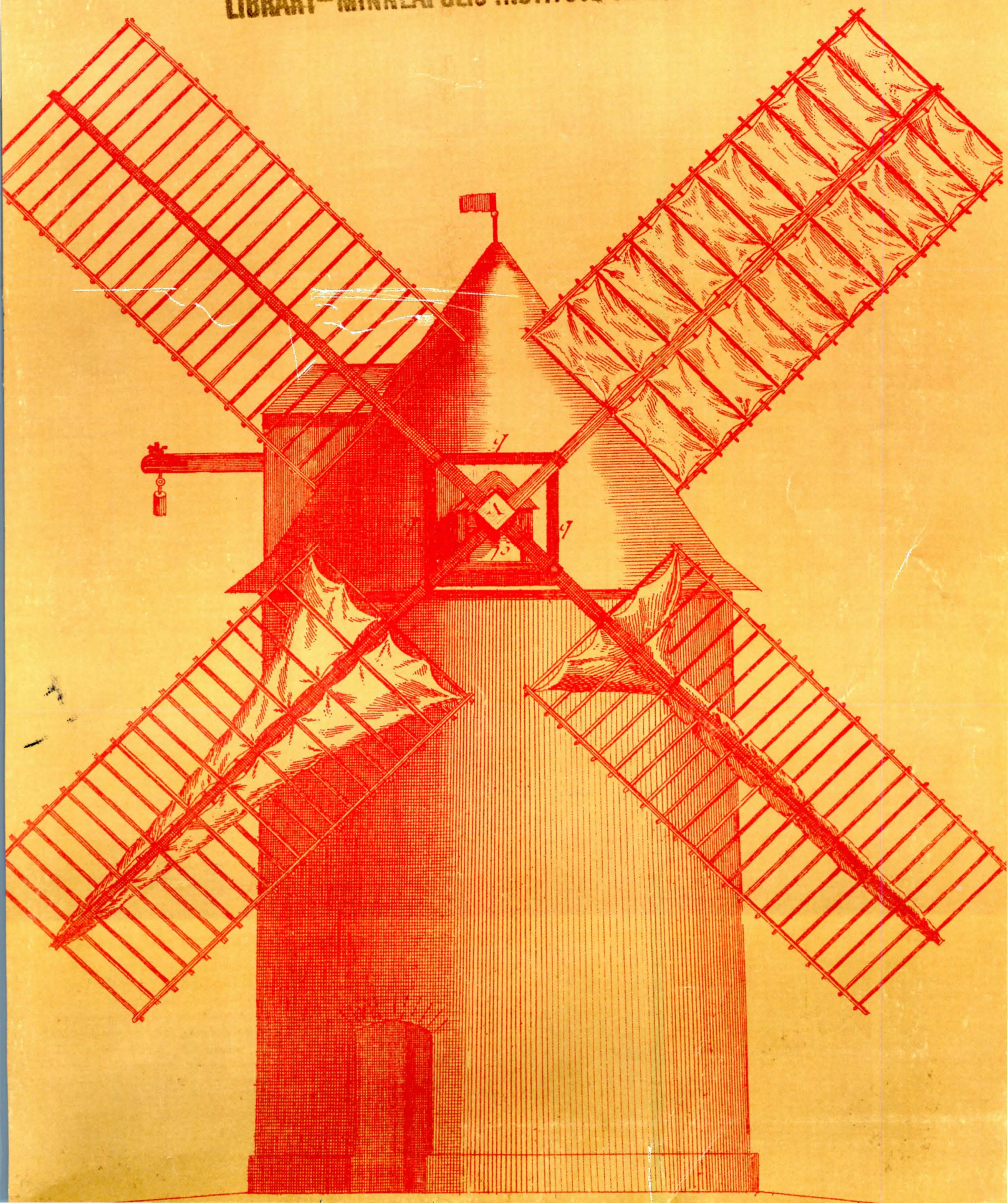
ARCHITECTURE plus



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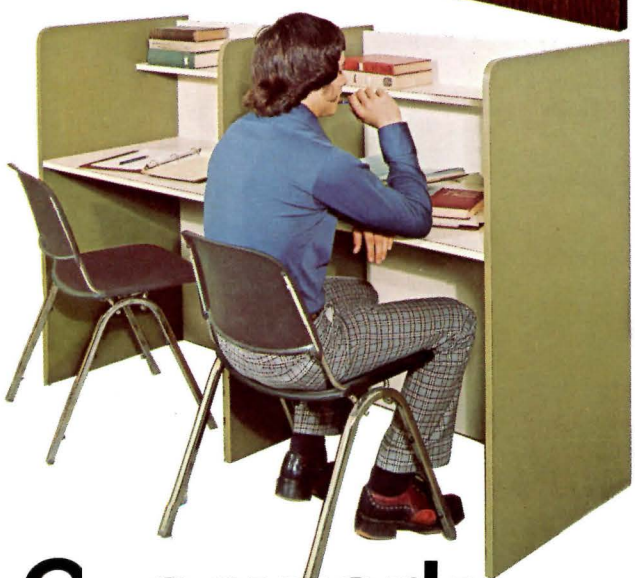

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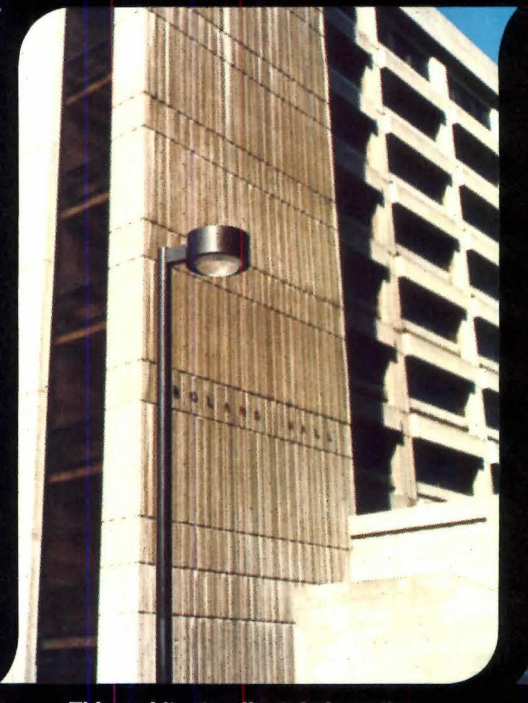

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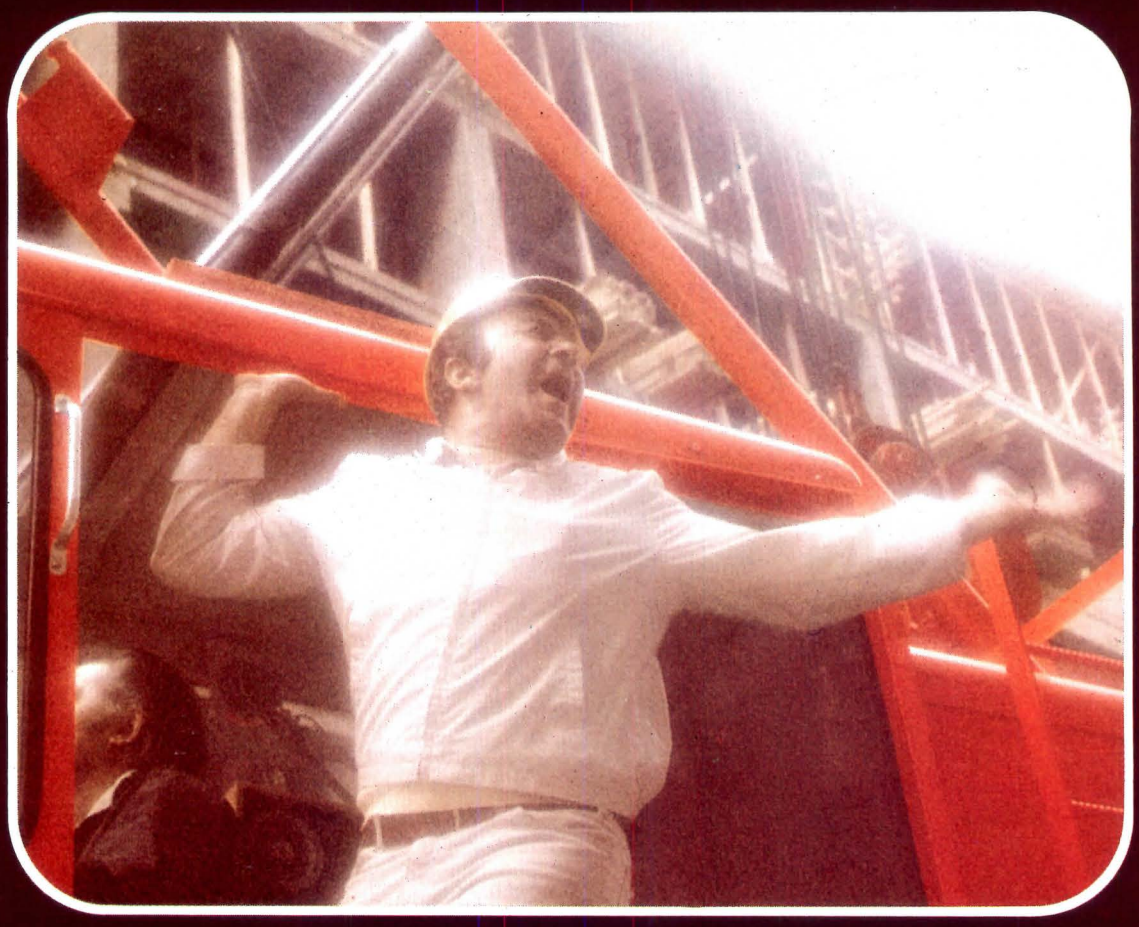

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ARCHITECTURE plus

THE INTERNATIONAL MAGAZINE OF ARCHITECTURE MAY/JUNE 1974

Cover from "Recueil de Planches sur les Sciences, les Arts Libéraux et les Arts Mécaniques," by Denis Diderot, Paris, 1762

ARCHITECTURE PLUS MAY/JUNE 1974 VOLUME 2 NUMBER 3

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presenting a new chair man: ray wilkes

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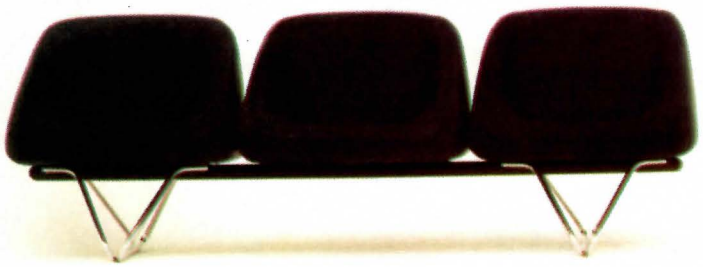


letter from SAO PAULO

by Donal Butterfield

No matter from which direction you approach Sao Paulo, the plane flies for many miles over a quilt of small houses with red-tile roofs. Finally the towers of the central city, clustered like a concrete forest atop a ridge between three rivers, come into view. The population of the city, the biggest metropolis in South America, is ten million. But the key to understanding Sao Paulo is to realize that, in general, while the three million people who live and work in the towers are part of a modern, urban community, the six or seven million who live in the houses with red-tile roofs and in the shantytowns, *favelas*, nearby, are essentially refugees from the impoverished agrarian society.

It is useful, if a bit oversimplified, to say that Brazil has three capitals: Brasilia, the seat of the government; Rio de Janeiro, the cultural center; and Sao Paulo, the industrial and commercial hub. In a country whose economy has been booming in recent years, Sao Paulo is the place where the action is. It has drawn its enormous new population from the entire country, in fact from Europe, Japan and the United States as well.

Sao Paulo was founded in 1554 as a semi-military outpost and Jesuit mission but it was not until after 1822, the date of Brazilian independence from Portugal, that its economy began to grow. In this curious setting, separated by a 3,000 foot cliff from its port city, Santos, 36 miles away to the south, how *did* such a metropolis form? There are several reasons. Fertile land and a high altitude were perfect for growing coffee. Sao Paulo was only another coffee town among equals until a radial pattern of roads and railroads marked it as the center. Banks were founded in Sao Paulo for the coffee revenue. When Europeans flocked into Brazil after 1887, the cool climate held them near the city. Their artisan skills added an industrial base to the economy. They settled in the river valleys, where the railroads had been laid, and where factories were being built.

Although the random arrangement of rivers thus formed segmental settlements, the wealthy coffee owners lived in the busi-

Donal Butterfield is a partner in Butterfield, Ottey and Associates. The firm is involved in new town design in Latin America.

Case Study No. 8*

Belated Recognition for a Countryside Loft Building that Spares Both L lscape and Energy

The National Geographic Society's Membership Operations Center is a notable combination of good machinery in a good building.

Wise design choices of a decade ago make a busy clerical facility in rural Maryland a building whose time has come.

Gaithersburg, Md. Situated here on rolling farmland, the Membership Operations Center of the National Geographic Society looks better the second time around. When it was occupied late in 1968 the center received only passing notice in the architectural press. That may have been because it came so relatively soon after completion of the Society's acclaimed headquarters located 20 miles away in downtown Washington, D.C. Boasting the familiar travertine imagery of architect Edward Durrell Stone and formally dedicated by then-President Lyndon B. Johnson, that structure's debut was widely reported. Or perhaps it was because 1968 was still a time of carefree bounty and the center's principal features of meticulous land-use and energy-conserving mechanical systems had not become the vital topics they are today.

Things are different now, of course, so the media direct more frequent inquiries in the direction of Gaithersburg. As an example, a CBS camera crew found its way here recently to shoot a segment for a prime time energy "special." The unit's director found much to film: a graceful structure that detracts not at all from the natural beauty of the land; a picturesque man-made lake that is at once a gem on the landscape, an element in the ecological chain, and a heat sump for the electric HVAC system; chillers that recover energy used for lighting and make it available for comfort heating; and a load-limiting off-peak electronic control panel.

Tale of Three Disciplines. Out of range of the cameras, however, was one facet of the center that is of timely interest. It has emerged as a classic example of the growing acceptance of building design as an interdisciplinary enterprise. The structure is what it is because of contributions from the architectural, engineering and business sciences.

Geographic's assistant secretary Raymond T. McElligott remembers their role in the planning. "We had some ideas on style, of course. It was to carry a family resemblance to downtown headquarters and because of the Society's historic involvement in environmental matters it had to treat the natural surroundings with care. But we gave our best shot to making sure we got indoor layouts tailored to our kind of business. We had lived for years with our membership services operations spread out in five different places in and around Washington and we knew from hard experience how they should be fitted together under one roof. We needed a workshop, not an image."

Hard experience apparently taught that membership services would be transacted best in a loft-type building, and stripped of its many architectural amenities, the five-story 408,000-square foot structure could be classed as just that. Each floor stretches 140 by 380 feet and, except for core sections, consists largely of wide-open unpartitioned space. There are 1100 employees working in carefully arranged and coordinated departments including data processing, membership correspondence, billing and remittance control, and microfilm and magnetic tape files.

Almost Life-Size. Activity in these departments is prodigious at times. Magazine mailing labels are addressed at speeds of more than 110,000 labels per hour from magnetic tape by means of an electrostatic printer. These are then shipped to the Chicago printing plant from which monthly issues are mailed directly. A data assembly group processes nearly two million transactions per month during peak periods in updating the 29 million documents on file. The mailroom dispatches approximately 70 million pieces of outgoing mail each year including copies of Geographic's

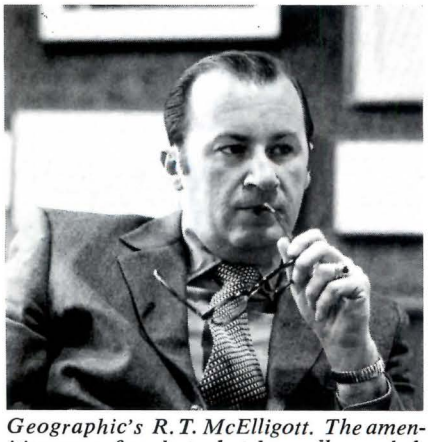
One of a series of reports giving recognition to the efforts of architects and engineers on behalf of resource conservation.

Having demonstrated the feasibility of recovering heat from light, The Geographic is now investigating the possibility of recovering heat from its vast stores of printed matter.

School Bulletin which is circulated weekly to a half-million subscribers, routine correspondence with members, shipments of books, maps and globes, dues notices, and promotion materials.

The breadth of these operations may come as a surprise to a few whose only reading of *National Geographic* took place during a tense, preoccupied wait in an outer office and who might assume as a result that doctors and dentists are the principal subscribers. Nothing could be further from the truth, according to McElligott. "Actually our membership has expanded steadily over the years. We are operating in a curious time which has seen the demise of some great general-interest magazines. *Look* and *Life* for example. At the same time special-interest publications are prospering. Any day, *Geographic's* circulation will cross the 8½-million mark!"

All in the Family. Although executed by a different architectural and engineering firm, the center does bear a general exterior resemblance to the headquarters building whose facade is marked by a succession of Vermont marble columns, a wide colonnade surrounding the street level, and a flat overhanging roof line. This similarity was to be achieved within a somewhat tighter budget. "To save cost," says architect Robert W. Wening of The Mills & Petticord Partnership, "we selected composite construction of steel and concrete. Precast exposed aggregate sections of a very white mix cover the vertical steel members and produce much the same effect as a marble column but at considerably less expense. Similarly, windows are anodized aluminum rather than bronze and are operable rather than sealed to eliminate the need for a costly window-washing rig."



Geographic's R. T. McElligott. The amenities were fine, but what he really needed, and what he got, was five floors of loft.

Architect Robert Wening. A 150-acre site made it easier to give the building a gentle relationship to its environment.

The building has a penthouse mechanical room and an oversized basement which is exposed on two sides because of the rolling terrain of the site. On one side of the basement is a 540-seat employees' cafeteria featuring a 180-foot long window wall that opens onto a concrete terrace. The latter, cantilevered over an 11-acre artificial lake, is used for dining in fine weather.

The opposite side of the basement level extends 215 feet beyond the building line and out under the 525-car parking lot, landscaped areas and access roads. This extension houses duplicating and mailing operations as well as a shipping platform with space for docking six tractor-trailers at a time. Reached by an inclined roadway, this area has columns and footings designed to support a five-story addition in the future.

Ladies Invited. There were special efforts to have the work environment reflect the preferences of women who make up 95 percent of the employee roster. To this end, the Society's interior designer (female) shared with architect Wening in the choice of color schemes for walls, floors coverings and furnishings. And as an adjunct to the conventional toilet facilities on each floor, there is a roomy carpeted women's lounge with comfortable seating and warm lighting selected to encourage use during coffee breaks and other leisure times. Facilities for men are, interestingly, somewhat more austere.

The decor benefits handsomely from *Geographic's* own fund of hundreds of thousands of color photographs. Exquisite framed samples of these are generously clustered on walls of rooms and corridors throughout the premises. The magazine has been a leading force in color photography and printing ever since the November 1910 issue when its first color series was published.

Room at the Top. The center's height—almost 100 feet exclusive of penthouse—is exceptional for a five-story building. "We were able to provide greater spacing between floors," explains Mills & Petticord structural engineer Hugh C. Clagett, "because we were building out in the country and didn't have to contend with the height restrictions of downtown zoning. And about all we had to pay extra for was the additional skin."

The added elevation yielded benefits to architect, owner and engineer. The architect was able to give the building an appearance of considerable grace, avoiding the squat, ponderous impression that a building of this size might present were he limited to, say, ten feet between floors. "In addition," Clagett points out, "the inside environment is better because ceiling heights of ten feet or more were possible. Some work areas are almost 400 feet long and with the usual eight-foot ceilings, employees could get the feeling they were working in a tunnel. Then, too, consider the space conditioning system. Plenums in the center are five feet deep so it was easy to run ductwork without expensive geometrics."

Sidewalk Supervision. The gentle relationship of the building to its environment can be traced to a variety of influences. Obviously one was the unquestioned altruism of the Society itself. Another was the size of the site, 150 acres. Then there was the matter of the watchful eye of one Otis Beall Kent. Mr. Kent was the previous owner of the land on which the center is situated. A wealthy patent attorney and zealous

Structural Engineer Hugh Clagett. Away from downtown zoning, he could work with ten foot ceilings and five foot plenums.

Mechanical Engineer Roy Tuttle. He took the client to New England to demonstrate the feasibility of a heat recovery system.

conservationist, he had many years ago dedicated his 1000-acre Maryland estate to the causes of nature. It was he who had dammed the spring-fed stream running through the property to create a series of seven ponds. Kent's expressed purpose for doing this was to furnish havens for wildlife of all kinds. When he decided to dispose of the estate, Kent chose only those buyers he could trust to preserve what he had begun. The National Geographic Society qualified for a parcel as did the Isaak Walton League.

Kent was a constant overseer while the center was being constructed. "When the architects decided to locate the structure near one of the ponds," recalls consulting engineer Roy J. Tuttle of Syska & Hennessy, Inc., "we saw at once the feasibility of using the water as a heat sump for the space conditioning system. We could eliminate the need for cooling towers and save energy because we would be pumping against lower heads. Before going ahead with the idea, however, we had to prove to Kent from tests and calculations that volume and flow were sufficient to prevent thermal pockets that would harm the fish. After six years of operation, that pond is still full of fish."

Soothing the Skeptics. Imbued perhaps with some of Kent's conservationist spirit, Syska & Hennessy engineers went on to propose a heat recovery HVAC system. Specifically, it would be an electric refrigeration-type, combination ducted-air and hydronic system that would salvage much of the energy employed in lighting the building and reuse it for comfort heating. Society officials greeted the proposal with skeptical reserve, which was understandable at the time design discussions were begun. The year was 1964 and there were very few such systems in everyday use.

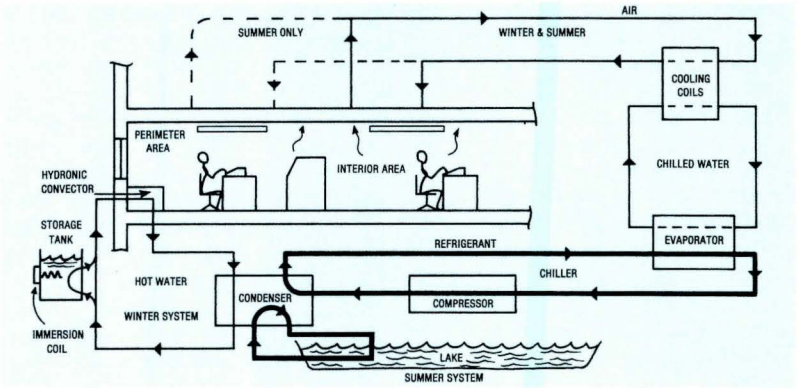
Tuttle remembers that one existing system had been installed in the office building of a New England electric utility company, hardly a neutral proving ground. "But it was working beautifully and was convincing evidence that heat recovery was a viable concept. The Geographic people found it difficult to understand that lighting fixtures can also supply heat requirements in cold weather. We recommended that they visit New England for a demonstration, which they did. After that, they became believers and we were allowed to proceed with the design."

HVAC System. Central to the system are two 800-ton electric motor driven refrigeration machines which supply chilled water for cooling the building. In the process, the circulating chilled water picks up heat which is transferred through the compressors to the condenser water circuits.

During the summer season and if no heat at all is required inside the building, all of the condenser heat is rejected into the lake. Even in warm weather, however, there are considerable periods of time when some heat is needed for preheating the cold water being drawn into the domestic hot water system and for the duct coils that control zone temperatures by reheat. At such times, an appropriate quantity of the condenser heat can be distributed within the building while the remainder is disposed of in the lake. It is possible to divert all of the condenser water heat for use in the building, as is the case throughout much of the wintertime.

Bulldozer Sculpture. The condensers are furnished with two identical heat exchangers or bundles. One bundle of tubing carries lake water exclusively while the second is coupled into the sealed hydronic circuits of the building's heating system. With this arrangement, pipes in the building are kept completely free of lake water and the contaminants that could lead to maintenance problems.

Although the lake is pretty much as it was in Kent's day, certain improvements were made during the center's construction. A new dam, thoroughly engineered for strength and permanence, was built to replace the original, which was of more casual design. This was intended to enhance the reliability of the lake viewed as a component in a mechanical system. Because it was essential to avoid soiling the lake waters with the debris of construction, the building was erected a short distance away. Upon its completion, earth moving machines carefully sculpted the

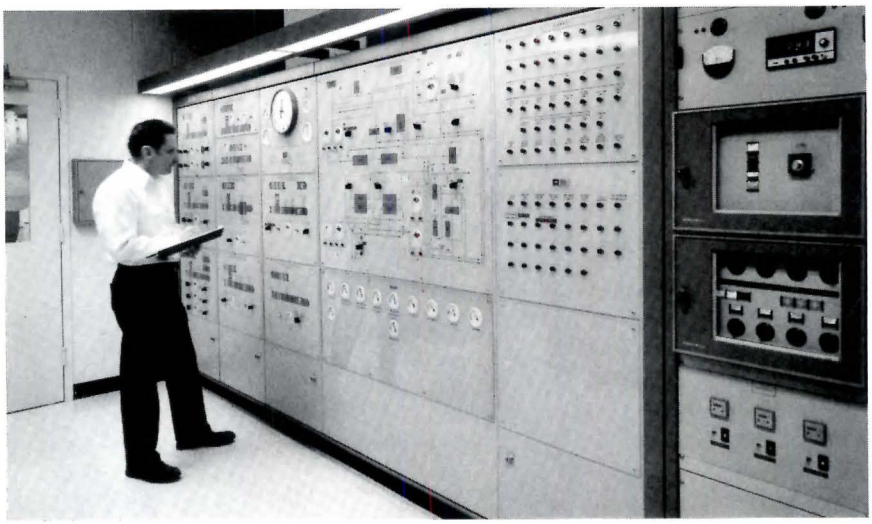


HVAC SYSTEM OPERATION

Conditioned air is supplied to ceiling diffusers in all interior and perimeter zones through a single-duct low-velocity distribution network which is served by air handling units located in the penthouse mechanical room. In this schematic, a centrifugal chiller employing two separate water circuits in a double-bundle condenser is shown as the source of both hot and cold water for the system. For cooling, the internal heat of the building is picked up by the circulating chilled water and transferred through the compressor to the condenser water system.

During periods in the summer season with the entire building on cooling and no heat required, all of the condenser heat is rejected into the lake. In winter the interior zones remain on cooling while the perimeter areas switch to heating. At such times, the flow of lake water through one condenser bundle is throttled down or cut off altogether. Then the hot water produced in the second bundle is pumped as required to preheat coils in the air handlers for the perimeter zones, to reheat coils in the core-area ducts, to hydronic convectors installed beneath windows, to a heat exchanger in the warm water storage tank, and to a preheat coil in the supply line to the domestic hot water heater. Thus any heat rejected by spaces on cooling is either transferred to zones having a need for it, stored for later use, or applied to domestic water heating.

If heating is called for when the building is unoccupied and lights switched off, it is drawn initially from the heat accumulated in the warm water storage tank. When this is depleted, electric immersion heaters are energized in steps to provide a supplementary amount. The load-limiting control circuits prevent simultaneous operation of lighting and immersion heaters.



photography by Otto Baitz

Chief Engineer Dick Padgett controls the electric HVAC system from basement panel.

shoreline to bring it into contact with the esplanade beside the cafeteria.

Diverse Uses. In essence, the chillers are double-ended machines producing cold water on one side and hot water on the other. Distribution of the chilled water is comparatively uncomplicated. It is delivered to heat exchangers in the penthouse air handling units which supply low-velocity conditioned air through single-duct networks to the various independent zones. Hot water, on the other hand, is put to more diverse uses. It is piped to zone reheat coils in the ducts which serve as the primary source of heat for perimeter spaces on heating as well as a means of temperature control for interior spaces on cooling.

Hot water from the condenser is also used to raise the temperature of air entering the system through the fresh air intakes; for preheating the domestic hot water supply; for charging the warm water storage tank where heat is accumulated for later use; and for circulation to the hydronic convectors installed beneath the windows.

Conditioned air exhausted from a building for ventilation purposes represents a loss of energy. To reduce this loss, the ventilating system for the building has been fitted with "run-around" heat reclaim loops. A run-around loop consists of matching heat exchangers installed in both the fresh air inlet and exhaust air discharge associated with each air handling unit. These are connected by pipes in a closed circuit incorporating a circulating pump and filled with a 35 percent aqueous ethylene glycol solution. The circulating solution transfers heat to or from the incoming air depending on whether the exhaust air is warm or cool.

Load-sensing Control. If the building requires heating when unlighted and unoccupied, it is provided by supplementary immersion heaters in the warm water storage tank. These heaters and those in the domestic hot water tank are restricted to off-peak operation by a load-sensing control panel. Both tanks are sufficiently large to satisfy a full day's requirements and normally do not require electrical input during daytime hours even during the most severe weather. The load-sensing control prevents simultaneous operation of the lighting and the resistance elements.

The Message is the Media. The skepticism of 1964 is nowhere to be seen in 1974 and both McElligott and Geographic's chief engineer Dick Padgett give the impression of being enthusiastic heat recovery partisans. They are enjoying the happy combination of good machinery in a good building.

For its part, Syska & Hennessy, Inc. has in the intervening years gone on to a number of other successful applications of the basic concept. S & H engineers have in addition undertaken several development programs investigating other approaches to energy conservation, one involving solar cells. They have, in fact, returned to Gaithersburg for many visits, paying particular attention to a 3-million cubic foot high-bay storage facility recently completed near the center. In this building, thousands of tons of palletized books, maps, magazines and other printed media are held in storage.

DESIGN SUMMARY

GENERAL DESCRIPTION:
Area: 408,000 sq ft
Volume: 6,770,000 cu ft
Number of floors: five plus basement and penthouse
Types of space: private and general offices, computer room, cafeteria, kitchen, lounges, mailroom, storage, medical offices, multipurpose room, conference rooms

CONSTRUCTION DETAILS:
Glass: double solar gray
Exterior walls: 1″ slate facing, 2″ urethane insulation (R-14), furring, metal lath and plaster; U-factor: 0.06
Roof and ceilings: built-up roof on concrete deck, 4″ glass fiber insulation (R-14), suspended acoustical tile ceiling; U-factor: 0.06
Floors: concrete slab
Gross exposed wall area: 65,520 sq ft
Glass area: 49,300 sq ft

ENVIRONMENTAL DESIGN CONDITIONS:
Heating:
Heat loss Btuh: 12,000,000
Normal degree days: 4333
Ventilation requirements: 100,000 cfm
Design conditions: 10F outdoors; 72F indoors
Cooling:
Heat gain Btuh: 16,000,000
Ventilation requirements: 100,000 cfm
Design conditions: 95F dbt, 78F wbt outdoors; 75F 50% rh indoors

LIGHTING:
Levels in footcandles: 20-125
Levels in watts/sq ft: 1-5
Type: fluorescent and incandescent

CONNECTED LOADS:

Heating and Cooling (1600 tons)	2800 kw
Lighting	1372 kw
Water Heating	370 kw
Cooking	570 kw
Elevators	230 kw
TOTAL	5342 kw

PERSONNEL:
Owner: National Geographic Society
Architects & Engineers: The Mills & Petticord Partnership
Consulting Engineers: Syska & Hennessy, Inc.
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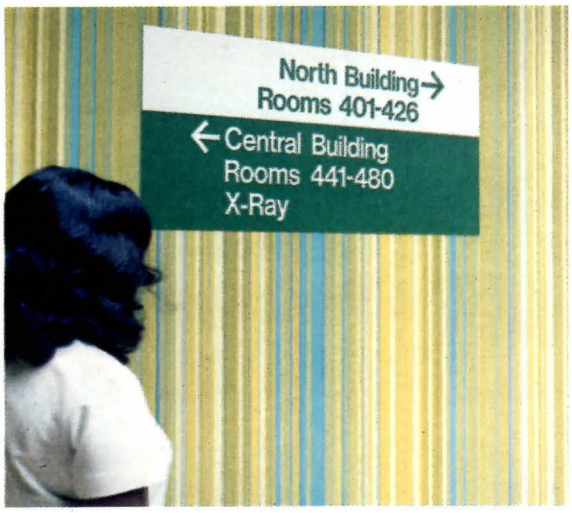

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ness town of Sao Paulo. This town became the present core. Even today, public utilities and services are limited to that area, where the wealthy have tended to cluster in slender apartment towers. As the area has burgeoned into a metropolis, the road pattern, utilities, and public facilities have proven increasingly inadequate.

There are several characteristic urban streets in this part of Sao Paulo, the Central Business District. One is the pedestrian street, narrow and twisted, found in the old center. That area is now the financial district and trucks are allowed to use those streets only at night. Another is the commercial galleria, a covered pedestrian alley with two or three levels of shops, cafes and offices served by ramps and escalators. Still another distinctive space is the plaza from the colonial era. These formal public squares served as outdoor living rooms, where early ladies and gentlemen met in the Portuguese manner: conversing, courting, displaying their families, holding public talks and events. Today such activities would be overwhelmed by the bustle of the city and only large gardens like the Praca (plaza) Republica offer refuge from the activity. There are as yet no good modern examples of public space design. The Praca Roosevelt, finished a few years ago, is isolated from side streets, cut off by traffic. Its top level is barren and lonely; its lower level, with shops, is not as successful as it could be if tied into the urban fabric.

Although some officials had called for greater urban density as a goal for future planning, that is not happening. It appears instead that the pattern of urban growth will proceed in a series of nodes to the west and to the east toward Rio. In the past few years the trend of development has in fact been primarily to the southwest, at the expense of the center. Good highways have encouraged industry to spread out. The State of Sao Paulo, which assists industrialists when they move to outlying towns, is interested in spreading the economic base and in relieving the industrial burden on the city's inefficient utilities network. Auto ownership has tempted the wealthy to leave the residential ring around the CBD for suburban pockets where they provide their own utilities and services. Their flight has accelerated decay of the center. Nothing has been done by the government, in the meantime, to reorient priorities toward the well-being of those too poor to provide adequately for themselves.

Life for the average family

How does the city's form affect the *average Paulista?* With infrastructure limited to the core areas, well over half of the people in Sao Paulo live where dirt roads are rutted, where whole areas are without mail, phones, or adequate electricity. There are few schools or health facilities. Open sewers, cesspools, open pits, and contaminated wells are common. Despite vegetables be-

Typical *favela*

ing huge, delicious, and ripe when sold, diets lack meat, milk and many proteins. Home gardens, chickens and pigs sometimes supplement meager incomes, but usually all adults must work outside the home.

The grind of a workday is stretched by ceaseless commuting. Five days a week (and half on Saturday), the *Paulista* worker rises at 4:30 a.m. and returns home at 9:00 p.m. Since the sea of red-tile roofs houses only about 12 persons per acre, the vast lower classes are spread far from their destinations. Buses meander the in-and-out radial routes among the houses. First the workers go into the center of Sao Paulo and then get back on another bus to their job. The poorer the family, the further out they live and the longer they commute. Sleeping on the bumpy ride, in overcrowded, insect-infested, damp and drafty buses, they are exposed to all contagious diseases.

The inefficiency of Sao Paulo as an urban machine can be measured most dramatically by a constantly decreasing life span and an increasing infant mortality. In 1958 life expectancy was 63 years, in 1963 it was 61 years and today it is less. Inside the city limits infant mortality rose from 60/1,000 deaths in 1961 to 74 in 1967 and to 89 in 1970. The average is worse, up to 98/1,000, when the entire metropolitan region is considered. Whether these depressing statistics are due to immigrants' tropical diseases or inferior habits of health and cleanliness, the city does nothing to provide a remedy for them.

Although the health budget remains low, the State of Sao Paulo has greatly raised the education funds. Recently, to discourage the 70 percent drop-out rate of 10-year-olds, the term for a primary-school diploma was extended to age 12. At higher levels, the traditional school system once oriented only to the elite, now caters to the middle class. The federal government, faced with the fact that Brazilian cities had an increasing illiteracy rate, 83 percent counting people who have forgotten how to read, write or use numbers, finally began "MOBRAL," an adult literacy program which is considered a success. But in general, social programs are not Sao Paulo's greatest achievement. At the bottom ten percent of the socio-economic scale are those people, mostly immigrants from the underdeveloped areas of Brazil, living in *favelas* as squatters in houses built of used lumber and sheet metal. These shantytowns are found in bypassed valleys, usually on the fringes of the city.

In the *favela,* partly-clothed bands of kids play ball or fly kites in open spaces between the clusters of shacks, which are not walled off as are houses in better neighborhoods. In fact there is much more of a communal spirit and open interchange among *favela* families. It is reflected in, perhaps generated by, the physical structures themselves. Since most adults are away sixteen hours a day to make ends meet, informal communal care of children replaces the normal family structure. If one scans the statistics for juvenile delinquency in such communities and then crime rates for those ten years older, it is clear that organized education is desperately needed.

Actually, *favelas* are free of crime compared to nearby neighborhoods where there is more to steal. An interesting contrast to the urban experience in the U.S. is that theft and muggings are usually highest in areas of low buildings rather than of high-rises. That is because the high-rises are far from the desperate population; and even though low buildings have high walls with glass-studded tops, and protected further by dog, locks and sometimes even guards, the ingenious thieves still get in. Another difference between American householders and the average *Paulista,* in every social class but the *favela* dwellers, is their apathy toward public problems like littering, potholes, noise in the street and other neighborhood troubles. They expect the city to take care of everything outside their own high walls.

If you live in a *favela* you may not be isolated from your neighbors but you are cut off from the organized life of Sao Paulo. In legal terms, you probably don't exist. Without documents, you cannot hold a job, receive public health benefits or schooling, marry, own property or drive a car. To obtain documents costs money and takes endless hours of being shuttled back and forth between different offices, a process that even an educated and urbane *Paulista* finds confusing. At the levels of bureaucracy dealing with the poor, there is little sympathy. "Those troublemakers should all be arrested and their shacks ripped out," a police officer said to a friend of mine who tried to help a *favela* woman get documents.

But economic difficulties are the most pressing ones for these people. Most *favela* dwellers have emigrated to Sao Paulo from the country or else their parents did. Many go back to the countryside for the struggle to enter the industrial economy is bitterly frustrating. Although the building industry has a great shortage of unskilled workers and is seeking them among the *favelas,* the majority survive by what is known as "urban subsistence": begging, hawking trin-

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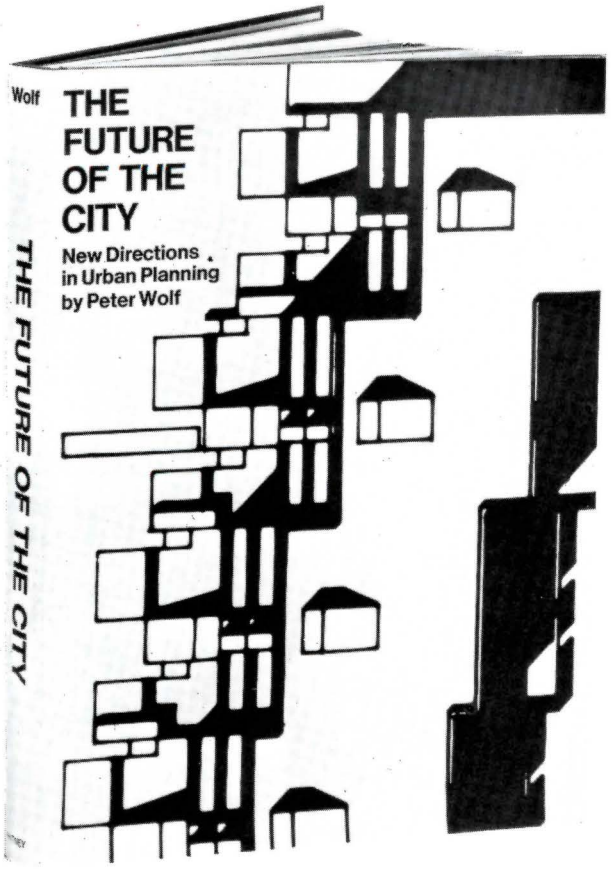

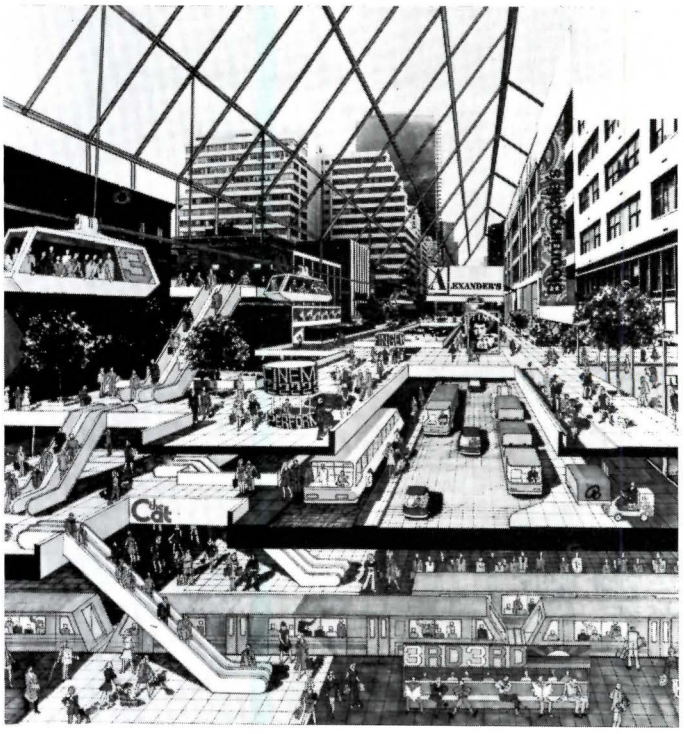

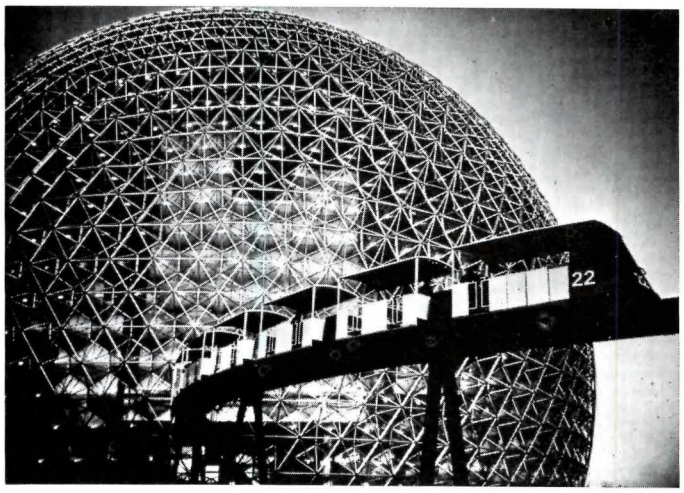

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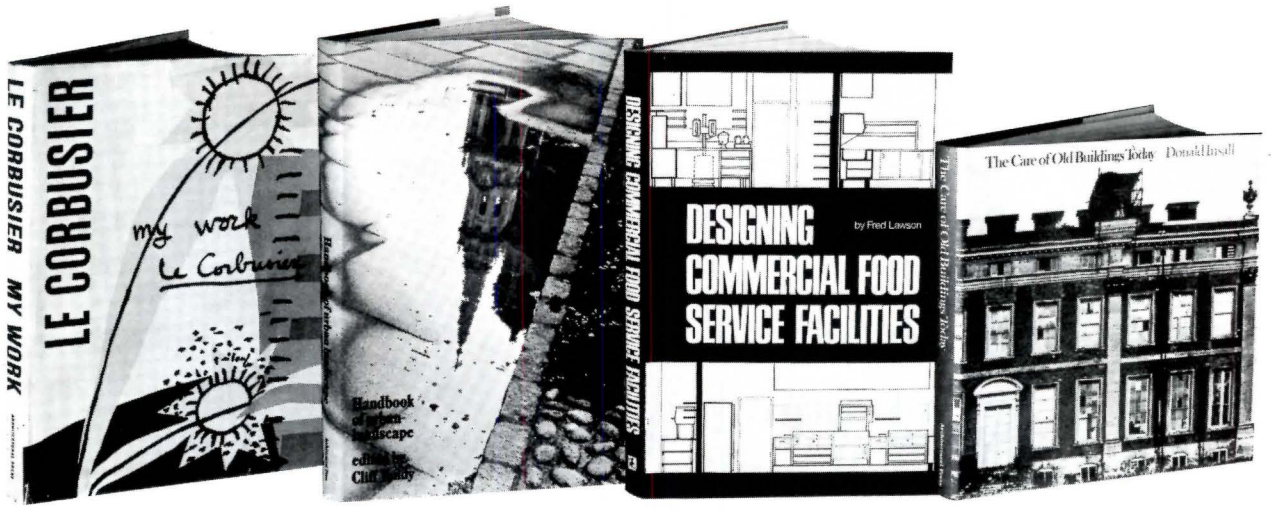

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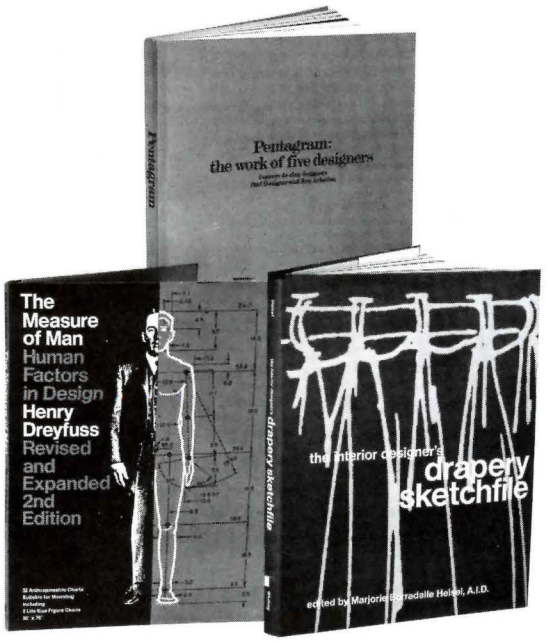

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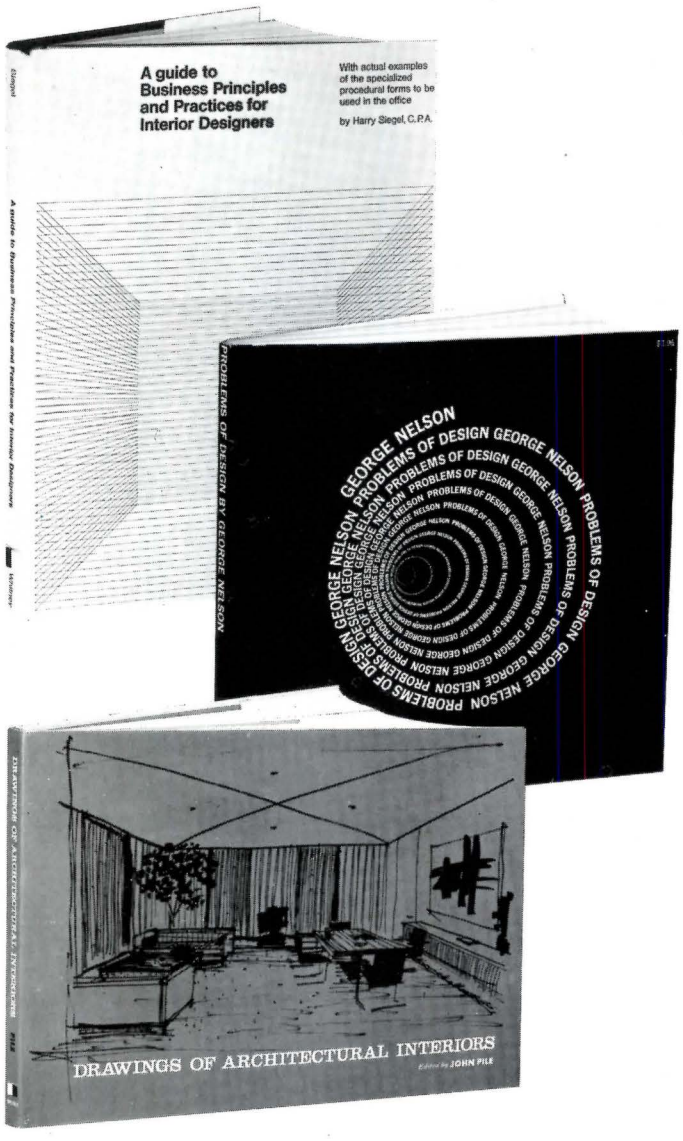

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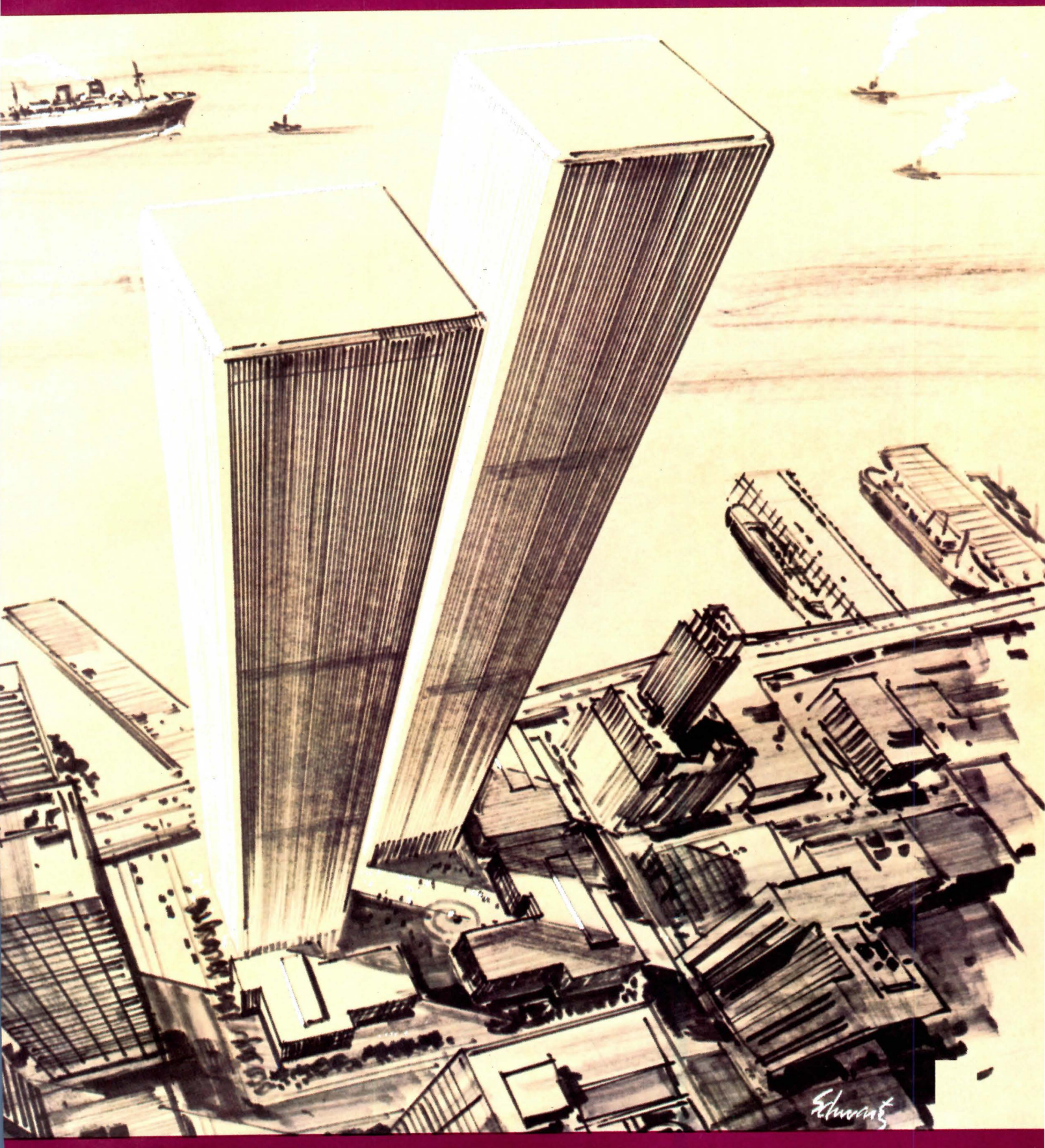

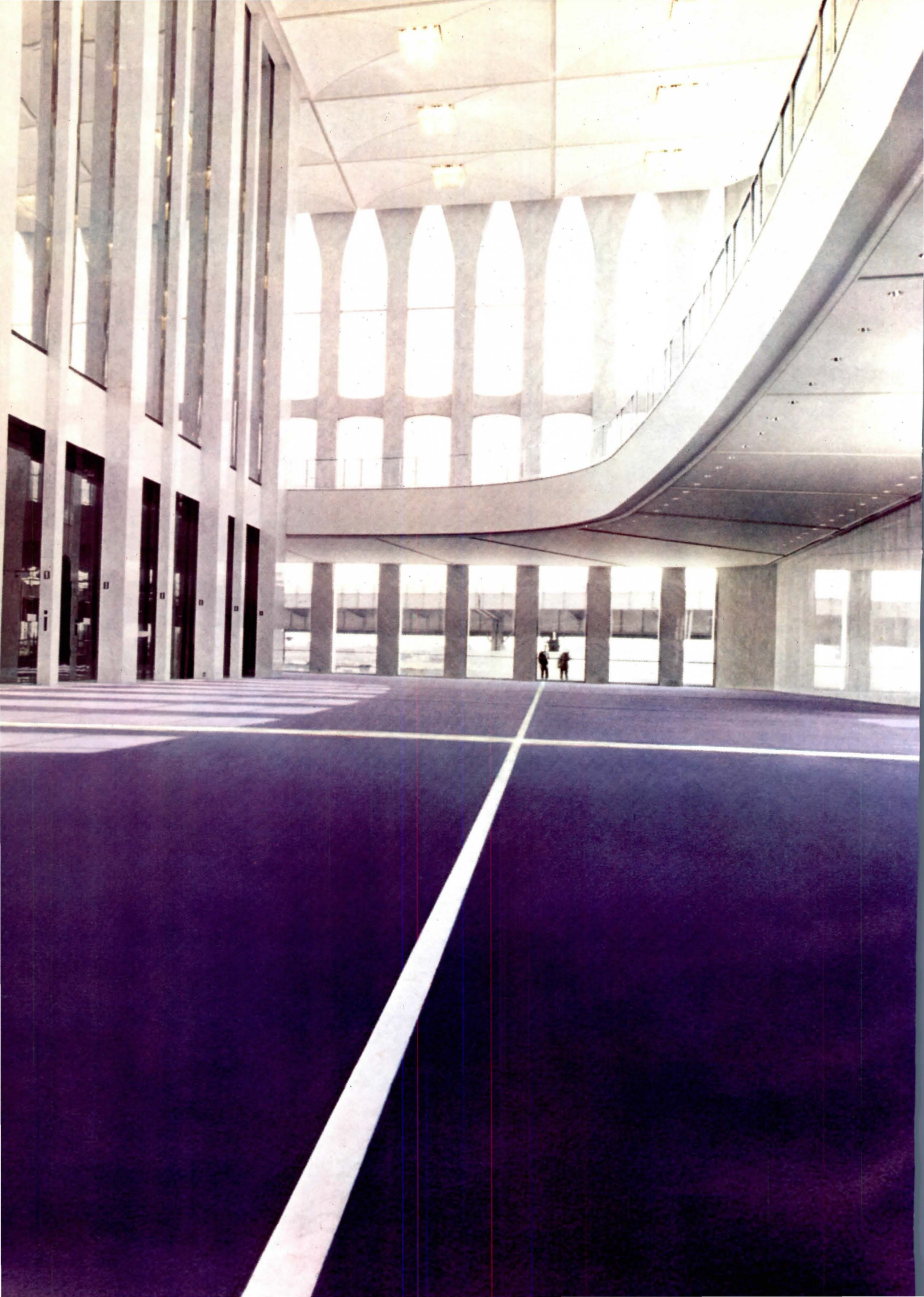

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More than twenty-five of the World Trade Center's acres have been covered in wool, but far more wool acreage is projected.

The use of wool in the Trade Center might be described as three-faceted, with three classifications of areas to be covered. First, public areas including entrance lobbies, hallways, elevators and "skylobbies" or changeover points from local and express elevators on the forty-fourth and seventy-eighth floors. Second, the twenty-two Port Authority floors including executive offices, dining rooms and cafeterias, the World Trade Institute's language school and seminar rooms, the library, etc. Third, tenant areas.

This means that almost everywhere in the World Trade Center, wool warms concrete, cuts sun glare at windows, softens the sound of hundreds of thousands of phones, voices, footsteps. It adds flowing elegance, color, warmth, helping create a more human scale and ambience in these larger-than-life towers of concrete, steel and glass.

However, there was no need to review all these virtues when the time came to make a decision on carpet fiber. The decision was automatic. Fire Department regulations practically specified it.

Sid Schachter, the Planning Manager for the Port Authority's move to the World Trade Center, who is responsible for the twenty-two Port Authority floors, points out that "wool is naturally flame-retardant. With synthetics, smoke density is higher. So we also strongly encourage Port Authority tenants to stick with wool."

And most of them have. For instance, Manufacturers Hanover on the forty-fourth floor has all wool carpeting and upholstery, as have the four banks on the Center's Concourse level.

On the twenty-two Port Authority floors, wool was even the choice for partition coverings: Elkhorn pebbly wool fabric from Isabel Scott. In addition to its fire retardancy, wool helps solve the acoustical problems of these vast floors.

Office chairs throughout the twenty-two floors are also covered in wool: grey Timme Acorama wool fabric. V'Soske and Edward Fields wool rugs as well as Tai Ping wool carpeting and drapes are also used to create special decorating effects. Even cafeteria and dining rooms are almost totally carpeted in wool.

Although fire retardancy was the most pressing consideration, it was, according to Mr. Schachter, far from the only one.

"Synthetics simply don't clean on the floor as well as wool."

Ms. Michael Love, the New York interior designer retained to decorate all non-tenant areas in the complex, agrees.

"I like wool's clarity and subtlety of color. The carpet I chose for the lobby could be called purple, but it's more. It's softer, a true violet that adapts to any lighting. The color stays beautiful and rich even after repeated cleanings."

Ms. Love selected two basic carpetings for the one hundred and two elevators and elevator lobbies in each tower and for the two skylobbies: a plain tufted and a stripe in neutral shades of beige and brown by Philadelphia Carpet. She used considerable designing imagination to avoid monotony, creating distinctive graphic arrangements by mitering the stripes or by using a segment of carpeting cross-wise like an area rug within another carpeting pattern. Specifications are as follows: Custom-tufted. Jute primary and secondary backings. Five tufted stitches per inch. Pile: ½ inch. Brunslon® antistatic control.

For carpeting on the Port Authority floors, Lees and Philadelphia Carpets furnished over 60,000 sq. yds. of custom-made wool Wilton. (A number of brands were subjected to strenuous testing for durability, color retention, texture, etc.) Great interest was created through the use of the same grey/brown checked pattern with changes in scale for different areas. The total effect is an impressive combination of unity and variety: unity through the consistent use of one pattern, variety through the change in scale. Checks are quarter-inch for office floors, magnified to a dramatic two feet in halls and five feet in elevator banks. Specifications include: 256 pitch; .290 pile height; loop pile; 45.6 ounces per square yard face weight; 10 wires per inch.

Nowhere is wool more distinctively and effectively used than on the Port Authority Engineering Work Station. Rancocas wool covers even the metal doors of drafting table book shelves.

Decorating was a special challenge on the World Trade Institute floor. Beneath it all is a small-check Stevens Gulistan wool carpet specified by Leo Kornblath and Associates.

Wool. It does the big job in the big architectural achievement: the World Trade Center. It's strong, cleanable, elegant, has true color-clarity. It deadens sound, cuts drafts, cuts glare.

But perhaps most important, wool creates a whole natural ecology, a human environment, in what might otherwise be a dehumanized one. Wool, imaginatively used, creates smaller, entirely livable environments within one gigantic one, and thus makes the World Trade Center a delightful place for productive and vital human working and living. Never has there been a clearer illustration of the words, "Wool, it's got life."

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kets on street corners, or running messages (every office has messenger boys to supplement inadequate telephone service). Some do part-time domestic work for people just a little bit better off than they.

Growth over welfare

How does this involve architects? The quantity of construction and especially that with building programs so complex as to require architectural services, depends directly on the economic level of a society and on how many people are operating in its mainstream. Just what proportion is doing so is a sensitive topic in Brazil with political overtones. Figures published in 1967 showed that only four percent of Sao Paulo's working population earned more than $1,400 per month. Of the remainder, one-third averaged $470 and the lowest two-thirds only $155 per month. Since 1967 many low-income people have moved into skilled and semi-skilled occupations where they are benefitting from the rising average of middle-income salaries. But claims that income has soared in the highest bracket have exacerbated class bitterness. The lowest income group, with large families, is swelling at a phenomenal rate. In spite of government efforts to control inflation, the real purchasing power of these marginal workers fell 30 percent over the past decade.

Despite inflation and other problems, optimism prevails, industry booms and the middle-class prospers as never before. In the fifties, a steady job did not mean that an average *Paulista* would have the purchasing power to buy household appliances, a car or other products easily available to him today. All this is possible, it is claimed by Brazilian economists, because of the "monetary correction" system which was instituted after the military coup of 1964. In this program, as prices are allowed by the government to go up, wages, rents, taxes and interest also go up. In effect the *cruziero* is devalued in small increments and debts remain stable. Government policy also helps the lower-middle-class by boosting their wages, increasing their purchasing power and for those who work in factories, providing health programs.

Even though the monetary correction system is only partially successful at controlling inflation, Sao Paulo is undergoing an industrial expansion unmatched in the entire world. One of the reasons the unskilled are moving into industrial jobs so easily is because of a cyclical shortage of factory labor. Since profits are reinvested in expansion of industrial production in this controlled economy, the need for workers continues. The government's choice however, to maximize the development of resources as quickly and efficiently as possible, is made at the expense of increased programs of social welfare. In economic jargon, the choice is growth over welfare. Yet it is possible that these intensive economic goals could be more easily achieved if important social concerns were not ignored. As a Sao Paulo factory owner put it to me, the elite finds itself "surrounded by incompetents." The city is neglecting its role of "civilizing" the hordes who have appeared at its gates. And that is not just an altruistic obligation. By training them to perform and partake of the industrial society, the city will benefit itself in the long run.

Planning for the physical development of Sao Paulo has also been done in a short-sighted way. Attempts to reshape the infrastructure of the city, a legacy of the agrarian society, have been made from the most simplistic engineering points of view. In urban design, housing, public works in general (and highway planning in particular), the response has been to immediate problems. The solutions have then tended to cause new problems.

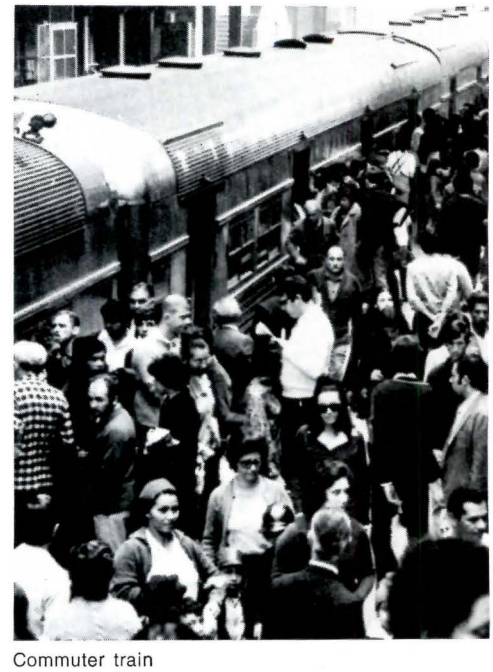
Perhaps because of the huge automobile industry based in Sao Paulo, the most obvious response to urban congestion was to build an expressway system which now wraps around the city, cuts through it and runs along the rivers. It was a good idea, initially, because it provided jobs, economic stimulation and efficiencies in transport. It was a bad idea because swarms of incoming cars now choke the downtown streets designed for much lighter traffic. The CBD now smells like a garage much of the time and, in spite of many pedestrian overpasses, it is dangerous to be on foot in the streets.

In 1967, an official master plan for metropolitan Sao Paulo, entitled PUB (*Plan Urbano Basico*), was prepared at the direction of the mayor at that time. It was said that he wanted Sao Paulo to be bigger than New York City. A team of U.S. and local consultants, working with inadequate data and under a deadline, obligingly produced a document that called for an increase in Sao Paulo's central density. But the plan failed to relate to the needs of people with an agrarian tradition. To help them, it certainly would have necessitated creation of a whole range of services for everyone, from education and health to recreation and cultural. And it would have meant sacrifices by the haves for the have-nots. To date, except for the highways, PUB has had little effect on Sao Paulo.

Sao Paulo established a planning department, COGEP (*Coordenadoria Geral de Planejamento*), two years ago. So far its major accomplishment is the formulation of a new zoning code and that work was done by consultants. The principal thrust of the code is toward separation of incompatible uses (several years ago, some gas tanks located next to a department store exploded!). Industry, for example, is encouraged to locate near the city's perimeter. Officials at COGEP said that each city department used its own data and decided its course independently; the planners neither knew of departmental activities nor coordinated them. Earlier zoning and planning departments (since 1947) have been ineffective and ignored. Is COGEP headed in the same direction?

The present mayor, engineer Miguel Colasuonno, comes from the State of Sao Paulo planning agency, whose statistical diagnosis of the metropolitan region is the best available. It appears that most planning decisions by the mayor will implement state policy and the staff work will actually be carried out at state, not city level.

Urban development



Commuter train

The city's principal project is the development of a long-contemplated subway (Metro) for Sao Paulo. Part of the system, which crosses the city from north to south, is now in operation and when it is complete, should ease the burden of the tired *Paulista* commuter. Meanwhile, down in the Anhangabau River valley splitting the CBD, some 8,000 buses line up each day to deliver and remove the workforce. Although the Metro (where it passed near the urban core) was originally planned to be integrated into a massive project involving excavation of separate levels for subway, pedestrians and automobile traffic, this was shelved by the mayor in order to expedite the subway itself. So the priorities have shifted from those based on integrated planning to the same short-sighted ones pursued in the past.

In 1972, the city started EMURB (*Empresa Municipal de Urbanizacao*), a large-scale development agency similar to New York's Urban Development Corporation. Because it is intended to be an efficient, profit-making operation, its founders, in the words of former mayor Figueiredo Ferraz, expect it to be "a great enterprise, free of bureaucracy and acting as a true entrepreneur."

EMURB's present, somewhat contradictory goals are: to build Metro stations; to

continued on page 28

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increase parking facilities in the city center; and to develop and open cargo terminals. It also has an ambitious urban renewal scheme for a district, Santana, at the north end of the Metro. A brochure proposes that services and open space, superior to those existing in the better sections of the city today, will be built there. Photos of the model, however, show a sterile towers-in-a-park approach in this first attempt to grapple with urban renewal.

Unfortunately, no program for relocation has been made public nor is one called for in the feasibility studies. There is a similar project at the south end of the Metro, where three-fifths of the land is unoccupied and services are appallingly inadequate. Most houses are poorly built, without plumbing and in disrepair. Relocation of the 17,600 inhabitants might take place within the area if government low-income housing programs were effective. Most likely the inhabitants will be replaced by those in higher income brackets.

Anyone familiar with American urban renewal programs will view this EMURB project with great skepticism. Here is a stable but marginal population that only needs adequate public services and incentives to correct local and individual housing problems. What will happen when these thousands are uprooted and sent from one temporary location to another? What will happen to all the disrupted businesses? How can renewed property be sold to make up the huge costs of removing an already built-up community?

There appear to be some differences from the American experience however. Former mayor Ferraz claimed there were enough empty lots in Sao Paulo to accommodate another city of the same size. That is due to an old practice called *loteamento*. When the Brazilians were faced by massive immigration of Europeans 80 years ago, the landowners would subdivide a small portion of their plantations into lots and sell them cheaply. When the new owners had succeeded in hounding the city into providing them with utilities, the plantation owner could sell the rest of his property, now easily serviced, at great profit. Now the city wants to fill the gaps left from that process in order to use its utility network more efficiently.

To control land speculation in areas programmed for EMURB projects, Sao Paulo is using regulatory techniques developed in London: lots that remain undeveloped will have their taxes raised to encourage use; lots that are sold will pay a "betterment tax," so that most of the increase in value goes to the city; and developed property will pass along the costs to purchasers of condominiums or commercial space. In this way the city hopes to pay for a complete infrastructure of utilities and social facilities. Public and private uses can even be mixed by condominium tenure such as a park over a private garage, or an office tower over a school.

Housing programs

Property ownership is a traditional Brazilian hedge against inflation. This attitude is reflected in the patchwork of tiny lots with high walls. Land is sold on the installment plan. Rent control laws from the forties discouraged the building of rental properties when the construction boom began and condominiums were built instead, spreading mortgage risk and giving banks more business. This has worked reasonably well for middle and upper-income housing, but not for those who need housing most.

BNH (*Banco Nacional de Habitacao*) is a government-operated reserve bank for housing which was initiated after the military coup of 1964. Its goals, similar to the U.S. housing acts, are to promote home ownership for low-income families and to provide employment for unskilled workers. One-twelfth of every employed person's salary is contributed to BNH funds as part of a unique insurance fund which protects employees from dismissal. Sao Paulo has a housing shortage and most of what exists is of low quality. Yet 61 percent of the homes in greater Sao Paulo, including high-rise condominiums, are owned by their inhabitants. This phenomenon produces a stable population which takes good care of its housing. Abandonment of buildings is unknown.

In the private market, construction profits run from 100 to 200 percent. The controlled profits in BNH programs are so far below those that qualified builders do not apply. When in an interview with a BNH official, I repeated the rumor that BNH had more money than it could put to use, I was answered with a blush but no denial. There are few low-income projects in Sao Paulo. In general, it appears that most of BNH's money has gone into consumer mortgages for luxury and middle-income housing. Although it has been claimed that this is contrary to the original intent of the law (which was to provide low-income housing), there have been some tangible benefits for middle income groups.

First, BNH's practice of evaluating new condominium apartments at prices lower than market rates has held down the developers' profits somewhat.

And second, its low mortgage rates over 15- to 20-year terms have forced private lenders to lower their interest rates in order to compete. Thus the program has had a stabilizing effect on the entire housing industry.

BNH has a list of programs for low-income housing, however little they may be utilized, that is organized in terms of various income brackets expressed as multiples of the official "minimum salary," about $65 per month at present. Minimum salary changes automatically as the "monetary correction factor" is adjusted and everyone gets a raise. By defining housing subsidies in minimum salaries, the subsidies are tied to mortgage debt, premium payments and share of income. None of the BNH programs, it should be emphasized, *give* money to lower the real costs of building dwelling units, rather they loan money at very low interest rates.

For those who earn less than the minimum salary, about 20 percent of the population, BNH has a program to loan money at three percent to buy building materials. It is part of an overall BNH effort to encourage production, distribution and use of certain building materials.

The self-help building tradition in Brazil, known as *mutirao,* is very strong and people of even middle-income brackets will often build their own house slowly over the years in their spare time. Unfortunately, this program has never been used. Perhaps, if the original goal of BNH were ever realized, the organization should accept real-life conditions and actively promote the low-interest financing of materials for self-help housing, in conjunction with community planning. Such action is necessary as long as construction profits are so high that lower income groups cannot afford new housing.

For those earning from one to three minimum salaries, or $65 to $195 per month, there was the COHAB (*Companía de Habitacao*) program. It has built one group of very small houses (300 to 500 sq. ft.) at a cost of $25 per room outside of Sao Paulo. This project failed mainly because it was five hours' commuting time from employment sources, but also because no utilities or services were provided. In 1973 PLANHAP (*Plano Nacional de Habitacao Popular*), for the same income group, was organized to offer mortgages bearing interest under three percent.

In the range of three to six minimum salaries, or $195 to $390 per month, in conjunction with a workers' union, BNH is financing moderate-size condominium apartments (875 sq. ft.) under CECAP (People's State Housing Bank) with monthly mortgage payments at about $70 for 25 years.

Sr. Joao Batista de Vilanova Artigas, a prominent Sao Paulo architect, drove me out to Guarulhos, northeast of the city, to look at a CECAP project he had designed. The grimly-regimented three-story blocks each have 30 units in pairs around entrance courts. About 32 blocks are completed with another 16 under construction. When complete the 445-acre development will include schools, health services, shops

Guarulhos housing

continued on page 130

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Letters

Louis I. Kahn

Mature architects, I imagine, are not supposed to have gods but Lou Kahn has for many years been a very special anchor to me. Not that I desired to copy his esthetic but, like so many, I felt in his statements and in the intensity of his search for a concept of clarity that he gave all of us a language that became a yardstick to our own personal goals.

I had the private pleasure of meeting Lou in Ahmadabad and with Doshi watching his work under construction. This participation in his own self-evaluation and his opportunity for some relaxation as only India and Doshi can provide is a special personal memory.

Working with him and attending his seminars and sharing dinners after his lectures was also a personal event that allowed for a language and devotion and concern to reaffirm itself in the intimate language of his discussion rather than the larger language of the lectures.

I do not know how the profession and the magazine can adequately reflect his contribution but it is a little like the loss of Dr. King or the Kennedys for us in Architecture.

WALTER A. NETSCH
Architect, Chicago, Illinois

Last month I took a two-week tour of the East Coast schools: Harvard, Yale, Columbia, Cooper Union, MIT and Penn. I must admit I was disillusioned. The lack of enthusiasm and talent was obvious. The schools were very disorganized. The interviews I managed to get revealed to me much of the doubt these administrators have in themselves and their respective institutions.

Penn was the last school I visited. I had felt fairly negative about the other schools, but was moved and interested in the motivation of the students working in Kahn's studio. I visited Kahn's office the following day and, although Kahn was in Israel, I had a long and interesting tour with a student worker, Bill Bird.

Several days have passed now since I learned of the death of Louis I. Kahn. The tragedy leaves me at a loss.

Is there some way a memorial statement could be made? Some way to bear out the affirmation of freedom and his dignity to love? If there is some way the pitiful spirits of this corporate country could be shaken, the lousy money we earn could finally be exposed as worthless paper. Somehow the fallacy will be uncovered as a kind of stupid uselessness and somehow the truth will be exposed.

S.H.
Architect, San Francisco, California

Louis I. Kahn was a man of confidence, confidence in belief, belief in wonder which can be transformed by imagination into form, form expressed by built environment.

His confidence was so strong and fresh that *even now* it inspires us to go on—as always contact with him was something fresh and gay.

Forms created by him were strong and severe like rocks and medieval castles.

That's how I experienced yesterday the interior and exterior silhouette of Bryn Mawr's dormitories. Strong and clear were the concrete lines and planes cut in universal space.

Confidence in human quality to bring down on earth, by imagination, our wondering about existence in clear cut forms.

That was Louis I. Kahn's message. This message will stay a long time with us.

J.B. BAKEMA
Architect, Rotterdam, The Netherlands

Of all prominent architects Kahn was most implacable in his opposition to the commercially motivated kind of building which the new Penn Station exemplifies. What a dirty trick for Louis Kahn to die there.

Thinking of Kahn brings up what is architecture's most serious issue: form versus symbolism. More than anyone else Kahn exemplified a moral approach to the act of building, yet he fathered (or midwifed) by his willingness to look to the past the new Pop architecture, an architecture willing to learn from even in certain ways to emulate, the new shabby way of building.

For myself this is the dilemma. Art teaches the valuing of things for themselves, or more exactly for the pleasure derived from the immediate sensations which these things can stimulate. Claes Oldenburg, while deriving his sculpture from the everyday world—a bathroom, telephone, baseball mitt, etc.—claims that his interest is in the form: "Form or the bone of the thing, its essentialness is what matters to me the most." This is what Kahn's architecture seems to me to have been about.

After a century or so of struggle, some of modernism has become acceptable, but at the cost of modernism's content. For Business the

clean-lined forms of Modern Architecture have acquired status. The corporate executive who commissions a SOM-style headquarters likely lives in a Georgian mansion with hunting prints in his den. And his motives are the same in both cases. His all-glass corner office and Palladian becolumned portico are both symbols. This is how he values them.

And me, along, I guess, with most architects, we see only the form, the shapes, textures, colors. When I go to the Arena Chapel in Padua or Notre Dame in Chartres, I don't give a shit about the church they glorify, nor even the God. It is Art I worship. Similarly, when I visited Venturi and Rauch's medical office in Bridgeton, N.J., with its moon-gate entry suggesting a million tawdry motels across America, I cared only about the magnificent and daring composition of porch and windows across the facade.

Patrons, whether the president of American Can or Pope Julius II, commission art for the symbols presented, but for artists these symbols, even if the symbols are ones they cherish, are the excuse for form, for material and idea.

Kahn will be missed.

TOM KILLIAN
Architect, New York, New York

BFU

Thank you for your detailed presentation of the Free University of Berlin. Your publication continues to serve the design profession as the mechanism for the transmission of valuable information.

The work that Shad Woods was kind enough to share will continue to speak to our condition—both as a statement of his intent and as a model of how to build for people.

ANTHONY PANGARO
Architect, Boston, Mass.

I greatly enjoyed your fine article in the January/February issue on Shadrach Woods and the Berlin Free University. It was particularly appreciated by those of us who were students in Shad's last studio at Harvard. His buildings and spaces reinforced by his teaching and writing reflect his breadth of concern and set an example for many of us who had the opportunity to know him.

WILLIAM WINKLER
Architect, Cambridge, Massachusetts

Somebody once said that the value of it all lies in its vagueness. He must have been referring to architects verbalizing about architecture. In your January/February 1974 issue, some of the nine evaluators of the Berlin Free University campus contributed their share of inarticulate, contradictory, redundant and mystifying expressions. I am including a few excerpts from what is a textbook example on how the English language can be used to confuse the issues.

Serge Chermayeff: *"This is an open-ended grid system accommodating omni-directional growth in three directions."*

This sentence contains two redundancies. One is "omni-directional" and "three directions." The other is "open-ended" and "growth." Would it not be much clearer to say that this is a system of construction which can grow in three directions?

O. M. Ungers: *". . . the principle of flexibility and adaptability was made one of the basic conditions of design."*

Flexibility and adaptability have identical meanings. The use of one of them would have been sufficient.

". . . an organizational system which permits additions and adaptations over a period of time. It is a heroic attempt to include the fourth dimension."

What is so heroic about it? How else does one cause any additions or adaptations to happen except over time?

"Woods' 'Free University Structure' is an innovation, and it comes out of simple but original ideas . . . a grid of corridors, a variety of halls and boxes with spaces in between."

I wonder if Mr. Ungers has ever heard of Chicago, or for that matter any of history's town planners.

Jacob Bakema: *". . . the image of the open society can be realized by matrix."*

Giancarlo De Carlo: *". . . fronts are wrappers of solid volumes; corners are intersections of right fronts."*

I think this sort of rhetoric does not help us at all toward "de-mystifing" (to use Bakema's expression) the design process.

REINHARD SCHNEIDER
Architect, Houston, Texas

World Trade Center

Despite—or rather, because of—the superficial grace and charm with which Henry Wright presents his interpretation of the history of building technology in his eulogy of the World Trade Center (January/February issue), his argument is as dangerously misleading and self-serving as the building project itself.

The balloon frame (a structural system in which the vertical supports rise-up through more than one story) was not "invented in 1833" as Wright states. It was developed in the mid-seventeenth century to replace the medieval jetty (a structural system in which each story projected beyond the wall-face of that below). Nor are

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WTC's exterior load-bearing, rigid-frame trusses "structurally unique" or a "technological breakthrough." Curtis and Davis' IBM Building in Pittsburgh (lattice trusses) and SOM's Beinecke Library at Yale (Virendeel trusses like WTC) were both built more than ten years ago.

"The sons of this year's graduating architects may be hearing about Minoru Yamasaki and the early 1970s" not because WTC is so unique and good as Wright argues, but because it is so terribly common and bad. It is just because WTC is such a gigantic disaster—architecturally, urbanistically, and ecologically—that a significant number of architects may begin to question the assumptions upon which its design is based.

HARRIS STONE
New Haven, Connecticut

Mr. Wright replies:
Mr. Stone reminds me of Don Quixote. On the balloon frame, his windmill is not me, but Sigfried Giedion (pp 350-353, Space, Time and Architecture). *And I doubt if the lattice truss bracing of the Pittsburgh IBM constitutes a bearing wall, or that Gordon Bunshaft would claim the 6-story Beinecke Library was a precedent for the WTC towers. Also, Stone fails to address himself to the possible demise of the cage-frame-curtain-wall, which was what I wrote about. Anyway, it's nice to be told you have grace and charm, even with qualifications.*

Ossorio

I think my first introduction to Ossorio was splendid (Jan/Feb 1974). The best ever—even in one's wildest dreams did one see such majestic art, magnificent carpets, elegant oriental objects of art, fuzzy dried flowers, dreary ancient plumbing fixtures, ecclesiastical stuff (worse than Italy) assembled or congregated into one place before Ossorio.

Many thanks for the twelve issues of PLUS you have previously sent and for Ossorio.

STUART R. PENN
Architect, Morgantown, North Carolina

Letter from Berkeley

That you should afford so much space to Linda Groat's "Letter from Berkeley" (Jan/Feb 1974) when there is so much real information necessary to dispense startles me. After all, her article was little more than the hollow plaint of a romantic from the steps of the Berkeley Veterans Home for Aged Radicals.

What did she tell us but what we knew she would find years ago?

That the radical planners weren't planning, but were re-living their moments of glory. She found that the Left Democrats would only go along with the radicals until it started to interfere with their own personal interests; just like regular people.

She told us that the voters wouldn't vote for the radicals' terrific schemes which were designed for the well-being of the poor and the put-upon because either her group failed to organize them properly (two times) or because they have apathy. She tells us that her group's efforts were blunted by another group's efforts. She tells us that factionalism (sometimes called jockey-ing for position) damaged the cohesion of the radicals just like it seems to amongst Democrats and Republicans. And then finally she reports that a court decision went against her group, which court decision incidentally is one of the most brilliant I've read in a long time. (That particular Judge's capacity to see that it may well be a right for people to expect to make a profit from their investment is unique in this world of embarrassed and embarrassing decision making.)

In a word, what Ms. Groat discovered was reality.

MELVYN KAUFMAN
Investment Builder, New York, N.Y.

It was with mounting delight and dismay that I read Ms. Groat's "Letter From Berkeley," with its combination of cheerful activism on both sides in behalf of such undemonstrated premises.

She says, "If the right to make a profit has as much legal validity as the right to enjoy adequate housing, then all serious efforts at housing reform will have been blocked." When Ms. Groat then, after having outlined an elaborate program for preventing the construction of more housing, regrets that this housing is now likely to proceed, the careful reader is baffled. This program of non-construction, "duplicated in every city in the country" is to house people? This program, if initiated long ago, would have us living in log cabins. Who would build housing if government is to impose rent controls to lower its value and then provide low interest loans to the occupiers so that they can take it over at a reduced figure? Where is the long term gain?

Yet when the opposition says, "If the landlord cannot be assured of a sufficiently profitable rate of return, won't he abandon Berkeley . . ." Ms. Groat is not the only one who is baffled. Pick up his land and go? How?

In fact, real estate is not one thing, it is two quite different things. It consists of 1. Land, the surface of God's planet Earth, and 2. Improvements, produced by human beings after they are in some fashion or other motivated to do so.

The land is given and fixed. Its usefulness and value is created not by the owner of the title, but by civic improvements installed and maintained by the public expenditure of tax money, and by the presence of and buildings belonging to the other individuals who make up the public.

That is not true of buildings. If there is no incentive to bring them into existence or maintain them over time, they will disappear. They require original and continuing motivated human effort.

Taxes on buildings discourage construction, reduce the volume of housing and through the operation of the law of supply and demand, tend to raise rents. Taxes on land, by making it unprofitable to hold valuable land vacant or poorly used, encourage construction, increase the volume of housing, and tend to lower rents. When Justice Marshall generalized that "The power to tax is the power to destroy," he was merely evidencing the ignorance of his generation. In fact, a tax on land does not destroy, it produces.

If we really want to provide housing, not merely for some specific individuals now in *situ*, but for our neighbors in general, all that is required is that we remove taxes from buildings and raise from land values alone the same amount of government income that we now raise from property taxes on both land and buildings.

Who could afford not to improve or release his land for improvement, if it is taxed just the same whether used or not? Even land holders would be better off to hold land on which the property tax would not increase regardless of the quality of improvements they build, land steadily rising in value because of the surrounding development. How better could we, without the expenditure of one penny of tax money, provide that housing and other construction of which we stand so much in need?

What we need is not less incentive, but more incentive.

HENRY TIDEMAN
Architect, Chicago, Illinois

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EN A

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news+

Will Rogers once told a friend who wanted to invest some money to "buy land—they're not making any more of it." This fact seems to have escaped the Congress of the United States, which this spring killed President Nixon's proposed national land use policy bill.

The bill had been typically over-advertised as a key to building a better America, or some such drivel. It was, however, a modest first step in the general direction of treating our land as an increasingly precious resource that was not being replenished—and should, therefore, be used carefully and well. The U.S. Senate passed the bill by a huge 3 to 1 margin last year, and the House Interior Committee reported it out by an almost equal margin.

But then the lobbyists for such public-spirited friends of our earth as the American Mining Congress, the Forest Industries Association, the Farm Bureau and the Liberty Lobby went to work under the helpful direction of a lobbyist for the U.S. Chamber of Commerce; and before you could say "Watergate," the House Rules Committee voted 9 to 4 to prevent the bill from even reaching the floor of the House for a final vote. (It is particularly instructive that something called the "Liberty Lobby" would deprive the House of Representatives of the liberty of voting for or against anything.) In any event, the modest Nixon proposal is currently deceased, in part, also, because President Nixon, who initially labeled the bill "high priority," subsequently caved in under the onslaught of these friends of our earth.

The sponsor of the bill in the Senate was that wild-eyed radical, Henry Jackson; and since Sen. Jackson wields a certain amount of influence, some sort of land use bill may eventually be passed. But not this time—those friends of our earth saw to that.

Sen. Jackson's bill (a similar measure was sponsored in the House by Rep. Morris Udall, an increasingly effective spokesman on environmental issues) was tame enough: under earlier pressures from such other friends of our earth as the homebuilders and the realtors, the bill had been severely emasculated—e.g. some of the earlier, mandatory regulations that would have required suburban subdividers to meet certain environmental protection criteria, were watered down to mere "suggestions." Still, the bill was an important start in the right direction; its defeat by a handful of ruthless lobbyists is bad news for most Americans.

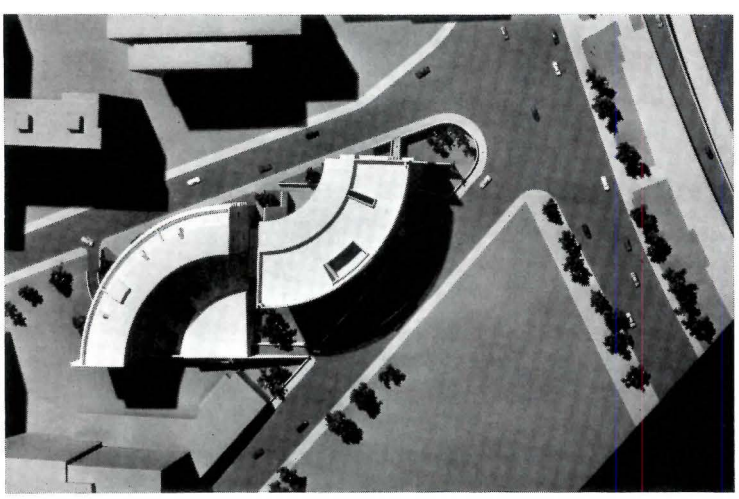
The world is just beginning to recover from the shock of the recent energy shortages. Other shortages are about to become similarly evident—including a shortage of land, spoiled or unspoiled, all over the world. When the energy crisis struck, we could always start walking; when the land crisis strikes, we may be forced to stop living.—PETER BLAKE

Paris design team

An international team of architects and engineers is currently at work on the drawings for the new Australian Embassy in Paris. The architects are Harry Seidler & Associates (Sydney); their consulting architect is Seidler's former teacher, Marcel Breuer (New York and Paris); the structural consultant is Pier Luigi Nervi (Rome); and the further consulting engineers are Claude Bancon and Cabinet Trouvin (Paris). The result of this global collaboration is a project that fits incredibly well onto an impossible site (3 or 4 blocks southwest of the Eiffel Tower), and has gained the approval of the cautious French authorities in record time.

The wedge-shaped site measures 6,280 sq. meters, and enjoys magnificent views toward the north

Australians build a flattened-out "S" beside the Seine



(Eiffel Tower, the Seine, the Palais de Chaillot, etc.). The conventional thing to have done on a site of this sort might have been a wedge-shaped building, roughly following the property lines. The program suggested a much more interesting alternative: what the Australian mission to France needed was not merely a Chancery (including quarters for the Ambassador, and for the Australian mission to OECD); but also 34 residential apartments for the use of Australian diplomats and their families. This suggested the possibility of two buildings rather than one—the apartments taking advantage, primarily, of the south orientation; and the Chancery, primarily, facing north, toward the grand views.

The plan that evolved is a flattened-out S-curve, cut apart at the "waist," but joined below and just above ground. The building is to be of precast concrete with a surface described as "reconstructed stone." The massive sculptured columns that support the apartment wing—and the even more massive column at the porte cochère of the Chancery—are evidence of Nervi's inspired touch.

The two buildings cover only 50 percent of the site; yet the ingenious plan fills the site visually by touching and defining its critical corners and perimeter. Although the pointed leading edge of the site seems less clearly resolved than it might have been, this shortcoming may be more apparent in two dimensions than in three.

Many of the news reports and comments are from our regular field editors: John Donat (London), Gilles de Bure and Marc Emery (Paris), Detlef Schreiber (Munich), Vanna Becciani (Milan), John Hadidian (Beirut), Charles Correa (Bombay), Patricia Boyd and Neil Clerehan (Melbourne), Yasuo Uesaka (Tokyo), and Leonardo Aizenberg (Buenos Aires). Plus correspondents are identified by their initials; other contributors by their full names. The remainder is contributed by our New York staff.

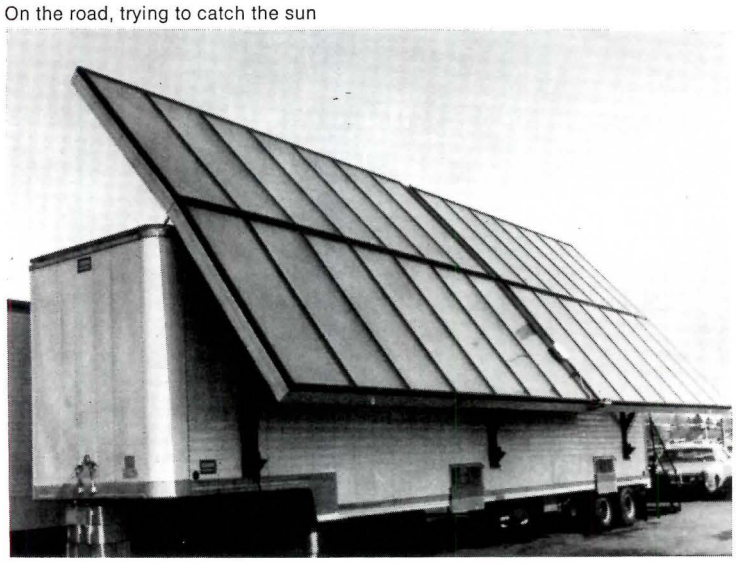
Sun lab

The U.S. National Science Foundation and Honeywell, Inc. have announced joint sponsorship of a traveling solar laboratory, which will move about the U.S. and collect data for heating and cooling systems powered by the sun. The laboratory will also serve as a resource and information center for architects, builders and others in the building industry. Its professional staff of researchers and scientists will offer seminars in various aspects of solar systems.

The laboratory consists of two units. One is a 45-ft. trailer that houses solar heating and air-conditioning equipment and a complete weather station, which will collect such information as wind direction, relative humidity, outside air temperatures, barometric pressure and detailed solar data in the areas the lab visits. The second part of the laboratory is an office unit, which will be heated and cooled by the solar equipment housed in the first of the two structures.

The lab's tour began this spring and will continue throughout the summer. At intervals, the lab will return to Honeywell's headquarters in Minneapolis for data analysis and for installation of new solar energy testing equipment.

On the road, trying to catch the sun



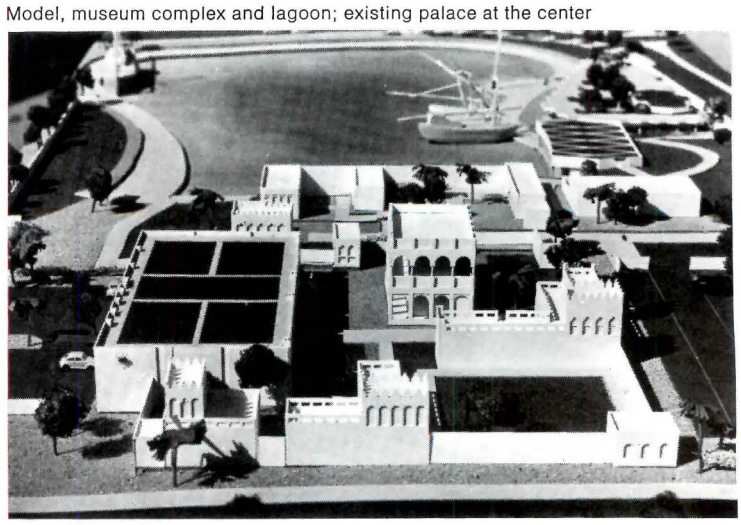
The Qatar Museum

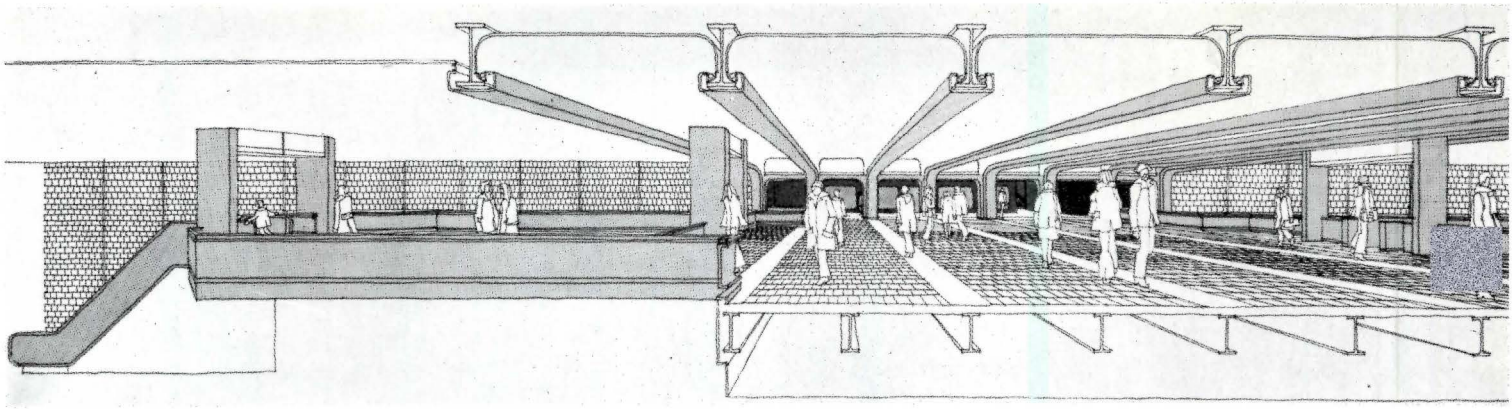
A cluster of houses, empty since 1940 but well preserved, on the west coast of the Persian Gulf will form the nucleus of a museum devoted to recording the life and culture of the nomadic tribes of the Arabian peninsula. The buildings, known as the Feriq al Salata houses, are about 75 years old, and were the home of the present ruler when he was a child. They were built by his ancestors, the Al Thani family, who came to Qatar in 1830.

The houses will be faithfully restored using, whenever possible, material and paint similar to the original. Added onto the houses will be two new buildings, the Museum of the State and the Museum of the Sea. A lagoon will be created off to one side to show traditional gulf craft.

British architects Irving and Jones have designed the new buildings and directed the renovation of the old houses with a sensitivity that gracefully acknowledges the presence of the ornate houses but does not overpower or attempt to mimic their high style in the new buildings.—J.H.

Model, museum complex and lagoon; existing palace at the center





First Stop

Manhattan's Second Avenue subway line is planned for operation in 1980. The first commission to design a station for the new line was given to Damaz and Weigel, Architects, New York, with James Hadley as Project Designer. Their design, for Second Avenue and 96th Street, has now been accepted by New York's City Transit Authority.

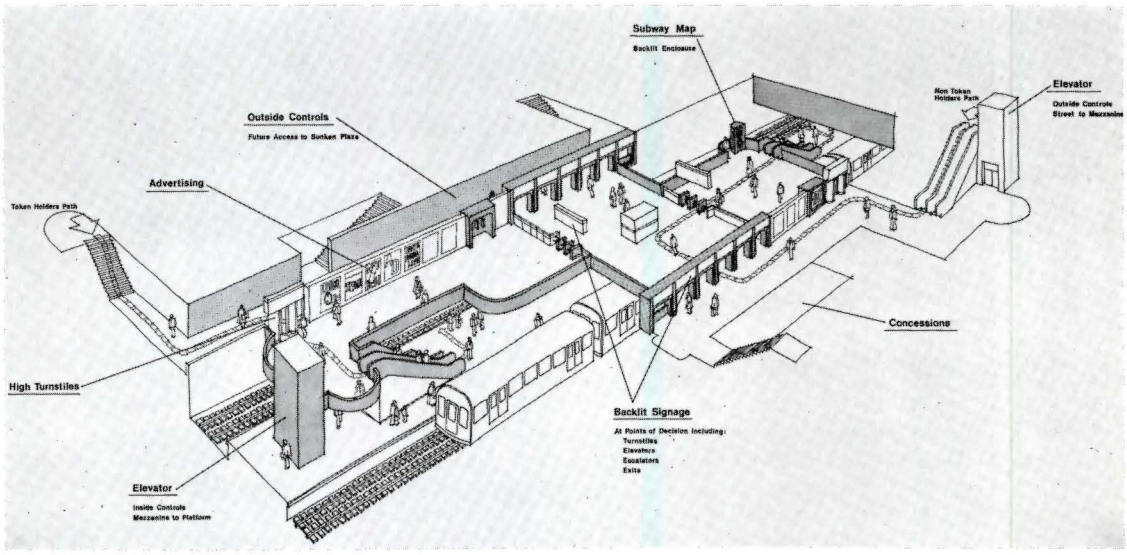
Compared to new subway stations in other major cities of the world, the design is ordinary; compared to existing stations in the New York system, it is glorious.

Damaz and Weigel's work was done with some standards imposed by the Transit Authority—their stock token booths and turnstiles are to be used, and the graphics planned for the entire system by Unimark International will be continued. Because some Federal funds are involved, Federal regulations apply, such as those for accessibility to the subway platform for those in wheelchairs.

Restraints for all stations were also imposed by DeLeuw, Cather and Company, who were engineers for the entire line. One of these restraints is a disappointingly low ceiling height (ten feet) for the mezzanine level. From this mezzanine passengers descend to a lower platform between the tracks, and Damaz and Weigel have mitigated the effects of the low ceiling heights by opening the mezzanine to the lower level wherever possible. The design intention is that the mezzanine, with parapets of stainless steel, will hang inside a larger shell of glazed brick. Ceilings will be acoustically treated, and floors will be of brick pavers. At the edges of the mezzanine space, there will be double glass partitions with spaces for posters between the glass sheets.

Mechanical engineers for the 96th Street station are Seelye, Stevenson, Value and Knecht. The present cost estimate is $7 million for the station interior, exclusive of $22 million for its structure.

Other firms which have so far been awarded contracts for stations are: for the station at 106th Street, Johnson and Hanchard; for 86th Street, Gruzen and Partners; for 72nd Street, Carson, Lundin and Thorson; for 57th Street, I. M. Pei and Partners; for 48th Street, Harrison and Abramowitz; for 23rd Street, Poor and Swanke and Partners; for Grand Street, Haines, Lundberg and Waehler; and for Chatham Square, Morris Ketchum, Jr., and Associates.



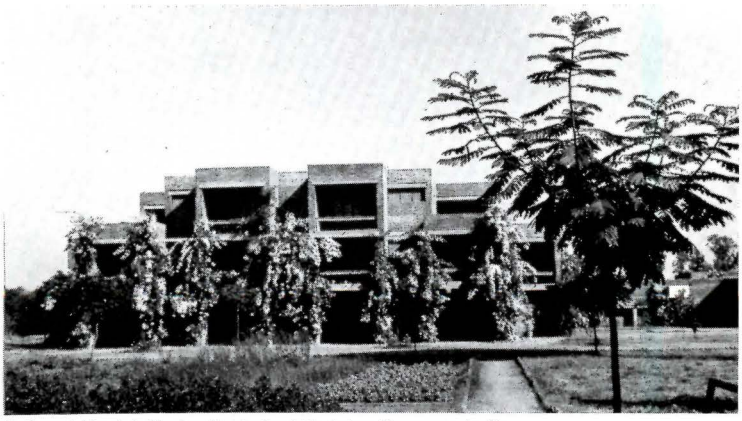
India school

The campus for Xavier Technical Institute is located on 12 acres of farmland near the village of Savasi, not far from Baroda. There are workshops, classrooms, a prayer hall, administrative offices, a library, canteen, dormitory and staff housing, to serve 500 students, 300 of whom will live on campus.

The school was begun to train craftsmen in mechanical and electrical work, and artisans in building construction. A country site was selected in order to give boys from the city and villages a chance to be in the fresh air.

Quality of construction was a major objective, to inspire the students by setting an ever-present example of high standards. The actual work was done by the Jesuits who run the school.

The whole site was laid out on a grid, using the hollow block as a basic module. The challenge was formidable, since the plasticity of concrete had to be reconciled with the discipline of prefabrication. Most of the buildings are only one floor in height, with a few having one additional floor. Each building is arranged around a court, and each group of buildings in turn is arranged around a larger court.



Fathers' Hostel, Xavier Technical Training Campus, India

Dormitories and staff quarters are separated from the school by open space and green areas. Only very limited vehicular traffic is allowed on campus. The architect is Hasmukh C. Patel, and the project team consists of J. M. Gunjaria, A. I. Patel, Harish Bhatt, and J. P. Vyas.—C.C.

Big bang

The USSR plans to build a dam sometime around 1980 for a water-power project in the Naryn River gorge in Central Asia. To build the dam, the Soviet authorities will set off the world's largest conventional explosion—using 500,000 tons of conventional explosives—to dislodge 500 million cu. meters of rock from the gorge walls, thus creating, in a couple of minutes, a granite rock dam 1,000 feet high and two miles long.

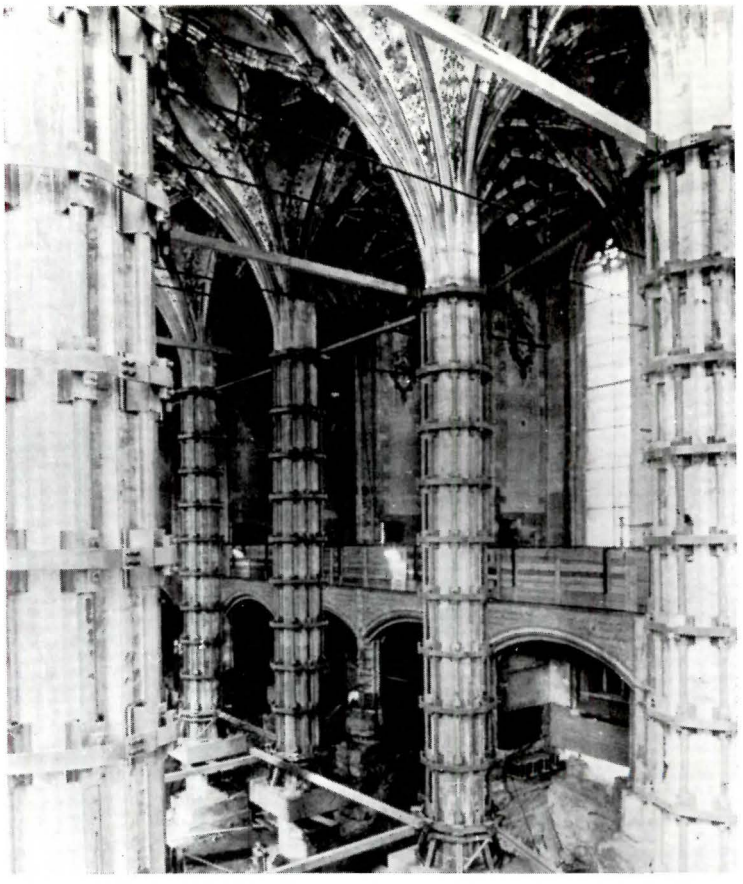
A trial explosion, at one-tenth scale, to refine engineering calculations, is to be conducted next fall in the valley of the Burlykiya River, a tributary of the Naryn, downstream from the site of the intended "big one." The enormity of this explosion becomes evident from the fact that the largest detonation to date in the U.S. involved only 2,000 tons of explosives, set off in Arizona in 1973.

Moving day at Most

There's nothing wrong with this 16th-century Gothic church except that the ground it's sitting on is covering a rich deposit of excellent-quality brown coal. The huge Diaconate Church is in the old mining town of Most in northern Bohemia; and it is being moved, along with the rest of the town, about 800 meters to the south.

The building, dating from 1517, has a ground floor area of 1,800 square meters, including the peripheral chapels. Ten thousand tons of masonry are being moved on 53 special cars with hydraulic lifting cylinders; and the cars will move on four railroad tracks. The entire caravan will travel at a speed of up to three centimeters per minute.

At 3 cm. a minute it takes 444½ hours to move a church 800 meters



Slow down, Toronto!

The 45-ft. height "limit" on new construction in the City of Toronto is on every architect's mind here. Most don't like it at all. The regulation overriding existing zoning laws was instituted by David Crombie soon after he became Toronto's mayor in 1972. It refers all building projects of more than the maximum height to the City Council where each case is decided on its own merits.

Developers grumble that the new rule is too much trouble to deal with. So they are going out to the other boroughs that make up Metro Toronto and building their towers there. Architects complain because it means less work and because the Council decisions are not being made in terms of a comprehensive urban design plan. Others say the process is fueling land speculation against the time when the present law is rescinded.

But citizens of Toronto seem truly alarmed by the number of new towers that have been built in their city. They are unhappy with the effect the skyscrapers have on life in the downtown: public spaces in shadow much of the day, whirlwinds generated by the towers and loss of the small shops that have been replaced by banks and empty lobbies. That is why, beginning in 1970, individuals campaigning on an anti-development platform have been decisively elected to the City Council. In 1972, an apparent majority of such "radicals," as they are called, was elected and Crombie, an alderman who often voted with them during the first term, became mayor.

John Sewell, a lawyer and community organizer, was one of the two anti-development aldermen elected in 1970. Now considered the leader of this group, he is also dissatisfied with the mayor's procedure. Taking a position contrary to that of the developers and architects, Sewell sees the height limitation as a token action, "a sieve through which most projects pass anyway." His position is firmly against any further growth at all in the city, especially "offices to be occupied by foreign corporations." The largest new towers in Toronto tend to fall into that category. Because the Province of Ontario, whose highest officials are pro-development, has more power than the City Council to regulate urban growth, the alderman is not optimistic.

Sewell is not entirely anti-building but wants to see Toronto's present low-density urban fabric strengthened through in-fill housing and rehabilitation of existing commercial space. He has been concerned by the effect on established lower-class neighborhoods whose real estate prices have been driven up by young professional-class families, called "white-painters," who renovate the older houses, usually painting them white.

To encourage low-income families to stay, he is sponsoring two projects by architects Diamond and Myers to rehab whole blocks of run-down houses into apartments, replacing the derelict ones among them with five-story subsidized flats and duplexes. A. J. Diamond claims he can provide densities equal to the zoning maximums allowed for high-rise construction at rents that people already living in the neighborhood can afford. In a city that seems hell-bent to put everybody in a high-rise apartment, that's good news.—J.M.

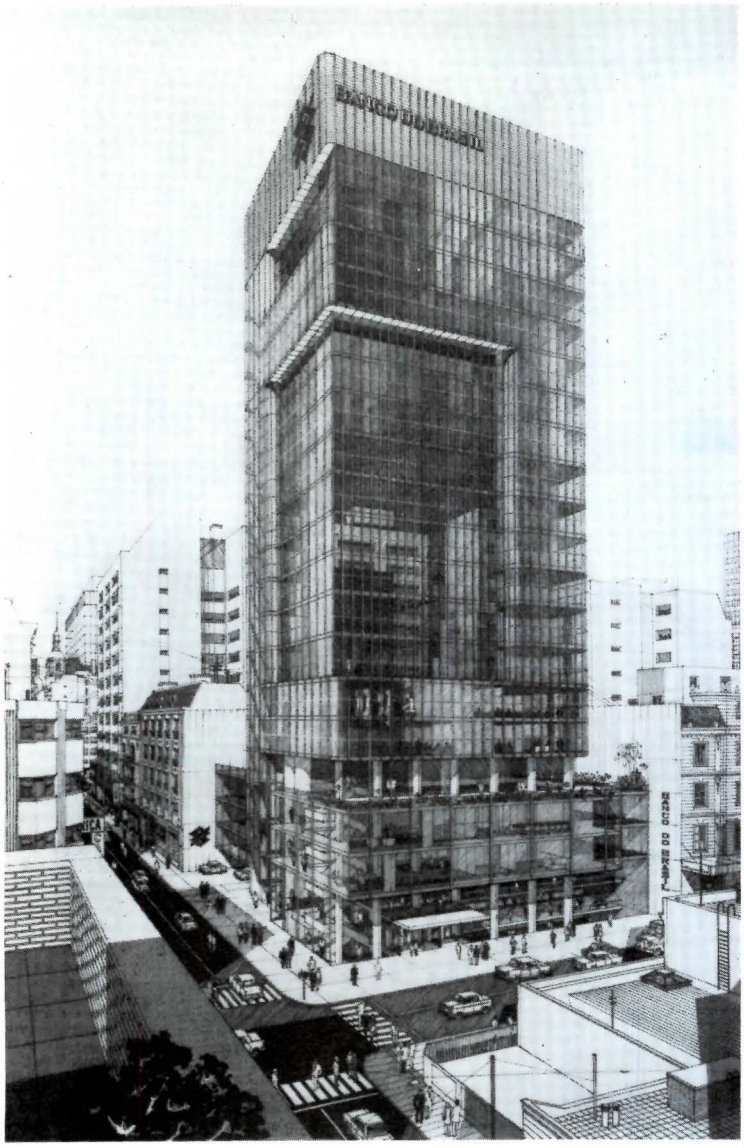
House of summer

A house made of shells sits by the Red Sea in southeastern Sinai. Built by nomads at the beginning of summer as a gathering place for the men, the house will be destroyed by the heavy rains and winds of winter, when the Bedouins will have gone into the mountains.

To build such a house, earth is mixed with water and camel droppings and the mixture becomes very hard in the sun, and holds the shells in place. The shells, washed up from the shore in great abundance each year, have seven finger-like projections along one side. This side is pushed into the "cement" before it hardens until the entire house is covered with shells.

Wood from nearby palm trees is used for supports and door framing. The roof is covered with dried palm leaves and sheets of canvas before the "cement" and shells are added. Bones of camels are used as decoration on the roof.

The summer tenants took special pains with this year's house, but they don't seem to mind that, come the rains, it will all wash, once more, into the sea.



Buenos Aires

Soon, in the center of Buenos Aires, they will start building a tall tower to house the central office of the Bank of Brazil. The architects Raúl Raña Veloso, Hernán Alvarez and Samuel Forster are in charge of the project and the technical management of the construction.

The 21-story tower will have a floor space totaling 20,700 sq. m. The basement will be formed of three "tray-shaped" floors, completely occupied by the offices of the bank and easily visible from the surrounding streets. By means of bridges the public will gain access to the ground floor where they will find the section for current accounts. From this section a general view of the other floor will be obtained.

The second and third floor will be occupied by the distinct branches of finance, secretaries, managers and conference rooms.

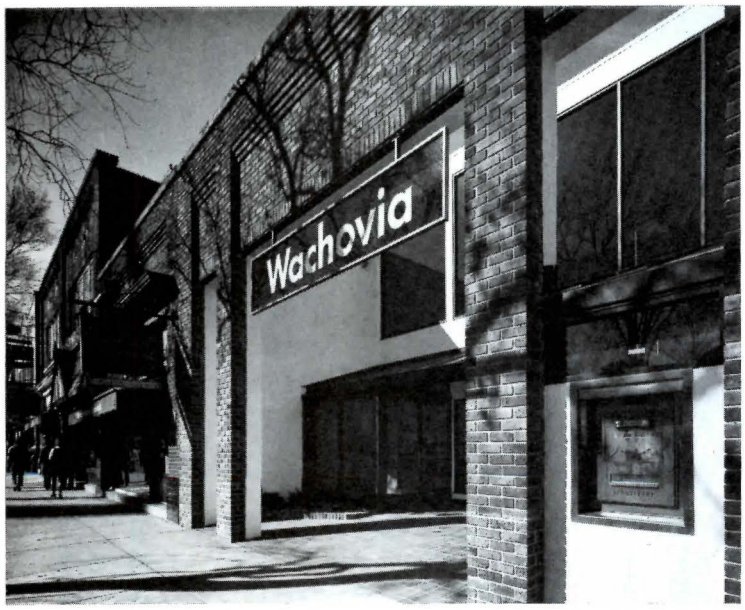
The fourth floor, the lines of which catch the eye immediately, will be the auditorium and the room for receptions and conferences. It will have direct access, not only from the lobby door but also from the vertical circulation of the tower so that these rooms can be used outside of banking hours. A vertical independent circulation with very steep stairs links the different floors and gives a visual expression of the bank's space integration. The rest of the tower will be used by commercial offices and "free trays" were proposed for a better adjustment to any kind of future division.

The columns were set back so that the configuration of a curtain wall facade might have rounded corners. The curtain wall itself is designed to read as a continuous glazed sheet.—L.A.

Max's universe

The "Smiling Sage" looks on as the "Cosmic Jumper" runs through the space people's universe. American artist Peter Max has created this colorful postage stamp using his now-familiar characters to commemorate Expo 74, the world's fair just opened on May 4 in Spokane, Washington. The post office plans to print 250 million of these stamps. That, it must be conceded, is a lot of Max.

Peter Max is also busy creating a very special museum in New York's Times Square in the Allied Chemical Tower, formerly the New York Times Building which gave the square its name. Each floor will demonstrate another aspect of American life.



Recycling

A small but skillful conversion in Chapel Hill, North Carolina, is a new branch bank for the Wachovia Bank and Trust Company. In some respects it is unnecessarily complicated and fashionably angular, but its great strength is the contrast between recessed new construction and the fine exterior shell of old brickwork. The character of the row of existing shopfronts was carefully respected and, in fact, with its square-headed arches now open, the building has probably never looked better. Architects were John D. Latimer & Associates of Durham, N.C., and the associated architect for design was Roger H. Clark of Raleigh.—S.A.

Double-decker comeback

Four British-built, double-decker buses, somewhat larger than the red ones now serving London, are going to be put into trial service in New York City by the end of this year. Present plans call for the two-level buses to be tested on the express routes carrying commuters into Manhattan during rush hours.

New Yorkers over thirty will greet the buses with nostalgia. Double-deckers, some of them open-air on top, replaced horses in 1907 and carried enthusiastic travelers all over town until 1953 when the high labor cost of having two crewmen (one to drive and the other to collect fares) put them to pasture along with the horses.

The new buses will be designed for one-man operation and have 70 seats each compared to 45 or 49 on present conventional buses. According to the British Leyland Company who manufacture the London buses, and who will produce the New York four, fuel consumption in the double-deckers is at least twice as good as the buses now in operation in New York.

At the same time as the New York experiment, two other double-deckers, manufactured by the Neo-Plan Corporation of West Germany, will be tested in Los Angeles.

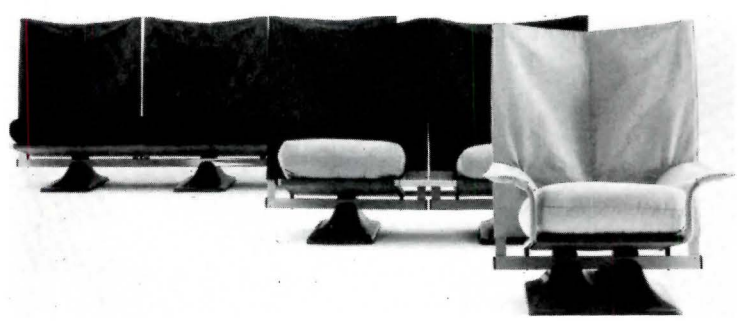
The six imported buses and whatever research studies accompany the trial runs are being financed by a grant of more than $1 million from the U.S. Dept. of Transportation. European buses were selected for both cities because no U.S. companies were equipped to build double-deckers.

Archizoom's AEO

Printed materials for Italian manufacturer Cassina's latest chair include a comic strip poster. Designed by Archizoom, a Florence-based group, the AEO has neither clean lines nor a slick form—but it is revolutionary.

AEO has only three parts: a plastic base, a metal frame for the seat and back, and a slipcover. The seat and back frames lock into the base without screws and the chair is completely knocked down. A fabric envelope slips over the back frame and endows AEO with a grey flannel or chintz personality. It works well alone or in linear or circular configuration.—Suzanne Slesin.

Suzanne Slesin is a free-lance writer on design.



Water power at Salto Grande

Plans for a huge water power complex at Salto Grande on the Uruguay River, natural boundary between the Argentine and Uruguay Republics, are being developed with great intensity. A Mixed Technical Commission with experts from both countries has been formed to proceed with plans for all stages of the work. The entire project has been designed by architects Mario Roberto Alvarez & Associates, in cooperation with Uruguayan technicians.

The energy potential of the Uruguay River at Salto Grande and Salto Chico Springs has long been known. In 1946 Argentina and Uruguay signed an agreement for a Mixed Commission to begin studies. In 1960 an advisory team did feasibility studies to fix the location of the dam.

The complex will have the capability to produce 1,620 megawatts, comparable to the Argentine El Chocon Cerros Colorados, a power project built recently in Neuquen. The new dam will produce 6,000 million kwh annually, almost a third of the annual electric output of Argentina. Funds will come from public and private sectors in Argentina. Uruguay will contribute $5 million a year during the construction term.

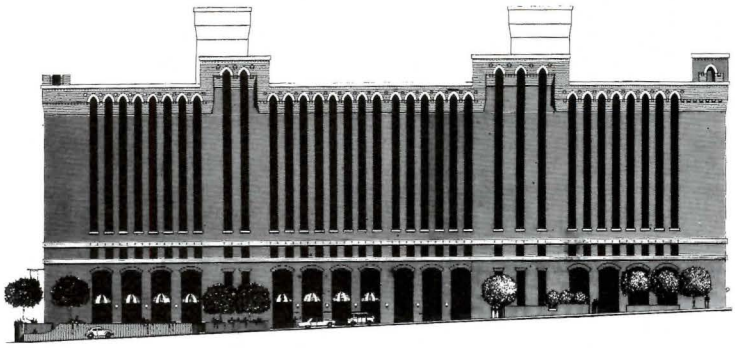
The water works include a navigation channel on the right hand of the Uruguay River, with weirs at Ayui and Salto Chico, an International Bridge 8.30 meters wide, with a railway and two pedestrian paths.

The entire project will cover 78.300 hectares, reaching 144 kms. up the river to Monte Caseros. The Uruguay River is going to be dammed at Ayui, 14 kms. from Salto, in the Uruguay Republic, and 17 kms. from Concordia in the Republic of Argentina.

The dam will regulate the flow during the summer when the water is highest. Two structures, one at each side of the river, will house machinery. Nineteen openings in 318 meters of length will allow 47,000 cubic meters of water per second to pass through. The navigation weir will be on Argentine territory.

Two generating units will be in service in August 1978; two more completed three months later, and the rest in March 1980.—L.A.

Rendering of Salto Grande dam on the Uruguay River



Butler Square reborn

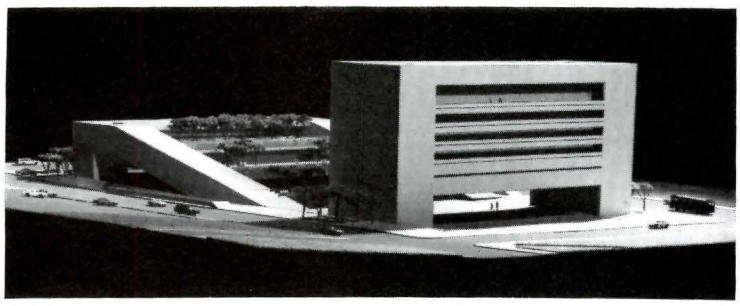
A 500,000-square foot warehouse in downtown Minneapolis, having stood empty and forlorn for ten years, is being recycled into an office building. The Butler Brothers Building in the heart of the city's garment district was designed in 1906 by Harry W. Jones, and was considered by a contemporary architecture critic to be one of the "most commanding" buildings in Minneapolis. The building is listed in the National Register of Historical Places, and is now called Butler Square.

The formidable exterior will remain unchanged except for the removal of the window spandrels at grade level to permit pedestrian access, and the installation of floor to ceiling glass in the offices.

The architects, Miller Hanson Westerbeck Inc., deciding that the massive, fortress-like exterior of the structure suggested an inward orientation, opened up the center to the sun. A nine-story atrium was created by ripping out the floors but leaving some of the columns and beams in place as a free-standing structure. The space will be covered over with a skylight.

The original structure is of heavy timbers, with 22-inch-square columns narrowing to eight inches on the top floor. Sunlight filtering through should give the atrium, lined with shops on lower floors, the character of a public square.

In order to preserve the original ceiling timbers, floors were raised to conceal cables and ducts. Much of the new detailing is being done with materials salvaged from the atrium demolition, a recycling gesture which will lend a certain integrity to the whole, and cannot fail to bring honors from preservationists *and* ecologists.



Colorado competition winner

The State of Colorado, for the first time in its history, has held a competition for a major public building, the State Judicial/Heritage Center Complex adjacent to the State Capitol in Denver. The competition, open to all Colorado architects, attracted 92 submissions, from which 19 firms were accepted for further review. Specific designs were then requested from six finalists: The ABR Partnership; Haller and Larson, Ltd., and Fisher, Reece and Johnson; Marvin Hatami and Associates and the Ken R. White Co.; Lusk and Wallace Associates and Johnson-Hopson Associates; Rogers-Nagel-Langhart (RNL, Inc.); and James Sudler Associates. The winner was Rogers-Nagel-Langhart.

The RNL scheme puts the judicial functions in a six-floor structure lifted 25 feet above grade over a clear span of 160 feet. The span is to be framed on steel trusses the full height of the lowest floor. Heritage Center functions (including the headquarters of the State Historical Society) will be in a low, terraced building easily visible and accessible, beneath the judicial building, from the Civic Center Park.

The jury consisted of 3 architects (Pietro Belluschi, Portland; Karel Yasko, Washington; and Charles Blessing, Detroit), the Director of the Colorado Heritage Center, and the Chief Justice of the Colorado Supreme Court. The entry by Lusk and Wallace Associates and Johnson-Hopson Associates was named first runner-up, and the entry by Marvin Hatami and Associates and the Ken R. White Co. was second runner-up. Professional Advisor was James M. Hunter of Boulder.—S.A.

To the partisans

Yugoslavia lost one-tenth of her population during the Second World War. Many of the bloody battles of that war took place in the beautiful mountain region in the northern part of Bosnia. This entire part of Yugoslavia is now a national park.

This monument to the partisans who died is by Yugoslav sculptor Dusan Dzamonja, who considers it to be the most significant of his creations. The recently completed memorial, a very strong statement in concrete and steel 34.16 meters high, is situated on a high mountain in Kozara near Croatia.

Second City's Center

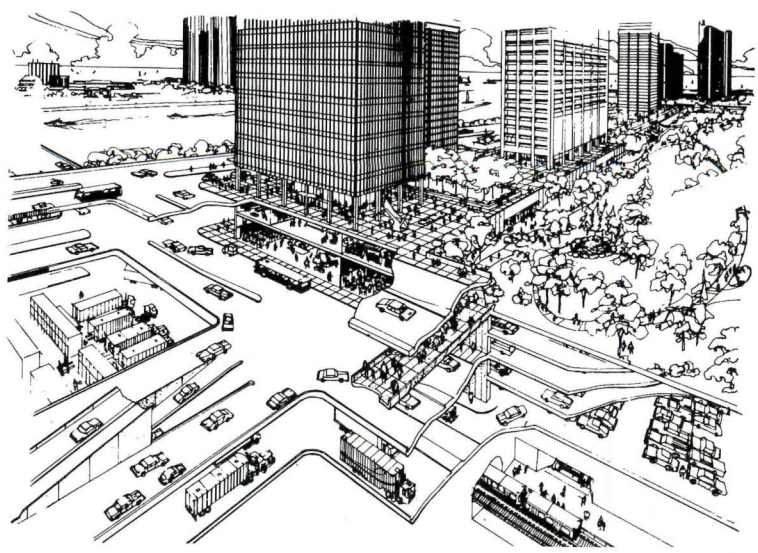
The Office of Mies van der Rohe, in a joint venture with Solomon Cordwell Buenz, has prepared the master plan for the 83-acre, commercial / residential / recreational project, known as the Illinois Central Air Rights Development presently rising along the Chicago River and lakefront. The finished project —Illinois Center (of which five buildings are now completed)— will include 9 million sq. ft. of office space, 14,000 residential units, 4,500 hotel rooms, and 1.25 million sq. ft. of retail space.

Currently under construction is the "infrastructure," a basic four-level substructure that will connect the buildings of Illinois Center. The "infrastructure" and two of the buildings already completed (One and Two Illinois Center) have been designed by the group.

The base structure provides for three levels of vehicle traffic: the lower level for truck deliveries, the intermediary level for through traffic, and the top level for local traffic. A deeper level will accommodate subway and railroad connections, and a pedestrian concourse just below the top level.

Joseph Fujikawa, a long-time associate of the late Mies van der Rohe, is the Mies office's partner-in-charge of the vast $2 billion project. According to Fujikawa, "We can plug in any kind of tower into that base, whether it's an office building, an apartment building or whatever."

Multi-level base permits ¾ of the 83 acres to be parks and streets



continued on page 122

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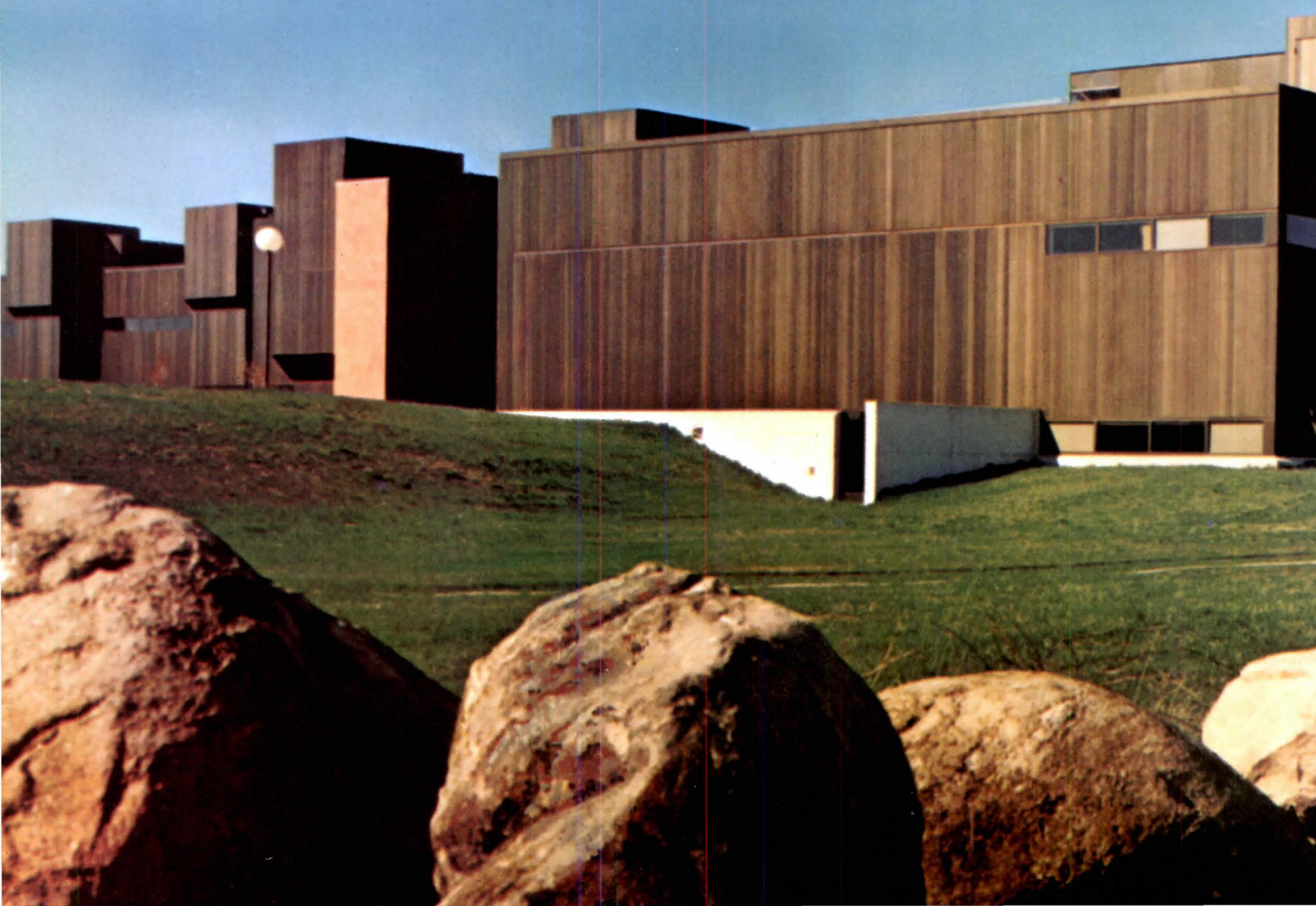

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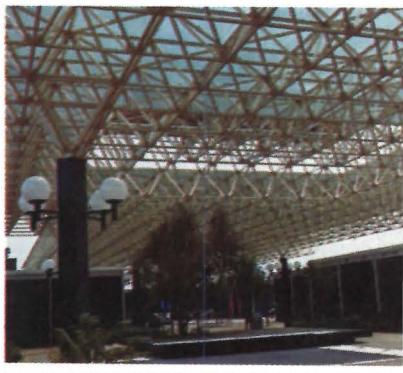

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1. *Entrance Canopy*
Mt. Bell Telephone & Telegraph Company
Phoenix, Arizona
Architect: Alfred Newman Beadle & Associates
Phoenix, Arizona

2. *Eastgate Square Shopping Mall*
Hamilton, Ontario
Architect: Petroff and Jeruzalski
Toronto, Ontario

3. *Canopy Structure for Office Complex*
University of California
Sacramento, California
Architect: Ian MacKinlay & Associates
Orinda, California

4.&5. *Franklin Park Mall*
Toledo, Ohio
Architect: Daverman Associates
Grand Rapids, Michigan

Inclined Wall
Century Properties Building
San Antonio, Texas
Architect: Neuhaus & Taylor
Houston, Texas

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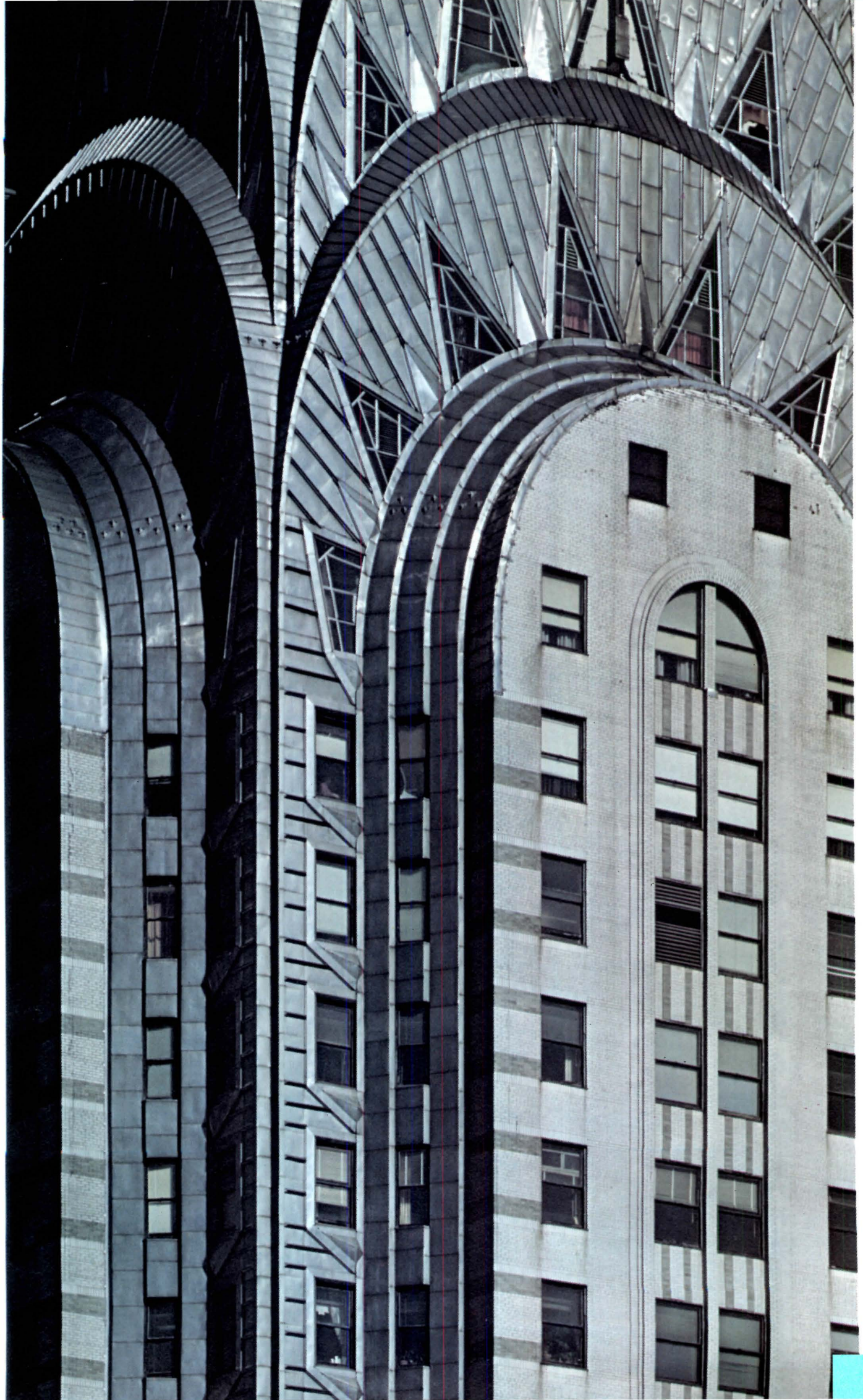


CHR_SLER

On skylines shaped by shabby boxes, this skyscraper is emerging as the business cathedral of the century

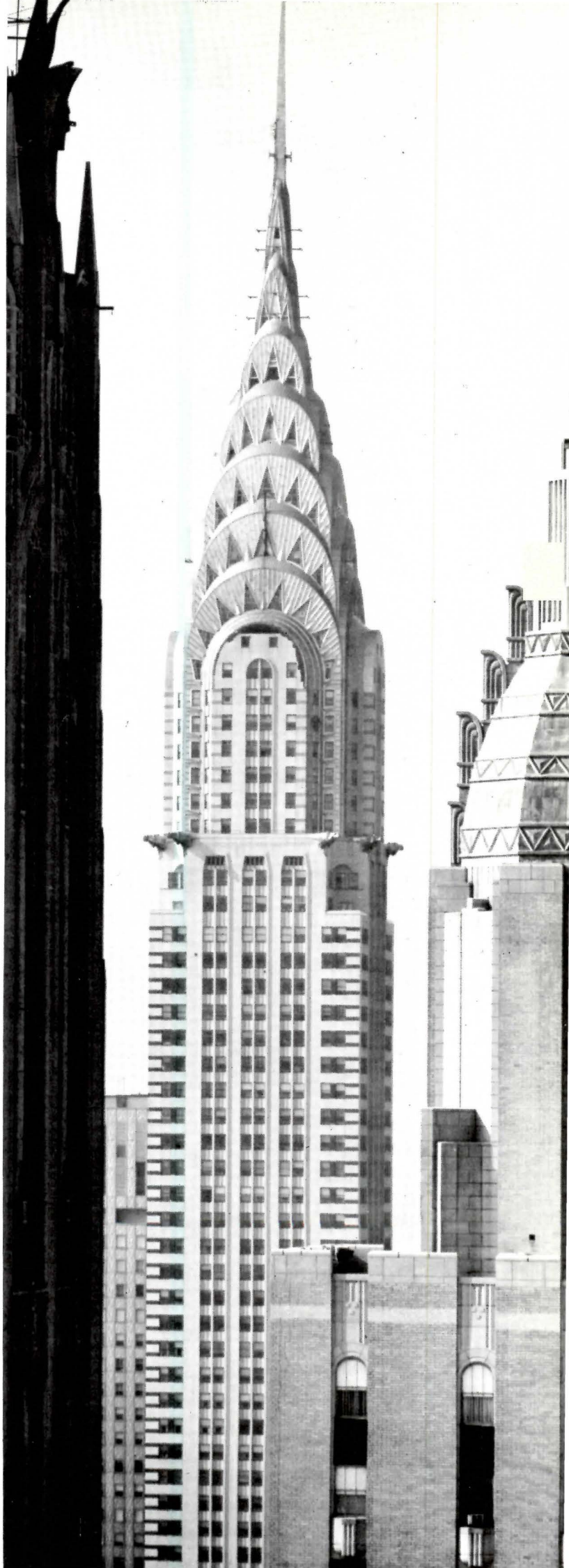
Text and photographs by Cervin Robinson

Had William Van Alen's Chrysler Building in Manhattan displayed less confidence in its particular modernism, the building might conceivably have found some place in the orthodox story of 20th century architecture. But, what with its crowning, temple-form gesture, no one could imagine it, even seen squinty-eyed and from a distance, as International Style. And so, both it and its designer were simply left out of accountings of this century's architecture. The Chrysler would, it is true, be hard to defend by the tenets of Modern architecture. It stands firmly on its base; has a major and minor axis; is sheathed in masonry and decorated. There is nothing innovative about its steel frame. In general massing, the building is not dissimilar to others built under a zoning law that required setbacks and allowed a tower on part of the building site.

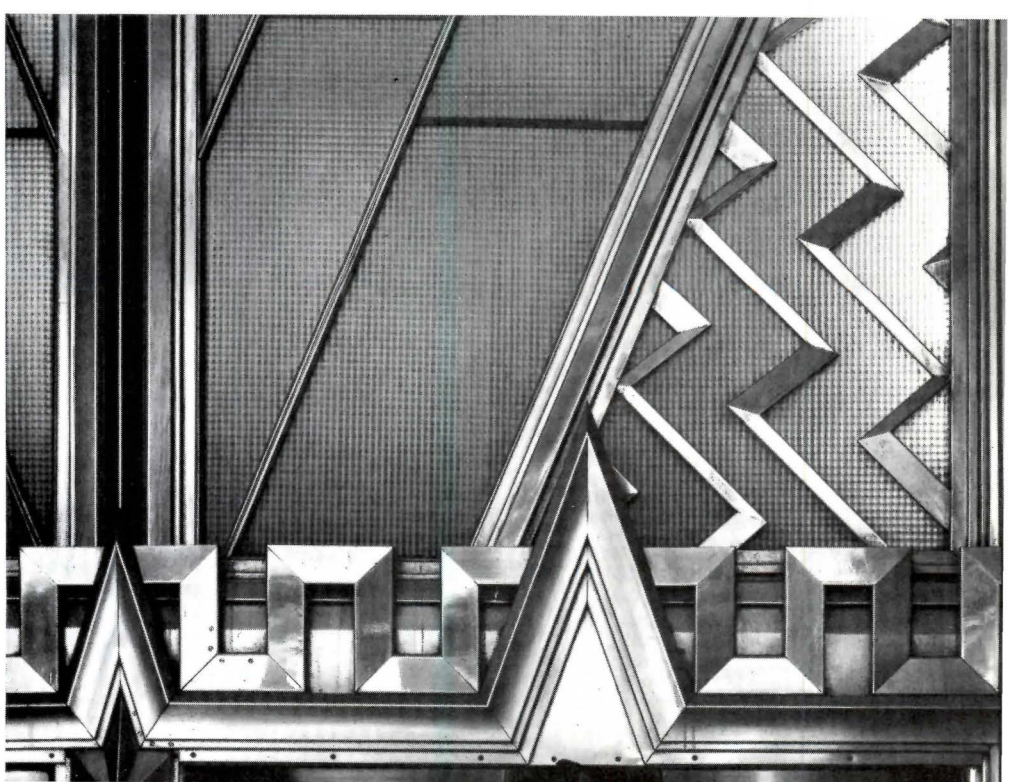
Inside, the building has ground-floor and basement shops and restaurants and an entrance from its basement to the IRT Subway station at Grand Central. Above, it is mostly offices. When newly completed the building was furnished throughout with "office partitions of steel made up in interchangeable sections. Steel panels [were] packed with sound-proofing material and provisions made inside for carrying of wiring for telephone extensions, buzzer systems, electric outlets, etc." Was Van Alen the father of the demountable partition? No, these partitions were a Hauserman product that had been introduced back in 1920 and was intended for factories (one that was later to be used in the Empire State and RCA Buildings). Of these partitions in the Chrysler perhaps the most one can say is that Van Alen's use of them in a prestige office building was something of an innovation.

The building also had gargoyles, non-functional ones at that, and, more surprisingly, a frieze of hub caps and mudguards. It was this frieze which in the Pop '60s made us look at the Chrysler once again. In the teens and early twenties Van Alen, a Pratt graduate who had won a Paris Prize to the École des Beaux-Arts, designed a series of steel-framed buildings in New York City, some eight of which are extant. In 1927 he started on the building we know as the Chrysler for a William H. Reynolds, who liked being known as a former senator. He had been a state senator for one term many years before but was primarily a real estate and theatrical promoter. In the instance of the building to be built at Lexington Avenue and 42nd Street, Reynolds engaged Van Alen to prepare plans for a Reynolds Building. He then sold the lease and plans to Walter Chrysler. Van Alen was retained as architect. He lowered the building somewhat and altered the 30th-floor frieze to include the hub caps and mudguards. This particular level of the building received special attention since it was intended that the splayed corners here overcome an optical effect from which set-back buildings with horizontally striped towers suffered in that the tops of their towers appeared larger than their bases. The splay was something apparently suggested by Arthur Loomis Harmon's highly-regarded Shelton Hotel up Lexington Avenue. The Reynolds Building had had, like the Shelton, zigzags and turrets at this level where the Chrysler has mudguards and radiator caps. With the passing of ownership

Cervin Robinson, historian, writer, photographer, has completed with Rosemarie Bletter a book on the Modernistic architecture of the 1920s and '30s in New York City to be published by Oxford University Press.



Previous page: the Chrysler, 1928-1930, seen from the north between Cross & Cross's RCA Victor (now GE) Building and a tower of Schultze & Weaver's Waldorf Astoria, both of 1930-31. Left: at the base of its tower the Chrysler's profile widens for optical reasons to the 30th-story service floor which is embellished with a frieze of mudguards and hub caps. The building beyond (with visible entasis in its terminal screen) is Raymond Hood's News Building, 1929-30. This page: the Chrysler's Lexington Avenue (west) entrance illuminated and a detail of the metalwork of its screen.

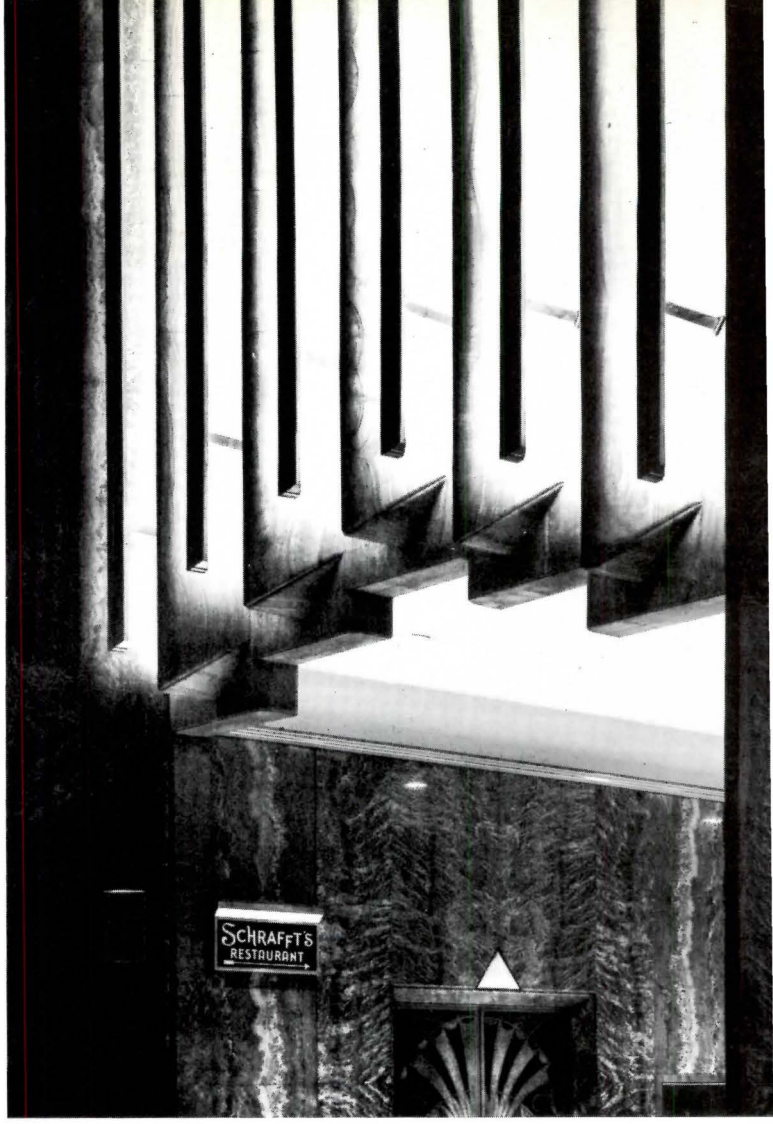


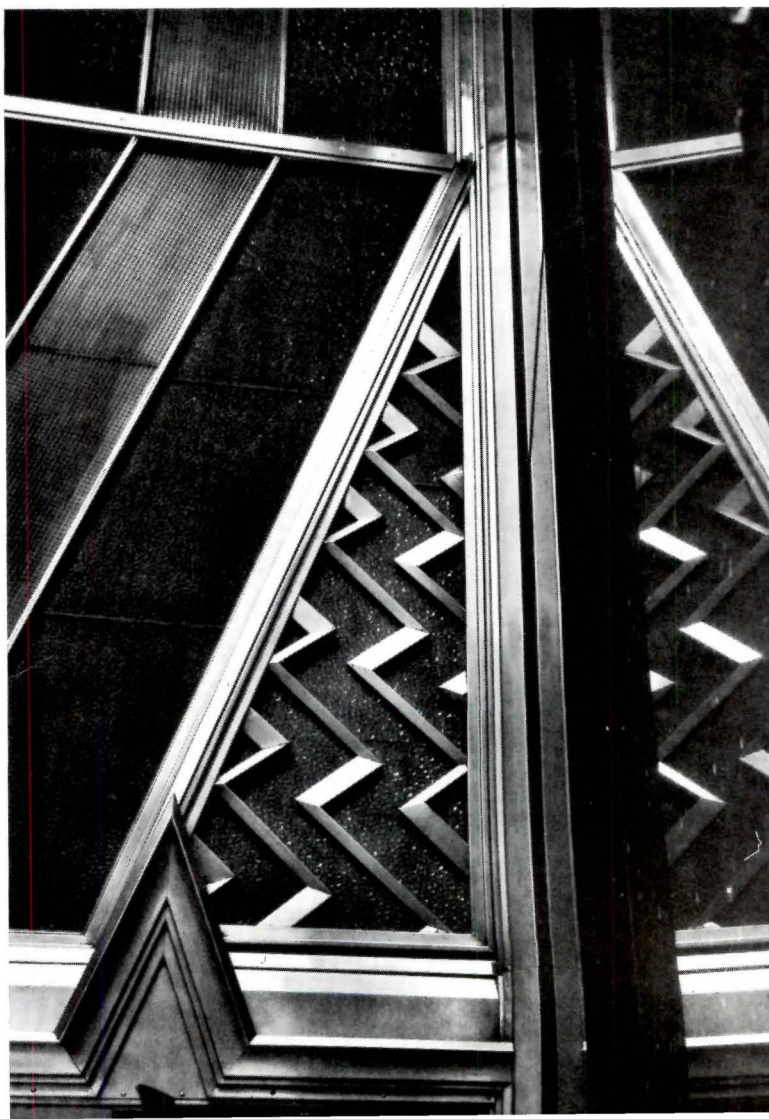
Right and opposite page: coved cold-cathode lighting above an elevator lobby, three of the four varieties of elevator cabs in the building, and an elevator door. Both cabs and door have inlaid wood veneers. Below: a detail of the 42nd Street (south) entrance screen which, though missing its crenelation (see previous page), retains its original variety of textured glass. (Even the spandrels were to have been of "relief glass" in the original Reynolds scheme.)

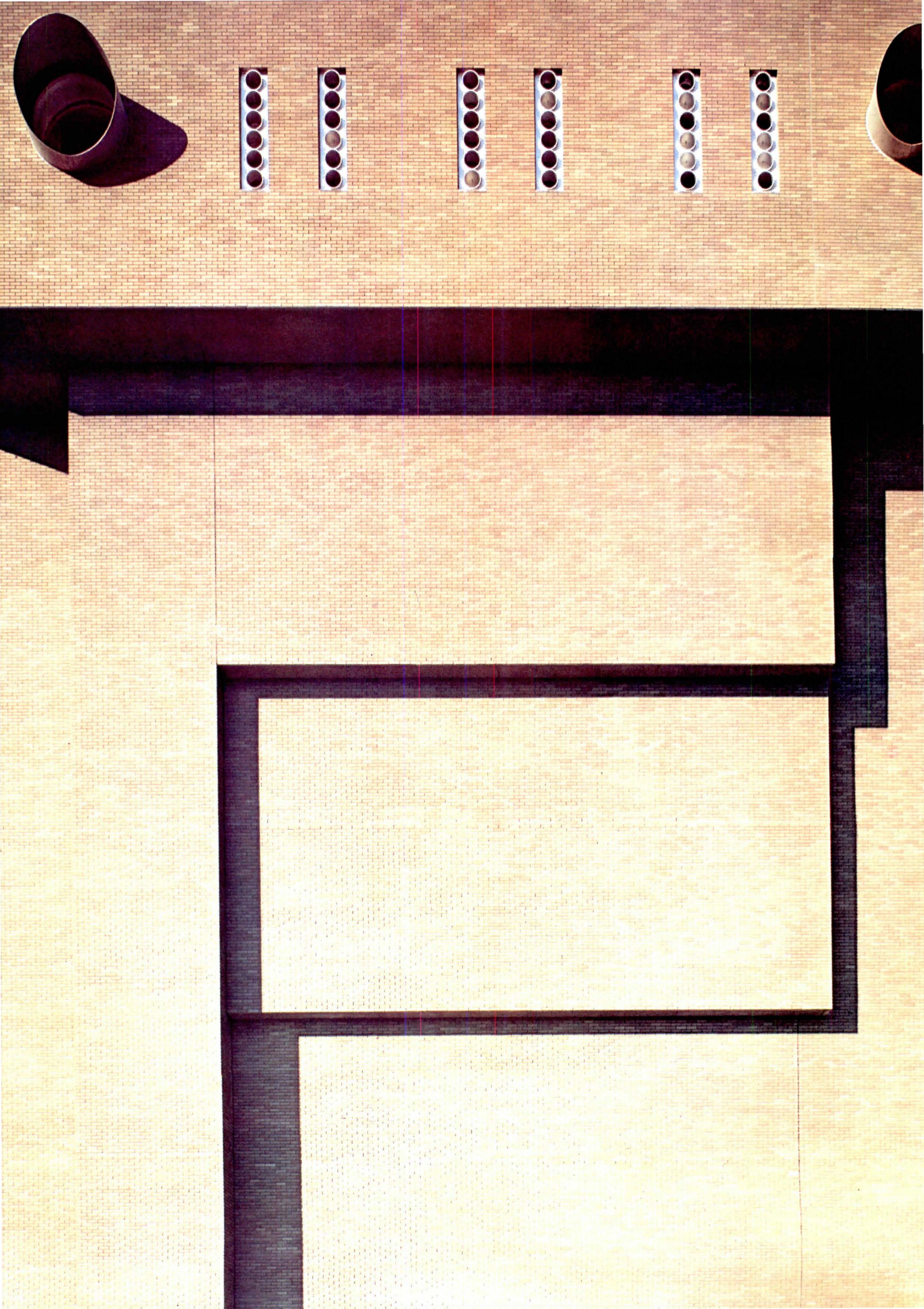
to Chrysler, Van Alen also changed the building's top from what was originally to have been a glass dome illuminated from within (it was to have had "the effect of a great jeweled sphere") to the motif we know.

The New York architect looking for a modernist style for the skyscrapers called for in a building boom that began in 1925 (and lasted into 1931) would have been exposed since 1922 to a considerable amount of European modernism, most of which we would now classify as Expressionist. The Modernistic is popularly assumed to have come to America from the 1925 Paris *Exposition International des Arts Décoratifs et Industriels Modernes.* Actually the role of that French Exposition here was to give Americans, trained under the Beaux-Arts system, license to turn to a variety of modernist tendencies that had been for some time in the offing. The New York Modernistic architects seem also to have absorbed 19th-century German theory that the proper form for walls was a woven one (the walls of the Chrysler below its first setback were described by a contemporary as suggesting "the interlacing of a basket-weave"). This theory had apparently reached New York by way of Chicago along with the skeleton frame. Another influence on the Modernistic was the theater, an art whose dominance in the twenties it is hard for us to imagine today. The entrances to the Chrysler Building are in proscenium-form and contain screens of glass and metal in fabric patterns. (The Lexington Avenue entrance has lost some of its original textured glass but retains, above the revolving doors, a strip of metal crenelation minus the black glass it once held.) Inside, above the ground-floor elevator lobbies, coved lighting appears in the form of raised curtains. "As it is a commercial proposition, embodying the emblazonment of automotive progress," wrote Kenneth Murchison, "why should the architect have hesitated a moment in being the Ziegfeld of his profession . . ." The Modernistic was also at this point a craft style, and this is evident from the wood veneers of the elevator doors and cabs. The building may be unique in New York in having all its original elevator cabs intact.

The Chrysler was completed in 1930 when Van Alen was 48, and with it, thanks to the Depression and the War that followed it, his career was substantially over. One hears of plans for prefabricated housing in the 1930s; during the war he taught. He died in 1954. Architects of the twenties had been trained to build monumental, ceremonial buildings for the rich. They found themselves designing rental space. "If the question be asked, 'What is architecture in this country today?' " wrote Edwin Avery Park in 1927, "one can only answer it is not what it once was. It certainly is not what it was, say ten years ago. Times have changed and many architects heave sighs. There is no more fun in the game . . ." In this country Van Alen is remarkable in that he did make architecture look like fun (and not only by dressing up as his Chrysler for a Beaux-Arts Ball). To his contemporaries he was clever, and cleverness was a special thing in the twenties. " 'Well, how do you like it?' " an architect was reported (at the end of an article on Van Alen) to have been asked of a Van Alen building. " 'How I *don't* like it is what you mean,' he asserted; but answered: 'Van Alen's stuff is so darned clever that I don't know whether to *admire* it or *hate* it.' "



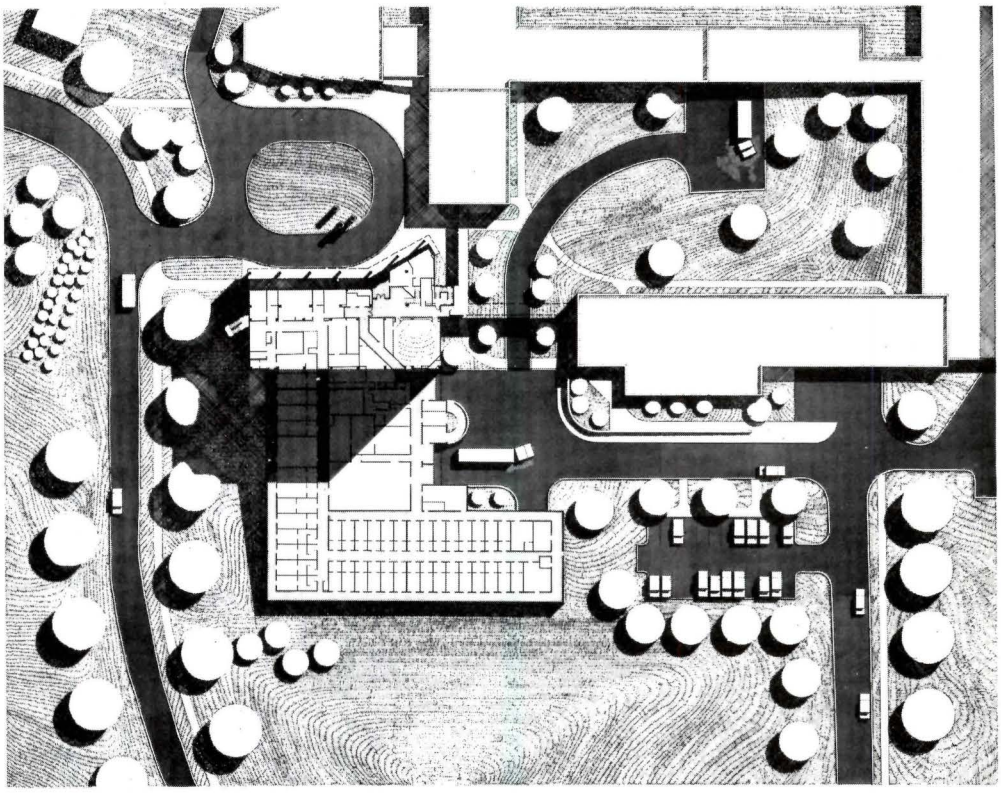




MULTI-CAT

Veterinary lab is a successful marriage of architectural intent and engineering skill

Detail of Multi-cat's south façade shows stainless steel "nostrils" exhausting air close to roof level. The large "nostrils" exhaust the separate zones of the general airconditioning system; the small ones exhaust air from laboratory fume hoods. The hard-surfaced brick is grey-brown in color, and the mortar is stained a dark grey. Site plan (top right) shows the new building in relation to the existing College of Veterinary Medicine.



SITE PLAN

The Multi-categorical Research Laboratory at the College of Veterinary Medicine, Cornell University, Ithaca, N.Y.—or Multi-cat for short—is one of Ulrich Franzen's most recently completed buildings. Like his earlier research labs, Multi-cat reflects three concerns that are difficult to pursue individually, and often impossible to resolve jointly: first, some very complex requirements in mechanical engineering; second, an architectural form appropriate to function and to site; and, third, a relationship, visual as well as organic, to existing buildings, near and far.

At Multi-cat, Ulrich Franzen & Associates resolved the first two of these problems with impressive skill, and would have resolved the third if the client had not reduced the program.

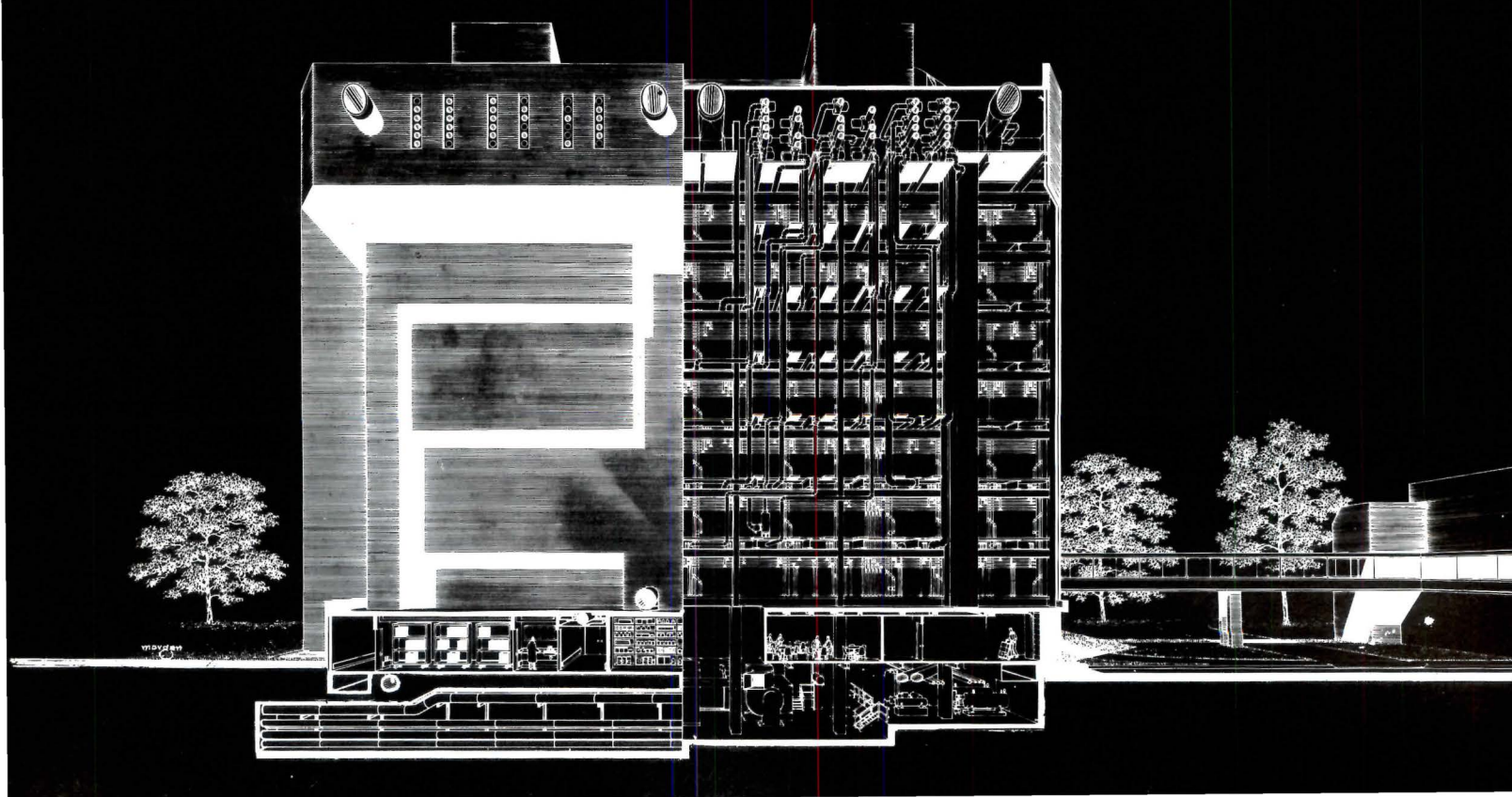
Schematically, Multi-cat is two slabs: a vertical slab of offices and labs, 11 stories high (including basement and mechanical penthouse); and a horizontal slab that extends to the south at ground floor level, and contains what is known as the Laboratory Animal Facility—a place where animals are bred, fed, cleaned and otherwise prepared for use in research.

The key to the design of the vertical slab is the north-south section through it. To the north (the approach) side of the vertical slab, there stand three air-intake "snorkels," more than 20 ft. tall. This is the windward side of the building, and it was determined that the principal air-intakes for the mechanical systems should be here, facing the prevailing winds. The fresh air is then drawn into the mechanical equipment areas located in the basement, where it is chilled or heated. After that, the air is distributed to various areas of the building. And, finally, all used air is exhausted on the lee side of the building, at the highest possible point of the vertical slab, and directed horizontally (through the multiple nostrils visible at left) in a downwind direction.

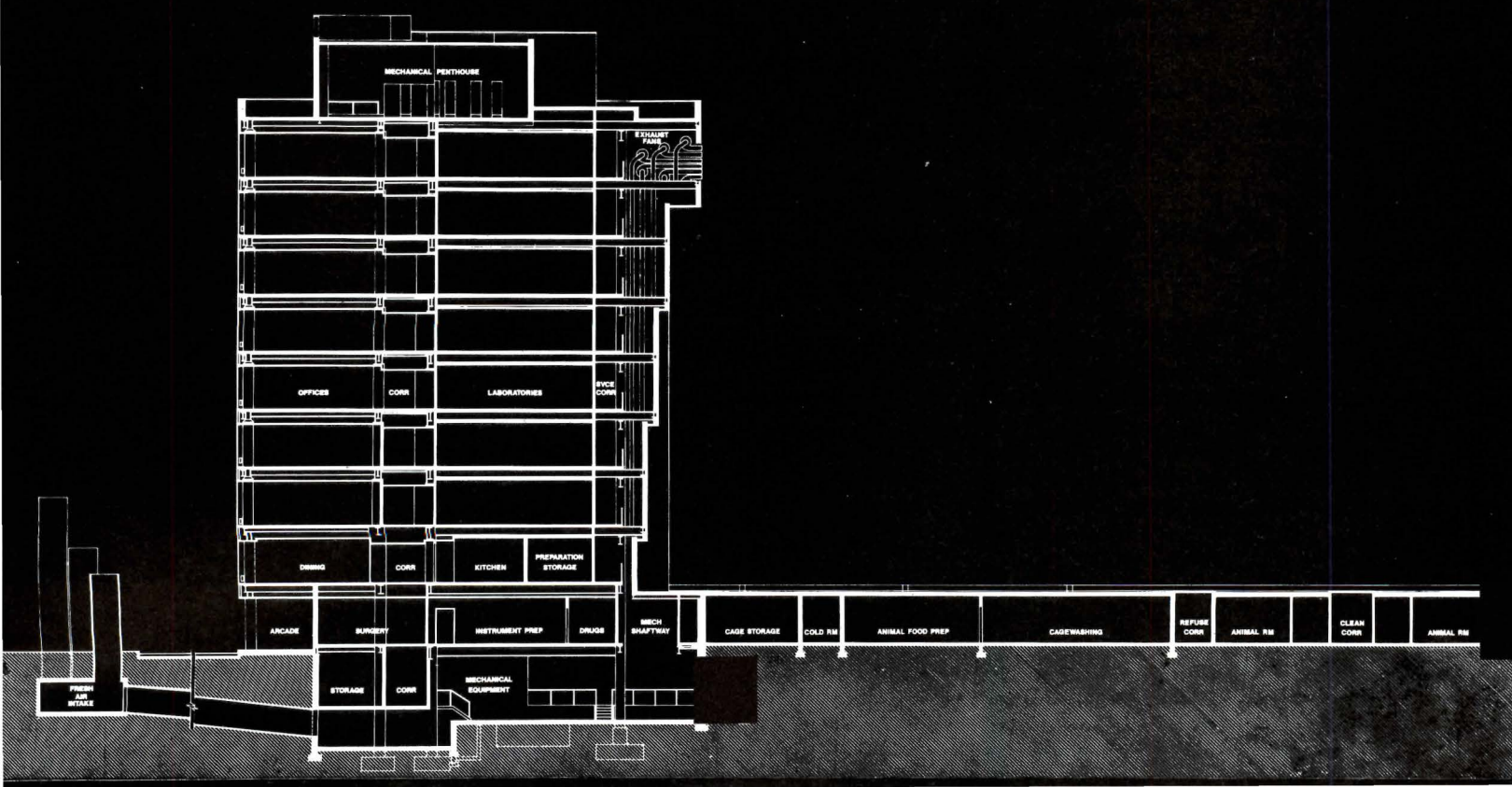
In short, the building literally inhales on its windward side, and exhales on its leeward side. It is an impressive and very expressive organism of brick and glass.

Unlike Franzen's Agronomy Tower for the same campus (see *Architectural Forum*, July/August 1968 issue), which had laboratories along both sides of a double-loaded corridor, Multi-cat has offices and

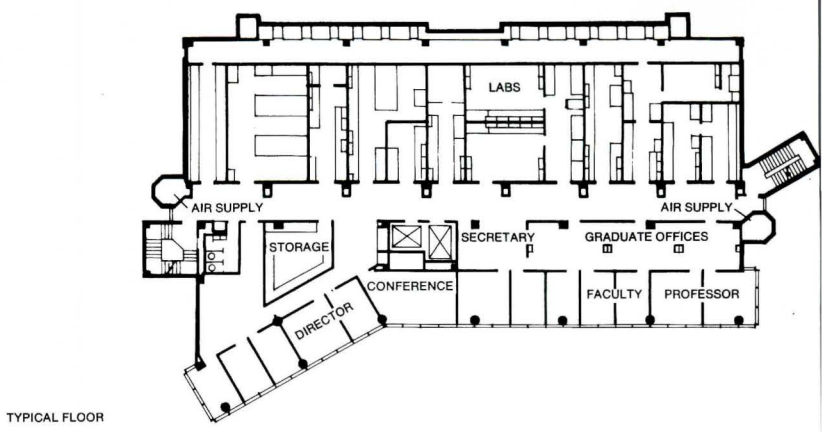
Brick face of building is symmetrical, with stainless steel nostrils near the roof line. Modulation of the brick wall expresses the path of the ascending exhaust ducts. Cut-away elevation/section (below) explains the mechanical system. The one-story wing extending from the tower contains breeding, feeding, and cleaning facilities for the animals used in laboratory research.



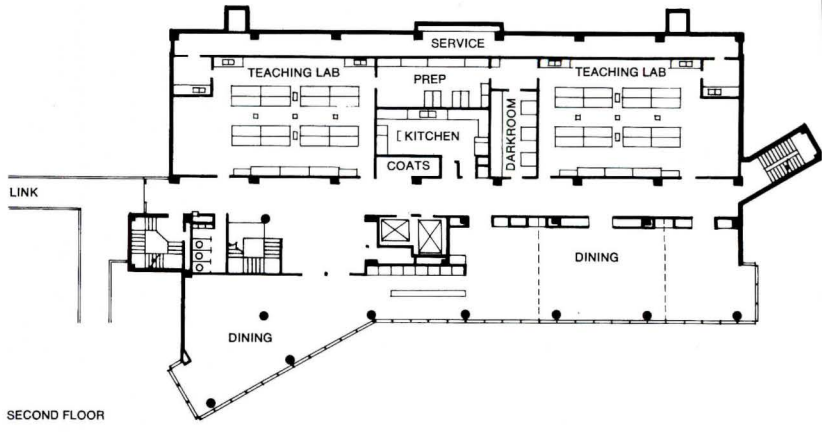
Glass face of building is angled to complete the enclosure of the approach drive at the east end of Tower Road. Three tall "snorkels" are air intakes on the windward side of the new tower. They are painted a bright vermilion. The glass is tinted grey. The north/south section through the building (below) explains the air-intake and exhaust cycle around which Multi-cat was planned.



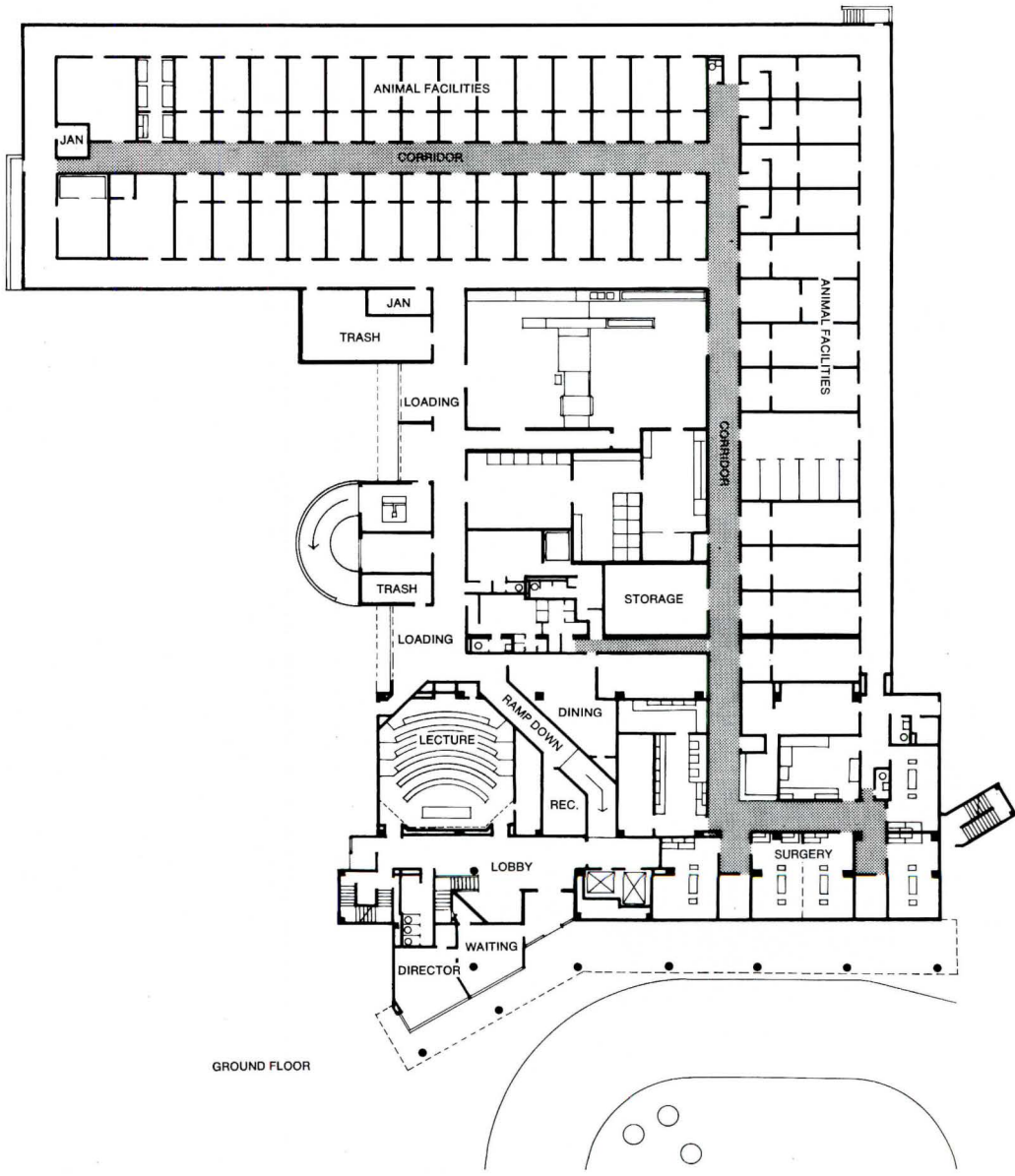
Plans at near right show (from top down) a typical lab-and-office/classroom floor; the second floor of the tower, with its cafeteria and other communal spaces (and the as-yet-unbuilt connections to existing buildings nearby); and the ground floor with the Animal Facility to the south. Photos on opposite page show first and second floor spaces, including a view west from the cafeteria, down Tower Road, with the silhouette of Franzen's earlier Agronomy Building visible in the distance.



TYPICAL FLOOR



SECOND FLOOR



GROUND FLOOR

classrooms along the north side of its central corridor, and labs along its south side. As in the earlier Agronomy Tower, the labs are windowless, so that the exterior wall becomes, in effect, one continuous service shaft, filled with all the necessary cables, pipes and ducts, and culminating in the battery of exhausts below the roof-parapet.

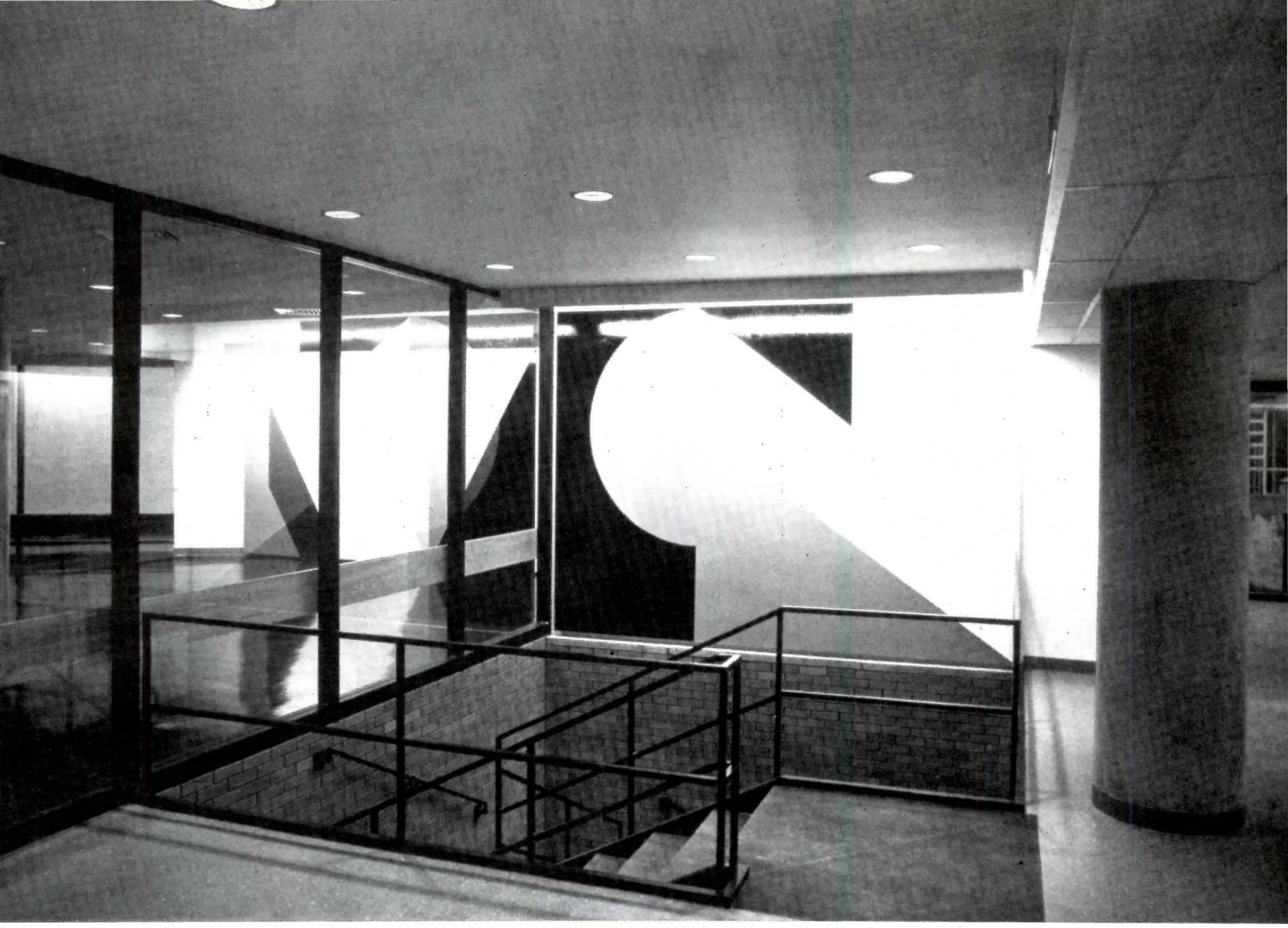
The exterior expression of this simple, organizational idea is quite direct: the north side of the building, which contains offices and classrooms, is all grey-tinted glass in a simple aluminum frame; whereas the south side of the slab, which contains only laboratories, is all brick (grey-brown colored, hard-surfaced, with darkly stained mortar joints). Behind the brick face is the service shaft filled with exhaust ducts; and the brick wall is modulated to express the ascent of these exhausts.

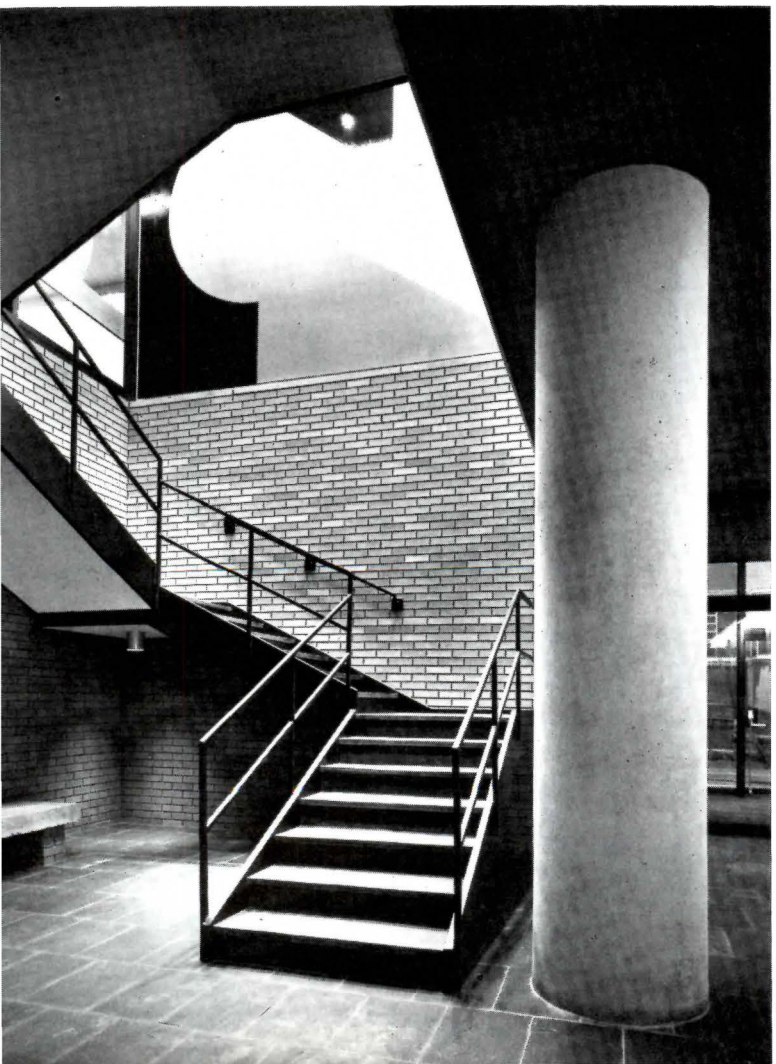
So the mechanical innards and the various uses of the building are expressed with great strength and directness in Multicat's overall form. Some of the off-beat angles of the building are attempts to relate the new structure to its existing surroundings: the break in the glass façade, for example, relates the vertical slab to the existing approach drive and to the older, nearby buildings of the Veterinary College. And the placement of the building and its various attachments makes it the visual terminus of Tower Road, the University's major East-West connector.

All of this is eminently successful—so successful, in fact, that one is amazed at the architectural gymnastics indulged in by some of Franzen's contemporaries, particularly in buildings that have nowhere near the functional complexity of this one.

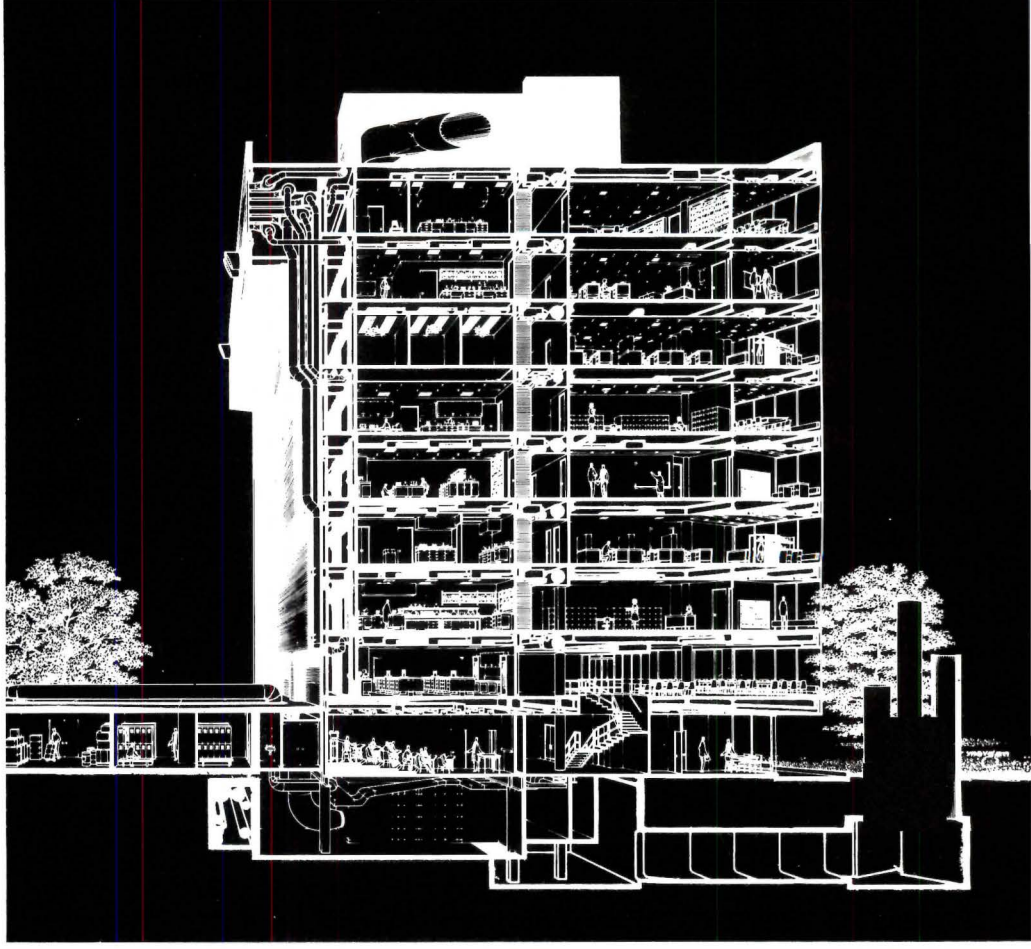
Unfortunately, one of the architects' most significant contributions made in this project remains unbuilt to date.

In studying the site and the existing Veterinary College, the architects found that the principal pedestrian level of the older complex was, in fact, at an elevation about one floor higher than the level of the approach drive. So they planned their new building with an enclosed, connecting bridge, at second floor level, to the older complex next door. Further, they placed many of the communal facilities (cafeteria, etc.) onto the second floor level of their new tower, so as to make these directly accessible from the pedestrian level of the





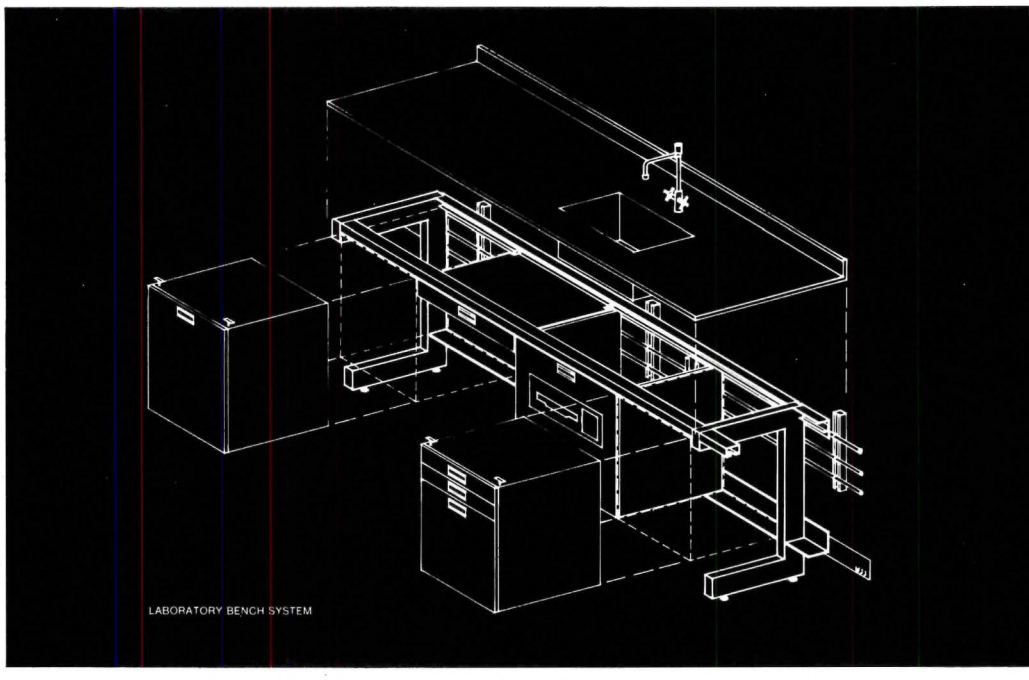
The cutaway section at right is a further explanation of the mechanical systems that have helped shape this building—and which, in turn, have been shaped by the architects. (These beautiful drawings were done in the architects' offices.) Drawings and photo at bottom of page are of typical, architect-designed laboratory benches, using a U-shaped steel frame for support, with storage units interchangeably suspended below the bench top. The photo on the facing page is a detail of the grey-tinted glass wall, with its changing reflections.

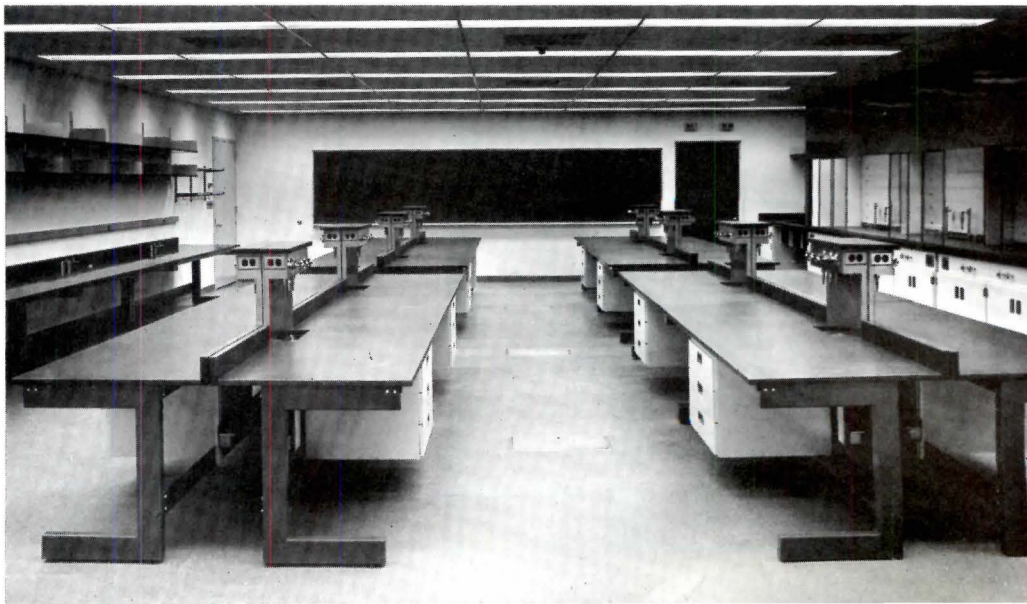


older complex. And, finally, they envisaged the roof of their horizontal slab as an extension of that same pedestrian level into a paved and planted terrace, equally accessible to all students of the Veterinary College.

This was a really significant contribution to planning philosophy on a campus that is congested with automobiles at ground level, and difficult for pedestrians to traverse during the harsh winter months. Fortunately, there is nothing about the initial portions of Multi-cat to prevent the completion of Franzen's plan, and one hopes that the authorities in charge will hasten to complete it.

In visiting Multi-cat, one discovers very quickly that, consciously or not, some very amusing imagery began to emerge as the architects developed their design. For this building for animals is, of course, a very big and very nice animal itself: it inhales through three bright-red snorkels; it has two faces—one glass, the other brick; it has big shiny eyes and nostrils; and when its air exhausts are going full blast, the building sings a song, sounding a little like a team of huskies, tuning up. It is a very cheerful building, on a campus that can use some cheer.—PETER BLAKE





Facts and Figures

Multi-categorical & Laboratory Animal Research Wing, College of Veterinary Medicine, Cornell University, Ithaca, New York. Owner: New York State University Construction Fund. Architect: Ulrich Franzen & Associates. Associate in Charge: Edward Rosen. Project Architect: William Jacquette, Jr. SUCF Project Coordinator: Arthur Zeiger. Engineers: Aaron Zicherman & Associates (Coordinating); Aaron Garfinkel & Associates (Structural). Interior Designer: Ulrich Franzen & Associates. Consultants: Earl Walls Associates (Laboratory Design). Contractors: Stewart & Bennett, Inc. (General); A. J. Eckert, Inc. (Mechanical); T. H. Green, Inc. (Electrical); S. Blickman, Inc. (Laboratory furniture). Building Area: 148,000 gross sq. ft. Site Development (including utilities) $250,000. Construction Cost: $7,650,000. Furnishings: $180,000; Laboratory Equipment: $850,000.
Photographs: Norman McGrath, except first page: David Franzen.

WIND POWER

A fascinating combination of romance and technology, windmills are closer than ever to becoming practical power sources

by Marguerite Villecco

here are, indeed, few merrier spectacles than that of many windmills bickering together in a fresh breeze over a woody country; their halting alacrity of movement, their pleasant business, making bread all day long with uncouth gesticulation; their air, gigantically human, as of a creature half alive, put a spirit of romance into the tamest landscape." Robert Louis Stevenson's words of a century ago illustrate how windmills have captured the hearts and minds of people for thousands of years.

The Babylonian emperor Hammurabi used windmills to irrigate his lands in the 17th century B.C.; A 7th century Persian king so valued the skills of a windmill carpenter that he forgave him a large tax debt. Leonardo da Vinci sketched six-sailed windmills, and Cervantes sent his pathetic hero, Don Quixote, tilting after the windmills of his mind. Today, however, scientists, engineers, architects, entrepreneurs, universities and governments are chasing windmills. The energy crisis has suddenly made windmills look useful again, not to pump water or grind grain, but to generate electricity. The efficient new versions in metal and plastic resemble aircraft engines and eggbeaters more than Dutch postcards, but their concept remains a pleasant notion at a time when ecological harmony and natural preservation are important. Windmills seem to combine uniquely the romance and technology of this era.

The long-term promise of windmills, however, remains elusive and costly. Windmills are traditionally expensive to build and their power yield, like the wind that fuels them, is often intermittent. The wind is free, but capricious in strength and direction; efficient power generation seems always at least one step away. And, while we are learning more about the behavior of wind daily, it sometimes remains the mystery it was to A. A. Milne, who wrote in *Wind on the Hill,* "No one can tell me, nobody knows, where the wind comes from, where the wind goes."

Harnessing the wind

Electric power generation is a relatively new role for the windmill (perhaps more properly called a wind plant, wind generator or wind power system, though the windmill image and label persist). The first reported example was made in 1894 by the icebound Arctic explorer, Fridtjof Nansen. His rig drove a dynamo that charged batteries for an electric light in the polar wilderness, at a time when most major cities were still using gas and kerosene.

The operating concept of such units is quite simple. The wind turns a propeller or vane, which is attached to a shaft. The shaft rotates and, either directly or via a series of gears and couplings, spins the rotor of a power generator, which in turn feeds electrical current into a transmission line or storage unit for eventual consumption.

The windmill's propeller is its liveliest and most varying display, crucial to its aerodynamic performance. Traditional types of blades include the Dutch "four-arm" design, the American multi-blade fan still dotting the Great Plains landscape, and the sail design used extensively in many Mediterranean countries. The sail blades require reefing in high winds, but their slow rotational velocities make them well suited to mechanical power generation and to developing countries.

Other types of blades include the solid-foil, high-speed wind generators and vertical-axis models, including the Savonius rotor made of offset cylinder halves and the Venturi-type, or shrouded, version which promises to increase power outputs up to 75 percent. A flexible sail wing model is being developed at Princeton University.

Blade materials range from wood, steel and aluminum to plastic, fiber glass and paper honeycomb laminates. The number of blades may vary, but tests have shown that two or three blades perform the most consistently under varying wind velocities, with many designers feeling that three blades offer the most stable design. (One or two blades can lead to balancing problems and vibration as loads increase; more than three blades can confuse aerodynamic performance and increase costs.)

Ideally, a windmill extracts 59.3 percent of an airstream's energy. This is the theoretical maximum, but modern windmills generally extract only 70 percent of that, with some new exceptions. The general formula is that wind power varies as the cube of velocity and as the square of any circular area through which it passes. For example, a 20-ft.-diameter blade in 15 mph wind will yield 2.55 kw of electricity; a 40-ft.-diameter blade will yield 10.23 kw in the same wind. (A watt equals amperes multiplied by volts. Amps are a measure of electrical current volume; volts, of current pressure, or speed. A 12-v windmill delivering 100 amps will supply 1,200 w of electricity, or enough to light one dozen 100-w bulbs.)

Several types of generating systems are appropriate to windmills. It is possible to generate a-c (alternating current) electricity at a constant 60 Hz (Hertz, or cycles) independent of shaft speed, usually by converting a-c into d-c (direct current) at a battery and then reconverting it to a-c (the battery converts the current steadily, whereas the windmill may feed the battery at variable rates). Direct-current generators have been available for a long time. Direct-current hydrogen generators are technically feasible, but require more development work to lower costs and increase operating efficiency. Mechanical generation converts energy into compressed air or can be used to pump water.

The primary requirement of most generators is that the relatively slow rotation of the windmill propeller be geared to the higher speeds required to spin the generator rotors efficiently. A windmill may, for example, turn at 150 rpm, while a generator may operate at 600 rpm.

Power conversion for a windmill power system may be supplied by solid state power inverters, fuel cells, turbines, or internal combustion engines. Solid state inverters are reliable and efficient. At least one company offers a version that converts d-c into a-c electricity and feeds any excess power into a conventional power grid, thus eliminating a storage system.

Fuel cells are not yet commercially available (although Disney World has several), but are a very efficient—and costly—spin-off from the space program. Most use hydrogen as fuel and convert it to d-c electricity at 75 percent efficiency. Hydrogen-powered turbines that convert compressed air into electricity are also a recent development, but costs remain uncertain. Internal combustion engines that use hydrogen fuel are also in the final stage of development.

Windmill energy production varies according to wind velocities and when there is no wind, or breezes at less than 6 mph, electrical generation ceases. Storage systems are therefore a vital part of a wind energy system.

Batteries are the most common storage system. Lead-acid batteries are inexpensive compared to other types, are easily modularized and offer instant start-up and no emissions. They do not, however, last as long as nickel-cadmium batteries, which are considerably more expensive. A lead-acid system offers a power density of .016 kwh/lb and costs approximately $80/kw.

Other storage media include hydrogen, which is obtained by electrolysis and may be stored as compressed gas, metal hydride or as a cryogenic liquid. Water must be purified before electrolysis and this contributes to high system costs. Gas is the most economical method now and hydrides offer promise. Cryogenic (cold liquid storage) systems offer extremely high energy densities (17 kwh/lb), but involve proportionately high costs at this time. More research is needed.

Compressed air storage is appropriate for some kinds of installations. It costs about $80/kw and requires about 6 acres per megawatt of stored energy.

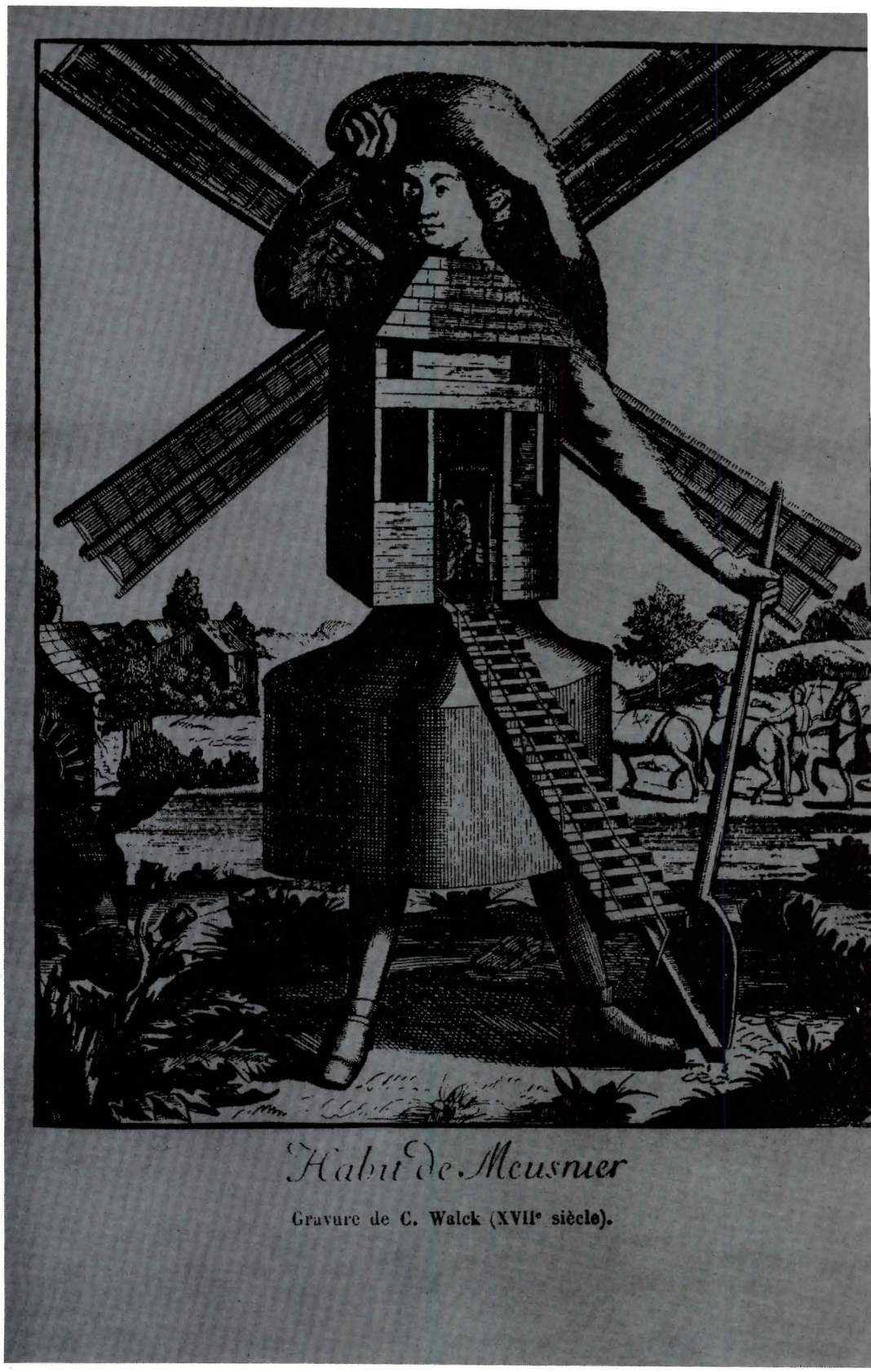
Pumped water storage is 67 percent efficient and costs $180/kwh of electricity. No more research and development is needed here, but the system requires appropriate sites or must be teamed with a water-powered utility system.

Finally, there are flywheel storage systems, but these are still largely experimental. Similar to a toy gyroscope or top, flywheels store energy by spinning at very high speeds (24,000 rpm, for example) and then tapering off. They offer extremely high power delivery for short periods of time—perhaps 1,000 kw/lb for 2/10 sec. Generally they store 30 kwh/lb and cost $50-$75/kwh over a 30-yr. lifetime.

Some of the components and technologies just discussed are fairly exotic and costly, but the windmill has always appealed to the handyman as well as the sophisticated engineer. The current windmill revival extends not only to large-scale applications, but to single-family homes.

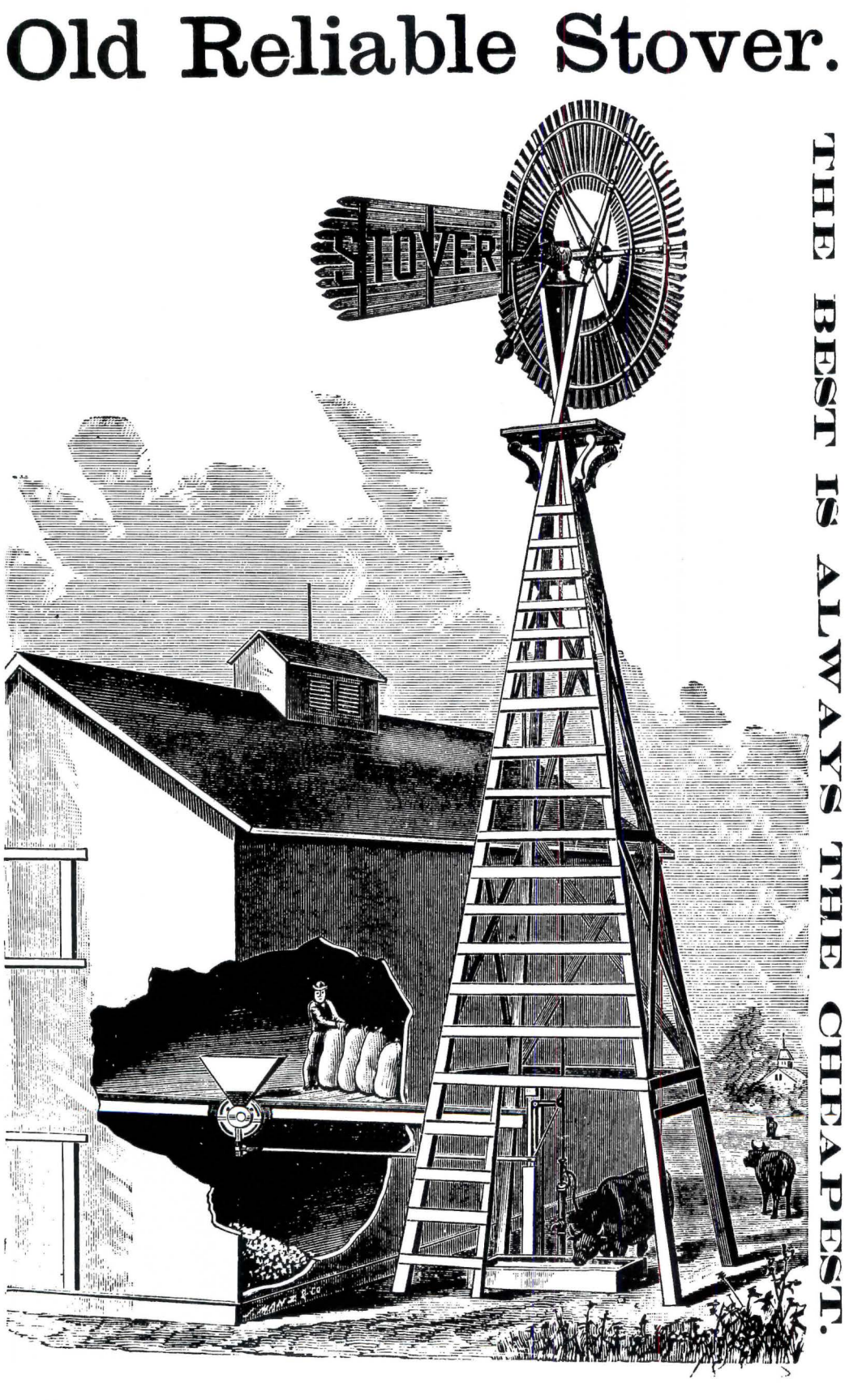
Pioneer delight

When Americans started to move westward, so did the windmill. Almost as soon as permanent settlements appeared in the Midwest and West, windmills were built to pump water and, later, to supply electricity. In the 1920s and 1930s, the Great Plains were dotted by many thousands of



Habit de Meusnier

Gravure de C. Walck (XVII^e siècle).



windmills, some of which still remain standing, but abandoned. The era of the homestead wind generator ended in the 1950s, when the Rural Electrification Administration succeeded in bringing central utility connections to even remote farms and dwellings.

Today, the abandoned windmills of yesteryear are being restored by many young homestead families and innovators who seek a way of life compatible with nature. Their power needs are modest and they seek a source that will not pollute the environment or drain its resources. There are many commercial wind units available, but they are often too expensive to buy and so these families find their power sources in barns, on rivers and irrigation ditches, and in the junkyards of the lands where windmills stood. For a few hundred dollars and a little mechanical knowledge, windmills can supply new homes with electricity for stereo, lights and power tools.

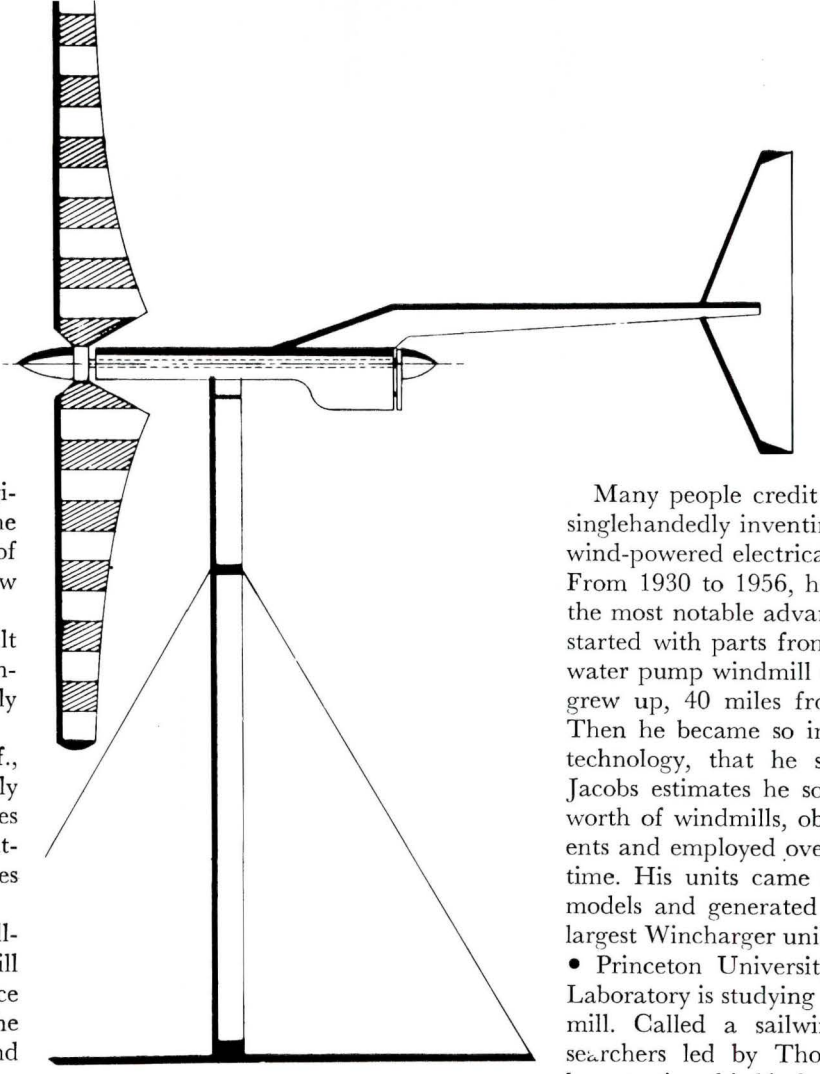
Enthusiasm for the windmill projects also seems to be contagious. Many families who set out to merely supply their own power needs with the wind are now seriously into windmill design and innovation. Some market their plans, recommendations, and/or equipment. Many publish their stories in U.S. magazines like *Mother Earth News, Plowboy, Shelter* and others, with headlines stressing the how-to, low costs, improvements and pleasures of living with a windmill. Examples follow:

• Robert Reines and his Integrated Life Support Systems Laboratories have built the world's first dome powered solely by wind and solar energy, near Albuquerque, New Mexico. The first wind unit was installed in 1972, two others were added later, for a total 5 kw installed capacity. A bank of 16 batteries stores 22 kwh of current and the families that live in the settlement enjoy most of the modern conveniences of life, including television and stereo.

• Winnie Red Rocker, of Farisita, Colorado, wrote of his wind generator in *Lifestyle* magazine, where he related that his windmill puts out 12-15 amps on a 12-v system in 25 mph winds. He assembled his machine from old Wincharger parts, miscellaneous hardware, and parts picked up from friends, farms and cars. (Winchargers were the most popular and economical wind systems before the days of the Rural

Electrification Administration. The original company stopped production in the mid-1950s, but Dyna Technology Inc. of Sioux City, Iowa still markets a 200-w model.)

- Bill Gibbons, of Ontario, Canada, built a 6-v windmill, also made of old Wincharger, car and junk parts, for only $109.50.
- Jim Sencenbaugh, of Palo Alto, Calif., has published and (for $15) will supply plans for a $400 wind system that includes a fan, d-c generator, support tower, batteries and an inverter. The unit produces 400 w of 110 v a-c house current.
- Henry Clews is perhaps the most well-known of the family homestead windmill pioneers. Clews was a high school science teacher in Portland, Maine, when he packed family and $10,000 of savings and headed into the woods of East Holden, Maine. He had to use windmills or live without electricity, so he spent $2,800 on a 2-kw Australian Dunlite windmill, plus batteries, etc. That wasn't enough power, so Clews bought a larger Elektro windmill and installed it, with the help of extra money from his grandmother. Clews and his family have adjusted to country life; Clews lives, sells, writes and talks windmills. He is even the U.S. agent for Dunlite and Elektro windmills (Elektro are made in Switzerland in 2- to 6-kw capacities).



Princeton sailwing (top)
and Henry Clews' Elektro windmill

Small-scale technologists

More sophisticated research and development of residential-scale wind-powered electrical generating systems has been carried out by some manufacturers, universities and small, independent groups of engineers and designers. These efforts make significant contributions to the state of the art and the feasibility of mass production in the future.

- Marcellus Jacobs, of Ft. Myers, Fla. now in his seventies and out of the windmill business, made the "Cadillac" of the post-depression era windmills. His windmills are a rare find for a lucky family seeking to restore an old unit; they were the most advanced and reliable of their day. Jacobs recently startled a young engineer at a wind workshop sponsored by the National Aeronautics and Space Administration and the National Science Foundation by telling him: "Why, you young whippersnapper. You're trying to reinvent the wheel."

Many people credit Jacobs with almost singlehandedly inventing the first practical wind-powered electrical generating system. From 1930 to 1956, he produced some of the most notable advances in the field. He started with parts from a Model T and a water pump windmill on a farm where he grew up, 40 miles from town or power. Then he became so involved in windmill technology, that he started a company. Jacobs estimates he sold over $50-million worth of windmills, obtained over 25 patents and employed over 260 people at one time. His units came in 32 v and 110 v models and generated 1,500-3,000 w (the largest Wincharger unit was 1,200 w).

- Princeton University's Flight Concepts Laboratory is studying a new kind of windmill. Called a sailwing, a team of researchers led by Thomas Sweeney have been testing this kind of design since 1966.

The basic sailwing concepts came from aircraft and sailboat aerodynamics. The structure consists of a two-blade axial flow type mechanism with a 10-ft. diameter. The blade design includes a rigid leading edge, tip and root section. The tip and root of the wing are connected by a trailing edge cable fastened to a wrapped (two-surfaced) sail. The sail is cut with a catenary arc trailing edge shape that allows chordwise tensions to develop as a function of the trailing edge cable. A taut wing, with no intermediate structure, is the result. But the wing is therefore deformable under loading and enjoys maximum life and minimum drag effects.

Sailwings are only one half the structural weight (and material cost) of the most inexpensive conventional wing, according to Sweeney. His next project will be a 25-ft.-diameter model, which Sweeney thinks is the maximum size for a two bladed machine. Above 25 ft., Sweeney reports that more blades are desirable to achieve the same dynamic results without resorting to mass balance devices to overcome negative gyroscopic effects.

The Grumman Aircraft Corp., of Bethpage, N.Y. has the license to manufacture and sell the Princeton sailwing and inquiries about purchases should be directed to William Carl there. Carl reports that Grumman is also pursuing larger windmill design, including preliminary research on megawatt offshore installations.

- Windworks, in Mukwanago, Wisconsin,

NASA's vertical-axis prototype at Langley Research Center (top, this page) and typical Savonius wind plant (below). Opposite: Carousel windmill in 18th century Hudson River, N.Y. lumberyard (top) and 18th century European sail windmill

and led by engineer Hans Meyer, is doing some of the most serious research by any independent group. Meyer is a former associate of Buckminster Fuller and Fuller maintains close ties with the Windworks group. The group built a Venturi windmill on Fuller's Maine island in 1971 and, since, has designed and constructed a 16-ft.-diameter solid foil windmill, 15- and 25-ft.-diameter sail models, and has others under design or construction. The 25-ft. sail windmill was developed in cooperation with the Brace Research Institute of McGill University, which is primarily concerned with adapting windmills to the needs of underdeveloped countries. Windworks has developed and has built a 12-ft.-diameter solid foil windmill and offers its plans to homebuilders; an 8-ft. model is also in the design stages. The group has published many papers (send $2 with requests) and recently completed a study for Edward Larrabee Barnes, in New York, on the potential of wind energy for the new College of the Atlantic, Bar Harbor, Maine. Other publications include a description of all wind generators presently on the market and potential applications.

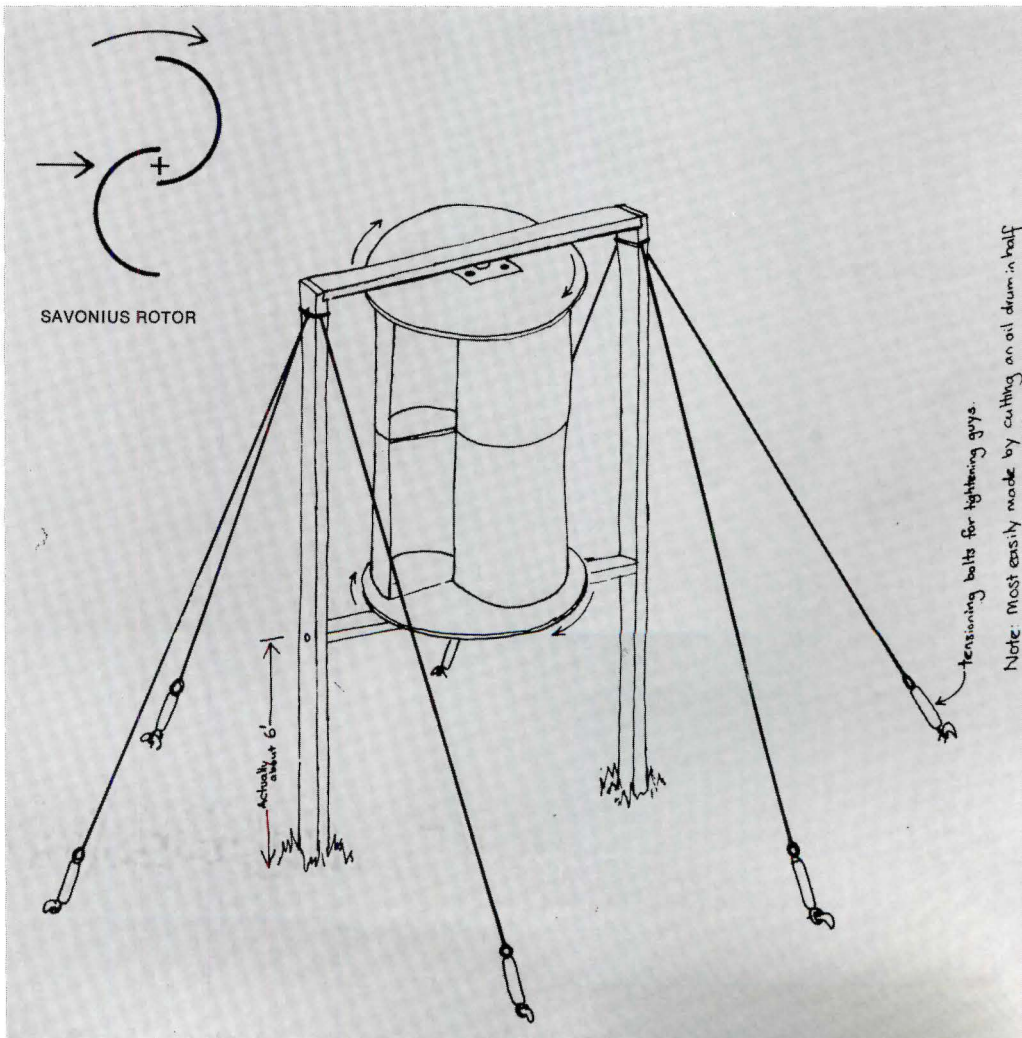
Turnaround

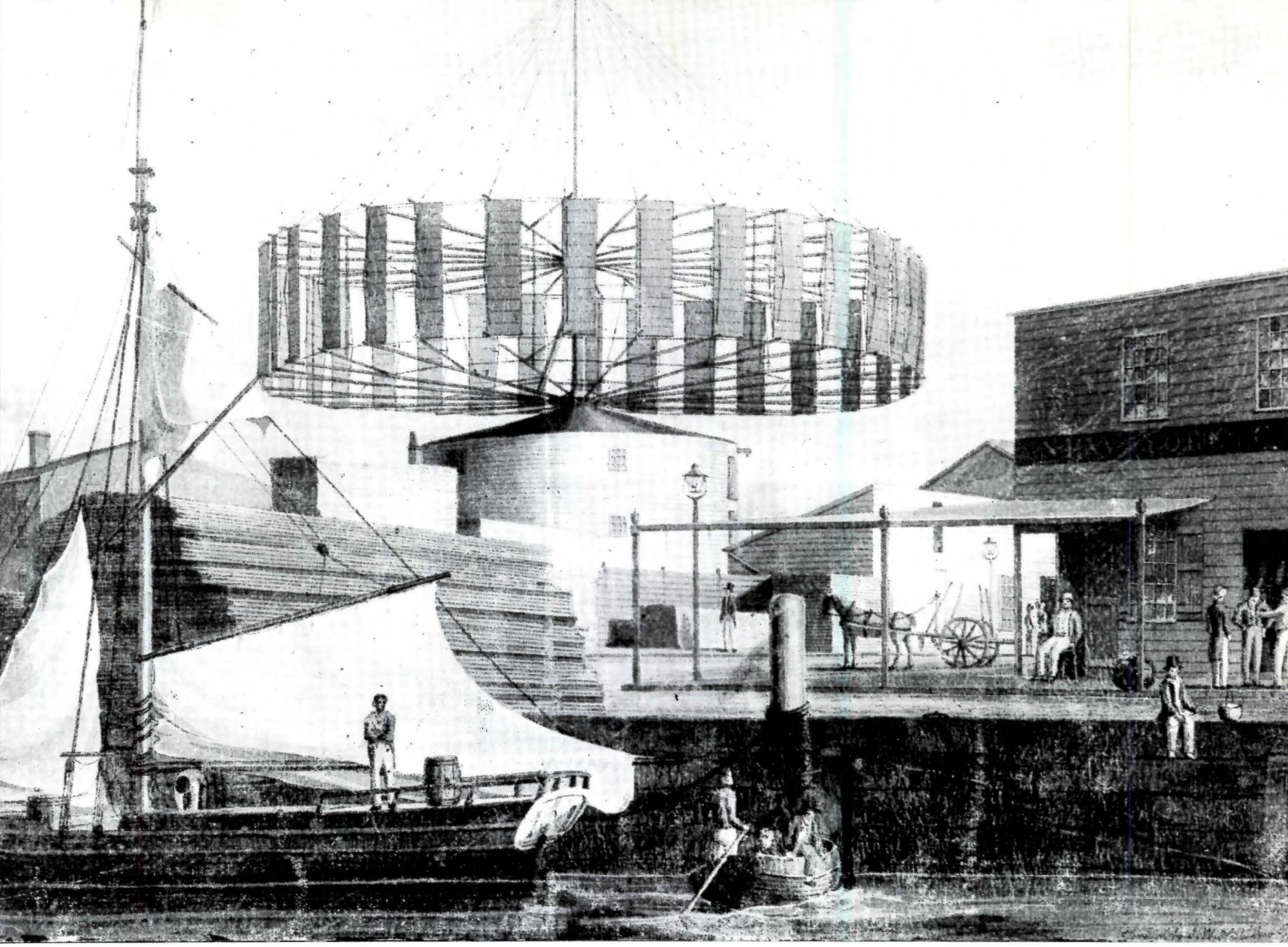
All of the preceding projects used propellers turning on a conventional horizontal axis, but not all windmills work that way. Several types of windmills rotate on a vertical axis.

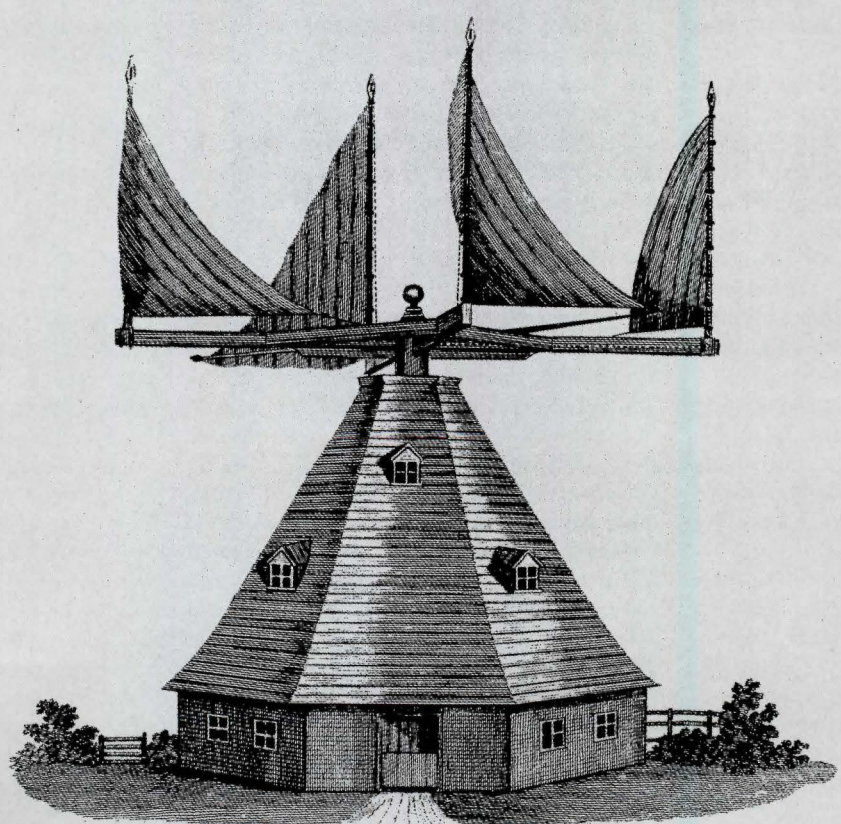
One of the simplest of the vertical-axis windmills is the Savonius system, named after Finnish engineer S. J. Savonius, who designed wind plants in the 1920s.

Michael Hankleman, of Earthmind, in Sausus, Calif., reported that his "Savonius Super Rotor" was easy to make, turns in any direction, starts to charge 12-v batteries in 7 mph winds, and cost less than $100 (excluding batteries and inverter). Hankleman made the machine by cutting cylinders in half, lengthwise, and offsetting the halves by a distance equal to the radius of the original form before securing the new configuration with end plates. Inserting a rod through the assembly (which may include a stack of several drums), fixing the ends in ball bearings and holding the system upright completes the process. Brace Research offers a version for $51.

Long used to pump water, the Savonius rotor is rarely economical for electrical







generation because it has a low velocity ratio. It is, however, adequate for very basic power needs.

A more sophisticated approach towards vertical-axis windmill design is evident at the National Research Council of Canada, in Ottawa, and at the (U.S.) National Aeronautics and Space Administration. Both efforts were inspired by French inventor G. J. M. Darrieus' eggbeater design, which was patented in 1927. The vertical-axis design can offer many mechanical advantages over a horizontal shaft design, but it consistently has the disadvantage of having one element always moving upwind and so creating drag on the system.

The Canadian program is headed by Peter South and Raj Rangi, who have made considerable calculations, tests and design modifications in vertical-axis windmills. Tests, for example, showed that high-speed rotors with straight rigid blades turning on a vertical rotation axis are subject to high bending moment and would need exterior bracing. But flexible blades, under centrifugal and aerodynamic stress, conform to a shape where there are only tensile stresses. The result is a parabolic curve and this became the basis for a new windmill design.

South and Rangi built a full-scale model with a 14-ft.-diameter rotor and tested it in the NRC wind tunnel. The result was a maximum efficiency comparable to conventional windmills: .67 hp with two blades at 150 rpm and .65 hp with three blades at 130 rpm. A 15-ft.-diameter version produces 1 kw in a 15 mph wind and 8 kw in 30 mph air flows. Early Canadian tests also indicated that the vertical windmill is self-starting in a 12 mph wind, but would accelerate only to 13 rpm no matter how hard the wind blew. Manual assistance to 65 rpm, however, allowed the windmill rotors to take over and then accelerate to a free-running speed of about 213 rpm. The problem has now largely been solved.

The Canadian team is reluctant to estimate costs for the vertical-axis design, but note that it is as efficient as conventional designs and far lighter. It could cut costs by almost 80 percent over corresponding horizontal units, but until the new design is in full production, any cost estimates remain tentative.

The Canadian research helped to inspire the U.S. effort, now being carried out at NASA's Langley Research Center under the direction of John D. Buckley. NASA is interested in the vertical-axis design as power for single-family homes and estimates individual units could sell for as low as $500 or $1,000.

The NASA tests involve a test unit located atop a two-story building at Langley. The windmill has two 14-ft.-diameter blades made of balsa wood, coated with fiber glass, and mounted on a 15-ft. vertical shaft made of aluminum tubing. Initial tests will calibrate the horsepower of the windmill at various rpm; further tests will involve the windmill's ability to run household equipment and appliances.

Limitless power

The inexhaustability of wind complements the imagination of man. The plans and schemes for large-scale windmill installations supplying trillions of clean, economical kilowatt hours are multiplying as fast as fossil fuel prices. Scientists and researchers are working in ever greater numbers to improve the technology and lower the costs of major wind power projects.

Windmills on a grand scale are not a new idea. In recent history, there have been several serious projects in various countries of the world, but none survive today.

In 1931, the Russians built a 100-ft. diameter unit that drove a 100-kw generator to supplement a steam-powered electrical plant 20 miles away. The unit produced 279,000 kwh of electricity in one year. In the 1930s and 1940s, the Germans envisioned a 1,000-ft.-high tower with multiple turbines that would produce 50,000 kw of power; war, however, ended the project before it began.

In the early 1960s, Germany again turned some attention to large-scale windmills. Ulrich Hutter, of the University of Stuttgart, designed and built a unit called the Hutter-Allgaier windmill, which generated 100 kw of electricity in 16 mph winds and featured a V-belt drive and fiber glass propeller blades. Hutter was and is known for his scientific approach to windmill design and has made important advances in the areas of aerodynamic design calculations and the use of fiber glass materials. In the 1950s, he designed a mass-produced 10-kw wind generator that was sold in 16 countries. (The U.S. distributor was a division of Pennwalt Corp., which is now installing windmills on offshore oil drilling rigs.)

Engineers in Britain conducted extensive programs from 1945 to 1960 in site and wind analysis, but the largest unit built was 100 kw, in Enfield-Andreau. The tower was hollow and so was the propeller, which included a centrifugal air pump. When it rotated, it sucked air in the openings near the base of the column. Air passed through the air turbine that drove the generator, then passed up the tower, through the rotor, and up the tip.

In 1957, the Danes built the Gedser Windmill, a fully automated, 200-kw unit with three blades nearly 45 ft. long and mounted on a 75-ft. prestressed concrete tower. By 1961, the unit had produced over 400,000 kwh/yr. for the Danish Public Power System. The unit cost $56,000 to develop and build, but mass production could have cut this to under $40,000.

The Gedser machine inspired plans for even larger models, with two propeller rotors on one tower for a total generating capacity of 600 kwh/yr. One report estimated that 20 percent of Danish power needs could be met by the wind, but the prophecy has yet to be fulfilled. Cheap nuclear and fossil fuels proved too competitive and the idea was abandoned.

Grand scheme

U.S. companies and individuals were also flexing wind muscle during the 1940s. The most important result was the 1,250-kw wind generator built in 1941 by engineer Palmer Putnam.

Putnam had been investigating large windmill installations for several years and had concluded that the most economical system for the U.S. would be a teaming of windmill and a hydraulically-powered utility network. He reasoned that when the wind blew, a utility company could shut down some of its turbines and allow the reservoirs to fill for later use under peak load or windless periods.

The Morgan Smith Co., a manufacturer of hydraulic turbines in Pennsylvania, agreed to sponsor a test installation and the Central Vermont Public Service Corp. agreed to participate in hopes that the windmill would supplement its water-driven system. A search for a site led the project organizers to a farm near Rutland,

Smith-Putnam wind turbine, at Grandpa's Knob, Vermont

Vermont, where "grandpa's" 2,000-ft.-high knoll was selected and named Grandpa's Knob.

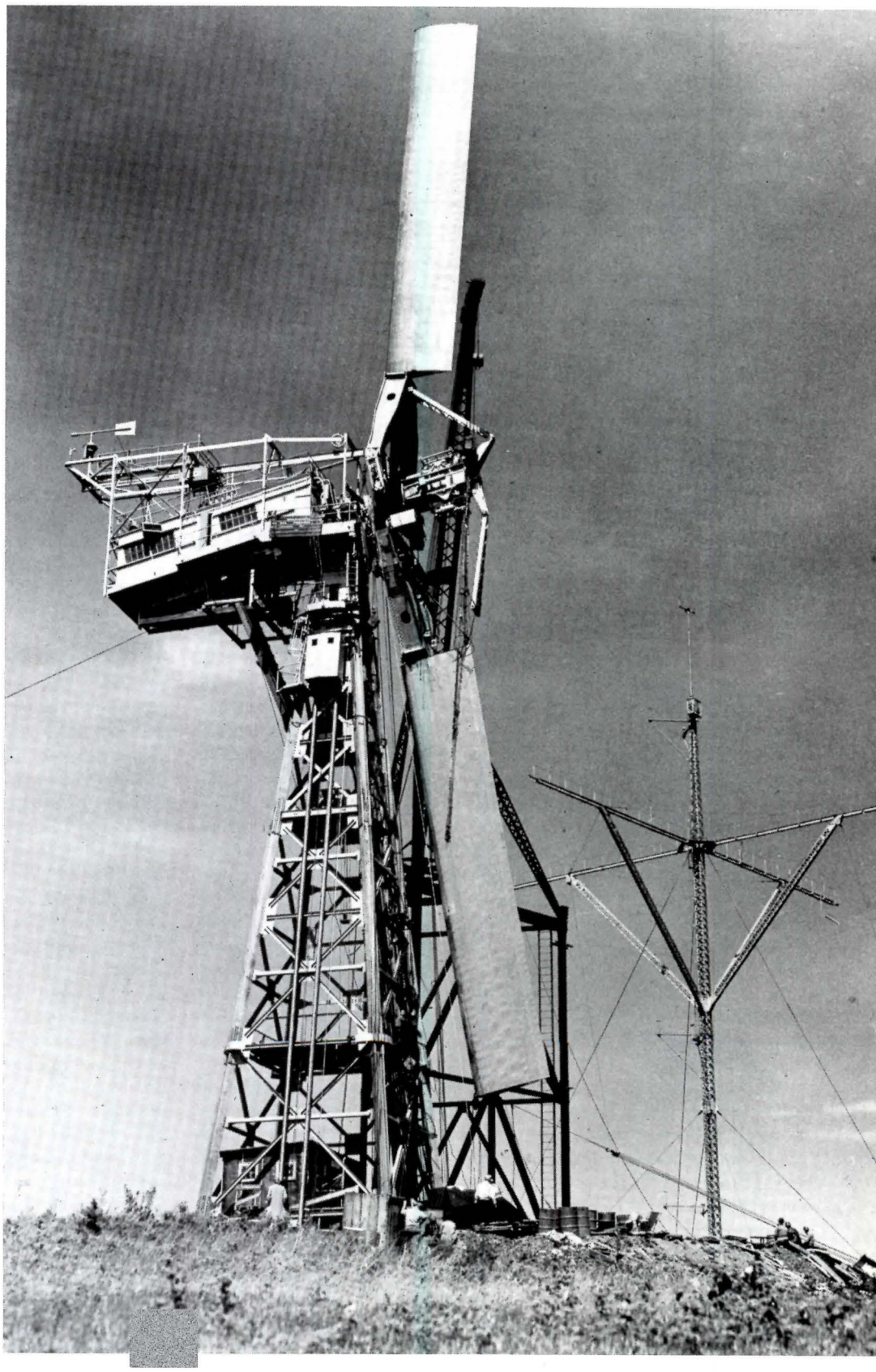
Putnam soon had the project in full swing as he and a battery of consultants and experts from universities, industry and government started testing, design and analysis of structure and meteorological data. Among the early conclusions were that the large-bladed turbines could convert only 6 percent of the total available wind energy into electricity per year (many days have either too little or too much wind for a windmill to operate effectively). The project was also pressured by general wartime conditions, which made some testing and analysis more expedient than thorough.

The windmill, however, was built and stood tall with a 110-ft. tower and a 175-ft.-diameter propeller. Each blade weighed eight tons and had stainless steel skin over stainless steel ribs; the streamlined shape represented sophisticated application of aerodynamic principles. The blades had adjustable pitch and an automatic feathering system that allowed them to turn away from storms. The blades were also designed to reduce bending tendencies at their base by moving independently forward or backward through a set angle.

The propeller turned at up to 29 rpm; gears raised this to 600 rpm at the generator's rotor. The unit was tested for weeks before it was finally switched into the power company's utility lines, where it worked well for three years, in winds up to 70 mph, and generated up to 1,500 kw. Then everything stopped. The main bearing had to be replaced and bearings were difficult to obtain during the war.

The windmill sat idle until spring, 1945, when operations resumed. Little more than three weeks later, however, the windmill stopped again, this time for the last time. A spar broke and the whole blade flew away from the propeller and landed 750 ft. away. The spar was known to be slightly underdesigned and was installed as a "calculated risk" under the pressures of war; good luck had given out.

The Putnam windmill, however, left a legacy in design and structural data. Putnam calculated ways to make more and similar windmills, but the economics of wind power couldn't compete with conventional energy sources. Percy Thomas met a similar fate with a 6,500-kw windmill pro-



posal based, in part, on Putnam's work. This gigantic windmill featured two 200-ft.-diameter propellers atop a 475-ft. tower. But the Korean War made the windmill a low-priority item when Thomas tried to raise the money to build it in 1951.

Upward bound

Today, even Thomas' windmill seems small in comparison to the increasing numbers of proposals that envision networks of giant windmills supplying significant portions of the world's energy needs. Although work on windmills of scale virtually stopped in the 1950s and 1960s, the resurgence of interest in the last couple of years already has some people concerned that vast numbers of windmills may change air current patterns, temperatures and create their own brand of visual pollution. But windmill proponents dismiss this and remain optimistic.

Some of the most elaborate windmill proposals are those of William Heronemus, an engineering professor at the University of Massachusetts. Heronemus helped revive interest in large-scale windmill installations in 1970 when he proposed a wind power system as an alternative to a nuclear power plant scheduled for Shoreham, N.Y. and made similar proposals for the New England states.

The Shoreham plan called for two networks of floating wind power stations on Long Island, beginning in 1975. A station would support three wind towers, each housing two 200-ft.-diameter wind turbines. The stations could be erected on submersible platforms 200 ft. by 500 ft. in size, or they could stand in relatively shallow shoal waters. The windmills, with propellers similar to Putnam's design, would then be hooked into utility lines. The New England version of this scheme called for 640 such stations linked along 16 north-south utility lines.

According to Heronemus, such systems will be competitive with the future costs for more conventional power systems in some areas. Breakdowns on individual units, he notes, could be handled on a modular basis without failure of the entire power grid.

Heronemus is not only a man of the wind and sea, but has proposed vast landlubber schemes as well. The Congressional Record notes that in 1972, he proposed a forest of 300,000 windmills, each equivalent in size to a 70-story skyscraper, for the Great Plains. Each structure would stand in a square mile of land on an 850-ft. tower supporting 20 two-bladed turbines with 50-ft. diameters. The scheme would generate 189,000 megawatts. (The total installed capacity of electrical generating plants in the U.S. in 1970 was an estimated 360,000 megawatts.)

The storage system for such a network is included in Heronemus' proposal. He suggests that (since a hydroelectric hookup like Putnam's is impractical) the d-c generators of the windmills power electrolyzers, which convert water to its component hydrogen and oxygen. The hydrogen would then be used in industry, as fuel, for fuel cell production of electricity, or as part of a coal gassification process.

Heronemus estimates that production of 20,000 of the 850-ft. units per year could lower costs to $100 per installed kw, excluding land. The calculation, however, does not account for the fact that it takes 2.74 kw of installed wind power to equal 1 kw of installed nuclear capacity. This factor raises Heronemus' figure to $2.74 per installed kw.

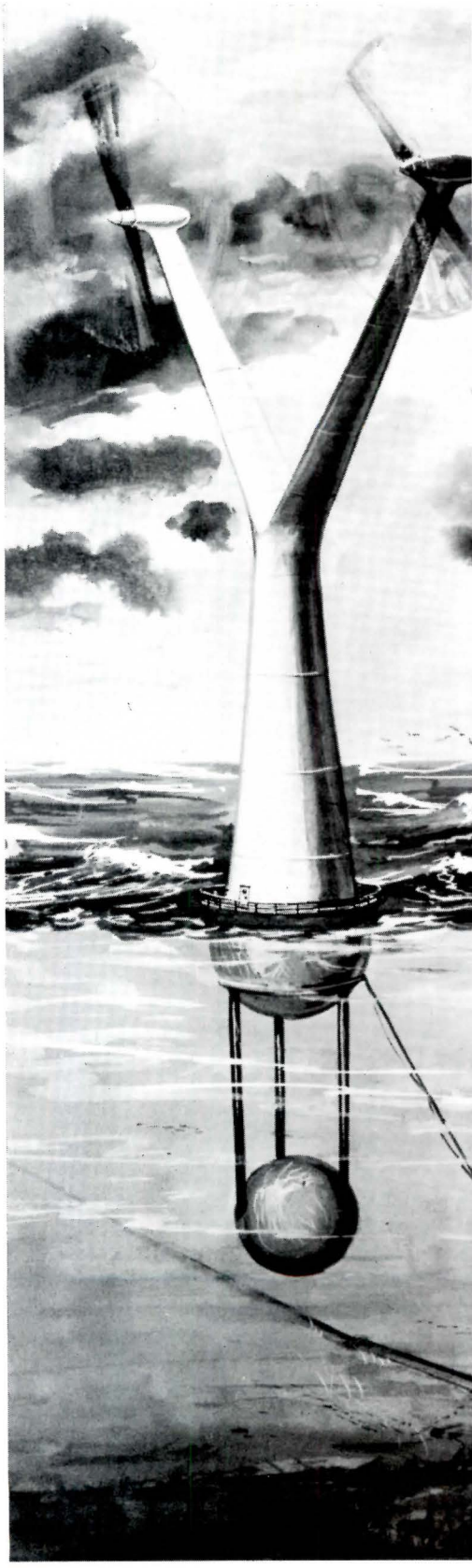
Progress

Schemes on the megawatt scale inspire some of the experiments now being performed on large-scale windmills. A megawatt unit is still sometime in the future, but the changing economic and fuel situation of the world is leading to new work in the field.

Last summer, Walter Schönball, a Bonn lawyer, and a team of engineers, aerodynamic researchers and others, erected a 70-kw windmill on the German island of Sylt. Reportedly, the unit converts available wind force into electricity efficiently compared to the usual 30 to 35 percent of conventional windmills. The 70-kw unit, which included several design innovations, can supply the power needs of five families.

The most unusual design element of the Schönball experiment is that the windmill's two rotors rotate in opposite directions. The electrical generator is mounted on the axis between the two rotors to take advantage of the high relative speed between them. This eliminates the need for gear wheels to convert the slow rotational speed of a propeller into the faster speed required to turn a generator rotor.

The designers spent $190,000 of their own funds to design and build the Sylt



Proposed offshore wind generator (opposite). Shönball windmill on German island of Sylt (below) and Wright's Romeo and Juliet prairie windmill (bottom)

windmill, but estimate that another could be produced for $46,000, and that mass production could reduce unit costs by another 20 to 30 percent. The team already has blueprints for a 230-kw unit and for a small, 30-kw unit and hopes to improve their windmill's efficiency even more.

The U.S. is exploring large-scale windmills at Lewis Research Center, near Cleveland, with the support of $1.25 million this year from the National Science Foundation. A committee appointed by NASA and NSF says that the U.S. wind program could yield 1.5 trillion kw by the year 2,000, but this seems terribly optimistic in view of the apparent low priority granted to wind systems development. (The NSF grant comes from $872 million requested by the Administration for energy research and development.)

Despite a low budget, NASA has set out on a five-year wind research program that includes plans to build a 100-kw unit by 1975 at NASA's Plum Brook, Ohio, site. The unit will have a 125-ft.-diameter, two-bladed propeller and a 125-ft. tower and will be studied as a prototype for much larger units. NASA hopes to follow it with a 1,000-kw unit and a series of demonstration units on various sites in the U.S. and Caribbean.

The five-year program includes studies on windmill technology, storage systems, meteorological data, site selection, wind energy potential and, particularly, costs. Costs, says a NASA spokesman, are the greatest hindrance to large-scale windmill installations—either their costs must come down relative to other energy systems, or the technology will not be supported on commercial scale.

Implementation, however, may be closer than some people realize. The president of the Block Island, Rhode Island, Power Co., Henry Hutchinson, has already announced that islanders will receive 60 percent of their power from windmills by 1976. Installation will start in 1975 and the company plans to spend $250,000 for "five or six" 100-ft.-high, 100-kw units.

Block Island enjoys winds of 17 mph on the average, making it ideal for wind power. The National Weather Service says the island has more wind weight passing over it than any other location in New England.

Hutchinson noted that his decision to use windmills is partially based on his estimate that oil prices will double. The company supplies power to about 500 persons and the oil now costs about 15¢/gal. At 30¢/gal., says Hutchinson, "you can start thinking about putting in windmills."

Romeo and Juliet

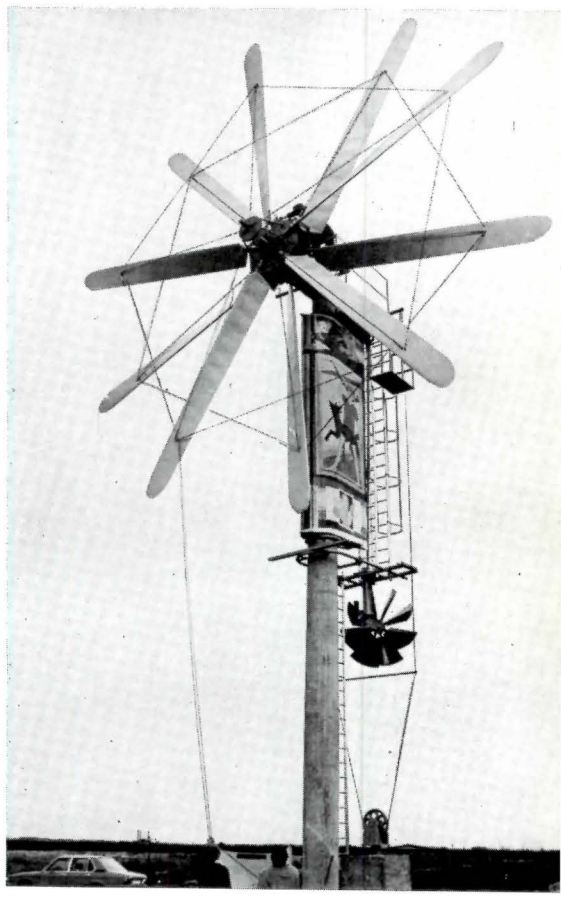
It's hard not to like a windmill. Perhaps they fulfill too many childhood fantasies of pleasant lands or perhaps it's their honest reflection of man's reliance on nature for power that is so appealing. In any case, they are a highly visual energy source and therefore fall, at least in part, into the province of the architect.

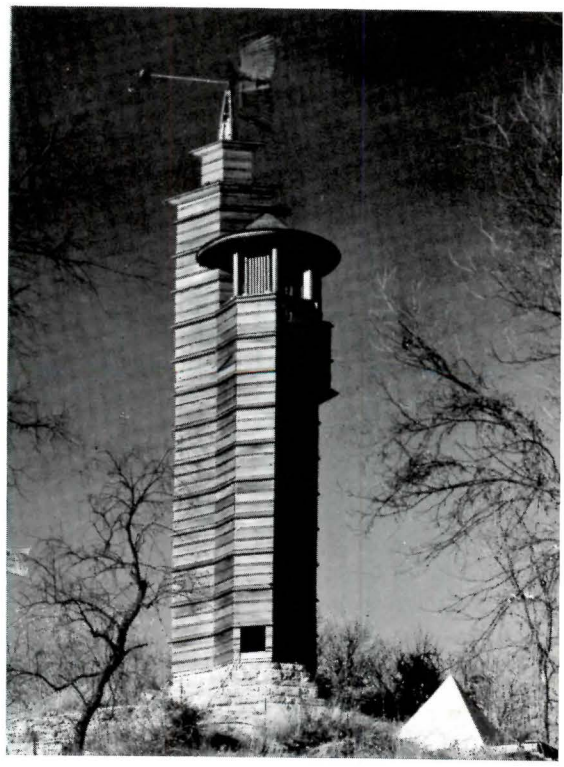
Even Frank Lloyd Wright indulged in windmill design, producing Romeo and Juliet, as he called his water-pumping windmill, for two maiden aunts. They asked him for a "pretty windmill" instead of the "ugly" wood and steel versions prevalent at the time. Wright responded with drawings and structural details for a 60-ft. shingled tower with a 14-ft. wheel that a local contractor warned would "blow down as sure as Death and Taxes." The aunts, however, were not swayed and built the windmill for $950.

Wright described the project in his autobiography. Romeo, he said, was designed to "do the work," while Juliet "cuddled to support and exalt him." The windmill survived hurricanes and its owners until, 45 years later, Wright contemplated its fate. "Shall I take it down, faithful servant serving so well, so long? Or shall I let it go until it falls just as I myself must do . . . No. Romeo and Juliet shall live to fall together."

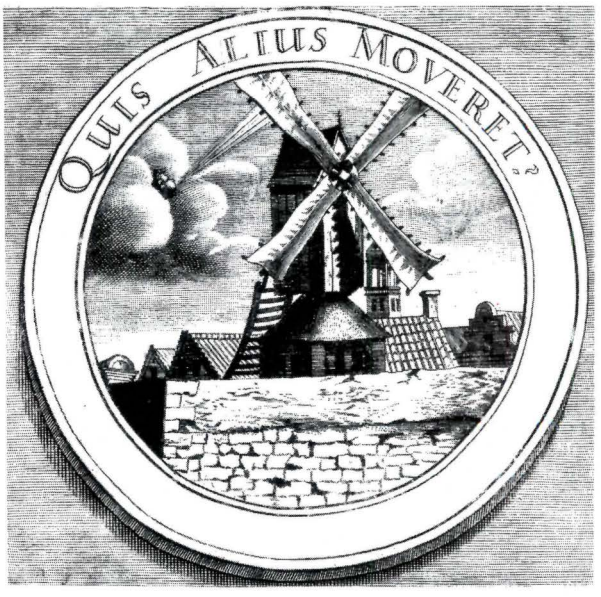
The parameters of windmill design have changed drastically since Wright set out to improve the appearance of prairie windmills. But it is largely technology that has changed; the spirit remains. Hans Meyer, of Windworks, has said, "Windmills are significant not only for the energy they produce, but for the consciousness of energy, for which they provide the visual key." Windmills remain a romantic and technical challenge for the designer who cares enough to find out more. And, note the Windworks designers, if windmills do not prove sufficient power producers, perhaps our power needs, not the windmills, are to blame.

Photographs: Color: Rhodes and Mykonos, J. Alex Langley; Holland, J. Peter Happel; Portugal, Jules Zalon. Black and white: Putnam-Smith turbine, Wide World Photos. Engravings: Bettmann Archives, except last two (N.Y. Public Library).





Dutch four-arm windmill (left), Portuguese sail windmill (below) and Mediterranean sail windmill in Mykonos, Greece



During the 1960s, a small group of dedicated, creative English architects began producing a collection of extraordinary, futuristic architectural proposals. They called themselves Archigram. Today, a small group of Japanese architects is actually building such schemes, realizing the potential of a modular, flexible architecture conceived only a decade ago.

Peter Cook proposed a visionary entertainment tower for Montreal in 1963; Kiyonori Kikutake actually built it, with minor alterations, in Osaka, for Expo '70. Warren Chalk's imaginative Capsule Homes Tower of 1964 has its diminutive counterpart in the Kibogaoka Capsule Tower by Tatsuhiko Nakajima and GAUS (Institute of General Arts and Urban Sciences). Even the notion of Archigram's Instant City, which used balloons to support temporary structures, has also found reality in Japan, where balloons are used for festival and other short-term facilities.

The pressures to translate fantasy into concrete reality are probably greater in Japan than in any other industrialized country. As an island nation with finite geographical limits, Japan is very densely populated. Both material and land costs are astronomical. Land in central Tokyo generally costs about $7 million per acre. Recently, however, the Mitsubishi Corporation paid an unprecedented and incredible $46 million per acre for a prime piece of Tokyo real estate. Such exorbitant land and material costs, higher population densities and an urgent post war need for housing have combined with what Herman Kahn described as Japan's self-appointed task of "catching up with or surpassing the West economically and technologically." This has led to the flourishing of industrialized, prefabricated and packaged building systems on a scale unequalled in the Western world.

This should come as no surprise to anyone acquainted with traditional Japanese construction, in which modular coordination and interchangeability of parts are standard procedure. Bernard Rudofsky, author of *Architecture Without Architects,* has written that: "Centuries before we even thought of standardization, prefabrication and mobility as architectural possibilities, the Japanese applied them to their houses as a matter of course. From economical measures these developed to aesthetic norms. To enforce compliance of poor and rich in all matters of building, the authorities issued to the artisans precise specifications." As a nation very responsive to authority, Japan has followed these specifications to the letter, and, in time, walls, doors, windows and floors became standardized in size and construction all over the country. It is understandable, therefore,

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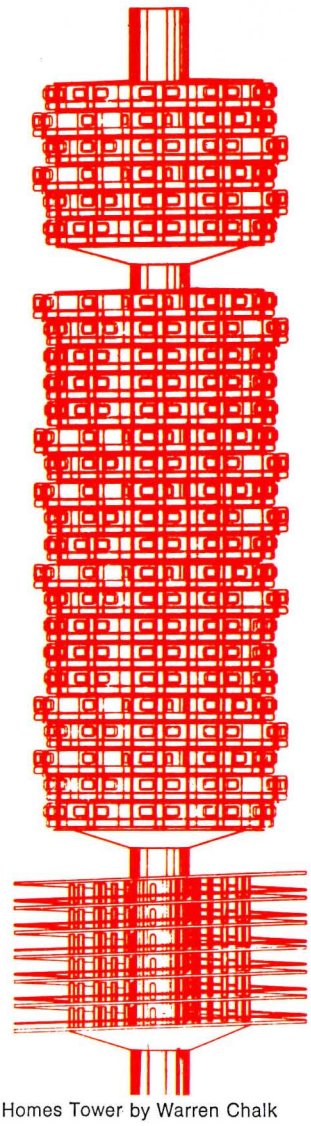
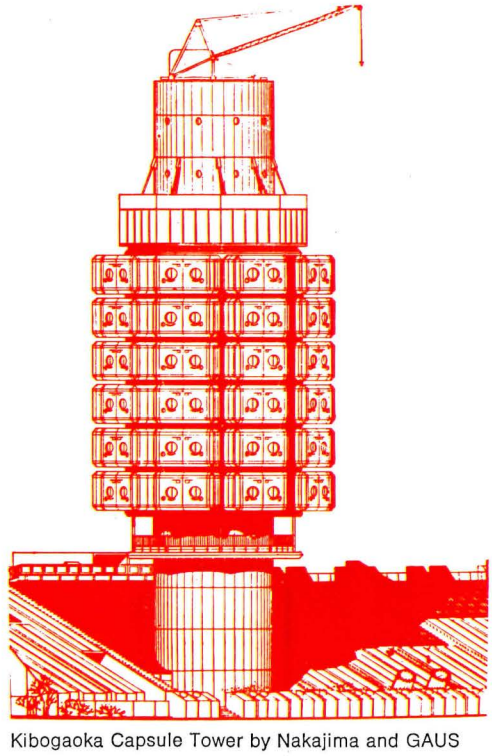
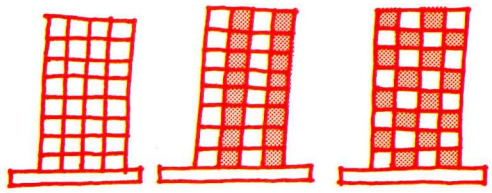


Capsule Homes Tower by Warren Chalk



Kibogaoka Capsule Tower by Nakajima and GAUS



Comparison of earthquake resistance

that the modular coordination necessary for the successful industrialization of architecture was readily accepted. What is astounding, however, is the diverse, unorthodox, yet remarkably creative way in which Japanese architects are borrowing, refining and integrating industrial technology into contemporary architecture.

Japanese puzzle

Two approaches dominate the industrialization of building in Japan. One approach emphasizes economy, rationality and limited interchangeability of parts. It may offer some variety in the planning stage, but once the layout is agreed to, the prefabricated pieces are interlocked into a closed unit. Such schemes are called "closed systems" because they accept only parts predesigned to fit into their closed universe. While most projects based on the closed system principle are not very flexible, they are generally very efficient and sometimes ingenious in their ability to interlock components in a seemingly unending variety of ways, finally achieving a total unit reminiscent of a Japanese puzzle.

The second approach to industrialization is called an "open system." It uses separately prefabricated elements, each selected because of its capacity to serve a specific function, and combines them to provide flexibility in adapting to varying site conditions, functional requirements and the changes incurred by time. To accept change easily these structures are designed on the principle of Modularism, defined by Alvin Toffler (author of *Future Shock*) as, "the attempt to lend whole structures greater permanence at the cost of making their sub-structures less permanent." Thus, projects based on an open system begin as a neutral field into which a variety of clip-on, plug-in, snap-on, inflatable, unfoldable, detachable components can be forever rearranged to adapt to specific needs.

Among the plethora of closed systems being produced in Japan today, two projects emerge as representative of the best thinking in imaginative, efficient design. These are the MCS (Mitsui Checker System), by the Mitsui Construction Company, and the TOS (Taisei Overseas System), designed by Kisho Kurokawa and manufactured by the Taisei Construction Company. The MCS employs precast concrete members interlocked into a prefabricated steel superstructure. The name is derived from the precast planes that are interwoven into a "solid-void," or checkered, pattern, which has proven most resistant to earthquake tremors. The checkered pattern also affords greater variety in floor plan layout than a traditional shear wall system.

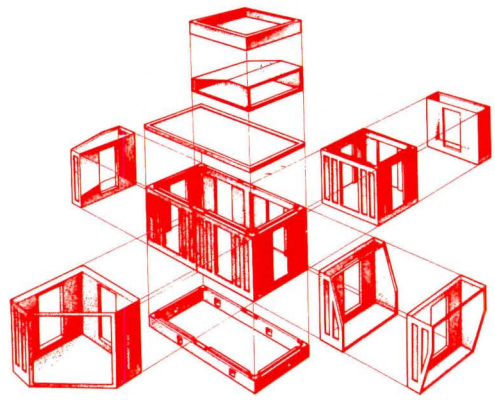
At present, MCS is being used to build Dezu New Town in Chiba Prefecture, an 80-minute train ride from downtown Tokyo. Mitsui has set up a precasting assembly line adjacent to the site and will produce a total of 1,412 living units in eight separate structures. The buildings are de-

signed to take maximum advantage of available natural light and are organized to create a vehicle-free park in the center of the complex. A typical two-bedroom unit with den (Japanese style) measures roughly 20 ft. by 40 ft., or 800 square feet. These units cost Mitsui about $15,000 each to construct (at $18.75 per square foot), and sell for $30,000 each as condominiums. Mitsui is confident it will sell every unit before construction is completed.

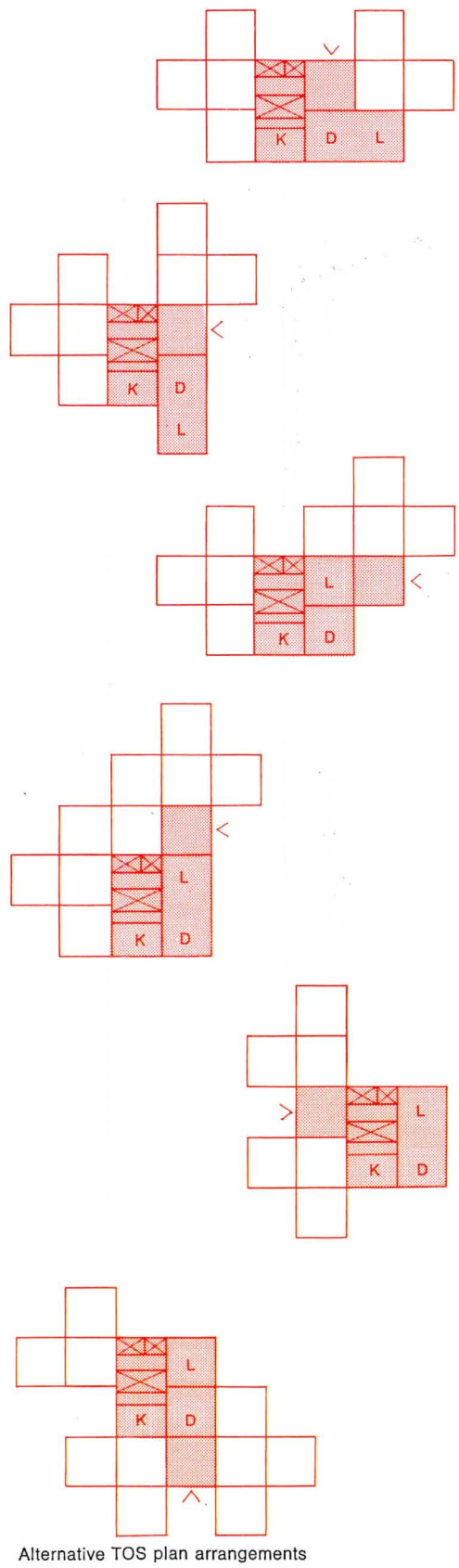
Mitsui employs its own architects and engineers, fabricates its own building components adjacent to the construction site, and so is a model of other Japanese construction company conglomerates that have cut costs substantially by putting research, development, design and construction under one roof. While this system could stifle creative design, Mitsui's in-house designers give as much attention to intelligent space planning as they do to construction technology. Thus their final product is on a par with the best closed systems being produced in the independent architectural offices.

The alternative to having designers in house is to hire a consultant architect, who specializes in the creative application of industrialization to architecture. This is the story behind the Taisei Overseas System (TOS). The Taisei Construction Company, contractors for many of the progressive pavilions at Expo '70, and a company with a long-standing interest in industrial technology, hired Kisho Kurokawa, the champion of capsule architecture, to design a flexible, precast concrete townhouse system. Kurokawa proposed a modular set of interlocking components to be arranged around a utility core in a three-dimensional matrix of almost infinite variation. All components are designed on a modular grid whose maximum dimension is determined by the Ministry of Transportation, so that the units can be moved within the country or shipped outside Japan. Taisei already has contracts to deliver 500 units per year to Southeast Asia.

While closed system industrialized architecture inherently lacks the flexibility to change with time, it does offer variety in the planning stages and, considering the present state of the art, is the most economical, efficient way to build the repetitive components that make up most housing solutions. For these reasons the Ministry of Construction in Japan has been sponsoring housing competitions focusing on middle and highrise developments. The most notable of these are the Pilot House and Ashiyahama projects. The recent winner of the Ashiyahama competition was the Takenaka Construction Company, a company that is one of the "Big Five" construction companies in Japan (see May 1973 issue). With its own research and development staff, as well as architects, Takenaka produces refined building systems and constructs them at a price that is very difficult to beat. While I do not advocate eliminating independent architects, the U.S. might try



Taisei Overseas System module by Kurokawa



Alternative TOS plan arrangements

to lower costs, without sacrificing design freedom, by following Japan's model and encouraging experimental joint ventures between our country's best designers and biggest builders.

Open solution

Beyond the undoubted precision and efficiency of closed systems is a question that has haunted every hot rod designer since the beginning of the industrial revolution: Why won't a Ford engine drop neatly into a Chevy chassis? Any architect who has laboriously counted brick courses or paid through the nose to watch a skilled laborer saw concrete blocks to fit his wonderful design must at some point ask the same kind of question: Why can't all the separately manufactured pieces fit neatly together? The answer is the dream of the open system designer. And one such man is Professor Yoshichika Uchida of Tokyo University.

Professor Uchida's Laboratory analyzes industrialized building systems from all over the world and proposes new systems that integrate and improve previous concepts. Recently, the laboratory has emphasized open systems development. Professor Uchida believes that Japan's traditional architecture is itself a form of open system: "It is well known that Japanese traditional houses are characterized by the use of wood, the planning on grid, both horizontal and vertical, and the post-and-beam construction. That Japan has a traditional module system is of the utmost importance in relation to the open system. . . . It may well be said that no traditional building practice in the world has ever given birth to more open components than that of Japan. For example, we have *tatami,* or a 90 cm. by 180 cm. straw mat, *shoji,* or a sliding screen covered with translucent paper, and *fusuma,* or a sliding screen with opaque paper glued on both sides, and so on. Above all, *fusuma* and *shoji* are the traditional building components that exceptionally satisfy the contemporary qualifications for the open component."

The laboratory's most interesting proposal is the GUP VII (Group Uchida Project No. 7) housing system. Based loosely on Le Corbusier's famous idea of slipping a prefabricated box into a frame, the Uchida group has blown open the sides of the box as well as the structural skeleton itself, lending far more flexibility to the system.

Remembering that the basic premise of open systems architecture is to create a neutral field into which any combination of prefabricated components can be inserted, GUP VII employs an erector set series of structural components that clip together, leaving a regular grid of voids and shafts for insertion and removal of mechanical equipment. The mechanical equipment is also designed as an open-ended set of prefabricated panels, shafts and units, which slide easily into the structural skeleton. Kitchen and sanitary units, for example, back up against what Uchida calls a hot

panel (a panel containing racks of pipes and conduits), which can be installed in the same manner a computer circuit snaps into your TV set.

The remainder of GUP VII is comprised of box units. These units are inserted into the skeleton, then interlocked and cantilevered in a wide variety of configurations. The system can expand up, down or sideways. The box units and the structural skeleton are independently self-supporting, so a builder can create two and three story spaces simply by not inserting a number of box units. The system is flexible enough to negotiate steep slopes and uneven terrain.

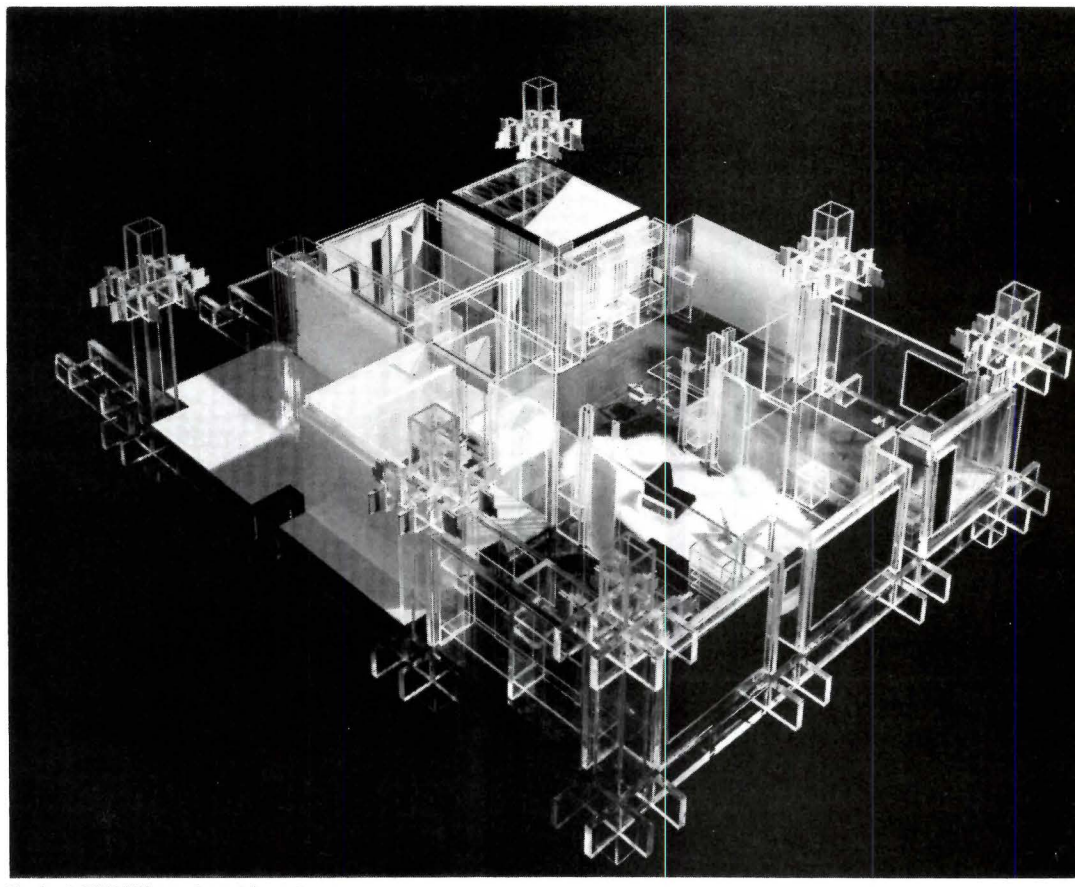
The entire open system is designed on a grid based on the standard Japanese dimension of one shaku (30 cm.), or about one foot. The basic box unit is roughly 9 by 12 feet. A typical apartment may comprise six or seven boxes, or, roughly, 700 sq. ft., plus 3 ft. of space between units, for a total of about 1,100 sq. ft.

The student most directly responsible for the development of GUP VII was Katsuhiko Ohno, who received his Doctor of Engineering degree from the Uchida Laboratory in April, 1972. Since that time the prodigious Dr. Ohno has convinced the Sekisui Chemical Company to produce a slightly simplified version of the box unit open system.

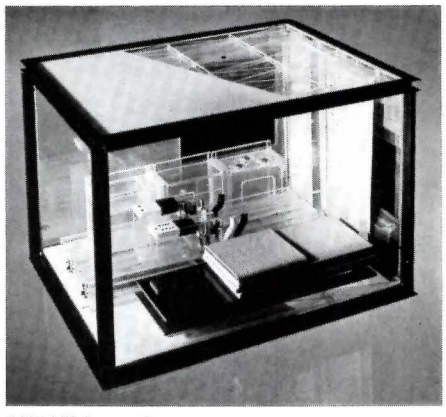
The Sekisui Chemical Co. has named the box unit system, Sekisui Haim. Production began early this year in two separate factories with an annual estimated output of 40,000 box units. The factories are set up like automobile assembly plants and at optimum efficiency produce 100 units per day per factory. In an eight hour day that is equal to 12.5 units per hour or one unit every five minutes. Each unit weighs one and a half to two tons and costs about $2,700. The units have a light-gauge steel frame, with steel and wood infill panels. A typical three-bedroom house, comprised of seven or eight units, can be erected in only three hours, not including caulking and finishing. The completed house, with built-in wall storage units sells for about $22,500.

The Sekisui Company is now offering the box unit house in twenty variations and as the technology becomes more sophisticated, its options will expand. This phenomenon has been asserted by several observers of super-industrial society, notably Alvin Toffler who claimed that: "The more advanced the technology, the cheaper it is to introduce variation in output. We can safely predict, therefore, that when the construction industry catches up with manufacturing in technological sophistication, gas stations, airports and hotels, as well as supermarkets, will stop looking as if they had been poured from the same mold. Uniformity will give way to diversity."

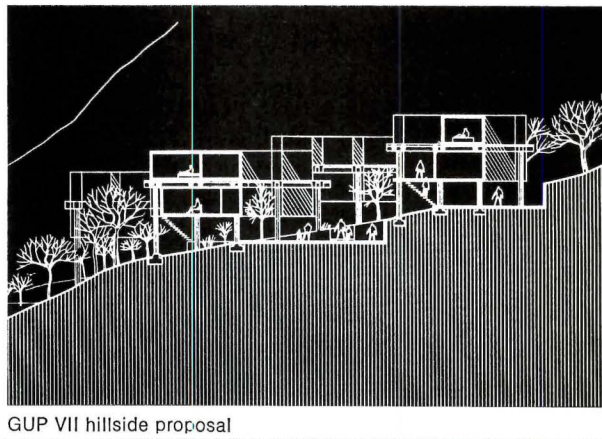
This ability to harness advanced technology in order to offer more permutations and variations in building systems is already becoming apparent in Japan. Apart from Sekisui Haim, the box unit housing concept is being expanded and refined by the



Typical GUP VII apartment layout



GUP VII box unit



GUP VII hillside proposal

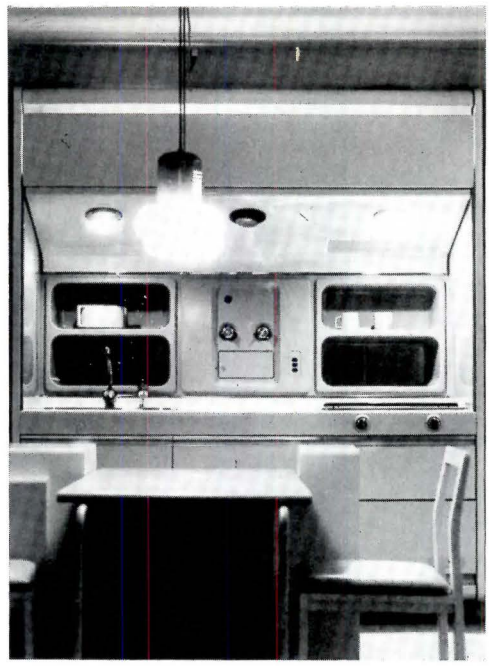
Sekisui Haim box system

Shinihon Steel Company, the Yawata Steel Company and a host of others bent on fulfilling the promise of open system flexibility.

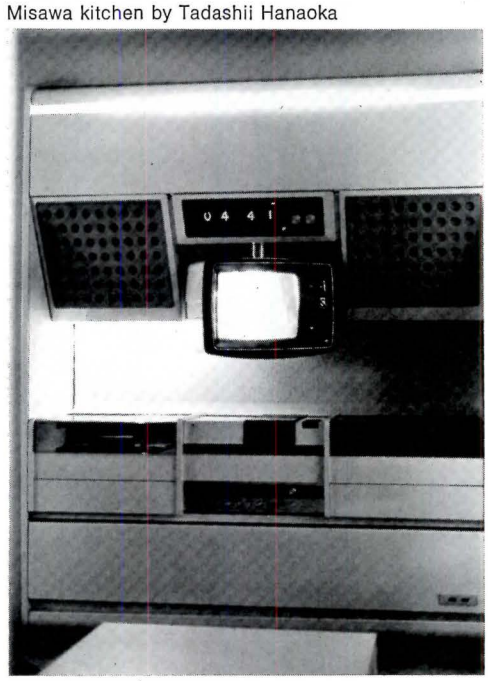
Another company determined to advance the technology of housing construction is Misawa Homes. A prefabricated housing company started twelve years ago by Chiyoji Misawa as an offshoot of his family's lumber company, Misawa Homes increased its sales in 1970 to $83 million, a 95 percent increase over 1969, and a 166 percent increase in net earnings. Misawa Homes has unabashedly modeled its entire operational hierarchy on the automobile industry, using three basic phases: production, sales, and construction. Misawa's concern is production, defined as, "the process involving the research, development, and manufacture of products." Sales are handled by franchised dealers (20 in Japan), and construction by bonafide contractors (1200 throughout the country). Some of Misawa's designs, as well as its operation, borrow from the automobile industry. Misawa recently hired Tadashii Hanaoka, a talented industrial designer who was previously an employee of automobile manufacturers Isuzu of Japan and Ghia of Italy, as a designer. Intent on bringing diversity and sophisticated mass production technology to housing, Hanaoka has proposed a series of plug-in wall units. These include an environmental control unit, an electronic communication unit, as well as sanitary, culinary and dressing units. Unlike most industrialized housing designers, who generally collect the mechanical functions into a compact core, Hanaoka distributes his plug-in wall units around the periphery of the building. Each unit contains a modular set of appliances and equipment which can be updated easily. At the same time it is possible to simply remove the entire unit and replace it with a different or improved model. In other words it is not only possible to unplug the entire unit, it is even possible and economically feasible, to unplug pieces of the piece.

The wall units are constructed of vacuum-formed, fiber-reinforced plastic and are resistant to the highest wind and earthquake loads. In addition, special tubing has been implanted throughout the unit's casing so that it is both sound and water proofed. When installed, the units cantilever from the building and do not infringe on valuable interior living spaces. All piping, ductwork and electrical conduit is located within the units themselves. This facilitates removal and servicing and renders the units almost self-sufficient—a key quality of a well-designed open system component.

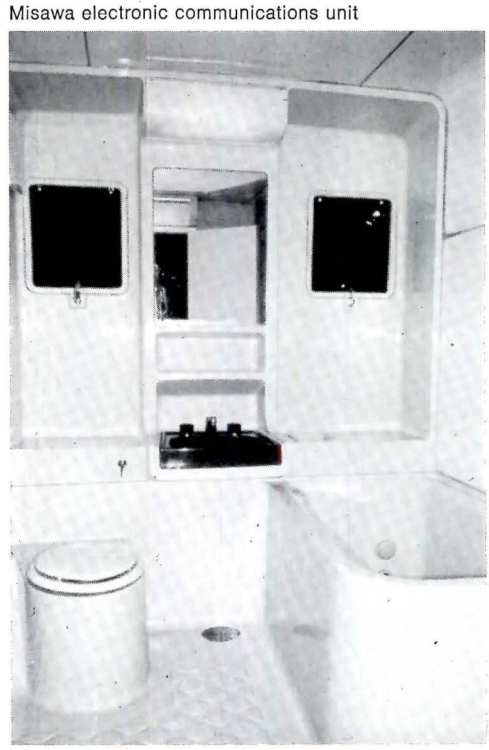
Components that meet these open system specifications are now being manufactured in Japan in ever increasing numbers. Interlocking box units, culinary, sanitary, and environmental control modules, as well as unfolding garages, inflatable living rooms and premolded plastic capsules are all available right out of the catalog. Charles Eames' dream of being able to select open components from a catalog and integrate them into a flexible environment for living, as he attempted to do in his Pacific Palisades home in 1949, is more than ever a reality in the world's fastest growing super-industrial state. With 90 percent of all Japanese housing designed on a 90 cm. (*tatami* mat) module, the flexibility, adaptability and interchangeability of parts inherent in open systems, are creating an industrialized architecture of unlimited variety.



Misawa kitchen by Tadashii Hanaoka



Misawa electronic communications unit



Misawa bathroom by Tadashii Hanaoka

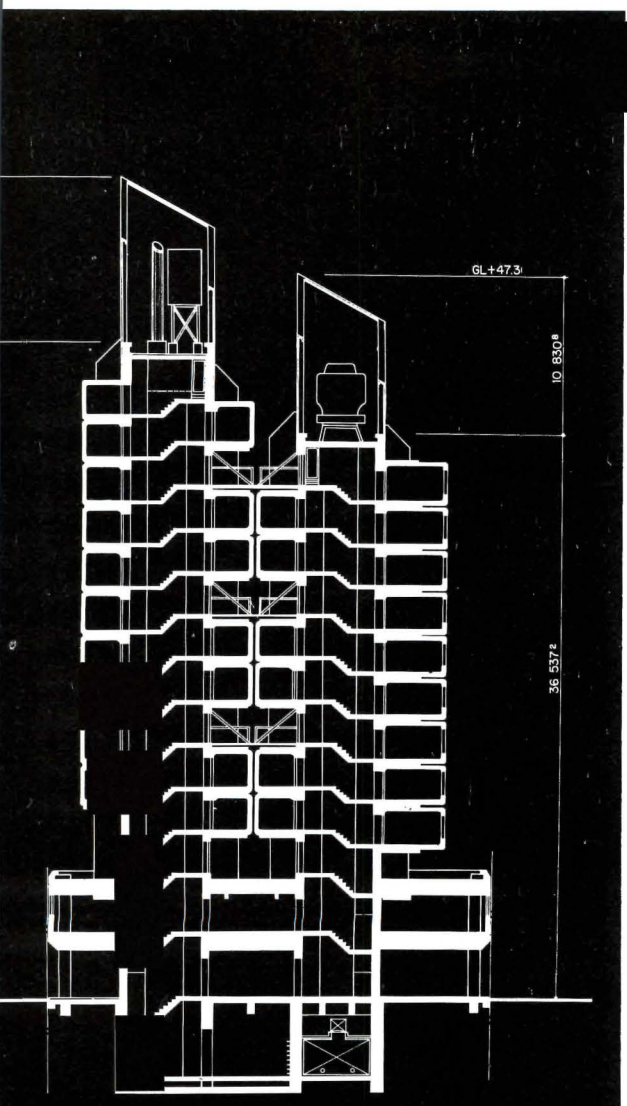
Capsuled freedom

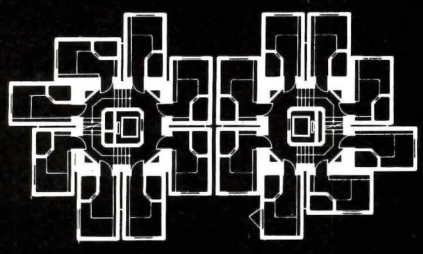
The term "industrialized building" most often generates images of prefabricated boxes or interlocking planes organized on a modular coordination grid. These mental images are the result of the open and closed systems building that is proliferating around the globe. At the same time that these open and closed systems are being developed and refined, a quiet revolution is occurring in "architechnology" — architecture utilizing industrial technology—that could restructure our urban evironments. Largely under the influence of aerospace hardware, architects are designing space capsules that do everything but fly. By far the most influential proponent of capsule architecture is Kisho Kurokawa (see Jan./Feb. issue).

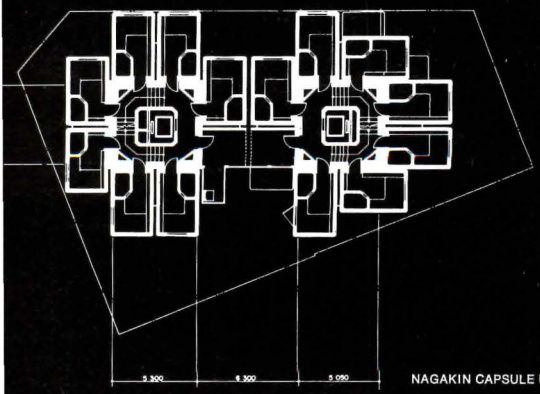
Like the aerospace industry from which the term was borrowed, Kurokawa has designed his capsules to be mini-universes. In his recently completed Nakagin Capsule Building, man is offered a complete living environment in no more than 8 by 12 feet. A more efficient use of space would be difficult to find even in densely packed Tokyo. The main objectives of capsule architecture, claims Kurokawa, is to achieve "100 percent mass production of living units by creating a new understanding of the house as a community of individuals." The Nakagin Capsule Building represents the first link in such an architectonic community.

To achieve such a community of individuals it is necessary to give life to the capsule by joining it to a mother-ship that will provide the water, oxygen and power supply essential for its functioning. This need generated a system of construction that combines prefabricated components with the more familiar elements of traditional construction. We call these "mixed systems."

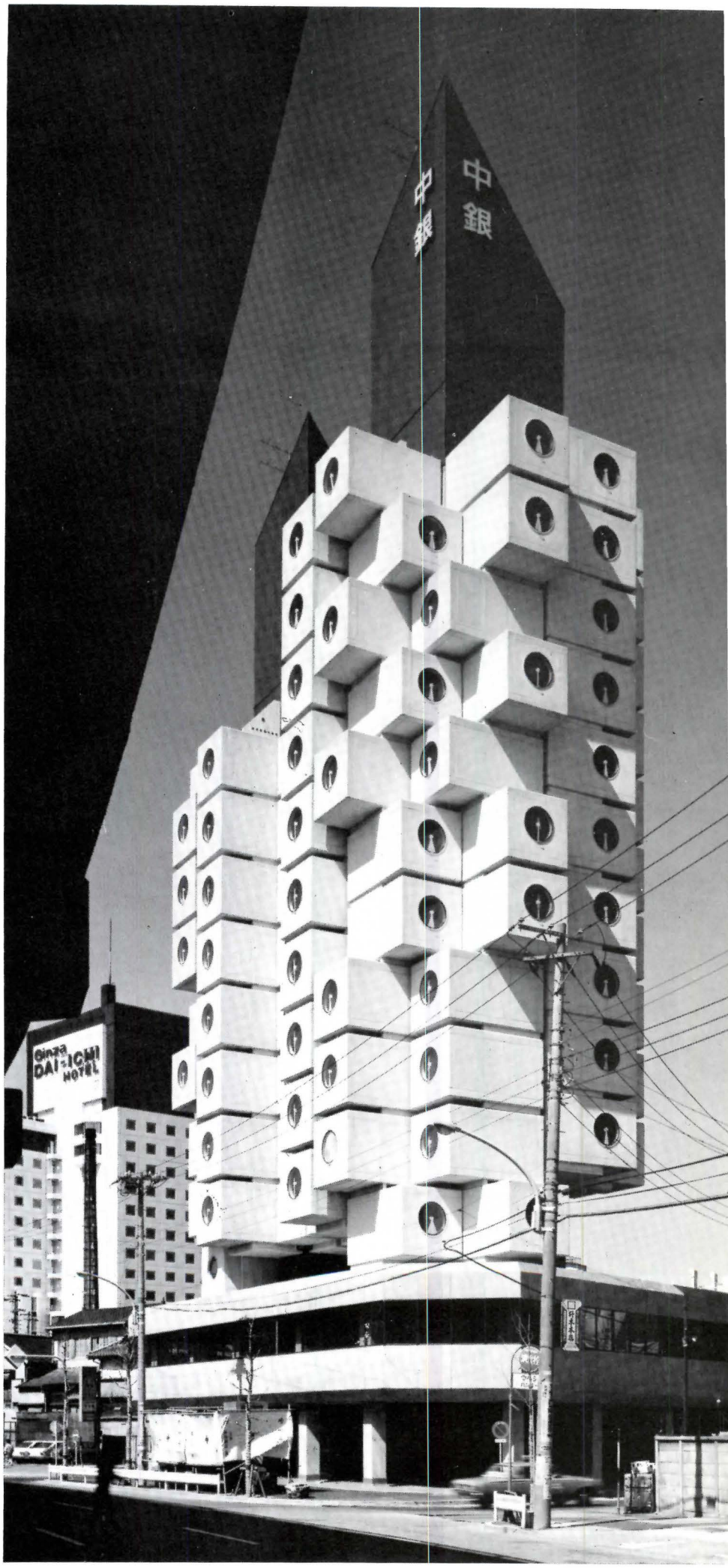
The Nakagin Capsule Building is a perfect example. By mixing traditional construction techniques with industrialized, interchangeable components, Kurokawa has created a mixed systems architecture that is perhaps even more flexible than the present open systems which accept *only* prefabricated components. The virtue of a mixed system is that the architect is no longer restricted to one technology, but can aggregate, synthesize and amalgamate elements of technology from a broad industrial base. For example, the basic structure of the Nakagin capsule is an all-welded, lightweight, steel box, manufactured by Aruna Koki on an improved version of the same







NAGAKIN CAPSULE UNITS



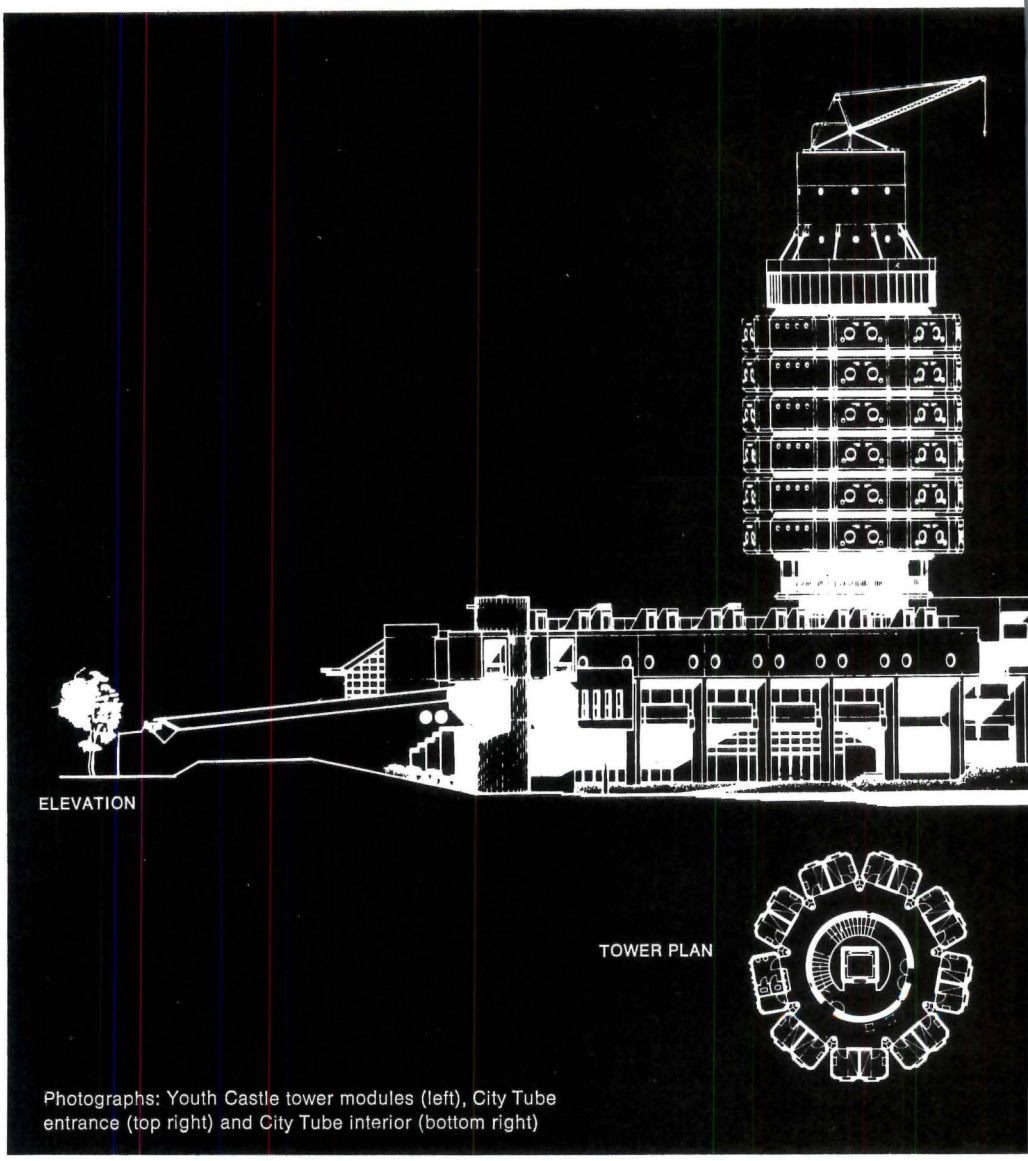
rig they use to produce large shipping containers. By tapping the expertise of the largest shipbuilding nation in the world, who pioneered containerization for transoceanic freight, Kurokawa has fused two technologies, affirming the versatility of mixed systems architecture. This ability to mix technologies and to combine seemingly divergent and contrasting parts into an integrated whole is the key to Japan's success in the field of industrialized architecture.

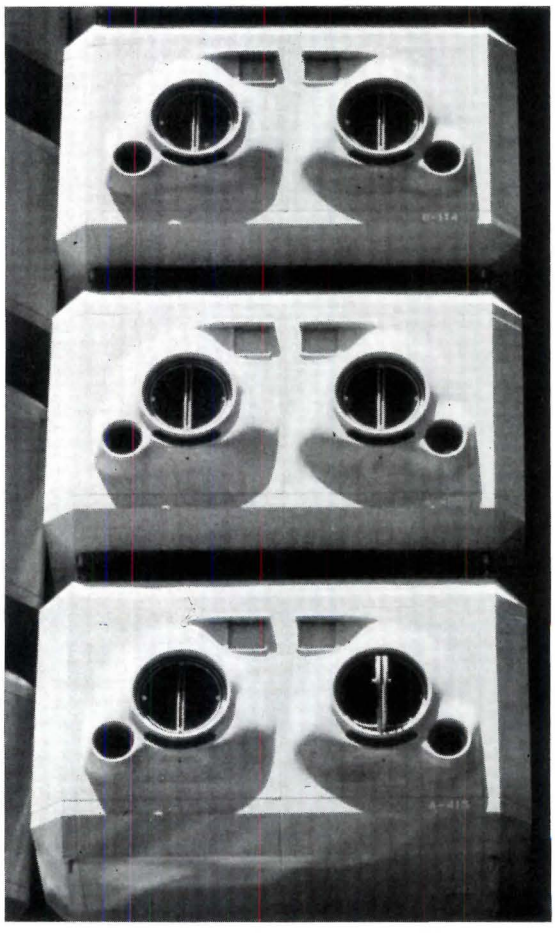
Kurokawa has also pioneered a concept he calls multistructure, of which his own house is a good example. The house is made of four weathering steel capsules and has a thoroughly modern exterior and interior, with the exception of one module, which is used for the tea ceremony. The interior of this capsule is copied directly from the famous tea master, Kobori Masakuza, usually known as Kobori Enshu (1579-1647). This contrast may be disturbing to Bauhaus adherents, but it exemplifies beautifully the Japanese ability to use contrary elements together.

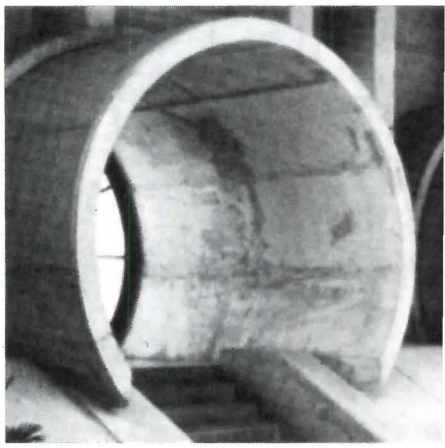
One of the finest examples of this architectural trend is the Kibogaoka Youth Castle in Shiga Prefecture, designed by Tatsuhiko Nakajima and GAUS. According to Nakajima, the highly diverse structure was meant to act as a visual focus, as well as a symbol, of technological progress for the residents of Shiga Prefecture. It does both successfully. The open arms of the plan receive approaching guests while the capsule tower draws their attention across the 2,000-acre cultural park. This expansive area is divided into three zones; sports, outdoor activities, and culture. The entire park acts as a green belt between two urban centers, Keihanshin and Chukyo, while the Youth Castle forms the nucleus of the culture zone.

The building itself is an intriguing assemblage of preindustrialized components, each one serving a specific function. The dominant element is of course the capsule tower, made up of a reinforced concrete cylinder which supports and services the nine capsules, clustered around it at each level. The capsules are sleeping and study modules and, unlike the Nakagin capsules, are not equipped with private bath. Instead a separate service capsule has been included on each floor to provide necessary plumbing facilities, and so limit piping to a very finite area. The capsules are constructed of bent and grooved steel plates braced inside the premolded walls and suspended from the cylindrical core. Arranged radially, they are supported at first by cantilevered concrete beams connected by steel rods running from the top of the major cylinder, then they were post-tensioned by an oil-jack located at the top of the tower. In this way the capsules are supported simultaneously by compression and tension, which according to the designers will withstand irregular earthquake loads.

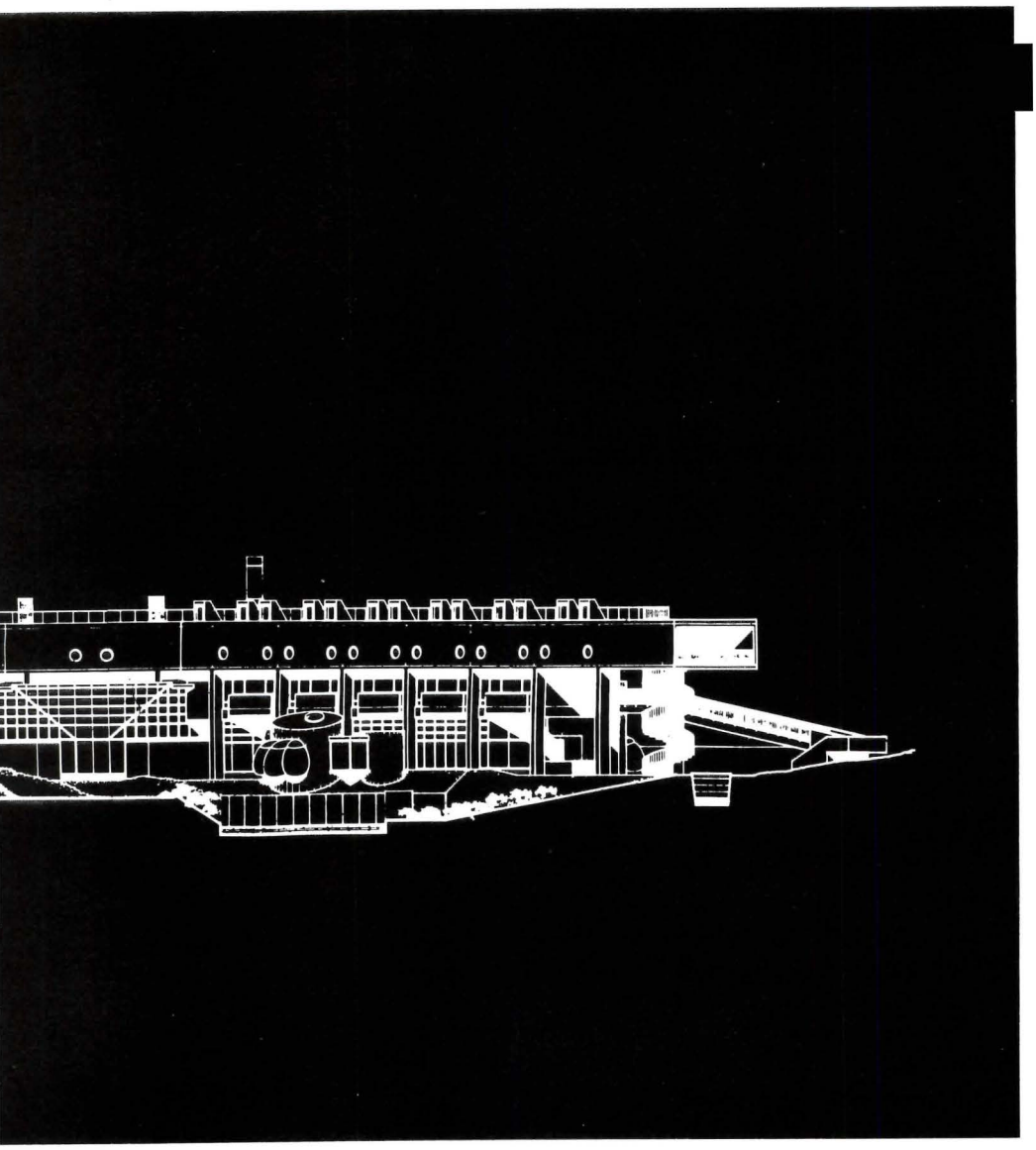
The horizontal space of the City Tube is counterpoint to the Castle tower. Accord-

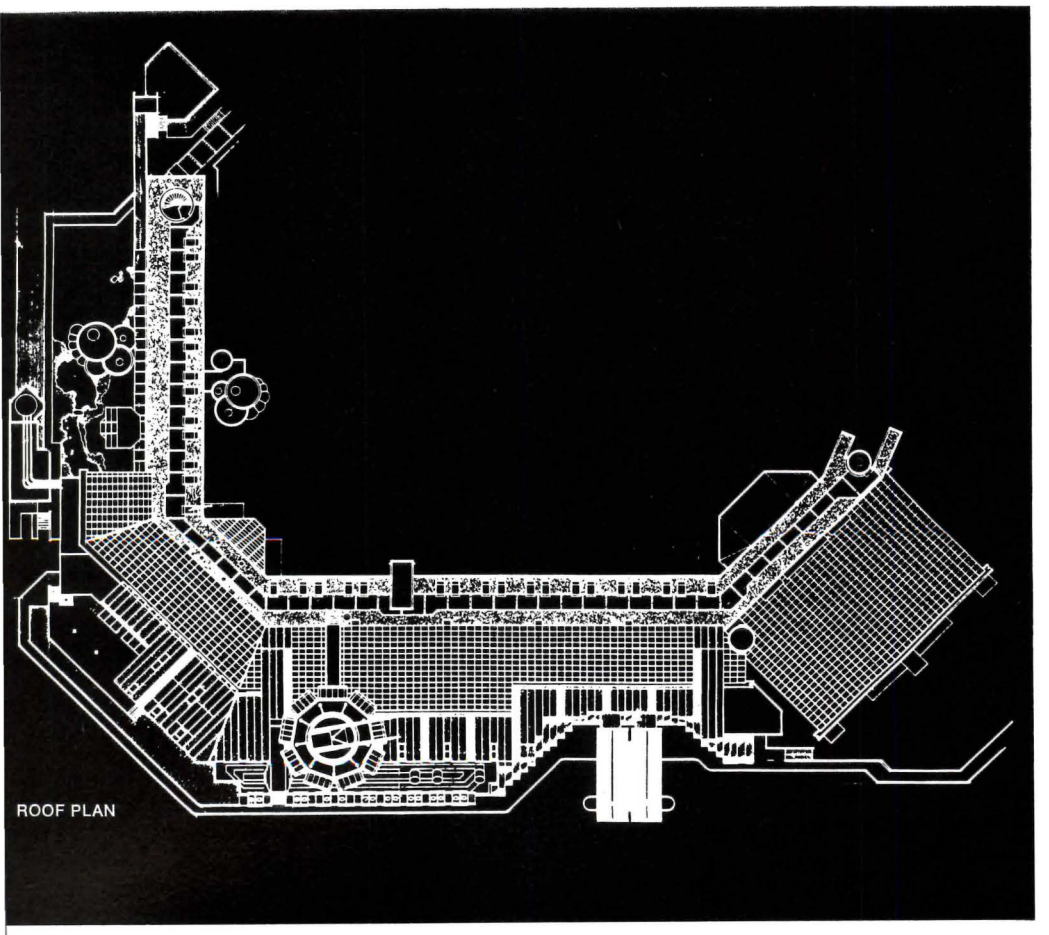






Photographs: Youth Castle tower modules (left), City Tube entrance (top right) and City Tube interior (bottom right)





ROOF PLAN

ing to Akira Shibuya, one of the project architects at GAUS, the City Tube was designed to simulate the diversity of urban space. The expanding and contracting spaces of the City Tube are unified by a space frame roof covered with a glass sandwich panel filled with mineral wool fiber. This industrialized roofing system insulates the space while filling it with diffused, natural light. Punctuating the linear space are sanitary capsules wrapped in translucent canvas, prepackaged HVAC units, and an information-control station. Sculptural elements on opposite sides of the City Tube are men's and women's public baths, consisting of preformed FRP (fiber reinforced plastic) shells set on their side. These shells bring a warm, natural light into the rooms and, at the same time, assure visual privacy.

As a total entity the multifarious Kibogaoka Youth Castle is an imposing structure, yet within the bold framework there is an intelligent application of technology to architecture. Industrialized building components have been used as a vehicle for expression, but at the same time are serving the human beings that inhabit the capsules and meeting rooms within the building.

Technological facade

Among the many architects responding to the influences of industry on architectural design, there are some who are more concerned with the visual product than with the construction techniques of building. This has produced a school of thought that embraces the image of technology, the "techno-esthetic." This esthetic emphasis is creating buildings that look like pieces of technology, rather than buildings that incorporate industrial principles into their construction. This is not unlike the "experience makers" of the automobile and electronics industries who increase the number of dials and gadgets on a product to make the user believe he or she is master of a complex piece of technology. The application of this concept to architecture, while visually amusing, is fraught with grave implications. It is essential that as architects we distinguish between visual preoccupations and the intelligent application of technology to building.

In Japan the man probably most fascinated by the techno-esthetic is Youji Watanabe, a relative newcomer to the use of industrialized components in architecture. During the 1960s when the Metabolist movement was at its height, seeking to find new ways of relating technological change to human habitation and the burgeoning of cities, Watanabe was still immersed in a nostalgic affair with traditional Japanese materials and forms. This is apparent in his Yamazaki House in which he played with interlocking wooden structural members and employed traditional interior building elements. Since that time he has acquired a taste for the image-of-the-machine, the techno-esthetic, which is both literally and metaphorically, a facade of technology. This was first demonstrated in the now

famous New Sky Building No. 3 in which Watanabe dressed traditional Japanese interiors with imitation "Airstream" mobile homes stacked one upon the other. Although the units resemble capsules, they are merely the prefabricated facade, and not an integration of advanced technology with a service tower as in the Nakagin Capsule Building and in the Kibogaoka Youth Castle. As to the "streamlined" water tanks on the roof, Watanabe explained that he was "influenced by the desire to recreate the marine architecture of the Navy," in which he was a lieutenant.

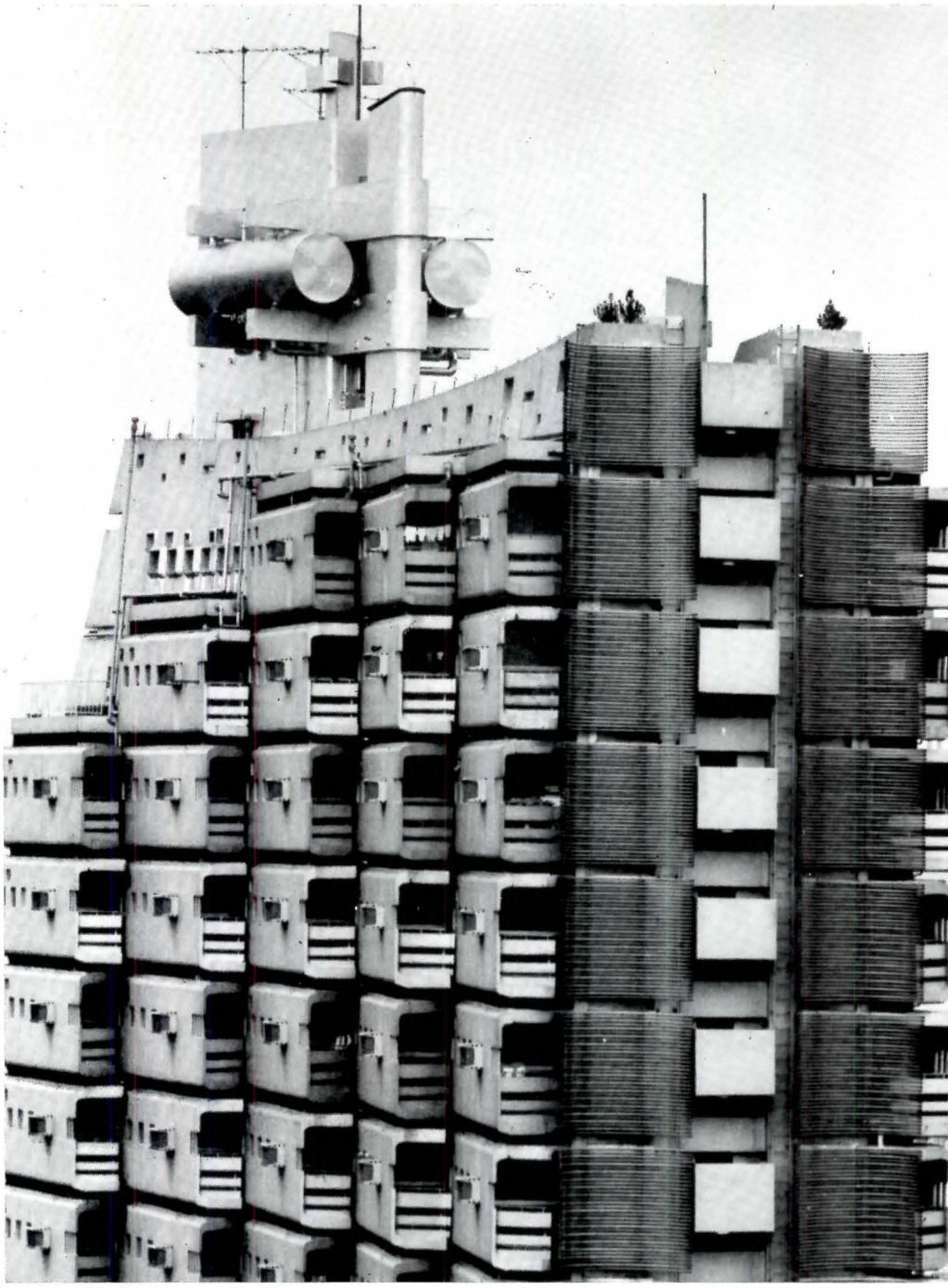
This preoccupation with the machine esthetic has continued to permeate Watanabe's recent works. In his design for the New Sky Building No. 5, he attempted to create a sleek object with "exhaust pipes" for "dragging" down the street. His esthetic concept is clearly represented in his model for the building, which is made of sheet aluminum, however the actual reinforced concrete structure bears little resemblance to the conceptual ideal.

His most recently completed work is the Doctor Yamazaki Residence (not the same Yamazaki for whom Watanabe designed the traditional house a decade earlier). The building seems to be four capsules suspended from a core, but in reality is another reinforced concrete hoax, straining the traditional material to its limits. When I visited the building with the architect in March of last year, I mentioned this apparent paradox. He explained that it was, "a harmonious combination between traditional Japan and the modern West." Later in discussing a housing competition of his, I asked how he felt about using systems analysis in his work, either in the programming and design phases or in the construction phase. Watanabe replied that, "The Japanese architect tries to distinguish himself from engineers or technical specialists. He considers himself more or less close to an artist or a philosopher. Any architect who depends on computers is a poor architect." This reconfirmed Watanabe's devotion to the esthetics of technology, even to the exclusion of actual technological advancement itself.

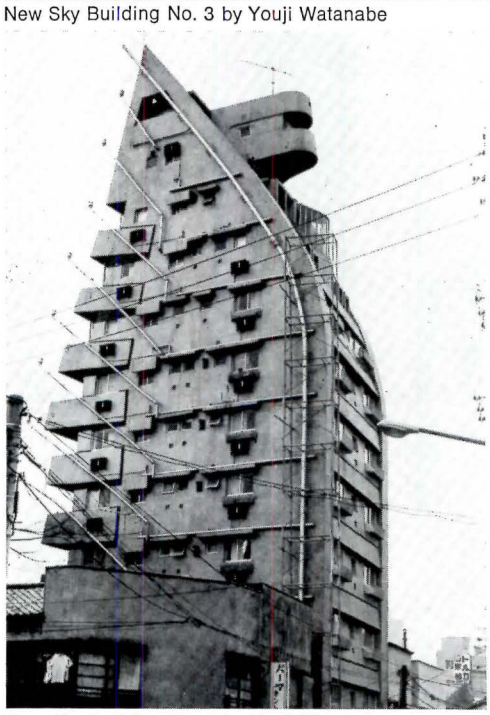
Clearly every architect is charged with the responsibility of creating visually stimulating environments, and whether his preference is for Classical, Mannerism or Baroque is his personal choice, but to confuse infatuation with the image-of-the-machine, and its resultant visual formalism, with the substantial development of architectural technology is a serious trap into which we must not be seduced.

Everyman architecture

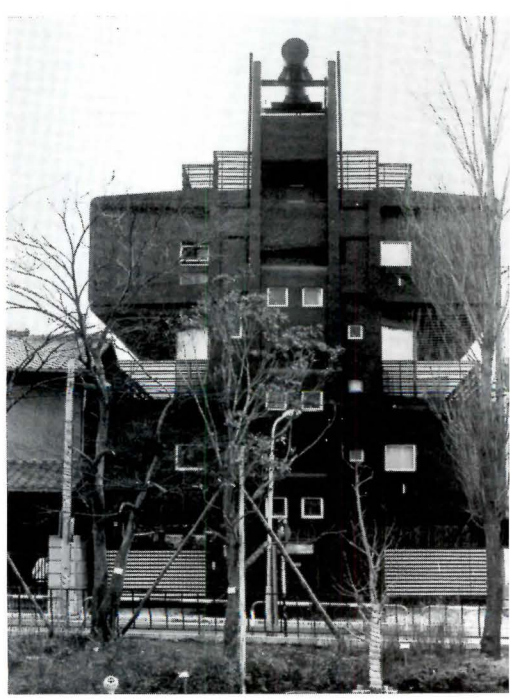
The final chapter on industrialized building isn't being written in the university laboratories nor in the sophisticated arena of mixed systems architecture. It is being written in the hamburger drive-ins, in the outdoor recreation tents, and in the floating playgrounds of fun architecture. This is the test of industrialization, whether it can



New Sky Building No. 3 by Youji Watanabe



New Sky Building No. 5 by Youji Watanabe



Doctor Yamazaki Residence by Youji Watanabe

stand up to the use and abuse of the average citizen.

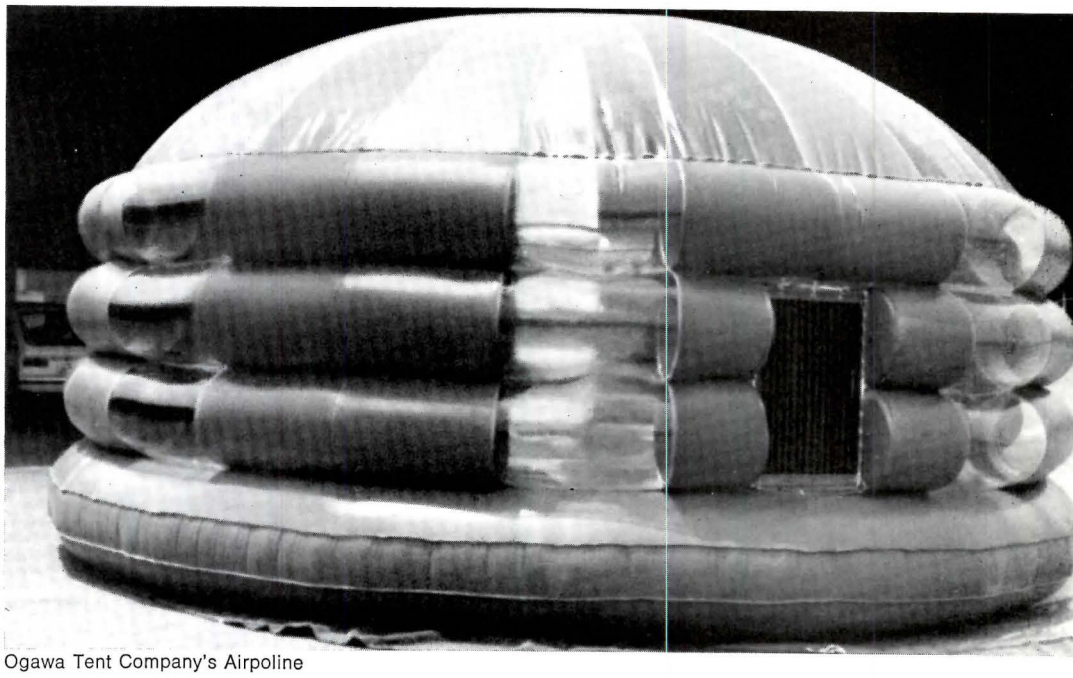
One of the leading protagonists of this movement is the Ogawa Tent Company. Founded in 1914, the company has a long history of manufacturing practical, everyday goods, including such diverse items as awnings, tents, rafts, fishery tools, rainproof goods and prefabricated provisional structures. The Ogawa Tent Company manufactured no less than eight different pneumatic structures at Expo '70 including the remarkable Fuji Group Pavilion designed by Yutaka Murata. Their latest creation is the Airpoline, a 21 foot diameter, 12 foot high, multi-purpose, pneumatic tent. With or without its dome-shaped roof, the Airpoline can serve as a children's playroom holding fifteen kids comfortably, or as additional living space to be attached anywhere on to your existing residence. Available in a rainbow of colors, the canvas and clear plastic structure comes complete with two pneumatic air pumps, for about $6,400.

The indefatigable Kisho Kurokawa has also applied his technological know-how to the design of everyman architecture. At the Odakyu Drive-in in Otome, Kurokawa used a steel-pipe space frame to support a capsule restaurant. Furthermore, a tent structure on the roof serves as an open-air beer garden. A short drive from Kurokawa's space frame drive-in, is the Oiso Long Beach poolside restaurant, a bright orange geodesic dome serving up such twentieth century delights as an instant microwave cheeseburger. When Bucky Fuller's genius filters down to the ubiquitous hamburger joint, architechnology is here to stay.

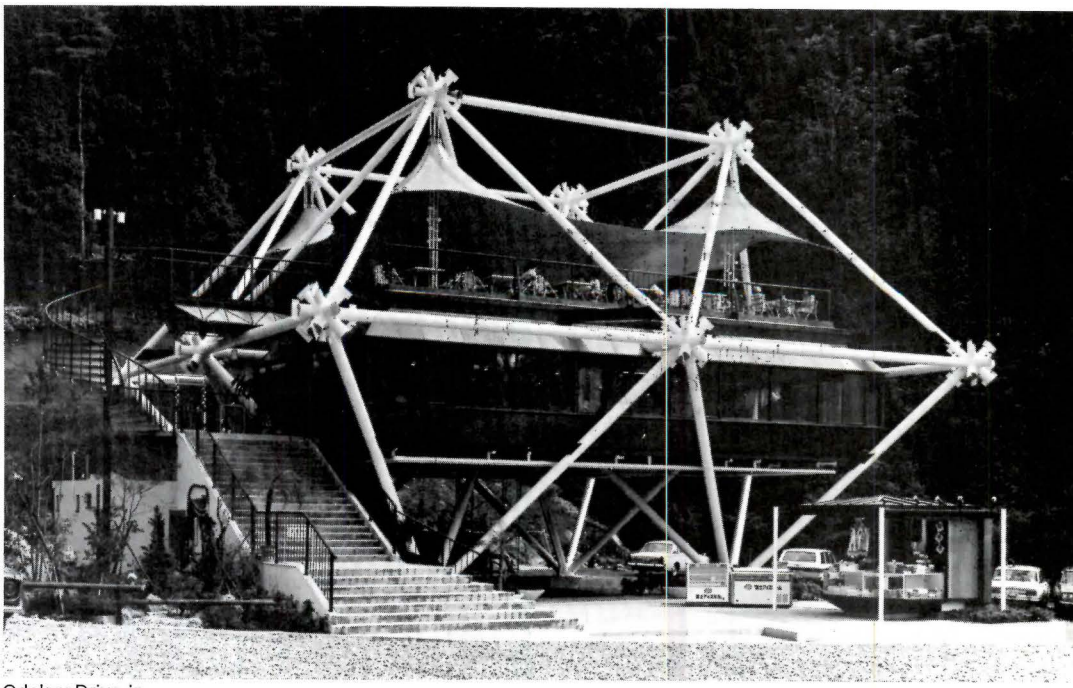
Even the once independent world of marine architecture cannot escape the ripples of the wave. The floating Daika Dream House is nothing short of a space capsule on water. The fiber-reinforced plastic structure is finished to endure wind and rain and is guaranteed not to deteriorate under normal use. In Japan, the unit houses a family of five comfortably, and sells for about $2,500. It is touted by its manufacturer to be perfect as a summer lake house, a beach house, a camping retreat, tea house or ski house. Whatever its application it is obvious even to the most casual observer, that the country with the fastest growing Gross National Product in the world is applying industrial technology to everything that floats, rolls or stands still.

In many respects Japan is the testing ground for the super-industrial, densely packed, techno-society of the future, that the urbanizing world is moving toward. Whether we will be able to adapt our built environments to the ever changing demands of such a society, is a question architects the world over are grappling with. Surely if we can "learn from Las Vegas," then maybe we can also benefit from "Benihana."

Oiso Long Beach poolside restaurant



Ogawa Tent Company's Airpoline



Odakyu Drive-in

Photographs: By author, except p. 91 (top and middle) and p. 93, by Tomio Ohashi.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CLOSE-UP

How to read the American City

Grady Clay has a special way of looking at the American urban scene: always concerned primarily with the physical environment but interpreting it through the political, economic and social forces which make each city unique. Close-Up, How to Read the American City, *a book recently issued by Praeger Publishers Inc., is a compendium of his thoughts, distilled into a terse, intriguing vocabulary and then elaborated and illustrated with material found on his travels across the continent. "Fixes," the chapter excerpted here, is a catalog of traditional ways by which we understand cities. It is followed in the book by a series of perceptual aids for unraveling urban complexity with such provocative titles as "Beats," "Stacks," "Sinks" and "Turf." Grady Clay is editor of* Landscape Architecture, *president of the American Society of Planning Officials and a Guggenheim Fellow for 1973-1974.—ED.*

Fix 1: Perspective

Most of us still look outward from rigidly conditioned points of view. Our visual gyroscopes, set spinning centuries ago, cause us to swerve, pause before familiar scenes, and resist the new and unfamiliar. We are fixed or, in the earliest meaning of that word, fastened or pierced, stuck to an old constraint.

Of all the fixatives still permeating the modern vision, the perspectivist tradition is one of the most rigidifying. Like a mental chemical, it tends to preserve our perception in an earlier state—a kind of tunnel vision.

I recall being part of the voluble and amiable Delos III Symposium, a group of touring discussants brought together in 1965 by the Greek planner-architect Constantinos Doxiadis. On the Aegean island of Thassos we were wending our way up the mile-and-a-half climb to the Temple of Apollo for a memorable lecture by Dr. Arnold Toynbee. Along the way I had stopped to photograph the lovely crescent harbor below with its red-roofed village in the middle distance, greenish-blue mountains in the far distance, and setting sun casting its beams over the Aegean Sea just at the nose of the mountains, all enframed in pine branches.

For a moment I thought I was alone until I discovered the teen-aged son of our host sitting in an ancient crypt behind me. Young Apostolos Doxiadis was sketching the selfsame view that had stopped me in my tracks. Suddenly I realized that we both were captives of a 400-year-old way of looking at the world, as a stage setting, tied to the perspectivist tradition, and magnetized to that particular spot and to no other. As Marshall McLuhan was later to put it, we were still prisoners of the Renaissance way of looking outward, "a piazza for everything and everything in its piazza,"—visible, predictable, and static.

Later, home from Thassos, I was assembling an array of Kodachrome slides for a lecture on the principles of waterfront development only to discover, as I slouched over the light table, that each scene had been photographed from the same viewpoint as in Thassos: land was on the left, water on the right; the crescent of the water's edge ran from upper-right center downward. No matter where I had stationed myself, at home or abroad, my "fix" was showing.

What invisible hand had guided mine to produce those uniform photographs? It was indeed the perspectivists, those innovative artists of the fifteenth and sixteenth centuries who discovered and developed that powerful instrument of vision, the perspective drawing. For over 200 years, artists and mathematicians experimented to produce a sense of three-dimensional space in two-dimensional drawings. By the sixteenth century, the study of architectural perspective, in Louise Bowen Ballinger's words, "became almost a theatrical extravagance, evidenced in the theater, in paintings and in architectural interiors."

Stereotyped ways of looking became the standard stance of the educated classes in Europe. According to Paul Shepard, "Gentlemen of the seventeenth century . . . having learned the clues to scenery from looking at pictures . . . were prepared to look for the picturesque wherever they found it . . . [depending on] the scenery's capability of being formed into pictures."

Such fixes, organized out of the past, assume powerful influence, as in the work of Camillo Sitte, the Viennese architect whose *City Planning According to Artistic Principles* was immensely popular when published in 1899, and has become a standard reference.

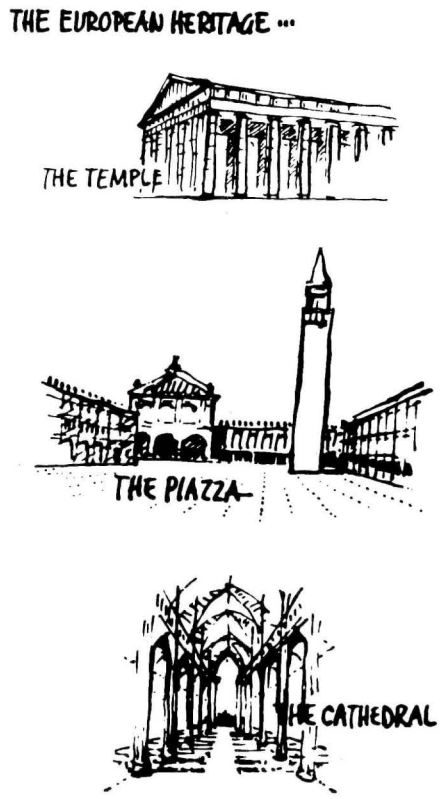
Like many a contemporary critic, Sitte made "an alarmed outcry of a cultured and sensitive citizen about the disturbing urban developments of his day." He analyzed Greek, medieval, and Renaissance cities "to bring forth something of the old masterpieces," seeking out, "as technician and artist, the elements of composition which formerly produced such harmonious effects."

Since proper perspective has everything all lined up in three dimensions with no questions asked, no answers are needed; it is already taken care of in the picture, laid out neat and proper. We need do nothing about it. No demands on us, no intervention required of us, a limited relationship is set up between us. That is the end of a vital visual language—when it creates pictures that need no answers. And that also is the death of a townscape—when it produces pat visual answers that require no questions.

Thus, by the 1950's when the United States was getting into its largest building boom, when housing, redevelopment, and suburban sprawl began to preoccupy American writers on urban affairs, many of us concentrated on the city in terms still visually organized by the perspectivist tradition. Gordon Logie, the British architect-planner, in his book *The Urban Scene,* dealt with towns and cities "from one particular point of view, their success or failure as pieces of scenery—one could almost say as sets in a theater."

The most influential practitioners were English, notably Gordon Cullen whose brilliant prose-and-pen style, inventiveness in examining evidence firsthand, and ability to give readers a feel for the "thereness" of places had international impact. His perceptive book, *Townscape,* available in the United States in 1961, and his earlier writings and sketches in *The Architectural Review* set up a new vocabulary of serial vision. His sketchbooks gave a clear sense of what it is like to move through neighborhoods. Although he dealt with the new sense of mobility, his ideal city seemed to be a medieval clustering of hobbledehoy buildings and winding alleys and streets. He projected so powerful a context in his sketches that it overshadowed much of his inventive, mobile gamesmanship for dealing with cities.

Traditional viewing of cities as stage settings and visual compositions dies hard. In her 1968 book, *The Language of Cities,* Fran P. Hosken dealt with the city mostly in such old-style terms of European theatrics as: order and unity, scale and space, light and shadow, color and texture. Predictably, in such books today's cities fail to measure up. Even the contemporary landscape architect Lawrence Halprin, in his



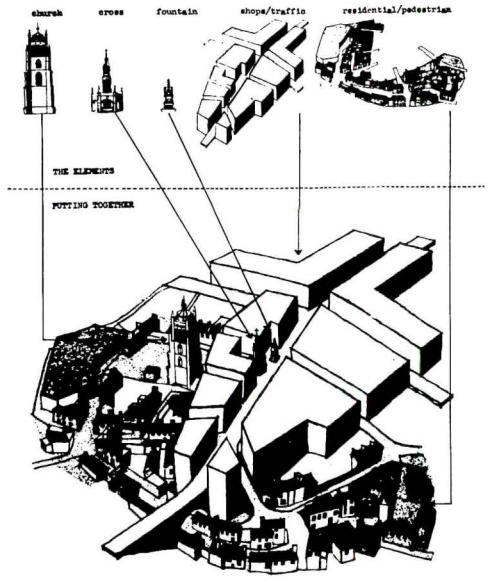
1963 book, *Cities,* seemed to be stuck with the old townscape shopping list—nostalgic encounters with street furniture, urban pavement details, fountains. However, at the very end of this book he broke loose with an adventurous choreography, "movement notations," later expanded in his 1970 book, *RSVP Cycles,* into the concept of scoring movements through the environment, a new intellectual confrontation with urban processes.

Lurking among us still are feisty rear guards defending the older perspectivist tradition. They mutter that highway drive-ins are messy, sign-boards low class, suburbs lifeless, and that industrial districts are contemptible unless they copy the moated and turreted castles on the hill of the Middle Ages, surrounded by protective open fields, sentry posts, gates, and other medieval tackle.

Only when we manage to break loose from the old fixes and look with new vision will the city fully come alive to our presence in it. Only then can we fully recognize functions, goings on, competition, cooperation—the energetic processes of city life too often concealed by the stage settings of the Renaissance and current efforts to copy them.

Furthermore, the burden of the Watts-to-Washington, D.C. riots of the 1960's, fears of mob violence and of official repression, the looming presence of domestic poverty and of increased governmental surveillance, and the growing gap between American claims to moral purity and the immorality of its violence abroad—all this served to traumatize too many of us into a cynical nearsightedness when looking at the world. When it was discovered that Lake Erie was dead—a discovery like Mark Twain's death, somewhat premature—too many otherwise perceptive Americans shut their minds to a continuing analysis of that complex water system and its behavior setting. It was more satisfying to condemn than to investigate, simpler to look, only to look away.

But I do not think steady trauma is a healthy state, nor the dour puritanical glower a receptive stance. All gatherings are not potential mobs, all gleaming waters are not to be scrutinized exclusively for oil slicks, nor all forests penetrated merely for proof of corporate clear-cutting. There are pleasures as well as crimes to be uncovered, distinctions to be made, and prospects to be explored, described in clear detail, and understood.



Fix 2: Cross Sections

If only cities, like insects, could hold still like good specimens while we pin them to the laboratory table for study! If only they were like cadavers: cold and rigid from the freezer so that anatomists could debate, following the lead of Andreas Vesalius in the sixteenth century, the proper way to cut a cross section and examine the anatomical patterns inside.

The cross-section examination is an ancient device for studying almost anything from insects to regions, and that great biologist, Sir Patrick Geddes, has left us a superb example in his valley section. It worked well as a pictorial image in his day, and was most clearly put forward in his famed Cities Exhibition at Chelsea, London, in 1911. Geddes had exhibited a large painting of a typical valley cross section as a visual device for understanding the unity and complexity of that geographic unit.

Travel with old Sir Patrick in mind, starting as he did at a remote mountainside, descending through woods, pastures, fields, outer suburbs and then into the town and its seaside docks. It was a predictable set of places, which Geddes perceived in simplistic panoramic terms; the town was a product of its region. From its neighboring hills flowed coal to be shipped, game to be eaten, cattle to be slaughtered, wheat to be milled —everything proceeding downward from hills and fields to grocer, miller, baker, brewer, and shipper. The town was the local magnet, the processor of raw materials that were raised, found, dug, or grown nearby.

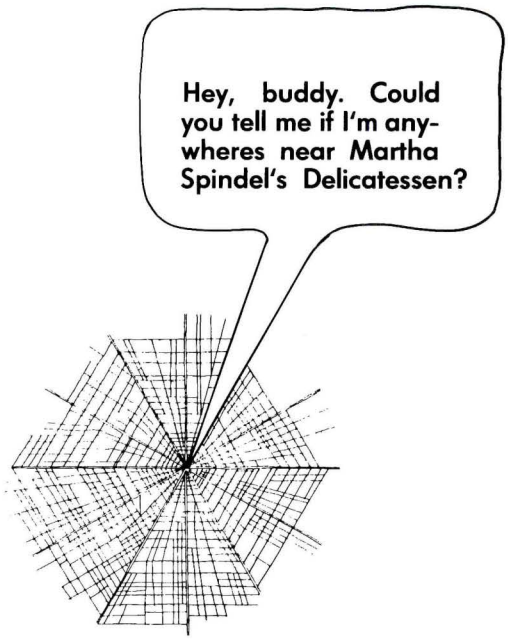
Thus Geddes perceived the early twen-

tieth-century town region as a unit. His cross-section diagram enabled him and his exhibition audience to see towns and cities as the expression of their settings. His 1911 panorama showed an orderly, progressive system of transactions from uplands to port, from raw to finished materials. The town or city was still the receiver of raw materials, messages, goods, instructions, and influence from its hinterland.

But how does one translate that old intellectual device today? The contemporary urban complex has become the major power source, the originator of organization, the sender of messages, the manufacturer of influence. Its major exports are energy and control. It ships out regulations, orders, information, propaganda, and directives. It generates transactions to be carried out by the city's agents, salesmen, bureaucrats, managers, and owners. The city is a source region, as polar Canada and Siberia are source regions for North America's weather fronts, spawning and giving identity to cold air masses that flow southeast across the United States.

This 180-degree shift in influence, from Geddes's day to this, has been traumatic. In three generations, "countryside" has been converted from source to recipient, from generator to subject, chattel, or pawn. Countryside is judged chiefly by the presence of, or lack of, urban goods, techniques, and influence. College curricula writers are hard pressed to insist there is still a legitimate subject called "rural sociology," and tend to speak instead of the rural-urban continuum. The prevailing view in America is outward from a city base of operations. Country takes its identity from the city rather than from its own self, and country life is increasingly hung up with nostalgic and usually denigrating images of itself created in Washington, New York, Boston, San Francisco, and other major image-generation centers.

Thus to view the city with anything resembling Geddes's perspective of the valley section is to misjudge its force, to misperceive its direction, and, above all, to be stuck with a mental tool that hardly equips us to grasp the dominance of city influence over the whole of American life and landscape. Geddes's analysis, like that of the perspectivists, is out of date; and those who hold to it steadfastly are ill-equipped to deal with, or to understand, the forces at work within the contemporary metropolitan scene.



Fix 3: Centrality

There was a time when everything that was important in a region happened at its center; when all roads led to the center (before the automobile made possible the discovery that all roads also led *away* from the center); and when the importance of one's home, business, office, showroom, and activities was measured by its proximity to that most central of all points, the old city center, the old downtown.

So powerful was this fixation that it has dominated city growth and attitudes toward cities for thousands of years. During most of those years, mankind had no choice: being physically "close-in" was the only way one could efficiently buy, sell, trade, barter, exchange, charm, seduce, or negotiate. Everything in urban life sooner or later had to flow, either physically or symbolically, through the central market places for goods, services, and ideas. Geddes's valley section reflected this flow.

Today, thanks to cheap or free media, to the new interconnected and intercommunicating, switched-on society, and to increased personal mobility and movement, the old grip of centrality is loosening. No longer can we be certain that, by the grace of God and the laws of geometry, all things of importance are best transacted at the center, all debates concluded at the center, and all great structures located at the center. The first nails in that coffin were supplied by the invention of the telegraph and telephone (which, among other things, put the skids under coffeehouses in New York as *the* places for swapping business information in the 1870's); by mass transportation to space for sale via street railways in cities, railroads, and automobiles; and now by the new personal media—portable TV, console access to computers, hotlines to libraries and data centers, and quick access to plugged-in information.

Just as the old concept of chastity has been structurally undermined by the Pill, so the old concept of centrality has been undercut by everyman's access to space by movement (commuting, vacationing, long-range visiting, etc.), and by everyone's access to information that does not require face-to-face encounters for its production and possession.

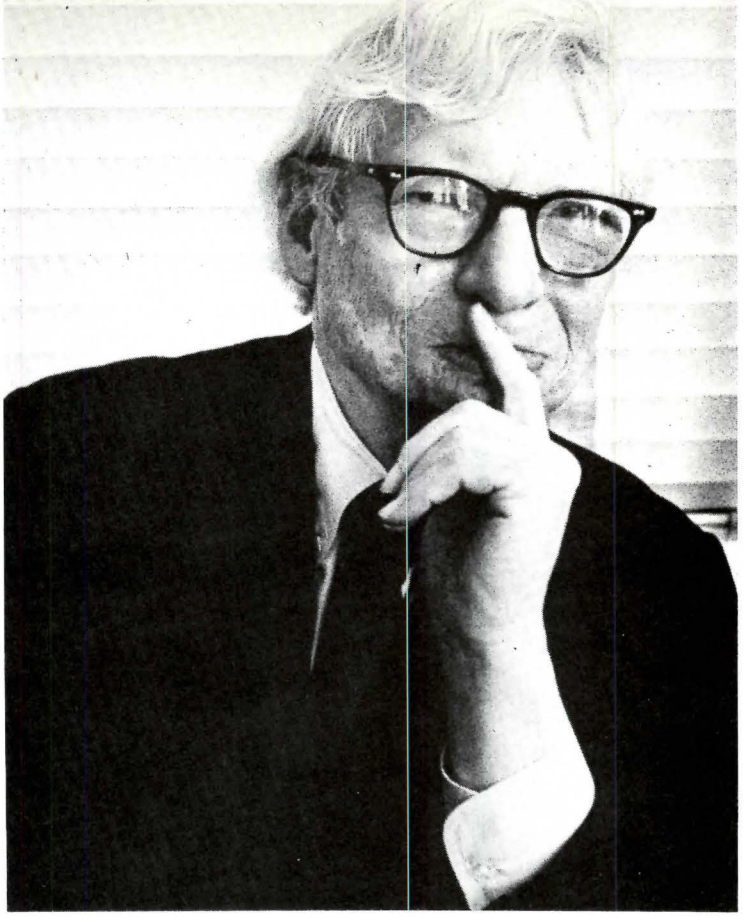
For hundreds of years, royalty and other powerful groups had sought to tighten the reins on central places, to force the public to traffic through and with the center, to build at high densities and not sprawl at a distance. But these containment efforts have generally failed, except in such land-starved and crowded countries as Holland, where sprawl is rigidly prevented in order to save scarce farmland.

Consequently, it is time to recognize that the magic of centrality has waned; and that our fixation with the old concept of a city where "everything goes up in the center"—land values as well as skyscrapers—no longer provides an accurate view of the way cities are acting and changing. And so what happens to old downtowns now epitomizes something far bigger: traumatic changes and shifts in voting and financial power; the takeover of central neighborhood turf by blacks and other minorities; the restructuring of whole cities as they segregate shopping onto suburban strips and clusters, health care into medical centers, jobs into industrial and port districts, and many another single-purpose enclave in a more dispersed pattern.

To be sure, the rising power of government in many parts of the world, including the United States, continues to express itself in "efficient" and "rational" efforts to promote high-density centers, especially in master plans that try to restrict the growth of suburbs, and concentrate housing developments downtown.

But, just as the marvelous discovery of perspective gradually became perverted into stage setting, just as the cross section and its scientific uses led us to look at the city as a specimen to be frozen for laboratory examination, so the old magic of centrality has misled us into seeing the city only in terms of its ancient and once-immobile geometry. Each of these old-time fixes now tells us to get out and take a new look around.

Engraving from *Perspective: The Most Famous Art of Eyesight* (1604-5) by Jan Vredeman de Vries. Drawings by Charles William Brubaker



KAHN

Norman Rice, who was one of Louis Kahn's oldest and closest friends, made these remarks at a funeral service held in Philadelphia on March 22nd. They are reproduced here, together with a number of photographs of Kahn's most significant buildings.

A year ago or so, Esther and Lou Kahn, and other friends, were at our home. While conversing with Lou and another man, I said that the funeral oration spoken by Pericles over the fallen Athenian soldiers was the greatest of all funeral orations. Lou asked me to read it to him; he was deeply moved by it. Let me read a few sentences from its beginnings.

"Most of those who have stood in this place before me have commended the institution of the closing address. It is good, they have felt, that solemn words should be spoken over our fallen soldiers. I do not share this feeling. Acts deserve acts, not words, in their honor. . . . Our sense of the merits of a number of our fellow citizens should not depend on the felicity of one man's speech . . . and those who have known and loved the dead may think these words scant justice to the memories they would hear honored."

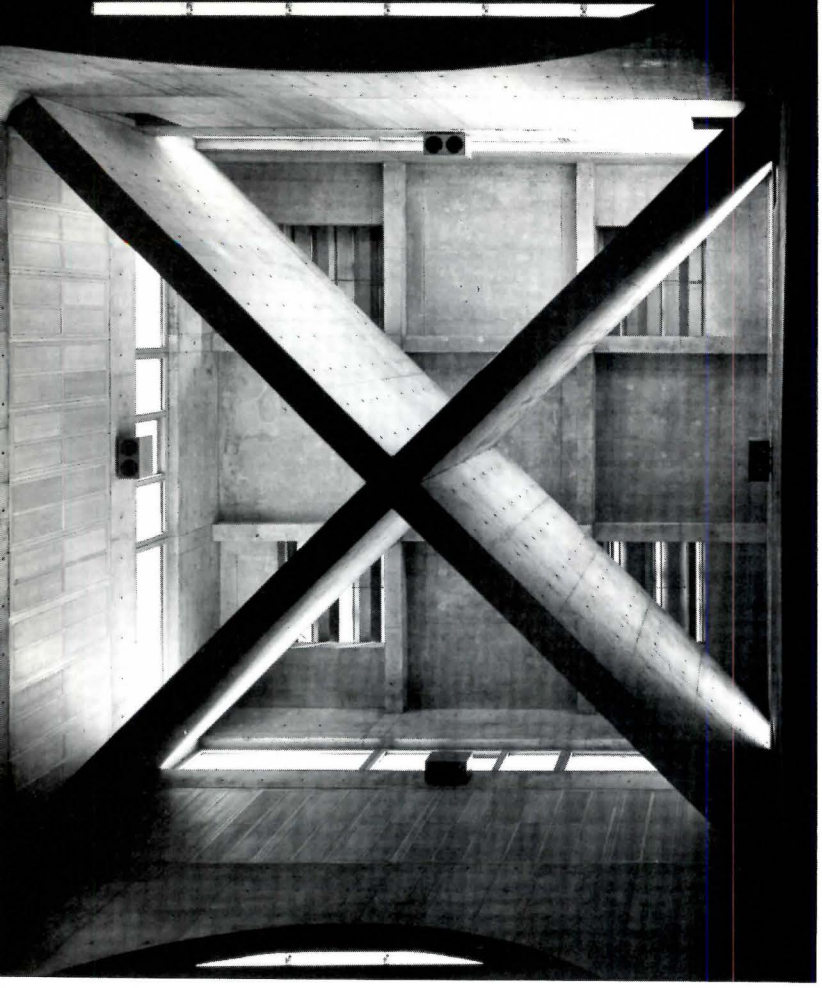
Since many have written and will write of Lou Kahn's works and sayings, and many have spoken and will speak of them, I was asked to speak as his oldest friend and colleague teacher.

When I was in the sixth grade and showed some talent in drawing, I was sent to a unique public school, long since gone, the Public Industrial Art School, established by a remarkable man with the unique name of J. Liberty Tadd. There we were taught drawing and painting, modeling in clay, and woodcarving. There I first met and got to know Lou Kahn. He was an outstanding student in that school, renowned for his sketches of animals at the Zoo.

Later, we were together during four years at the great Central High School in this city. I claim I was really educated at Central High and learned only my profession at the University of Pennsylvania. Lou claimed he passed the high standards and great faculty of Central only by the skin of his teeth; I told him his language showed the effects of four years of his youth spent with excellent teachers.

In those years, we and several other boys who wanted to draw and paint used to meet for sketching trips in the nearby countryside—the countryside was more nearby then. Also in those years, Lou won first prize several times in citywide contests in drawing. In our senior year, the head of the school's art department, William F. Gray, gave us a course in architectural history that included making drawings with ruling pen and India ink of famous buildings. Lou earned some much needed extra money in the somewhat illegitimate way of making drawings for untalented students; he said he masked his authorship by purposeful ink blots.

Kimbell Art Museum, Fort Worth, Texas, 1972. A series of vaults, each 100 ft. long, forms the basic structure of this building. Slots of light run the length of each vault. Highly reflective aluminum diffusers distribute the light. Photos:Hans Namuth.



Exeter Library, Exeter, New Hampshire, 1972. The cross-bracing of the central well is shown at left. Below that: Richards Medical Research Building, Philadelphia, Pennsylvania, 1961. Photo: Peter Blake. Opposite: Staircase in Yale University Art Gallery, New Haven, Connecticut, 1951. Photo: John Ebstel.

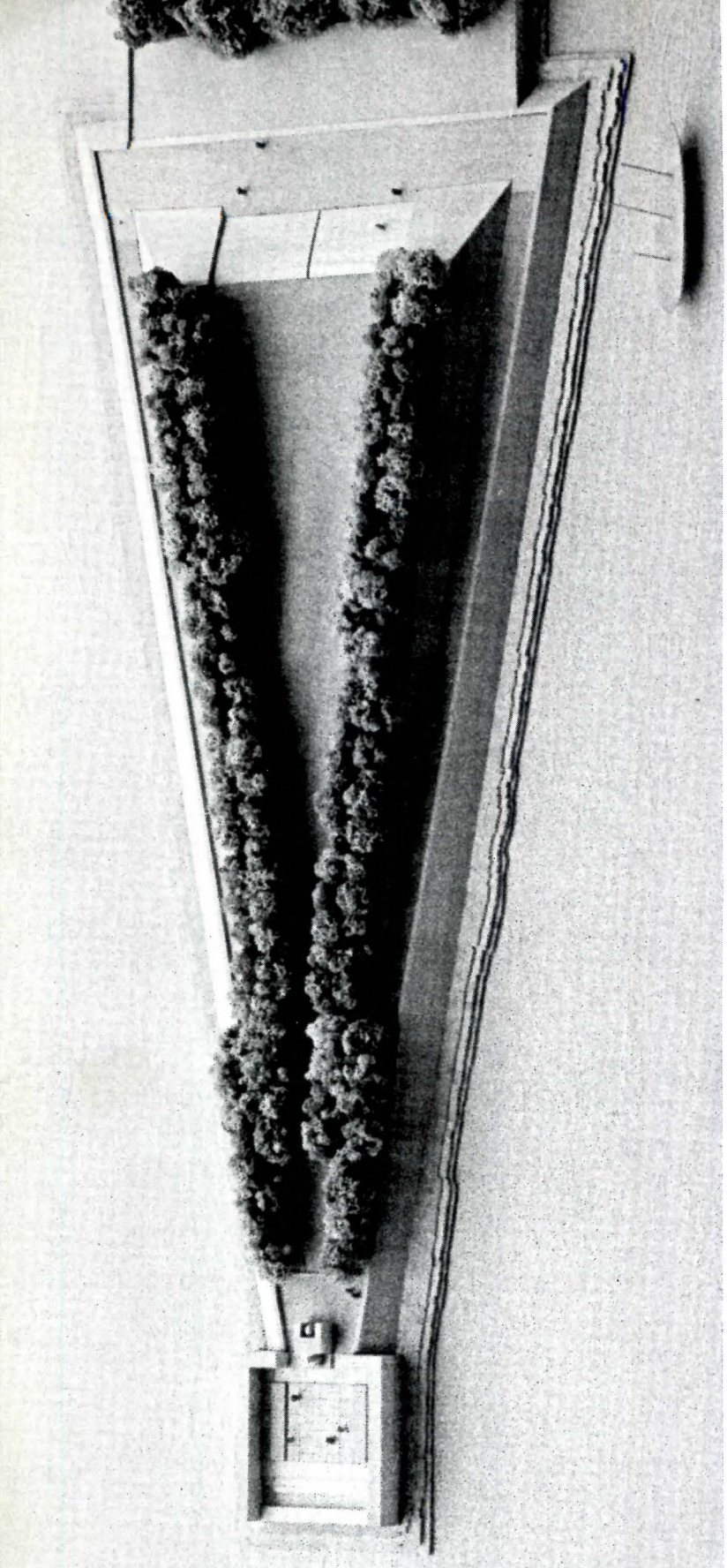
It was this course, and the wonderful teaching of William Gray, that inspired Lou to become an architect, as they inspired me to do, and others before and after us.

We then entered the School of Architecture at the University of Pennsylvania, and worked very hard for four years, often night and day, and gained the habit of working night and day that still persists. Lou worked till the end as if there were 72 hours in each day. In the senior year we attained our hearts' desire, to study in the atelier of Paul Philippe Cret, the bright star of the faculty, a great architect and teacher. When, many years later, Lou was chosen to hold the Paul Philippe Cret Professorship in Architecture and to teach at his Alma Mater, it affected him to the deepest.

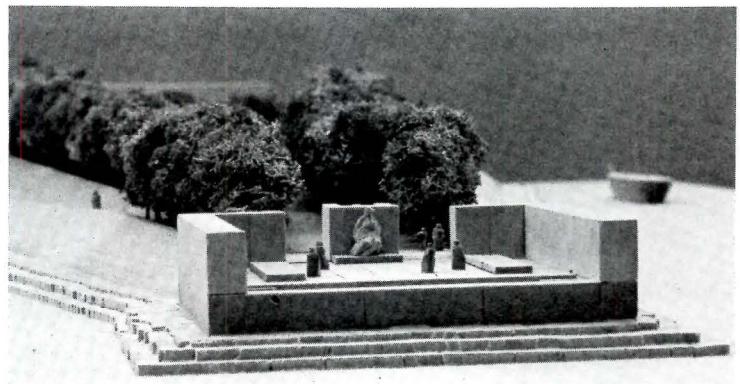
One year after our graduation from Penn, John Molitor, the City Architect, was appointed architect of the Sesqui-Centennial Exposition of 1926. Lou was then working for Molitor who appointed him chief of design. He quickly recruited his young architect friends and we became the team. Burning with our enthusiasms and with the ideals planted by our recent teachers, full of brash courage founded on naiveté, we did the Exposition and its many buildings within one year's time. For that era, some of the buildings were very creditable. It was an exhilarating and encouraging experience for all of us, and especially for Lou.

After 13 years with Lou and Robert Le Ricolais in the unique, simultaneous teaching triumvirate of our postgraduate Studio at the University of Pennsylvania, I say that Lou Kahn was never a teacher in the conventional, didactic sense. He was an ardent missionary of architecture, a magical revealer of the art of architecture, and he loved being them. My preceptor, the renowned architect Le Corbusier, who was also a painter, once told me that he fought out his architectural battles in his paintings. I believe that the discussions in the Studio, with their give and take, helped Lou fight out and resolve many of his architectural battles.

He fascinated students by his poetic visions and the veritable flood of his images, the analogies with music, his evocation of primary essences. For the first time they saw the essential nature of a stairway, of a column and a beam and a wall, and the differing natures of brick and concrete. He urged them not to become mere satisfiers of so-called building programs, mere problem solvers. Above all, he tried to inspire them, by his own example, to become



Franklin D. Roosevelt Memorial, Roosevelt Island, New York City, 1974. Aerial view at left, showing 700 ft. long park leading to a 72 ft. square granite "room" at southern end of the island. Below: close-up of "room" from the East River. Photos: George Pohl. Opposite: First Unitarian Church, Rochester, New York, 1963-64. Photos: John Ebstel.



architects of the nature of a building as well as the architects of its plan and configuration. Of course, they were fascinated by discussions of his own works.

The triumvirate was not always unanimous, as would be expected of three quite different men, and we voiced our differences, so that the students as well as we learned from such free discussions.

Almost every Monday and Friday, late in the afternoon following Studio, Lou, Robert Le Ricolais and I went to Robert's apartment on Sansom Street. Over a drink or two, we talked of many things and ideas, as three comrades, frankly and openly. We discovered some important conclusions. For me, the Studio and these sessions have been a constant source of rejuvenation. Lou looked forward to these sessions, and often he would delay keeping an appointment so that we could be together a little longer.

Louis Kahn was in the tradition of architects and architecture that is not widely honored in our time except by lip service, and except upon occasions such as this one.

He was not acclimated to the marketplace where the avowed professional thrives best.

He did not want the men of measured merriment to prevail.

He believed that art and joy are for Life's sake.

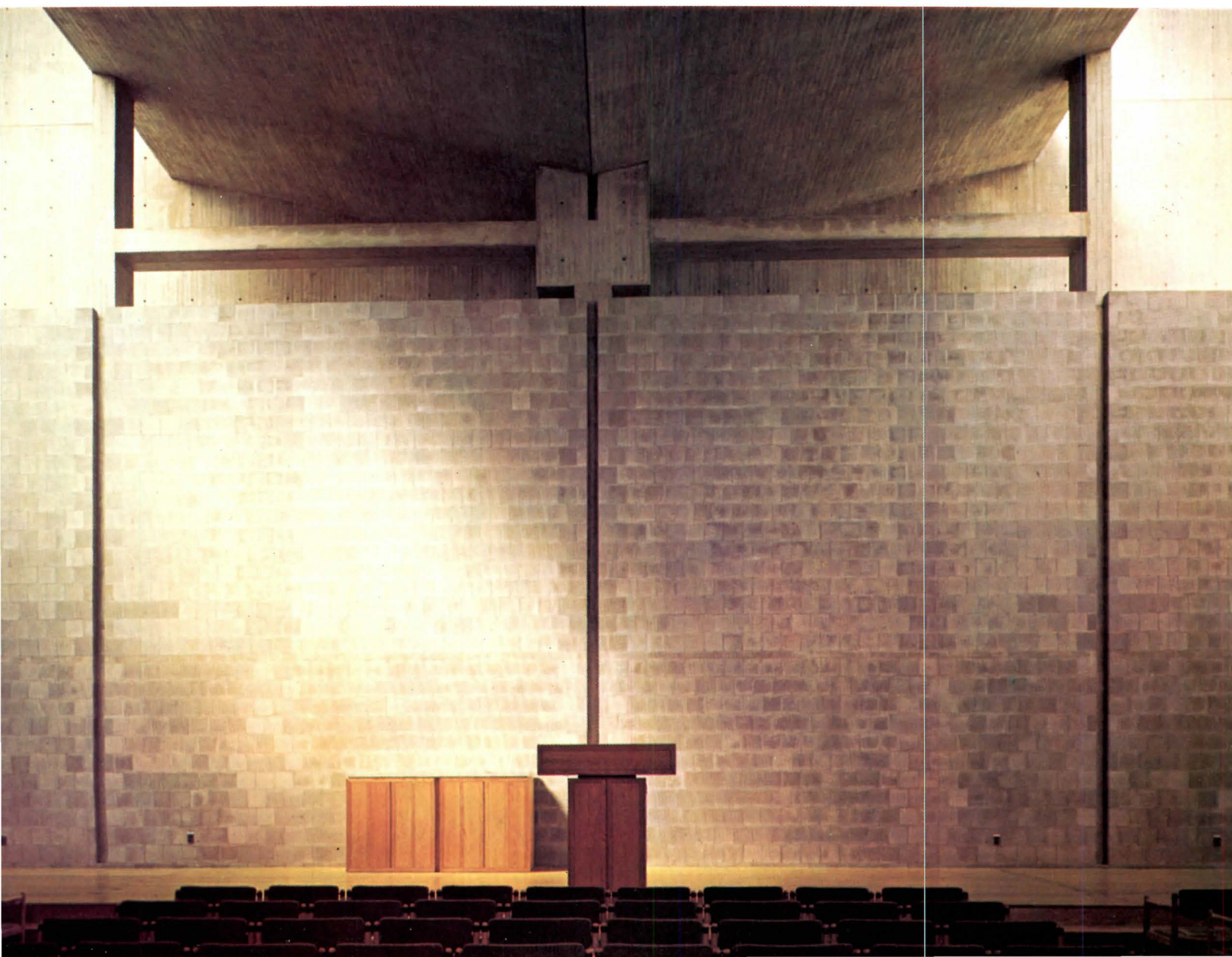
As Buckminster Fuller says, "God is a verb, not a noun."

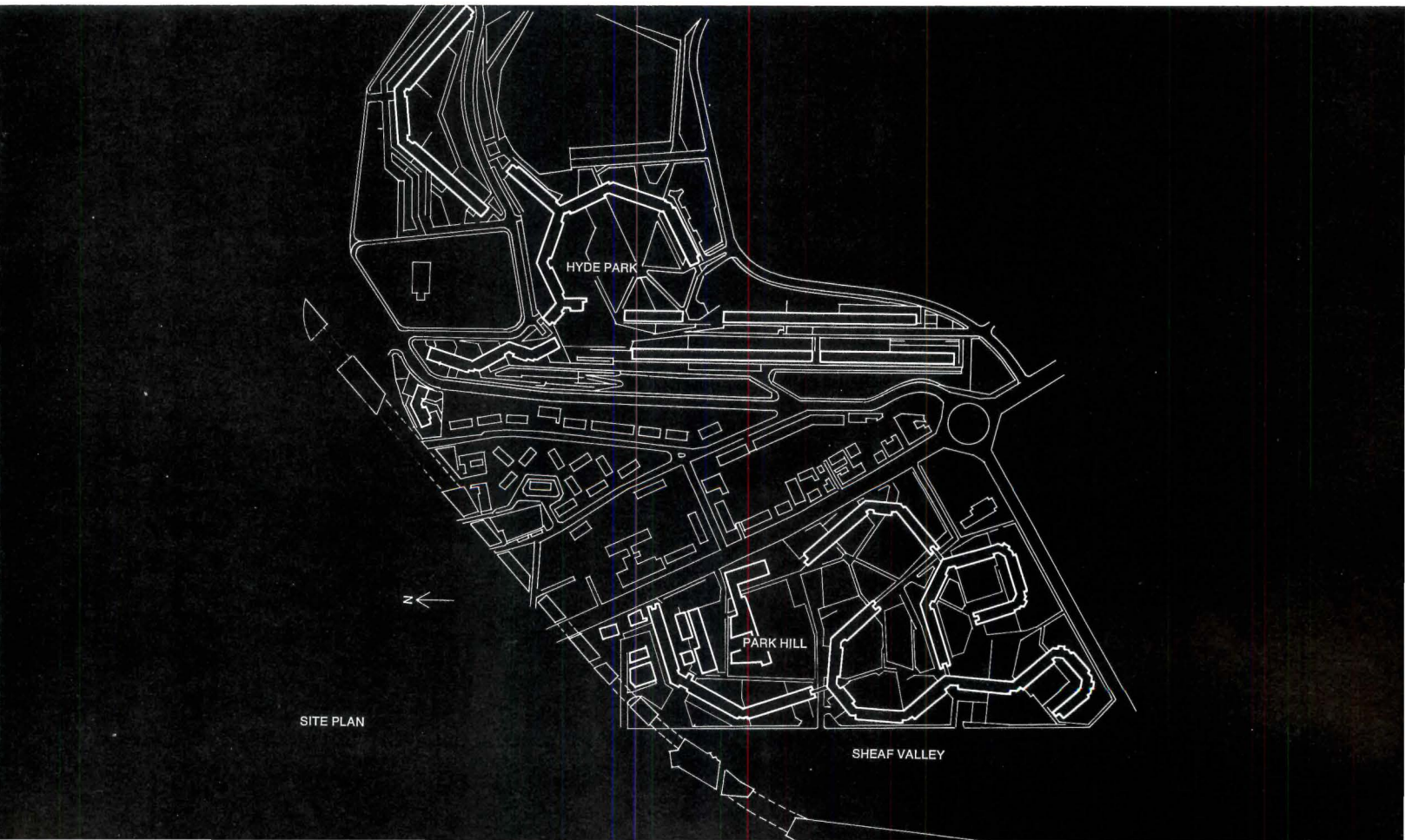
All great artists seek to express more than they can utter, and they beckon us on to regions beyond.

And now, let me paraphrase what I said nine years ago when Le Corbusier passed on. Lou Kahn materially influences every architect. Not merely through his visible works of architecture, but by the principles he enunciated so beautifully. He influences us even if that influence is not consciously recognized or understood, or is denied. Human nature often induces the debtor to decry both the debt and the creditor, but this cannot diminish in the slightest degree the power and dimensions of Louis Kahn's genius.

In honoring him, it is not to honor a profession. In honoring him, it is not only to honor a man, singular as he was. In honoring him, it is for us to honor, and be dedicated to, the eternal art of architecture which men such as he comprehend with all their minds, which they sustain with wit and high courage, which they love with all-consuming passion.

Thank you, comrade and friend of many years.





SITE PLAN

PARKHIL' REVISITED

English public housing that broke the rules (but works anyway)

by Reyner Banham

Looking from the center of Sheffield across the Sheaf Valley towards the housing blocks of Park Hill. Part of the distant Hyde Park development is visible above the roofline of the Park Hill blocks.

Recent American discoveries in the field of housing design seem to have left the British conspicuously under-awed. When the US Embassy in London staged an exhibition of the New York Urban Development Corporation's low-rise projects for Brownsville/Brooklyn and Fox Hills/Staten Island, the body architectural was duly impressed by Ed Logue as a political operator, but not at all by the proposed buildings. "To the British" (sniffed the weekly *Architects' Journal*), "most of the exhibition will seem commonplace. . . . The architecture still looks as though it came straight out of the Weimar Republic . . . identical repetition of units and drab uniformity of facades hardly strikes a happy balance between community and individual identity. . . . These prototypes, so highly acclaimed in the US, are likely to do much to perpetuate the stigma of public housing."

Why so hoity-toity? Anti-colonial snobbery? . . . or prophets without honor in own country, since everybody knew that the architects of both schemes were English? . . . or bad conscience over some recent housing disasters of our own, since any mud thrown at these schemes would also stick to what is being built now (as opposed to what was shown to Mayor Lindsay's drooling emissaries four years back) at Thamesmead? Or is it simply that we have learned from fifteen years' slowly-accumulated experience since the completion of the London County Council's much-praised Roehampton scheme that it is infernally difficult to show any statistical, let alone causal, relationship between better design and social amelioration? For every project which delivered the social relationships its designers claimed, we can show another which has been every bit of the catastrophe its detractors prophesied—and usually for reasons that have nothing to do at all with the virtues or vices that were advertised at the time of opening.

This baffling experience must do something to account for the curious reception awarded in Britain to Oscar Newman's *Defensible Space*. Initially acclaimed because it said all sorts of things about buildings and people that architects were in a mood to hear in 1973, it has suffered a slow but steady cooling of attitude, which had started long before the sociologists had begun to sink the sharp little piranha teeth of professional jealousy into Newman's text. As of this writing, it seems that his only friends left in London are the producers of the ever-alarmist TV series *Horizon* which specializes in importing American prophets of doom. Outside urban-activist circles, the book is probably incomprehensible here anyhow, for reasons identified by Mitzi Cunliffe (who bids fair to become the British Sibyl Moholy-Nagy of the Seventies) in a review in *The Planner*: "*(Defensible Space)* requires translation not into English, but into an England with so relatively low an incidence of violence as to make some of the factual premises on which this book is predicated all but incomprehensible."

Much as we may panic and grouse about our public housing in Britain, none of us has been physically exposed to a social and environmental disaster like the Pruitt-Igoe scheme in St. Louis, Mo., which triggered the studies that led to *Defensible Space*. On the contrary, most of us can take a visitor to at least one estate we know that either flatly contradicts Newman's architectural determinism, or just makes it look totally irrelevant to what is visibly happening to the buildings and people in the project. If Britons complain that Newman treats people like laboratory rats by supposing that their behaviour can be controlled by the design of their mazes, it is because they can usually put their hands on examples where the human rats behave in the exact opposite way to what their mazes predict, and appear to thrive socially in projects where his theory supposes they won't.

One particular case that has persistently come up in conversation ever since the country was positively flooded with Xeroxes of Ada Louise Huxtable's rave review of Newman in the *New York Times*, is Park Hill, Sheffield. Ever a controversial design, it was damned as inhuman at the time of its opening in 1961 by pundits as weighty as Lewis Mumford, Serge Chermayeff, John Betjeman (now knighted and our poet-laureate) and the Town and Country Planning Association. Contrariwise, though, it carried most of the architectural hopes and aspirations of a whole generation of younger architects, who believed that it was possible to achieve certain highly desirable social results by housing some 2,800 souls in 995

Dr. Reyner Banham, the well-known English historian, teacher and critic, is the author of Los Angeles, the Architecture of Four Ecologies, *among other books.*

apartments in £2,200,000-worth of continuous primitive megastructure. They had this theory, you see . . .

It was a theory I got to know pretty well. I used to go up to Sheffield quite a bit in the mid-Fifties on teaching assignments, and used to get my ears pinned back pretty forcefully about Park Hill by the Young Turks in the City Architect's office who were designing it, and their friends and allies among local academics and professionals—one visit was marked by a real knock-down-drag-out argument far into the night, in which I got severely mauled for doubting that works of abstract art, however applied, would really give inhabitants any sense of identification with the parts of the building they were to inhabit. However, I agreed that it was a strike in favor of the city's Chief Architect that he was prepared to employ the abstractionist John Forrester as "esthetic consultant," though I personally felt that aerodynamics consultant would be more to the point, because I was damned if I could see how placing these art-works as screens on the outside of the building opposite the points where the "pedestrian decks" passed through the block would significantly reduce the windflow through those architectural venturis (not you, Bob and Denise; a venturi tube is a particular kind of high-velocity aerodynamic orifice, which these passageways suspiciously resembled on plan).

But, like everybody working on the design, I was perfectly convinced that there should be these "streets in the air," and that they were a good thing. These broad pedestrian walkways at every third-floor level, open to the air (and gale) on one side, would (we presumptuously presumed) correct the faults of Le Corbusier's *rue intérieure,* buried in the heart of his Unité at Marseilles. Further, by grouping the front doors of all the apartments in a neighborly, street-type relationship, the decks would promote those patterns of healthy community relationships that my generation was happy to impute to traditional working-class streets, after a hurried reading of Young and Willmott's *Family and Kinship in East London* (a kind of dry run for Jane Jacobs' *Death and Life of Great American Cities,* and a book from which neither architecture nor sociology has fully recovered in Britain, twenty years later).

In the end, however, all that was to remain of Forrester's consultancy was a pseudo-Mondrian safety-screen next to each elevator door, and the wind has howled through those street-deck crossovers unimpeded by either art or science for thirteen years now. But the decks are there all right. They are what the design is all about in the eyes of the historians of our times. They are the feature by which the design is reckoned to stand or fall, from Lewis Mumford in 1961 (he was there for all of twenty minutes!) to recent detractors like Martin Pawley (in his book *Architecture versus Housing*) who claimed that "the intended social relationships based on 'streets in the air' failed to materialize" (apparently after research in libraries, rather than on the decks themselves).

Confronted with the pile itself, however, endless fussing about the decks now seems extraordinarily trivial. What hits you now is its sheer bloody-minded size—those nearly 1,000 apartments zigzagging their angular way down a quarter-mile diagonal across the hill-slope above the city, only four stories high at the uphill end, but cragging out nearly fourteen stories high above the railroad cutting in the valley at the bottom.

It must rank forever as a prodigy of the sheer pioneering nerve of younger architects in Britain in the mid-Fifties. In spite of Forrester, its concrete and brick facades deliberately eschew any graces of art; it makes a bluntly Brutalist pitch that concentrates all its architectural craftiness in the plan and section and leaves the elevation to fend for itself. That it got built—in the teeth of established standards of taste in local government at the time—is chiefly a tribute to the high-flying but cheerfully self-serving civic ambitions of Sheffield—and a change in methods of financing slum-clearance which suddenly made it possible (or profitable?) to identify the site as a problem area.

Now with its city-ward face fouled from dirty at the top to filthy fourteen stories below by Sheffield's leading industrial product—acid smog—it is clearly a building that never asked to be loved. Respected, no doubt, in the approved local paternalistic style, but loved? Nay, Lad! Yet, of all the grandiose projects of that megalomaniac epoch that actually got built, this is the one that has the air of being a distinctive place with which the inhabitants can identify—with or without the aid of abstract art. Something that pollsters and sociological questionnaires, (however slanted) never seem to bring out, is the weird sense of *loyalty* that Park Hill seems to engender. You get it not only from old-timers who can remember the slums it replaced; but also from youngsters who patently cannot, whose loyalty is simply to Park Hill as they find it. We taped the following from a couple of thirteen-year-old football fanatics in early April last year:

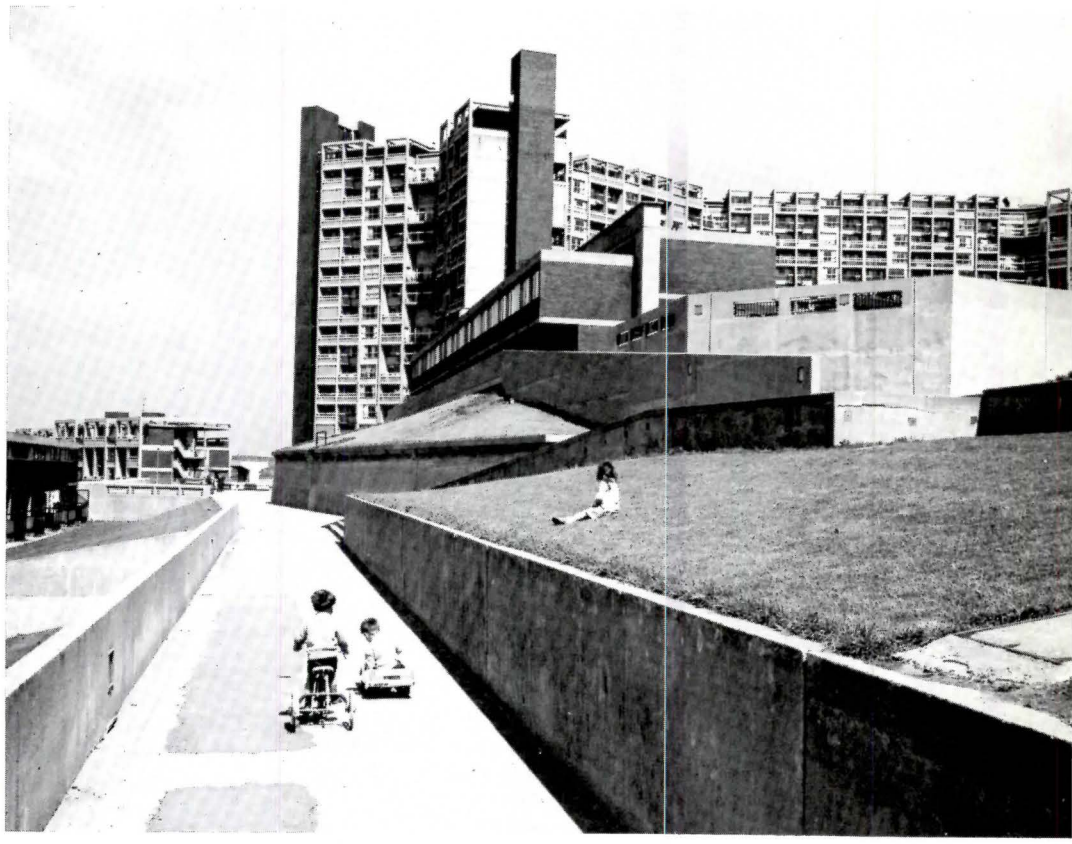
How do you like it here?
It's great . . . it's brilliyunt. Better than Hyde Park. (Gesturing at the newer megastructure across the street).
Better than Hyde Park? Why?
Hyde Park's gunna be slums in another two years.
Isn't this going to be slums?
Ner . . . 'cause its much cleaner; not so many vandals.
No vandals here?
Not hardly. When you walk in Hyde Park all bottles fly off t'top . . . only one or two here, only one or two.
Then who writes things on the walls here?
Vaaandals!

. . . and the adenoidal smirk in that last word was practically the whole loyalty story in itself. But what an extraordinary claim to have volunteered . . . and he was right; the absence of vandalism is now the most striking thing about Park Hill after its size. And if vandalism is, as all the radical chickens of the liberal establishment now insist, the proper response of The People to inhuman environments, then Park Hill can't be inhuman, whatever the pundits have said from Mumford onwards.

Of course, there is *some* vandalism, for honesty's sake. The face of the local cop, as I put the point to him was a *study,* as the saying goes. Raising his eyebrows well up behind the peak of his traditional pointy British helmet, and shrugging resignedly, he opined that such might be what I thought, Sir, but not if I asked him—and I suppose that from his absolute and authoritarian point of view, three smashed lamps, four rather modest exercises in spray-can graffiti, and a few chalkings were a serious blot on his bailiwick.

But that is literally all we could find in the whole huge project on that day, and we were consciously looking for them too. The specific reason for the revisit was an

Two ramped, hard-surfaced pedestrian approaches to the Park Hill blocks. A few trees and grass plots notwithstanding, this is overwhelmingly an environment of unyielding surfaces, abrasive to the touch, polygonally disposed on a sloping site. A right angle in this plan is rarer than a growing tree.



invitation to speak at last year's International Design Conference in Aspen, Colorado, on a topic billed as "Inhuman Buildings" and I'd have had to be culturally tone-deaf not to hear echoes of *Defensible Space* in that title at that time, wouldn't I? So we went up to Park Hill to make a little movie, as objectively as we could, to show the conferees that a housing project designed *à la* Pruitt-Igoe didn't have to turn into a permanent scar on the conscience of the architectural profession. If it isn't literally *à la,* it's still remarkably close to Minoru Yamasaki's design at Pruitt-Igoe. Close in date (only six years separates the designs) and close in conception, since both have the same broad and hopefully "sociable" access decks that are normally blamed for the violence, vandalism and behavioral aberrations at Pruitt-Igoe. Carefully chronicled from Lee Rainwater's classic 1966 paper onwards, Pruitt-Igoe must now be the most thoroughly researched mistake in the whole history of public housing, and the series of condemnations of the decks—from Rainwater through Roger Montgomery to Newman—as a piece of ignorant middle-class wishful-thinking foisted on the working classes begins to look as if it must have concrete substance to it.

But has it? *Defensible Space* as we have it may be only half the story. Somewhere there must be another half, representing the work and findings of Dr. George Rand, who gets a brief mention towards the end of Newman's acknowledgements for *Defensible Space,* but was, in fact, Co-Principal Investigator during the critical first year of the study that led to the writing of the book. During the public and private sessions at Aspen at which Rand burned my ears off (it was pure coincidence that he was there!) for having got it all wrong (ya stupid limey!) he was studiedly loyal to the work as a whole, but finally left me with the impression that I had not, in fact, misunderstood Newman, merely misunderstood the more important half of the work which Rand himself had done!

In any case, it was Newman's architectural half that had sent us up to Park Hill again, and largely because pundits like Ada Louise Huxtable had presented it as containing infallible architectural recipes for preventing further social disorders in large housing schemes—her review was illustrated with a picture of one of the Pruitt-

Igoe blocks being officially dynamited, an event so aptly timed that the more cynical among us could not but wonder if the demolition wasn't a promotional stunt got up by Macmillan's, the publishers of *Defensible Space*.

Presumably I don't now need to tell any reader of *Architecture PLUS* that Newmans' recipes are really two only: the first is to use selected architectural forms (steps, turns of corridors, changes of floor-surface, recessed entrances, etc.) to suggest that some parts of the project are less public than others. The second is to ensure that all entrances and access routes are overlooked by the windows of occupied rooms, so that strangers may be spotted and potential malefactors deterred by the fear that they may be observed.

Personally, I find being spied on by local gossips—beg pardon, "community surveillance"—as repugnant as being spied on by the CIA, but clearly there is a market for the concept in architectural circles, and has been ever since Jane Jacobs rediscovered it in Greenwich Village. I say *re*discovered, because much of what Newman has to say and illustrate was until recently commonsense rule-of-thumb conventional wisdom among housing architects, at least in Europe. But conventional wisdom has a way of becoming ossified into ineffective routine, and falls into disrepute.

Like so much disreputable ossified conventional wisdom, these old planning recipes needed revision, overhaul, reanimation —and the writing of *Defensible Space* should, I submit, properly be seen as one part only of that process of revision. Our revisit to Park Hill was another part of the process, because I knew that the design broke several rules that have been glibly deduced from Rand and Newman's work and are being enforced as dogma, I am told by disgruntled students, at some US architecture schools (though they never tell me *which* schools).

Now, as far as the first recipe is concerned, Park Hill is so vague about the distinction between public and private realms (deliberately so, the decks were seen as extensions of the existing street system) that only in the remotest reaches of the uppermost of the four decks will you be recognized as an interloper, and then only if you insist on poking a camera, microphone (or conceivably gun) in the folks' faces. As far as the second recipe is concerned, Park Hill does even worse, since it manages to mislay those virtues which Newman claims to find in single-loaded external access balconies visible from across the courtyard. For a start the courtyard (if such you can call it) is so wide that you'd need binoculars to spot malfeasances, and it might take ten minutes to reach the scene of the surmised crime. To compound this design misdemeanor, the windows that look out on the deck contribute nothing to surveillance. The spaces they light are minute lobbies alongside the entrance stairs, normally inhabited by umbrellas and pot-plants rather than people and they are glazed with glass so reeded that you wouldn't even recognize your own twin through them.

As I read Newman, designing thus ought to be tantamount to contributing to the delinquency of a whole district of minors, and Park Hill ought to be a classic behavioral sink. Patently it is not. This is not to perpetuate claims of earthly paradise which some of us—and I am prepared to admit my own guilt if challenged—may have put about when the design was new, but it's in no sense a disaster area. Increasingly, however, one has to wonder if this has anything direct or specific to do with the architecture. And the reasons why I wonder have less immediately to do with Newman or Rand than they have to do with our own well-respected Alison and Peter Smithson. They were not the architects of Park Hill, but in a sense they have as much to do with the design as the job-architects, the afore-mentioned Young Turks: Ivor Smith, Jack Lynn, and Fred Nicklin.

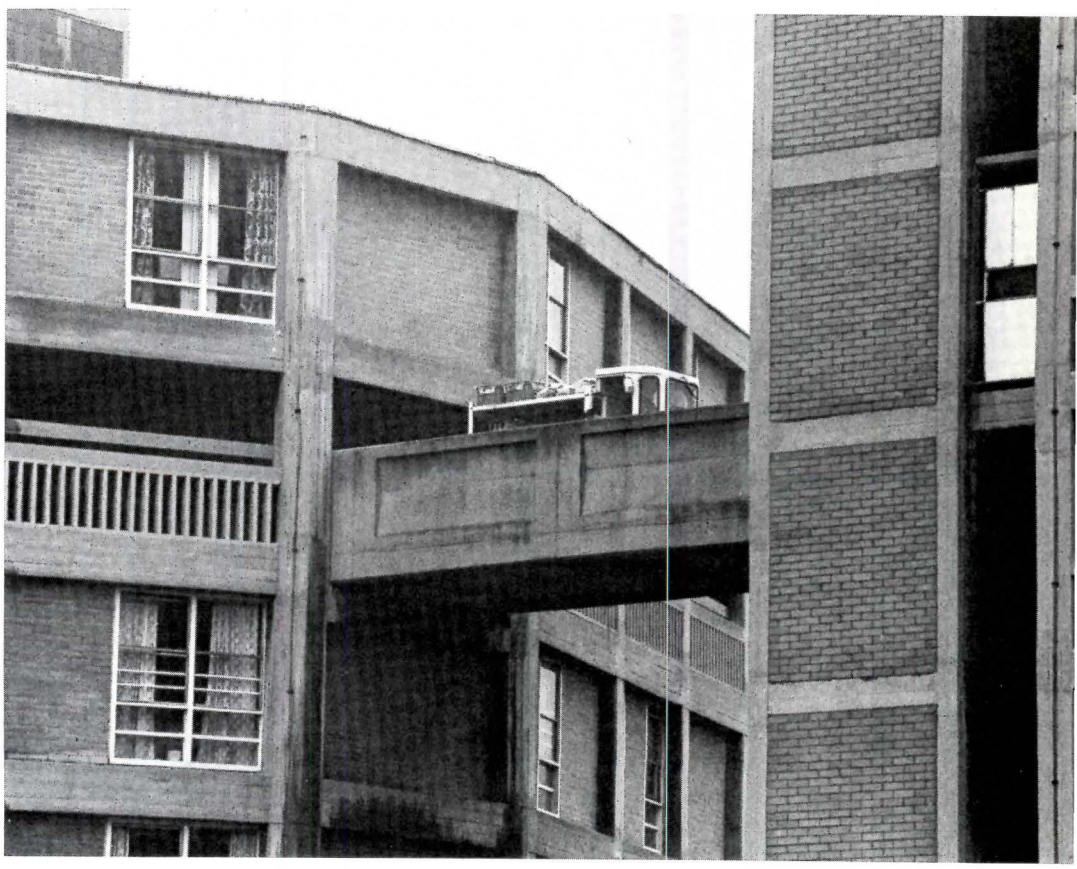
The Smithsons and the Smith/Lynn connection had arrived at forms of street-deck simultaneously in entries for a housing competition (Golden Lane, in the City of London, in 1952) but is not unfair to say that in the Smith/Lynn versions the decks were simply superior forms of access, whereas in the Smithson version the decks are already imbued with the mystique of the surrogate working-class derived from Willmott and Young's famous sociological studies. When Smith, Lynn and Nicklin came to design Park Hill they took over a lot of Smithsonian thinking, both in the design and in the sociological justifications they offered for it. But the Smithsons had no chance to build any of it themselves until they were commissioned to design Robin Hood Gardens (in the East End of London, real Willmott and Young territory) for the Greater London Council in 1966. (See June 1973 PLUS.)

Robin Hood Gardens differs from Park Hill in being smaller and discontinuous (two separate blocks) and has a clearly defined "private realm" between each pair of front doors (which face each other across recessed entrances at the side of the deck). It also has an architectural treatment of the facades which is stronger and more obviously character-full than that of Park Hill. With their customary courage they stuck their chins out (on TV) and claimed that it was the kind of design that would involve the interest of the residents, earn their respect, and thus—a point they insisted on—help discourage vandalism. Maybe it will ultimately, but it was all too clear in 1972-73, as the residents moved in, that it was not preventing anything of the kind. It passed through a really bad phase (doors ripped off their hinges and stuff like that) of a sort that Park Hill never suffered.

So . . . what has Park Hill got that Pruitt-Igoe hadn't got and Robin Hood Gardens hasn't got—in spite of the fact that it stands nearer to some of Newman's prescriptions. The answer, I suspect, lies in George Rand's territory—cultural, social or psychological. *Defensible Space* handles only the simplest social data; "ethnicity" is the nearest its Conceptual Model Outline comes to cultural, social or psychological variables for study. This is understandable because they are infernally difficult to handle in the kind of research project that looks respectable and non-controversial enough to acquire grant support (especially from the US Department of Justice!) but I think it is unacceptable because the differences between, say, Park Hill and Robin Hood Gardens are conspicuously cultural—a different population in a different city, a different urban culture in a different time.

For a start, public attitudes to public housing have changed spectacularly in the ten years between Park Hill and Robin Hood Gardens. The residents at Park Hill were moving in long before there were any middle-class activists around to tell them that public housing was a middle-class conspiracy to tidy the working classes away, and that only spontaneous revolutionary workers' action can produce acceptable

An interior view of a street deck and an exterior view of a bridge between two buildings' decks. Because the orientation and internal planning favor the living rooms of the apartments with views and sunshine (both worth fighting for in Sheffield!), the decks are always on the dark sides of the blocks; their value is in their use—largely as raceways for kids on foot or on wheels—rather than in their environmental attractions. Since each deck, even the highest, runs back to ground level somewhere, small vehicles (like the milk truck below) have direct access to them from the city streets.



working-class environments. Sheffield at the time had, in fact, a nominally Socialist administration, a well oiled and well understood Tammany-style Labor-Party machine that was perfectly capable of delivering the goods that Sheffield's tolerably affluent workers wanted—about two-thirds of the residents actively wanted to move in, whereas at Robin Hood Gardens, and even more at Pruitt-Igoe, residents appear to have felt they had simply been drafted there. Under such circumstances one could hardly expect them to feel that sense of "community" that supports an effectively self-policing neighborhood.

But the use of the word *community* touches a monster irony about Park Hill. It is no secret that one of the City's main motives for building Park Hill was to destroy—I mean that, *destroy*—the local community. There was a well-known and well-studied body of persons living on the lower Park Hill slopes whose outstanding characteristic was the highest rate of criminality in Britain, and the City simply decided to extirpate them, and destroy their lairs. It is difficult to imagine anyone getting away with such a policy nowadays; both the community and the little Victorian row-houses it inhabited would have numerous and influential defenders—especially among those outside Sheffield who would not have to live with the consequences of leaving them undisturbed.

Disturbed they were, however; obliterated without trace. Any sense of community that invests the present inhabitants of those slopes is a recent growth without ancient roots on the ground. On the other hand this rootless community enjoys the stabilizing and sustaining effects of being located in Sheffield. The city, though large, is pretty introspective; it prefers to look in on itself from the surrounding ring of hills, not over those hills at the world outside. It serves itself, and the hell with everybody else: Park Hill is, above all, the city of Sheffield rehousing people of Sheffield within the administrative boundaries of Sheffield in the full view of the rest of Sheffield.

Furthermore, Sheffield folk were already fully accustomed to the idea of high-density high-rise public housing because there was plenty of it all around to see. They weren't being asked to do the unthinkable in being moved into Park Hill—whereas George

Rand seemed to confirm my suspicion that few if any of those drafted into Pruitt-Igoe had ever seen a building more than a story-and-a-half high before. And I have used that word *drafted* again, because I suspect that part of the success of Park Hill may be owed to the way its tenants got there; they must have been the most carefully briefed tenants to move into anything ever.

During the late Fifties and early Sixties while Lewis Womersley was the chief Architect of Sheffield, it was his policy to ensure that those about to be "decanted" from slum-clearance areas were as fully informed about their new homes as possible. A series of large-scale public meetings was held, all relevant city officials were expected to be present, explanations were given *viva voce*, and all questions were patiently answered, however stupid. I don't suppose such paternalism would be tolerated today. It certainly wasn't participation in any currently recognizable sense, and it was too late to affect the design of the buildings. But it did help residents get full value out of their new apartments and facilities, and it gave evidence that somebody cared—though that was more effectively demonstrated by the fact that, for instance, there was a day when "two or three architects arrived with a variety of large cardboard cartons to do a mock-up of preferred storage space in kitchens," some time after tenants had moved in.

Incidents like that, and the presence of members of architectural staff at tenants' meetings showed that "caring" was a continuous process, but the real proof of that sustained care was the first tenant herself. Her name was Joan Demers, she was a trained social worker, and she had both a watching brief for the Housing Department, and a helping brief for the tenants. Although her appointment came from the Housing Department, her real support, as she says herself, came from Womersley, Ivor Smith and other members of the architectural staff. They, after all, had pinned great social hopes on Park Hill, and needed detailed reports on how their experiment was working out. Mrs. Demers was the appointed channel by which information, complaints, queries were fed back to City officials.

A strictly neutral observer, however, she could never be. Right from the start she helped the tenants get together and organize themselves, first in small groups, later into a fully fledged Residents' Association. This she achieved on a modestly auto-destructive basis: ". . . The leadership had to come from the residents; I wanted to work myself out of a job. It was a slow tedious process but the important thing is that the enthusiasm was there. To give an indication of the desire of the residents to maintain their homes, the very first items purchased by the Residents' Association within a few weeks, were two sets of trestles and planks to enable easier decoration of stairwells in dwellings. Certainly not the rent-strike some had forecast!"

It now looks as if her self-effacing modesty was (and continues) excessive—I am not the only one who believes that she was a key factor in the success of the project. Yet her modesty and the scrupulously careful wording of her *Park Hill Survey* of 1962, have tended to disguise her own success and that of the building, and have left both open to smart-Alec ridicule from critics like Martin Pawley—very tempting when she says "from a total of 197 families questioned, 37 were uncertain and 37 definitely did not want to come," instead of "123 families out of 197 questioned definitely wanted to come."

To be fair to Pawley, however, what he is really ridiculing is the obsession with specifically architectural features like the street decks. Even so, the fact that "only 4 percent of the inhabitants remembered that the decks made it possible to stand and talk to people," in 1962, does not necessarily mean that "the intended social relationships based on 'streets in the air' failed to materialize" by the time he was writing ten years later. The evidence of the eyes and ears suggests to me that something like those relationships have emerged, whatever the causes—architectural, managerial, social or combinations thereof.

I suspect the answer may be managerial. There seems to be strong evidence here that the established British governmental procedure known as "caring" does work, but it has to pervade the whole structure of architecture and its administration, and it has to suffuse the actions of every official involved. It has to begin with architects who believe —in the case of Park Hill—fiercely in the working classes as a very special and valuable breed of folks with a unique way of life that should be supported, and it has to go through a Chief Architect who is prepared to go and lay it on the line in person and take the responsibility for the consequences, and it must ultimately reach through to social workers who want to help people make a success of the place for themselves. Established "caring" is admittedly a paternalistic system, and may indeed be the capitalistic plot to de-fuse revolutionary situations that Maoists claim it to be, but the sincerity of most of those who practice it professionally is as patent as it is irresistible—it delivers the social goods.

And if it isn't there, the architecture apparently can't deliver them on its own. By the time that Hyde Park—where "all bottles fly off t'top" because of the vandals, you'll recall—was finished, Womersley had been edged out of his job, and most of the Young Turks had quit in disgust as a result. Joan Demers's *Survey* seems thus to have been delivered to an administrative vacuum —some of the architectural lessons which had been deduced from the Park Hill experience were applied at Hyde Park, but virtually none of the social and managerial ones. No wonder she, too, quit in her turn. By comparison with the pioneers at Park Hill, the residents moving into Hyde Park were unbriefed, unsupported, uncared-for. It would be tempting to blame its much higher vandalism and delinquencies on that fact alone, and not on the architectural changes. No doubt architect-baiters have already rushed off to do that very thing, but my own feeling is that the situation is still ambiguous.

Park Hill, clearly, is the product of rare and unrepeatable circumstances, and that makes it very difficult to generalize from the experiences enjoyed or suffered there—but if that's so, how are we to learn from its success? For instance, I still find it difficult to believe that *none* of that success has architectural causes. This may be residual loyalty on my part to the team who designed it, but my own hearings on the site confirm that it is a building whose layout and design have always attracted the interest, support or dislike of the tenants—it's not a building whose appearance you could pretend not to have noticed! And even if the tenants have forgotten that the street-decks were supposed to promote neighborly chat, they haven't forgotten their other virtues, such as covered circulation. Yet the same basic architectural format—even with

Around the feet of the megastructure, traces remain of the original townscape that Park Hill set out to destroy: small-scale, handcrafted, dangerously steep, and decrepit as far back as living memory can reach.

improvements—produced Hyde Park, and with even *more* improvements produced Robin Hood Gardens.

On that basis though, I think we can safely learn that architectural nostrums—street-decks, defensible spaces—don't necessarily work on their own. In which case the US may be in for another round of Pruitt-Igoes in about fifteen years' time or less as the generation of students now allegedly being brought up on Newman, as if he were Holy Writ, graduate and assume design responsibility for real buildings. If Park Hill and its compeers mean what they now appear to mean, learning to design for "natural surveillance, realm-definition, image and milieu" may be less important than learning a new understanding (even a slightly dotty one, as in the British case) of the life and aspirations of your ultimate clients and eradicating the stigma that still attaches to "Welfare" in middle-class American minds.

But that'll never happen, you say, and that's why Park Hill must remain forever unique. Must it? We aren't talking about changing the minds of a whole nation—this article has already named most of those who had to adopt a "caring" attitude to make Park Hill possible. Add to them a few middle-ranking bureaucrats and elected representatives, and they still don't total much over a dozen; but they were enough to pervade their local system and transform its performance. All that, taken together, suggests to me that the ultimate lesson of Park Hill may be concerned with manners of procedure, with *style*—not of architecture but of public service. You don't get that kind of stuff in the books in architecture-school libraries, nor do you hear much about it in studios and seminars, but as a consumer of housing I wouldn't knock it. Newman's recipes, applied with enthusiasm by Newman himself within an administrative system that passionately believed him right, might—on that basis—still deliver the goods, even if the recipes were all as wrong as I think they are. Caring hath its victories, no less than design.

Photographs: p. 108 and 111 (top), Department of Planning and Design, Sheffield; others, Ron McCormick.

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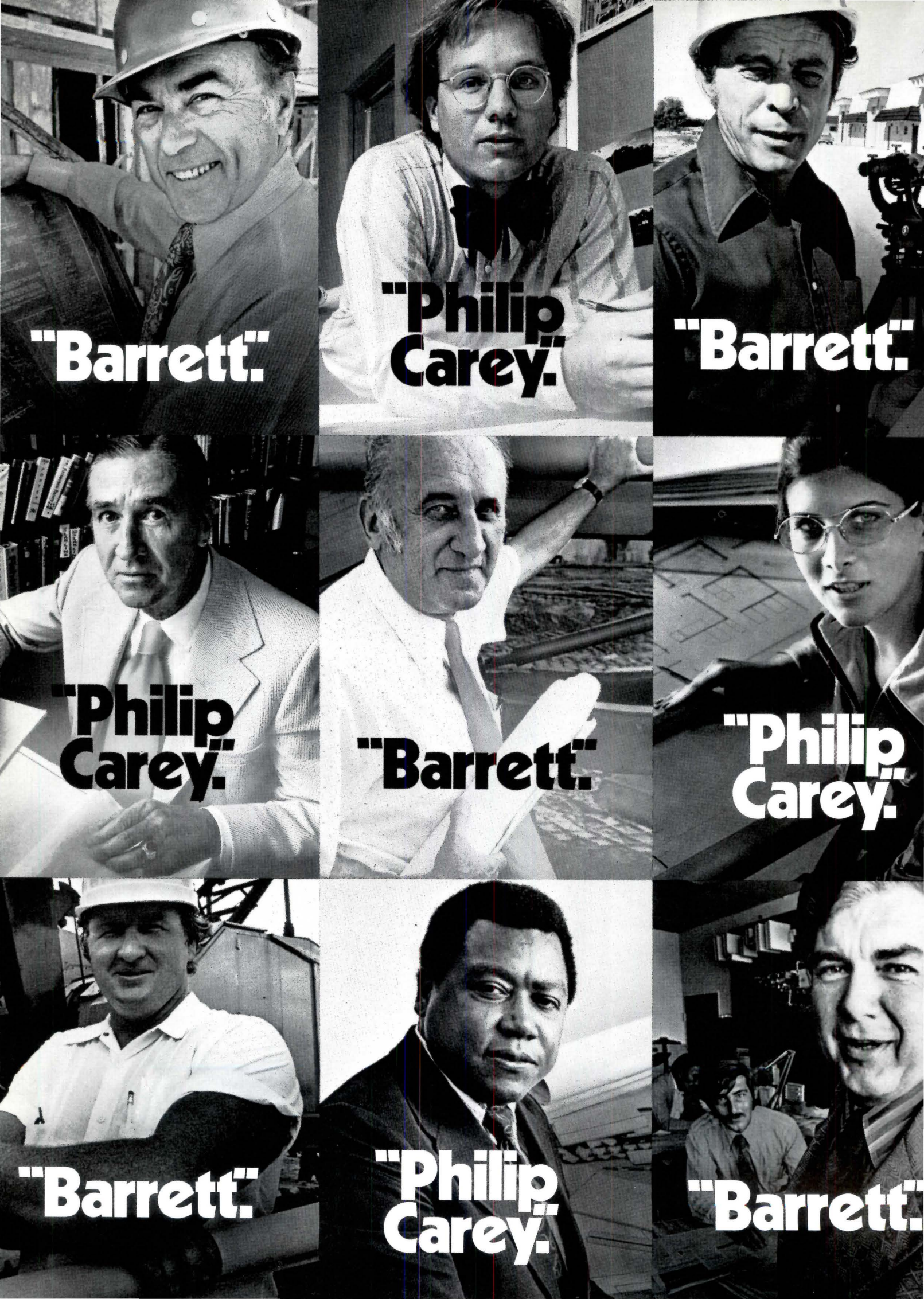
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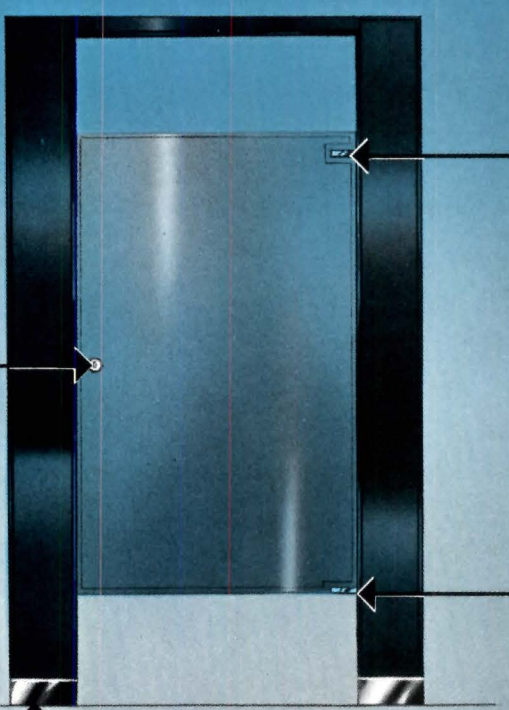

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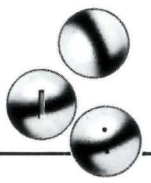

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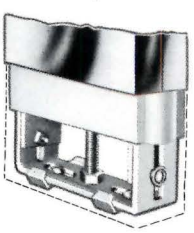

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news+

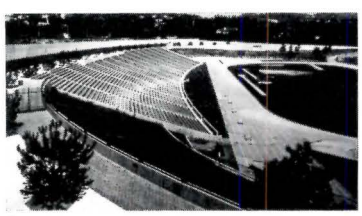
continued from page 45

AIA awards

The American Institute of Architects gave its 1974 Honor Awards to eight buildings, all of which were praised by the jury for the way in which "they fit their sites and meet the requirements of their owners," and for their "highly motivated and committed design intent." The winners are:

1 Multi-purpose Track and Field Stadium, University of California, Los Angeles; Daniel L. Dworsky & Associates, architects.
2 Illinois Bell Telephone Co., Northbrook, Ill.; Holabird & Root, architects.
3 Renwick Gallery, Smithsonian Institution, Wash., D.C.; Hugh Newell Jacobsen, architect for interior restoration; John Carl Warnecke & Associates, architects for exterior restoration.
4 Twin Parks Northeast Housing, Bronx, N.Y.; Richard Meier & Associates, architects.
5 MDRT Foundation Hall, American College of Life Underwriters, Bryn Mawr, Pa.; Mitchell/Giurgola Associates, architects.
6 Morgan Residence, Atlantic Beach, Fla.; William Morgan Architects.
7 Paul Mellon Center for the Arts, Choate School, Wallingford, Conn.; I. M. Pei & Partners, architects.
8 North Carolina National Bank, Charlotte, N.C.; Wolf Associates, architects.

The 25-Year Award, for "architectural design of enduring significance" went to the Johnson Wax Administration Building in Racine, Wis., the second time in a row that a Frank Lloyd Wright building received this award. The low-slung structure, warm red brick and glass tubing inside and out, was opened in 1939, coinciding with the New York World's Fair. *Life* Magazine, referring to this building, wrote at the time: "Future historians may well decide that a truer glimpse of the shape of things to come than is represented by the New York World's Fair was given in a single structure built strictly for business." Wright himself said it was to be "as inspiring a place to work as any cathedral was to worship in." The unique structural system is visible inside—hollow slender columns 2 ft. 10 in. in diameter at the ceiling tapering to 9 in. at the floor.



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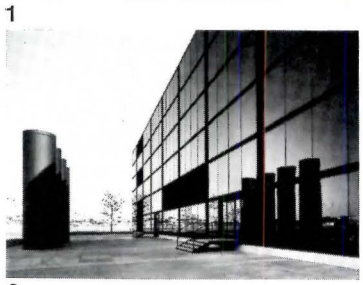

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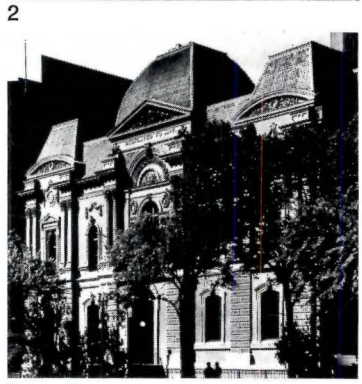

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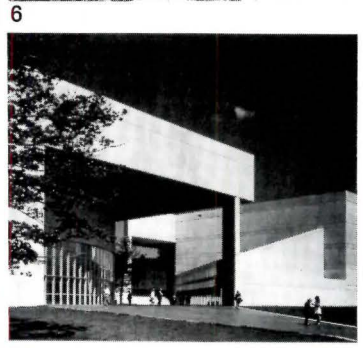

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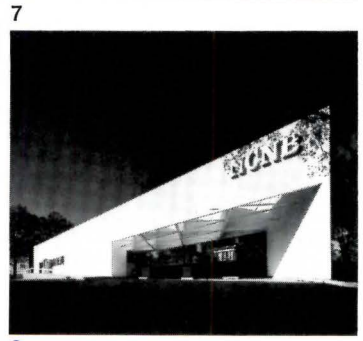

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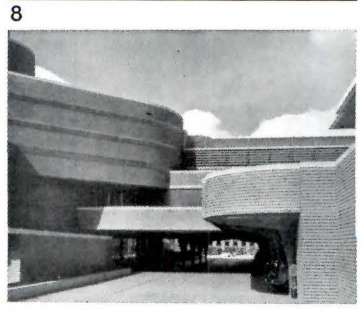


Wright, 25 years later

A town by any other name . . .

Does the name of your home town embarrass you? Many of the geographic names in the U.S., once considered humorous or picturesque, now seem offensive to a generation which inherited them from more earthy ancestors. The Department of the Interior, through the Geological Survey's "Geographic Names Section," is now changing the names of towns, rivers and meadows to eliminate further trouble.

Names which are considered to imply racial or ethnic slurs are the first to go. In the "cleaning up" process of other names, many of them dating from the California and Alaska gold rush when a lusty breed of adventurers were inspired by nature's resemblances to human anatomy, an attempt will be made to fix a new name not too different from the original. For example, a place in Arizona named for a woman's distinctive upper torso was changed to College Peak, while another spot in Oregon, defining the location of a house of ill repute now appears on the map as Naughty Girl Meadow.

One wonders what euphemism will replace Intercourse, Pennsylvania, a town which seems to support itself selling postcards to tourists.

Some names may or may not be offensive depending on how you see them—towns such as Willie's Bottom, Kentucky; Old Woman's Gut, Delaware; Nakedtop, Virginia; or The French Broad, North Carolina. The Department of the Interior is pondering the problem.

Meanwhile, it looks like Bumble Bee, Hinkey Dinkey, Rough and Ready, Goose Pimple Junction, Blond, Brunette and Redhead are here to stay.

Dead river, dying sea

A funeral service was conducted in Weaverville, California, on the bank of the Trinity River by 90 high school students this spring. The deceased was the river itself. While the Trinity High School band played a funeral march, a eulogy was delivered by one of the students, praising the river's rich past life and expressing sorrow at the river's demise. The cause of death was attributed to a dam project which had destroyed the river's natural fish habitat.

Meanwhile, in Athens, a conference attended by experts on maritime law from 13 Mediterranean countries issued a warning that the Mediterranean Sea has only 30 years of life left if anti-pollution measures are not put into effect immediately. The steady increase in navigation and the reopening of the Suez Canal are expected to worsen the situation.

People

• Wilhelm von Moltke, director of the Urban Design Program of the Harvard Graduate School of Design, has taken a two-year leave of absence to serve as consultant to a survey to redevelop and expand the Istanbul area. A previous international competition to conduct this survey was won by a British-American conglomerate, Buchanan & Partners of London and the Institute of Public Administration of New York. This conglomerate selected Professor von Moltke to be their Chief Consultant. The current population of the Istanbul metropolitan area is 2½ million. It is planned that satellite towns will be developed to accommodate an additional population of 100,000 to 250,000 people. The survey group will accept proposals on how to deal with the formidable squatter problem of Istanbul.

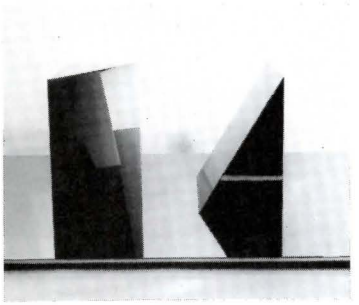
• Sir Leslie Martin, one of Britain's leading architects, has been appointed to the faculty of the Yale School of Architecture and will hold the William Henry Bishop Visiting Professorship. Sir Leslie, who received the Royal Institute's Gold Medal for Architecture, and is Professor Emeritus of Architecture at Cambridge University, will teach advanced design classes and give lectures. Sir Leslie is the first knight ever to hold a regular faculty appointment at Yale, a fitting celebration of the coming American Revolution Bicentennial.

• Lee Krasner, one of today's leading U.S. painters (with a recent Whitney Museum one-woman show to her credit), was cited by the Cooper Union Alumni Association for outstanding achievement in the field of art. Lee Krasner,

who is the widow of Jackson Pollock, studied art at Cooper Union in the class of '29. The "Augustus St. Gaudens Medal" was awarded to her for "her accomplishments as a painter and her influence on the art world." The Medal is named for the sculptor who studied at Cooper Union in 1861.

• New York artist Robert Rauschenberg, one of the Grand Old Men of Pop, suggested that artists be paid a royalty on the profits made by collectors when the latter sell any of the former's work. He had just observed one of his 1958 paintings (for which collector Robert Scull had paid $900) sell for $85,000 at an auction of some of the Scull Collection, for a profit of 9,333 percent. If collectors refuse to sign royalty agreements, Rauschenberg told art critic Robert Hughes, artists should retaliate by producing "nothing but unsuccessful work." Since many an architect's building (successful or unsuccessful) is eventually and repeatedly sold at a considerable profit to the owner, Rauschenberg's suggestion might interest that profession as well.

• James Prestini, the Berkeley-based one-time associate of Mies van der Rohe at I.I.T., who used to concentrate on making the most perfect wooden bowls known to man (or salad), had another one-man show in Manhattan—this one consisting of the most perfect, chromium plated sculpture known to man (or machine). His best piece was a composition of two chromium wedges facing each other on a mirror-like chromium base, and clearly demanding realization on a monumental scale, at least 100 feet tall.



Prestini's *No. 299*

• C. Ray Smith, former Editor of *Theatre Crafts* is now the Editor of *Interiors.* As Senior Editor at *Progressive Architecture,* he has been writing about architecture and interior design for the past 15 years. Olga Gueft, the present Editor of *Interiors* (and the vital force on that magazine for 29 years), is now Editorial Director.

• Marc Emery, until recently Editor-in-Chief of *L'Architecture d'Aujourd'hui,* and now Editor of a new magazine on city planning called *Metropolis,* is now a Field Editor (Paris) for PLUS, joining Gilles de Bure who reports on industrial design. Emery, educated at the University of Pennsylvania, is an architect and urban designer.

• John Hadidian, assistant professor of architecture at the American University of Beirut, and a practicing architect, has joined the staff of PLUS as Field Editor, reporting from the Middle East. He did his architecture studies at the University of California at Berkeley, and has a graduate degree in environmental studies from University College London. Professor Hadidian wrote the feature story on the Defense Ministry of Beirut in our May '73 issue.

• Richard K. Dozier, assistant professor at the Yale School of Architecture, is documenting the role of the black man in architecture from 1800. Data on black architects, builders, contractors, or craftsmen should be sent to him, Box 105, Lincolnton Station, N.Y., N.Y. 10037.

Obit

George Bain Cummings, one-time president of the AIA (55-56), died in Binghamton, N.Y., in March at the age of 84. Cummings served on the N.Y. State Building Code Commission for ten years, first as vice chairman, later as acting chairman; and was instrumental in drafting a modern state building code. He was often critical of many aspects of modern building design, especially the constantly changing house fashion. He once said, "These changes create an aura of impermanence in our society. A house is not something to be traded in on a new model every few years." From 1926 to 1961 he was a partner in the Binghamton architecture firm of Conrad & Cummings.

• William T. Snaith, president of the industrial design firm of Raymond Loewy/William Snaith, Inc., died in February at the age of 65. A yachtsman/ocean racer by avocation, he wrote two books on the subject, *Across the Western Ocean* and *On the Wind's Way,* published last fall. In 1964 he was commissioned by the Coast Guard to design a new insignia for them. He studied architecture at N.Y. University, the École des Beaux Arts in Paris and the Fountainbleau Academy of Fine Arts. He painted during his Beaux Arts days in Paris and his works have been shown at the Whitney Museum of American art and the Pennsylvania Academy of Arts. He is the author of *The Irresponsible Arts,* 1964.

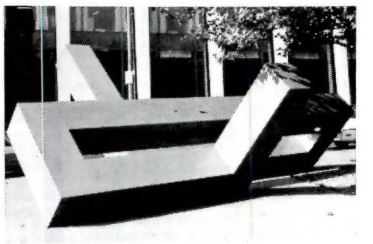
• Adolph Gottlieb, abstractionist painter, died in March at the age of 70. A major figure in American art, his paintings are in the permanent collections of the Museum of Modern Art, the Metropolitan Museum of Art, the Whitney Museum of American Art and the Brooklyn Museum, all in New York. Years ago, Gottlieb called his paintings "pictographs," and said this would make it easier for critics to "pigeonhole" his work. (They did, they called it Freudian.) The son of Hungarian immigrants, he was born in New York, and went to Paris at 17 to study art for three years. During the Depression, back in New York, he joined "The Ten," a group that included Rothko, de Kooning, Lee Gatch,

Gottlieb's *Blast I*

and Ilya Bolowtowsky.

He hated Pop art: "I'm against popular culture in any form. It's all on the level of Disneyland." He won the Grand Prix at the Sao Paulo Bienal in 1963 and was a member of the Art Commission of New York City.

• Robert (Robin) E. Costelloe, young Irish sculptor, died this spring in an automobile accident in Dublin at the age of 30. He received a citation in 1973 from the Design In Steel Awards Program for a sculpture now outside the Burlington Industries headquarters in N.C. Three of his immense

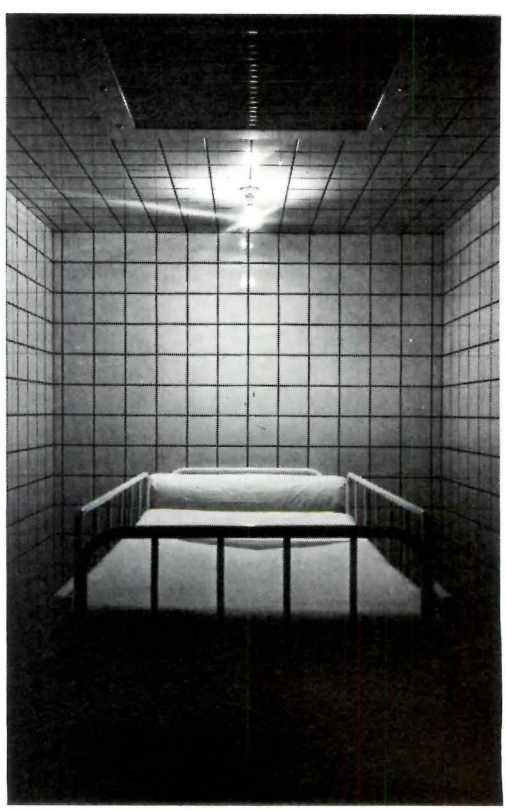


Costelloe's *Illiamore*

sculptures were shown at the Union Carbide Plaza in New York a year ago; two of them have since been donated to Fairleigh Dickinson University in New Jersey. Robin had taught at the North Carolina School of the Arts, and was an art teacher in Ireland at the time of his death.

Photos: Page 39 Bettmann Archive. Page 42 (top) Keystone; (bottom) Judith Turner. Page 43 (bottom l.) Gordon Schenck, Jr.; (bottom r.) Brit. Info. Ser. Page 44 (top) P. Costa; (middle r.) Gabriele Basilico. Page 45 (top r.) Aleksandar Karoly. Page 123 (Prestini) James Hong; (Gottlieb) Mus. Mod. Art; (Costelloe) Richard Ellis. Page 124 André Morain. Page 125 Taisuke Ogawa. Pages 126, 127 US Dept. Interior. Page 128 Tempo.

SURVEY



Chacun à son goût

PARIS—In La Celle de Saint Cloud, an elegant suburb west of Paris, a young artist has built what he calls a *blockhaus* to protect himself from the world outside. Jean-Pierre Raynaud's house is made of concrete with only one window (a narrow horizontal slit which is sealed) in case he should ever feel the need to check whether it's day or night out there.

The house has walls 2.62 meters thick and contains a music room, a bedroom, a bath, a studio, a parlor (for what?) and a grilled crypt for his paintings. The vases in the crypt hold dead flowers, "especially killed by the artist." Raynaud has said that he intends to cover the concrete exterior of his fortress with military-style camouflage.

The *blockhaus* is totally air conditioned with artificial light throughout, except in the crypt which receives natural light from a plexi-glass dome.

Doors to all the rooms are black iron armor over 20 cms. thick, the sills raised, submarine style. The interior walls and ceiling are covered with white tiles (15 by 15 cms.) separated by intense black lines 5 mms. wide.

One enters the house (if one were invited, which will not be the case) through a metal passageway. The floors are white or black rubber.

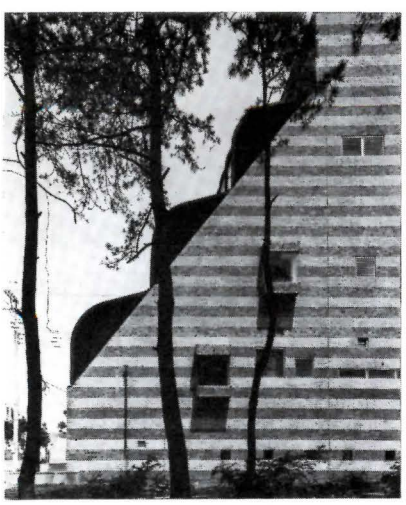
In March, the Gallery Alexandre Iolas, which shows Raynaud's paintings, furnished a bus for their friends and clients to visit "La Maison de Raynaud." The photographs opposite show the music room, with built-in speakers; the crypt (his white-tile paintings can be seen through iron bars); and the bedroom.

The *blockhaus* has taken Raynaud four years to build. The site is 55 meters long and 9.50 meters wide, sloping down to a forest.

There will not be a house-warming party.—G de B.

A dentist in a waterfall

HIRATSUKA, JAPAN—If one must absolutely have one's teeth messed about with, this five-story dental clinic should make the experience seem almost a pleasure. With an extremely narrow site, architects Kazumasa Yamashita and Associates decided on a multilayer piling up of functions. The step-back of the upper floors was a result of the decreasing need of space on those floors, and was not due to zoning restrictions. The building's curved glass front looks very much like a sculptured waterfall. Construction is reinforced concrete, the walls covered with tiles.



Breuer power

WASHINGTON STATE, USA—As other architects turn their attention to building techniques which can conserve energy, the firm of Marcel Breuer and Associates is at work on a gigantic project for the creation of energy—a 2,500-ft.-long addition to the Grand Coulee Dam in the State of Washington. The first half of the addition will house six generating units, each rated at 600,000 kilowatts, and construction is well underway. When completed, the complex will be the world's largest single power facility, as well as one of the most massive structures erected since antiquity. (Indeed, its forms as well as its dimensions seem vaguely Egyptian.)

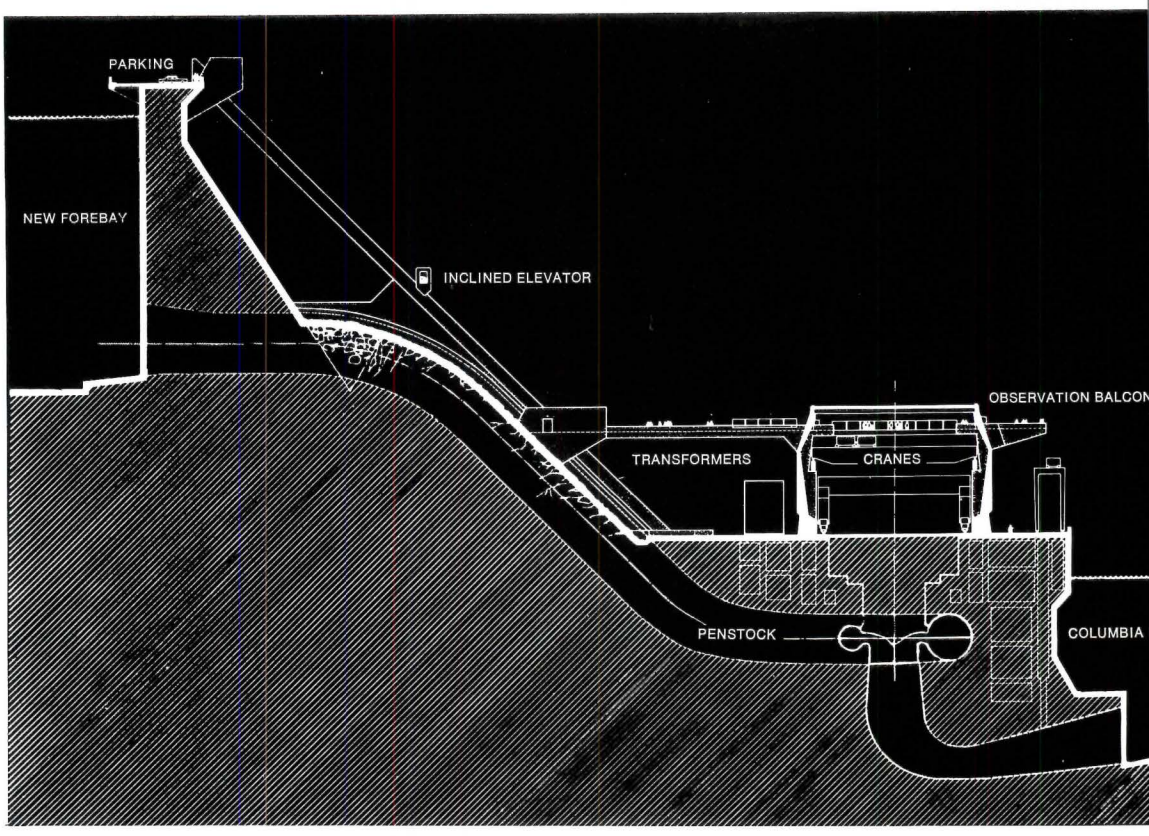
The fact that the Federal Bureau of Reclamation decided to turn to an architect of Breuer's stature, rather than to consider such construction as just an engineering project, is heartening, and the results promise to well repay that decision. In Breuer's words, his work with the Bureau "is not directed toward cosmetic application but toward the very anatomy of the project."

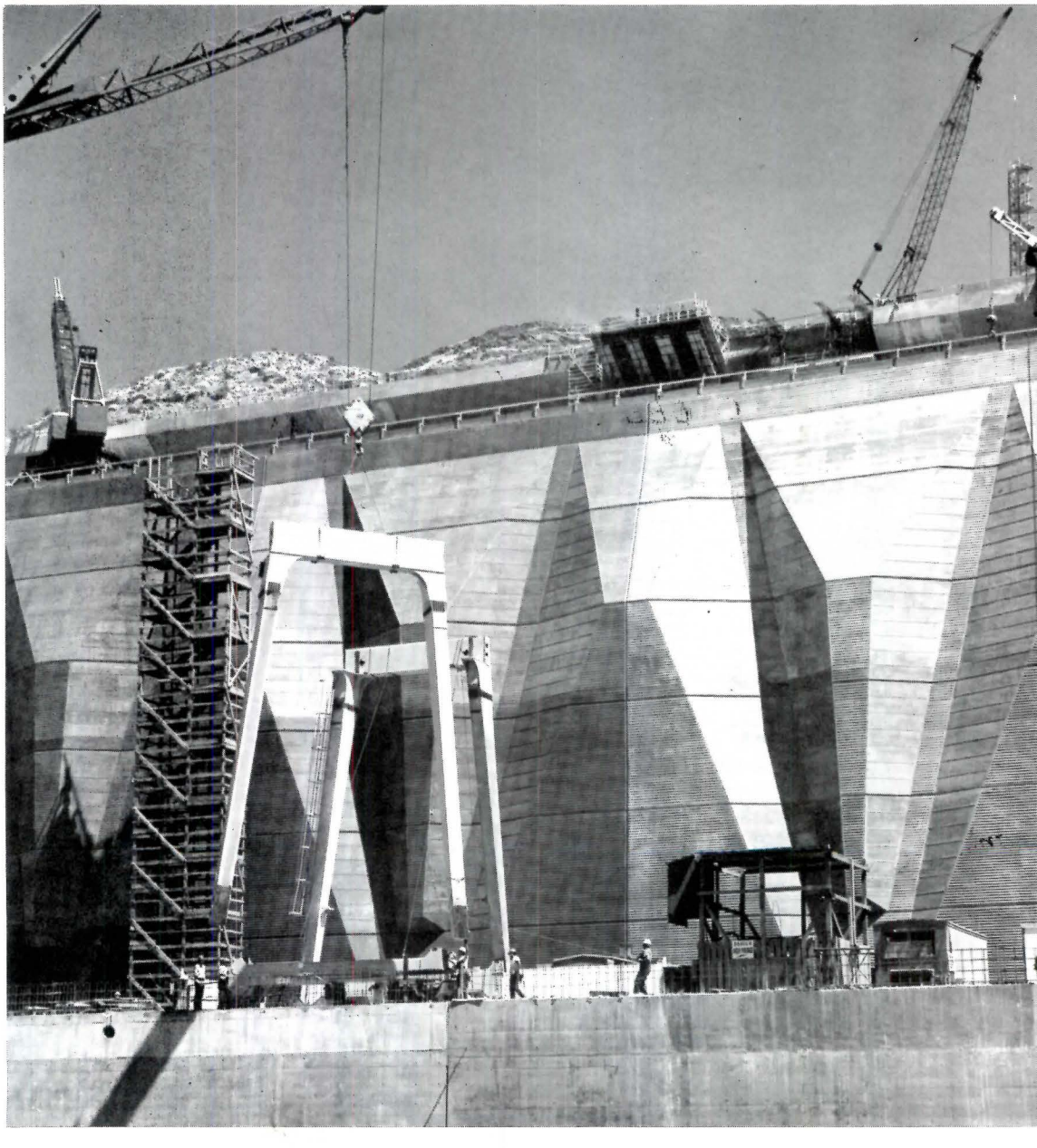
As well as generating power, the new dam will provide dramatic facilities for visitors. An inclined glass-enclosed elevator will carry them 475 feet down the face of the dam, stopping midway at a cantilevered platform overlooking the spillway. At the bottom of the ride will be a working display of spectacular technology: a pair of 275-ton beam cranes overhead, a 1,900-ton gantry crane, and the great spinning shafts (eight feet in diameter) linking turbines to generators.

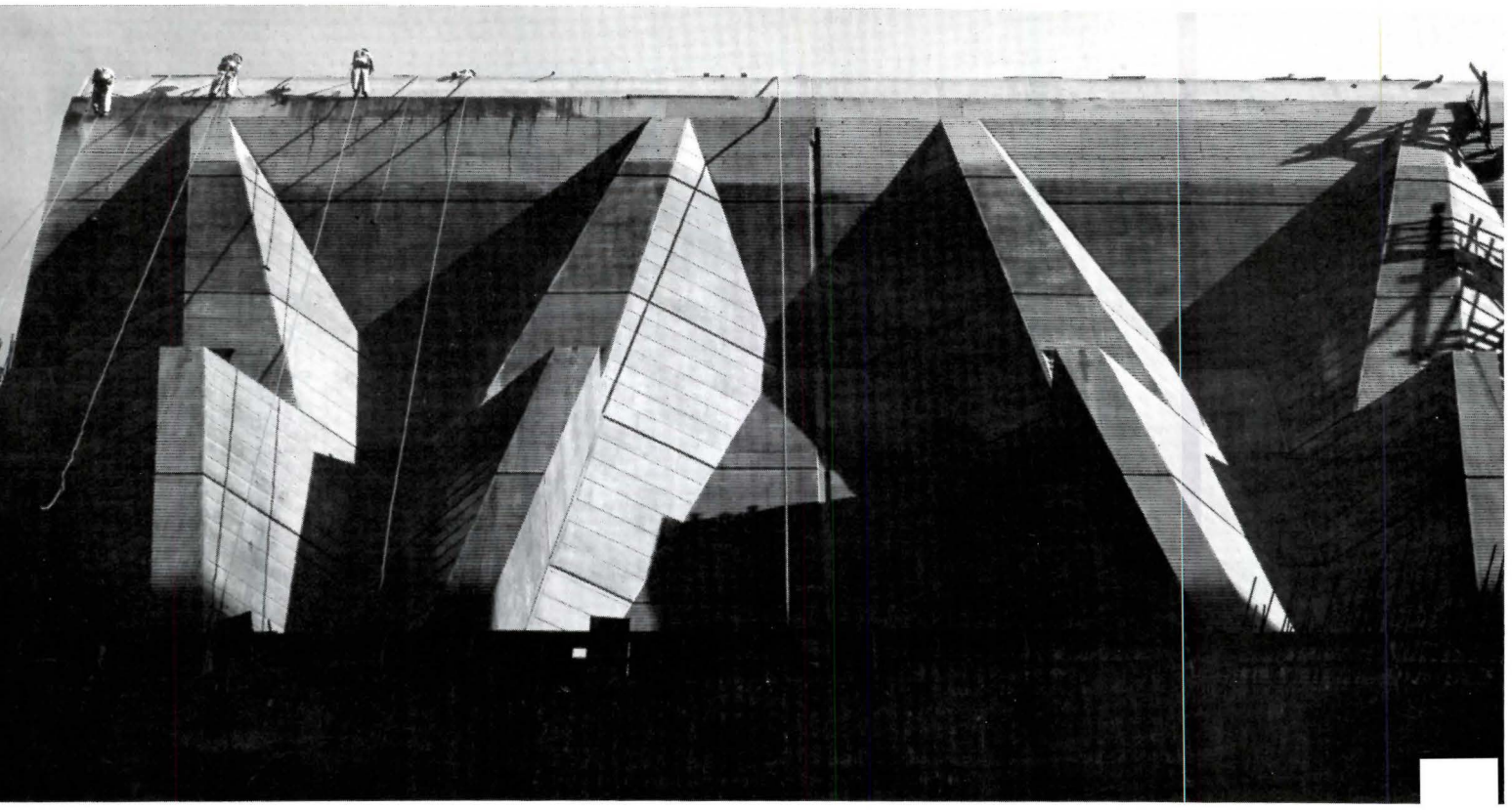
Breuer's partner in charge of the project is Hamilton P. Smith. Thomas Hayes is Associate Architect; Kenneth Brooks is Environmental Planner; and the structural consultant—a key role on such an undertaking—is Paul Weidlinger.

The aerial view opposite shows the 1,258-foot-long first stage of the dam extension under construction. When the dam is completed, the excavation in the foreground will be filled with water to form a new forebay. The end of the existing Grand Coulee Dam is visible at the left of the photograph. Other photographs show portions of the great concrete walls, corrugated for increased strength. The vertical section shows the elevator and bridges which provide visitors' access.

At a later stage of construction, *Architecture PLUS* will present a thorough examination of this monumental work.—S. A.



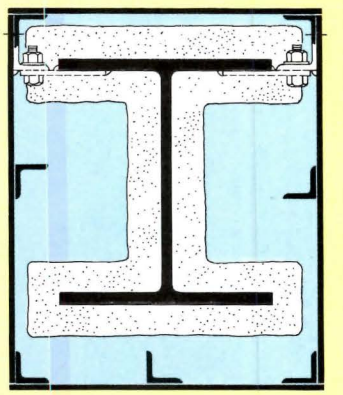




Footnote

One of Marcel Breuer's windows is missing! Or, rather, one of the angled windows Breuer designed for Manhattan's Whitney Museum of American Art seems to have turned up on the 24th floor of Melbourne's new Board of Works tower (Perrott Lyon Timlock Kesa & Associates, Architects), and nobody seems quite sure of how (or why) the window got there. Anyway, please return window to owner at 75th Street and Madison Avenue, New York City—and no questions asked.

Owner:
United Air Lines Incorporated, Chicago, Illinois
Architects/Engineers:
Graham, Anderson, Probst & White, Chicago, Illinois
General Contractor:
Power Construction Company, Elmhurst, Illinois
Steel Fabricators:
Frame: Wendnagel & Company Inc., Chicago, Illinois
Exterior: David Architectural Metals Incorporated, Chicago, Illinois
Architectural Walls:
H. H. Robertson Company, Pittsburgh, Pennsylvania



Section through typical free-standing column, illustrating steel plate cladding method.

PAINTED STEEL IS WORTH A SECOND LOOK.

The clean, crisp lines of this white-painted steel building command instant attention.

It's the Regional Reservation Center in Elk Grove Township, Illinois—the newest addition to a group of United Air Lines buildings not far from O'Hare Airport.

A 1973 AIA Honor Award winner, the building has a modular steel frame and a white-painted carbon steel plate exterior skin—enhanced by grey insulating glass. The steel—both structural and exterior—is ASTM A-36 from United States Steel.

Spandrel and column cover components were shop-fabricated into sub-assemblies and painted with a primer coat. In the field, these parts were bolted to brackets on the frame, joints were welded and ground smooth and the entire exterior was sealed with two coats of white, acrylic-latex paint.

The striking simplicity of this new structure demonstrates one of the features of a painted steel building: it's well worth a second look!

For further information about this building and for advice on the many ways to use architectural steel, contact a USS Construction Marketing Representative through the nearest USS Sales Office or write: United States Steel, Room C307, 600 Grant Street, Pittsburgh, Pa. 15230.

USS TRADEMARK

United States Steel

letter from SAO PAULO

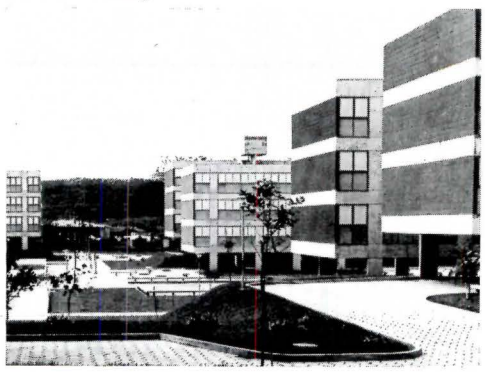
continued from page 28

and a social club. But the first impression of bleakness is reinforced by the lack of such elements at present. It is a lifeless scene with no individuality expressed in the building forms. The concrete-framed structures with block-infill walls are all raised off the ground on *pilotis* and have parking space underneath. The entrance sides are subdivided into well-proportioned, sunlit courts by open stairwells bridging to each apartment entrance. When we visited, children were playing games in the grassy open spaces between buildings. People seemed happy and a few talked casually together. There might have been more mingling, however, if there had been laundries, shops and sports areas at ground level. The major triumph here is the removal of the barriers that isolate homes in typical neighborhoods, although this group is still segregated economically.

Another architect of note working with the BNH is Abrahao Sanovicz. In 1972 the first of seven identical 11-story residential towers on *pilotis* was constructed in a middle-income suburb. They are concrete-framed with painted gypsum block walls. Their large condominum units (1,345 sq. ft.) are intended for those earning more than six minimum salaries per month and the design follows the basic *parti* of a luxury Sao Paulo apartment tower, but has been carefully detailed to control costs. The sidewalls have flattened columns and deep beams of exposed concrete with simple aluminum windows. Endwalls and interior partitions are gypsum block, built-in cabinets are of asbestos-cement sheeting and the flooring is vinyl asbestos. These towers are a study in well-styled, low-cost design.

Also interesting is Sanovicz' scheme for 144 three-bedroom garden apartments in Jundiai, a town north of Sao Paulo. The three-story blocks, built at the same time as those described above, use similar construction methods. But in this case only twelve families are grouped around each stairwell. Terracing of the open site has separated it into landscaped areas and paved ones which have seating, playgrounds and ballfields. Are there enough attractions to populate the park-like setting or will these wide-open spaces become desolate, even dangerous? With few examples of how Brazilians behave in a neighborhood commons, this architect has been inspired by the free social relationships fostered by the "unwalled" common spaces found in the *favelas*. Yet unlike the *favela* dweller in his free social space, the average worker has less free time to hang around communal areas and his informal socializing must go hand-in-hand with his daily work routine.

Jundiai housing



Architects' future role

Under these conditions, of slowly evolving life-styles coupled with rapidly-expanding settlements, *Paulista* architects will probably increase their role in urban planning, especially planning for smaller communities as the population spreads. In addition, there is an increasing awareness of the need for higher standards in the physical design of urban centers and the architect is recognized as the professional most responsible for that work.

In the long run, it is the regional setting that offers Sao Paulo the most exciting potential. The Rio Tiete, draining inland from the city, connects in a rich hinterland to the Rio Parana, which flows into the La Plata. Thus, Sao Paulo is the only coastal city tied by water to Paraguay and Argentina. A series of hydroelectric dams blocks navigation from Sao Paulo. If a series of canals allowed boats to pass, the Tiete might be to Sao Paulo what the Erie Canal was to New York 150 years ago.

The great bulk of buildings will continue to be simple housing, shops and factories. Very little of that work will be done by architects. But there may be some possibilities in the area of residential and office towers. Although architects and engineers nominally design these structures, it is likely that fire disasters such as that in the Joelma Building (News Plus, March/April 1974) will cause changes in the codes so that the professionals will be able to insist on a responsible role. It will mean that instead of working for developers as employees, as at present, architects will have the independence to raise and maintain standards of construction and fire safety.

But in the end, the future of the Sao Paulo architects is linked to the broadening of individual economic opportunity there. Until the standard of living and social expectations of Sao Paulo's six or seven million second-class citizens increase substantially, there will be a limited demand for hospitals, theaters and the other complex building types that truly challenge the architect's skill. But the integration of these people into modern industrial society, it appears, is taking place very slowly.

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Reviews

James Stirling's Work, a film produced by Charles Oakley; co-directors Charles Oakley, Alfred Munkenbeck and Charles Mullally; cameraman Charles Mullally; 1971, 11 minutes, color. Purchase $125, rental $25, from Museum at Large, 157 West 54th Street, New York, N.Y. 10019.

Christo's Valley Curtain, a film produced by Maysles Films Inc., New York; directed by the Maysles Brothers and Ellen Giffard; 1973, 28 minutes, color. Rental $75 from Maysles Films Inc., 1697 Broadway, New York, N.Y. 10019.

Christo Valley Curtain, a book published by Harry N. Abrams Inc., New York, 1973. 351 pp. illustrated, $35.

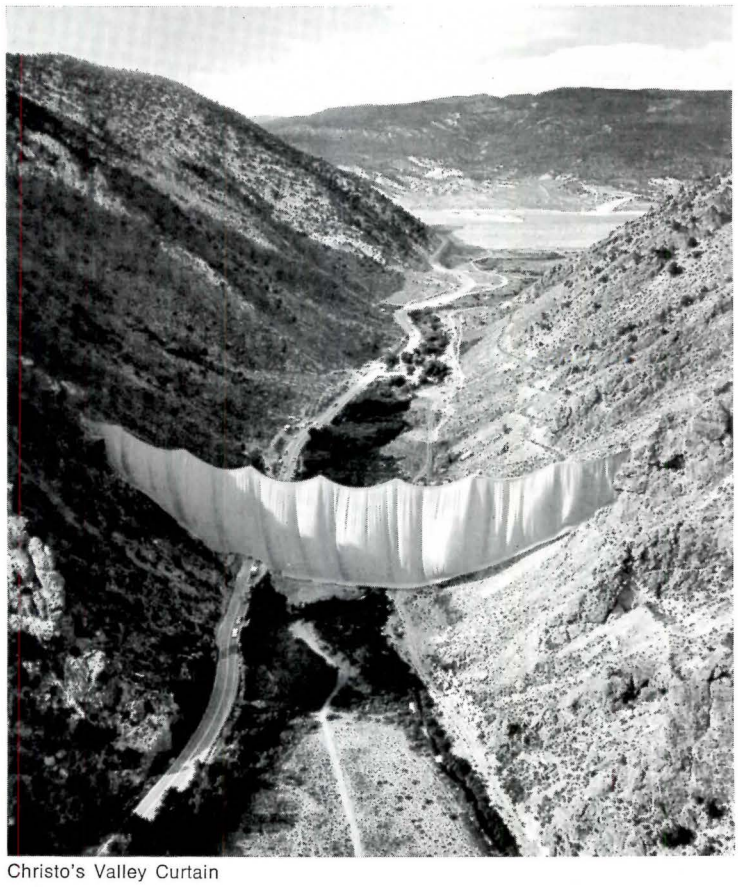
Thieves, a comedy by Herb Gardner, directed by Charles Grodin, starring Marlo Thomas and Richard Mulligan. Broadhurst Theater, 44th Street West of Broadway, New York, N.Y.

Reviewed by Dorothy Alexander

Dorothy Alexander was born in Montreal, Canada, is a registered architect in California and lives and works in New York City.

5:18 p.m. Tuesday, March 9th, and not a dry eye in the house. Unfortunately, my late arrival at that moment meant I had missed 55 minutes of mirth provided by "New Directions in the Building Industry," a sleeper produced by a roofing manufacturer. Cautiously, I groped for a seat in the darkened conference room ("overlooking Central Park" said the hand lettered leaflet announcing the event). So, without starlets but within easy reference to Olmsted's masterpiece, the first Architecture PLUS Film Festival was underway.

Next item on the program was "James Stirling's Work," an 11 minute film by Charles Oakley, Alfred Munkenbeck and Charles Mullally. This first film by three young filmmakers gave reassurance that it's still OK to trust people under 25. Because of its freshness, restraint and lack of both commercial and ideological "hype." In the best sense of the documentary idea, the architect and his work were permitted to speak for themselves.



Christo's Valley Curtain

The "work" in question is one building, the History Faculty Building at Cambridge University. The film opens with a loving tracking shot of the ambiance of the town. Greenness and old stone, against a murmuring soundtrack of Stirling in the studio preparing to talk about the building. Laughter, the scraping of chairs and the music of Yorkshire speech. Slowly the camera backs away from old stone. Glass comes into view, more and more glass, until the screen is entirely filled with faceted surfaces of glass.

Cut to Stirling, pencil and rough model in hand. Briefly he discusses the background of the commission, a competition, and proceeds to sketch and describe the development of the idea. Clearly he is not an actor in a drama. Meanwhile Mullally's camera illustrates idea with reality. Reality comes off rather better, not because it isn't connected to idea, but because it is so much *more*. The camera, like the architect, lingers on the great glass-roofed space of the reading room. Then it moves through tubular intricacy and double glazing of the roof structure, out over the roof and along the track of the ingenious engine that washes the glass. Stirling is happily pointing out that various aluminum extrusions can be cut to measure on the job, as though that explained new directions in the building industry. Well, maybe it does. The film may be rented for a nominal sum from Museum at Large. For best results it should be seen within view of Central Park.

"Christo's Valley Curtain," the last work shown, a documentary by the Maysles Brothers, also speaks for itself but in a rather different way. This time the artist would hardly be described as modest, unassuming or uncomfortable. In fact, on the basis of having seen "Christo . . ." and "Gimme Shelter," which recorded the mayhem and pathos of the Stones' last American experience, I am tempted to say that the Maysles Brothers make strange films.

There are some points of similarity between "Christo . . ." and "Gimme Shelter." Both deal with the myth of the artist as romantic hero (The Agony and the Ecstasy). Both record a hysterical enterprise that involved staggering amounts of money and human energy. (The curtain of the title is a quarter of a mile long, up to 360 feet high, cost almost ¾ million

continued on page 139

Review

continued from page 134

dollars, took 24 months to plan and erect, and lasted 28 hours before it was torn away by the wind.) And both end with an ambivalent failure-in-success and a certain shattering of myth.

In "Gimme Shelter" an unpremeditated murder happens on camera. "Valley Curtain" is not that kind of gig but it has its bad moments. Christo's friend, Jeanne Claude, lying on her back in the grass lazily asking about a swarm of iron workers struggling 300 feet in the air with several tons of wind-whipped cable. Or the shouting match when she suggests they are working too slowly and not taking enough chances. The iron workers respond with true grit. This must be "The Bridge Over The River Kwai," an ultimate affirmation of the glory of the gratuitous act. Not only do they do it (with the help of a cast of hundreds), but one of them explains why before exiting to the nearest saloon. "It's not the (sic) erection of it, it's the *thought* . . . this here's a vision, boy! I would never in a lifetime ever thought that anybody would think of doing something like this."

Well, Christo is not among those artists who slice off parts of the private person in public. The film may be rented from Maysles Films Inc., 1697 Broadway, New York, at a cost of $75.00.

Besides the film documenting the act, there is a book *Christo Valley Curtain* recently published by Harry N. Abrams, Inc. At first I was reluctant to review it because it looked like a big book and naturally I thought I would have to read it first. However, this proved to be unnecessary because the 351 pages contain "299 illustrations, including 119 plates in full color, plus 243 documents and 61 plans," but no text. Caveat emptor. Get the coffee table ready.

Being a film freak, I'm not much into theater, so the decision to attend a preview of "Thieves" written by Herb Gardner (author of "A Thousand Clowns") may have been prompted by a recent subway ride with the drama critic for a local magazine. Plus wondering what kind of audience would be delivered to the ailing theater by an extravaganza like John Portman's proposed hotel for Times Square (one of the drama critic's pet projects). Senses already saturated by a plunge through two artificial lakes in a glass elevator.

In any case, the audience for "Thieves" appeared for the most part to have been provided by an airline or a travel agency. (This hasn't happened yet with the movies, but watch out). Hence, not a motley collection of individuals free to respond to the experience of theater, but a faceless collectivity yearning for whatever was promised in the brochures. Or, more a matter of going to the theater in New York in order to go back where you came from and say you have been to the theater in New York. In which case, why not run in and out of an empty theater? Hardly worth the trouble to look at a play.

Some authors have responded to this problem (perhaps inadvertently) by making excruciatingly long (say 12 hours) and lethally tedious plays in which absolutely nothing happens. These require at least endurance on the part of the audience. But as with the battle of the sexes, no one wins this war of attrition unless a dialogue ensues. Whether Mr. Gardner had intuitively given up hope of that happening, or for whatever reason, his play was flabby, feeble and unfunny.

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o k view

Centers for the Urban Environment by Victor Gruen. Van Nostrand Reinhold, New York. 266 pages. Illustrated. 1973. $24.95.

Reviewed by Samuel Kaplan

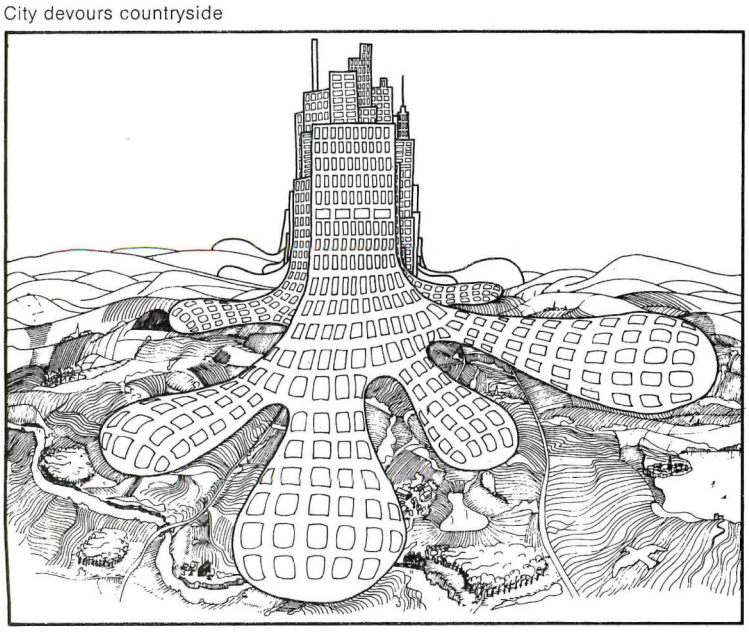
Victor Gruen, it seems, has learned from the entrepreneurs of the shopping complexes he has designed: when you have a product, and you believe in it, project it in absolutes. Never say "good" when you can say "greatest." Never say "possible alternative to downtown congestion" when you can say "survival of the cities," which, by the way, is the subtitle to Gruen's book.

If you accept the reality that in our free mercantile society the marketing of goods is the most powerful factor in the planning process, determining above all else whether the banks and real estate interests will invest their capital in a public or private scheme, then you will be able to put "Centers for the Urban Environment" into perspective. There are other factors of course that go into the decision making process of what we do with our environment, such as transportation, production, security, residential patterns, community and recreation needs, ecology and, usually last, design quality. Gruen is quite thorough in noting them. But it all turns on commerce, Gruen's rhetoric notwithstanding, with the entrepreneurs weighing the market against the risk, and local government, whose assistance in these plans are essential, weighing its expenditures against projected tax incomes from businesses. Let the individual be damned, unless of course he stops coming downtown or going to the regional shopping centers, complexes or towns to spend his money, as if he had a choice.

Gruen knows what makes our society tick, though his perspective is somewhat prejudiced by his loyalty to his institutional clients. But if you are interested in the hard reality of today, his book provides an excellent insight into the design process that gives form to our plastic value system, influenced by advertising and political rhetoric. It is also on another level an excellent handbook for the urban designer of today and, perhaps, tomorrow, if he indeed wants to take part in the constant reshaping of city, suburban and countryscapes. It presents the BIG picture on the BIG world canvas. No sensitive small rehabilitation or restoration projects here. Got to keep the economy moving and the taxes flowing.

With his feet firmly planted, as much as they can be, in the morass of commercial development, Gruen takes the reader on a tour of twenty years of shopping complexes, from the early centers, such as his Northland Center in Detroit, through various developmental forms, from "open centers" to "enclosed space," from "extroverted" centers to "introverted" centers, from one level of activity to multiple levels, from the countryside back to the urban core, from single use to multi-functional use. It is a fascinating tour, due in most part to a varied international selection, albeit many of his own, of case studies. We are shown how the simple designs for single use, the big department store by itself in a sea of parking, have slowly, but surely, moved to joining with other business interests

City devours countryside



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into more complex financial and design arrangements; then into a mix of other uses, public or residential, even more complex, but more viable.

Keeping his prose to a minimum, Gruen follows for the most part a consistent format in describing the studies, noting the background, planning approach, goals and status of each project. With the studies well illustrated by photographs, plans and perspectives, they form the heart of the book. Certainly it is the most informative review of such developments to date, a valuable sourcebook. It also offers without the generalities some interesting insights into the design process, as perceived by Gruen. In particular I found his clashes with "romantic" architects and planners to be quite revealing, perhaps more than he meant it to be.

Following the development of multi-purpose centers, literally and figuratively "blockbusters," Gruen points to the future: Compact high density complexes rising like Phoenixes from the center of dead cities, or out in the countryside, urban organisms incorporating all the essential services and amenities of life, ecologically pure, the automobile banned to its edges, serving our free society. It reads well and the illustrations are provocative, but the question is whether, if it is ever built, would YOU want to live there.

Samuel Kaplan, a member of our Board of Contributors, teaches urban design at the School of Architecture of The City College of New York.

Le Corbusier and the Tragic View of Architecture by Charles Jencks. Published by Harvard University Press, Cambridge, Massachusetts, 1974. 198 pages. Illustrated. $13.95.

Reviewed by Peter Blake

What a fascinating book this is! Charles Jencks, an American architectural historian now operating in Britain, did not, apparently, know Le Corbusier (as I did); but his insights into Corbu's life and work are extraordinary. Indeed, having written a short book on Le Corbusier, and having had many opportunities to talk with him, I am ashamed to admit that much of what Jencks uncovered escaped me completely.

How is one to review a book of this sort? There is hardly a page, or an illustration, that doesn't reveal something unexpected even to someone who has believed himself to be quite familiar with Corbu's most significant insights. All I can say, really, is that anyone among us who is really touched by the work of this wonderfully complex man must read this book—and throw mine away (after first having bought it, of course).

There is only one very minor flaw in this book: Charles Jencks does not quite catch one small but significant aspect of Le Corbusier's work: Corbu's unfailing "taste." Corbu was not only the most influential and the most beguiling architect of our century; he was also the one artist, among us, whose sense of form and color and sheer style was unequalled in our day. I remember being baffled by that very nice but rather jazzy paraboloid transformer station next to the Unité d'Habitation in Marseille—both by its form and by the fact that it was not ever shown in any of Corbu's books—until Shadrach Woods told me that it had really been designed by somebody else in Corbu's office, and not by Le Corbusier himself—and that the latter disliked it. Well, Corbu's eye was obviously better than mine, and better than the eye of Charles Jencks. And those well-publicized architects in New York—those self-appointed heirs to Le Corbusier, who don't seem to understand his work *at all*—should stop and think and read this book, and, having read it, ask themselves if they are really entitled to cheapen Corbu's heritage, and who, precisely, elected them to be his executors.

The Architecture of Frank Lloyd Wright, A Complete Catalog by William Allin Storrer. Foreword by Henry-Russell Hitchcock. Published by M.I.T. Press, Cambridge, Mass., and London, England, 1974. Pages and illustrations not numbered. $9.95.

A useful reference book purporting to document, for the first time, *all* the buildings designed by Wright that were actually built. 433 buildings are listed, most of them described in a brief paragraph and illustrated with a single photograph. Two minor flaws: first (perhaps at owners' requests), street addresses are not given in the text but are hidden in a curious index arranged by "Zip Codes"; second, some of the buildings that were not found or that have been demolished are illustrated by drawings so inept that they are insulting.

A List of Architectural Books Available in America before the Revolution by Helen Park. Foreword by Adolf K. Placzek. Published by Hennessey and Ingalls, Los Angeles, 1973. 79 pages, 11 illustrations. $7.95.

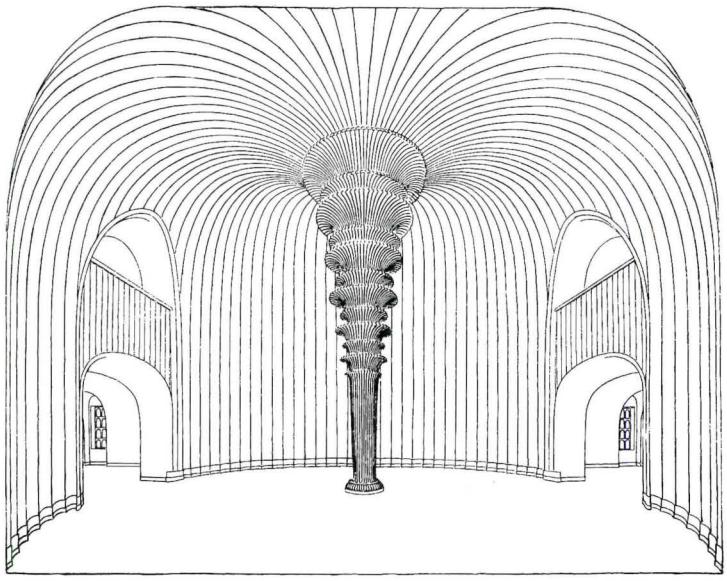
The "Park List" first appeared as an article in the *Journal of the Society of Architectural Historians* in 1961 and has become an important tool for the study of early American building. Revised and enlarged, it is now available in book form.

Expressionist Architecture by Wolfgang Pehnt. Translated by T. A. Underwood and Edith Küstner. Published by Praeger, New York, 1973. 234 pages, illustrated. $27.50.

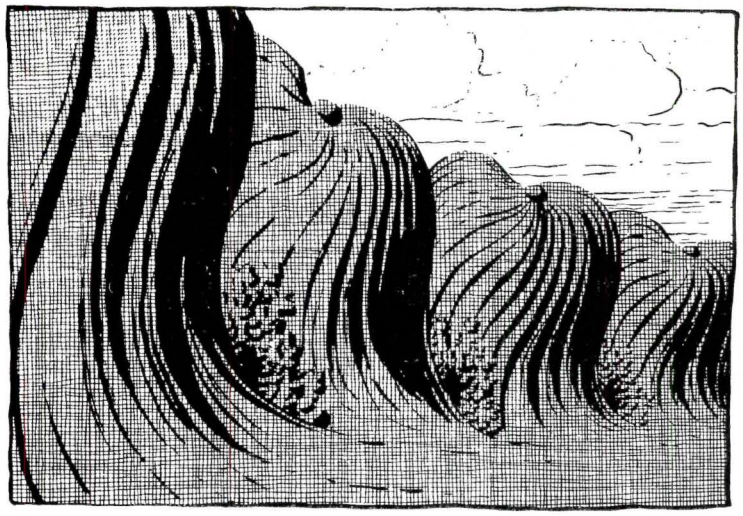
Reviewed by Stanley Abercrombie

Like "hot ice" and "poor little rich girl," the phrase "expressionist architecture" is an oxymoron: its terms are contradictory. For there is basic to architecture a quality (Vitruvius' "firmness," perhaps, the quality that makes it stand) which resists pure expression. A similar conflict exists in every artistic medium, but the level floors and straight beams of architecture seem particularly intransigent. Still, some say that it is this conflict which *produces* art, as sand provokes the oyster to pearls. Maybe so.

Certainly this new book is filled with art. There are some dazzling accomplishments and some much more dazzling sketches. Almost two thirds of the projects illustrated were never built, and it is clear that their architects knew they never *could* be built. Pehnt refers, for example, to drawings by the architect Otto Kohtz (1880-1956) which "went so far as to show gigantic growths, serving unimaginable purposes and constructed of quite inconceivable materials."



The main foyer of Hans Poelzig's Grosse Schauspielhaus, Berlin, 1918



A 1909 sketch by architect Otto Kohtz (1880-1956)

Not that the expressionist architects were frivolous; by present standards, they were embarrassingly zealous. Few architects these days would dare write (as Pehnt tells us Bruno Taut did in 1919), "My torch dazzles me, but I am determined to carry it." Nor do many of us now hear mysterious voices (as Otto Bartning did in 1917) urging us to "build towers, build towers." But we could use a bit of the expressionists' confidence in the importance of architecture. Adolf Behne (who, in 1915, may have been the first to use the phrase "expressionist architecture") wrote that "In the last analysis every art is a sculpting of the human being. Architecture is most powerfully and obviously so."

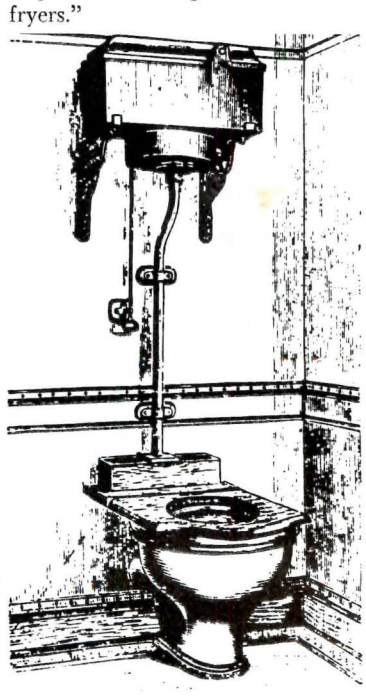
Pehnt's book offers us a generous and well-illustrated collection of all the buildings we ever thought might be called "expressionist," some we would never have called "expressionist" (the inclusion of a photograph of Marcel Breuer's Technology Building at New York University is unexplained), and other buildings and projects most of us never knew before. What the book doesn't give us is any clear idea of what expressionist architecture is. "The label used in the present work," Pehnt warns, "... should not be taken to imply anything more than the fact that the designs and buildings here discussed bear more resemblance to one another than they bear to other designs and buildings." That evasiveness may get Pehnt off the hook, but it isn't very helpful to his readers.

A scholarly friend, David DeLong of Columbia University, suggests that expressionist architecture might be divided into "high" and "low" categories, "high" including all those visionary fantasies never meant to be built, and "low" including buildings which express some aspect of their function or construction. Separate from both these categories are works that are merely expressionistic, using expressionist forms as decoration.

Pehnt makes no such distinction or any other distinctions. He has assembled an admirable amount of material, but his book unfortunately follows the New England Boiled Dinner recipe: dump the ingredients into a single pot, and cook until they all taste the same.

Survival Scrapbook #1: Shelter, $3.95. **Survival Scrapbook #2: Food,** $3.45. **Survival Scrapbook #3: Energy,** $3.95. All by Stefan A. Szczelkun. Published by Schocken Books, New York. Illustrated.

Rich compilations of information about domes, dugouts, tents, inflatable suits, inflatable houses, windmills, heat pumps, fish farming, and even such esoteric contraptions as things called "shit-fryers."



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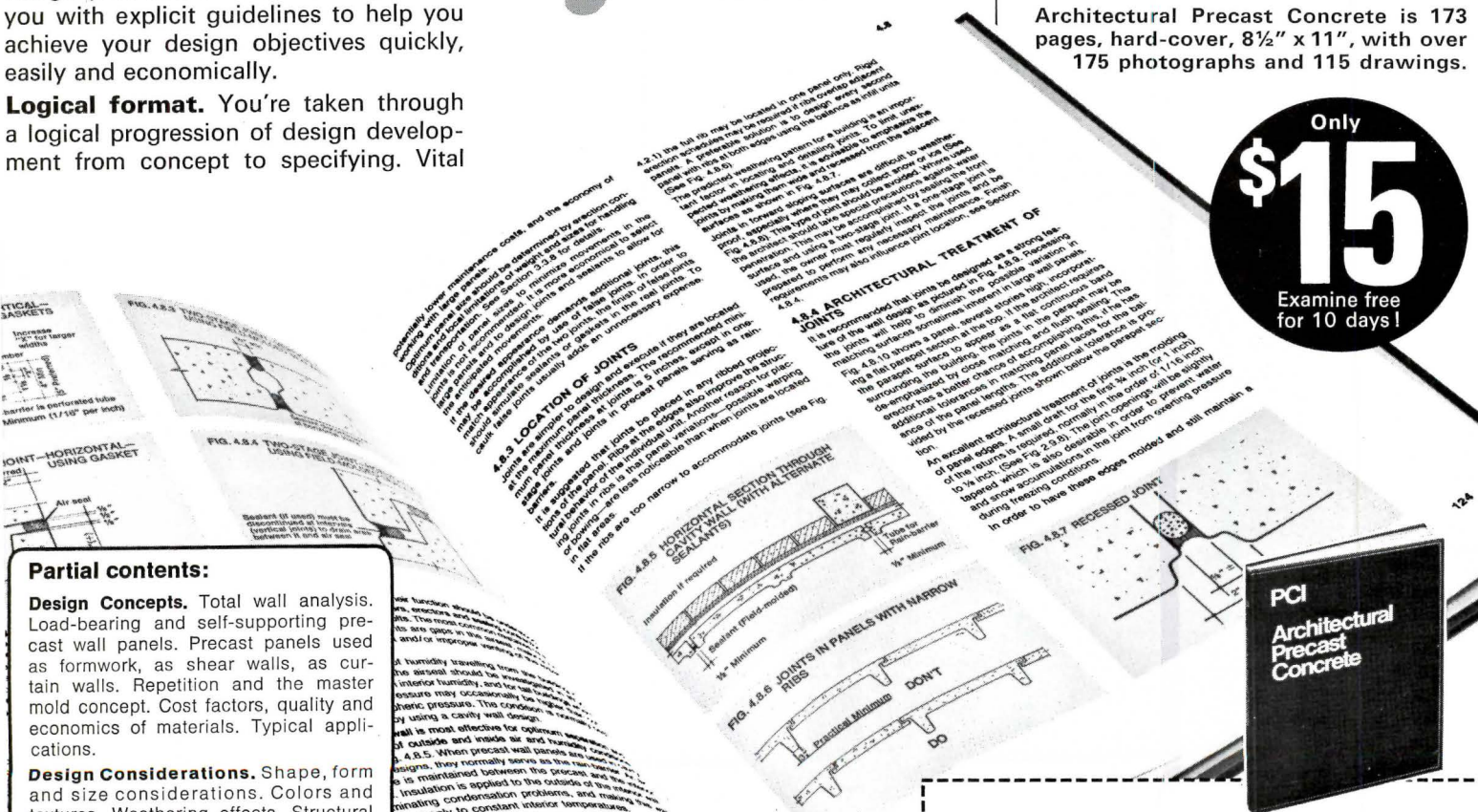

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Eurotex offers information pamphlet on Tretford carpet, a versatile system of ribbed carpet and carpet tiles for schools, hospitals and offices. Installation and specification data are included.
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The Jute Carpet Backing Council has published the latest version of its architectural guide specification for glue-down installation of double jute-backed carpet.
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CHALKBOARDS
Porcelain-on-steel chalkboards are described in new brochure by AlliancеWall Corp. All chalkboards are guaranteed for 50 years or for the life of the building in which they are installed.
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R-Way Furniture Company offers a new, completely modular executive office furniture grouping called "The Brentwood Collection." Designed for flexibility and individuality, the group has many variations in storage modules, finish choices and seating selections.
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Stendig, Inc. has announced the publication of their new 63-page General Services Administration Catalog/Price List.
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