside it, a vast screen, roughly a half dome in form, fills the field of vision of spectators in the steeply raked seating. There are actually two independent triodetic domes around the theater—an inner one supporting the screen and an outer one supporting a skin of enameled metal sheet. The gap between the domes houses sound equipment and provides valuable heat and sound insulation. The exposed framework of aluminum tubing on the exterior has lights at each joint that turn the dome into frozen fireworks by night (see cover).

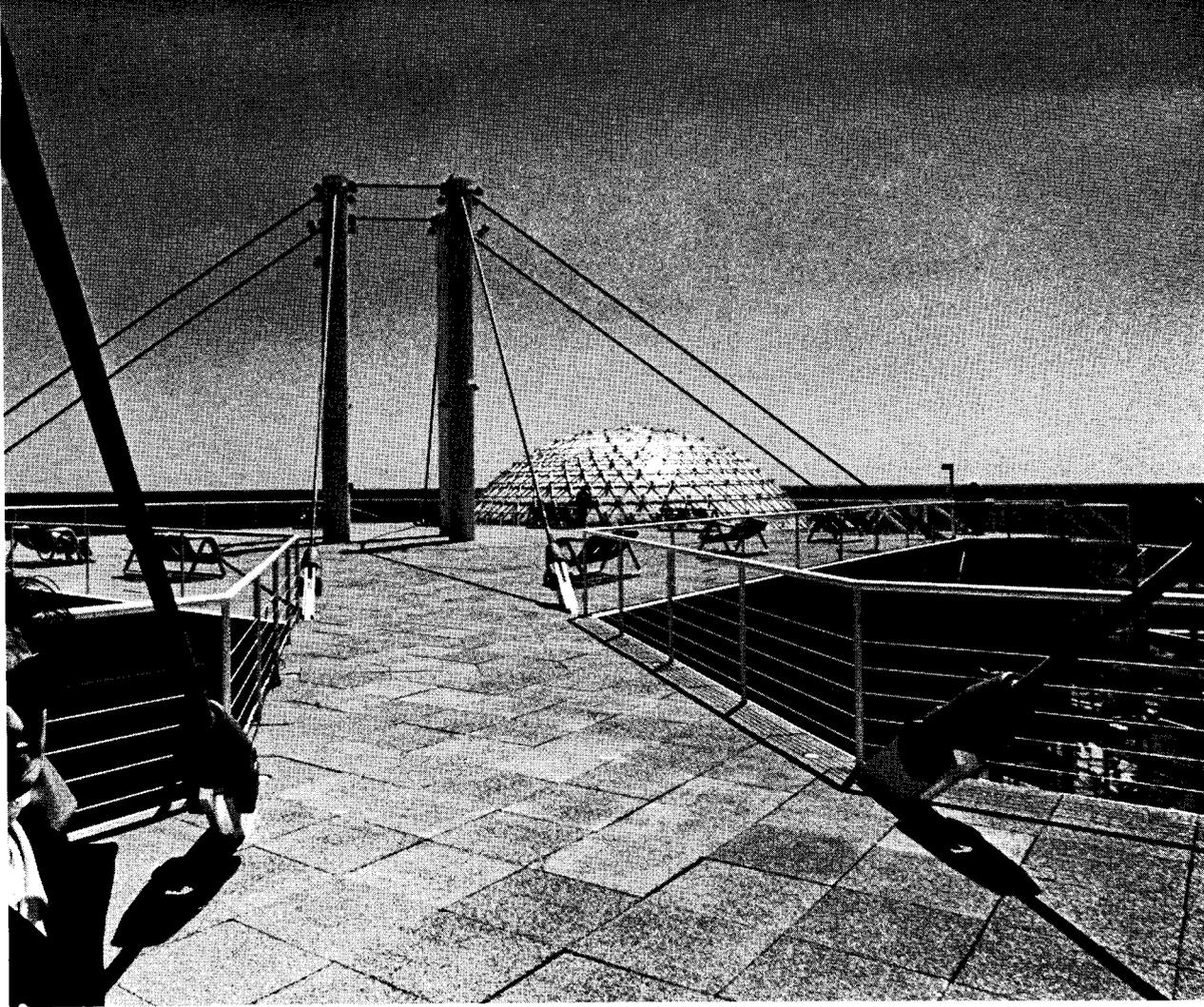
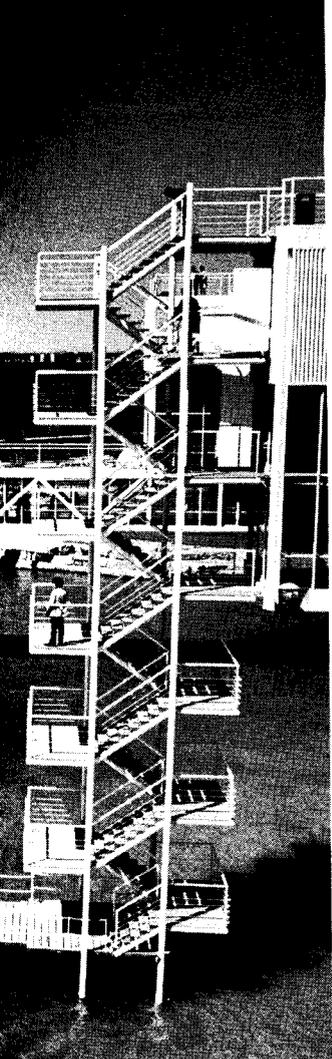
The initial exhibitions inside the pods and the Cinesphere have gotten mixed reactions. Some of the mixed-media presentations have technical problems to be ironed out, while the big-screen movie is a definite technical success. (Spectators feel air sick during a plane ride over the north woods.) The content of the exhibitions—built around the resources and history of Ontario—has been scored by one local critic as nothing but “lovely wilderness, lovely people, and amazing machinery,” but he acknowledges that much of the public will like it.

Actually, the exhibition facilities offer an open-ended opportunity to present material on any theme. And there is much more to Ontario Place than just exhibition structures.

The buildings of the three is-



A two-level bridge, extending from the mainland, leads through the main pavilion to the Cinesphere (top left photo). From either the open top deck or the enclosed lower level, waiting crowds get interesting views of the whole site. The triodetic framing of the Cinesphere dome is exposed on the outside of its enameled metal skin. Each modular “pod” of the main pavilion (bottom left) is suspended from a central cluster of four pipe columns. The roof deck of the pavilion (top right), with its cable anchors and white-painted railings, suggests the deck of a ship. And it offers bird’s-eye views of activities below (bottom right).



land villages, though casually laid out, have a tight structural logic of their own. All of the buildings are made up of the same modules—spaces of alternately square and octagonal plan, with faceted roofs of stressed-skin plywood. The geometry of the roofs is emphasized by the whiteness of troweled-on synthetic roofing.

Inside, concessionaires are free to imitate any exotic environment they wish (English pub, South Sea Island hut, etc.) and the high angular roofs lend themselves to such treatment; they also leave space for mechanical equipment, lighting, etc.

Exteriors, too, can have individual treatment, but only within definite limits. All vertical surfaces—lower walls and gable faces—are available for painted graphics (photos, near right).

The islands themselves have been contoured and planted (by Landscape Architects Hough, Stanbury & Associates) to give visitors walking through them an interesting sequence of vistas. The outer edges of the islands are shaped to respond to natural forces; a series of rock-armored points protects concave stretches of pebbly beach. Even when there are 30,000 visitors on the development's 30 acres of land, this perimeter will not be crowded.

Zeidler considers the free choice between crowds and emptiness one of the major accomplishments of Ontario Place: "Even on very crowded days, a child can play undisturbed on the beach. Yet nearby, just over the hill, are cafes, restaurants, and boutiques full of human activity." —JOHN MORRIS DIXON

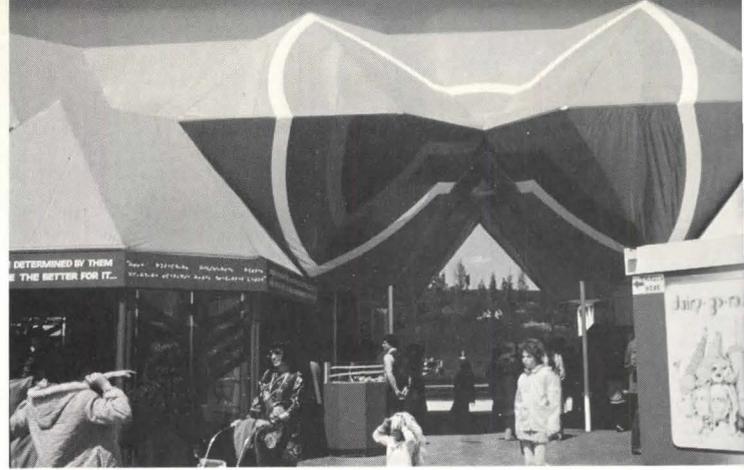
FACTS AND FIGURES

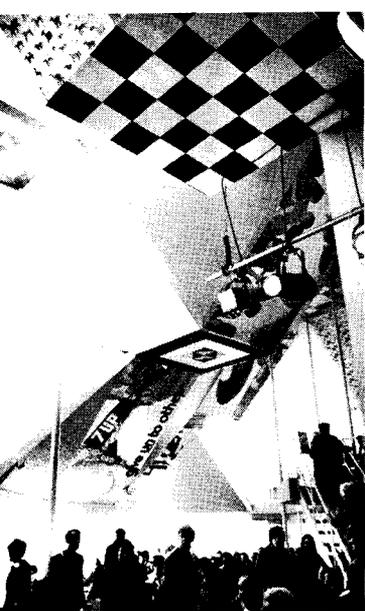
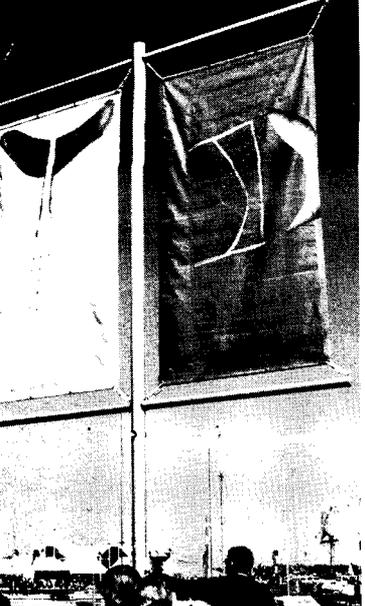
Ontario Place, Toronto, Ont. Owner: Government of Ontario. Architects: Craig, Zeidler & Strong (Eberhard H. Zeidler, partner in charge; Allan M. Young, project architect). Engineers: Gordon Dowdell & Associates; W. Hardy Craig & Associates (mechanical). Landscape architects: Hough Stanbury & Associates. Interior exhibitions: Stewart & Morrison. Acoustics consultant (for the Forum): Christopher Jaffe. Contract Management: J. L. Neilson Management, Ltd. Site area: 96 acres (land and water). Building areas: 90,000 sq. ft. (pavilion), 20,000 sq. ft. (Cinesphere), 40,000 sq. ft. (Forum), 40,000 sq. ft. (island buildings). Cost: approximately \$23 million.

(For a listing of key products used in this building, see p. 84.)

PHOTOGRAPHS: aerial photo, George Hunter; other photos by Peter Wakayama, Madan Rao, Hiro Nakashima, and Terry Shaw.

Bold graphics in the three island "villages" include (near right, top to bottom): a canopy of painted canvas on a metal frame; two examples of supersigns on cafe walls; blossom-spattered plywood canopies at the Edelweiss Beer Garden. Other colorful patterns occur (center column, top to bottom) on banners, on windsocks, on an angular snack-bar ceiling, on the painted and mirrored walls of a restaurant in the main pavilion. Restful beaches facing the lake (far right, top) are only a few steps from the bustle of the marina village (bottom).







PLAYING WITH BLOCKS

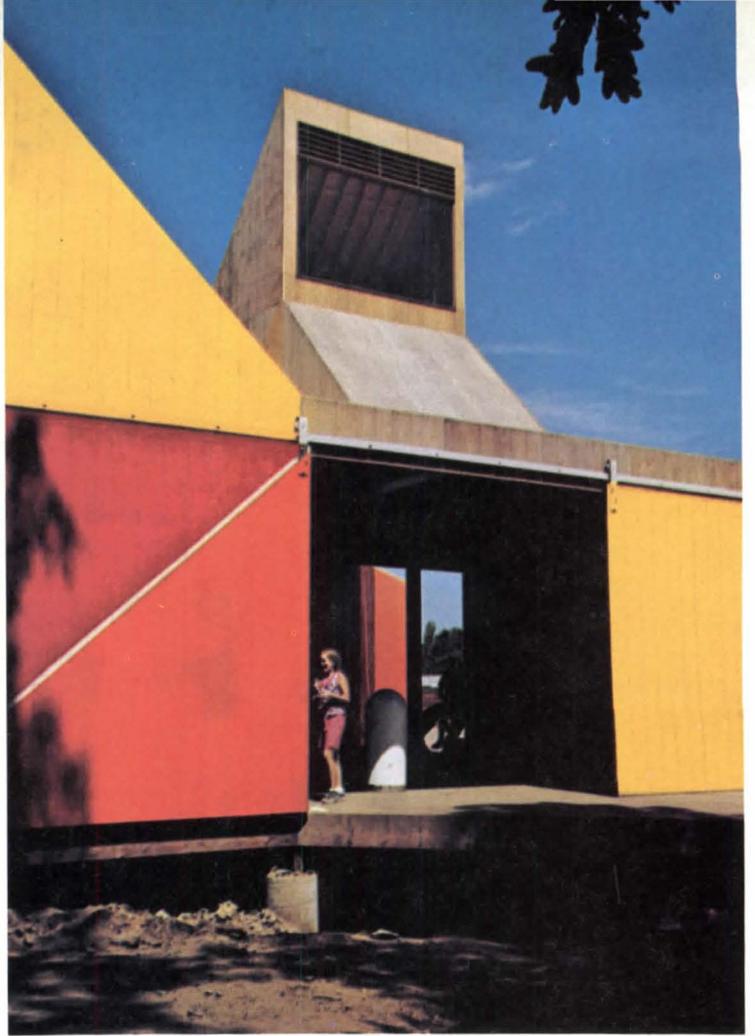
A day camp in New Jersey is fun for those in it and for those passing by

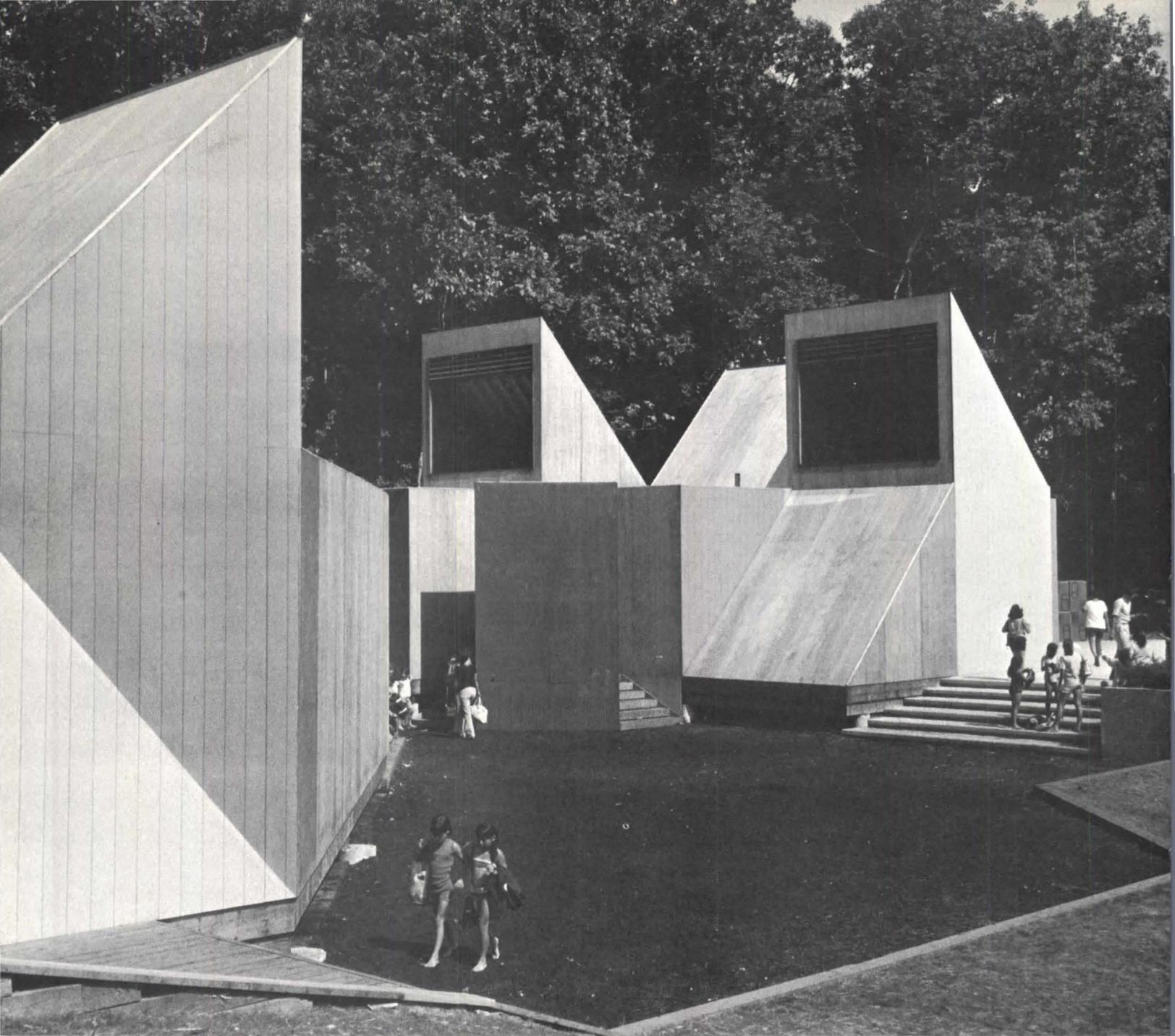
Despite its playful resemblance to a set of building blocks, this YM-YWHA day camp by Samton Associates is a carefully designed piece of architecture, creatively answering the needs of campers and staff, and resulting in a low-budget work of considerable visual and spatial interest.

Claude Samton, the partner in charge, started off with a concept unusual in summer camps. He chose to link the separate buildings along a deck that would be more than a passageway, and he worked the main activity buildings around a central amphitheater as "a kind of town center."

A consultant on camps had advised the client against grouping the facilities—"you've got all this woods." But Samton's plan will preserve that area primarily as woodland (and as the setting for five "home-room" cabins, yet to be built). And his arguments for the continuous deck and central amphitheater were convincing: the deck would circumvent a drainage problem and allow children to be outdoors even after heavy rains; the amphitheater would provide a good collection place for end-of-day activities; and the compactness of the main activity spaces would require only a few people for control.

The deck opens out in several





directions to give room for many simultaneous activities. Samton is convinced, in general, that "you can't design a specific space for a specific purpose; you have to have general space they can use for various purposes." Except for the locker and shower rooms, and to some extent the arts and crafts building, the enclosed areas are as adaptable as is the open deck.

The cost of the deck was \$15,000, but Samton explains that the clayey soil would otherwise have needed drainage pipe and a blacktop surface, "so the costs were very close." He cites the great savings in labor in simply putting down all the deck and

then building units on top of it. In effect, the deck is a foundation, built up on piers that are 12 ft. on center.

The \$175,000 price (including pool) was negotiated rather than bid, and the builder consulted as to feasibility of the design. The cost of the enclosed space was \$12.50 per sq. ft. Skylights and the sliding door assemblies were built on the deck and then fitted into place; all else was built conventionally, putting up studs and fastening the 4 ft. x 12 ft. sheets of plywood to them. (A whole carload of the over-sized panels had been specially ordered from the West Coast.) Openings in the panels were cut in place,

after the panels went up.

Directions for getting to the camp include the final words "and you can't miss it." This is quite true. The brightly colored faces of cubes and parts of facades are the smile in a deadpan landscape. But the pleasures are not just painted on; the interesting and varied spaces offer flexibility to suit a varied program. (The only three-story space, with its eye on the amphitheater, was not in the program and was not received with enthusiasm by the building committee; but staff and campers use it and like it.)

At one time, says Samton, "I thought there should be one roof

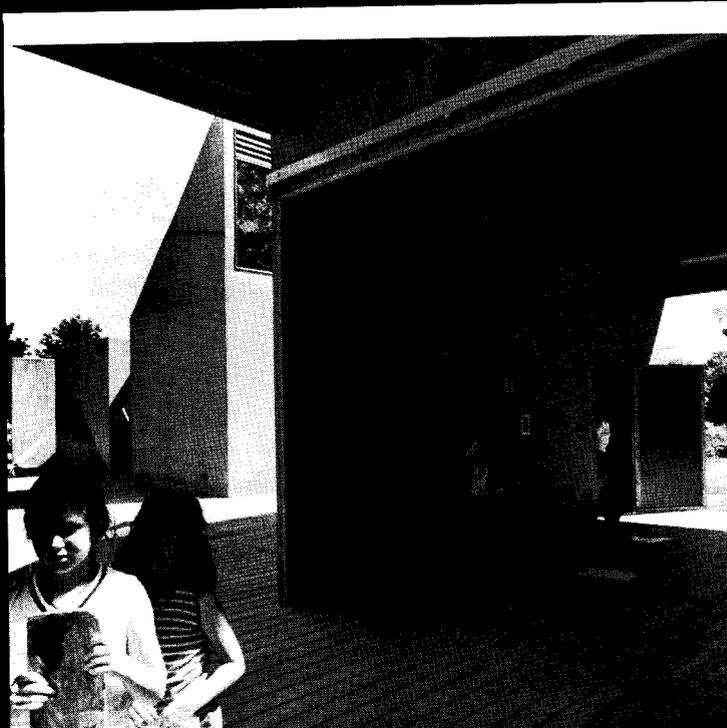
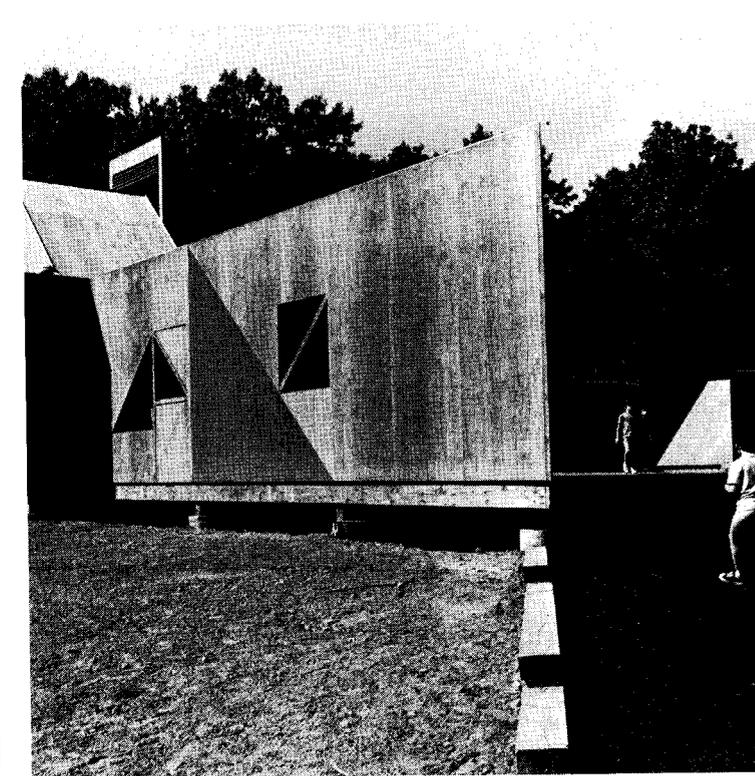
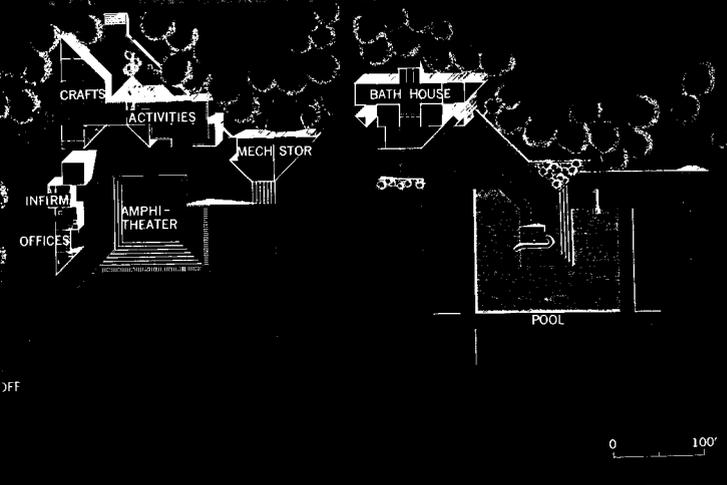
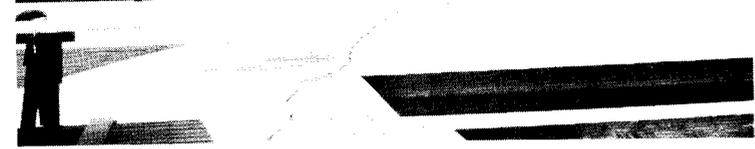
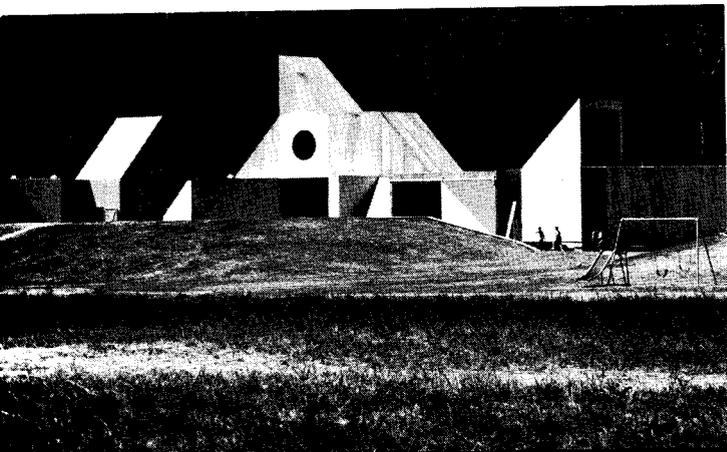
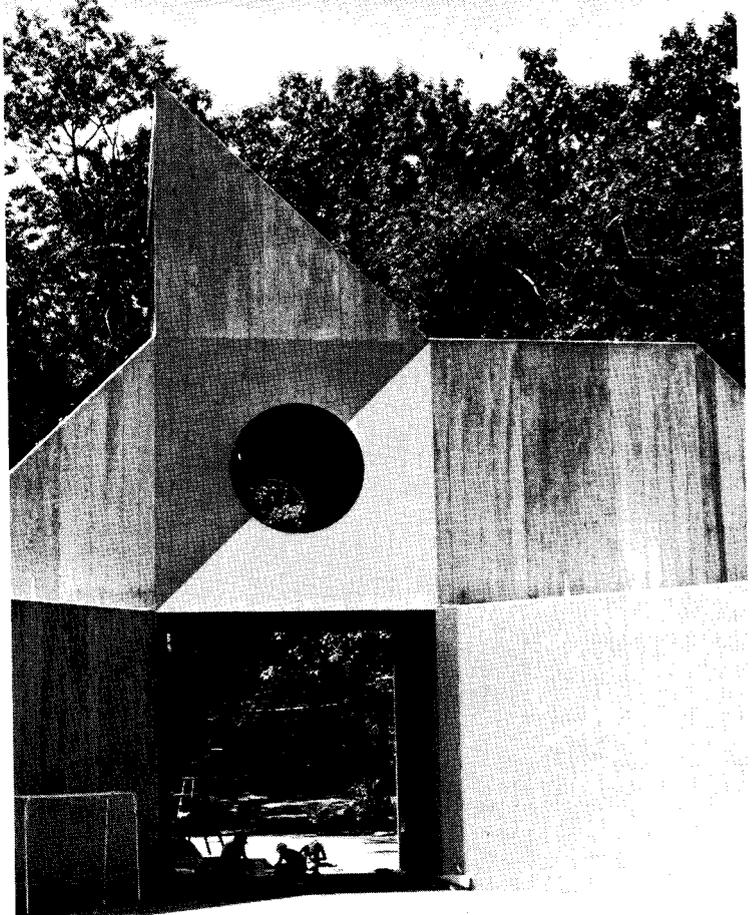
over the whole thing, but then I decided it must be kids' scale; it must be their own."

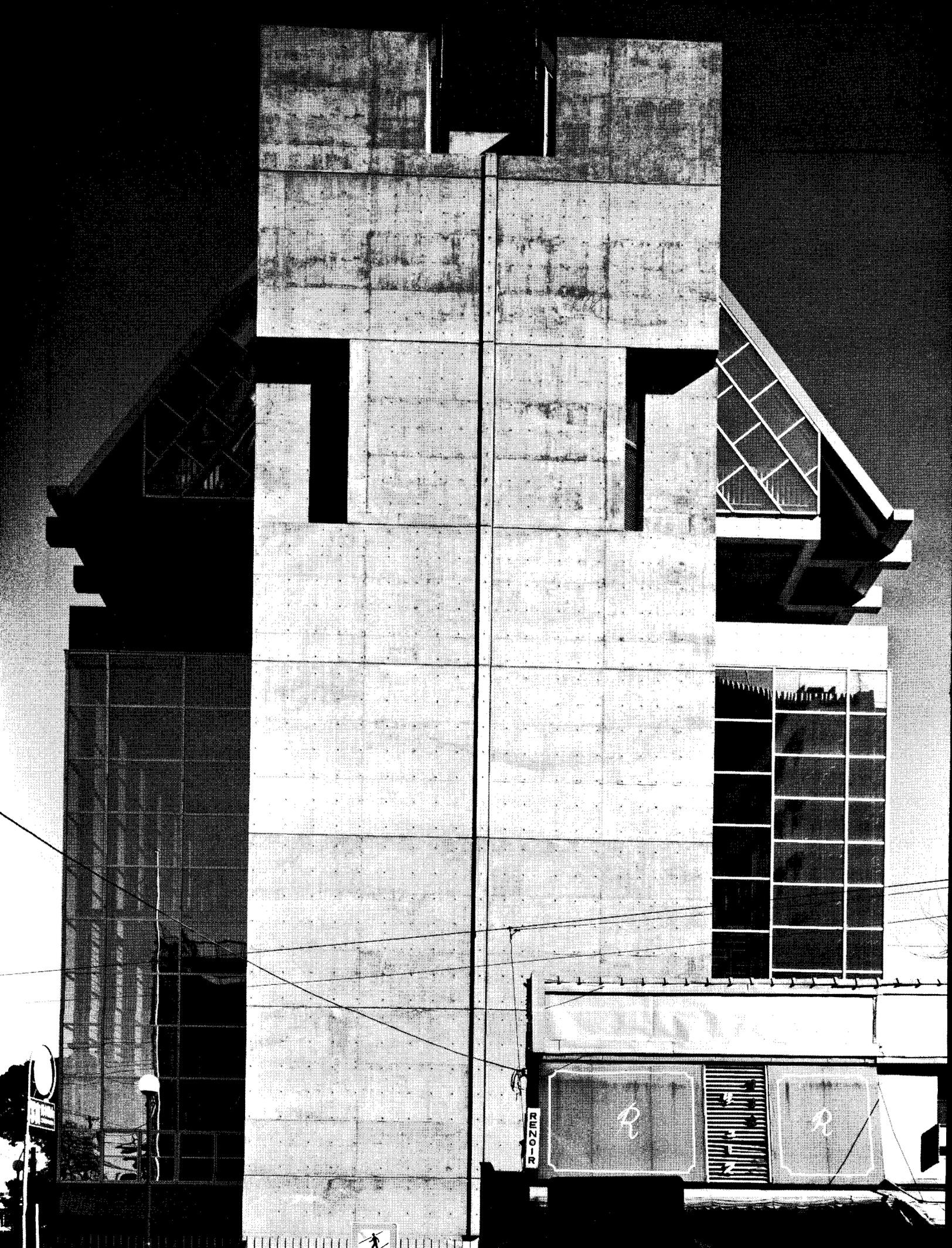
—ELLEN PERRY BERKELEY

FACTS AND FIGURES

YM-YWHA Day Camp, Mt. Olive, N. J. Owner: YM-YWHA of Essex County. Architect: Samton Associates (Claude Samton, partner in charge; Fred Calabrese, job captain). Engineers: Robert Silman (structural); Robert Freudenberg (mechanical/electrical). Landscape architect: D. C. Richardson. Pool consultant: Gerald Palevsky. General Contractor: Miller & Nelson. Building area: 6,292 sq. ft. Construction cost: \$80,000 (enclosed buildings); \$50,000 (pool); \$15,000 (deck); \$10,000 (amphitheater); \$20,000 (land development, athletic fields, planting). (For a listing of key products used in this building, see p. 84.) PHOTOGRAPHS: David Hirsch

An earth berm shields the camp partially from the road; nestled into the berm is the small amphitheater. The swimming pool is worked into a U-shape around the pool works, and the inside of the U is edged by many steps (useful both to campers learning to swim and to those taking a rest from the water). The bright colors, except for the orange, came directly out of the can, and were sprayed onto the plywood panels in order to preserve their rough texture.



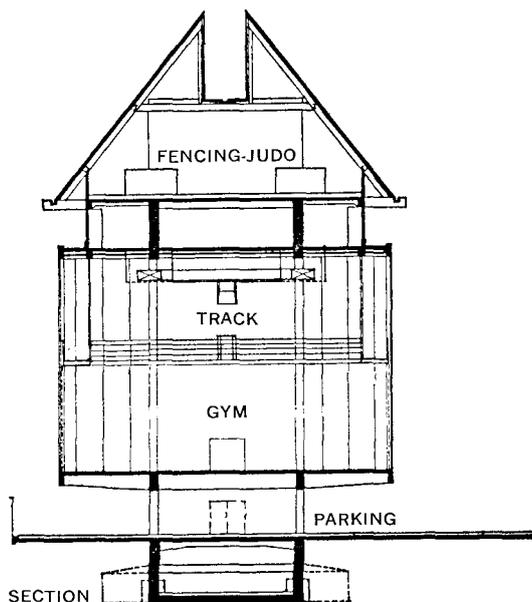
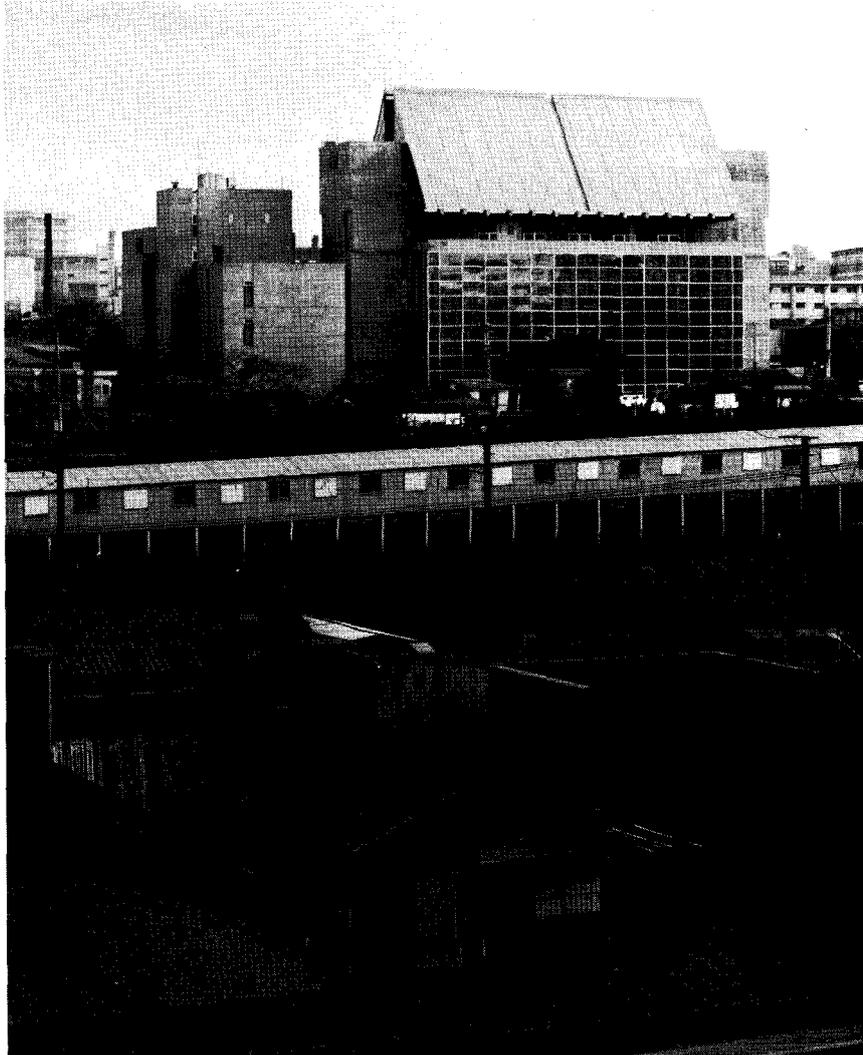


RUZO-R



SPORTS SHOWCASE

Glass-walled college gym in the heart of Tokyo makes an urban event out of indoor athletics



Monolithic concrete service towers at the ends of the gym (left) contrast strongly with the glass-walled volumes they support. Diagonal divisions of the glass on the upper portion emphasize the skin-like quality of all the glass walls. A distant view (above) shows the relation of the end towers to the massive concrete structures of the existing college.

The gymnasium for the Japan Dental College had to be wedged into an old neighborhood near Tokyo's Imperial Palace. The site is at a busy streetcorner near a transit station, and Architect Shin'ichi Okada was determined not to blight it with a forbidding, blank-faced volume.

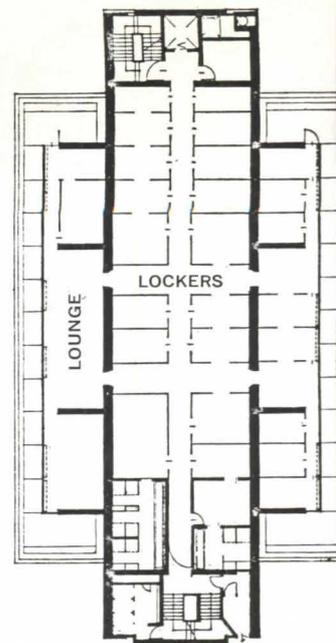
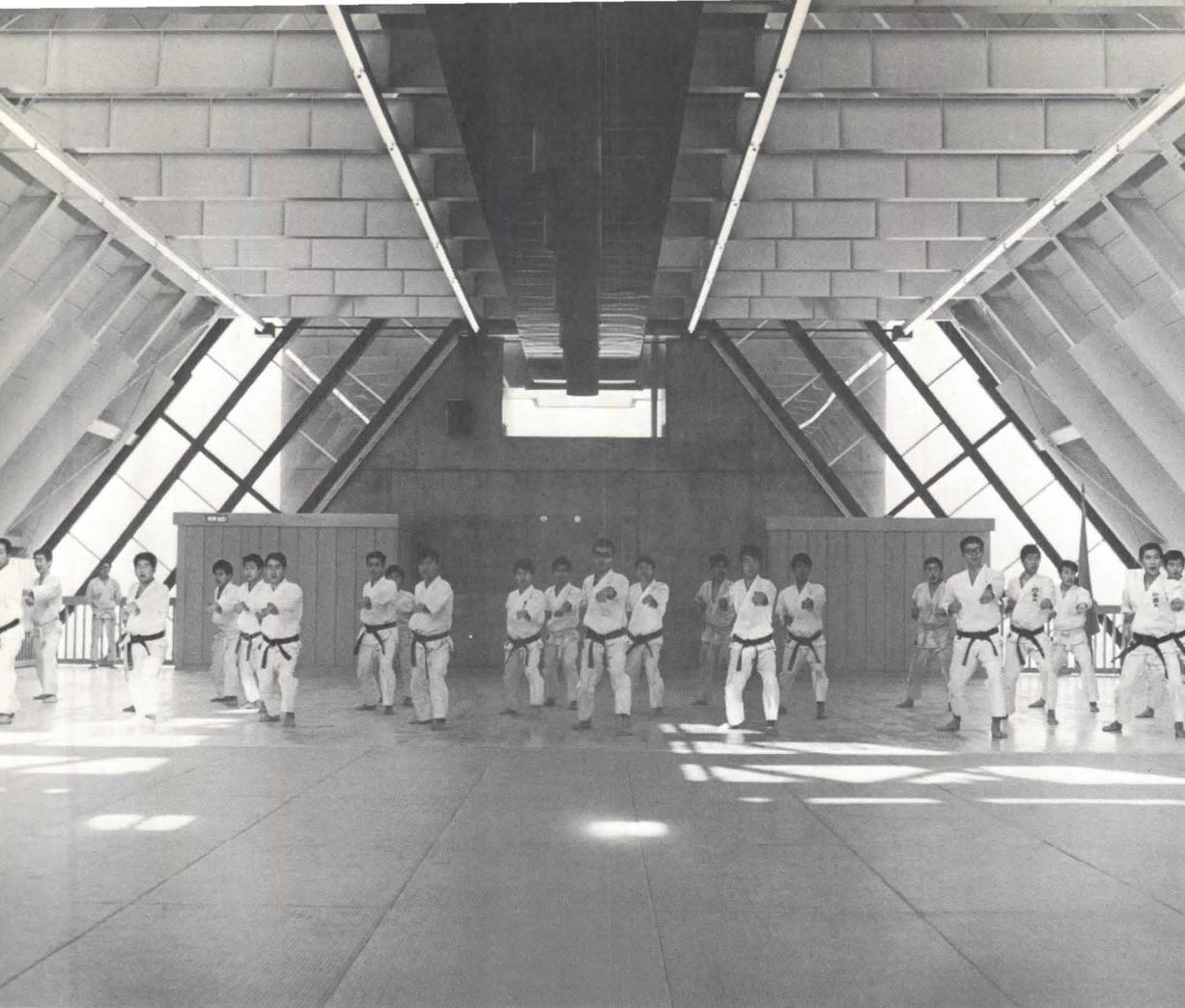
He explains his see-through gym with a parallel to fishermen at the town waterfront: "There exists no relationship between the person who is fishing and the spectators, but there is a warm atmosphere. The same can be said in the case of sports. Those who are playing and those who are looking on casually, all are sharing the pleasure of the moment."

Okada's glass cage around the main gym seems to carry the familiar device of the delicate curtain wall to a rare level of refinement. Thin aluminum frames, set in front of steel mullions, stretch the full 45-ft. height of the space. Glass with a thin reflective coating will give a rather shadowy view of the interior by day. By night, however, the players are clearly visible, and the building lights up the area like an enormous lantern.

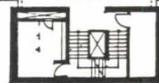
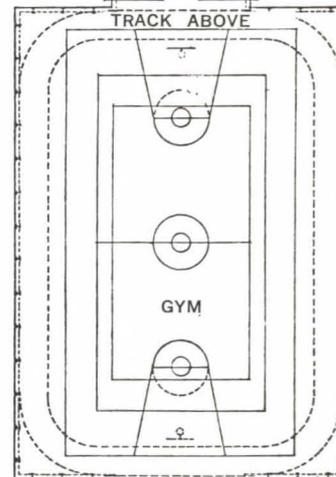
Okada had to stack the various activities of the gym vertically, and he made this stacking the basis for the building's powerful form. The volume of the main gym is topped by a recessed layer of locker and dressing rooms. Above them is a tall, angular volume housing the judo and fencing halls.

These upper halls are carried on story-high beams running through the locker room floor and resting on the massive concrete towers at either end of the building. This organization of end towers and cross beams—clearly apparent from the exterior—quite obviously recalls the form of the traditional Japanese gate. Okada notes this relationship, and points out that the gym is near the site of a historic ceremonial gateway to the palace precincts.

In fact, the angular form of the upper halls seems to have little purpose except to echo the traditional form of a gateway roof. Projecting beam ends at the base of the slopes reinforce this image. Whether or not this symbolism is appropriate, the outcome is a superbly sculptural urban landmark.



THIRD FLOOR



SECOND FLOOR

0 2

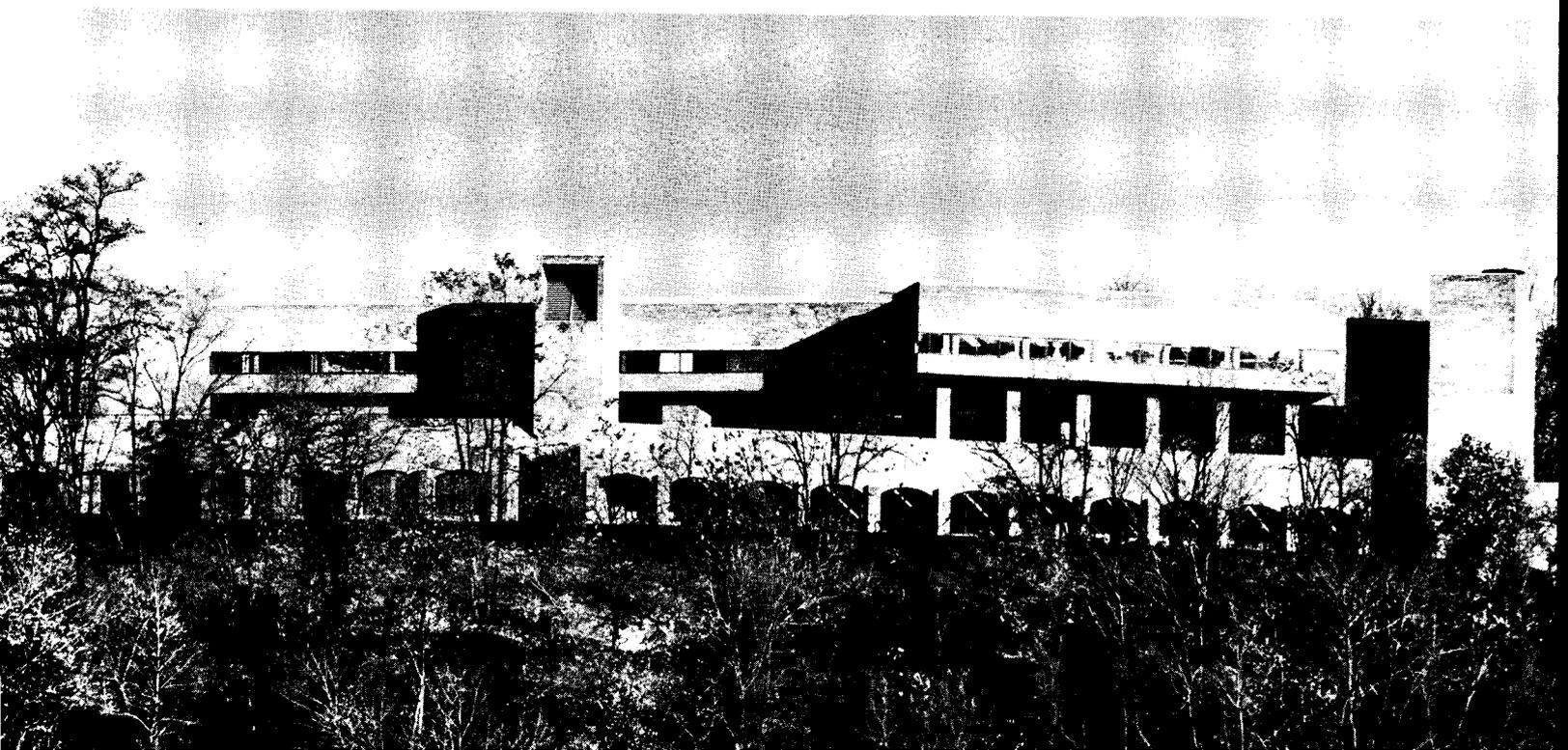


The glass walls of the main gym (left) are protected from the impact of basketballs by a metal screen that, paradoxically, makes the wall look even more delicate. The 45-ft. height of the room allows for an elevated training track around it. The judo and karate hall at the top of the structure (top left) has tall light monitors along the split peak of the roof. The building was designed to contribute a strip of paved public space to its busy street corner (right), but the college has closed off the space with a tall security fence.

FACTS AND FIGURES

Gymnasium for the Japan Dental College, Tokyo, Japan. Design and construction: The Kajima Construction Co. (Shin'ichi Okada, Architect). Building area: 35,530 sq. ft. PHOTOGRAPHS: Taihaku Ishimoto.





OVERLOOK IN A NATIONAL PARK

The new Interpretive Design Center at Harper's Ferry surveys the confluence of the Potomac and Shenandoah Rivers

The National Park Service, in addition to looking after a certain amount of spectacular real estate, tries to explain to its visitors what it is they are looking at. In the past, this mission was accomplished by means of exhibits and other visual aids prepared in different places and with varying skills. Now that the handsome Interpretive Design Center at Harpers Ferry, W. Va., is complete, all the design disciplines employed by the National Park System are centralized and directed from here.

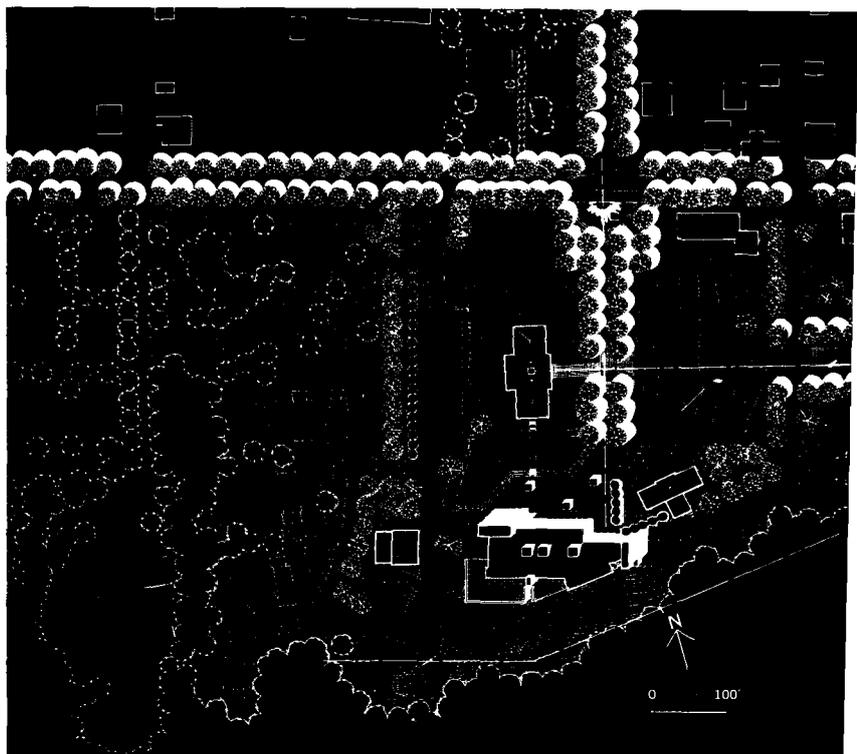
These disciplines bring together "in a work-in-progress fashion," as the architect, Ulrich Franzen, puts it, "the historian, the naturalist, the ranger, graphic designer, film maker, exhibition designer, writer and editor, diorama maker—as well as historic preservation and restoration experts."

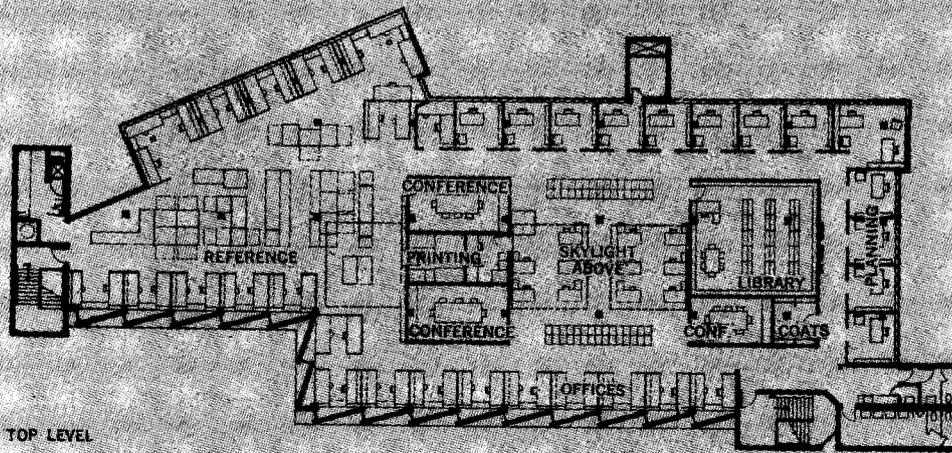
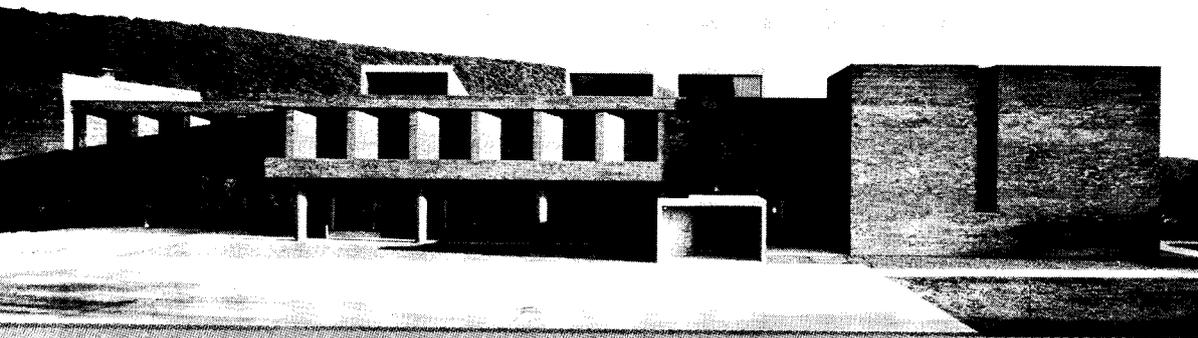
No site could be better suited to stimulate "interpretive designers": a promontory at the intersection of the Shenandoah and Potomac Rivers, once the location of George Washington's first armory works, now a breathtaking overlook of the Shenandoah's rapids, whose roar forms a constant, musical backdrop to the visual experience. The new Center—"a studio-and-workshop-type building," according to Franzen—is only an hour's driving time from Washington, D.C., where many of the experts who now work here used to be stationed.

Because of the beauty and historic significance of the site, the architect organized his building, along its southern edge, to follow the configurations of the valley—breaking up its three horizontal volumes to reinforce the contours of the hillside.

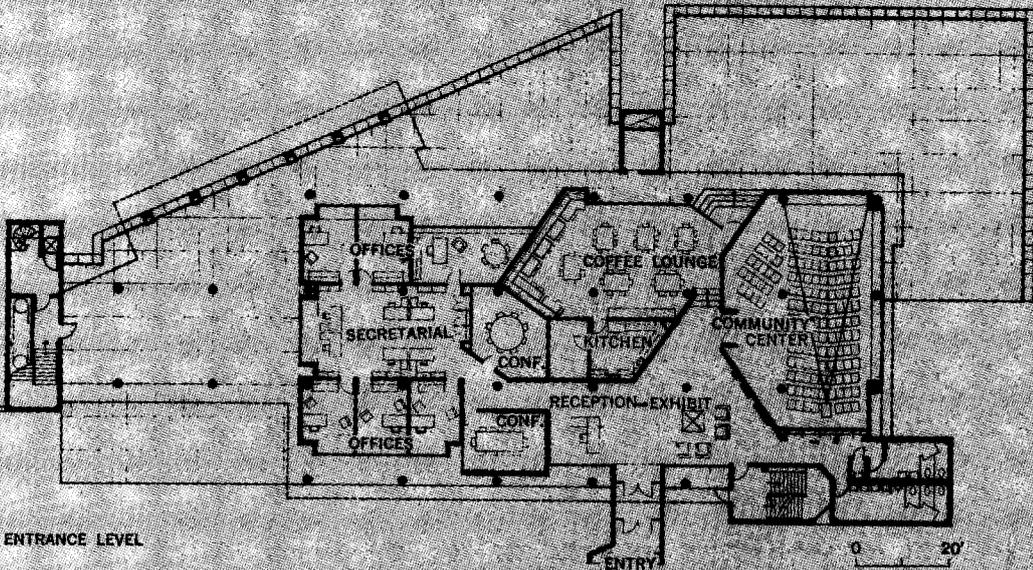
These three horizontal layers of the building differ both in function and in perimeter: the middle layer is the entrance level (the building is entered from the north, the uphill side), and this level contains reception areas, administrative offices, a lounge, an auditorium, and spacious terraces that offer panoramic views of the valley, west, south and east. The lower level, with its arched openings toward the valley, contains graphics and carpentry shops, and audio-visual studios. And the upper level, which has carefully angled views in all directions, contains drafting rooms and design and other studio areas. These areas are

The middle or entrance level of the Harpers Ferry Building has spacious terraces for visitors to overlook the intersection of the Shenandoah and Potomac Rivers. The terraces are shown at top left and top right. At bottom left there is a view from across the valley, showing the three horizontal layers of the building. The middle layer has the overlook terraces. The site plan at bottom right shows how the building follows the "organic" configurations of its site along its southern edge, and fits into the gridiron geometry of the village on the northern approach side.

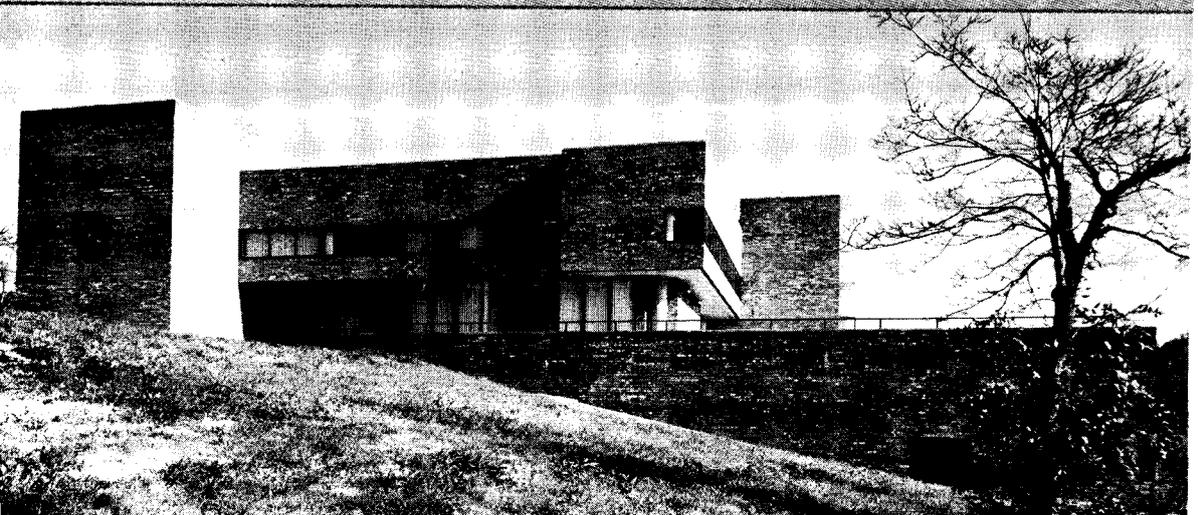




TOP LEVEL



ENTRANCE LEVEL



skylit (with skylights facing north), and the viewing slots are limited and shielded to reduce heat load and glare.

The early plans for the Harpers Ferry promontory were based on a rectangular grid to accommodate workers and offices in the armory works. Franzen's building, where it ties into the historic community to the north, follows the dictates of the original gridiron plan. In other words, the building is, in a way, two-faced: an "organic" configuration where it faces the valley; an axial, "geometric" configuration where it faces the historic village.

The structure is reinforced concrete—20 ft. square bays, flat-slab floors, brick veneer, cavity, block interior; in short, very inexpensive. All the luxuries are natural light and natural views. And so the building seems luxurious, indeed, though its construction cost was well below \$1 million.

There was a time when the National Park Service, under the Department of the Interior, seemed a rather fuddy-duddy organization: well-intentioned but dull. When Stewart Udall became Secretary of Interior under Kennedy, and continued under Johnson, much of this changed dramatically. This building, inspired not only by the new visions from above, but also by the visions of George B. Hartzog Jr., its Director, and of Bill Everhart, Director of Interpretive Services, is a symbol of that change.

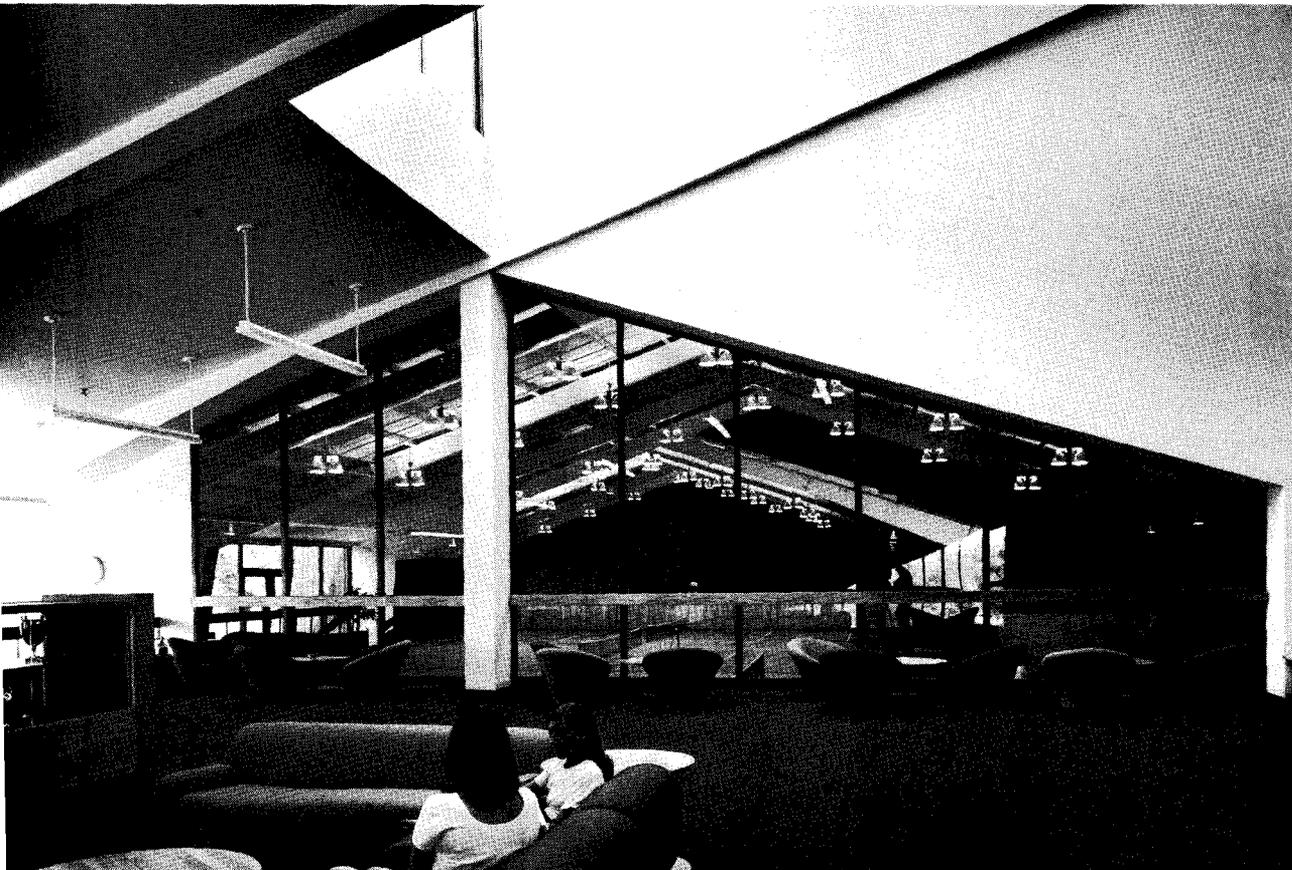
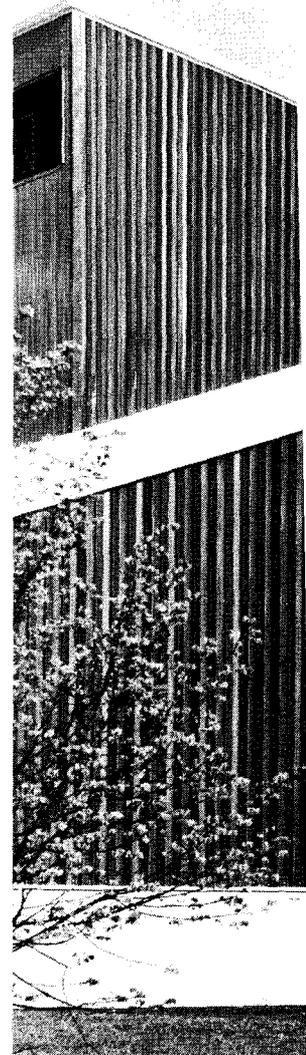
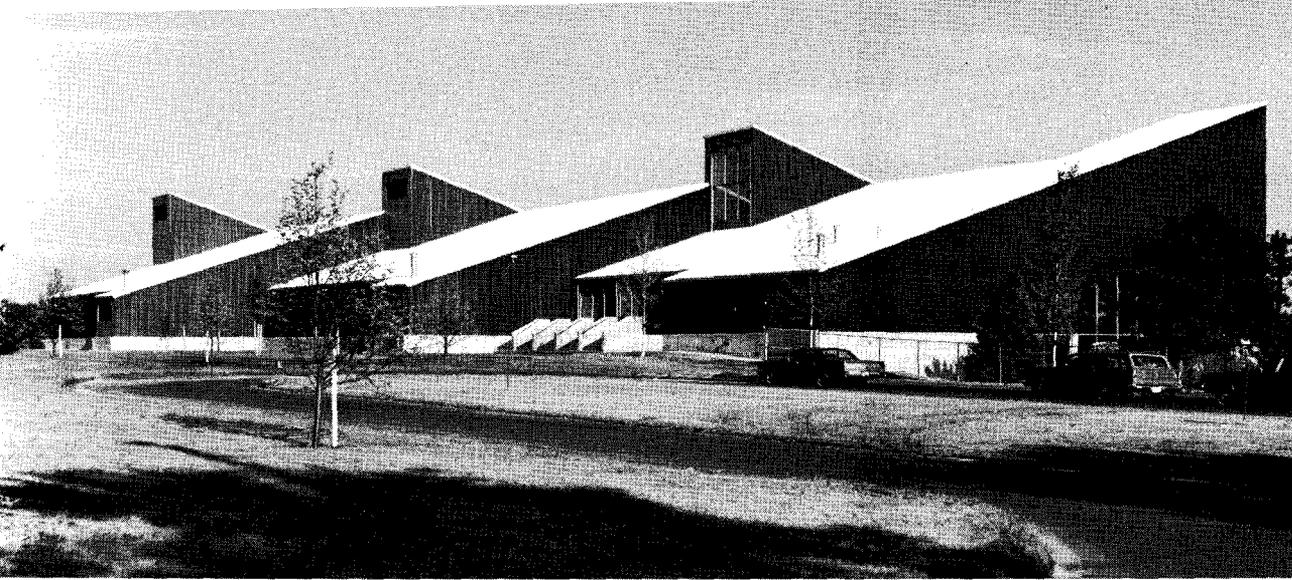
FACTS AND FIGURES

Interpretive Facilities Building, Harpers Ferry, West Virginia. Owner: National Park Service. Architect: Ulrich Franzen and Associates. Engineers: Andrew G. Elliott (structural); John L. Altieri (mechanical and electrical). General Contractor: Norman S. Earley & Son, Inc. Building area: 37,000 sq. ft. Construction cost: \$935,000 (approximate).

PHOTOGRAPHS: George Cserna, except page 49 National Park Service Photo by M. Woodbridge Williams.

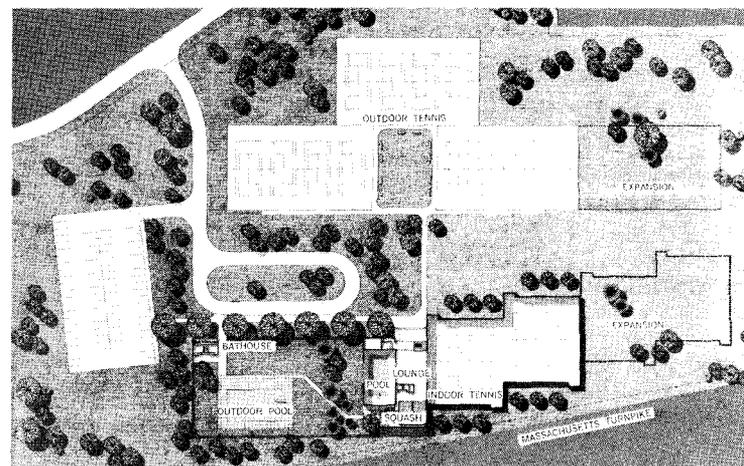
The picture at top left, is of the approach side of the building. The skylights, facing north, illuminate the studios on the top floor. Plans show that floor, and the middle (entrance) level; the lowest floor, which is dug into the hillside—see photo at lower left—contains graphics, carpentry workshops, and audio-visual facilities. On the facing page: view from the terrace at the middle level, with the Shenandoah River below. The roar of its rapids is audible at all times.

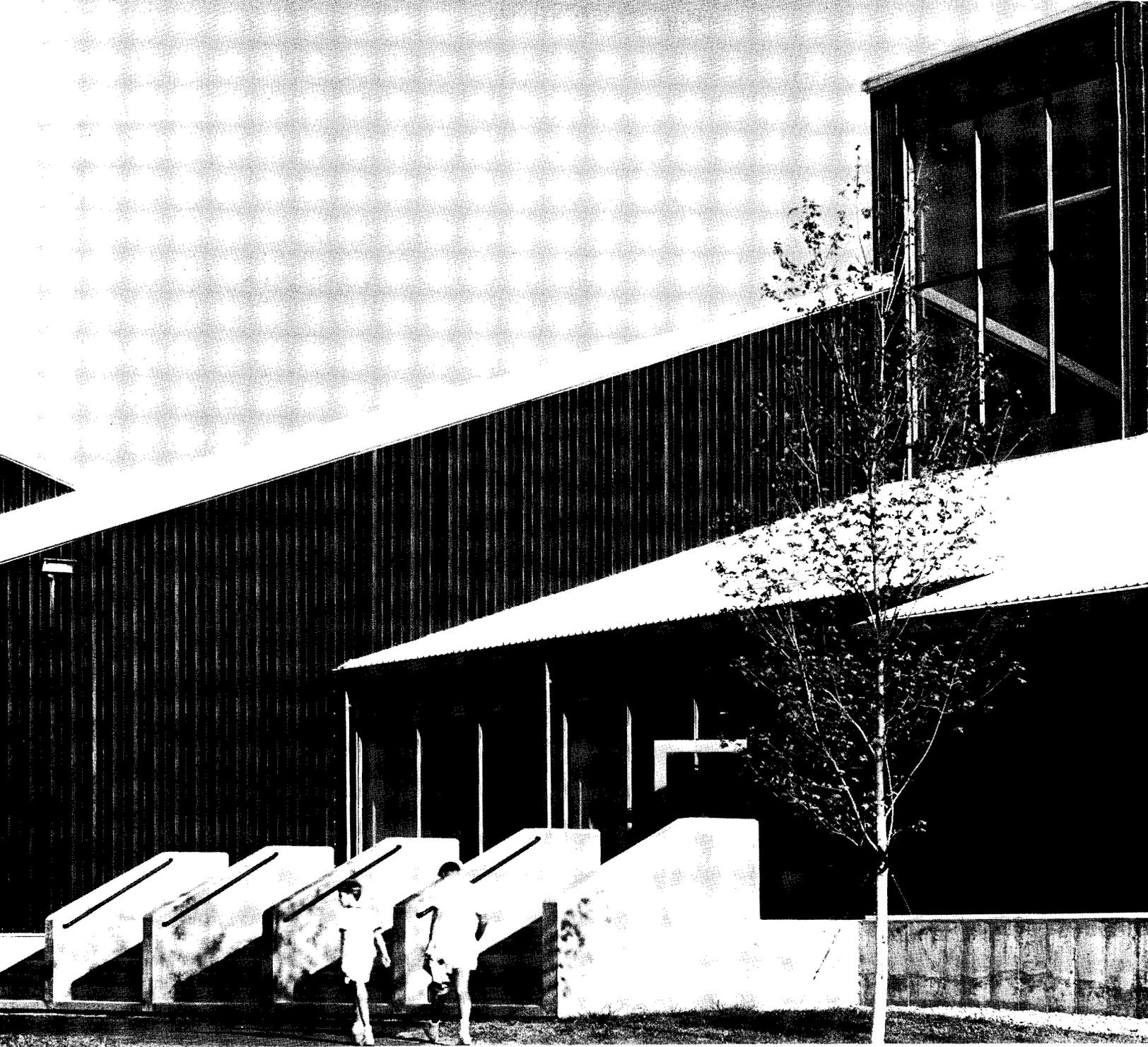




METAL BUILDINGS FOR SPORT

A tennis club achieves a low-cost structure of some elegance with standard components





Three hundred tennis-playing families in suburban Boston came to Sasaki, Dawson, DeMay Associates with a stringent budget, with 16 acres of land abutting the Massachusetts Turnpike, and with a sketch for a block-long Colonial building—complete with cupola.

They got an excellent facility for their money, made of standard pre-engineered components, and having an elegant lounge that overlooks sports activity in all four directions. They got insulation of both interior and exterior against the noise of traffic. They did not get their cupola,

but it doesn't seem to be missed.

"Our design attempt was to remove, once and for all, the stigma of obligatory ugliness from pre-engineered buildings," says Kenneth DeMay. To break up the vast surfaces of roof, the building was divided into three staggered sections, a pair of tennis courts in each of two of the sections.

The building is used as a buffer, to isolate the outdoor courts from traffic noise. The pool, because it is another source of noise, was also located near the road. The building itself is well insulated against road noise.

"We only took the standard components," says DeMay, "which are standard with about six firms. We didn't come up with any radical departure on pre-engineered buildings." Heating and ventilating equipment is housed in a series of simple roof and wall extensions which use the standard components while adding further to the variegated silhouette.

The architects worked with Butler Manufacturing Co., in the design stage, but in the end Inland Steel Products Co. components were used, having been included by the low bidder.

FACTS AND FIGURES

Hazel Hotchkiss Wightman Tennis Center, Weston, Mass. Architect: Sasaki, Dawson, DeMay Associates, Inc. (Kenneth DeMay, principal in charge; Richard T. Hardaway, project architect). Engineers: LeMessurier Associates (structural); Greenleaf Engineers (mechanical/electrical). General contractor: Charles A. Logue Building Co. Building area: 44,115 sq. ft. Construction cost: \$741,000 (building); \$208,000 (site work and exterior facilities). Approximate cost per sq. ft.: \$10 (tennis court buildings); \$30 (other enclosed facilities, including pool, squash courts, carpeting, lockers); \$16.80 (overall cost). (For a listing of key products used in this building, see p. 84.) PHOTOGRAPHS: Hutchins Photography, Inc.

RADBURN REVISITED

Unlike Hoover's "two chickens
in every pot, two cars
in every garage,"
the promised Town for the
Motor Age almost materialized.

BY HENRY N. WRIGHT

The idea that architects should be advocates is not all that new. Present-day activists have a way to go just to catch up with the co-designers of Radburn, New Jersey—Clarence S. Stein and my father, Henry Wright. Radburn's influence on community planning has persisted 40 years and spread worldwide. And Radburn did not just happen. It was the harvest of almost a decade of theorizing, organizing and agitation by two innovative technicians. It all started with their dissatisfaction with the building industry's stumbling attempts to relieve the housing shortage following World War I.

Should architects be their own clients and show what should be built? In 1919 Henry Wright did just that. In an effort to stem the spate of railroad flats that was inundating cities like Boston, Chicago, and his home town of St. Louis, Wright invested his limited capital in a demonstration project. On a corner site in a vicinity of narrow, tightly packed, multi-family buildings, he built two attractive four-family dwellings broadside to the street, complete with sloping slate roofs—buildings which used twice as much frontage as those built by neighboring speculators. These broadside flats were copied many times. The apartments rented easily at a premium—a result which even profit-oriented businessmen could appreciate.

Should architects involve themselves in politics? Clarence Stein did. In 1919, fresh out of the army, he became secretary of the Housing Committee of New York Governor Alfred E. Smith's important post-war Reconstruction Commission. Later he was appointed chairman of the State Commission for Housing and Regional Planning. The subsequent investigations of the housing shortage which he conducted rated front-page headlines in the New York City papers, including the tabloid *Daily News*. Lewis Mumford was later to trace the beginnings of the public housing movement to this pioneer work commenced by Stein on a volunteer basis. Another of the Com-

mission's achievements, a regional plan of the State of New York, was recalled with approval by *The New York Times* 30 years later—a possible record for delayed approbation.

Can architects turn promoters and put together sufficient corporate power to make waves in the nation's biggest puddle? Stein and Wright did. What brought them together was the creation of the City Housing Corporation, builder of Radburn. In 1917-18 Wright came East to help the U. S. Shipping Board in its efforts to cope with wartime housing shortage in centers like Camden, N. J., Newburgh, N. Y. and Bridgeport, Conn. At the end of the emergency, Architect Robert D. Kohn, director of the project, who knew of Stein's interest in large-scale housing, introduced the two men. At the time Stein was discussing with Alexander M. Bing, a prominent and successful New York realtor, the possibility of Bing's retiring from commercial activity to devote himself to housing reform. The result was a three-man team of varying talents. Each was to make a decisive contribution to Radburn, "the town for the motor age."

"Philanthropy at Six Per Cent"*

In 1923 Bing, Stein and Wright made a study for a hypothetical garden suburb involving one square mile (640 acres) of apartments, row houses, parks, allotment gardens and industrial sites for the New York City region—an early form of feasibility study which led to the creation of the City Housing Corporation, a limited-dividend enterprise organized under the laws of New York State. It was backed financially by the do-gooders of the period: people who supported Governor Smith, the Hudson Guild (a settlement house), or the Society for Ethical Culture—or, like Stein, had long supported all three. Dedicated to the ultimate creation of a garden city on the English pattern, the corporation was able to purchase a large tract in the Borough of Queens close to midtown Manhattan and served by several subways. Sunnyside Gardens, built on this site in 1924-28, accommodated 1200 families and pioneered the grouping of privately owned row houses around a central common area. While of neces-

Mr. Wright is a former Managing Editor of the *Architectural Forum*. After six and a half years at Kansas State University, Professor Wright is about to join the faculty of The City College in New York.

city conforming to New York City's elongated block layout, Sunnyside anticipated numerous features of the Radburn plan.

Neither Sunnyside nor Radburn was a goal in itself. Each was part of a larger plan. Long before Sunnyside was finished Stein and Wright, in association with Charles Harris Whitaker, brilliant Editor of the *Journal of the AIA*, formed the Regional Plan Association of America. This group included among its charter membership Lewis Mumford, then a disciple of biosociologist Patrick Geddes; Benton McKay, a pioneer ecologist and father of the Adirondack Trail; and progressive economist Stuart Chase. Eventually the membership list of this select but influential body read like a roster of the housing and planning movement. In addition to the above, it included Catherine Bauer, Frederick Ackerman, Tracy Augur, Russell Black, and Edith Elmer Wood.**

A Systems Approach

The RPAA developed a view of the housing problem which today would be called a systems approach. The housing supply, as they saw it, depended as much on transportation, public schools, recreation facilities, power networks, water supply, sewage disposal, etc., as upon dwellings themselves. Conversely, the cost of all these things depended to a large extent on where and in what form housing was built, as did the vital question of the quality of life which the assemblage of such factors would foster and accommodate.

This organization, according to Lewis Mumford, "already recognized in the 1920's that a substantial dispersion of population and industry to suburban areas would be accelerated by electric power and the gasoline engine. It viewed the issue as one of controlled, regional decentralization . . . or formless dispersion in which the suburbs would sooner or later be swallowed up and lost in the maw of the great city"—the megalopolis, in fact. The most co-

*Title of an editorial in a *Staten Island, N. Y.*, paper attacking the City Housing Corporation.

**Missing are Henry S. Churchill and Albert Mayer. Both, however, worked with Wright in the mid-Thirties, and later helped Stein with *Kitimat, B. C.*

THE DREAM . . .

" . . . the whole life of the community revolved around its central park system. Once the motor car was put away in the garage that entered from the lane, the street was forgotten. All activities, including walking from one home to visit friends in another, took place over the park walks. Here children played because the things that attracted them were centered in the park or made accessible from its walks instead of from the streets."

HENRY WRIGHT (Sr.)
co-designer of Radburn,
in *Rehousing Urban America*, 1935

. . . AND REALITY?

" . . . neighboring Radburn cul-de-sacs have no social connection. Interests are turned inward. The kitchen becomes the inelegant focal point for all outside activity, which consists of 'across the pavement' contacts . . . The children play more in the lanes than the parks . . . The automobile becomes, in fact, a member of the family . . . Despite this, Radburn has always retained its validity as a place for young couples and small children."

ALDEN CHRISTIE
Harvard Design School graduate
and former Radburn resident,
in *Connection*, 1964



Airview of main portion of Radburn (circa 1950) shows generous commons and recreation areas which constituted the cores of the super-blocks, and the compact, economical character of the surrounding residential development. The apartment buildings which were an integral part of the original scheme are visible at lower right. Picture at left is a romantic view of the pedestrian underpass which became the trademark of Radburn's complete separation of vehicular and foot traffic.



herent expression of these ideas was the Regional Planning Report for New York State mentioned above. Prepared by Henry Wright, this report showed how the advent of coal fuel, steam power and rail transportation had drawn the population of the state into a congested dog-leg joining Buffalo, Schenectady and New York City, wiping out the "eotechnic" balance and diffusion that existed as late as 1840 and leaving much of the state underpopulated and economically orphaned. The way to reverse this trend, it suggested, lay in long distance electric transmission and motor truck transportation. These could reshape the economic life of the state and provide a practical foundation for population dispersion—as indeed they since have, in an unplanned way.

Radburn is Born

Sunnyside was finished in 1928. Meanwhile, the City Housing Corporation had continued to look for a suitable site for a garden city. At one time it considered a large tract of land on Grand Island in the Niagara River near Buffalo. However, no entirely suitable location was found. Eventually a site in Fair Lawn, New Jersey, ten miles from the George Washington Bridge, was chosen for a community in which the incorporation of industry was contemplated. The projected town, however, would not be a true garden city since it could not be surrounded by an agricultural greenbelt. The cost of land in the Fair Lawn area precluded this.

Preliminary planning of the Radburn community began in January 1928, and by August of the same year construction had started. The first houses were occupied nine months later—a respectable period of gestation for a housing development started from scratch. By the end of 1929, 175 single-family houses, ten two-family houses, and a 92-unit garden apartment had been built. By 1931 the number of families had increased to 355; it ultimately reached 400.

Architecturally, the houses were vaguely "Colonial," inasmuch as most of them had white clapboard walls, shingle roofs and window shutters. Some had brick walls below, clapboards above, many had hip

roofs—a rather commonplace formula that benefited considerably from the compact, irregular groupings which resulted from the cul-de-sac layout. This eliminated the two-dimensional, “cardboard house” effect which results from continuous streets and the uniform setbacks and side clearances dictated by today’s zoning.

Any evaluation of Radburn must recognize that only a small part of the projected community was built. In Clarence Stein’s words, it “was engulfed by the Depression.” Of the 1300 acres purchased by the corporation, only 150 were built upon. Nevertheless, the two superblocks that were built proved a sufficient demonstration of its basic and highly original planning concepts to attract national and eventually international attention.

Fundamentally, these concepts grew out of a demonstration by British town planner Raymond Unwin which he called “Nothing Gained by Overcrowding.” Unwin’s analysis hinged on the fact that the improvements needed to make raw land suitable for housing cost considerably more in the aggregate than the land itself. Moreover, such improvements are essentially linear. Thus, a large block of land surrounded by streets, sewers, etc., which can be utilized with greater efficiency than is possible with several smaller blocks, results in savings sufficient to pay for the cost of a considerable open area in the middle. This gives rise to the superblock, with its developed perimeter surrounding an open commons. When combined with the use of cul-de-sacs, on which as many as 18 or 20 houses may be grouped around a short, dead-end street, these savings become even greater and are sufficient to justify dedication of enough park area for social and recreational facilities like tennis courts, swimming pools and even nursery schools.

As Clarence Stein was later to point out, “The area in streets and the length of utilities [at Radburn] are 20 per cent less than in the typical American street plan. The saving in cost . . . not only paid for the 12 to 14 per cent of the total area that went into internal parks, but also covered the cost of grading and landscaping the play spaces and green links con-

necting the central block commons. . . .”¹

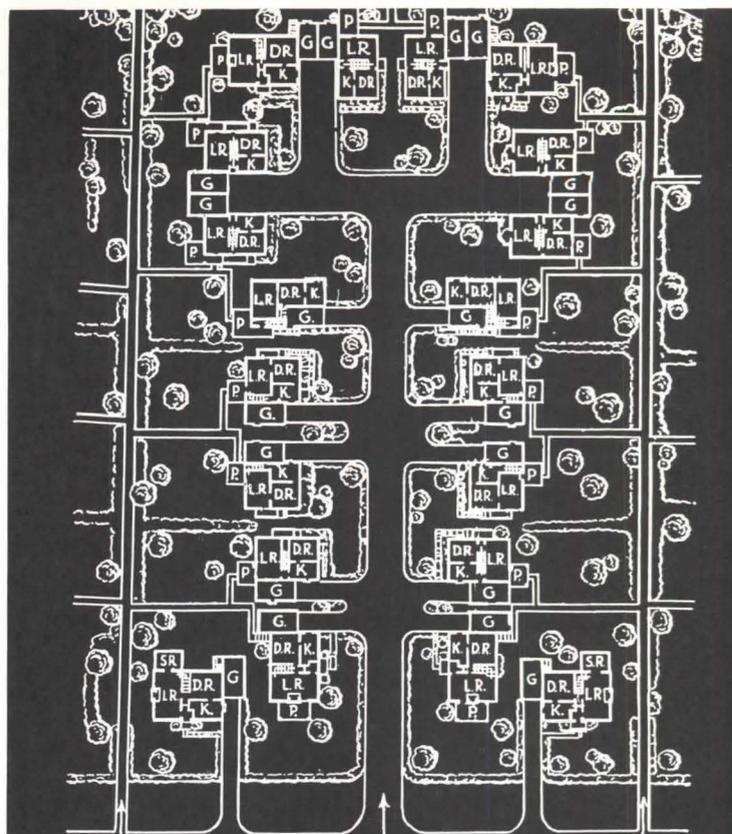
Complete separation of pedestrian and vehicular traffic was a third revolutionary feature of the Radburn layout. Vehicular streets were not bordered by sidewalks. Instead, walks surrounded the cul-de-sacs on the “garden side” of the houses, dividing the cul-de-sacs from each other and from the central park area, and crossing the park where necessary. Finally, to maintain this separation of pedestrian and vehicular traffic, a pedestrian underpass was provided, connecting adjoining superblocks.

First Reactions

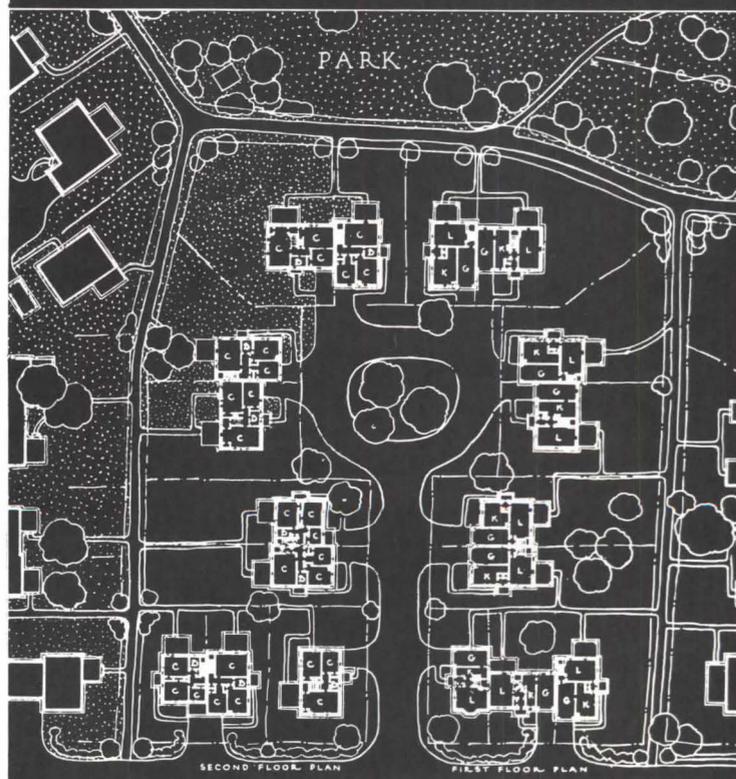
As a contemporary article described it: “. . . This system has been so devised that a pedestrian can start at any given point and proceed on foot to any other place in the town without the necessity of once crossing a street used by automobiles. . . . This result has been achieved in a more or less simple manner by the safety street plan which . . . provides only a single underpass. As to the truth of this the writer himself can vouch, for he traversed 17 blocks, covering a distance of well over a mile, without crossing a motor-traveled street on a single occasion, and only once making use of the underpass.”² This comment is typical of initial reactions to the plan, which were universally laudatory. It was as though a great light had suddenly burst over the horizon. Another writer enthused: “Radburn stands out . . . because it is the first tangible product of a new urban science . . . that seeks to make the places of man’s habitation and industry fit the healthy requirements of his daily life.”³

Subsequent Criticisms

Detailed shortcomings of the plan, some of which are painfully evident today, did not dampen the enthusiasm of contemporary observers. A good deal later, commentators became more critical. In 1963, for example, Chermayeff and Alexander, in *Community and Privacy*, pointed out that the individual attached garages, each with its own driveway, “though convenient, disperse vehicle access.” Also, “there is no provision for



Radburn cul-de-sacs. Original layout (above) lacked a turnaround and employed rather long driveway extensions to the attached garages. These defects were corrected almost immediately in the scheme below, as was the entry-through-the-kitchen aspect of the earlier design. Four of the houses in the later group have center-hall plans with their kitchen-dining areas running through, thus relating garden and service sides.



temporary off-street parking." They might have added that the cul-de-sac layout made snow removal a problem. The same critics add that "access from opposite sides of the house makes entry unclear," putting their finger on an ambivalence which caused the designers and their real-estate advisers considerable agony. Actually, the houses ended up with three doors each: one on the kitchen, vehicle-access side (nominally the "service" entrance but actually the most used of all three), one on the garden side opening onto the porch, and a "formal" side-entrance-vestibule leading into the living room. This door, rarely used, was reached by a roundabout walk from the access driveway.

Inevitably, Radburn came in for a debunking. This was provided by a designer who grew up there:

"The layout of the dwellings in the superblocks creates a network of intensely developed spaces which abruptly evaporates into a shapeless common, too vaguely defined to suggest an extension or expansion of private yards, too wide to command a directional tendency towards a focal point, too sparsely landscaped to invite a refuge from the tight complex of houses. . . . The dwelling complexes surrounding the open green in effect are drawn away from it. The automobile has been made such a dominant feature of the Radburn scheme that life is more oriented towards the peripheral access road . . . than towards the common green. . . ."

Long-continued interest in the "Radburn Idea" and the tendency to ignore what may be glaring shortcomings—in present day terms—probably result from a concentration on essentials which is in the main wise. The fact that today's Radburn resident has little or no space for his second or third cars is irrelevant to the conditions under which Radburn was built. (It is also true, for instance, that the annual incomes of the purchasers of the houses in 1933 ranged between \$2,000 and \$5,000—figures almost inconceivable today.) Possibly the fact that the garages are too small for modern automobiles indicates a mistake, but the fact is that most family garages of the time, despite Herbert Hoov-

er's campaign rhetoric, were no bigger.

Some time after Radburn was built, Clarence Stein commented: "Experience has taught me that planning . . . does not adequately take into account the factors of time and progress. . . . The standard size of stoves was increased after we had started to build Radburn. When some original installations wore out, there was not enough space for the new models. The same inflexible tightness has made many garages inadequate since some types of American autos were increased in size."¹ This, too, is wisdom but does not destroy the validity of the basic Radburn idea.

Initially Radburn consisted almost entirely of single family houses, joined to their neighbors, in about half the cases, by their attached garages. Later, in an effort to lower costs to meet the exigencies of a fast-shrinking market, row houses were built near the area reserved for industry. This necessitated an overpass (later abandoned) bridging the principal east-west street and creation of a third park area. Altogether, two swimming pools, several tennis courts, a baseball diamond and a public elementary school were built, but by 1933 the City Housing Corporation had thrown in the sponge and ceased all construction activities. Land-poor, it was later declared bankrupt.

Mixed Progeny

As the country struggled painfully out of the Depression, the influence of the Radburn Idea was first reflected in the various Greenbelt communities of the Resettlement Administration and later in Baldwin Hills Village, Los Angeles, and Kitimat, B. C., both designed by Clarence Stein. It then jumped the Atlantic, showing up in England and at Vallingby, the huge Stockholm suburb designed by Sven Markelius, and the Baronbackavna Estate, Orebro, and Biskopsgaden Estate, Goteborg, Sweden. Still later, it returned to the U. S. by way of the early portion of Reston, Virginia.

It was in post-World War II England, however, that the word Radburn achieved generic status. The "Radburn Plan," the "Radburn Idea," the "Radburn Layout" appeared—first at Coven-

try, later at Stevenage, Bracknell and Cumbernauld. And in Britain the superblock cul-de-sac principle came in for a good deal of criticism, pro and con.

In the British *Architects' Journal* (Nov. 1960) Paul Ritter commenced a series of articles telling what Radburn Planning is, listing the reservations British planners developed during the Fifties and discussing these objections one by one. He quoted a speech by Lionel Brett in 1955: "American experience has shown that the 'mews' becomes the center of life and fun; its hard surface attracts the children and everybody approaches the house that way. Garden gates may be used by afternoon pram-pushers, but this is an expensive luxury in terms of land. For we must remember that Radburn layouts are of their very nature low density, and give us no help [in the conservation of land]. Indeed, I would say that for English conditions, the Radburn Idea stands condemned for that reason alone, quite apart from the lack of privacy in the garden, which I believe to be a basic English requirement."

Ritter answers Brett's criticism by saying that in many British examples the pedestrian walks don't lead anywhere, and are not provided with Radburn-type over- and underpasses. After arguing that low density is not inherent in the Radburn layout, he concludes by saying:

"The defects of the early Radburn plans in Britain are attributable, not to Radburn principles, but to specific failures to carry out these principles. At the time when Lionel Brett's criticisms were made Radburn stock stood at its lowest. But shortly after, Willenhall Wood 1, Coventry, did much to restore confidence in the Radburn Idea and it was indeed this example, joined to the need for close on 100 per cent garage provision, which led others to plan on Radburn lines. Since then there has been a reversion of interest to Radburn. Today [1960], among the new towns Stevenage has one scheme nearly finished, a second due to start and a third, a very large one, planned.

"Basildon, Harlow and Peterlee are planning along these lines. Other Radburn Estates have been completed at Hull, Beeston, Nottingham and Letchworth; and there are certainly

many others in embryo. This persistent rise in interest is itself corroborative evidence that the criticisms of five years ago were unjustified."

Somewhat later *The Architects' Journal* returned to the subject with a further article, "Radburn Estates Revisited" (Nov. 1967) which systematically compared a number of conventional and Radburn "estates" in the same locality. The results were generally favorable.

A domestic "revisitation" occurred in the *New York Herald Tribune* in 1964. The revisitor, Anthony Bailey, calls Radburn "perhaps the most significant single notion in 20th Century urban development." He continues, "Somehow when you look at Fair Lawn today, the fastest growing township in Bergen County . . . it seems amazing that Radburn hasn't been gobbled up, that it survives at all . . . That it preserves . . . a semi-independent existence is a tribute to the basic plan."

Arriving in mid-afternoon, Bailey noted that the "paths that weave through the parks and behind the houses [were] thronged with children, running, skipping and dawdling along . . . out of sight, touch, and almost the sound of cars." Maintenance of the Radburn park system and the community's recreational facilities, he reported, was taken care of by the Radburn Association, which also managed an extensive activities program, at a cost of \$125-150 a year per family. "Sixty per cent of the breadwinners commute to New York," he found in 1964. "It is, perforce, a suburban dormitory, more a country club without a golf course than a garden city, more a continuously running social event than a town."

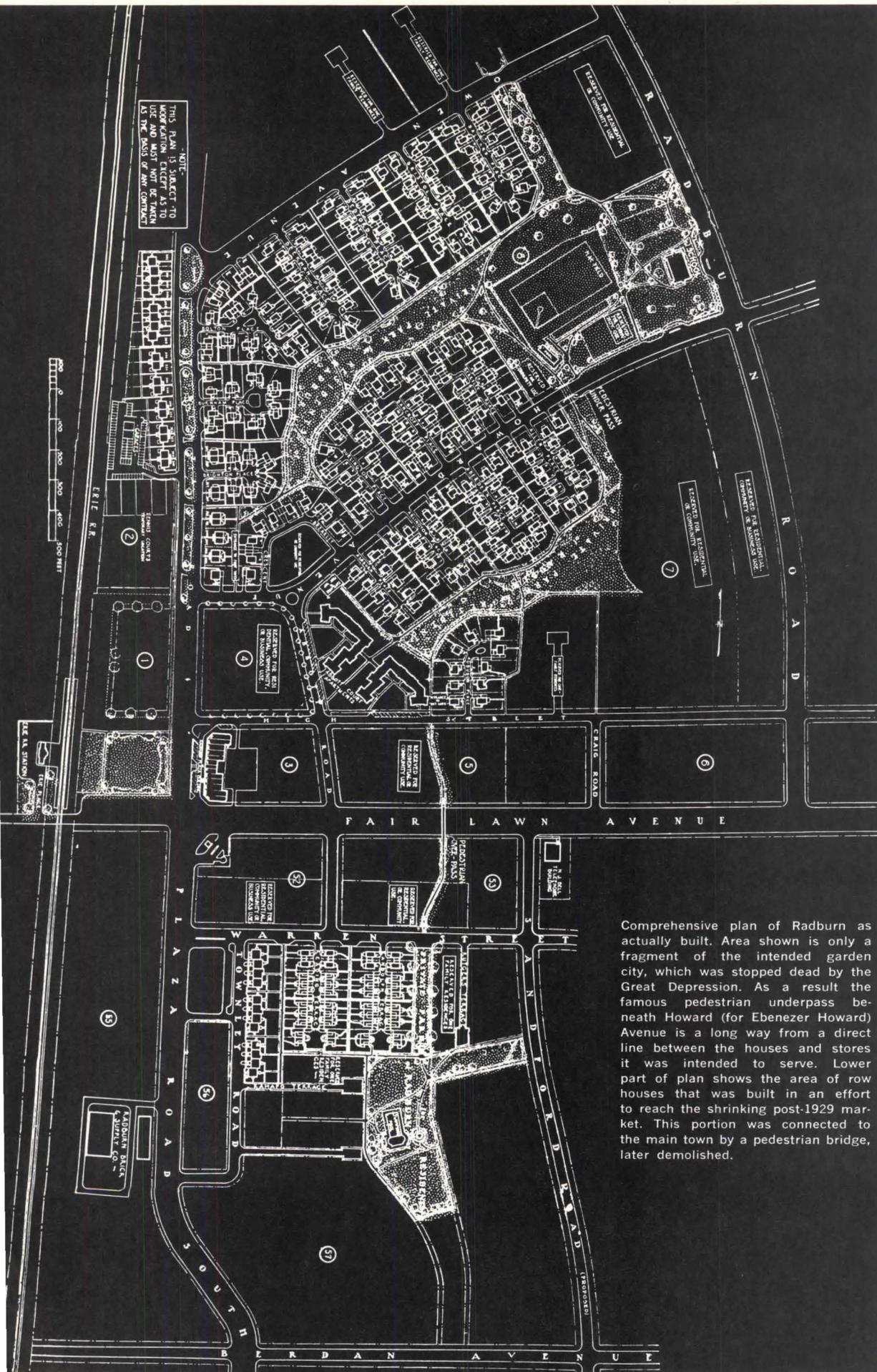
Bailey quoted one resident, proprietor of a local filling station, as saying, "If you want to own a lot of spacious private property, then Radburn isn't the answer. But if you like a place which is at the same time busy and safe for children, where you don't have to spend all your time driving them around, where you have beautiful parks and great public amenities, then it's dandy. We're now getting back the kids of the first residents, kids who grew up here, went to college, married, and now have kids of their own. They want to live in Radburn, and I don't blame them."

Radburn Today

Radburnites continue to be revisited and resurveyed at a rate that must leave them somewhat jaded. No sooner, one surmises, has the typical Radburnite settled himself after filling out one more soul-searching questionnaire than he is confronted by yet another enthusiastic college student wanting to know what life in Radburn is "really like," how it compares with his former existence in an apartment, "conventional suburb" or whatnot, where do his children "habitually play" (as though he knew!) and so on. In fact, if our systems of information storage and retrieval were only a bit better, it might be possible to compile a supersurvey of how particular Radburnites respond to Question A at the ages of 25, 30 and so on until 60.

A recent study made by the Institute for Social Research of the University of Michigan⁵ includes Radburn with a number of other residential communities — planned and unplanned — ranging in time from Radburn to Reston. In each case the planned community is paired with a nearby unplanned area of the same general characteristics. Radburn is paired with nearby Glen Rock, an unplanned development of approximately the same vintage. This investigation discloses a great deal about the habits of Radburnites in a way which permits comparison not only with Glen Rock but also with latter-day planned communities. Some of the results seem highly significant. For example, 47 per cent of Radburn's residents now shop for groceries on foot, whereas this figure is only 8 per cent for the neighboring unplanned community. This would seem to indicate that the internal walkways through the parks get adult use as well. The corresponding figure for Reston is 23 per cent, and for Lafayette-Elmwood, a highly urban development in Detroit, 40 per cent. Thus the frequency of shopping on foot is somewhat higher in suburban Radburn than in an urban environment! In one of the comparison communities where there are no sidewalks, the percentage walking to stores of any kind was zero.

Another interesting index was supplied by weekend trips of 10



Comprehensive plan of Radburn as actually built. Area shown is only a fragment of the intended garden city, which was stopped dead by the Great Depression. As a result the famous pedestrian underpass beneath Howard (for Ebenezer Howard) Avenue is a long way from a direct line between the houses and stores it was intended to serve. Lower part of plan shows the area of row houses that was built in an effort to reach the shrinking post-1929 market. This portion was connected to the main town by a pedestrian bridge, later demolished.

miles or more made during the weekend immediately preceding the interview. Asked in how many cases the trip in question had been made mainly for social-recreational purposes, the Radburnites reported 48 per cent, Reston 49 per cent, and Glen Rock 73 per cent. This seems to show that the facilities afforded the residents of the two planned communities eliminate some of the need for trips for recreational purposes.

Another significant difference was in the use of bicycles, particularly for utilitarian purposes. Of the Radburn residents, 25 per cent made such use of their bicycles as compared with only 8 per cent of those in the Glen Rock area.

On the question of automobile ownership, the study says: "The two older communities, Radburn and Glen Rock, show slightly lower levels of multiple [automobile] ownership than the income level of the people who live there would suggest. This result is consistent with earlier findings that automobile ownership tends to be depressed in the New York [City] region except near its periphery. There is virtually no difference in ownership level between Radburn and Glen Rock [around two cars per family], implying that the planned features of Radburn such as the superblock have little or nothing to do with automobile ownership levels." So also, apparently, the lack of garage or curb space for the extra vehicle.

Among reasons for "neighborhood satisfaction," traffic safety was the most frequently mentioned reason in Reston and Radburn. In the category of community programs and activities Radburn was well in the lead with 67 per cent mentions of this type; Reston ranked fourth with 26 per cent.

Under reasons for evaluating the surrounding area positively or negatively in terms of facilities and activities, Radburn rated highest at 60 per cent. Glen Rock, the unplanned community in the same general area, was next at 50 per cent; Reston, probably because of its relatively isolated location, was near the bottom of the list with 30 per cent.

"In talking about reasons for moving to Radburn, some people mention the town's concept, but the most [frequently men-

tioned factor] is the recreation facilities and playgrounds for children. Undoubtedly people are referring to the superblock arrangement with public open space in the center . . ." In evaluation of the community as a place to live, Reston rated highest (61%) and Radburn next (54%). In Radburn 87 per cent of the respondents with young children rate the community "excellent."

Thus it seems that in the terms in which Radburn was conceived as a new-type residential community, it was and is a success—this on the basis of evidence which is rather more than usually available. Ronald F. Gatti, manager of the present Radburn Association, declared in a recent interview: "Radburn permits a person with a moderate income (\$10,000-\$15,000) to enjoy the same lifestyle and benefits that would require a much higher income (\$20,000-\$30,000) elsewhere." He also said that Radburn houses are typically worth \$8,000 to \$12,000 more than comparable houses in the surrounding area. He attributed this to the availability of swimming pools, tennis courts and other recreational facilities. Quite an endorsement for community planning!

Wright On—Radburn

Because of my father's early death in 1936 and Clarence Stein's long-continued activity as a community planner, there has been an increasing tendency, over the years, to attribute the revolutionary site planning work they did together solely to Mr. Stein. The appearance of Stein's book, *Towards New Towns for America*, in 1951 probably accentuated this tendency despite Stein's effort to set the record straight.* According to Stein, "The creation of the Radburn Idea was a group activity. It was not merely the conception of the architect-planners . . . But there can be no question that the seed from which the Radburn Idea grew was conceived by that imaginative genius Henry Wright."

Lewis Mumford, in his introduction to Stein's book, made the same point. "So close was

*Wright's book, *Rehousing Urban America*,⁶ is less known, perhaps because it appeared in the depths of the Depression, and thus had a considerably smaller sale.

the relation of the two men during the decade of their active association that it is hardly possible to assign credit to one or the other for any particular part of the work . . . By training, however, Wright was the planner, with a specially fine eye for site planning and grouping; while Stein was predominantly the architect. When their association terminated, however, Stein devoted himself increasingly to planning."

Thus in the case of Radburn, and also Sunnyside and Chatham Village (a development near Pittsburgh often cited as the most successful product of their collaboration), Wright functioned as the community planner, Stein as the architect. This is not to say that Stein was only an architect. He was involved with community planning as early as 1915 when he helped Bertram Grosvenor Goodhue plan the model town of Tyrone, New Mexico—and continued to be involved. But Wright, more than Stein, was responsible for the site plans of Sunnyside, Radburn and Chatham Village, and their worldwide influence.

If challenged, Wright himself would probably have said that the seed of the Radburn Idea was planted by Raymond Unwin, planner of the pre-World War I garden cities in Britain. However, he did once offer a more romantic explanation:

"In 1902, as an impressionable youth just out of architectural school, I took a short trip abroad and finally, after a remarkable day's sailing down the Blackwater from Lismere Castle, landed at Waterford on the south coast of Ireland, here visiting friends who lived near the town center. I passed through an archway in a blank wall on the street into a beautiful villa fronting upon a spacious interior garden. That archway was a passage to new ideas which have struggled up through the ensuing years! I have learned that the comforts and privacy of family life are not to be found in the detached dwelling, but rather in a house that judiciously relates living space, the open space in turn being capable of enjoyment by many as well as by a few.

"Later it was but natural that my first commission for Brentmoor in St. Louis [a subdivision] should turn its back upon the

passing boulevard and face its houses upon a lovely ravine.

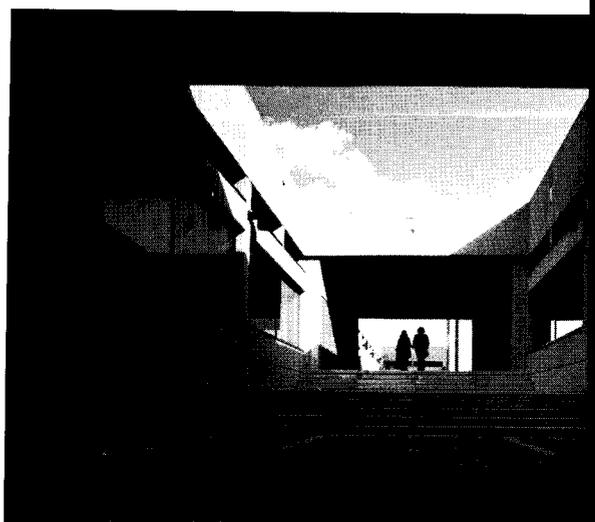
"While acting as Town Planning Advisor for the U. S. Shipping Board, there was developed a theoretical scheme which reversed our awkward and irrational arrangement of house fronts on the street, where unpleasant things must take place, and the inconvenient placing of service doors on the rear or garden sides just where they ruin what should be a pleasant quiet garden plot. [The architect] Edmund Gilchrist . . . has since been bold enough to put the whole idea into full effect in a group of houses with walled service yards and main entrances on the street line, reserving every inch of garden space for the garden front of the house . . .

"And so when Radburn was approached there appeared a plan . . . a social plan of a 'superblock' large enough to contain the population for a whole school . . . Superblocks reduced the number of traffic streets and intersections, placed a large majority of the houses on quiet closed-end lanes, turned the house around with its service streetward and its living toward the garden, connected the gardens with a system of inner block pedestrian ways . . ."

Such descriptions of Radburn account for the seminal importance of the Radburn Idea. In the great majority of instances, those who were influenced by Radburn planning probably never visited Radburn itself, and might have been a bit disappointed if they had, if only by its small size. They fell in love with the Idea—the ideal. To borrow Daniel Burnham's famous phrase, it had the "magic to stir men's blood." It held hope—still holds hope—of a humane, orderly future in the midst of a discouraging present.

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2. "Radburn, N. J., A Town Planned for Safety," *American Architect*, Jan. 1930.
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4. "Radburn Reconsidered," Alden Christe, Connection No. 7, (*Harvard School of Design*) 1964.
5. *Planned Residential Environments*, Lansing, Marans & Zehner, Institute for Social Research, University of Michigan.
6. *Rehousing Urban America*, Henry Wright.



MADE FOR WALKING

The Student Union
at Stony Brook's
state campus is
also a pedestrian mall

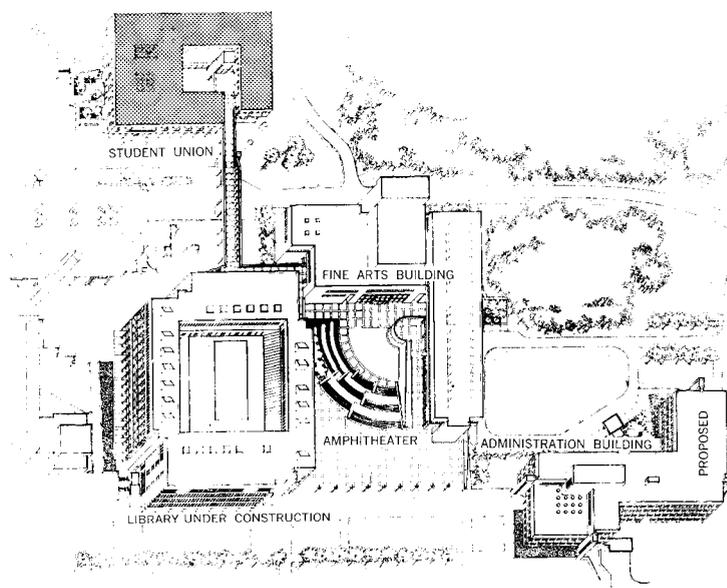
A building one can walk through and never enter. This is not a riddle, but the planning key to the new Student Union on the New York State University campus at Stony Brook, Long Island.

Entrance to the building is at the second-floor level, through a stair tower accessible from a pedestrian walkway that connects the Union to the library (under construction) and bridges a road. A person can walk through the building and out to the gym, athletic fields and parking beyond. But the architects, Damaz, Pokorny, Weigel, have designed the center so that a person will want to slow down and hear a student speech in the courtyard below, just watch a girl sunbathe, chat with a friend or peek into the faculty rooms.

The Student Union is an integral part of the campus master plan, for which Damaz, Pokorny, Weigel were responsible. It calls for a central plaza, landscaped with an outdoor amphitheater. Surrounding the plaza are the library (the focal point of the campus) the administration building, and a proposed humanities center and fine arts building. From this plaza, pedestrian malls extend out to the various university disciplines.

The Union is built right over the pathway to the recreation areas and is part of the mall system. The main plaza is higher than the Union, which is on a lower site across the street, so the second-floor entry is actually a level path from the library.

Inside the Union, the most-frequented spaces are on the ground floor. These include an information and display lobby, highlighted by a large metal sculpture by Bernard Rosenthal. At the rear is a lobby bookstore. The first floor also includes a theater with an optional rear entrance and ticket booth, and a two-story student lounge with balconies overlooking the courtyard and campus and highlighted by a large brightly-colored wall tapestry by Adja Yunkers specified in the budget as a "handwoven wall covering" because there was "no money" for art. The cafeteria may be partitioned into smaller areas, but is designed to run from the courtyard through the building to an outdoor dining terrace on the perimeter of the building. The mood inside the eating areas is relaxed and informal, with intimate booths in one area and



SITE PLAN

Connecting the main campus plaza (plan) to the Student Union is a wide pedestrian bridge (left) over a road and lower building entrance. Entering the center (from the right, top photo), a stroller may go into the building through the tower or continue walking around the courtyard, then down a stepped passage (center) and out to the playing fields and gymnasium beyond (right). The exit bridge forms one side of a dining terrace adjacent to the cafeteria within.

round tables beneath a high sky-lighted ceiling in another.

The second floor has meeting rooms, balconied reading rooms, faculty and administration facilities and the student lounge balcony areas. The meeting rooms are casually set up so that students may rearrange them according to need; the large conference tables are modular so their shape may change; the seating is simple. The administration areas are for the Union staff and lie between student lounge and faculty areas.

The basement has informally assigned spaces for recreational facilities, such as a pool and game room, for lockers and for organized student clubs and activities. Additional space is provided for utilities and a barber shop (programmed in the clean-cut middle 1960s, and still, somehow, operating).

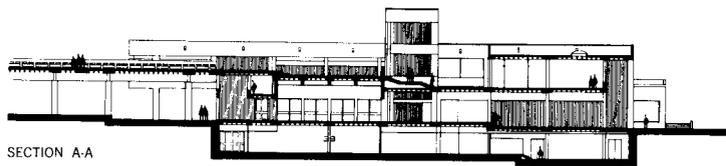
The structure of the building is undisguised inside and out. Part of the master plan is an "architectural vocabulary" that calls for buff-colored concrete and a warm brown-colored brick or block infill. The Student Union adheres to this vocabulary with block infill.

Damaz, Pokorny, Weigel were the second master planners for the university, taking over in 1965 from a firm that erected a series of brick neo-colonial structures that resemble dandified barracks. Gruzen & Partners now administer the plan. The university was founded on 400 acres donated by a Stony Brook resident who stipulated "a community college in the Federal style." Today the university and its architectural goals have expanded; the university, with additional land, is programmed for 25,000 students and the buildings no longer pretend to be "Federal." Certainly, there is little reminiscent of colonial days about the Student Union.

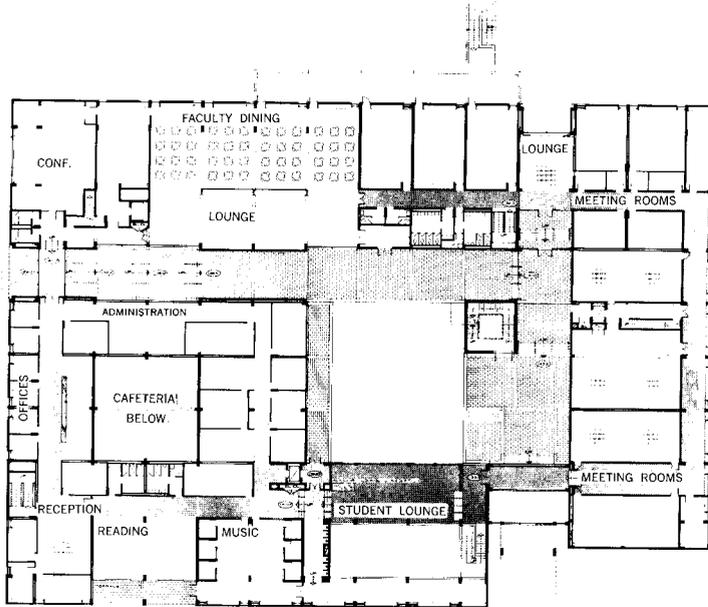
FACTS AND FIGURES

Student Union, State University of New York at Stony Brook, Long Island. Construction agency: State University Construction Fund. Architects (joint venture): Damaz, Pokorny, Weigel (Arthur Costello, job captain). Engineers: Summers & Molke (structural); Frank J. Sullivan & Associates (mechanical and electrical). Landscape architect: Richard J. Cripps. Interiors: D-P-W. (Lawrence Randolph, designer.) General contractor: Rosoff Brothers. Building area: 154,000 sq ft. Construction cost: \$4.06 million. (For a listing of key products used in this building, see p. 84.)

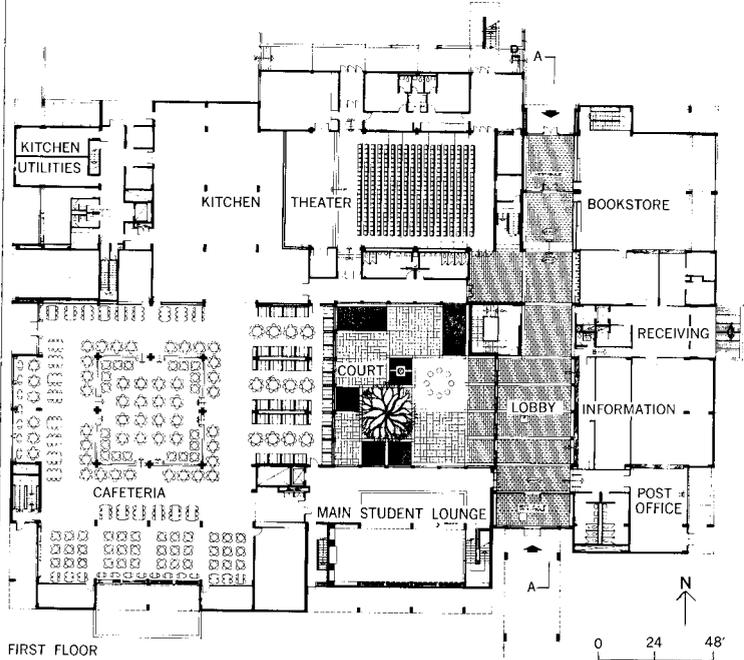
PHOTOGRAPHS: David Hirsch.



SECTION A-A

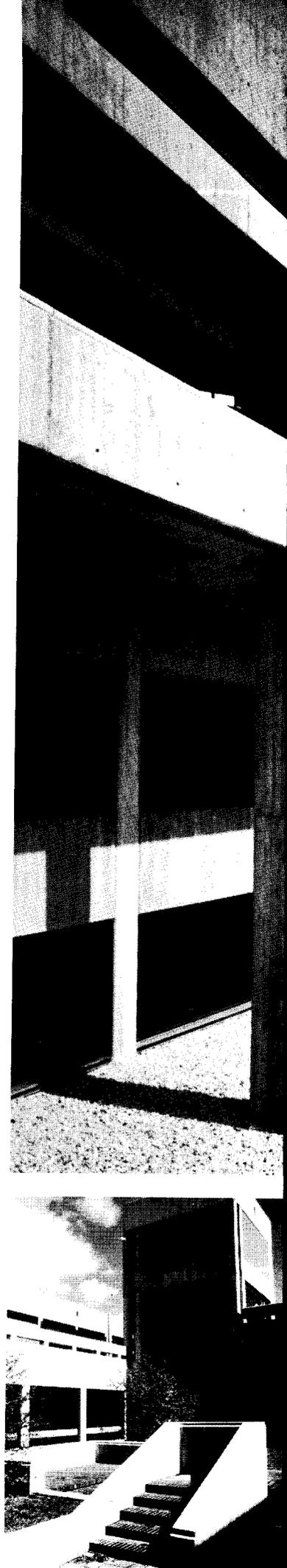


SECOND FLOOR



FIRST FLOOR

The large windows are recessed beneath smaller windows (top left), which give way to small balconies (top right) outside a reading room. The student lounge (middle right) has interior balconies that overlook either the courtyard or campus. The court features a podium for impromptu speeches or student rallies (bottom left). The cafeteria (center) has natural light above and from the courtyard at one end and a dining terrace on the other. The street entrance to the lobby (right) has direct access to the court, other ground-floor areas, and stair tower.





THE CROWN AND EAGLE MILLS

Two unique 19th Century mills,
symmetrical and connected across
their common river, cry
for permanent preservation

"As striking as a chateau over the Loire," the Crown and Eagle Mills are "absolutely unique" in the history of American architecture. The comparison and the judgment are those of Randolph Langenbach, a young scholar/activist and photographer whose work documenting the Amoskeag (N. H.) Millyard is familiar to Forum readers (Jan/Feb '69 issue). Langenbach is working to secure the lasting preservation of the Crown and Eagle Mills, located in North Uxbridge, Mass., ten miles south of Worcester.

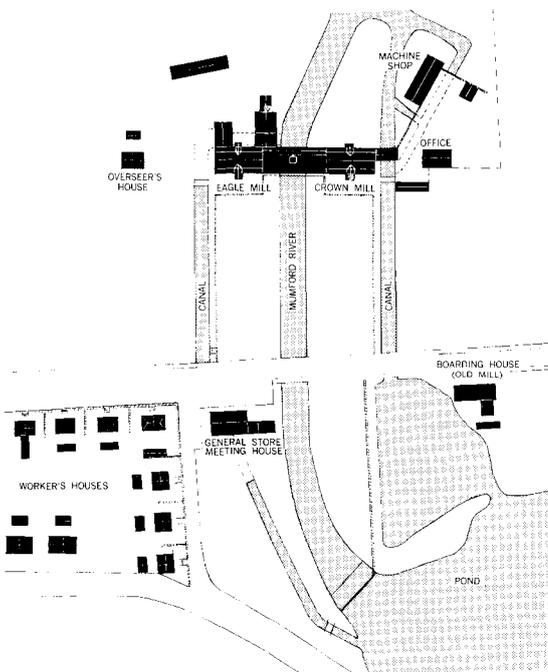
The "Crown Mill" (with the belfry) and the "Eagle Mill" date from 1825 and 1829 respectively (the structure uniting them across the waterway dates from 1851), and are therefore among the earliest American industrial buildings. They are located in the Blackstone Valley, upriver from Pawtucket where the first successful textile mill in this country was built in 1790.

The stone portions of the mill, with the clerestory monitor roofs and front stair towers, are in a style characteristic of many of the early mills that originally filled this region. Only a handful survive in anything like their original design. Not only are the Crown and Eagle Mills complete and unaltered down to the original sash, but, even in their own time they were considered to be of outstanding design and of unusually extravagant construction for textile mills. The landscape planning, with the positioning of the stone mills at the ends of two rigidly parallel canals (and the brick portion later spanning the river between them) harks back to a Renaissance precedent, and is uniquely extensive and formal for mills of this early date. The possibility that a building of this quality would be allowed to fall into ruin through ignorance and neglect is an appalling prospect, but it is rapidly happening.

The Crown and Eagle Mills are up for sale, but the owner—who recently acquired them to use the adjoining mansion—has kept the buildings off the general real estate market, in order to discourage a purely speculative buyer.

The Society for the Preservation of New England Antiquities is aware of the significance of the buildings, and although it is unable to acquire them for museum purposes, it is involved in the effort to find a new owner. The State of Massachusetts has been looking at the land surrounding the mills, to include in its plans for a recreational park in the area surrounding the best-preserved piece of the Blackstone River Barge Canal (built in the 1820's and '30's). The mills and the surrounding land, including a cluster of workers' houses (sold off to the mill workers in the 1920's, when the mill was abandoned), a general store, and a machine shop, unique in that it still contains its forge and all its woodworking equipment, are in the process of being placed on the National Register of Historic Buildings. With this comes the possibility of financial assistance.

In the meantime, Langenbach is coordinating efforts to find or fabricate a new owner—perhaps an artists' co-op that would need studios, workshops and living quarters. Or a furniture-making or other craft-oriented operation that could use the 50,000 sq. ft. of floor space contained in the mill. Or any user who would welcome being simultaneously out in the country, near the city, and living in one of the richest remnants of early America.



PHOTOGRAPHS: Randolph Langenbach, taken for the Historic American Buildings Survey.





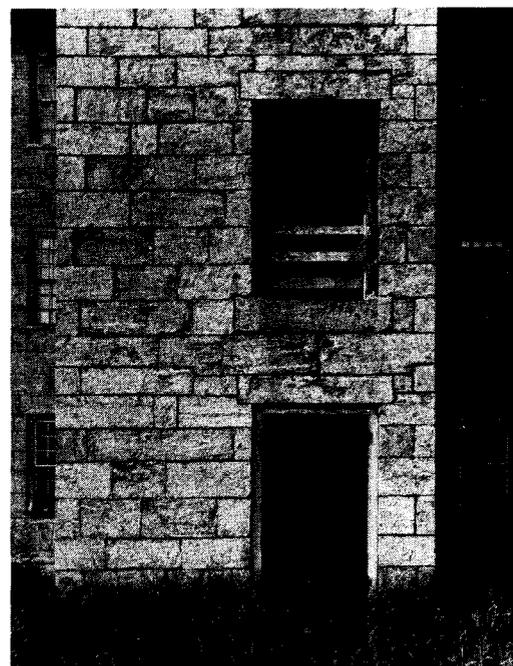
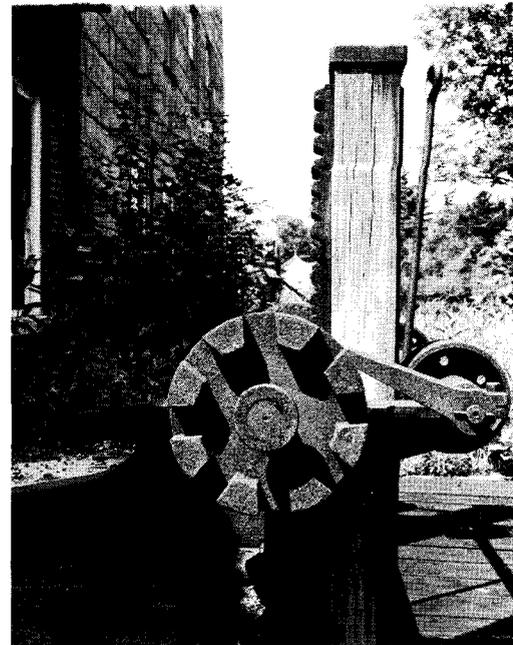
"In 1823 Robert Rogerson, a Boston merchant, erected his first stone mill at Uxbridge, a part of its site being ground previously occupied by an old mill (built in 1811), which was removed to a location on the north side of the road running parallel with the front of the mill, where it still stands, having been changed into tenements. The machinery was made chiefly on the premises. It was built in the best possible manner, regardless of cost, and the goods manufactured there were of as high quality as any then made in this country. To this mill, the construction of which was of the most solid and substantial character, of hewn granite, one hundred feet long, forty feet wide, and three stories high with attic and basement adapted for the running of machinery in them, he added in 1827 a structure of the same material, size and general appearance on the opposite side of the Mumford River. To the mill of 1823 he gave the name of Crown Mill, and to that of 1827, the name of Eagle Mill; the former it may be supposed, in compliment to the country of his ancestors, and the latter to his own native land . . . *

"In 1851 (after acquisition of the property by the Whitin family in 1849) the capacity of the mills was increased nearly one-half by the erection of a brick building, one hundred and twenty feet long and of uniform width and height with the two stone mills, uniting them and spanning the river, which flows under the connecting part. The whole structure is now three hundred and twenty feet long, forty feet wide, and three stories high with the attic and basement.

"The amount expended in building and equipping these mills and in laying out, building up and beautifying the village, was nearly or quite \$200,000, and it was said by one writer that the village 'at that time had more of the quality of perfection than almost any other manufacturing village in New England.' Another said, 'The whole village is laid out with so much taste that it attracts the notice of any stranger who may pass through it.'"

From William Bagnall's unpublished history of the textile industries of the U.S., ca. 1890

*Recent research dates the first two buildings closer to 1825 and 1829.





TECHNOLOGY

A lightweight component building system from France makes its U.S. debut

A lightweight component system of building construction, imported from France, is about to make news in Chicago, with construction of 459 units on a downtown site that has been vacant for 12 years. The system, introduced to the U.S. by one of its French creators, Paul Depondt, is an open system, more an organization and concept than a new technology. But it promises to reduce sharply construction labor costs and to shorten construction time.

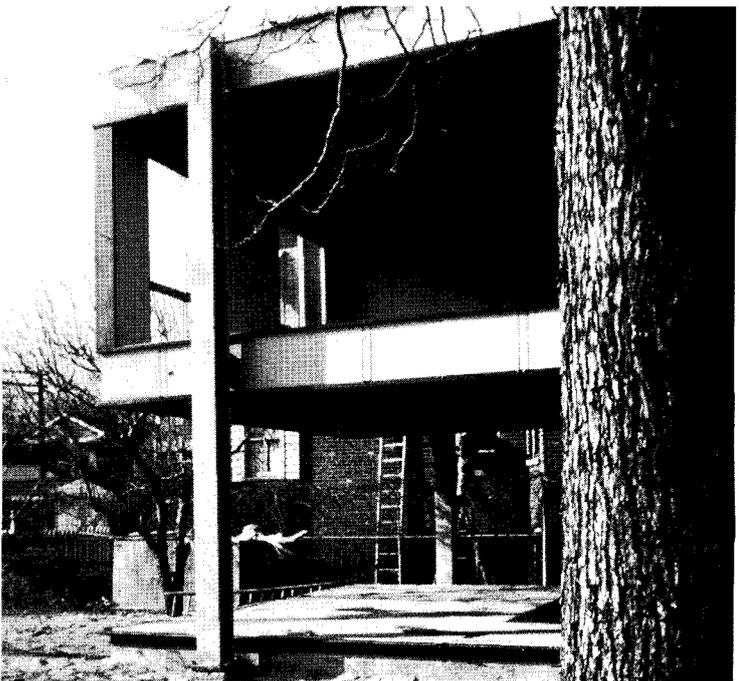
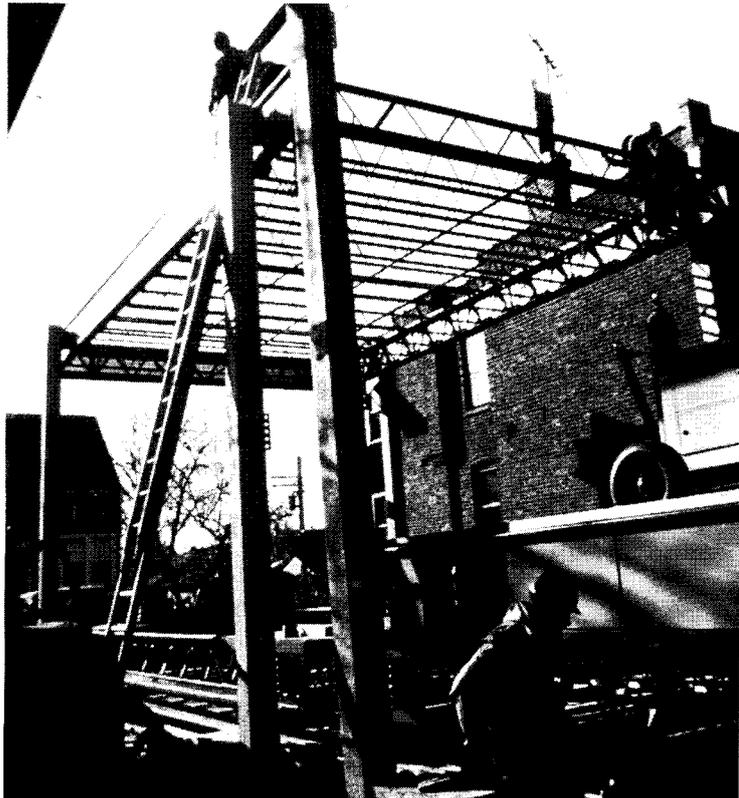
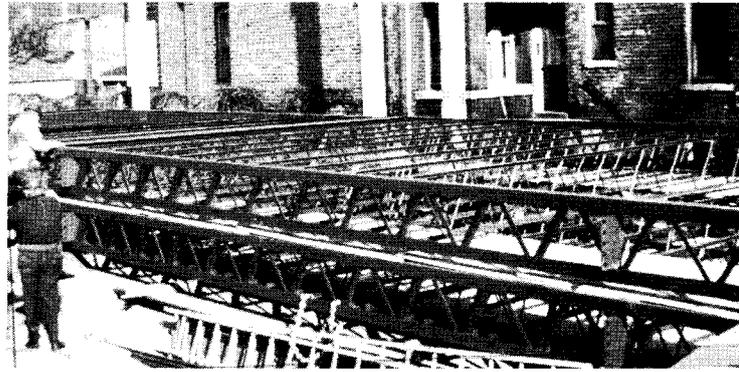
A prototype of the system has already been erected, consisting of two duplex units, back to back on a residential block on the north side of Chicago. Each unit has three bedrooms and about 1,300 sq. ft. of space. Because they are prototypes and the builder had to order small amounts of materials and supplies, there is little basis for establishing cost savings over conventional construction. But the units took only a short time to erect; they used union field labor with little problem; they meet all code requirements.

After site preparation and foundation work, the floor frames, apartment-sized (about 35 x 20 ft.) and made of bar joists and girders, are trucked to the site and stacked in order of erection. Workers then erect the supporting exterior steel columns; there are no interior columns. Then they install fascia, spandrels, window tracks, railings and wiring. A crane positions the frames between the columns, then hoists them into place, where workers bolt them to the columns.

The system calls for floor panels and roofing to be installed on the ground, but this site was too small for a crane large enough to lift the additional weight. Instead, these elements were installed after erection. Leaving the framing open also allowed the crane operator to drop cables through the top frame after it was erected, hook onto the lower frame and hoist it into place.

After the floor frames are secured, workers walk on them and install the wall panels, windows, sliding doors, floors and ceilings. All of this is done from inside the building; no scaffolding is ever required.

The facade elements are all prefinished. According to Depondt, two men can install a wall panel in only five minutes



—they just lift the panel, place the lower edge in the floor channel and tilt the top into place. The seams are all waterproofed (the contractor has repeatedly sprayed water on the building to test the waterproofing).

Pipes and ducts run between the double wall that separates the two units and between the floor spaces, which also serve to deaden sound transmission between floors and units.

After the floor and ceiling tiles are installed, the interior spaces are partitioned. First the runners are placed, then the partitions inserted (these are easily removed or moved, according to resident preferences). The bathroom in the prototypes includes a plastic one-piece shower/tub unit, but any equipment may be installed.

With landscaping, kitchen equipment, carpeting and fixtures, the units are complete and ready for occupancy.

Conventional systems start

Depondt's involvement with systems building started in Europe, where he is a founder and partner of Lods, Depondt & Beauclair, Paris architects. The firm has used precast concrete systems to build over 20,000 housing units for the Paris-area cities of Fontenay-sous-Bois and Meux. Some of the units were produced by an off-site factory and assembled on site; when there were too few units to justify factory production costs, the concrete was poured in place conventionally.

But Depondt's experience with concrete systems soon made him and his partners aware of its shortcomings. A factory was expensive to build and operate and the components are heavy and therefore costly to transport. A large, continuous, nearby market is therefore necessary. Other disadvantages include inflexible floor plans, since many of the interior walls are loadbearing and slab sizes uniform. Depondt also notes that in many urban areas it can cost as much to tear down a concrete building as to erect one and that the refuse materials cannot be reused—in cities where new construction is constantly replacing old buildings it seems wasteful that the older buildings cannot be sold, moved and erected elsewhere.

Three years ago, the direction of the Paris firm began to change as its partners looked for a new

approach to building. Rejecting conventional concrete technology, they looked toward lightweight components that could be mass produced and shipped long distances, cheaply. Dry on-site connections could reduce the required skills of field labor and speed erection, therefore cutting construction costs and producing income for the owner earlier.

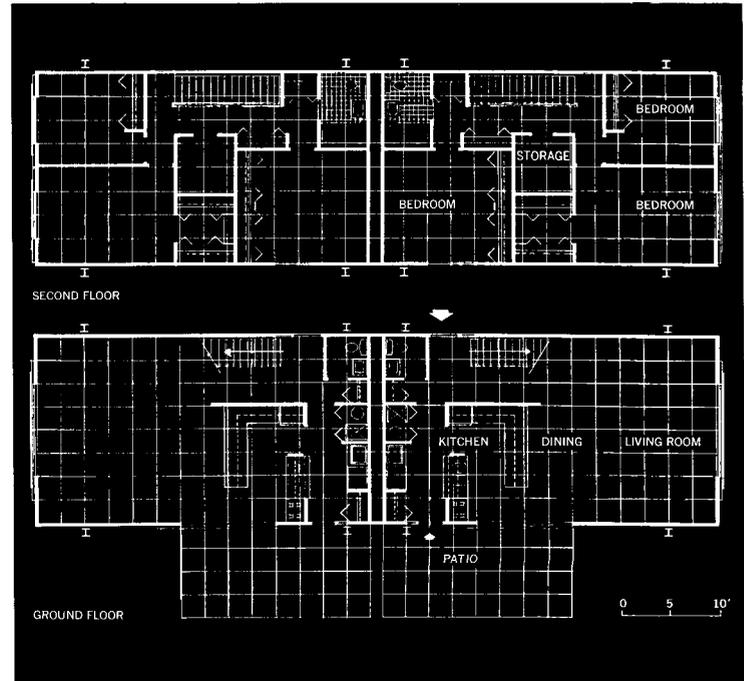
The two most obvious problems with such an approach were that (1) lightweight materials, such as steel and aluminum, are more expensive than concrete, so savings would have to come almost exclusively from production and labor; and (2) there was little information on how to solve the acoustic problems that could develop in lightweight component buildings.

For two years, the firm experimented in these areas. Their studies showed that 500 units would be competitive with conventional concrete construction and that construction time could be cut in half. The cost of components would equal 85 per cent of the building's cost, compared to a conventional 50 per cent, with most of these savings coming in labor.

The acoustical problem was solved with air spaces. The prototypes featured double partitions between apartment units, with over 1 ft. of air space. Between the precast floor planking and the hung ceiling of acoustical tiles, there was almost 2 ft. of air space.

The first prototypes were a three-story apartment and a small office building. Both were successful in proving the firm's concepts workable and both projects have since proven the system's flexibility: The apartment house was built on land that the firm did not own. When the land had to be cleared, the

Construction of the Chicago prototypes started with delivery and stacking of the floor frames (top left), made of girders and bar joists. Fascia, railing channels, etc. are installed on the ground, then the frames are crane-hoisted and bolt-connected (middle left) to the steel columns. Wall and window enclosures are installed from the interior of the building (bottom left and top right), top floor first. The prefinished window and wall panels are interchangeable (middle right); workers install them by placing them into a floor channel, then tilting them up to engage in ceiling clips. Seams are waterproofed. Floor plans for each 1,300-sq.-ft. unit show air space between the common wall. Eight steel columns support the structure.



firm sold the house and the new owner simply moved it to a new site. The office building, financed by the government, was needed as office space for only two years. Afterwards, it was successfully converted to an apartment house. The office was built in only three weeks initially.

Soon after the prototypes were constructed, the Ministry of Construction in France proposed a 500-unit experimental housing project, outside Rouen, for low- and moderate-income families. Lods, Depondt & Beauclair were chosen to do the job, using their lightweight component system.

The project, called Project Experimental de la Grand'Mere, consists of 25 five-story buildings with five walk-up apartments on each of the upper four floors, and with utility and storage spaces on the first floor. The project took only one year to complete and has won kudos from its residents and from the architectural world at large.

Its residents have taken advantage of the fact that interior wall partitions are not loadbearing and may be moved; many apartments have since been rearranged to suit individual family preferences. The Renault company took advantage of the system's flexibility by using the project for a contest. The company hides a car and the finder can keep it. In Rouen, the car was concealed in the first floor of an apartment building by simply removing two exterior wall panels, driving the car in at night, and replacing the panels. The car was not easily found.

The city government has since ordered 1,000 additional units, despite the fact that there is a precast concrete factory in Rouen. These new units are now under construction.

Last year, the project won architectural plaudits for its use of aluminum. It won the \$25,000 R. S. Reynolds Memorial Award.

The system in France

The Rouen project best represents the system as it evolved in France. The buildings have a structural frame of weathering steel and exterior facades of aluminum sandwich panels, aluminum shutters and sliding glass doors. Aluminum handrails give a balconied effect in front of the sliding doors.

Inside, the partitions may easily be moved and rearranged.

Double, permanent walls, with space between them for plumbing, electrical and heating equipment, separate apartments. But room partitions are positioned by a moveable network of channels and can be changed any-time.

The foundations for the building need not be as extensive as for conventional concrete structures because the Rouen buildings only weigh one-fourth to one-fifth as much. Erection requires a crane to hoist assemblies, but mostly handtools to complete connections and finish interior and facade work. Every connection is dry, so cracking problems are eliminated; there is a tolerance for movement built in.

Construction starts in an off-site metal shed, which is used as a staging area for assembling sections of floor framing and the steel columns. The columns are assembled to their full five-story height. Floor frames are assembled into units equaling the full floor area of a building. Exterior spandrels, channels for windows and doors, and railings are attached.

On site, construction begins with the erection and framing of a five-story stair tower. The tower is braced in two directions. The floor frames are then hoisted into position, with single-hinge connections to the stair tower. Columns along the side of the frames are connected; the rest of the frame cantilevers until additional columns are placed, with the space frame absorbing the stress.

The exterior shutters and sliding glass doors are installed from the inside, without scaffolding, once the floor frames are secured. The wall panels, which have a baked enamel exterior and plastic interior finish are also tilted into place from the inside of the building. The vertical joints overlap with neoprene joint sealer.

The concrete floor slabs have a stone aggregate surface and sit on rubber blocks. The ceiling tiles have a lap edge and hang from concealed clips.

Interior partitions for the rooms clip on at the ceiling and fit into channels on the floor. Flexible conduit can fit along the head of the partitions.

The roof has a vapor barrier, thick sheets of fiberglass and is covered in ribbed aluminum.

U. S. debut

The Americanized version of the lightweight component system is now being introduced to the U. S. through Component Building Systems, Ltd., a newly formed Chicago firm whose organization includes an engineer, architect and contractor in equal partnership. The president of the firm is Ken Naslund, a founder and partner of The Engineers Collaborative (TEC); Paul Depondt is vice president and in charge of architectural design; Arthur O'Neil, chairman of the board of W. E. O'Neil Construction Co.—one of the largest in Chicago—is also a vice president and is in charge of construction. (O'Neil paid for the prototype.)

The partnership started when O'Neil went to France on a professional tour and visited the Rouen site, when the project was about one-half completed. When he returned to Chicago, he told city urban renewal officials about the system and invited Depondt to Chicago to meet them.

Depondt talked at length with Lou Hill, the city's urban renewal director, and the talk ended with Hill proposing that Depondt build a project similar to Rouen's in Chicago. Depondt then met with O'Neil and Naslund and Component Building Systems was born.

Chicago's Breakthrough

The project Hill proposed has since been dubbed Chicago's Operation Breakthrough, technically and socially in the area of black/white community relations. It will comprise 459 housing units, including three 10-story buildings and five 3-story buildings. The highrises will include mostly one- and two-bedroom units. The lower buildings will have larger apartments for families, allowing children ready access to nearby parks and recreation areas.

While the project introduces a new housing technology to the U.S., it is being treated as a conventional 236 FHA interest subsidy program. Says Depondt: "We did not want to present the project as a huge innovation to FHA. We played that down, allowing FHA to recognize the conventional elements."

The project is located on an old land clearance site in downtown Chicago (35th Street south and Cottage Grove), which has been vacant for over a decade. Some of the problems in its re-

development were in deciding who should sponsor it. This project is being sponsored by a partnership of two black neighborhood church groups, called the United Presbyterian-African Methodist Episcopal Conf., Inc.

The architect for the project is black: William Wallace, of the architectural firm Environment Seven.

For Wallace, who has visited Rouen, the project in Chicago has been a learning process. Initially, he feared the system would prove a mechanical monster dictating design. But "much to my surprise, flexibility is really there," he says. "It has added to my skills as a designer, not limited them."

Wallace calls the social impact of the project "crucial. It marks the first time in Chicago that a new technical system has emerged under the auspices of blacks."

He looks to the project to provide jobs and training, as well as housing, for blacks. O'Neil, the contractor, has given Wallace cause for optimism—he is negotiating with black subcontractors where possible and has served on city commissions trying to increase employment of blacks in construction.

Community residents have taken a tour of the prototypes with Wallace, who wanted their reaction. "Housewives' reactions were the same as with any new housing," he says. "One thought the units 'cute,' one loved the orange door, they all liked the large space and, most important, they wanted to live there. Negative comments were highly personal—one wanted brighter colors; another lady did not like the bolt connections painted black; a few wondered how they could hang pictures on the vinyl walls, but appreciated the care-free maintenance."

One unfortunate similarity between the federal and Chicago "breakthroughs" is the delay in initial construction. This project is now scheduled to break ground in August, almost one year behind original schedules.

Change for the U.S.

When Depondt brought his system to the U.S., he knew he would have to modify it according to local code, union and industry requirements. He planned other changes as the result of experience on the Rouen project.

France has a national code

system (though local fire requirements) and, says Depondt, "every draftsman knows what is allowed and what is not." Here the system must be inherently flexible or undergo constant redesign according to local building codes. Chicago has been "friendly," says Depondt and the system has had little problem adapting because it is flexible. In Rouen, he used flexible conduit; here he must use rigid conduit. In Rouen, exterior steel columns did not have to be fireproofed; in Chicago they do. But the system does not change; it will incorporate what economies and innovations it can into its management system, but, even without these, the system will save time and labor over conventional construction, says Depondt.

Unions have not yet proved a problem, since System III can be assembled in the field; it's a familiar, yet efficient process. If union objections to shop fabrication lessen, more work will be done in the factory. Meanwhile, Depondt seeks to streamline field work.

In France, field and factory wages are similar, while in the U.S., field wages are far higher than factory wages. This has prompted some changes. For example, Depondt has switched from space frames (used at Rouen) to bar joists, which can

be shipped flat and, therefore, more cheaply. In France, the connections of the joists to girders are not a problem, since labor is not as expensive as it is here. But in the U.S., Component Building Systems (CBS) has put a great deal of time into developing simple field connections that can be accomplished quickly (and cheaply).

Other changes involve trade-offs on the technology of U.S. vs. French industry. The Rouen project used artificial stone or lightweight concrete flooring. The gypsum industry is more advanced in the U.S., so the Chicago project will use it; since it is lighter, spans can also be longer. Now steel decking is available in France and allows even longer spans than gypsum would. The switch has been made in France on floors and roofs. It was too late to change the floor specifications on the Chicago plans, but the roofs have already been changed here too. Other modifications: The U.S. has good-quality gypsum wall board. In France, wood fiber panels proved the most economical.

In France, Depondt developed a close working relationship with the major suppliers, who would manufacture products according to his specifications. Here he is less well established and has learned he must use what is available. Generally, he

feels that U.S. industry is less willing to innovate where it does not have total control than it is in France. CBS was part of the original ALCOA (Aluminum Company of America) Operation Breakthrough proposal, but, after the submission was named a finalist, CBS withdrew. "ALCOA wanted me to work for them; we would have been absorbed into the corporation," explains Depondt.

There are two ways that architects and engineers may use System III. CBS is preparing a System III Architect/Engineers Use Manual and designers may use it as a guide in making plans. Or, the designers can present their preliminary plans (not working drawings) to CBS, which will then help prepare a componentized design program, using System III.

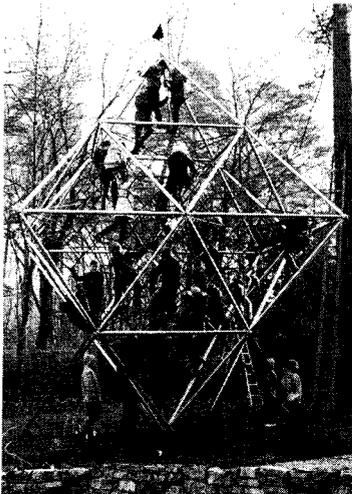
However the design is conceived, CBS then prepares the package of component specifications, prices it to a contractor licensee and prepares, with the contractor, a CPM (Critical Path) for the delivery sequence and erection schedule. Component Building Systems will also provide a construction manager for the project and he will help guide the use of the system and supervise the CPM. Finally, CBS inspects the manufacturing of the components, coordinates delivery to the site and inspects fabrication and erection.

Chicago's Breakthrough



PLAY SPACENET

Intricate new playground structure is the best thing since jungle gyms



The wicked-looking little spider staring at you from out of his net (photo, right) is, in fact, a German boy having the time of his life: he and his pals are busy exploring the wonders of the new "play spacenet" designed and patented by the Berlin architect Conrad Roland, whose considerable work in space-frames and tensile structures has been published here before—and, indeed, around the world. Roland's play spacenet consists of external triangulated supports containing a network of synthetic-fiber rope tied together to form a tensile grid that is capable of supporting the most active children at play. According to the designer, this model is a rather small prototype and merely suggests some of the ultimate possibilities. These include a "spacenet play city," in which children will be supplied with raw building materials or with prefab elements with which to build floors, walls, roofs, etc. within the net. "In another version," says Roland, "all sorts of semi-finished play houses, catwalks, internal streets, ramps, bridges, small cablecars and elevators will be installed." With or without Muzak?



FORUM

(continued from page 29)

Franklin memorabilia in its pedestal base, and be suitable for climbing up into (Sept. '67 issue, page 33).

Unaccountably, the press—including this publication—refused to take him seriously. While the official Philadelphia Bicentennial Corp. was busy cooking up a gradiose billion-dollar scheme (only to see it rejected again and again, even in scaled-down versions), Beauchamp was quietly sculpting his bust of Franklin. And, unlike the official Bicentennial Corp. schemes, which appear to have died from delusions of grandeur, Beauchamp's bust has now become a reality. It was unveiled on June 10.

It, too, had undergone changes. It was not 14 stories



Penny Franklin

high, but 10 ft. high. It was not situated on a high plateau in Fairmont Park but in the fire-house courtyard of Engine #8, Ladder #2. It was not illuminated from within, but was very shiny, covered with 80,000 pennies collected by school children. There was no museum, but it talked to you when you pressed a button.

"Welcome and good greeting to you! . . . The pennies were made just across the street at the United States Mint . . . your obedient servant, Ben Franklin."

You fellows at the Bicentennial Corp., eat your hearts out!

TENTS

RAISING THE BIG TOP

We were informed in May by New York's Museum of Modern Art that the erection of Frei Otto's tent would be accomplished on the morning of June 3rd by the turning and twisting of wenchens.



Trevira and hardhats

Well, we are accustomed to braggadocio from the MOMA, but this particular boast seemed more promising than most. And so we assigned not one but three editors to the event, including one extra wench in case one of the on-site jobs failed to turn and twist.

The cranes were flying over the sculpture garden as we arrived, and the big top, looking like a cluster of Halloween shrouds, soon took off to meet them. The wenchens, however, remained discreetly immobile on the sidelines. Only one polyester (her trade name is Trevira) got truly carried away.

BIG PLANS

NEW HOPE FOR DOWNTOWN

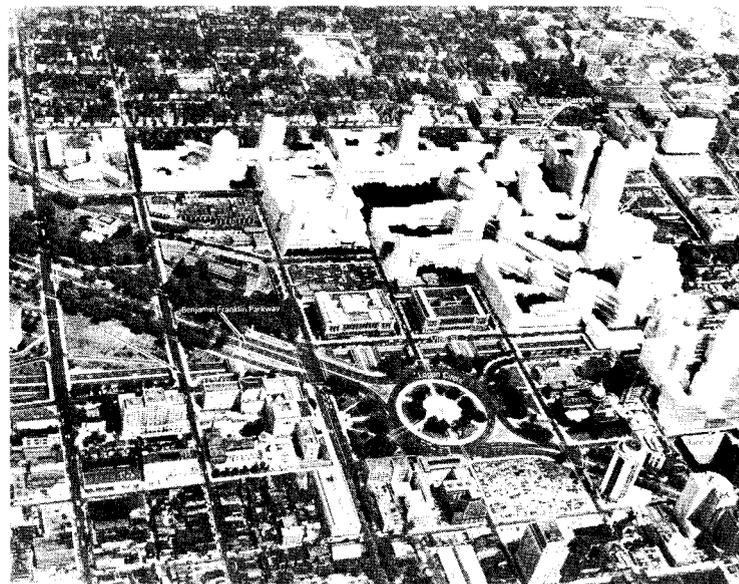
Five top Philadelphia corporations have submitted—for city government approval—a pro-

posal to build a \$400-million new town in the central city. Their approach should be welcomed, not only by the Philadelphia City Council but as a model for cities and the business community everywhere.

To be called "Franklin Town," the mixed residential-commercial community would be located on a 52-acre, 22-block site near City Hall, now mostly occupied by obsolete factories and parking lots. The Franklin Town Corp. (made up of Butcher & Sherrerd, I-T-E Imperial Corp., the Korman Corp., Philadelphia Electric Co., and Smith, Kline & French Laboratories) already owns 70 per cent of the property. The remainder will be purchased by the city redevelopment authority, after the city has given approval, and sold to the developers at cost. The entire project will be financed privately, including relocation of the 125 families or individuals now living there. The only government subsidies that might contribute to the development would be those under federal mortgage-guarantee programs for low-income homeowners.

Franklin Town's corporate sponsors will also establish a separate nonprofit corporation that will provide financial and technical assistance to adjacent communities to help them meet their own goals for housing, employment, health care, social services and education.

Jason R. Nathan, formerly Mayor Lindsay's chief of housing and development in New York City, will be president of the new corporation, and Philip



Johnson and John Burgee are architects and planners.

The Franklin Town plan includes: 4,000 housing units from lowrise town houses to highrise apartment buildings for a wide range of family incomes; nearly 4 million sq. ft. of office and retail space, plus hotels, to insure a lively community both day and night; a pedestrian walkway system; and recreational open spaces that make up 25 per cent of the total area. All of these would be situated around a central "spine"—a wide boulevard and greenway, set diagonally to Philadelphia's street grid and culminating in a 2-acre "town square."

PRESERVATION

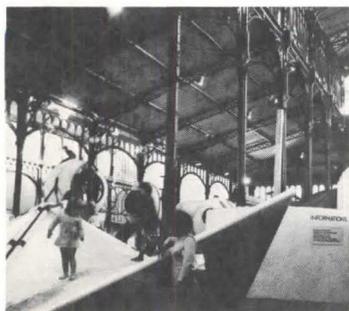
LES HALLES FINIS?

Two years ago (Apr. '69 issue), we published an appeal to help save the magnificent cast iron and glass skylighted pavilions of Les Halles, designed by Victor Baltard in 1851. At that time, the famed open market had just evacuated Les Halles for the outskirts of Paris.

Last month, our editors joined students, artists, professionals, historians, and other preservationists outside the offices of the French Cultural Services in New York City in what was politely called a "manifestation" of American concern over the French Government's announcement that the wrecker's ball would swing on July 1.

Six of the twelve buildings—and the most beautiful—are the original Halles (construction began in 1854), and these were to come down immediately for the planned construction of a major subway station. The authorities claimed they could not be disassembled and reassembled elsewhere because breakage would run as high as 35 per cent. It was also claimed that to save

Playground in Les Halles



Les Halles by burrowing under it—and its Gothic-style underground caves—would cost the government 250 million new francs more than the open-pit method decided upon. The remaining six pavilions are to be demolished later and replaced by a mall.

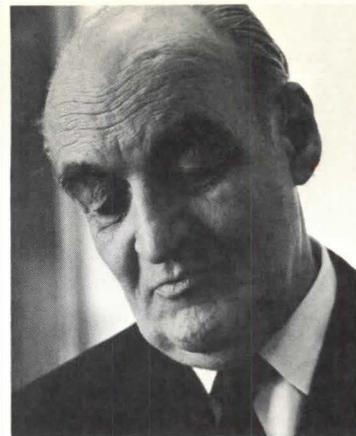
Les Halles have not lain dormant in the two years since the merchants left. They have, in fact, become a center for exciting and spontaneous "wildcat" promotions, including touring theaters, a circus, a Picasso exhibition, and a very popular show-

ing of playground equipment.

Other government plans for the area have not been disclosed, and Parisians fear they may ultimately include a big commercial building project that would destroy the area's personality.

Much of the 11th-hour American activity to spare the landmarks came from the United States Committee for the Preservation of Les Halles and its chairman, Orrin Hein, president of Orrin Hein & Co., investment bankers.

As we go to press, the wreckers barricades are going up.



Graham's Entenza

the wayside," said the Museum of Modern Art's director of architecture and design, Arthur Drexler.

Drexler's own department was, of course, where some of those things happened, including the extraordinarily successful Le Corbusier exhibition in 1951 and a current project, the Museum of Modern Art-Graham Foundation Papers on Architecture (the first book by Robert Venturi was published in 1967, the second in the series will be published in a few months).

Among current exhibitions wholly or partially subsidized by the foundation are: the "Rise of an American Architecture" at the Art Institute of Chicago; the Frei Otto show at the MOMA; and the "Architecture of Venturi & Rauch," which will be on view at New York's Whitney Museum the month of October.

But exhibitions are only one aspect of the foundation's extensive activities, which have included the establishment of student funds, the supporting of doctoral programs, and participation in extensive programs with leading universities. The list is long and impressive.

Entenza's distinguished former career as editor and publisher of the magazine *Arts and Architecture* may have accounted for what Drexler calls Entenza's "sophisticated and knowledgeable skill in evaluating projects." Editors, however, frequently rewrite what is handed them for approval. In resisting this, Entenza endeared himself to his many beneficiaries.

Both rare qualities will be required of a successor if the foundation is to maintain its hard-won position and if architects and other visual artists are to continue their own search for new directions.



Winning plan, Vienna South redevelopment

AWARDS

VIENNA SOUTH

First prize in an international planning competition for the staged development of a 2,500-acre "new town" three miles south of the congested Vienna city core has been won by the Philadelphia firm of Geddes Brecher Qualls Cunningham. The award included a \$28,500 cash prize.

The major traffic arteries that surround the site in a rough square would be connected by four new parallel crossroads, which would serve as the framework of the plan. Between the crossroads would be flexible land strips devoted to shopping, housing, schools, industry, offices, recreational facilities, etc.

Greenways would run the length of the site on the east and west sides and through the center from north to south. These would allow for expansion in an east-west direction.

Where crossroads intersect with the central, north-south underground railway, highrise offices and commercial facilities

would be located, and a shopping arcade would bridge the crossroads at each intersection. Housing of five basic types—from elevator apartments to freestanding houses—would be located outward from these commercial centers, and light industry would be in the easternmost section.

Runners-up were Czech Architects Jan Kavan, Tibor Alexy, Filip Trnkus and Jan Antal. Third prize was won by Tsuto Kimura of Japan, and fourth prize was shared by another Czech team headed by J. Krise.

PEOPLE

ENTENZA RETIRES

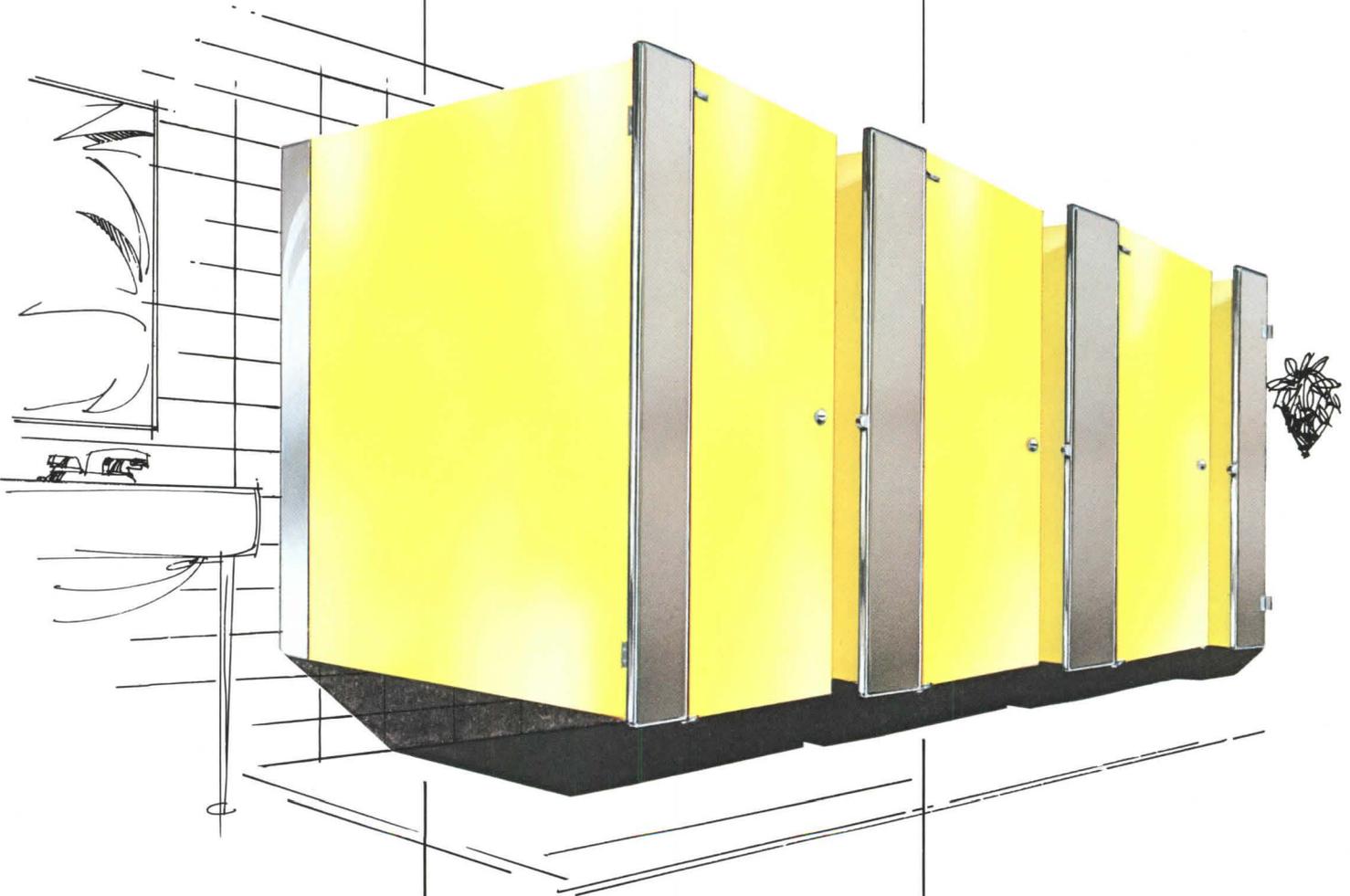
During the past decade, Chicago's Graham Foundation for Advanced Studies in the Fine Arts became the country's foremost force for stimulating fresh ideas in architecture and in those of the fine arts that are contributive to it. It did so under the creative directorship of John Entenza, who retires Sept. 1.

"He made things happen that might have otherwise fallen by

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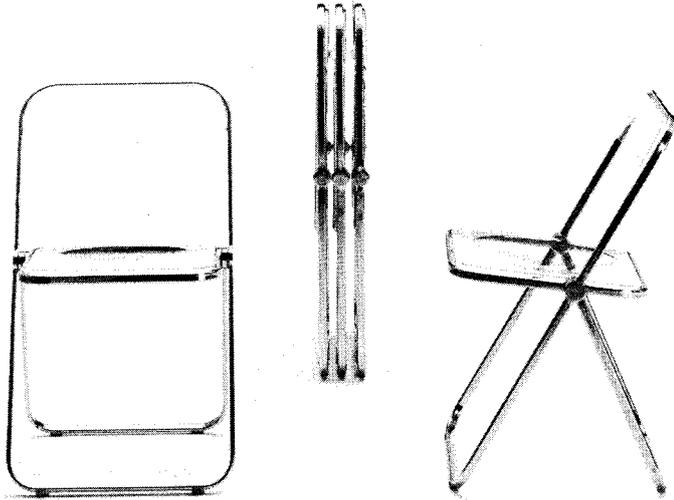
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PRODUCT REVIEW

This month's Product Review concentrates on selected furnishings for home, office and institutional buildings.

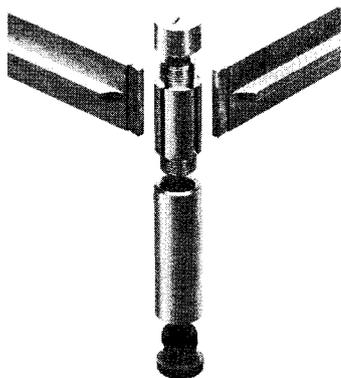


SEE-THROUGH STACK CHAIR

The Plia chair, designed by Giancarlo Piretti and produced by Anonima Castelli (of Bologna, Italy), is framed in chromium-plated steel and has a translucent plastic seat and backrest. For home or contract installations, the chair is designed for indoor or outdoor use. (For outdoor use, the entire frame can

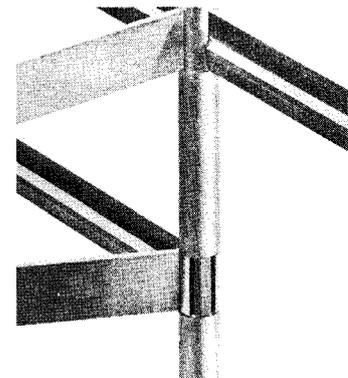
be coated with a white protective plastic.) The chairs stack vertically or horizontally and up to four can hang from a wall hook. Available in neutral, blue, yellow, rose and smoke plastic, with optional decal ornamentation, the chairs are distributed by Krueger Metal Products.

On Readers Service Card, circle 101



DISPLAY FIXTURES

A modular system for assembling functional display and exhibit fixtures has been introduced by Austen Display Corp. Called the Kralex System, the product may be used either for interior or exterior applications. The components are made of ex-



truded aluminum, with a satin-anodized finish. The design of the connectors enables construction of triangular and hexagonal forms in addition to conventional right angles. No special tools or skills are required for assembly.

On Readers Service Card, circle 102.

EVERYTHING SYSTEM

The Interlubke furniture system, developed by Swiss Architect Walter Muller and West German furniture-maker Leo Lubke, is available through International Contract Furnishings, Inc. Designed primarily for apartments, the system accommodates a wide variety of functions in compact form. Besides the usual shelves and cabinets, the system offers a fold-down table or desk (shown), a drop-front bar, a revolving TV shelf, speaker enclosures, and a folding bed (which pivots to expose book shelves by day). Units require no connections to wall or ceiling, and parts can be rearranged freely as

needs change. Wood components are coated with a white polyester finish that is tough, washable, and stain-resistant.

On Readers Service Card, circle 103.

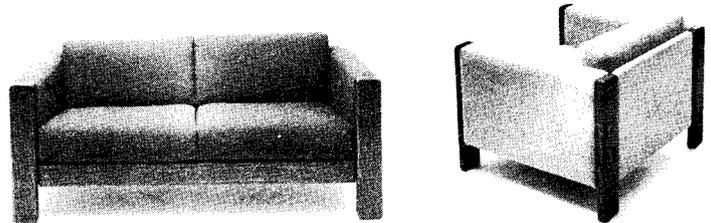


LOUNGE SEATING

A new line of lounge seating, designed by Jim Eldon for Knoll International, includes a chair, settee and sofa proportioned for large, public areas. The units are componentized; the seat and back elements of

the settee and sofa are multiples of the basic chair unit, and the arms are the same on all three pieces. Available in walnut, teak or oak, the seating also features reversible and interchangeable back and seat.

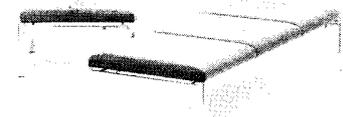
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OFFICE MODULES

Modular office furniture, by Lyon Metal Products, Inc., creates work stations that are both flexible and easily adjusted. Desks are standardized, with tops ranging from 45 in. x 30 in. to 78 in. x 39 in., and the pedestals available include a variety of box, file, tray and stationary drawer compartments. Other components, all with acrylic enamel finishes, are also available.

On Readers Service Card, circle 105.



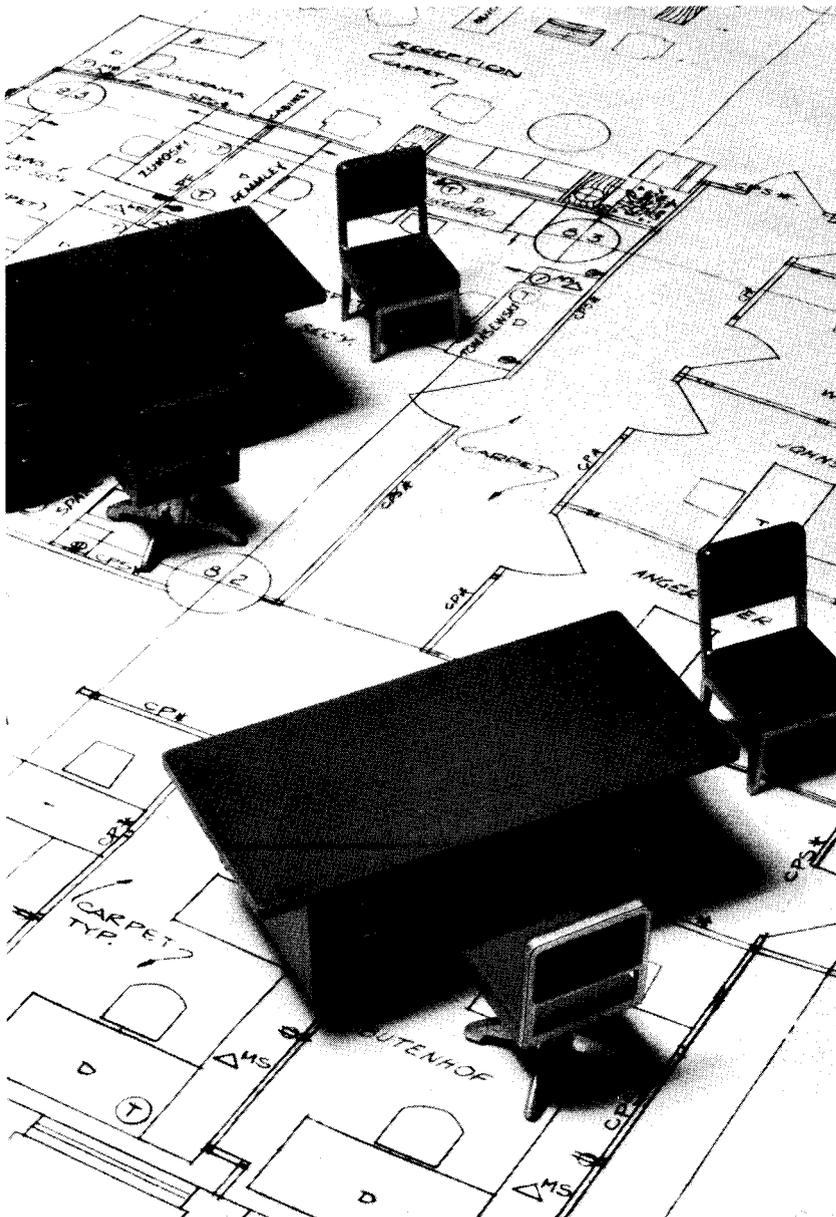
STEEL FRAME FURNISHINGS

Stendig Inc. has announced several new models in the series of furniture designed by Ilmari Tapiovaara, first introduced about ten years ago. Deep lounge seating, benches, settees and additional tables are among the new items. The frames of the new and earlier designs are all oval steel tubing with polished chrome finish.

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continued on page 78

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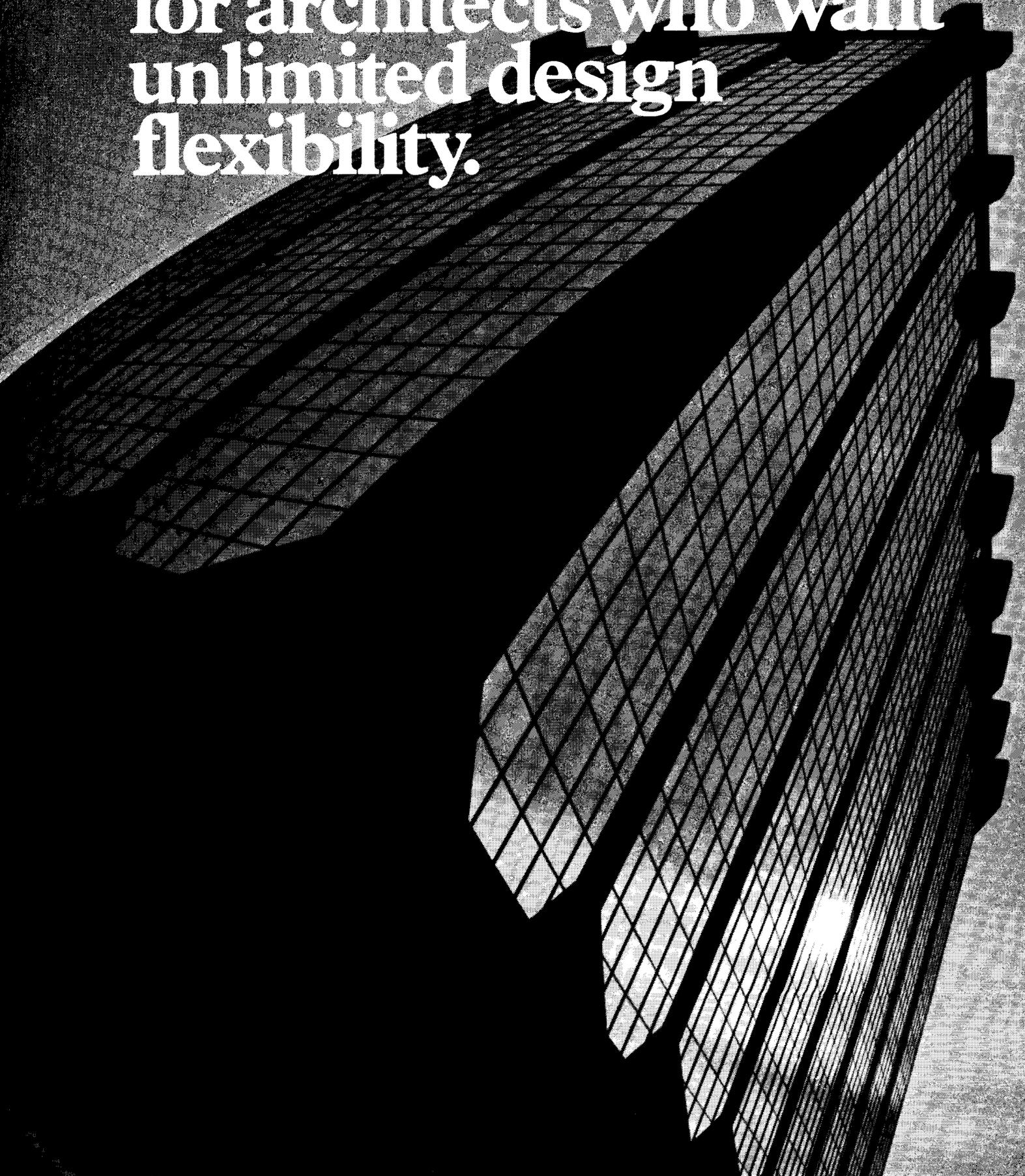
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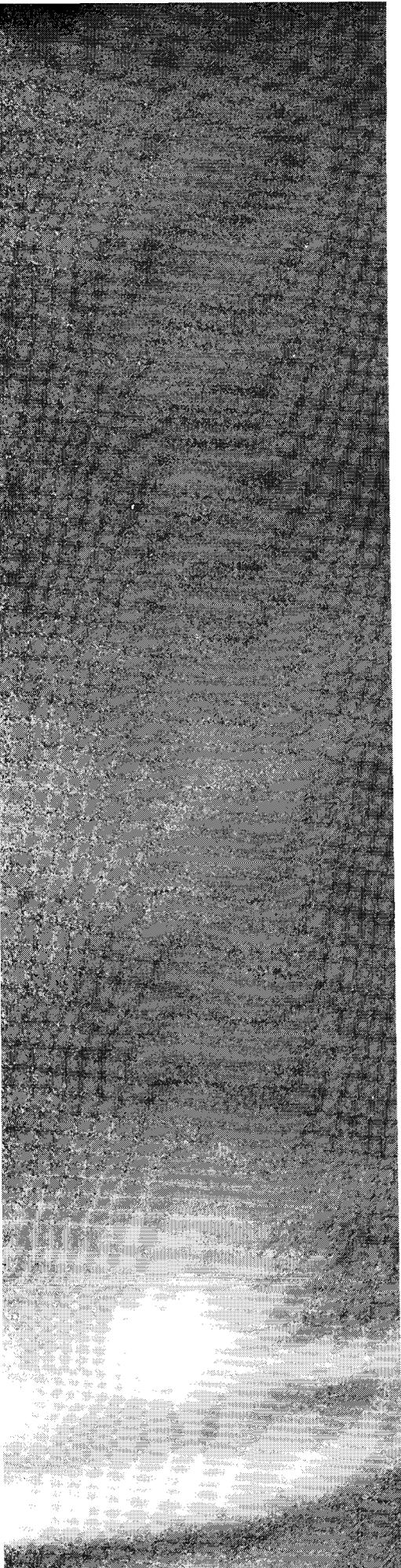
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**PRODUCT
REVIEW**

continued from page 74



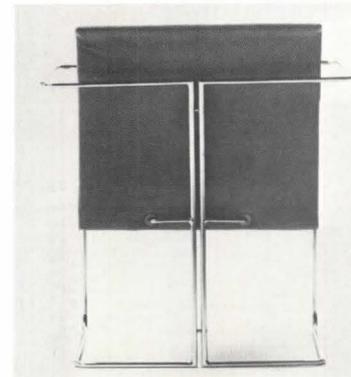
DIAMOND CHAIR

The new Diamond 400 line of lightweight aluminum chairs is being marketed by the General Fireproofing Co. The chairs' arms and legs are turned 45 deg. to give them a diamond shape and, the manufacturer says, the chairs are especially attractive in groupings for schools, cafeterias, hospitals, etc. The line has four chair styles—two with A-frame legs to permit easy stacking, two for formal dining rooms and contemporary offices. The posture-contoured seats are cushioned and may be covered in fabric, vinyl or leather.

On Readers Service Card, circle 107.

ARM CHAIR

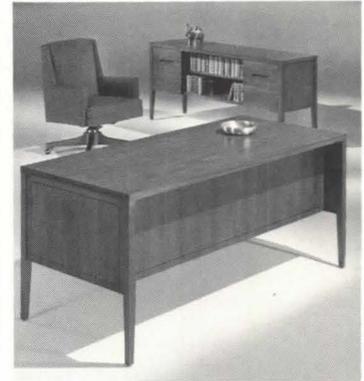
A new chair, imported from Italy and designed by Ernesto Radaelli, is ideal for dining, conference and reception areas. The frame is of solid steel tubular bar stock with a fine chrome



FLAME-RESISTANT COVERING

The General Tire & Rubber Co. has introduced Boltaflex GSA, a new flame-resistant vinyl upholstery line consisting of 32 stock colors and four patterns. Added to the company's Boltaflex USA line, introduced last year, there are now 82 stock items available, all of which are not only flame-resistant, but also are treated so that they will not support the growth of bacterial organisms. The whole line is made of 54-in.-wide fabric-backed expanded vinyl and is also designed for durability, abrasion and stain resistance.

On Readers Service Card, circle 108.



OFFICE FURNITURE

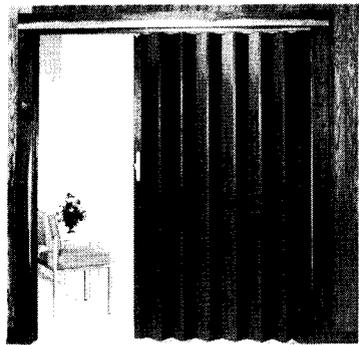
A moderate-priced line of office furniture by R-Way Furniture Co. is offered with textured walnut plastic laminate tops and genuine walnut veneer panels and drawer fronts. Called the Commander series, the furniture is available in three pedestal desks, left and right secretarial units, and a credenza.

On Readers Service Card, circle 109.

finish. The seat and back shell of molded plywood is padded with foam rubber and upholstered in glossy white or black vinyl. Available at Hank Lowenstein, Inc.

On Readers Service Card, circle 110.





FOLDING DOORS

A new vinyl folding door is being offered by Rolscreen Co. The 4-mil. vinyl is bonded to stable core panels and the vinyl is backprinted to assure that there can be no wearing of the patterned surface. A patented spring hinge system maintains the panels at a uniform angle and makes operation easier. The doors are available in several widths and heights and in several patterns: fruitwood and walnut grains or oyster white. The doors can open at either side, in the center, or at any other point.

On Readers Service Card, circle 111.



CLASSROOM CHAIR

A new chair, designed to make classrooms more functional and attractive, has been introduced by Irwin Seating Co. Called model 1082, the chair features a special triangle-shaped tablet arm that provides more writing surface than traditional designs. Available in black enamel frame, with a walnut-finish laminated writing surface and walnut tones on the seat and back, the chair has options that include a fold-down tablet arm, attached book rack and a wide selection of materials and colors.

On Readers Service Card, circle 112.

ROD STACKING CHAIR

A new steel rod stacking chair for auditoriums, classrooms, etc. offers simplicity, form, function and economy, according to the manufacturer, Steelcase, Inc. Called the Max-Stacker, the chair has a continuous steel rod frame with minimum seams and welds and a polypropylene seat and back. The color will not flake off or scratch. Forty-five chairs can stack to over 5 ft. 6 in. on a dolly and floor-protecting glides double as ganging devices.

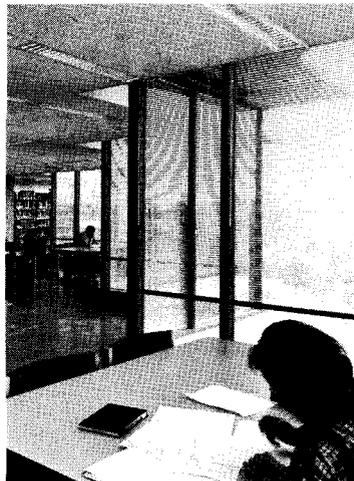
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WINDOW BLINDS

One-inch Flexalum Venette blinds, manufactured by the Alcan Aluminum Corp., are almost transparent when open, yet close tightly. The slats are of spring-tempered aluminum. The head mechanism has a lightweight tilt-tube that supports the blinds and actuates the tilt by rolling on its end supports; it cannot overtilt or jam. Installation is into simple end brackets, much like a window shade.

On Readers Service Card, circle 114.



continued on page 82

On Readers Service Card, Circle 318→



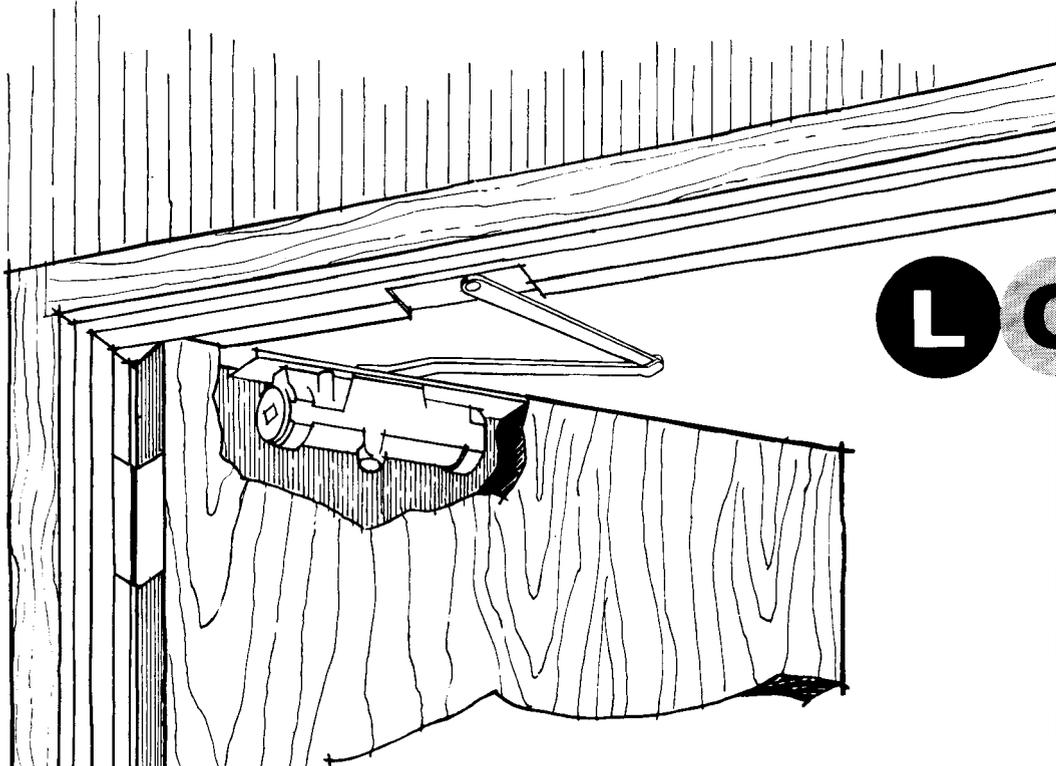
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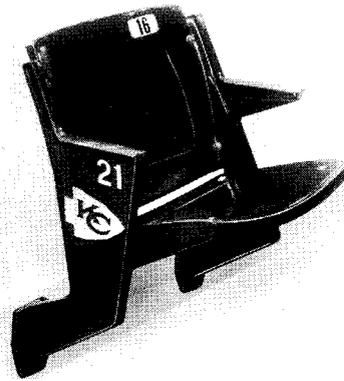


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PRODUCT REVIEW

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STADIUM CHAIR

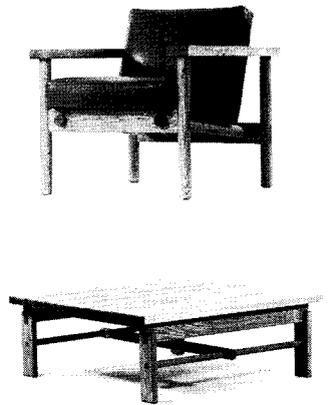
A slick, new stadium chair has a compound curved back and seat, blow-molded of high-density polyethylene plastic. The plastic resists the effects of weather, sunlight and wear, but is easy to clean and requires little maintenance. Modern Z-shaped cast iron standards house a new type of hinge that gives the seat a self-rising feature. It rises automatically to a three-quarter fold position and, in addition, allows occupants to push it further to provide more passing room. Available in a wide variety of colors, the seats are manufactured by American Seating Co.

On Readers Service Card, circle 115.

LOUNGE SEATING

A complete lounge group of seating and tables has been introduced by Tech Furniture, Inc. Designed for long and hard institutional use, the furniture is made of thick, solid oak framing. Benches are available in a variety of shapes and sizes to fit most any application. Table tops are solid butcher block oak or plastic laminate. Seating is modular and available in one-, two- or three-seat varieties. Walnut is optional.

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PARTITIONS

Richards - Wilcox Manufacturing Co. offers a complete line of pneumatic and ceiling-hung partitions and operable walls in a wide range of retardation rat-

ings. There is a wide range of color and material selections and the partitions come with either electric or manual operation.

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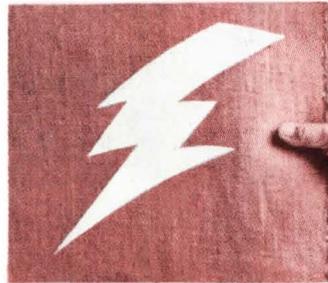


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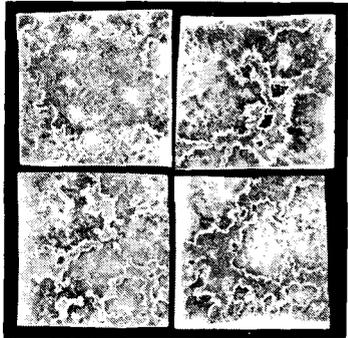
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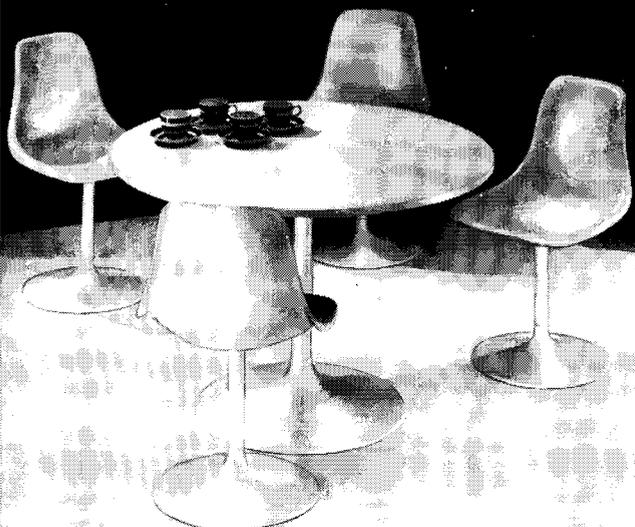
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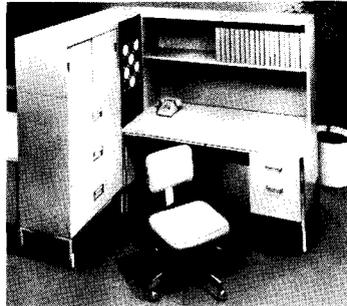
PRODUCT REVIEW

continued from page 82

MODULAR WORK STATION

A new modular work station concept, by All-Steel Equipment Inc., is aimed toward easy planning and versatility. The components are available in many colorful finishes, chromes and various chair fabrics. The individual work stations can be tailored to specific needs, and include a steel desk, table, file cabinet and shelf components.

On Readers Service Card, circle 118.



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

ONTARIO PLACE. ARCHITECTS: Craig, Zeidler & Strong. (Materials & Manufacturers as submitted by the architects.) WATERPROOFING: Dean Chandler Waterproofing Ltd. CONCRETE & CEMENT: Gilbert Steel Ltd., Canadian Bldg. Materials/Dufferin P. STRUCTURAL STEEL: Steel Co. of Canada. CURTAIN-WALL: Westeel Rosco Ltd., Aluminum Co. of Canada. FLOOR & DECK SYSTEMS: Westeel Rosco Ltd. ROOF MATERIALS: Dean Chandler Water-Proofing. THERMAL INSULATION: Dean Chandler. ACOUSTICAL MATERIALS: Fiberglas Canada Ltd., Ure-Al Corp. Canada Ltd. FENESTRATION: Canadian Pittsburgh Ind. GLASS: Glaverbel Glass Ltd. PARTITIONS: Northdown Dry Wall Construction Ltd. ELEVATORS: Otis. DOORS: Glaverbel, S. W. Fleming, Power Steel Products. HARDWARE: Contract Hardware Specialists Ltd. PAINT: Performance Coating of Canada, McNaughton Brooks Products Ltd. ELECTRICAL DUCTS: Canada Wire & Cable. LIGHTING FIXTURES: Howard Lighting Fixtures. PLUMBING FIXTURES: Crane Canada Ltd. PIPING: Grinnell Co. of Canada, Interprovincial Steel & Pipe, Sceptre. UNIT VENTILATORS: Mark Hot Inc. AIR CONDITIONING COMPRESSOR: Trane Co. of Canada, Chrysler Airtemp Canada. SPRINKLER SYSTEM: Viking Fire Protection, Erin Engineering. FINISH FLOORING: Crossly & Harding, St. Lawrence Ceramics Ltd. FLUSH VALVES: Mueller Ltd. MISC. METALS: Modern Railing & Metalcraft, Dundaf Iron & Steel Ltd.

YM-YWHA DAY CAMP. ARCHITECTS: Samton Associates. (Materials & Manufacturers as submitted by the architects.) CONCRETE & CEMENT: Portland Cement. EXTERIOR SIDING: U. S. Plywood Fir Roughtex. FLOORS & DECKS: Douglas Fir. ROOF MATERIALS: G. E. Silicone. GLASS: LOF. INTERIOR PARTITIONS: Marlite. DOORS & PANELING: U. S. Plywood Fir Roughtex. PAINT: Benjamin Moore. PLUMBING FIXTURES: American Standard. CEILING MATERIALS: U. S. Plywood. KITCHEN EQUIPMENT: Dwyer.

HAZEL HOTCHKISS WIGHTMAN TENNIS CENTER. ARCHITECTS: Sasaki, Dawson, DeMay Associates, Inc. (Materials & Manufacturers as submitted by the architects.) WATERPROOFING: Western Waterproofing Co. CONCRETE & CEMENT: Varney Bros., Bellingham, Lehigh Portland Cement Co. BLOCK: G. Rappoli, Inc., Woburn. STRUCTURAL STEEL: Inland Ryerson Construction Products Co. ROOF MATERIALS & THERMAL INSULATION: Inland Ryerson Construction Products Co. FENESTRATION: Williamsburg Steel Products. GLASS: American St. Gobain Glass Co. LOCKERS: Republic Steel. DOORS: Williamsburg Steel Products, Freeman-Carder Co., Weyerhaeuser. HARDWARE: Russwin Hardware Co. FLOORING: New England Decks & Floors, Dex-O-Tex Flooring. PAINT: Sherwin-Williams, Martin Senour. ELECTRICAL EQUIP.: Federal Pacific Co. LIGHTING FIXTURES: Holophane, Miller. PLUMBING FIXTURES: American Standard, Stasco Seats. PIPING: Charlotte Pipe & Foundry, Bridgeport Brass Co. HEATER: Johnson Heater Corp. UNIT VENTILATORS: Honeywell Controls, Jenkins Bros. AIR CONDITIONING COMPRESSOR: Mannouth Div. Lear Seigler Corp. DIFFUSERS: ENPO Co. FANS & VENTILATORS: Penn Domex, Barry Blower. SPRINKLER SYSTEM: Automatic Sprinkler Co., Newton. WATER COOLERS: Halsey - Taylor. TENNIS COURT: "Uniturf." FINISH FLOORING: Empire Carpet Corp., McGee "All-Site," Wellco "Rockland."

STUDENT UNION-STATE UNIVERSITY OF NEW YORK AT STONY BROOK. ARCHITECTS: Damaz, Pokorny, Weigel. (Materials & Manufacturers as submitted by the architects.) FOUNDATION WATERPROOFING: Durex. CONCRETE & CEMENT: Saylor's. BLOCK: Plasticrete Concrete Block. FLOOR & DECK SYSTEMS: Concrete Waffle. ROOF MATERIALS: Barrett. FENESTRATION: Samson. GLASS: PPG. INTERIOR PARTITIONS: Brunswick, Hough. ELEVATORS: Burlington, Parkline. DOORS: Hanssen, Williamsburg. HARDWARE: Schlage. TILE: Hanley. PAINT: Debevoise. ELECTRICAL EQUIP.: Westinghouse, I.T.E. LIGHTING FIXTURES: Gotham. PLUMBING FIXTURES: American Standard. HEATING CONVERTORS: Aerco. UNIT HEATERS: McQuay, Webster. UNIT VENTILATORS: Leslie, Fairbanks, Honeywell. HEATING VALVES: McQuay. AIR CONDITIONERS: Waterloo, Ketcham, Weinman. DIFFUSERS: Swartout. FIRE PROTECTION: Simplex. WATER COOLERS: Filtrine. PARTITIONS: Brunswick, Hough. KITCHEN: Sefi Fabricators. FINISH FLOORING: Kentile. FURNITURE: Harvey Probbler. FABRICS: Knoll. DRAPERY HARDWARE: Kirsch. SLIDING DOORS: Arcadia.

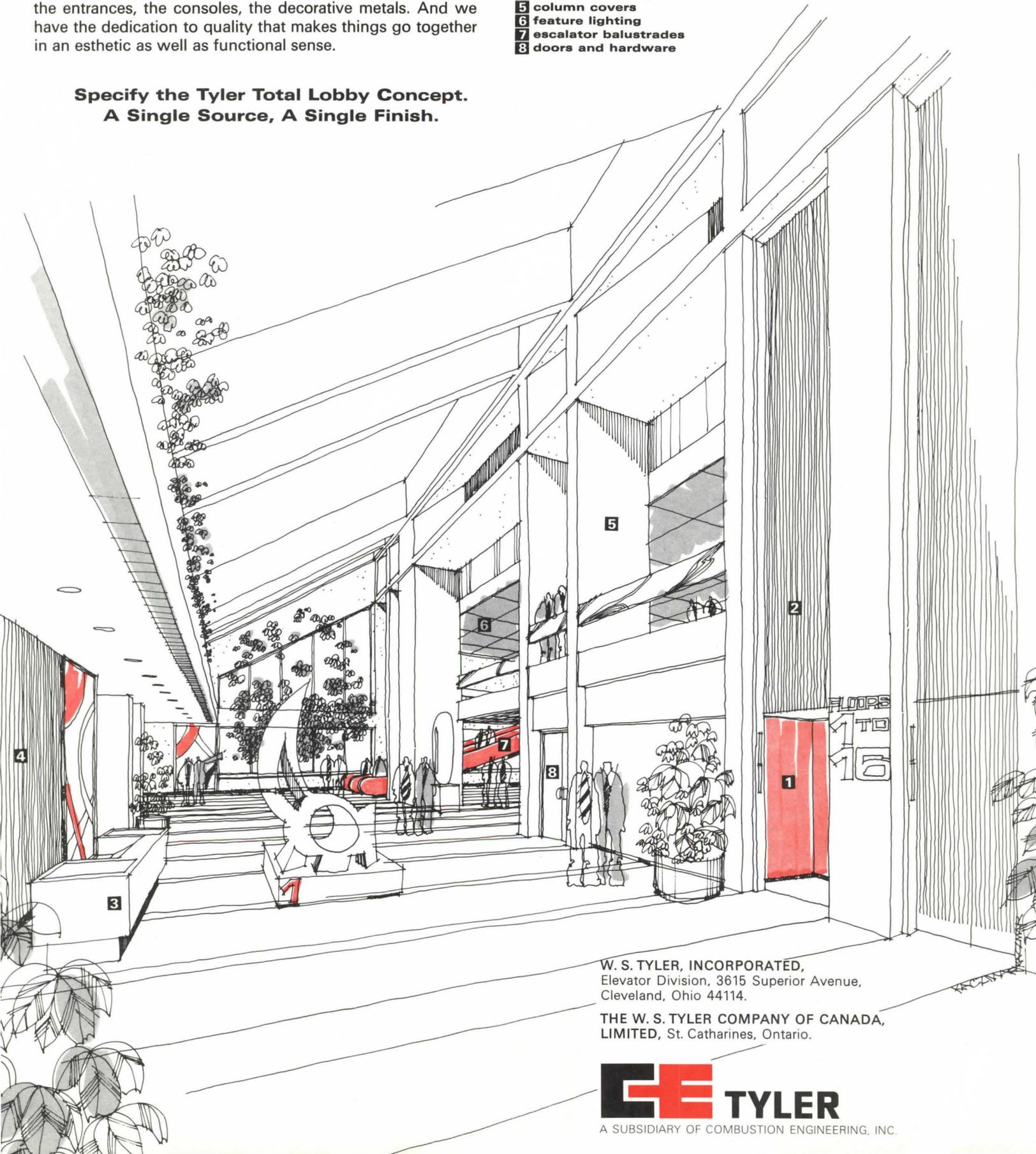
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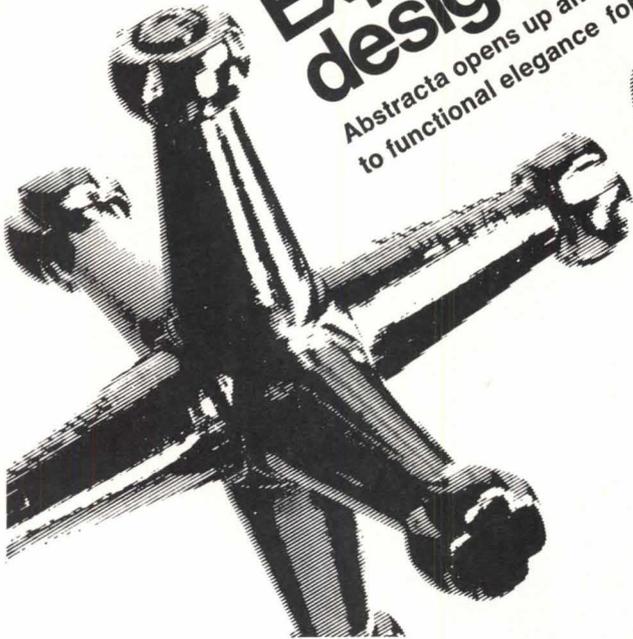
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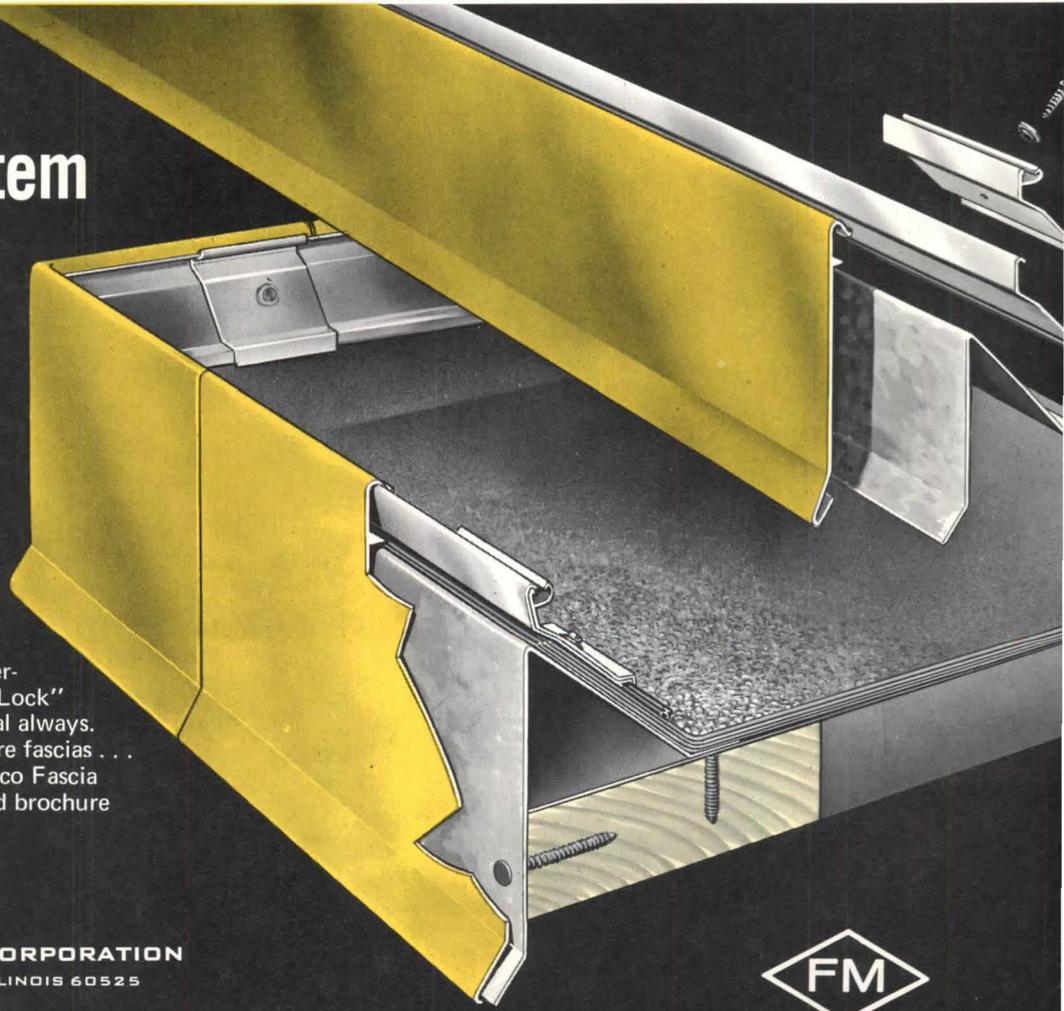


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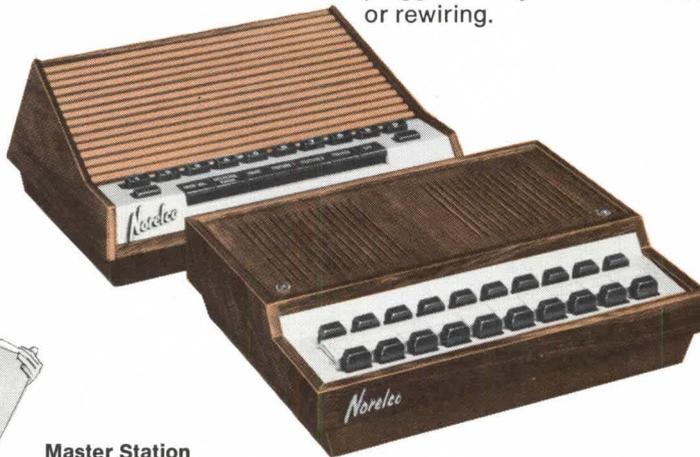
SILBRICO CORPORATION
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Two good reasons why you should specify a Norelco Mastercom System for your new construction or modernization projects.

1. Meets the needs of your clients for an efficient, trouble-free, internal communications system • quicker and more convenient than using a telephone • voice controlled for hands free operation • superb design complements any office • unlimited expansion for future growth • frees telephone system for important outside calls • solid state electronic system needs little or no maintenance.

2. Provides simplified, low cost installation without complex construction problems or complicated wiring • dependable, fully electronic system without relays, crossbar switches or other moving parts • simple to install, no electrical adjustments or maintenance of contacts • central control pack and stations are plugged into sockets connected in parallel in one continuous 8-pair cable in each section • stations can be moved and plugged in anywhere in the section without any changes or rewiring.



Master Station

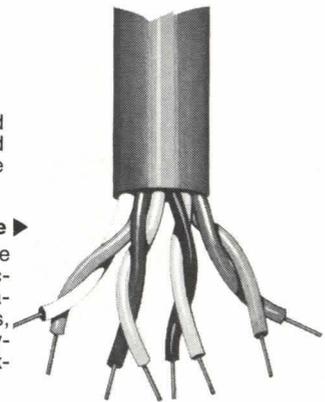
Attractive, reliable, easy-to-use; pushbutton control keys; designed in rich looking rosewood or blond oak wood grains and hand finished metal; true to life sound quality . . . microphone and speaker are built in; decentralized duplex system.

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AF-771

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Company _____

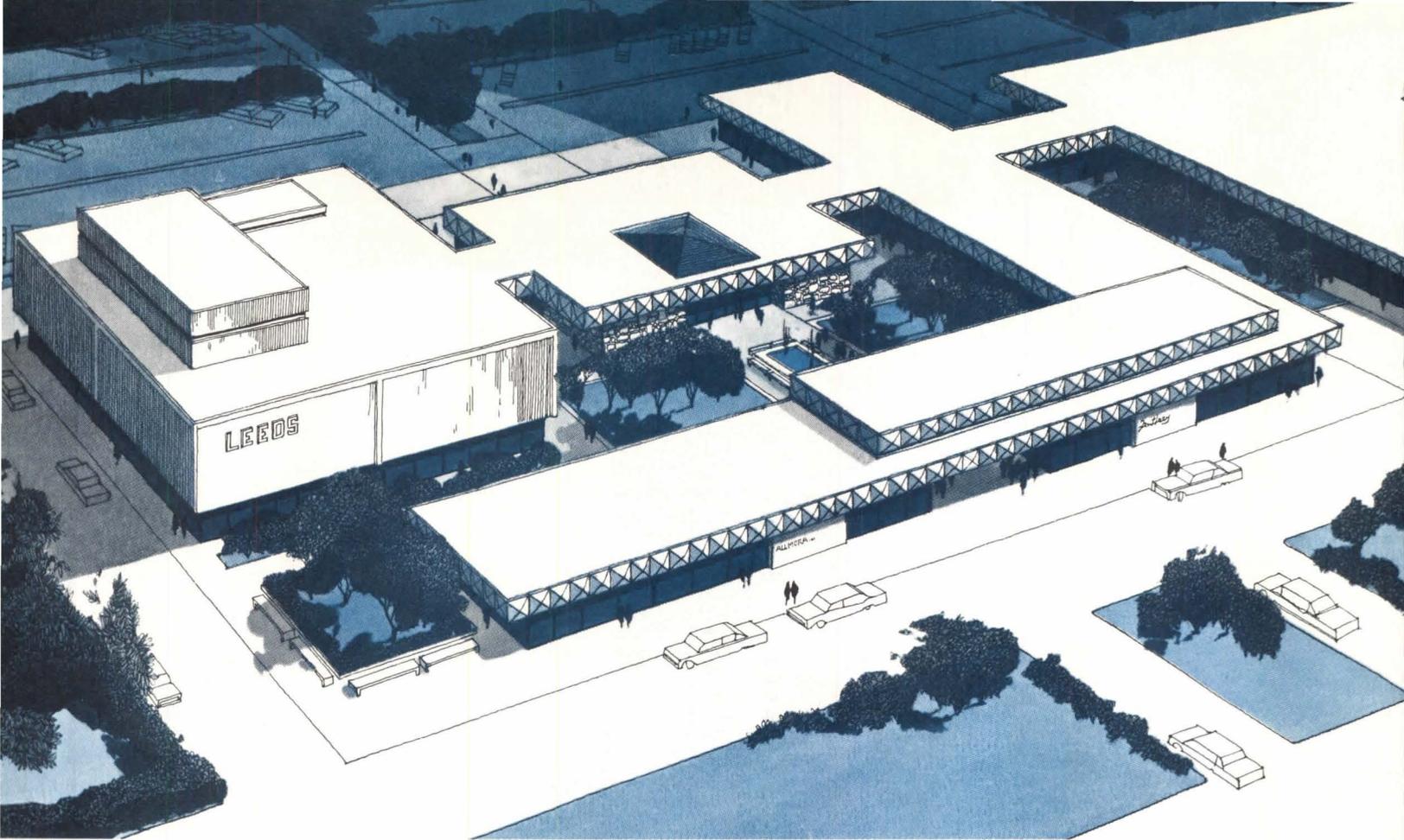
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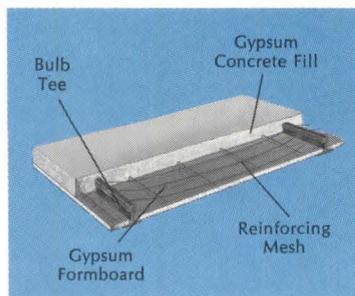


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- FM SPECIFICATION does not restrict optimum bar joist spacing—can result in substantial bar joist cost reductions.
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- LOWEST COST UL 2 HOUR FIRE RATED ROOF DECK SYSTEMS are available in four designs: two designs with a suspended ceiling and two without suspended ceilings.

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BUILDING AMERICA

READERS SERVICE FILE

PRODUCT LITERATURE

To order material described, circle indicated number on self-addressed Reader Service Card, facing page 82

ARCHITECTURAL INDEX

A valuable aid to research. A cross-indexed listing of editorials run in leading architectural publications. Information is broken down by buildings, types of buildings and methods of construction. Available at \$6.50 from The Architectural Index, P.O. Box 1168, Boulder, Colorado 80302. On Readers Service Card, circle 200.

BATHROOM FITTINGS

A colorful brochure illustrating shapes, colors and tile patterns is now available from the Mid-State Tile Co. On Readers Service Card, circle 201.

The new Aquarian lavatory and bath fittings from American Standard shown in a colorful brochure. The makers claim that the unique ceramic washer system virtually eliminates replacement, repairs or lubrication and guarantees long life. On Readers Service Card, circle 202.

CARPETING

Shock-free carpeting is guaranteed when Brunsmet Metal Fibers are incorporated in the weave. Advantages are explained in a 12-page color brochure. On Readers Service Card, circle 203.

CLOCKS

A fully illustrated catalog from Howard Miller Clock Co., showing their complete line of clocks for contract installations. On Readers Service Card, circle 204.

DISPLAY SYSTEMS

All you need to know to build tubular display structures is contained in a brochure from Abstracta Structures. Module sizes and connector components along with applications and actual installations are shown. On Readers Service Card, circle 205.

DOORS/WINDOWS

Architectural Reflections. A full-color pictorial brochure depicting history of esthetic uses of Kinney reflecting glass. Kinney Vacuum Division. On Readers Service Card, Circle 206.

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 207.

Catalog gives technical data on LOF glass: includes Varitran and Vigilpane

SA68. Libbey-Owens-Ford Co. On Readers Service Card, circle 208.

ELECTRICAL

A new four-page, color brochure on Norelco intercom systems, describes applications and features. Norelco, Philips Business Systems, Inc. On Readers Service Card, circle 209.

ELEVATORS

Illustrated color brochure featuring elevator doors, entrances. Architectural components take on a new dimension of design and decor with many combinations of Ty-Weave lustrous woven metal. W. S. Tyler Co. On Readers Service Card, circle 210.

Series of six color brochures showing elevators for many different building types. Cab designs, dimensions, freight elevator information are all part of the package. Dover Elevator Division. On Readers Service Card, circle 211.

FLOOR COVERINGS

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 212.

FURNISHINGS

Special 16-page catalog with information on LCN Door Closers. Includes surface-mounted, overhead, concealed, and floor models. LCN Closers. On Readers Service Card, circle 213.

FURNITURE

New extra durable Mushroom furniture is attractively illustrated in a colorful brochure from Hollen, Inc. On Readers Service Card, circle 214.

An illustrated brochure detailing the J. G. Furniture line of commercial seating for 1971 is now available. On Readers Service Card, circle 215.

Fourteen new executive desks are illustrated in a brochure from Davis Brayton Designs. On Readers Service Card, circle 216.

The new Openscape office is attractively described in a 32-page color booklet from InterRoyal. A selection of landscaped office arrangements and possibilities within given areas are shown. On Readers Service Card, circle 217.

Krueger Metal Products offers catalogs of chairs designed by G. C. Piretti. Full-color catalog introduces a new modular dimension to contract seating. On Readers Service Card, circle 218.

Executive office furniture is attractively illustrated and detailed in a colorful 26-page folder from R-Way. Wood has been generously used in this handsome furniture. On Readers Service Card, circle 219.

GLASS

Useful information on Pilkington Bros. Ltd., Glass Products is contained in an informative, interesting brochure. On Readers Service Card, circle 234.

HARDWARE

Twenty-page catalog describes full line of advanced architectural door hardware including specifications and function charts. Sargent & Co. On Readers Service Card, circle 220.

LIGHTING

A new line of lighting fixtures, the "Aspen Series," has been announced by Keene Corp. They are available in widths from 6 inches and in lengths up to 8 feet. A brochure is available. On Readers Service Card, circle 221.

ROLLED DRAWINGS

Square Tube Filing equipment insures quick and easy retrieval of rolled drawings according to Plan Hold, Inc. The brochure describes some of the many cabinets and storage files that are available. On Readers Service Card, circle 222.

ROOFING

New extruded aluminum fascia system provides fast permanent installation of a water dam for roofing. This new, easily installed system will withstand high winds, hide building irregularities and comes in a variety of colors. Available from Silbrico. On Readers Service Card, circle 223.

A 16-page brochure describes fast economical installation of a UL 2-hour fire rated versatile roof deck system. U. S. Gypsum's four roof deck systems meet Factory Manual's Non-combustible Spec. On Readers Service Card, circle 224.

SKYLIGHTS

A detailed brochure describing standard and interesting innovative installations on skylights is available from

Fisher Skylights, Inc. Both large and small installations are shown. On Readers Service Card, circle 225.

WALL/LAMINATES

New textured-surface wallcovering samples are included in a folder from Koroseal. These new textures are available in a variety of colors suitable for contract installations. On Readers Service Card, circle 226.

Information on Marlite Plank and block, Korelock and firetest panels is given in an illustrated brochure from Marlite Div., Masonite Corp. On Readers Service Card, circle 227.

A new, detailed, 8-page color brochure (#618) on wallcoverings is now available from Columbus Coated Fabrics, Div., Borden Chemical Co. Complete specifications are given along with a color guide. On Readers Service Card, circle 228.

A new sandwich wall panel is described in a brochure from Armco Steel. The one-step composite panel comes pre-finished with interior and exterior coating and foamed-in-place urethane core. On Readers Service Card, circle 229.

WASHROOM DATA

Many different methods of installation of toilet compartments are shown in a colorful brochure from Sany-Metals. New surfaces and color finishes are described and shown. On Readers Service Card, circle 230.

MISCELLANEOUS

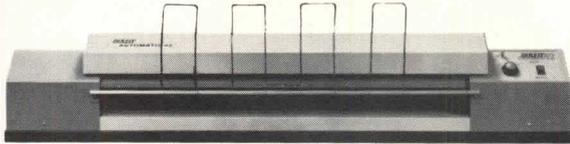
Planters in all shapes and sizes for public areas, parks and private homes are illustrated and detailed in a folder from L. Paul Brayton. These planters are fabricated from a new, strong, lightweight material. On Readers Service Card, circle 231.

"Kodak Compass," a booklet describing how photographic techniques such as paste-up drafting as well as economical production of renderings, shadow prints, multiple floor plans, and reduced-size prints can save architects hours of repetitive drafting time. Eastman Kodak Co. On Readers Service Card, circle 232.

Exceptional quality is claimed for the new 747 Whiteprinter from Blu-Ray. It prints at the rate of 15 feet per minute and is liquid free. Many maintenance steps have been eliminated. On Readers Service Card, circle 233.

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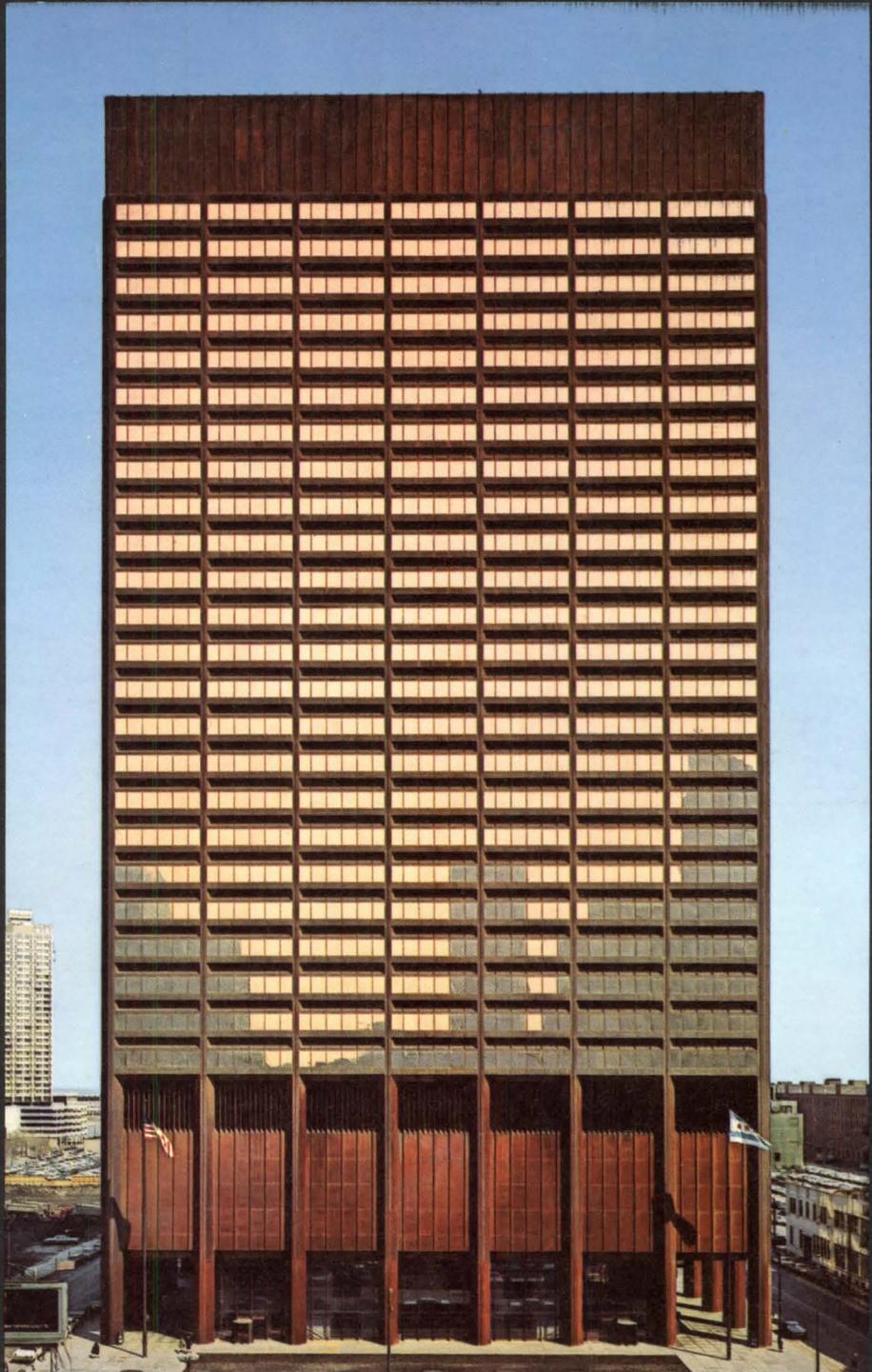
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Time-Life Chicago is one of the latest in a number of structures that feature Kinney Architectural Glass. Our booklet "Architectural Reflections" describes some of them. Please write for it. Kinney Vacuum Coatings, 7030 Colonial Highway, Pennsauken, New Jersey 08109.

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For complete information on Marlite's 1971 line of plastic-

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