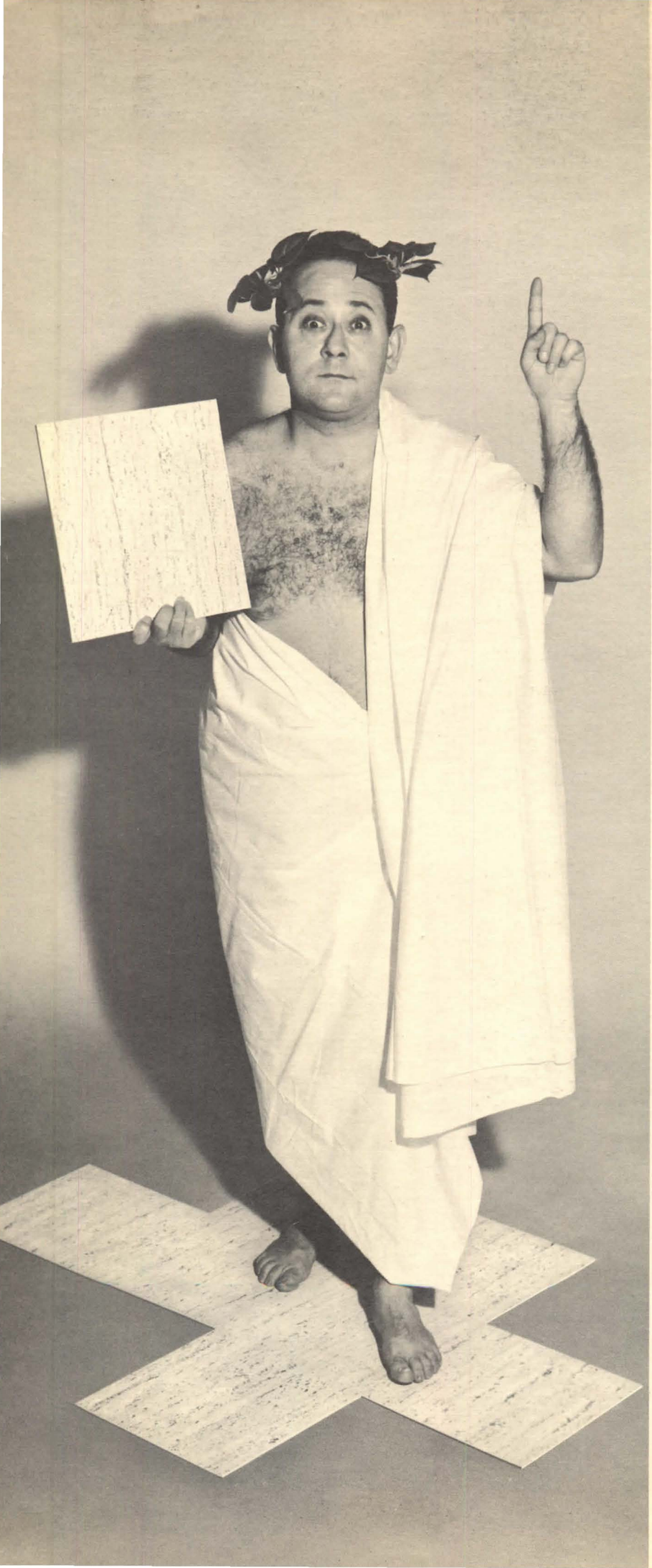
E ARCHITECTURAL FORUM / JANUARY-FEBRUARY 1968



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KENTILIUM FLOORUM

LETTERS 15

FORUM 43
A monthly review of events and ideas.

TRAFFIC IN CITIES 47

THE GREAT GRAND CENTRAL 48
The world's first urban mixer is still going strong. By Frank Williams.

TRANSIT FOR SEATTLE 56
The proposed new system would do a lot more than just move people.

UNDER THE ACCESS TREE 62
N. Y.'s Regional Plan Association suggests a new concept for urban form.

MILAN AND MONTREAL 68
Two foreign design efforts prove that subways need not be sewers.

FREEWAYS IN CITIES 72
They will get better, but will they be good enough? By Priscilla Dunhill.

THE FORGOTTEN MAN 78
Several oases that remember the neglected pedestrian.

THE CASE FOR SOFTWARE 86
A plea for action now, using today's technology. By Sumner Myers.

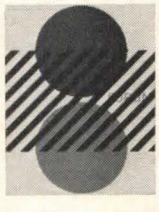
THE AIRBORNE STAMPEDE 90
Air traffic of the future will call for a revolution in ground facilities.

URBAN MINISYSTEMS 98
Proposals for moving people downtown. By Brian Richards.

FORM AND FUNCTION 106
How projected (and existing) systems may affect tomorrow's cities.

PREVIEW 120
Plan for Astor Place, New York City.

BOOKS 136
The Urgent Future by Albert Mayer.



Cover: Design by Charlotte Winter.

THE ARCHITECTURAL FORUM
Vol. 128 No. 1. JAN./FEB. issue.
Published 10 times a year, combining Jan./Feb. and July/Aug. issues, by Urban America, Inc., 111 W. 57 St. New York, N. Y. 10019.
Sent without charge to architects registered within the U.S.A. Qualified persons are invited to write the Circulation Manager on company letterhead. Please give your principal state of architectural registration, your title, and the kind of work you do. Correspondence regarding service, change of address, etc., should be sent to the Circulation Manager.
Subscription rate is $12 within the U.S.A. and possessions; Canada, $15; Elsewhere, $20. College Rate for students and faculty members of U.S. accredited schools of architecture, $6.
Single copies, $1.50.
Member of Business Publications Audit of Circulation, Inc.
Controlled circulation postage paid at New York, N.Y.

PUBLISHER'S NOTE

So much thoughtful standing-back-and-squinting occurs in our editorial offices each month, I would hesitate to label any one issue "special." This, then, is a *specialized* issue. Occasionally, when the subject matter warrants it, our editors commit an entire issue to a single theme (Housing—July/Aug. '65; LeCorbusier—Oct. '65).

This time the focus is on Urban Transportation. Our total concentration here does not mean we have slighted this subject in the past. In May '66 we did Boston's Inner Belt Freeway and followed it immediately with a definitive article on San Francisco's Bay Area Rapid Transit system (June '66). Montreal's pedestrian transit network was published in Sept. '66; New Orleans' Vieux Carré expressway in March '67. There were others.

But with the growing urgency of urban transportation problems, evidenced daily in the national press, it was apparent that the time had come for a thorough study.

Forum's editors, in their research for this issue, observed, however, that much of the transportation planning and remedial research reported was confined to the technology of movement. All too frequently ignored was the simple fact enunciated by Wilfred Owen in September, 1966, at the conference, *Our People and Their Cities:* "Providing transportation is not just a matter of getting things moved. It is also a major means of improving the urban environment."*

Our concern, in this issue, is directed toward that *larger* question: how can transportation help provide a solution to the multiple ills afflicting the city. L.W.M.

* Owen's remarks have been reprinted and illustrated in a booklet called *A Fable: How the cities solved their transportation problems.* Copies at $2 each, less for bulk orders, are available at Urban America Information Center, 1717 Massachusetts Avenue, N. W., Washington, D. C. 20036.

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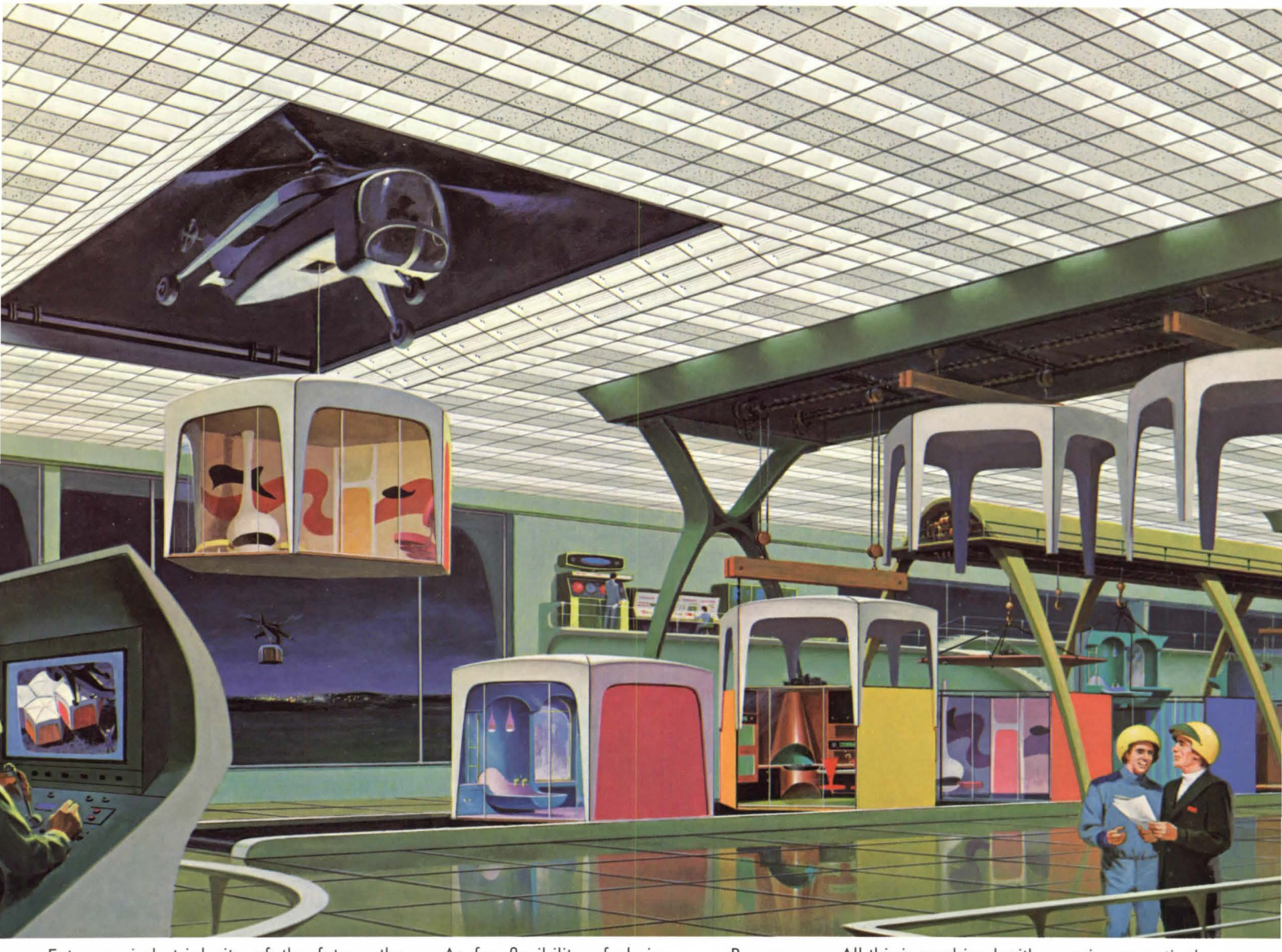

Enter an industrial site of the future: the plant and distribution center for pre-built homes. As each room or part of a room (in the form of a hexagonal module) reaches the end of the assembly line, a helicopter transports it to the construction site, where it is set and coupled in place.

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CEILING SYSTEMS BY

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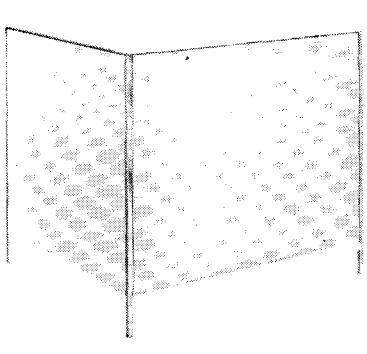
You'll have to face it. An office divider should be good to look at.



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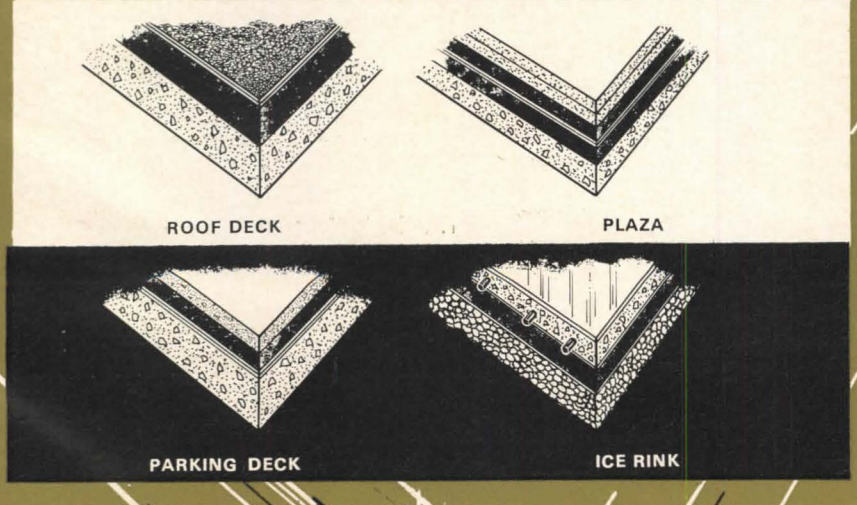

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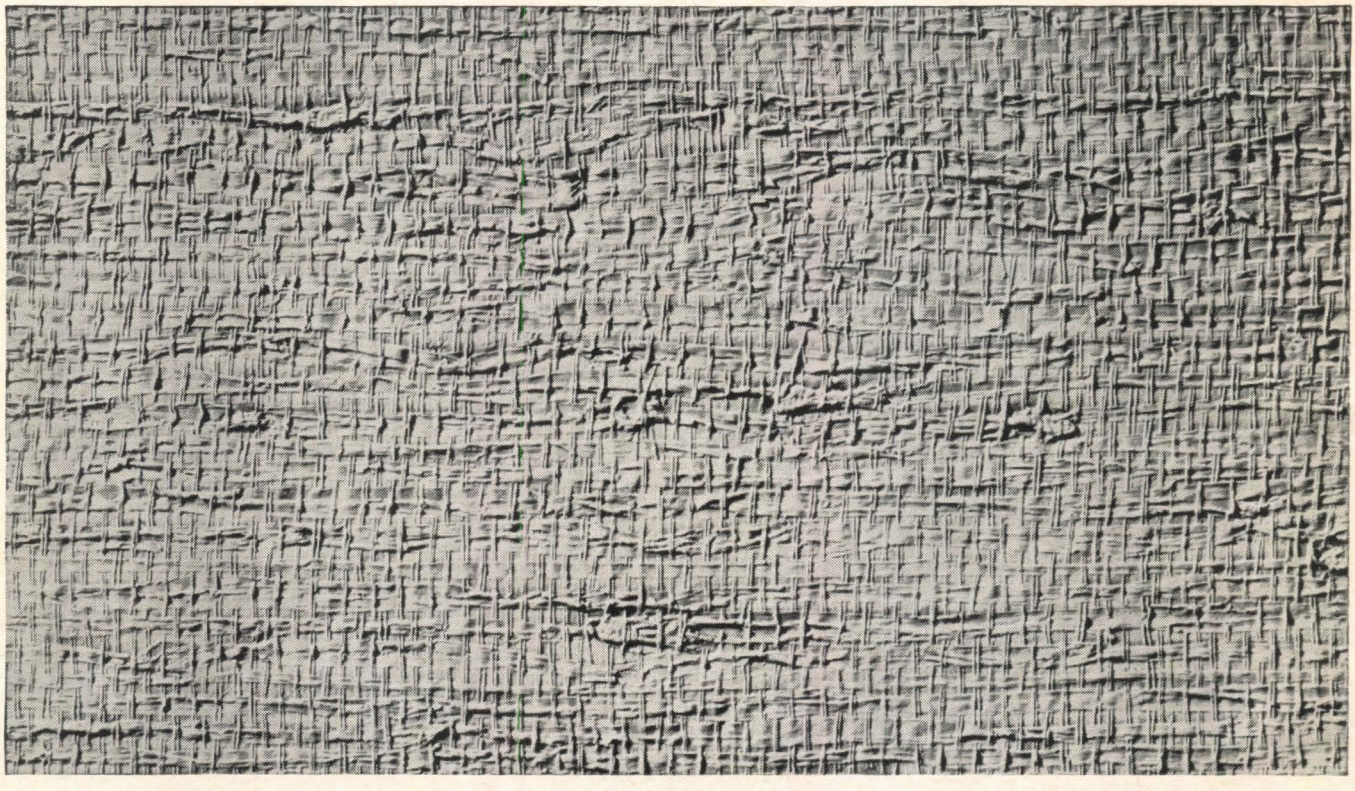

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LETTERS

TRAGEDY OF THE IMPERIAL

Forum: Starting in 1916 it took about four years to build Frank Lloyd Wright's Imperial Hotel, and now demolition will take about four weeks. From the window of my eight-story room in the "new" Imperial, I've seen the steel wrecking ball swing from 8 a.m. to midnight and have walked through what is left of the grand public areas. Their furnishings have been stripped; it is damp and cold. Outside, frontloaders lift the debris into trucks which haul it away for landfill.

The hotel's furnishings were spirited away by the management to a Nagoya department store two weeks ago and sold as second-hand goods. Within 45 minutes everything was snapped up at cheap prices, "Peacock Chairs" going for a dollar each.

The pros and cons of preservation will not be discussed at length here. On simplest terms, if an Imperial had stood on Central Park South, privately owned, three stories high, and more a motel than a hotel, it would have disappeared 20 years ago. This is hardly the point.

Wright designed everything for the Imperial: an earthquake-proof structural system, foundations, carved stonework, various bricks, copper cornices, floor patterns, stained-glass doors and windows, heating and lighting elements, grills, hardware and, as I mentioned, all of the furnishings. The genius of Wright was his total creativity and involvement, from the whole concept to every detail of material, color, and texture—each part exquisite in itself, an interpretation of a gracious way of life. Saving of parts of the Imperial for a museum or exhibition would have been next best to saving of the whole.

A local committee to preserve the structure has fought a losing battle, and at this moment, with demolition about half complete, has too few yen to move the entrance section to a city park as it had hoped. Management has given permission to remove parts, if it does not disrupt their realistic demolition timetable.

Our press rightfully sounded the clarion well in advance: Huxtable and generous coverage by the *New York Times*, Von Eckardt of the *Washington Post*, the *AIA Journal*, and all of the architectural press warned. Our architectural establishment, comprising the affluent foundations, schools, councils, fellowships, museums, and leagues, remained silent and offered no action or funds to obtain the parts of the Imperial that are there for the taking. The taking is consequently being done by the frontloaders—off for landfill.

Frank Lloyd Wright's great achievement will be seen from now on only through photographs. The tragedy of the Imperial is not that it is coming down, but that nobody stepped forward with funds sufficient to save anything. For $20,000, or approximately the cost of a foundation board room, we could have preserved a heritage.

EDGAR TAFEL
New York City — *Architect*

Forum: I assume you will shortly be dealing with the story of the demolition of the Imperial Hotel, and I assume you already know the quote from Wright most appropriate to the event.

However, just in case a reminder is in order, you will find it in the second paragraph on page 263 of the 1932 edition of the *Autobiography*. There Wright repeats a statement Sullivan made to him on the Imperial: "At last, Frank, something they can't take away from you." And he follows it with his own thought:

"I wonder why he thought 'they' couldn't take it away from me? 'They' could take any hing away from anybody."

R. C. HASKETT
Washington Grove, Md.

DIALOGUE VS. ORATORY

Forum: I am pleased that Forum was among the communications media at the Fiftieth Annual Conference of the American Institute of Planners. It is regrettable that your limited comment, headed Discourse, in the November '67 issue appears to reflect what you gained from this experience.

We, in AIP, are pleased that we attempted a conference of this scope and content. We felt it was important to provide, at this time, the opportunity for an interdisciplinary dialogue concerning man's environment. That a number of outstanding spokesmen in the world today participated in the program indicated its relevance in the judgment of others as well.

We feel the discussions presented during the course of the conference were useful. Their substance has been reflected in a number of considerations since that time. The conference proceedings have the promise of serving as an important reference for those interested in urban affairs.

The issues discussed by Planners for Equal Opportunity warrant every attention. Consistent with AIP policy, including a statement on minority groups and the responsibility of the professional planner adopted by the Board of Governors a year ago, we continued to give them consideration. These are issues that address themselves to every responsible person and organization. We would urge other professional groups, architects, engineers, as well as journals of special responsibility, to undertake a similar effort. We would caution, however, that the time for oratory and pious testimony is past. What we need today are specific expressions dealing with the issues involved along with commitment, resources, and hopefully, action.

We have no illusion that AIP and its 4,800 members, alone, will solve these demanding questions. But we expect to do everything we can. That's what the Fiftieth Annual Conference was all about.

IRVING HAND
Washington, D.C. — *President, American Institute of Planners*

NEW LEASE

Forum: Through the kindness of Mr. Frank Jacobi, AIA, I received tear sheets of your May '67 issue, showing the present condition of the Tugendhat House [Mies van der Rohe, 1930].

My mother visited Brno two months ago, for the first time in 29 years, and was shocked by the condition of the house and grounds [above]. However, the biggest shock she received was being told that the house still "belongs" to her. None of us had ever thought this possible, but it is now confirmed.

Private houses were not expropriated, unless the owners were German. The house is quite a tourist attraction, particularly for students.

Apparently a group of architects are interested in its restoration and use as an architectural center. My mother is now studying the possibility of donating the house, either to the state or an architectural group or school, subject to complete restoration. The chances for success seem to be reasonably good.

HERBERT TUGENDHAT
Caracas, Venezuela

While the Tugendhat House must, to its owners, seem sadly neglected, the most striking impression received by other visitors is its remarkably good condition, considering the ravages of war and the passage *of time*—ED.

PLASTIC DREAMS

Forum: Walter McQuade's article, "Encasement Lies in Wait for All of Us" [Nov. '67], appears to be a bit facetious, yet he voices a fear which is all too often left unspoken; the fear of working with new materials; the fear of having to engineer the basic material as well as the end product.

Until our architects and engineers better understand, and fulfill, their responsibility in developing proper applications of these new materials, we will just have to tolerate "plastic encased" real material!

We are in the infancy of manufactured basic materials. Our chemists are far ahead of us. There is more than a clinging to accepted materials for certain applications—there is a positive reluctance to assume the responsibility of designing the material for the application.

Cheer up, sir! Ultimately our working architects and engineers will take this ball from the dreamers and then we will see the sort of relationship between materials and their utilization which will again make you comfortable. It is only a matter of time!

C. GUSTAV MAGNUSON
Department Operation Manager, American Cyanamid Co.
Wakefield, Mass. — *Building Products Div.*

OUTSIDER WITH INSIGHT

Forum: The article by Piet Hein, "Of Order and Disorder" [Dec. '67], is priceless. He must be a lovely person. It is interesting that personalities outside the fields of art and architecture reveal the spirit of the artist and the architect: that is, one who is involved in problem solving and motivated by a sense of service to others.

Mr. Hein's article, while oriented to physical reality, seems to move into the spiritual reality. His appreciation of working intelligence with unknown factors and implied actualities gives encouragement to

(*Continued on page 23*)

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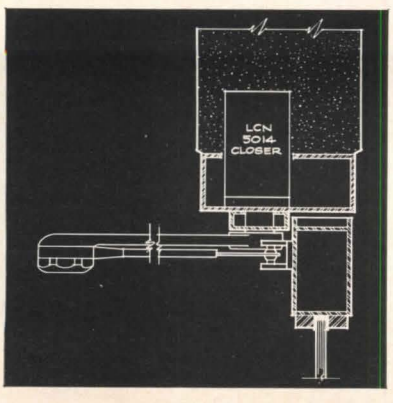

The door closers for the entrance of this handsome college building are LCN—5010 series . . . concealed in the head frames. It was a good choice. With the closers concealed the entrance is better looking. And because the closers are LCN the doors are under complete control regardless of traffic, drafts, wind, or hard usage. LCN makes nothing but door closers. There's a wide variety of styles: Overhead concealed, surface mounted, bracket mounted, concealed in floor, etc. Whichever you specify, remember that with LCN you are assured the quality that means "lowest long-run cost".

PHOTO: Lake Michigan Hall, Grand Valley State College, Allendale, Michigan; Meathe, Kessler and Associates, Architects.

LETTERS

(continued from page 15)

the belief that there is a creative process and that this process is evident in the search for order and unity.

He also reminds us of our responsibility to the democratic process: that there are rules to the improved development of the world we ought to create. . . .

SIDNEY GORDON BUDNICK
Sacramento, Calif. *Architect*

BRAVE NEW TOWNS

Forum: Your perceptive identification of many of the real causes of urban problems is a thread which runs through many of your articles. Accordingly, I was somewhat taken aback to read your comments on Columbia versus Reston [Nov. '67].

It certainly seems to me that both of these developments, and I use that word intentionally (perhaps I might use the word tract), talk a much better game than they play: both profess to be "new towns" intended to demonstrate viable alternatives to urban accretion; but both are, in fact, little more than somewhat more elaborate subdivisions a little farther from the metropolitan trough.

As you point out in your C vs. R article, "Columbia's site lies smack astraddle the Washington-Baltimore corridor, the fastest growing metropolitan area in the east. . . . Reston lies halfway between Washington and Nowhere." The less profitable performance of Reston, to date, is the logical corollary of its not being as shrewdly sited in terms of the continuing pattern of urban sprawl as Columbia. As an architectural critic, you should realize that this may well have been a deliberate, if very timid, attempt to avoid the real-estate game for environmental reasons on Simon's part, and not fault the project for poor economic sense.

To this degree, R may be "better" than C in attempting to ignore or redirect the urban agglomeration pattern, but it is certainly not much better. Until we can talk about real new towns, in real unpopulated areas (certainly nowhere near existing SMSA's or urban corridors), we should not delude ourselves by pretending that the likes of C or R will help solve the problem. They may make it simply easier to ignore.

You point out that Reston's houses aren't selling as well as Columbia's suburban-type units. Perhaps neither would sell as well as units in a real, not make-believe, new town at a much greater remove from our metropolitan chaos.

MARTIN S. HARRIS JR.
Brandon, Vt. *Architect*

CONTINUITY

Forum: The reference to my services being retained by Gulf to design new housing units [Dec. '67] is not exactly correct.

The new project I had designed for Simon's Reston was stopped by Gulf. Gulf did decide to complete two clusters of my townhouses located on Golf Course Island. These townhouses were designed several years ago for Simon and are not newly commissioned work by Gulf.

LOUIS SAUER
Philadelphia *Architect*

CAMPUS LECTURE

Forum: Coincidentally, the same issue [Nov. '67] which categorized you as an adverse critic in the controversial issue of the Ohio State University River Dormitories (Focus, page 55) also carried your article on the "kit house" of Sim Van der Ryn and Sanford Hirshen (page 78).

On November 10, Professor Van der Ryn lectured at O.S.U. on the subject, "Planning the University for its Users." During the question session following the lecture, a student in the audience pointed out to Professor Van der Ryn that his own investigation into the controversy revealed little dissatisfaction with the dorms on the part of those living there despite the outraged cries of professional critics who have been expressing great dissatisfaction with the buildings.

Appropriately, Sim Van der Ryn tempered his previously offered criticism of the towers (quite similar to yours, by the way) with the admonition that what he had to say was a personal opinion, not a professional criticism, since the short tenure of his visit to the campus certainly did not qualify him for anything more by his own admissions.

A lesson there?

JEAN D. HANSFORD
Ohio State University *Campus Planner*

MORE FOR STRATHMOOR

In our December '67 issue we inadvertently failed to give sufficient credit to Fielding L. Bowman as associate architect of the Strathmoor-on-the-Park residential development in Fairfield, Conn. Our apologies to Mr. Bowman.—ED.

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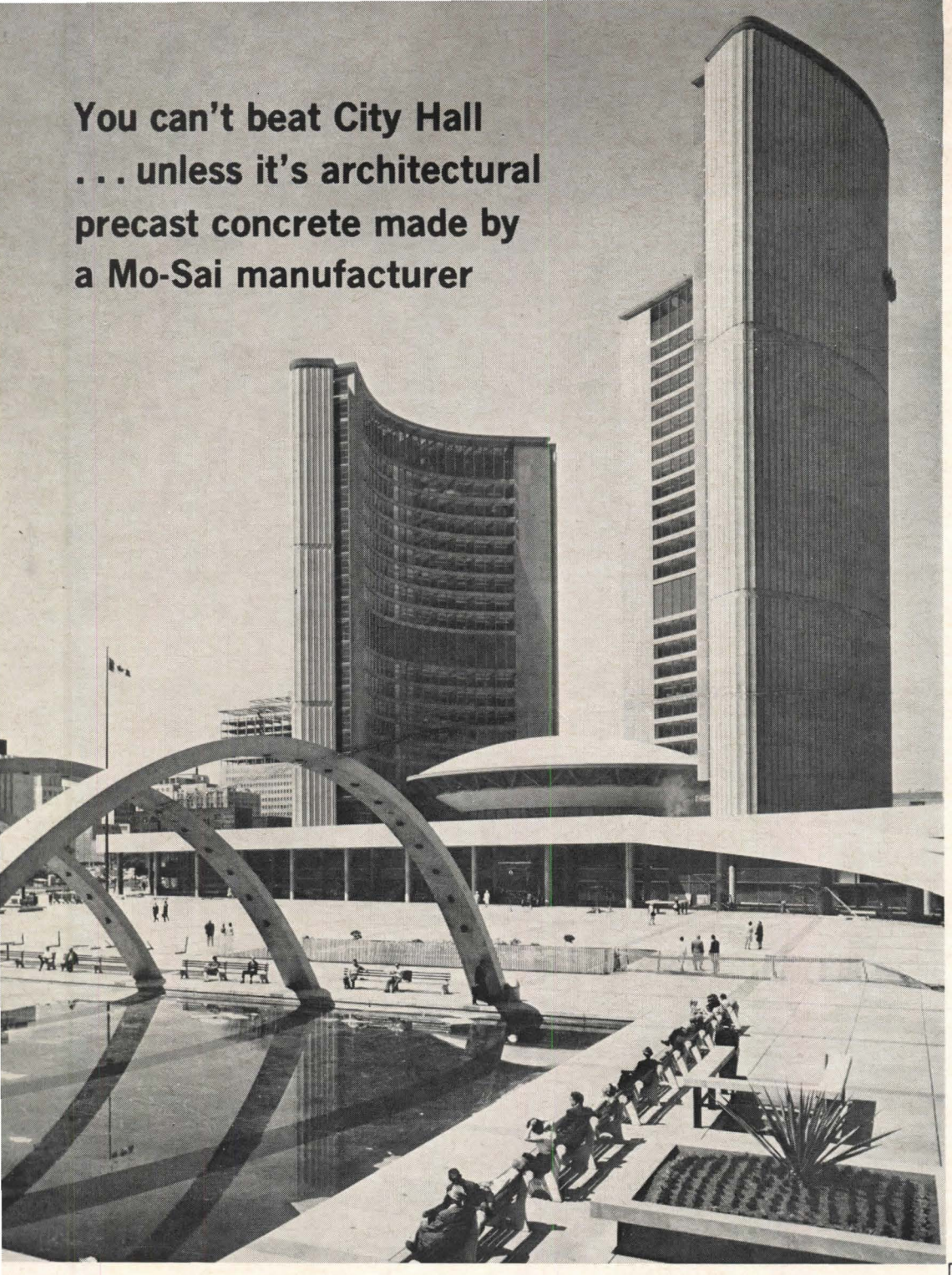

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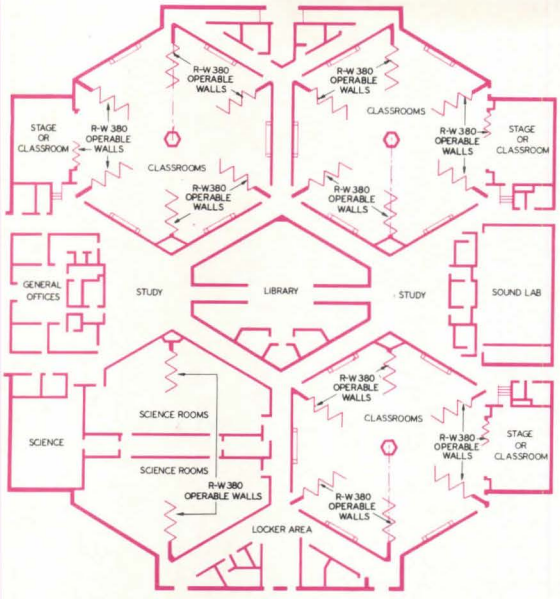
why does Richards-Wilcox dare reveal the secrets



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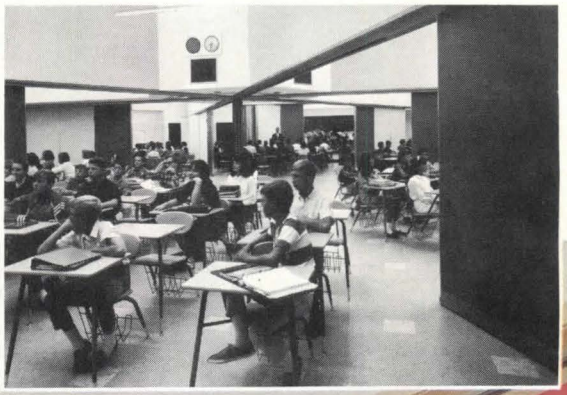
Interior view of Everitt Junior High School, Denver, Colorado, showing six intersecting 380 partitions plus a seventh closing off the stage. This arrangement provides total flexibility for classroom and/or auditorium usage.



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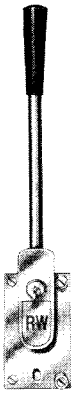

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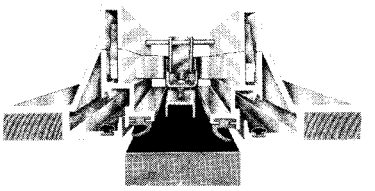

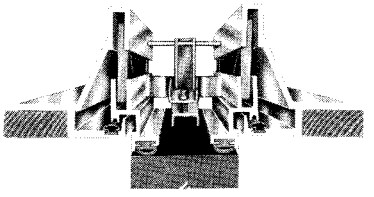

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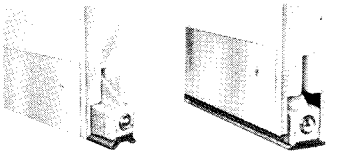

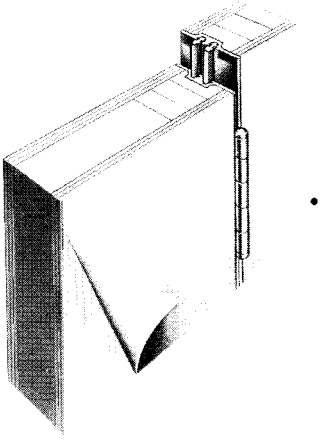

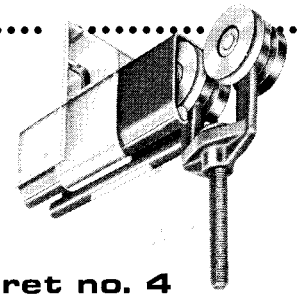

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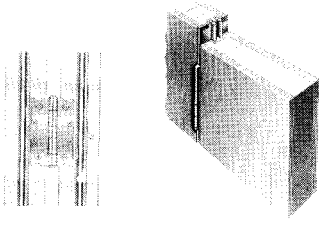

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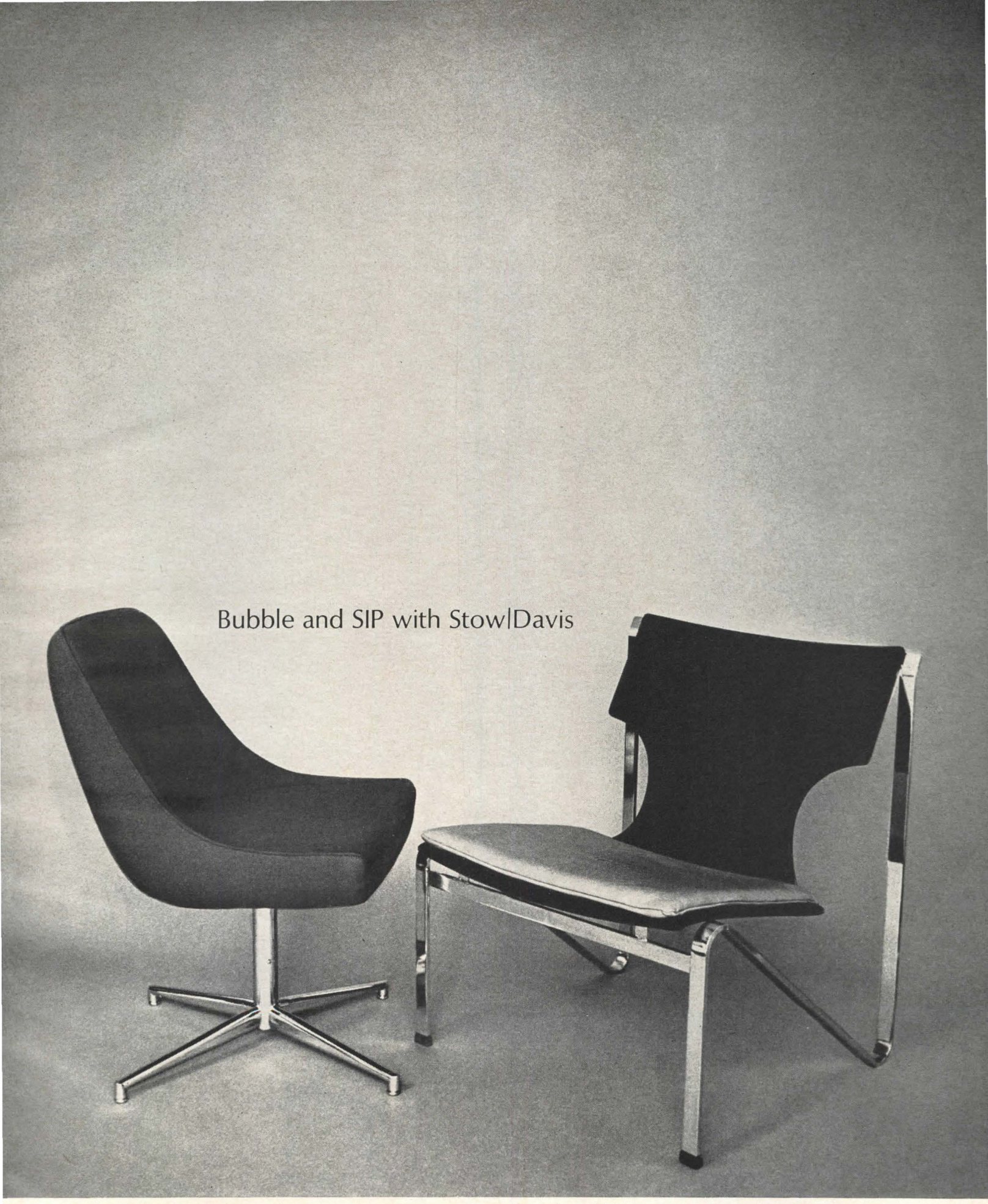

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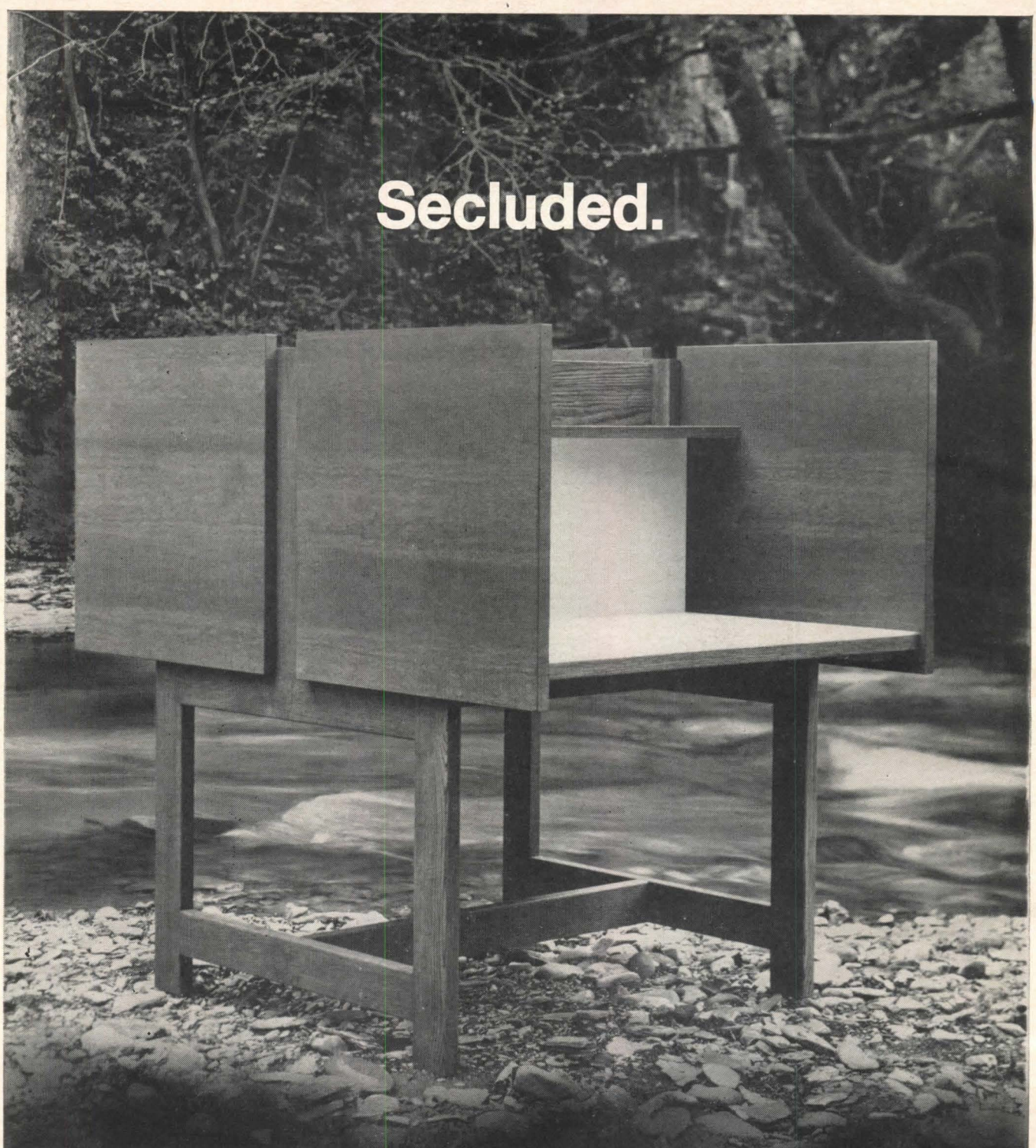

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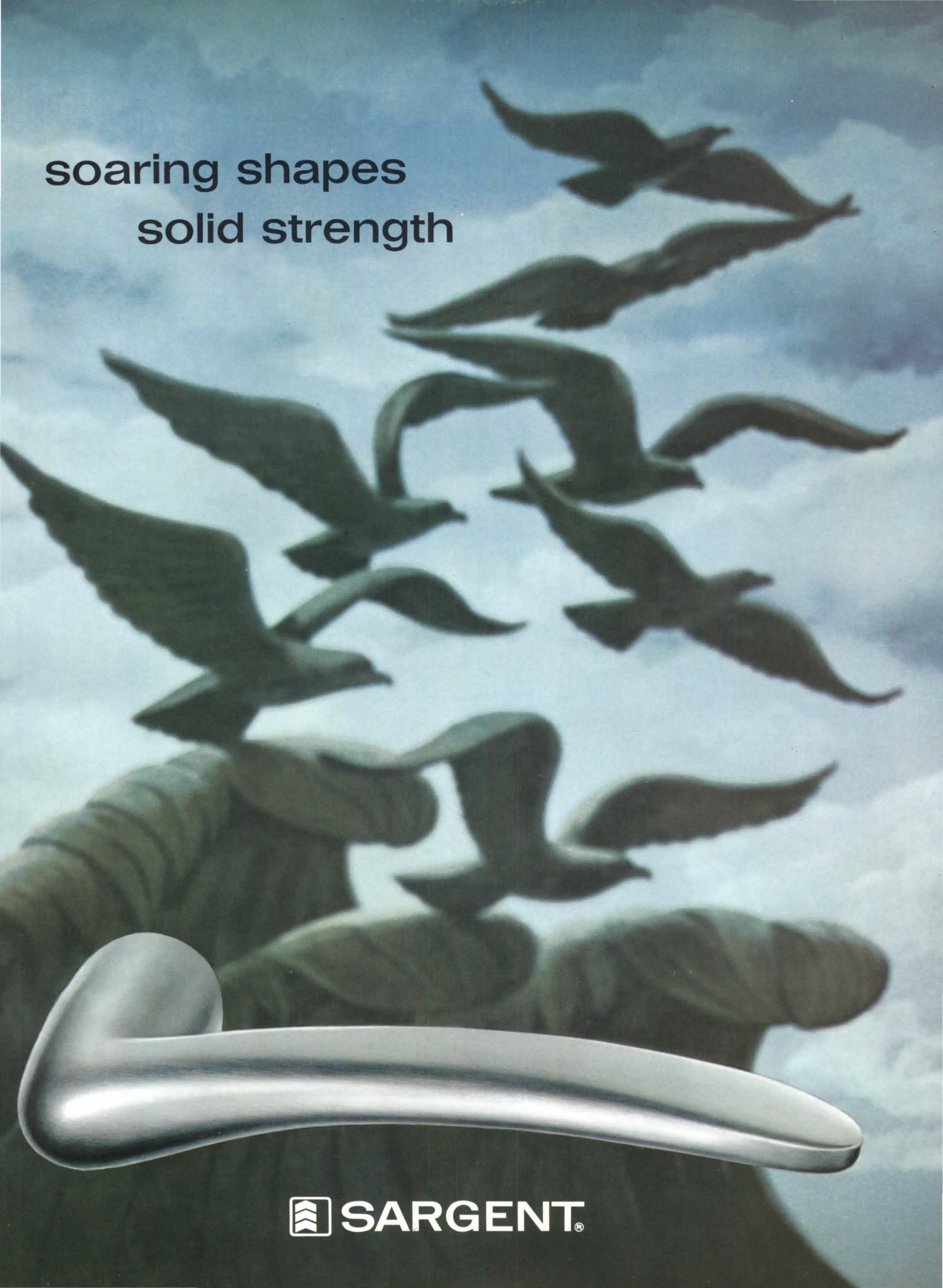
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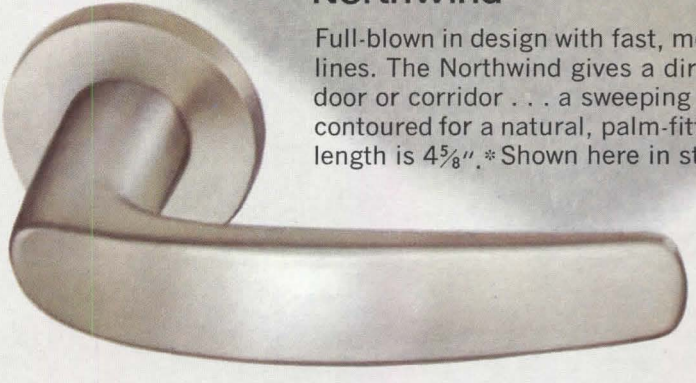
Northwind

Full-blown in design with fast, modern, air-foil lines. The Northwind gives a directional flow to a door or corridor . . . a sweeping lever softly contoured for a natural, palm-fitting feel. Lever length is 4⅝".* Shown here in stainless steel.



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Stark, spare design, bold from a sturdy shank to snub, truncated end. Gently rounded lever edges, straight lines, give the Oceanspray a simplicity in hardware format. Lever length 4".* Here in dull bronze.

Levers are cast or forged in rich brass, bronze, aluminum and stainless steel, and each is available in a wide range of finishes, some of which are shown here. Projections range from 2⅜" to 3". All levers are available with 2" rose or Sargent rose-less trim.

Viking

As solidly Nordic as its name and just as advanced in design as Scandinavian sculpture. Thick shank for strength . . . a thin sweep of handle for grace and easy grasp. Lever length 4⅜".* Shown in oil rubbed brass.

Seaswept

Hefty, massive — a solid handful in a lever with grace in the Seaswept's slowly gathering mass from muscled shank to its abrupt rounded end. Lever length 4⅜".* Shown in polished brass.

Seawing

Here's the dynamic flight of the seabird captured in this lever's wing-like symmetry. Smooth flowing lines and rounded edges accent the motion designed right into this distinctive Sargent lever. 4⅞".* Seen here in dull chrome.

Seabreeze

This lever takes the same Sargent swept-concept and changes plane. Result: a strong, flat shape and bold mass with clean, simple lever lines that give flight to any door, invite the touch. An exact 4"* of lever handle. Seen here in polished bronze.

Northcoast

Sleek looks in a lever that's purely lyric. And the Northcoast is functional right down to the sculptured design of this lever's return. Sargent created this lever as a startling objet d'art. 4 13/32"* long. Here in aluminum.

*All lever lengths given are from center of spindle to end of lever.

The same sculptured, classic feel of levers is carried to the new Sargent knobs cast in brass, bronze and aluminum. Choose from a wide variety of finishes, some of which are shown here. Available also with square or round roses — or with Sargent exclusive rose-less trim.

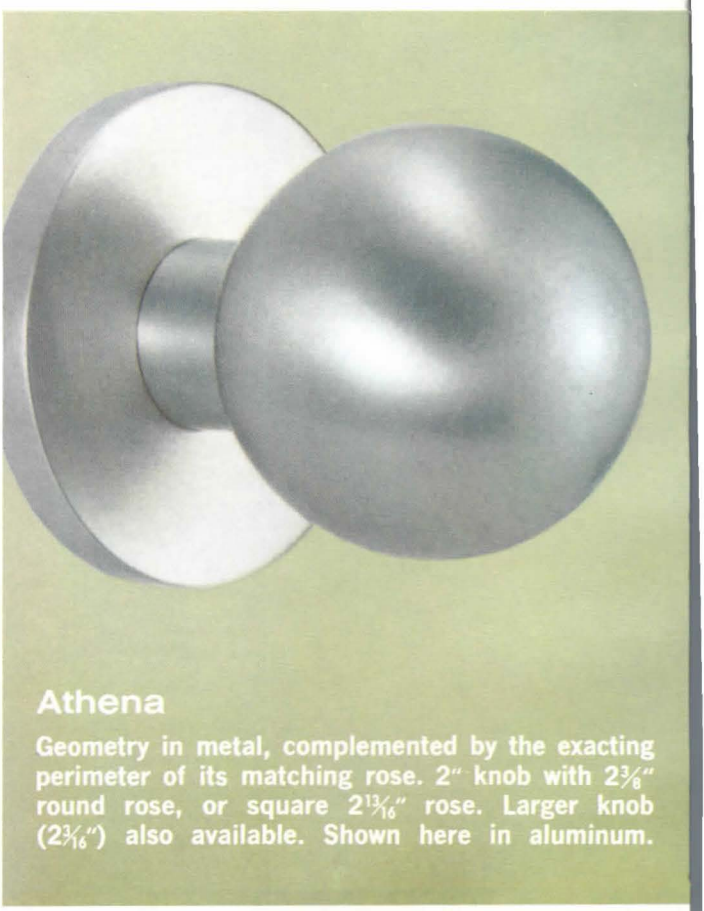
Zeus

A gentle concavity of the drum knob accented against this trim vertical escutcheon. Sargent design, balance, beauty at work. Escutcheon length 7⅝". Knob diameter 2⅛". Also available in 2¾" diameter. Shown in brushed bronze.

LEVERS:
This vertical escutcheon also available with any Sargent lever.

Jove

A sphere that states itself boldly, simply with a strong thrust matched by its solid grip. 2" knob diameter also available. Here as exclusive Sargent rose-less trim, in dull chrome.



Athena

Geometry in metal, complemented by the exacting perimeter of its matching rose. 2" knob with 2⅜" round rose, or square 2 13/16" rose. Larger knob (2¾") also available. Shown here in aluminum.

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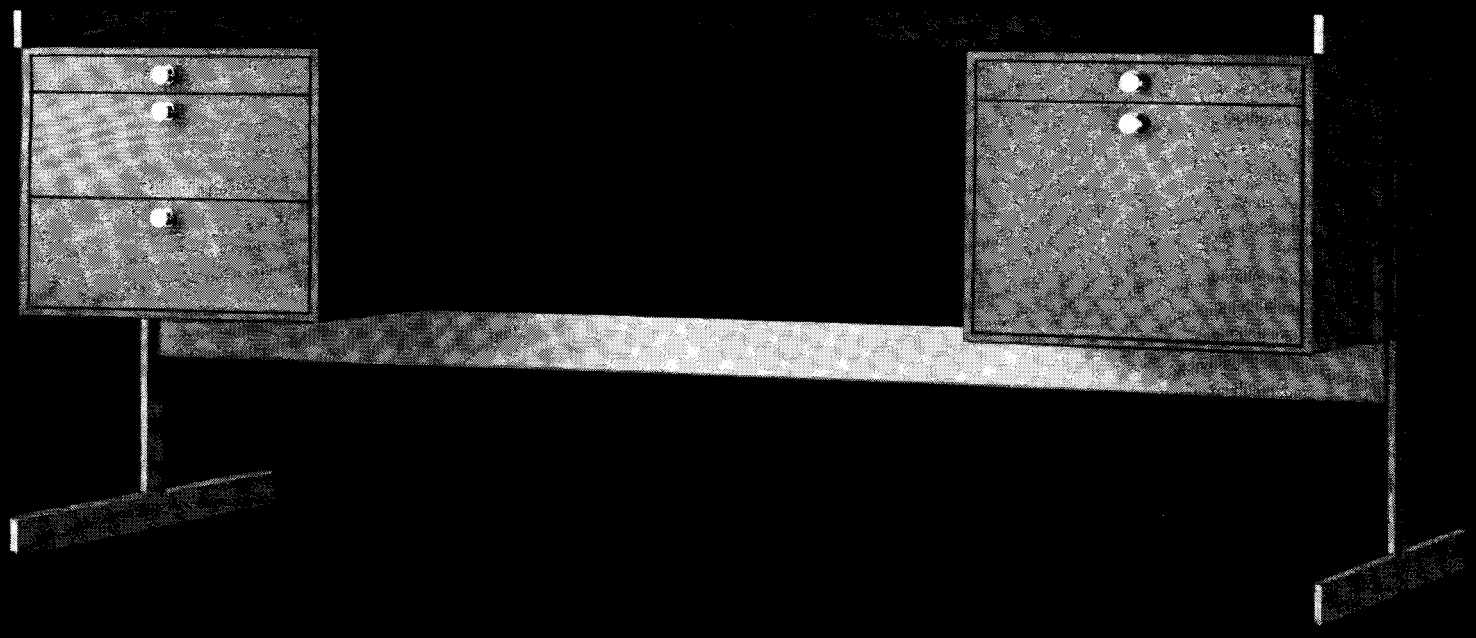

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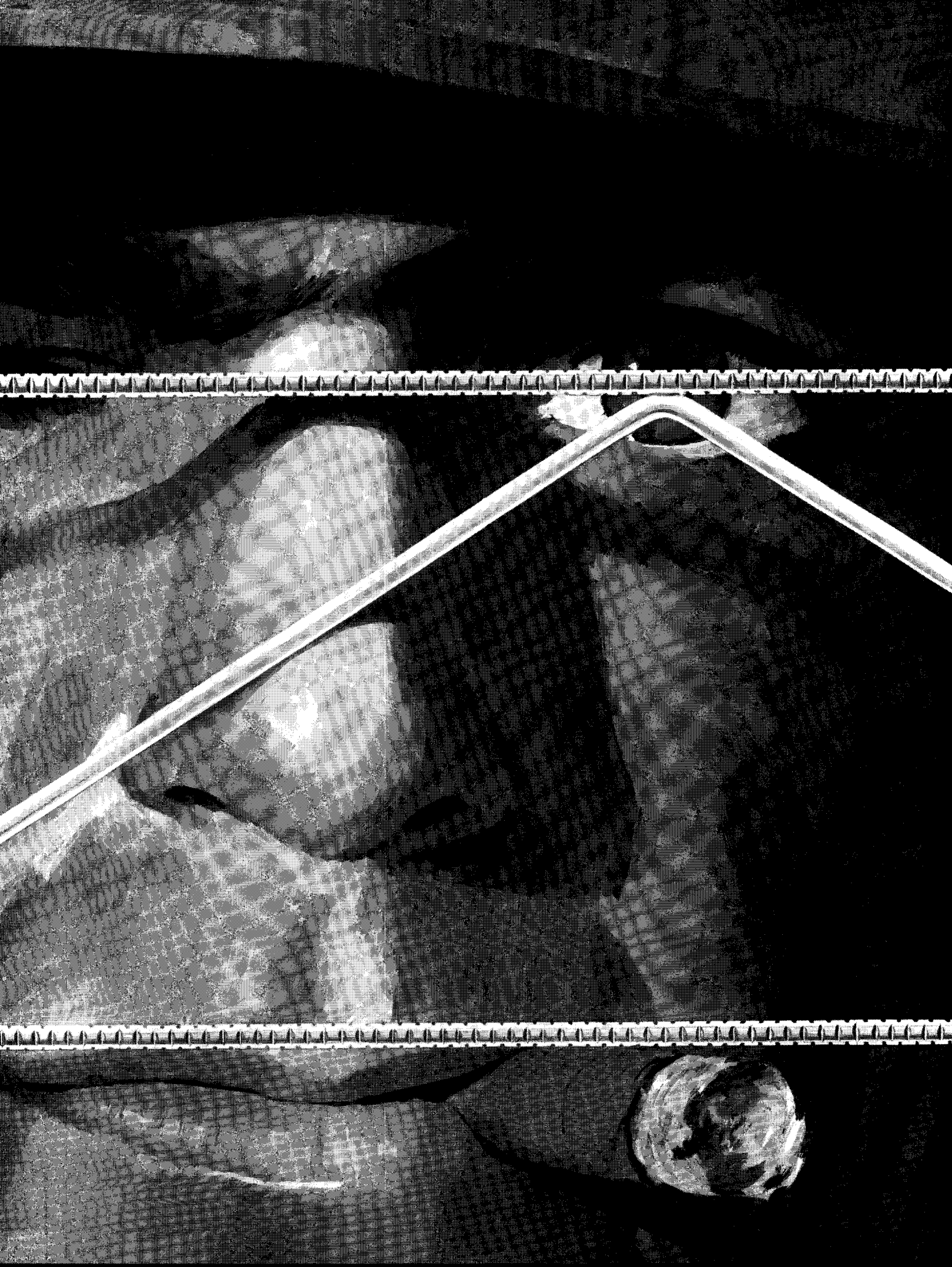

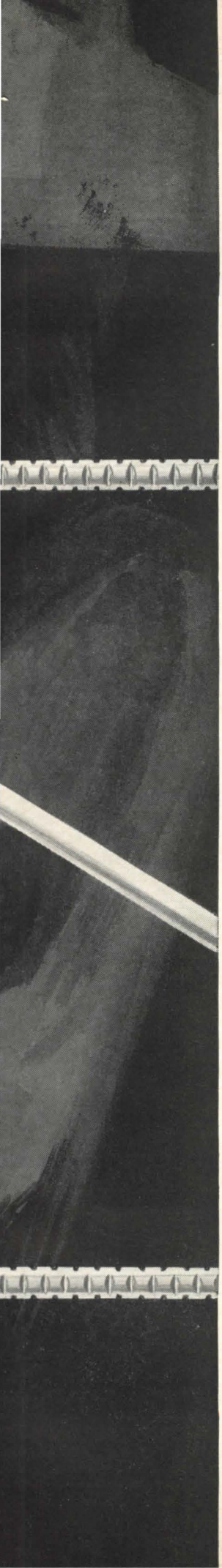

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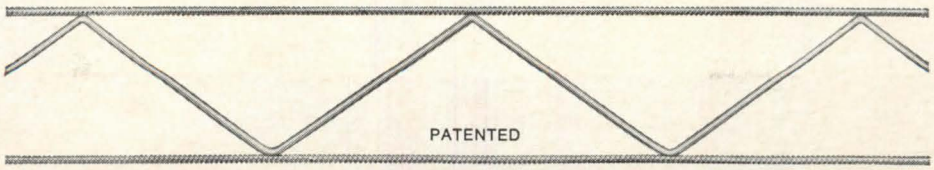

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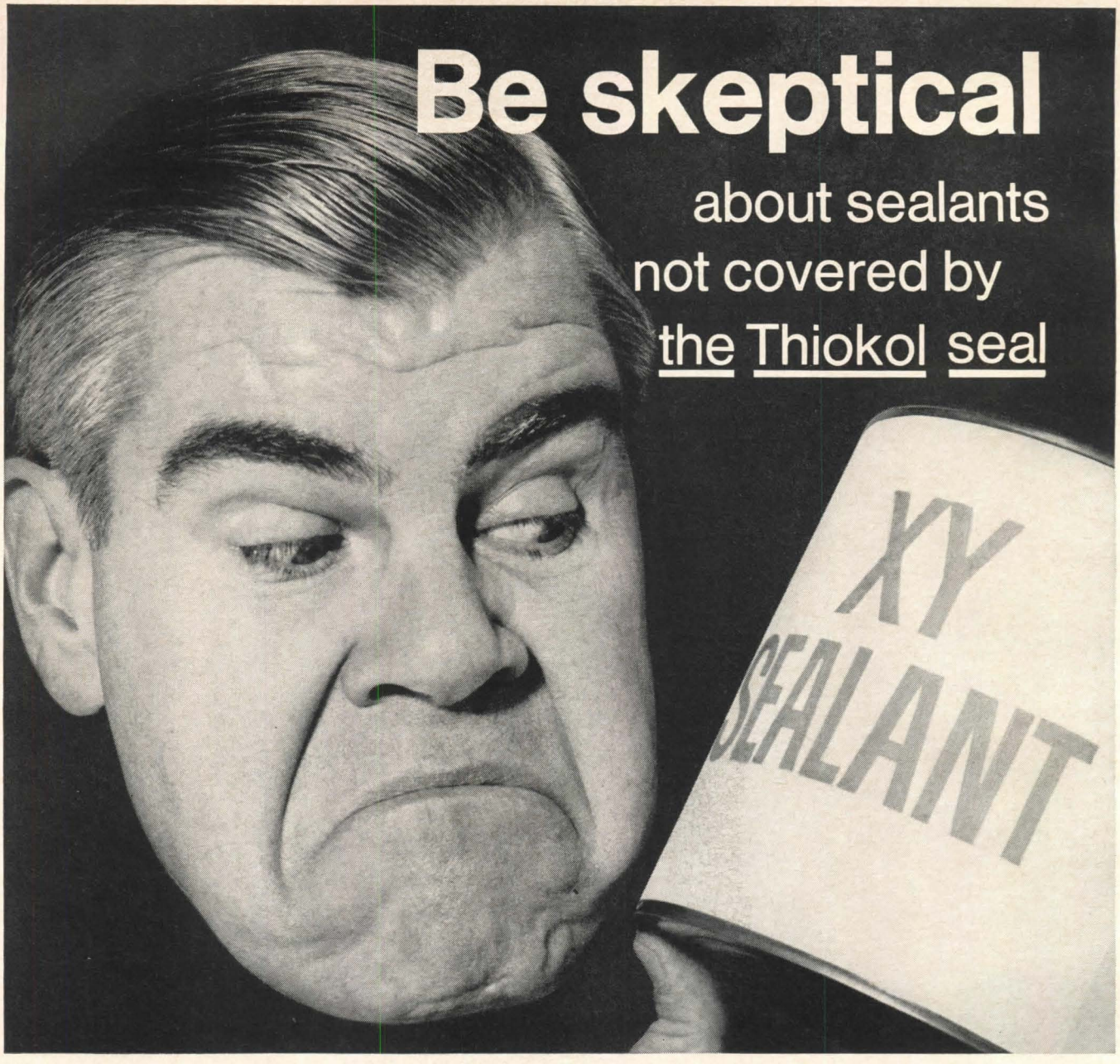

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THE ARCHITECTURAL FORUM

PUBLISHED BY URBAN AMERICA, INC.

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FORUM

Just as this issue went to press, the rumor broke that the Department of Housing and Urban Development and the Department of Transportation had ended their dispute over who should administer Federal programs in urban transportation. The winner: DOT.

If the rumor is correct—and HUD Secretary Robert Weaver has refused to deny it—DOT will take over HUD's programs in urban mass transportation; in return, HUD will be given "more of a voice" in the urban segments of the DOT-administered Federal Interstate Highway Program.

While this seems to downgrade HUD to little more than a public housing agency, it also suggests (a) that highway planning and mass-transit planning will henceforth go hand in hand; and (b) that urban transportation will have more powerful and persuasive spokesmen in the future than it has had in the past.

SNAGS

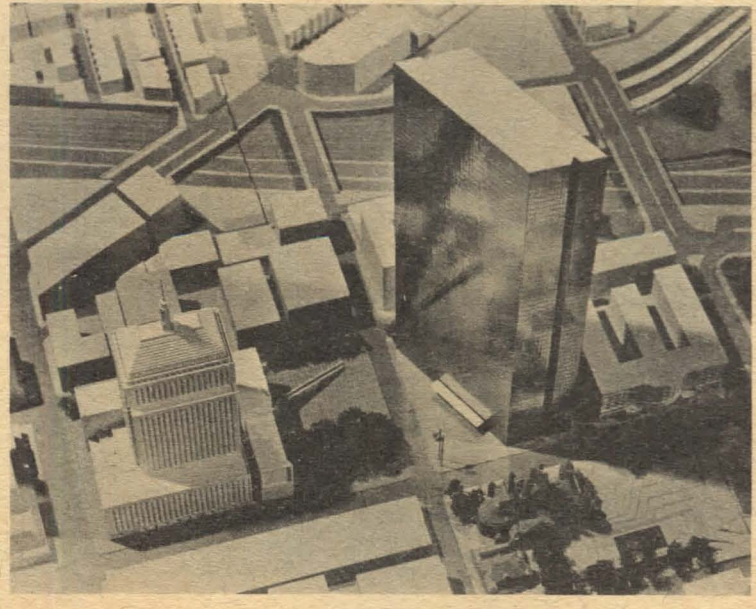
ON SENSITIVE GROUND

The John Hancock Insurance Co. recently announced plans to add a 60-story tower and a three-acre plaza to its home office in Boston to form a new complex, designed by I. M. Pei & Partners, to be called John Hancock Place. The company's present headquarters (left in photo below), though only 419 ft. tall, dominated the Boston skyline until 1964, when the Prudential Insurance Co. put up its 750-foot shaft. With its proposed 790-ft. tower, Hancock would recapture the title.

The new tower would rise on one of the most critical spots in Boston, from an urban design standpoint. It would stand at one corner of Copley Square, looming above two of the most important U.S. buildings of the 19th century: H. H. Richardson's Trinity Church (bottom in photo) and McKim, Mead & White's Public Library (across the square). If funds can be raised, a competition-winning landscape design by Sasaki, Dawson & DeMay (Apr. '66 issue; bottom right in photo) will draw these two very different buildings into a complementary whole.

According to Henry N. Cobb, Pei partner in charge, the Hancock project was carefully designed to complement neighboring landmarks. The rhomboid shape of the tower, he asserts, was "conceived as a direct response to the buildings and spaces around it . . . . The diagonal orientation of the tower shapes Hancock Place as an antechamber to Copley Square, and particularly enhances the setting of Trinity Church," which would be a focal point for the new open space. The tower's continuous skin of mirroring glass, with subdued metal members, would contrast with—and reflect—the massive stonework of the church.

For all of its nuances of form, the Hancock project got mixed reactions in Boston. In the first place, the tower would contain three times the volume permitted by the zoning ordinance for its 1½-acre site. (The new plaza across the street cannot techni-

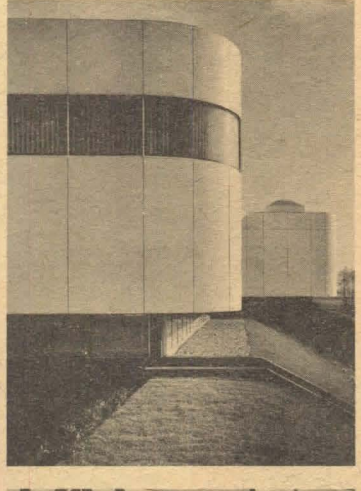


cally be considered part of the site for zoning purposes.) Boston business interests and almost all abutting property owners have urged the appeal board to grant a variance, but two groups of eminent architects—a special subcommittee of the Boston Society of Architects and the design review board of the Boston Redevelopment Authority—have urged that the impact of the new project on Copley Square be thoroughly studied and discussed. This study could go beyond questions of mere appearance to consider whether the area needs anything more lively than just office space and open space.

EXPOS

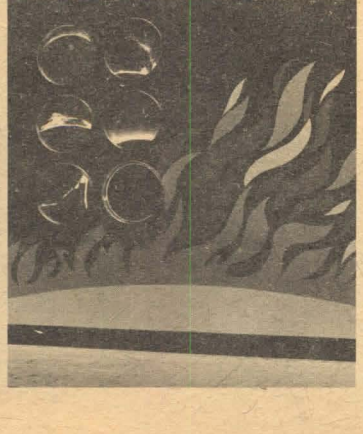
SUPER BUBBLE

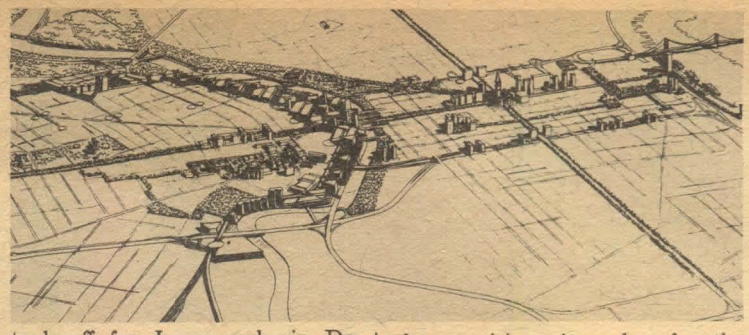
Last fall, the U.S. Information Agency invited a group of private citizens to come to Washington. Purpose: to advise the agency on the selection of a team of architects and designers for the official U.S. exhibit at the next world's fair—Osaka's Expo 70, the first world's fair ever in Asia. They met for three days and interviewed 11 teams of architects, designers, and related artists. The representative designs shown below are by members of the team selected—architects: Samuel Brody and Lewis Davis (top); Designers: Ivan Chermayeff and Thomas Geismar (bottom left); Rudolph deHarak (bottom right).



The advisory panel included Doyle Dane Bernbach ("We try harder") President William Bernbach, Pratt Institute Professor of Architecture William Breger, MIT Architecture Chairman (and Forum correspondent) Donlyn Lyndon, Chase-Manhattan President David Rockefeller, CBS President Dr. Frank Stanton, Fine Arts Commission Chairman William Walton, and Forum Editor Peter Blake. Among those interviewed, in addition to the group finally selected, were Architects Ulrich Franzen, Myron Goldsmith, Gruzen & Partners, Philip Johnson, George Nelson, Gyo Obata, James Polshek, Paul Rudolph, and Minoru Yamasaki, and Engineer William Mouton. The designers and artists (who were associated with one or another of the above) included Ronald Beckman, Charles Forberg, Morton Goldsholl, Harper & George, Sculptor Isamu Noguchi (who was his own team), Ward & Saks, and Sculptor Bob Whitman.

The team selected had suggested building the largest inflatable structure done anywhere to date, getting fairgoers to enter it by way of ascending platforms, and creating a vast 360-degree environment by multiple projection of images upon the inside surfaces of the super bubble. Although the panel approved of the concept, it suggested that there might be one or two details that could be improved or would have to be ironed out. In any event, the members picked the team, rather than the specific design concept—and the team appeared sufficiently talented to tackle any program that the USIA might develop for its Expo 70 exhibit. To find out what problems might confront them, the selected architects and designers





took off for Japan early in December, looked over the site, and met local contractors.

The next step, of course, will be to persuade Congress to appropriate the necessary funds, after which USIA should be able to act upon the panel's recommendations. Since every Congressman considers himself an expert on architecture, design, art, etc., the selection of this talented and proven team of young architects and designers will probably set off the usual fireworks on Capitol Hill. In view of the superlatively high standard of much Japanese architecture and design, it is going to be tough enough, without such shenanigans, for the U.S. to compete successfully. Hopefully, Congress will support rather than hamstring the team chosen to prepare the U.S. entry.

AIR-RIGHTS FAIR

The Committee for an International Exposition in Philadelphia in 1976, a group of young professionals from many fields, has produced a futuristic concept (above) that commemorates the past by helping to cure the urban ills of the present. It is Philadelphia's latest manuever in its quiet war with Boston for recognition as the most appropriate city to celebrate the bicentennial of the American Revolution.

The committee has placed its exposition grounds on a 4½-mile-long ribbon over the right-of-way of the Pennsylvania Railroad in the inner city. (It is expected that many high-speed Northeast Corridor trains will link New York, Boston, and Washington to the site by 1976.) The tracks run contiguous to the Schuylkill River as it curves to form the shape of a sickle. These main transportation arteries, and various proposed nonstop transit spurs—to airports and Penn's landing on the Delaware—would be matched within the exposition site by minirails and moving sidewalks. Mobility is obviously the key to the plan.

But perhaps most striking are the provisions it makes for the future. A permanent megastructure would be built over the tracks, requiring no displacement of persons or businesses. (Countries would be assigned areas of the megastructure to develop, and their designs would be supervised by a central commission traveling from country to country to coordinate efforts.) "Revolutionary housing concepts" would be employed to accommodate visitors to the fair, and be used later as residential complexes to infuse new life into surrounding blighted areas.

"This site," says the committee, "adjacent to institutional areas, open space, and urban ghettos . . . makes it an ideal location for a prototype of the new city capable by extension of revitalizing the existing city."

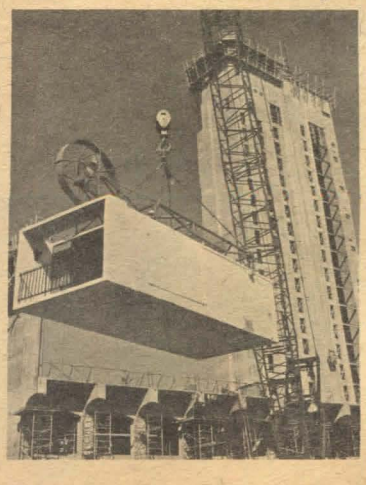
Their theme for the exposition: "The Permanent Revolution."

QUICK LIFTS

FLYING CARPETS, PLUS . . .

The $10 million Palacio Del Rio hotel in San Antonio is being rushed to completion for HemisFair 68, to open April 1. In the process it has made some technological, if not esthetic, improvements on Expo 67's Habitat (May '67 issue). The refinements were in evidence at the installation of the hotel's first prefabricated guest room, as staged for the press.

The box (below)—lifted by a



specially reinforced building crane and stabilized by the vertical tail rotor of a helicopter—was "flown" into position complete with plumbing, wiring, fixtures, carpets, furniture, bed linen, ash trays, and—yes—registered guests! The ceremonies over, workmen got down to a tight schedule averaging 18 such coups per day—*sans* guests.

The rooms were precast in reinforced lightweight aggregate concrete at a yard set up seven miles away. Two assembly lines of eight forms each maintained the pace of installation. The prefabricating system and much of its equipment had to be created for the job by the contractor, H. B. Zachry Co. Zachry, chairman of the HemisFair Corp. owns the hotel, which he will lease to the Hilton chain.

On the hotel site, across the street from the HemisFair grounds, rooms were stacked above a conventionally built four-story podium extending out from both sides of a central slip-formed elevator core. The simple vertical stacking, unlike Habitat's, permitted greatly reduced wall thicknesses and overall weight. (Habitat box: 38 ft. by 17 ft. 6 in. by 10 ft. high; walls 10 to 12 in. thick; 90 tons. Hilton box: 32 ft. 8 in. by 13 ft. by 9 ft. 1 in. high; walls 5 in. thick; 35 tons.) The resulting benefits were greater speed of operation, complete prefabrication, and greater height—21 stories.

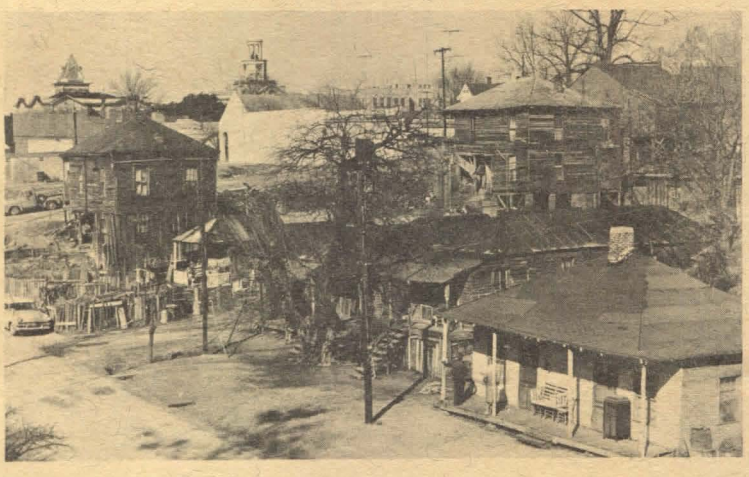
All construction phases, operating simultaneously, surpassed expectations (peak day: 36 units raised in place), guaranteeing that the hotel's deadline would be met.

PERMANENT MOBILE HOMES

Another prefabricated box system, this one employing production technology developed for mobile homes, has been demonstrated by HUD on an urban renewal slum site (below) in Vicksburg, Miss. The modest development, called Fredella Village, consists of 28 low-income family townhouses (bottom). The dwellings are stacked two boxes high—living room and kitchen-dinette downstairs; two bedrooms and bath upstairs—giving the system its name: "piggy-back" housing (top).

The assembly line boxes of wood frame construction, made by the Magnolia Homes Manufacturing Corp., have cedar plywood exterior paneling. Homes are equipped with electric baseboard heating, range, oven, refrigerator, and water heater.

Built at a 15 per cent saving over standard construction, the



monthly rent is $26 per room. The project is FHA-insured and tenants are eligible for Federal rent supplements. Several other developments using the piggy-back system are scheduled for 1968.

BIG THINK

THE SEARCH FOR RESEARCH

With $10 million in new HUD research funds, and with a six-man formative committee, President Johnson has launched an "urban think tank." The Institute for Urban Development, as it is officially called, will be a nonprofit organization undertaking research for HUD and other Federal agencies at the outset, eventually serving private groups and governmental bodies at state and local levels.

The precise structure of the institute will be established by the six-man panel, which will be meeting shortly to draft incorporation papers, select a site, and nominate a board of directors. The panel comprises Irwin Miller, chairman of the board of Cummins Engine Co., Columbus, Ind.; Arjay Miller, president of Ford Motor Co.; McGeorge Bundy, president of the Ford Foundation; Kermit Gordon, president of the Brookings Institution; Richard Neustadt, director of the Kennedy Institute of Politics at Harvard; and Cyrus Vance, former Deputy Secretary of Defense.

Reaction to the announcement of the "think tank" has been mixed. Some professionals regard it as an encouraging sign that research money is at last finding its way into urban problems and into the problem of the city as a whole. Others are more cautious, feeling that the establishment of a study institute merely delays the time of action on already well-thought-out proposals, and that the expenditure of $10 million is only a hedge against the truly massive sums that are required from still-recalcitrant legislators.

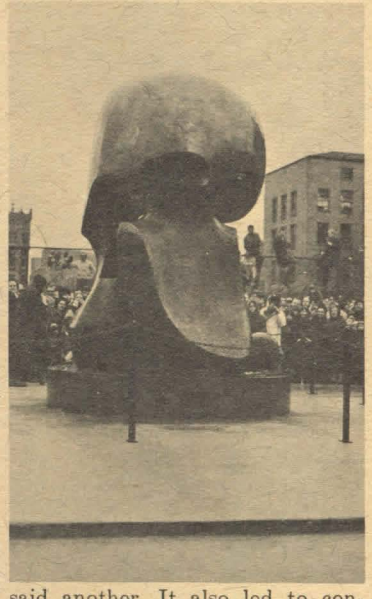
ARTS & ATOMS

BRONZE IMAGE OF POWER

An outdoor sculpture by Henry Moore named Nuclear Energy (below) was dedicated at the University of Chicago on December 2 in ceremonies marking the 25th anniversary of the first controlled nuclear chain reaction.

Moore, who worked on the sculpture for four years and supervised its casting in West Berlin, was in attendance, as was Mrs. Enrico Fermi, widow of the Nobel Laureate physicist being honored.

The 6,000-pound abstract bronze led to a now-familiar chain reaction among literal-minded Chicagoans: "A football helmet," suggested one; "a mushroom cloud,"



said another. It also led to conjectural syntax from the day's orators: "Thanks to atomic energy, the end of poverty no less than the end of humanity now seem real possibilities," said William H. McNeill, chairman of the university's history department.

NEW IMAGE FOR THE BOMB

Eight days after the Chicago unveiling, a thermonuclear device was exploded 4,240 ft. below the earth's surface near Farmington, N.M., opening up more than a huge hole in the ground. The peaceful use of atomic power has, until now, been largely confined to harnessing nuclear energy for power plants and the medical uses of radioactive substances. Now, with the Plowshare Program—a series of joint government-business projects set in motion with Project Gasbuggy—the way has been opened for the swift and economical exploitation of vast latent mineral resources. And not alto-

gether out of sight is the prospect of moving mountains—for canals, harbors, and roads.

The Gasbuggy "bomb," financed by the AEC and the El Paso Natural Gas Co., created a cavity "roughly the size of a one-half-block-square, 35-story building underground," according to project officials.

The explosion filled the cavity, or "chimney," with shattered rock and debris, and opened fractures in the densely compacted surrounding rock. Gas will seep through the fractures and into the chimney. From there it will be removed for analysis of radioactive content and effective yield. If results meet expectations, the U.S. natural gas supply could be doubled.

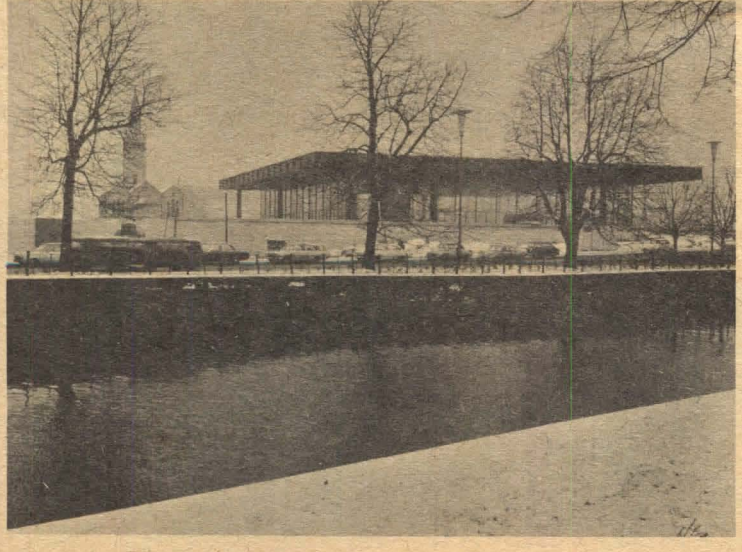
Other Plowshare proposals include the mining of copper and drilling of oil now inaccessible by conventional means, and the diversion of surface water sources to underground "storage tanks."

The moving of mountains, of course, must await the "visionary" development of a clean bomb.

LANDMARKS

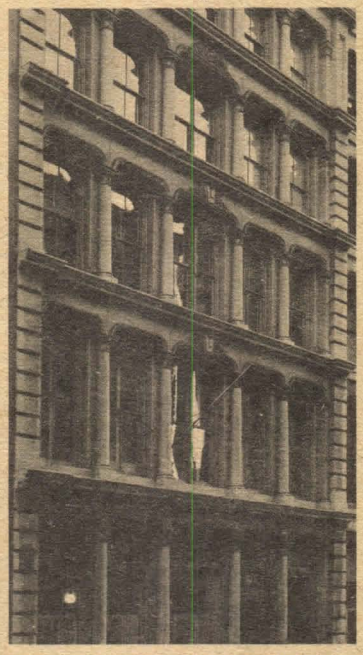
MIES VS. ST. MATTHEW

Next to the Landwehr Canal in West Berlin, construction of Mies van der Rohe's new National Gallery for a collection of 20th-century art is proceeding at a fast clip: the steel has been up for eight months or so, the granite base is just about complete, and the glass is in place. Pictured below on a recent cold winter day, the Gallery stands against a backdrop consisting at present of the 1845 St. Matthew's Church and, barely visible in the far distance, the five-year-old Berlin Philharmonic by Hans Scharoun, with its saddle-shaped roof (May '64 issue). Other buildings to be added to the West Berlin Cultural Center are a library (also by Scharoun) and a complex of other museums. The Mies gallery, with its 28-ft. ceiling height, looks as if it might turn out to be his most impressive building since the 1929 Barcelona Pavilion.



CAST-IRON FACE-LIFT

Nearly an entire block of downtown Manhattan containing several century-old cast-iron-fronted buildings has been torn down to make way for a highrise switching



center for the New York Telephone Co. But preservationists long concerned over this vanishing breed of buildings were given half a loaf.

The prefabricated cast-iron facades, products of a system patented by James Bogardus in 1848 (see April '64 issue), were not legally designated by the New York Landmarks Commission. The commission, however, interceded with the Telephone Co. on behalf of three of the buildings on Worth and Thomas Streets off lower Broadway (left). The company agreed to disassemble the facades, piece by piece, for storage, thus becoming the first New York City property owner to undertake preservation beyond the requirements of the law.

The commission hopes that civic-minded benefactors will come forward with proposals for incorporating the facades in other building projects, for decorative retaining walls, or, say, enclosures for a sculpture garden. Until then they will be in storage under the Brooklyn approach to the Manhattan Bridge.

CONSERVATION

DEAD END AT MINERAL KING

Mineral King valley, so named for a mining operation long abandoned, is a wildlife refuge, sheltered by alpine slopes, in California's High Sierra.

"When I first saw Mineral King, I thought it was one of the most beautiful places in the world. Its great natural beauty must be preserved at all costs."

Those were the sentiments of the late Walt Disney. His unusual concept for "preservation at all costs" was to build a resort in Mineral King at $35 million.

The plan of WED Enterprises, a Disney affiliate, calls for 11 ski lifts; a village with year-round accommodations for 20,000 visitors on peak weekends; and parking lots for 8,600 cars.

The scheme, granted a preliminary permit by the Forest Service (under Agriculture Secretary Orville Freeman), gained an enthusiastic ally in Governor Ronald Reagan. California's economy stands to be enriched by at least $600 million in the first ten years.

Exploitation of Mineral King, however, was contingent on construction of a 26-mile dead-end access road. Eight and a half miles of it would cross Sequoia National Park, which straddles Mineral King on three sides. For that, Park Service rights-of-way were needed from Interior Secretary Stewart Udall.

For nine months Udall resisted, contending that development would "violate" the valley and create water and air pollution. Then, in late December, after a heated ex-

(continued on page 115)

TRAFFIC IN CITIES

This spring, the Stanford Research Institute will present a detailed report on urban transportation to the Department of Housing and Urban Development.

In their report, the Stanford researchers will say:

"The great bulk of urban planning today fails to recognize transportation's potential for guiding change and improvement in the urban condition. Transportation is planned largely as the dutiful servant of existing demand....What passes for the future in these studies is a projection of past trends—with the result that the next...transportation facilities are built as a self-fulfilling prophecy, strengthening the trends yet further."

The report will also say:

"Transportation is a service function; it does not exist of and for itself....The efficiency of the transportation linkages depends... on the degree to which transportation is considered as part of the larger problem of urban organization....The complexity of the city needs to be examined in a systematic way if we are to prepare comprehensive solutions."

This special issue is an attempt to examine the complexity of the city, to report on the various transportation subsystems now available—or about to become available—and to suggest ways in which these subsystems might be employed to bring a degree of order into that complexity.

On the first 24 pages we have explored several rail systems—both existing and proposed—and their integration into the urban fabric.

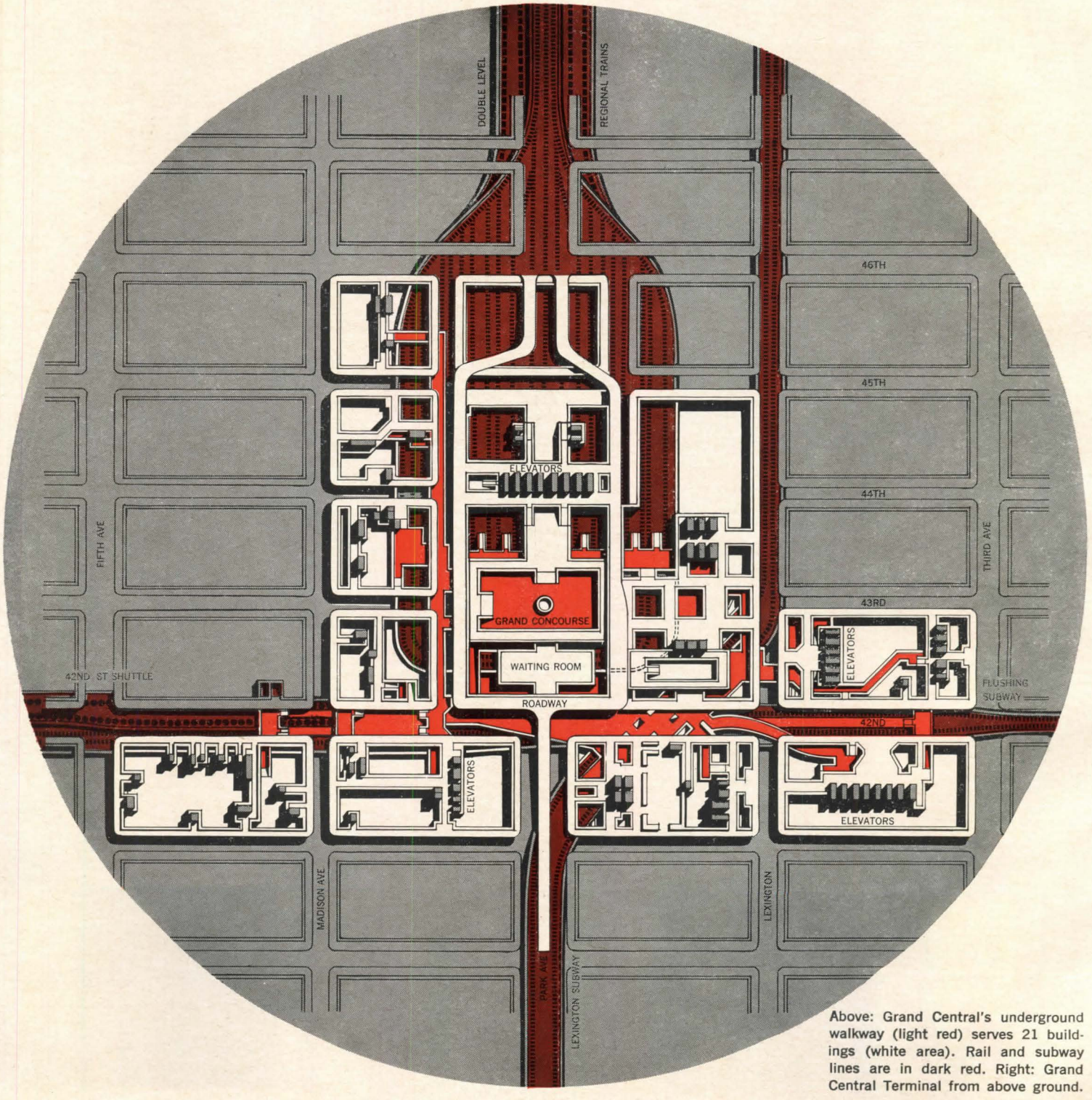
On the next 18 pages we have gone into proposals for better uses of roads—for pedestrians as well as automobiles.

On pages 90-97 we have reported on air transportation as it relates to intra (as well as inter) urban transport, today and tomorrow.

And on the final 16 pages of this special issue is a report on new systems now being investigated for use in urban transportation—and a prognosis of how these systems (as well as existing ones) might affect the form of tomorrow's cities.

This issue is an interim report. It is in the nature of transportation that its techniques and its problems are subject to constant change—sometimes unpredictable change. But this issue is also an attempt to suggest, as the Stanford researchers have suggested, that transportation is a powerful tool with which to guide urban growth and to change its direction for the better.

GRAND CENTRAL CITY



Above: Grand Central's underground walkway (light red) serves 21 buildings (white area). Rail and subway lines are in dark red. Right: Grand Central Terminal from above ground.

Why begin an issue devoted to urban transportation with a project that was conceived at the turn of the century and largely completed by 1913?

Simply because Grand Central Terminal remains today the most advanced urban "mixing chamber" in existence. As such, it has even more relevance now than it had in 1903, the year that construction of the complex began.

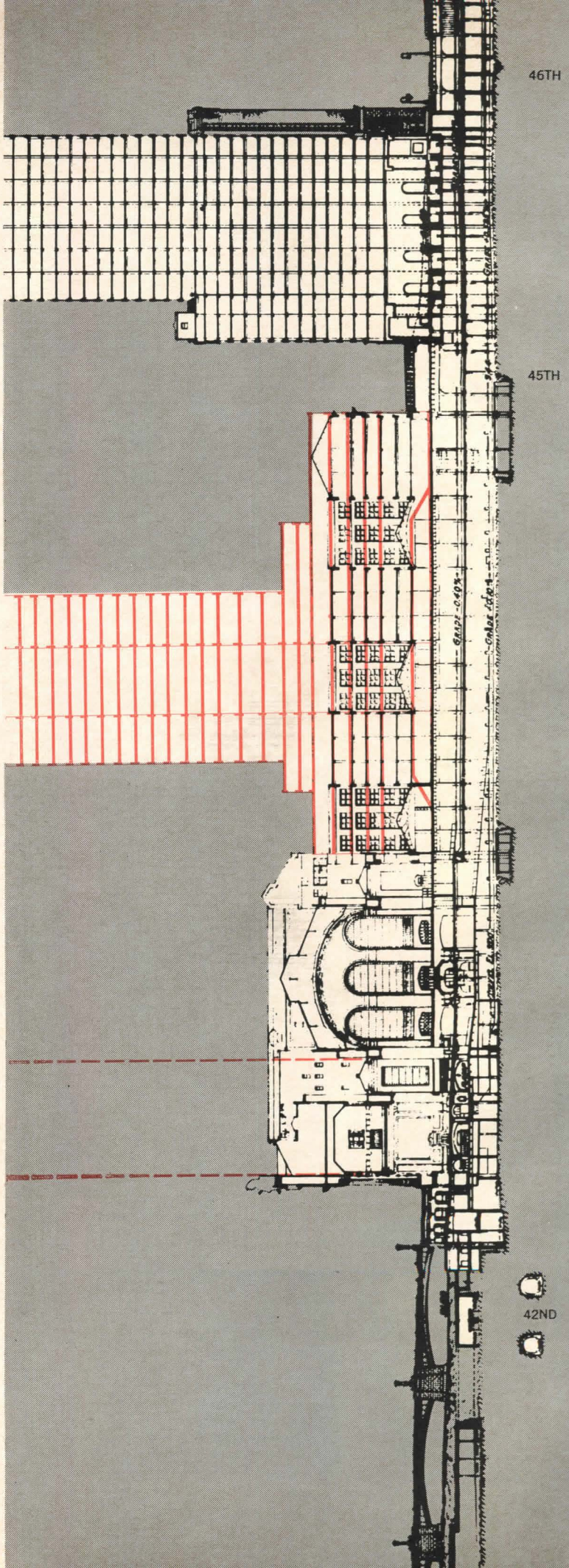
Grand Central is the prototype of all modern multilevel, multiuse urban distribution centers, having profoundly influenced such notable later projects—both real and unrealized—as Rockefeller Center in New York, Penn Center and Market Street East in Philadelphia, and Montreal's newly restructured downtown.

Grand Central Terminal—more specifically its Grand Concourse—is the heart of a vast, tightly integrated horizontal and vertical movement system (see plan, page 48, and section at right) through which more than half a million people pass each day. It gathers up these multitudes from suburban and interurban trains, from intracity subways, from buses and taxis, and from off the sidewalks; and it disperses them not only to far-flung destinations and to other parts of the city but, through a vast underground pedestrian network, directly to the 21 buildings that currently form the 60-acre Grand Central complex.

For good measure the terminal deals neatly with the traffic on Park Avenue, which it straddles, by providing an elevated roadway "collar" that diverts cars around the perimeter and back on their course. And to top it off, Grand Central even offers helicopter service to Kennedy Airport from the roof of its latest, but probably not last, addition: the 59-story Pan Am Building.

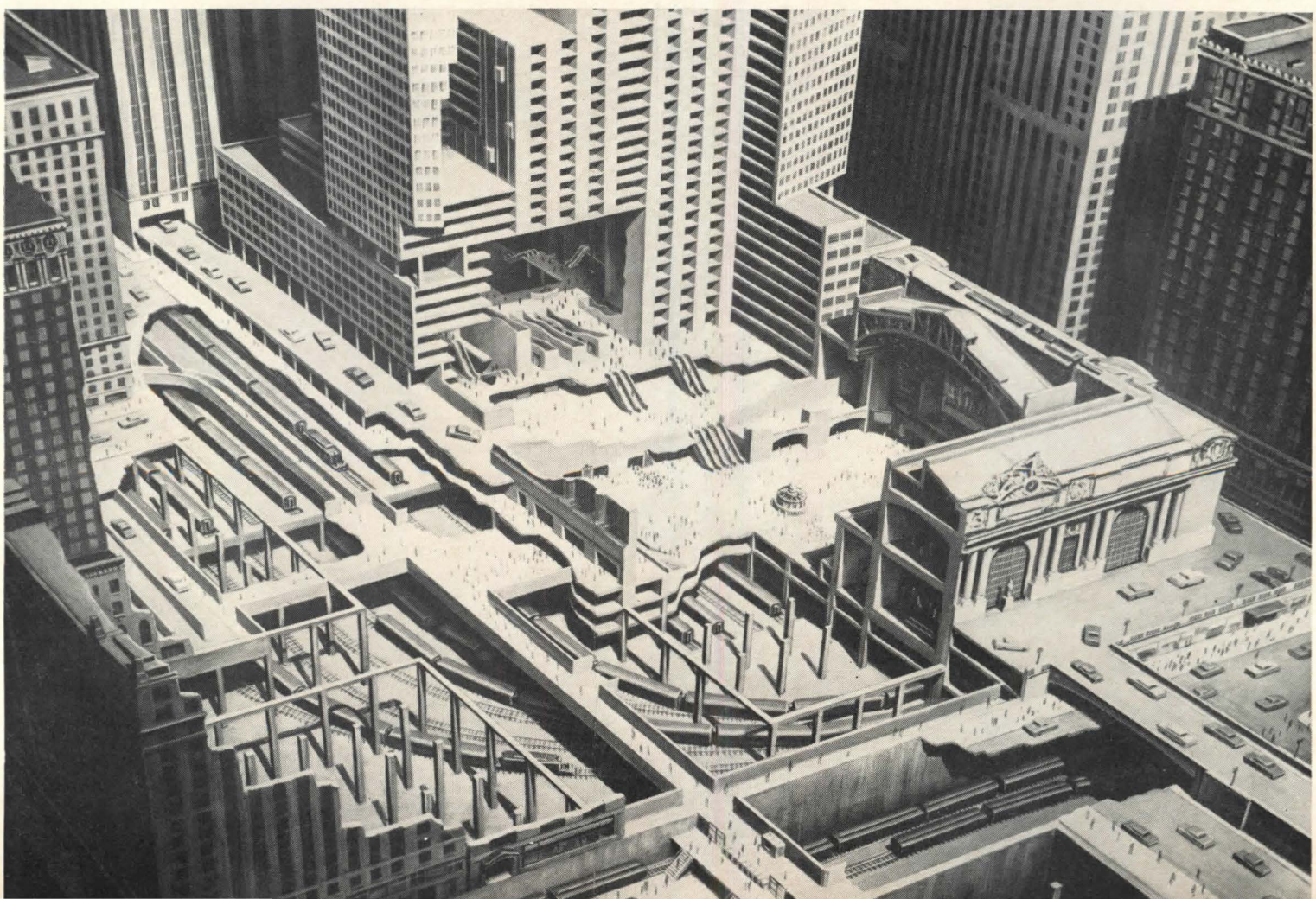
The fact that a project begun 65 years ago is capable of car-

BY FRANK WILLIAMS



The Beaux Arts Grand Central Terminal building crowns an underground multilevel network as "modern" in concept as any in existence (see section at right and cutaway rendering opposite). At the bottom of the subterranean stack is a two-level track loop—one level for suburban trains, the other for express trains. Above them, in ascending order, are two levels of subway lines, a shuttle subway to Times Square, and a pedestrian level radiating out from the Grand Concourse. Superimposed in red on the section at right are the Pan Am Building, added in 1964, and the location (indicated by dotted lines) of a proposed new tower to be built over the existing waiting room.

Mr. Williams is an urban designer who has worked on many projects and studies involving urban transportation, including two reported elsewhere in this issue: the Regional Plan Association's Mid-Manhattan study (page 62), and the plan for Seattle's proposed rapid transit system (page 56).



rying out all these functions today is a testament to the remarkable planning and design principles upon which Grand Central was structured. Most of the credit for those principles belongs to the New York Central Railroad's chief engineer, William J. Wilgus, who at the beginning of the century proposed that the existing terminal on the site be demolished and replaced by a flexible, open-ended complex that could incorporate future growth and change.

It was Wilgus who worked out Grand Central's basic system of multilevel separations tied together by a series of ramps, and the idea of providing an underground concourse capable of being extended to the elevator banks of new buildings as they developed. And it was Wilgus who proposed the use of air rights over the railroad tracks and yards, a historic precedent that made a major contribution to urban design.

Wilgus wrote the program for the limited competition to select a design for the new terminal complex—and he picked the winner. It turned out to be a scheme by Reed & Stem of St. Paul, one of whose principals happened to be a brother-in-law of Wilgus. A commonly held belief among Grand Central historians is that Wilgus actually instructed Reed & Stem on how to design their competition entry. The firm was small and virtually unknown, so it was later required to associate with the established New York firm of Warren & Wetmore.

However questionable the ethics might have been, the Grand Central competition nevertheless produced a design that matched Wilgus' remarkable vision. The design included only the terminal building and the underground levels immediately beneath it; but over the years this nucleus has absorbed, almost effortlessly, two additional subway lines, a many-thousand-fold increase in foot traffic, two office buildings that rise through and above the terminal itself, and 19 other structures whose elevators connect with the underground pedestrian concourse.

By placing the suburban and long-distance trains underground (a decision made possible by the then-recent electrification of the lines), the design also paved the way for the pioneering air-rights development along Park Avenue to the north. Before then, open train yards, bridged by pedestrian catwalks, had extended on grade from the old terminal to 49th Street, covering an area of 16 city blocks. After the yards were put below grade in a 3-million cu. yd. excavation 65 ft. deep, the New York Central built an infrastructure of streets and sidewalks over the tracks and leased the "holes" for apartment buildings (later replaced by office structures).

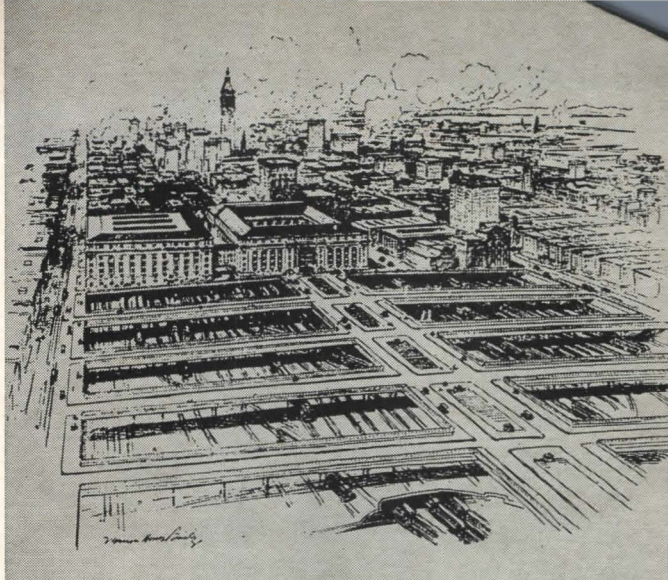
Mammoth addition

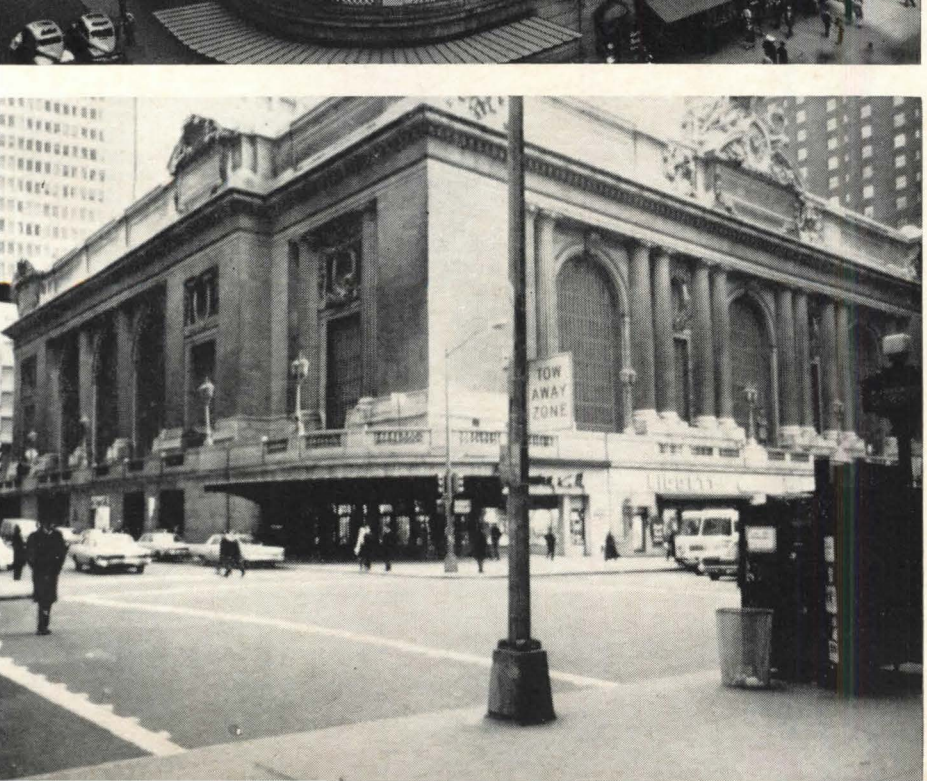
The supreme test to date of Wilgus' and the architects' foresight came in 1963 with the addition of the Pan Am Building, which rises just north of the Grand Concourse. Pan Am, the largest commercial office building in the world, added 2.4 million sq. ft. and 17,500 new office workers to the complex. Grand Central even managed to absorb this avalanche—though just barely. Grand Central's pedestrian concourses, especially at the metropolitan subway level, had already become overcrowded, a condition that was further aggravated by the new traffic —an estimated 250,000 people per day—which Pan Am generated. (As many as 48,600 people now arrive at the Flushing IRT subway platform alone during the morning peak hour.)

But the Pan Am building did make one major functional contribution to Grand Central's circulation system: it provided, for the first time, a direct pedestrian link from the Grand Concourse to the north. Pan Am's designers accomplished this by supplying a bank of escalators that rise directly up from the Grand Concourse to the grade-level lobby of their building, thus allowing the lobby to double as a concourse connecting 45th Street to the core of Grand Central.

The circulation bonus which the Pan Am Building brought to Grand Central would not have been possible, however, had it

The six illustrations at right record the evolution of the core of the Grand Central complex as viewed from both the south (near row) and north (far row). The terminal itself, with its underground network, was completed in 1913 (top). The north view (top right) shows the infrastructure built over the outlying train yards for air-rights development. In 1929, the 35-story New York Central Building was added (center). It occupied, according to a press release issued by the railroad at the time, "the last available building site in the area." But by 1964, another "site" had been found, and the 59-story Pan Am building was superimposed over the original terminal (bottom).




TOW
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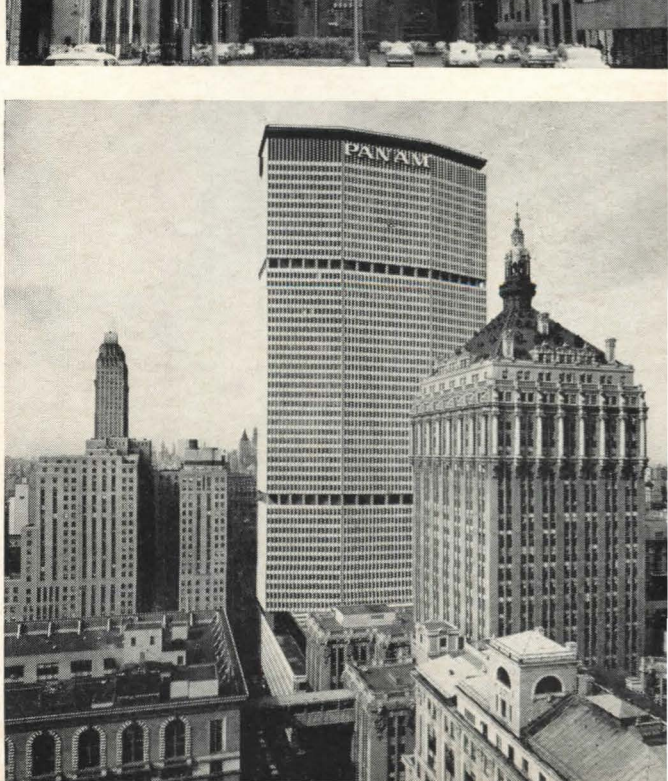

PAN AM

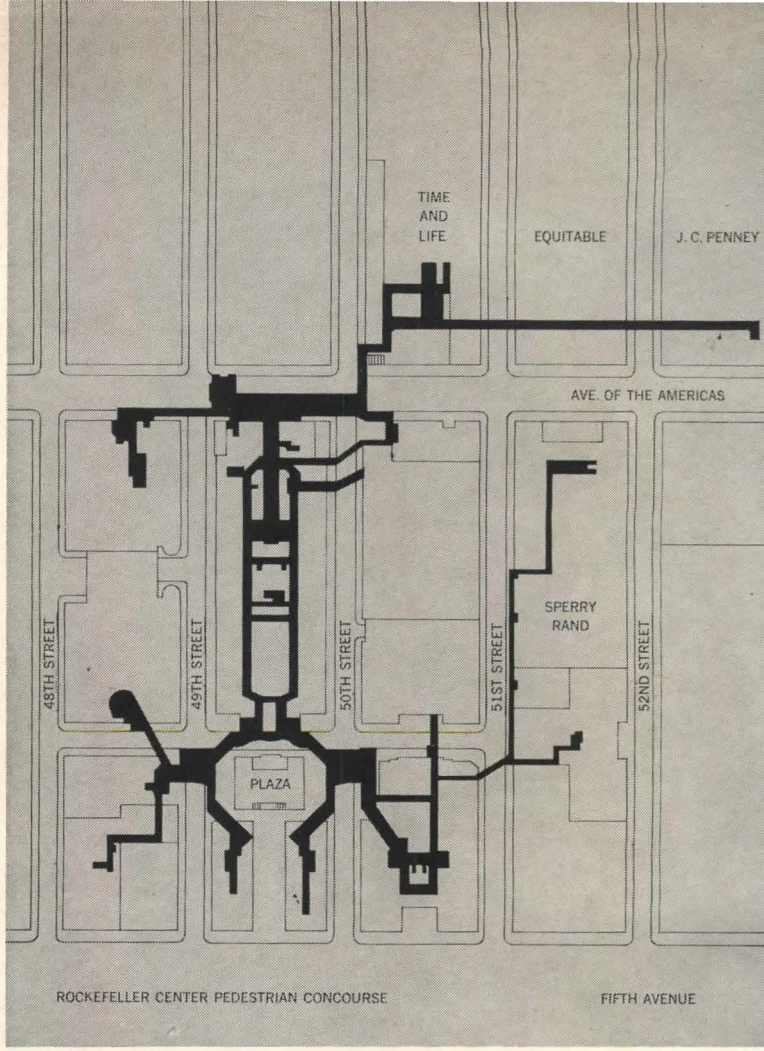
not been for one of the more brilliant parts of the terminal's original design: the Grand Concourse itself. The architects conceived of this great room as the core of the giant mixing chamber, the reference place that ingests all the pedestrian traffic and sorts it out. Significantly, the architects separated the Grand Concourse from the waiting room, knowing it could never serve as a central reference point for thousands of people and a resting place at the same time.

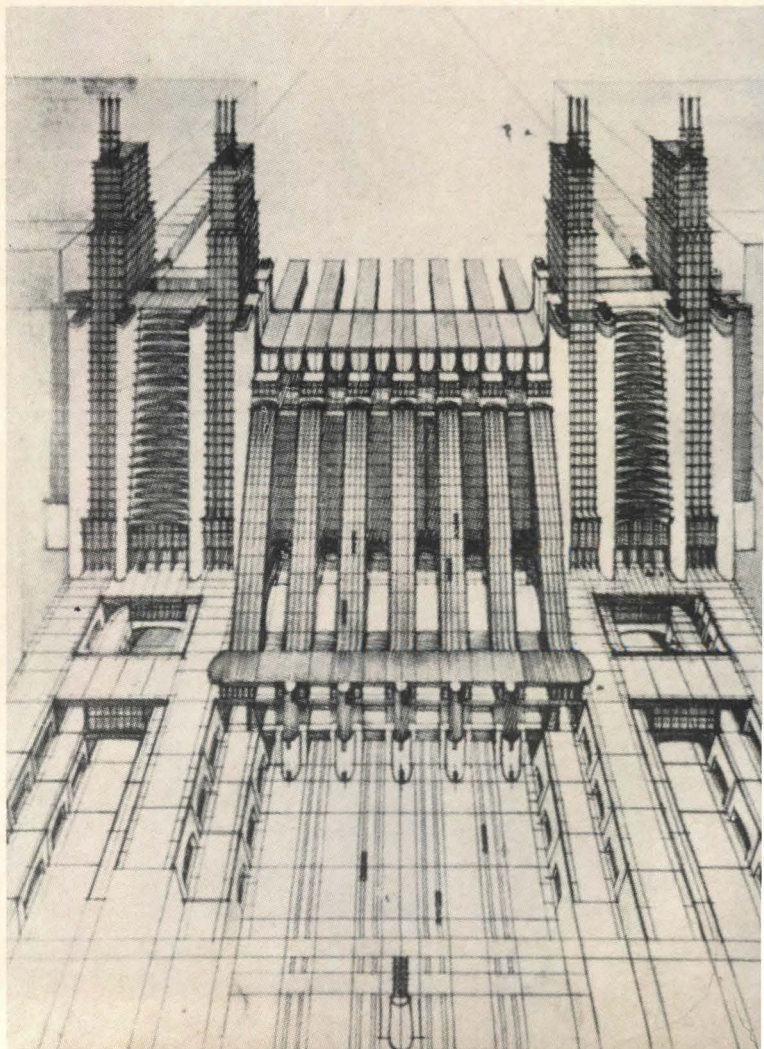
The floor of the Grand Concourse was placed 16 ft. below grade for three major reasons: to prevent friction with the activity at street level; to bring it on level with the underground pedestrian concourse, and to serve the gravitational principle upon which the multilevel movement system is based. The idea was that people instinctively follow the course of gravity, so the most natural movement pattern is a system of one-way ramps flowing down from street level. Wilgus went so far as to claim that a barrel pushed from any of Grand Central's major street entrances would roll directly to the ticket counter area.

End of the line?

Grand Central has absorbed enormous growth over the 55 years of its existence, but its capacities are not limitless. Even now its pedestrian concourses are dangerously overcrowded at rush hours. They are also gloomy, dirty, and occasionally ugly. But apparently the New York Central Railroad has infinite faith in the terminal's ability to take on more and more duties. The railroad recently announced plans to impose still another office building over the terminal. It would replace the main waiting room and rise to a height greater than the 59 stories of the *Pan Am* Building.

Grand Central's pedestrian concourses could be widened and refurbished to accommodate a substantial increase in traffic. Unless this is done, however, the new highrise building might well prove to be the addition that finally exhausted this remarkable mixing machine.

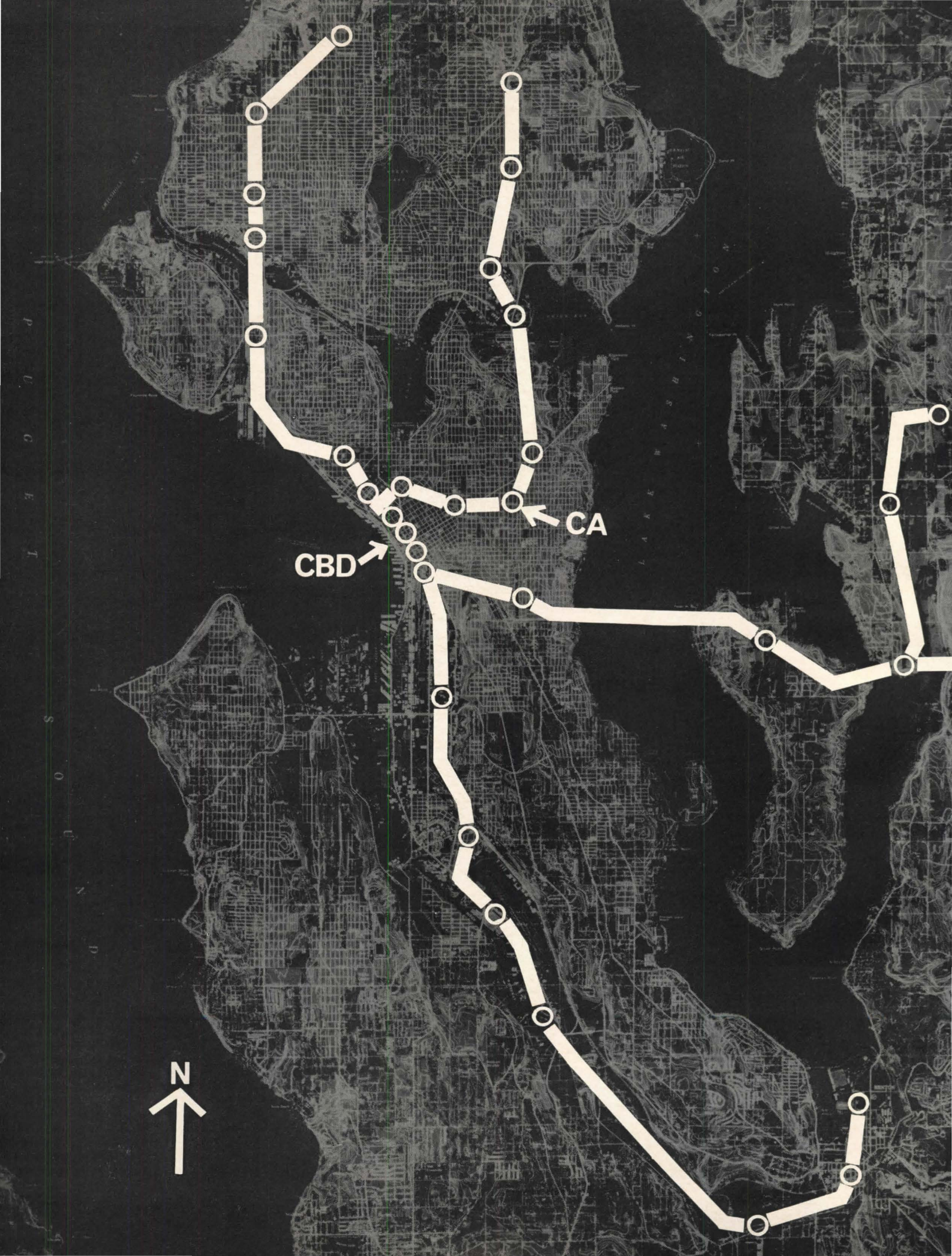




Rockefeller Center (photo opposite) is the clearest application to date of the principles first used at Grand Central. The 19 buildings of the complex are all integrated one level below grade by a shop-lined pedestrian concourse (plan, above right).

Grand Central's design, completed in 1903, might well have had a direct influence on the work of Italian visionary Antonio Sant'Elia, whose proposals it predates. Sant'Elia's 1912 scheme for a multilevel city (right) has been called "Grand Central minus the Beaux Arts wraps."

PHOTOGRAPHS: Pages 49, 51 (top), and 53 (bottom right), J. Alex Langley. Page 51 (bottom), Ray Pioch, courtesy *Popular Science Monthly*© 1962. Page 55, Thomas Airviews.


CA
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N

TRANSIT'S POWER TO SHAPE A REGION

In this age of moon rockets and SSTs, the biggest development in U.S. urban transportation is rail rapid transit, a product of 19th-century technology. Cities across the country are embracing it, or eyeing it covetously, as their long-sought savior from gradual strangulation by the automobile.

The San Francisco Bay Area started the trend in 1962, when voters approved a whopping $792-million bond issue to partially finance construction of the $1.2-billion, 75-mile Bay Area Rapid Transit (BART) system. This year, Washington, D.C., will begin construction of a $600-million, 25-mile system that eventually may be extended to 95.3 miles at a total cost of $2.3 billion. Atlanta, Baltimore, Los Angeles, and Pittsburgh are all carrying out specific planning projects for new rapid transit systems. And a dozen or so other cities are giving it serious consideration.

On February 13, voters in Seattle and its suburbs will decide whether theirs is to be the next urban area to put its faith in rapid transit. They will be asked to approve a $385-million bond issue to finance one-third the cost of a 47-mile system connecting downtown Seattle with the major outlying population and employment centers (see map). The Federal Government, it is hoped, will put up the remainder of the estimated $1.15 billion total.

If the bond issue passes—and the odds are that it will—Seattleites will have bought much more than a shiny new mode of transportation. For the first time in this country, the system proposed for Seattle has been planned and designed not just as a device for getting people from one place to another, but as a positive force for guiding the physical, social, economic, and esthetic improvement of the metropolitan area that it serves.

Rapid transit is, by its nature, an inherent shaper of urban form. The stations of a transit system attract large numbers of people, making them inevitable magnets for concentrated development nearby. But until now, in this country at least, transportation engineers have designed new systems by a narrow formula: put the line where it will serve the most people at the lowest possible cost. They have looked upon rapid transit's built-in power to influence rational urban development as something beyond the scope of their responsibilities.

Strictly speaking, they have been right, of course. But such considerations are not beyond the *collective* scope of physical planners, urban designers, architects, sociologists, economists, city administrators—and engineers. By working as a team, each contributing his specialized skills and knowledge, these professionals can produce a rapid transit plan that serves community goals and needs beyond mere transportation.

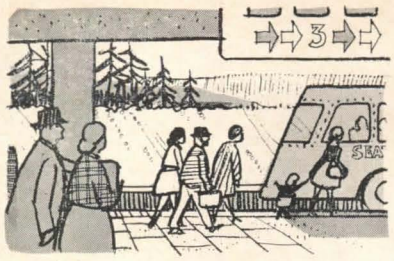
Broad-gauged approach

In Seattle, this is exactly what has happened: a multidisciplinary team has planned and designed the proposed system from the ground up. In important ways, the product of their joint efforts dramatically confirms the validity of this approach.

One direct beneficiary of the team effort will be a Seattle neighborhood known as the Central Area, a predominantly Negro section that has the region's highest unemployment rate and worst housing conditions. By strict patronage and cost standards, the northeast leg of the system should bypass the Central Area, following a straight course from downtown to the outlying middle-class suburbs. Instead, before it heads north it will dip toward the south to a station situated within the Central Area ("CA" on map). Thus, for the first time, the region's most deprived citizens will have direct and cheap access to the aircraft plants and other suburban industries that provide most of the area's employment opportunities.

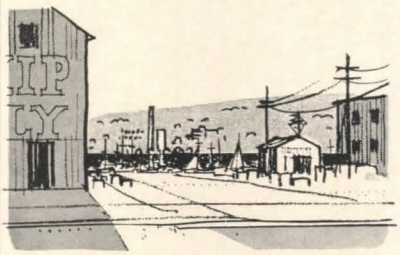
Last November Seattle received a Federal model cities grant for planning the physical and social rehabilitation of the Central Area, and the city intends to develop the land around the new

The four legs of Seattle's proposed 47-mile rapid transit system would converge on three shared subway stations in the Central Business District (CBD), giving downtown Seattle direct connection with the suburban population and employment centers. "CA" identifies the station to be located in the Central Area, a slum section slated for redevelopment. A revamped bus system, integrated with transit, is part of the plan. The schedule calls for completion of one segment (unidentified) by 1975, and of the entire system by 1985.

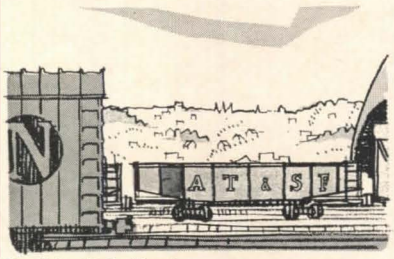


Terminal Station

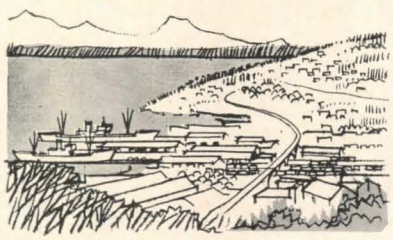
Holman (Carkeek Park)



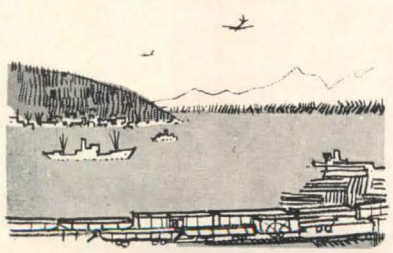
Ballard from Salmon Bay



Magnolia from Interbay (Dravus)



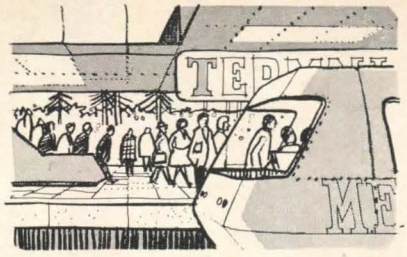
Interbay — Naval Supply Depot



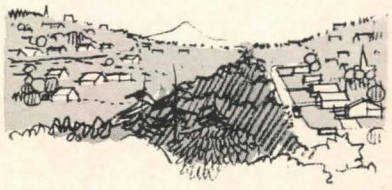
Elliott Bay

SUBURBIA

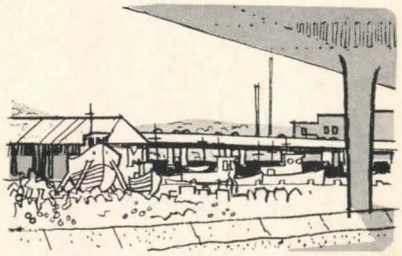
DOWNTOWN



Terminal Station



Southeast from Holman Road



Salmon Bay (15th Ave. bridge)

Dravus Street Area

Queen Anne — near Magnolia Bridge

Kinnear Park

Left: The series of sketches shows the rider's view at various points along the transit system's ten-mile northwest leg, from the downtown subway station (bottom) to the elevated terminal station (top). The quality of the rider's visual experience was a factor in determining the final route location. Visual surveys were conducted in the field along each of the route's potential corridors.

Opposite: Prototype designs for three types of station, prepared by the system's consulting architects and urban designers. The at-grade station (top section and plan) has a depressed concourse beneath the tracks and platforms; the elevated station (center) has a grade-level concourse; and the open-cut station (bottom) has its concourse above the platform. The open-cut station is also a terminus, so it contains unloading areas for feeder buses at the platform level.

station as a major focal point of the plan. In effect, the natural power of transit to attract new development will be channeled toward the reshaping of an entire slum area.

Inclusion of the Central Area within the system's routes was the most dramatic example of how Seattle's team approach extracted a valuable community bonus from transit, but there are many others all along the line. Before the routes were decided upon, every potential transit corridor and station area was evaluated for its social, physical, economic, and esthetic impact—as well as by engineering and cost criteria. In several instances, strict transit considerations were outweighed by the other factors, and route segments and station locations were determined accordingly.

Active advocate

Most of the credit for making Seattle's enlightened transit plan possible belongs to the city's mayor, J. D. Braman, who took office in 1964. Before then, a handful of civic leaders had been beating the drums for rapid transit, and getting nowhere. With Braman on the bandwagon, things began to happen. In July of 1966 the Puget Sound Governmental Conference, a consortium of city and county officials in the region, signed a contract with Consulting Engineers DeLeuw, Cather & Co., the firm that had headed Toronto's transit project, among others. DeLeuw, Cather was asked to do only a preliminary engineering study, but Braman had already learned enough about transit to recognize some of its potentials for aiding urban development, and he was determined to take advantage of them. He and his staff—especially his assistant, Edward Devine—met with architects, planners, urban designers, and civic leaders, and gradually evolved the idea of assembling a design team to develop the system.

"We found out soon," says Devine, "that architects and urban designers were really talking our kind of language. Their goals are what our goals are; they are sensitive to the needs of people. But we had to work very hard to overcome their anti-public-body bias. Most of them came to us harboring lots of myths and misconceptions about politicians and their motives." Says Braman: "This is a challenge to the architectural profession. But they asked for it, and they won't be foreclosed by engineers."

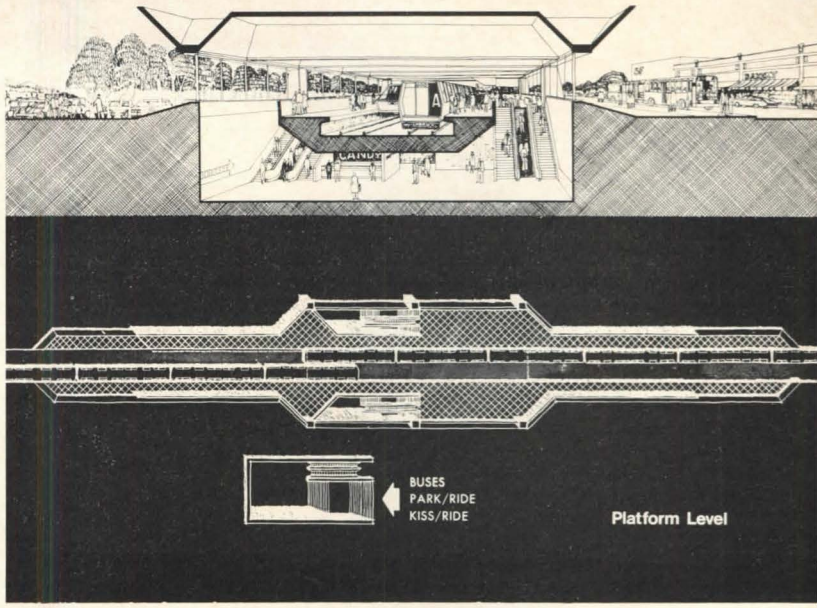
Recruiting a team

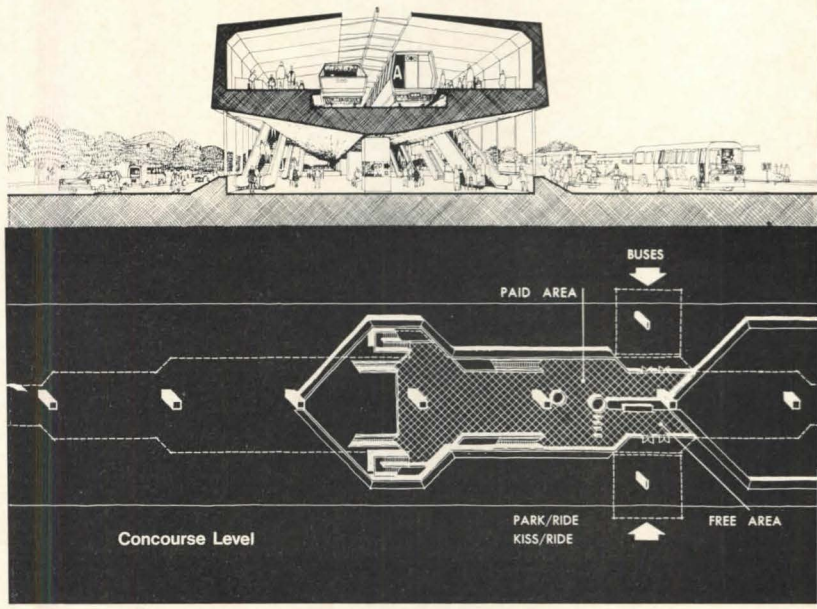
Braman and his staff developed the team concept into a formal request for a HUD transit grant, and the mayor flew off to Washington with it. HUD officials were so impressed that they forked over $650,000—the largest transit planning grant ever awarded by the department.

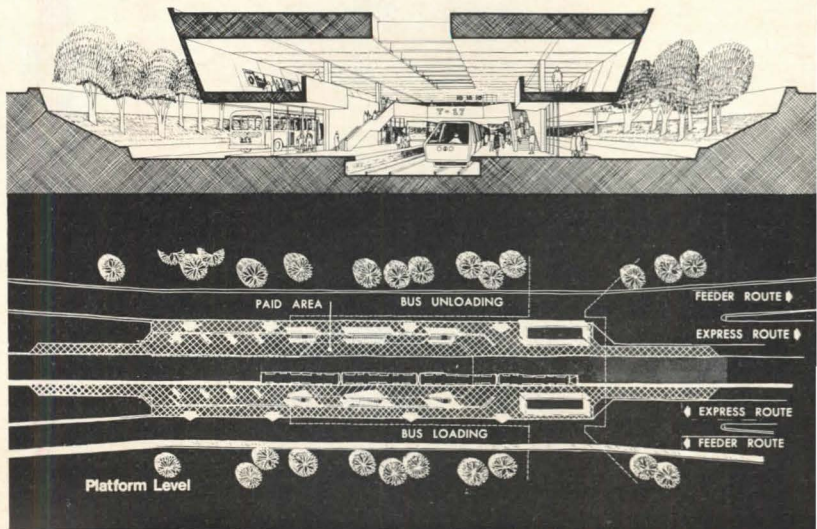
Last June, the Municipality of Metropolitan Seattle (Metro), a quasipublic agency established in 1964 to clean up the area's water pollution and later empowered to carry out a comprehensive regional transit plan, signed a contract with DeLeuw, Cather that contained a key requirement: architects and urban designers were to participate in the development of the plan—as consultants to the engineers.

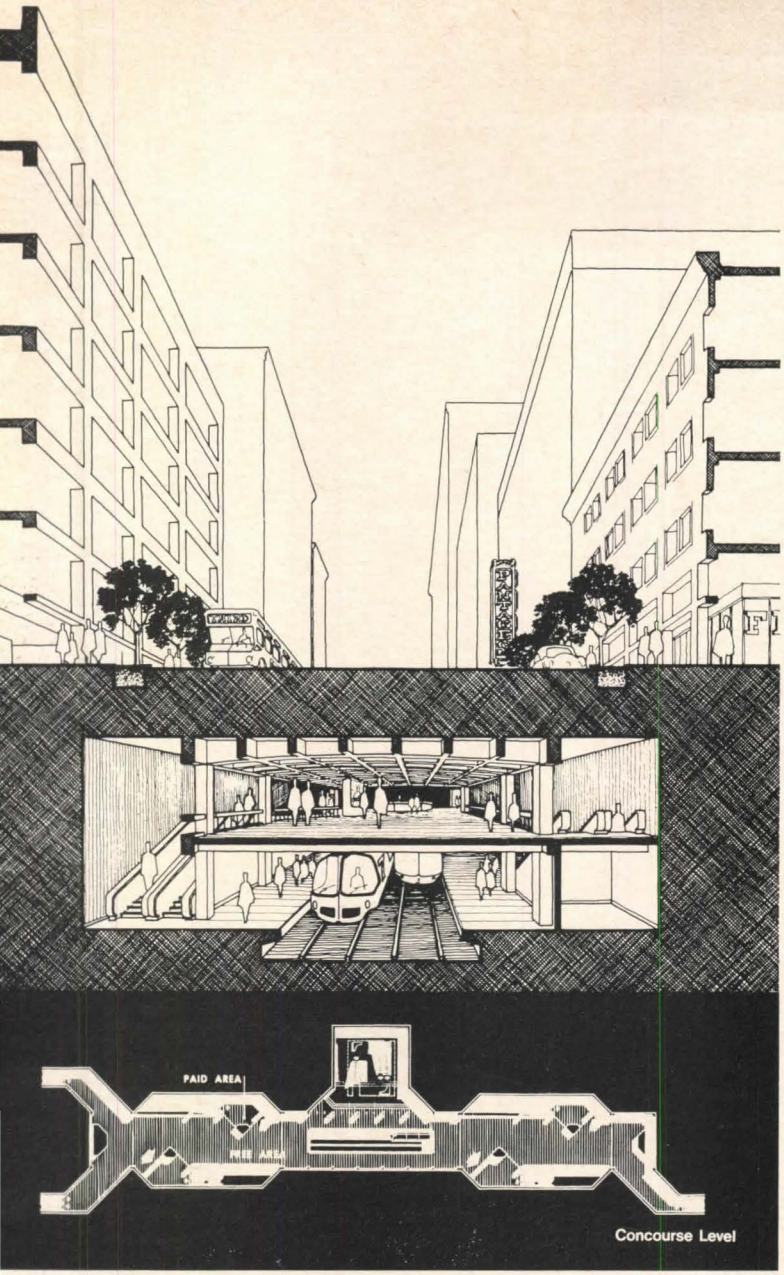
DeLeuw, Cather accepted the provision, and a selection committee was set up under the chairmanship of Israel Gilboa, head of the engineering firm's Seattle office. After interviewing several local architects, the committee selected Naramore, Bain, Brady & Johanson, one of Seattle's largest firms. The choice was a rather easy one, according to Gilboa, because NBBJ was the only candidate to bring in an outside urban design firm with extensive experience in transit: Okamoto/Liskamm of San Francisco, which had conducted several studies for cities traversed by BART (June '66 issue).

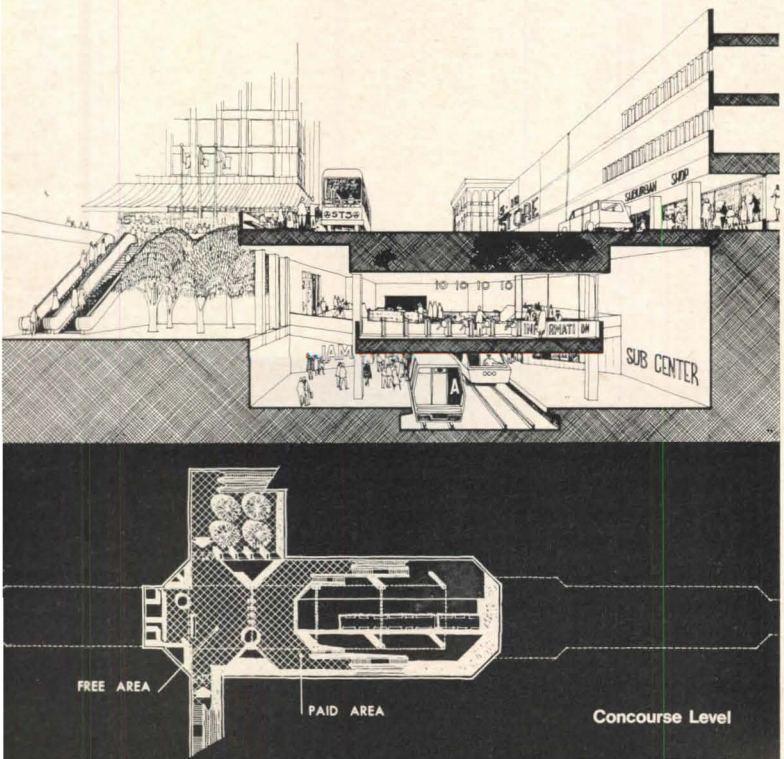
Economists, sociologists, and others were added to the team and, with Braman's office acting as a combination client, referee, and participant, work was begun. From the beginning, weekly meetings were held with Braman's staff and representatives of the counties and cities in-











Left: Prototype designs for underground stations in the region's dense areas. As first built, the stations in downtown Seattle (top section and plan) would be largely enclosed, with a major entrance in the form of a plaza at street level leading to the concourse one level below grade. The design for an underground station in a suburban center (bottom) calls for a sunken, landscaped plaza, admitting natural light into the concourse.

Opposite: The system's designers have prepared the groundwork for making transit the focus of future downtown renewal. Station concourses would be joined to form a continuous underground pedestrianway integrated with a lateral network of walkways (plan). New buildings would connect directly with the concourse (section). Gray areas on the plan are all scheduled for public or private redevelopment.

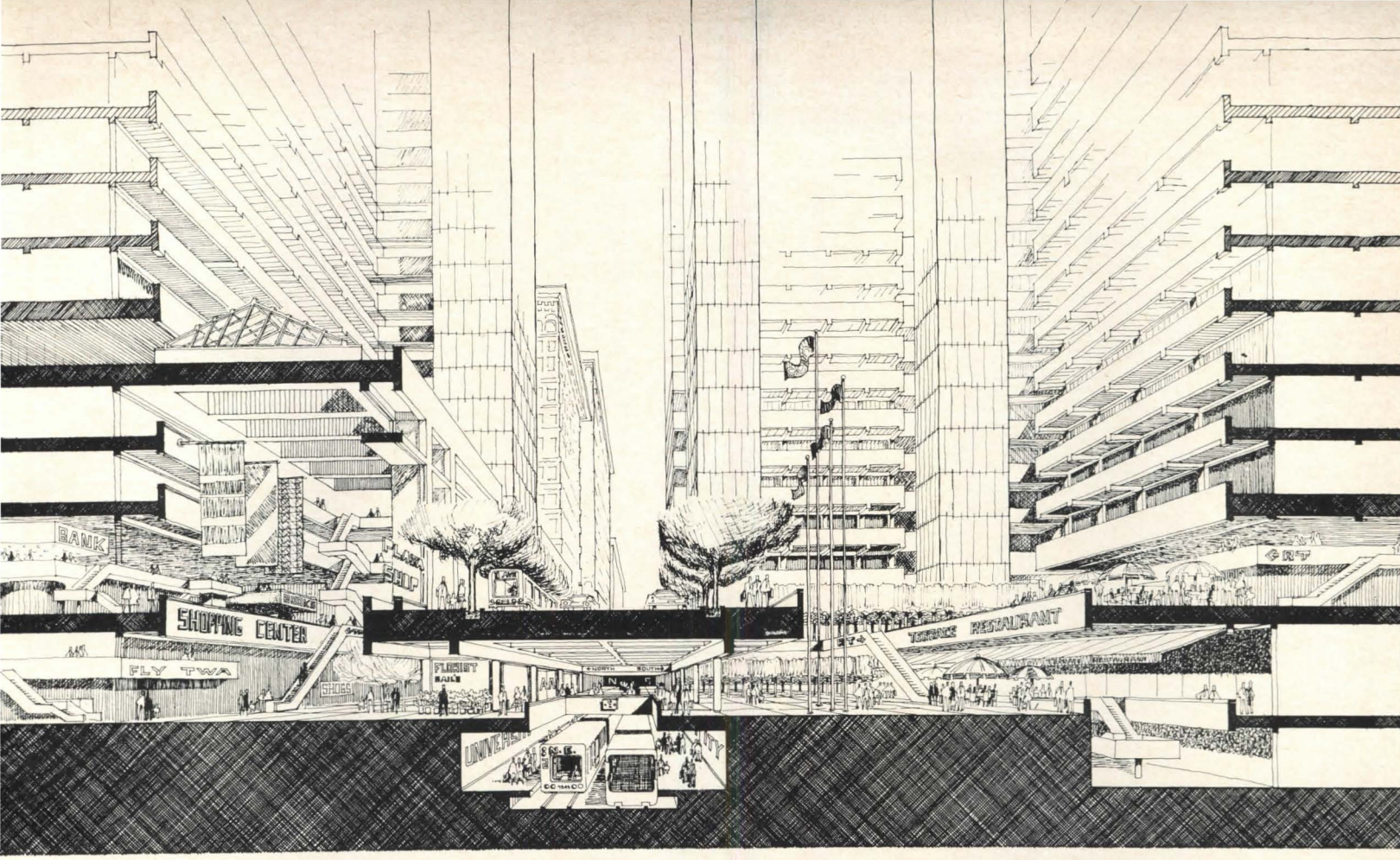
volved, during which progress was reported, differences aired, and decisions reached.

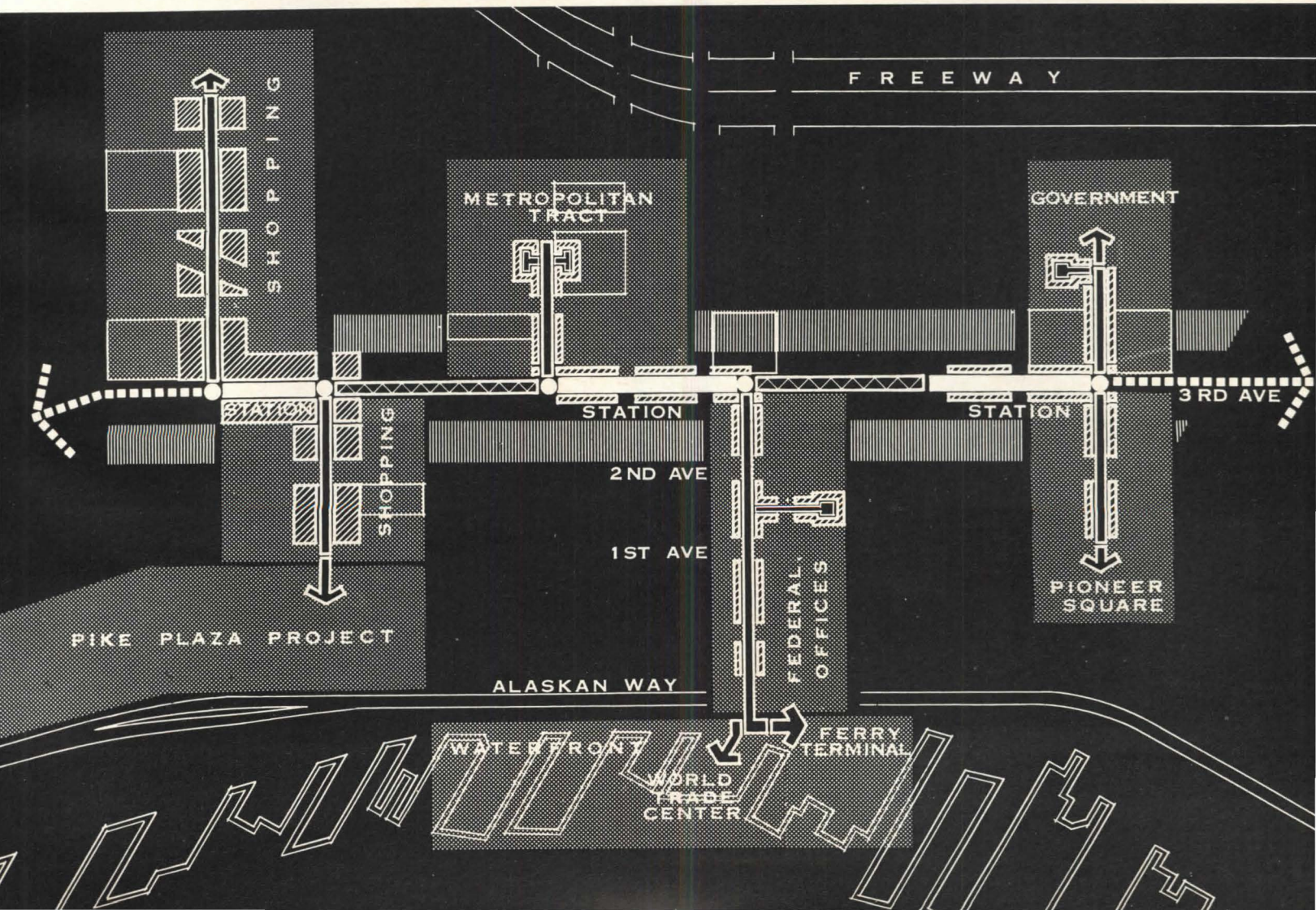
In Gilboa's view, the procedure has worked beautifully—so much so that he claims he would propose a similar setup to other cities, without waiting to be asked. Perry Johanson, who headed the project for NBBJ, also praises the team effort. "I have not felt any constraints or problems," he says. "Gilboa is very sensitive to the prevailing climate." Urban Designer Rai Y. Okamoto is somewhat less enthusiastic. Though he agrees that, in practice, the procedure was a vast improvement over BART's, where architects were overruled by engineers all along the line, he points out that the organizational structure in Seattle was basically no different.

Okamoto has put his finger on an inherent—and potentially troublesome—weakness in Seattle's transit planning and design process. Seattle's city fathers, in contrast to BART's management, have not assumed that rapid transit is essentially an engineering project; yet, like BART, they have set up a contractual arrangement under which engineers are the prime contractors and other, equally important, participants are merely consultants to the engineers.

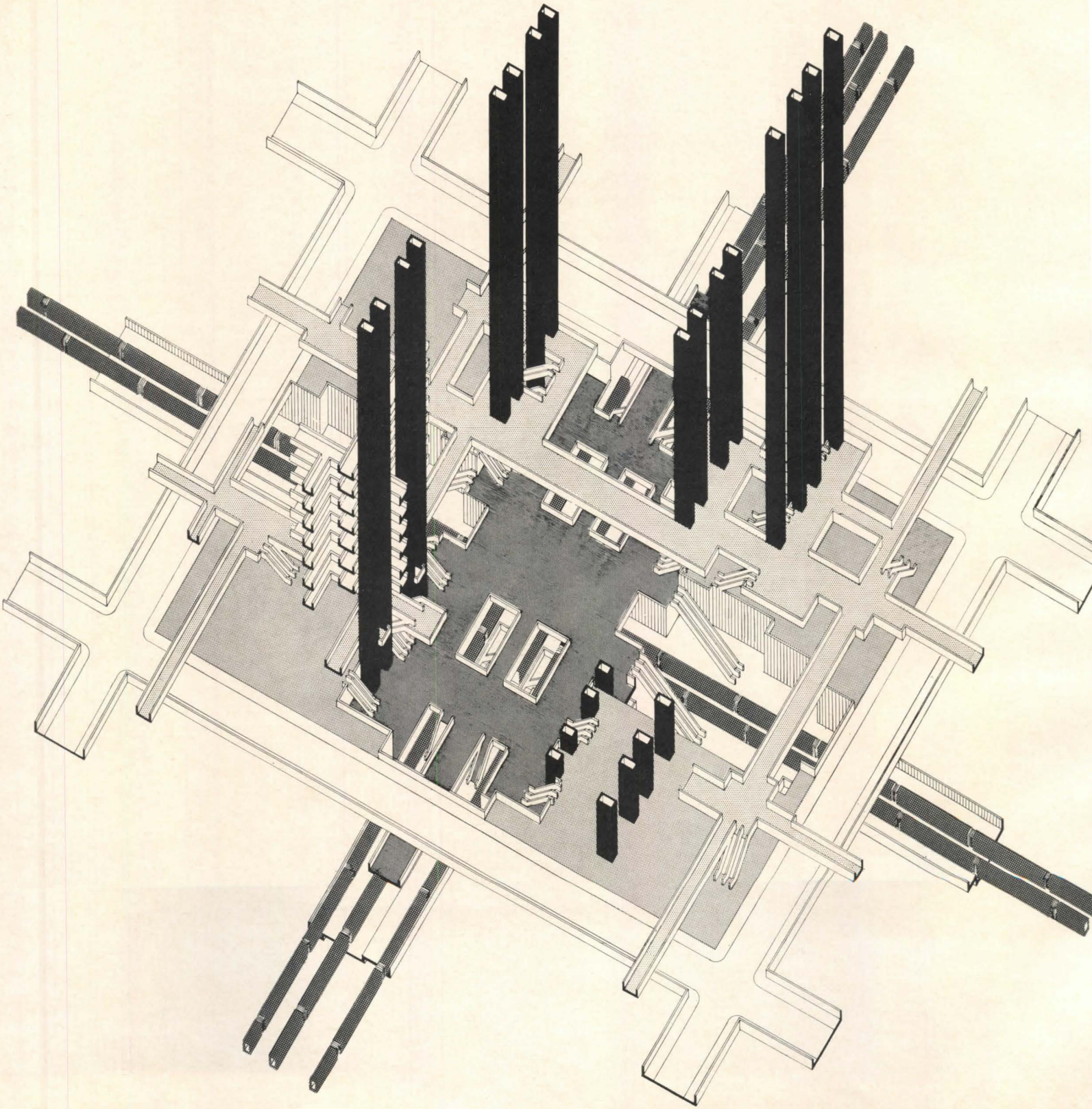
Seattle's team approach has worked well to date largely because an enlightened city administration has made it work. But there is no certainty that Braman and his staff will be around through the system's 17-year planning, design, and construction process. Thus there is no built-in assurance that a broad viewpoint will pervade the next, crucial, stages.

If the bond issue passes on February *13, the existing* team probably will be retained to carry the project through to completion. But continuation of the team's high performance would be made more certain if each of the principal participants were guaranteed an equal voice, and an equal responsibility, in the development of a system that not only moves people, but profoundly affects urban form. —James Bailey


BANK
SHOP
SHOPPING CENTER
FLY TWA
FLEISH
TERRACE RESTAURANT


FREEWAY
SHOPPING
METROPOLITAN TRACT
GOVERNMENT
STATION
STATION
STATION
3RD AVE
2ND AVE
1ST AVE
SHOPPING
FEDERAL OFFICES
PIONEER SQUARE
PIKE PLAZA PROJECT
ALASKAN WAY
WATERFRONT
FERRY TERMINAL
WORLD TRADE CENTER

UNDER THE SPREADING ACCESS TREE



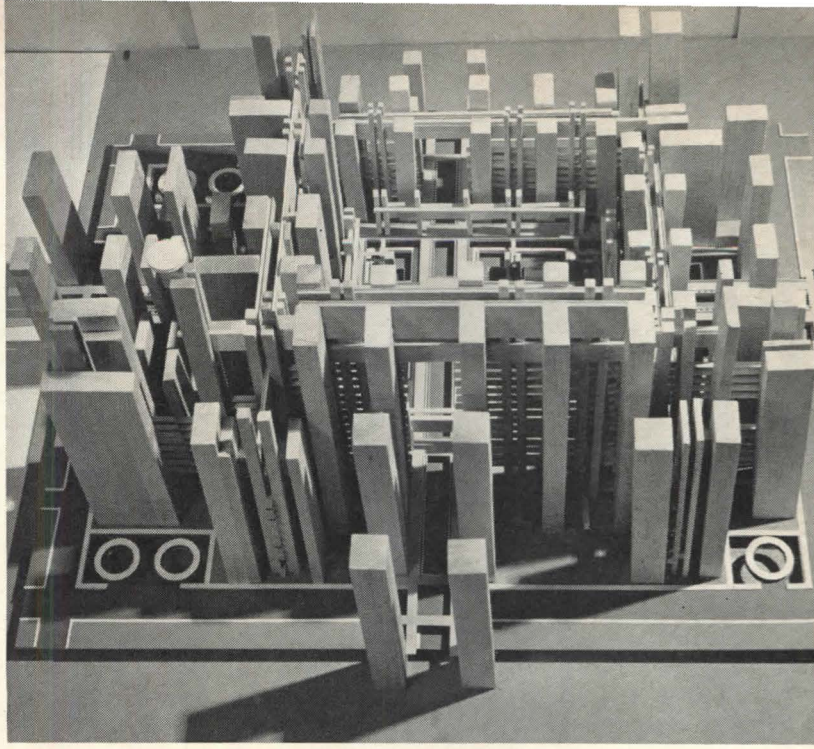
Rapid transit is no automatic solution for urban transportation. The fact that 77% of the workers in Manhattan's central business district use an underground train on their trip to work (74 per cent use the subway) does not imply that the trip as a whole is either efficient or comfortable.

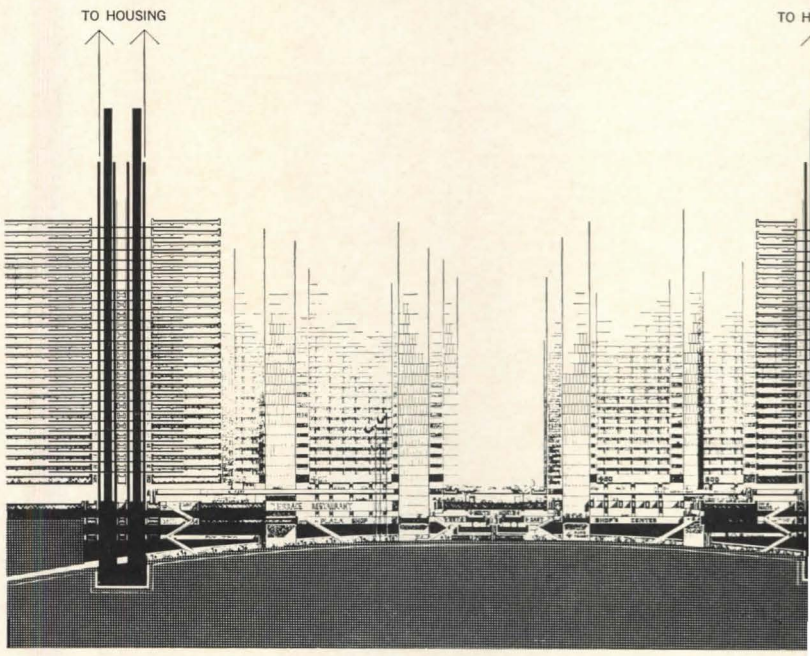
In their brand new urban design study for Manhattan's CBD (part of the forthcoming Second Regional Plan), the New York Regional Plan Association suggests that the essential malfunction in the transportation system is the trip between train door and office door, taking up some 20 per cent of the total time. Digging into the facts of underground life, the RPA has come up with some revolutionary concepts of urban form.

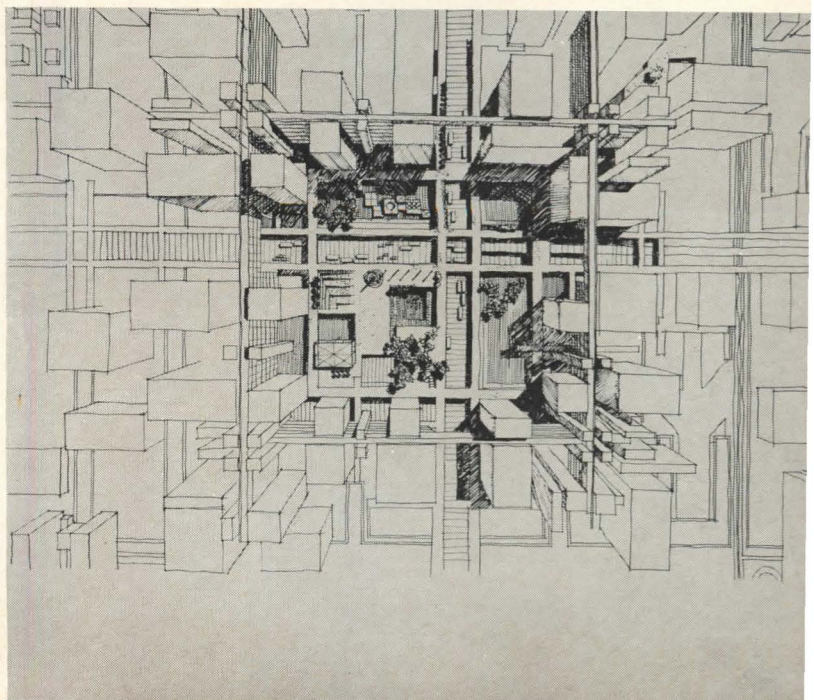
Basic to the study is the premise articulated by Rai Y. Okamoto, urban design consultant to the RPA, that all parts of the movement network should be treated as related elements of a single system. The product of this thinking is the "Access Tree" (opposite), which joins public and private circulation into an integrated system. The roots of the Access Tree are the various levels of the city's infrastucture; the trunk contains elevators and mechanical services; the branches are "skyscraper sidewalks."

Using the Access Tree as the generative element of a new urban architecture, the RPA builds a prototype office center (right). This "transit architecture" clearly shows: 1) separation of the different forms of circulation; and 2) separation of mechanical systems and public utilities from office spaces. Not visible, but the primary basis for development: floor area ratios are determined not by the condition at street level but by the capacity of the transit facility below.

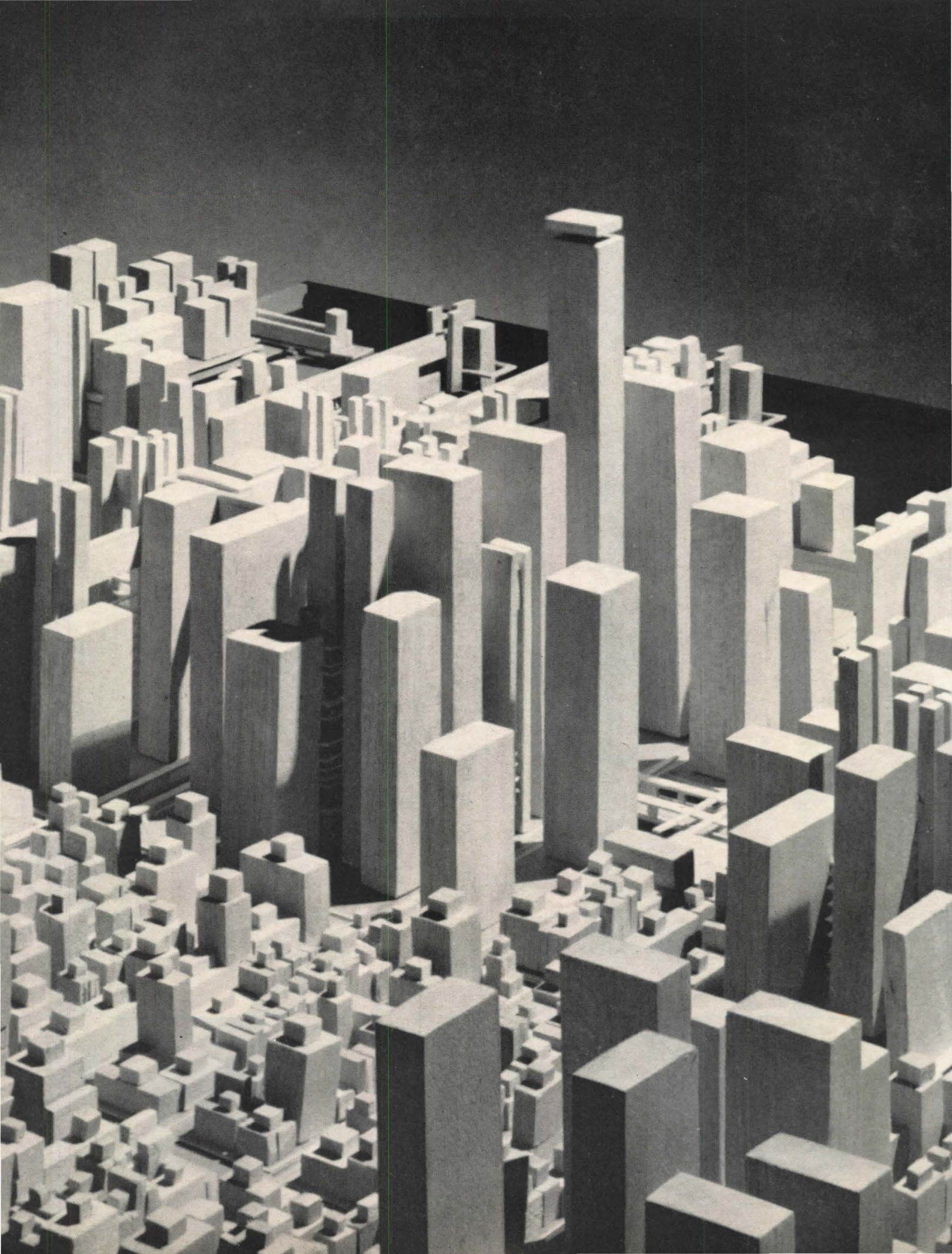
Revolutionary, or simply common sense? Both, says Stanley B. Tankel, planning director of the RPA. The concept may be radical only in its recognition of the underground, yet its implications for urban form are enormous.







The Access Tree (opposite) is the Regional Plan Association's answer to the internal circulation problems of midtown Manhattan. High-speed transit is at the lowest level, with a mixing and redispersal plenum just above. Moving stairs, vertical lifts, and upper-level paths complete a system that meshes public and private circulation. The Access Tree principle is the basis for a prototype office center (right). The curved station is for a Gravity Vacuum Transit tube (page 105). There are antecedents for the Access Tree in Le Corbusier (the separation of different forms of movement, for instance), but its primary philosophical roots are in the work of the Italian Futurist architect, Antonio Sant'Elia, who was preoccupied by circulation in a tighter urban setting.



The Access Tree creates clusters of high buildings for functional efficiency, and leaves low areas for visual variety.

Urban design can't deal with everything, says the RPA—for instance, the notorious air pollution of the CBD is beyond the scope of this study. But the Access Tree can resolve functional and visual problems and give amenity to an area choking on another kind of congestion.

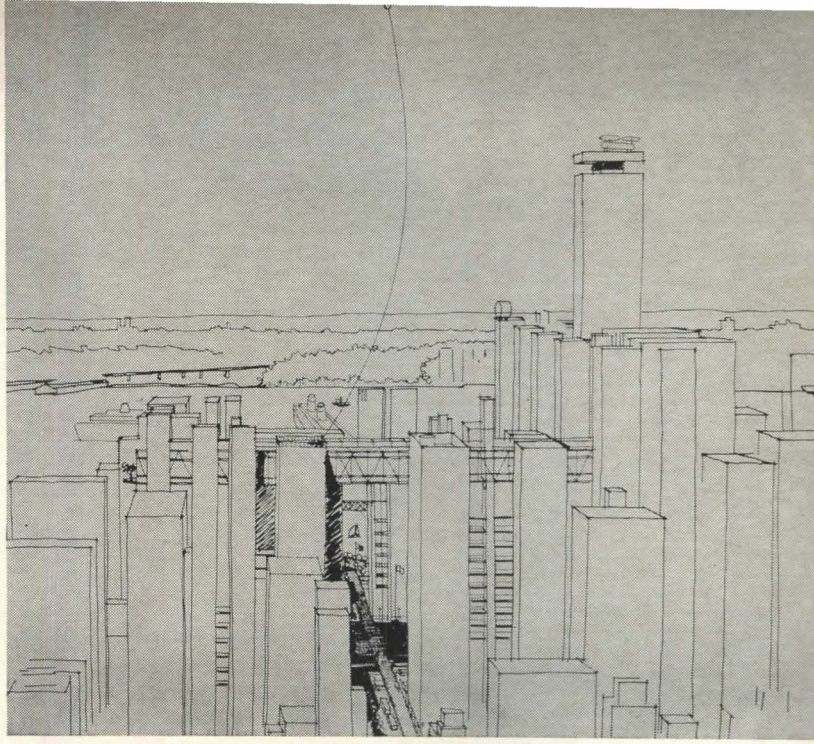
As the RPA expresses it, survival isn't at stake so much as survival with amenity. "Increasingly, the success of the CBD will depend on people's ability to move freely and comfortably within it, and to enjoy it."

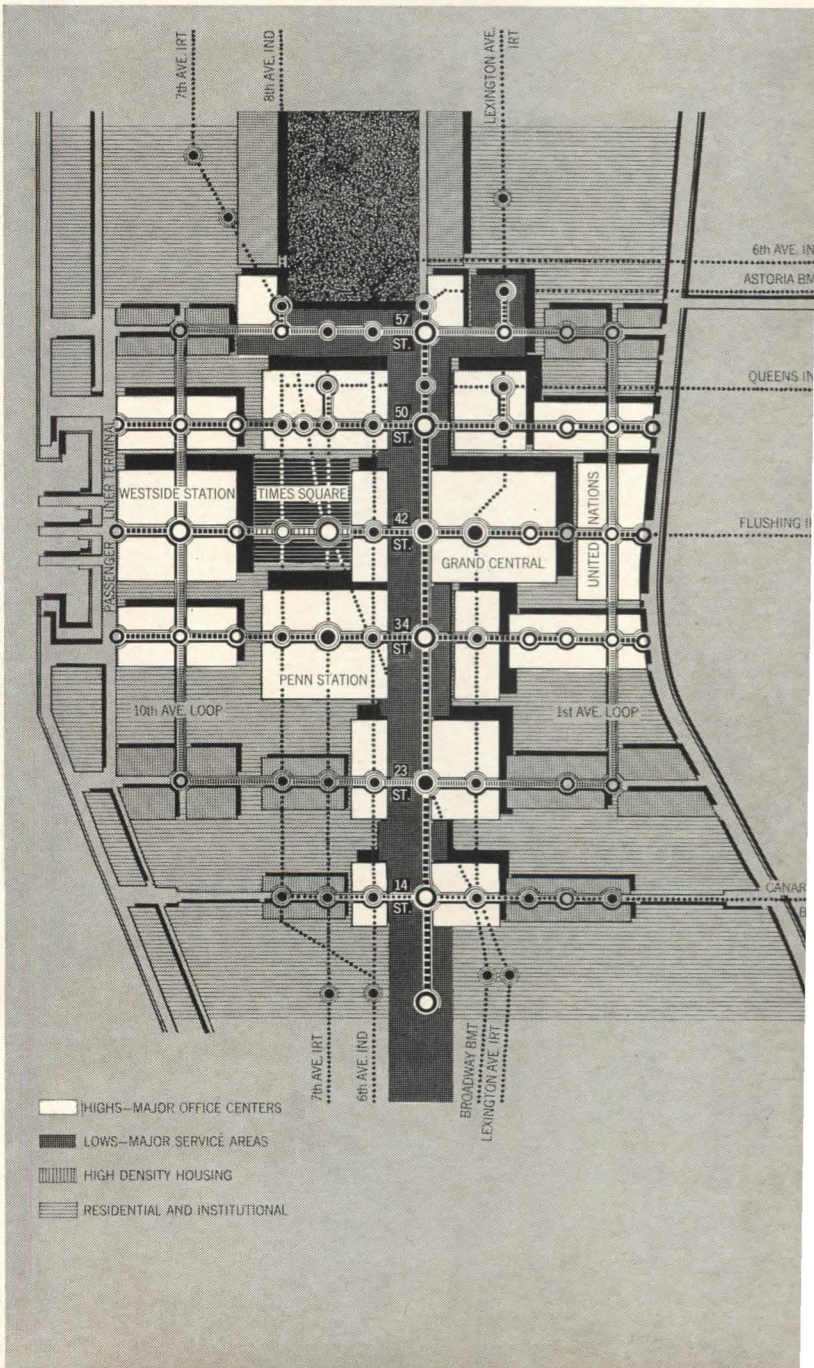
For various reasons, the RPA believes that Manhattan's CBD not only *can* grow but *should* grow. They anticipate a rise in CBD office jobs from 800,000 today to 1.3 million by the turn of the century, and an increase in the total CBD jobs from 2.1 million to 2.4 million. (This, however, while the CBD declines relative to the rest of the 31-county region—from 52 per cent to 43 per cent of the office jobs and from 27 per cent to 18 per cent of all jobs—and while 93 per cent of the region's new jobs go outside the CBD.)

A key aspect of the CBD's growth must be improved transportation into and within the area. The Access Tree is simply a device enabling the CBD to cope with the increased numbers who will be deposited in it.

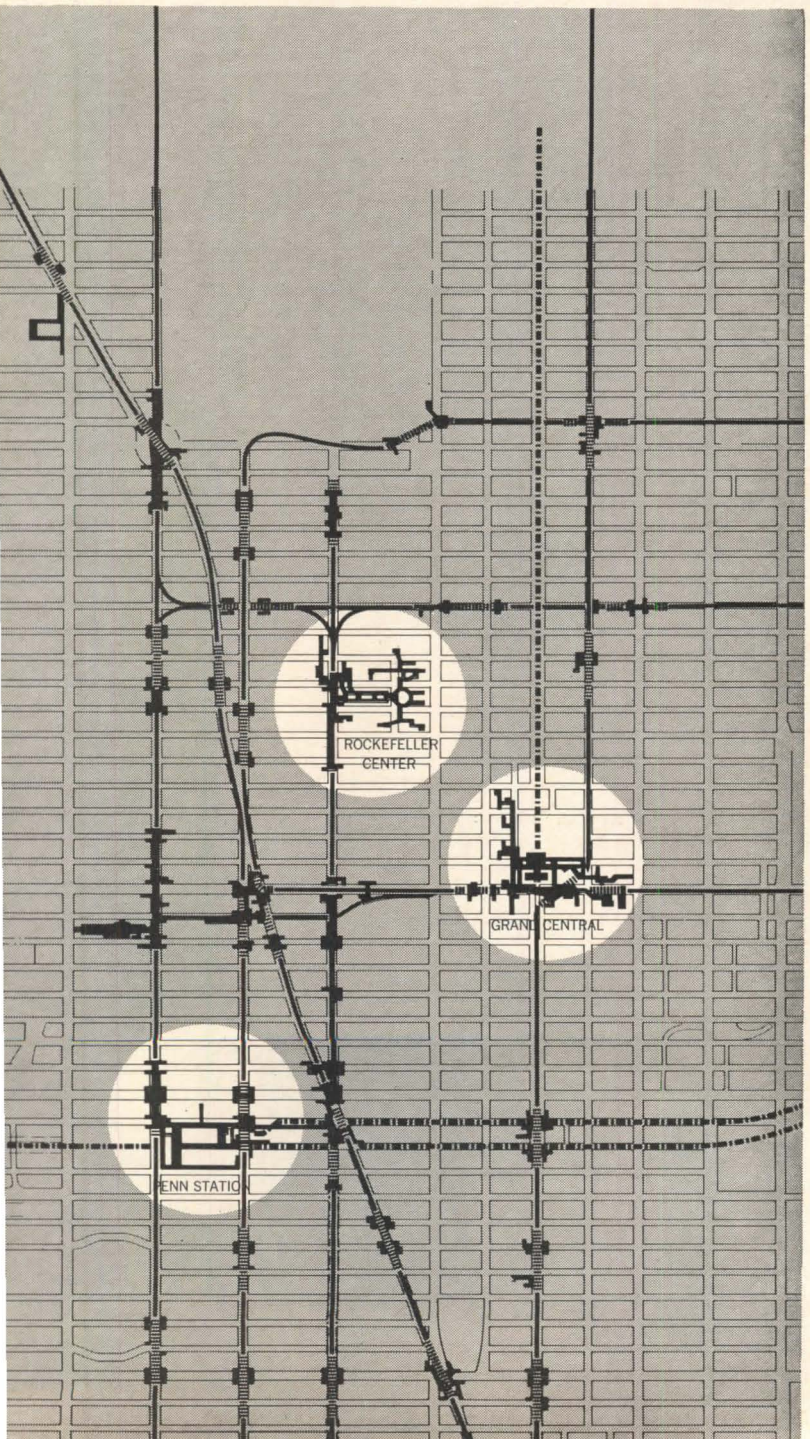
But the visual function of the Access Tree is as important as its circulatory function. The device prevents what RPA calls "Slab City"—the endless repetition of the typical postwar office building—a name that sounds more for the dead than the living. The Access Tree, by making possible high buildings at transportation nodes, leaves valleys between, for visual coherence and comprehensibility to the city as a whole.

The high and low clusters of this urban design study are a major proposal of the report, prompted both by visual and functional reasons. Various activities (department stores, theaters) are not suitable for location in the high office clusters, the RPA believes. These should remain in low areas and be protected against obliteration.





The conceptual diagram of the CBD (below right) shows the nodes that are transit exchange points, and the crosstown corridors linking these points. The corollary of high office clusters at these exchange points (note the new West Side cluster proposed between 42nd and 50th Streets) is the creation of low clusters in the intervening areas, the contrast making for a visual "grasp" of the whole area and a sense of identity among its parts (opposite). The environment is conceived as a three-dimensional grid, based on the existing gridiron but responding far more to the safety and delight of pedestrians. There is an occasional diagonal too, mostly underground but possibly in midair, as a pedestrian way (perhaps with a minisystem) to solve what C. McKim Norton, president of the RPA, calls the "midtown wiggle"—the need to make a diagonal journey through a system that is basically right-angled.



The RPA makes numerous recommendations for implementation, stressing the need for a CBD plan.

The RPA illustrates the application of the Access Tree principle to the intersection of Sixth Avenue and 42nd Street (opposite). Valuable opportunities have been lost during the past year alone—the new building replacing the old Met, for instance, and the World Trade Center, have thick basement walls separating their sites from the adjacent subways. The extent of Midtown's underground system is surprising (bottom left). This map is a first-of-its-kind compilation of the extensive network, and a rare subway map that relates to any system outside itself. Photo, top left: a shopping promenade under Place Ville Marie, Montreal.

FACTS AND FIGURES

Urban Design, Manhattan: Central Business District, a report for the Second Regional Plan, by the Regional Plan Association; under the direction of Rai Y. Okamoto, urban design consultant, with Frank E. Williams, principal urban designer, and Klaus Huboi, urban designer; assisted by Dietrich Kunckel and F. Carlisle Towery. An exhibit on this study is being sponsored by the Architectural League of New York, to be presented February 21–March 15, 1968, at the League. PHOTOGRAPHS: Jeremiah O. Bragstad

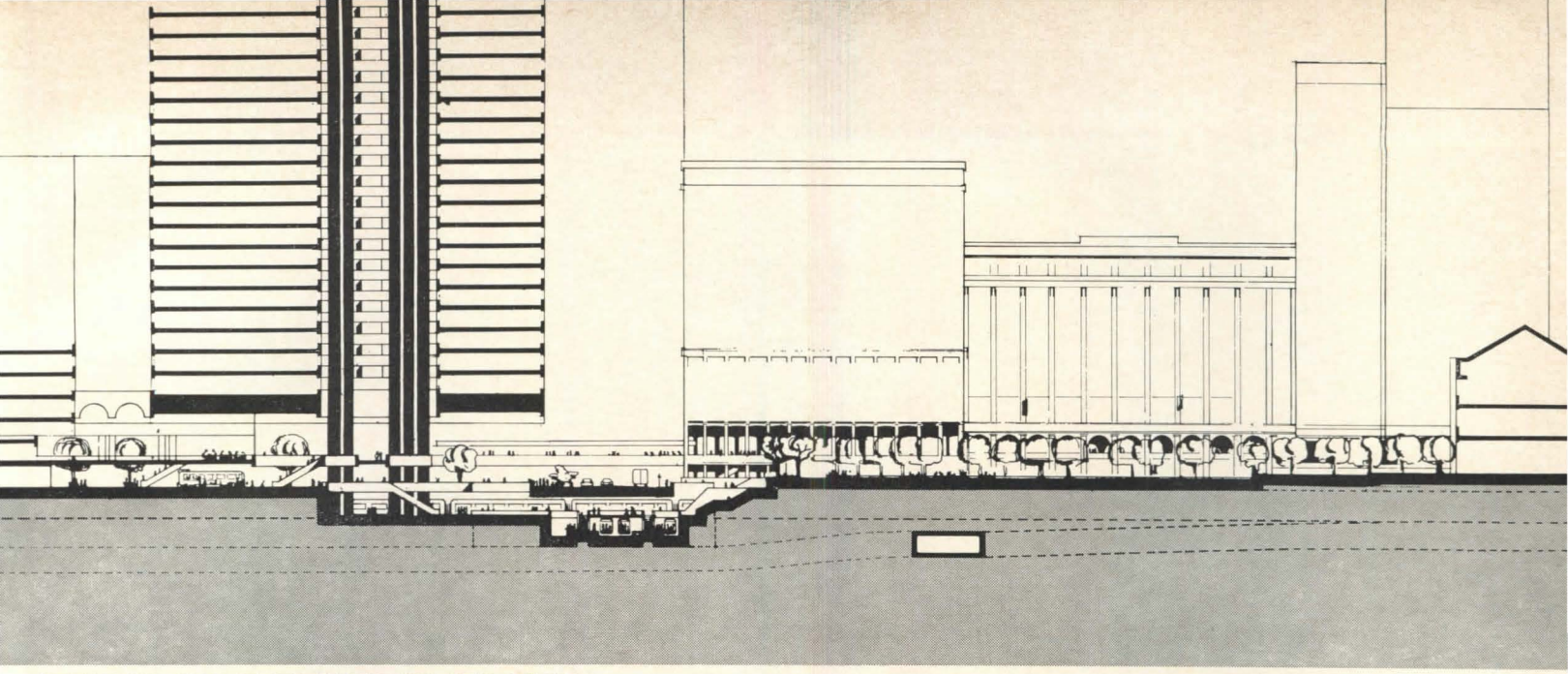
Can the Access Tree take root in today's legal and jurisdictional framework? The precedent is there, argues the RPA; if movement of sewage gets the attention it does, why not movement of people? If government lays out streets and highways for future development, why not pedestrian paths?

What is needed, says the RPA, is a new public-private partnership. Perhaps a municipal development corporation should undertake development of the air space over transit points, or should promote private development conforming to performance standards.

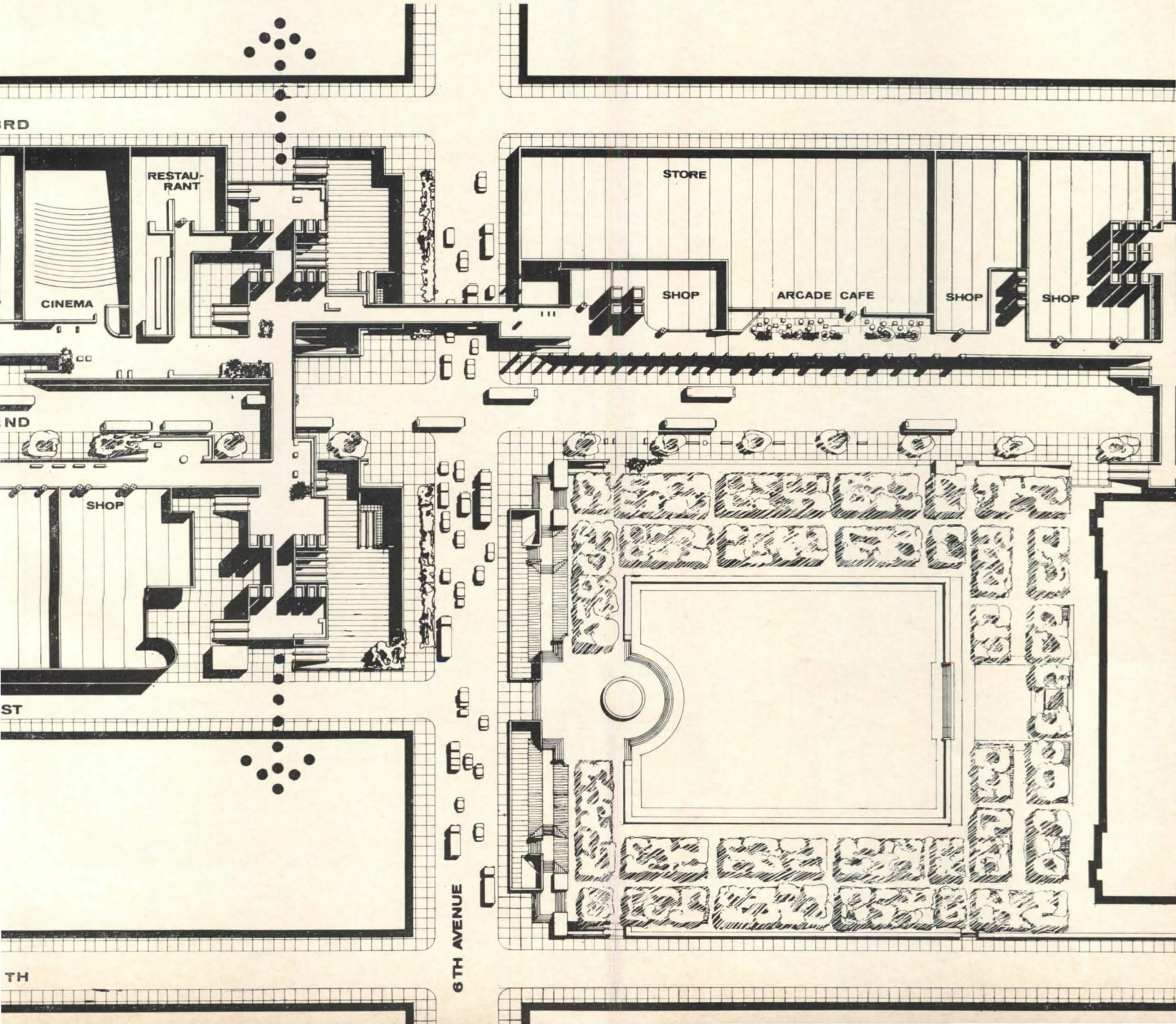
It is up to the city—now—to guide new growth. New tools for land acquisition are required. A change in zoning is implicit. Floor area ratios and other bulk controls should be flexible, but determined primarily by access capacity. New incentives are necessary, comparable to the FAR bonus the city has just enacted for the theater district to encourage the inclusion of theaters in new highrise office buildings.

Above all, planning thinking must penetrate the street to the crucial underground, and builders must be made to show that they relate to transit.

What is most needed, says the RPA, is a permanent CBD planning group (in an action-oriented municipal department), developing a plan with the full involvement of the public that is necessary for ultimate acceptance. The present urban design study is not a plan as much as a *way* to plan. Its message to the city administration and the business leadership, however, is clear: the existing situation needs improvement, and new growth needs accommodation. Urban designers cannot continue composing static relationships between building and building, building and site. "A product attitude prevails," says Rai Y. Okamoto, "in a situation where process is the essential mode of behavior." This study sees the CBD instead as an "organic whole of interrelated activities, spaces, paths, controls, and services."



SECTION AND PLAN AT 6TH AVENUE AND 42ND STREET



SUBWAYS NEED NOT BE SEWERS

One reason so many Americans spurn mass transit may be that U.S. subways are the ugliest in the world. Here are some new subway systems from abroad—Milan on these two pages, and Montreal on the next—that demonstrate that subways need not be sewers.

The Milan subway is small—four lines, eventually, with a total of a couple of dozen stations—but it is exquisite. The idea that a city bureaucracy would hire architects of the quality of Franco Albini and Franca Helg to design its subway stations, signs, typography, etc., will seem highly unlikely to anyone familiar with the American urban scene. Yet this is precisely what happened in Milan—and with the results visible here. Moreover, the designers were not too proud to borrow proven devices from elsewhere: the arrows inside circles were first used at London Airport; they work very well, because the basic shape of the symbol can be retained, while the arrow can be swiveled to point in the desired direction. The graphics are by Bob Noorda.

Photographs by Carlo Cisventi and Foto Masera.

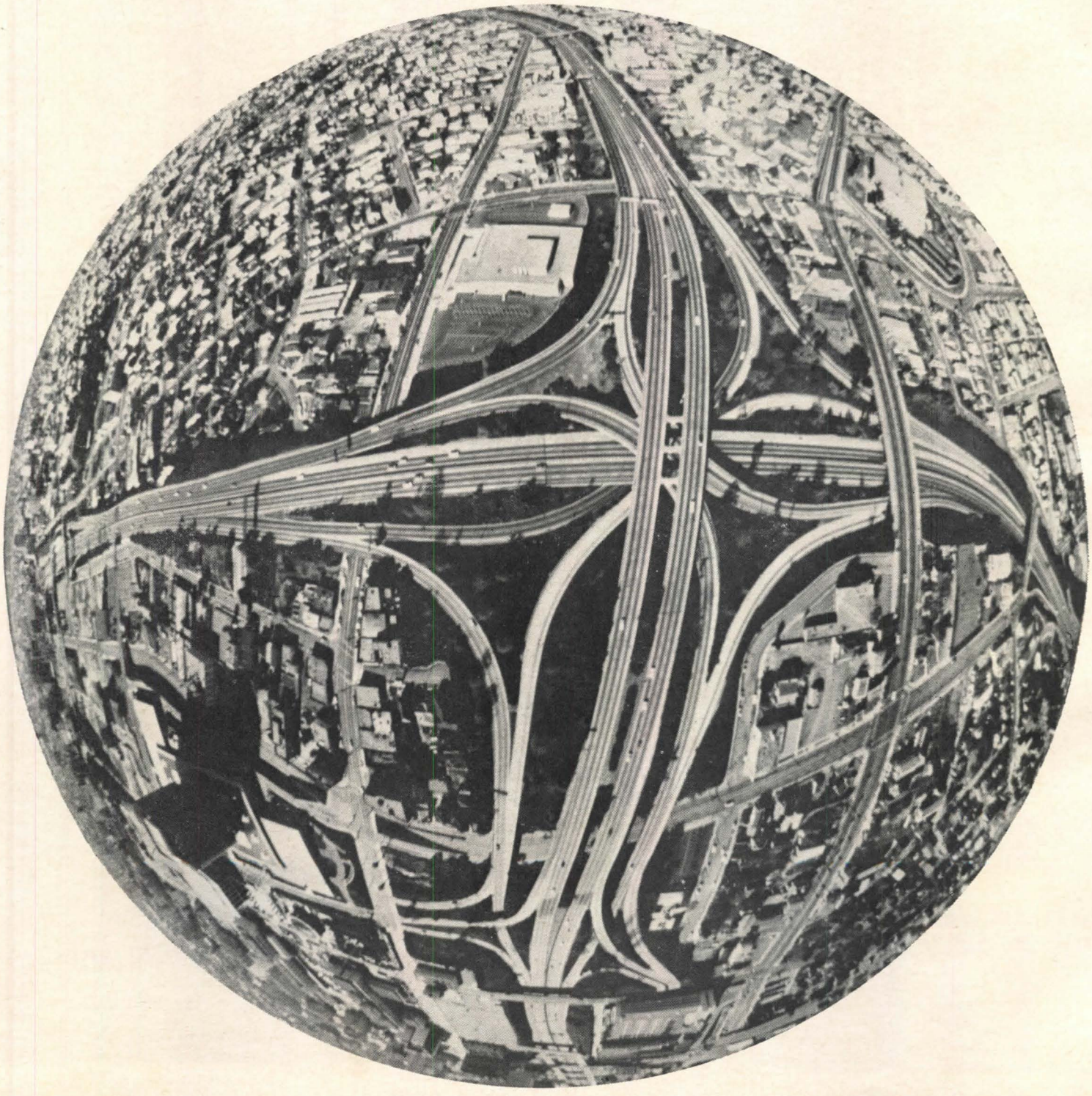

USCITA

Much has been said and written about Montreal's new Metro, which is very handsome, though not as uniformly successful as Milan's. Reason: Montreal, following some U.S. practice, farmed out the design of different stations to different architects, with the result that some stations are breathtakingly beautiful, and others are banal. The most breathtaking of all is Place Bonaventure, located under the vast merchandise mart of the same name (see our Sept. '66 issue), and the pictures at right show some of it: great vaults reminiscent of Piranesi, washes of light largely from concealed sources, handsome finishes and smooth details. The station was designed by Affleck, Desbarats, Dimakopoulos, Lebensold & Sise, who were also the architects for the Place Bonaventure building above the station. Typography and graphics in Montreal's metro system, incidentally, are similar to those employed in Milan, though not quite as simple and, hence, not quite as effective. Still, it's the best subway in North America, and the one to which all others will, henceforth, have to measure up.

Photographs by George Cserna.

THE FREEWAY VERSUS THE CITY

BY PRISCILLA DUNHILL



Ever since the late '40s, when the construction of U. S. 40 divorced Reno from its beautiful and torrential Truckee River, U. S. cities have decried their dismemberment by freeways. Today there are no less than 25 cities desperate to prevent unwanted freeways.

Cleveland and San Antonio are fighting to save their major metropolitan parks. Housewives in Cambridge, Mass., have chained themselves to the stately sycamores bordering the Charles River to protest a highway that threatens to topple the 50-year-old trees. In Joliet, Ill., an irate citizen has taken potshots out his window at a highway surveyor on his property.

Staten Island's only remaining greenbelt; Baltimore's waterfront, where the great Yankee clipper ships were built; New York's Lower Manhattan area; Boston's historic Faneuil Hall—all have been humbled or threatened by a freeway. Hardly a major U. S. city has escaped the casualty list.

The situation has produced an impasse: only half of the scheduled 5,000 urban miles of the interstate system have been built. This has so alarmed the Senate Public Works Subcommittee on Roads that, for the first time since the inception of the Federal Interstate Highway Program in 1956, it opened hearings in December to find out why. As Committee Chairman Jennings Randolph (Dem., W. Va.) asked: "Why are highways sometimes characterized as assassins?"

To Federal and state highwaymen, whose job it is to build more and more highways as long as the money holds out, the urban standstill is an intolerable situation. As a result, they have begun to offer concessions to defiant cities—concessions which are bound to result in better urban freeways than otherwise might have been. But two major questions remain: will the concessions be good enough; and will there be sufficient funds to permit the kind of planning and design that will turn freeways into a constructive force in urban life?

Since all U. S. interstate highways are Federally financed (cost is split with states on a 90-10 ratio), it is the Federal Government by and large which will answer these questions. And in the Federal Government there are three men, more than any others, who will determine the course of highways across cities: Charles Haar, assistant secretary of the Department of Housing and Urban Development; Alan S. Boyd, secretary of the Department of Transportation; and Lowell K. Bridwell, Federal highway administrator.

Of the three, Haar, a former Harvard law professor, is the most intellectual and the most sensitive in his approach to the city as a living microcosm of society. But he has the least power: $144 million in urban transportation research funds, and no direct control over the highway program. Alan Boyd is a king of confidence—affable, gets along well with Congress—and is the most powerful of the three. But urban highways are only one of his many pressing transportation concerns.

By far the most important man in urban highways is 43-year-old Lowell Bridwell who, as Federal highway administrator, heads the powerful Bureau of Public Roads (BPR). When Bridwell took office last April, the battle-weary cities were noncommital about the appointment. While there was nothing in his qualifications to encourage the cities (he was a newspaperman), there was nothing to discourage them either. At least he was not a highway engineer, as was his predecessor, and he had a reputation for being open-minded.

Since taking office, Bridwell's early caution has given way to a kind of confidence, almost ebullience, in his job of adjudicating, manipulating, coercing, and cajoling cities and state highway departments into some kind of working *entente*. Most important, he is becoming something of an urbanist in his own right.

Bridwell personally and painstakingly pierced together the current solution being offered for New Orleans' embattled Riverfront Expressway (page 74 and March '67 issue). His stance in other cases—the Century Freeway in Los Angeles, his offer to underwrite the $4.8 million for Baltimore's Urban Design Team—has left the impression that he and BPR are often more concerned about a highway's impact on a community than is the community itself.

Bridwell has repeatedly stressed two tools for the deliverance of cities from ill-conceived highways: implementation of the joint development concept and the Federal Highway Act of 1962. The joint development concept, in effect, gives BPR the right to acquire wider corridors of land than are needed for a highway and sell them at cost to a city. A city could develop these corridors, plus air rights over the highway, to construct schools, parks, shops, housing, and the like. The Federal Highway Act requires that BPR be assured, before releasing highway funds to any city of more than 50,000 population, that comprehensive and continuing transportation studies have been undertaken.

Neither of the two concepts is new. Bridwell is simply making greater use of them than did his uninspired predecessor, Engineer Rex M. Whitton, who did little more than toss the ideas into an occasional speech to pacify highway antagonists.

A third device, the Urban Design Team approach, which grew out of Baltimore's excruciating 20-year impasse with Interstate 95, is now being pushed with equal vigor by BPR. This multidisciplinary approach, which is being tried initially in Baltimore and Chicago, is potentially the most valuable of the three, but it raises a crucial question that has yet to be answered by BPR: Who will make the ultimate decisions on the recommendations of such teams? At present, each city decides for itself. In Baltimore, for example, it is a committee of the mayor, the state highway commissioner and his chief counsel, and the city director of public works.

The following interview with Bridwell, conducted in New York and Washington, offers a kind of dialogue on the shape of cities to come.

Q. Mr. Bridwell, after ten months' experience with the joint development concept, how would you assess its strengths and weaknesses?

A. Joint development offers the greatest hope in the Federal highway program to relieve cities of their transportation problems. It is the best potential tool I know of for encouraging creative urban design. It gives cities the assurance that they have money behind them—a single catalytic agent, a pump-primer. The biggest problem, of course, is to implement a design plan that can satisfy a multitude of private and institutional interests within a city. Some specific examples? There are Baltimore and Chicago. Then Brooklyn, Seattle, New Orleans, and Washington, D.C., are all considering it. Watts is one of the most exciting. As you probably know, California has proposed adding the Century Freeway in Los Angeles to the interstate system. While the segments of real estate burnt out during the riots in 1966 are not along the proposed freeway, we have told California that any consideration of adding the freeway would have to involve both joint development and public transportation in Watts, and other areas.

Q. Doesn't the joint development concept impose a linear pattern on cities?

A. Not necessarily. A city can add its own parcels of land to a highway strip, and develop any land configuration it wants. I do not envision a continuous strip development extending for blocks, but rather nodes or cluster communities like beads on a string. A continuous strip development for any substantial distance is probably not realistic anyway.

Q. What do you mean, it is not realistic?

A. Generally speaking the cost of air-rights development cannot exceed the cost of its non-air-

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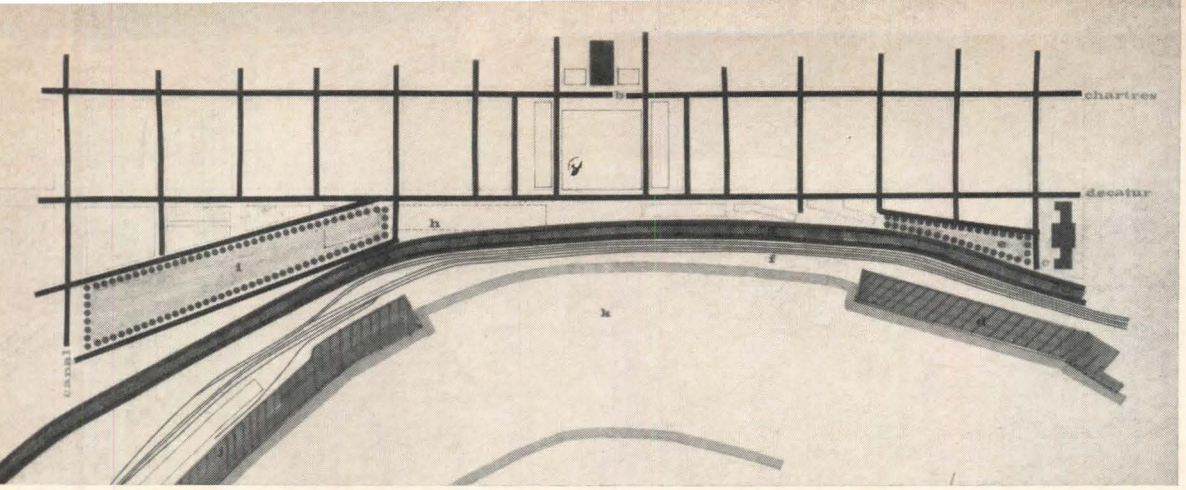
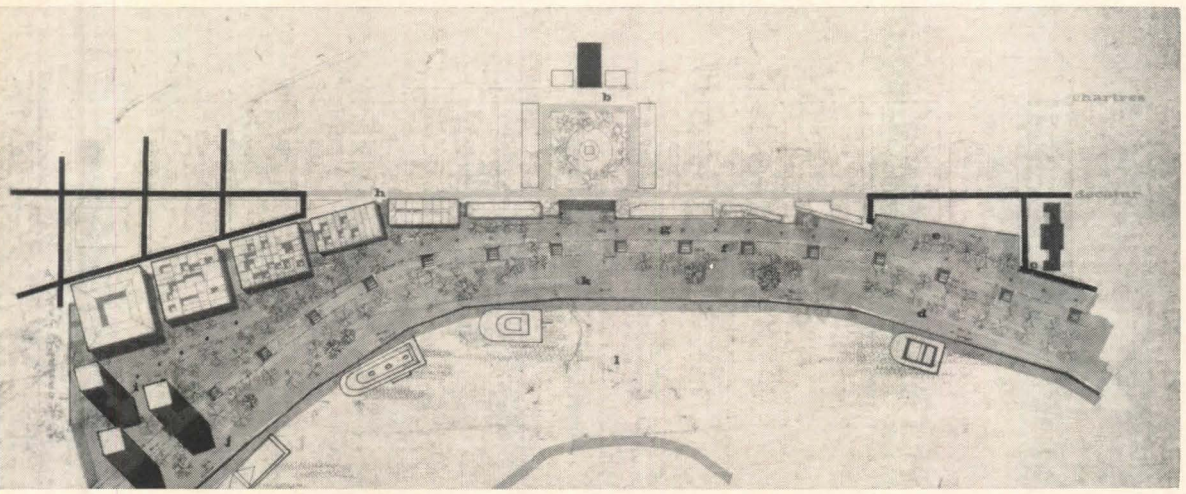
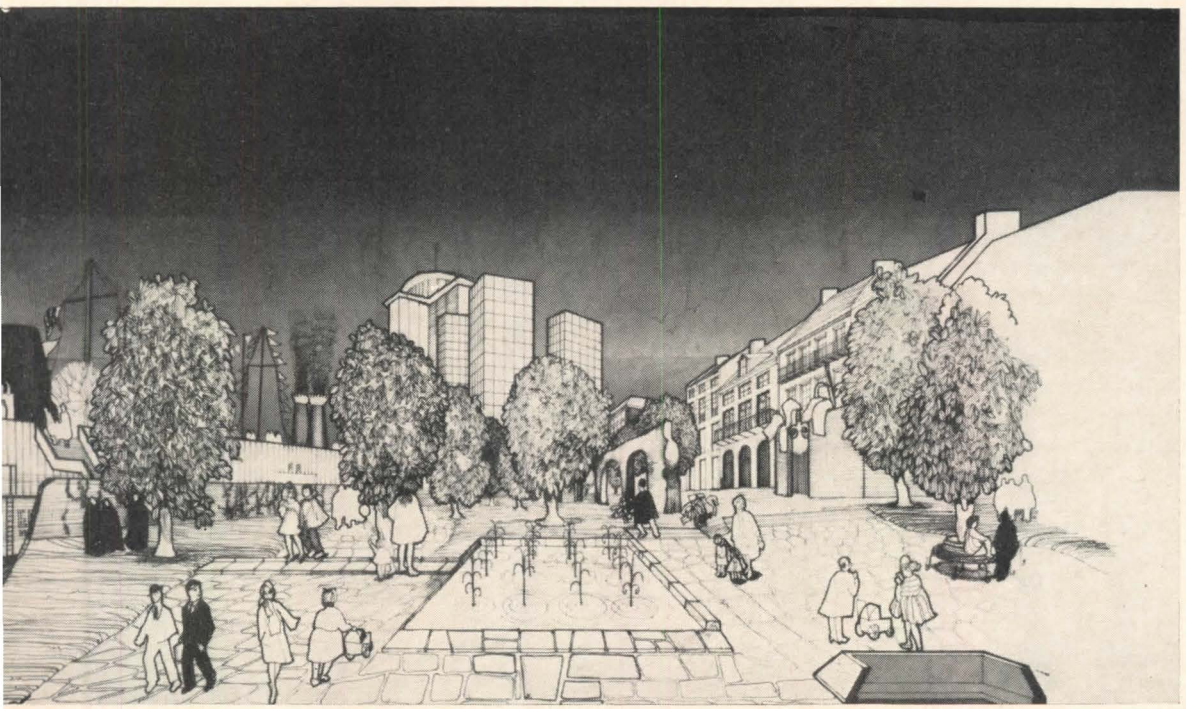
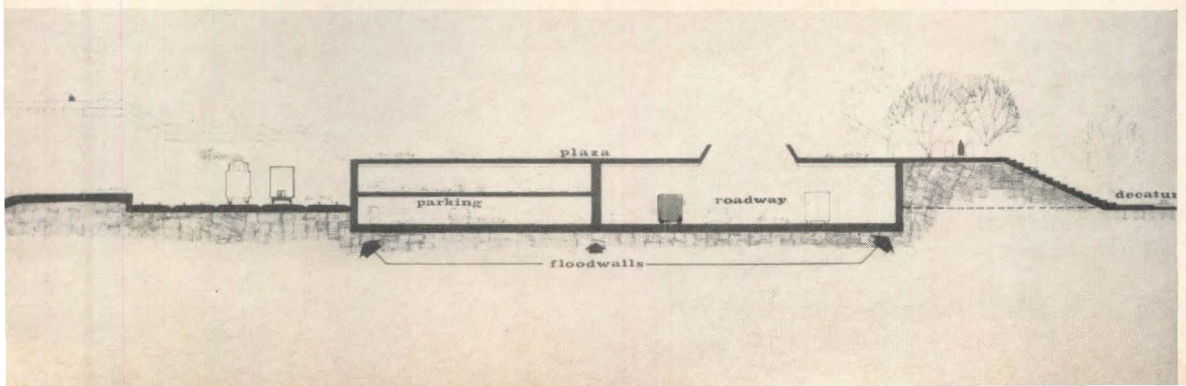
Mrs. Dunhill is a former Newsweek writer and managing editor of Interiors. She has contributed frequently to the Forum in the past.









As an alternative to New Orleans' proposed Riverfront Expressway, which would slice between the historic Vieux Carre and the Mississippi River at a height of 30 ft. (*plan at top*), Research Associates of New Orleans has developed a scheme that calls for depressing the freeway and building over it a pedestrian plaza joining Jackson Square with the riverfront. Research Associates, a planning and architectural firm, prepared the scheme to show how a major traffic artery along the river could be a contributive force for revitalizing the area. The scheme is similar to one put forth by Federal Highway Administrator Lowell K. Bridwell, though Bridwell talks of a grade-level, rather than a depressed, solution.

rights neighbor. For example, a developer can acquire air-rights "land" at a lesser cost than surrounding land, but his building costs will be more. In the end, his rents must be competitive on the open market with those in non-air-rights developments. Of course, there can be exceptions to that rule, when a community deems it important enough. The rule also *does not* apply, of course, for public buildings such as schools and libraries which don't pay taxes anyway. An economist would never let you call such land tax-free, but for all intents and purposes, for a city it is. In fact, the concept of joint development was born when Congress approved the sale of air rights over highways in 1962.

Q. What is HUD's reaction to the joint development concept?

A. I think they are lukewarm about it. Ask them. I think you will get a noncommittal answer. It is a matter of concern to them that highway engineers would have too much control over planning air-rights development.

In an interview in Washington, Assistant Secretary Haar replied: "The joint development concept may answer some questions, but it can be oversold. Look at the housing development over the George Washington Bridge in New York City. It is full of fumes and noise and simply isn't a very pleasant place to live. The only way joint development can work is to consider it case by case. In some areas it will work, in others it will not."

Q. *What about* New Orleans? Will the joint development concept be tried with the Riverfront Expressway?

A. New Orleans is a different matter altogether. There is no unity of feeling there, even as to the corridor, or whether or not a highway is even desirable. I cannot *dictate* to New Orleans, or any city, no matter how bad I think their planning is, that they should use joint development or an urban design team. They have to come to us and want it.

Now in New Orleans I am not at all persuaded by their arguments of preserving the educational and cultural values of the Vieux Carré. If they permit sleazy strip-joints on Bourbon Street and put up giant hotels in the heart of the Quarter, I can't understand why they're so worried about highway esthetics.

Q. But that depends on how you interpret your leadership. Do you simply reflect the wishes of cities, or do you attempt to raise their sights?

A. Leadership must come locally. I am not in the business of dictating to cities what they should be. Our job is to raise questions. I can help a city identify its goals, but if a city wants a patently bad highway that makes a mockery of urban planning, that's probably what they are going to get. Of course, I can always refuse, but the political pressure on me is enormous. Every time I say no to a highway, you can bet there will be a governor, a senator, and some representatives on the phone in 45 minutes.

Q. Then why did you decide to do something about New Orleans?

A. After the meeting in April with a group of prominent local people, I told the Louisiana State Highway engineers to go back and evaluate alternatives, which they did. They said, 'No, we can't move the highway north, Jax Brewery is there. No, we can't go south, there are railroad tracks and the river there. No, we can't move a levee.'

In the meantime, we—BPR—began making some phone calls of our own and collecting scraps of information. We called the railroads and asked them whether they would consider track sharing operations provided we paid for the change. Then we called the New Orleans Levee Board to find out how much annual slippage of soil there is into the Mississippi. By the elevation, it looked as if it might be considerable; and we found, indeed, that it is great. So we asked the Levee Board, how would you like a permanent stabilizer for your levee—for free? They are still skeptical about the idea. By then, we found that a freeway moved 50 ft. toward the river—not elevated but on ground level—would cost only an additional $7 million. So in New Orleans it was engineers saying no no no, while I said yes yes yes.

Let me digress for a moment on what kind of creature an engineer is. He is a physical scientist, schooled in orderly answers, exactitude, precision, and conservatism. He has become thoroughly cost-conscious by training and experience. Time after time an engineer will tell me, 'It can't be done.' My standard answer is, 'I am very surprised. I thought engineers could do anything. Go back and look again.'

Now to get back to New Orleans and the exciting part. The highway at ground level could be built on pillars like a bridge and a pedestrian plaza built over the whole shebang. The sea wall in front of Jackson Square would remain where it is now, and the Square would gain an access to the Mississippi. Now I will use this [the new highway plan] to bargain with the city, and this is where joint development *could* come in. Clear out all the marginal buildings and warehouses that lie between Jackson Square and Canal Street along the waterfront and make a legal guarantee that there will be no automobiles on certain streets in the Quarter, and no new motels. They can be built on the new cleared land.

Q. How do you have the power to make such an ultimatum to a city?

A. I take exception to your word 'ultimatum'. I call it the art of gentle persuasion. New Orleans need do nothing. But then BPR need not approve the Riverfront Expressway either.

Q. If the Federal Government provides the money, and the states provide the design and route of a highway, what can a city really do to stop a highway it doesn't want?

A. I repeat that we have yet to give a city a highway in defiance of its wishes, and you cannot show me one. There are many devices a city can adopt to keep out a highway—certain legal actions such as refusing to close local city streets. Yes, these are last-ditch, stop-gap devices, but let me explain the overall picture and why I think it is changing.

The highways cities are getting today are the product of pre-1962 planning. Up until the early '60s a city automatically assumed that its transportation needs would be met by private auto and more highways; the city had no resources with which to conduct independent studies and research as a means of examining alternatives. The 1962 legislation changed that. It provided in BPR's budget that 1½ per cent of all funds would go for research. Now that does not mean I can hand over the entire amount to cities, but we can insist on land use studies, the basis of city planning. Every land use decrees a certain kind of transportation. If a city wants rancho sprawl, that means one kind—probably automobiles. If it wants a strong central core, that means mass transit of some kind. But the land use plan must come from the city itself, and the state highway department takes that land use plan to begin planning highways.

Q. How does a city get rid of a highway that was put on the map ten years ago? Seattle, San Antonio, Milwaukee, Brooklyn, Baltimore, Staten Island—to name a few.

A. First there must be a considerable, unified local stir before a state highway department will withdraw their highway and start again. This means resubmitting the highway plan to the land use planning requirement. The Highway Planning Act of 1962 is not retroactive, you know. Once a highway is resubmitted, it means reevaluating everything, maybe setting up new studies. Meantime, the money allotted for the highway reverts to the state for reapportionment. Most cities do not want to hazard the delay of starting all over again with highway location. It might hold a highway up ten years.

Q. What is the way out of the dilemma for cities?

A. Well, one answer is the urban design team concept. You are familiar with the one in Baltimore, where we are paying the full cost—$4.8 million for a planning team of engineers, architects urban specialists of all kinds, to recommend both design and location of the highway, although the corridor cannot be changed. [A corridor can be up to half a mile wide on a map, and somewhere within that, the highway will eventually be located. BPR can legally pay the full amount of a study once the corridor has been determined, because then a study is considered a pre-engineering cost.] There is an urban design team forming in Chicago and undoubtedly there will be others.

Q. But I understand the Baltimore team bogged down in quarrels over who gets the biggest cut of money and control when it was being formed. How does BPR propose to cope with such intramural fighting?

A. Whom were you talking to, Nat Owings? Yes, in the beginning things were deteriorating into a split between engineers and architects. We had to make some changes and negotiate a settlement. The entire project is dead in the water if this thing polarizes into a power struggle between disciplines. It is not a good way to build highways, believe me. And as long as people choose up sides—your magazine included—things will only get worse. BPR does not propose to cope with intramural fighting; each city with a design team will have to decide for itself who will have the power of decision.

Q. Now that you are financing urban design teams and stressing land use plans, will you add planners and architects to your own staff at BPR?

A. Yes. But not in the immediate future.

Q. How many architects and city planners are there on your staff now? How many engineers?

A. No architects, about 1,800 engineers. We have 25 landscape architects. No city planners as such, but engineers have become specialists in different aspects of city planning.

Q. What changes will you recommend for the post-1975 Highway Program when you appear before the Randolph Subcommittee on Public Roads?

A. Authority to build parking facilities at interchanges or transfer points, to keep cars out of center city. I now have no authority to move beyond the right-of-way. Our problem in urban highways is peak congestion. If an engineer isn't concerned with that, he is out of his mind. His product falls apart at peak time, so it doesn't really matter if it works the rest of the time.

I have said this again and again to engineers: 'Get with it on urban planning. Provide for alternatives to the single private car. Either you design exclusive bus lanes and buses with comfort and convenience, or you are going to end up being rural highway engineers and nothing more.' We need authority to replace land-in-kind. If we take a park, we should replace it with a park. And we need far more liberalized relocation assistance.

Q. You mean you won't need additional money to build better urban highways. Won't tunneling, burying highways behind embankments of trees, or cantilevering out over highways cost more money?

A. Of course urban highways are going to cost more. And in my opinion they are worth it. I am confident that Congress will come up with the money once they see the validity of it.

Taken at its face value, Bridwell's expressed faith in Congress makes him something of a Pollyanna. Congress' current tight-fisted, antiurban mood hardly inspires confidence that it will recognize, much less act upon, the fact that the real cost of an urban highway goes far beyond its land acquisition, design, and construction.

Who, if not the Federal Government, is to pay for terminal parking at the city's edge, for off-street parking in town, for widening streets that will receive traffic disgorging from expressways? Who pays when land for highways is removed from the city tax rolls? When land is devalued because it borders a freeway?

If automobiles, as Bridwell says, are an irrevocable fact of life for U. S. cities for the forseeable future, who will finance studies of how to mask highway noises? Or studies of how to filter carbon monoxide and carcinogens given off by exhaust fumes? Who is to pay for environmental studies of locating housing, schools, parks, and shops around an urban highway? Only when these costs are included in a cost analysis, can the true price of a highway be computed.

A current and painful case history of the inadequacy of funding is New York's Lower Manhattan Expressway, an elevated highway put on the maps 25 years ago. For 25 years the residents of Broome Street—the area most affected—have lived under a cloud of uncertainty. Would the highway be built? When and where?

When John Lindsay, New York's first Republican mayor in 30 years, took office, he scrapped the elevated highway and ordered a tunneled one, as he had said he would in his campaign speeches. A tunnel, Lindsay later learned, was impossible. It would cost $100 million for only four lanes, which could not begin to accommodate the traffic. A joint task force of city and state highway engineers then came up with a compromise: a depressed 10-lane highway costing $150 million. By using BPR's joint development concept, the highway could have a dual use—a park, and two rentable levels for offices or schools integrated into the highway structure (opposite).

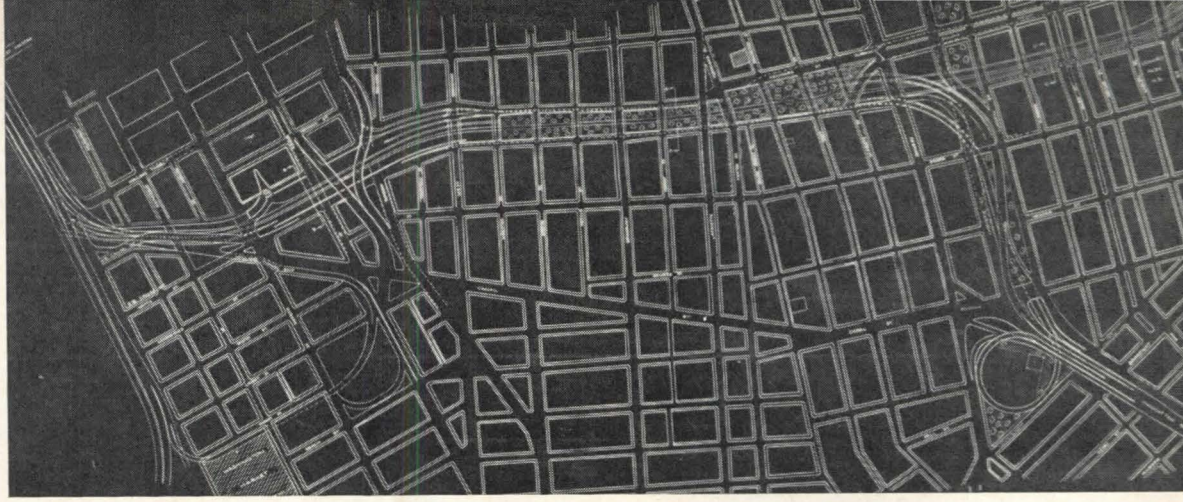
The engineers were the first to concede that the dual use areas had major flaws. Who wants to sit in a park 140 ft. wide, when 60 ft. are given over to huge ventilator shafts spewing up exhaust fumes? Who would want to rent space without natural light or air? And the highway, no matter how it is sliced, will still make a 175-ft. path through New York's ancient grid plan with nothing of sufficient monumentality in the surrounding environment to match the gargantuan scale of the highway.

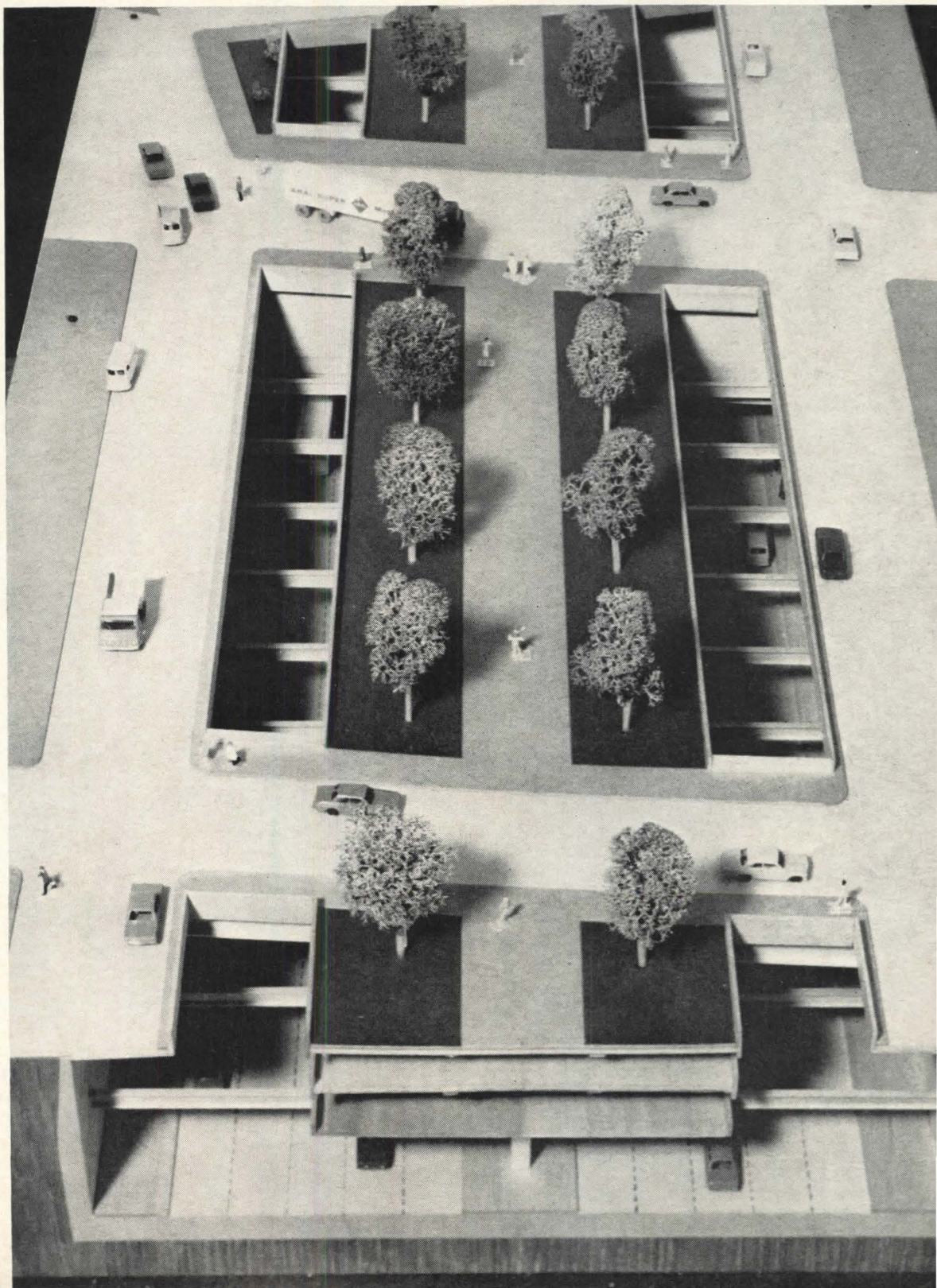
"But we are not in the business of designing housing and parks," stated George C. Toth, a New York City highway engineer. "We can only suggest the concept of dual use. We need architects and city planners to develop the specifics. But there is no money to develop specifics. There is not even a city plan for this part of New York. We had to design this highway in a vacuum."

At a meeting in December, representatives from city, state and Federal agencies were invited to view the model of the proposed Lower Manhattan Expressway, and suggest how their organizations might possibly utilize space in or around the highway. "HUD, BPR, the Department of the Interior, the City Board of Education—everybody was here," said Toth. "Everybody thought the concept was fine, but when it came time to put up money for further feasibility studies, nobody had a nickel to spend. The BPR representative was willing but powerless. He told us, 'Bridwell can make all the speeches he wants, but there is nothing in the current highway legislation to do anything but build highways. We cannot solve the ills of a city with highway funds'."

Here lies the real tragedy of highways: in a $150 million highway project there is not one planning penny available for a total environmental study—and the Lower Manhattan situation has its counterparts in cities throughout the country.

No doubt the post-1975 highway legislation, which is being framed now in Congress, will include, as concious public policy, the requirement that urban highways be located and designed to enrich the urban environment, rather than destroy it. But such a policy will be meaningless unless Congress is prepared to back its words with money.





To make the proposed depressed, ten-lane Lower Manhattan Expressway (plan above) more palatable to its opponents, New York City and State engineers have come up with a "dual-use" scheme calling for a grade-level linear park in the center of the freeway. Beneath the park would be two levels of space for offices, shops, schools, etc. (model photo). This center section would be flanked by open shafts 60 ft. wide, which would serve as ventilators for exhaust fumes from the freeway below.


PERMAPRINT

FORGOTTEN MAN IN THE CITY

The pedestrian might wish that he *were* forgotten—instead he is doused with carbon monoxide, honked at, herded, jostled, jangled and sometimes run over.

Computerized traffic control doesn't seem likely to save him. In Wichita Falls, Tex., location of the nation's most advanced system of traffic control, 54 intersections are linked to a digital computer that responds instantaneously to the changing volume of traffic. The results are enthusiastically reported: reduction in vehicle stops (8 per cent), average vehicle delays (18 per cent), and accidents (8.5 per cent). The improved speeds save motorists an estimated $1,500 in operating costs and 60 hours in travel time each day. No word about the man on foot.

Not everyone has forgotten the Forgotten Man. With the likely addition of a second deck to the world's longest suspension bridge (the Verrazano in New York, whose first deck does not allow pedestrians), the Sierra Club is suggesting that people demand from the Triborough Bridge & Tunnel Authority their rights as pedestrian-citizens.

An "Urban Promenade Network" for the "humanization of modern urban landscapes" has been proposed by the International Research Center for Urban Anthropology, a group based in West Germany. Among their studies for promenade spaces is an Anthropological Test Table, by which various factors—optical, acoustic, olfactory, tactile, and thermal—are keyed to numbers, and the total picture of any urban promenade can thus be described entirely by numbers. The notation system is suggested for communication without language difficulties, and for computerized choice of "promenade-worthy streets."

Throughout the world, pedestrian malls are proliferating, in cities large and small. In some cases vehicles are not completely excluded, as in Minneapolis' Nicollet Mall where buses still traverse the now narrowed road.

Increasingly there are more and more places where the pedestrian, the Forgotten Man, can forget his usual problems.

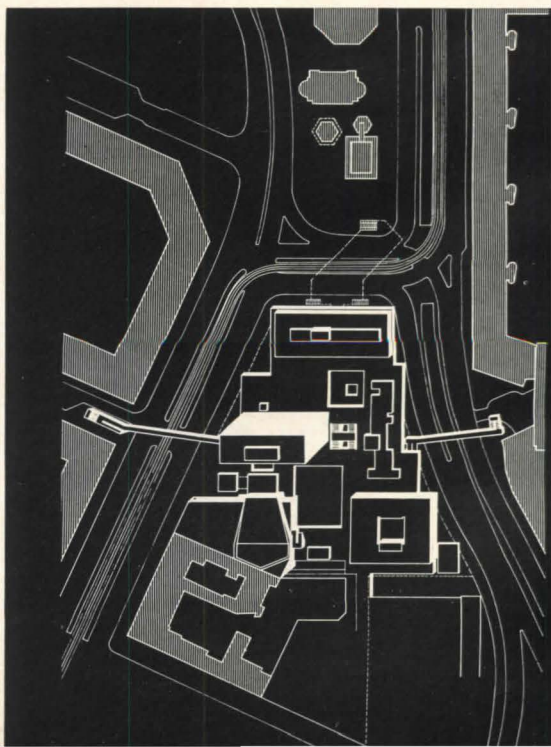
For example, a unique double-decker sidewalk has been built in Morristown, Tenn. (below).

The "Skymart" was paid for entirely by downtown merchants of this town of 30,000, taxing themselves $50 per frontage-foot for a system that runs 1,000 ft. down Main Street.

Increased rentals for the upper level are expected to return the $150,000 cost, and the upper-level sidewalk meanwhile provides a ready-made scaffold from which to rehabilitate the upper parts of these buildings. The canopy carries power and telephone lines (eliminating all overhead wires).

Although the double sidewalk is believed to be the first of its kind in the United States, its antecedent in Chester, England, goes back to medieval times. At dedication ceremonies in Morristown, there was no activity yet on the second level, but much interest in the display of antique and custom automobiles below.

Lo, the forgotten pedestrian, only dimly visible in the usual proposals for traffic improvement (left: street scene, New York City). Right: a new double-decker sidewalk, built along Main Street in Morristown, Tenn.
PHOTOGRAPH: (right) Chet Brogan.



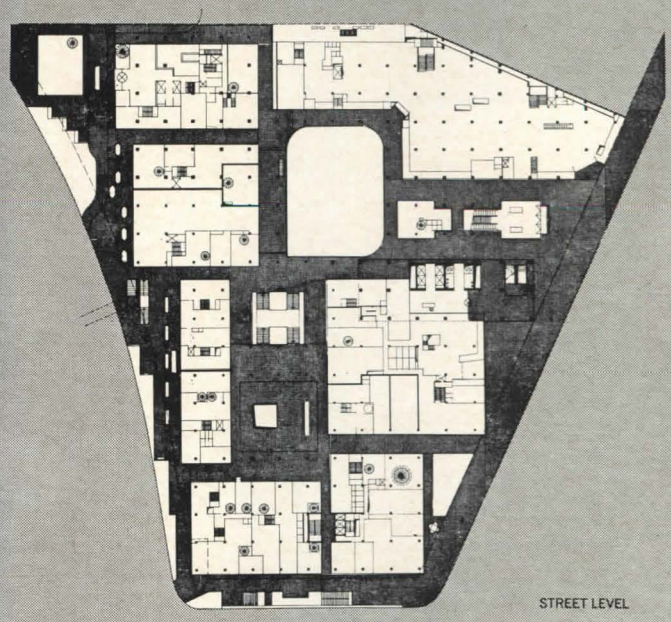
Pedestrian concourse spans two Berlin streets

In the heart of West Berlin, the new Europa Center is wedged in by broad avenues but is safely entered by pedestrians either above or below the traffic.

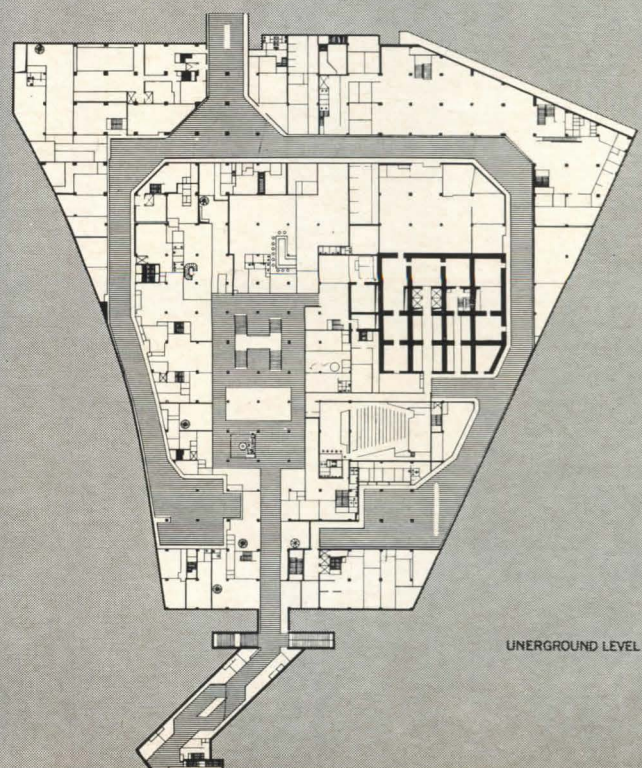
Where the site of this "miniature Rockefeller Center" comes to a blunt point, there is an underground passage lined with shops and ending inside the center in an expansive yard surrounded by more shops. From the yard one ascends to street level, either by stair or escalator (or inside any of several shops that run vertically through two or three levels). A flower mart and an ice-skating rink are among the more unusual attractions. There are also restaurants, bars, and night clubs in this part of the center, some with terraces overlooking the traffic and crowds on the streets that flank the center.

The upper level, looking down on all activity, is reached again by internal stairs, or by the two pedestrian bridges that span the flanking streets. The pedestrian bridges and the elevated shopping plaza together form a continuous pedestrian promenade 260 ft. long. Escalators are paired with stairs at the ends of the bridges, to bring the promenade within easy reach of any who find stairs burdensome. The center is unusual in providing extensive space for pedestrians in and around the shops (see plan, right center), and is noteworthy in giving aboveground access from the two avenues on either side (as well as underground access at the narrow end of the site), but it is especially generous in this provision of escalators, making the whole center easily accessible to those on foot.

The complex also includes an underground 1,500-car garage (located between the two boulevards at the broad end of the site), an underground route for service to the center, a hotel and 22-story office tower with a rooftop restaurant that looks out over the city skyline and traffic. Architects were Hentrich and Petschnigg; consultants were Architect Egon Eiermann, and Architect Werner Düttmann of the Berlin municipal planning department.

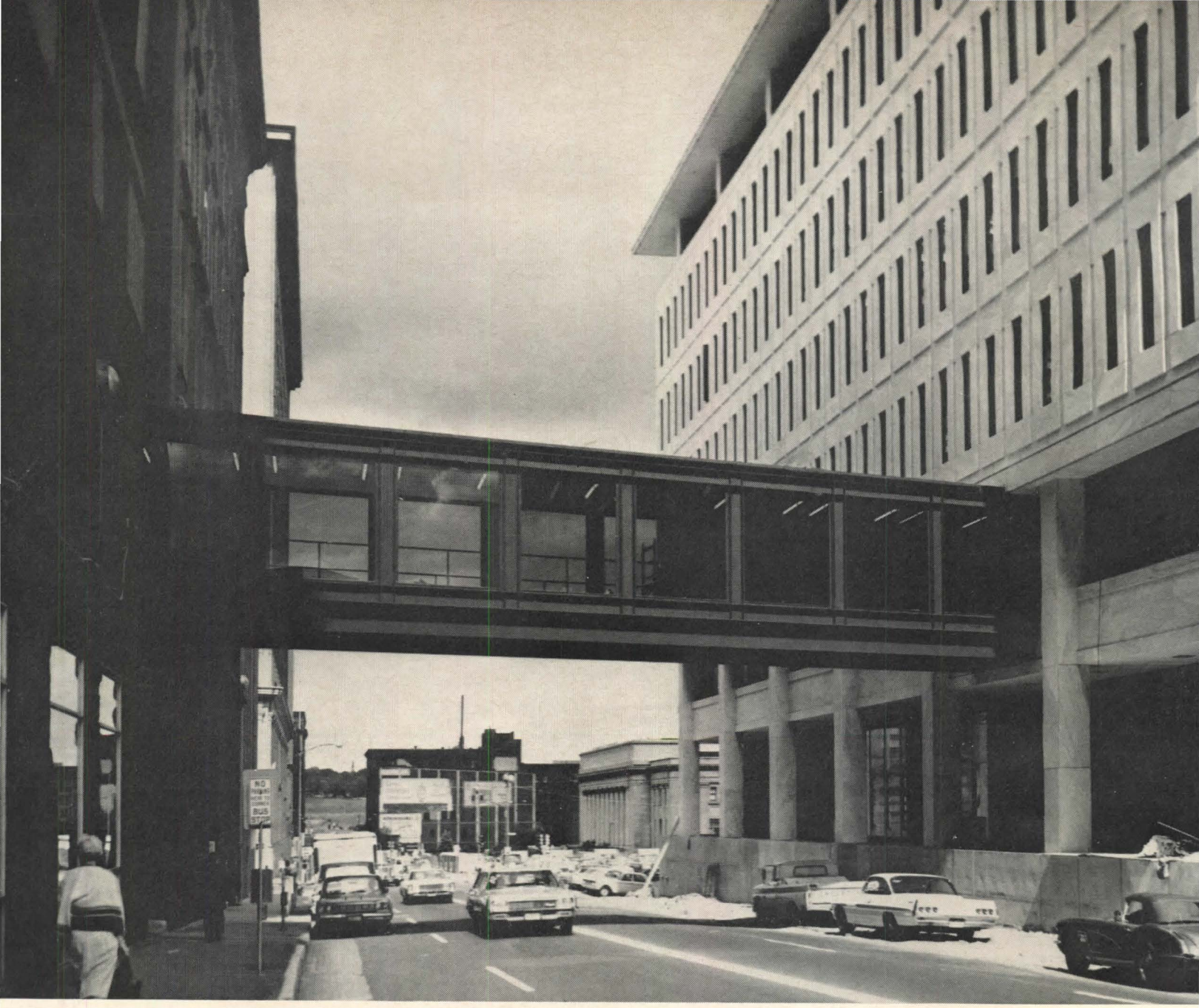


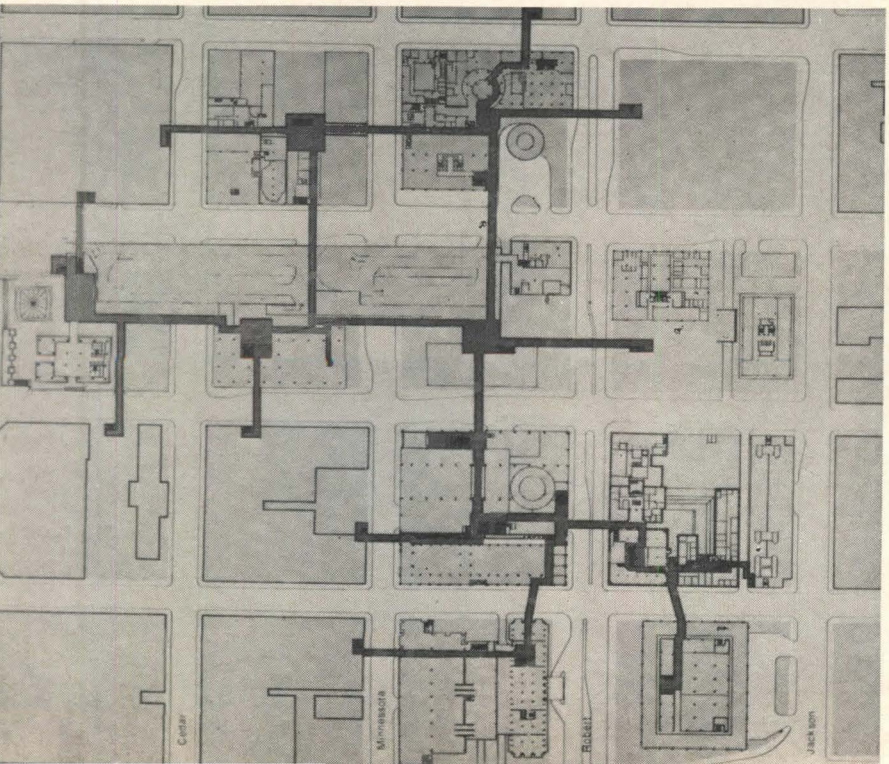
STREET LEVEL



UNDERGROUND LEVEL

New Europa Center in Berlin. Opposite: two pedestrian overpasses span the busy flanking streets (top); close-up of one overpass (bottom left). This page: the central shopping concourse, showing street level, upper level, and roof garden, with well that opens to underground shops (top). Europa Center's office tower is visible at rear. Plans are of the low portion of the center. At middle: the main floor (street level); at bottom: the underground level, showing service street at perimeter of shops. PHOTOGRAPHS: All, except bottom left: Rolf Koehler.

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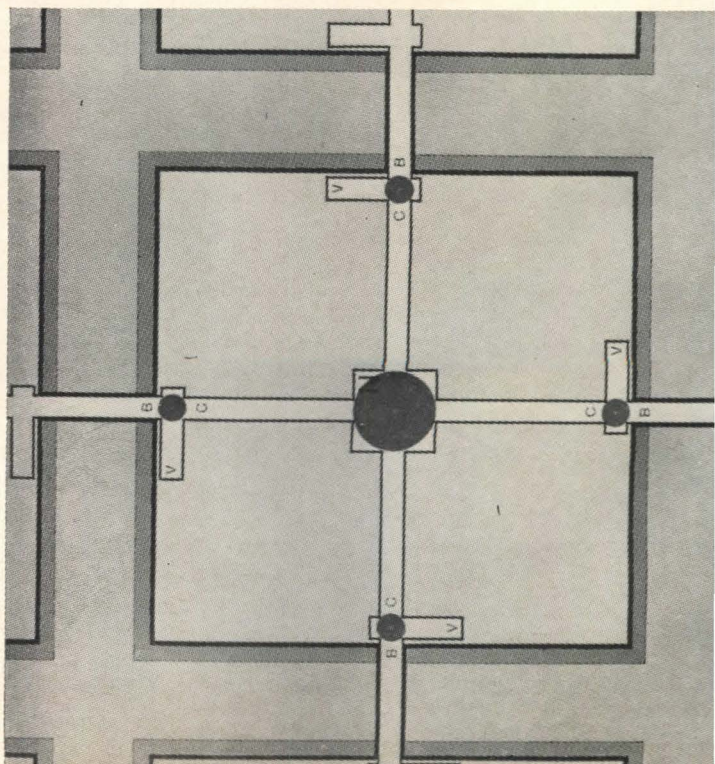
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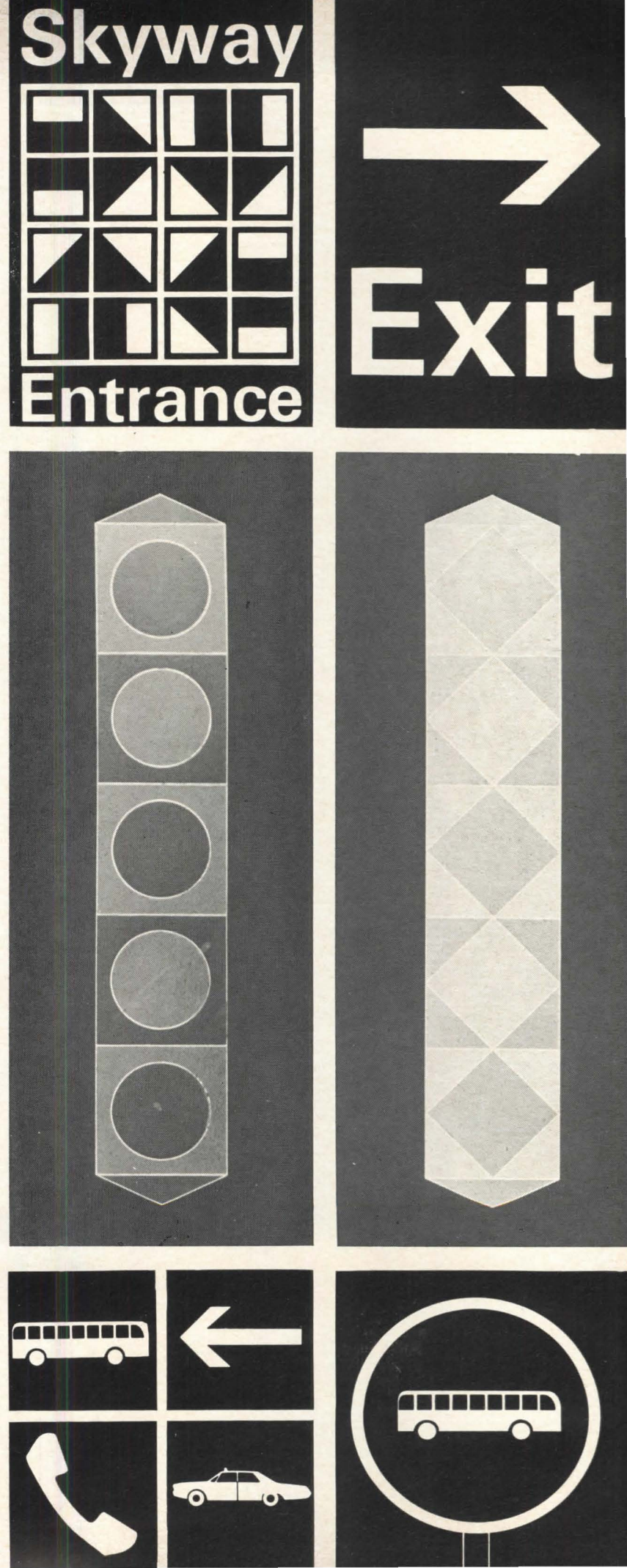
Renewal project brings second-story Skyway

The first pedestrian bridge of an elaborate second-story network has been completed in downtown St. Paul. Part of the 12-block urban renewal project, the "Skyway" will eventually comprise an integrated system of bridges and concourses—the bridges spanning existing streets, and the concourses going through new and existing buildings.

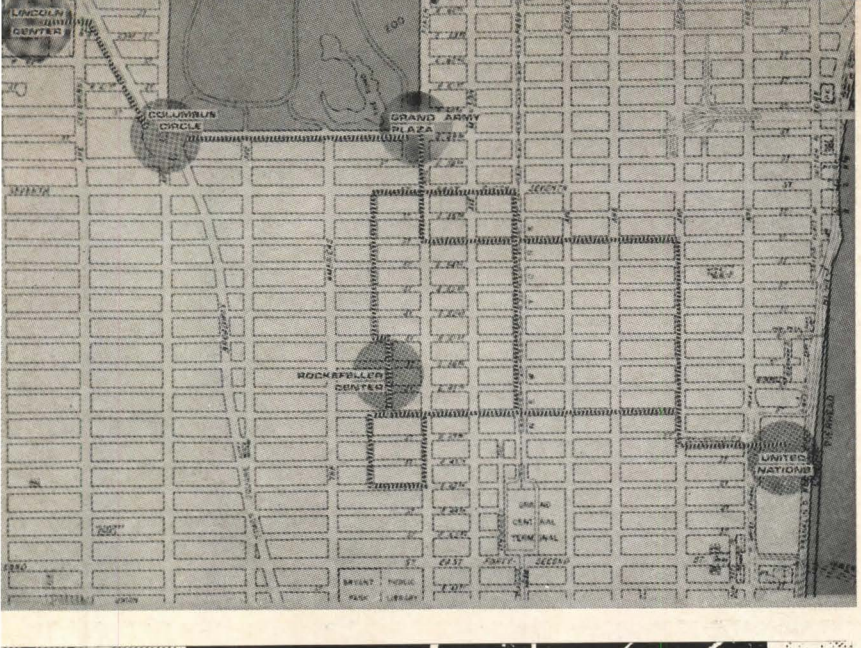
Individual developers will fix the precise location and configuration of their own segments of the system (for approval by the St. Paul Housing and Redevelopment Authority); the public authority will be responsible for building the bridges, while private developers will be responsible for the corridors and interchanges within their own blocks. The project received a Title I Federal grant of $16.9 million, approved in 1964. The local share is approximately $5 million. When the entire renewal project is completed, in 1972, the real-estate taxes in this 43-acre renewal area will have increased threefold, from $710,000 to $2.4 million, the city estimates. The first major projects, already underway, include a Federal building (at one end of this first pedestrian bridge), a garage, and two office blocks.

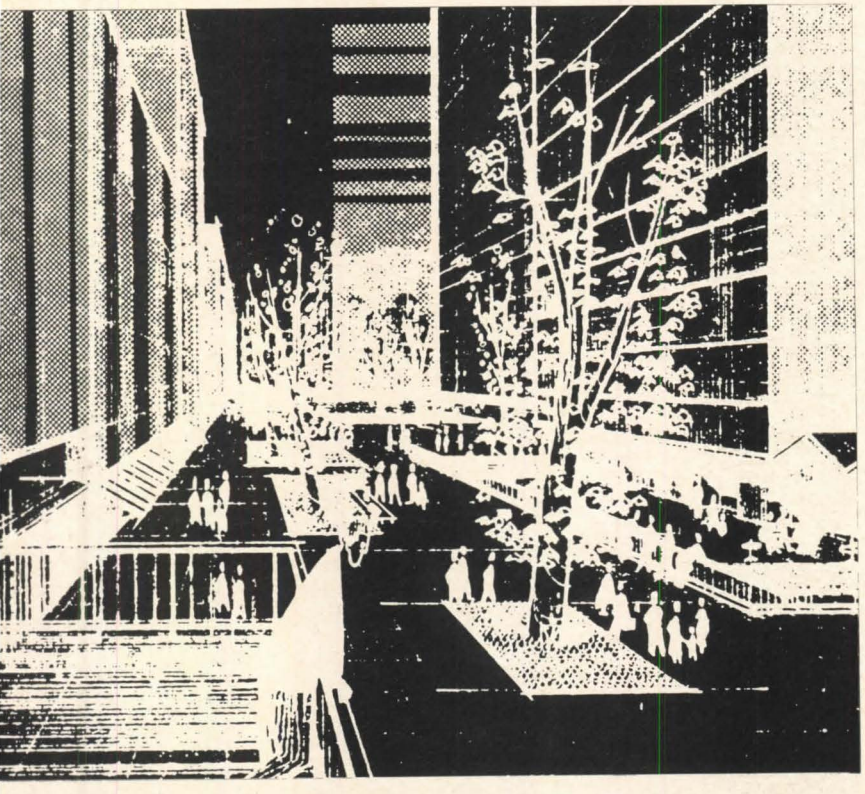
The Skyway system will be heated and cooled at the expense of property owners, but maintenance costs will be shared by concourse tenants. Ultimately, it is hoped that a variety of shops and services will locate along this second-story street. At interchange points and the frequent access points, a concentration of amenities is planned—benches, news racks, telephones, planters. A node will generally occur in the center of the block at the crossing of two corridors. Some interiors will lend themselves better to other arrangements, though, such as two nodes in a block, each of them T-shaped.

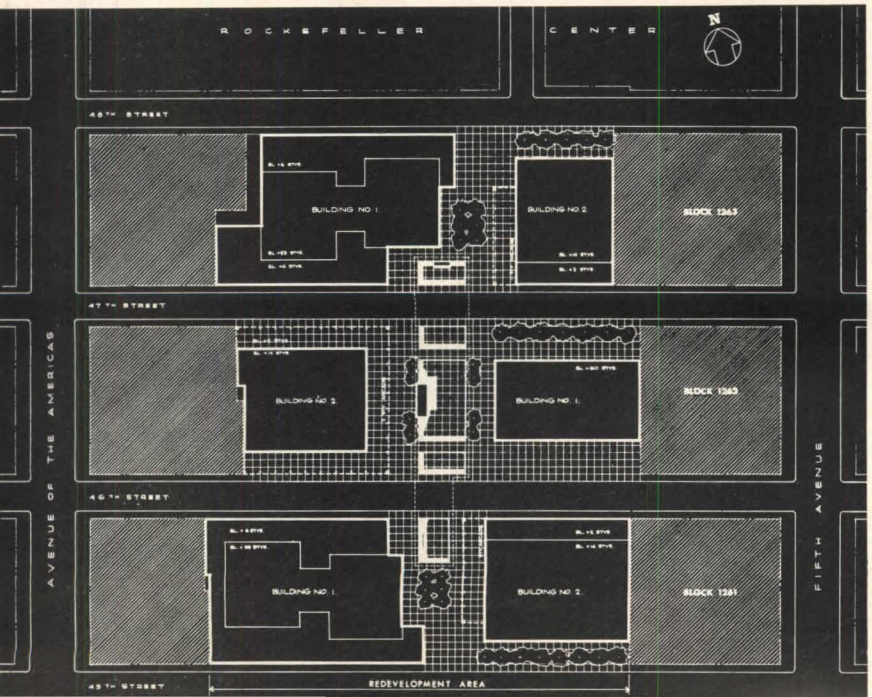
Design continuity for graphics and street furniture is an important part of the Skyway, giving it a continuous image and a ready identification. The development plan, and design of the various elements, is by Hammel, Green & Abrahamson, Inc., consulting architects and engineers.



Opposite: pedestrian bridge (top) is first segment of proposed "Skyway" system (map, bottom left). Each developer in the renewal area will provide concourses and a node, or interchange, according to the established guidelines (schematic drawing, bottom right). This page: a selection from the coordinated system of graphics that ranges from major directional signs to informational signs.
PHOTOGRAPH: Jim Ehlke







A proposed Urban Strollway System (top left) would link focal points of midtown Manhattan. Part of the system would be "5½ Way" (middle and bottom) proposed some years ago by Pomerance & Breines. According to Breines, the section of the Strollway along Central Park South could be achieved by narrowing the sidewalk that borders the park, a suggestion once made by Olmsted himself. The five-block segment between Lincoln Center and Columbus Circle (opposite) will be built in 1968.

Relocated center strip becomes a Strollway

Manhattan's Broadway will turn into a "Strollway" with the imminent widening of the sidewalk in the five-block stretch between Columbus Circle and Lincoln Center (opposite page).

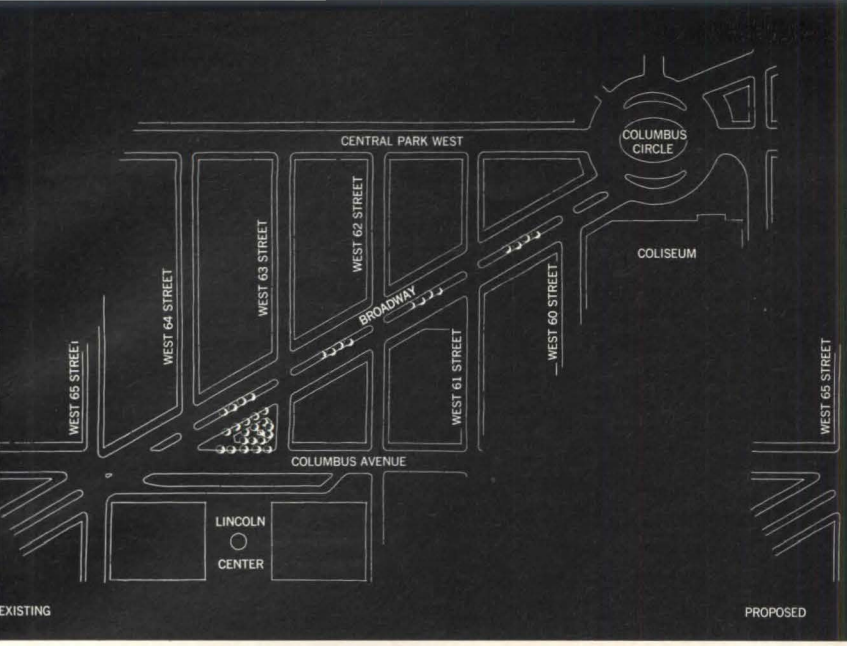
In this unusual reversal—widening the sidewalk instead of the street—the extra width will be obtained by reducing a fenced-in green strip that now separates northbound and southbound traffic (see maps, right). Width for vehicles will add up to the previous 80 ft.; width of the westerly sidewalk will increase from an average of 24 ft. to 41 ft. The street's center strip was previously unusable (except for some subway ventilators that are being redesigned to fit the new 4-ft strip). The extra width added to the sidewalk will be landscaped to provide a buffer between pedestrians and traffic.

The redesign is the work of Pomerance & Breines, architects whose "5½ Way" (left, middle and bottom) was widely hailed when first proposed. That pedestrian route now reappears as a segment of the proposed Urban Strollway System that would link the focal points of mid Manhattan (top left).

The five-block segment on Broadway is being realized through a $500,000 gift to the city from George T. Delacorte chairman of the board of Dell Publishing, and already known to New Yorkers for his gift of the outdoor theater for Central Park's program of free Shakespeare performances.

Special features of the Strollway will be new lighting to supplement the existing street lamps (lower, and at a more intimate scale than customary street lighting), new paving to give identity to the Strollway, benches, display and information areas, planters. The *location of manholes* in the existing street has influenced the location of benches and planters along the widened sidewalk.

The Strollway is expected to draw more than strollers—the hope is for new commercial life in the shops adjoining the Strollway, and for its use as a walkway and resting place by residents, office workers, and Lincoln Center audiences alike.



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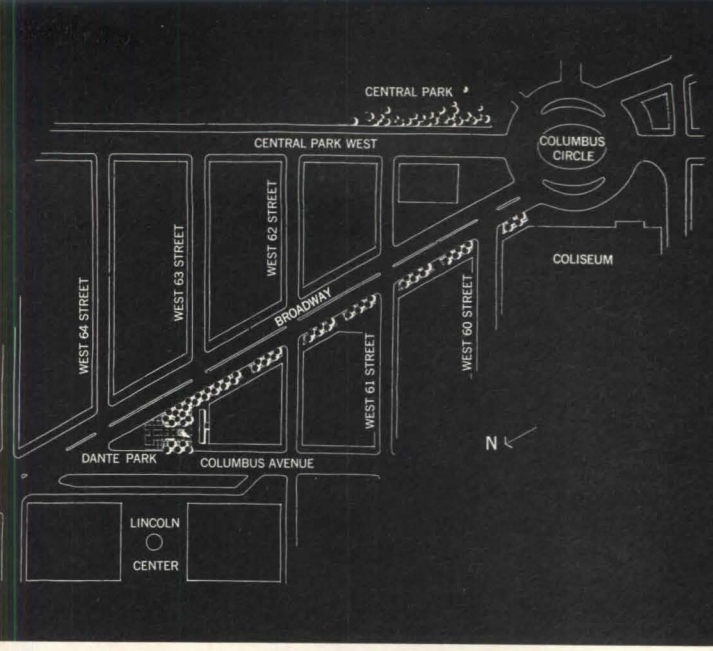

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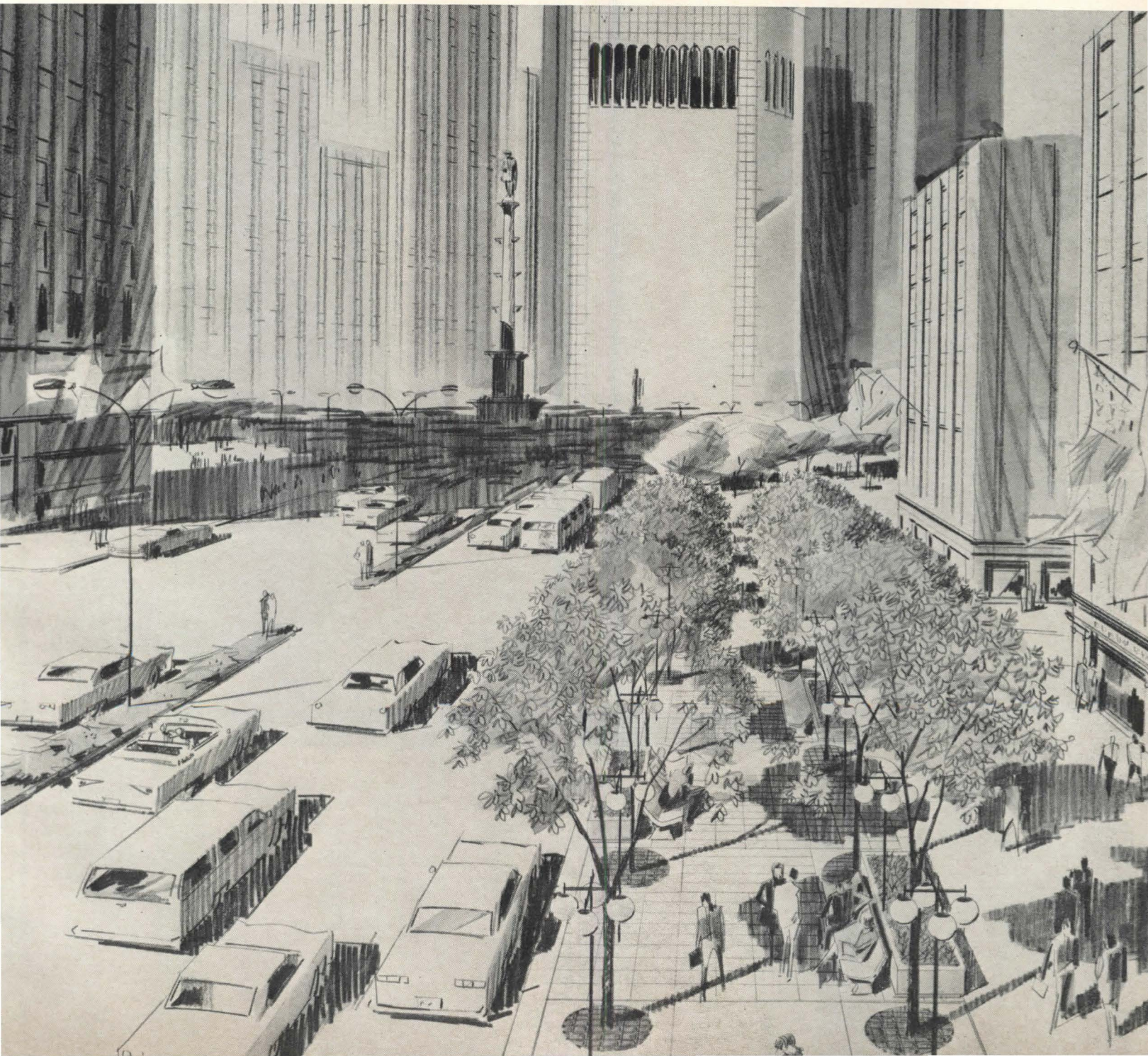


THE SOFT REVOLUTION

BY SUMNER MYERS

As an engineer, I am naturally intrigued by shiny new hardware ideas. But here I want to discuss how "software" — not hardware—can bring about revolutionary improvements in urban transportation. Indeed, I feel that we must forego technological tours-de-force and concentrate instead on how off-the-shelf technology can improve urban transportation within the next decade. That is where the action really is.

The first question is, to what ends should the action be directed? Not everybody benefits equally from public improvements — especially in the short term. Indeed, sometimes people are hurt, either in an absolute sense (as when property is taken without sufficient compensation), or in a relative sense (as when money is spent first for suburban commuters rather than for in-city subway riders).

The connection between transportation and urban goals is much looser than many would like. There is no one-to-one relationship between social problems and transportation solutions. While transportation is often a necessary condition for the accomplishment of urban goals, rarely is it both necessary and sufficient. For example, a better transportation system for Los Angeles' Watts area is necessary for solving the ghetto's unemployment problem, but much more than transportation is needed to get people decent jobs.

Solutions aimed at one set of problems may help solve another set. Thus, transportation technology designed to meet the particular needs of, say, the aged and the poor might also relieve the transportation problems of the young and the high-income commuter.

With respect to social goals, transportation is more nearly like a shotgun than a rifle. To belabor the analogy, buckshot tends to hit other—sometimes unintended—targets. (For examples we need only think of the unintended effects of the interstate highway program.) Even so, the weapon must be aimed in the direction of the main target.

In order to provide a framework for this discussion of transportation technology, I will put forth three specific goals — all short term and all high priority —to be implemented. I hasten to add that these goals stem from my personal value system. There is nothing inviolate or holy about them. The key point is that together they comprise a set of specific action-oriented goals which are likely to be consistent with longer range and more general transportation objectives.

Mr. Myers is a research engineer on the staff of the Institute of Public Administration. This article is adapted from a speech he delivered recently in Paris to the Organization for Economic Cooperation and Development.

Amenity, efficiency, and welfare

My first goal would be to improve the qualitative aspects of urban life with higher amenity transportation. By "higher amenity," I mean better esthetic design of stations, vehicles, and roadways, more comfortable seats, and so on. And most important, I include the elimination of transportation side effects that make urban amenity impossible: noise, heat, fumes, and especially congestion, both on the streets and in the vehicles.

My second goal would be to increase the economic efficiency of existing systems. This is related to the first goal. Amenity improvements will cost a good deal of money, of course, and it is therefore especially urgent to increase the economic efficiency of transportation systems whose amenities are to be improved. I certainly do not mean to suggest cutting back on service to save money. I mean instead working on those problems which, if solved, would result in important cost savings without degrading service.

My third goal would be to improve transportation for those who particularly need their transportation improved—those who cannot, for one reason or another, use an automobile. This goal requires more explanation because it runs head on into the conventional wisdom, which holds that the urban transportation system ought to be im-

proved because it benefits "everybody." The means of improvement favored by most planners is usually some kind of rail system with which they will rescue the city from that insolent chariot, the automobile.

The auto lobby has infuriated the intelligentsia by arguing, in effect, that the best way to improve urban transportation for most people is to improve the auto user system. Yet this argument cannot be dismissed out of hand. After all, four times as many city residents, on a national average, go to work by auto as by public transit, and pleasure trips are almost always by automobile.

Transit proposals are usually promoted not as improvements for transit users, but as a way of decreasing highway congestion—to improve the lot of auto users. At a recent urban transportation conference, a speaker who represented the San Francisco Bay Area Rapid Transit District (BART) opened his talk by showing slides of the traffic congestion his subway was going to relieve. I don't recall that anyone in his audience of several hundred transportation experts objected to this as a primary goal of transit.

Unquestionably, the BART system and others like it will induce some people to use transit instead of their autos and, in a differential sense, will reduce congestion "that might otherwise have been." But there is no empirical evidence that I know of to indicate that transit reduces highway congestion in an absolute sense.

Are there fewer cars on the streets of Toronto or Montreal now that they have their new subways? Have the old subways of New York City, Boston, Philadelphia, and Chicago prevented street congestion? Just the opposite: they have encouraged downtown development and thereby encouraged congestion.

Reducing highway congestion is surely a worthwhile goal of transit, but in the absence of contrary evidence it looks as if it may be such a high-risk goal that it should not be a prime objective. If transit improvements do reduce highway congestion, fine. **But this should be treated as a byproduct of the main purpose of improving transit: to increase mobility of those who are unable to use an automobile. Baldly stated, this is a welfare goal.**

Those without cars

For better or worse, the design of the city, and therefore the pattern of urban life, has already been shaped by the automobile, perhaps irreversibly. With an automobile, urbanites can enjoy reasonably good access to almost all of the resources in the metropolitan area. But for people without an automobile, such access to most of the city's delights is inconvenient if not impossible.

As of 1960, over a quarter (7.3 million) of the urban households in the United States were without an automobile. Of these, 6.6 million were relatively poor households where the head of the family earned less than $6,000 per year. Twenty per cent of the nation's adult population (over 17 years old) cannot drive — some because they don't have to or want to, but many because they are physically unable to.

While a breakdown of the data is not available, it may be assumed that a good many persons are unable to drive because of advancing age. Hopefully, poverty will be a less important constraint on auto ownership in the future, but as the number of elderly persons grows, aging will be a more important one. Even now, there are 18.5 million people over 65 years old.

The elderly should be encouraged to travel about the metropolitan area—to go to church, to take part in senior center activities, to use libraries, to visit friends and relatives. If this sort of goal is to be met, public transportation must be designed to give economic door-to-door service at all times—during the off-peak hours as well as the peak hours—and to all other places in the metropolitan area as well as to its downtown.

For economic reasons rooted in old technology, public transportation systems are today primarily downtown oriented. With few exceptions, only the central business district (CBD) generates enough demand to justify the use of mass passenger vehicles—and then only for a few peak hours. Now, however, most urban travel demand is not downtown oriented. In many large cities less than 10 per cent of total person trips begin or end in the CBD. This percentage varies from a low of 7 per cent in Pittsburgh to a high of 35 per cent in Washington, D.C. Evidently, people want to go to many other places besides the CBD.

Because existing mass transportation systems do a poor job of handling this type of demand, people who are dependent on transit find themselves shut out of opportunities that other urbanites have. This is a particularly serious problem in the case of employment opportunities—a point that Watts has made dramatically clear. A recent U.S. Labor Department study found this to be a general problem: "Payroll employment has soared in the suburbs compared with downtown areas. . . . Many of the new jobs created by this movement could be filled by poor and unemployed city dwellers if they could get to them. [But] metropolitan transportation systems, geared to getting people to work downtown, make it even tougher for those in the city to work in the suburbs."

Transportation expert Wilfred Owen of the Brookings Institution has summed up the basic problem: "The person who for a variety of reasons has no car is increasingly barred . . . from enjoyment of what the city has to offer. Because . . . urban growth assumes the availability of private cars, everything becomes increasingly difficult to reach by other means."

While there are many people who depend on transit for their mobility, they are too few to support a transit system extensive enough to provide anything approaching the mobility that other members of the urban community have. The frequency and coverage of transit service are determined by the number of people who are willing to use transit. If these people are relatively few, the system will provide relatively little coverage and relatively infrequent service; and the mobility of those who must use such a system is correspondingly circumscribed.

If a transit system is to be extensive enough to serve its dependent users well, the system must be good enough to attract and hold a sufficient number of optional users too. This means the system must provide more than minimal service to everybody because the optional users can resort to their automobiles if they don't like the kind of service they are offered.

My third goal—improving transportation for those who have no alternative to mass transit—ends up as a multiple of several objectives. In considering various alternatives, I would push hard on whatever technology might yield the following joint products:

1) Improved mobility for the disadvantaged, especially the physically disadvantaged, but including the economically disadvantaged;

2) Greater attractiveness to optional users. But it only makes sense to attract this additional patronage if it generates enough marginal revenue to offset marginal costs and thereby helps to buy better transit service for everybody.

These goals are necessarily set forth here as desirable ends without any reference to costs. In "real life," of course, the cost constraint must be faced with every decision: how much of a given improvement is worth what? And most important, who is going to pay for it?

Existing realities

Now that a set of goals has been identified, we are ready to ask: how might technology be applied to achieve these goals? Realistically, this must be technology that can be applied to already existing transit systems. Given the depleted condition of urban pocketbooks, the multitude of other human and physical problems cities face, and the bu-

reaucratic and legal tangles involved in city action, the forces compelling the retention of existing systems are overwhelming.

But if we cannot impose *tabula rasa* solutions in urban transportation, neither must we accept by default a widening gap between technological promise and existing realities. The existing realities are the rail systems and the bus systems, which represent the points of departure for evolutionary change. They are discussed below:

Better rail service

Rail transit handles demands which are relatively high and relatively predictable as to both time and origin-destination pairs (e.g., peak-hour, downtown-oriented travel). Urban railroads, particularly subways, now generally provide low amenity service and are economically inefficient.

Better rail service *might* help persuade the middle class to stay in the cities and at the same time raise the mobility and aspiration levels of the culturally deprived. It will surely improve the quality of urban life—a high priority goal. Thus, the initial objective should be to improve rail systems by relieving inhuman crowdedness, noise, dirt, and fumes, and by lowering costs to provide some of the money necessary to upgrade amenities.

The single most effective way to upgrade rail transit amenities is to reduce rush-hour crowdedness. For a given number of riders, this means either spreading the load evenly throughout the day or expanding capacity. One way to spread the peak transit load might be to stagger working hours. Another possibility is off-peak pricing.

Unfortunately, despite all the volumes written about both possibilities, nobody can say for sure that either one will work well enough to reduce the transit crush. Before spending billions on capacity expansions, one or both of these presumably cheaper alternatives should be explored. Sorely needed are some critical experiments to point the way. A critical experiment in staggering work hours would probably have to turn the city upside down. But critical experiments in off-peak pricing are entirely feasible and should be undertaken as soon as possible.

Realistically, however, we might hope for the best, but plan for the worst. If the public rejects a rational pricing system or if the experiments fail, it will be necessary to reduce crowding by expanding capacity. This means more cars at the peak and in some cases more tunnels and better signaling systems. All of this costs money—lots of it.

Some of the money required for upgrading rail transit amenities could come from reducing costs on inefficient systems. This means finding and exploiting resource-saving opportunities. At one time this would have happened as a matter of course. Forty years ago, urban rail systems were vital centers of technological innovation. Over the years, however, rail management has adopted conservative attitudes, highly skeptical of innovation. And while these attitudes are ripe for change, the process needs impetus.

A taste of success would provide some of this impetus. To assure success, the first technological projects undertaken should be low-risk ones with large and quick dollar returns. It is relatively easy for the operations analyst to find surefire cost saving projects that will neither degrade service nor displace labor.

In short, the best way to improve existing rail systems in the near future is to apply operations research techniques to make the system more efficient. That is, the technology should begin with software, not hardware.

Moving buses

The bus is usually given short shrift in transportation plans for the future. This is true even in the United States, where buses now carry approximately 75 per cent of all public transportation passengers. Most cities in the U.S. are, and will be for some time, entirely dependent on buses for mass transportation.

Even in cities with excellent subway systems, buses are practically indispensable. In New York City, over a third of the CBD workers begin the day by taking a bus to a subway station.

Buses may be important, but lets' face it, they have no "tech appeal!" Cumbersome vehicles crawling through snarled city traffic seem like anachronisms in the space age. Unglamorous and inadequate as they now are, however, bus systems represent a highly promising point of departure for improving urban transportation. The reason: buses can go anywhere on rights-of-way paid for by somebody else.

This is not an insignificant factor. It means first that buses have the potential for giving door-to-door service—something that is absolutely essential if the needs of the disadvantaged are to be met. It also means that bus systems can provide chauffeured transportation at low cost.

But buses will continue to be a less than adequate means of transport as long as they get caught in traffic jams. Fortunately, this is not an insoluble problem. There are two approaches to it: put buses into lanes that are physically separate from the rest of traffic; or decongest the flow of all vehicular traffic on the streets and highways used by buses and give buses some kind of priority in the stream. The second alternative is technologically feasible and economically sensible.

In urban areas buses must for the most part continue to share their rights-of-way with other vehicles. Even separate bus lanes are wasteful of urban space except under very special conditions. As primarily journey-to-work transportation, buses would use separate lanes intensively for only 20 hours a week—and then would generally use but a fraction of the lane's vehicular capacity. A recent study in California found that separate bus lanes actually increase, rather than decrease, total person delay. The time saved by all the bus passengers would be much less than the time lost by all the auto passengers who were denied use of the relatively empty bus lane.

The approach, then, must be to get the whole traffic stream moving. This is really a "joint payoff" problem: in order to decongest urban arteries for transit users, they've got to be decongested for all users, including—for better or worse—motorists.

Top priority for buses

Two somewhat different technologies are involved in decongesting the traffic stream. The first is flow control on limited access highways; the second is traffic control on city streets.

The first involves metering vehicles onto the highway at a rate that will hold traffic concentration below the point of greatest instability. At that point, even minor perturbations in the traffic stream cause slowdowns that may finally result in stoppages that diminish the highway's capacity. Flow control keeps highway capacity up by keeping the stream moving. Because a bus carries more people than a car, buses should be permitted to enter the flow-controlled highway "at will." Once on the highway, the bus would keep moving.

Theoretically, metered freeways should handle 6 to 8 per cent more vehicles during the peak hours. If, however, total demand were left to expand freely, as in the past, the metered freeways might attract more automobiles than the system would allow on the freeways in a given period of time. Long queues would then form on approach ramps. Presumably, this could be avoided if we had the political courage to limit aggregate demand by pricing. Of course, we do not—yet.

But even with ramp congestion, a flow control system is still highly recommended as a transit measure. Under the transit priority approach, buses would always be allowed on the highway and would therefore not be adversely affected by congestion on the ramps—thus achieving high-speed, high-volume service.

Although street traffic control is different from highway flow control, the principle of bus priority is similar. Most street traffic control systems are now programmed to move vehicles, not people. All vehicles are treated equally, which means that their passengers are treated unequally. Traffic lights are set to favor three people in two cars over 50 people in one bus. In order to maximize the through-put of people, buses should be given some kind of priority in the traffic stream.

To give buses the priorities they deserve, traffic control systems must be redesigned to "count" people rather than vehicles. As matters now stand, they cannot tell a bus from a scooter or from anything else! Yet it is technically simple to sense the approach of buses in the traffic stream—by equipping them with simple transponders, for example. But the next step is experimentation, not hardware.

The Institute of Public Administration. in a consortium with Wilbur Smith Associates and Melpar Inc., has been working on some of these new operational concepts for HUD. In a recent experiment conducted for the project, traffic lights on a street in Los Angeles were manually changed to favor buses according to how many people the buses carried. The preliminary data indicated a delay reduction of about 50 per cent for all persons in the traffic stream.

A new flexibility

But decongesting the flow of buses answers only part of the need. What is also needed is a system that can respond dynamically to demand *as the demand occurs*—a system whose routes and schedules are not fixed in advance. When only a few people want to go to and from the same places during a short period of time, it is economically infeasible to route and schedule transit vehicles in advance to serve them well. At present, transit serves such demand poorly, if at all.

It now looks as if such a system can be developed, perhaps to give door-to-door service at costs not very much more than conventional bus service. A demand-actuated road transit (DART) system would use a vehicle like a minibus to pick up passengers (at their doors or at a bus stop) shortly after they had phoned for service. A passenger's call for service is logged in by a computer along with all other origin-destination demands currently on the system.

The computer knows the location of all its minibuses, how many passengers are on them, and where they are heading. It selects the right vehicle and dispatches it to the caller according to some optimal routing algorithm which has been programmed into the system. The system can also be designed to give the next passenger's phone a warning ring a few minutes before pickup time.

The system has a good deal of operational flexibility, and can be programmed to give different levels of service for different fares. At one extreme it might offer unscheduled single passenger door-to-door service, just like a taxi—or multipassenger service, like a jitney. At the other extreme, it might offer something more like bus service, picking up passengers along a route according to a schedule specified in advance.

But even DART's bus-like service would differ from conventional bus service. The route could include several home pickups at extra fare. In this mode, the passenger would call only to cancel his prescheduled pickup.

The point is that DART can do what no other transit system does: it can go where the demand is and only when the demand is ready to be satisfied. The many-to-many traffic pattern to be served by DART is, of course, dominant in the low-density suburbs. But it should be emphasized that the same kind of demand can also exist in the most thickly populated sections.

Right now the automobile handles this demand for those who have access to one. For those who do not, a bus takes too long and a taxi costs too much. The cost of the taxi can be driven down by "sharing the ride," and basically the DART system is designed to accomplish this.

There is no question that a DART system will work. The question is: how well and at what cost? Preliminary data from our study indicate that, depending on demand, DART will serve its passengers not quite as fast as private taxi but at a quarter to a half of its cost.

Instant dispatching

The hardware system that makes DART economically feasible is an automated vehicle locating (AVL) system for knowing at all times precisely where perhaps several hundred DART vehicles are. Our study shows that AVL improves the efficiency of DART's performance by 50 per cent because dispatch decisions can be made "on the fly."

The AVL system can establish the location of any vehicle with an accuracy of 100 ft. in a metropolitan area 50 miles in diameter. A central transmitter broadcasts repetitive FM command pulses continuously and at a regular rate. Each command pulse in effect addresses one particular vehicle whose equipment recognizes its own coded signal among all the others.

On receiving the coded signal, the addressed vehicle activates a keyed transmitter which produces a respond-acknowledge (R-A) signal. At least three wayside receivers pick up this R-A signal and relay it to data central. At data central, the vehicle's location is computed by triangulation using the differences in arrival times of the R-A signal at the three receivers.

The two salient features of this system are: 1) it has almost inexhaustible capacity—the system can keep track of over one million vehicles—and 2) it can be "time shared" by many different users, public and private. Thus the AVL system makes it possible to improve the urban transportation operations of police departments, trucking companies, taxi fleets and, of course, transit systems. This can be operational within five years.

The system also makes it possible to control the flow of *all* vehicles at *all* times in the metropolitan area. But this is something for the long-term future—and then only if we are willing to sacrifice personal anonymity.

THE AIRBORNE STAMPEDE

The radarscope view at left of the skies over New York symbolizes (cryptically, for most of us) the traffic that is already jamming our major airports. But the rush that is about to begin will demand total revision of our mechanisms for getting passengers up into the air and onward to their ground destinations after landing.

Behind this coming revolution are several factors, each of which multiplies the effect of the others. To begin with, there is the present steep climb in passenger volume (up 29 per cent in the past year). But soon, radically larger aircraft will be introduced, carrying many more passengers per flight. *Passenger* traffic will then rise sharply at airports where *airplane* traffic is already approaching its limit.

By the end of 1969, the Boeing 747 "jumbo jet" is expected to be in service, carrying up to 490 people. Shortly after that will come several versions of the medium-range jet "airbus," with capacities of about 300. In the mid-1970s, the Boeing supersonic transport will arrive, also expected to seat 300. (The Russian and British-French supersonics, scheduled to fly earlier, will have capacities of less than 150.)

By 1980, almost half of the commercial airliners in service are likely to carry more than 200 passengers, roughly the maximum today. Larger passenger loads will lead to reduced fares, further stimulating air travel.

Even greater than the growth in total passenger volume will be the increase in *peak* volume at major cities. Obviously, the new larger planes will tend to fly over the busiest routes at times of maximum demand. The busiest U.S. airports handle no more than 10,000 passengers in a peak hour; in a few years, this maximum could exceed 25,000.

Breaking the ground barrier

Today's critical congestion may be in the air, but the major obstacles of the future will be on the ground. The new, larger planes may—at least temporarily—ease pressure on the airways, but they will play havoc with facilities on the ground.

No existing airport is equipped to get 490 passengers off the plane and put 490 others aboard in less than an hour. No existing passenger concourses or baggage facilities could handle the load of two or three jets arriving within minutes at adjacent gates. Existing taxi and bus service would be swamped by peak-hour crowds. (Cargo volume, which is increasing much faster than passenger traffic, will raise further problems for the airport planner.)

One way to beat the problem of congestion at the jet airports and on routes to them is to find alternative ways to travel. For trips of up to 200 miles, fast trains are a possible solution. But a faster, more flexible, and immediately available alternative is the "short takeoff and landing" (STOL) aircraft. Planes already exist that can carry up to 60 passengers, cruise at 285 miles per hour, and take off on a 1,800-ft. landing strip.

Bypassing the jetport

About 27 per cent of all air travelers leaving New York are bound for points within 250 miles. Most of these trips could be made in less time, door-to-door, using STOL craft between downtown airstrips than by taking 600-mile-per-hour jets between metropolitan airports.

In New York, where the need to reduce airport congestion is acute, an "emergency airlift exercise" was carried out in September, 1967, demonstrating that STOL planes could operate from parks, piers, and islands in the harbor (right).

STOL ports have been proposed for rooftops in the city core, but they would raise problems of approach paths, noise, and safety more severe than those of heliports. More logical sites would be waterfront areas or railroad yards.

Recently Pan American Airways proposed to build a 2,200- to 2,400-ft. strip on the site of abandoned Hudson River piers in Manhattan (above), only two blocks from Lincoln Center.

With STOL ports downtown, at suburban hubs—or even at the jetport—we could reroute much

of the air traffic between New York and, say, Boston, Syracuse, or Washington.

STOL for shorter trips

There are equally likely STOL routes all over the country: Miami to Tampa, St. Louis to Kansas City, Seattle to Portland. STOL routes would, of course, have to avoid major airport traffic patterns—and they might eventually generate STOL congestion—but they would add significantly to our air travel capacity.

Although some future air travelers may benefit from convenient STOL service, the vast majority will still have to find their way to a big jet airport, which will be, if anything, farther from their points of origin than present ones.

Today, most passengers make the trip to the airport by private car or taxi. In New York, where a high percentage of traffic originates in the urban core, an airport bus system with check-in facilities at its Midtown terminals attracts only 13 per cent of the New York area's passengers.

Cars, buses, and taxis all have the same critical flaw: they depend on highways. Airport traffic rarely *causes* jams on the expressways leading to big metropolitan airports—not yet, anyway. The trouble occurs when the vastly larger volume of cars going to and from work (or, as in New York, to and from the beach) grinds to a near standstill.

So far, U.S. cities with extensive transit systems have not built lines to their airports. Boston has long had an "Airport" station in its system, but it is only a stop on a line to somewhere else, separated from the terminal by a ½-mile bus ride. (Nevertheless, it must be a boon to airport workers.)

Subways to the planes

Up to now, the volume of travelers willing to plunge from an airplane into a possibly bewildering transit system has been too small to warrant building airport spurs. There was also the problem of handling baggage in a transit system.

Now, however, the volume of "air commuters"—familiar with the cities they travel between and free of heavy baggage—is

rising rapidly. The first subway line that will lead directly into an airport terminal is now under construction in Cleveland. New York has just announced plans to build a subway to Kennedy Airport, which has long had a transit line running along one of its boundaries. Kennedy, unfortunately, has a smaller proportion of "commuters" than the other New York airports.)

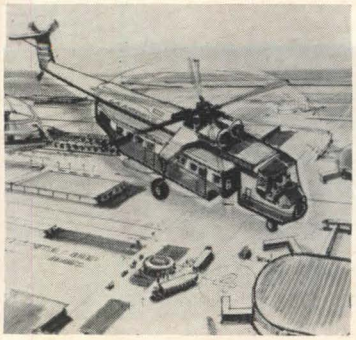
New ways to reach the airport

Long before a transit line is completed—possibly by the end of this year—a recently unveiled "rail bus" (below) may be shortening the rush-hour bus run to Kennedy Airport (from 90 minutes to 45, for a 13-mile trip!). The plan is to drive these discon-

certing hybrids through the Midtown Tunnel to Queens, where they would lower their railroad wheels and take off over some little-used trackage to a point near the airport; then they would rejoin the highway. The rail bus may be makeshift, but anything would be an improvement.

Another way to get to the jetport, of course, is by air. New York, Los Angeles, and San Francisco already have helicopter service linking airports and in-town heliports.

Los Angeles may soon be using the "skylounge" (below) to get passengers to the airport. As clumsy-looking at first glance as



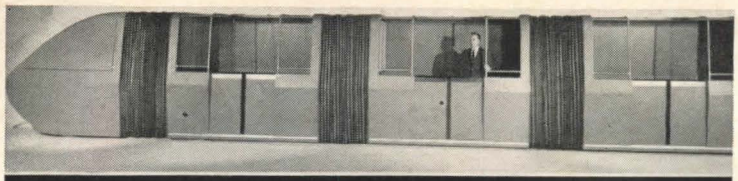
the rail bus, this device may prove to be a long-range improvement. It is made up of an existing "aerial crane" type of helicopter and a 40-passenger "lounge." The lounge can be towed along a passenger pick-up route, then flown to the airport, where it can be towed around to subterminals while the helicopter goes off to pick up another load. The system virtually eliminates on-the-ground loading time for the helicopter itself.

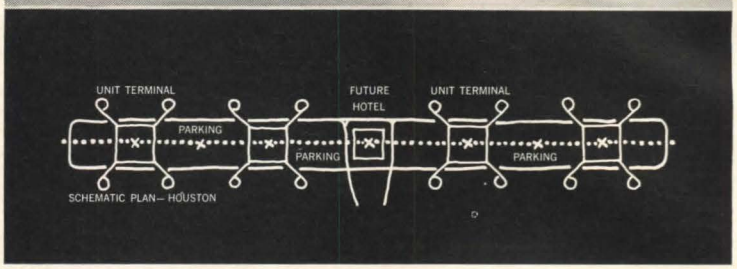
As planes have grown in both numbers and size, the air terminal has had to get bigger. Until recently, the only alternatives to the notorious long walk inside the terminal were the moving sidewalk (strangely underutilized), the decentralized airport (several self-contained subterminals, as at New York's Kennedy), or the bus-to-plane airport (like Washington's Dulles, with its specially designed "mobile lounges"). But decentralization forces transferring passengers to travel between subterminals, and bus systems put all passengers through an additional loading and unloading process.

Transit within the terminal

Another, seemingly obvious, solution is finally being tried—the in-terminal transit system. At Tampa International Airport (Reynolds, Smith & Hills, architects; Leigh Fisher Associates, consultants), all passengers will be carried from "airside" satellites to the central "landside" terminal in a smaller, simpler version of the "Transit Expressway" (right and page 102). These vehicles will operate like horizontal elevators, shuttling up to 100 passengers (all standing) between the terminal and the satellites in 40 seconds. Each link will have a capacity of 840 people in a ten-minute period. Two pairs of doors on each side of the vehicle will allow rapid unloading from one side and reloading on the other. At both ends of the line, vehicle doors will be synchronized with doors in the

PHOTOGRAPHS: Page 90, Nelson Morris for **Time.** Page 91 (top), Litton Industries—Aero Service Div. (bottom), The **New York Times.** Page 92 (upper left), The **New York Times.**





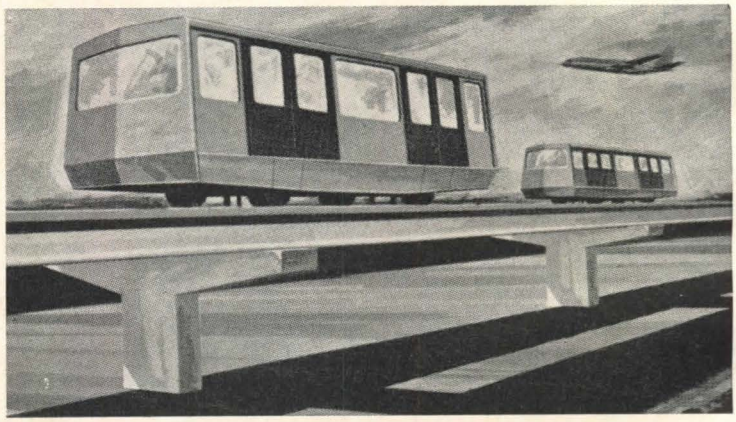
buildings that will look—and work—like typical elevator doors.

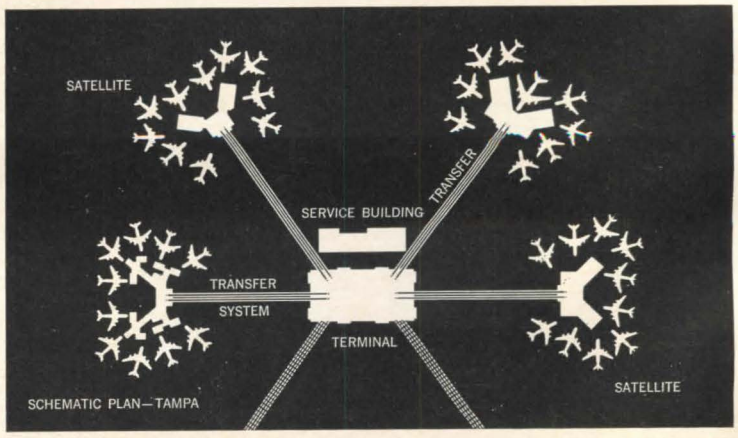
Houston International Airport (designed by Architects Golemon & Rolfe and Pierce & Pierce) will have a small-scaled, automated subway (above and page 102). It will run along the axis of the decentralized terminal complex, stopping at unit terminals and at the centers of the parking lots between them. Its modest capacity—200 passengers in a ten-minute period—will probably be adequate at Houston, where only passengers bound for other terminals or distant parking lots will have to use it.

Whatever happens to air travel patterns, several cities with high volumes of air traffic are going to need additional jet airports just as soon as they can build them—or sooner. Boston, Chicago, St. Louis, San Francisco, and Miami are already seeking sites. New York's search has been going on for seven years. Sites as far as 70 miles from Midtown Manhattan have been considered, but every one has been rejected by local, state, or Federal authorities. (One is now a National Wildlife Refuge.)

Nobody loves a jetport

Most opposition is based, of course, on the noise of approaches and takeoffs, which will get more annoying as planes grow and traffic increases—especially cargo traffic, which is





likely to move by night. (Contrary to popular fears, supersonic jets will not produce any "boom" at the airport, but miles away from it.) Air pollution from planes is likely to become more significant, especially if other sources are controlled.

New shapes, new sites

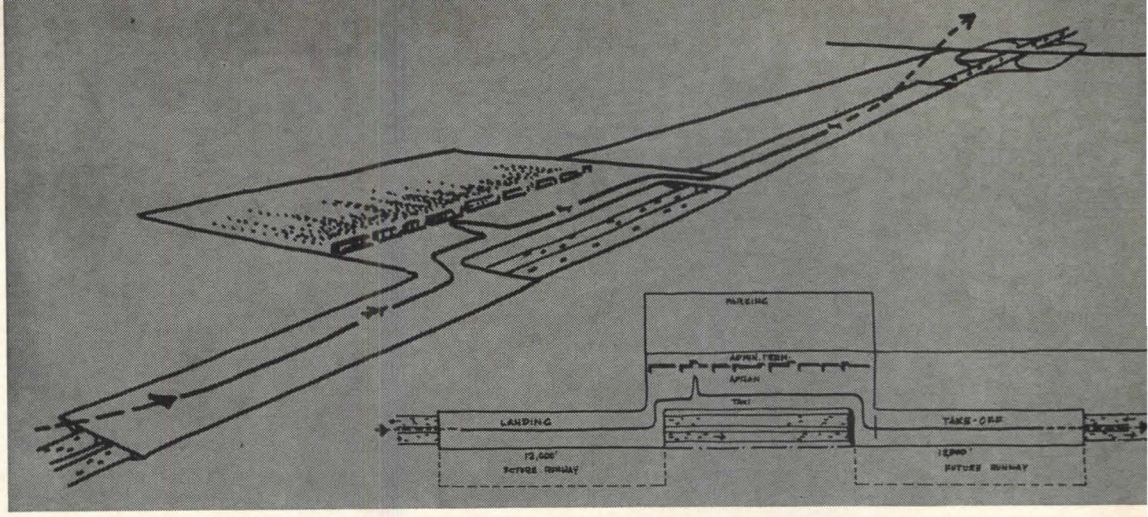
As open land becomes scarcer and opposition stiffer, conventional ideas about airport form and location may be reconsidered. Airports laid out since the advent of jets have already abandoned the earlier network of runways based on shifting winds, relying instead on sets of parallel runways. Auxiliary cross-runways are often still needed, but they can be relatively short, since the winds that make them necessary also reduce landing and takeoff runs.

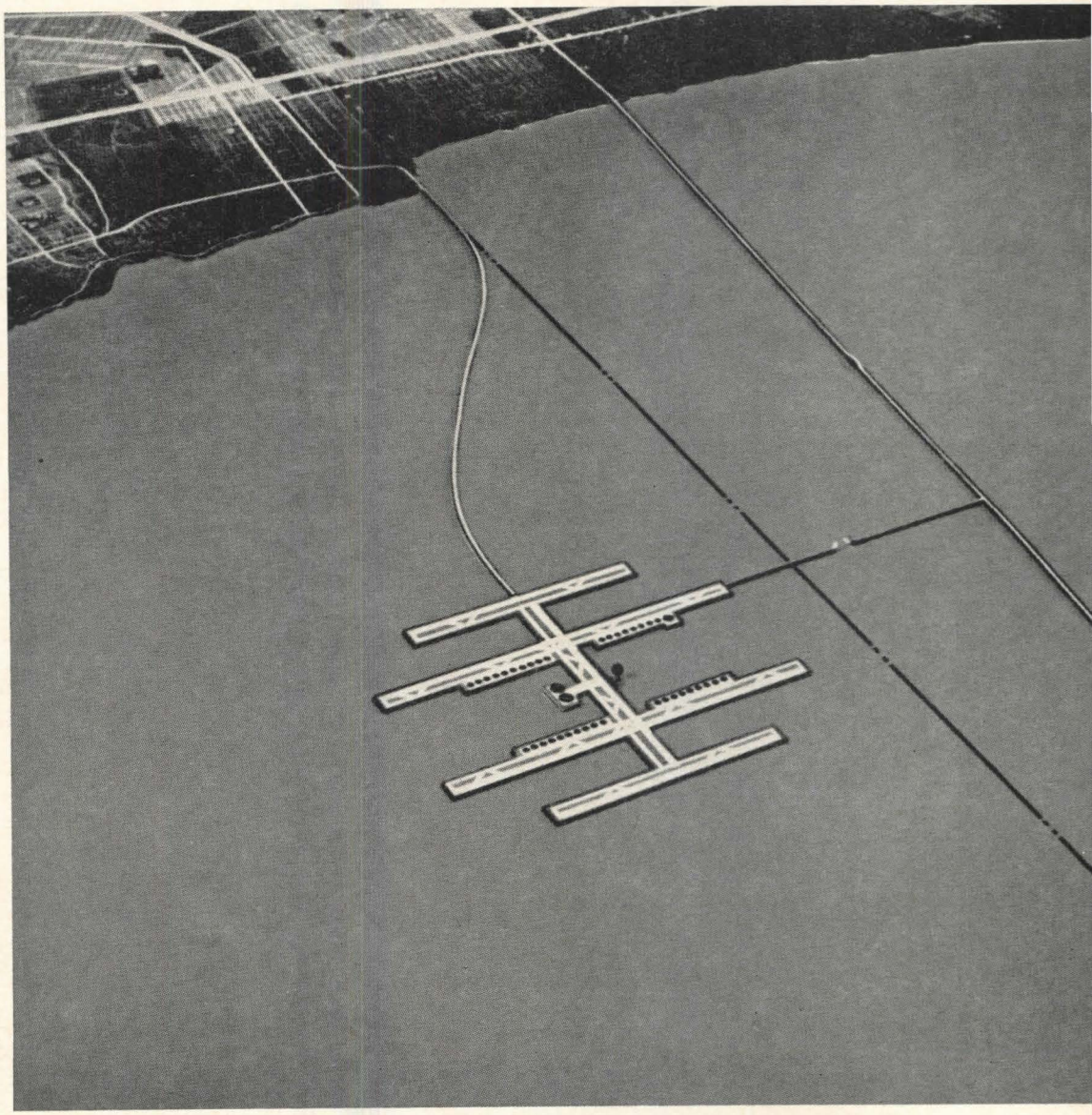
Now that runways can be oriented in a single direction, it would be possible to integrate them with highway construction. The airport-over-highway scheme (top right) proposed by Robert E. Dudley (of Tracey, Brunstrom & Dudley, Seattle) merges two major land-consuming functions and provides a road to the airport at no additional cost. It also offers the possibility of laying out landing and takeoff runways end-to-end—an ideal way to eliminate time-wasting taxiing. If cross-runways were necessary, the airport could, with coordinated planning, be built over a highway intersection.

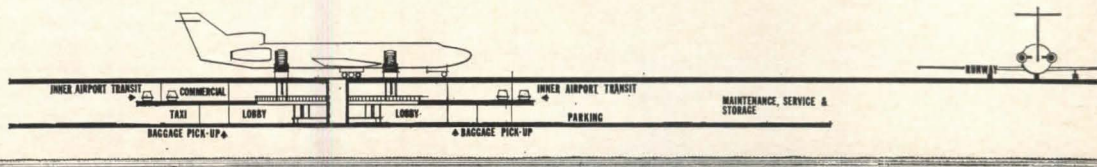
Another unconventional source of airport space is water. Chicago is seriously considering an airport island 3½ miles offshore in Lake Michigan. A study of jetport sites for New Orleans by the Gulf South Research Institute proposes an airport in Lake Pontchartrain (right). Instead of an island, this report suggests a lattice of pier-like structures (section, below right).

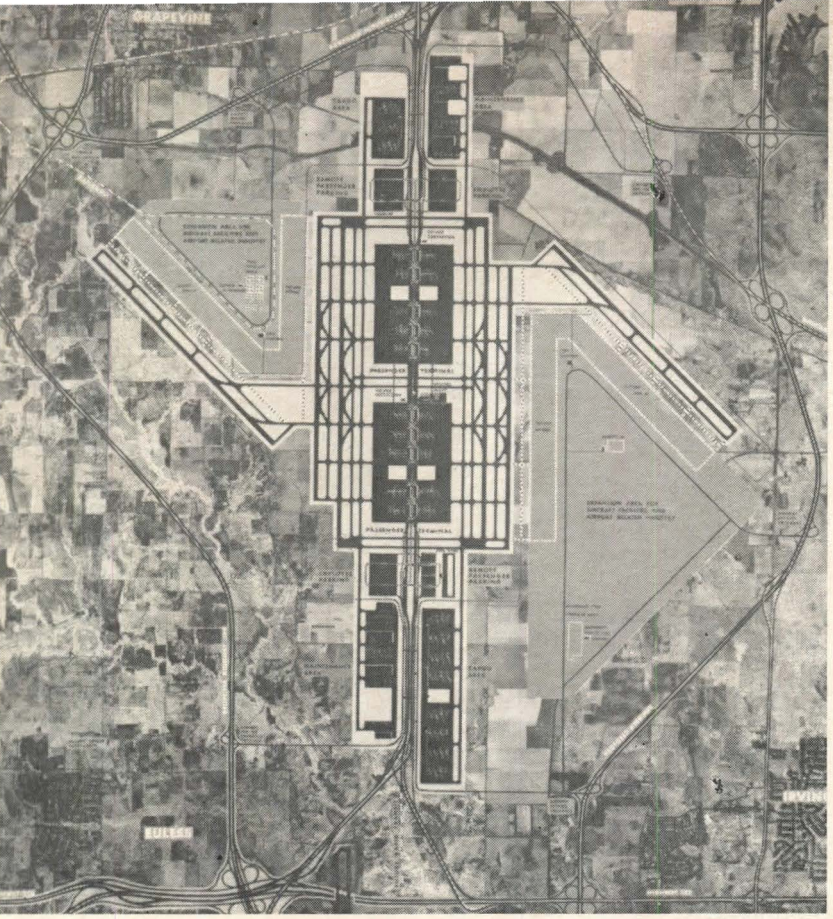
There have also been suggestions that New York build its fourth jetport in the Atlantic, and that Los Angeles put one in the Pacific. These might be drastic solutions, but as hordes of travelers take to the air we may be forced to try them.

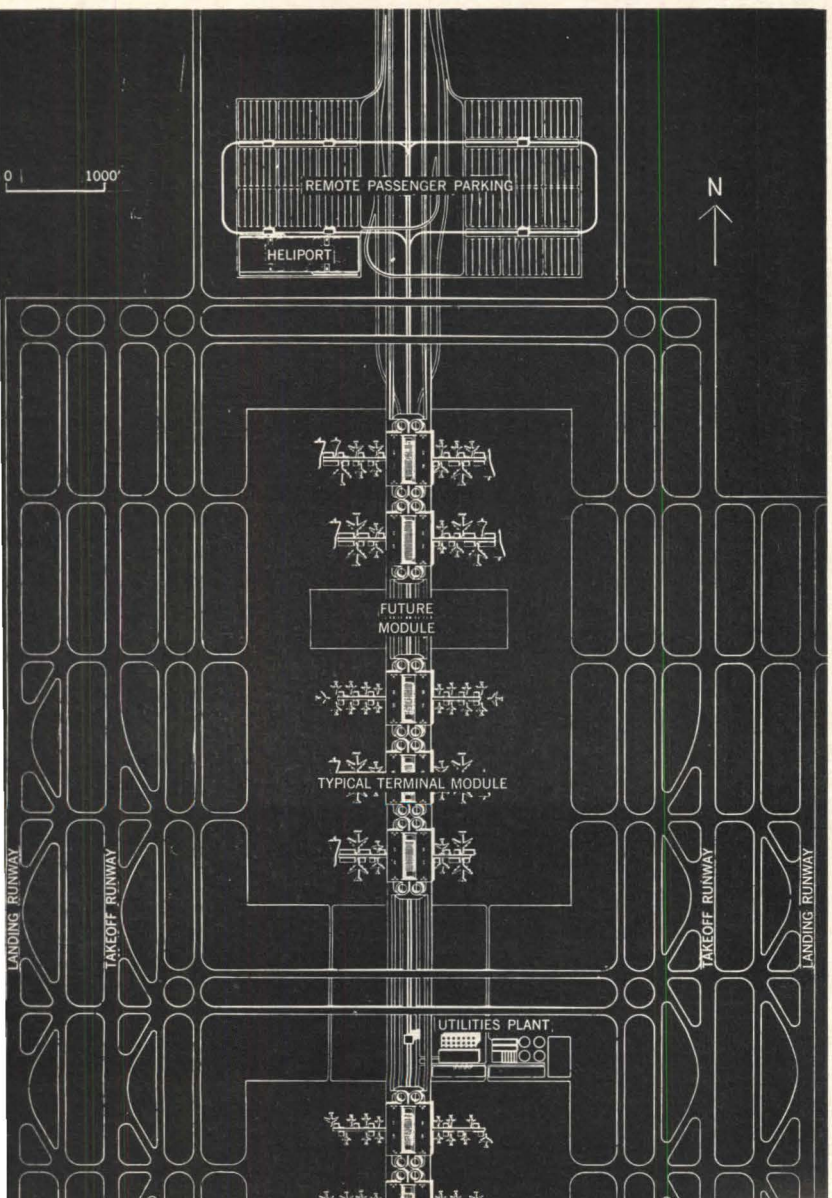
—John Morris Dixon











Dallas-Ft. Worth: two-mile trunk with many branches

The airport plan (top left) shows the passenger terminal on the main axis, with cargo facilities at either end. The inner pair of north-south runways, to be built first, will be reserved for takeoffs when landing runways are added (plan left). Angled cross-wind runways will be needed only 1.6 per cent of the time. A terminal section (top right) shows the passenger concourse at the center, with car and bus access above it. Below, at apron level, will be service roads and transit. An automated baggage system, centered underground, will serve all parts of the terminal, including the parking levels on top.

Up to now, every major air terminal has had a basically radial layout—a logical arrangement for the center of a taxiway web. Now, all at once, several schemes of a radically different type have appeared in response to changing runway layouts and increased passenger volumes. The new form is linear, with transfer between air and land vehicles occurring all along it.

The largest-scaled linear terminal yet designed for an actual situation is Tippetts-Abbett-McCarthy-Stratton's proposal for the new Dallas–Ft. Worth airport.

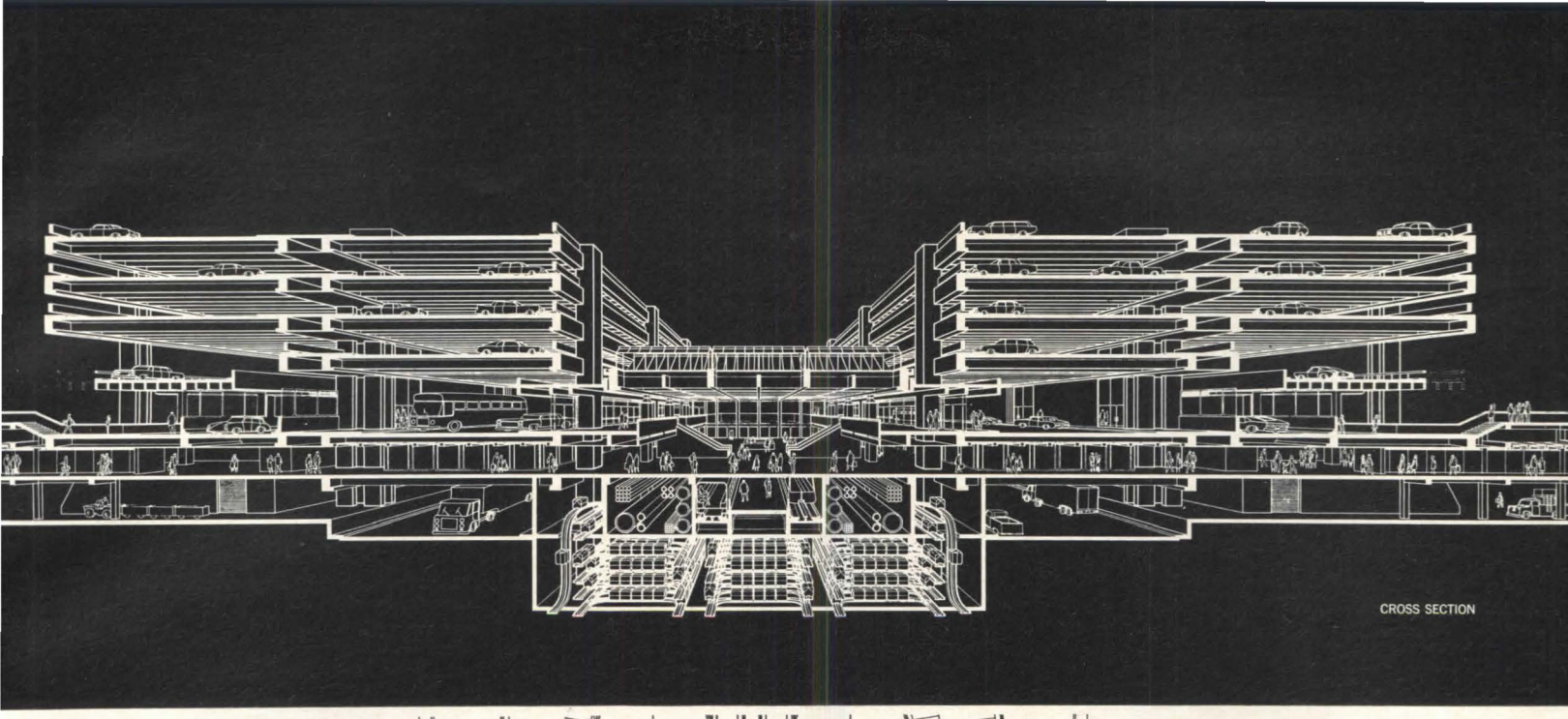
The site selected by TAMS for this collaborative effort of two rival cities (an effort that still needs voter approval) lies between two east-west routes linking the two centers (above left). Major runways will run north-south, with a mile-wide corridor between them (to permit simultaneous landings or takeoffs.)

A road through the middle of this corridor will intersect both routes and form the spine of the two-mile-long terminal. At either end, the road will split into service lanes at apron level and passenger lanes two levels higher (section, right). Above will be four parking levels.

Running along the axis at the service level will be a transit system, linking points along the length of the terminal and the long-term parking lots at both ends. Potentially, this line could be part of a regional system.

The ideal linear scheme would have direct transfer to ground transportation at every boarding gate. But actually, stops for cars, buses, and transit must be farther apart than the 200-odd ft. required for docking each plane. Moreover, escalators, passenger counters, baggage facilities, etc., must be shared among several gates to serve any adequately.

At Dallas-Ft. Worth, these facilities are in nodes 800 ft. apart, from which lateral passages lead to boarding gates. These extensions accommodate only a few more planes than could line up along the central structure, but they give each airline tenant a chance to arrange boarding areas to fit changing needs.



CROSS SECTION

RAMP DOWN
RAMP UP
RAMP UP
RAMP DOWN
SPECIAL PURPOSE PARKING
RESTAURANT
RENTAL
HOLD ROOM
PASSENGER CONCOURSE
CONCESSIONS AND AIRLINES
HOLD ROOM
REST
THEATER
SPECIAL PURPOSE PARKING

PARTIAL PASSENGER CONCOURSE LEVEL

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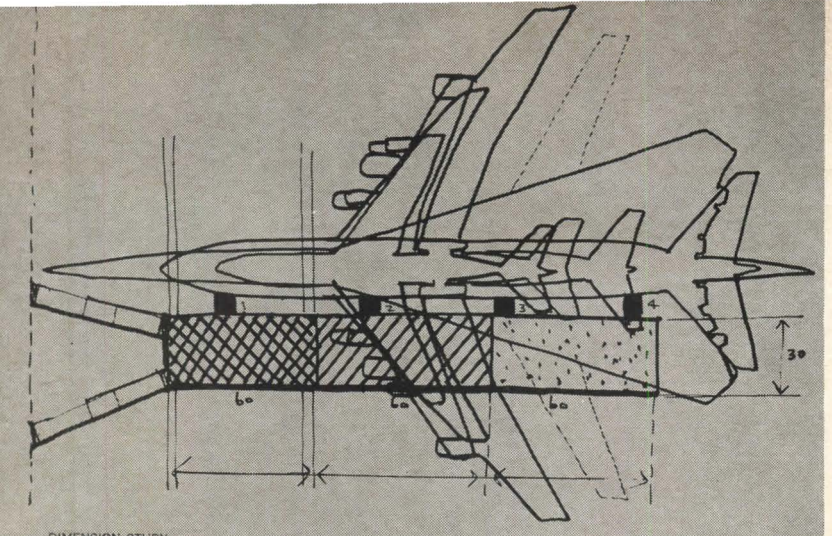
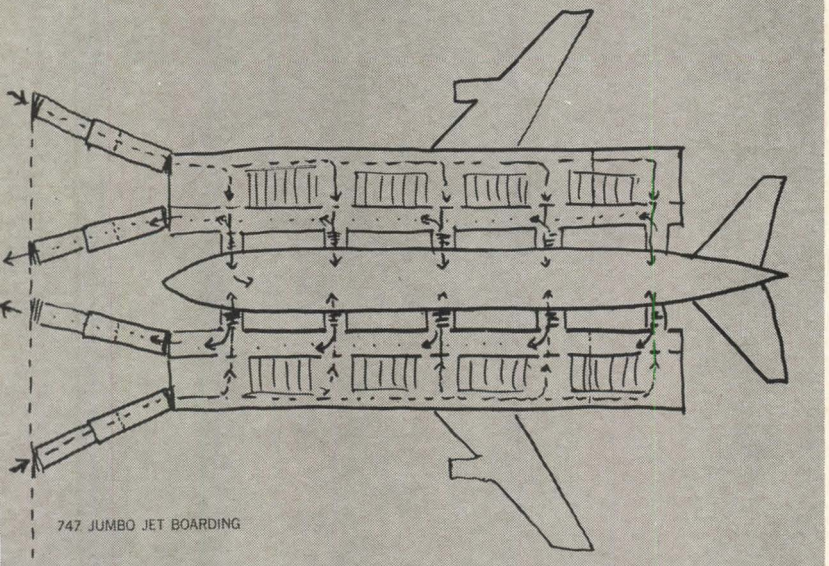
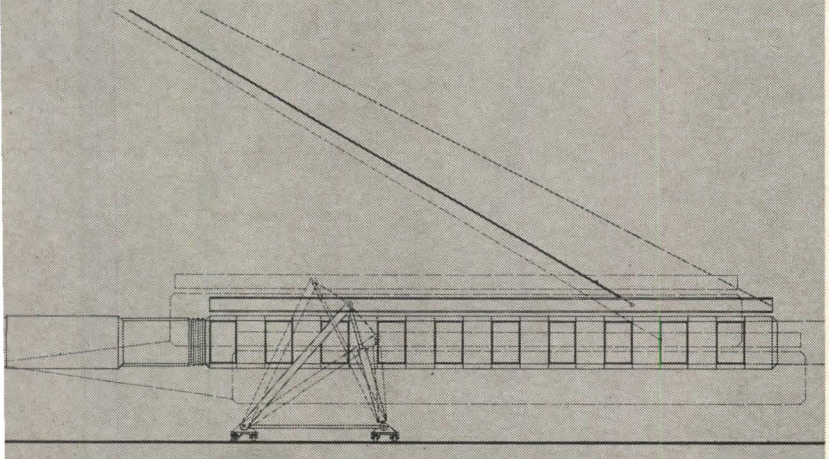


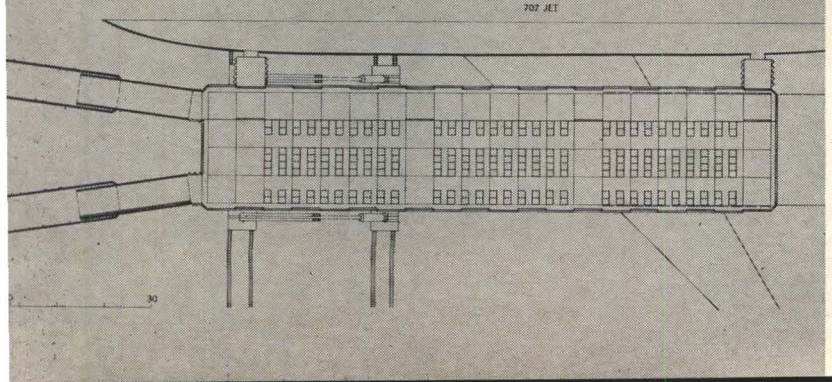
DIMENSION STUDY



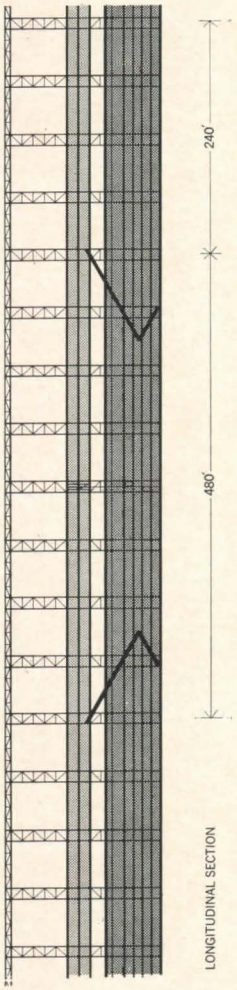
747 JUMBO JET BOARDING



GONDOLA ELEVATION AND PLAN



Hypothetical airport: the linear terminal without compromises



Weese's boarding gondolas, devised to fit all jets (top left), could be used singly or in pairs (center left). They could move up, down, or laterally (elevation, left), suspended from cables—or cantilevered if that proved more economical. Gondola walls would be metal panels, replaceable with adjustable gangways wherever needed (plan, left). A typical cross section (top right) shows the minimal width of the passenger concourse. Restaurants, etc.—and a moving sidewalk—would be located on the mezzanine above it.

The firm of Harry Weese & Associates has worked out a "universal" linear terminal scheme to fit a variety of situations. Weese's purely linear plan would bring the planes right up to the central structure, which would take up as little area as possible. All access roads and parking, transit and baggage equipment would be underground.

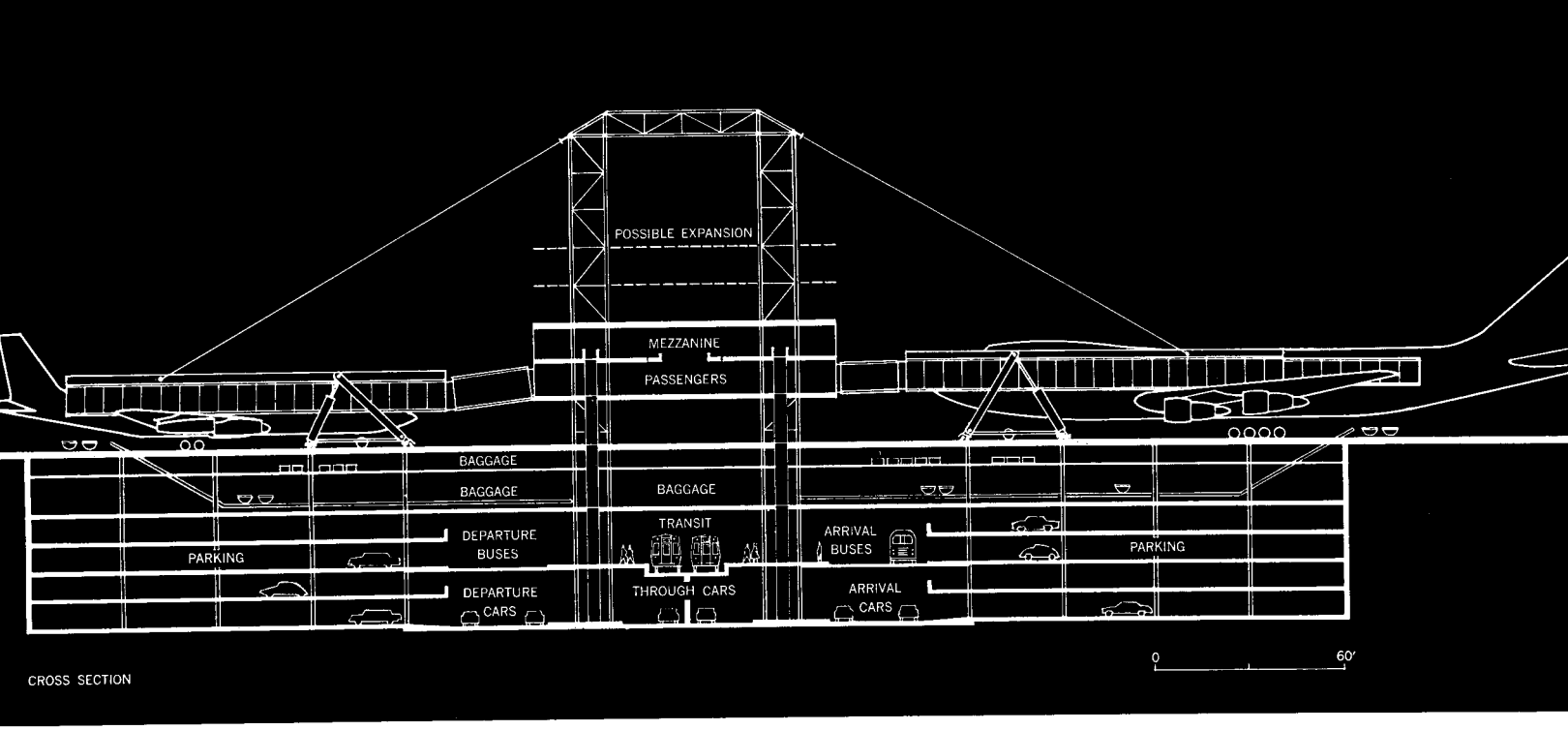
The key to Weese's scheme is an adjustable boarding "gondola," which would permit the fastest possible unloading and loading of any jet now flying or on the boards. As a first step, Weese and his staff superimposed the plans of all these planes (top left), lining them up at the leading edge of their wings, the outer limit for any structure resting on the apron.

The gondola they developed could be 60, 120, or 180 ft. long, depending on the size and door locations of the planes it served. Since passengers could assemble in it, there would be no need for the usual boarding lounge.

The overhead beams of the gondola would be supported by adjustable frames on the ground and adjustable cables (elevation, left). Tracks on the apron and on the terminal superstructure would allow the device to be moved along the terminal, to meet changes in aircraft or schedules.

In the Weese scheme, the need to share bus and transit stops, baggage facilities, etc. among several gates is met by centering a passenger transfer point in each 960-ft. segment of the terminal (section, left). Escalators leading up to the boarding level would be within 240 ft. of any boarding gate.

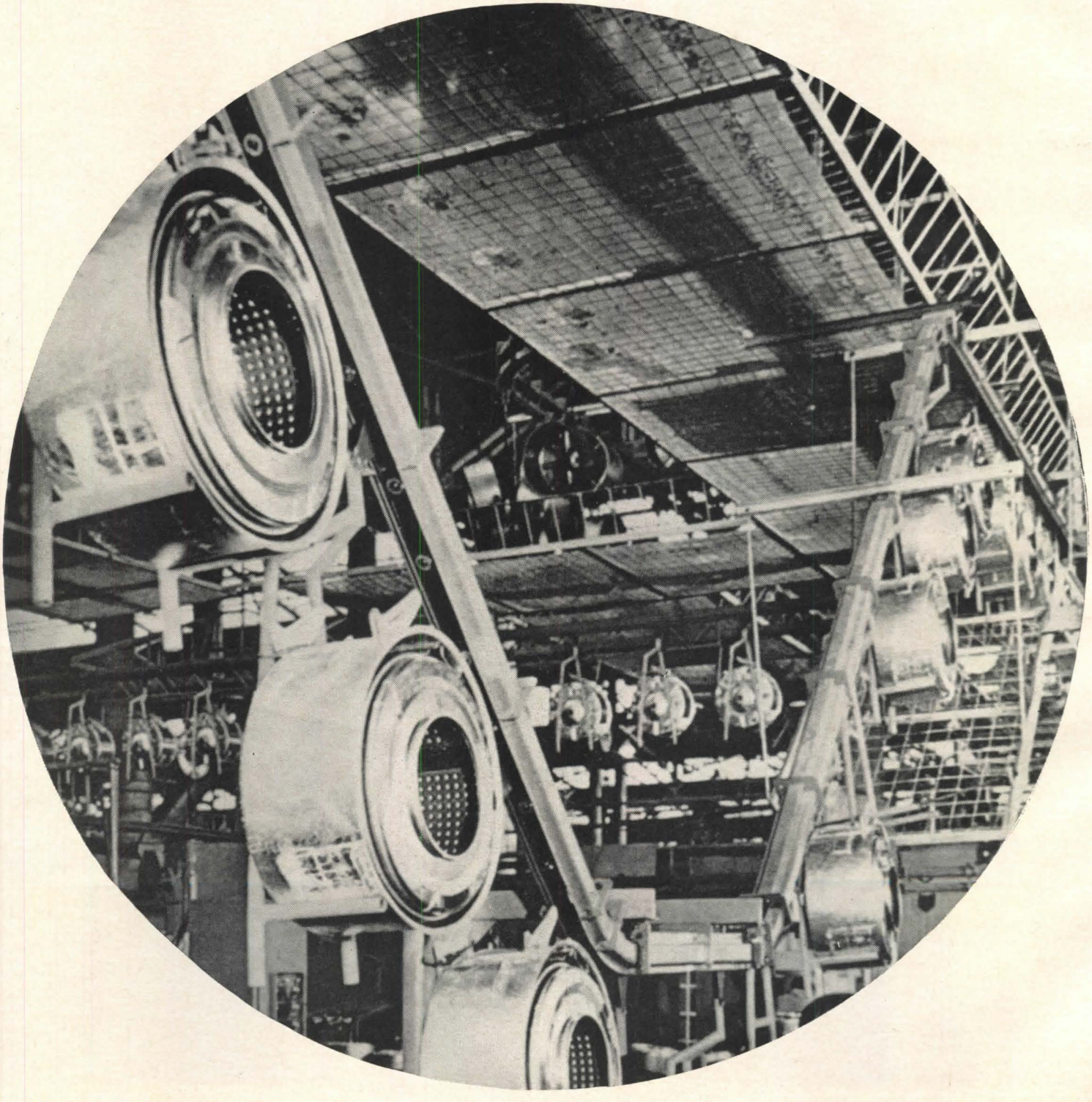
The full scheme shown here is intended only for major air hubs. At smaller terminals — with smaller planes—car and bus levels could be combined, transit omitted, and parking reduced. If underground construction were restricted, Weese concedes that vehicle traffic and parking could be stacked above the passenger level. And, although the scheme is "linear" in principle, its segments could be readily arranged in a square—or bent around to form a circle.



CROSS SECTION

MINISYSTEMS IN THE CITY

BY BRIAN RICHARDS



In the spring of this year, the U.S. Senate will be asked to consider what could prove to be one of the most forward-looking studies into future concepts of metropolitan transportation ever produced.

The Urban Mass Transportation Act of 1964 had placed undue emphasis on research into more spectacular systems of high-speed transit for intercity use. It had largely ignored the problem of metropolitan transportation or that of travel within cities. Then, in August of 1966, Congress amended the Act, authorizing HUD to "undertake a project to study and prepare a program of research, development, and demonstration of new systems of urban transportation that will carry people and goods within metropolitan areas speedily, safely, without polluting the air, and in a manner that will contribute to sound city planning." The amendment instructed HUD to report its findings and recommendations to Congress within 18 months.

Cornell Aeronautical Laboratory, one of those commissioned by HUD, has done research into the feasibility of a special automated vehicle called an Urbmobile, capable of being driven on road or track. Recently HUD announced a $300,000 joint study between General Motors and the University of Pennsylvania on the design of a three-seater minicar having both gasoline and electric propulsion, for both out-of-town and in-town use.

The "in-town" mention sounds dubious, however; for even mass acceptance of minicars in cities will never prove a solution and only lead to worse chaos. But what is interesting about the study is its promised intention to consider the feasibility of vehicle standardization and the practical aspects of mass vehicle hire. Both aspects are prerequisites of any Urbmobile system, and could lead to its eventual introduction.

Meanwhile, rapid transit will continue to be essential for the larger cities. It alone has the capability of bringing commuters closer to the city core or, alternatively, of encouraging the new growth of additional cores. Express buses, too, given proper road facilities, are equally useful but, like automobiles (maxi or mini), less able to terminate easily at any points except those peripheral to the core area. This factor may reinforce the argument to provide for good short-distance transport within cores.

Mr. Richards is a British architect and author. His influential book, New Movement in Cities, has had worldwide distribution in several languages.

Here to stay

It may be argued that cores will no longer be necessary in the future, and that increased phone or videophone communications will in fact enable people to stay at home. But, to date, the reverse appears to be true: people tend to congregate and move more than ever before. Automobile owners, for example, often make three times as many trips in a day as nonowners. The easier it is to move, the more people move.

But in city cores, such as those of New York or Chicago, up to 90 per cent of the people working and visiting are without their automobiles, and most short-distance trips are made on foot, by bus, or by taxi. Yet all three invariably offer deplorable service. Sidewalks are often intolerably narrow and overcrowded; bus service slow and irregular due to heavy traffic; and taxis unobtainable and expensive.

Successful experiments in which streets were closed to vehicular traffic are now well known, and some of these street closings have led to increases of trade of up to 20 per cent. Experiments with minibuses running at close intervals have been successful, as in Washington, D.C., and have proved conclusively the need, on some streets, for such systems. Only with taxis, the most flexible of all systems, have experiments lagged behind. The jitney, or shared taxi, was common in the U.S. in the '30s and is operating successfully in many foreign cities.

All three systems—walking, bus, and taxi—offer the easiest and most economical way of getting around in cities. Rapid transit in the city core is often, for reason of size, placed underground at a high cost. (Capital costs per two-track mile of cut-and-cover construction may be assumed to be $17.5 million.) Partly for this reason, only a limited network has been provided in the city core, making its use for short-distance trips far from ideal. Also, compared with surface-level or elevated transport, it disorients the passenger within the city — an important factor where, on shopping or visiting trips, experience and enjoyment of the scene are essential.

On the streets of the city, traffic termed "essential," such as service trucks and vans, clog movement and result in poor travel times for taxis and buses. And traffic engineering measures to improve flow (e.g., one-way streets) increasingly negate the convenience of buses. In Washington, D.C., for example, although the minibus runs at 2½-minute intervals, average journey speed is only 4½ mph; average trip length is six city blocks; and 11 buses are required for a circuit of 1½ miles. And so, because of the dense traffic in our cities, the subway, for those cities possessing one, may still be quicker to take for short trips of ½ mile because it is segregated from other traffic—although it was not designed for short trips.

Elevated rapid transit has been proposed for several cities, ranging from the Monorail at Seattle to the recently rejected guided bus system proposed for Manchester, England. But few city streets are wide enough to take the large scale structures required—and again, as with the underground, they are not designed to solve problems of short distance movement.

Small-scale systems

Research and development are now under way in the U.S. and in Great Britain with systems small enough in scale to be acceptable when running above the city street. Some of these are slow enough to permit station spacing at close intervals (¼ mile), and many are likely to prove cheap enough both to construct and operate so that fine-mesh networks would be profitable. It is undoubtedly this kind of transport facility for which there now exists a latent demand in many of our cities.

The basic requirements of such a small-scale system are these: 1) it must be capable of integration into the "inherited environment"; 2) it must be available for operation 18 hours a day; 3) it should involve no waiting and must be easily accessible; 4) it should operate on low fares, or possibly be free of charge; 5) it should be silent, free from fumes, and safe; 6) it should be open-ended, capable of change, addition, or easy removal; 7) it should have a variable capacity and ability to handle certain goods and deliveries; 8) it should have an average speed of 15 mph— twice the current average in many cities; and 9) it should be enjoyable to ride on.

No system of secondary movement having all the above requirements is manufactured today, although several are under study by firms in the U.S. and elsewhere. Many systems, such as multispeed moving pavements, have been tried with success at expositions over the past 70 years, but no single transport authority has been prepared to consider their validity in the context of city-center transport. Three factors, however, may lead to introduction of short-distance movement technology: the rising cost of manpower (bus drivers' wages often represent 60 per cent of operating costs); public demand for better public transport; and the increase in traffic congestion.

The systems discussed on the next four pages are all small in scale and therefore capable of running above street level or even through buildings. They are likely to have high initial capital costs but low operating costs when fully automated systems are available. Maintenance costs are likely to be high, but this will depend on the complexity of the technology. No mention is made here of this factor, which is, of course, an extremely critical one.

CARVEYOR

Designed by Stephens-Adamson and Goodyear, the Carveyor was studied first in 1954 as a system to run underground and replace the Times Square–Grand Central shuttle. An actual full-scale prototype was tested successfully. As the operating staff would have been minimal, it is understood that union difficulties effectively blocked its installation.

In this system, cabins with from four to ten seats run on a track at 15 mph, with boarding platforms at 400-yard intervals. The latter consists of pedestrian conveyors, parallel to the track, and moving at the same speed as the cabins (1½ mph), for people to board or leave in safety. The capacity of the system ranges from 5,000 to 11,000 seated passengers per hour in one direction, depending on cabin size.

In the rapid transit plan for Los Angeles, prepared by Daniel, Mann, Johnson & Mendenhall, the Carveyor was one of the systems considered for downtown distribution. Atlanta proposes to use it in its rapid transit plan, also as a distribution system. Victor Gruen, in his plan for New York's Welfare Island, proposed using the Carveyor to run the two-mile length of the island as the principal system of internal transportation.

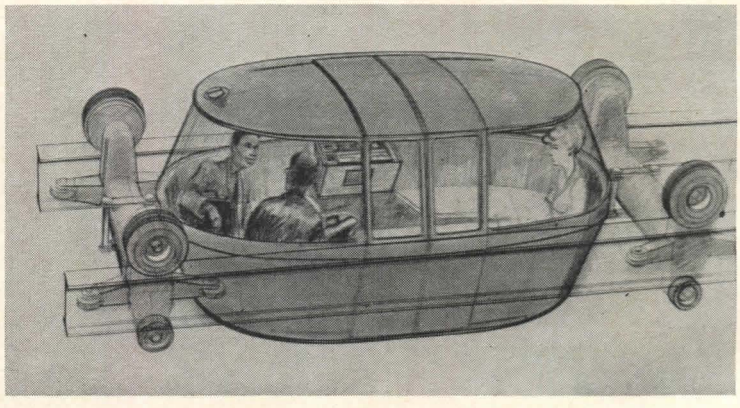
Only one known comparable system, the Carlator, is operating today—in a recreation park in Japan (below). After running three years, it has achieved an annual capacity of over a million people, at a maximum rate of 3,000 passengers an hour.

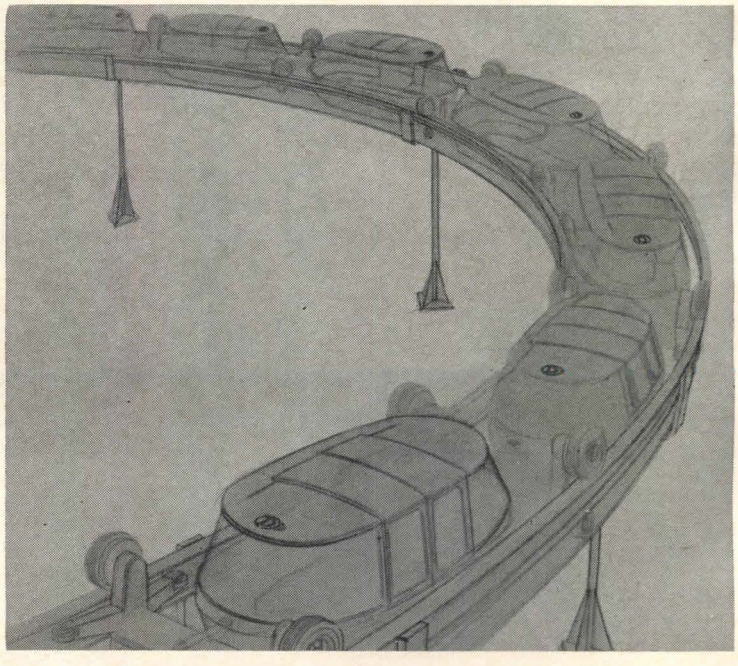
Cost estimates of the Carveyor vary from $4.8 million to $7.4 million per mile for a two-way installation, and Federal funds are now being sought for a half-mile demonstration line.

DASHAVEYOR

This system is relatively unknown as yet in the transport field, but is considered by mechanical handling specialists to be one of the most technically advanced and robust systems developed to date. Designed by the Dashaveyor Co., it consists of small six-seater cabins, called "modules" (below), which run within an enclosed tubular guideway. The modules can operate singly or in "flights" of up to 20 cars (bottom). The modules are electrically propelled and remote-controlled to slow down, empty, fill up, and accelerate to speeds of up to 80 mph. The system is capable of running horizontally, vertically, up and down inclines—even under water.

A five-mile installation has operated for over a year at a copper mine in Michigan, and the system is considered ready for application to the field of public transport. A number of public agencies already have expressed interest in the new system, the company claims.





PEOPLEMOVER

Designed by WED Enterprises and Goodyear, the Peoplemover is an automatic, continuously moving system. It consists of four-seater cabins running at 7 mph on an elevated guideway 6 ft. wide; and it has a capacity of 4,800 people an hour. Stations consist of revolving circular platforms, around which the cabins circle at the same speed, doors opening automatically.

The Peoplemover is being developed as a transport system for use in Disney's new Florida city of EPCOT, where the tracks will radiate from the central shopping and business zone out into the residential areas, reducing the need for parking in the center. The system has been operating successfully at Disneyland since September (below). Although the circular boarding platforms likely would be too large for use in dense city centers, parallel conveyor belts would consume less space.

MINIRAIL

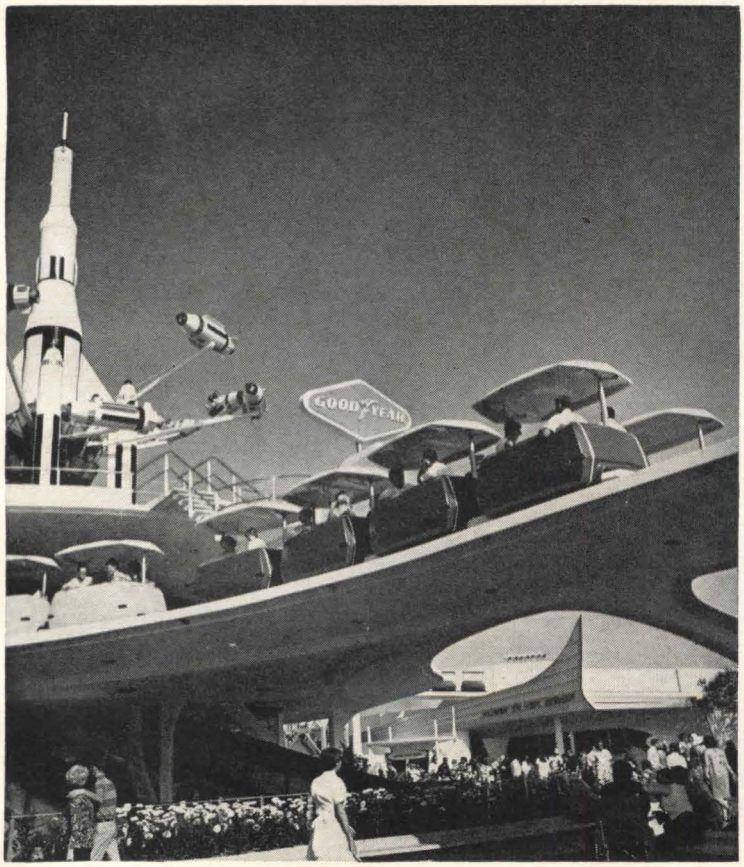
Designed by Habegger of Switzerland, the Minirail consists of a series of small 12-seat cabins joined into trains. It runs on a twin steel-channel track under automatic driverless control at speeds of up to 15 mph.

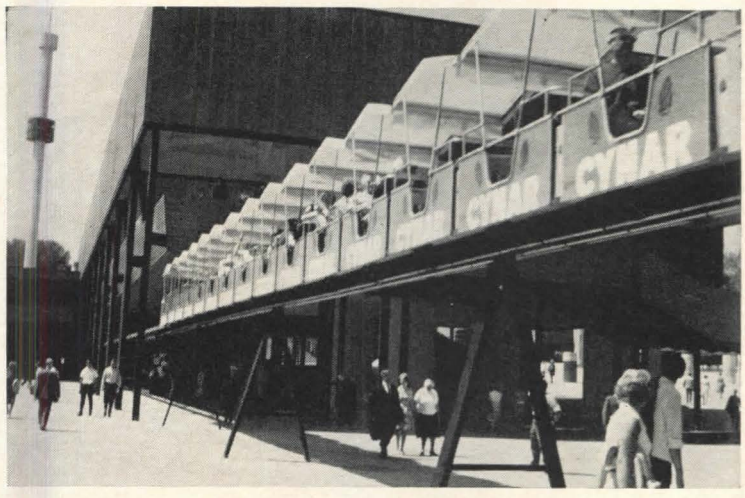
The system operated at Montreal's Expo 67, carrying 5,400 people per hour over an elevated track through the grounds. Its function was primarily that of a sightseeing system, generally with a one-way track and relatively few stations. Unfortunately, due to high demand, the system became overloaded.

(At Lausanne, incidentally, the Minirail ran over, under, and straight through several of the buildings (below), demonstrating its adaptability to difficult urban situations.)

The Montreal system and the two previous installations at Munich (bottom) and Lausanne used openair cabins designed specifically for exhibition use. More recent designs use cabins that are fully enclosed and have automatic doors. The most recent serious proposal by an authority for its use is at Haringay, North London, where it is intended as a connector system between car parks, the main shopping center, and the underground station.

Installation and operating costs are low: the Lausanne system, with a 20¢ fare, paid for all development and operating costs after running six months.



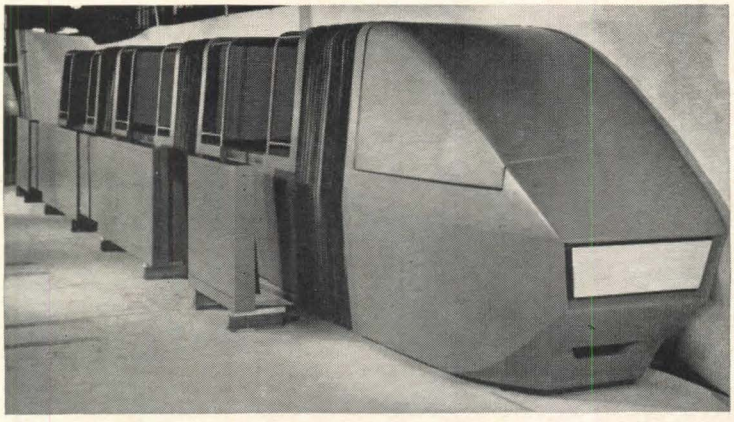


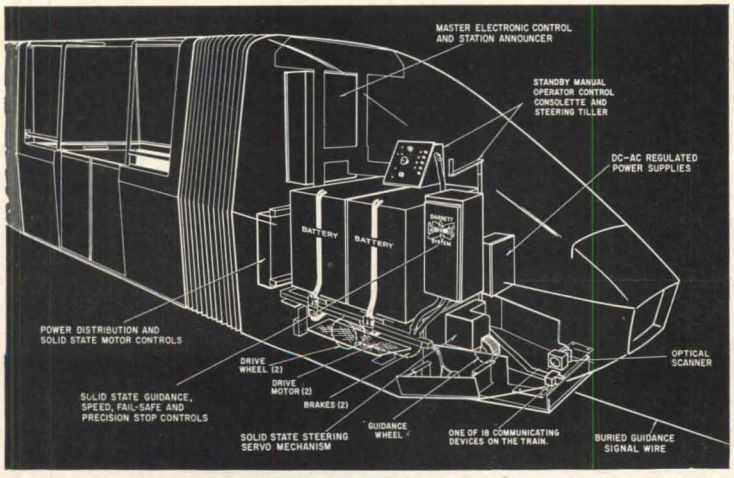
GUIDE-O-MATIC TRAIN

Designed by Barrett Electronic Corp., this system uses a small-scale train that follows a guidance cable laid in the floor. It is now being installed as an underground circulation system at Houston Airport (page 92).

Each train (see photo and diagram below) consists of three eight-seater coaches and a forward "power unit" containing batteries that supply power to dual rear-wheel motors. Built of aluminum and fiber glass, each train is 7 ft. 6 in. high, 5 ft. wide, and 45 ft. long.

A four-train system, such as that at Houston Airport, can handle 200 passengers in a ten-minute peak period, with a maximum hourly capacity of about 1,200 people. Operation is fully automatic, requiring no driver. An electronic monitor on each train sends malfunction alerts to a central control station, where an attendant mans an electronic console.





TRANSIT EXPRESSWAY

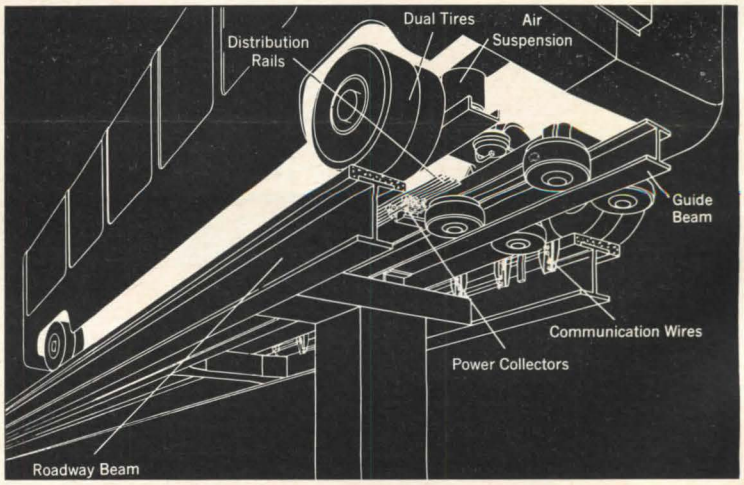
Developed by Westinghouse Electric Corp., the Transit Expressway, or "Skybus," is larger in scale than the other systems discussed here. It is intended primarily as a commuter system for medium-density areas. In 1965, a 9,340-ft. test loop was installed in Pittsburgh's South Park (photo below), where some 135,000 passengers rode the system in two years. The Port Authority of Allegheny County now plans to build an operating Skybus shuttle line between the Golden Triangle and a suburban area.

The electrically propelled Skybus cars run on four pairs of pneumatic tires along an elevated steel roadway topped with concrete "tracks" 22 in. wide. The cars are stabilized and locked in place by sets of chassis-mounted horizontal guide wheels which engage a steel "guide beam" between the tracks.

The Skybuses would operate 24 hours a day, using single vehicles during off-peak hours, and linking them into trains of up to ten cars at peak times. The maximum speed is 50 mph, and load-carrying capacity is 21,000 passengers per hour.

The trains are fully automatic, requiring no motorman, conductor, or attendant on board. They are so quiet, claims Westinghouse, that they could operate inside a building without disturbing its occupants.

For large cities, Westinghouse foresees the use of the Skybus as an outlying feeder for the central rail rapid-transit system In smaller urban areas, where it would be the central system, its outer parts would be served by feeder buses.



TELETRANS

This system, now under study by the Teletrans Corp., consists of four-seat cars running on an elevated track under computer control (below). Passengers at each station (bottom) receive a card punched with their intended destination, which they take to the first car waiting in line. After the card has been inserted into a slot, car doors close and the car accelerates automatically to merge with others passing on the main track. The car runs directly, with no intermediate stops, to the required station, where it is switched into a siding, ready for the next passenger.

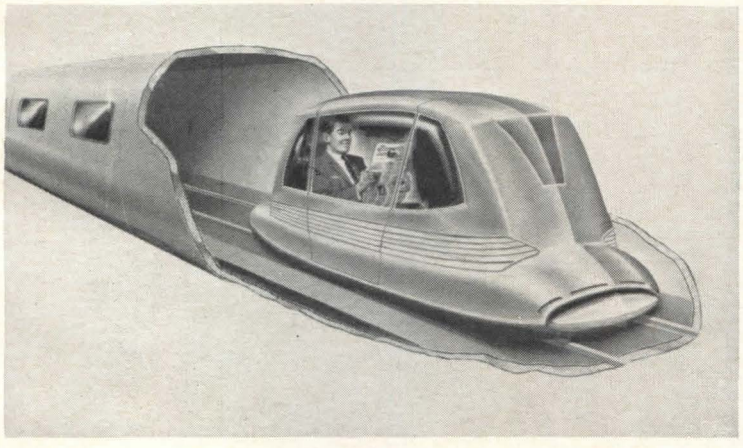
Teletrans are now under contract from American Airlines for a study of the system at small scale applied to baggage handling in airports. In Great Britain, a government contract was recently awarded to the Brush Electrical Engineering Co. to develop a system having similar operating characteristics. A full-scale prototype will be tested.

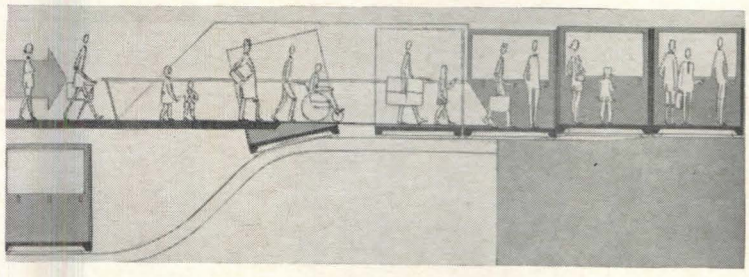
Both systems claim theoretical capacities of 20,000 people per hour, which could make them suitable for metropolitan use. But the feasibility of Teletrans within existing cities will partly depend on the method of handling cars at stations. A need for large sidings at stations could mean that only extensive and costly land purchase would make the system usable above ground in dense urban areas.

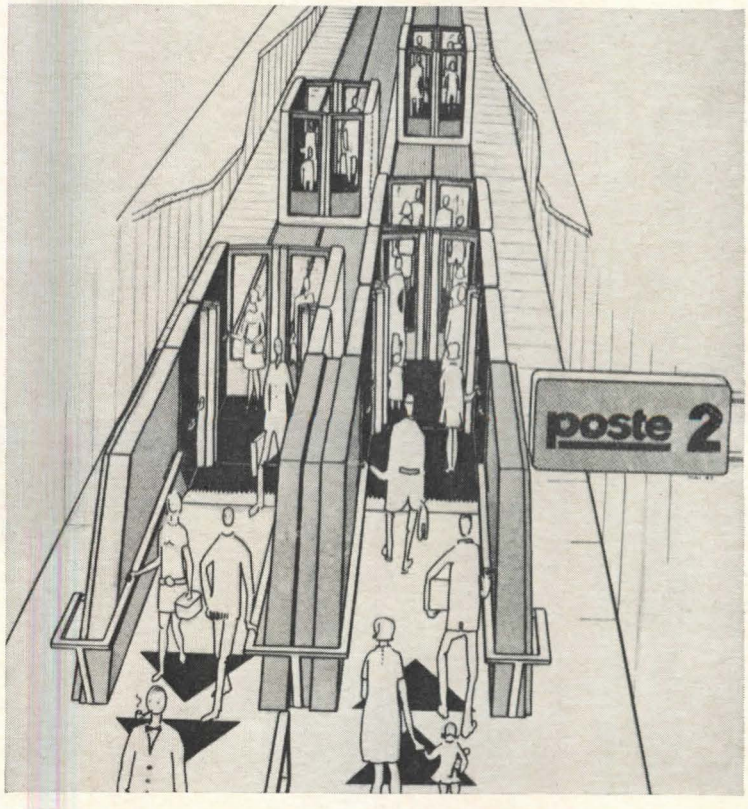
TRANSVEYOR

Designed by the Battelle Institute of Geneva, in cooperation with Sud-Aviation, the Transveyor is now under development for use in the new Paris Nord Airport and should be operational within two years. It consists of a series of platforms about 6 ft. square onto which the passenger steps, as onto an escalator. Doors close first in front, then behind. The platform then accelerates to 15 mph, until slowing down at the end of the trip, when the reverse procedure occurs (section, below, and rendering, bottom).

At present the design is intended for use between points with no intermediate stops. It is suitable for use in a situation such as a shopping center parking lot, where a distance of half a mile or more is too long for a normal pedestrian conveyor. Capacities are estimated at 7,000 people an hour, and the system is small enough to run elevated. Boarding platforms require about 12 ft. of depth, sufficient for the system to turn around.





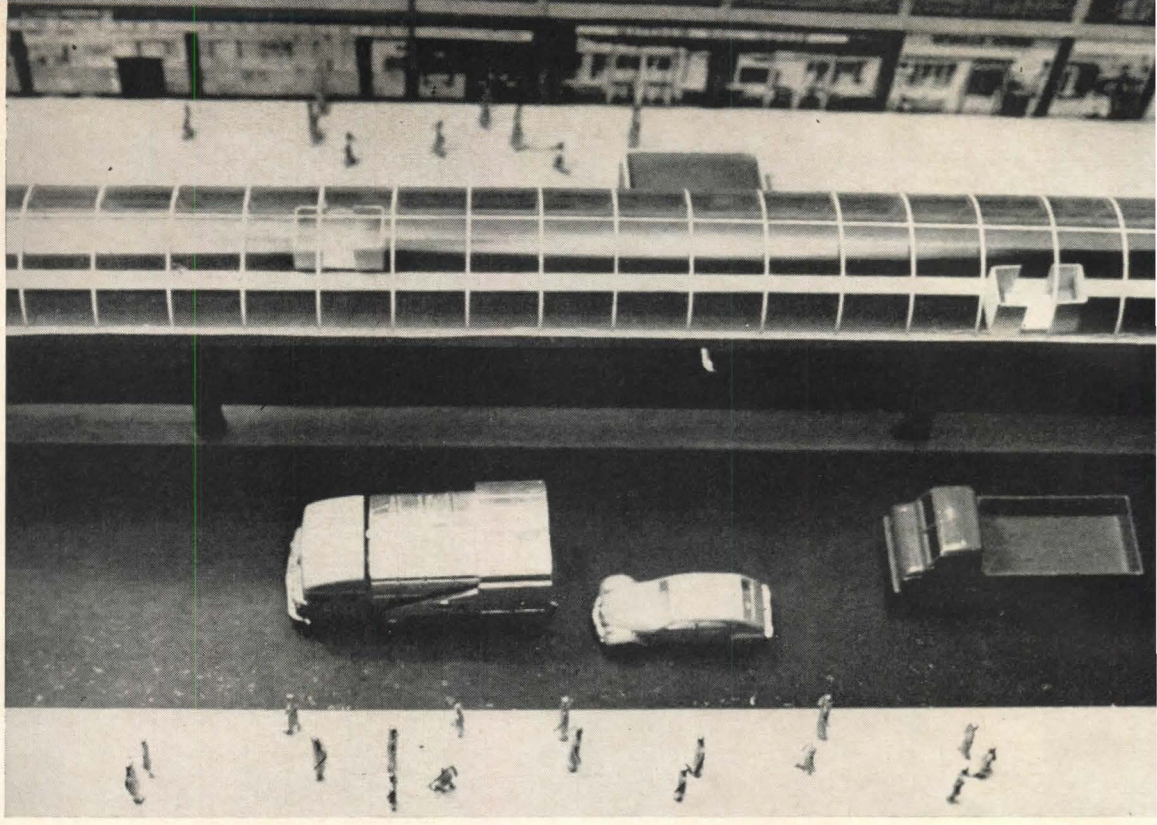


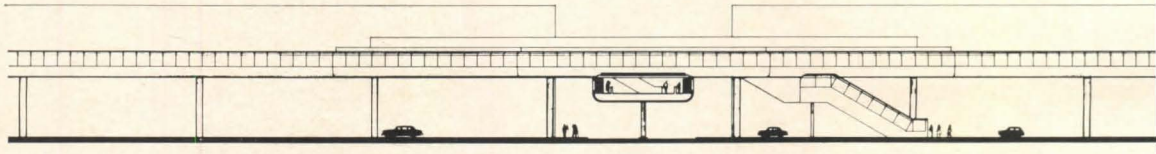
OVERGROUND IN LONDON

British Architect Brian Richards, author of the preceding article on promising new movement systems for dense urban areas, is himself engaged in a study to apply a small elevated system to the Central Area of London. Richards and Transportation Economist J.M. Thomson are proposing a system employing four- or eight-passenger cars which travel within a plexiglass-enclosed tube 12 ft. in diameter. They would run 20 ft. above the center of major wide streets in the area (photo right), with escalators and stairs leading down to sidewalks at the stations (sections and bottom photo).

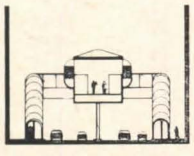
The system would connect with an inner ring of parking garages around the Central Area, and with the stations of the subway system. It would also handle the movement of light goods with service capsules placed on the line at special points. Richards and Thomson envision the eventual integration of the system into new air-rights developments of buildings and pedestrian ways.

The cars would travel at 15 mph, 75 ft. apart, and bunch together at stations, where they would slow to the same speed as two 50-ft.-long parallel pedestrian conveyors. Doors would open for 30 seconds to permit boarding or leaving the cars. Capacity is 6,000 people per hour in each direction.

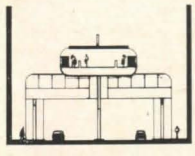




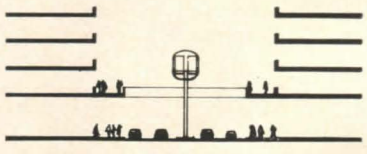
ELEVATION OF STATION



SECTION OF INTERCHANGE



SECTION THROUGH STATION



SYSTEM AT -30 LEVEL

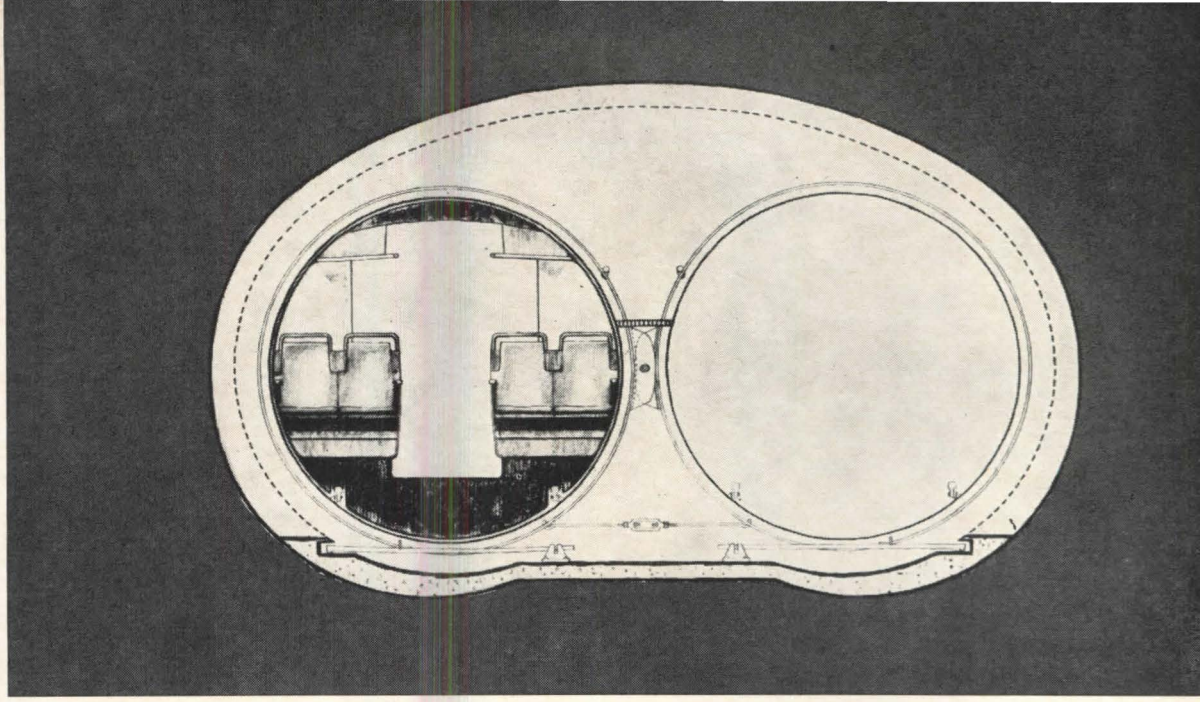
SWOOSH!

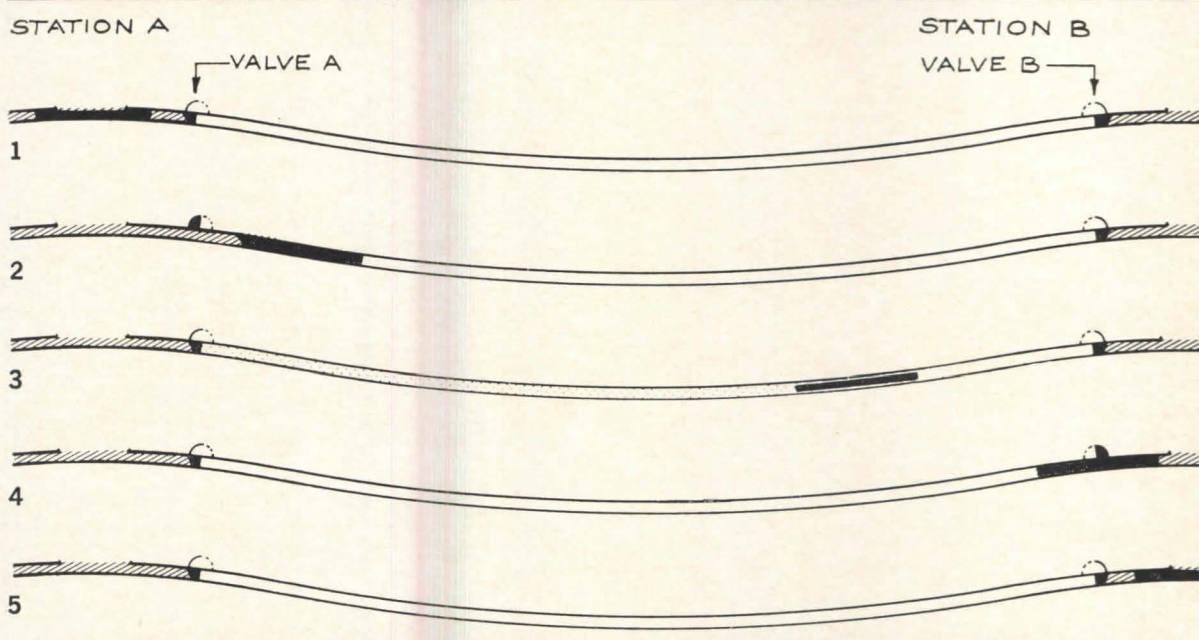
In the eyes of a number of transportation experts, the most promising device currently being proposed for future high-speed transport within and between urban areas is Gravity-Vacuum Transit (GVT), a system developed by Aeronautical Engineer Lawrence K. Edwards, president of Tube Transit Corp. in Palo Alto, Calif.

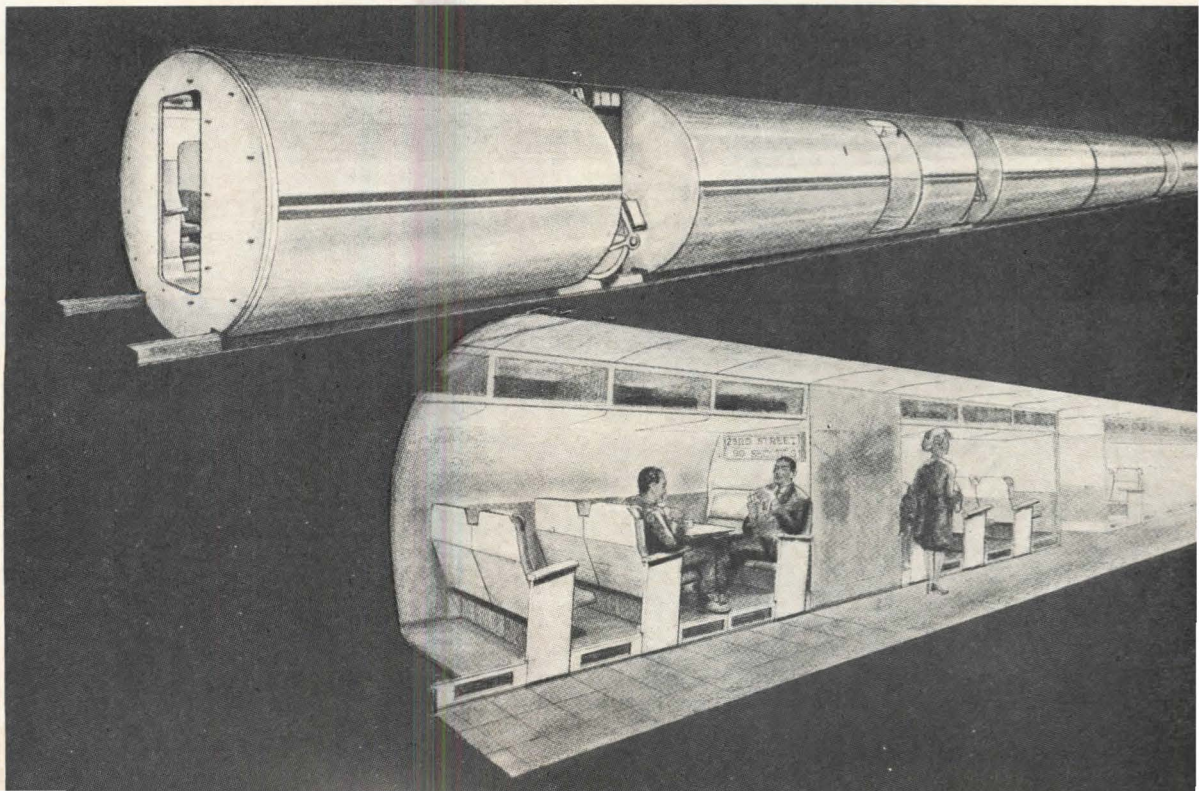
As its name implies, GVT employs gravity and vacuum to propel trains — at enormous speeds—through a pair of steel tubes imbedded in underground tunnels (see section and cutaway rendering). The five diagrams at right show the basic steps of the system's automatic operation: 1) While the train is resting in station A, surrounded by normal atmosphere, air in the tube section between it and station B is evacuated. 2) Valve A is opened, and the train is pushed into the tube incline by atmospheric pressure aided by gravity. 3) As the train approaches station B, valve A is closed; air behind the train is expanded while air ahead is compressing. 4) Valve B opens when air in the tube returns to atmospheric pressure, and the train's momentum carries it into station B. 5) The train stops in station B, again surrounded by normal atmosphere—and the five-step process begins again.

For stability, the trains would travel on rails, but no on-board engines would be required for propulsion. Lawrence claims that GVT is capable of speeds roughly twice the limit for any other system, existing or proposed. He also says that GVT would be much cheaper to build and operate.

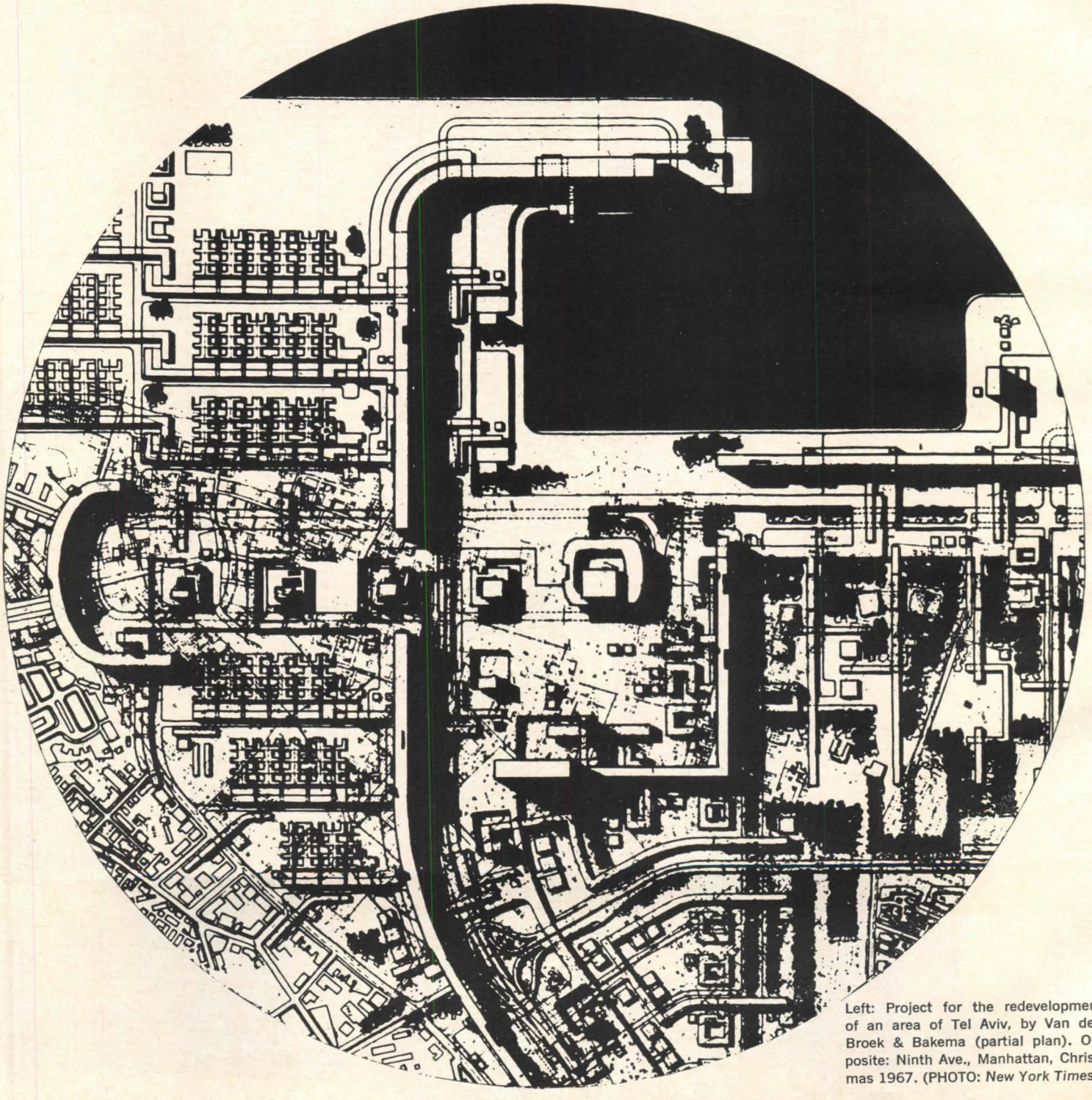
The Regional Plan Association of New York, which considers GVT's potential "almost too good to be true," has proposed that it be incorporated in future transit plans for the region — subject to its being tested out with a full-scale demonstration model. For that purpose, Lawrence needs an estimated $10 million, which is about a fifth of the cost of a single moon-landing vehicle.







URBAN FORM AND URBAN FUNCTION



Left: Project for the redevelopment of an area of Tel Aviv, by Van den Broek & Bakema (partial plan). Opposite: Ninth Ave., Manhattan, Christmas 1967. (PHOTO: *New York Times*).

The extraordinary Grand Central complex described earlier in this issue is traversed by 500,000 people on every single working day. That is the equivalent of the total population of Memphis or of Cincinnati; and yet the core of "Grand Central City" manages to accommodate its transients within an area of less than ten acres.

The reason Grand Central City functions so well, as pointed out on pages 48-55, is that this "city" was designed as if it were a single building—which, in effect, it has become. It was designed, and it grew, to become a single organism, in which all the innumerable services required by a city were separated out from one another, but also meshed and integrated with one another; in which different transportation systems were all designed to interact, connect, but also to keep out of each other's way.

Unhappily, most of our *real* cities have been planned and built by what appears to be a coalition of schizophrenics.

If the analogy of "the city as a single building" holds true, then the single buildings that most of us inhabit would have elevators shooting up through corridors and air conditioning ducts that double as mail chutes.

For the pedestrian corridors of our cities double as horizontal distributors that convey everything from garbage to highly inflammable fuels—all carried in trucks that come barreling down those corridors, forcing mere humans to run for their lives.

These horizontal distributors of services don't only carry rampaging trucks, of course; they carry an infinite variety of vehicles, all operating at different speeds and serving different needs: bicycles, motorcycles, private cars, taxis, buses—as well as trucks of every conceivable size and shape, and vehicles supposedly available (instantly) to assist in emergencies.

And to compound the confusion, there are not only vehicles that are meant to operate at different speeds, but also some vehicles that serve localized, neighborhood traffic, and others that serve interstate commerce. And all are tossed into the same network of streets.

Any architect who managed in this fashion to mix up all his services in a single building would probably be disbarred. Yet those who shape our cities—public officials as well as private citizens—get away with this sort of confusion every day.

The analogy of the city as a single building can be carried still farther: much of the time, the "rooms" within our cities have been carefully distributed so that all those serving the same function are, generally, located in the same place. (This is about as intelligent as putting all the washrooms in a skyscraper on one floor—which would play havoc with the elevators, to mention only *one* likely result.)

Yet this is exactly the sort of "zoning" that has occurred in our cities, often by regulation, sometimes as the result of some sort of herd instinct. For example, in Manhattan all major theaters are located within a small area of a couple of dozen city blocks; and this concentration has, for many years, created spectacular traffic jams on every evening between 8:00 p.m. and curtain time. Indeed, on a Wednesday afternoon about a month ago, a combination of matinee-goers and office workers brought all traffic in the Broadway area to a full and seemingly permanent stop (right).

Yet, when someone determined the location of Lincoln Center, he proceeded to cram all of it into all of four city blocks! This concentration—five theaters, so far, in search of a nightly audience of close to 11,000 people—has, of course, had all the predictable results.

It seems unnecessary to cite additional evidence to show that the form of our cities and the flow of traffic within our cities are inextricably linked. The form of our cities can either facilitate or impede traffic; and the planning of transportation can either obstruct the city's growth, or direct that growth toward more desirable objectives. But what are the specific remedies now being advanced? For some of the answers, see the next six pages.

For old cities, a third dimension

Numerous proposals have been advanced to make traffic in existing cities more efficient. In this discussion the emphasis will be on some of the more radical proposals made to date.

The first group of such proposals attempts to sort out different kinds of traffic and separate them. The most obvious categories are pedestrian and vehicular (with several subcategories of vehicular traffic); and here are some of the ways in which such incompatible kinds of traffic might be separated from each other:

Separation by levels. Double-decking of streets or entire sections of cities is becoming increasingly common, especially in cities with steep changes in grade: in San Francisco **(1)** whole parking garages have long been secreted under public parks; in Manhattan, the UN Park **(2)** sits on a platform that cantilevers out over the East River and successfully hides the East River Drive; and elevated sidewalks are a familiar sight everywhere: this one is in the center of Stockholm **(3)**.

Separation by grids. The closing of some streets to vehicular traffic, or the opening of pedestrian arcades through the middle of city blocks, has worked effectively in many places—e.g., London's Royal Arcade **(4)**. A recent proposal by Barry Benepe extends this notion by superimposing a new pedestrian grid upon existing city blocks **(5)**, which would be bisected by walks **(6)**. Pedestrian crossings would be by over- or underpasses.

Separation by function. Systems like the Minirail can not only be elevated above existing streets or rights-of-way without interfering with traffic on other levels; they can also (as at the Lausanne Exposition of 1964) run under, over, or through buildings or city blocks **(7)**, thus simplifying the location of stations and possibly establishing a *diagonal* mass-transit pattern that would reduce travel time in rectangular gridiron cities.

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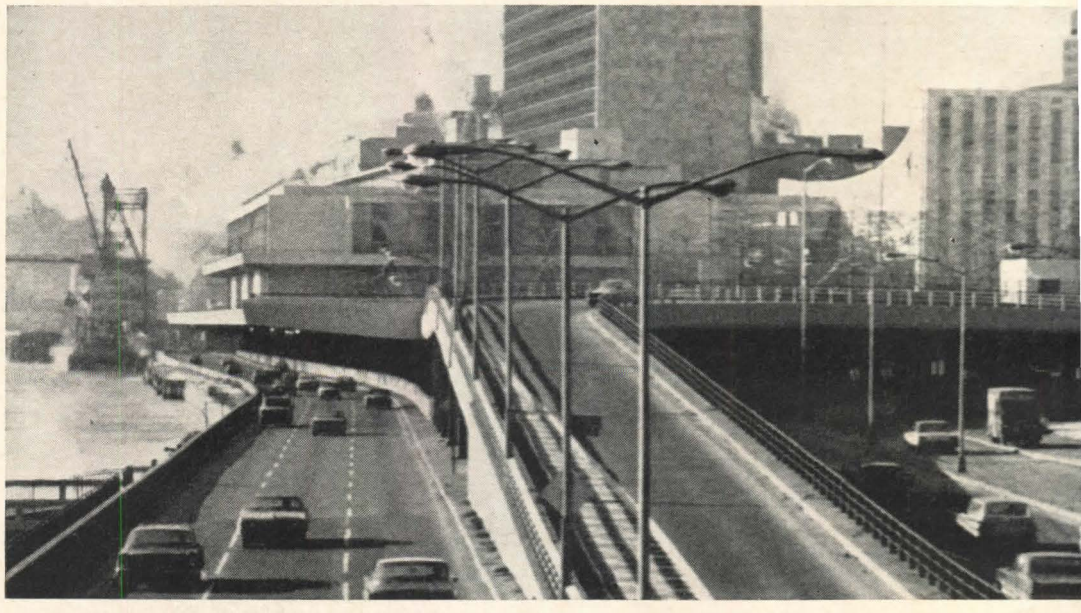
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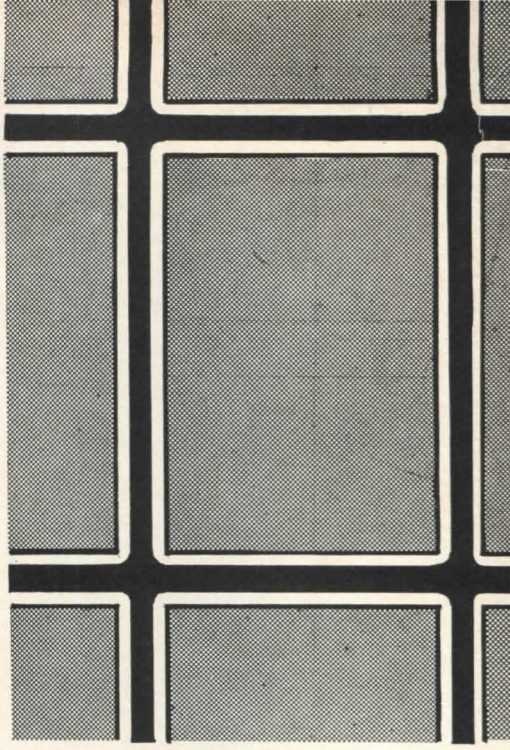

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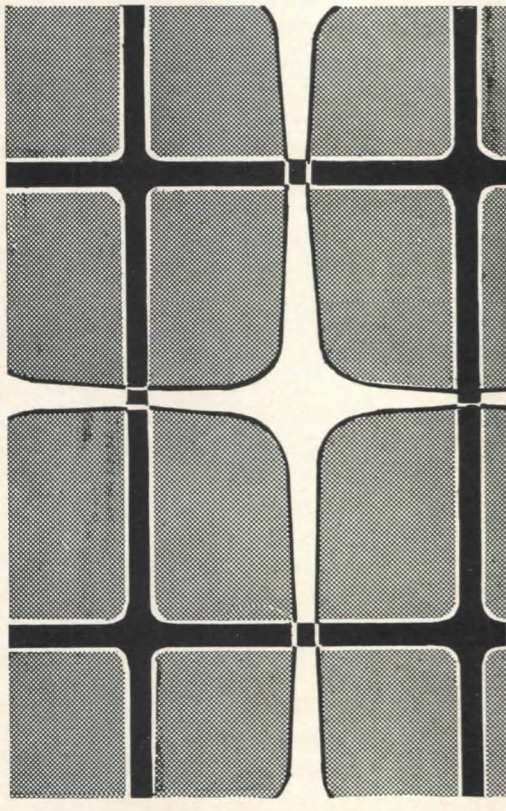

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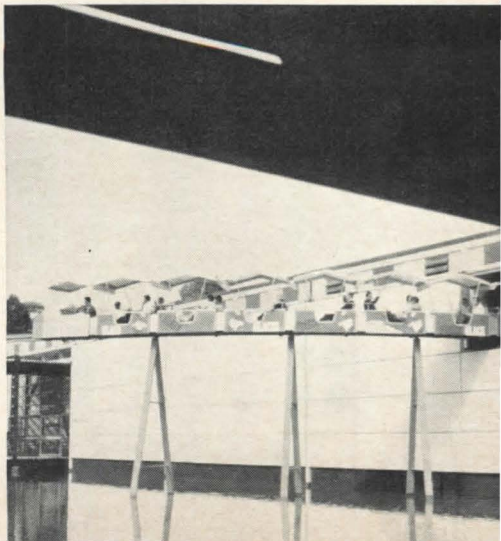

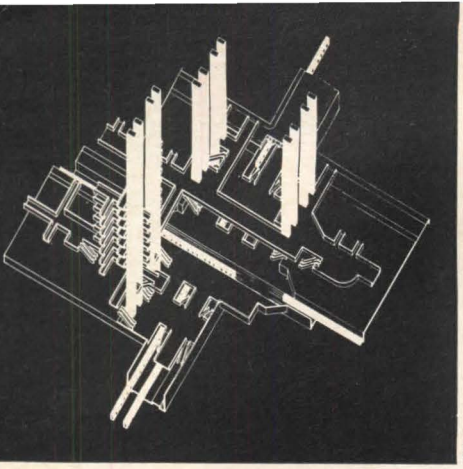

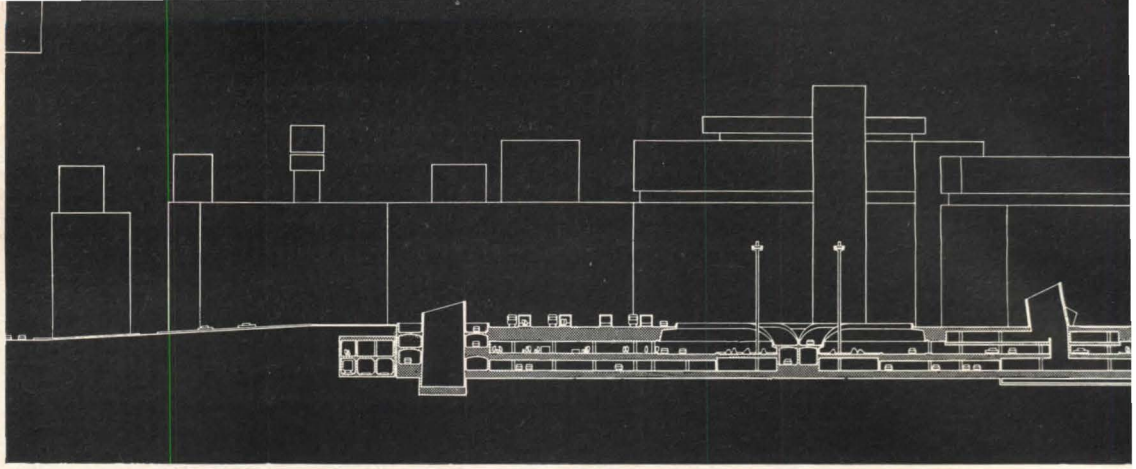


SUNTORY
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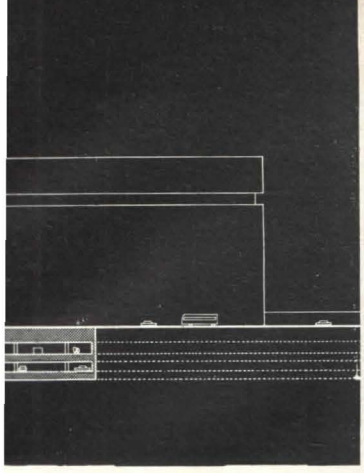

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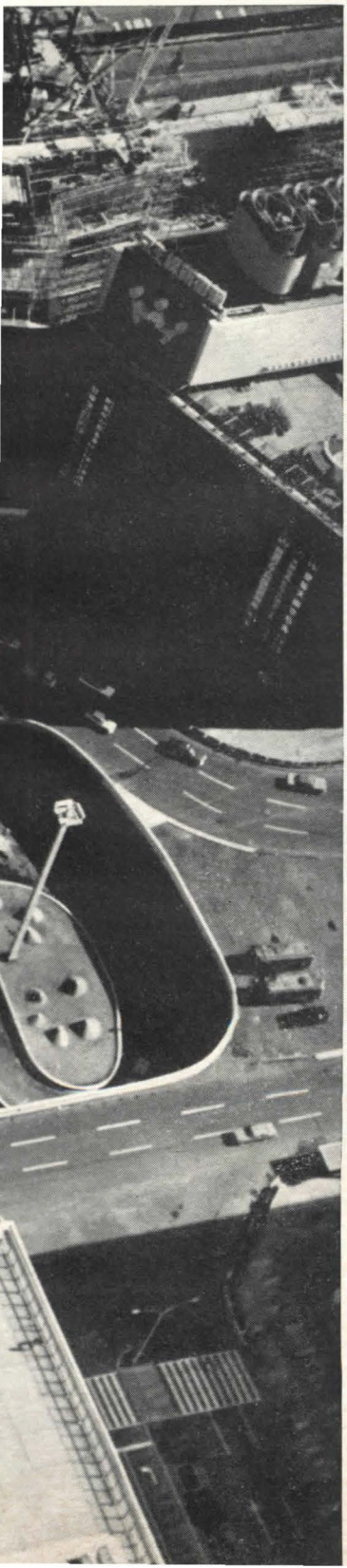

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Integration, as well as separation

In addition to *separation* of different kinds of traffic, various suggestions for the *integration* of different transportation systems have been advanced:

Vertical integration. The "access tree" proposal **(8)** by the N.Y. Regional Plan Association (pages 62-67) to integrate vertical transportation systems with mass-transit facilities at basement level is a brilliantly simple concept, and one relatively easy to realize.

Multiple interchanges. Since most suburbanites have to switch from one mode of transport to another (and, possibly, to a third or fourth) during the trip from home to work in the CBD, the design of efficient and attractive interchanges, located in the right places, becomes crucial.

The likely scale of such multiple interchanges is suggested by the extraordinary new Shinjuku Center in Tokyo **(9, 10)**, which combines, in one huge complex, a parking garage, railroad station, bus terminal, pedestrian shopping concourse, subway and monorail stops, as well as office buildings. The architects were Junzo Sakakura Associates.

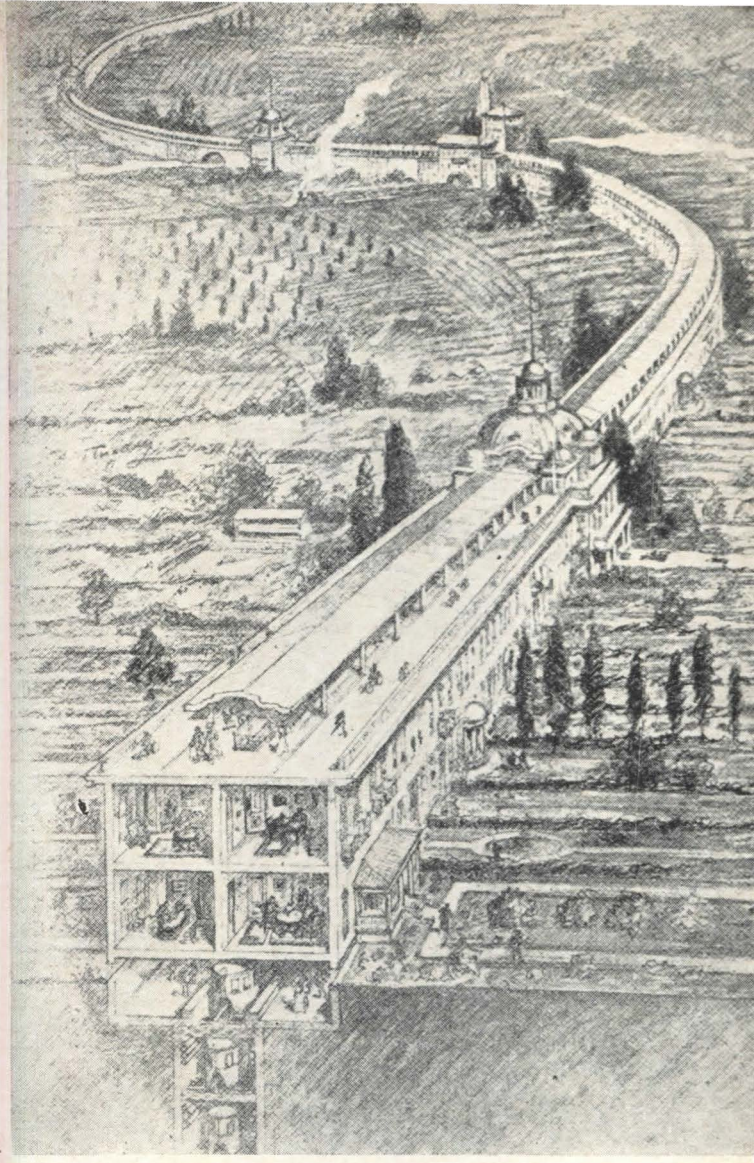
For new cities, a new architecture

Much more radical solutions have been advocated for traffic flow in *new* cities.

One of the earliest examples, undoubtedly, was the "Roadtown" proposed in 1910 by Edgar Chambless **(11)**. Le Corbusier's 1930 scheme for Algiers **(12)** is a modern version: a new city in the form of a single building, that would carry a continuous highway on its roof, and would contain several levels for localized automobile traffic and pedestrian circulation down below.

The scheme pointed the way toward a new kind of urban organism, in which buildings and the transportation links that connect them would be merged in huge megastructures.

Since Le Corbusier's project for Algiers, similar proposals have been advanced and built in Japan **(13)** and elsewhere.



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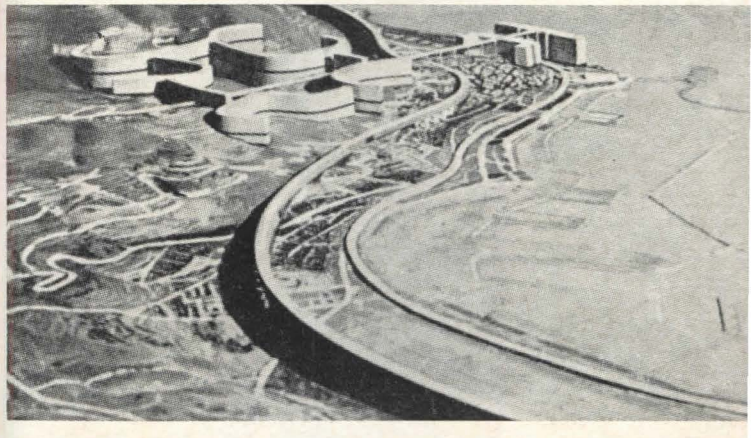

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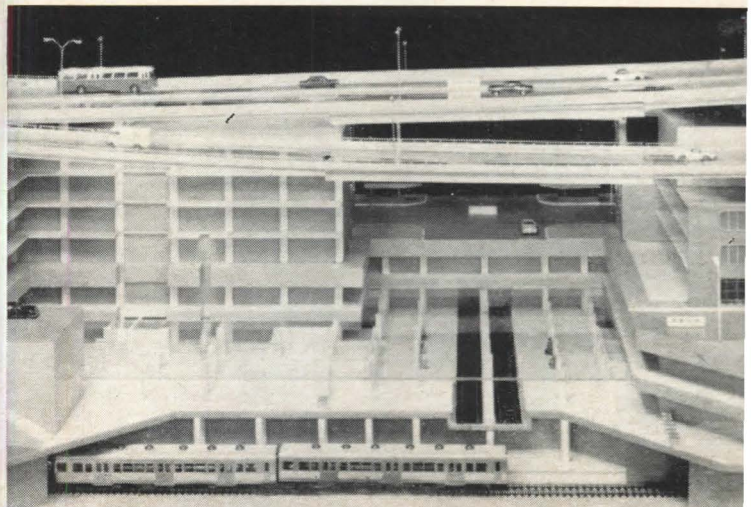

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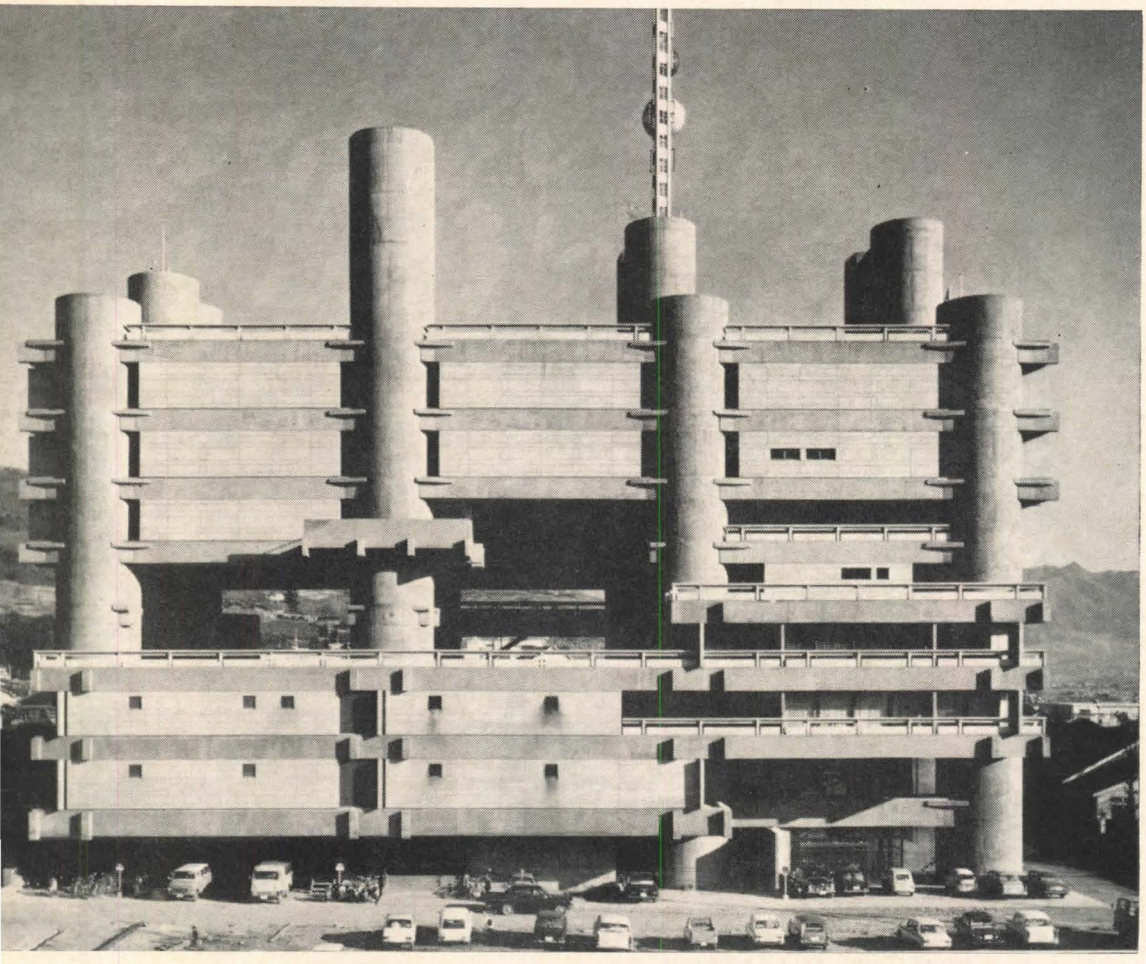

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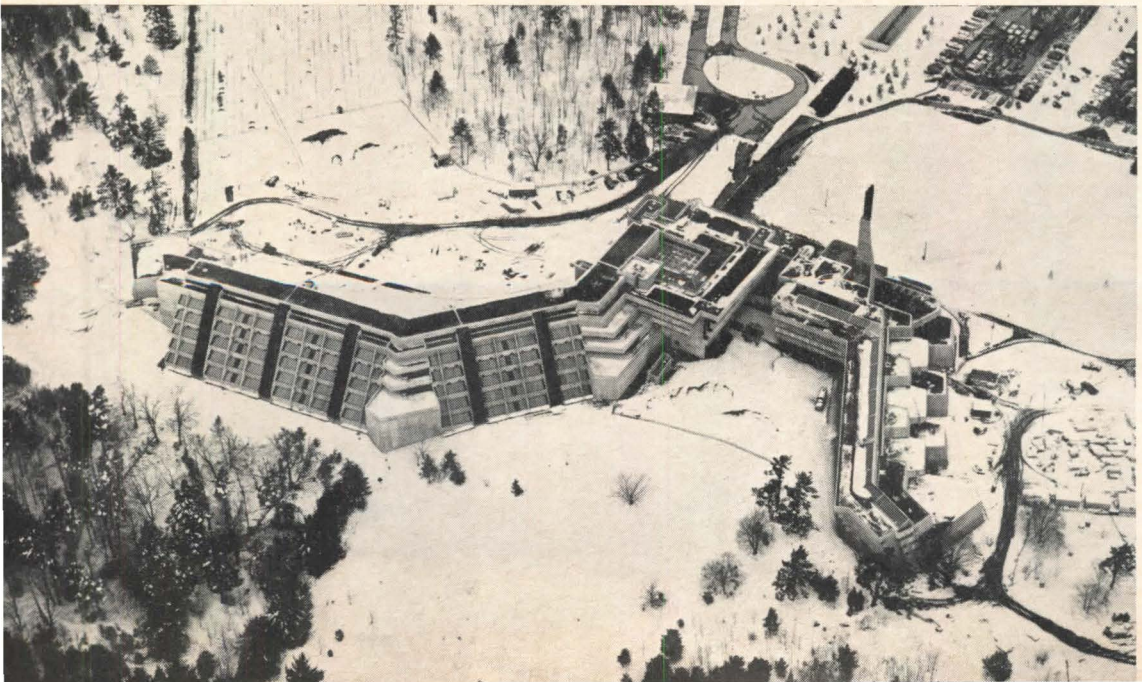

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Movement as a generator of urban form

The megastructures envisaged by Le Corbusier and others have two things in common: they are open-ended, and they are fluid.

Open-ended buildings. Just like the transportation networks of which they will be a part, the buildings for new cities will tend to be designed to encourage and welcome growth and future change, rather than reject it. The essential difference of such megastructures from traditional architectural forms may be found in a comparison of, say, Lincoln Center **(14)** with Kenzo Tange's Yamanashi Building **(15)**; the former is static, hardly capable of accepting change; whereas the Yamanashi Building is dynamic, flexible, designed to accept, indeed to welcome change.

Fluid buildings. The new structures may tend to reflect the flow of traffic—as does John Andrews' Scarborough College **(16)**, a small megastructure built along the route of a multilevel, interior street. Tomorrow's larger megastructure may also contain highways and mass-transit facilities—in short, the new megastructures are likely to be buildings that are also streets, as in the center of the new town of Cumbernauld, Scotland (17, 18).

Quite clearly, what these new concepts will do is to liberate urban form from the traditional, plaza-and-boulevard concepts of the past. The structuring of cities will be dictated by the most efficient and pleasant flow of traffic. The multilevel project for Berlin **(19)**, by Alison and Peter Smithson, demonstrates this kind of structuring, where buildings of varying permanence and quality may be "plugged in."

It is in the nature of the new urban organisms that they will supply only the substructure that will make cities function in tomorrow's world. What will actually meet the eye is anybody's guess—and perhaps not as important as one once thought.

PHOTOGRAPHS: (3) A. G. Annerfalk; (15) Shigeo Okamoto; (16) John Reeves; (18) John Donat.

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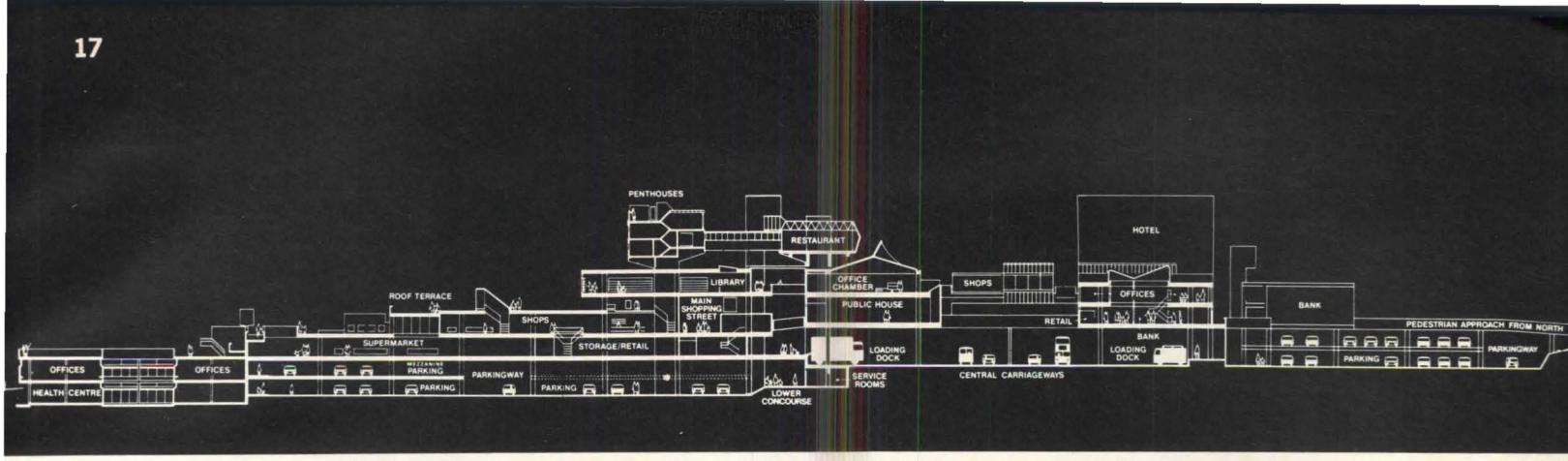
PENTHOUSES
RESTAURANT
HOTEL
LIBRARY
OFFICE CHAMBER
SHOPS
OFFICES
ROOF TERRACE
MAIN SHOPPING STREET
PUBLIC HOUSE
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SHOPS
SUPERMARKET
STORAGE/RETAIL
RETAIL
PEDESTRIAN APPROACH FROM NORTH
LOADING DOCK
BANK
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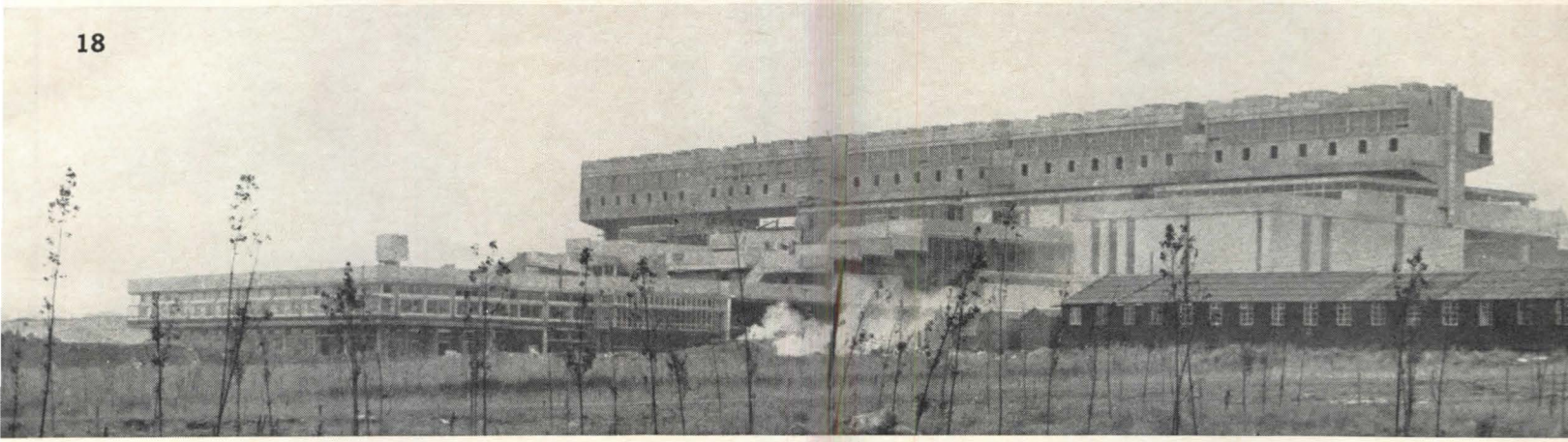

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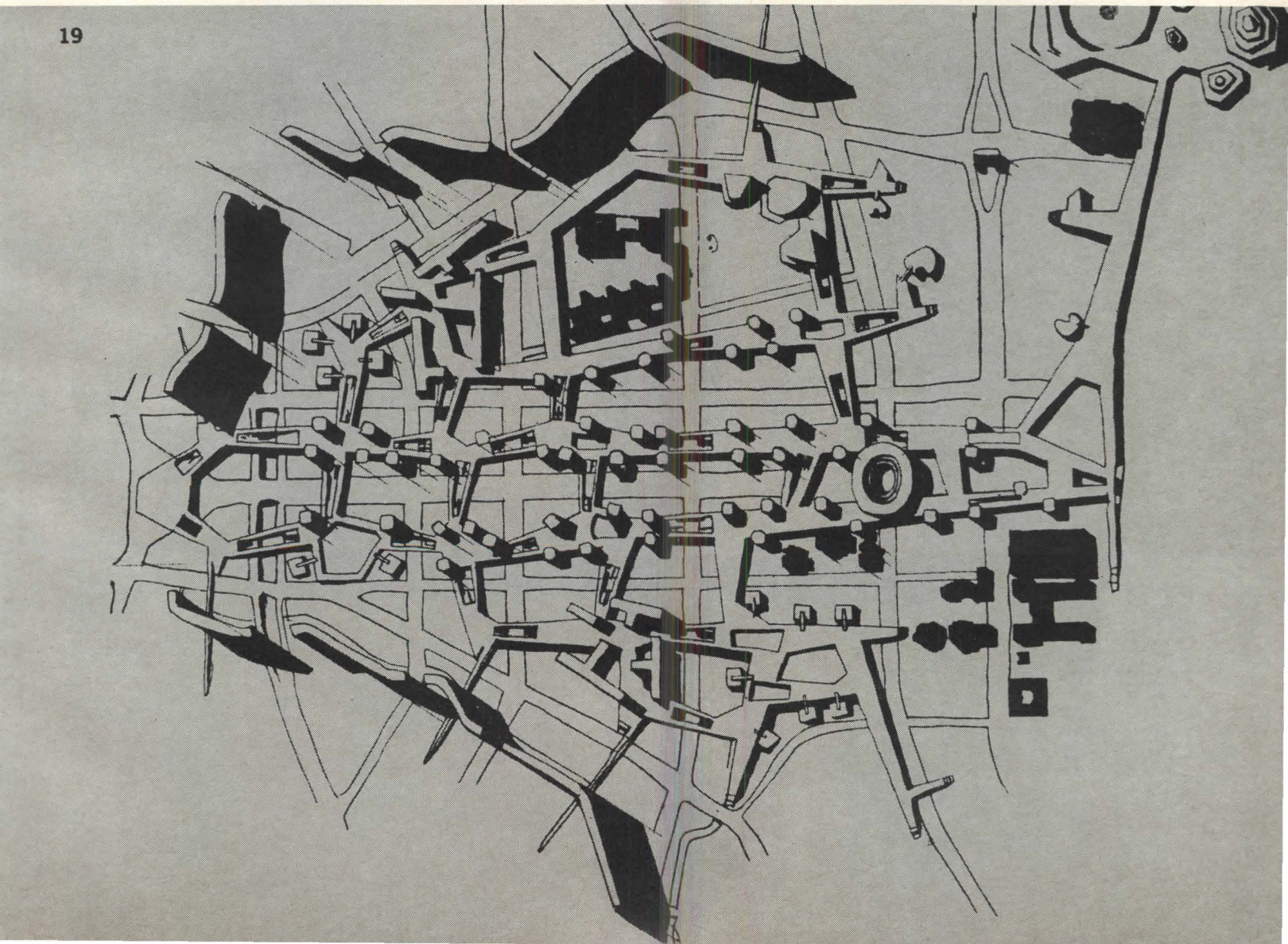


FORUM CONT'D

change of letters with Freeman, he assented. And conservationists' efforts to have Mineral King annexed to Sequoia National Park appeared to be at a dead end as well.

Meanwhile, Freeman is evaluating studies made by the Forest Service for another proposed road through a wildlife refuge on the western slope of the Rockies in Colorado. Called Eagle's Nest, the primitive area separates the Arapaho and White River National Forests. Justification for the four-lane road is that it would shave 10.6 miles off the present Route 6 from Denver west. Conservationists may bring pressure on Congress to investigate if the decision goes against them.

WAYS&MEANS

MIRACULOUS SABOTAGE

From a report in the November 23, 1967, issue of the British magazine, *New Scientist*, we learn that Joshua made the walls of Jericho tumble down because he knew about soil mechanics. The theory was proposed by Dr. Jacob Feld, a N.Y. consulting engineer, in a paper entitled "Failure in Foundation."

On a visit to the excavation site of ancient Jericho in 1931, Dr. Feld was able to study foundations of a city wall, dating from "approximately" the time of Joshua. He notes that the state of collapse of these foundations presented an entirely different picture from that of other ancient walls he had studied. These seemed to have been deliberately undermined. The lower stones were tipped downwards and outwards, and the earth had been removed from beneath them.

What could have happened, he explains, is that Joshua, with his "apparent" knowledge of soil mechanics, had correctly calculated that by undermining the walls, it wouldn't take much to bring them down.

Since foundations were never built deeper than 5 ft. in those days and Jericho's soil was soft, the job of loosening the stones could easily have been completed in six days—the time mentioned in the Bible. Joshua merely needed some diversionary tactics—like marching around the city, blowing trumpets—for the military engineers to do their work unnoticed. Then, on the seventh day, the people shouted a little louder, the priests blew the trumpets a little harder, and presto, the walls collapsed (below).

Dr. Feld added that his theory did not need to rule out the religious view of the event as having been an act of God. "The Almighty may have worked through the agency of Joshua whom he directed."

Anyone for explaining the staying of the sun?

HOW-TO FOR THE HAVE-NOTS

Conferences usually produce a lot of talk and little action, but the First World Congress of Architects and Engineers, held last December in Israel, was a notable exception. It resulted in the establishment of a permanent center in Israel to promote the international exchange of professional and scientific data, and to supply technological assistance to underdeveloped countries.

The center will operate in conjunction with the Israel Engineers' and Architects' Association, sponsor of the congress. It will be administered by an executive committee of international membership.

The purpose of the congress was to give delegates from the Western nations a better understanding

of the needs of the technologically less sophisticated ones and, for the latter, better access to advanced know-how. It also confirmed Israel's desire to become a bridge between the "have" and the "have-not" nations.

The three day congress was attended by 1,500 delegates from 50 countries including, significantly, the underdeveloped African and Asian nations. Among the noted speakers were Buckminster Fuller and Louis Kahn (pictured above shaking hands with Israel's President Zalman Shazar), Bruno Zevi, Moshe Safdie, and Lev Zetlin.

DISPUTES

UNION POWER

Increasing union power and the current surge of union interest in organizing field crews, draftsmen, and technicians sparked a national conference on "Facing the Union Problem."

The conference, held last December in Chicago, was sponsored by the AIA and other professional organizations.

Commenting on the conference, AIA President Robert L. Durham said that "architects' and engineers' concern over inroads by union organizers is not based upon opposition to labor, but upon the incompatibility of professionalism and unionism."

His address dealt with the impact of recent court decisions and Federal legislation. As an example he cited the "Philadelphia door" decision, a case handed down by the Supreme Court last April, which upheld the right of carpenters to boycott a product, in this instance prefabricated doors. The Court contended that it did not violate the provision of the Landrun-Griffin Act, which forbids unions and employers to enter into

FOOTNOTE

Tubula—Herewith the latest creation of M. François *Dallegret, the French* architect and self-syled *estheticien*, currently based in Montreal. It is an automobile he calls Tubula. The prototype is approximately as long as a Volkswagen and appears to be stripped down to essentials. Dallegret, seen here in the driver's seat, is wearing his combination crash helmet and gas mask (there is no windshield). The Tubula does not, at the moment, run, which may be its greatest contribution to the unsnarling of traffic jams. Eventually, it may be equipped with an electric motor. Or it may not.

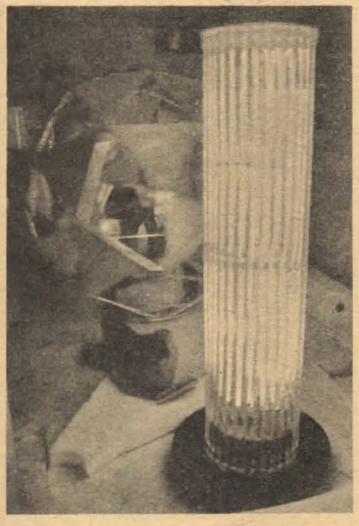
a contract under which an employer "agrees to refrain from handling any of the products of any other employer."

Some recent decisions made by the Supreme Court, the lower Federal courts, and the NLRB, Durham observed, would "impede technological progress in the construction industry at a time when our urban areas are in dire need of major rebuilding, and increase construction costs beyond today's all-time highs."

FANTASIA

GETTING THE VIBRATIONS

The fifth and by far the most smashing of the N.Y. Architectural League's "Environment" exhibitions, held last December, transformed its galleries into a phantasmagoria of flickering colored lights, throbbing patterns of shadows (below), and eerie electronic sound effects. Visitors moved like specters, alternately submerged in semidarkness or freakishly outlined in bluish light. The show was entitled "Vibrations"; the artists



were Jackie Cassen and Rudi Stern (in collaboration with Edwin Hodder of Hubert Wilke Communications Facilities Consultants).

The props: a geodesic dome and rotating sculptures covered with reflective surfaces, illuminated from within or lit by projectors from the sides; transparent plastic forms; a pool of water; mirror-like surfaces and fiber optics here and there; a tinkling water fountain; stroboscopic light; ultraviolet light; and foam rubber floors. The effect of this superbly coordinated and imaginative display was all-engulfing and a trifle unsettling.

Withdrawing momentarily from these hallucinogens, we took a look at the press sheet's "declaration of purpose," and read: "The exploration of light as an art medium provides the challenge of creating in architecture enveloping rhythms of color found in nature. . . . It is the purpose of this environment to create in the participant an increased awareness and response to these phenomena."

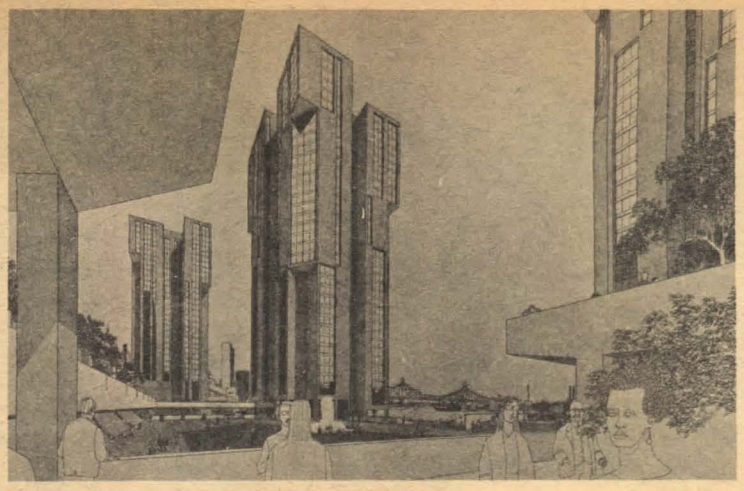
Artists should be the last ones asked to explain their work; so we ignored the words and continued to "respond" to the acts.

TECHNOPOLIS

The 134th annual meeting of the American Association for the Advancement of Science, held in New York in the last days of 1967, showed a lively interest in improving the human environment. Scientific topics like "The Social Behavior of the Mountain Goat" were by no means slighted, but there was a whole four-day symposium on "Man and Transportation," and air and water pollution, ghetto sociology, and other real-life problems were discussed.

This year's Distinguished Lecture was a proposal for a new kind of community. In a speech entitled "The Experimental City," Athelstan Spilhaus, President of the Franklin Institute in Philadelphia, called for building a series of new cities of roughly 250,000 people each, at least 100 miles from existing metropolitan concentrations. Starting from scratch, free of the "traditions, outmoded building codes, and the abortions of historical development," Spilhaus's cities could take advantage of the latest technology, serving as laboratories for further testing.

Atomic power could be used to process water supplies and wastes of all kinds, as well as to synthesize fertilizer, or even food. Geodesic domes could be used for environmental control. Free public



transit could be provided, much as elevators are in buildings.

Spilhaus's city would be allowed to grow only to a predetermined size, within a strictly enforced boundary. Around it, 40,000 acres would be perpetually reserved for agriculture and recreation. It would be constructed on a "sub-structure" of several levels (below), which would be built all at once to meet the city's predetermined needs. In his substructure would be all utilities, communication links, roadways for combustion-powered vehicles, and "fume tunnels" for gaseous wastes. Garbage would be carried away in special sewers; building materials would arrive at the site underground and be removed the same way when the structures were dismantled.

Spilhaus estimates the cost of one of his cities at $4 billion. This is not much more, actually, than a conventional community for 250,000 people would cost. But the security of this single, unconventional investment would depend, he admits, on whether the whole scheme proved "attractive to the industries that will come to the city to build new plants."

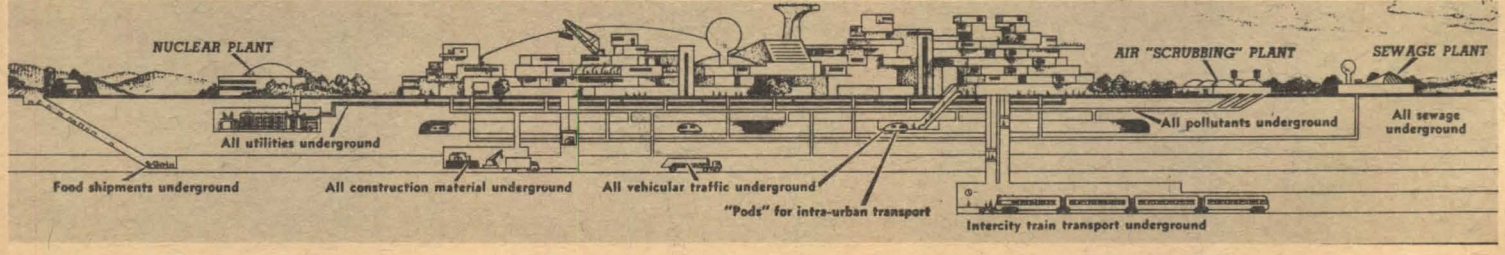
GREEN LIGHTS

DOWN BY THE WATERSIDE

Waterside, the controversial development along (and over) New York's East River between 25th and 30th Streets, was narrowly passed by the Board of Estimate on December 22. The project will have 1,468 units altogether—145 apartments renting at $18 per room, 205 at $30, 370 at $40, 370 at $53, and 378 at $65. This represents a last-minute revision by the sponsor, increasing the lowest category from 5 per cent to 10 per cent of the total (at the expense of the next lowest category) in an attempt to eliminate opposition to the project.

Jason R. Nathan of the Housing & Development Administration, who (with Mayor Lindsay) has consistently favored the project for its unusually high standard of design, considers the "unparalleled rental spread" an opportunity for "economic and ethnic integration never before offered." The scheme (above), by Davis, Brody & Associates, provides four highrise towers, townhouses, and a four-acre plaza for the residents, with boat docks, bicycle paths, a waterfront promenade, cinema and restaurant open also to nonresidents (see Jan./Feb. '67 issue). Not once in the stormy public hearing was the design of the project an issue.

Beverly Moss Spatt, lone dissenter in the City Planning Commission's earlier approval, sees the project as a reversal of city policy in granting tax abatement for housing "when the rents are equivalent to units now available and renting on the private market." By an elaborate formula the project will pay the city $425,000 annually (subject to upward revision), based on 50 per cent tax exemption on the assessed valu-



ation of the buildings; full taxes on the commercial space; and rent for land and areas over water equal to taxes on the present value of the site. (Nathan states that since there is no money *now* coming into the city from the unused piers on the site, and since there is no out-of-pocket city money being spent on the project, tax exemption cannot be considered a subsidy. Also, without city aid, the project—requiring a $6 million platform over the river—would undoubtedly not be built.)

Members of the community are divided, many feeling that the project is sorely needed—to keep the middle class in the city and to keep the schools integrated. Others, notably the local planning board, feel that existing facilities will be strained by more people.

But the most detailed opposition was expressed in a brief by the Planners for Equal Opportunity. To PEO, Waterside makes only a token attempt to accommodate the families with the greatest need for improved housing. PEO claims that the project uses tax abatement for a group not requiring it; and the sponsor will get 20 per cent on his investment, not 6 per cent. "The most disturbing aspect of Waterside," says PEO, "is that it appears to signal a municipal housing policy that will stress retaining the prosperous in the city, while the poor are essentially relegated to the slums." PEO further contests the Federal involvement as an improper urban renewal designation, and an unauthorized use of an FHA-insured mortgage, for 90 per cent of the cost, where rehabilitation is not involved. They suggest more units at lower cost, and alternative financing.

The city responded with the readjustment mentioned above, and PEO is considering court action.

WASHOUT ON THE HUDSON

The "go" sign was given in January to build the long-pending, $220-million sewage treatment system for Manhattan's West Side. Unhappily, the project will be less than New York citizens had a right to expect. It does not include a genuine waterfront park, nor is the facility capable of maximum efficiency.

The project, to be partially subsidized by state and Federal funds, will consist of a 12½-mile interceptor sewer and an eight-block long disposal plant.

Philip Johnson—hired to redesign the unadorned sewage disposal plant (a potential eyesore)—has created a handsome arrangement for concealing the plant's functional facilities (below).

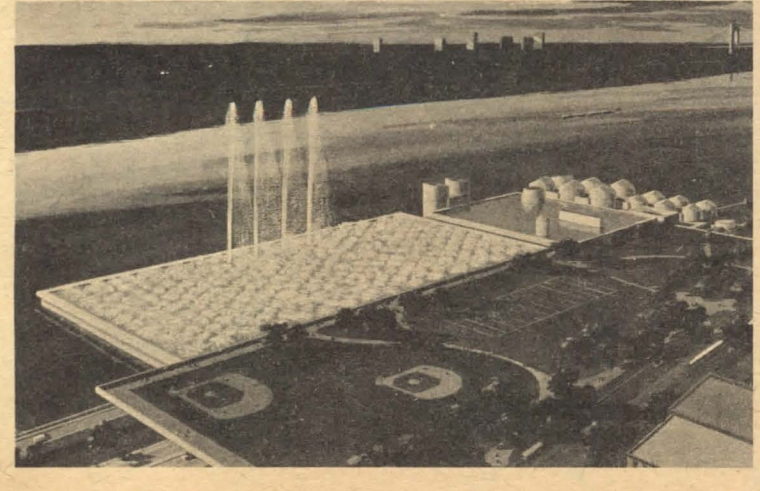
The plant, jutting 500 ft. into the Hudson River, will have on its roof a 15-acre water display, consisting of a four-acre pool at the northern end and 11 acres of aeration nozzles at the southern end. Sculptural shapes protruding from the pool will camouflage various technical requirements of the plant; four 200-ft. water jets will climax the waterscape.

A 15-acre elevated park will connect the roof of the plant with Riverside Drive, spanning the tracks of the N.Y. Central Railroad as well as the West Side Highway.

Plans for pedestrian access to the pool and fountains—envisaged by Johnson—were vetoed by the Department of Public Works, because of the alleged danger of ozone leakage near the aeration nozzles and the possibility that someone might fall into the pool!

A serious technical flaw of the plant was the fact that it would be too small to allow for the minimum 90 per cent of waste removal required for Federal participation. A compromise was reached, however, whereby the plant's waste removal capacity would be increased from 60 per cent to 70 percent. The Federal Government further stipulated that the city would have to improve its entire sewage treatment system in the years to come.

After waiting 30 years to build a sewage system that would eliminate pollution from the Hudson River, removing only 70 per cent of the raw waste now dumped directly into it still seems like a dirty deal.



PEOPLE

APPOINTMENTS

The designation of Edward J. Logue, Boston's former urban planning administrator, as the chief planning consultant for the model-town Fort Lincoln Urban Renewal Project in Washington, D.C., is unexpected good news.

The "new town in town" will be constructed on 335 acres of Federal land in Northeast Washington, soon to be vacated by the National Training School for Boys. The project was made possible last fall with President Johnson's decision to give the land to the city, for the purpose of building housing for 25,000 Washingtonians in various income levels.

But the renewal project will do more than relieve a dire need for low-income housing in Washington. it will be a prototype that may set a pattern for future uses of surplus Federal land in urban areas. And in view of Logue's dynamic performance in New Haven and Boston, it could well become a major event in the history of U.S. urban development.

• Lady Barbara Ward Jackson, British economist and author, and a member of Forum's Board of Contributors, was named Albert Schweitzer Professor of International Economic Development at Columbia University. Created by the 1964 N.Y. State legislature, the professorship will be in the School of International Affairs and Graduate School of Business.

HONORS

The AIA's first architecture critic's awards, to be presented at the AIA convention in Portland, Ore., in June, went to Lewis Mumford and George McCue—the AIA Medal to Mumford on the basis of his distinguished career, the Citation to McCue, art and urban critic for the *St. Louis Post-Dispatch*, for excellence in a single work.

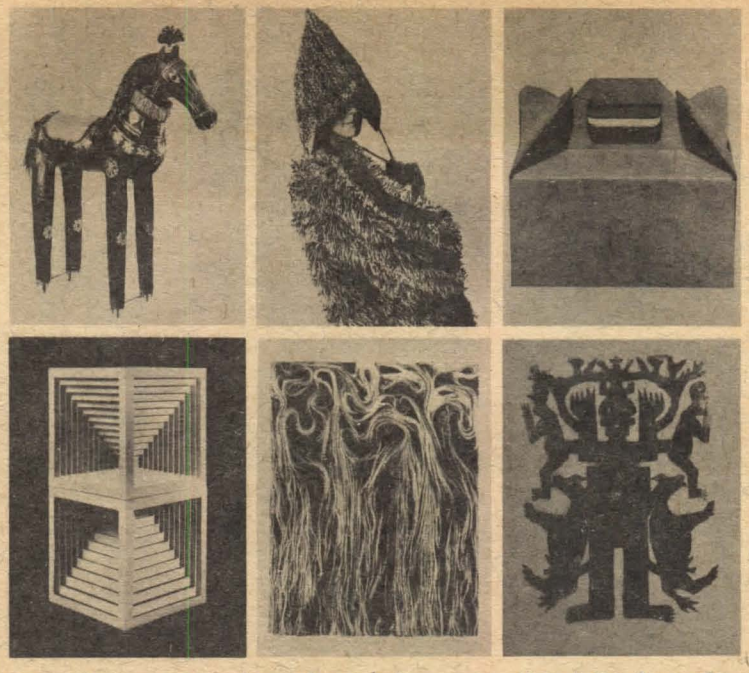
• Ludwig Mies van der Rohe was elected a member of the American Academy of Arts and Letters, the nation's highest honor society of the arts. Mies, along with Artist Ivan Albright, bring the academy's membership to 48. He will occupy the chair vacated by the death of painter Edward Hopper.

DEATHS

It is not very likely that the name of Mrs. Arvin Shaw III, wife of the architect, will go down into the architectural history books. But B. J. Barnes, as she was better known to her many friends and fellow-architects in Europe and the U.S., played an important part in some of the most significant projects completed during the past 20 years: B. J. was a member of the design team for the UN headquarters in Manhattan; she worked for Le Corbusier during the period when the Marseilles Apartments were being designed and built; she was a designer in Marcel Breuer's New York and Paris offices when the UNESCO headquarters were being planned; she worked with Wallace K. Harrison on the new Met, and with Philip Johnson on the N.Y. State Theater, both at Lincoln Center; and most importantly, she was a bright and witty friend to dozens of young architects who could depend upon her help and advice at the start of their careers. She was only 46 years old when she died of cancer last December 26.

• Joseph Hudnut, the former Dean of Harvard's Graduate School of Design (1935-1953), died on January 15 at the age of 81. Hudnut was a distinguished architect and critic; but he will be best remembered for having had the courage, as early as 1938, to invite Walter Gropius and Marcel Breuer to come to the U.S. and to join the Harvard faculty. Although Hudnut's own views were somewhat at variance with those of his ex-Bauhaus protégées, his willingness to call them to the Graduate School of Design probably had a more profound effect upon the overall direction of architectural education in the U.S. than any other single act; for during the years after Gropius' and Breuer's arrival in this country, almost every major architectural school patterned itself after Harvard's GSD.

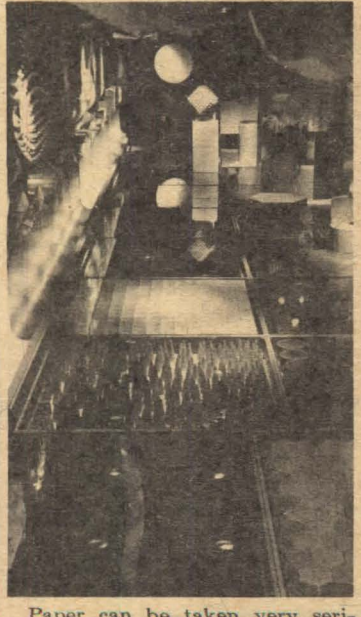
Walter McQuade



It was only a paper moon

The photographs are all of paper objects—playful, pedestrian, even downright artistic ones. Immediately to the right is a horse, 57 in. high, for religious processionals in India. Next to it, a tufted paper coat and hat by Bonnie Cashin. Then, the classic fiberboard pet-carrier. Starting the second row, a "construction" by Kurt Londenberg, then a "painting" made of sliced billboard posters by Pavlos, and a Mexican Indian sorcerer's good luck charm, cut from folded bark paper. All are from a recent exhibition called "Made with Paper" organized by the Container Corporation of America and the Museum of Contemporary Crafts in New York. Two separate galleries were stacked with the above and some 400 other papery productions. More people crowded in to see this show than any other ever presented by the museum.

The scene:



Paper can be taken very seriously. John Massy, director of design for Container Corporation is one who does take it that way: "The form and structure of paper and paperboard are a reflection of the form and structure of our society. Paper is an expression of our everyday existence. It is an expression of the fleeting moment, the fleeting thought, and most importantly, an expression of an evolving reality. . . . Paper has become our most effective and efficient means of transporting products and ideas; its use and its form are limited only by the imagination of man." And paper is also made from trees. How often have I felt slightly uneasy writing in paper magazines, each edition of which was an expression of some fleeting Canadian forest.

What I'm getting at is that the representation of the fleeting thought or idea is a heavy industry today, and on occasion is a forced one. Perhaps even, sometimes, in exhibitions. For example, it was not quite clear to me what statement this show's creators really were reaching for. Their paper objects divide into two somewhat incompatible categories. First are objects such as carefully handcrafted dolls, toys, and votive objects, which might just as well have been made of beaten gold, if gold had been available. This represents the admirable economy of people who, lacking more precious materials, have worked within limited means.

The second category may represent just the opposite. It ranges from utilitarian objects made to be used and then thrown away, to paper folded up for the mental hell of it, intellectual littering.

But enough of that. "Made of Paper" was basically an amusing exhibition and, in New York, was promoted that way. The day the show opened, the police were beguiled into blocking off 53rd Street between Fifth and Sixth Avenues, so that Artist James Lee Byers could make a 400-ft.-long "Performable sculpture" of "dissolve" paper stretched from curb to curb, which later was washed down the drains by Department of Sanitation flusher trucks. This, of course, is what is known as a Happening, but perhaps should be called a Publicity. This resourceful artist's personal promotional material was interesting too. Byers delivered to the press on paper a dozen staccato biographical facts including "FAVORITE SENTENCE LIKE A DREAM LIKE A VISION LIKE A BUBBLE LIKE A SHADOW LIKE DEW LIKE LIGHTNING; FAVORITE SIGHT WATER; FAVORITE SOUND O; FAVORITE SMELL SEAWEED; FAVORITE TASTE POPPYSEED; FAVORITE TOUCH SILK." On January 1 he went on to stage a collateral celebration, by releasing a helium-filled weather balloon from the plaza of the CBS building bearing one end of a mile of gold paper thread made in Japan "as a gift to the universe." The balloon was provided by the *Helium Centennial Committee from Government and Industry*, the press release said, which consists of "more than 50 government agencies interested in the conservation of helium and other natural resources." The centennial significance involved the discovery of helium on the sun exactly one century ago.

Watch for the pleasant paper show, which is touring (pausing in Chicago for a month at present). If you have a desire for a mile of gold paper thread, you might also watch for a drifting weather balloon.

Photographs: Page 44, Norman McGrath (bottom center). Page 45, Sandy Kronquist, The University of Chicago (right). Page 46, Landmarks Preservation Commission (top). Page 115, Reproduction from Luebeck Bible, 1494, Courtesy of The New York Public Library (bottom); Alexander Suesskind (top). Page 116, Jon Henry (left); © by the New York Times Co. Reprinted by permission (bottom).

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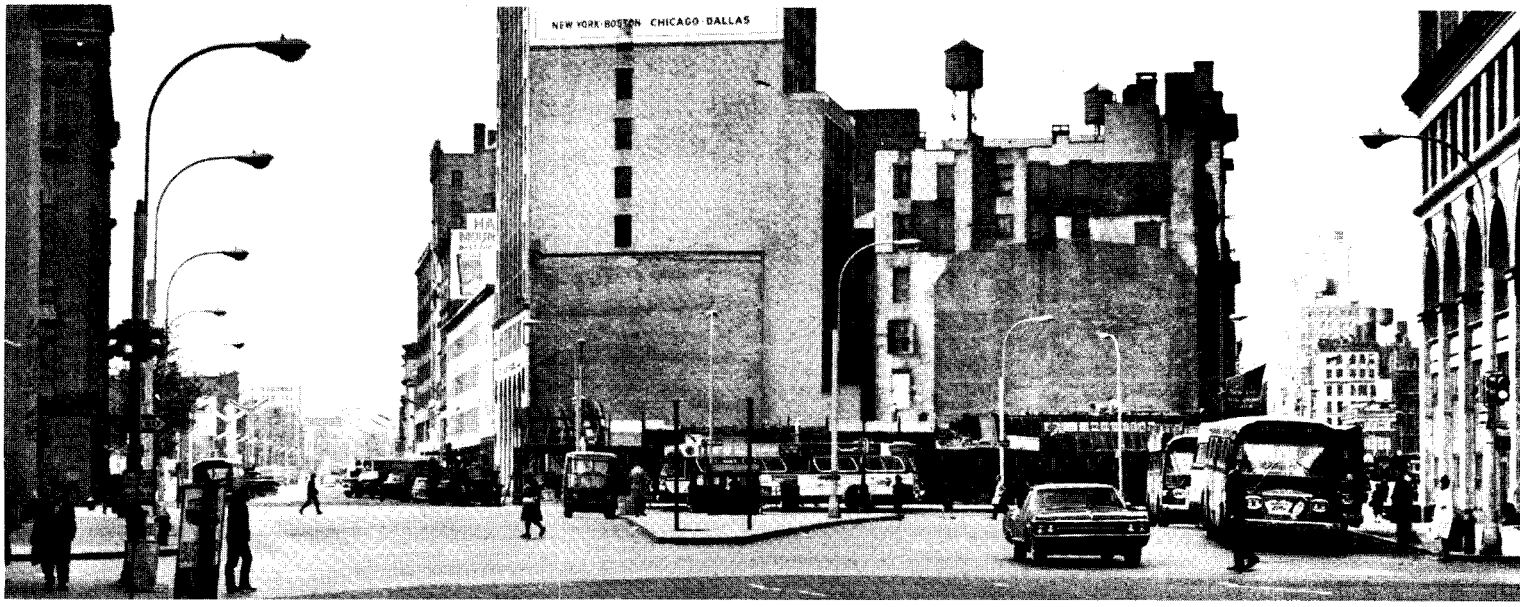
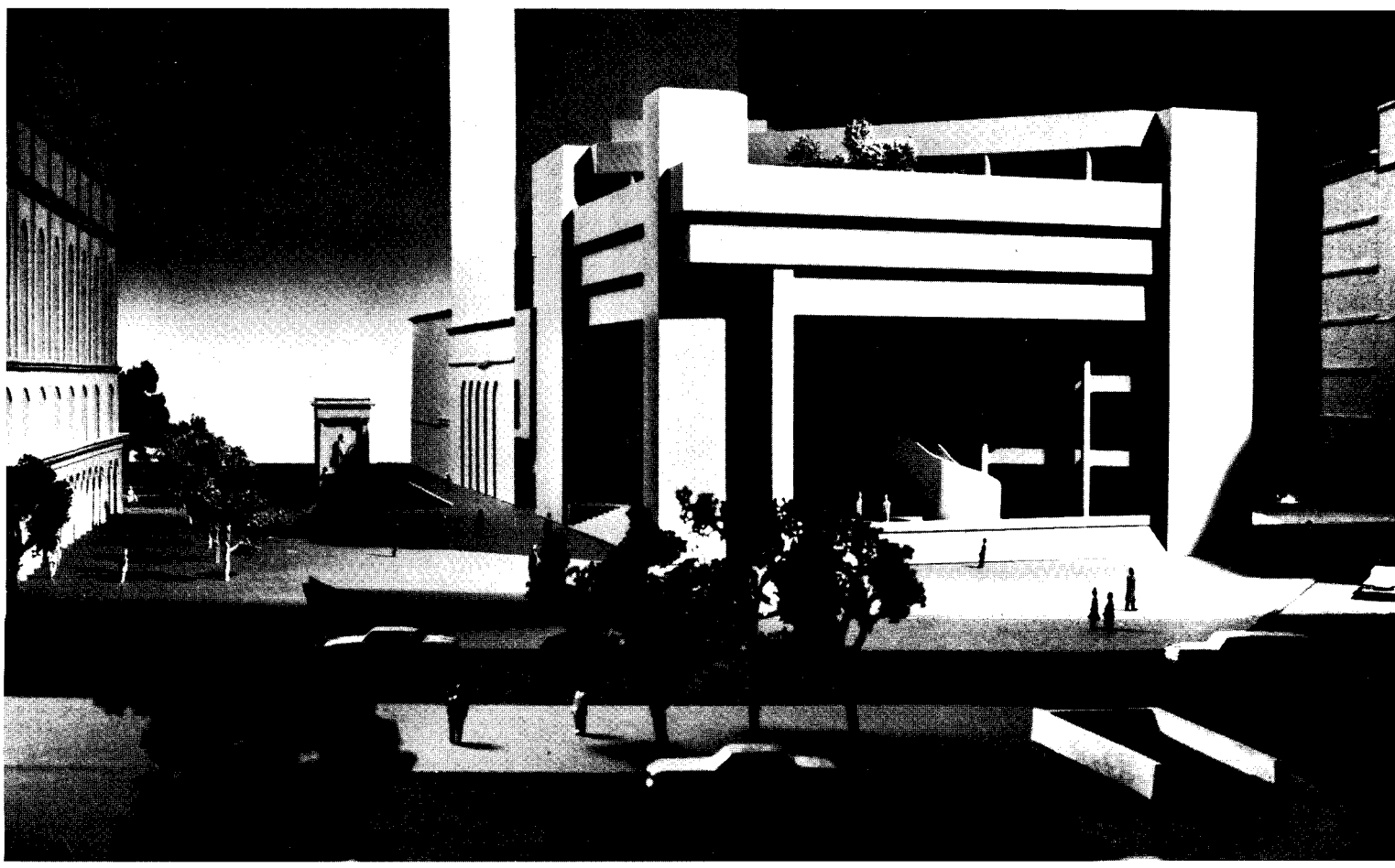
PREVIEW

CROSSROADS CAMPUS

Ulrich Franzen's design for the Astor Place Building of New York's Cooper Union provides much-needed facilities for that institution, while it gives long-vanished amenity to the city.

The proposal goes far toward clarifying the traffic pattern of an intersection that is now one of Manhattan's most bewildering (below). At the same time, the proposal gives the pedestrian some space of his own. Principal change in traffic is the new pedestrian mall that closes Fourth Avenue in the block between the proposed building and the century-old Foundation Building (bottom photo). An extended sidewalk on the north side of Eighth Street enables pedestrians to reach the subway from the east without crossing a street. A new sitting and play area for residents is also added, to be created from the triangular "parklet" that exists, un-





used, at the intersection. The statue of Peter Cooper that now stands south of the Foundation Building, is proposed for relocation to a focal position in the new pedestrian mall. The figure will terminate a major vista southward from 14th Street (before and after maps, below, are oriented to the southward view).

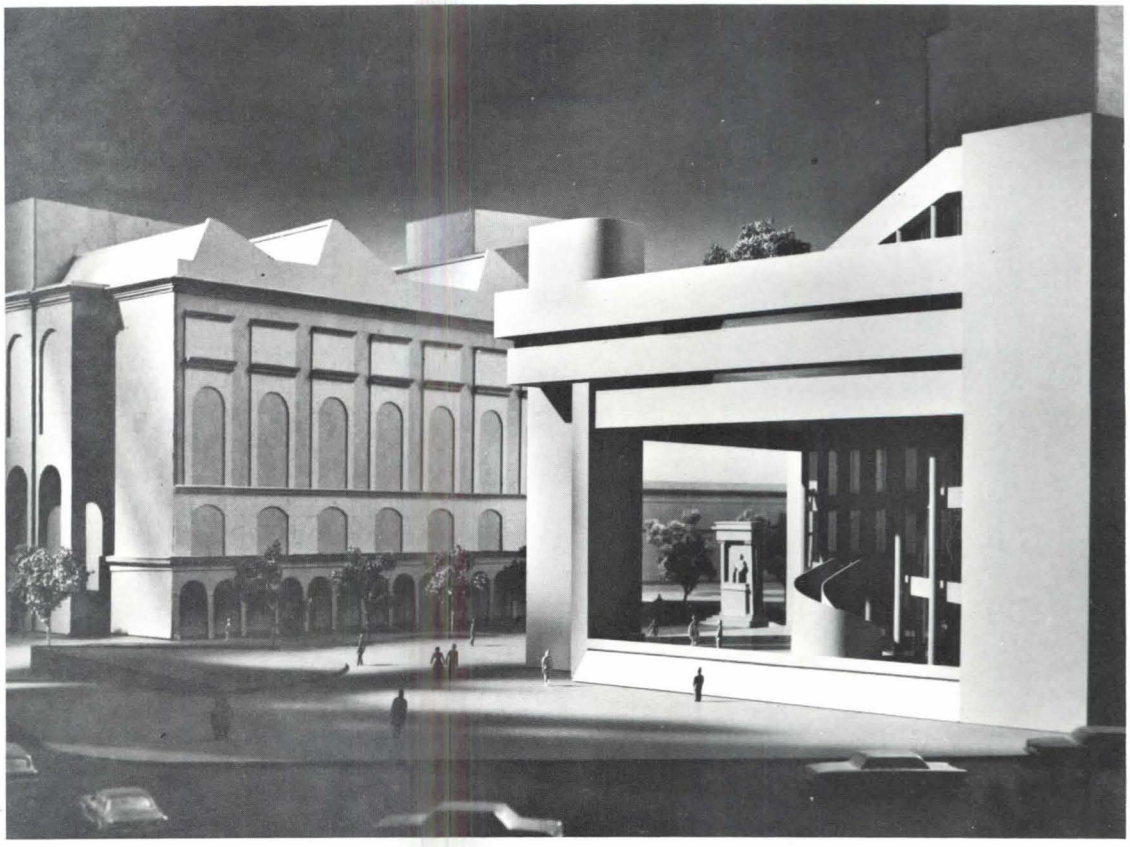
Describing the site as "a coming together of many varied streets and spaces," Franzen sees "a major opportunity to unify these many discordant notes from an urban point of view. The opportunity is one also of reversing the trend toward urban blight in the neighborhood." Other aims: "to assert Cooper Union's presence on Astor Place, while opening up a new perspective and appreciation of the Foundation Building."

A diagonal setback in the new building creates a three-story outdoor room at the entrance, with the resulting triangle oriented both toward the Engineering Building to the northeast and the Foundation Building to the east, bringing the three buildings into a campus relationship across the barrier of Eighth Street.

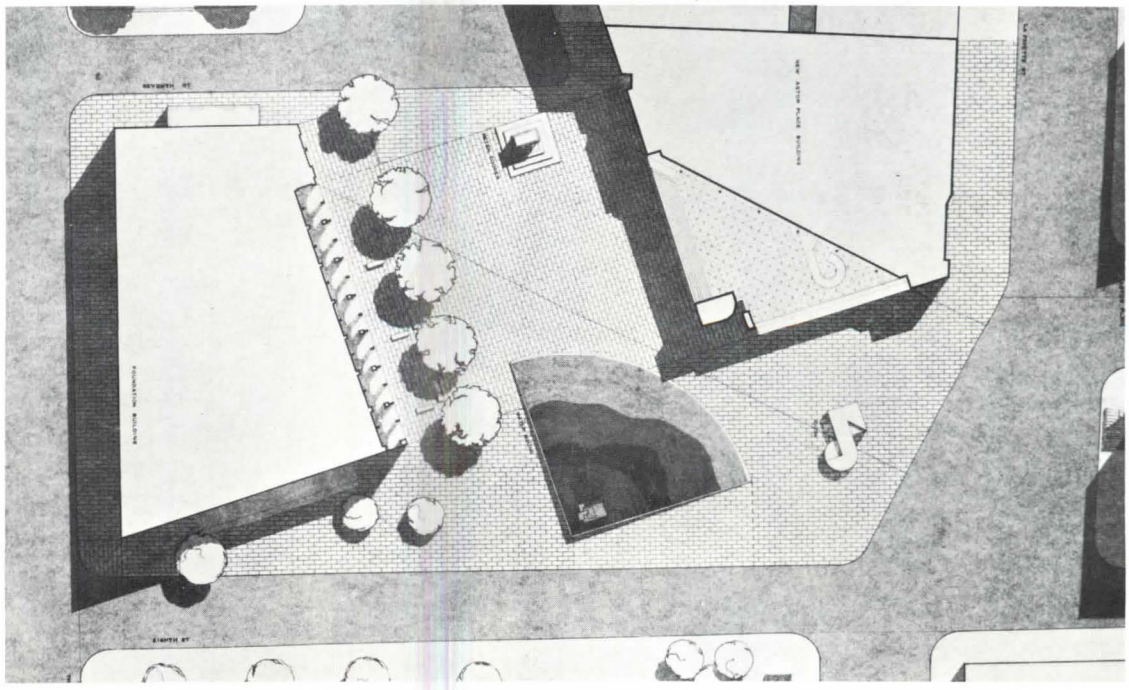
Inside the building, student activities are on the first level, with an exhibition area visible half a level below (this exhibition space also serves as a lobby for the auditorium below). The basement loft space of 6,000 sq. ft., two stories high, is open for various uses—for architectural or mixed-media experiments, dances, etc.

From the ground floor lounge, a ramp leads upward to the cafeteria and dining hall on the second floor. On the third floor are administrative offices; on the fourth (and mezzanine) is the library; on the fifth, seminar rooms and offices; on the roof, space for outdoor seminars.

EXISTING



PROPOSED



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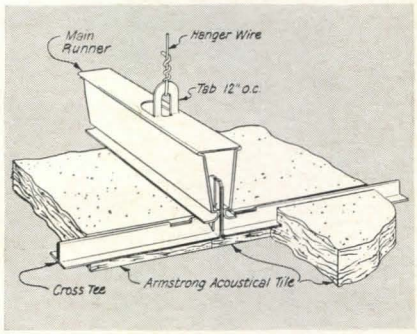

Using the systems approach? There's been a lot in the news lately about the revolutionary, new concept that allows a building to be completely redesigned — practically overnight. The systems approach. A modular approach with movable partitions that make changing room sizes and shapes a snap. A building approach that lets lighting modules and acoustical panels be quickly interchanged to meet changing service requirements.

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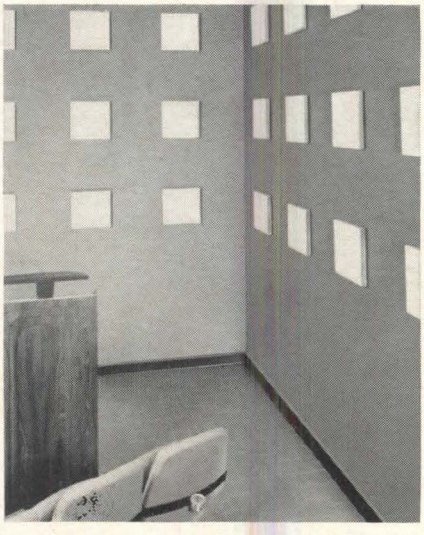

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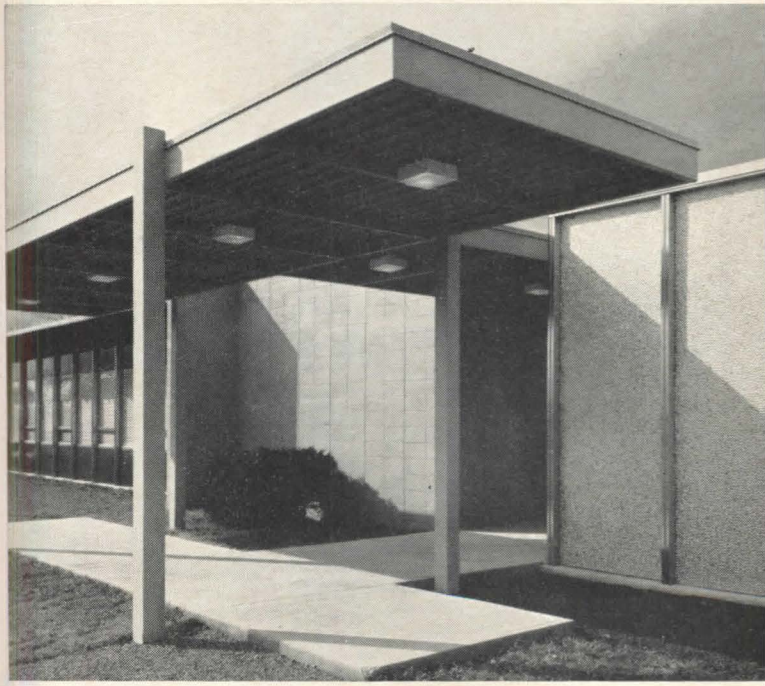

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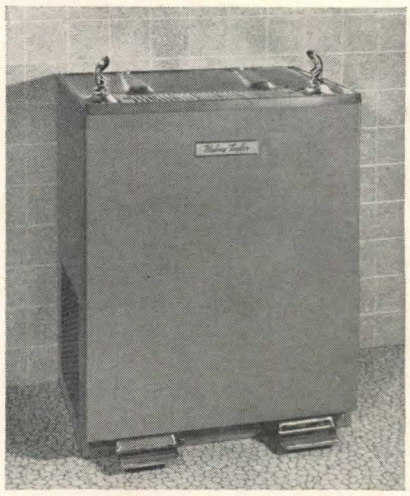

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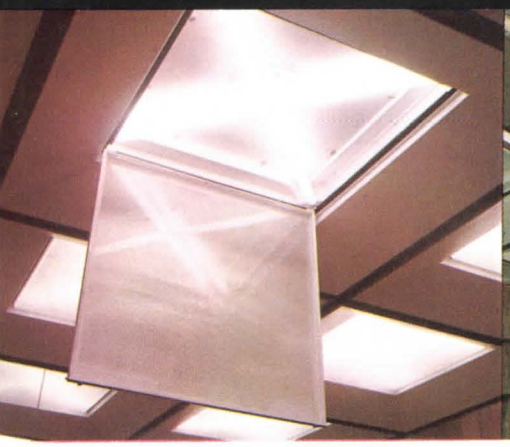

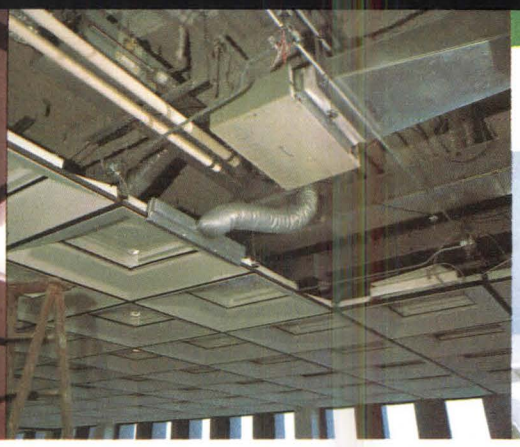

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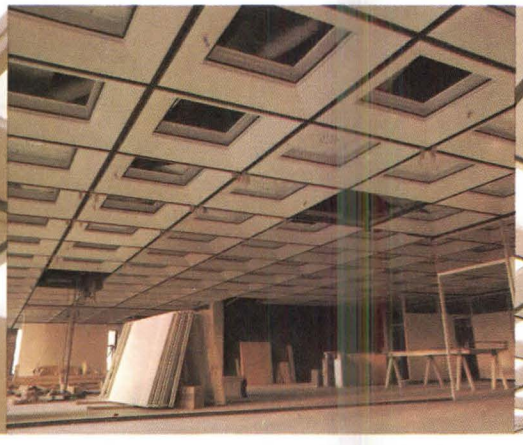

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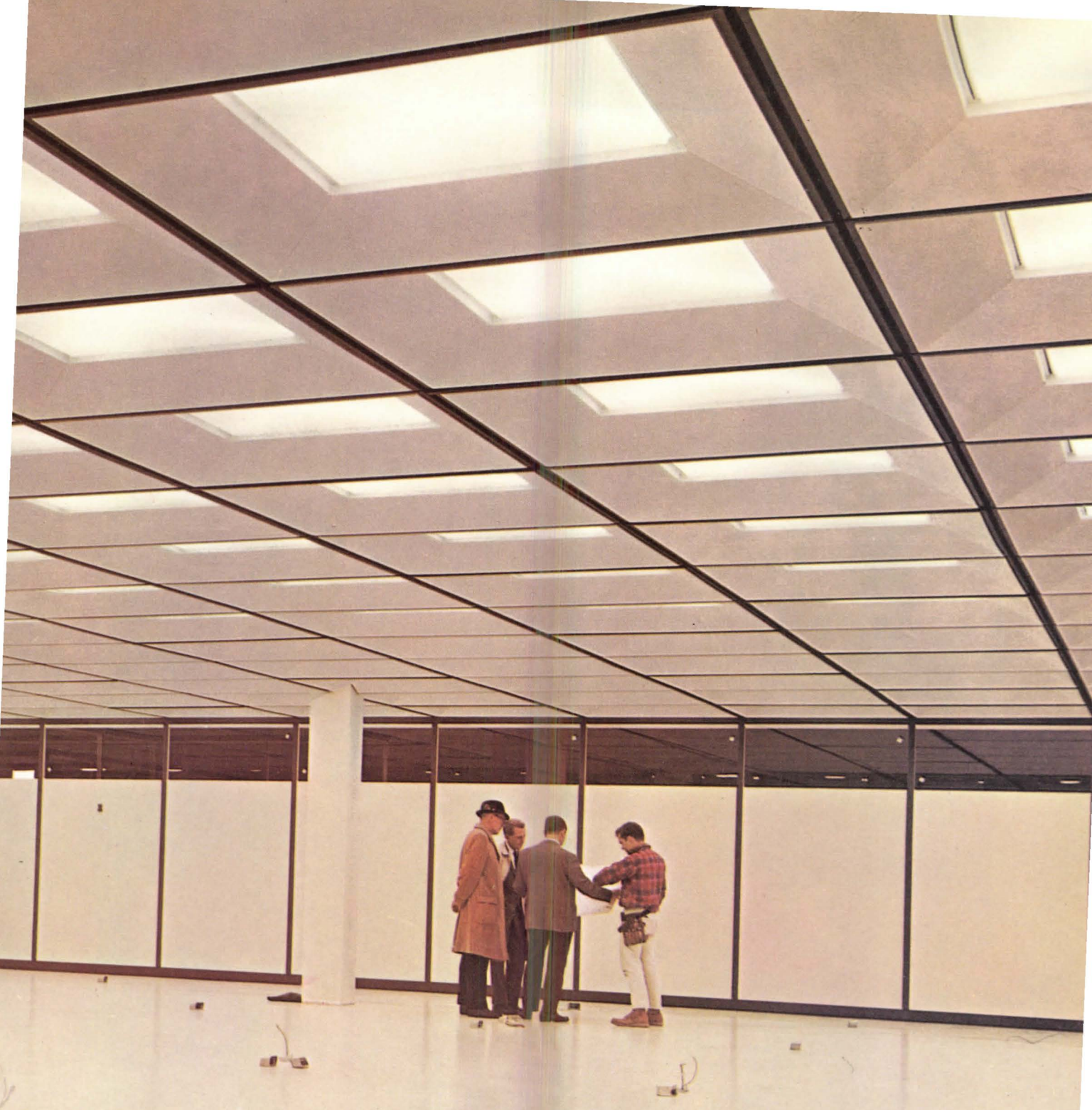

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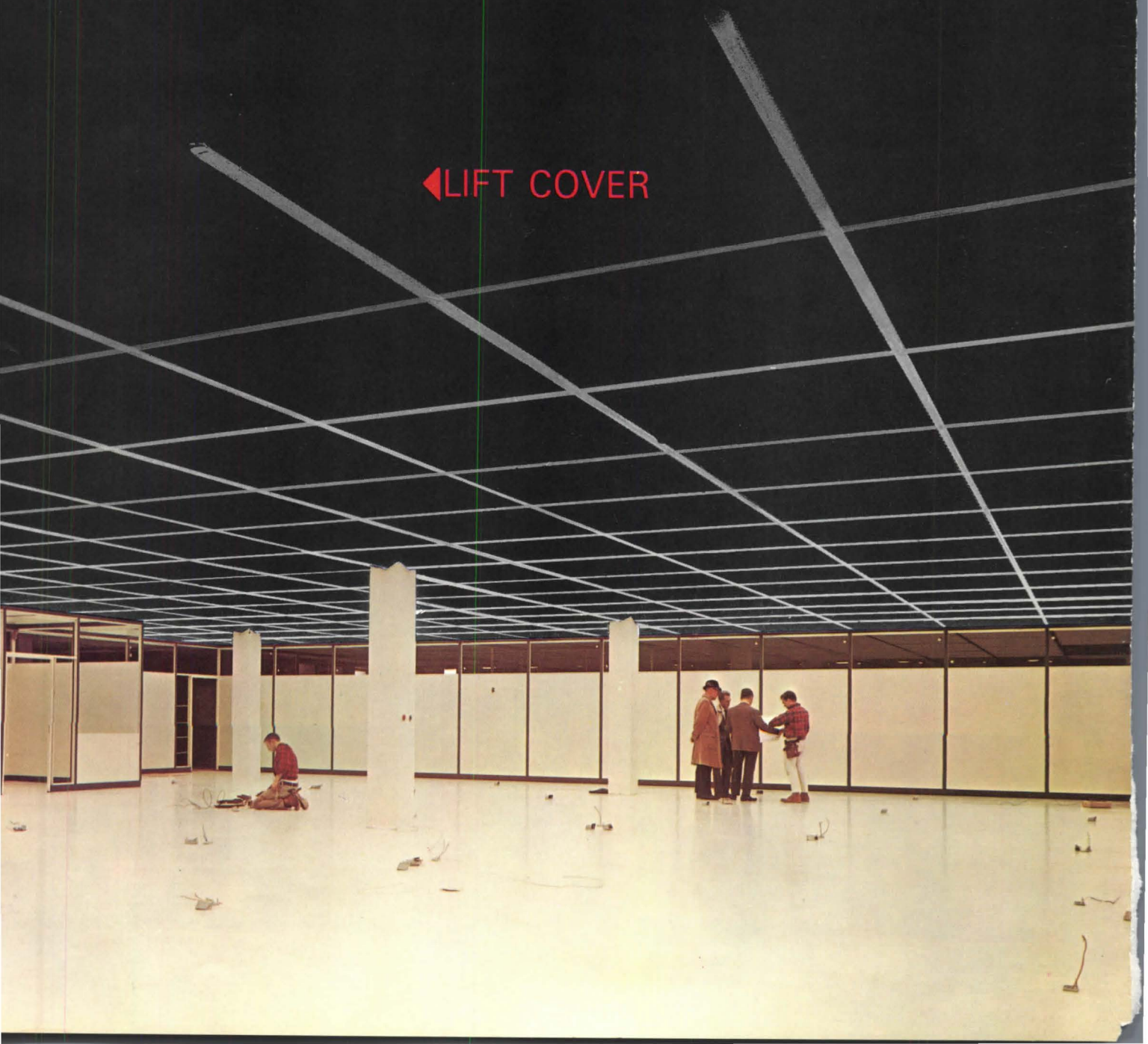

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BOOKS

THE URGENT FUTURE: By Albert Mayer. Published by McGraw-Hill Book Co., New York, N.Y. 177 pp. Illustrated. 8½ in. by 11 in. $16.50.

REVIEWED BY DOUGLAS HASKELL

This book by a veteran in housing and planning is mighty good. The urgent future it describes is real, in a way that most readers of magazines like this hardly need to have certified. We are desperately in need of a correlated approach to it, however, and that is what Mayer supplies. His book goes the gamut from regional planning through new towns, new treatments of existing cities and metropolises, and the need for new concepts of public housing; but the line it takes is far from revolutionary, is not based on startling proposals or inventions, and represents rather the latest elaboration of what has been the best school of planning ideas regnant since World War I, the one led by advocates of housing, garden cities, regional planning, and open space. This strain of conservatism is a help because the massive Congressional action that is needed has to have broad support. Nor is this a book that throws responsibility to the computer, fed with "trends." "Trend is not Destiny," as Mayer keeps trumpeting, for it leaves will and quality and morality out. Man's finest leaders have decisively changed trends.

A volume so comprehensive cannot be summarized with any completeness—and its comprehensiveness is its best mark. So we will hit some high points.

First, Mayer makes it distressingly vivid how minuscule has been the human achievement in popular buildings and in planning, in a country which is far and away the world's leader in total technological capacity and wealth. Just as our new legislation of 1965 bore the title "Demonstration City" program, so altogether too much of our progress has been at token, or "demonstration," scale. For example, it is by telling how minuscule our public housing program has really been that the author lifts his discussion of that stale subject, and shabby realm, up into an illuminating and fascinating light.

After 30-odd years of public housing, fewer than 600,000 units had been produced as a total at the time when he wrote! This in a nation that during the period grew from 135 million to 200 million population, but on an average got 20,000 public housing units a year, one for every 10,000 citizens, just about.

Now all who were at work when the first New Deal public housing bill was passed can well recall the uproar against "subsidy" that was then raised. And they recall, too, how the public housing advocates and managers responded with endless penny-pinching, and often turned to the orphan asylum style, to prove that they were "costing" not too much. Now Mayer says the time has come for them to cease being "prisoners of their opponents" and to step boldly out. The fact is that America is awash with government subsidies, which seem to cause the recipients anything but shame, in fact the subsidies mostly all go to great corporations and to those already rich, and are hidden more often than they show. Mayer tactfully labors no such easily provable point. He merely calls attention to the annual agricultural subsidy of $3 billion which could carry *in addition* a ten-fold expanded housing program of 250,000 units *a year,* if there were diverted from agriculture to housing just 3 per cent of it!

Once we see how very very little the planners and housers have been asking for at the very most, it becomes more plausible that a Congress even faintly intelligent might be persuaded to appropriate for a new friction-easing kind of public housing more than it appropriates for antiriot police. And the moment that happens, there will be a vivid relevance in Mayer's painstakingly collected expedients to make public housing a "key to community," and a far more open community at that.

Same way with urban renewal, which has been vastly more popular with the business community (and with architects) but has met the real challenge that city revival poses by a good deal less than half. For it has been done carelessly and spottily for immediate benefits, despite the show-window "workable program" adjuncts, and has caused an immense number of decent citizens to be kicked about. Think of it: the 200 sq. mi. cleared for renewal programs had displaced some 160,000 families already by 1964, and we can interpolate that Mayer wrote just before there was a turn for the worse, so the *new* highway plans, since put before Congress, when added to new urban renewal plans, could turn out with the Indians no fewer than 5 million citizens, man, woman, and child, in the next ten years. This is the stuff out of which riots, rebellions, and revolutions are made, for no agitator is needed to cause the outraged to reach for the torch.

Mayer, however, takes only positive and creative remedies under counsel; and it is urgent reading indeed to follow through his closely reasoned suggestions for a program. Broadly speaking, this program concentrates on two aims: to secure relocation housing *ahead* of the event (a surprising move of common sense) and to use urban renewal as an instrument to gradually restructure the city as a whole and not merely to restructure it in spots.

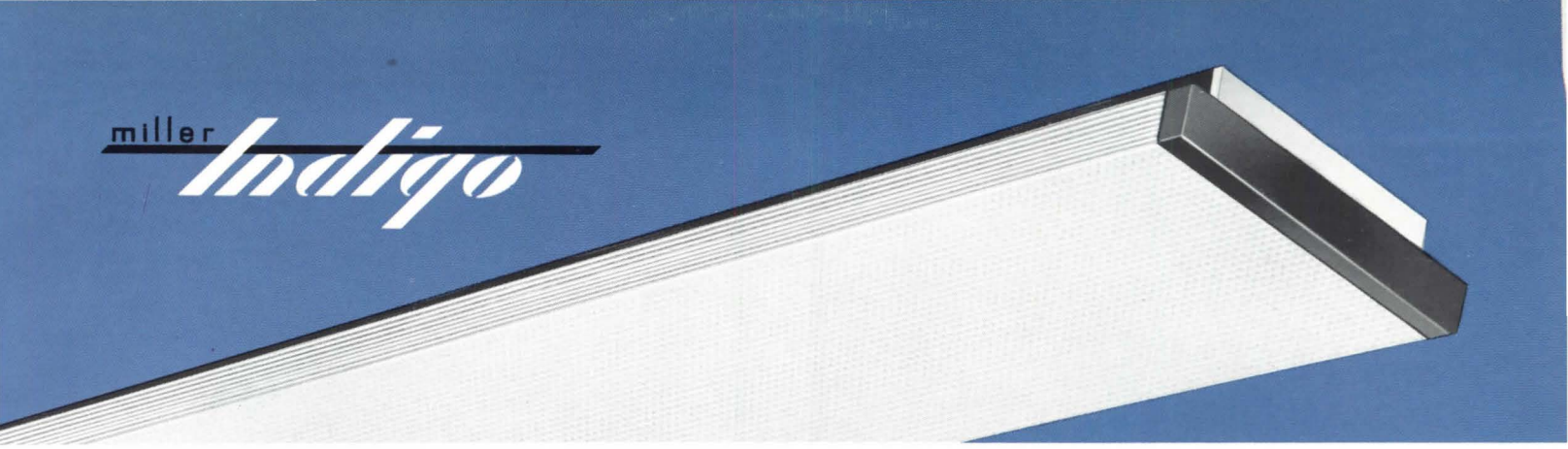
In urban renewal, as in city planning or metropolitan planning, Mayer is a decentralist. It is hard to sell him the idea of an absolute need to give giant treatment to the whole central downtown. What for? That is not where the people are, and even if they came, it would be nicer to come for recreational facilities surrounded by open space than to get jammed into heavy new traffic lines for an artificial build-up of what could better be done outside with greater ease. For one of the things that Mayer insists on is that highways built in congested districts, on a short-sighted "cost-benefit" ratio calculation based on short-term trends, have only one sure result: they throw the present occupants of the underlying residential areas out. The second most probable outcome is that they delay development of outlying regions that could be planned in a far less congested manner at a mere fraction of the money that is now being spent.

It is with a far-going reconsideration of cities as such that Mayer produces the closing section of the book. Thus within the large city he is not content to decry "giantism" in the central downtown—he seeks the subdivision of the vast amorphous mass into "subcities" or at any rate "subcommunities," with suitable institutions as their focal points, on a model that has been brought into being quite plentifully in the European town. He wants vital cities built up at every scale. He is skeptical about "new towns" built entirely by private corporations with only the habitual credit and highway subventions, for even the best such cities have been unbalanced in their make-up. Only the well-to-do inhabitant can afford to buy the expensive housing which is all that private enterprise can build, and industries if introduced have to be of the fancy electronic type rather than the blue-jeans common style.

It is in his consideration of regions that Mayer is at his best. Acutely aware of the effect of policy and governmental administration as well as of natural conformation and resource, he applies his "holistic" criteria to the various forms possible embracing community factors, population distribution, traffic patterns, open space; and he has traveled enough to bring evidence from the regions of London, Stockholm, Zurich, and Holland into play no less than the "Year 2,000 Plan" of Washington's

(continued on page 138)

Mr. Haskell, a member of our Board of Contributors, is the former editor of The Architectural Forum.



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BOOKS

(continued from page 136)

area, or the Piedmont Crescent of North Carolina.

The Urgent Future is hard reading because of the special Mayerese language and style which a good editor could have helped him to translate a bit. But it is thoroughly worth sticking with. This is the complementary effort to Lewis Mumford's eloquent and comprehensive exhortations and the thoughtful writings of Clarence Stein. Mayer is fully involved with all the refractory details of the day; his writing carries an air of tough realism that builds confidence and breeds will. For, praise the Lord, this is an action book.

THE MYTH OF THE MACHINE. By Lewis Mumford. Published by Harcourt, Brace & World, Inc., New York, N. Y. 341 pp. Illustrated. 6 in. by 9¼ in. $8.95.

To the seasoned Mumford reader this new book will come as no great surprise. His previous book, *The City in History,* in its early chapters served as a stimulus for much of the material in the *Myth of the Machine.* Instead of exploring the development of the city, Mumford now explores the nature of man himself—man in his evolution from his primitive anthropoid state to homo sapiens.

His chief contention seems to be that no one has taken the trouble to find out what man is all about. Anthropologists approach the subject from one point of view, historians and sociologists from another. Mumford attempts an integration of the various sciences concerning man from his earliest times to his latest development. "What is especially and uniquely human is man's capacity to combine a wide variety of animal propensities into an emergent cultural entity: a human personality."

Mumford challenges man's use of tools as the primary cause of his development. Thomas Carlyle described man as a "tool-using animal" and Marx emphasized the material means of production as the central and directive function in human achievement. Mumford feels that play rather than work was the formative element in human culture. It was man's tendency to mix his fantasies with his daily grind which contributed to his creativity.

He dwells on the "rise of civilization" which occurred around the Fourth Millennium and which was the result not of mechanical or technical developments but came about because of a new type of social organization. This new social organization was compounded of myth, magic, religion, and astronomy, and the invention of the potter's wheel and the plow was not primarily the cause of the mighty transformations which occurred in the valleys of Egypt, Mesopotamia, and India.

These authoritarian civilizations of the Near East had many similarities with our own modern machine age, though we tend to regard our own modern technics as unique. But authoritarian civilizations deprive man of his creative powers.

Mumford emphasizes again and again that all culture is a form of play—that before man had the power to transform his natural environment he created an imaginary environment through play.

Johan Huizinga, the Dutch historian, in his book *Homo Ludens,* says of play that it is basic to man's early expression in ritual. Ritual established some sort of order and pattern intrinsic to man's needs before man turned to tool making and building.

Myth is used in the Freudian sense. Thomas Mann in his essay "Freud and the Future" correlates Mumford's thesis: "For the myth is the foundation of life, it is a timeless schema, the pious formula into which life flows when it produces its traits out of the unconscious."

Having pulled man out of the primeval ooze, Mumford examines his various customs, rituals, and religions in a lengthy and

(continued on page 144)

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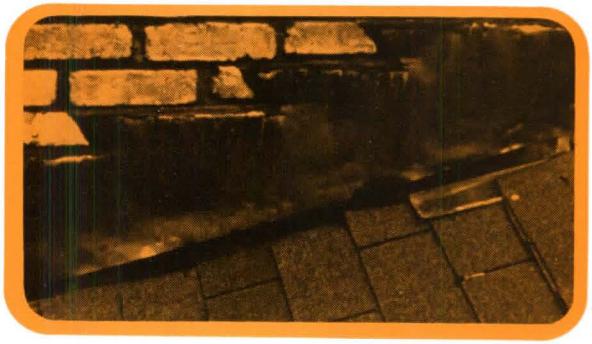

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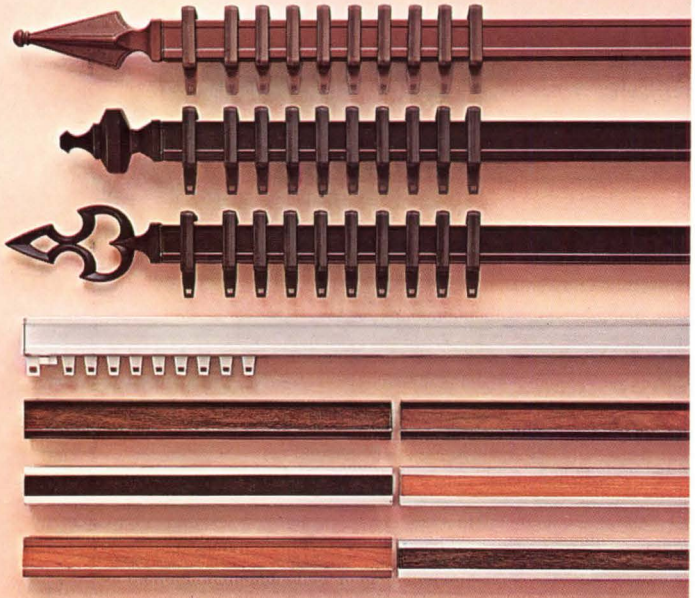

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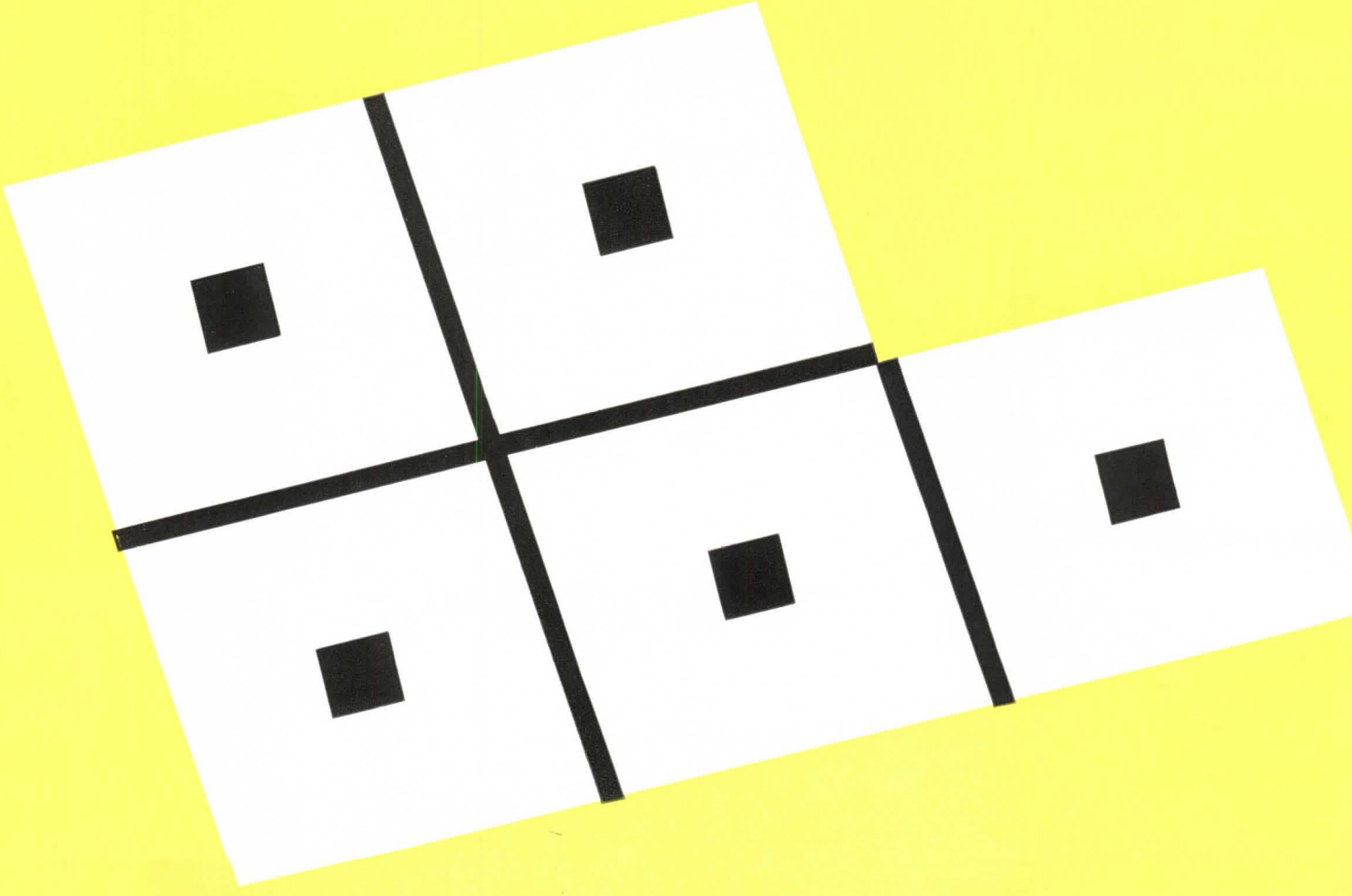

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BOOKS

(continued from page 138)

erudite manner, not always in sequence. The object is to show us that the continued expansion of science and technology does not necessarily provide man with a final salvation. Somewhere in the shuffle man loses his creativity and his identity. He points to Egypt as an example of a bureaucratic culture ending in decay.

Haunted by the invisible machine—he means I suppose the bureaucracy of government and the overtechnical development at the expense of human and creative needs—the megamachine ends by being a force destroying culture and causing war.

Mumford does not accept a machine culture as a final and perfect state. Agreeing with Levy-Strauss and Spengler, he views man as undergoing various changes not necessarily on an upward spiral. Mechanical development does not bring cultural development. Modern man is no more rational than his primitive ancestors.

The book ends on a melancholy note—it is the 16th century, the beginning of modern times, and Leonardo is disturbed by his own mechanical fantasies, a foreboding of the future.

Criticism could be levied at Mumford for his attempt to delve into so many facets of science without being himself a specialist in any given field. Mumford describes himself as a generalist. In 1938 in the *Culture of Cities* he avows his debt to Patrick Geddes and describes the process of accumulating material from many sources: "a work of synthesis must rest mainly upon facts already gathered and critically digested by the relevant specialists." From these facts come the interpretation. And again in the *Myth of the Machine* he states of his bibliography that it "seeks to be representative, as a generalist's sources must be, but it does not pretend to be exhaustive enough to meet a specialist's requirements in any individual department." In *The City in History* Mumford states, "I am a generalist, not a specialist in any single field." Out of modesty, perhaps, or because such words imply inactivity or remoteness, he does not call himself a philosopher, humanist, or historian.

Whether or not one can accept a work of this monumental quality as justified, Mumford himself emerges as a Balzacian figure, complex, baroque, and brooding —never threatened by the immensity of any subject.

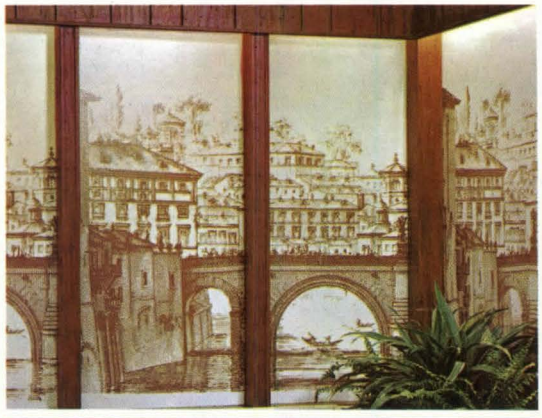
His approach is didactic and Emersonian—much of his work has been delivered in the form of lectures, which explains in part his moralizing and at times annoying lack of sequence. He is continuously searching for relevant facts in history to prove the irrevocable decline of the 20th century. Perhaps this zeal to score a point has been the spur for his indeed remarkable scholarship. Nonetheless, a more consistent chronology would be an aid to the reader. The book starts with the dawn of history but ends with the 16th century—the premonitions of da Vinci. In spite of this, Mumford, urbane and witty, is jumping around from the Pyramidal Age to the 20th century with the greatest of ease.

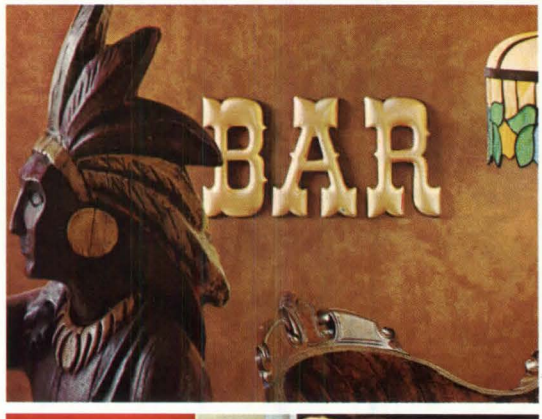
If some of his conclusions are open to question and if his sequence is at times confusing, these faults seem irrelevant in view of the tremendous scope of the book. His ability to interest and to stimulate, to blaze new trails and challenge old ones, places him at the top of American intellectuals and philosophers though he himself rejects such titles.

He explains in his prologue the reason for the *Myth of the Machine*. Why this terrific effort to review the past? "The widened interpolation of the past is a necessary move toward escaping the dire insufficiencies of current one-generation knowledge. If we do not take time to review the past we shall not have sufficient insight to understand the present or command the future, for the past never leaves us and the future is already here." —D.G.







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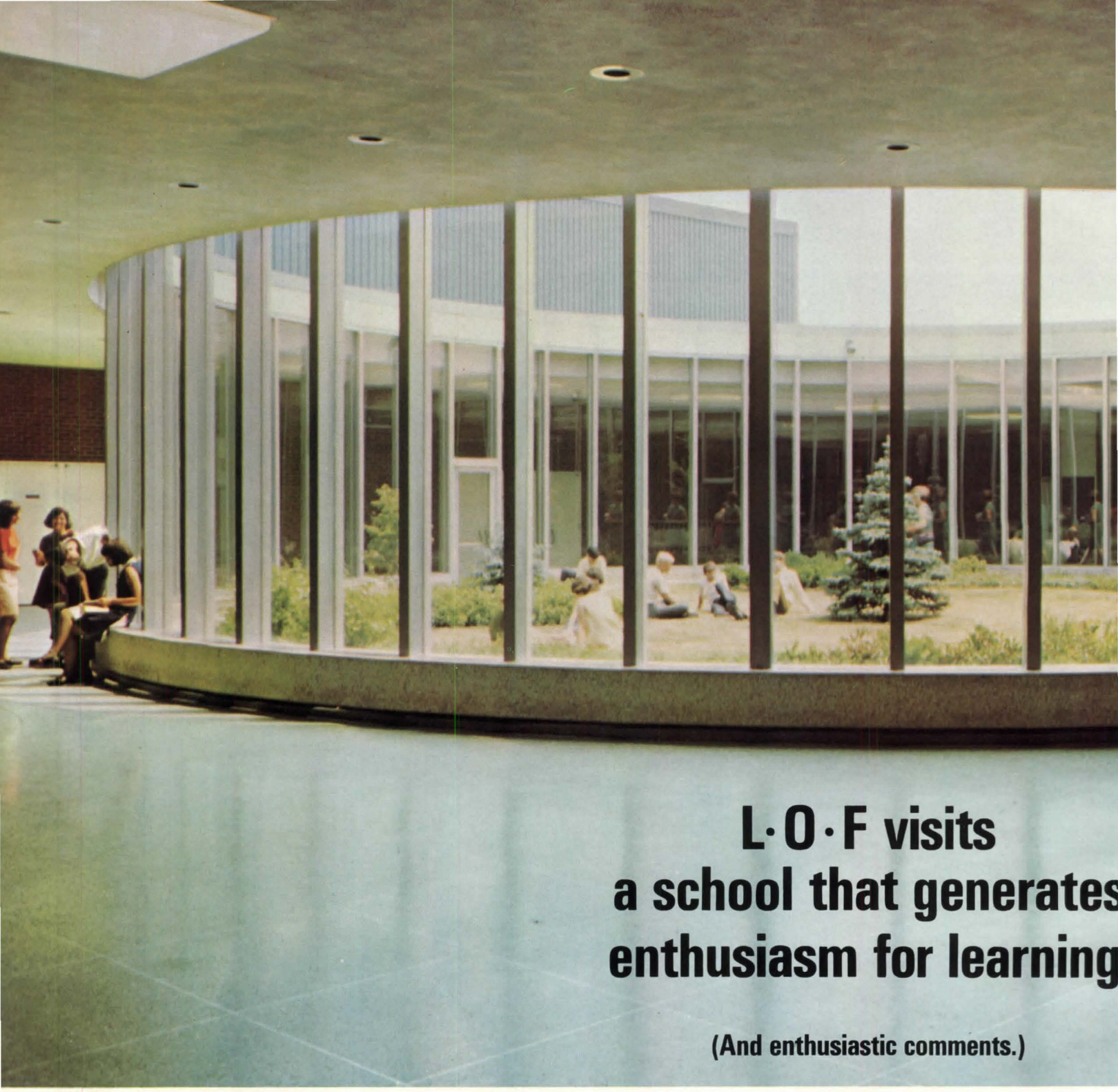

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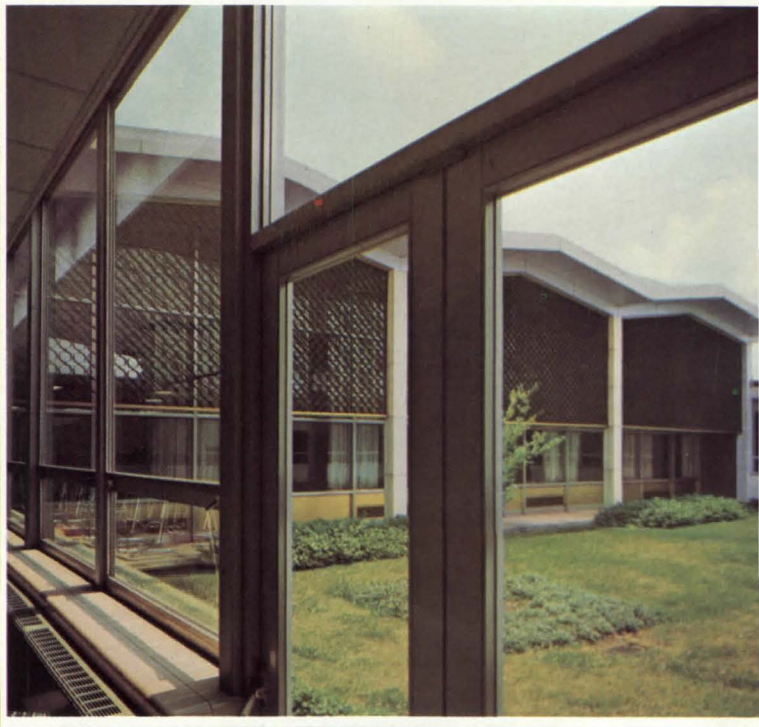

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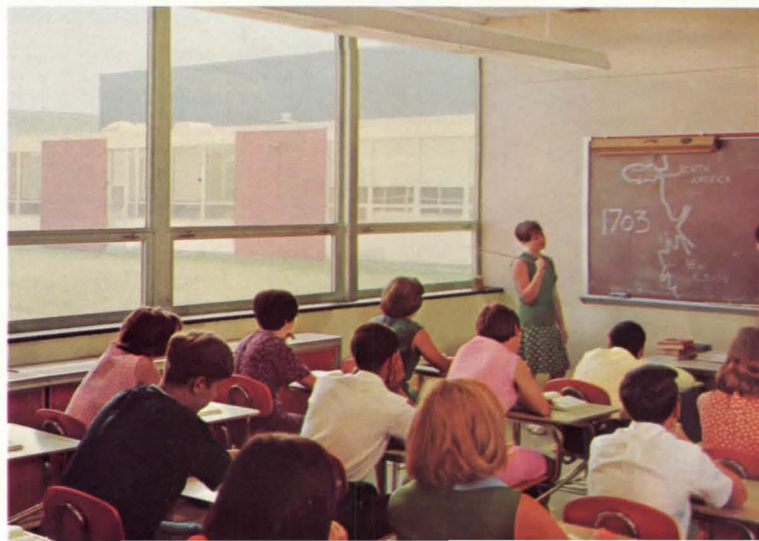

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EDITORIAL INDEX

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VOLUMES 126 AND 127

ARCHITECTS, DESIGNERS AND PLANNERS

Aalto, Alvar, Mount Angel Benedictine College Library, Mount Angel, Ore., June 95
Adler & Sulivan, Auditorium Theater, Chicago, Ill., (restoration by Harry Weese), Dec. 47
Affleck, Desbarats, Dimakopoulos, Lebensold & Sise, Place Bonaventure, Montreal Canada, Apr. 68
Andrews, John, African Place, Expo 67, Montreal, Canada, May 53
Arup Assocs., Maltings Concert Hall, Snape, Suffolk, England, Nov. 66
Aubry, Eugene E. & Howard Barnstone, Harris County Center for the Retarded, Inc., Houston, Tex., Dec. 48
Auger, Boyd, Gyrotron, Expo 67, Montreal, Canada, May 53
Aydelott, A.L., Pet Milk headquarters, St. Louis, Mo., Nov. 54
Barnes, Edward Larrabee, New South Building, Princeton University, Princeton, N.J., July/Aug. 58
Barnstone, Howard & Eugene E. Aubry, Harris County Center for the Retarded, Inc., Houston, Tex., Dec. 48
Baroni & Garati, Cuban Pavilion, Expo 67, Montreal, Canada, May 54
Beckhard, Herbert with Marcel Breuer, FDR Memorial design, Jan./Feb. 124
Belfatto & Pavarini, Church of the Epiphany, NYC, Nov. 82
Bennett, Hubert (chief architect, Greater London Council), Queen Elizabeth Hall, London, Apr. 70
Birkerts, Gunnar, Lincoln Elementary School, Columbus, Ind., May 48
Blouin, Andre, Place des Nations, Montreal, May 53
Blurock, Ellerbroeck & Assocs., with William L. Pereira & Assocs. and Jones & Emmons, University of Calif. at Irvine, June 55
Boehm, Gottfried, Bensberg City Hall, Bensberg, West Germany, Apr. 71
Borgstrom, Hans & Bengt Lindroos, communications tower, Stockholm, Sweden, July/Aug. 87
Bowman, Fielding L. & Landis Gores, Strathmoor-on-the-Park, Fairfield, Conn. Dec. 60
Breger, William N., Civic Center Synagogue, NYC, Oct. 64
Breuer, Marcel with Nolen-Swinburne & Assocs., Dept. of Housing & Urban Development office building, Washington, D.C., Sept. 72
Breuer, Marcel with Herbert Beckhard, FDR Memorial design, Jan/Feb. 124
Bryant, W.S. with Blanco Soler, British Embassy, Madrid, Spain, July/Aug. 87
Burger & Coplans, with Donald P. Reay, consultant, depressed highway & housing scheme, San Francisco, Calif., Jan./Feb. .. 96
Burnham & Root, Kansas City Board of Trade, Kansas City, Mo., Dec. 54
Cambridge Seven Assocs., Arlington Street MTA Station, Boston, Mass., May 95
Cambridge Seven Assocs., Exhibits, U.S. Pavilion, Expo 67, Montreal, Canada, May .. 54
Cambridge Seven Assocs. New England Aquarium, Boston, Mass., Oct. 58
Carvajal, Javier with Kelly & Gruzen, Spanish Pavilion of N.Y. World's Fair, St. Louis, Mo., Nov. 54
Christ-Janer, Victor, James F. Lincoln Library, Lake Erie College, Painesville, Ohio, July/Aug. 62
Clay, Pafford Keatinge, San Francisco Art Institute, Calif., Oct. 100
Dattner, Richard with Davis, Brody & Assocs., Estee Lauder Laboratories, Melville, N.Y., Mar. 76
David, Barrott, Boulva, Associated Archts., with Moshe Safdie, Habitat 67, Montreal, Canada, May 41
Davis, Brody & Assocs. with Richard Dattner, Estee Lauder Laboratories, Melville, N.Y., Mar. 76
Davis, Brody & Assocs., Waterside, NYC, Jan./Feb. 118
Davis, Cochran & Miller, Yale Corinthian Yacht Club, Branford, Conn., Oct. 58
Defty & Assocs., Central Midwestern Regional Educational Laboratory Inc. conceptual design, July/Aug. 121
Eisenmann, John & George H. Smith, Cleveland Arcade, Sept. 60
Elbasani, Barry, Donn Logan & Michael Severin, Broome County Cultural Center scheme, Binghamton, N.Y., Dec. 87
Erskine, Ralph, Erskine house, Drottningholm, Sweden, July/Aug. 88
Friedberg, M. Paul & Assocs., prototype playgrounds, NYC, Mar. 91
Frost Jr., Frederick G. & Assocs., design for conversion of an existing NYC school, July/Aug. 114
Fuller, Buckminster, U.S. Pavilion, Expo 67, Montreal, Canada, May 54
Brothers Gabriel & Martin, Monasterio Benedictino de Las Condes, Chile, July 55
Gibberd, Frederick, Metropolitan Cathedral of Christ the King, Liverpool, England, July/Aug. 86
Gillespie, Kidd & Coia, main building, St. Peter's Seminary, Cardross, Scotland, Sept. 73
Girard, Alexander, Compound Restaurant, Santa Fe, N.M., June 62
Goldberg, Bertrand, Burns-Jackson Neighborhood Renewal Plan, Dayton, Ohio, May 56
Gores, Landis & Fielding L. Bowman, Strathmoor-on-the-Park, Fairfield, Conn., Dec. .. 60
Graham, Anderson, Probst & White with Schipporeit-Heinrich, Lake Point Tower, Chicago, Ill., Nov. 56
Green & Savin, Inc., Regency Square, Detroit, Mich., Jan./Feb. 82
Gutbrod, Rolf with Frei Otto, German Pavilion, Expo 67, Montreal, Canada, Apr. 58
Gwathmey, Charles with Richard Henderson, studio, Amagansett, N.Y., Jan./Feb. 81
Hardy, Hugh & Assocs., Simon's Rock Arts Center, Great Barrington, Mass., Jan./Feb. 100
Hartman & Cox, park, Southeast Washington, D.C., Apr. 93
Hellmuth, Obata & Kassabaum, Gateway Tower office Building, St. Louis, Mo., Nov. 54
Henard, Eugene, "The First Modern Urbanist," Oct. 50
Henderson, Richard with Charles Gwathmey, studio, Amagansett, N.Y., Jan./Feb. 81
Higueras & Miro, cultural center, Burgos, Spain, Oct. 93
Hirshen & Van der Ryn, Kit House, Berkeley, Calif., Nov. 78
Hisaka, Don, Hisaka House, Shaker Heights, Cleveland, Ohio, Sept. 99
Huntington, Darbee & Dollard, Episcopal Mission Housing, Hartford, Conn. 102
Ireland & Assocs., apartment for elderly, Columbus, Ohio, Apr. 96
Isozaki, Arata, Oita High School, Oita, Japan, July/Aug. 89
Jacobsen, Arne, Landskrona Tennis Hall, Landskrona, Sweden, Jan./Feb. 104
Jamgochian, Haigh, Markel Service Corp., Richmond, Va., Jan./Feb. 80
Johansen, John, Charles Center Theater building, Baltimore, Md., May 73
Jones & Emmons, with William L. Pereira & Assocs., and Blurock, Ellerbroeck & Assocs. University of California at Irvine, June 55
Kahn, Louis I., Salk Institute of Biological Studies, San Diego, Calif., Dec. 27
Kallman, McKinnell & Knowles, Boston City Hall, Boston, Mass., Dec. 44
Kammerer, Hans & Walter Belz, two schools, Stuttgart, Germany, Apr. 84
Kaplan, Marshall, Gans & Kahn, plan for West Oakland, Calif., Apr. 42
Katan, Roger, Urban Gateway, NYC, Apr. 72
Kelly & Gruzen with Javier Carvajal, Spanish Pavilion of N.Y. World's Fair, St. Louis, Mo., Nov. 54
Ketchum, Jr., Morris & Assocs., I.S. 29, NYC, Nov. 95
Kilkutake, Kiyonari, Miyakonojo Civic Auditorium, Japan, Apr. 69
Kiralek, Paul, Trinity College Library, Dublin, Ireland, Oct. 78
Koulbanis, Charles J. & Assocs., (Designer: Nicos D. Zographos) Papert, Koenig, Lois, Inc. offices, NYC, Jan./Feb. 90
Laramore & Douglass, Engrs., Plains Electric Generation and Transmission Cooperative, Albuquerque, N.M., Sept. 72
Lasdun, Denys & Partners, University of Liverpool Sports Center, Liverpool, England, Sept. 71
Le Corbusier; completed by A. Taves & R. Rebutato, Centre Le Corbusier, Zurich, Switzerland, Sept. 82
Lehmbruck, Manfred, Wilhelm-Lehmbruck Museum, Duisburg, Germany, Mar. 31
Lippincott, Steve, welded sculpture, Apr. 53
Loebl, Schlossman, Bennett & Dart, House of Prayer Evangelical Lutheran Church, Country Club Hills, Ill., Oct. 57
Luckman Assocs., new Madison Square Garden, NYC, Jan./Feb. 81
Lundy, Victor A. with Lyles, Bissett, Carlisle & Wolff, U.S. Tax Court building, Washington, D.C., Sept. 76
Lutzker, Arthur with Bernard Marson, International Production Service and Sales Employees Union building, Islip, L.I., N.Y. Oct. 59
Lyles, Bissett, Carlisle & Wolff with Victor A. Lundy, U.S. Tax Court building, Washington, D.C., Sept. 76
Ian Mackinlay & Assocs., Syntex Interim Facility, Stanford Industrial Park, Palo Alto, Calif., May 51
Marcou, O'Leary & Assocs., study of impact of proposed Vieux Carre expressway, New Orleans, La., Mar. 54
Marquis & Stoller, U.S. Coast Guard Barracks, Almeda, Calif., Sept. 95
Marson, Bernard with Arthur Lutzker, International Production Service and Sales Employees Union building, Islip, L.I., N.Y., Oct. 59
Meier, Richard, Smith House, Darien, Conn., Dec. 66
Mitchell/Giurgola Assocs., AIA headquarters, Washington, D.C., June 89
C.F. Murphy Assocs., Central District Filtration Plant, Chicago, Ill., Mar. 63
Nemeny, George, Prussack house, Woodmere, N.Y., Apr. 76
Nervi, Pier Luigi, George Washington Bridge Bus Terminal, NYC, Mar. 68
Nivola, Costantino, plaza, Nuoro, Sardinia, Oct. 71
Nolen-Swinburne & Assocs. with Marcel Breuer, Dept. of Housing & Urban Development office building, Washington D.C., Sept. 72
Otto, Frei with Rolf Gutbrod, German Pavilion, Expo 67, Montreal, Canada, Apr. .. 58

Continued

Palpacelli, Francesco, Cecchina Water Distributing Plant, Rome, Italy, Mar. 62
Papineau/Gerin-LaJoie/LeBlanc, Quebec Pavilion, Expo 67, Montreal, Canada, June . . 29
Papineau/Gerin-LaJoie/LeBlanc, dormitory, University of Montreal, Canada, July/Aug. 88
I.M. Pei & Partners, National Center for Atmospheric Research, Table Mountain, Colo., Oct. 32
Paatelainen, Raili & Reima Pietila, Kaleva Church, Tampere, and Dipoli Student Union, Otaniemi, Finland, Dec. 74
Pereira, William L. & Assocs., University of California buildings, Irvine Calif., June . . 55
Pietila, Reima & Raili Paatelainen, Kaleva Church, Tampere, and Dipoli Student Union, Otaniemi, Finland, Dec. 74
Pinney, Neil & Peter Ong, megastructure for renewal, Oakland, Calif., June 58
Portman, John, Embarcadero Center, San Francisco, Calif., Mar. 94
Posokhin, M.V., Russian Pavilion, Expo 67, Montreal, Canada, May 54
Reay, Donald P. consultant with Burger & Coplans, depressed highway & housing scheme, San Francisco, Calif., Jan./Feb. . . 96
Roche, Kevin/John Dinkeloo & Assocs., Ford Foundation headquarters, NYC, June 52
Rogers, Taliaferro, Kostritsky & Lamb, Hopkins Plaza, Baltimore, Oct. 57
Rouse Co., The planners and developers, Columbia, Md., Nov. 42
Rudolph, Paul, Art & Architecture building revisited, Yale University, New Haven, Conn., July/Aug. 47
Saarinen, Eero & Assocs., Bell Telephone Laboratories, Holmdel, N.J., Apr. 33
Safdie, Moshe with David, Barrott, Boulva, Associated Archts., Habitat 67, Expo 67, Montreal, Canada, May 35
Schipporeit-Heinrich, in association with Graham, Anderson, Probst & White, Lake Point Tower, Chicago, Ill., Nov. 56
Schneider-Esleben, Paul, ARAG Insurance Co. offices, Dusseldorf, Germany, Jan./Feb. . . 79
Schneider-Esleben, Paul, Stimmen der Zeit (Jesuit office-housing complex), Munich, Germany, June 53
Schooley, Cornelius & Schooley, twin dormitories, Ohio State University, Columbus, Ohio, Nov. 55
Paul Schweikher Assocs., Duquesne University Student Union, Pittsburgh, Pa., July/Aug. 78
Sert, Jackson & Assocs., Holyoke Center, Harvard University, Cambridge, Mass., Jan./Feb. 64
Skidmore, Owings & Merrill, Alcoa Office Building, Golden Gate Center, San Francisco, Calif., Mar. 62
Skidmore, Owings & Merrill, John Hancock Center, Chicago, Ill., Nov. 56
Skidmore, Owings & Merrill, Lindheimer Astronomical Research Center, Northwestern University, Evanston, Ill., Mar. 60
Skidmore, Owings & Merrill with Harwood K. Smith, One Main Place, Dallas, Sept. 71
Skidmore, Owings & Merrill, Robert R. McMath Solar Telescope, Kitt Peak National Observatory, Kitt Peak, Arizona, Oct. 44
Smith, Harwood K. with Skidmore, Owings & Merrill, One Main Place, Dallas, Sept. 71
Soler, Blanco with W. S. Bryant, British Embassy, Madrid, Spain, July/Aug. 87
Sternbach & Rheaume, University of Connecticut Art Gallery, Storrs, Conn., June 54
Stone, Edward D., Busch Stadium, St. Louis, Mo., Nov. 54
Stonorov & Haws, East Park, Philadelphia, Dec. 90
Tabler, William, Louis Inn., St. Louis, Mo., Nov. 54
Tange, Kenzo & the Urtec Team, Yamanashi Communications Center, Kofu, Yamanashi, Japan, Sept. 34
Taves, A. and R. Rebutato; completing the work of Le Corbusier, Centre Le Corbusier, Zurich, Switzerland, Sept. 82
Trujillo, Dr. Eduardo & Dr. Carlos Raul Villanueva, Venezuelan Pavilion, Expo 67, Montreal, Canada, Sept. 58
Uluot, Erik, library, Vaxjo, Sweden, Mar. 61
Underhill, William, welded sculpture, Apr. . . 53
Urbahn, Max, John F. Kennedy Space Center, Fla., Jan./Feb. 50
Urban Design Assocs., "Great High Schools" plan, Pittsburgh, Pa., June 40
Villa, Macioge of Montreal, futuristic phone booths, Expo 67, Montreal, Canada, May . . 54
Villanueva, Dr. Carlos Raul & Dr. Eduardo Trujillo, Venezuelan Pavilion, Expo 67, Montreal, Canada, Sept. 58
Wagener, Hobart & Assocs., Williams Village, University of Colorado, Boulder, Colo., Oct. 56
Warner, Burns, Toan & Lunde, Barbados Hilton Hotel, Apr. 70
Warner, Burns, Toan & Lunde, Hofstra University Library, Hempstead, N.Y., Jan./Feb. 78
Wearden, Clifford & Assocs., housing, Slough Lane, Kingsbury Green, London, England, Apr. 46
Weese, Harry, Auditorium Theater (Adler & Sullivan) restoration, Chicago, Ill., Dec. . . 47
Weese, Harry & Assocs., South Lower Campus Project, University of Wisconsin, Madison, Wis., Oct. 60
Wenzler, William P., Inland Steel Products Co. plant, Milwaukee, Wis., Dec. 38
Wiens, Clifford, Central Heating & Cooling Plant, University of Saskatchewan, Saskatoon, Canada, Nov. 57
Woollen, Evans & Assocs., housing for elderly, Indianapolis, Ind., Dec. 46
Wright, Frank Lloyd Foundation, Guggenheim Museum addition, NYC, Dec. 46
Zanuso, Marco, vacation house, Arzachena, Sardinia, June 64
Zion & Breen, Chatham Center plaza, Pittsburgh, Pa., June 53
Zion & Breen, Paley Park, NYC, July/Aug. . . 88
Zographos, Nicos D., (Architects: Charles J. Koulbanis & Assocs.) Papert, Koenig, Lois, Inc. Offices, NYC, Jan./Feb. 90

ARCHITECTURAL HISTORY

Architectural Iron Works, by Cervin Robinson, May 63
Auditorium Theater, Chicago, Ill., Adler & Sullivan, Archt., Harry Weese, Archt. for restoration, Dec. 47
Cleveland Arcade, John Eisenmann & George H. Smith, Archts., by Mary-Peale Schofield, Sept. 60
The First Modern Urbanist (Eugene Henard), by Peter Wolf, Oct. 50
Kansas City Board of Trade, Kansas City, Mo., Burnham & Root, Archts., by Donald Hoffmann, Dec. 54
Modern Antiques: 20th Century Landmarks, May 80
Modern Antiques: 20th Century Landmarks, by Cervin Robinson, June 74
Soviet Architecture Today, by Ada Louise Huxtable, Nov. 32
What Ever Happened to Sarasota?, by Philip H. Hiss, June 66

BOOKS

Alander, Kyosti, **Viljo Revell: Works and Projects,** rev. by Bernard P. Spring, May 101
Bacon, Edmund N., **Design of Cities,** rev. by Douglas Haskell, Sept. 80
Bell, Ervin J., **The Architectural Index for 1966,** rev., May 101
Boesiger, W., **Richard Neutra 1961-66 Building and Projects,** rev. by Esther McCoy, Dec. . . 96
Cenival, Jean-Louis de, **Egyptian Architecture,** rev. by Sibyl Maholy-Nagy, Sept. 81
Cook, Peter, **Architecture: Action and Plan,** rev. by John M. Johansen, Dec. 72
Donat, John **World Architecture 3,** rev., July/Aug. 77
Dorsett, Clyde, Ellis Kaplan, Herbert McLaughlin, Dr. Joseph Downing & Dr. Robert Kimmich, **Planning, Programming, and Design for the Community Mental Health Center,** rev. by Daniel Sullivan, May 101
Fitch, James Marston, **American Building: The Historical Forces that Shaped It,** rev. by Henry Millon, Oct. 76
Gans, Herbert J., **The Levittowners,** rev. by Roger Montgomery, July/Aug. 77
Jacobus, John, **Twentieth-Century Architecture,** rev. by Edgar Kaufmann Jr., July/Aug. 76
Kepes, Gyorgy, **Sign, Image, Symbol/The Manmade Object/Module, Production, Symmetry, Rhythm,** rev. by James Marston Fitch, Mar. 74
Kiesler, Frederick, **Inside the Endless House,** rev. by Marguerite Young, May 71
Le Corbusier, **Mise Au Point** and **Le Voyage D'Orient,** rev. by Stamo Papadaki, Jan./Feb. 89
Monroe, Harriet, **John Wellborn Root,** rev. by Carl W. Condit, Apr. 74
Myller, Rolf, **The Design of the Small Public Library,** rev. by James Baker, Jan./Feb. . . 135
Picard, Gilbert, **Roman Architecture,** rev. by Sibyl Moholy-Nagy, Sept. 81
Richards, Brian, **New Movements in Cities,** rev. by Shadrach Woods, Jan./Feb. 88
Rosenberg, Harold, **The Anxious Object,** rev. by Leslie Powell, Nov. 104
Scheidig, Walther, **Crafts of the Weimar Bauhaus 1919-1924,** rev. by Sibyl Moholy-Nagy, Nov. 64
Silver, Nathan, **Lost New York,** rev., Dec. . . 73
Stierlin, Henri, **Mayan Architecture,** rev. by Sibyl Moholy-Nagy, Sept. 81
Summerson, John, **The Classical Language of Architecture,** rev. by Douglas Haskell, Apr. 75
Venturi, Robert, **Complexity and Contradiction in Architecture,** rev., June 56
Vogt-Goknil, Ulya, **Ottoman Architecture,** rev. by Sibyl Moholy-Nagy, Sept. 81

CHURCHES

Church of the Epiphany, NYC, Belfatto & Pavarini, Archts., Nov. 82
Civic Center Synagogue, NYC, William N. Breger, Archt., Oct. 64
House of Prayer Evangelical Lutheran Church, Country Club Hills, Ill., Loebl, Schlossman, Bennett & Dart, Archts., Oct. 57
Jesuit office-housing complex, Paul Schneider-Esleben, Archt., by Edward Marc Treib, June 53
Kaleva Church, Tampere, Finland, Reima Pietila & Raili Paatelainen, Archts., Dec. 74
Metropolitan Cathedral of Christ the King, Liverpool, England, Frederick Gibberd,

Archt., July/Aug. 86
Monasterio Benedictino de Las Condes, Chile, Brother Gabriel & Brother Martin, Designers, June 55

CITIES (see Planning)
CULTURAL BUILDINGS

Auditorium Theater, Chicago, Ill., Adler & Sullivan, Archts., Harry Weese, Archt. for restoration, Dec. 47
Broome County Cultural Center scheme, Binghamton, N.Y., Barry Elbasani, Donn Logan & Michael Severin, Archts., Dec. 87
Centre Le Corbusier, Zurich, Switzerland, Le Corbusier; completed by: A. Taves & R. Rebutato, Archts., by Ueli Roth, Sept. 82
Charles Center Theater Building, Baltimore, Md., John Johansen, Archt., May 73
Cultural Center, Burgos, Spain, Higueras & Miro, Archts., Oct. 93
Guggenheim Museum addition, NYC, Frank Lloyd Wright Foundation, Archts., Dec. 46
Lehmbruck Museum, Duisburg, Germany, Dr.-Ing. Manfred Lehmbruck, Archt., Mar. 31
Maltings Concert Hall, Snape, Suffolk, England, Arup Assocs., Archts., Nov. 66
Miyakonojo Civic Auditorium, Japan, Kiyonari Kikutake, Archt., Apr. 69
San Francisco Art Institute, Calif., Pafford Keatinge Clay, Arch., Oct. 100
Queen Elizabeth Hall, South Bank Art Center, London, England, Hubert Bennett, (chief architect, the Greater London Council), Archt., Apr. 70
Simon's Rock Arts Center, Great Barrington, Mass., Hugh Hardy & Assocs Archts., Jan./Feb. 100
University of Connecticut Art Gallery, Storrs, Conn., Sternbach & Rheaume, Archts., June 54

DESIGN THEORY

Dreams of Tomorrow, by Robert B. Riley, Apr. 66
Henry R. Luce, 1957 speech to AIA, June .. 38
Of Order and Disorder, Science and Art, And the Solving of Problems, by Piet Hein, Dec. 64

EDUCATION BUILDINGS (see also Libraries)

California, University of, Berkeley: How Do Students Really Live?, by Sim Van der Ryn & Murray Silverstein, July/Aug. 90
California, University of, Irvine Campus, William L. Pereira & Assocs., with Blurock, Ellerbroeck & Assocs., and Jones & Emmons, Archts., June 55
Central Midwestern Regional Educational Laboratories, Inc., Defty & Assocs., Archts., July/Aug. 121
Colorado, University of, Williams Village, Boulder, Colo., Hobart Wagener & Assocs., Archts., Oct. 56
Columbia University Campus, NYC, by C. Richard Hatch, July/Aug. 68
Connecticut, University of, Art Gallery, Storrs, Conn., Sternbach & Rheaume, Archts., June 54
Duquesne University, Student Union, Pittsburgh, Pa., Paul Schweikher Assocs., Archts., by William R. Cooper July/Aug. .. 78
Finnish Institute of Technology, Dipoli Student Union, Otaniemi, Finland, Reima Pietila & Raili Paatelainen, Archts., by Edward Marc Treib, Dec. 74
Harris County Center for the Retarded, Inc., Houston, Tex., Howard Barnstone & Eugene E. Aubry, Archts., Dec. 48
Harvard University, Holyoke Center, Cambridge, Mass., Sert, Jackson & Assocs., Archts., Jan./Feb. 64
Intermediate School 29, NYC, Morris Ketchum, Jr. & Assocs., Archts., Nov. 95
Lincoln Elementary School, Columbus, Ind., Gunnar Birkerts, Archt., Nov. 48
Liverpool, University of, Sports Center, England, Denys Lasdun & Partners, Archts., Sept. 71
Montreal, University of, Women's Dormitory, Canada, Papineau/Gerin-LaJoie/LeBlanc, Archts., July/Aug. 88
NYC school conversion design, Frederick G. Frost, Jr. & Assocs., Archts., July/Aug. .. 114
Ohio State University, two dormitories, Columbus, Ohio, Schooley, Cornelius & Schooley, Archts., Nov. 55
Oita High School, Japan, Arata Isozaki, Archt., July/Aug. 89
Pittsburgh's "Great High Schools" Plan, Pa., Urban Design Assocs., Archts., June 40
Princeton University Campus, Princeton, N.J., July/Aug. 54
Princeton University, New South Building, Princeton, N.J., Edward Larrabee Barnes, Archt., July/Aug. 58
St. Peter's Seminary, Main Building, Cardross, Scotland, Gillespie, Kidd & Coia, Archts., Sept. 73
Saskatchewan, University of, Central Heating & Cooling Plant, Saskatoon, Canada, Clifford Wiens, Archt., Nov. 57
Simon's Rock School, Arts Center, Great Barrington, Mass., Hugh Hardy & Assocs., Archts., Jan./Feb. 100
Stuttgart, two schools, Stuttgart, Germany, Walter Belz & Hans Kammerer, Archts., Apr. 84
Wisconsin, University of, South Lower Campus Project, Madison, Wis., Harry Weese & Assocs., Archts., Oct. 60
Yale University, Art & Architecture Building revisited, New Haven, Conn., Paul Rudolph, Archt., July/Aug. 47

GALLERIES

Architectural Iron Works, by Cervin Robinson, May 63
Houseboats of Sausalito by Albert Garvey, March 49
Oh, What a Lovely War, the ruined shore batteries of Fortress Europe, Nov. 58
Takrouna, by Myron Henry Goldfinger, July/Aug. 98
Welded Giants, William Underhill and Steve Lippincott, sculptors, Apr. 52

GOVERNMENT BUILDINGS

Bensberg City Hall, West Germany, Gottfried Boehm, Archt., Apr. 71
Boston City Hall, Boston, Mass., Kallman, McKinnell & Knowles, Archts., Dec. 44
British Embassy, Madrid, Spain, W.S. Bryant & L. Blanco Soler, Archts., July/Aug. 87
Dept. of Housing & Urban Development, Washington, D.C., Marcel Breuer with Nolen-Swinburne & Assocs., Archts., Sept. 72
FDR Memorial design, Marcel Breuer with Herbert Beckhard, Archts., Jan./Feb. 124
John F. Kennedy Space Center, Cape Kennedy, Fla., Max O. Urbahn (planning and architectural design), Jan./Feb. 50
Miyakonojo Civic Auditorium, Japan, Kiyonari Kikutake, Archt., Apr. 69
U.S. Coast Guard barracks, Alameda, Calif., Marquis & Stoller, Archts., Sept. 95
U.S. Tax Court, Washington, D.C,. Victor A. Lundy with Lyles, Bissett, Carlisle & Wolff, Archts., Sept. 76

HOTELS/MOTELS/RESTAURANTS

Barbados Hilton Hotel, Warner, Burns, Toan & Lunde, Archts., Apr. 70
Compound Restaurant, Santa Fe, N.M., Alexander Girard, Archt., June 62
Place Bonaventure, Montreal, Canada, Affleck, Desbarats, Dimakopoulos, Lebensold & Sise, Archts., Apr. 68
Louis Inn, St. Louis, Mo., William Tabler, Archt., Nov. 54

HOUSES

Erskine House, Drottningholm, Sweden, Ralph Erskine, Archt., July/Aug. 88
Hisaka House, Shaker Heights, Cleveland, Ohio, Don Hisaka, Archt., Sept. 99
Houseboats of Sausalito, Calif., by Albert Garvey, Mar. 48
Kit House, Berkeley, Calif., Hirshen & Van der Ryn, Archts., Nov. 78
Prussack House, Woodmere, N.Y., George Nemeny, Archt., Apr. 76
Smith House, Darien, Conn., Richard Meier, Archt., Dec. 66
Studio, Amagansett, N.Y., Charles Gwathmey & Richard Henderson, Archts., Jan./Feb. . 81
Vacation House, Arzachena, Sardinia, Marco Zanuso, Archt., June 64

HOUSING

Apartment for elderly, Columbus, Ohio, Ireland & Assocs., Archts., Apr. 96
Episcopal Mission Housing, Hartford, Conn., Huntington, Darbee & Dollard, Archts., Nov. 102
Habitat 67, Expo 67, Montreal, Canada, Moshe Safdie & David, Barrott, Boulva, Associted Archts., May 35
Housing for Elderly, Indianapolis, Ind., Evans Woollen & Assocs., Archts., Dec. 46
John Hancock Center, Chicago, Ill., Skidmore, Owings & Merrill, Archts., Nov. 56
Lake Point Tower, Chicago, Ill., Schipporeit-Heinrich with Graham, Anderson, Probst & White, Archts., Nov. 56
Regency Square, Detroit, Mich., Green & Savin, Archts., Jan./Feb. 82
San Francisco freeway housing proposal, Calif., Burger & Coplans, Archts., Jan./Feb. 96
Slough Lane, Kingsbury Green, London, England, Clifford Wearden & Assocs., Archts., Apr. 46
Strathmore-on-the-Park, Fairfield, Conn., Landis Gores & Fielding L. Bowman, Archts., by Donald-David Logan, Dec. 60
Waterside, NYC, Davis, Brody & Assocs., Archts., Jan./Feb. 118

INDUSTRIAL BUILDINGS

Cecchina Water Distributing Plant, Italy, Francesco Palpacelli, Archt., Mar. 62
Central District Filtration Plant, Chicago, Ill., Stan Gladych of C. F. Murphy Assocs., Archt., Mar. 63
Estee Lauder Laboratories, Melville, N.Y., Davis, Brody & Assocs. with Richard Dattner, Archts., Mar. 76
Grand Isle and Caminada Mines, Freeport Sulphur, in Gulf of Mexico, by John Johansen, Sept. 44

Continued

ADVERTISING INDEX

By Advertiser

Aberthaw Construction Company (Cabot, Cabot & Forbes) 16

All-Steel Equipment, Inc. 21

Armstrong Cork Company (Bldg. Prod.) 5

Armstrong Cork Company (Action Line) 123-125

Art Metal, Inc. 6

Butler Manufacturing Company, Buildings Div. 130

Cabot, Samuel, Inc. 138

Carrier Air Conditioning Company 30

Day-Brite Lighting, A Div. of Emerson Electric Co. 131-134

Dow Badische Company 28

Dur-O-wal .....40 & 41

P & F Corbin Division-Emhart Corp. 129

Faber-Castell Pencil Company, A. W. 3

B. F. Goodrich Consumer Products 14

Gotham Lighting Corporation .. 142

Haws Drinking Faucet Company.. 122

Inland Steel Products-Engineered Products Div. 2

Kentile Floors, Inc. .....Cover 2

Kirsch Company .....140 & 141

Kittinger Company Inc. 156

Knoll Associates, Inc. 143

Koppers Company Inc. 7-12

Laclede Steel Company 20

LCN Closers .....22 & 23

Libbey-Owens-Ford Glass Company .....146 & 147

Lone Star Cement Corp. 157

Malta Mfg. Company 144

Marlite Division of Masonite Corp. 145

Medusa Portland Cement Company 4

Miller Company, The 137

Mo-Sai Institute 24

Mosaic Tile Company 135

Myrtle Desk Co., Office Division 25

Norton Door Closer Div., Eaton Yale & Towne, Inc. .....Cover 4

Olympic Stain Company 119

Peerless Steel Equipment Co. .. 39

Republic Steel Corp., Mfg. Div. 148

Richards-Wilcox Mfg. Company 26 & 27

Rigidized Metals Corporation ... 127

Sargent & Company 35-38

Schokbeton Products, Inc. 34

Seamloc Loma-Loom Carpet Company 17

Silbrico Corporation 13

Elwin G. Smith & Company, Inc. 33

Sperry Rand Corporation (Remington Rand Office Systems Division) Library Bureau 32

Standard Dry Wall Products, Inc. 155

Steelcase, Inc. .....Cover 3

Steel Joist Institute 31

Stow/Davis 29

The Halsey W. Taylor Company.. 128

Texas Instruments, Materials Div. 139

Thiokol Chemical Corp. 42

United States Steel Corp. 158

Vermont Marble Company 156

W & F Mfg. Inc. 156

Westinghouse Electric Corporation, Elevator Div. .....18 & 19

York Div. of Borg-Warner Corp. .. 126

By Product

DOORS AND WINDOWS

Libbey-Owens-Ford Glass Company 146, 147
Malta Manufacturing Company 144

ELECTRICAL EQUIPMENT

Elevators
Westinghouse Electric Corp., Elevator Div. 18, 19

FLOORING

Kentile Floors, Inc. .....Cover 2

FLOOR COVERINGS

Dow Badische Company 28
Seamloc Loma-Loom Carpet Co. 17

FURNISHINGS

Furniture
All-Steel Equipment, Inc. 21
Art Metal, Inc. 6
Kittinger Company, Inc. 156
Knoll Associates, Inc. 143
Myrtle Desk Co., Office Div. .. 25
Peerless Steel Equipment Co. . 39
Sperry Rand Corp. (Remington Rand Office Systems Div.) Library Bureau 32
Steelcase, Inc. .....Cover 3
Stow/Davis 29

Lockers
Republic Steel Corp., Mfg. Div. 148

HARDWARE

P & F Corbin Division—Emhart Corp. 129
Kirsh Company 140, 141
LCN Closers 22, 23
Norton Door Closer Div., Eaton Yale & Towne, Inc. Cover 4
Sargent & Company 35-38
W & F Manufacturing Co. ... 156

HEAT., VENT. & AIR CON.

Carrier Air Conditioning Co. ..30
York Division of Borg-Warner Corporation 126

INSULATION—ACOUSTICAL

Ceiling Systems
Armstrong Cork Co. 5, 123-125

INSULATION—THERMAL

Silbrico Corporation 13

LIGHTING FIXTURES

Gotham Lighting Corporation. 142
Miller Company, The 137

LIGHTING SYSTEMS

Day-Brite Lighting, A Div. of Emerson Electric Co. 131-134

MASONRY & BUILDING STONE

Lone Star Cement Corporation 157
Medusa Portland Cement Co. . 4
Mo-Sai Institute 24
Schokbeton Products, Inc. 34
Vermont Marble Company ... 156

METALS IN BUILDINGS

Rigidized Metals Corporation.. 127
Smith, Elwin G. & Co., Inc. .. 33
Texas Instruments, Materials Division 139

OPERABLE WALLS

Richards-Wilcox Mfg. Co. ...26, 27

PAINTS, COATINGS & SEALANTS

Cabot, Inc., Samuel 138
Koppers Company, Inc. 9, 10
Olympic Stain Company 119
Standard Dry Wall Products, Inc. 155
Thiokol Chemical Corporation 42

PLUMBING EQUIPMENT

Haws Drinking Faucet Co. .. 122
Koppers Company, Inc. 11
Taylor Co., The Halsey W. .. 128

ROOFING

Koppers Co., Inc. 7, 8, 9, 10

STRUCTURAL

Aberthaw Construction Co. (Cabot, Cabot & Forbes)... 16
Butler Mfg. Co., Buildings Div. 130
Dur-O-wal 40, 41
Inland Steel Products Co., Engineered Products Div. .. 2
Laclede Steel Company 20
Steel Joist Institute 31
United States Steel Corp. 158

WALLS. PART. & MATERIALS

Goodrich Consumer Products, B. F. 14
Marlite Division of Masonite Corp. 143
Mosaic Tile Company 135

PROF. MATERIALS & SERVICES

A. W. Faber-Castell Pencil Co. 3
Koppers Company, Inc. 12

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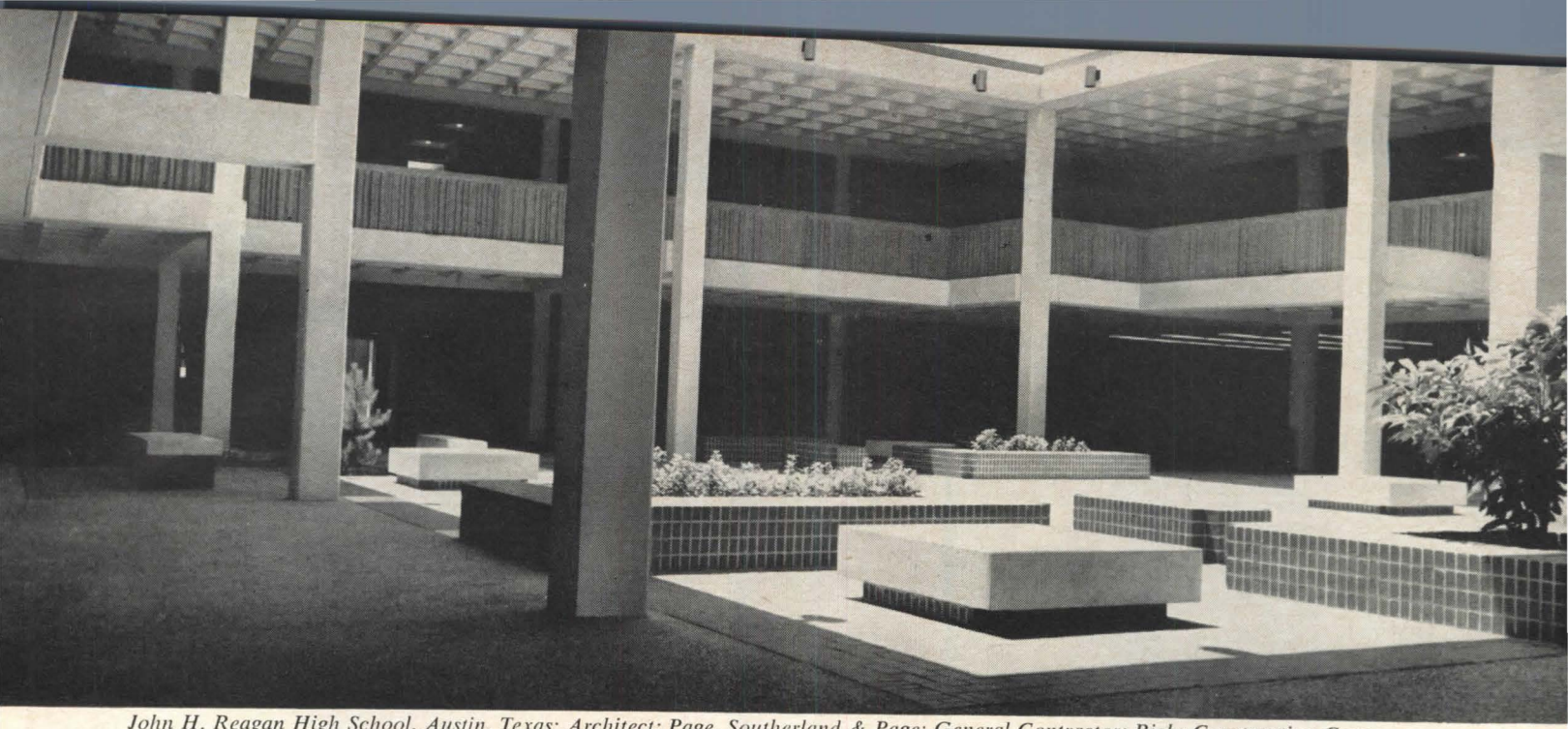

John H. Reagan High School, Austin, Texas; Architect: Page, Southerland & Page; General Contractor: Ricks Construction Company

Finish and waterproof concrete surfaces at the same time with THOROSEAL PLASTER MIX, a cement-base coating that made dramatic savings in the construction of this new school. 8,000 square yards of concrete were completely waterproofed with THOROSEAL PLASTER MIX, applied by spray, floated, and then re-sprayed for a durable, uniform texture which was contrasted with rough "exposed aggregate" panels.

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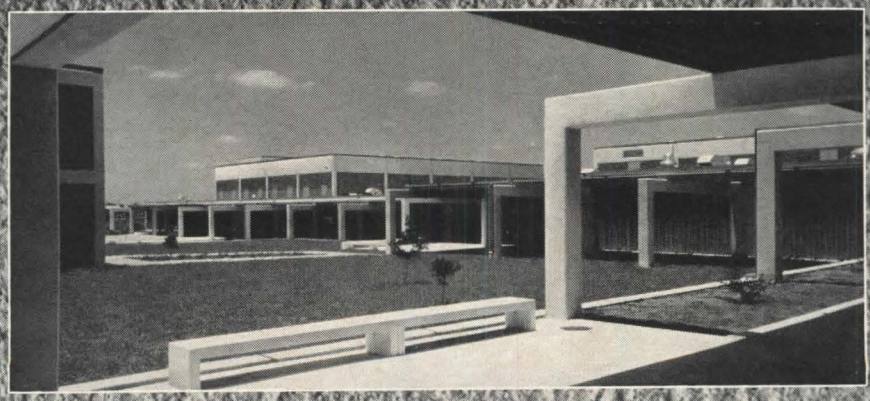
Job-tested, spray-on coating finishes and waterproofs new school with amazing speed and at ½ the cost!



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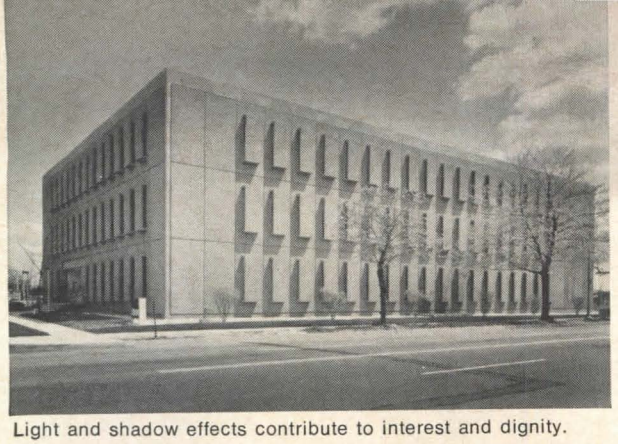

Light and shadow effects contribute to interest and dignity.

No plastering was needed inside the precast wall panels.

New slant on sun control

Windows are at right angles to precast concrete wall panels in IBM office building

IBM OFFICE BUILDING, Garden City, N. Y. Architect: ELIOT NOYES & ASSOCIATES, New Canaan, Conn.; Structural Engineers: WERNER-JENSON & KORST, Stamford, Conn.; General Contractor: L. A. WENGER CONST. CO., West Babylon, N. Y.; Precast Concrete: PRECAST BUILDING SECTIONS, INC., New Brunswick, N. J.

The 16,650 square feet of precast wall panels in this attractive IBM office building at Garden City, N. Y., were designed to eliminate all windows parallel to the surface of the building. Instead, 131 of the 230 panels have protruding center sections, permitting two narrow windows to be set at right angles to the wall surface. Sunlight enters the building only at a slant, providing adequate soft light and minimizing glare and heat.

As a result, no additional sun control devices were required. (Nor sound control devices; the walls effectively block most of the noise from the busy street outside.)

Attention to detail figured not only in the design of the building but also in the economics of the architect's "assembled wall" concept. The precision-made concrete panels were bolted at top and bottom to the concrete frame while positioned on the wall by crane. They were also direct-glazed, eliminating the need for metal window frames.

Lone Star's **Incor**® 24-hour portland cement was used for all the precast panels. **Incor's** reliable performance—proved for over 40 years — made possible rapid production of quality units, using a minimum number of forms. Lone Star Cement Corporation, 100 Park Avenue, New York, New York 10017.

LONE STAR CEMENT CORPORATION

design in steel saves $80,000 on two-deck parking garage

Two designs were prepared and bid simultaneously on this parking garage in Decatur, Illinois. The first used a reinforced concrete frame for the upper deck, the second used a steel frame.

The structural steel design won at a bid price of $1,160,000—$80,000 less than reinforced concrete. This translates as a saving of $111 per car for the 725-car garage —$1,710 per car for concrete and $1,600 per car for steel, including demolition and site preparation costs.

The garage is a rectangular shape 400′ x 321′. The second level consists of 32′ x 28′ bays using composite beams and girders of A36 steel. Columns are A36 steel. Field connections were made with ASTM A325 high strength steel bolts.

For more information on our construction products, contact the USS Construction Marketing Representative through our nearest sales office or write United States Steel, P.O. Box 86 (USS 5097), Pittsburgh, Pa. 15230.

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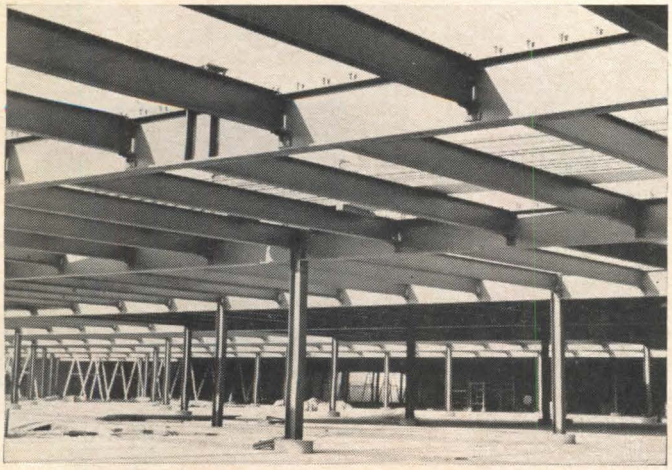
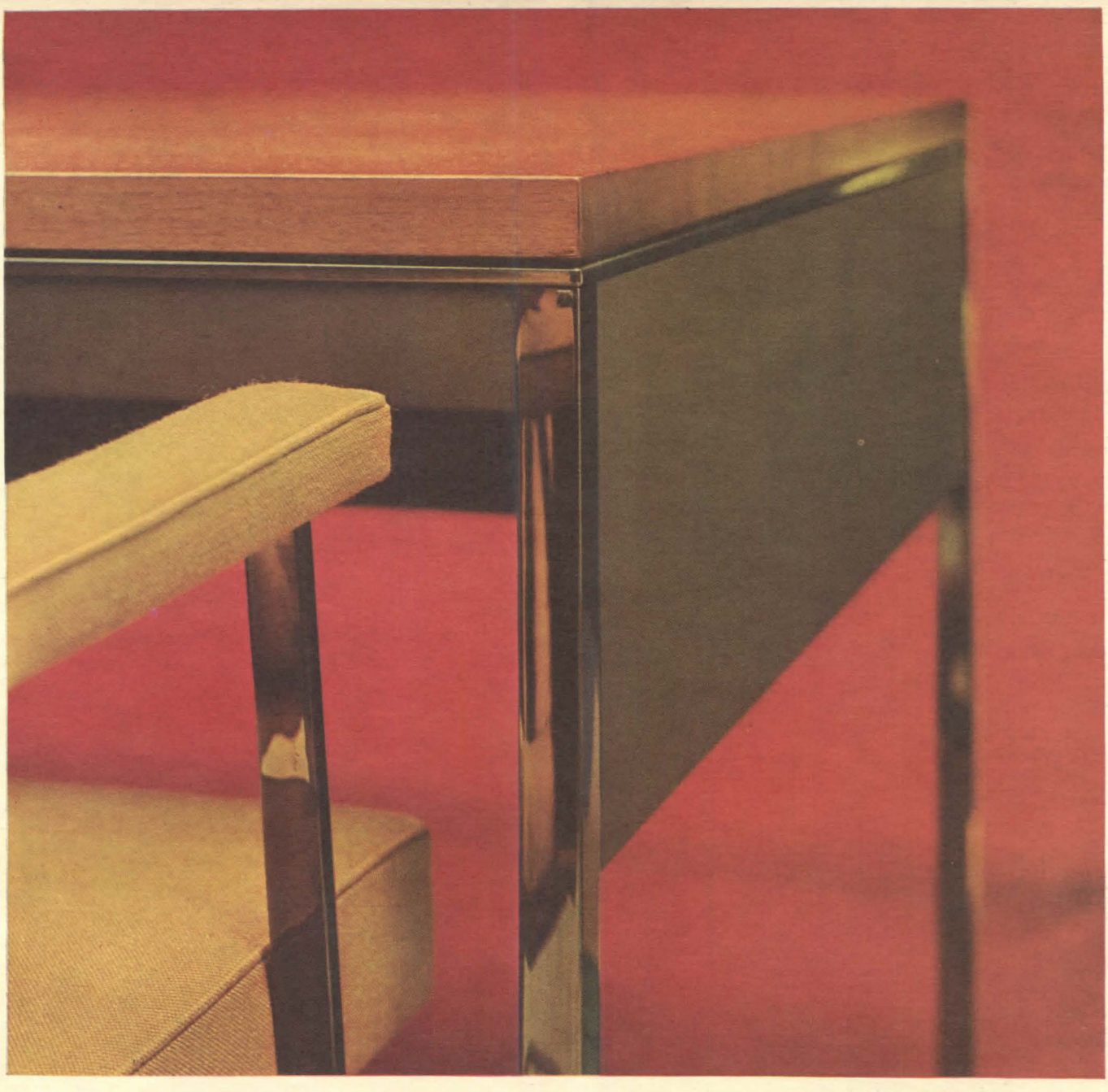


Owner: City of Decatur, Illinois
Architects: Engineering Service Corporation
Structural Engineers: The Engineers Collaborative
Steel Fabricator: Mississippi Valley Structural Steel

USS United States Steel



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But to fully appreciate the understated elegance that new Chromattecs can bring to your next office project, you should see them firsthand. Why not visit one of our showrooms? Or, we'll have a Steelcase representative stop by with samples. For further information, write Department A, Steelcase Inc.; Grand Rapids, Michigan; Los Angeles, California; Canadian Steelcase Company, Ltd., Ontario.

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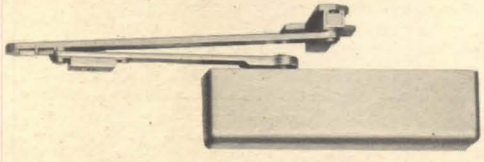
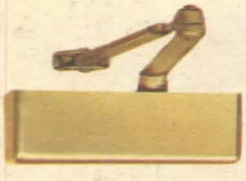
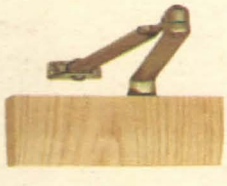




SERIES 7000A



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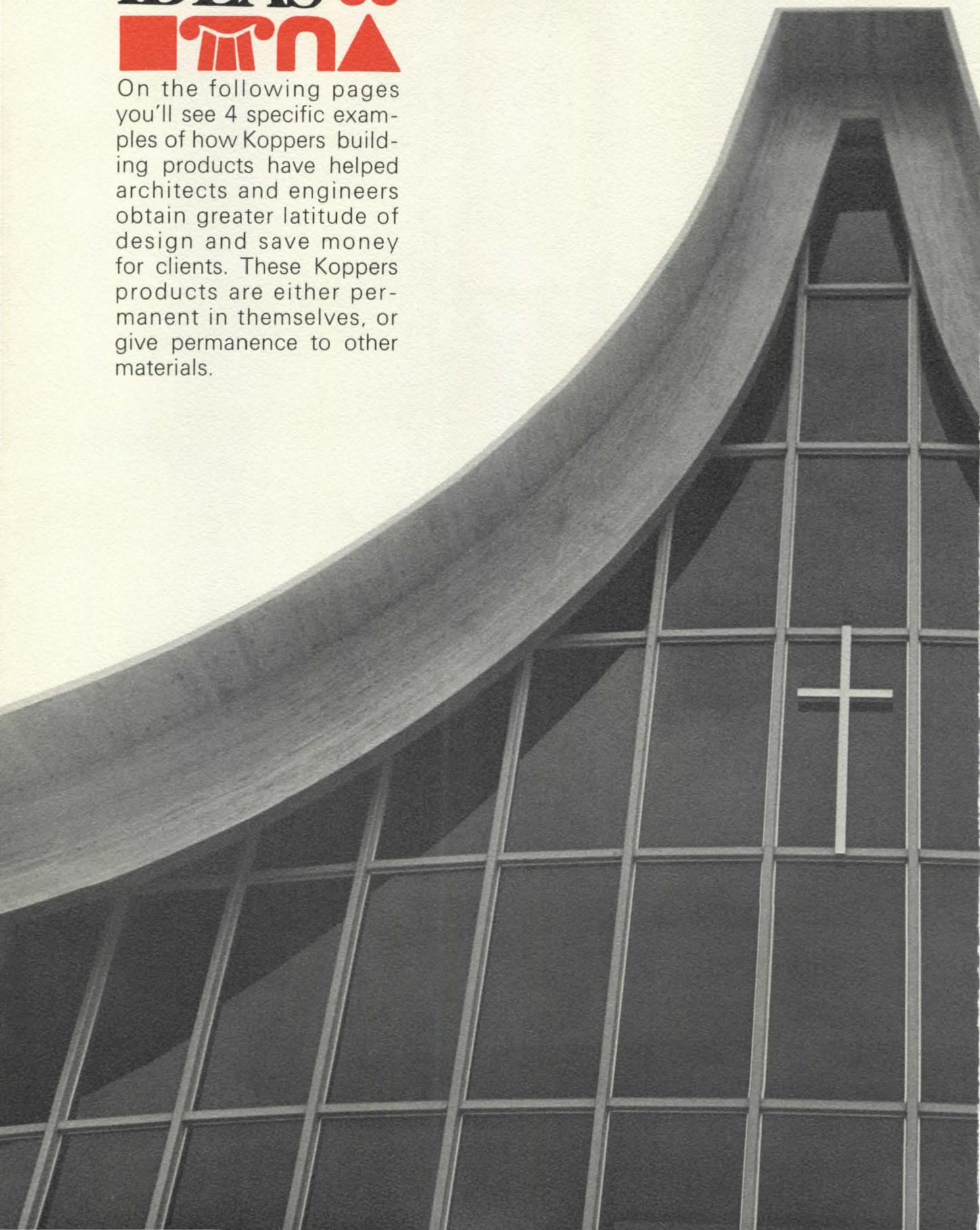
DESIGN IDEAS '68

On the following pages you'll see 4 specific examples of how Koppers building products have helped architects and engineers obtain greater latitude of design and save money for clients. These Koppers products are either permanent in themselves, or give permanence to other materials.

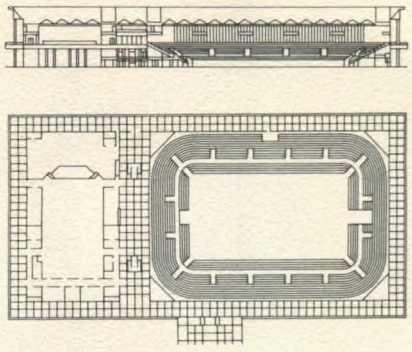


Edward Durell Stone designed Tulsa's Assembly Center so that audiences of up to 10,000 can watch activities ranging from rodeos to a Shakespeare play. And there's not a bad seat in the house.

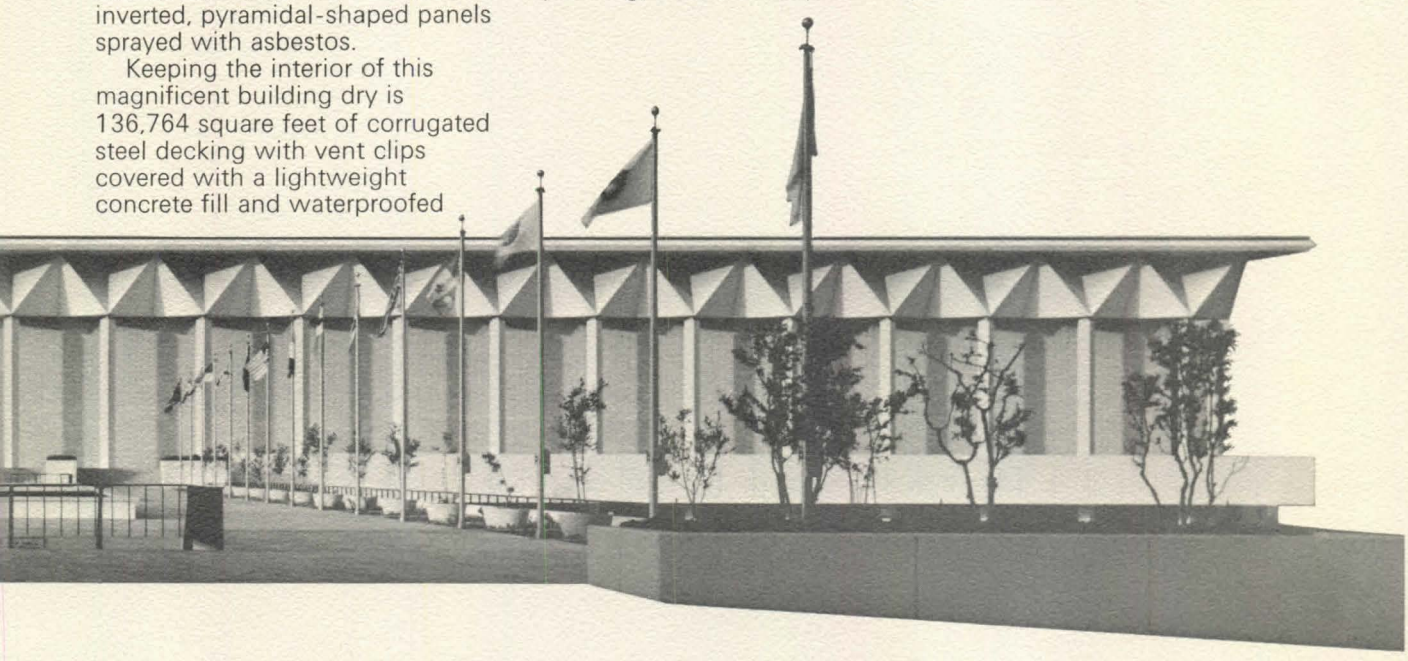
The building contains three separate, versatile space units: an arena with flexible partitions that convert the main area into meeting rooms; an assembly hall; an exhibition hall. Together, the exhibition hall and arena provide 55,000 square feet of exhibit space. The arena and assembly hall ceilings get their excellent acoustical control from 20-foot inverted, pyramidal-shaped panels sprayed with asbestos.

Keeping the interior of this magnificent building dry is 136,764 square feet of corrugated steel decking with vent clips covered with a lightweight concrete fill and waterproofed by a 4-ply membrane of Koppers No. 15 tarred felt, each ply solidly mopped with coal tar pitch. The deck itself was first mopped with pitch, and the Koppers tarred felt laid shingle fashion, then solidly mopped with pitch. The top surface of the roof is gravel, imbedded in the pitch after the final mopping operation.

This waterproof membrane doesn't oxidize and is self-healing to make it one of the best protection barriers against moisture in existence. For more information on Koppers roofing *or* waterproofing, send the coupon today.



Architect: Edward Durell Stone, New York, New York; Associate Architect: Murray, Jones & Murray, Tulsa, Oklahoma

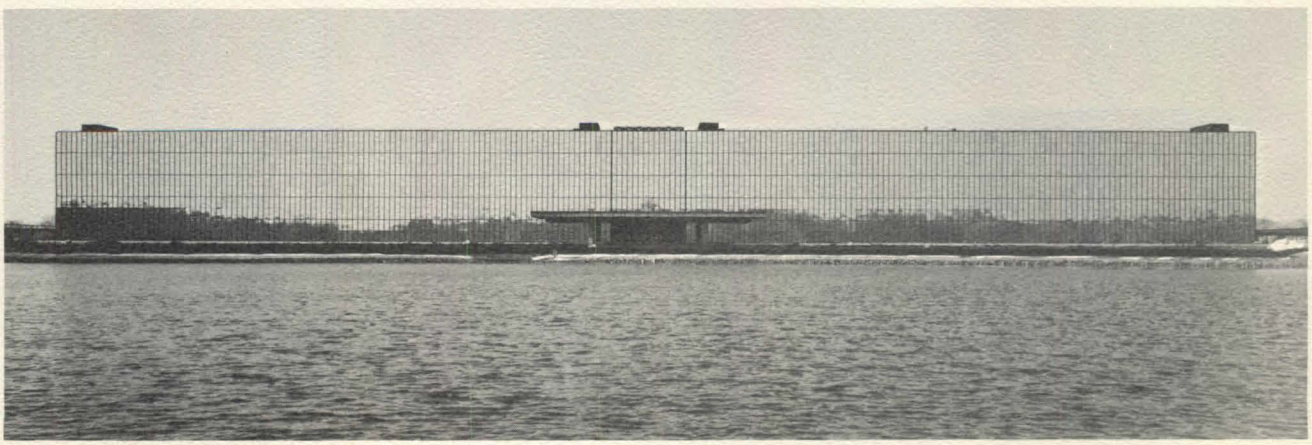


The parking area at Bell Telephone Laboratories at Holmdel, N. J., is the size of 28 football fields—an immense target for sun, rain, frost, and automotive drippings.

To protect the asphalt foundation, it was coated with Koppers Super Pavement Sealer. The coal tar base of Koppers Sealer makes it highly resistant to gasoline and oil, and keeps the surface firm and crack-free the year-round. An interesting sidelight: it took only 21 working days to give the entire area two base coats and a finish coat.

The exterior of Bell Laboratories' new building is mirrored glass. Aside from providing the building with unique good looks, the walls serve as a practical reflecting agent. They bounce away much of the sun's light and heat, considerably easing air-conditioning demands. Completed last year, the building's 136,000 square feet of mirrored walls turn back 65% of the sun's energy—and also reflect some of New Jersey's loveliest countryside. A nice idea.

We think weatherproofing the parking lot with Koppers Super Pavement Sealer was a good idea, too. To learn more about it, check and mail the coupon.



Bell Telephone Laboratories, Holmdel, N. J., designed by Eero Saarinen & Associates, New Haven, Connecticut.

East meets West over this Southern church to form a roof that looks like an open Bible or a pagoda

Eastern Oriental and Western Traditional architectural styles have been combined to create a pagoda-like roof for the new Baptist church sanctuary in Miami Springs, Florida. But the structure's motif seems to be in the eye of the beholder. Some of the congregation see the roof as praying hands, or an inverted, open Bible. Others get the impression of Gothic architectural style from the cedar-stained, Koppers laminated wood beams and arches soaring 75 feet above the floor.

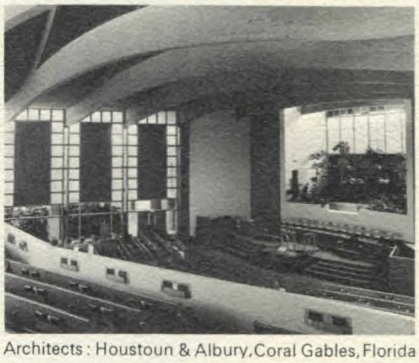
The roof and understructure had to be designed to shelter three areas: the new church education building, the original sanctuary, and the church office building. This called for supports of enormous weight and strength.

One of the laminated beams is 141′ long, and weighs 15 tons. In lengths diminishing to 114′ —to accommodate the site's shape—nine other laminated beams complete the span from main entrance to rear wall. The beams are anchored to the tops of 30′ high concrete columns on 14′ centers outside the sanctuary proper.

The interior arches are carried to the roof's apex by supporting beams. The total system, including the roof deck, required about a quarter of a million board feet of Southern Pine.

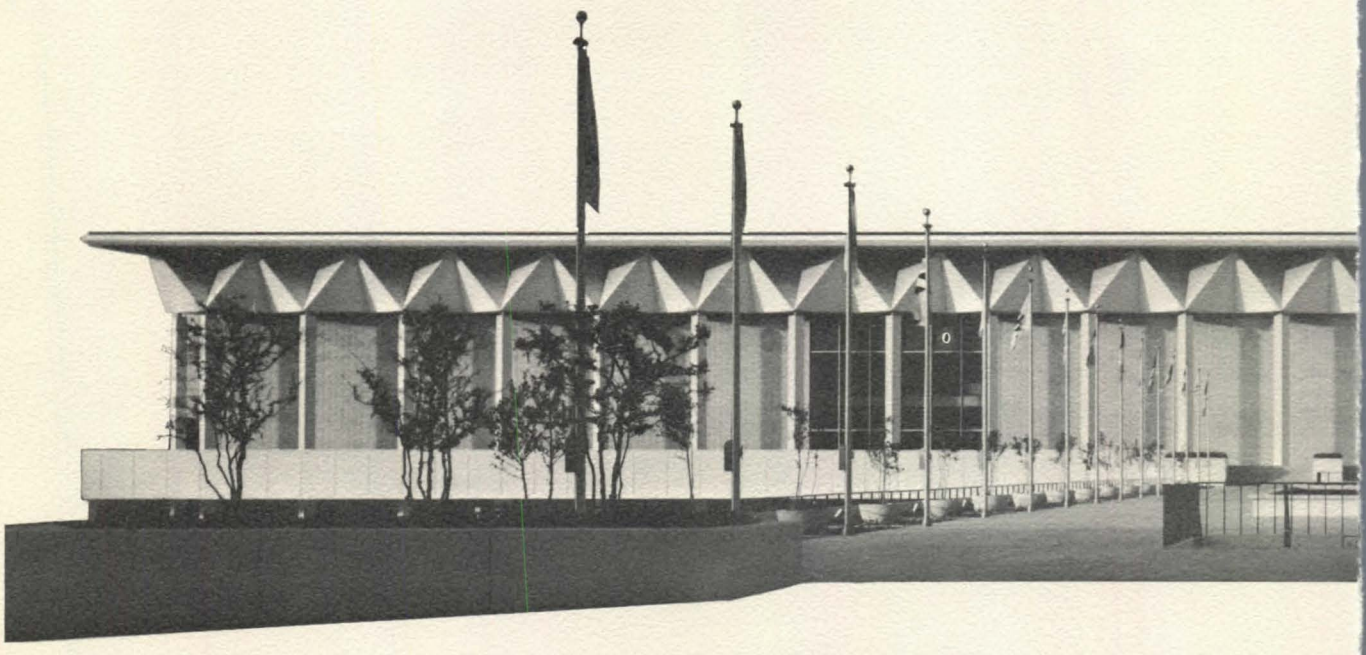
The architect who designed the structure likes laminated wood because, "I can create any shape or dimension I want." Pastor Hankins F. Parker offers an equally significant reason why wood was used instead of manufactured materials to create his church's East-West architectural style: "We wanted the interior to have a natural look that invites contemplation. Wood does that."

There are many good reasons why *you* should know more about Koppers laminated wood. Mail the coupon today.



Architects: Houstoun & Albury, Coral Gables, Florida

2 Tulsa Assembly Center, designed by Stone, stays dry under a Koppers roof



3 This Bell Telephone Laboratories project includes the best protection known for parking lots