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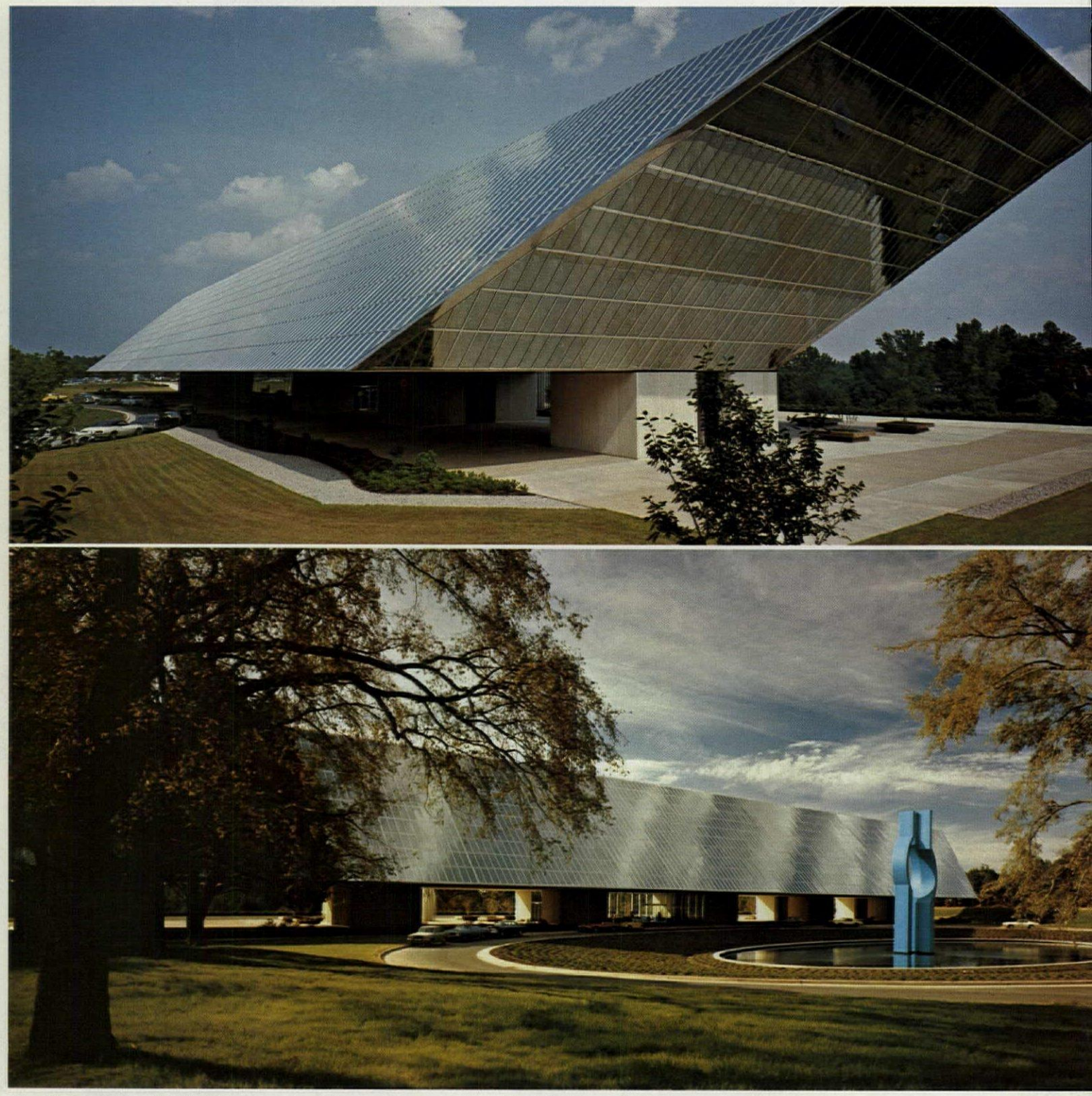

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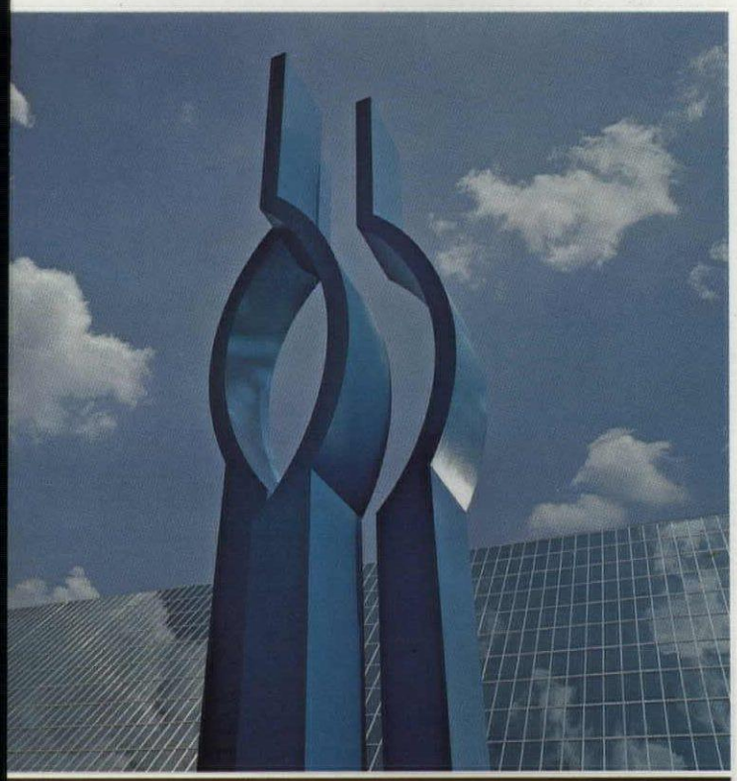

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THE INTERNATIONAL MAGAZINE OF ARCHITECTURE SEPTEMBER/OCTOBER 1974

Cover photograph of 100 William Street by Norman McGrath

ARCHITECTURE PLUS SEPTEMBER/OCTOBER 1974 VOLUME 2 NUMBER 5

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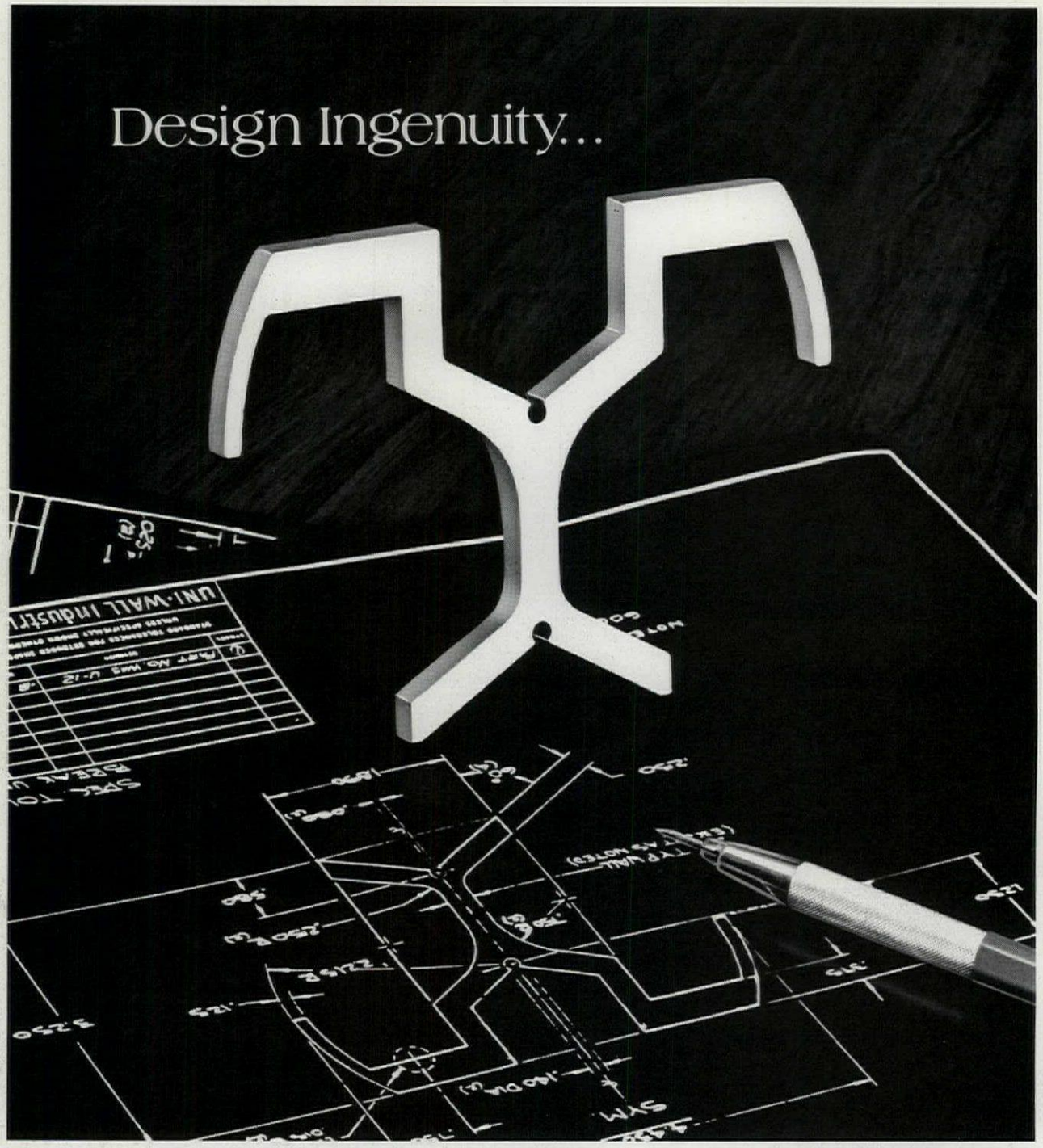

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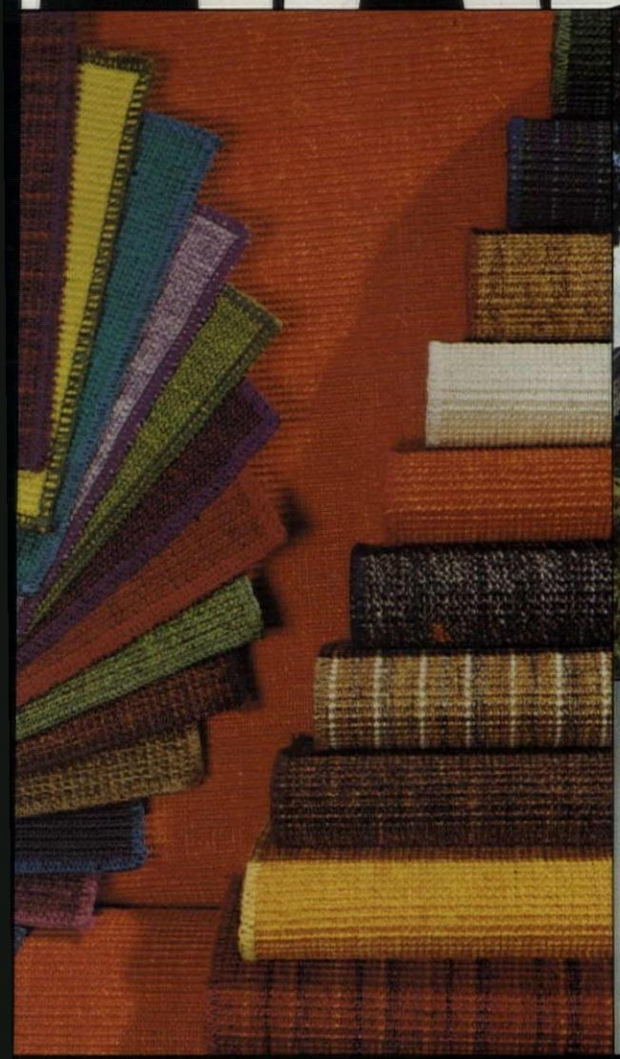

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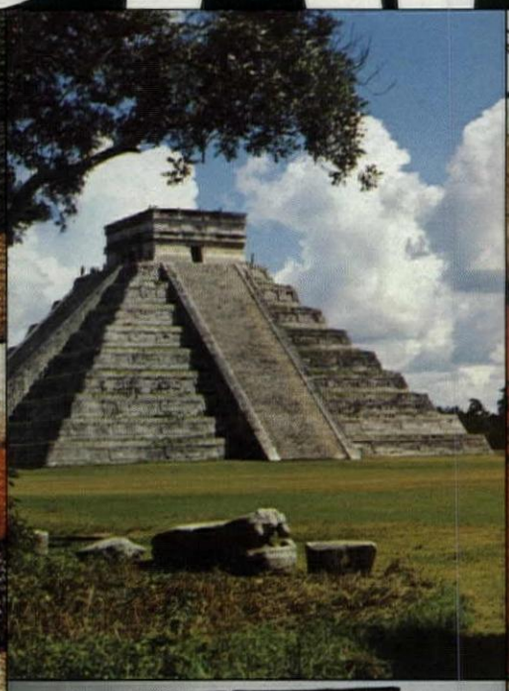

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Letters

U Mass

I very much enjoyed the article you published (March/April issue) on the planning of the University of Massachusetts Boston Campus. My agencies were responsible for both the university construction and the transportation improvements, so I have been deeply involved in this effort for the past several years. Your article was by far the best report and analysis that has yet appeared on this highly significant project, and I don't recall spotting even one significant error. This is surely some sort of record.

ALAN ALTSHULER
Sec. of Transportation & Construction
Commonwealth of Massachusetts
Boston, Massachusetts

You have attempted a most ambitious task in weaving together the past and present story of the University at Boston while focusing on its physical setting and on the pretensions and concerns of its neighbors.

Rather than quibbling about misquotations or unbalanced consultation, I would like to make a contrary case on the question of "housing impact" which was central to the formation of the Dorchester Columbia Point Task Force and which permeates so much of your discussion not only of housing but of transportation.

I consider it a little unfair to quote Ms. Feingold's judgment on our projection ("inconceivable") without referring to the fact that the Justin Gray estimates on impact were demonstrably exaggerated, misleading and arithmetically erratic. More than that, the Gray report portrayal of the housing issue has, I believe, contributed to a mood of fear and anxiety regarding the University's arrival which is not only unjustified but could, in the end, prevent the constructive role which the University community might play in halting the decline of a vulnerable, aging neighborhood. The 1,500 to 1,800 vacancies which you cite were never mentioned by the Justin Gray planning team. According to the Boston Redevelopment Authority, these are increasing and the community sponsors of the new Housing Technical Service Corporation now acknowledge that a policy of keeping the students out of Dorchester may be an error.

The Justin Gray report justifies the fear of a take-over of Dorchester by U Mass students and the consequent eviction of low income families by reference to the experience of Brighton and Allston in the 1960s. Your statement that our buses "unwisely" are open to walk-in as well as MBTA passengers reflects a similar judgment regarding the effect of University students living in the area. In this regard, I would point out that U Mass is one moderate-sized institution in a very large residential area; Allston-Brighton is a much smaller residential area surrounded by several large educational institutions and a number of smaller ones.

I don't really expect to change your views on the matter. The subject is one in which impressionistic feeling seems to take precedence over facts. Ms. Feingold mentioned to me, for example, that the first draft of the Task Force report was completed *before* the student housing survey information became available.

In the journalistic tradition I assume that by now you are focused on a new story, but if you would be interested in discussing any of these further, I would be glad to do so.

NAN S. ROBINSON
Vice President for Planning
University of Massachusetts
Boston, Massachusetts

Nan Robinson was inadvertently identified in the article as Vice President for Policy, *perhaps our subconscious reflection of the widespread view that not much* planning *worthy of the name has taken place, in regard to this campus. We regret the confusion, and apologize to her and to Peter Edelman, who is the Vice President for Policy. To set the record straight, it was Edelman not Robinson who said, "the state builds expensively, for political reasons."*

We are sorry to see the official university response directed entirely to the question of "housing impact." This response confirms our suspicion that the "revitalization" project, undertaken by Benjamin Thompson Associates at the instigation of the university, was so much public relations—useful at the time, but not to be mentioned again.

As to whether a policy of keeping students out of Dorchester "may be in error," this depends largely on one's viewpoint. As suggested in the article (from a report by the Boston Urban Observatory —a report, incidentally, that has been delayed over precisely this issue), an institution can be viewed either as "upgrading" an area or as driving out the low-income residents. We are sorry that Ms. Robinson is not acknowledging even the possibility of this dual impact.

Continued on page 10

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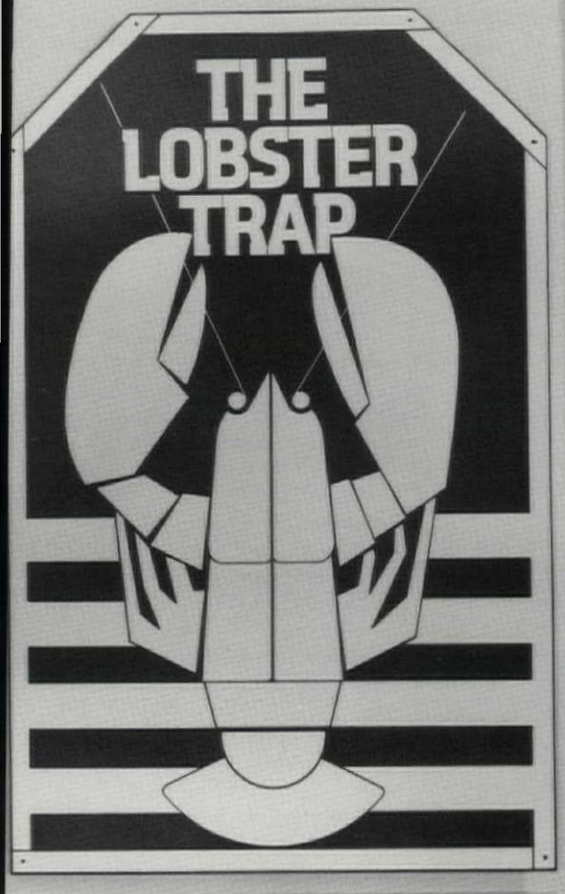

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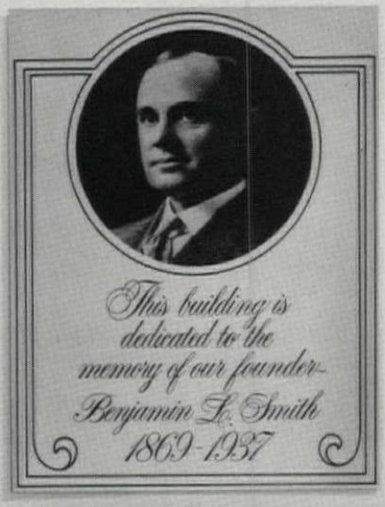

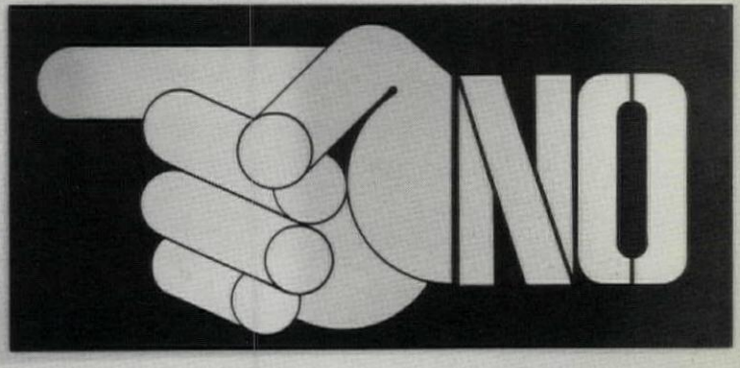

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Letters

Continued from page 8

On other points, it is true that "fear and anxiety" have marked the university's arrival, but to charge Justin Gray Associates with a significant role in creating that mood seems a misreading of the chronology. Dorchester residents were already fearful, or they wouldn't have asked the university for money to study the situation; a reading of the Gray report, in fact, shows that these consultants bent over backward to avoid labeling the university as "the enemy"; instead, the report tries to focus attention on problems caused by interlocking conditions and in need of efforts from many forces—private and public, university, city and state. It is irrelevant that most of the Task Force report may have been drafted before the student housing survey; most of it deals with quite different matters.

As to vacancies, there has never been any reliable data on habitable *vacancies, which is the real issue; one source suggests that a vacancy may easily require an expenditure of $15,000 to be brought to habitable condition.—ED.*

Wind Power

Your article on Wind Power (May/June issue) is one of the most interesting I've ever read. Absolutely fascinating!

This issue of Architecture PLUS is the best issue of any architectural publication to ever cross my desk. Your wind article is the *pièce de resistance.*

WILLIAM H. SULLIVAN
Dallas, Texas

Greetings

I am delighted to tell you that you have indeed kept your promise. The content of your magazine is brilliant and always valuable indeed! The articles on Olivetti, Afghan's Hot Rods, the Boeing 747 together with the field editors' candid comments give internationality to your magazine. All powers to your elbow.

UTTAM C. JAIN
Architect, Bombay, India

Louis Kahn

Your tribute to Kahn in the May-June issue, the eulogy by Norman Rice and selected photographs of Kahn's buildings was both touching and appropriate. As a former student in his Master's Class at Penn, maybe I can stir a few memories for someone else.

Perhaps the strongest memory I have of Lou Kahn is his deep humility, both as a person and as an architect. During the course of the studio he was undoubtedly subjected to reviewing considerable mediocre work. Yet, he always tried to encourage students and emphasize positive aspects.

As an architect, his buildings are not flamboyant or pretentious but rather confident statements. He brought to architecture a humility born of a patient search for form in contrast to the Brutalist shape-giving of the fifties.

I once heard him make a statement in a talk that now comes back at the time of his death; "Mozart died thinking he had accomplished nothing because all he knew was that which he had not yet done, and so it is with all of us."

MICHAEL J. BEDNAR
Assistant Professor, Univ. of Virginia
Charlottesville, Virginia

Park Hill

I think we're getting closer to the issues. Reyner Banham's "Park Hill Revisited" (May/June issue) addresses two critical aspects of housing and its impact on society: context recognition and user involvement.

My sense is that if Park Hill 'works,' it does so because of its particular context in British society and because of the management techniques employed in its operation. In an American public housing context, the design alone represents a model for disaster.

There are numerous urban examples, such as Boston's largest project, Bromley-Heath, of publicly assisted housing which succeed in spite of themselves. And the reasons for success are careful tenant selection and tenant involvement in management (management which is often complex by the design of the project).

It seems clear that design does contribute to behavior. Only by understanding the needs and behavior of particular groups of users in particular contexts can we design appropriate environments. To advocate the widespread application of models devised for particular circumstances would be simplistic and dangerous.

The UDC low-rise prototype referred to in the beginning of Banham's article was designed on the basis of behavior as observed in New York City in publicly assisted low income housing (the initial prototype by one English architect and two Americans!). Just as we did not accept British prototypes because of their differing contexts, we surely do not advocate that it become a universal model.

ANTHONY PANGARO
Architect, Boston, Massachusetts

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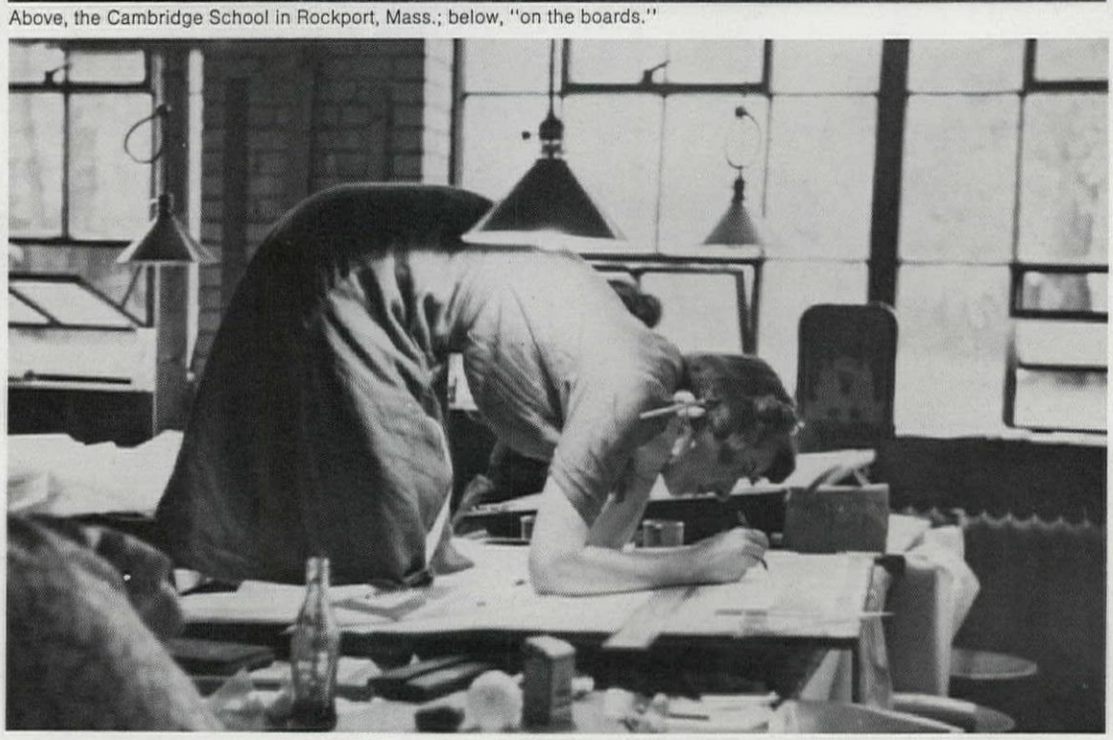
Reviews

From Tipi to Skyscraper: A History of Women in Architecture by Doris Cole. Published by i press incorporated, Boston, 1973; distributed by George Braziller, New York. 136 pp. Illustrated. Cloth $8.95; paper $3.95.

Reviewed by Barbara Shortt

Above, the Cambridge School in Rockport, Mass.; below, "on the boards."



Everyone should read Doris Cole's book. If you are a woman you must read it because it is one more strand in the unfinished tapestry of the history of women. If you are an American or an architect you should read it because it is about building and architectural practice in the United States, from the Indians to the present day, with an assemblage of facts and ideas not presented in the standard history books. And if you are none of the above, you should read it anyway because it is good reading, easily done, and chock full of the most fascinating tidbits.

Did you know, for example, that among most of the American Indians of the Great Plains and Southwest the women were the designers, builders, maintainers and owners of all buildings? And if a squaw got fed up with her husband, she could send him home to his mother? Did you know that Harriet Beecher Stowe and her sister Catherine Beecher wrote treatises on house design, and invented a "cook-stove" and a movable storage unit to be used as a variable room screen? That the Beechers, as well as many other women, wrote detailed analyses of plumbing, heating and ventilation systems?

In addition they discussed functional house layout and simply-made furnishings in the numerous "etiquette" books for ladies of the 19th century, which we wrongly associate with merely quaint manners and fashion. These etiquette books were really primers on house building, design and maintenance for the vast American middle class, many of whom were homesteaders whose women supervised building. Even the elegant Edith Wharton addressed herself to the subject of house design.

While the men were arguing about the merits of Egyptian *versus* Greek revival style, women were concerned with functionalism in the 20th century sense: that good design was the result of the simplest, most efficient and economical solution to practical problems. Miss Cole's thesis is that it was in times of crisis such as the Civil War, and the egalitarian societies of the homesteaders and the utopian communities, such as the Shakers', when women were active, that the best functional American design sprang forth, largely from women's hands. Frank Lloyd Wright may owe more to Harriet Beecher Stowe and these other women than is generally acknowledged.

The chapter on the "Education of Women Architects" has been printed in full in this magazine (December, 1973). It deals with the architecture schools of the land-grant colleges (such as Michigan and MIT) which were open to women by law, if not by choice.

Continued on page 14

Barbara Shortt is an architect who prepared at a Land Grant University and her special interest is Architectural History. She's currently a Professor at City College in the School of Architecture.

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Reviews

Continued from page 12

And it focuses on the private Cambridge School which was absorbed by Harvard during World War II, and where the bulk of the first generation of trained women architects were educated. Miss Cole also begins to document the work of significant women architects of the late 19th and early 20th centuries. However, this small book is in no sense encyclopedic. But we do find out, for example, that the first low-cost public housing built in Boston was by Eleanor Manning O'Connor (MIT, '06) in 1937.

The book ends with a brief overview of the status of women in architecture today, and an analysis of the current trends in architectural practice: large, hierarchical offices, tending towards assembly-line specialization. Miss Cole expresses the hope that with the influence of women in the field there will be increased humanization and socialization of architecture. She hopes that women, in fighting for their rights and acceptance as architects will "better the general human condition" and "bring new life to the practice of architecture."

Architecture of Neel Reid in Georgia by James Grady. University of Georgia Press, Athens, Georgia, 1973. 204 pages. Many illustrations, $29.75.

Reviewed by Stanley Abercrombie.

Damnyankees, accustomed to thinking that architectural history in Georgia was ended when General Sherman burned all those Taras and only began again when John Portman built the Regency hotel, have a new opportunity to learn what happened in between.

Georgia's most remarkable accomplishment in building, the first half of this century, was residential, and the most remarkable architects have been Philip Shutze, still practicing, and his predecessor in the same firm, Neel Reid (1885-1926). Reid's houses were, of course, "traditional"—in a few cases, copies of specific historic examples; in every case, carefully authentic in detail. These architects and their clientele were perfectly matched. The clients, obviously, were conservative in two senses of the word: in their care for the past, and in their moderation—the houses impress us, not with ostentatious display, but with their degree of perfection. And Reid's clients had money. The house shown on the dust jacket was for a textile mill owner in the beautiful (even if I *did* grow up there) town of LaGrange, and most of the others are in Atlanta, where many fortunes were beginning to be made by a local invention called Coca-Cola, a fact which may allow us to consider these houses as early examples of Pop Architecture. Sorry.

James Grady, a well-known bibliographer who teaches architectural history at Georgia Tech (and who once taught there, in addition, a terrifying weed-'em-out-in-their-sophomore-year Introduction to Design) has put 48 examples of Neel Reid's work together in an attractive book. We thank Professor Grady, and we salute any of our fellow architects who, now that Gropius is no longer watching over us, will allow themselves an hour being eclectic enough to enjoy this work.

Door grille, Macon, Ga., 1924

Neel Reid's last work: the Vaughn Nixon house, Atlanta, 1926

Antonin Raymond: An Autobiography. Published by Charles E. Tuttle Company, Rutland, Vermont, and Tokyo, Japan. 330 pages, 27 color plates, 600 black and white illustrations, 100 plans. Hard binding $27.50.

Reviewed by Douglas Haskell

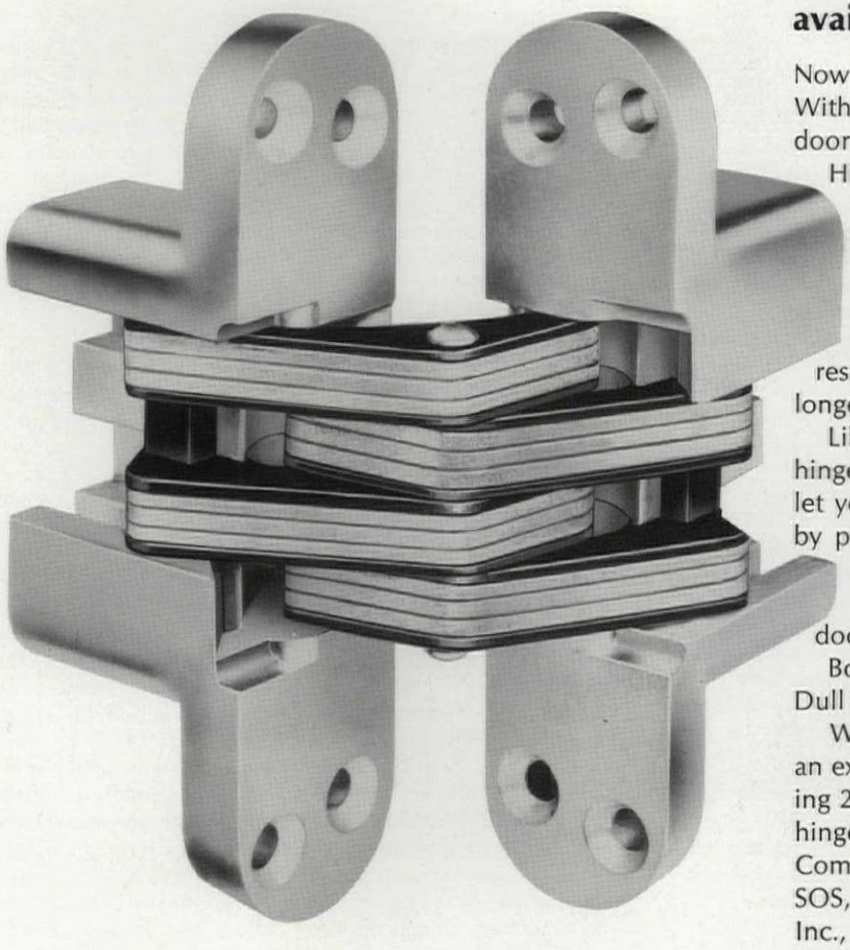
Fate chose Antonin Raymond, Czech born architect now 86 rugged active years old, and an American citizen, for a missionary role in reverse. At age 31 he was taken on a job to Japan, fell in love with its

Douglas Haskell, a member of our Board of Contributors, is a former Editor of the Architectural Forum.

Marjorie Grimm, extensively quoted in Mr. Haskell's review, teaches at the New School in New York City.

Continued on page 20

NEW! Hinges that hide... a lot longer



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Reviews

Continued from page 14

superior environmental beauty and building skill, ended spending altogether 45 years—thus far—practicing there and, above all, studying Japan's own culture and architecture and seeking to convey its ideas and skill to the West.

Raymond's present book, called *An Autobiography* following the style of Frank Lloyd Wright his mentor, proffers two levels of interest: it is a catalog of his own work, but above that it is a rich panoply of scene and pageant of extraordinary people reaching back to the beautiful Austro-Hungarian Bohemia of nineteenth century days before hell broke. Raymond has an evocative writing gift, and one is tempted to yield completely to it: to that countryside, to the discovery at the Technical University of Prague of one Frank Lloyd Wright as *it* among new leaders—this was 1908—to the dull scene in the architectural office of Cass Gilbert in New York in 1910, when the immigrant walking 5½ miles every day between home and work for the first month drew pseudo-Gothic terra-cotta details for the Woolworth Building and made friends with Hugh Ferriss (who would have dreamt *he* was there then). There was the year 1916 spent with Frank Lloyd Wright in Wisconsin —through an acquaintance with the impossible Miriam Noel made by the wonderful Noemi, Raymond's wife who joined in wild horseback rides there too; there was the operation in the first U.S. foreign intelligence office ever, working with Czechs in Geneva during World War I; then the incredibly complex drafting work in Tokyo (1919) on elevations and working drawings for Wright's Imperial Hotel; there's an eye-witness account of the Great Earthquake with a hint that some of Raymond's own work fared just a shade better than the Imperial itself; there's the decision to stay in Japan which resulted in 18 years straight, then more, up to 45 so far; the interruption by World War II, and the catastrophes on catastrophy, soul-deep, that were brought forth, including much more than destruction of some of his own best work.

For Raymond is a Czech and accustomed to grief, one who stoically recounts that through Hitler, if not by him, all his five brothers and sisters disappeared; who is ready to look indeed at world-wide deterioration of human culture with a steady eye and a steady determination, Wright-inculcated but also intrinsic, still to snatch victory out of defeat.

We ourselves have to try being equally realistic. For one thing, the emissary's work of understanding and working in two civilizations toward a meld of the best in them is no easy thing. This reviewer being by no means qualified on the subject of Japan has asked that this part of the commentary be written by architectural historian Marjorie Grimm, whose extensive study of Japan was made in Japan. It seems to show how some early comedies of misunderstanding by the ardent young Westerner can with time be very signally overcome!

Herewith Miss Grimm:

"Raymond began his Tokyo Women's Christian College in 1922

Concrete house, Tokyo, 1922

upon a lozenge of farmland. A bridged and covered gateway marks the College entrance that opens on a large court with buildings left and right in Classic symmetry, and they focus on a larger building, domed and centralized. A diagonal path leads behind this main hall to a second cluster of dormitory buildings arranged in a criss-cross of closed courtyards, conical pavilions and interlocking parts much as the 3rd century layout for Diocletian's Palace that still stands in Yugoslavia around the corner from Raymond's native land.

"The aim of the plan is to square the lozenge and utilize the space efficiently, which it does—corners are filled out by jutting perpendicular axes from the short side—and the length of the property is developed by running those diagonal paths away from the main hall that in reality parallel the long sides. In abstraction, Raymond's plan looks modern, like a 1968 Larry Zox color-field painting.

"Besides this Historicism being a very efficient use of lozenge property, it makes use of Wright's earthquake-proofing from the Tokyo Imperial Hotel where the floor is 'like a string of barges,' (this time quoting Haskell) that are free to yield to a rhythm of earth shocks while remaining securely attached. (The traditional Japanese anti-earthquake method worked on a pier system of suspended cubed bays set on independent posts.)

"Raymond was thrilled that after the disastrous Kano Earthquake of 1923 his Women's College buildings were intact. But upon returning to Japan in 1945 he was distressed that the directors of the College 'were Japanese' and had constructed new buildings 'carelessly scattered all over the place' destroying the symmetry of his scheme. Evidently Raymond did not understand the Japanese principle of 'scatter-site' planning, or their garden-plan known as Shinden style.

"Shinden style is a nucleus of buildings that are scattered to fit the curve of the land after one has passed a diagonal path that leads from the large courtyard to the back of the main building. The diagonal is one in a sequence of three bridges spanning a pond, often man-made, that teaches the 'universals' of life through the lay of the land and one's relation to it. This garden style was developed for Paradise Teaching of the Amida Buddha sometime after 897, late Heian period.

"Since Raymond was building in Paradise Teaching the Japanese concluded he was continuing their own tradition and scattered the rest of the buildings, which annoyed Raymond very much.

"West met East in Raymond's College but the twain did not meet in his Reader's Digest Building, Tokyo. Begun in 1949, in collaboration with L. L. Rado, it was dismantled 16 years later. Raymond was aware that Japanese in the post-war generation were craving the architectural images of the 20th century; using glass, concrete and steel he proceeded with the environmental plan achieved by Le Corbusier in Ville Radieuse. Instead he received criticism: too light, not earthquake-proof, not secure. The problem lies elsewhere.

"When westerners look, the Reader's Digest appears a familiar industrial park in Connecticut. When Japanese look, they see a long, low, oppressive structure of floor-to-ceiling glass, double rows of steel columns standing isolated, with recessed mullions dividing the glass skin but not the interior space. They experience an exaggerated horizontality that leaves an incomplete, uninviting, inhospitable presence.

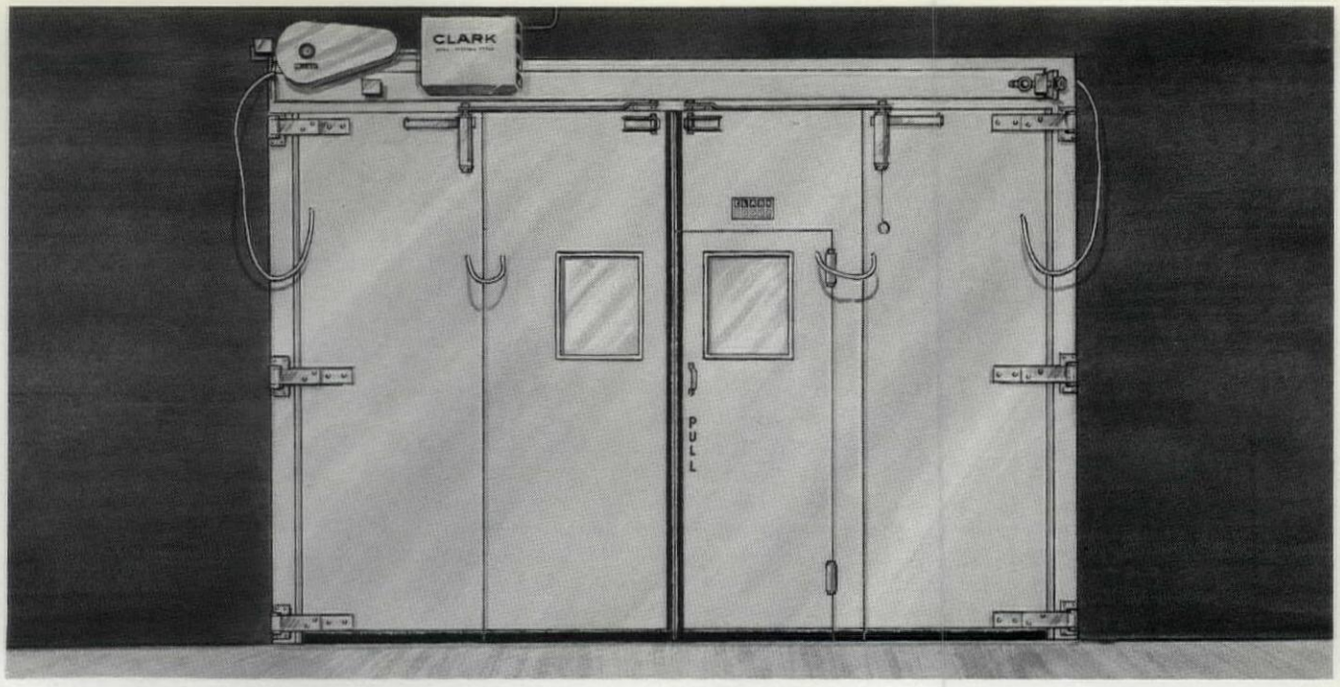
"Tall interior columns of concrete relate to neither glass wall nor interior space nor the fiber board ceiling they support. Fluorescence provides constant glare, not the fluid, changeable substance Japanese call light, a quality that can move like human thought from musk to brilliant.

"Finally, the classic ideal from 7th century Nara has a 3-bay front, the bays associated with the Buddha, the Law, and the Community of Worshippers. If a side bay is added to enclose the end porches, as in the later Heian tradition, the facade becomes 5-bays by 8-bays in depth. Integral, contained, nourishing. The Saimyo-ji is such a unit. Now 7 bays square, built outside Kyoto in 834, its beauty lies in the proportion of roof-width to total height. Japan may be the only nation that assiduously travels its countryside to seek nourishment from the beauty of architectural treasures.

"Raymond's uncountable increase of bays sprawl endlessly; for the Japanese, they lack coherence, seem irrational, offensive. Raymond introduced the first of everything modern to Japan; but the Reader's Digest did not seem modern; it was simply 'bad' Japanese.

"But a 1951 building by Raymond fares joyously, the Nippon Gakki on the Ginza, Tokyo; it achieves serenity and the single unit image of the Saimyo-ji. It is 7 stories tall, center-window strips

Continued on page 127



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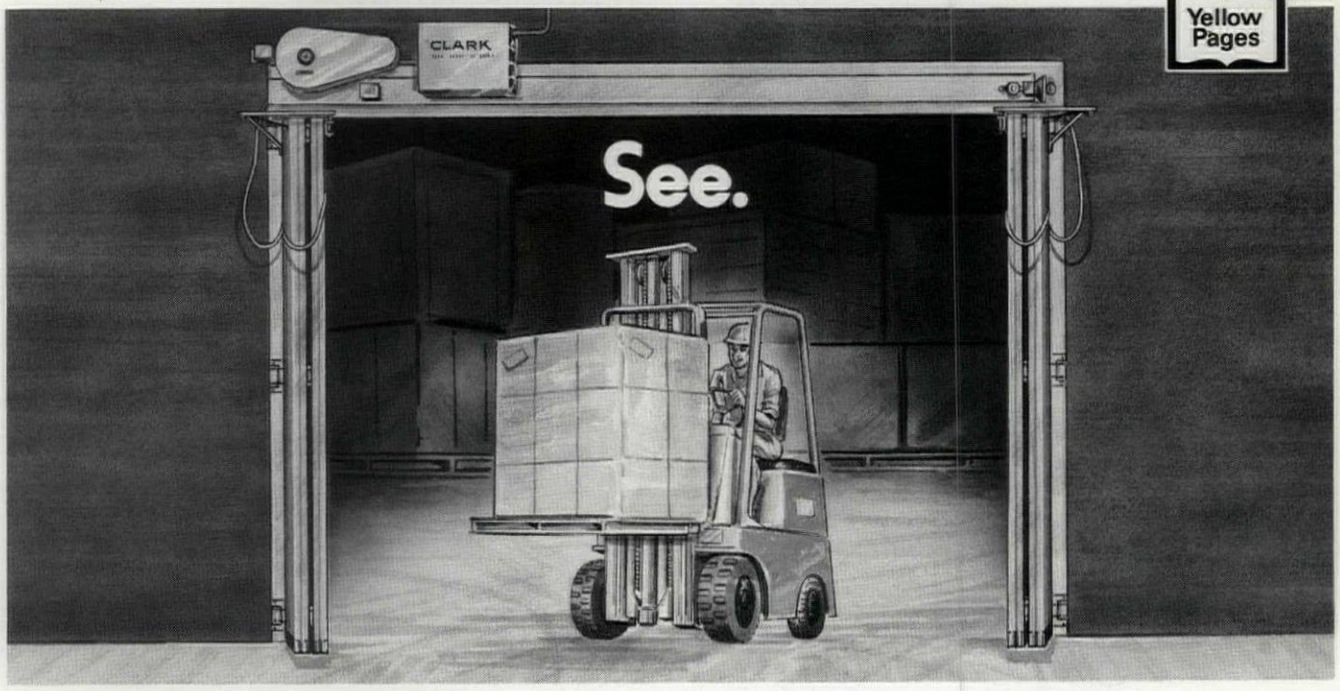

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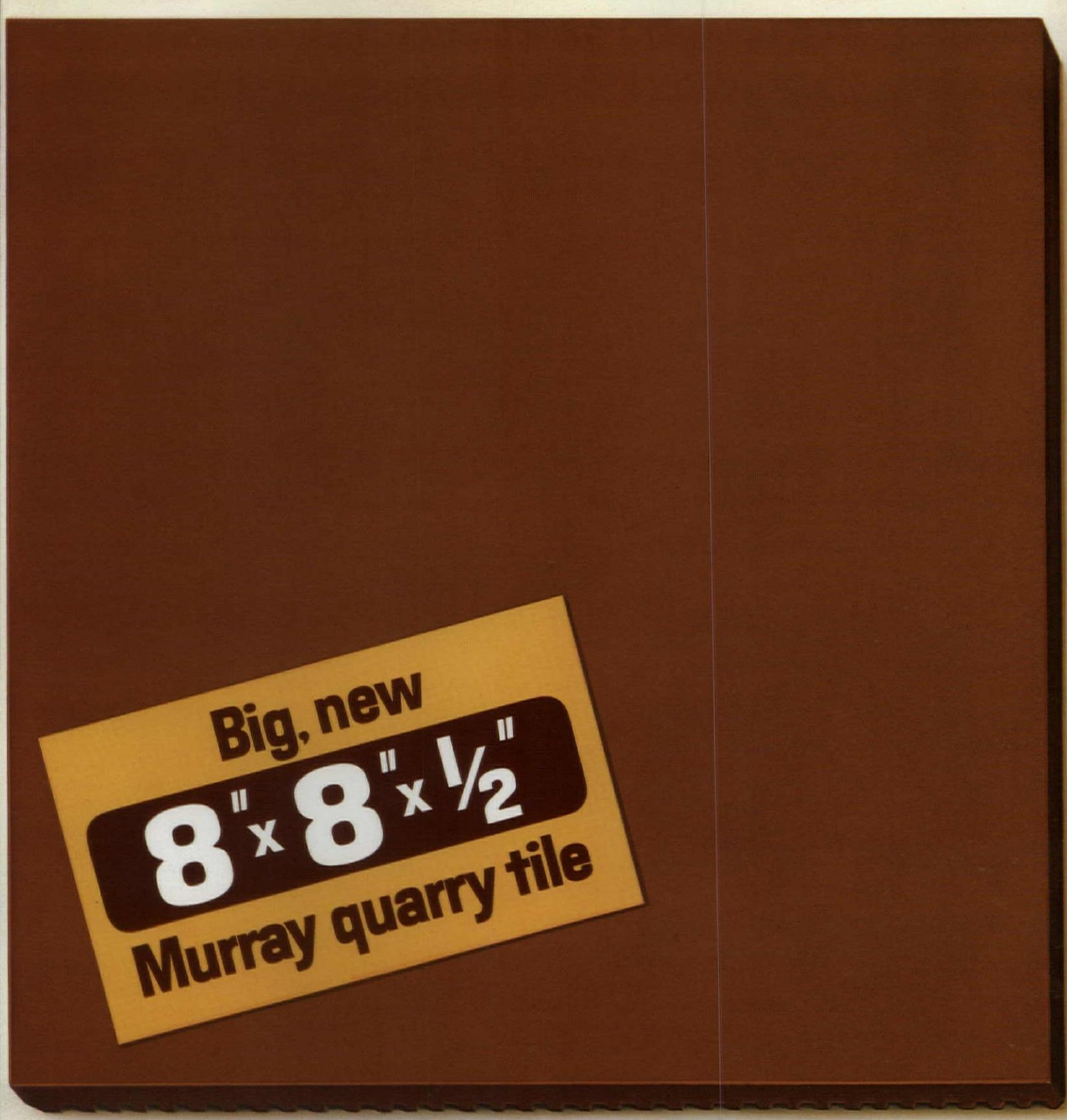

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letter from **CHINA**

Text and photographs by Sam T. Hurst

1. Beyond a wall now adorned with a portrait of Mao, Peking's Forbidden City. 2. The Great Hall of the People, Peking. 3. A canal in Su-chou. 4. A Su-chou garden window. 5. One of the sculptures along the entrance drive to the Ming tomb of Emperor Lushun. 6. Stairs and terraces at Peking's Summer Palace.

For the story of China today one looks beyond design and technology. This is not easy for architects trained in the tradition of the Academy and the Technische Hochschule and nurtured on style and competition, the mainsprings of capitalist architecture the world over. It was not easy for 15 noisy Americans traveling for 20 days over 4,000 miles to visit ten cities as the guests of the Architectural Society of China. We had to get outside and beyond our own experience, to look at China in the context of worlds other than our own, to look at building there in the light of history and the current reality of Chinese life and politics. These are inseparable from Chinese architecture, and that was to be our first lesson as we saw farms and factories and museums and kindergartens and wondered when we would see *architecture*.

Clearly we were to see the new China built by socialism for all the people, and architecture would emerge as part of that. The itinerary had been carefully planned by our hosts and became crowded with opportunity as they agreed, after our arrival, to add the lake city of Hang-chou. From the moment we crossed the border and heard the interpreters call for Mr. Urbahn, we were in the hands of generous and friendly people who guided us with extraordinary efficiency, patience and tolerance as we pursued those experiences so long denied most of the world. As we said warm goodbyes and boarded the train to leave Canton three weeks later I felt that surely these were friends I would see again. Three interpreters and three members of the Architectural Society of China had accompanied us for the entire visit as we flew north to Peking, took an overnight train to Shen-yang and Anshan and back to Peking, a train to Lo-yang and Sian in the west, and a plane east to Nan-ching and Shanghai. After day and night visits to Su-chou and Hang-chou, we flew back to Canton.

"Be frugal and build the country" was emblazoned on a hillside in painted stone characters as we approached the valley of the Ming Tombs. Frugality, discipline, productivity, personal integrity, self-sufficiency and high morale were to impress us as dominant characteristics in the People's Republic of China. How to explain them? Do they follow from consensus so pervasive as to be called thought control? Can those qualities survive material success and affluence? Can they survive industrialization and urbanization? Can they survive the passing of Chairman Mao who personifies ideology, success, stability and continuing revolution?

While the answers to such questions lie well beyond this piece and largely in the realm of speculation, the asking of them is necessary to convey the impact of doubt which burdens the Western mind. To make such a visit is to hold a mirror to one's own person, manners, habits, life style, values and political commitments. It is to sow doubt, to force encounter with the contradictions of our own society, to expose the hollowness of ideology in the service of class and wealth. It is to test the meaning of our freedom and to reveal our exaggerated loyalty to the concept of individualism and our desperate search for collective will in American life today.

People's architecture

We are accustomed to the practice of an architecture initiated largely by the land development and building industry and devoted historically to the service of the dominant class, be it political, commercial or ecclesiastical. In China we were to witness architecture in the service of the politics of socialism, clearly giving primacy to social goals, to basic needs of the people, to practical construction, and assigning low value to form and symbol, style, and technology in the service of comfort. A few conspicuously ceremonial public buildings such as the Great Hall of the People still bear the stamp of neo-classicism. Otherwise the new building is straightforward and refreshingly free of design clichés of East or West. And the survival of traditional vernacular building in clay brick and tile seems assured by the large amount of renovation and do-it-yourself construction in suburb, village and countryside.

Any critical appraisal requires one to separate practical building in housing, schools, factories and recreational facilities from the public building embodying symbols of the state and serving ideological and political functions. There is wide disparity between them and one might hope that the gap will close as architecture in the service of propaganda becomes less necessary and architecture in support of the ordinary needs of the people becomes more sensitive.

Further, it is necessary to ask by what standard one criticizes present day building in China. By an absolute world standard much of it can be described as of low technology, crude detail and somber esthetic. By relative and historic standards, those of a developing country only 25 years past feudalism and devoted to improving the life of all its people, it is of high quality in the allocation of space, in construction technique, in the provision of conditions of health and comfort. The austerity of gray and white plaster walls and communal baths and kitchens is as traditionally Chinese as the extravagantly ornate color and form of the Imperial structures of the Temple of Heaven and the Forbidden City. In the gray housing of Peking, the black and white gardens of Su-chou and the yellow clay courtyards of Sian one feels the strength and beauty of indigenous architecture unspoiled by design or the whims of wealth and decadence. Out of that tradition of nature, technology and man in harmony might be drawn the principles for a revolutionary philosophy of architecture for the new China. However presumptuous for the outsider to suggest it, the clarification of such principles and the statement of such a philosophy seem to me to be urgent tasks for the architects of China. In the dialectic of theory and practice the praxis of technology becomes self-justifying, and much of the world has already experienced the destructive results of overbuilding with the architecture of high technology.

What is the meaning of China? It lies beyond architecture new and old. It is more than cityscapes and countrysides turning green with millions of trees and manicured fields wet with irrigation. For me, one rebellious architect in search of optimism, the meaning of China is victory and hope. Here the common people have won a remarkable battle against nature and the perversity of man, a struggle against plague and flood and hunger and drought, and war with the outside and war with each other. They appear to be healthy, very well

Sam T. Hurst is a Professor of Architecture at the University of Southern California and was for 12 years the Dean of that school. While spending eight months as a Senior Fellow of the East-West Center in Honolulu, Mr. Hurst traveled to China with a group which also included Max Urbahn, I. M. Pei, Archibald Rogers, John Carl Warnecke, Harry Weese, and others.

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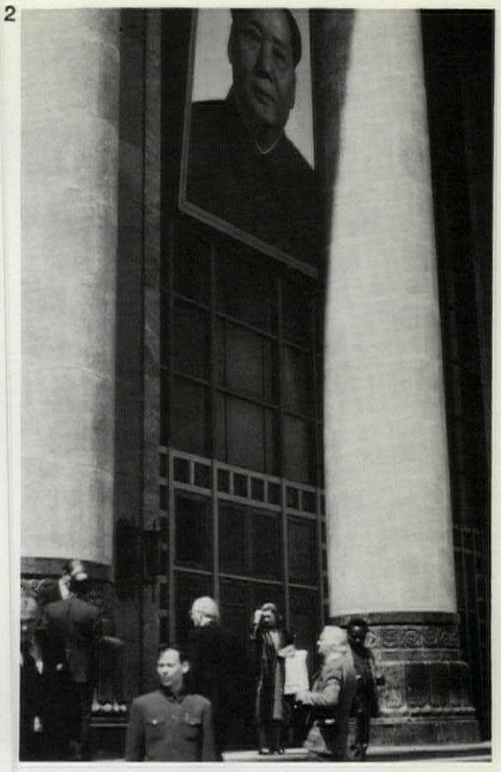

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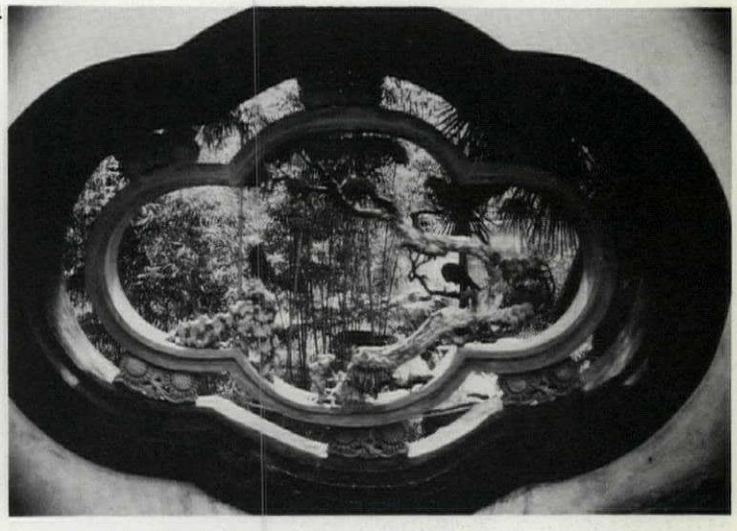

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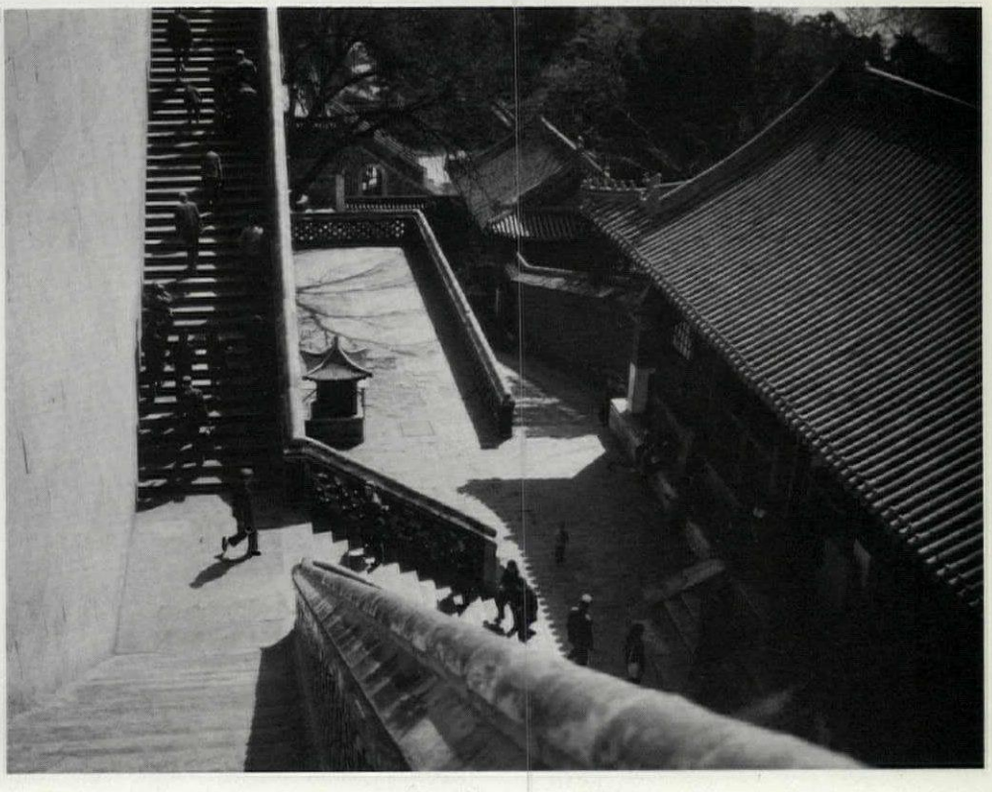

Top, American visitors being shown new housing construction in Peking. Center, architect Robert Madison visiting housing in Shanghai's Watermelon Lane. Below, a club building at a new housing development in Peking.

fed, friendly though reserved, together in purpose, open to constructive criticism, extremely proud of their culture and the success of the Revolution, suspicious of those sophisticates within and without who might disparage the goals of their distinctive brand of socialism. They seem to operate with a degree of consensus which I have found nowhere else in the world and with social sanctions having the force of law. The cultivation of that consensus is the constant role of politics which is practiced in field and factory by young and old as everybody's business. "Criticism from below" is a significant instrument in establishing and maintaining the credibility of party and program, and the expectation that initiative and integrity will be rewarded is widespread. As expressed by William Hinton, "the average Chinese believes that if you stand on principle others will rally around you."

Hinton has lived and worked in China and his books are required reading for one who would understand its recent history and especially the years of the Cultural Revolution. He traces the major struggles of the revolution and makes clear the inevitability of continuing struggle as the people and the party work through the contradictions between deep-seated Chinese values and the ideology of socialist reconstruction. Visiting the Architecture Schools of Tsinghua University in Peking and Tungchi University in Shanghai, we observed first hand the educational commitments growing out of the Cultural Revolution, and accounts of the impact of that time upon the growth, productivity and attitude of the country were releated to us everywhere.

The current criticisms of Lin Piao and Confucius can be seen as a part of the continuum of revolution, as a device for the exorcism of devils surviving from the past. Among them are class prejudice and repressive authority, elitism and influence peddling, the dominance of technology and outside technocrats and the danger of theory without practice. No surprise that these are the same devils identified by many critics of American life today, yet we have found no such convenient device for our expiation, unless it be Watergate.

The Courtyards of West Changan

A comparative look at old and new housing in Peking is useful in understanding the thrust of housing administration, policy and design. Yes, say the Peking architects, we are preserving much of our old housing where it can be brought up to new standards, but we must build a great many new houses to accommodate the people, and most of these will be multi-story buildings. We found a great variety of such housing, up to 5 stories in height and sometimes built over a first floor of shops. Materials were brick and concrete, sometimes prefabricated, often with balconies and grille designs which recalled traditional Chinese patterns. One 15-story apartment tower in the International Settlement has been built for diplomatic staff members.

The character of Peking is being rapidly changed. The old city wall was removed because it created serious barriers to circulation and communication, and the construction of an underground transit system which rings the city eliminates all building in its path. Although major new manufacturing plants are located on the leeward side of the city, the increase in coal burning industry and heavy truck traffic has added smoke and noise pollution to the naturally dusty air. Notwithstanding such heavy activity, the city is strikingly calm and beautiful. Multiple rows of trees planted since liberation were bursting with fresh green leaves. The cleanness of the streets and the absence of commercial advertising and extravagant lighting contribute to the quiet dignity which differentiates the city from Shanghai and most world cities. Cars, trucks and buses drive with horns and running lights, but after 10 pm the streets belong mainly to pedestrians and bicycles, and the city seems very much at rest.

From our sixth floor hotel balcony we could study the strange mixture of disparate transportation systems; walkers and cyclists competed with carts pulled by men and horses, gray taxis, two-cylinder farm vehicles loaded with produce, green military trucks and buses always packed with people. The gray tiled roofs of the courtyard houses of the inner city conveyed the unity of oldness so much admired by Americans abroad. Our cameras could invade the routines of family life in the courtyards and early morning Tai Chi Chuan exercises in park strips along the avenue.

A visit to the old housing of Peking began with tea and greetings in an elegant white conference room furnished with original paintings, delicate white and gold teacups, blue and gold plates and fresh cut flowers. Obviously vice-chairman Li Pin and staff members of Chi-in Lane cared about the quality of their surroundings: "On behalf of the Revolutionary Committee I extend a warm welcome to our American friends. I want to give you a brief account of this area. Our Household Revolutionary Committee is working under the leadership of the West District Shitung Revolutionary Committee. We are in charge of the area of West Tien An Mien and the center is West Changan Street.

"Altogether there are 150 lanes in this area, 20,000 households with 80,000 people. We operate 15 primary schools and 7 nurseries and kindergartens. There are 400 teachers and staff members and 15,000 children. The middle schools are under control of the District. We also operate 5 household factories which are household run. All these factories were established in 1958 by the women of this area and altogether there are 1,700 workers and staff members in the 5 factories.

"We also have 35 Residents' Committees. Today we will visit one of them. The place we are going to see is Lien-tze, mainly built before liberation but rebuilt and repaired after liberation. In the Residents'

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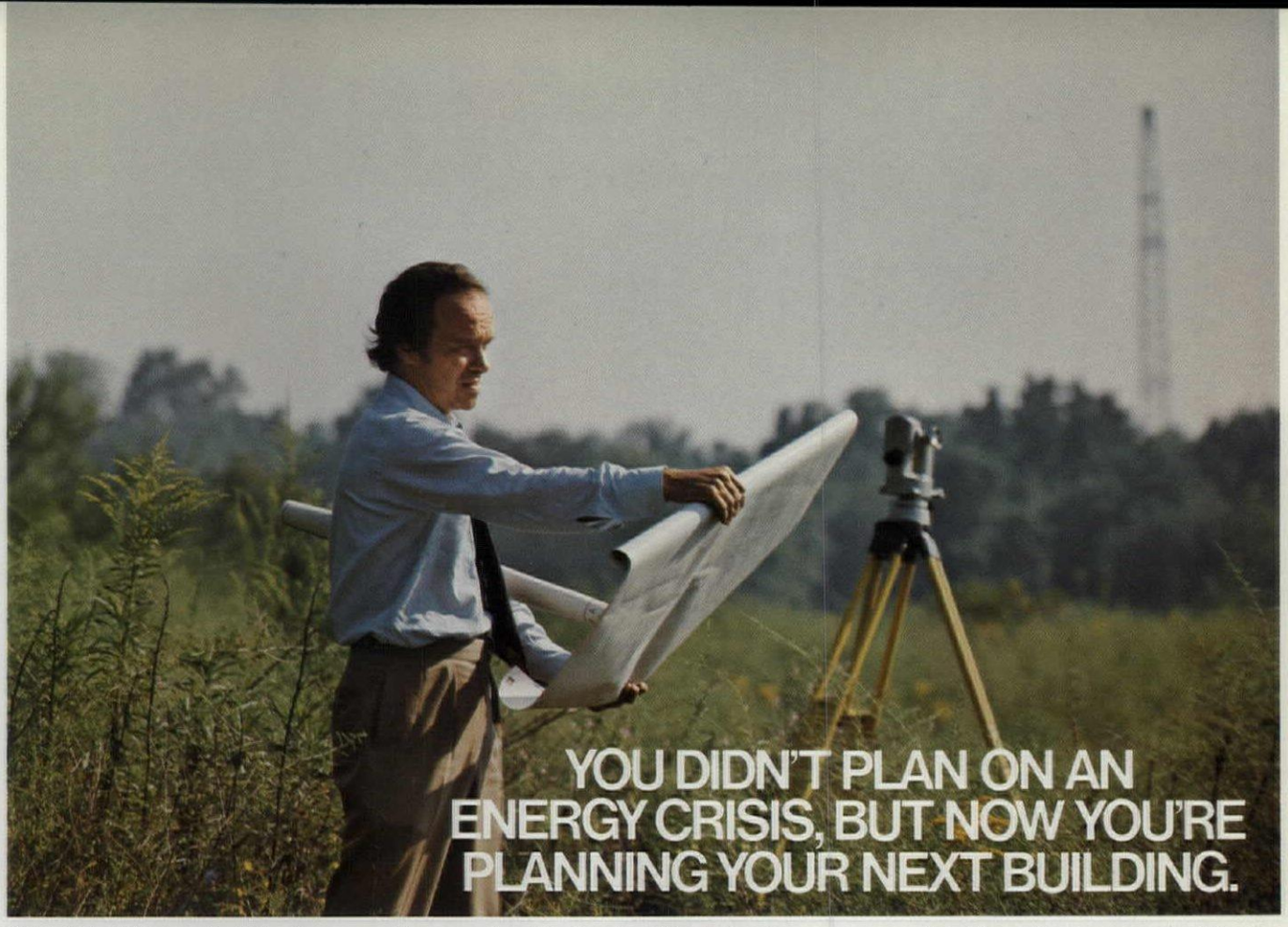

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Our masonry wall, for example, has a "U-value" of .12. The double-plate glass wall has a "U-value" of .55. (U-values are used to determine heat loss through one square foot of wall area in Btuh per degree Farenheit differential across the wall.)

This means that the masonry wall is about 450% more efficient, on the average, than the glass wall in reducing heat loss.

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Continued from page 26

Top left, housing in West Changan Street, Peking. Right, a multilingual welcome. Below, old and new transportation systems meet at a Peking street corner.

Committee of Lien-tze there are 690 households with 2,400 people.

"Most of the people living here were laboring people before liberation and they had no special skills. The houses here were very simple and poor and the streets and roads were also very poor, mostly mud. The people have a saying here, 'When it is windy it is very dusty and people will be full of dust; when it is raining it is very muddy, when they walk everywhere they get mud on their feet.' "

The vigorous discussion which followed confirmed that these houses were built before 1949, "in the Kuomintang reactionary rule period," and that there are about 800 pre-school children and 500 retired workers living in the West Changan District. Running water, sewerage and electricity have been provided all houses, and garbage collection is handled by the District. Most heating is by individual coal stoves and cooking with charcoal. Markets for food service are provided in all neighborhoods, and vegetables supplied by a suburban people's commune. Asked if clothing stores were here or downtown interpreter Chang reminded us, "It's very near to town here."

The neighborhood factories produce building hardware, locks and leather shoes. Recreation facilities such as cinemas, theaters and gyms serving the area are administered by the District. The people can choose to live in this type housing or the new apartment housing, their preference usually depending upon their age and the house condition. At the neighborhood clinic we saw a room for traditional herb medicines, a room for modern scientific medicine and a room for acupuncture.

We entered three households sharing a common courtyard and talked with the friendly residents including a grandmother and two-year-old boy. The court was paved with tile, fruit trees and potted flowers were in bloom, and two bicycles were parked in a corner. A temporary shelter of plastic had been added to contain outside cooking facilities. White plaster walls provided a background for revolutionary posters, maps of China and the world, family pictures and carefully folded and stacked quilted silk bedding.

At the neighborhood kindergarten we were greeted by applause and "how do you do's" by the children in unison. Like the houses, the kindergarten was a one story masonry structure with gray tile roof, substantial glass windows and doors opening into the courtyard and red painted screen walls of wood. Inside, the rooms were divided by rich dark wood screens in traditional patterns, and the spaces were alive with song and dance and the joyous color of children's clothing. As elsewhere this kindergarten provided both day care and week care, allowing most mothers to work full time. It develops the habits of collective living, self-reliance and concern for the group. In recitation, music and dance it implants the ideals of socialism, love of country, respect for the ethnic minorities and the virtue and dignity of work. A child gave a lesson on domestic and wild animals, pointing to models on a large diorama zoo, and our interpreter explained the words of a song, "We will pick up the weeds left on the ground in the fields."

Housing for the Peaceful Mind

The city of Peking is divided into four districts. In the Eastern District are 10 subdistricts or neighborhoods including the Hopingli or Peaceful Mind District. Before liberation it was a suburb of reeds and grassland including a cemetery. Since liberation, "in the course of development of the socialist economy," it has become a major new housing area of 16,000 households and 65,000 people. It has 23 Residents' Revolutionary Committees which are self-governing units, and it houses primarily teachers, cadres (political workers) and government

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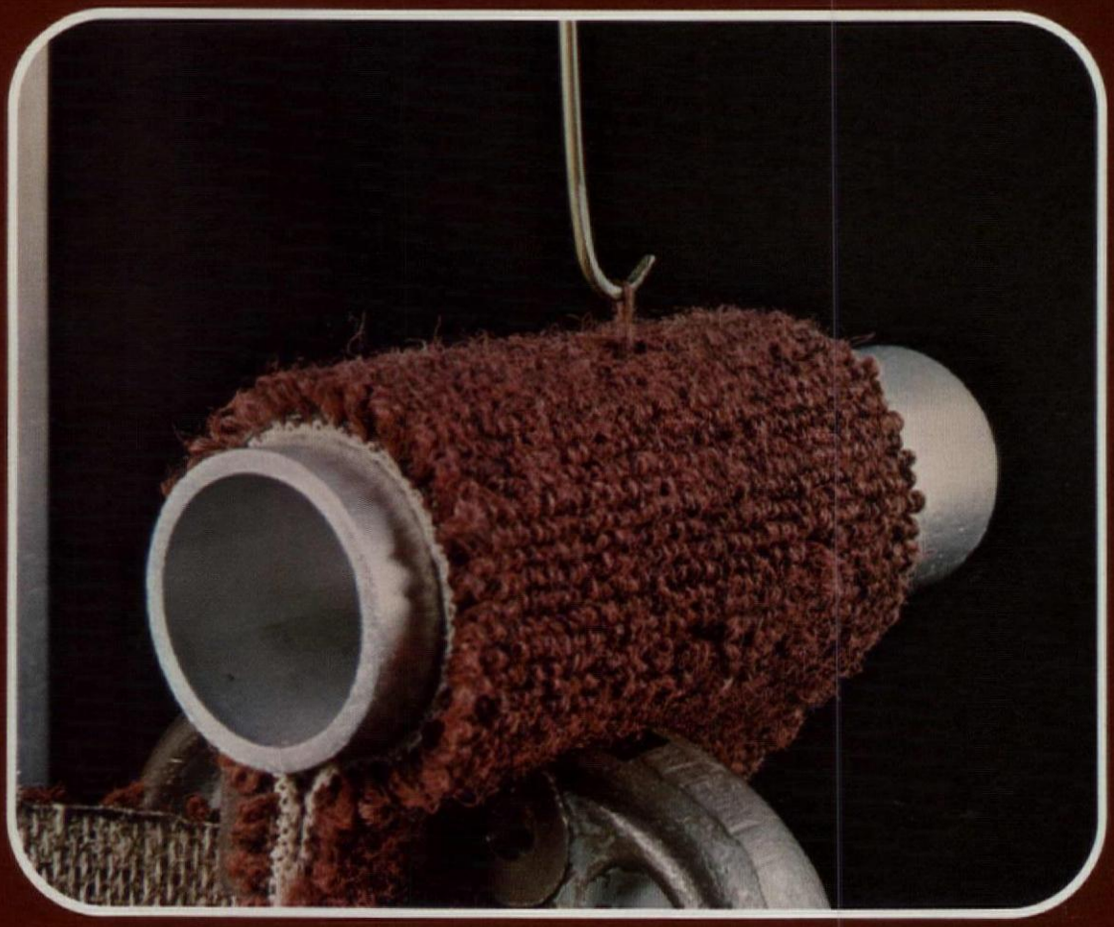

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Continued from page 28

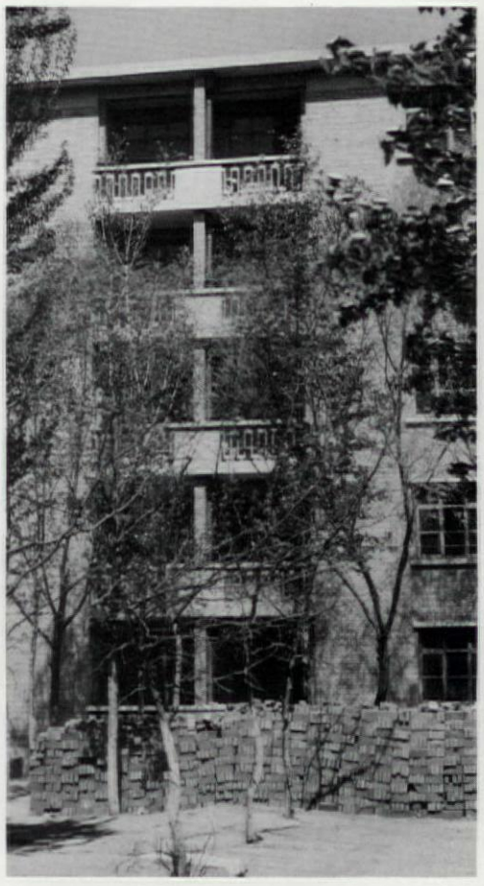
Left, students in the courtyard of a Peking school. Below, two views of new housing at Hopingli, in Peking's Peaceful Mind district.

workers. In the District are 10,000 school children, 13 primary schools and 3 nurseries. Its 3 non-polluting factories employ 300 workers and include a tailor shop making clothes and pillows and a mill making rolled paper. The building of housing began in 1950 and again in 1964 with major construction of roads and landscape work. Most buildings are 4 or 5 story walkups in red brick and concrete construction. All have electricity and plumbing services, some have gas, and those built since 1964 have central heating.

Our meeting began in an early structure and was followed by visits to two apartments in the newer buildings. In each place we were greeted by occupants and treated to tea, cigarettes and rich discussion which revealed the common concerns of all people for family, schooling, work and the cost of living. It further revealed the difficulties of precise verbal communication even in the hands of the most willing interpreters:

Q. Is there great interest in world geography? I see world maps and China maps on the walls.
A. People pay great attention to world affairs. Chairman Mao teaches us to study world affairs.

Q. What happens if a family is noisy?
A. Most buildings can be used for sound insulation; brick and hollow tile are good for sound and we have no such conditions.
Q. But what if a family has a complaint of any kind? How do they get it corrected?
A. They can go to the housing administration office, the Residents' Committee or the District Committee.
Q. How many are employed in maintenance and repair?
A. There is a special administration in charge of maintenance and repair, a branch administration, altogether about 200 people in this neighborhood district.
Q. Is the rent all the same?
A. Generally speaking, yes.
Q. How do you handle fire protection? Do you have equipment in this project?
A. Yes. (I never learned what equipment really meant.)
Q. How much space per person or per family is in the apartments?
A. Generally speaking a house (unit) will be 59 square meters, including two rooms, one about 17 sq.m and another about 12 sq.m, plus a kitchen, bathroom and laundry. (These were judged to be gross area figures. In U.S. terms, the basic allocation standard per person seemed to be about 80 sq. ft. here as compared to 50 sq. ft. in the old courtyard houses of the inner city.)



Q. What is the density here? How do you compare density in the inner city and suburbs?
A. We measure by 100,000 sq. ft. of land. In this place there are 600 people per 100,000 sq. ft. and in the old city 800 people per 100,000 sq. ft. The average family size is 4.5 persons.

From the architect accompanying us we learned that construction here was solid brick exterior walls and party walls between apartments. Interior walls and floors are hollowcore precast concrete. Finish walls are plaster painted white, and each room is lighted by one overhead ceiling outlet, usually a hanging fixture. Heating is by steam radiators, and a garbage chute is provided in each stairwell.

Living costs are quite stable. Rent is 6.5 yuan per month ($3.25) plus 3 or 4 yuan for electricity and water. The rent reduces at higher floor levels, the first and second

Continued on page 32

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Continued from page 30

Bicycle parking in Peking suggests the great popularity in China of that form of transportation. Below, indigenous housing in an old quarter of Sian.

being the same, the fifth the cheapest. A monthly budget of 13 or 14 yuan is comfortable for housing and a budget of 60 to 80 yuan ($30-40) for all living costs is comfortable.

In the second apartment we quickly discovered a bookshelf containing two copies of Kidder-Parker's *Handbook for Architects and Engineers*. Recognizing our pleasure in seeing familiar books, the refined woman in residence began: "Very glad to see all my friends. We are eight in the family, 6 children, 4 daughters and 2 sons, who work in the factories and on the state farms, and one studies hydraulics. My husband is a civil engineer, and before this time I worked in the Post Office. I have retired but my thinking has not retired. I do as much as I can for the Residents' Committee. We are living a happy life."

Q. Where are the children?

A. The children are grown up, all working and not living at home. My first daughter is married. My second daughter is working in Hopeh Province. My third daughter is working in Yunan Province. My fourth daughter is working in Ch'ungch'ing. My son is working in Shansi Province. Only my youngest son is living in town, in middle school and doing some work in the factories.

Our third daughter is at home visiting parents. She works on a farm in Yunan. She studies designing and may become an architect. She graduated from middle school, then went to the farm to be reeducated by the peasants, and is now doing some exercise work. She recommends this opportunity to go to Yunan.

We left the buildings to walk among young trees and through the marketplace where children played on carts of fresh vegetables. Stacks of red brick gave evidence of more building to come. We saw no single family houses, no knotty pine family rooms with overstuffed chairs. We saw no private cars, no parking lots, no watered green lawns beneath the trees. The bicycles were all black, parked unlocked in regular rows on the bare brown earth, and the children were returning from school, two minutes walk away. This seemed indeed to be a place for peaceful minds. We boarded our bus, and I understood the words of our Chinese friend, "There's time to grow grass in the future."

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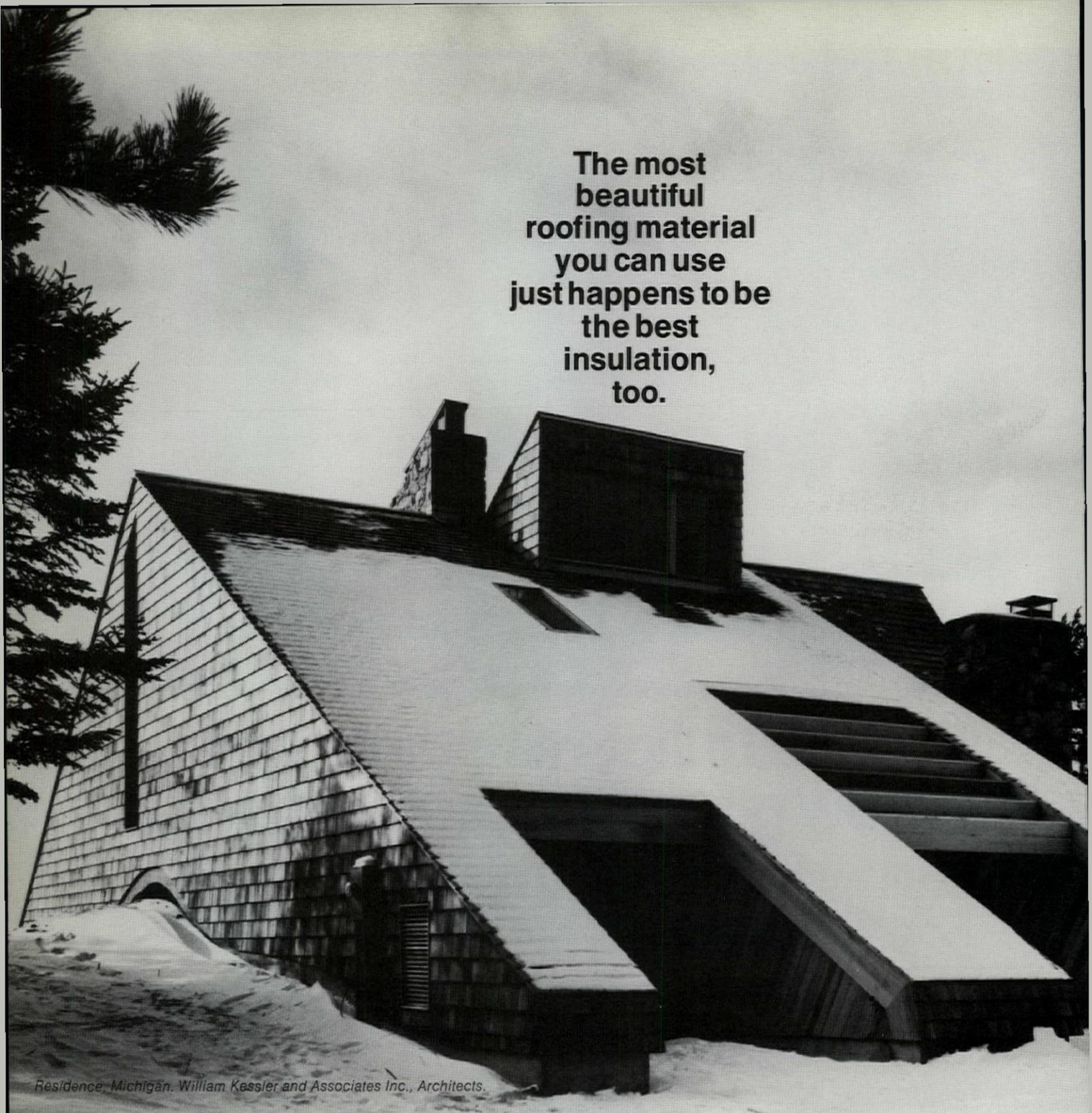

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*ASHRAE Handbook of Fundamentals, 1972 ed., Chap. 20 "Design Heat Transfer Coefficients" Table 3A, pp. 362-63.

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EXTERIOR WALLS brick veneer with block back-up•brick veneer and wood frame•brick bonded with block back-up•solid brick•brick cavity wall•brick and block cavity wall•precast concrete•wood siding on wood frame•concrete block-exposed•stucco on concrete block•cost of wall to window ratios

INTERIOR PARTITIONS concrete block, masonry exposed•concrete block, glazed•glazed structural tile•gypsum block•solid plaster-studless•solid plaster on channel studs•plaster finish on wood studs•plaster finish-metal studs•drywall-gypsum wallboard on wood studs•drywall-gypsum wallboard on metal studs•gypsum wallboard metal•drywall-solid gypsum single, double, triple

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news+

Minoru Yamasaki, the designer of Manhattan's World Trade Center, has been celebrated for his work on these pages before—particularly for certain technical innovations at WTC described by Henry N. Wright in our January/February issue. But one aspect of Yamasaki's WTC did rather escape Prof. Wright—but did not, this past summer, escape a 25-year old Frenchman called Philippe Petit: the interesting fact that the WTC, unlike most of the world's earlier skyscrapers, was a *double* tower! Prior to Yamasaki, most skyscrapers had been single shafts—the Chrysler, the Empire State, the Pirelli in Milan, the John Hancock in Chicago, Australia Square in Sydney, and all those spindly radio/tv towers, from London to East Berlin and beyond.

But Yamasaki's WTC, like Doublemint chewing gum, "doubled the pleasure, doubled the fun"—it was not one, but *two* vertical sticks, each 110 floors tall, side-by-side, with a 131-feet wide and 1,350-feet deep chasm of absolutely nothing in between.

Philippe Petit had no trouble at all figuring out why two sticks of architecture were better than one. M. Petit has got to be the world's greatest tightwire acrobat; and on August 7th, 1974, at 7:30 a.m., U.S. Eastern Standard Time, Philippe Petit started walking across the WTC chasm on a 1-inch diameter steel cable that he and his associates had strung from one tower to the next during the night. He repeated the act several times, over a period of 30 minutes, before some guards, who had initially fainted at the very sight of his feat, persuaded him to come off it.

While Philippe Petit was perambulating back and forth some 1,350 feet above Wall Street, hundreds of thousands of New Yorkers were transfixed by the spectacle, and showed up late at their offices. In fact, all of Lower Manhattan came to a standstill; and the stock market, which had planned to collapse that day, failed to open on time.

Nothing like it had happened since King Kong teetered on top of the Empire State in the 1930s—which, let's face it, happened only in our imaginations. But just as King Kong made the obvious phallic-skyscraper point (rather too obviously), Philippe Petit, in an act of supreme elegance and daring, ushered in the era of the Doublemint skyscraper.

Admittedly, the Doublemint style was not *invented* by M. Petit; it was simply identified by him. At this writing, Philip Johnson and John Burgee are completing their Doublemint Pennzoil Building in Houston, Texas—but the slot between its twin towers is only about 10 feet wide, and M. Petit will be able to manage that one blindfolded, backwards, and probably without a tightrope. I. M. Pei's project for a Doublemint building at La Défense, in Paris, is currently dormant—but if it is ever revived, its 325-foot wide chasm is certain to arouse M. Petit's interest. Mr. Pei and his partners are also doing a Doublemint job in Melbourne, and the chasm there will be approximately 40 feet—not bad, but not 110 stories up, either.

Architecture is *not* a rational art, whatever the Bauhaus may have thought. (How, in God's name, can you rationally explain the Sphinx?) Philippe Petit's act, on August 7th, 1974, was not the most rational act of the century; but it may have ushered in a new vision of the skyscraper.—PETER BLAKE.

Many of the news reports and comments are from our regular field editors: John Donat (London), Gilles de Bure and Marc Emery (Paris), Robert Jensen (Rome), John Hadidian (Beirut), Charles Correa (Bombay), Patricia Boyd and Neil Clerehan (Melbourne), Hiroshi Watanabe (Tokyo), and Edla van Steen (Sao Paulo), Detlef Schreiber (Munich). Plus correspondents are identified by their initials; other contributors by their full names.

Brazil's new bridge

Ever since 1875 there has been a plan to connect the city of Rio (capital of the State of Guanabara) with the City of Niteroi (capital of the State of Rio de Janeiro); 93 years later, in 1968, construction of the bridge was begun.

Special equipment used in its construction included floating islands transporting gigantic cranes across the Bay of Guanabara, and metal latticework units 180 meters long. Over 220 million sacks of cement were required, and, at times, as many as 11,500 workers.

The nine-mile long bridge has been plagued by problems—contracts made and broken; the deaths of workmen (rumored to be over 100); and the necessity of altering the design when the security of the structure was challenged.

Now finished, at a cost of $150 million, the bridge, officially named after Presidente Costa e Silva, serves as a motif to mark the creation of a new Brazilian State—the fusion of the two it connects.

The bridge has had its share of criticism. The president of the Brazilian Institute of Architects (Guanabara Section) Luiz Paulo Conde has said: "I'm not opposed to the bridge; it's a *fait accompli.* But the Rio-Niteroi bridge design did not conform to any master plan. It has no connection facilities with the planned underground transportation system. It does not provide room for mass transportation. It is a highway acting as an urban connection."

Another prominent architect Sergio Bernardes says, "I do not analyze the bridge from the esthetic point of view. I can say that it is a notable engineering work. Functionally, it's only for cars; the harbor and the railway were forgotten. The result: it is obsolete.

Apparently the bridge does not solve the basic problem of getting large numbers of workers who do not travel in cars from one side of the Bay to the other every day. The current mass transit system—barges which move 160,000 people back and forth every day—is overburdened and inadequate. And the gigantic bridge, even if it had provived accommodation for mass transit, connects only the peripheral areas of the two cities and not the urban centers.—E.v.S.

Saving the Pepperpot

Behind Trafalgar Square along the Strand in London is a John Nash building owned by Coutts Bank. The building is famous for its "pepperpots" at each corner. For the past 13 years plans have been made to destroy it, restore it, change parts of the facade, or build a four-lane carriage-way through the middle of it.

Sir Frederick Gibberd & Partners, London architects, were hired by the bank four years ago to design a new building on the site over the proposed motorway. However, the Nash building was listed as a building of historic interest and there was considerable public pressure to save it.

In 1903 the center portion of the Strand facade of the building was rebuilt in the Edwardian style and replaced with stone-faced frontages. The Amenity Society wanted the Edwardian additions preserved or replaced à la Nash.

Sir Frederick Gibberd's proposal is to glaze the Edwardian facade on the Strand to accentuate the entrance to the bank into a garden-like banking hall with a glazed roof, and to restore the Nash facades on the other two streets (the site is triangular).—J.D.

Arcosanti grows

Construction continues at "Arcosanti," architect Paolo Soleri's heroic new city in the Arizona desert (PLUS, March, 1973). From March, 1975, through the following November, Soleri will accept 400 participants in a series of 6-week workshops, combining seminars with actual work on the construction site. The $366.50 registration fee covers room and board. Those interested may write Paolo Soleri, Cosanti Foundation, Doubletree Road, Scottsdale, Arizona, 85253. The lazy and the frail need not apply.—S.A.

"This place isn't for human beings to live in."

Versailles recycled

The Akasaka Palace in Japan, built in 1909 with the Louvre and Versailles as its model, has been converted into a State Guest House for visiting dignitaries. Originally intended to house the Crown Prince, the palace was a landmark in modern Japanese architectural history. It represents, however misguided it may now appear, the supreme esthetic and technical achievement of that era, when Japan was attempting to raise herself to the level of the West. The finest artists and artisans were recruited, and much of the costly furniture and fittings were imported. Special precautions were taken to insure earthquake resistance, and steel sections from America were imbedded in the brick walls. It was an extremely expensive project: the government felt its prestige was at stake.

For some years the building was unused and in disrepair. The restoration and conversion, under the direction of Togo Murano, began in 1968, and again artists and artisans were gathered. New mechanical systems were installed to make the building habitable.

The late premier of France, Georges Pompidou, was to have been the first guest of the refurbished palace. One can only wonder now what his reaction would have been, after traveling halfway around the world, to being housed in this emulation of Versailles. The present Emperor, having had the benefit of five years' residence there while still a prince, is said to have refused to move back in when, years later, after the war, it was suggested that he make it his home, saying "That place isn't for human beings to live in." The now ex-god and descendant of the Sun Goddess, it appears, did not relish assuming the role of the son of the Sun King.—H.W.

USSR mission underway

The Russians are building a 20-story building from the top down in Riverdale, New York. Construction of the $8-million apartment house/foreign mission began with the raising of two concrete cores, each 40 feet by 23 feet and 260 feet high. Each steel-framed floor is being ground-assembled and then jacked into position, the first floor going to the top. The developer of the system, International Environmental Dynamics, says it provides rapid construction (one floor every five days) at a low cost. The first Russian families are scheduled to move in at the end of the year. The architects are Skidmore, Owings & Merrill.

Hootenanny

The annual International Design Conference at Aspen, described by the Aspen newspaper as "an intellectual hootenanny," was held for the 24th time this summer in the rare air of the Colorado mountains. This year's chairman was MIT Professor of Architecture Julian Beinart, and this year's theme was "Between Self and System." Writer Susan Sontag complained from the podium that this was just a rephrasing of the tired old theme "Individual and Society," and that the best (least prejudicial) phrasing of all would be "Person and World." But most of the conferees found "Self and System" a quite workable theme, and a few of the speeches even referred to it.

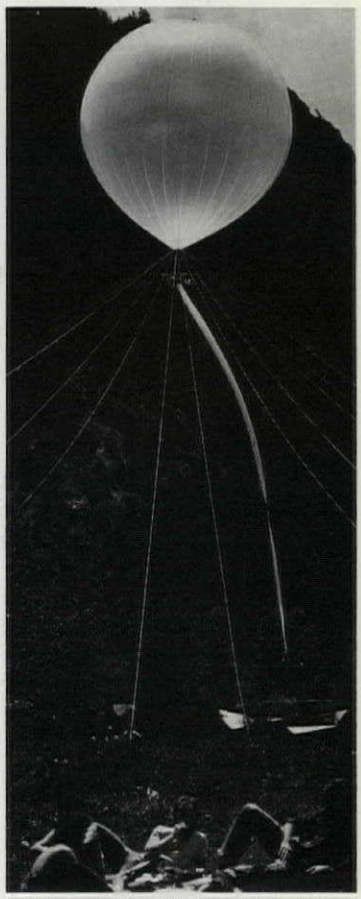
The week's program included a design workshop conducted by George Nelson, Eliot Noyes and Niels Diffrient, balloon inflations and deflations supervised by MIT's Otto Piene, yoga exercises in the meadow, a children's village made of refrigerator cartons, and presentations of various sorts by historian James Ackerman, photographer Cornell Capa, French industrial designer Pierre Monnet, feminist Betty Friedan, poet-playwright Wole Soyinka and others, many of them at the same time. (This was a "matrix conference," Beinart explained, rather than a "linear conference"—in other words, you couldn't see everything.)

But most of the 1,200 present (including over a hundred architects and, according to IDCA President Jack Roberts, one "dentist-designer") saw enough. The most rousing of all the scheduled talks was the opening one by Black Panther Bobby Seale, who said that his having run (unsuccessfully) for Mayor of Oakland, California, illustrated his belief that the self could never "drop out" of the system, and whose calls for radical changes of that system (reinforced with the driving delivery of a revival preacher) had everyone in the tent standing and applauding madly.

Perhaps the most enigmatic of the talks was by Japan's "metabolist" architect Kisho Kurokawa (see PLUS, Jan/Feb '74) who, after a slide show of his work that was astonishing in both quality and quantity, explained that for Buddhists the self *is* system and the system *is* self.

The most entertaining was by biologist-psychologist Jerome Lettvin, who spoke of such varied subjects as the artist as predator, the vision of fish, and something he called The Field Theory of the Madonna.

But the most eloquent speaker of all, who alone would have made the journey to Aspen worthwhile, was Milanese architect Giancarlo De Carlo. De Carlo called soberly for reinstating the user in the process of architectural design and for a more concerned professionalism. "We no longer need the architect-peacock," he said, "nor the architect-gladiator; we need the architect-architect."—S.A.



Piene's balloon; the children's village

Midsummer on the Mall

Janet Harley, who works at the Department of Health Education & Welfare in Washington, D.C., was given a surprise birthday breakfast she will never forget. Her friends, who like to celebrate birthdays properly, ordered a catered meal of extraordinary elegance, at 6:30 a.m. July 19 at the Reflecting Pool on the Mall, in the midst of the Washington Monument and the Lincoln Memorial. Miss Harley was fetched by horse-drawn antique phaeton, and all the guests wore formal attire, including canes for the men. The Wye String Quartet from Annapolis was hired to play for the dawn event, and they began, fittingly, with "Lark Quartet" by Haydn. The couples dined until 8 when the sun broke through, and danced until 9:30; then they all went home, changed clothes, and went to work.

Royal Gold Medals

The Queen has awarded the Royal Gold Medal for 1974 to the firm of Powell and Moya—the first time the award has been given to a firm rather than to an individual.

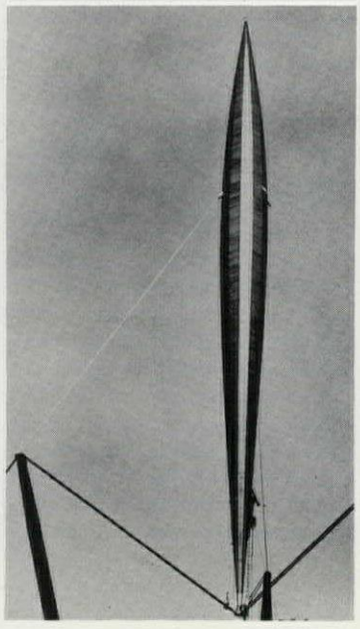
Ever since Powell and Moya won the competition for a "vertical feature" at the Festival of Britain in 1951, they have quietly and unostentatiously developed one of the best offices in the country. The Sklyon, as it was called (waggishly referred to with the adjacent Dome of Discovery as symbols of Britain—the rolled and opened umbrella), really did symbolize something: the emergence from drab, grey, rationed post-war Britain into a decade of hope in which we were going to transform our society and our environment and all for the better. That it didn't work out quite that way is no fault of Powell and Moya whose modest output has been consistently high in quality and low in pretension.

They have designed equally well for the ever-growing Welfare State clients (schools, hospitals and housing) and for the Oxbridge establishment.

Their Mayfield School in Putney threw the London County Council School's Division architects into a state of mild panic because it was so good—and so cheap. Their hospitals, against all odds, are essentially non-institutional in character. Their housing, Churchill Gardens in Pimlico, which dates back to 1950, is still one of the most humane modern environments in the country—notwithstanding the current overreaction to the evils of highrise housing.

In Oxford and Cambridge they have built in historic situations without compromising their manner or style, beginning with the miraculous little extension to Brasenose College in Oxford, which like an office stud has sired a whole family of descendants in the two universities.

It would be good to be a pupil in one of their schools, a patient in one of their hospitals, an undergraduate in one of their College buildings—and one can say it all, not as one architect admiring the work of other architects, but as a human being. I don't think they have designed a bad building. If such a standard were only the norm, we might have moved further than we have toward that new place we thought we could make in 1951.—J.D.



Quebec goes ashore

The Royal Architectural Institute of Canada (RAIC) held its annual assembly in Jasper National Park, Alberta province, this summer. A newsletter from the Nova Scotia Association of Architects reports on the event as follows:

The scenery was spectacular; the mountains overpowering; the recreational activities invigorating; parties attended; weather a little cool; professional enrichment nil!

The newsletter goes on to say that one of the highlights of the assembly was the announcement, much to the surprise of some of the attending members from Quebec, that the Quebec organization (OAQ) had officially withdrawn from the RAIC:

Quebec has decided to go ashore rather than stay aboard and help bail, trim the sails, lean on an oar, and patch the leaks. Needless to say, all the other provinces have decided to keep the old ship afloat, and fly the national colors. In the meantime, the RAIC Council has invited the OAQ to come back to the fold any time it wishes.

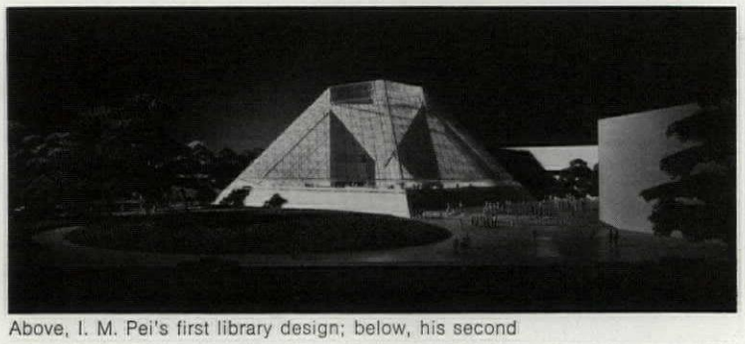
We don't think Quebec should return to the fold until the ship is repaired.

JFK number two

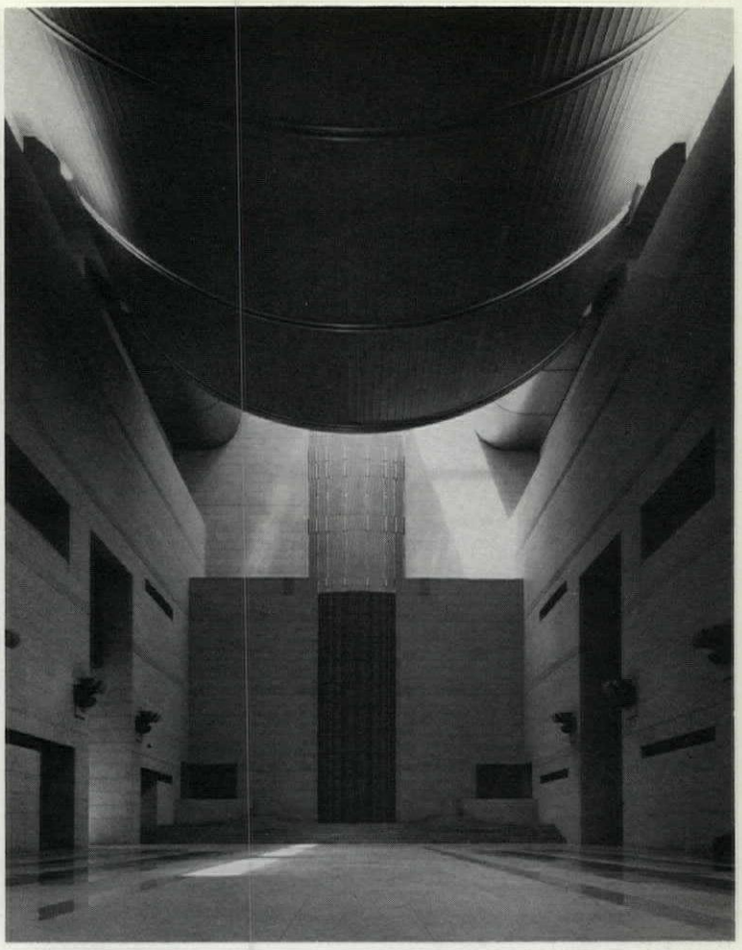
In May, 1973, we reported the unveiling of the first design by I. M. Pei and Partners for the John F. Kennedy Library. Although the site, on the Cambridge, Massachusetts, bank of the Charles River, had been selected partly on the basis of a traffic study, the plans, even before their unveiling, were protested by a citizens' task force worried about traffic jams, parking shortages, and potential changes to their neighborhood. Admittedly, the neighborhood—bookshop-rich Harvard Square and a fine residential area down nearby Brattle Street—is worth whatever protection it can be given; even so, the library site's past use as a storage yard for the Metropolitan Boston Transit Authority was not exactly neighborhood-enhancing.

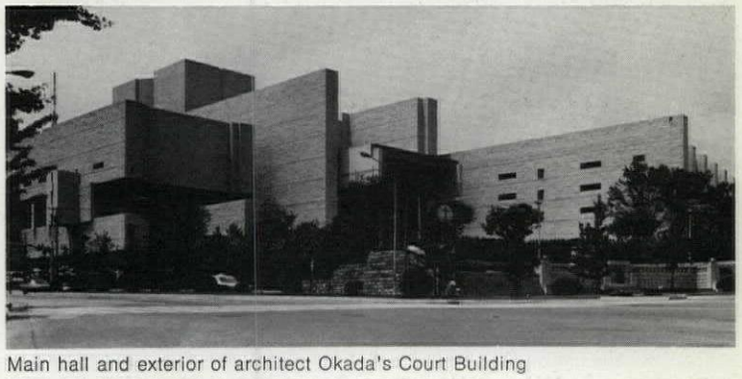
More than a year later, I. M. Pei and Partners have responded to the criticism (and also, perhaps, to the rise in construction cost which accompanied the delay) with a second, greatly subdued, design. The spectacular glass pyramid and sweeping concrete semicircle of the first scheme are gone; in their place is a pair of parallel brick buildings (the library itself and an academic building for Harvard University) flanking a simply landscaped central court. The bulk and the brio of the earlier scheme are replaced with smaller total volume, with more area given to parking, and with irreproachable decorum. The buildings will assuredly be detailed with the care for which the Pei firm is admired, and, if built, their protesting neighbors may even come to love them.

One wonders, however, if all of us—those who will visit the building as well as those who live near it—would not have been more greatly enriched by the spirit of the earlier scheme. It *is* probably true that the library, in its revised version, will attract fewer visitors than would have its first version, and excite them less once they're there, but surely the dumbest possible criterion for urban design is that new buildings should be made less attractive.—S.A.



Above, I. M. Pei's first library design; below, his second





Main hall and exterior of architect Okada's Court Building

Controversial court in Tokyo

The Supreme Court Complex by Shin'ichi Okada is undoubtedly one of the most newsworthy buildings in Japan this year. Based on the winning design of a major national competition held in 1969, it was built at the cost of over 12.5 billion yen.

The courts, library, chambers and administrative offices are organized along what the architect calls "space walls," which contain the circulation spaces. The structure is reinforced concrete; an enormous amount of granite (57,000 sq. m.) was used to clad both the exterior and the interior. The result is a curious blend of monumentality and Orientalisms. It has received sharp criticism from some quarters for its authoritarian image —others have likened it to a mausoleum.

As so often happens, many are having second thoughts about the original idea which seemed so powerful and which captivated the jurors.

The smaller scaled elements are lost and somehow beside the point in the large spaces. This is in part a result of an absence of any *intermediate* elements either in plan or elevation. But of course this may have been Okada's intention.

The bellying ceiling of the hall is sheathed in aluminum panels. At its lowest point, it is 18 meters high.—H.W.

Fence us in

The town of Golf, Florida has decided to build a chain-link fence around the entire town at a cost of $200,000. Village Manager Mark Gantar, citing the increasing crime rate in the area, says, "It should stop some of the unauthorized traffic around here." The town consists of 67 homes, 13 cottages, and a golf course. If it doesn't succeed in keeping the unwanted visitors out, at least it will keep the golf balls in.

Curacao bridges a gap

Now there are two bridges in Willemstad, the principal town on the Caribbean island of Curacao. The first one, a swinging pontoon bridge designed by the American Consul, Leonard B. Smith, has connected the two parts of town since 1888. But the enormous increase in tanker and cruise liner traffic since World War II, with each ship passing along the Santa Anna Channel to the inner harbor, has meant that most of the time the bridge is open. As a result, traffic jams in downtown Willemstad have been monumental.

That's why the second bridge, a $30 million high-level, box-girder type structure that allows auto and ship traffic to flow simultaneously, represents—among other things—the beginning of a new era of urban planning for the city and the island. Now, instead of forcing every automobile through the narrow streets of the city's oldest sections, Punda and Otrobanda, where they would often wait half an hour with engines idling for the floating bridge to close, traffic can be almost eliminated there.

That is the goal of a joint study done by American planners Lawrence Halprin and Associates with traffic consultants Alan M. Voorhees and Associates. As the approach roads to the new bridge assume their full capacity, it is expected that traffic on the floating bridge will be limited to pedestrians and emergency vehicles. The Halprin-Voorhees scheme calls for the narrowing of existing downtown streets, extensive tree planting and severe restrictions on parking in the densest areas.

If there ever was a town that could benefit from the removal of automobiles, it is Willemstad. Its picturesque little streets are lined with shops selling expensive goods at bargain prices. These sales and other income gained from tourism are major elements of Curacao's economy, second only to the Shell refinery on the inner bay. Yet increased tourism must be generated by the government for the six islands that make up the Netherlands Antilles, because the refinery is supplying fewer and fewer jobs as it becomes automated. There were 11,000 people working for Shell in 1964; today only 3,000. Although the island hopes to attract other oil companies and light industries, it is to vacationers that it looks for most future support.

When the Halprin-Voorhees design proposals are finished (many are under construction), the most highly-developed commercial district, Punda, will have a narrow one-way service road around it and will have new pedestrian streets interconnecting those already there. The new buildings along them, restricted to three-and-a-half stories with steep Dutch-style red tile roofs, will give the neighborhood an appropriate unity of scale and form. Already, seen from the top of a tower hotel integrated into the old fort and government office complex at the mouth of the Channel, the new construction blends into the old in congenial fashion.

The new bridge, 190 feet above the water, is a graceful span that was designed by the late W. J. van der Eb, a member of the Dutch firm, Rijkswaterstaat, which constructed it. The bridge was financed by the Netherlands with additional money for access roads from the European Common Market's Development Fund. Although construction began in 1962, completion of the bridge was delayed for more than two years after a section of the central arch collapsed into the Channel, killing 15 workers. For the people of Curacao, the completed bridge is more than a technological achievement. It also is the end of a long struggle to bridge a vital economic and social gap.—J.D.M.

Making waves

Mass transit in any form is almost unknown in Los Angeles where, it is rumored, there are more cars than people. Fifty years ago L.A. had one of the most advanced rail transit systems in the U.S. Then, on came the auto; the rails were torn up and the remains buried beneath freeway concrete. City bus service up to now has been feeble.

The Southern California Rail Transit District has now upgraded the bus service and, last spring, dropped fares to a flat 25 cents. The District was so encouraged by the immediate increase in passengers that a summer "street fleet" of ten buses to carry hot Californians to the Santa Monica beaches was put into service. With its destination gaily painted on the sides of each bus, the fleet has been an enormous success, especially with the inner city residents.

No unwed groupies

For the first time in almost 50 years, the U.S. Supreme Court has decided a case involving zoning regulations. It ruled 7 to 2 to uphold the legality of a Belle Terre, New York, ordinance barring more than two persons unrelated by family or marriage from living together. Belle Terre is on Long Island, which, long or not, is crowded every summer with nonresidents escaping Manhattan for vacations or weekends, and the ordinance was ostensibly designed to prevent group rentals. "Groupies," Belle Terreans feel, tend to be rowdy and bumptious. The court ruling does seem to have other, more threatening, implications, however. In a dissenting opinion, Justice Thurgood Marshall warned that the effect of the village's ordinance was "to fence out those individuals whose choice of lifestyles differs from that of its current residents."

Flowers and branches

The French sculptor Paul Sabatier has created a facade of flowers and trees gone wild for the Rochas Perfume Company in Paris. The work is called "Audace" after a new perfume of theirs. The massive superstructure is mounted on a giant screen of bronze and glass. And at night, we are told, lighting causes it to "bloom," suggesting heady perfume. How can you keep 'em down on the farm after they've seen Paree?

Lighting competition

The Yamagiwa Shomei Zokei Bijutsu Shinkokai in Japan is sponsoring a competition for lighting design. The co-sponsors are Yamagiwa Electric, LD Yamagiwa Research Center, and Shinkenchiku. Anyone may enter; registration deadline is December 10, 1974. To register, send a postcard stating name, address, school or place of occupation, and telephone number, to Yamagiwa Shomei Zokei Bijutsu Shinkokai, Tokyo International Lighting Design Competition, 1975 Office, 4-1-1 Sotokanda, Chiyoda-ku, Tokyo, Japan. Competition entries must be postmarked by January 6, 1975.

The jury, headed by Kenzo Tange, will include Japanese and European architects and designers. First prize is one million yen.

The lighthouse as a lark

A nine-story lighthouse sends a non-revolving beam over Lake Texoma, a vast lake in Texas; and is said to be the only inland lighthouse in the U.S. Designed by O'Neil Ford, who is the world's first and only ambulatory National Historic Landmark (July/Aug. issue p. 111), the tower houses Coast Guard ship-to-shore communications equipment, and six luxury master suites including "separate tub and shower, all fully carpeted, draped and decorated," which might be worth a trip to Texas right there.

Street furniture

New bus shelters shaped like an upside-down letter "J" have been quietly installed, here and there, in New York City. The rear and side panels are made of unbreakable polycarbonate; the roof is of reinforced fiber glass; and the structure is of steel pipe. So far, so good. Unhappily, the installers of one of these new shelters, at the corner of 60th Street and Second Avenue, turned out to be illiterate —and so the upside-down letter "J" was inadvertently turned around, so that the back now faces the roadway, and the front faces the sidewalk. Result: waiting passengers are either sheltered (and can't see the approaching bus, since the back of the shelter isn't transparent at eye-level); or they teeter on the curb, between shelter and macadam, and are exposed to the elements. The pipe legs of this shelter are massively embedded in concrete—a sturdy monument to the futility of good intentions.

Continued on page 114

Light is a lot of details,

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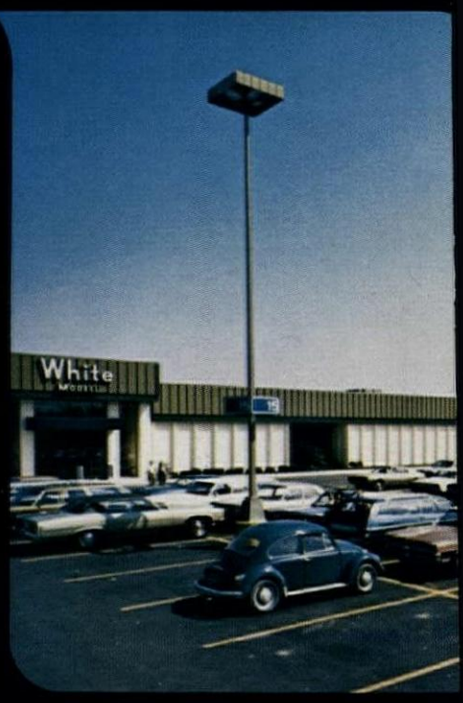

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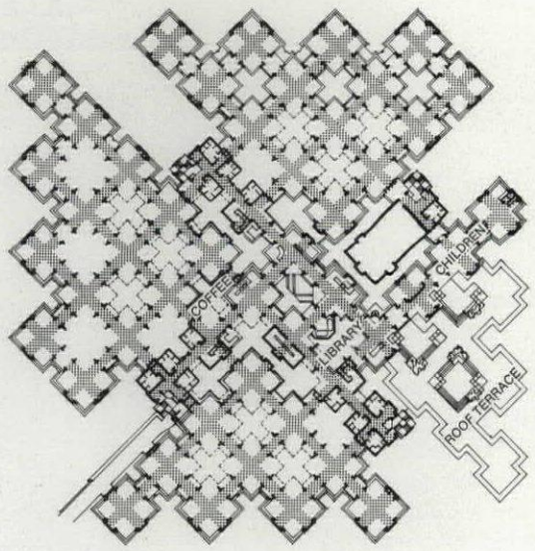
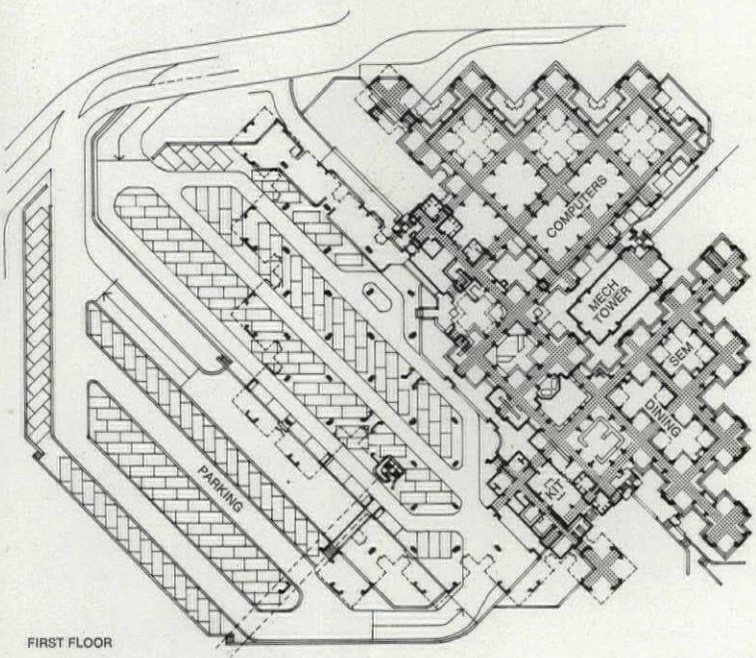
CENTRAAL BEHEER

In Apeldoorn, east of Amsterdam, Herman Hertzberger has intended the openness of this office building "to contribute to reconciliation of work and house, of public and private, of building and street."

by Alan Colquhoun



SECOND FLOOR



FIRST FLOOR

Alberti's injunction that a building should be a small city, and a city a large building, has acquired a new meaning in the 20th century with the arrival of the superblock. Whether it is a large piece of real estate destined for mixed use, or a large administrative unit under single occupation, the superblock radically alters the scale of the environment. Here is a new building type for which history provides no direct prototypes.

There seem to be two basic solutions to this problem. On the one hand, the superblock can be based on a biological analogy and consist of partially independent organs, arranged hierarchically under a central control. This was the method used by Le Corbusier, who more than any other modern architect recognized the superblock as a typically modern problem. Alternatively, the superblock can be considered a self-regulating aggregate of relatively small parts, with any centralized control reduced to a minimum. In Albertian terms, it could be said that the first method turns the city into a building, while the second turns the building into a city.

During the early phase of the modern movement the first type of solution was generally adopted. Within the functionalist frame of reference—particularly that of the Corbusian theory of *"objets types"*—the architectural program was supposed to reflect the rational disposition of society; but since World War II and especially in the last decade or so there has been an increasing attempt to adopt the alternative solution, although its seeds have no doubt existed in the modern movement all along.

In the '20s and '30s it was believed that universal human needs could be established and that the precise functions of the various parts of a building could be defined in terms of these needs. The architects of the *Neue Sachlichkeit* believed that the only task of the architect lay in this analytical activity, but those who, like Le Corbusier, were endowed with a more complex mental machinery, realized that beyond the satisfaction of "objective" needs lay a vast area of metaphor and poetry which was available to all, but which the architect, through his control of form, was especially suited to provide. The form-making role of the architect was therefore seen as directly increasing the well-being of the user through the mediation of artistic creation.

Both the functional determinism and the formal idealism of this attitude tend to be rejected by those who see buildings as potentially self-regulating systems. According to this theory it is the user who plays the active role in a building, while the architect's role is rather to provide the framework that allows the user to choose his own behavior. The well-being of the user is the result of his own spontaneous activity and not of any forms imposed on his environment by the architect.

Talking of the Centraal Beheer, Herman Hertzberger makes the following statements: "Architecture has never taken people very much into consideration. Pyramids, Temples, Cathedrals and Palaces were implements for making an impression on them rather than offering them a more liberal life." "The pretension inherent in an office building that has a distinct form . . . must justify itself by improving the work situation of the people who work there or rather by offering them a helping hand to improve their own conditions by themselves."

Alan Colquhoun practices architecture in London with John Miller. He has taught at the Architectural Association and Cambridge University, and is currently History Lecturer at the Polytechnic of Central London.

Hertzberger states: "The building is accessible at many points. There is no particular entrance with more pretension than any others; thus, all entrances are main entrances." The lower level will have shops looking onto a sunken pedestrian place, when this area becomes accessible from the existing city center.

It is clear from these statements that Hertzberger believes in the second type of solution to the superblock, the solution that interprets the building as a small town; the designer should not try to establish behavior patterns or particular formal hierarchies, but should concentrate on providing the *possibility* of behavior that is self-motivated.

The building itself confirms this general attitude. The plan consists of an aggregate of square repeating cells of office accommodation nine meters square, open at their sides and separated from neighboring cells by three-meter-wide voids lit from the roof, and penetrating through the three stories of the building. The cells are linked by bridges that prolong the implied circulation routes passing along the two axes of the cells. Each cell is supported by eight massive columns, occurring at third points on each side and serving further to articulate the circulation routes from corner areas of the cells, which are reserved for office work.

There are four groups of such cells, occupying the quadrants between a cruciform (or swastika-form) main circulation system on the diagonal of the over-all square of the building, and in this system occur entrances, inquiry desks, coffee bars, escalators, elevators and similar public functions. This public system does not break the pattern of cells, but is created simply by joining the cells together and the voids between them, so creating larger areas. The public areas are not cut off from the office cells any more than the cells are separated from each other.

Walking through the interconnected spaces of this building, enjoying *enfilade* diagonal views, sensing areas of relative quiet and relative movement, or looking into the voids flooded with daylight from above, one can believe it is indeed "a place where everyone would feel at home." This feeling seems to have been created by increasing the sense of total community while at the same time suggesting islands of semi-privacy with which individuals and groups can identify.

Although the building is occupied by a single firm (a large Amsterdam insurance company) the impression is of a number of different firms, because of the way the space is broken up by columns and voids, and is subdivided subtly into different zones. The grey and large-pored surfaces of the building demand, and get, a good deal of soft, large and brightly colored bric-a-brac, and indoor plants—although the extent to which these are the spontaneous acts of the employees, or gifts from a sensitive and tasteful management is not altogether clear. Free coffee is provided in the various coffee bars distributed throughout the building—a small touch suggesting that the managers are in tune with the libertarian ideals of the architect and know how to use the building as it was intended.

The fundamental achievement of this building is that it puts into practice on a large scale a certain principle of publicly shared working space which has until now remained on the drawing boards: the principle that it is equally important to provide for an awareness of the whole building (in contrast to a building that is sub-divided into self contained office rooms) and for a sense of identity on the small scale (in contrast to the *Bürolandschaft* type of office plan).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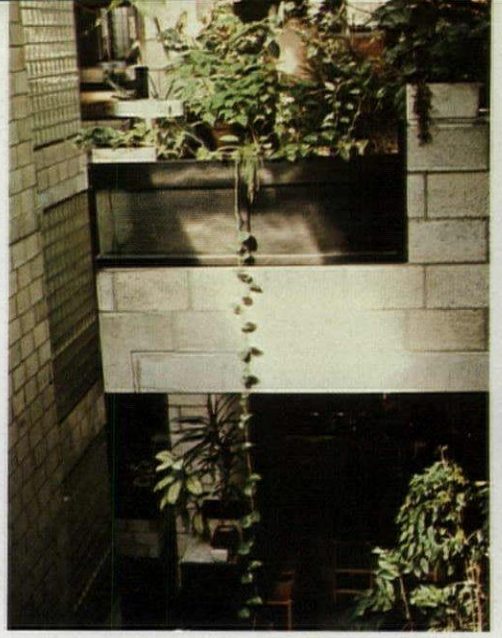
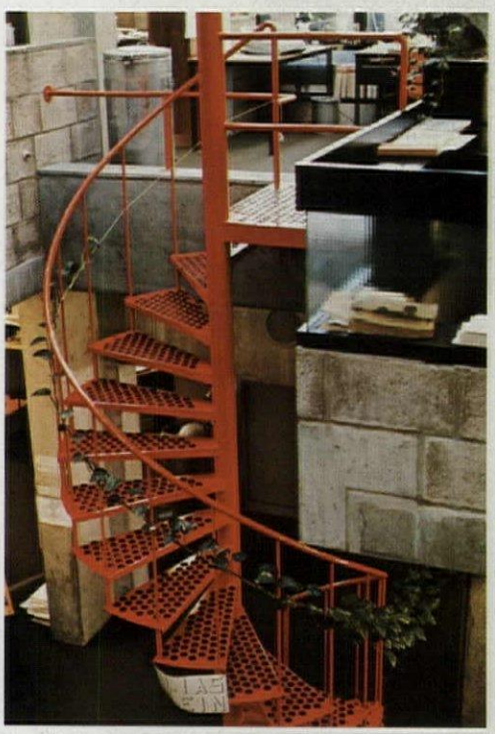
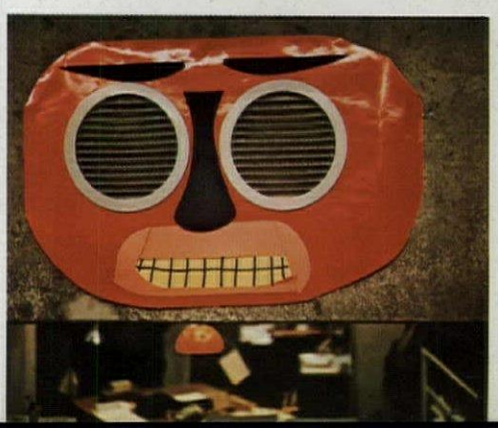
In Hertzberger's words, "The question was to make an office building that would be a working place where everybody would feel at home: a house for 1,000 people. Working spaces are large rooms, continuous, yet articulated in such a way that a group or individual can appropriate a comprehensive place for himself. The open relationship with floors below and above gives a certain feeling of belonging."







Although this has not been achieved before on such a scale or with so much consistency and attention to detail, there are a number of partial prototypes for this building. In Frank Lloyd Wright's Larkin Building, open office spaces were ranged around a large central well that was lit from the roof ; and the ambiguity between inside and outside space occurs in numerous 18th and 19th century galleries throughout Europe, as well as the contrast in scale between small cells and covered public spaces which prolong the street pattern of the city.

But the closest analogies are with Louis Kahn and Aldo van Eyck. In his Trenton Jewish Community Center, Kahn proposed an entirely novel way of distributing space in a large building; Colin Rowe, writing in *Oppositions 1,* has convincingly shown that this is a solution to the problem posed by Mies van der Rohe in the library project for IIT. In the Mies building the weak rhythm provided by the slender regularly spaced columns, implying a universal space, was denied by the necessity of compartmentalizing the space into large self-contained "rooms." Kahn re-introduced the Renaissance principle according to which space is built up out of cells of space articulated by a "strong" structure. The plaid pattern of "servant" and "served" spaces created an architectural order, while at the same time the functional spaces were allowed to occupy a varying number of structural bays. Such a loose-fit, architecturally ordered, scheme bears many resemblances to Hertzberger's project.

But the project also recalls the orphans' home by van Eyck in Amsterdam, in the way the building is made up of an accretion of identical cells clustering around or growing from a central stem. Hertzberger's achievement here is to have successfully carried out this idea in a multi-story building, using roof lights not to provide working light, but to create a sense of outside air penetrating into the heart of the building.

Rather more remotely, perhaps, the building is also related to Montreal's Bonaventure and Ville Marie Market buildings, in which the space of the city is annexed to a vast constructed and artificially serviced space.

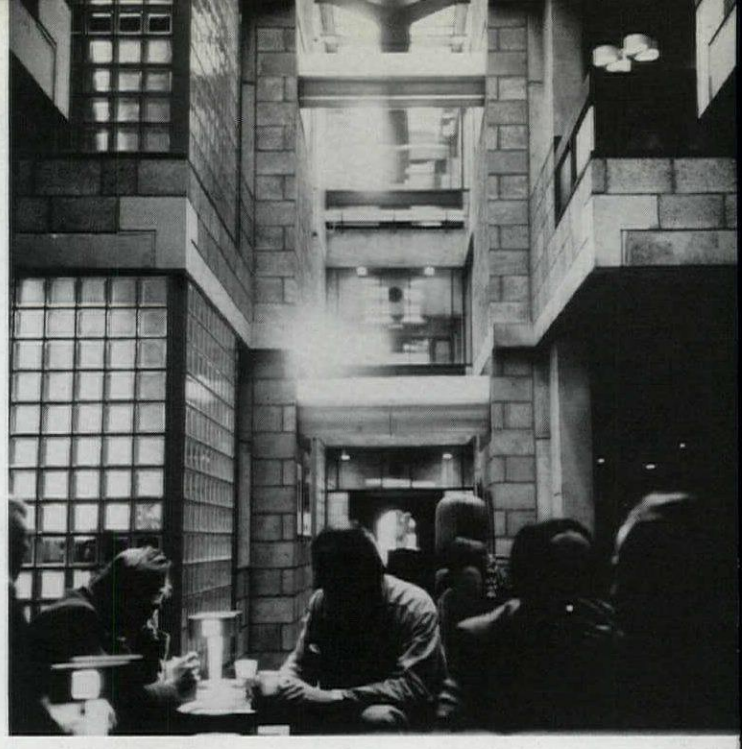
Finally, it was Le Corbusier himself who, by playing with the semantic ambiguities of "house" and "street" in a large structure, suggested a whole generation of plug-in schemes in which identical cells are inserted into a permanent megastructure.

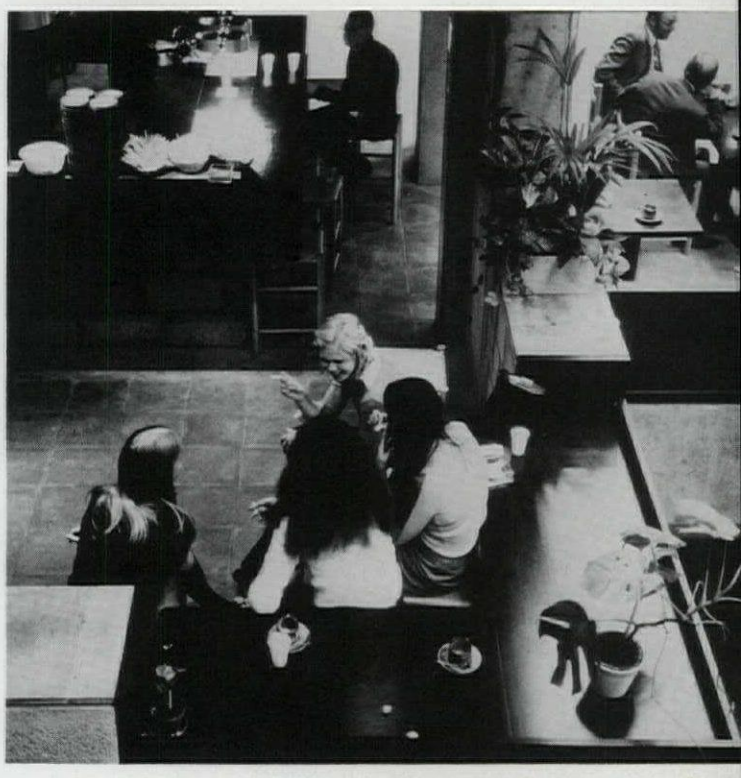
The names of Le Corbusier and van Eyck remind us that Hertzberger's student hostel in Amsterdam was still strongly influenced by the Le Corbusier of the Unité and the Brazilian student hostel in Paris. In the Amsterdam hostel the repetitive cellular nature of the students' rooms is completely dominated by the over-all cube of the building, which is treated as a plastic unit *à la* Le Corbusier.

Hertzberger's "conversion" to van Eyck must have occurred during the '60s during or after the completion of the hostel in 1965. Substantially the same scheme as the Centraal Beheer was submitted for the Valkenswaard Town Hall and Amsterdam City Hall competitions. Between the hostel and these two projects an entirely new attitude to composition has developed : a building is now seen as an elementarist composition of identical units. This change makes a consideration of the outside of the building essential.

However successful the interior of the building is, the exterior is much more problematic. One is forced to ask whether it is sufficient to make a building out of a single repeating unit and a single principle of organization. For the cellular spaces that are so successful

The shafts of daylight intersecting the building along the voids between the cells create a sense of ambiguity: is it an outside or an inside space? The "outside" feeling is encouraged by the deliberately *brut* finishes and heavy structural elements, but this impression is constantly being rectified by the artificially lit areas of office space and the low hum of the air conditioning system.





inside, because of their modified transparency, immediately become an embarrassment when translated into the necessarily opaque surfaces of the outside. Inside the building one is never aware of more than a part of the space, and the repetition of structure and spaces is only vaguely sensed; but on the outside one becomes aware of the purely mechanical way the modular boxes are assembled. As in Safdie's Habitat, the movement of the surface is by means of increments that are always the same, always blatant, monotonous.

The questions of how one enters the building and how the building relates to its surroundings do not seem to have been considered as serious problems. The frantically articulated surface, stepping back to form a truncated pyramid, seems to deny the possibility of entry and to make any frontalization and space-making impossible. A clue to Hertzberger's attitude to the outside form of buildings may perhaps be found in one of the statements already quoted: he says that the buildings of the past were intent on "making an impression rather than offering a more liberal life." He seems here to align himself with those *grands simplificateurs* of the modern movement for whom architecture is simply the demonstration of some internal principle, of a "system" that automatically ensures virtue in the same way that photosynthesis in a plant creates beauty. But there is no guarantee, in man-made objects, that a unitary principle similar to what can be deduced from the biochemistry of plant life will result in the wonderful variety found in nature. The puritanical fear of "making an impression" may blind one to the fact that all buildings make an impression—Hertzberger's not least—and the problem is to decide *what* impression needs to be made, since our only contact with buildings is through the senses, and the laws of perception govern our responses to every three-dimensional object. The statement that "a building makes itself" (dear to both Hertzberger and Kahn) may be an expression of belief, but it hardly corresponds to reality. Hertzberger's interior spaces are no less contrived because they are derived from a single repeating idea, and there is no law saying there should not be more than one governing formal idea in a building's conceptual order.

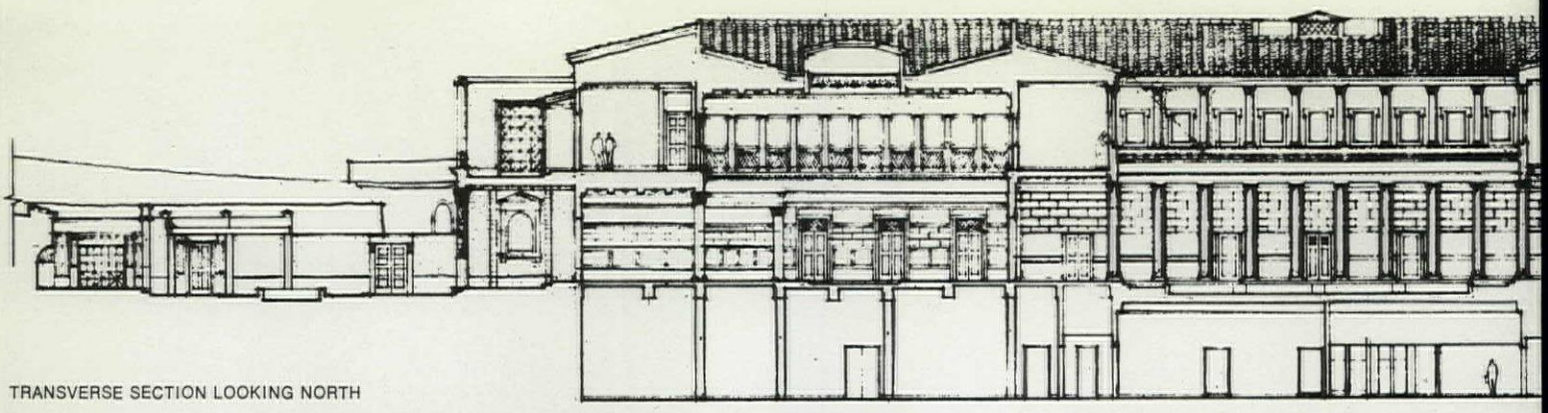
Perhaps the example of Le Corbusier might once more be invoked. In the Venice hospital scheme he seems to have attempted to achieve precisely the type of integration between internal multiplicity and external calm that is so lacking in the Centraal Beheer. In the hospital we find both an additive city-like schema in which identical units are repeated, and a subtractive schema which allows the outside to be molded and articulated to respond to the space outside. It is true that the program of the hospital suggested a horizontal stratification of functions and that Le Corbusier used *pilotis* to gain access from underneath the spreading mass of the building, and therefore the solution is not entirely relevant to the problem of the office building. But its example shows that the problems of external form and of access are as important as those of the interior, and that, difficult as it may be to solve all these problems simultaneously, it is not impossible, once they have been admitted *as* problems and the complexities of the situation have been acknowledged.

Facts and Figures

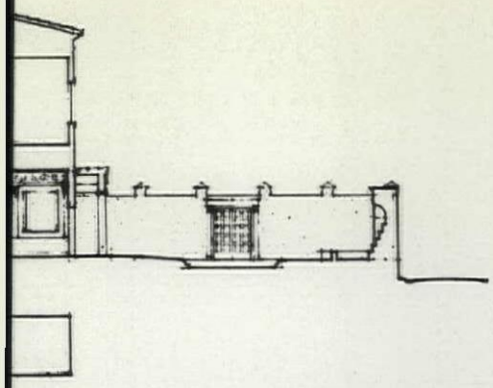
Centraal Beheer, Apeldoorn, Holland. Owner: Vereniging Pensionenrisico Amsterdam. Architect: Herman Hertzberger in cooperation with Lucas & Niemeijer Architects in charge: R. Blom van Assendelft and W. Th. Ellerman. Engineers: Dicke, v.d. Boogaard, v. Boom, Buijs, Nieuwland (structural); Van Heugten N.V. (technical).

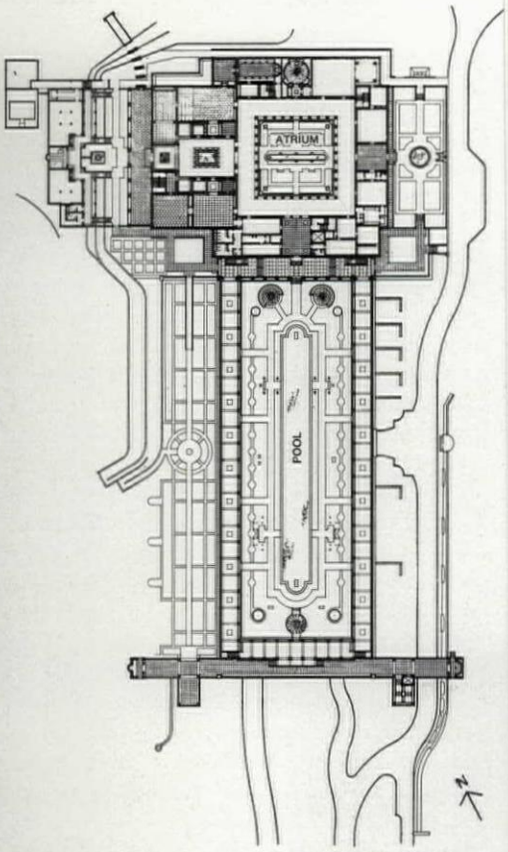
Photographs: Johan van der Keuken, p. 51 (top); Willem Diepraam, p. 55.


CAVTAT



TRANSVERSE SECTION LOOKING NORTH





MAIN FLOOR PLAN

0 25 50 100'
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GETTY'S MUSEUM

Is it "disgusting" and "downright outrageous?"

by David Gebhard

On June 15th of this year at Malibu the J. Paul Getty Museum officially opened its new building to the public. Here on a suburban site overlooking the Pacific is a building and a landscaped environment which has totally and completely turned its back upon the ideology and the imagery of "Modern Architecture." For the majority of the architectural establishment who still at least give lip service to the canons of the Modern Movement, this outright replica of a sumptuous first century Roman villa is not only disgusting, but it is downright outrageous. Though the tirades directed against the building have so far been local and regional, we can without great difficulty feel a return to the late '30s; only in this case the besieged edifice is not John Russell Pope's Jefferson Memorial or his National Gallery, but the J. Paul Getty Museum. The imagery of this building and the reaction it has so far provoked pointedly illustrate the current confusion and lack of confidence of our architectural establishment (and its apologists).

Before sampling the juicy richness of reactions to the building we should first look into the intent of the client and those who participated in its design; and then we should see what in fact has been realized in the way of the new artifact and the environment it has been set into. Fortunately, the client, Getty himself, has lucidly and clearly written about his building and there are no "ifs ands or buts" as to what he had in mind. "But the public," he wrote, "should know that what they will finally see wasn't done on a mere whim or chosen by a committee delegated for such a task; it will simply be what I felt a good museum should be, and it will have the character of a building that I would like to visit myself." Why was the imagery of a classical Roman villa used for an art museum? Getty's answer to this question is twofold: "The principal reason concerns the collection of Greek and Roman art which the museum has managed to acquire." And he went on to note, ". . . and what could be more logical

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On the preceding page, the museum's peristyle garden with its reflecting pool, a recreation of Herculaneum's Villa of the Papyri. Right, details of the illusionistic paintings on walls and columns, a mosaic-encrusted fountain niche, richly coffered ceilings, and intricately tiled floors.

than to display it in a classical building where it might originally have been seen?" Getty went on to observe that his new museum building must be something more than a grand and sumptuous stage-set for his collection of classical antiquities; it should, he felt, convey the feel of what a Roman villa of the early Roman Imperial period was really like. "There is, I believe, no other place in the world where one can go to see such a building in any state except in ruins, as one sees them now in Pompeii. There are replicas and imitations of ancient public buildings, but none of a private structure—so this one should provide a unique experience."

The collaboration which brought this project to realization was as special and unique as the building and its environs: a strong and determined client in the personage of J. Paul Getty who always has conveyed what he is about; an historian-archaeologist Norman Neuerburg; the Los Angeles architectural firm of Langdon and Wilson and the landscape firm of Emmet L. Wemple, ASLA and Associates (with Denis L. Kurutz, the project landscape architect). We would have to turn back to the late 18th century to the personage of James Stuart (who with Nicholas Revett had published *The Antiquities of Athens,* 1762-90) to come across an analogous situation where contemporary buildings were being designed by an archaeologist. Neuerburg, who spent a number of years at the American Academy in Rome and whose publication *L'Architectura delle Fontane e dei ninfei nell'Italia antica* (Naples, 1965) established him as the authority on Roman domestic architecture, was in every sense a logical choice for the client.

The basic plan of the museum was loosely modeled after a specific Roman building—the Villa of the Papyri—a large and sumptuous suburban villa which was situated on the coast outside of Herculaneum. This Villa, along with the cities of Herculaneum and nearby Pompeii, was buried in the famous eruption of Mount Vesuvius in 79 A.D. It lay unknown and deeply buried until the mid-18th century when during the years 1750 to 1765 it was excavated by tunneling underneath the encrusted lava and ash. The reconstructed plans of the Villa were published in *Villa of The Papyri* by its excavator, Karl Weber. The Villa of the Papyri was extensive and luxurious and in its interior and garden were displayed an impressive array of Greek and Roman sculpture.

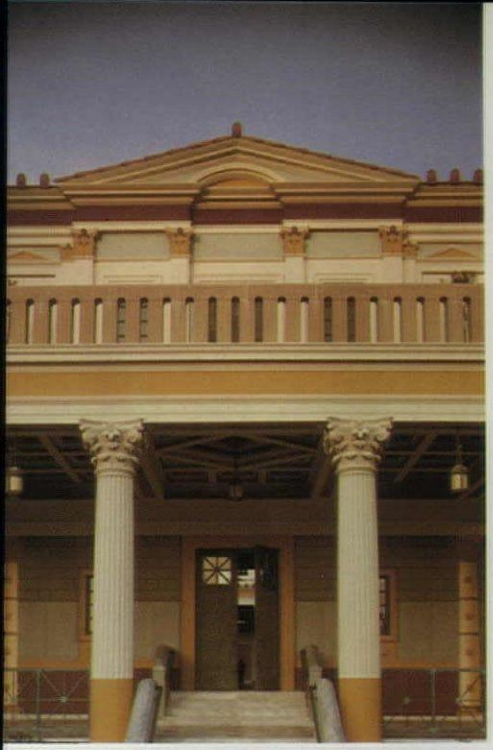
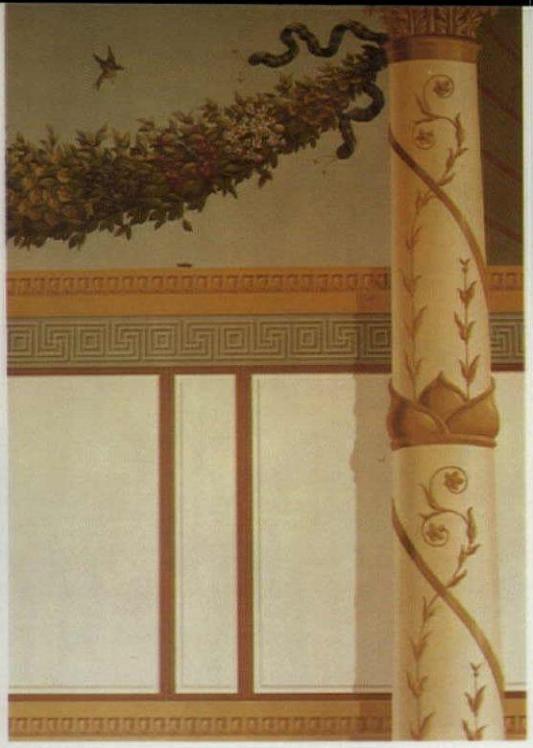
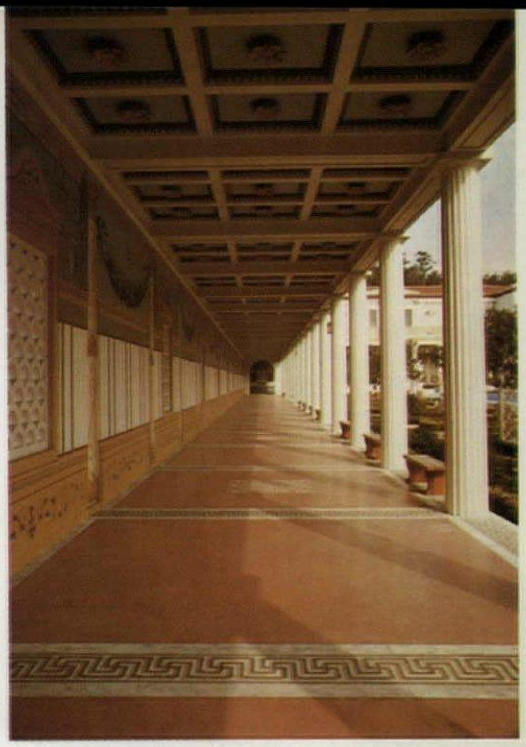
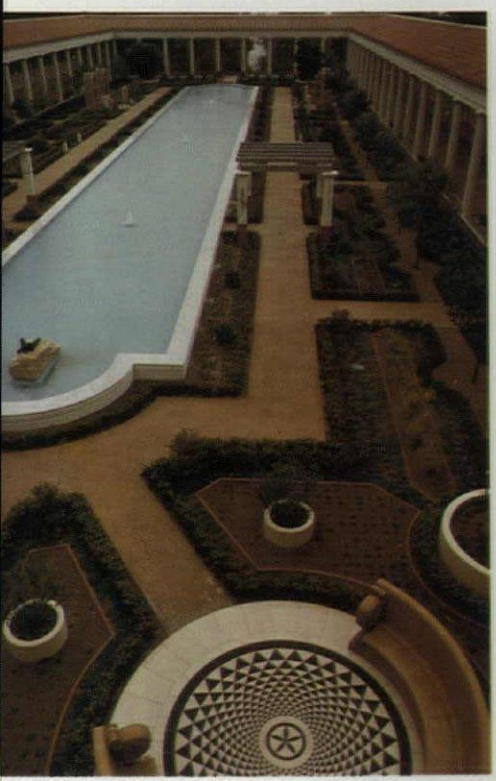
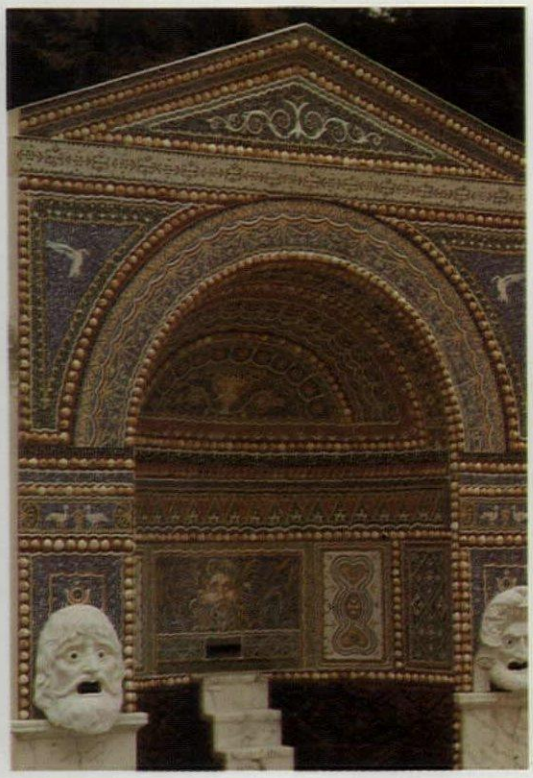
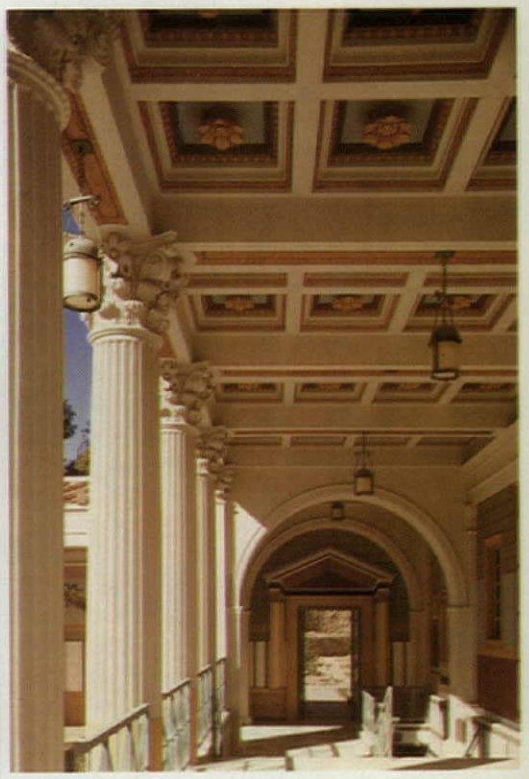
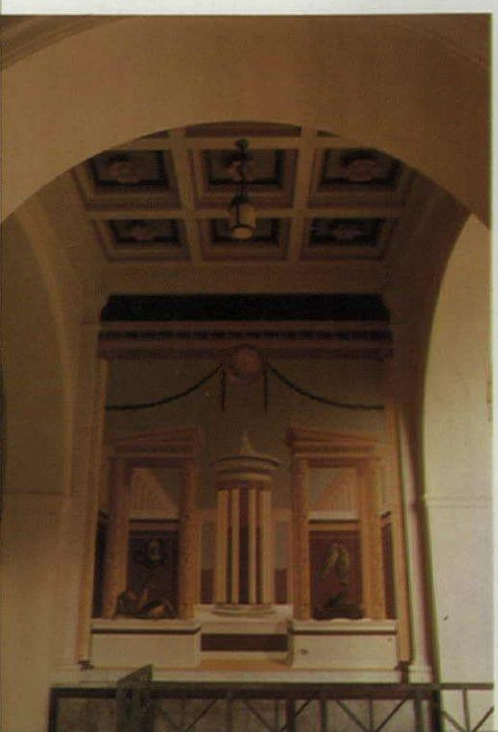
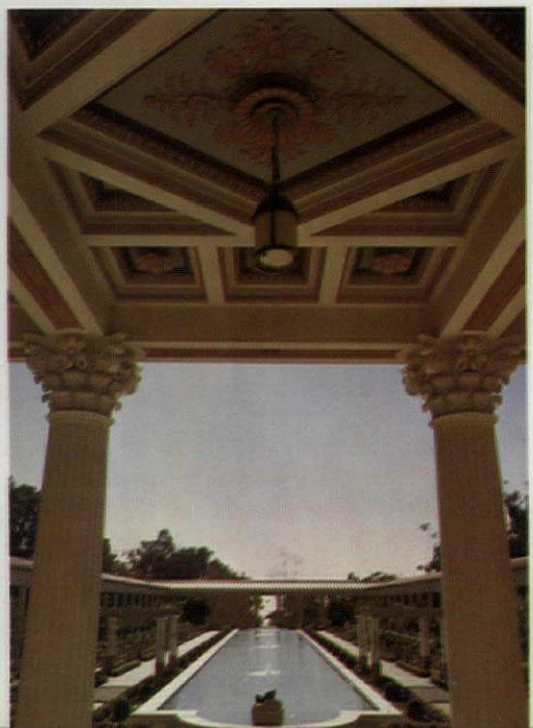
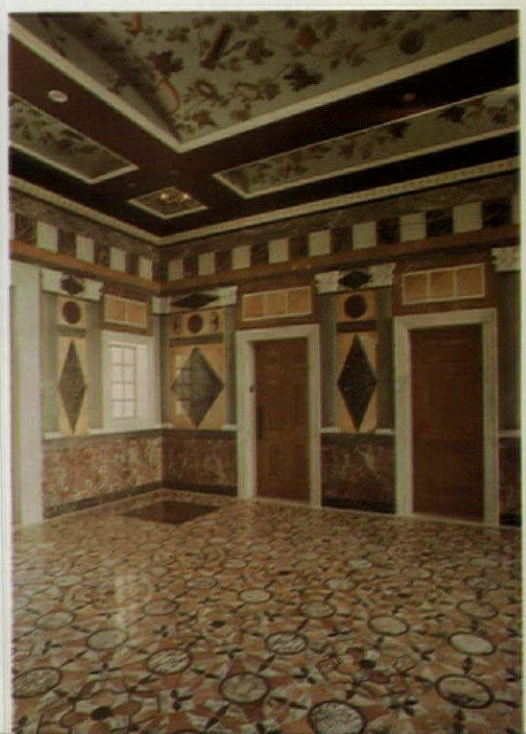
Though the Villa of the Papyri served as the prototype for the museum, numerous modifications were made in the original plan. Because of the narrow valley and steep slope of Getty's Malibu site, a high podium was provided upon which has been placed the two story museum structure, its courtyard garden and atrium. The podium not only solved the problem of elevating the building so as to fully gain a view of the Pacific; it ends up becoming the utilitarian level of the museum—housing a 175 car public garage in front, and all of the major workings of the museum (receiving, storage, conservation, offices, auditorium, etc.) to the rear.

As we would rightfully expect in Southern California, entrance to the museum is via the private auto which after going through a Roman gate ascends from the Pacific Coast Highway up the heavily planted canyon to the arched openings which give entrance to the garage. After alighting from the car the visitor can either walk up the stairs in the open tower or he can take the elevator up to the peristyle garden which is situated on top of the garage. At this point the visitor is greeted by an open Corinthian colonnade loggia—through which, to the south, he can gain a view of the Pacific; if he turns around and faces north he looks out upon a formal Roman garden enclosed on the two sides by a colonnade peristyle and at the far end by the two story museum building. The major axis of the peristyle garden passes through the building and is terminated in good, classical fashion by the secondary axis which meets it in the inner peristyle garden. This secondary axis ties together the Atrium, West Porch and its garden with the Walled Garden to the east. Thirty-eight galleries are contained in the Villa itself. These are arranged on two levels which are oriented around an inner peristyle and atrium. Sixteen of these are on ground level and they house Getty's impressive classical collection. On the upper level are a series of galleries which contain his collection of 15th through 17th century European paintings and the decorative arts of the 18th century.

Though classically formal in elevation and plan the museum complex creates an effect strikingly different from that usually encountered in other museums which have been built in recent years. The parts and segments of the building and its gardens are so broken up that, as Getty has indicated, the scale is entirely domestic, not public. And in this building there is a real connection, not an alluded one, between the out-of-doors and the enclosed space. Porches, pergolas, arbors, peristyles, large windows and doors, fountains, pools and shell encrusted grottos with their sound and feel of running water continually make one aware of the out-of-doors. The deep Roman fondness for nature and the garden, so revealingly conveyed in the first century letters of Pliny the Younger, has been beautifully realized by Emmet Wemple and his associates. The skillful siting of the building, the pattern of its roads, its impressively crafted stone terrace walls and the gardens themselves with their authentic selection of Roman plants reveal the hand of a landscape architect who obviously shares the same passion for nature reorganized as a first century Roman patrician.

Equally important in conjuring the scale and flavor of a Roman villa, are the brilliant illusionistic painted walls and ceilings, other walls sheathed in rare marbles and onyx, the intricate tile and mosaic floors. Rows of classical columns, engaged piers, pedimented and grilled windows, divide and subdivide the surfaces of the building so that its scale is private, not public.

Though the building's garb is Roman, its structure, mechanical elements and plan are pure 1974. The podium and the building are constructed of heavily reinforced concrete which has been designed fully to take into account soil and earthquake conditions of Southern California. As should be expected of a museum built in the '70s, the building is a complex, highly sophisticated machine with the ability precisely to control its internal temperature and humidity. And, in these days of grand and theatrical thievery, the building is equipped with a series of elaborate protective and surveillance systems. The utilitarian aspects of a museum have on the whole been well thought out. The basement or lower

Right, the automobile approach to the museum is through an open arch surrounded by small tile-roofed temples. The peristyle garden is behind the long pilastered wall, and beneath it is a service level containing parking, office space, and a public auditorium.

floor functions as a receiving, storage and conservation area, as the library and office space and as a public auditorium space which can be used when the public galleries of the museum are closed. Forgetting for a moment the strong imagery of the building, it is obvious that the museum works very well—both from the point of view of public use of its galleries, gardens and auditorium, as well as for the professional uses on the lower level.

The public reaction to the building during its first six months has been one of delight—it has turned out just as Getty had hoped. "I would like every visitor at Malibu," he has written, "to feel as if I had invited him to come and look about and feel at home." The building and its environs have fully succeeded in creating what amounts to a private world. Once we enter the classical garden gates of the museum, the roar of traffic on the Coast Highway and the tempo of the beach world of Malibu are left far behind. The villa's distance from the ocean and its closed-in situation in the narrow forested valley have created as secluded a world as any private estate in Montecito or on the 17 Mile Drive near Carmel.

From the beginning Getty realized that his selection of Roman imagery would undoubtedly cause consternation, especially among those who currently hold the reins of power in our architectural world. "I realize that our new building will be an unusual one and that architecture of this nature is not being done in our day and age." He went on to observe that "it is more normal for the trustees of a museum to hire an architect of renown to make a completely new design which, hopefully, would itself be a work of art. I have no criticism of this method; it is sometimes successful and sometimes not, depending on how good the architect is. But why should we assume that art created in the first century would look better in a brand new modern building instead of one in the style of the first century? . . . Why not show Californians what an especially attractive Roman building would have looked like, with its gardens, fountains—even details such as the lamps and appropriate flowers? Many contemporary museum buildings have failed while attempting less than that." Here then upon the part of the client is a sensitive and knowledgeable view of how specific historic architectural imagery may be used to create an environment which unites the work of art with its setting.

What are the criticisms the building has provoked and why had the local art establishment's reaction been so strong, even vehement? Having lost their faith in the righteousness of the old "Modern Movement" most of those who have so far commented on the building have floundered about, desperately grasping on to this or that fragment of the broken wreckage of the "Modern Movement." Though disjointed and in most instances not very well thought out, the criticism of the building and above all its use of past imagery provides a reasonably accurate picture of the current state of architectural criticism. The comments about the Getty have ranged from questioning the archaeological accuracy of the design, to claiming that it is elitist and "too learned;" that it is ". . . frequently lacking in basic architectural design judgment;" that it "is a multi-million dollar piece of unintended folk art," that it is morally reprehensible ("fraudulent," "recreated by inappropriate technologies"); and that the people are being "had" by an oil patrician who like his Roman counterpart, is cleverly and purposefully diverting their attention away from real social problems by the device of bread and circus.

If we carefully sift through all of this verbiage we will find that there are six basic criticisms which have been leveled at the building. They are: (1) that is is unethical to use past architectural imagery for a contemporary building; (2) that it is unethical to employ a technology different from that which was originally employed; (3) that if one is going to reproduce an object of the past one should be a stickler about reproducing it accurately and in total; (4) that its architectural design should express correct "design judgment;" (5) that its design should fit into and reflect a high art esthetic rather than the low art of "popular taste;" and (6) that socially the building is deplorable because it represents the whims of a single man, not the desires or needs of "the people."

Each of these criticisms and the architectural ideology which underlies them is presented as a universally agreed upon set of "truisms" that any intelligent individual would of course fully and naturally agree with. But are they? What indeed is the relationship (if any) between morality and architectural imagery and/or the uses and expression of technology? Is it really conceivable (and I suppose it is) that in the mid-1970s there are still architects and architectural theoreticians hanging around who continue to expose such a dated 19th century period-piece view? And even if a case could be made that ethics and design are somehow related, why is it reprehensible to employ distant forms of the past, rather than the borrowed forms of the near past? One does not have to be an erudite historian to point out that *all* high art architectural design has continually plagiarized its past—whether the past of architecture itself or some other fragment of our past. It is a moot question whether it is better to borrow, as the vast majority of contemporary practitioners do, from the latest by Tange, Kahn or Moore, or whether (as was done in the late 19th and throughout much of the 20th century) the designer has consulted the more distant past of Rome, the Middle Ages or the Renaissance. As to utility and structural authenticity, the history of high art architecture right down to the present moment has been that of function follows (or is accommodated into) form, not the other way around. To claim that architecture has a set relationship to ethics is openly untenable. If we wish to argue that there are certain values which should be incorporated and expressed in the design of a building, fine; but that such values are absolute and intrinsic is open to question. A far more plausible case could be made that high art architecture, like painting, sculpture and literature should be judged only as art and nothing else.

Equally strange as far as the design of the Getty Museum is concerned is the argument that it is not an exact replica of the Villa of the Papyri, and that it lacks a "fidelity to the spirit of the original." Since we can assume that none of us has lived in Imperial Rome of the first century, we can never fully know how a Roman would have responded to the various elements of his environment. But insofar as we possess literary and visual evidence the Getty Museum has faithfully and beautifully sug-

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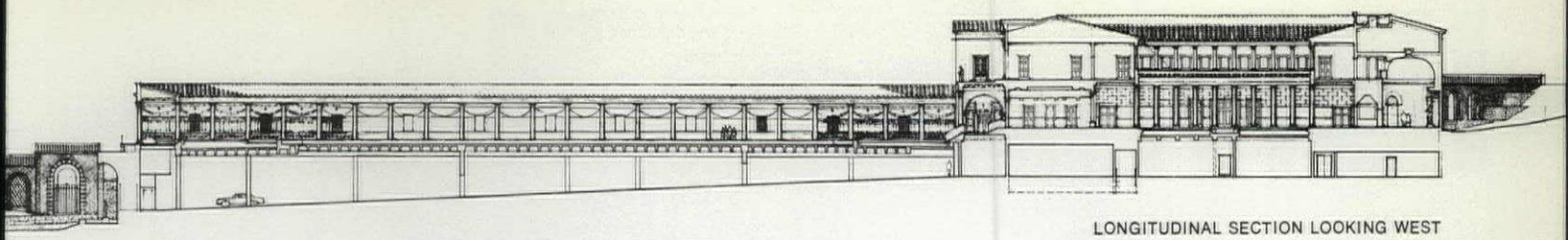


LONGITUDINAL SECTION LOOKING WEST

IBM

With new energy-saving sophistication, this glassy Chicago tower suggests that less is more than ever

by Stanley Abercrombie

In a charcoal sketch of 1919, Mies van der Rohe gave us the vision of a skyscraper encased in shimmering glass, an idealized building form that seems, at this close distance, destined to be one of the handful of architectural history's key archetypes. That archetype has had, of course, its clumsy imitations, and, in the years since Mies' death in 1969, its shortcomings have become increasingly apparent. "Glass box" is now, in fact, not just the scornful epithet of the esthetic philistine but of the supposedly *au courant* professional as well. Conventional wisdom sees the Miesian ideal as the source of physical danger (from fire), of visual boredom, and of extravagant energy wastage. Poor archetype.

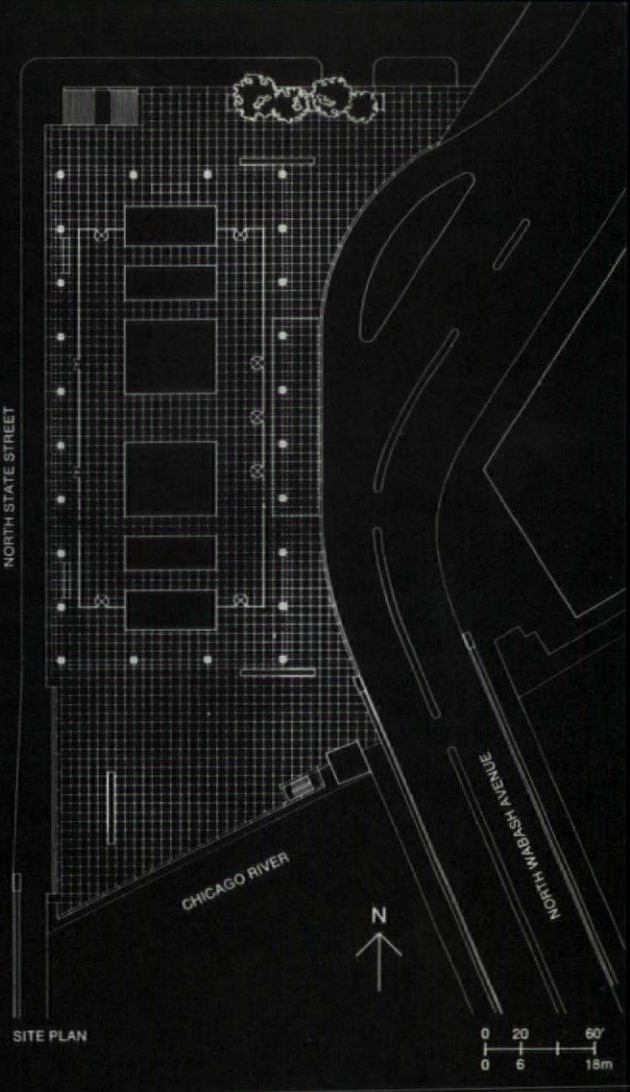
In the face of this criticism (some of it undeniably justified) have Mies' direct successors, The Office of Mies van der Rohe, traded their steel and glass for thatch and adobe? On the contrary, they have, with an admittedly new consciousness of energy shortages, proceeded in an appropriately straight line with the perfecting of the Miesian heritage. The shortcomings of the sealed glass tower can be overcome, their recent work suggests, by making a *better* sealed glass tower.

An excellent demonstration of such improvement is the IBM building in Chicago. One of the last commissions to come to Mies' office while he was still active in the firm, it was designed by The Office of Mies van der Rohe in collaboration with C. F. Murphy and Associates. (The Mies office did conceptual and design development drawings and served as project managers; the Murphy office did the engineering and working drawings.)

Preliminary work had to deal with an oddly shaped site split into two zoning classifications, and at an early stage it seemed that a U-shaped building might be necessary. Extensive negotiations with the City of Chicago, however, resulted in a modification of the property line to allow the present rectangular building plan, a rezoning of the site as a Planned Unit Development and, because of a railroad right-of-way under the building, some relaxation of on-site parking requirements. The rectangular plan thus allowed is based on a five-foot-square module and a 30-by-40 foot bay. It is three bays (120 feet) deep and 9 bays (270 feet) wide. There are 52 floors above the granite plaza.

When it was completed in 1972, it was immediately apparent that IBM was a handsome building. A perfectly proportioned and immaculately detailed slab of bronze-anodized aluminum and bronze-tinted double glazed fixed plate glass, it rises with striking elegance and sobriety on the north bank of the Chicago River, its effect impressive even among the architectural monuments of Chicago.

But IBM has more than a pretty face. Now that the building has been in use for two years, its function can also be evaluated, and such an evaluation—with sur-



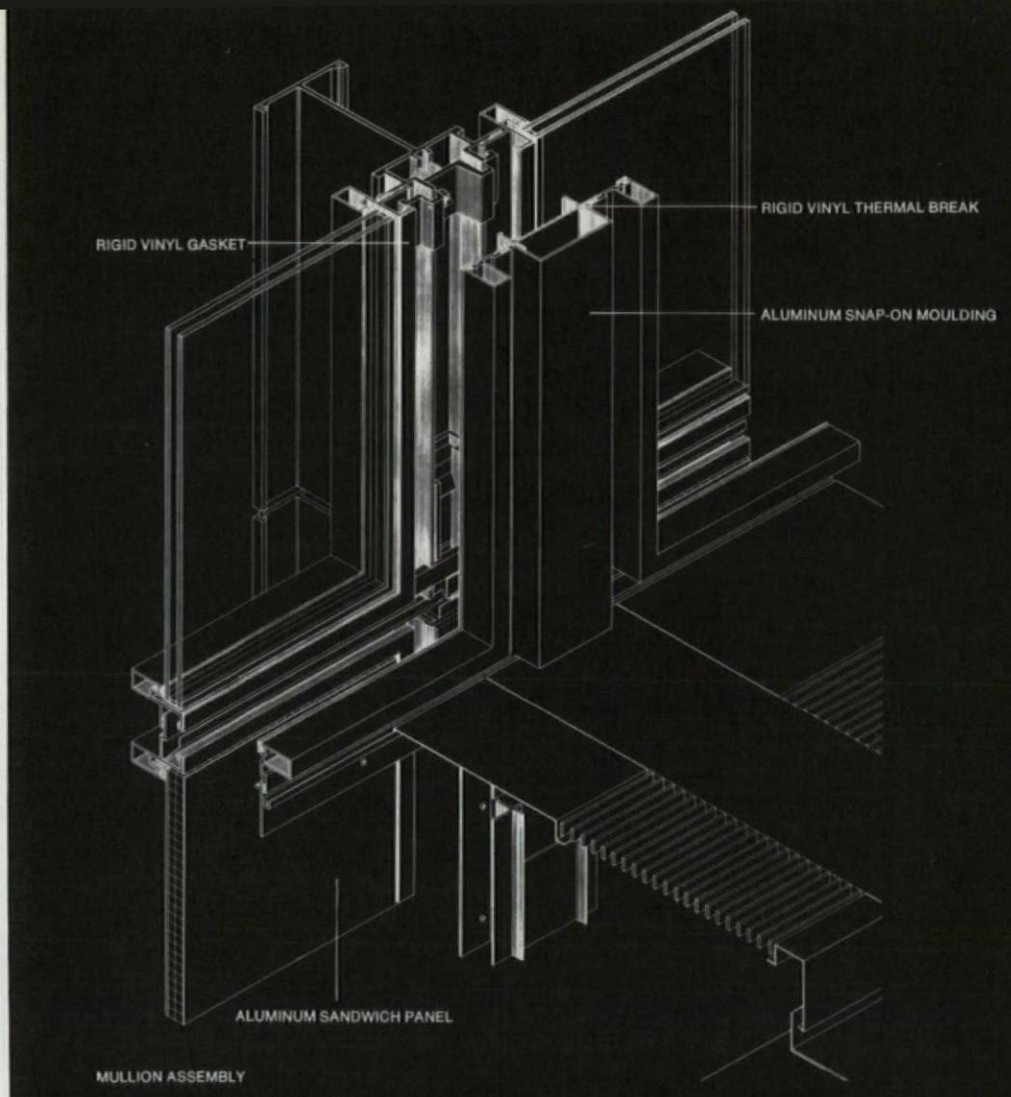
At left, the IBM tower on the bank of the Chicago River, with SOM's John Hancock Building in the background. The head of Mies van der Rohe by sculptor Marino Marini is in the IBM lobby.

prising results—has just been completed. At the suggestion of William Abraham, IBM's Building Manager, the Chicago Building Managers' Association invited major office buildings of the city to participate in a three-month comparison of operating efficiency. Chicago's most severe winter months (December, 1973, and January and February, 1974) were chosen for the test, and thirteen buildings, identified only by code numbers, submitted data related to energy use. All were prestigious office blocks, but of varied ages and materials, varied amounts of glass (some operable, some not), and varied standards of lighting level, humidity control and temperature. The average energy usage for all thirteen buildings was 20,369 Btu per sq. ft. per month; the worst offender (at 26,678 Btu/sq. ft./month) was a rather large old concrete building with less than 50 percent of its exterior walls glazed; and the most efficient (at 11,765 Btu/sq. ft./month), with 75 percent of its exterior glazed—and you can't get much glassier than that—was IBM. These figures do not suggest, of course, that the way to cut a building's heat loss is to add glass, but they do suggest rather strongly that glass walls present no insurmountable disadvantages.

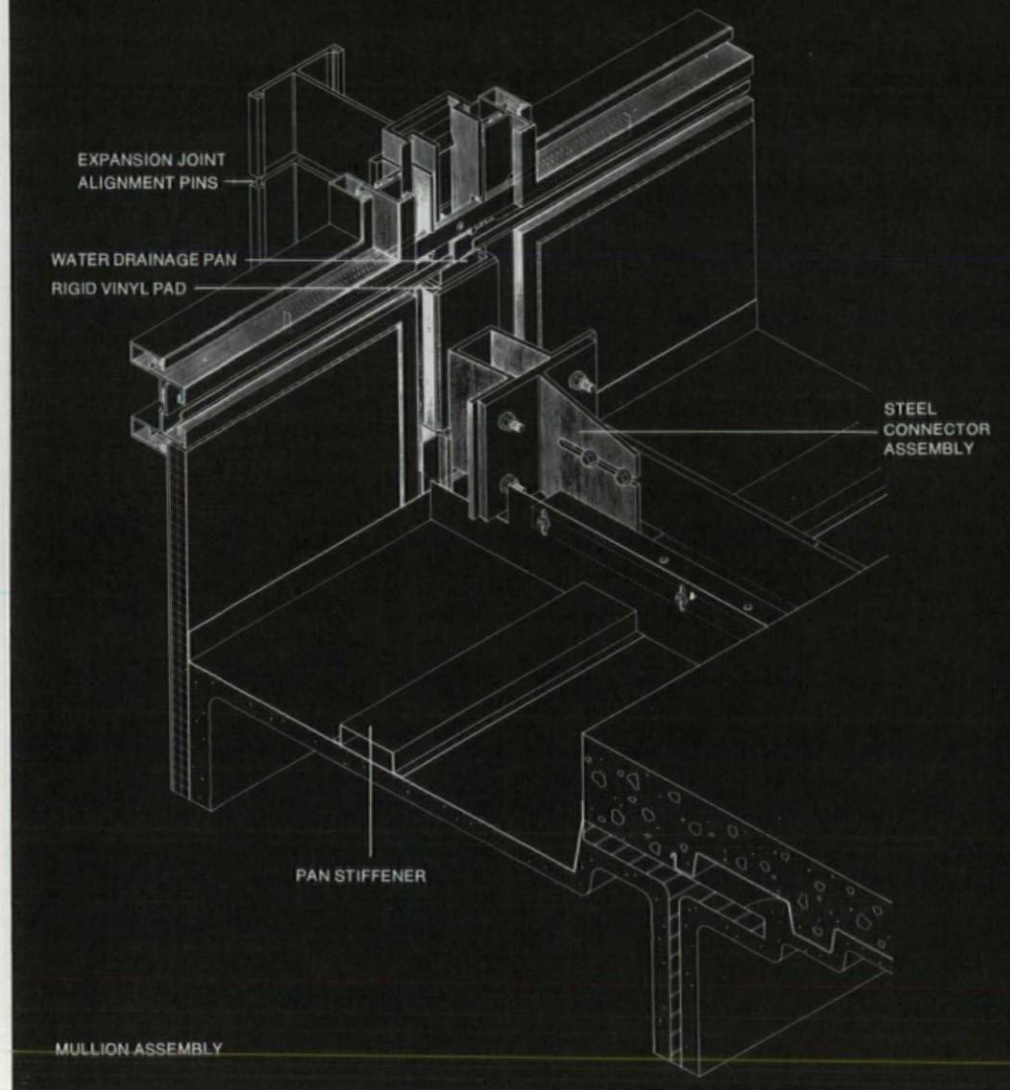
The IBM building's relatively low energy consumption, achieved with no compromise of lighting levels or comfort, seems to have resulted from a number of factors. One of them is a human factor: Building Manager Abraham, his Operations Manager Marvin Hamilton, and their educated staff are concerned about energy conservation (which often equals operating economy) and they are alert about how to achieve it; that must make a difference in any building. But the other factors are the sophisticated tools at Abraham and Hamilton's disposal.

Chief among these are a "Btu pump" heat recovery system, a weather station right on the roof of the tower, and a computer (by—naturally—IBM). It is the electrically-powered heat pump, a refrigeration machine with a reverse cycle, which is responsible for the fact that the building's excess heat is put to use. (Because lights and people are heat sources, most sizeable office buildings, even in winter, accumulate excess heat in interior areas. A conventional mechanical system would expel such heat into the surrounding air, but at IBM it is transferred to the perimeter of the building for winter heating.) Although this heat recovery system is supplemented by the usual boilers, that back-up has proved to be virtually unnecessary. During all of last winter, one-third of one boiler was put to use for two hours; the rest of the plant's seven boilers were never needed.

The weather station 700 feet in the air and the computer sunk ten feet below the level of the river work as a team to effect further efficiency: whenever the weather station tells the computer, for example, that the outside temperature and humidity are suitable, the computer automatically ad-



MULLION ASSEMBLY



MULLION ASSEMBLY

justs dampers on the two mechanical floors to receive outside air, sometimes as much as 100 percent of the air being circulated. This weather station/computer team is much more quickly responsive to changing weather conditions than would be any team of mere mortals. For further sensitivity, each quadrant of the building is monitored separately by the computer, so that offices facing west, for example, can be given cool air at the same time that offices facing north are given warm air.

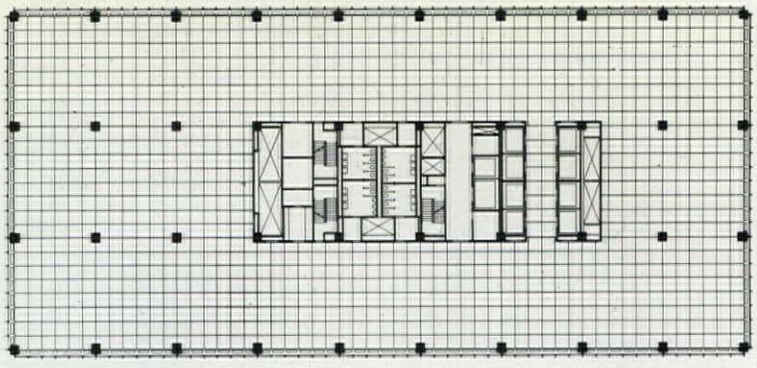
And the computer performs other functions as well—controlling inventory of building supplies, calculating employees' wages, and supervising what may be the world's first computerized lamping program. Every fixture in the building (45,000 of them, each with two fluorescent tubes) is identified by the computer, which also knows when every tube was last replaced and devises tenant bills based on the relamping. The computer can also predict, on the basis of past records, when the time will come at which it will probably be economical to completely relamp a tenant's space rather than to wait for further scattered lamp replacements.

Another job done automatically: at 6 p.m. every night, the computer switches off all the building's lights. People unlucky enough to still be working can, of course, fumble their way to a switch and re-light individual spaces; at 7 p.m. this little drama is repeated, and so on every hour during the night. The only exceptions to this system are on the floors occupied by IBM itself (about 40 percent of the building), where the automatic darkening after 6 p.m. occurs every 20 minutes, and in the computer's own area (being a constant worker, it allows itself light 24 hours a day).

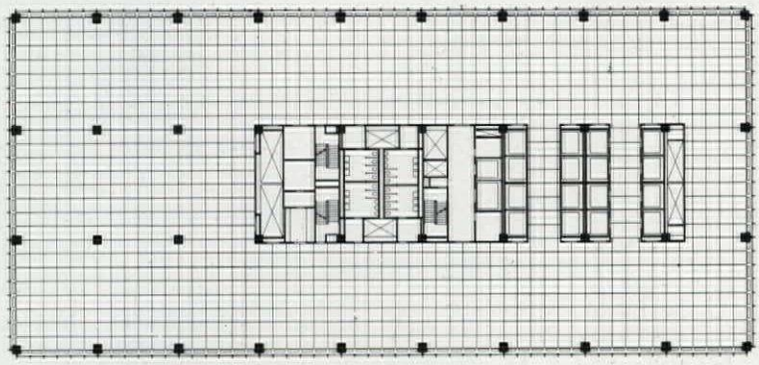
The computer, of course, needs some human assistance. It must be programmed by trained personnel, and there are in addition tasks that still require old-fashioned elbow grease and wrenches.

Such manual upkeep is minimized at IBM in two ways. First, by the refined detailing by the Mies and Murphy offices. Secondly, upkeep is aided by a collection of 1,700 photographs taken during construction. These supplement "as built" drawings, and are really much more informative. They show the precise locations of all pipe risers, electrical feeders, valves and other equipment buried within the building skin. If a leak or short should develop, a 35 mm. slide thrown on a screen will show the maintenance crew exactly where to look for its cause.

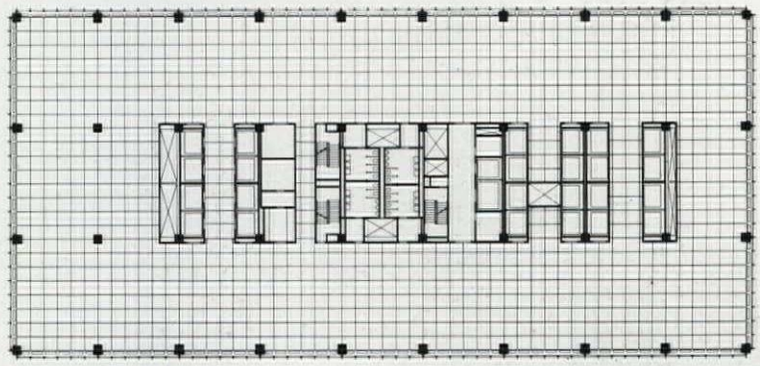
Fire safety in the IBM building, as in most buildings, depends largely on a program of fire safety education drilled into tenants by the building management (the primary lesson: use a stairway to reach a safe floor). Even here, though, there has been a bit of welcome technical innovation: IBM was the first building in Chicago, according to Operations Manager Hamilton, to install elevators with "fireman's re-



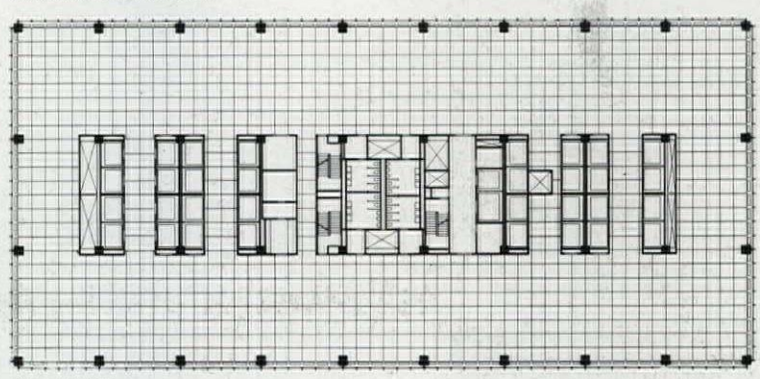
HIGH-RISE FLOOR



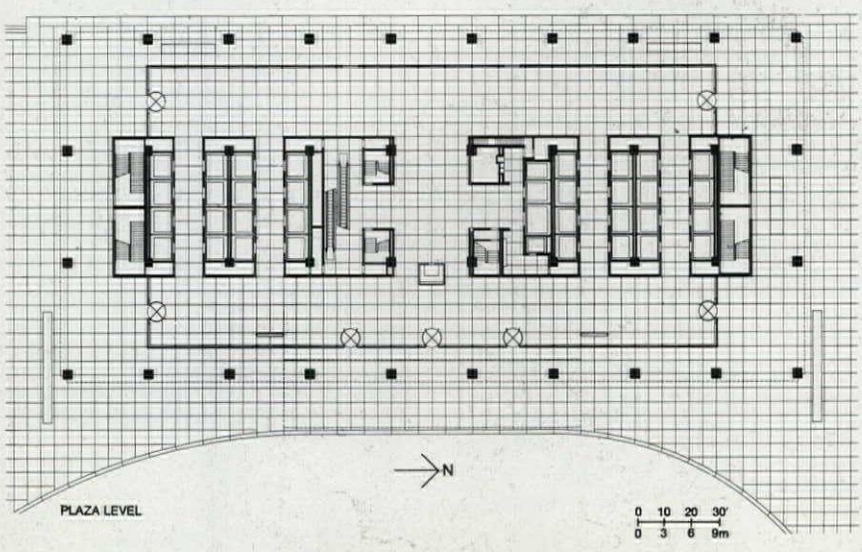
INTERMEDIATE HIGH-RISE FLOOR



INTERMEDIATE LOW-RISE FLOOR



LOW-RISE FLOOR



PLAZA LEVEL

IBM Building interiors: two floors of offices for Jenner and Block designed by David Haid.

call"—that is, at the first warning of a fire on any floor, all elevators can be called immediately to the lobby, where they are available for use only by firefighters; this precludes the possibility of any car with heat-sensitive switches being accidentally sent to a burning floor. ("Fireman's recall" has since become a standard item on most good building guidelines and, in some cities, a code requirement.)

What of the cost of all this technology? It can't have been cheap, but the extra initial cost has already been repaid by savings in operating expenses. In Hamilton's words, buildings "can't afford *not* to have this equipment," and he's probably right.

This happy story of building quality continues; IBM has recently commissioned The Office of Mies van der Rohe to design another building, this one in Pittsburgh and intended as a prototype for innumerable future IBM buildings. At the present (preliminary) stage, the prototype design differs in some respects from the Chicago tower: its spandrels and mullions are to be white, thus absorbing less heat ("We're going to be seeing a lot of light-colored buildings," Dirk Lohan of the Mies office predicts), and its glass areas are to be considerably smaller, reducing heat loss but also reducing the powerful visual effect of IBM Chicago's floor-to-ceiling glass. That's a shame, for heat loss is already considerably mitigated by the type of glass specified for IBM, and the spectacular views are probably largely responsible for the fact that the building is fully rented. (What's more wasteful of resources than unoccupied buildings?) But regardless of IBM Chicago's smartly outperforming its neighbors, the building's total annual energy usage is still much greater, for example, than the 55,000 Btu/sq. ft./year suggested for new Federal office buildings by the General Services Administration. Amenity and performance—views and fuel consumption—are difficult qualities to balance, and, at this stage of development, we obviously can't have everything.

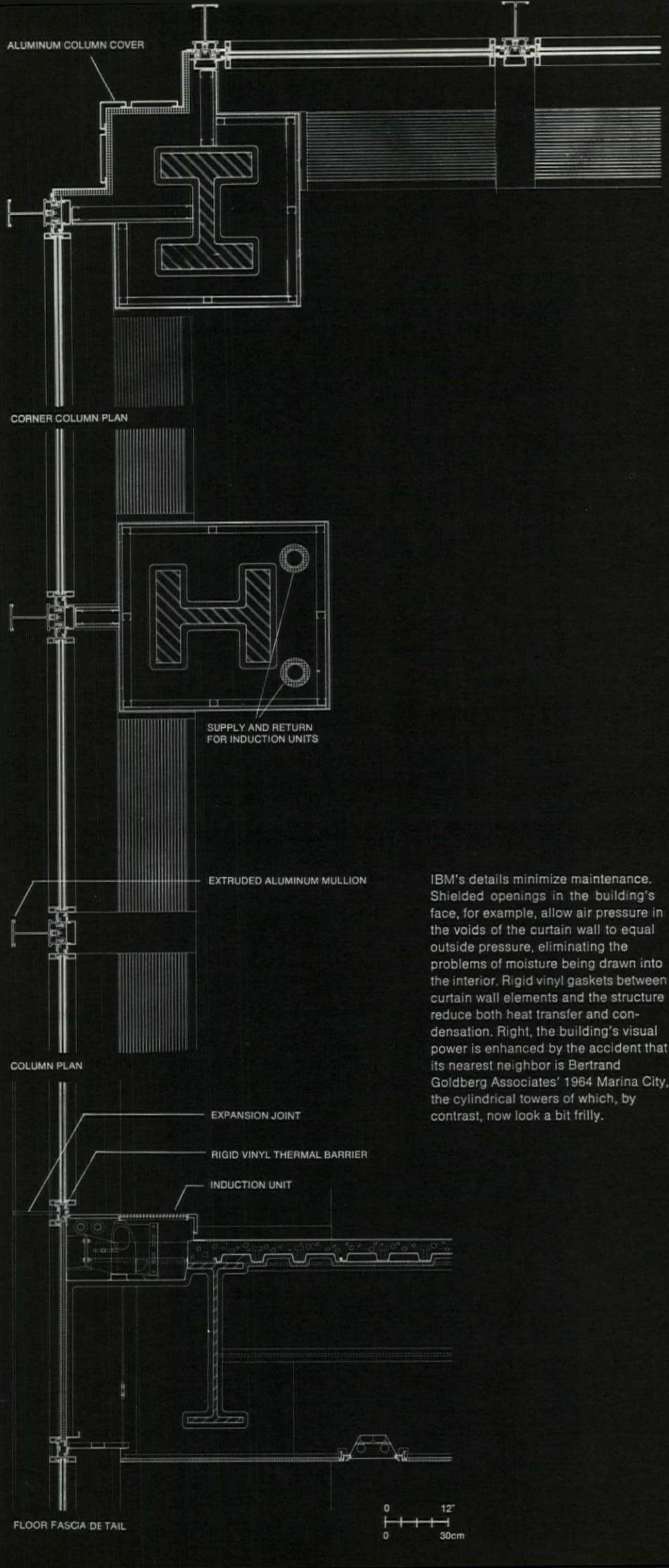
But that's a problem the Mies office is tackling with already demonstrable results. Such continuing refinement by serious professionals suggests a possibility for architecture that most of us once dreamed of but had almost abandoned as futile: the maturing of the machine esthetic so that its products would be beautiful not only visually but also mechanically. To put it another way, the energy-saving and labor-saving efficiency of IBM Chicago asks each of us a serious question: to what extent has our reaction against the "glass box" been an over-reaction?

Facts and Figures

IBM Building, One IBM Plaza, Chicago, Illinois. Owner: IBM Corporation. Architects and Engineers: The Office of Mies van der Rohe (Bruno Conterato, Partner-in-Charge), and C. F. Murphy Associates. General Contractor: Paschen Contractors, Inc. Building area: 1,835,360 sq. ft.

Photographs: Hedrich-Blessing, except pp. 62 and 65 by Mel Wilson.

Building suppliers listed on p. 130.



IBM's details minimize maintenance. Shielded openings in the building's face, for example, allow air pressure in the voids of the curtain wall to equal outside pressure, eliminating the problems of moisture being drawn into the interior. Rigid vinyl gaskets between curtain wall elements and the structure reduce both heat transfer and condensation. Right, the building's visual power is enhanced by the accident that its nearest neighbor is Bertrand Goldberg Associates' 1964 Marina City, the cylindrical towers of which, by contrast, now look a bit frilly.


CHICAGO SUN-TIMES
CHICAGO DAILY NEWS

VOCABULARY

A critical discussion of architectural criticism, with the view that its vocabulary isn't much help to professional or public understanding

by Richard F. Bohn

Critical vocabulary of the so-called *modern movement* in architecture has been vague, shifting, sometimes meaningless and generally confusing. To argue this point I will first examine the history of a very basic architectural word; I will then survey the recent explosion in the volume of critical terminology; finally I will make some generalizations about the nature of architectural vocabulary.[1]

To begin with an embarrassing question, what exactly does the word *modern* mean when used in the phrase modern architecture? An examination of architectural literature produced since the turn of the century strongly suggests the reply, "practically nothing."

For American architectural journals before World War I, the word modern was a favorable adjective when used to describe planning, efficiency, or engineering attributes of a particular building. When applied to other or more broadly defined aspects, however, the word met with a far less favorable reaction. Even a critic as generally astute as Montgomery Schuyler seemed compelled to end a favorable review of some of Frank Lloyd Wright's Oak Park work with the caution that Wright's ideas were really nothing new, having "furnished the basis of architectural design for all Europe up to the fifteenth century." [2]

Wright, of course, saw his architecture as aggressively and self-consciously modern. For him, the word modern represented the conviction that his work was the only architecture appropriate for contemporary American life as he understood it or wished it to be. The important point is that for Wright, if all *organic* architecture was *modern* architecture, surely the reverse must be equally true.

By the late 1920s and early 1930s, however, this position was being seriously challenged as the early works of Corbusier and members of the Bauhaus became well known in the United States. The year 1932 marked the publication of two important books: *The International Style* by Hitchcock and Johnson, and *An Autobiography* by Frank Lloyd Wright. Both claimed the word modern as their own. In doing so they began what sometimes became a bitter contest of values and dogma, the full implications of which, I would argue, are unresolved today. The struggle for an unassailable definition of *modern* revolved around the definition of still another uncertain word. Digressing for a moment in the discussion of *modern,* let us briefly consider the word *style.*

First of all, was modern architecture to be considered a style? Hitchcock and Johnson, after a carefully worded preliminary explanation, took the position that it was. Wright wrote that it wasn't. In retrospect, Hitchcock and Johnson's choice of a book title—*The International Style: Architecture Since 1922*—does seem a bit puzzling. Labeling the early work of Corbusier, Mies, Oud, and others as merely another style would seem to place them squarely in the ranks of the Gothic, Greek, Egyptian (or what have you) Revivalists against whose works the early "pioneers of modern design" were rebelling. After all, wasn't the whole modern movement founded on the notion of an end to styles; hadn't Corbusier already declared that architecture had "nothing to do with the styles"? [3]

True enough. But, Hitchcock and Johnson argue that the word *styles* doesn't mean the same thing as the word *style.* The plural form of the word implies a choice—the singular does not. The preceding period of eclecticism with its confusion of styles gave "the very idea of style a bad name in the estimation of the first modern architects." [4] The idea of style, the authors argue, is not a matter of choosing the proper decorative garment. Rather, style must only refer to a system of underlying principles carried out in an artistic fashion according to fixed, well defined rules "such as archaeologists discern in the great styles of the past." [5]

While one may speculate on the wisdom of tying so important a distinction to the presence or absence of an "s" at the end of a word, bear in mind that convincing a hostile audience deeply imbued with historical values and tastes is no easy task. By coupling the still dangerous word *modern* with the less threatening word *style* it would seem that the authors were seeking to lend their cause an historical legitimacy that Frank Lloyd Wright lacked. In the short run, it may have been a good tactic but in the long run it has only encouraged everyone else to try and concoct his own personal definition for style.

For Hitchcock and Johnson in 1932, International Style equalled Modern Architecture. The Revivalists of the period were said to be working in a *pseudo-style.* Architects such as Hannes Meyer, more concerned with planning and engineering considerations, were labeled *radical functionalists* and read out of the Party, to borrow a political phrase of the period. Still others were *fanatical* or *pseudo-modern.* But for Wright himself was reserved the curious term *half-modern.* (Is one to assume from this that *modern* can be scaled and divided? Could two *half-modern* architects collaborate on one *whole-modern* building?) *The International Style* piously regretted Wright's "lack of continuity" and "unwillingness to absorb the innovations of his contemporaries and his juniors in Europe." [6]

On the other hand, the very word *style* was the perfect indication to Wright that "certain aesthetes—French by sympathy or association"—were trying to defeat *modern* in order to return to the decadent and academic tyranny of the Beaux Arts tradition.[7] Thus, to Wright the new *style* was just a "bare bones" version of the old *styles* and

Richard F. Bohn received a B.Arch. from the University of Michigan in 1968 and a Master of City Planning from Harvard University in 1974.

certainly not *modern*. To complicate the situation further, Wright argued that indeed an individual artist might develop a personal order or expression that could be legitimately referred to as *style*, but this was not to be achieved simply by following the pat rules of an Establishment *Style*.

Architectural and general-interest magazines of the period seemed totally oblivious to the finer points of the *modern* debate. Their position might be summarized by the following propositions: 1) All buildings worthy of being called architecture have a style; 2) Buildings that look alike have the same style; 3) While there are many different styles, all may be categorized as either historic styles or unhistoric styles; 4) Since unhistoric styles are relatively new, they are by simple definition *modern*. Journalistic opinion on the new unhistoric or *modern styles* was divided. Some critics saw them as crude, faddish, inappropriate, or simply unhistoric. (For a few, the last charge was reason enough.) Other critics saw them as creative, original, daring or just modern (again, this last term was reason enough). If a general consensus may be said to have been reached by the journals, it was this: the new unhistoric styles might be appropriate for commercial and industrial buildings, but the historic styles were still the best bet for home, church, and school.

Clearly, this rather blunt and pragmatic appraisal could satisfy neither Wright nor Hitchcock and Johnson, and only added still more connotations of the word modern. It does, however, have the virtue of reminding one of the obvious. In its most usual form, modern is a *relative* term simply meaning contemporary. Yet, as a title for the new emerging architecture, the term began to become an *absolute* one from the late 1920s to the early 1950s, signifying the results and goals of an architectural revolution. There was to be a line, perhaps a bit wide and fuzzy in parts, but a line nevertheless, separating all that had come before from all that was to follow. For approximately the last forty years, architectural historians have devoted considerable energy to defining that line, pushing it back and forth and adjusting the width as necessary.

By the early Fifties, however, any definition of *modern* looked a bit premature. As long as a modern work remained an exclusively contemporary work, the ambiguity of modern's double meaning was not troublesome. Yet as the meanings themselves began to diverge over time, the International Style itself began to look rather dated. *Modern* clearly had to mean more than International Style, by principles as well as appearance. It also had to be made to cover the current output of Wright, Corbusier, and Mies—all of whose current work was as strikingly different in appearance from each other as it was from their earlier work. Thus, to accommodate the obvious changes that had taken and were still taking place, *modern movement* began to replace *modern architecture*.

Today, even when authors are consistent enough to use *modern* in its absolute sense (everything done after some fussy point in time, according to some undefined principles of the revolution), there is no agreement as to what is sufficiently important to constitute a principle, or which principles are truly revolutionary. Sensing this apparently intractable dilemma, some writers no longer use the word modern at all. Others adopt the approach that the journals have been criticized for using all along —modern simply means unhistorical.

Yet even this second approach doesn't necessarily take one out of the woods. Consider the current work of architects like Richard Meier and others who have been labeled the New York School. Their projects quote liberally from the forms of early Corbusier, and raise a series of interesting questions. Is the work revivalist, merely copying the mannerisms of a past style? How long does it take a collection of *modern* works to become historical—fifty years or one hundred and fifty years? The uneasiness with which the works of Richard Meier have sometimes been criticized belies this underlying confusion.[8] While the architects in question would surely deny it, their architecture seems to challenge, if perhaps in a very subtle manner, one of the basic meanings of the word modern. So does some of the work of Charles Moore. As a recent architectural journal relates, "Taken from the Collegio di Propaganda Fide in Rome, the shapes and colors [of a low income housing project] repeat the rhythms of the window moldings of the Collegio." [9] It is interesting to note that the above quotation, from 1972, could just as easily have come from a pre-World War I journal.

The above short course in the history of *modern* is by no means complete, but it is indicative of a serious problem. In the sense that I have been arguing, there exists today no meaningful definition for the term *modern architecture*. This is so in spite of the fact that almost every architect professes to practice it and support its advancement. A detailed investigation of the history of the ambiguities and contradictions inherent in words such as *organic, functional*, or *human* is beyond the scope of this article, but would reveal many of the same problems. Instead, let us now turn to a summary of the present architectural situation with respect to vocabulary.

When compared with other periods in the twentieth century, the literature of the last few years appears to be engulfed in an avalanche of terminology. No other period can match the depth and extent of the jargon, analogy, neologism, and assorted wit in the architectural criticism of today.

If past periods have had trouble defining *modern* to their satisfaction (or ours) the current period has had equal trouble just defining architecture. In an article on "Radical Alternatives" appearing in a 1972 architectural journal for instance, Michael Sorkin, a recent MIT graduate, claims that his essay itself "is my architecture." [10] Other "constructive alternatives" to the more traditional definitions of architecture suggested by Sorkin include "confronting the real sources of control and influence—banks and other prime controllers of capital," and becoming a carpenter. For followers of Buckminster Fuller, architecture involves playing the World Game with "spaceship earth." Radical architecture for some critics means advocacy while for others such as Robert Venturi and Denise Scott Brown who say, "Learning from the existing Landscape is a way of being revolutionary; not tearing down the city of Paris."[11]

For still others, architecture means megastructures, arcologies, instant city, walking city, non stop city, phun (sic) city, theater, sensuality, nudity, interior landscapes, exterior roomscapes, event structures, multiusables, inflatables, disposables, recyclables, transportables, transformables, floatables, hangables, collapsibles, ad infinitum.[12]

Many critics are finding it safer to use the word *environment* rather than architecture. To philosopher Suzanne Langer, architecture was "the total environment made visible." [13] Certainly the use of environment as a favorite word has also been intensified by the emerging Ecology Movement for which environment is also a favorite word. The concept of environment neatly accommodates everything from Ant Farm to Archizoom but it also can become so inclusive as to be meaningless. For the serious critic, Harvard's Eduard Sekler has written that an architect must design towards a *"specific* social purpose." [14]

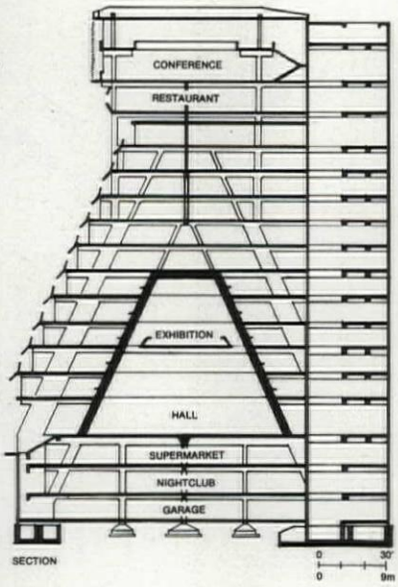
The word *modern* continues to be conjured with. *Modernistic* can now refer to work of the early Fifties, while Philip Drew is now talking about a Third Generation of modern architects. But to Robert Venturi has fallen the notoriety of being the first contemporary architect consciously to place his theory and work outside the mythical modern movement. With what I suspect to be real delight, Venturi walks away from the whole sacred quest for true modern "karma." Instead, he advocates drawing a line at the end of the modern movement as well as at the beginning, and labeling the territory falling between: *orthodox modern* architecture.[15] One can't help wonder: would Hitchcock and Johnson now insist that Wright's work be labeled *half-orthodox modern?*

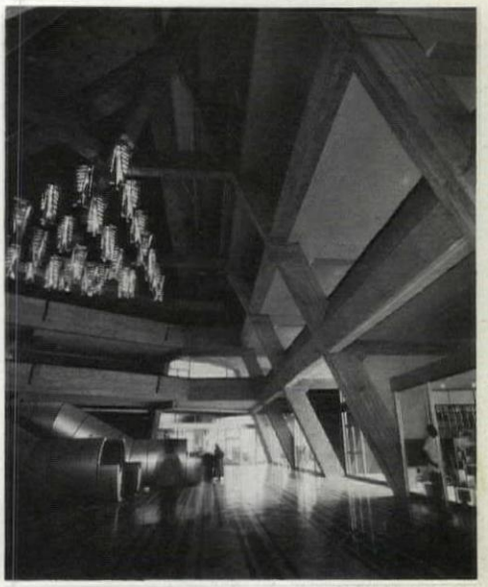
Rapid increase in technological ability has had a great effect on current vocabulary. Space exploration has yielded a new vocabulary (life support systems, urban module, etc.) along with a wealth of new forms. Co-op Himmelblau in Vienna bills itself as a producer of architecture featuring

Continued on page 125

OUR LADY OF LE PLATEAU

Ivory Coast pyramid has many uses





In Abidjan, the port city which is the capital of Africa's Ivory Coast, there is a remarkable new commercial center designed by Italian architect Rinaldo Olivieri, with a structural system which is the work of the famed Italian engineer Riccardo Morandi.

The main form of the building is a pyramid, containing shops, offices, and a monumental public hall at its center. To this are added two straight vertical towers containing elevators, fire stairs, toilets, and mechanical shafts. Another appendage, circular in plan, contains a snack bar, and three surprising underground levels accommodate a night club, a supermarket, and parking. Above the pyramid's 12 floors are two additional spaces, one a restaurant with panoramic views of the city and its lagoon, and the other, at the very top, a double-height conference hall.

Except for these highest levels, the pyramid is shaded entirely by aluminum sunbreaks, louvered to allow hot air to rise easily through them. Door and window frames are also aluminum, and some of the built-in furnishings are of marble and fine local woods. The service towers and the structural members are of poured-in-place reinforced concrete, its surfaces exposed on both the exterior and interior.

The following reaction to the building was written for PLUS by a recent visitor to Abidjan.

The main public space in the center of the pyramid is dominated by the diagonal concrete supports designed by engineer Riccardo Morandi. Two parallel stairways to the second floor shops are encased in metal, like great sculptural pipelines.

A report by Simone Withers Swan

From my balcony on the Cocody peninsula in Abidjan, two wonders in the pleasing landscape catch the eye: one an eight-, nine-, perhaps ten-story-high tree; the other, a gray shape composed of a shuttered pyramid and two towers, a strong character in the skyline of downtown Le Plateau, across the lagoon. ("One of those splendid Italians," I thought.)

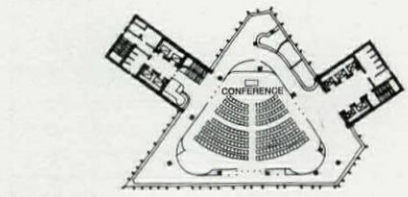
The tree dominates the gardens of the Hotel Ivoire. Its massive pyramidal root structure supports a trunk some hundred feet tall whose spire fans symmetrically into branches clustered with crisp round leaves. Scientist Jean-Luc Tournier, who runs the geophysical station at Lamto, identified it as the *fromager,* the cotton-silk tree which lives several centuries.

During a free moment from a conference sponsored by the Society for International Development, I asked a cab driver to find "the new gray building at Le Plateau." *"Bien sûr!"* he said, smiling, "Our Lady of Le Plateau, officially the Commercial Centre." We sped across the bridge to the tree-lined streets of white buildings and skyscrapers, past the open market places and the terrace of the traditional Hotel du Parc (if one can call anything traditional in this boom town that has swollen from seven thousand African and colonial inhabitants to seven hundred thousand in less than a quarter century). I skipped up the stairs of what is, to me, Abidjan's second wonder, amused by the mystico-mercantile evocation of its two names.

As you enter the great hall, you understand everything immediately: here you stand on the tier of shops, settled like stalls at the market place, all easily identifiable; glancing up from the shopping plaza, there are the series of offices reached by huge pipeline stairways; then the eye travels high into the multistoried triangular hollow, up endlessly along the diagonal concrete supports. From below, it takes but a few steps, a moment, to see the entire structure, hence to grasp the function of each level, each visible space, and of the supporting network.

I needed film. A turn of the head and

Simone Withers Swan is Vice-President of the Menil Foundation, known for its cultural activities in Houston, Texas, and elsewhere.



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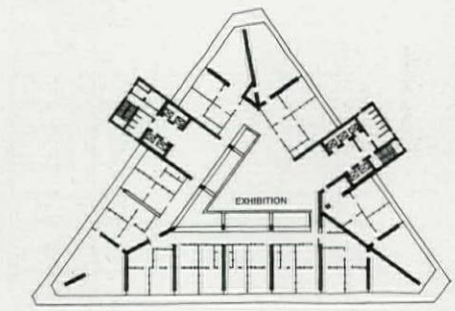
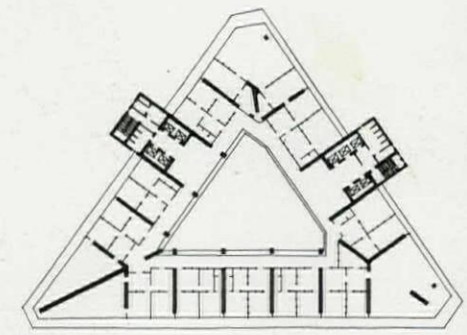


THIRD FLOOR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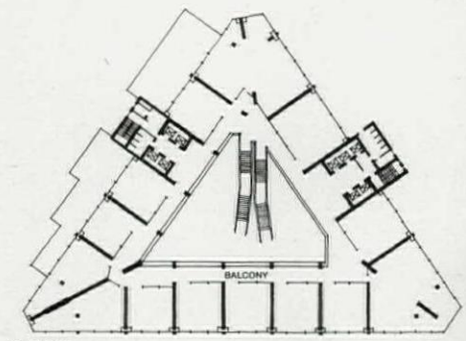
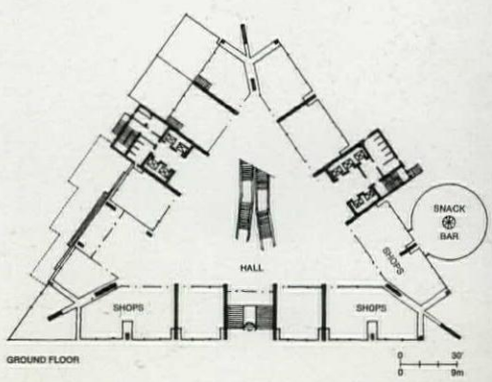
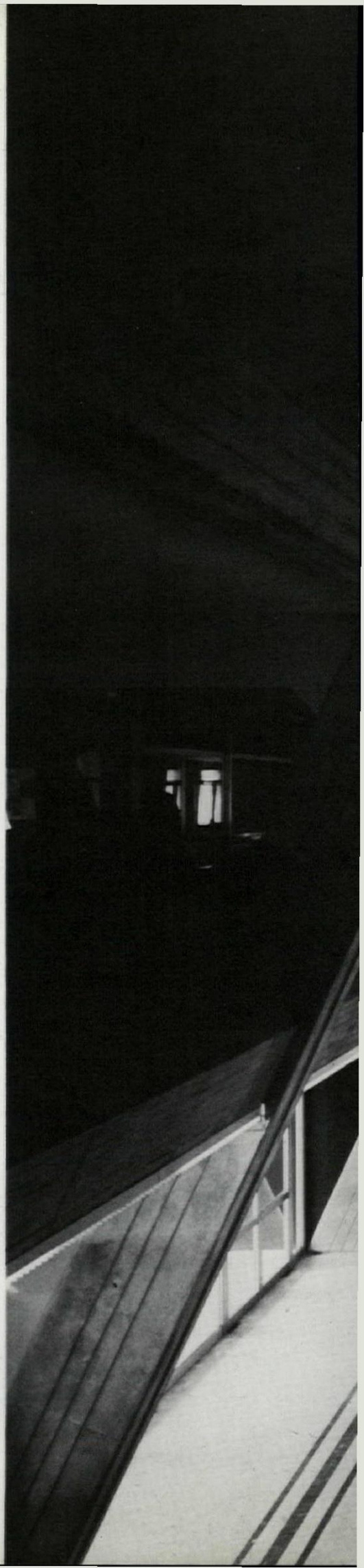


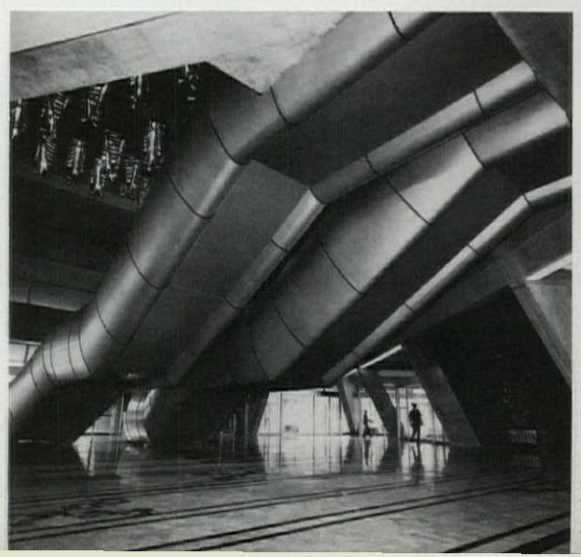
FIRST FLOOR

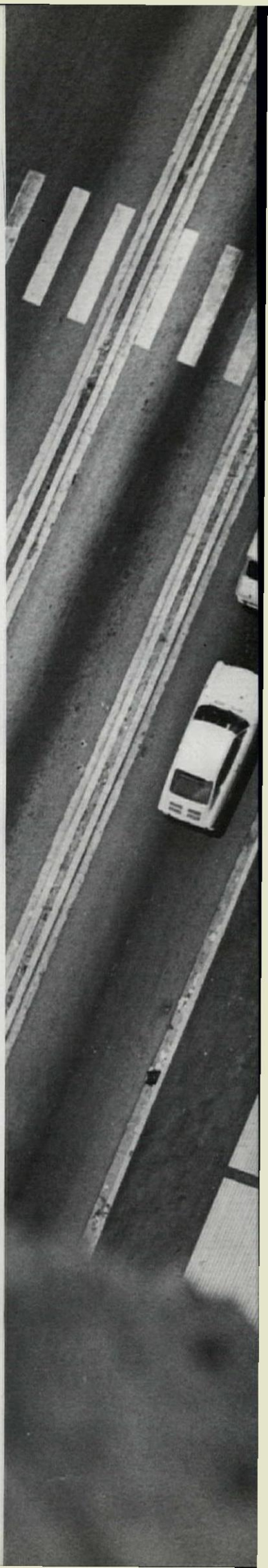


GROUND FLOOR



Four views from different levels of the central space. Although it is six floors high, surrounded by balcony corridors, the space is partly interrupted by a third floor platform for changing exhibitions. Far right, looking down at the aluminum sunscreens from the top level of the pyramid.





you spot camera shop, bookstore, stationer, record shop—all colorful and alive with people, mainly Ivorians, attracted by the exoticism of European wares, just as the tourist is magnetized by the African market. Here you find new titles, textbooks, reviews and magazines; the latest perfumes and pharmaceuticals; the last design in sunglasses and printed silk scarves from Italy and France; the sides of Stevie Wonder and of Sly and the Family Stone. Strollers and people intent on business pour in from the three lateral entrances, crisscrossing their ways in the generous space: dawdling couples, professionals heading for the stairs, students, women draped in Ivory Coast's own printed textiles, some with a sleeping child on the back.

The clarity of the building's intention struck me as unexpected. If the building has nothing to hide, no low-ceilinged corporate secrets, instead an Afro-Mediterranean welcome, what, then, is so mysterious to me?

It was not until I returned to my hotel balcony that I understood the connection between the great tree and the building. While observing the pyramidal shape and gazing up, up into a space full of promise, I had imagined being sheltered by the monumental root system of the cotton-silk tree and flying up into the trunk, a trunk as gray as the concrete of Our Lady of Le Plateau. This explains the feeling I had experienced on the shopping level of being enveloped by a living environment.

Seyyed Hossein Nasr, in his foreword to *The Sense of Unity, the Sufi Tradition in Persian Architecture* (by Nader Ardalan and Laleh Bakhtiar, published by the University of Chicago Press), wrote, "There is nothing more timely today than that truth which is timeless, than the message that comes from tradition and is relevant now because it has been relevant at all times." In this building of Abidjan, there seems to be such truth.

One practical question was on my mind. The architect? "Oh, yes . . . a young Italian." As happens in Athens, Beirut, Milan, or Houston, the specifics are hard to get unless you know who to ask. An Ivorian minister of state gave me the answer: "Rinaldo Olivieri, a gentleman of Verona obviously attuned to African tradition."

SOTO

His sculpture is painting in motion

Jesús Rafael Soto is a Venezuelan artist who was born in 1923 in Ciudad Bolivar, and now lives as much of the time in Paris as he does anywhere else. Late this fall, he will be given a one-man show at Manhattan's Guggenheim Museum. Yet, although his work is represented in some of the leading public museums and private collections around the world—and though he has worked closely and successfully with some of the world's most interesting architects—Soto's name is hardly known beyond a relatively small circle of art watchers.

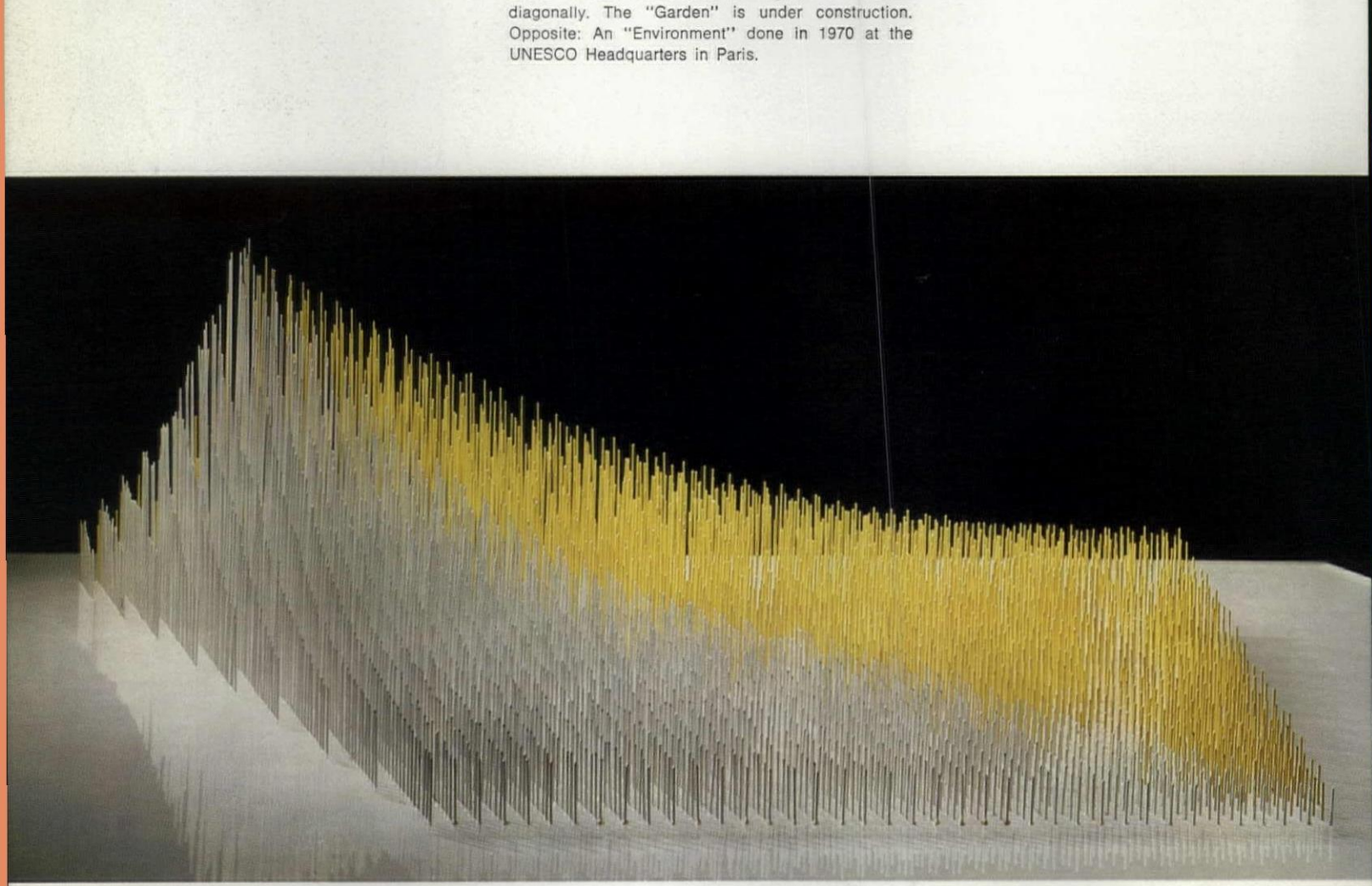
One reason, very probably, is that the nervous, electric vibrations generated by Soto's delicate rods, wires and strands are very difficult to reproduce on the printed page—or, for that matter, on film or videotape. His work is not a series of static images, but a succession of atmospheres. No one "atmosphere" ever seems to repeat itself—each motion of a wire twig or a plastic rod in a shifting field of color is a new experience, unexpected but beautifully controlled by an artist with an uncanny sense of space, and of timing.

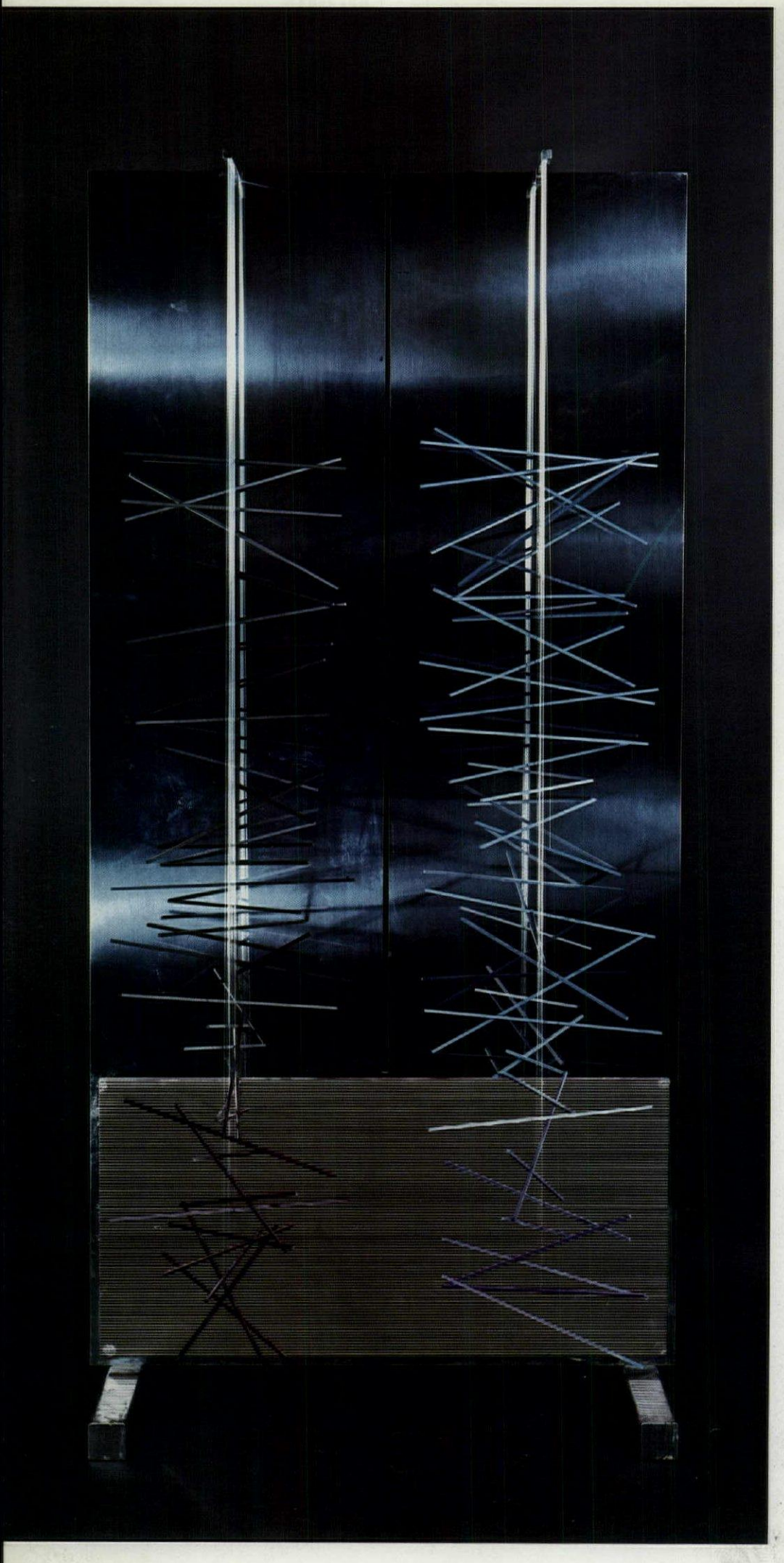
Obviously, Soto's work owes a great deal to the mobiles invented by Alexander Calder some forty years ago; and it is closely related to the op-images of artists like Vasarely and Agam. Like their visions-in-motion, Soto's "atmospheres" can never be pinned down for more than a fraction of a second—they change constantly as the light changes, and as the wind rustles through his plastic and metallic forests.

To most architects, the spatial experience is something very, very difficult to communicate. The gentle forests that Soto has planted in and around buildings do communicate that experience more persuasively than it has been communicated by others in recent times.

Opposite: Soto's so-called "Penetrables" are forests of rods or strings experienced by walking through. This one, done in 1971 at Pampatar, Venezuela, consists of nylon strings. Right: A more conventional Soto piece is this 1961 "Square Column," which measures 16 inches by 16 inches in plan, and is 79 inches tall. Clusters of rods are suspended from poles near top of column.

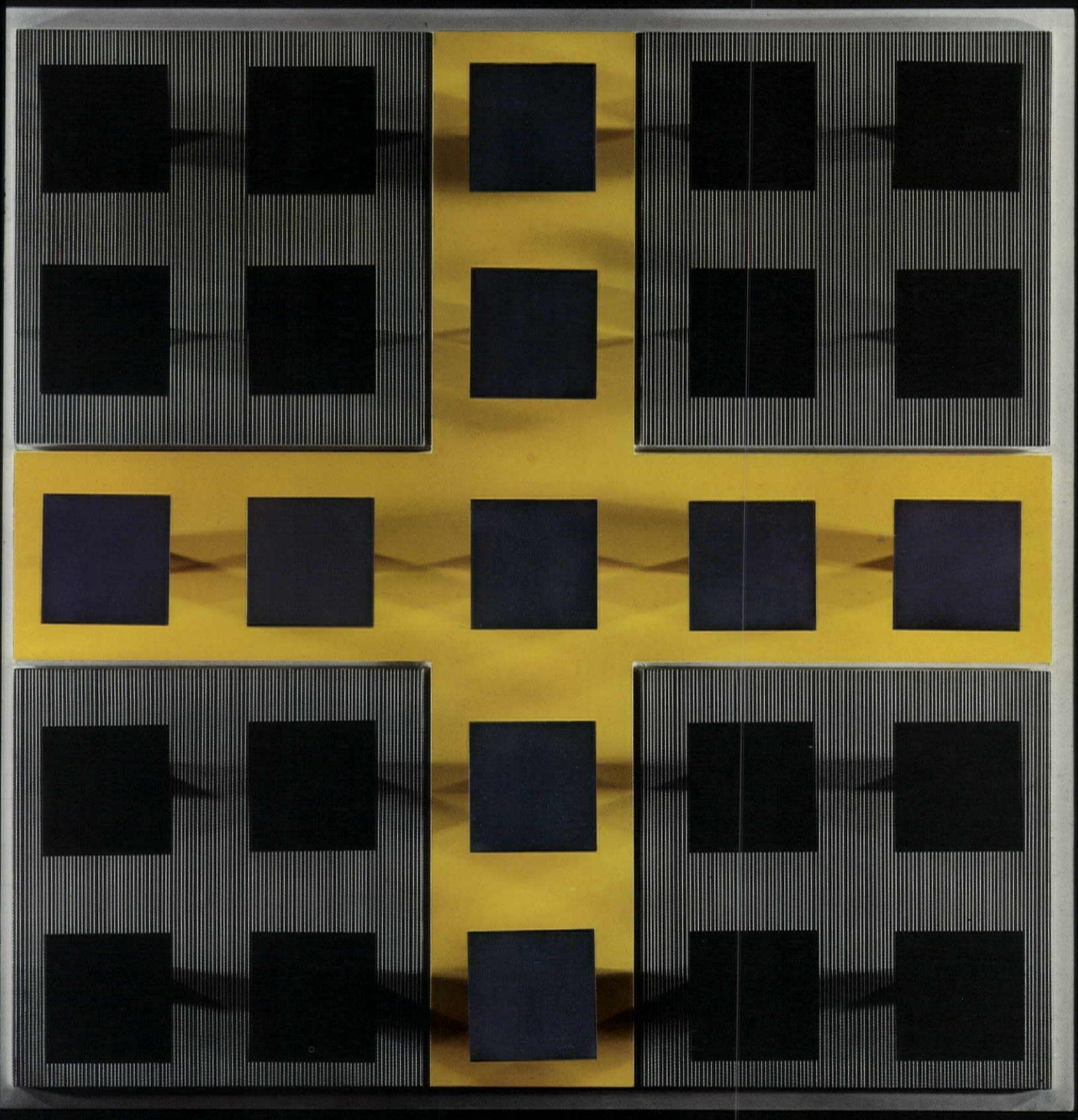
Above: "Kinetic Wall" of painted aluminum and wood rods is 8 feet high and 40 feet long. It was done in Caracas in the late 1960s. Below: Model of a "Garden" of vertical rods, designed for Barlovento, Venezuela. It measures 15 feet in height, and 387 feet diagonally. The "Garden" is under construction. Opposite: An "Environment" done in 1970 at the UNESCO Headquarters in Paris.





Left: The "Two-faced Column" done in 1970 is actually a flat slab faced with stainless steel. The rods are suspended from above. The slab measures 40 inches wide and 81 inches high. Top, right: The "Mobile Saturation" piece done in 1971 consists of 24 columns, each made of clusters of aluminum rods. The columns are equipped with motors that rotate them. The piece is 13 feet tall. Opposite: The "Yellow Cross" done in 1972 is one of several three-dimensional panels on the same theme. The painted metal squares are projected out from the wooden backdrop. This one measures 52½ inches square.

Photographs: Maxin Studio, Caracas, pp. 78, 80 (top), 82 (right); Tom Eckerle, pp. 79, 82 (left), 83; Andre Morain, p. 81.



SUN POWER

by Marguerite Villecco

"Heaven, earth and its water yet lay enfolded in the ghostly pallor of dawn; one paling star still swam in the shadowy vast. But there came a breath, a winged word from far and inaccessible abodes, that Eos was rising from the side of her spouse; and there was the first reddening of the farthest strip of sea and sky that manifests creation to a man's sense. She neared, the goddess, the ravisher of youth, who stole away Cleitos and Cephalus and, defying all the envious Olympians, tasted beautiful Orion's love. At the world's edge began a strewing of roses, a shining and a blooming ineffably pure; baby cloudlets hung illumined, like attendant amoretti, in the blue and blushful haze; purple effulgence fell upon the sea, that seemed to heave it forward on its welling waves; from horizon to Zenith went great quivering thrusts like golden lances, the gleam became a glare; without a sound, with godlike violence, glow and glare and rolling flames streamed upwards, and with flying hoofbeats the steeds of the sun-god mounted the sky." Thomas Mann so described a sunrise in *Death in Venice* and so has mankind revered and praised the power and beauty of the sun for centuries. Excepting times of drought and injury, the sun has become a synonym for joy, productivity, intelligence, majesty, life and even God. Ancient civilizations in all parts of the globe could think of no higher form for worship than the sun, and in Egypt, South America, the British Isles and other lands, the sun became divine.

Today, civilization may be coming full circle. Bikini-clad sunworshippers may be the only modern human sacrifices to the sun. But the sun is being resurrected as an ultimate power, not by priests performing religious rites, but by scientists, engineers, architects, governments and peoples, who see its inexhaustible, non-polluting energy as a possible solution to the world's suicidal depletion of its own resources.

The sun provides the world with virtually all of its energy. Its processes even form the fossil fuels we are consuming so rapidly; it also creates the winds, makes the plants and animals (including humans) grow and prosper. Ancient societies were not far wrong; the sun is indeed responsible for life.

The challenge now is to harness the sun so that it can provide us with even more benefits than it has on its own: namely domestic water heating, climate control systems for our buildings and electrical power generation. We want to enlist the sun in domestic service so that it performs as a reliable workhorse for society's real or imagined needs, simply and cheaply.

Our problem is that our closest star is by nature independent, unpredictable and elusive; its patterns can be described, not ordered. Solar power is almost infinite, but diffuse; scientist D. S. Halacy, Jr. estimates that if we could collect and efficiently use the sunlight falling on just the city of Los Angeles, it would supply more energy than is consumed in all the homes on earth. The sun performs its life-sustaining duties, but on its own terms, demanding partnership, not mastery.

In the past, we have adapted to the sun's routine in matters of clothing, food and shelter as necessary for survival. Our simplest societies learned to build earthen huts as insulation against the sun; they learned to reflect unwanted rays with light-colored surfaces and to create cooling breezes through ventilation. More recently, however, sophisticated societies have employed technology not to complement the environment so much as to ignore it. And so modern architecture boasts huge glass skyscrapers that try to control their climate by the brute force of mechanical intervention. And, while hardly efficient design by any measure, this practice seemed justified because fossil fuel was abundant, accessible and cheap.

The energy crisis changed things for most of us. We're still not ready totally to abandon glass towers, but we are perhaps more willing to spend thought and money to minimize their problems with good thermal design and systems that seek compatibility, not dominance over natural climate (IBM, in this issue, is a recent example).

Fortunately, however, not everyone waited for the crisis to occur before exploring alternatives. The early work in solar energy for buildings performed by scientists and universities from the 1930s onward has brought its technology to the point where practical thermal and electrical applications are clearly visible. Solar space heating systems are already considered economically competitive with electric resistance heating in most parts of the U.S.; other system comparisons are far less favorable, but the outlook improves every day.

Some scientists have become convinced that solar is *the* route to survival. In an interview with *Playboy*, Barry Commoner pleaded: "Any other alternative to massive development of solar energy would enormously worsen our environmental problems, create dangers such as plutonium radiation and potential nuclear-power-plant explosion, even risk wars over foreign oil supplies. In other words, failure to understand—and act upon—the ecological, economic and political imperatives that push us toward solar energy will end in disaster. It's as simple and crucial as that."

Thomas Moore, in *Voltaire*, wrote that "where it is a duty to worship the sun, it is pretty sure to be a crime to examine the laws of heat." Certainly, the U.S. is not in danger of reverting to solar godheads, but some of the strongest advocates of solar energy have been accused of sacrificing unpleasant economical and technical facts to their unwavering belief that there must be practical solar ways to improve building climates and provide power. The result has been almost a solar backlash, with the solar standard raised by environmentalists being subject to serious doubts from portions of the political and corporate realm.

The energy crisis has now taken the solar controversy out of the academic realm. Even its detractors would like to believe solar energy can work, they just aren't convinced that it will, economically.

The federal government is one of the doubters. It looks to nuclear advances, such as breeder reactors, or new coal technologies, including coal gassification, to be the most realistic, wide-scale alternatives to conventional fuels. Federal funding allocations reflect these priorities, which are not likely to change in the immediate future. A recent solar conference sponsored by the National Science Foundation heard confirmation of these facts in a speech by Frank Zarb, of the Office of Management and Budget: "I'd like to be able to tell you that solar energy is our first commitment, but it isn't. Nuclear technologies are. I can't even tell you it comes second. I've already told the coal industry it comes second." The federal government is not anti-solar, he stressed, but the burden of proof for solar must be taken primarily by private industry.

The Atomic Energy Commission (AEC) pays lip service to interest in solar energy and is sponsoring some research and development work in this area, including applications at its own Argonne Laboratories, near Chicago. But solar proponents in and out of government have severely criticized AEC for grossly subordinating solar to its more natural nuclear commitments, even for trying to "suppress" a favorable report it had commissioned on the subject of solar energy. The AEC, however, denies any suppression. In any case, the AEC's role in determining U.S. energy policy is seen by many as a threat to future solar commitments.

The National Aeronautics and Space Administration (NASA) is officially neutral about what leadership role or responsibility it should have in solar energy. But spinoffs of technology and personnel from the space program have led to important solar involvement, technically and economically.

By far the greatest federal commitment to solar energy has come through the National Science Foundation (NSF). Officially designated in 1973 as the "lead" federal agency in planning and coordinating the broad area of solar energy research and technology, NSF programs for fiscal 1974 were budgeted at $13.2 million and included four experimental school installations. It has a $50-million budget for 1975.

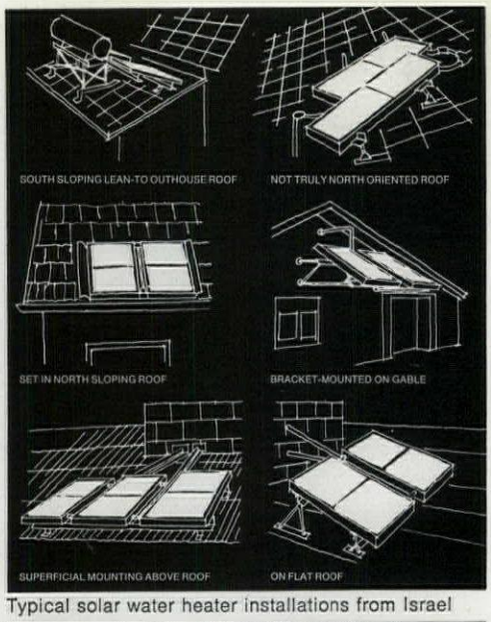
Congress, however, is now emerging as a solar leader. President Ford signed the Solar Heating and Cooling Demonstration Act into law (#93-409) last month, which authorizes $5 million each to HUD (Housing and Urban Development) and to NASA for research programs. Omnibus solar energy bills with much greater impact have passed through the committees of both houses and are awaiting floor action as PLUS goes to press. Both House and Senate version would transfer solar authority from NSF to the proposed ERDA (Energy Research and Development Agency), itself

awaiting final resolution in Congress. The House omnibus bill would establish a solar research institute, data bank and demonstration programs. It does not name an overall program budget, but would authorize $2 million this budget year to study a $1 billion over five years effort recently advocated by Energy Czar John Sawhill in testimony to the House. (This is a huge increase over the $200 million for five years proposed by AEC's Dixie Lee Ray before the "energy Crisis.") The Senate bill mentions this $1 billion figure and authorizes $100 million for fiscal 1976.

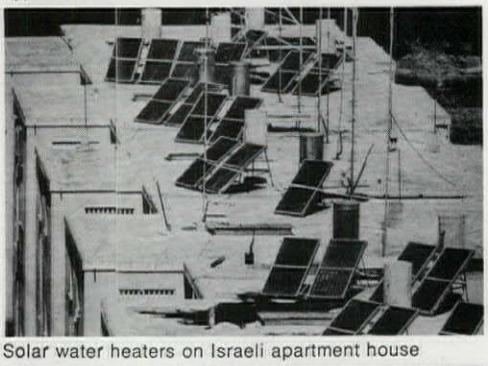
With government support thus relatively new and not yet fully defined for long-term research and development, the greatest support for solar energy has come from the private sector. Arthur D. Little (ADL), a Cambridge, Mass., research and engineering firm recently completed the year-long, first phase of a commercial and marketing assessment program for solar climate control systems. Over 80 corporations chose to participate, including such giants as General Electric, Westinghouse, Motorola, DuPont, Honeywell, Corning and PPG Industries. The conclusion: "The market for solar climate control (hot water, heating and cooling systems for buildings) could reach $1.3 billion by 1985 if industry, with effective government support, moves ahead promptly to introduce solar hardware into the marketplace." Establishment of such a market, says ADL, could "contribute to the goal of energy independence within 15 years and by 2000, annual energy savings could be 2 million barrels of oil daily."

Counterpoint to such corporate-level investigations into mass production opportunities are the many non-profit, environmental groups, universities, and technological entrepreneurs and scientists pursuing specialized solar applications, sometimes with low-technology implications. Often stressing the proverbially democratic ("the sun shines on all alike") and pollution-free aspects of the sun, these efforts range from $100 do-it-yourself solar heaters, to collectors made of aluminum beer cans, to sophisticated climatic membrane systems, which will be described in the next issue.

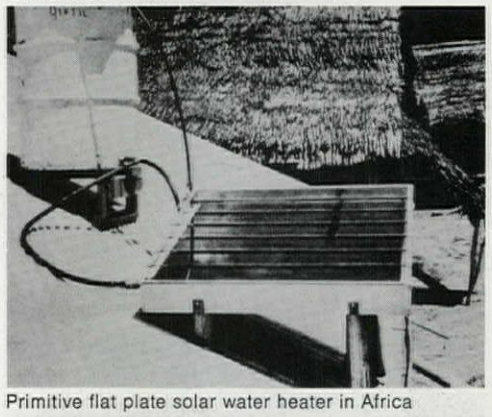
Part of the excitement about solar energy is, in fact, the invention it invites and its vast potential for wide-scale application. ADL's Peter Glaser has proposed an electrical power generating scheme that uses orbiting satellites to collect solar energy, convert it to electricity, then convert the electricity into microwaves for transmission to selected sites on earth. There the microwaves would be reconverted to electricity and integrated into a terrestial power grid. The scheme sounds, and looks, fantastic to some people, but is the subject of very serious private and government research. All such solar projects, which follow the tradition of innovation established by the early pioneers, are a vital part of the prospects for solar energy utilization in the United States today and tomorrow.

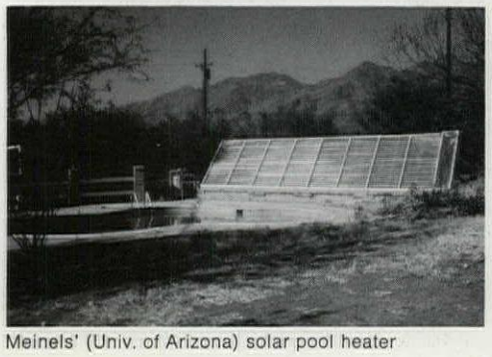


Typical solar water heater installations from Israel


Solar water heaters on Israeli apartment house


Combined solar still and hot water heater


Primitive flat plate solar water heater in Africa


Meinels' (Univ. of Arizona) solar pool heater

LOW-TEMPERATURE USES

Current commercial applications of solar energy in the United States are limited to low-temperature systems, or performance under 150 deg. F. This means that most of us will (or have had) our first solar system experience with domestic hot water heaters or, for the privileged among us, pool heaters. Some auxiliary space heating is also possible at this level.

Solar hot water heaters have been used for many years, in many parts of the world, including Australia, Japan, Israel and the United States, as well as some underdeveloped countries. The primary challenge to these systems has come from conventionally-fueled, low-cost alternatives.

- In parts of Australia, solar water heaters are mandated by law. The most common system circulates water through a blackened copper flat plate collector with soldered copper tubing and a glass cover, then siphons the water to an elevated storage tank. Auxiliary power is often provided by immersible electric heaters.
- Japan, which has no indigenous fuel sources, manufactures a wide variety of solar heating systems. The simplest unit is a basin lined with black plastic and topped by a glass cover; another type uses a series of water-filled metal tubes, tilted to the sun and covered by glass. Both systems, however, provide warm water only when the sun is shining and cool off quickly at night. The Japanese also use plastic water pillows, blackened to increase heat absorption. Thermo-siphoning systems and forced circulation types of collection units are also used, on large and small scale. The Japanese have recently produced some of the handsomest commercial units available, including one stylishly cased in orange plastic by Hitachi and already available in the United States.
- Israel once boasted solar collectors on every fifth home in the country, but the electrical utilities practically wiped out the solar-based industry by providing low off-peak rates for electrical units.
- The United States had an experience similar to Israel's. During the 1940s and 1950s, solar water heaters were common sights in Florida and Southern California. Many of the homes built during this period can still be identified by the black glass panels on their roofs. But few of the water heaters are still operable and, in fact, some of the newer residents don't even know what the panels are for. Cheap electrical power and natural gas replaced the solar units.

Today, interest in solar water heaters is reviving. Several new models have been announced for the U.S. market by such firms as Daylin, Inc., of Beverly Hills, Calif (which claims to offer the "first commercially available advanced technology" solar water heater) and by Tranter, Inc., of Lansing, Mich. Major corporations are also eyeing this market.

Swimming pool heaters are considered an ideal market by many manufacturers. Such devices use low-grade heat, simply and economically. The market is indeed attractive: There are as many as 1 million pools in the U.S. today, with more than 105,000 installed in 1973 alone. And the market is estimated to grow by another 25 percent this year.

Such systems are illustrated by Solaris, a version recently introduced by Burke Rubber Co. It carries a ten-year guarantee for its solar absorption materials and reportedly pays for itself in only a few years by cutting fuel bills. The system uses synthetic rubber heating "bags" as solar collectors. A small electric pump circulates water from the pool into the collector, where it is heated and then allowed to flow back into the pool by gravity. Another manufacturer offers what must be the cheapest system around: an $18.95 do-it-yourself unit that promises to raise the temperature of 10,000 gallons of water by 10 to 14 degrees. It is made by Fun & Frolic, Inc., of Madison Heights, Mich.

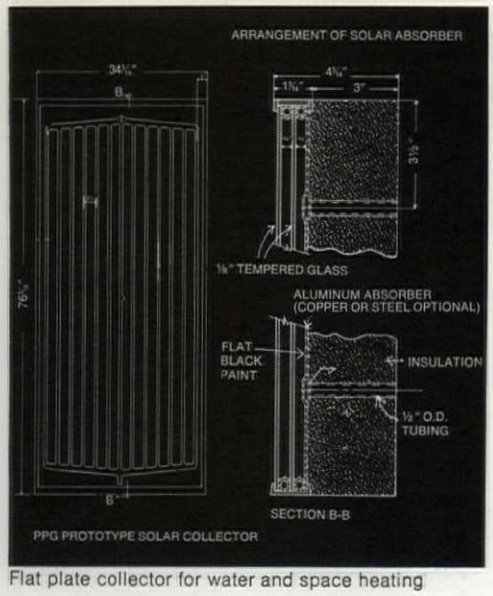
Low-grade thermal applications also include simple, supplementary heating systems for homes. A version invented by Aden Meinel, of the University of Arizona, and Dean McKenney, an associate of Meinel's in Helio Associates, Inc., of Tucson, sells for $100 and is easily installed by a homeowner. The unit is designed for supplementary heating in sunny climates and works like a residential forced air system. A fan circulates air from the house into an outdoor solar-heated black polyethylene bag (insulated by sand on the bottom and a transparent cover), then returns the air to the house. The system can heat air to 90 degrees above ambient temperatures when the sun is shining and, Meinel adds, for another $100 you can have storage too.

MEDIUM TEMPERATURE USES

Almost 25 percent of the nation's current energy production is consumed in heating and cooling buildings. Using solar energy to provide reliable and substantial space heating and air conditioning is therefore one of its most important frontiers.

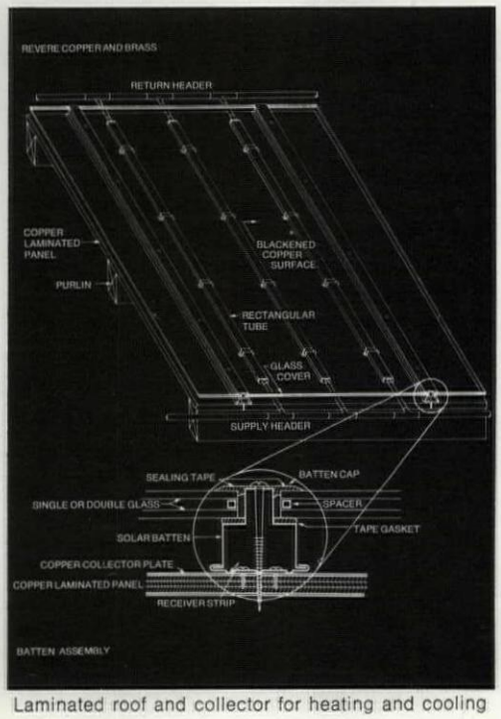
Solar space heating systems that can assume large portions of a building's load requirements on a regular basis are already technically feasible. However, except in limited applications, such units are not yet cost-competitive with conventional systems, even on a life-cycle cost basis (with the exception of electric resistance heating). Mass production economies, advancing technological processes, energy conservation practices that reduce load levels, and rising fossil fuel costs are expected to change this cost picture in the next five years.

Meanwhile, corporations in particular are left to play a chicken-and-egg game with solar markets and production schedules. If there is no market, the companies won't produce; if they don't produce there is no market. The most optimistic—and opportunistic—have already announced commercial collection units; these firms include PPG Industries, and Revere Copper and Brass (all of whom already manufacture material components of solar collectors, such as glass or metal for the collector plate). Other firms are intensifying their research and development efforts so they will be prepared when the moment of commitment comes. Motorola Inc., for example, has recently completed a 26,000-sq. ft. research facility in Phoenix, Arizona, which will devote much of its efforts toward solar systems testing and development, including collectors, selective surfaces and photovoltaic conversion to electricity.



Flat plate collector for water and space heating

Competitive pricing with conventional systems is a primary corporate objective as solar energy verges on commercial life. Proposed costs for a solar thermal conditioning system range from $10 to $20 per sq. ft. of collector specified; collector prices alone are expected to be under $10 per sq. ft. installed. PPG, for example is charging $5.80 per sq. ft. for its collector product. (A typical solar installation requires a collector to be over 50 percent of the area of floorspace to be controlled.) In his own calculations, the potential owner of a solar project must also account for a full-capacity, conventional backup system that can provide climatic comfort when or if the solar system cannot.



Laminated roof and collector for heating and cooling

Thermal applications for solar systems include air conditioning, but a viable, commercial market for cooling installations seems at least ten to fifteen years in the future, according to most corporate estimates. The primary difference between heating and cooling systems is that the cooling unit must supply higher temperatures and so may require more sophisticated, costly design. A space heating solar system usually runs under 200 degrees, but 220 degrees are required to run most commercial absorption units efficiently. An attractive feature of solar cooling units, of course, is that they work best when they are needed most—on hot, summer days.

Thermal system components

The basic physical components of a solar-powered thermal system are a collector to absorb heat, a transfer medium, and a storage system for sunless days and nights.

The collector is the single most important element in determining both thermal and cost efficiencies. A strong, visible statement of the mechanical installation it powers, a typical collector for a 1,200-sq.-ft. house could easily run between 600 and 1,200 sq. ft. itself, depending on load requirements and systems design.

The most common type of collector is a flat plate designed to absorb both direct and diffuse radiation. Collectors are generally modular panels of aluminum, copper or steel, but more exotic materials are also being studied. The unit's efficiency increases with decreasing temperature differentials between the ambient air and the collector plate. The collector plate has a surface coating of either flat black paint, or a selective surface designed to reduce re-radiation (or emissivity) of heat away from the collector and maintain solar ray absorption. Insulation protects the rear of the collector from heat losses. A transparent cover of glass or plastic is designed to prevent condensation from accumulating on its inside surface, which is potentially harmful to efficiency. One to three layers thick, the cover protects the face of the collector, reduces conduction and convection heat losses, and creates a greenhouse effect within the unit.

The greenhouse effect is so-called because it is the technique that traps heat in greenhouses to encourage plant growth, as well as the phenomenon that makes rooms with southern exposures hot on sunny days. In all such cases, the transparent cover allows short-wave solar radiation to pass through it to the collector (or plants or people) inside, where the solar heat is absorbed. The "transparent" cover, however, is opaque to long-wave, or infrared

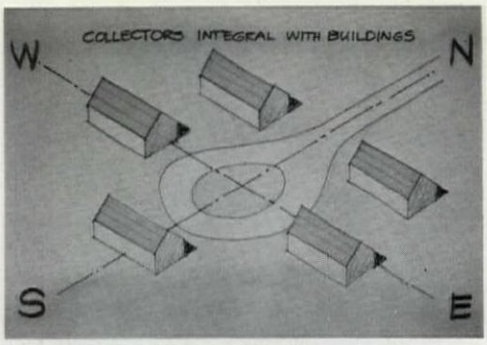
radiation, which the collector re-radiates away from its surface, back toward the inside of the cover plate, thus raising inside temperatures.

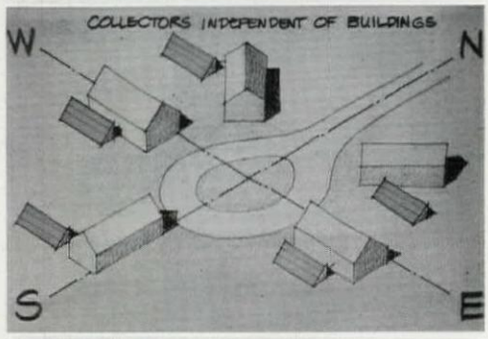
Scientists and engineers are still debating the relative merits of glass versus plastic covers. The more traditional glass is usually transparent to a larger portion of the sun's spectrum, especially glass with a low iron content. But glass is also easily broken in transportation, during installation, or by vandalism—a legitimate concern with a mechanical system as exposed as a collector. Glass is also heavy and rigid, requiring significant structural support. Plastics, on the other hand, are usually lighter, more flexible, and some are resistant to vandalism. However, they are also more transparent to long-wave re-radiation and likely to suffer ultraviolet or thermal degradation.

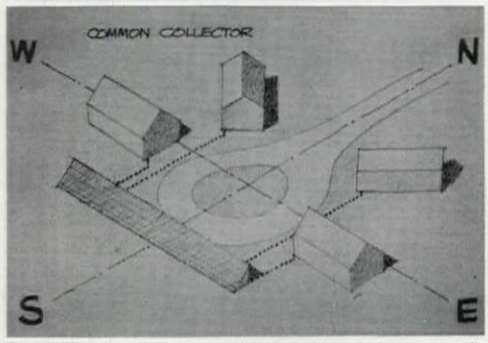
Collectors are usually tilted to achieve greatest operating efficiencies. The angle of the sun's incidence (how it hits a surface) is crucial to performance. At an angle of incidence of 60 degrees or below, transmission of the solar energy to the collector is high; beyond 60 degrees transmission drops sharply to zero at 90 degrees, or "grazing" incidence. Most collectors, then, are mounted to face south at a slope perpendicular to the sun's rays; a familiar formula for tilt is latitude plus 10 to 20 degrees for winter heating, when the sun is relatively low in the sky, or latitude minus 10 to 20 degrees for cooling in the summer, when the sun is high in the sky. With a stationary collector, tilt must be selected for optimum performance in most, if not all, times and seasons for a particular building.

The size of a collector requires sensitive calculations. Overestimating load requirements, and therefore collector dimensions, can be very expensive. Generally loads must be figured to achieve a balance between the capacity of a collector and the amount of time that capacity is needed. For example, Arthur D. Little has estimated that solar systems should usually be sized to assume 50 percent of a building's thermal load in most sections of the U.S. The number of times such load capacity would be exceeded during a year does not usually justify the extra cost of a larger installation. On this basis it would be foolish to insist on a system designed for peak seasonal loads in Washington, D.C., for example; such capacity could only be used a few days a year—a very expensive luxury. It is cheaper to operate conventional auxiliary systems during peak load periods or long stretches of insufficient sunlight.

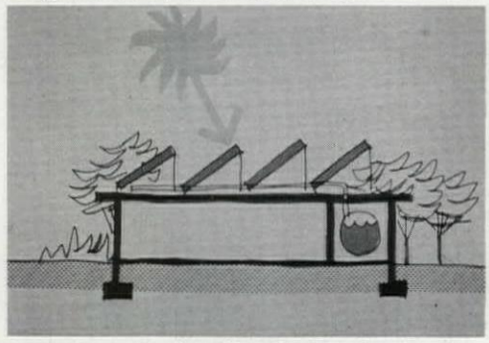
Location of the collector on or off a building is another important factor in solar systems design, and a problem of particular importance to architects. Integrating a collector into a building roof or wall is a common practice, but places restrictions on building design. If the collectors are built into the building roof, the roof must face south, and have appropriate tilt, size and structural strength to accommodate a specified collector. If the collector is designed as a building wall, similar problems must be solved and the collector may suffer because it does not tilt. Integrated design also leaves an owner with the state of the art of his installed solar system because the system is not as easily removed or changed. Alan Balfour, an architect with ADL says this could leave an owner with an obsolete system, especially while solar energy technology is still developing.



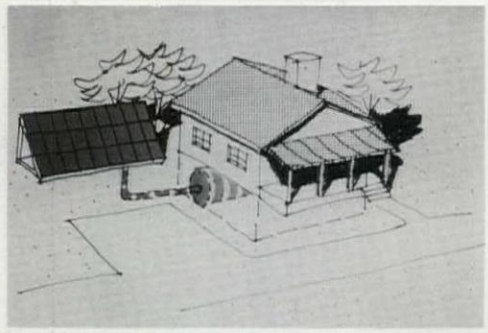




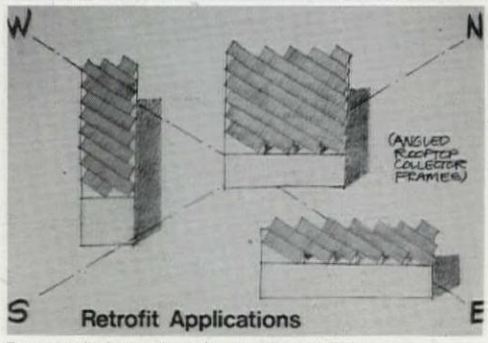
Design variations, but collector always faces south



Sawtooth pattern adaptable to horizontal roofs



Collector orientation independent of building axis



Proposed alternatives for existing buildings

Balfour, who worked on the recent ADL study with 80 companies studying solar thermal markets in various parts of the U.S., is convinced that a solar system independent of a building's structure, or serving several structures, offers greater flexibility in the design of both solar system and building, and greater potential for using, and therefore developing, standardized components. Balfour also notes that independent solar collectors could be deemed the responsibility of a utility company rather than a building owner.

Other designers, however, will argue that "billboard"-type collectors are ugly in themselves, requiring an independent structural system that might otherwise be part of the wall or roof of a building. These critics also note that an integrally designed solar collector can act beneficially as insulation; or that any heat loss from the collector can perhaps be used to advantage in a building.

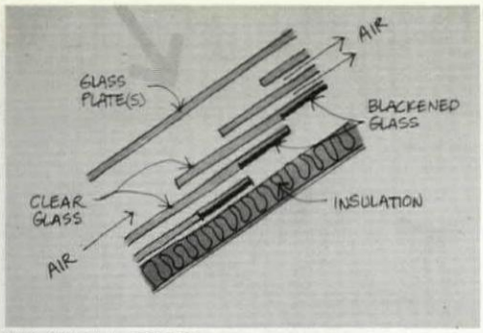
The second element of a solar system is the heat transfer system, or the way heat is carried from a collector into a building. The most common transfer media are air or water, which circulate through tubes mounted in or on the collector and carry its heat away for immediate use or to storage facilities. Air systems have some advantage over water versions in their elimination of corrosion problems (especially in non-copper collectors), but air is a less efficient thermal medium than water and so requires either higher collector temperatures or larger storage facilities. Water is generally the more frequent selection.

Storage systems are the third component. "The night has a thousand eyes and the day but one yet the light of the bright world dies with the dying sun," wrote Francis Bourdillon. So with the solar system; when the sun doesn't shine, the solar collector doesn't work and the system must rely either on stored heat or conventional auxiliary systems.

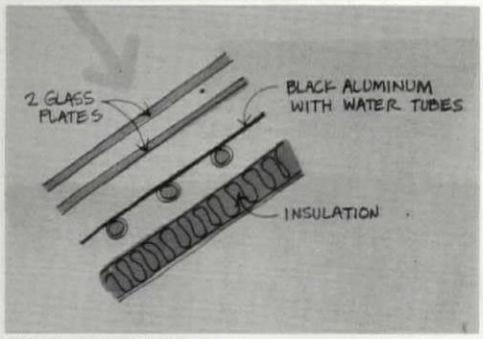
Most storage systems are sensible heat units, which means that they store the kind of heat we feel, or "sense," on our bodies. For air systems, crushed rock is usually used to absorb heat from the hot air, often in a well-insulated basement area. Water is its own best storage system and because water is more efficient thermally than air, water storage systems may be only one quarter the size of a crushed rock counterpart. Water systems, however, are not necessarily cheaper; non-corrosive storage tanks can be quite expensive.

An alternative to sensible heat storage, because it theoretically occupies little space for reasonable cost, is latent heat storage. Latent heat is stored in phase changes of materials, not a rise in sensible heat temperatures. An example of latent heat is the energy involved in changing water to ice. As described by John Yellott, in the current ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers) standards book, "the key to successful use of heat-of-fusion materials lies in understanding the manner in which they operate. Stratification is a common characteristic, in which the solid constituent separates from the remaining liquid. When water freezes, the ice is less dense than the liquid and so, fortunately, it rises as it solidifies (otherwise our lakes and rivers would freeze from the bottom up instead of from the top down)."

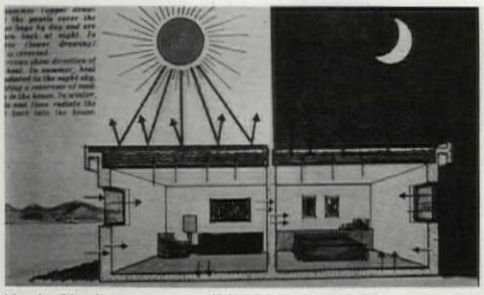
In the case of solar energy systems, the usual latent heat storage media are eutectic, or phase-changing salts, which turn from liquid to solid form at a given temperature. But problems remain to be solved, despite some experimental installations; so far at least, eutectic salts cannot endure enough phase changes reliably enough to make them practical for long periods. Maria Telkes, a storage expert and solar pioneer, has done extensive work with salts and remains cautiously optimistic about their future.

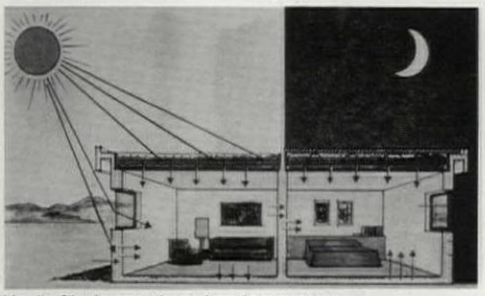


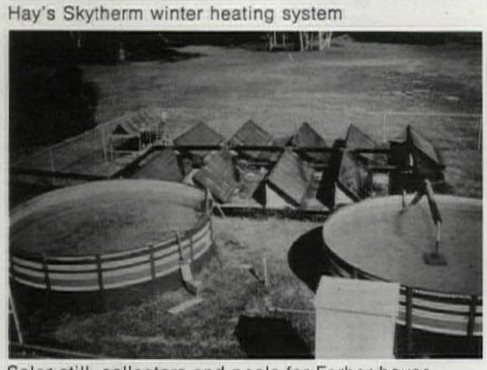
MIT flat plate collector

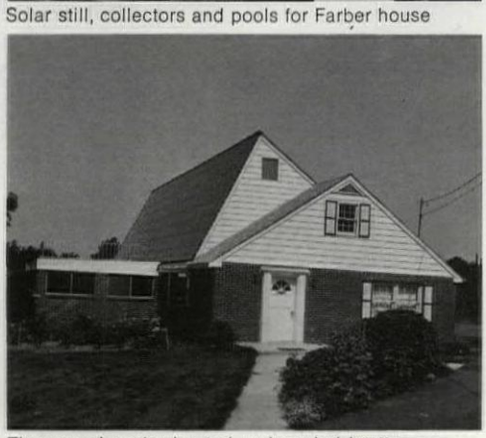


Löf flat plate collector


Hay's Skytherm air conditioning system


Hay's Skytherm winter heating system


Solar still, collectors and pools for Farber house


Thomason's solar heated and cooled home

Pioneers

Man's efforts to harness the sun probably precede history. Legend has Archimedes in 214 B.C. using highly polished shields to reflect the sun's rays onto the ships of his Roman attackers and burn them up on the spot. Work to develop thermal building systems, however, did not start until the 1930s.

These early efforts are primarily responsible for the state of solar art today. In the 1960s, the moon and space became the nation's primary scientific frontier; solar thermal systems were already regarded as economically impractical. Work was largely abandoned until recently, except by those dedicated enough to continue despite low funding or interest. Today, these pioneers are again at the scientific forefront. Some have grown sophisticated with the times and are competing in modern solar research efforts independently or as consultants; some others are still fighting for recognition in a modern technological world; but all can cast themselves as prophets fulfilled as the U.S. looks to the sun with renewed interest. Some of this early work follows:

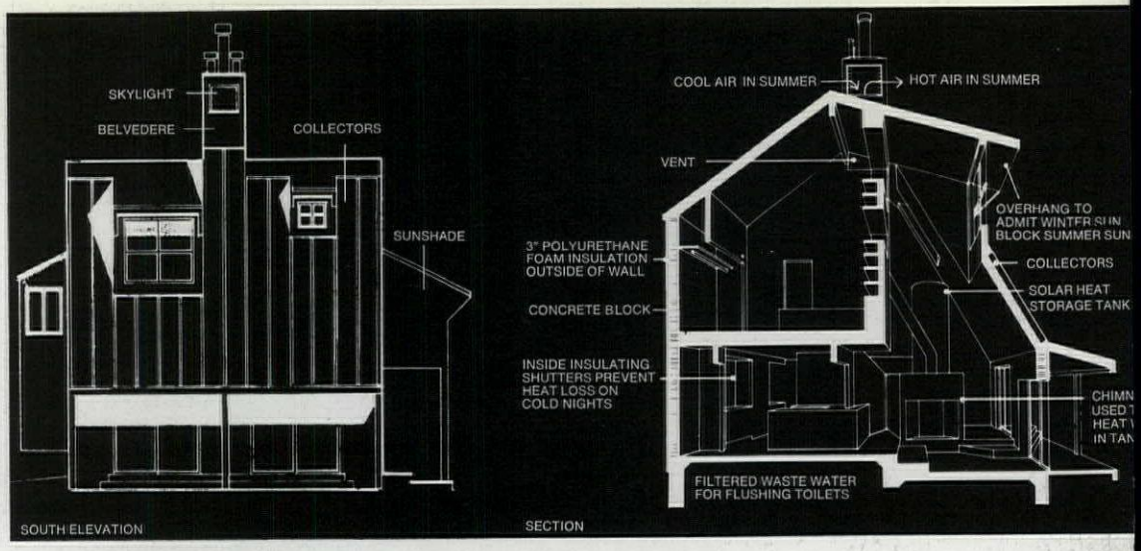
- MIT scientists, under the direction of James Hottle, built the first solar house in 1935, to be followed by three others. The last, MIT IV, in 1957, attempted to make solar heating, cooling and hot water common household items, but failed to demonstrate economic feasibility. Today, MIT is again doing extensive and vital solar research and will erect another experimental solar structure later this year.
- Maria Telkes, now at the University of Delaware, with architect Eleanor Raymond and philanthropist Amelia Peabody, built a solar house in Dover, Mass., that featured a vertical, hot air collector and eutectic salt storage before it was later converted to conventional systems.
- George Löf built a solar bungalow and a contemporary residence in Colorado during the 1950s, also using air collectors, but with crushed rock storage housed in vertical cylinders. Löf, with economist Richard Tybout, is responsible for establishing the fact that solar heating is technically and economically competitive with electric heating.
- Harold Hay's early work led to the "skytherm" process recently used for a home in Atascadero, Calif. The house has a horizontal roof covered with large plastic water bags, with insulating panels over them at night. Heat flows through the roof and into the living areas to provide heating. Heat flow is reversed for cooling. The first such structure was built in Phoenix, in 1967, with John Yellott, a professor at Arizona State University and solar consultant.
- The University of Wisconsin produced several simple solar systems for developing countries in the 1950s and today is involved in a computer model to analyze solar thermal systems by region.
- The University of Florida's Solar Energy and Energy Conversion Laboratory, under the direction of Erich Farber, has done a little bit of everything with solar energy, including both climatic and electrical applications. Projects include a solar house built in the 1950s with conventional systems, monitored, and then converted to solar. Its electrical capacity also powers a solar car, which staff people take turns testing and driving to work at speeds up to 65 mph.
- Harry E. Thomason, inventor, lawyer, physicist and do-it-yourselfer, has built four solar homes in the Washington, D.C. area since 1959 and lives in one of them today; it has a heated pool, space heating and air conditioning, plus the lowest fuel bills in town—$4.85 for one recent year! Thomason has over 40 solar system patents, and has published plans and literature about his work but little scientific test data or economic analyses, leaving some people skeptical. But the houses do work, simply and cheaply, and Thomason is convinced and convincing about their value. His own house uses a corrugated aluminum collector, aided by a reflective roof surface at its base. Water is used to transfer heat from the collector to the basement for storage in a 1,600-gal. water tub surrounded by rocks. A blower circulates hot air from the stones into the house. On a recent hot day, Thomason's house was cool and comfortable; he was instrumenting the cooling system and finding little variation from his thermostatic settings, day or night—"Who says cooling doesn't work?"

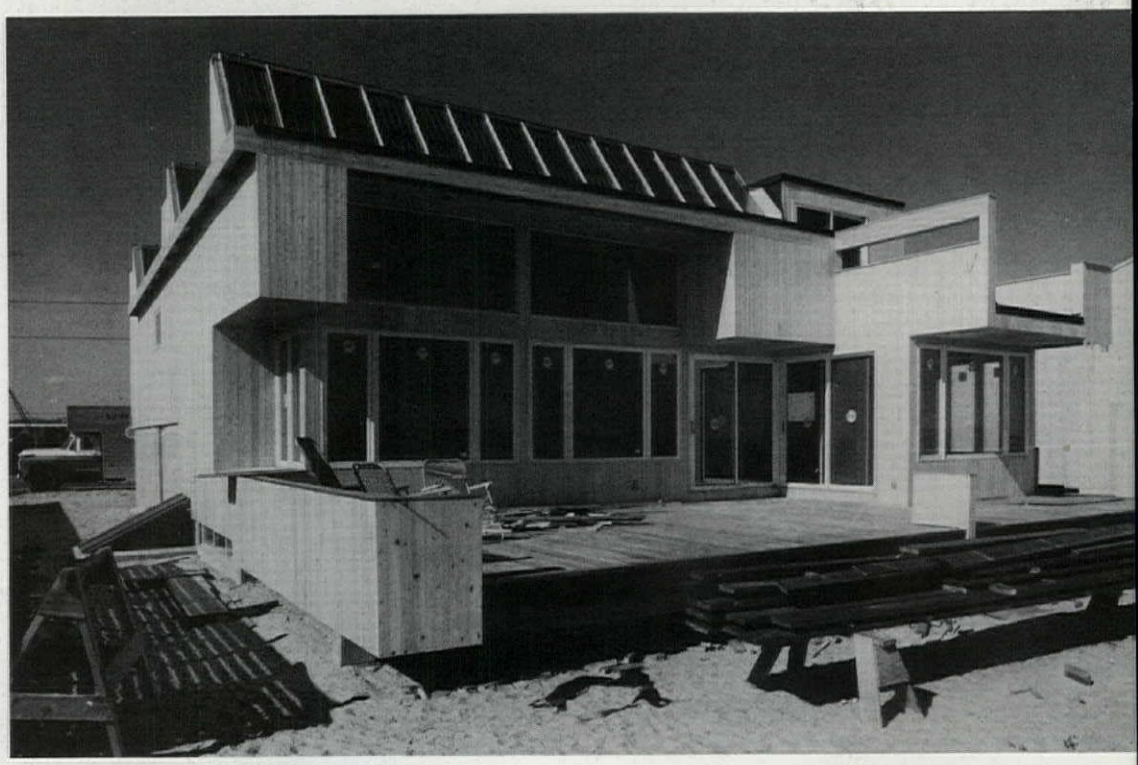
RECENT PROJECT WORK

History blends with the present in solar energy, especially after a virtual hiatus in new work until a year or two ago. But solar work is now proliferating; universities are continuing their important roles, small companies are being formed and large corporations are reexamining the market outlook. Government is exercising some leadership, and engineers and architects seem anxious to get on with the business of building.

Professional firms all over the country have projects on the drawing boards or under construction and, apparently, clients willing to pay for them, or at least thoroughly investigate their feasibility. The numbers of such cases are in the tens, not hundred or thousands, but all of these are necessarily custom-designed projects (there have been no commercially available, packaged solar climate systems) and therefore relatively costly. The New York City engineering firm Dubin-Mindell-Bloome Associates reports it is working on over a dozen solar studies and projects for both private and government clients.

The next six pages include a random sampling of some of the recent work being done, or proposed, today. Many good projects and buildings have not been included, but PLUS intends to continue to publish interesting solar work and will eventually cover these or other projects separately and more in depth.





Shoreline sunworks

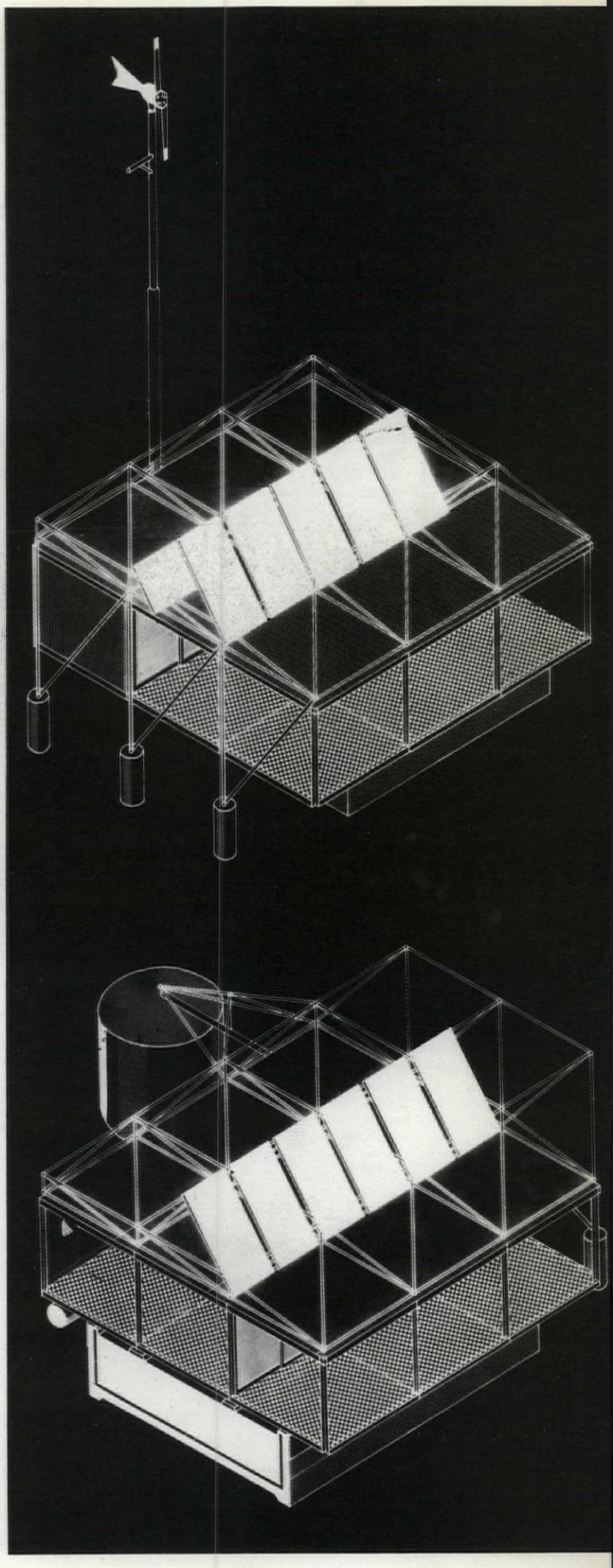
The house shown under construction would have been a conventional house, chosen from a builder's set of plans, except that the owner decided he wanted something better. So he turned over the plans to architect Donald Watson, who not only improved the design, but brought in fellow Yale faculty member and engineer Everett Barber to talk solar. Today their client has the first solar house on the Connecticut shore, using the sun to provide about 45 percent of heating this winter. Because of beachfront height limitations, the sawtooth roof was the most practical collector array. The collectors are water types with copper flat plates under one sheet of glass. They are produced by Sunworks Inc., of Guilford, Conn., of which Barber is president and owner. Barber is now building his own house (top drawings), using solar and wind energy. Designed by architect Charles Moore, this house was designed for solar conditioning and energy conservation from the start.

Decade 80 Solar House

The Copper Development Association is building the Decade 80 Solar House in Tucson, Arizona. The prototype house, designed by M. Arthur Kotch, incorporates the Revere Copper & Brass Inc. laminated copper roof panels and solar collector, which is expected to carry 75 percent of the cooling and 100 percent of the heating load of the house. An insulated 3,000-gal. water tank below ground level provides thermal storage. The house will also use silicon solar cells to convert the sun's energy to low voltage power for radios, clocks, and other small appliances. Major appliances will be served by a conventional electric utility system.

Mediterranean villa

A "traditional" Mediterranean house in Southern France (sectional axonometric, right) has been designed by Dominic Michaelis Associates of London to be totally autonomous. Platform and roof are suspended from an external three-dimensional steel spaceframe. Tubular elements and cast jointing units are supported on six piled foundation pads. The spaceframe serves as a permanent jig for twelve flat-plate solar energy collectors, and a panel of solar cells provides electric power for the pumps in the heating system. Heat collected from the flat-plate collectors is transmitted indirectly into an underground water tank. The designers expect to store enough heat in the summer to heat the house through the winter. Electric appliances will be powered by a windmill.

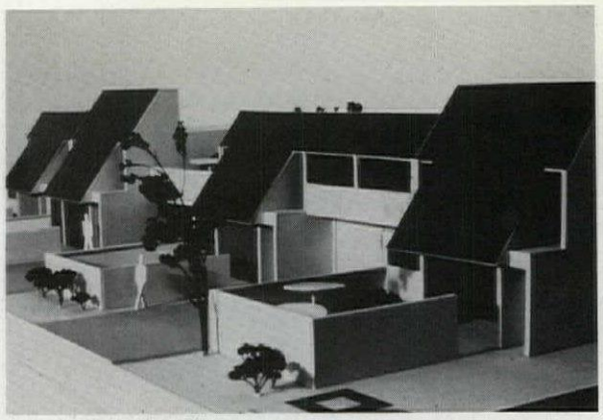


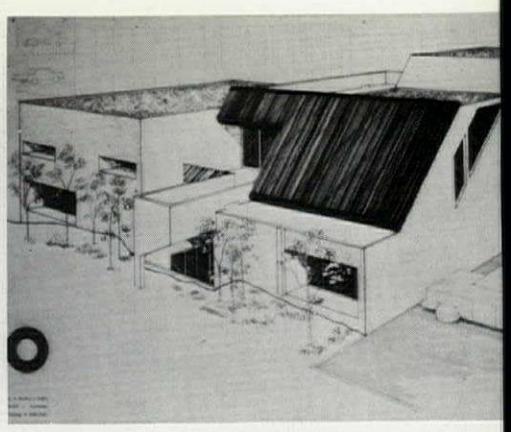
Nebraska house

Designed by Hansen-Lind-Meyer, of Iowa City, this house planned for Mead, Nebraska, features three kinds of solar collectors on its roof and in its walls. The roof collector is a hot water collector facing south at 45 deg. The south walls have two types of hot air solar collectors, integrated with a hot air distribution and storage system. Designed by James Schoenfelder, the two types include a semi-transparent and a perforated plate version. The semi-transparent collector allows visibility through the collector and allows light into the structure while producing heat for space conditioning. Heat is stored in phase-changing salts contained in a room with the mechanical equipment so that heat from operations is added to storage. Domestic hot water is stored in a 200-gal. tank. While the house is designed to obtain all of its heat from solar energy, a back-up heat pump and an electric element are also included; the heat pump will also be used for summer cooling. The structural system of the house consists of triangular modules joined by rectangular connectors. No wall faces directly south or east to reduce summer cooling loads.

Crowther conservation

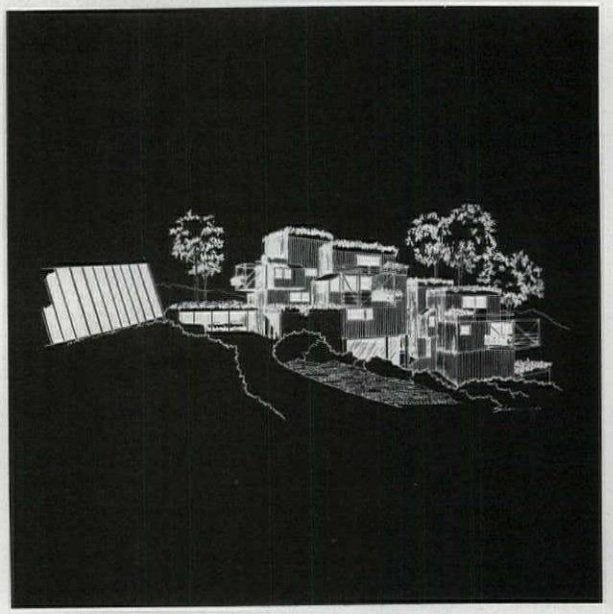
The architectural firm of Richard L. Crowther & Associates, in Denver, Col., was heavily involved in energy conserving building design before it became fashionable. Solar energy is a natural extension. The two projects pictured are a condominium project (top left) and office building (right) proposed for the Denver area. Both will use flat plate air collector systems for water and space heating. The collected hot air will be circulated through a heat exchanger to hot water coils in air handling units. The projects will also include such energy conserving features as windows designed to resist solar heat gains in summer, but use direct solar radiation to reduce winter heating loads; few, or small windows, will be used on the north, east and west sides of the buildings to reduce winter heat losses. The buildings will naturally ventilate themselves through convection. Internal heat build-up in the office building (from people, lights and equipment) will be recirculated to minimize thermal mechanical loads.

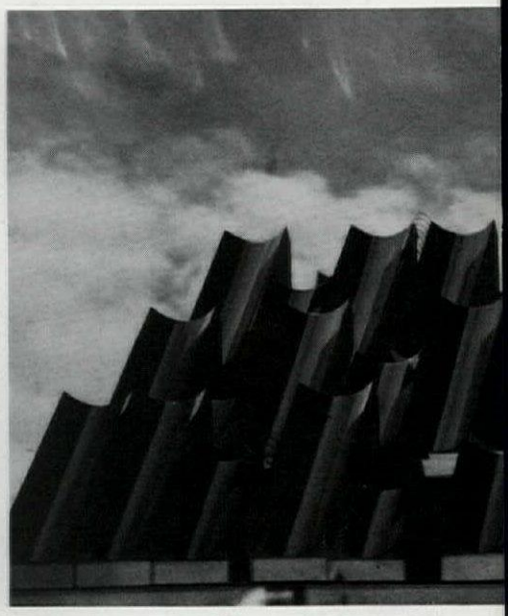




Grassy Brook Village

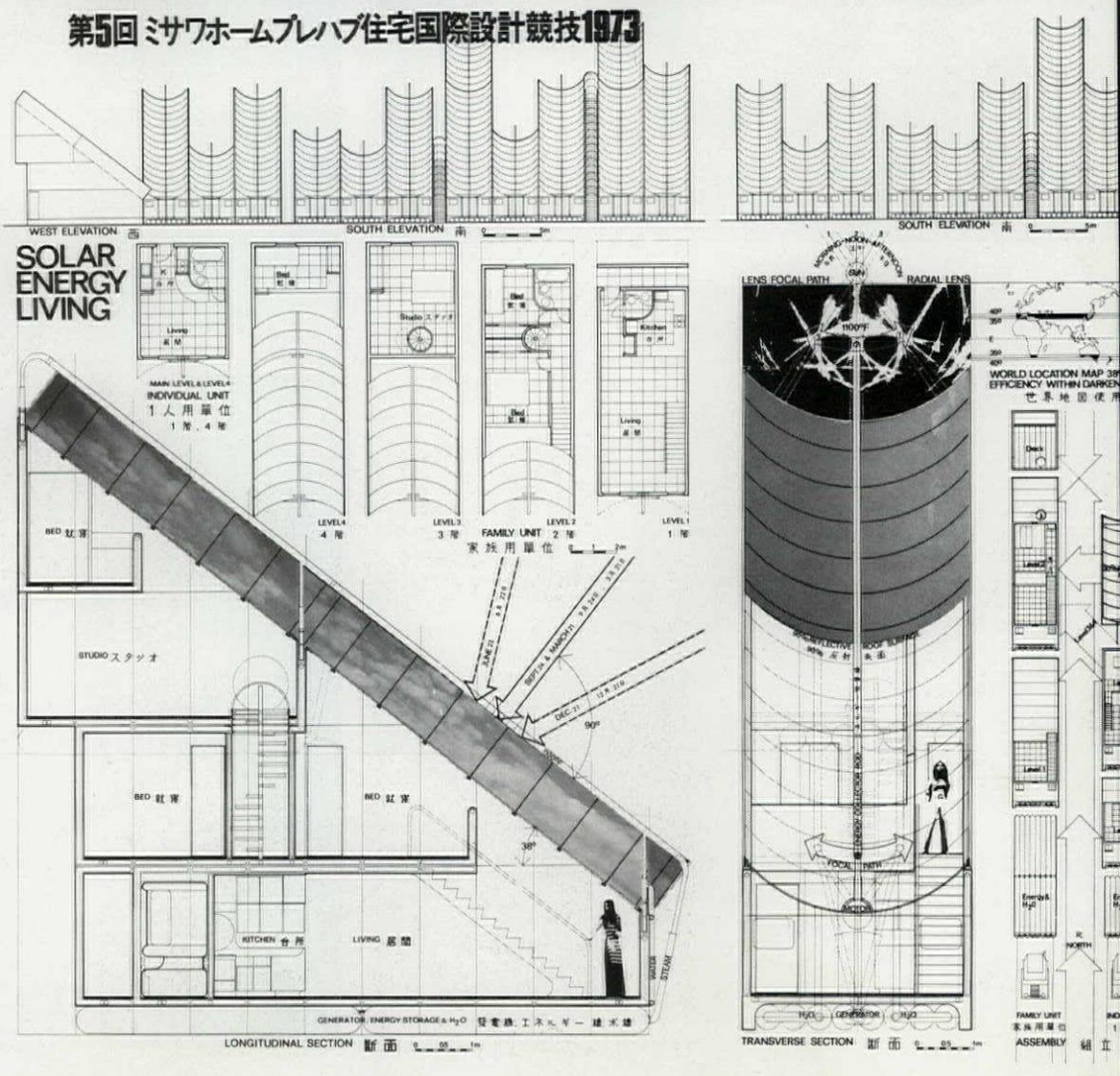
Ecological design is the idea behind Grassy Brook, a development of 20 residential units now under construction in Brookline, Vermont. The complex (middle, left) will use solar energy for house heating and hot water, and, in a second phase, may even use wind for electrical power generation. The three-bedroom units will be clustered in two groups of ten and each group will be integrated by its own solar heating system, including 4,500 sq. ft. of collector and 20,000 gallons of water storage. The concept of a central solar system for ten housing units was adopted to achieve some economies of scale and leveling of peak demands, as well as to free the design and orientation of the housing units themselves from the limitations of collector design. Architects for the project are the People/Space Co., of Boston; the engineers, Dubin-Mindell-Bloome Associates; the developer (and initiator) is Richard D. Blazej, of Brookline.





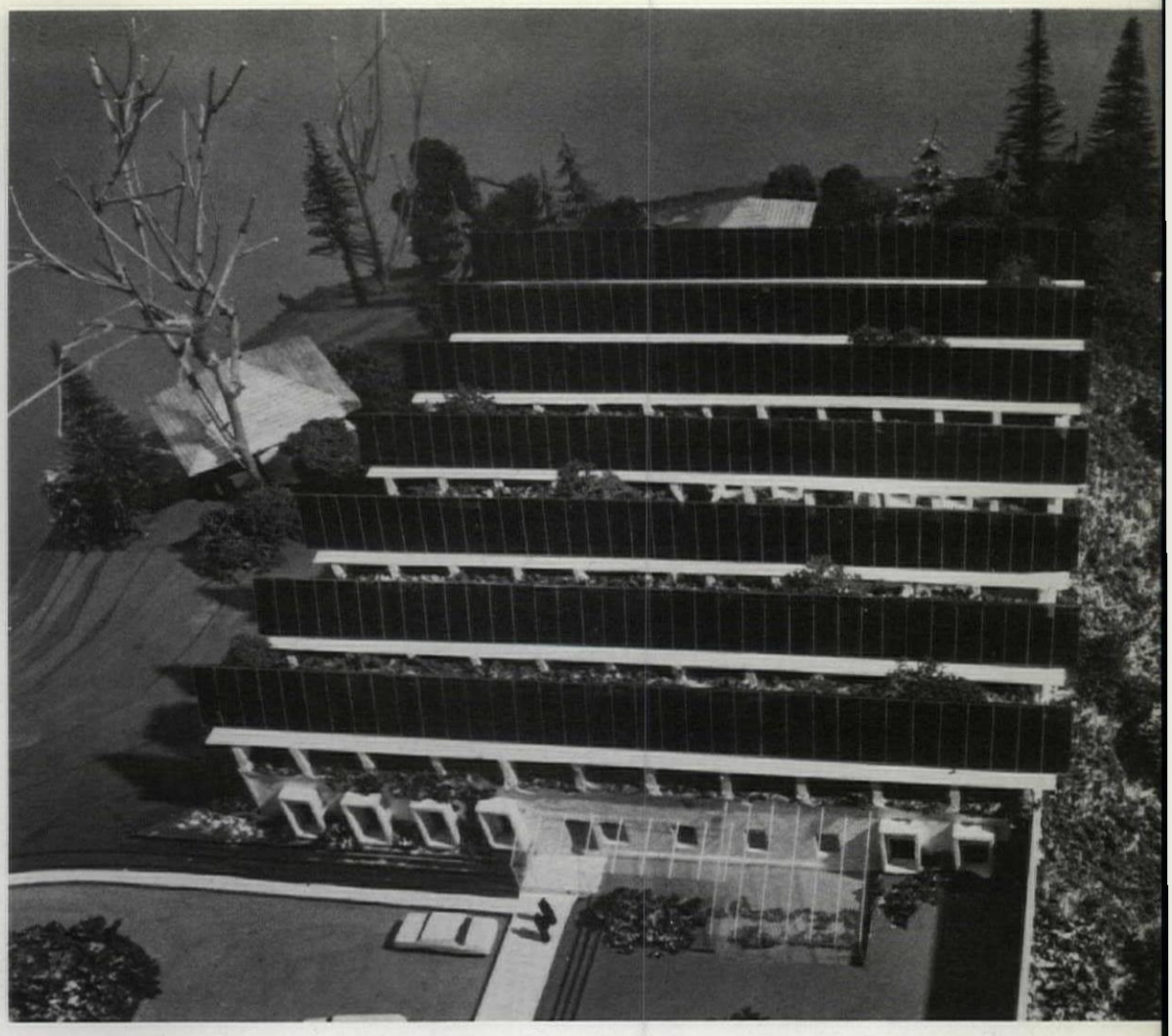
Apartment competition winner

Architect James Lambeth, of the University of Arkansas, designed this solar project for the Misawa Homes International Competition. The shapes of the units (middle right and bottom) are determined by their relationship to the sun. The units would use reflective lens roofs to focus solar radiation onto a moving collector rod, producing about 1,100°F., says Lambeth. He would use the collected heat for space heating and cooling and to generate electricity. Storage is located under the dwelling units.



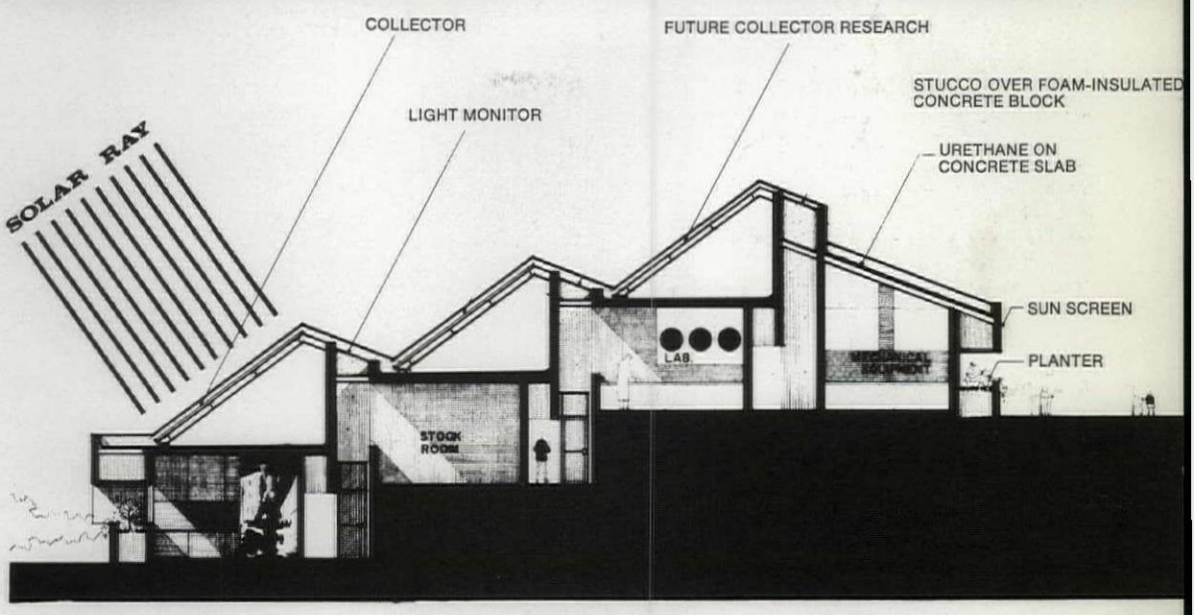
New York Botanical Garden

Seven black solar panels dominate the sawtooth roof of a new Administration and Research Center being planned by the Cary Arboretum of the New York Botanical Garden in Millbrook, New York. The flat plate collectors will face south and the back of each collector row will be reflective to increase solar radiation on the collector behind. Sod and plantings on the roof will serve as insulation. Excess heat and humidity from the attached greenhouse will be employed as part of the mechanical systems. The architect is Malcolm Wells of Cherry Hill, New Jersey; engineers are Dubin-Mindell-Bloome of New York.

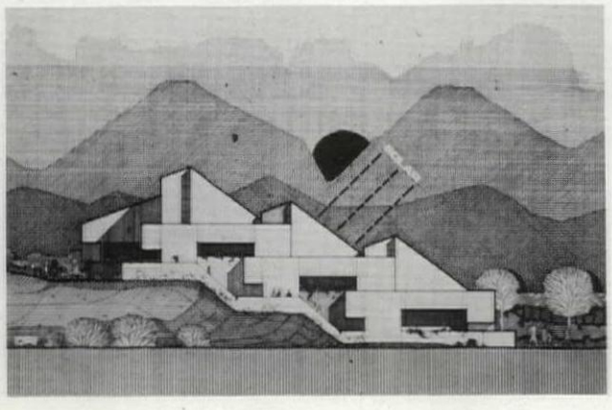


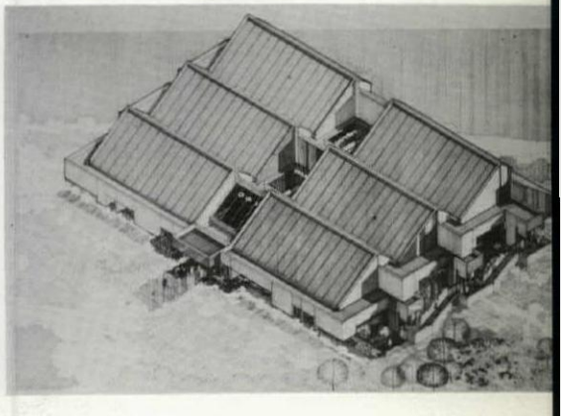
Desert Research Institute

The new biology lab (shown right in initial design) for the Desert Research Institute, an autonomous state agency and part of the University of Nevada system, aims to have solar energy provide 50 percent of its heating, hot water and cooling needs. The design team approached the project both as a pragmatic and experimental problem, with collectors planned in increments so that new types could be installed as they became available. The first phase of construction called for 4,000 sq. ft. of flat plate collectors with selective surfaces and two panes of glass. Cooling would be provided with a lithium bromide absorption unit. The design team included Jack Miller Associates, architects; Arthur D. Little, Inc., solar system designers and coordinators with the building form; and Johnson, Joeckel, Bartley & Associates, engineers. Initial bids for the project came in high and design changes will be made.



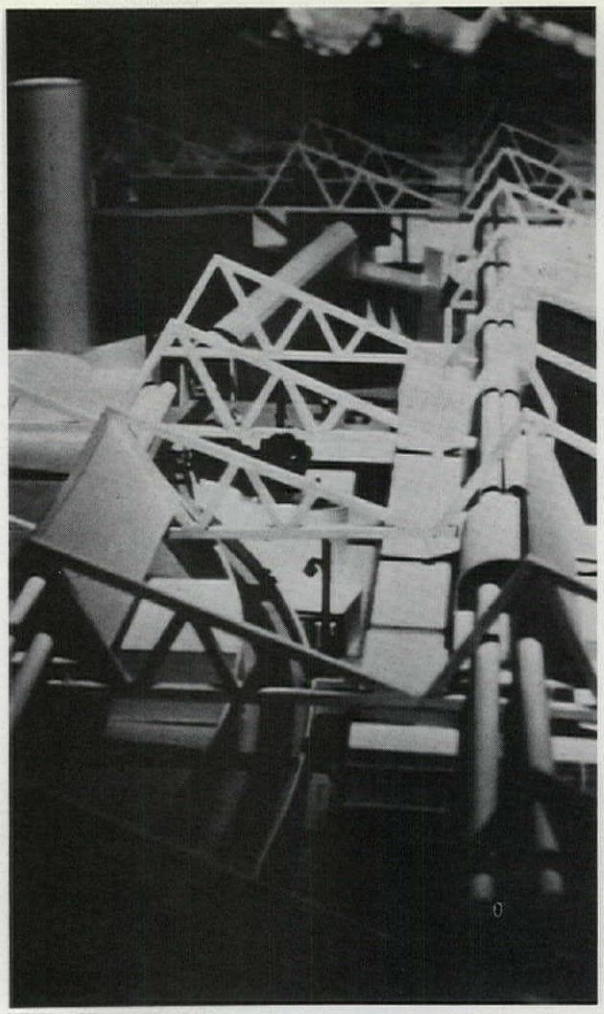
SECTION

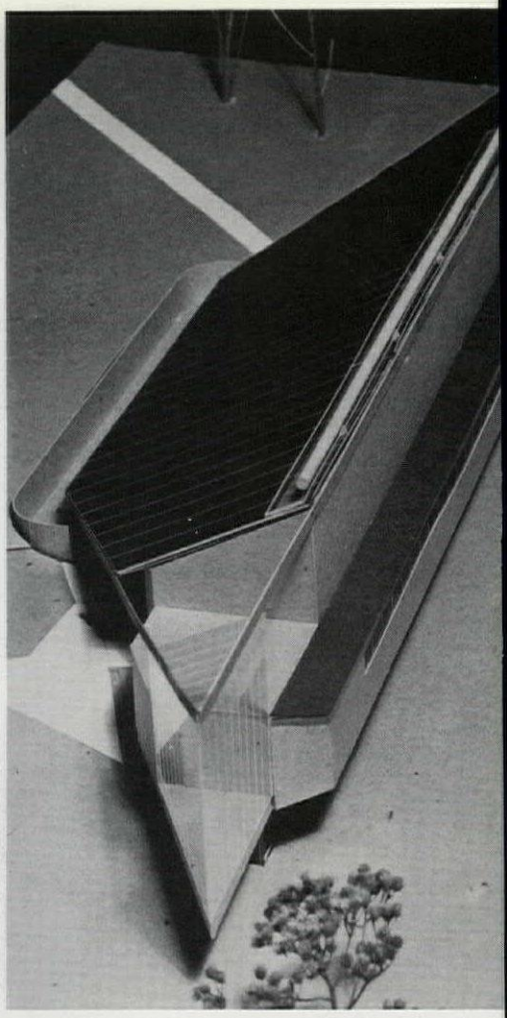




Denver Community College

The A-B-R Partnership in Colorado has designed a solar-heated building (top left), which they call a "super-duper solar silo circus," for the Community College of Denver/North. Described as "the largest valentine in the world," a heart-shaped reservoir will hold 400,000 gallons of sun-heated water, providing 100 percent of the heat required by the quarter-mile-long school. The building will have a sawtooth roof with collectors that will heat the reservoir; storage capacity is sufficient to deliver heat to the school at night and for one full week of cloudy days. The solar heating system will add $700,000 to construction costs of the $11-million school, but the school estimates it should pay for itself in 10 to 15 years.



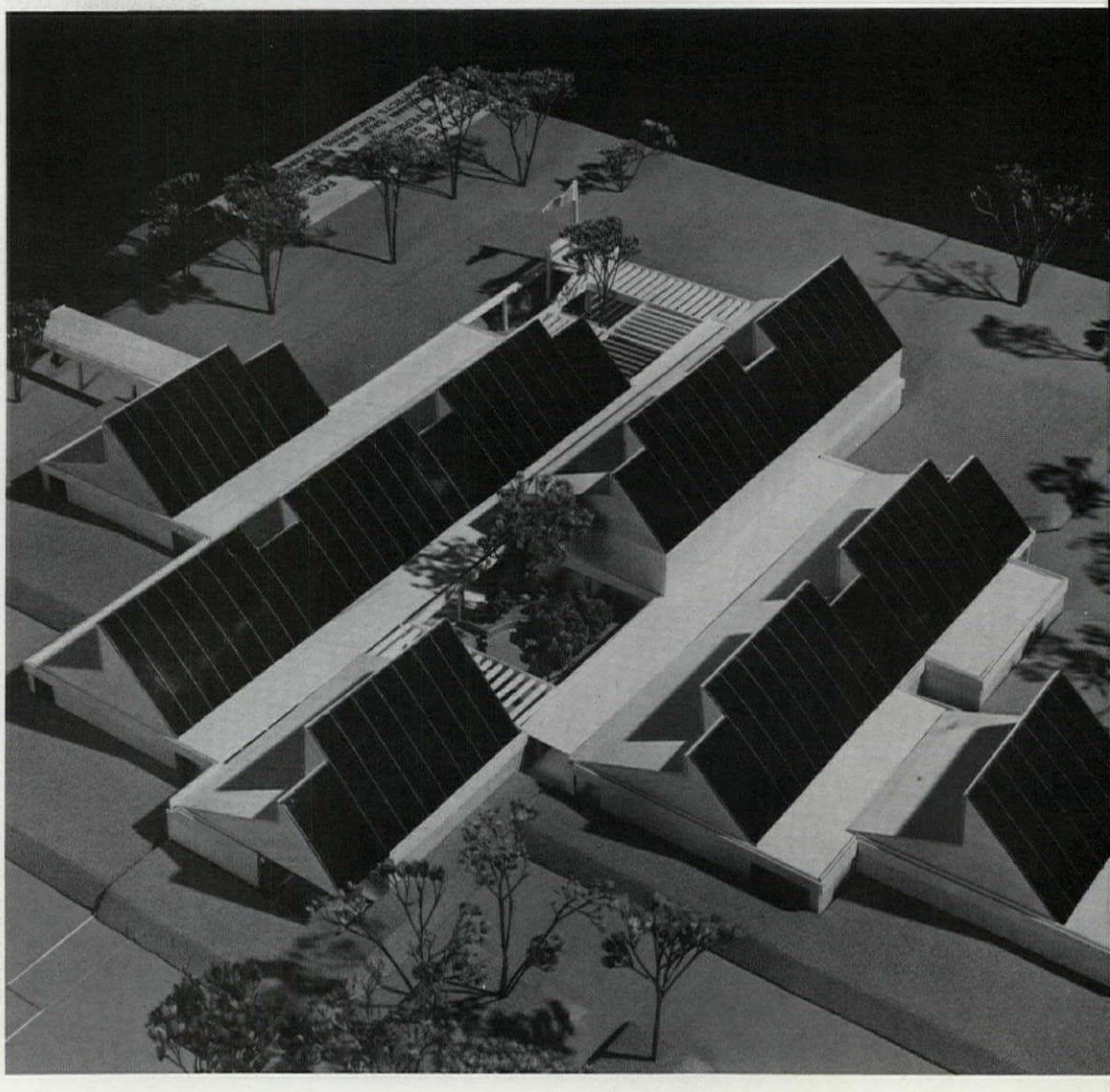


Madeira School

The Science Building of the Madeira School in Greenway, Virginia, designed but not yet built, will be the first large-scale solar energy building in that area. The entire roof is a flat plate collector, using water as a transfer medium to an insulated water storage tank, ready to heat or cool, as required. Cooling is achieved by using the stored heat to drive conventional air handling units. The system, designed by architect Arthur Cotton Moore and engineers Flack and Kurtz, uses no new or untried methods. The solar collectors added $30,000 to the cost of the roof, but the investment promises to save Madeira at least $1500 a year on heating and cooling bills.

Prototype solar school

Three new schools for the mentally retarded are in working drawings and may boast solar energy systems for primary heating loads, with electric heating as a back-up system. The schools were designed by Hoffmann/Saur & Associates, architects in St. Louis, and the solar systems portion of the work is based on a feasibility study performed by Hoffmann/Saur with PGA Engineers and David Lord, of Washington University. The state of Missouri is the client and the concept of solar energy is not only appealing as a way to reduce fuel bills and pollution, but it is also compatible with the therapeutic swimming pool program offered by the schools, where the pool can double as a teaching tool and as a "heat sink." The prototype school (bottom) uses a hot water collector system, mounted in rows on the building roof. During heating season, hot water would be diverted to a hot water coil for space heating or for storage. The plan calls for water temperatures to exceed 200 deg. F. to run absorption air conditioners; a boiler will raise the water to this temperature if necessary.



Proof of Concept Experiments

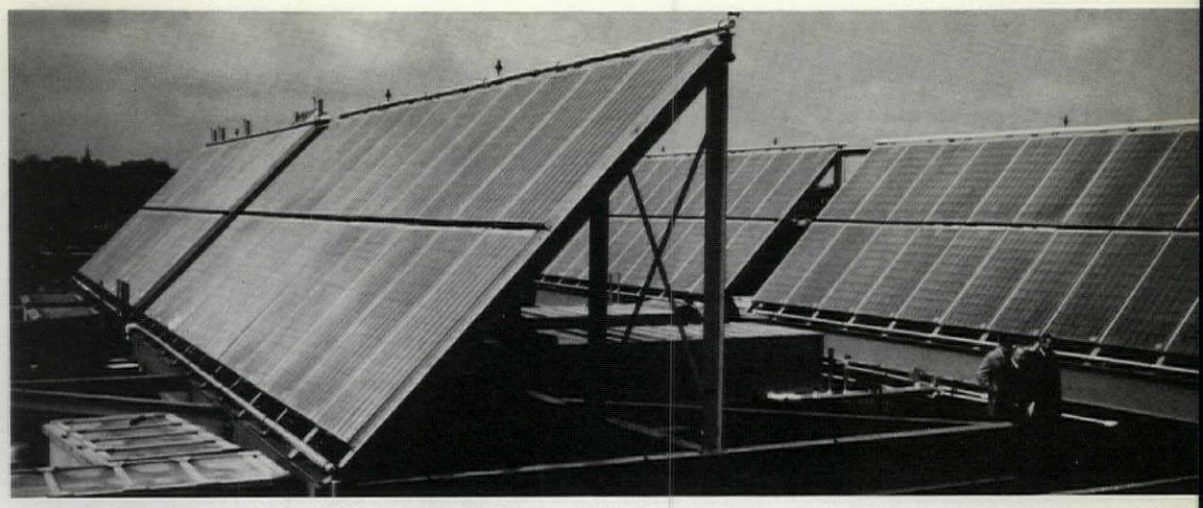
Early this year, the National Science Foundation contracted four companies each to erect a solar heating system on an existing school building; from contract award to system installation, the companies had about 60 days. The program was budgeted at $1.3 million, with contractors working for no profit. The contracts covered systems design, development and installation, plus one year of instrumentation and analysis. The installed systems (which cost up to $100 per sq. ft. of collector because of prototype R&D) are the property of the schools, which may dismantle and sell them after June, 1975, or call the contractor to take them away, or, of course, continue to use solar energy. Another $500,000 contract has been let to Westinghouse (with PPG Industries, Dubin-Mindell-Bloome, and Burt, Hill & Associates as subcontractors) to design, install and analyze a 60 percent cooling, heating and hot water system on an Atlanta school. The four initial schools follow, in order of the pictures at right:

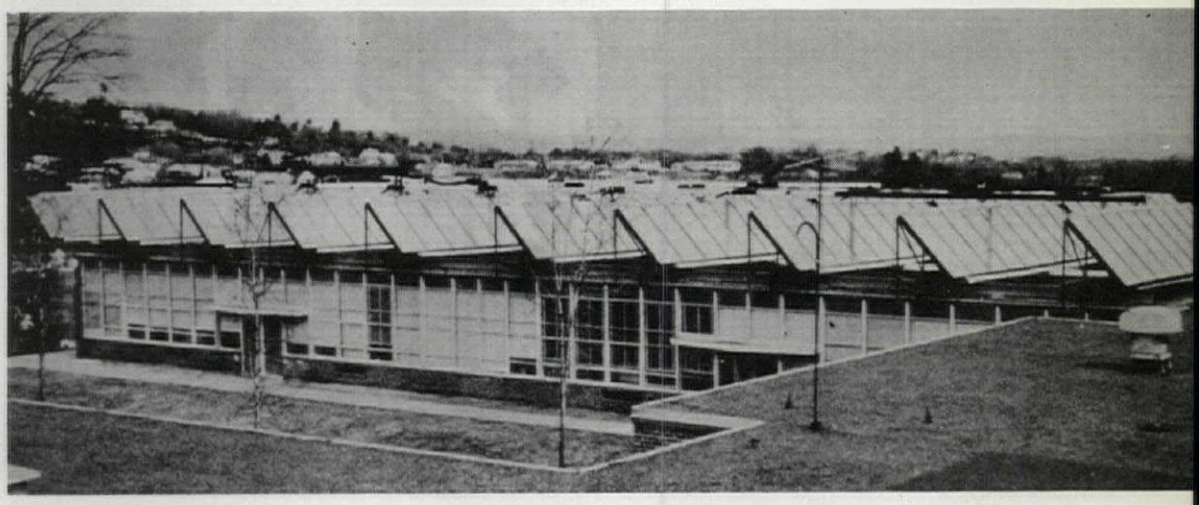
● Grover Cleveland Junior High School, in Dorchester, Mass., has 144 flat plate collector panels in three rows on its roof to provide 20 percent of the heating for the three-story, 61,000 sq. ft. urban school. The contractor was General Electric, with Ballinger as architect/engineer. The GE collectors use two sheets of unbreakable (students have thrown rocks) GE Lexan plastic over an aluminum absorber plate. The existing roof structure of the building could not carry the additional load, so a heavy steel structure was erected and storage facilities on the roof were limited to a 2,000 gal. water tank. The conventional electrical heating system was modified to accept supplementary solar heat. The collectors hook into three of the school's heat exchangers and provided almost all of the winter heating requirements for the portion of the building they serve.

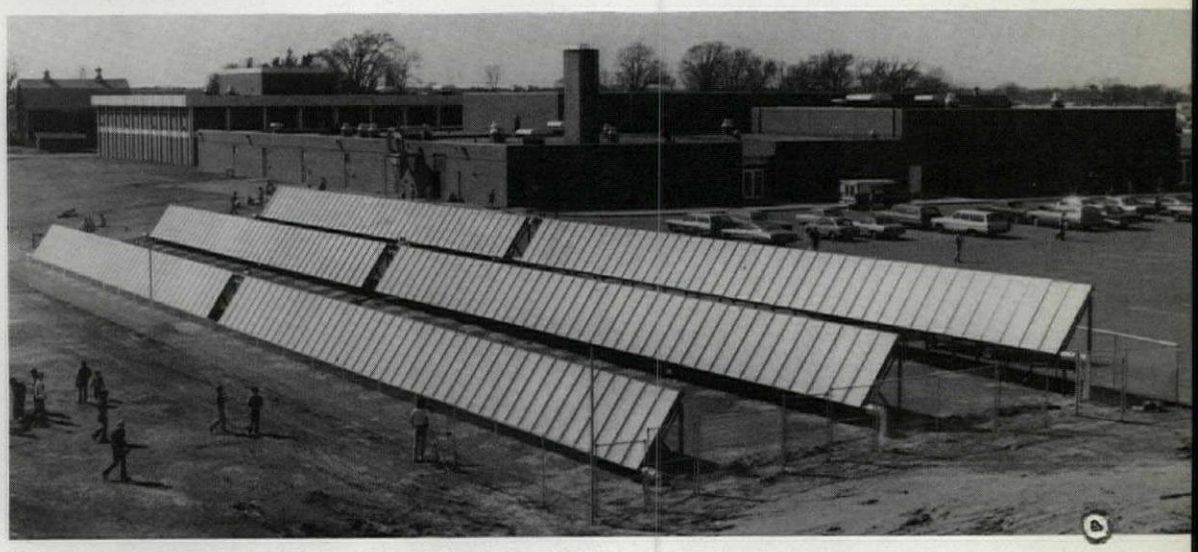
● Timonium Elementary School, in Maryland, has 5,000 sq. ft. of flat plate collectors mounted on its roof and the system cost about $10 to $13 per sq. ft. of collector. The system, designed by the AAI Corp., heats one of the school's three wings. In the completed installation, a facade has been erected to protect the solar system from view and vandalism.

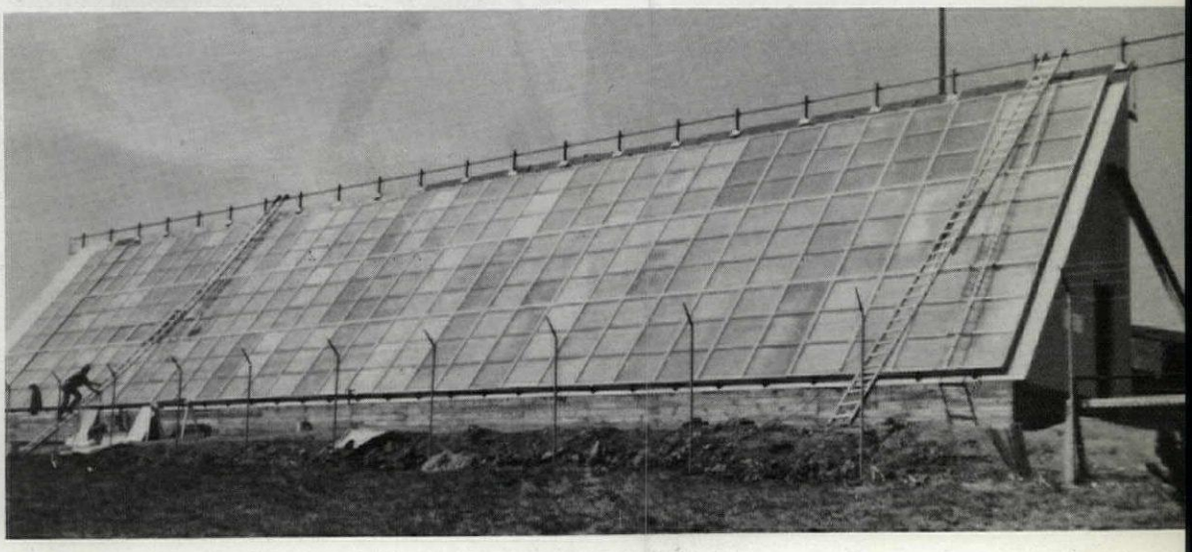
● North View Junior High School, in Minneapolis, Minn., was contracted to Honeywell. It has 5,000 sq. ft. of collectors, located near a baseball field. The 6-in. thick collectors have one sheet of no-iron, tempered glass over a layer of translucent plastic covering a steel absorber plate filled with a water-glycol solution. The unit is completed by fiberglass insulation and a painted steel outer box. The collectors provide 6,000 Btus per sq. ft. of collector to the water storage tank and they fulfill 6.3 percent of the school's heating requirements.

● Fauquier High School, in Warrenton, Virginia, has been retrofitted by Inter-Technology Corp. The system uses collectors in a 126-ft. by 26 ft. billboard array to provide 100 percent of the heating requirements for five "temporary" classroom buildings. The collectors use aluminum absorber plates with a chemical edge coating and operate at about 60 percent efficiency. Two underground water storage tanks can provide 12 days of heating.









ELECTRIC POWER

Using the sun on a wide-scale to produce electricity is the most ambitious solar dream. Some experts claim that Lake Erie alone receives more solar energy from the sun every day than the entire United States consumes in a year. Harnessing even small proportions of this power could relieve concern about future energy shortages.

There are essentially two ways to turn solar energy into electricity. The most familiar is indirect. Using equipment similar to that for heating and cooling applications, it involves capturing sunlight at high-enough temperatures to provide fuel to drive conventional electrical generators. The primary differences between this kind of heat collection, and that for climatic systems, relate to the need for higher temperatures, and hence ways to concentrate sunlight heat. The second, more advanced technology uses "solar cells" to convert sunlight directly into electricity, through what is called the photovoltaic process.

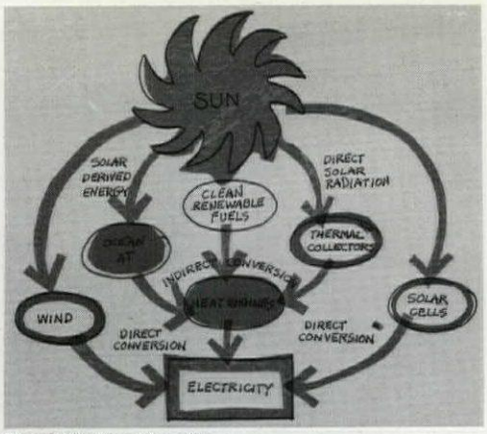
The thermal approach to electrical power through the sun still uses an almost infinitesimal amount of actual sun power. Sir James Jeans, in *The Mysterious Universe,* tried to describe this power by analogy: Heat an ordinary six-inch cannon ball up to 50 million degrees, the temperature of the center of the sun, and the radiation it emits would suffice to mow down—by its mere impact, like the jet of water from a fire hose—anyone who approached within 50 miles of it."

Collecting solar energy at temperatures sufficient to run electrical generators is a job for concentrating collectors, or units that focus solar rays onto a relatively small absorptive surface. Such collectors offer greater efficiency than flat plate collectors, although they share the common disadvantage that none can focus diffuse sunlight, meaning that they work only when the sun is shining—on a cloudy day, nothing. Concentrating collectors also share a certain degree of mobility; most are mounted on one or two axes and can be adjusted to track the sun's movement across the sky.

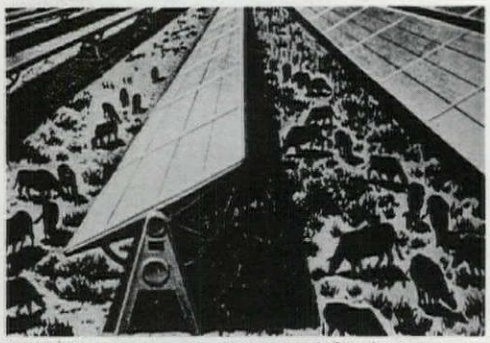
According to Walter E. Morrow, of MIT's Lincoln Laboratory, the differences between unfocused and focused collectors are striking in terms of performance: Unfocused collectors have about 10:0 rations of emissivity and are limited to output temperatures of 150 degrees C. or less. Single-axis, "steerable" concentrators can achieve ratios of 300 and temperatures of 600 degrees C.; double-axis versions can multiply these efficiencies dramatically.

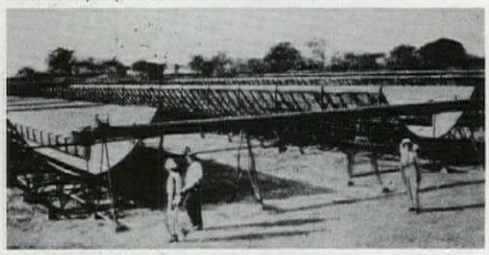
The simplest form of concentrating collector is a flat plate unit augmented by reflective mirrors. However, this scheme is rarely efficient enough for serious consideration in an electrical power system.

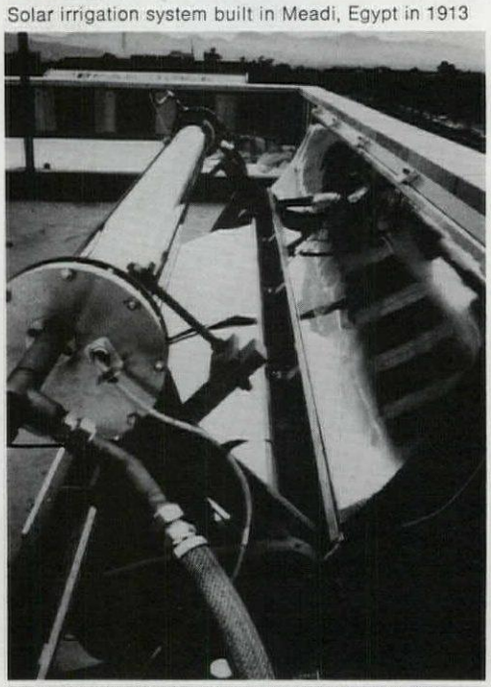
The most common one-axis concentrators are reflective troughs with parabolic cross sections that track the sun with minimum adjustment. Assuming that the troughs are placed on an east/west axis, the units need correction only for the sun's declination. The unit's absorptive surface is usually a linear tube covered with a selective surface (developed to reduce emissivity).

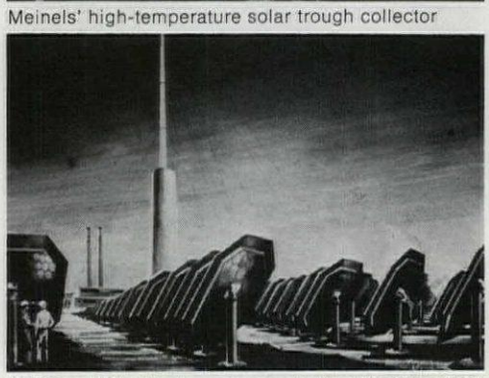


Electricity from the sun


Meinels' proposed solar farm for the Southwest


Solar irrigation system built in Meadi, Egypt in 1913


Meinels' high-temperature solar trough collector


McDonnell Douglas tower concentrator with mirror field

The first parabolic trough concentrator of note was built in 1913, in Meadi, Egypt, where it was used to operate a 50-hp steam-driven water pump. New technological developments from the space and other research programs today promise to make such systems cheaper and more durable, using plastics, more efficient optics, liquid metal heat transfer systems and such advanced devices as heat pipes (which are highly efficient passive heat transfer units that can operate efficiently at steam turbo-generator efficiencies).

A third form of concentrator involves more complex, two-axis tracking mechanisms; the added costs for such sophisticated devices must be weighed against the higher thermal efficiencies they provide. This type of concentrator again uses the paraboloid form, but in the form of a searchlight reflector, rather than a trough. Its tracking system can follow not only the altitude, but also the azimuth (arc of the horizon that a heavenly body makes with the meridian of the place of observation).

Much more research and development remains to be done in the areas of radiation collection and concentration, heat transfer and storage, heat exchangers and boilers, and materials performance and durability, including selective coatings, but already large-scale power generation schemes are being proposed and worked on.

Perhaps the most famous large-scale power proposal is that of Aden and Marjorie Meinel. They propose vast "solar farms," where thousands of acres of the United States would be converted to solar power stations, but where cattle, sheep and other animals could continue to graze. Specifically, they propose 1,000 land-based solar stations, each producing 1,000 megawatts, or 1 million kilowatts. They estimate such a system could supply most U.S. and northern Mexico power needs within 100 years.

So far, the Meinels have tried in vain to obtain money for even a one-acre demonstration project, but their plans are quite specific on paper. The solar farms would use conventional steam turbines, which would be cooled by water pumped from the Gulf of California, through aqueducts to the solar farms in the deserts of the Southwest. Cooling the water would desalinize it by condensing it into steam and so increase potable water in that region of the country—perhaps by as much as 50 billion gallons per day. The proposed collectors would be tubular heat absorbers mounted inside a glass envelope; liquid metal would circulate through the tube and transfer the heat to a salt storage tank. The Meinels estimate they could store heat at 1,000 degrees this way and that the entire project could consume 13,000 sq. miles (about 10 percent) of the southwestern desert area.

More recently, the notion of focusing sunlight onto a tower-mounted collector has taken precedence among large-scale power proposals. Scientists at the University of Houston are working on one such scheme that would place a tower with a two-axis concentrating collector on the edge of a field on individually movable reflectors. A magnetohydrodynamic, thermal electric system mounted on the collector would produce hydrogen through electrolysis, or the separation of pure water into its components. Tanks of hydrogen at the plant would provide storage capacity. The system would operate at a 32 percent overall efficiency, compared to about 25 percent for the Meinel proposal, although other factors enter into a comparison of the two.

Photovoltaics

There's a kind of magic in a solar cell. A ray of sunshine enters the tiny crystal and electricity comes out in a continuous stream, instantly, with no moving parts and no pollution, for as long as constant exposure to weather and radiation allows the solar cell to survive.

Such high-cost wizardry is a direct legacy of the space race. Solar cells are literally all around us. Over 1,000 U.S. and Russian satellites are powered exclusively by solar cells. The terrestrial challenge is to find a way to make solar cells reliable, long-lived, and cheap enough to compete with conventional fuel sources. Cost reduction is the biggest challenge, with arrays of solar cells for a central power plant now estimated to cost over $30,000 per installed kw versus $500 to $700 per installed kw in a conventional system.

The outlook, however, is not as gloomy as these figures might suggest. Charles Rieck, of Motorola's New Ventures Division, in Phoenix, has suggested that solar cells are similar to transistors in principle —similar, but reversed. He compares them to the visual number displays produced by pocket calculators, where a special transistor turns electricity into light. "Transistor-type things in the past have undergone price reductions by a factor of 100,000 from early commercial prototypes to modern commercial versions. Solar cells only need a reduction factor of 100."

Solar cells followed the discovery by some British scientists almost a century ago that sunlight striking selenium produced a small spark of electricity. By 1954, scientists in the United States had developed a silicon solar cell with 7 to 10 percent efficiency. Next to oxygen, silicon is the greatest constituent of the earth's solid crust. The silicon solar cell became the most highly developed and best understood photovoltaic device and was used extensively by NASA, which reports that efficiencies greater than 10 percent can be obtained at high device yield with present technology and that advanced cells have achieved 15 to 20 percent.

Reflectors can also improve solar cell performance. Eugene Ralph, of the Heliotek Division of Textron Inc. surrounds his silicon arrays with reflectors to concentrate more sunlight on the cells. He has thus boosted output of round silicon cells 2½ times that of non-reflected arrays and he envisions more concentrator advances that may ultimately increase power output 125 times.

The cost of silicon cells is primarily a result of their fabrication requirements for a lot of sensitive handwork. Silicon is generally grown in single crystals, then cut with a diamond saw and placed in a cell base by hand.

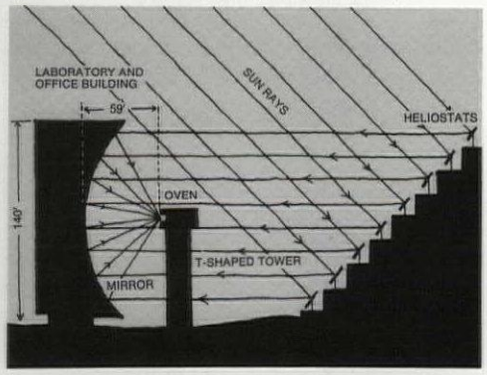
Proposals to streamline and speed the production process are optimistic. NASA itself has proposed a "solar blanket" as a way to reduce costs to 50 cents per sq. ft. This process calls for an automated solar array assembly line, where a roll of raw material for a thin photovoltaic cell is fed in one end and comes out as a "blanket" on the other end.

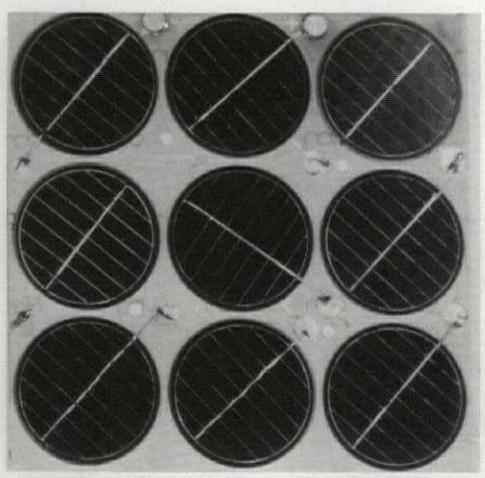
The most significant advance may have come from Tycho Laboratories, in Waltham, Mass., with the aid of Harvard University. Tycho has found a way to produce continuous ribbons of silicon that can be machine-chopped into solar cells. Tycho just received a pledge of $30 million over the next several years from Mobil Oil Corp. and Tycho's project director, A. I. Mlavsky, plans to grow longer ribbons more steadily next year; then grow several ribbons from a single vat of molten material and automate cutting; and achieve routine commercial production within five years. Mlavsky's own "conservative" estimate is that solar cells will generate electricity at one quarter the cost per kw of that produced by nuclear reactors today.

Not all solar cells are silicon; the most promising alternative materials, according to NASA, are cadmium sulfide and copper sulfide cells. Solar One, a house at the University of Delaware's Institute of Energy Conversion, has experimental cadmium sulfide solar cell arrays on three of 24 flat plate collectors built into the roof. Electricity generated by the solar cells is stored in lead-acid batteries and direct current is used to power electric lights, a clothes dryer, and stove under experimental conditions. An inverter converts the energy into alternating current to drive household appliances. Future plans include temporary hookups of the house and the power company utility system to charge depleted storage systems at night. Shell Oil Co. has given $3 million for continued research to Institute director Karl Böer.

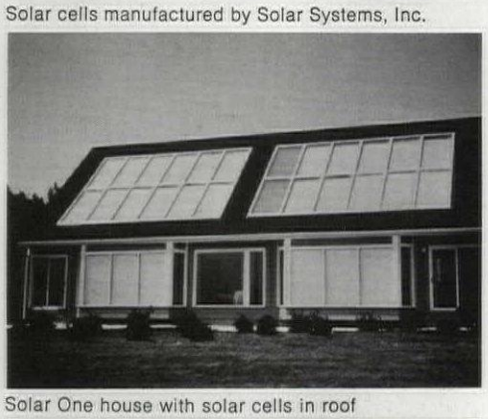
William Cherry, of NASA's Goddard Space Flight Center, thinks bigger than houses. He calculates that one percent of the total land area of the continental United States would be required to assemble enough solar cell arrays to meet total U.S. power needs in 1990—the equivalent of land now planted in oats. Cherry is convinced the scheme can turn waste

Solar furnace at Odeille, France, uses field of mirrors to direct sun radiation at reflective facade of structure, which then focuses it onto central tower top

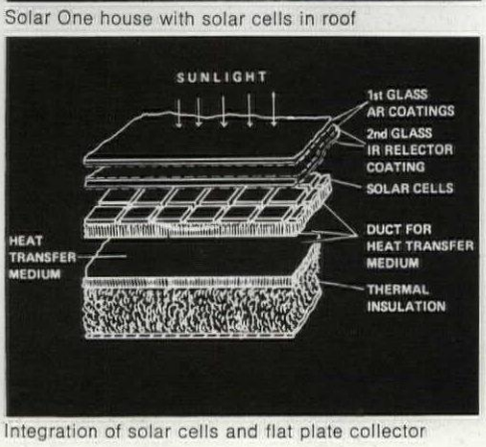




Solar cells manufactured by Solar Systems, Inc.



Solar One house with solar cells in roof



Integration of solar cells and flat plate collector

land to advantage, "with about $2,000 per year profit per acre." A typical one-square-mile solar-cell central power plant producing about 60,000 kw would cost about $1 million to build, maintain and operate for 20 years, assuming a practical solar cell is available. For storage, Cherry proposes massive lead-acid batteries, enough so that one such power plant could supply 10,000 homes with energy for four sunless winter days.

The satellite proposal by ADL's Peter Glaser returns the solar cell to outer space and remains, quite literally, the highest solar system aspiration yet. Such satellites, which collect solar radiation as electricity and then beam it in the form of microwaves to selected stations on earth for reconversion to electrical power, are astounding in their scale. Each will weigh over 50 million lbs. and it will take 600 to 1,100 flights by a second-generation space shuttle just to get the parts into low-earth orbit for assembly in space.

The satellites will be launched into synchronous orbit with the earth's Equator by ion propulsion. There, over 22,000 miles above the earth, they will receive six to 10 times the amount of solar radiation available to suitable locations in the United States. According to ADL (which has worked with NASA, Grumman Aerospace Corp., Raytheon Co., and Textron Inc. on preliminary investigations of the scheme), one such satellite "could be designed to deliver up to 15,000 megawatts of power, or enough energy to satisfy the needs of a city the size of New York in the year 2000."

LIVING WITH SUN POWER

There is something inherently peaceful in the notion of solar energy. It is satisfying to see through a chronic shortage in conventional fuels and realize there is an alternative, or at least a supplement, that is inexhaustible in supply and free from pollution and fuel bills. In the case of some power installations, solar energy may even free some of us from reliance on central utility monopolies. The old American dream of independence and self-sufficiency reasserts itself; relying on the sun seems consistent with relying on ourselves.

Developing solar energy is an international affair. The United States seems to be putting more time and effort into the process now, but other countries (especially Australia and Israel) are interested even if less committed in a practical sense. On a recent State Department-sponsored tour of European and Scandinavian countries to discuss solar energy, Fred Dubin found great interest in U.S. solar activities. Much of the work in Europe remains in the university arena and enjoys little official or monetary support, but this was also true in the U.S. a very short time ago.

Practical solar systems for heating, cooling and power will not occur overnight. Not only must the technical and economic aspects of solar energy be demonstrably improved, but widespread use of solar energy may raise ethical and legal issues yet to be addressed.

Perhaps the most fundamental of these issues concerns ownership of the sun: who has the right to use it? No one and Everyone is the ideal answer, but, practically, there are problems. What happens when a man builds a solar home and then his neighbor decides to follow suit on his own land, threatening obstruction to the first man's collector? In Britain, the original homeowner would be protected by law, but not until he's been there 27 years; then his "solar rights" are guaranteed and protected forever. But in the United States, the courts have traditionally repudiated any version of solar rights when they conflicted with property rights, as in this case.

On urban scale, the problems become more complex. Solar system may call for a new definition of air rights. Installations could be constructed in rows over the highways, facing south, or as giant networks—almost trellises—over the entire urban fabric. More likely, a city would have a centralized collection station outside its limits. But in any case, new concepts of planning and zoning may be needed.

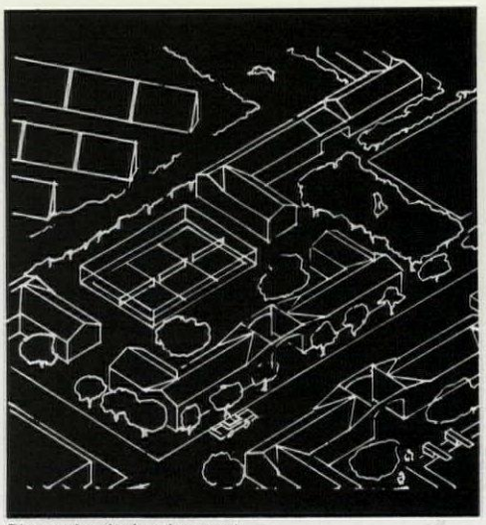
Solar farms may present their own growth and development challenge. Alan Balfour notes that new communities may start to grow around solar farms in the desert, especially where a side effect of the solar plant may be an increased water supply. Theoretically, the desert, its flora and fauna, could be threatened.

Constructing solar systems may involve new interpretations of building codes and labor jurisdictions. Codes that specify height limitations, and structural and mechanical components may be inappropriate, although performance-based codes have posed few problems. Labor jurisdictions will need definition, or a large-scale application of solar energy may create its own, new labor force.

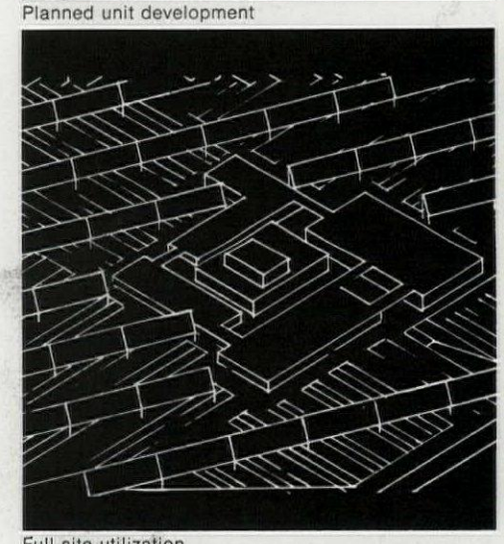
Financing is a delicate subject. Institutional incentives in the form of lower tax or insurance rates, loan priorities or life-cycle costing procedures can improve the investment outlook. In Indiana, Hoosiers are already legally entitled to deduct as much as $2,000 a year from the assessed value of their real estate to compensate them for the value of solar heating and cooling systems. Other states have similar legislation pending. In the private sector, Joan Berkowitz, of ADL, was encouraged when she followed up an advertisement in a New York newspaper by a bank offering 20 percent interest discounts on loans for home improvements to conserve energy. She asked if solar was included and, after some apparent confusion on the part of bank executives, was told yes, solar counts.

Solar counts, but it hasn't happened yet. Now seems a good time to start thinking about living with solar power.

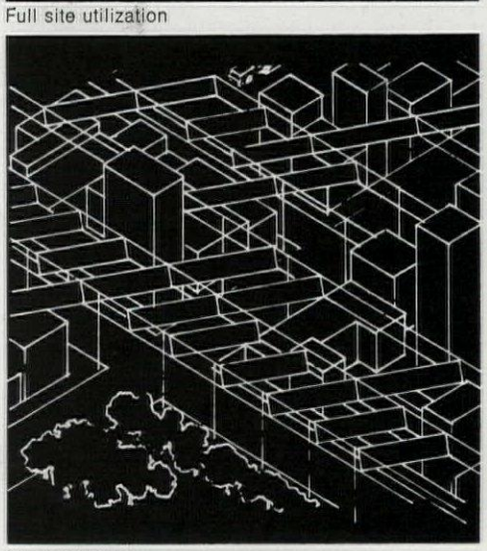
Sunshine.



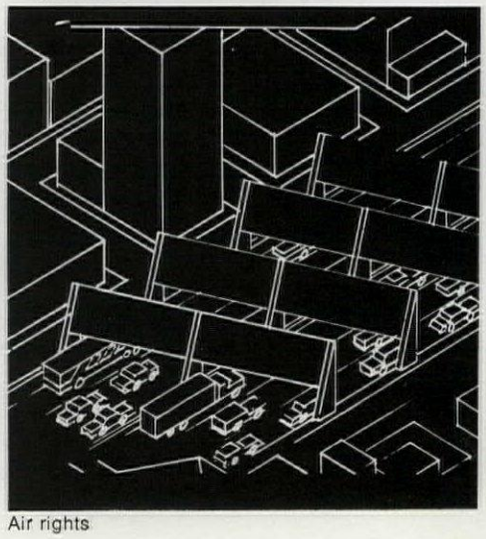
Planned unit development



Full site utilization

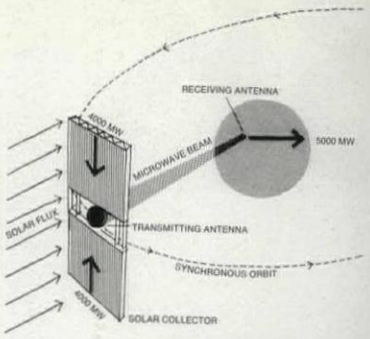


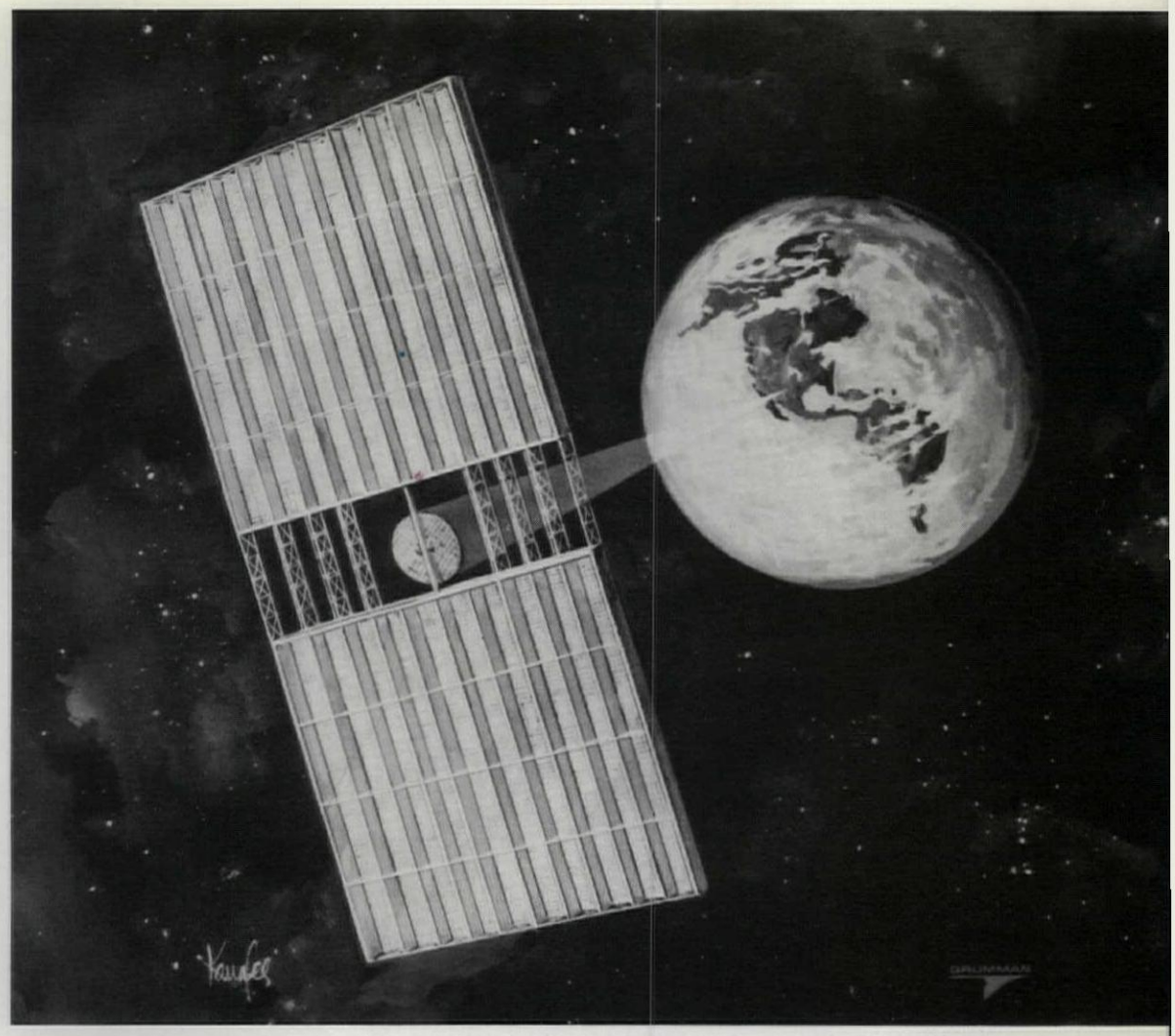
Megastructure



Air rights

Peter Glaser's solar cell satellite



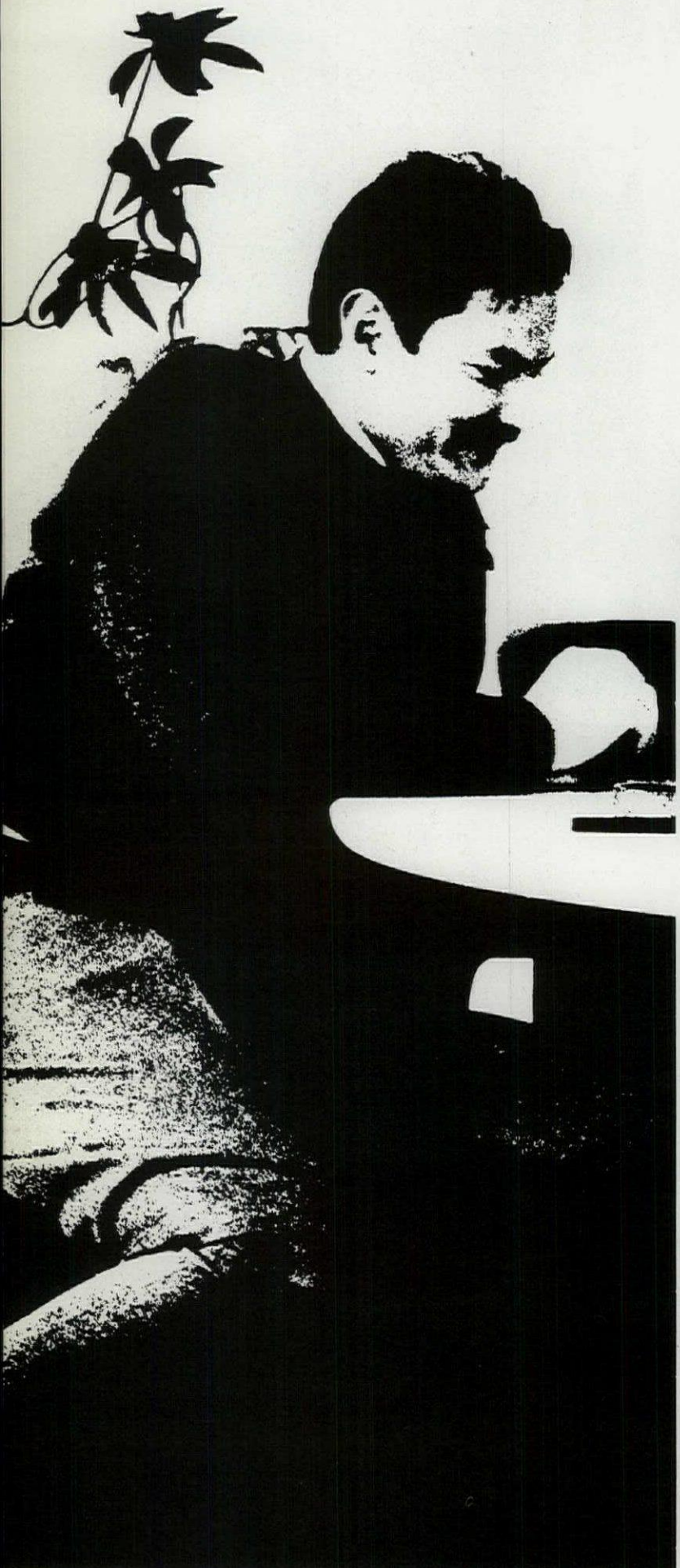


Solar energy just for fun: Hot air rises, so designer and scientist Steve Selkowitz indulged in some solar whimsy and designed a transparent balloon with a black solar collector inside, then stood back and watched the solar takeoff.

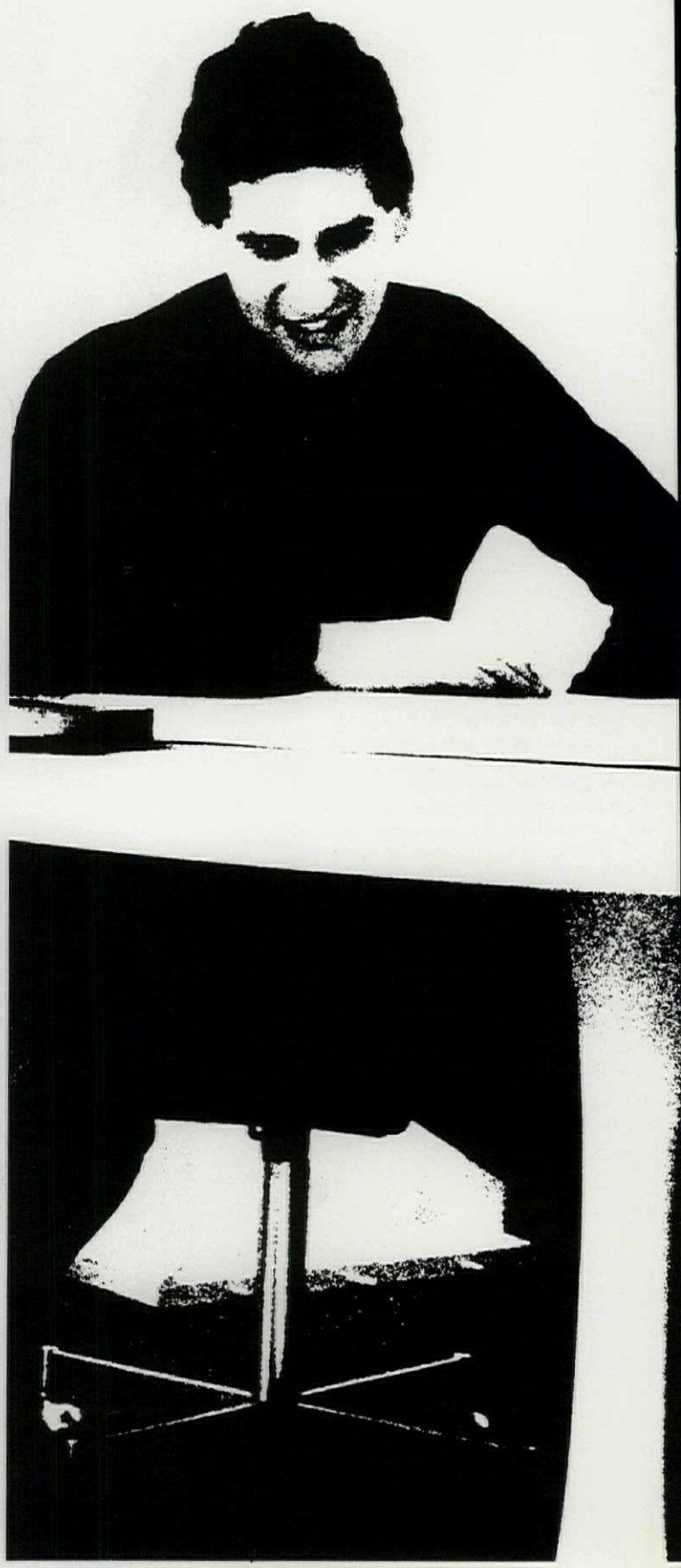
Photographs: Courtesy Arthur D. Little, Inc. except: Peter Crown p. 86 (bottom); Robert Perron p. 90 (center); James Lambeth p. 92 (center left); Steve Selkowitz p. 99 (bottom); courtesy of Environmental Action Council of Denver p. 89 (3rd, 4th, 5th down), p. 92 (bottom), p. 94 (top left), p. 96 (2nd, 4th, 5th).

ABK

by John Donat



Paul Koralek



Peter Ahrends

The firm of Ahrends Burton Koralek came into existence in the early 1960s, soon after Paul Koralek won the international competition for the Trinity College library in Dublin. Koralek had been working in the U.S. at the time. He returned to London to form a partnership with Peter Ahrends and Richard Burton; the three had been close friends since their student days at the Architectural Association. During the past decade, ABK has become one of the most interesting younger firms in Britain.

An ABK building is recognizable not through any family resemblance of style, appearance or manner, but because what they build comes through a process of decision and selection specific to each job, but characterized by their own particular way of solving (and sometimes creating) problems. What the buildings have in common is an attitude to the process of designing and making buildings which can pop out at the end in radically different solutions that nevertheless remain unmistakably ABK.

Their buildings begin Kahn-like from basic questions: What *is* a school? What *is* a library? From there they juggle the variables that constitute the brief, trying to keep as many of them in the air at once as possible, until they begin to come together to form a single communicable experience. It doesn't always work. Sometimes too many factors are seeking resolution at once and the process gets a bit out of control.

ABK have never been providers of anonymous, universal spaces. Everything they do is personal and particular (sometimes too personal and too particular) but it is an attitude that produces buildings of undeniable character whose architecture *works* not in a deterministic manner but in the more real and valuable way of providing for a variety of responses which are ultimately up to the users themselves in their interpretation of the options and choices that the buildings provide.

It is hard to imagine three more dissimilar buildings than St. Andrews College, the Wallingford Warehouse and Showroom for Habitat, or the Central Library at Maidenhead, but each and all of them illustrate how one group of architects approach their architecture, how they think through the problems, get themselves into corners and fight their way out again.

John Donat is PLUS Field Editor in London.

Richard Burton

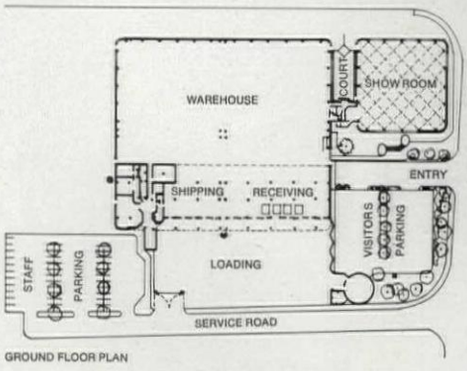

habitat

Habitat

The Habitat warehouse and showroom at Wallingford is ABK's most recently completed project and one of their most triumphantly successful designs. You may have reservations about the Habitat philosophy of instant good taste for the relatively well-heeled middle classes, but the new building is designed as a day out for the family and as such is fresh, welcoming and works extremely well. There is a protected play area for small children (play sculpture designed by Eduardo Paolozzi), another larger playground outside and a small cafe-restaurant with an outdoor terrace which is part of the single-space showroom itself.

The warehouse is made of four tubular steel space frames (36m by 30m) and the showroom of one of them (30m by 30m). Both structures are zipped around with curved eaves and corners in prepainted corrugated asbestos cement which catches the light with a glossy sheen, is marvelously detailed and looks for all the world like the rolling stock of Canadian Pacific. Services of galvanized trunking snake through the space-frames making a no-nonsense roof-space where the servicing of the floor below is manifestly seen to be done. The relationship of Big Brother green (warehouse) to Little Sister white (showroom) is superb, the large and small structures working admirably together with their common materials and details but distinguished by size and color—that indescribable green so vivid that no color film does it justice, and white.

The link between the two parts and a staircase projecting outside the otherwise self-contained perimeter of the warehouse, have both been designed in an inexplicable dark brick which doesn't appear to belong to the same set of design assumptions at all. It looks as though that extra degree of complexity has escaped unresolved again, but in this case it is a very minor cavil because the essence of the design is in the working of the two main parts and the assurance and conviction with which they have been made.



GROUND FLOOR PLAN

Top, the square warehouse, built of four space frames, and the adjacent showroom, built of one. Center, the terrace (with Paolozzi sculpture) and an interior view of the showroom, which contains a small cafe. Below, the warehouse interior. In both buildings, the space frame, lighting fixtures and mechanical ducts are completely exposed.

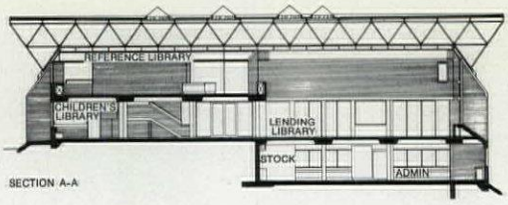
Maidenhead Central Library

The roof of the Maidenhead Library is a clear span space frame constructed on the ground and jacked up into position where it is supported independently from the rest of the structure on eight cruciform reinforced concrete columns.

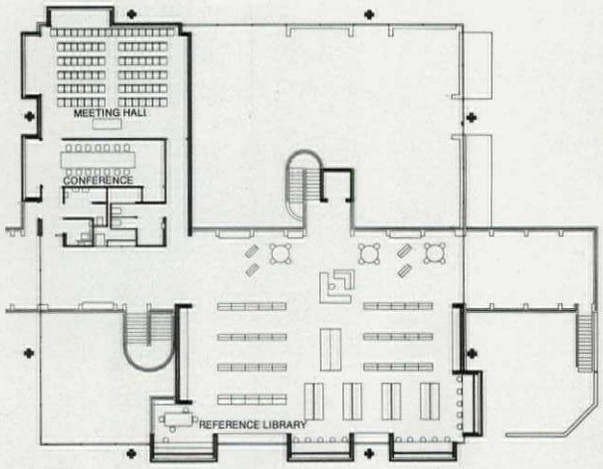
A secondary structure supports the mezzanine gallery inside. It is a classic attempt to separate the sheltering structure above from a supporting structure below and involves an ingenious flexible gasket in the upper part of the glazed skin to allow differential movement between the topmost glass which is fixed to the roof structure and the remainder that is fixed to the supporting structure below. One of the principal elements of the supporting structure are the bay windows with their upper parts steeply splayed back at the same angle as the roof truss and roof glazing. These bays, in a manner very characteristic of ABK's designs, perform a multitude of functions: sometimes as supporting structure they hold up the mezzanine gallery, sometimes they rise through the space supporting nothing but themselves, on the ground floor they contribute the profile of the interior space providing protected alcoves for a variety of functions—sitting, reading, browsing, shelving—sometimes glazed, sometimes solid; sometimes the upper parts of their sloping hoods become sheltered niches for readers above in the reference library. On the exterior they become a principal modulating element of the facades.

On the north side of the building is a wide public plaza shaded near the building by a superb cedar. This space connects one of the main access routes from the central bus station, across a small brook, to the town —in other words it is a busy route with shoppers, families, schoolchildren, constantly passing by able to see into the exhibition area at the corner of the library which is open and welcoming.

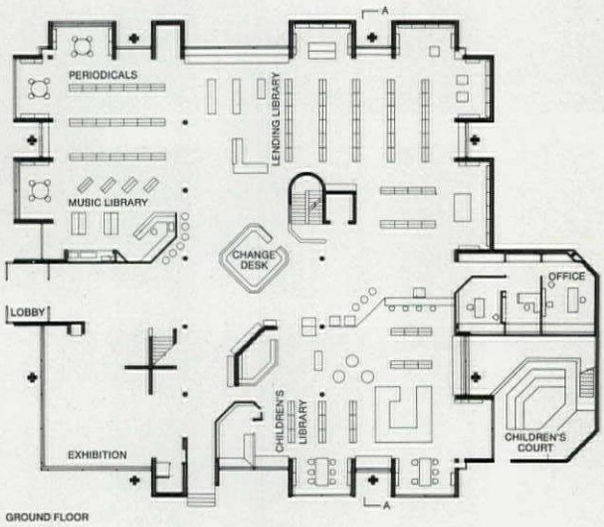
Of these three buildings, the Maidenhead Library most completely resolves its own inner complexities and follows through its own programmatic logic to the smallest detail with a panache and verve that is confident and convincing. The designer's determination to squeeze every last drop of drama and interest from site, program, structure, space and materials may involve what appears to be a tortuous structural logic, or even as so often in their work what seems to be a will to complicate, but in this case they have succeeded in fighting their way out of most of the corners and have made a place positively enjoyed by the people using it. The people of Maidenhead are reserved and doubtful about the unfamiliar exterior of their new library—but they seem to have no doubts at all about the pleasure of using the building inside. Perhaps the manifest enjoyment will eventually reveal to them that outside and inside are not so very different but each part of the same whole experience.



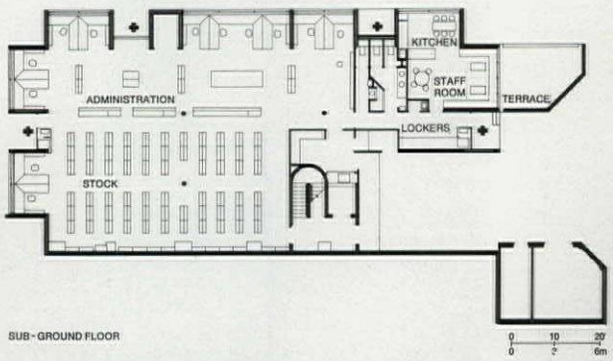
SECTION A-A



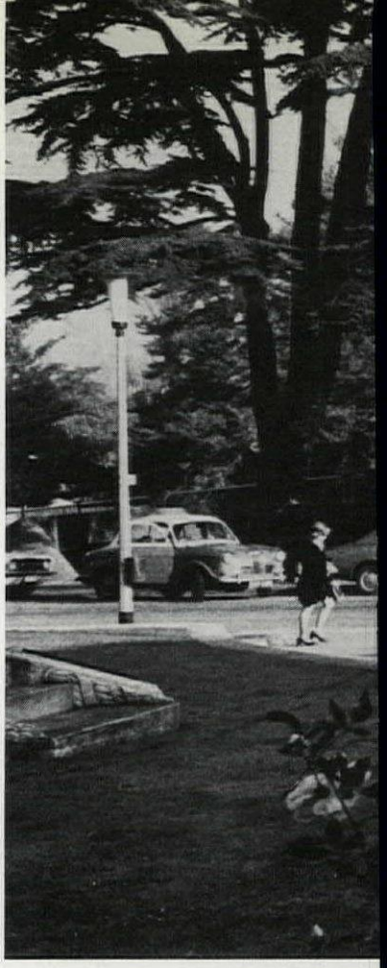
FIRST FLOOR

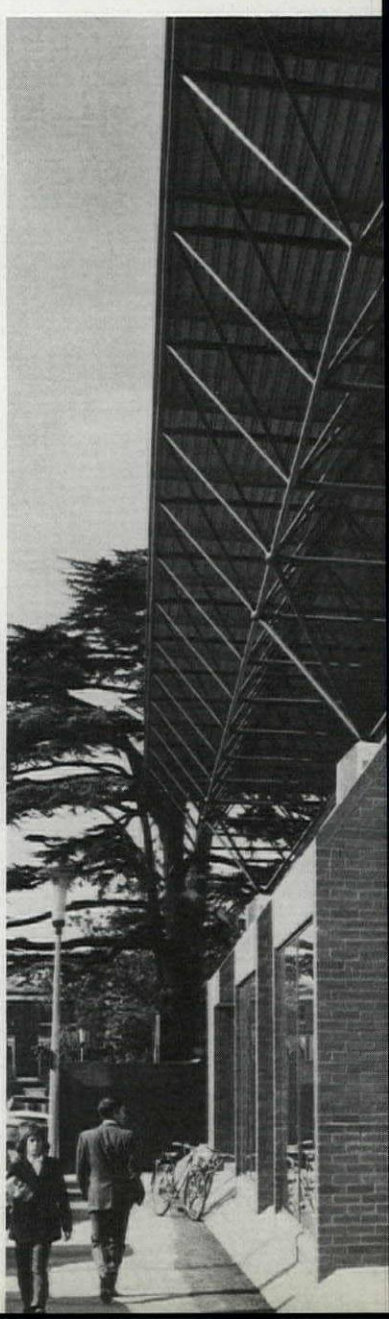


GROUND FLOOR

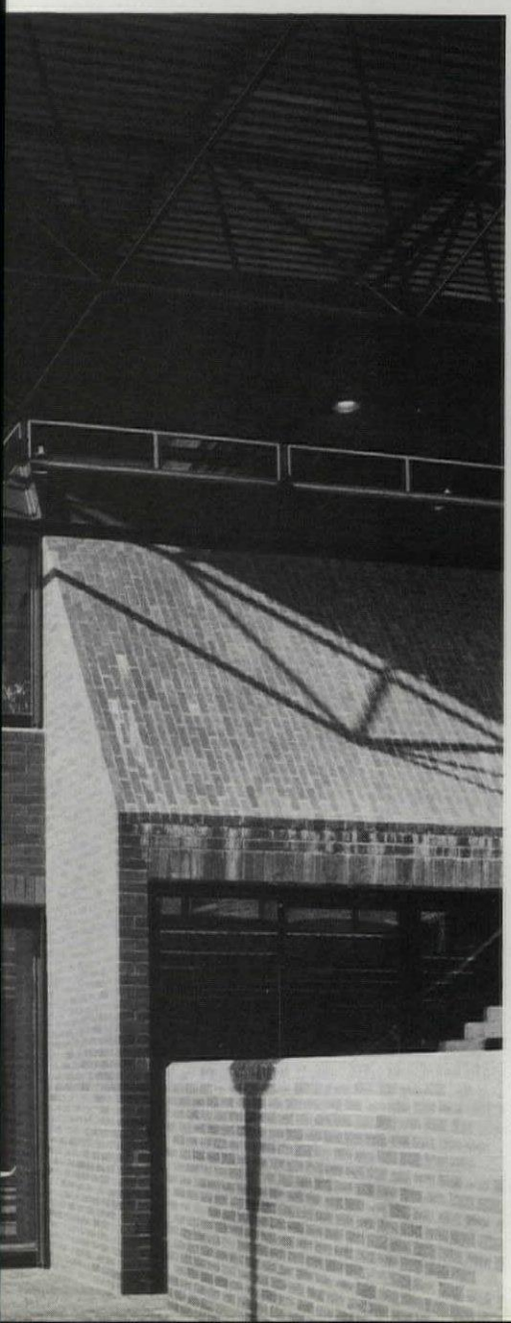


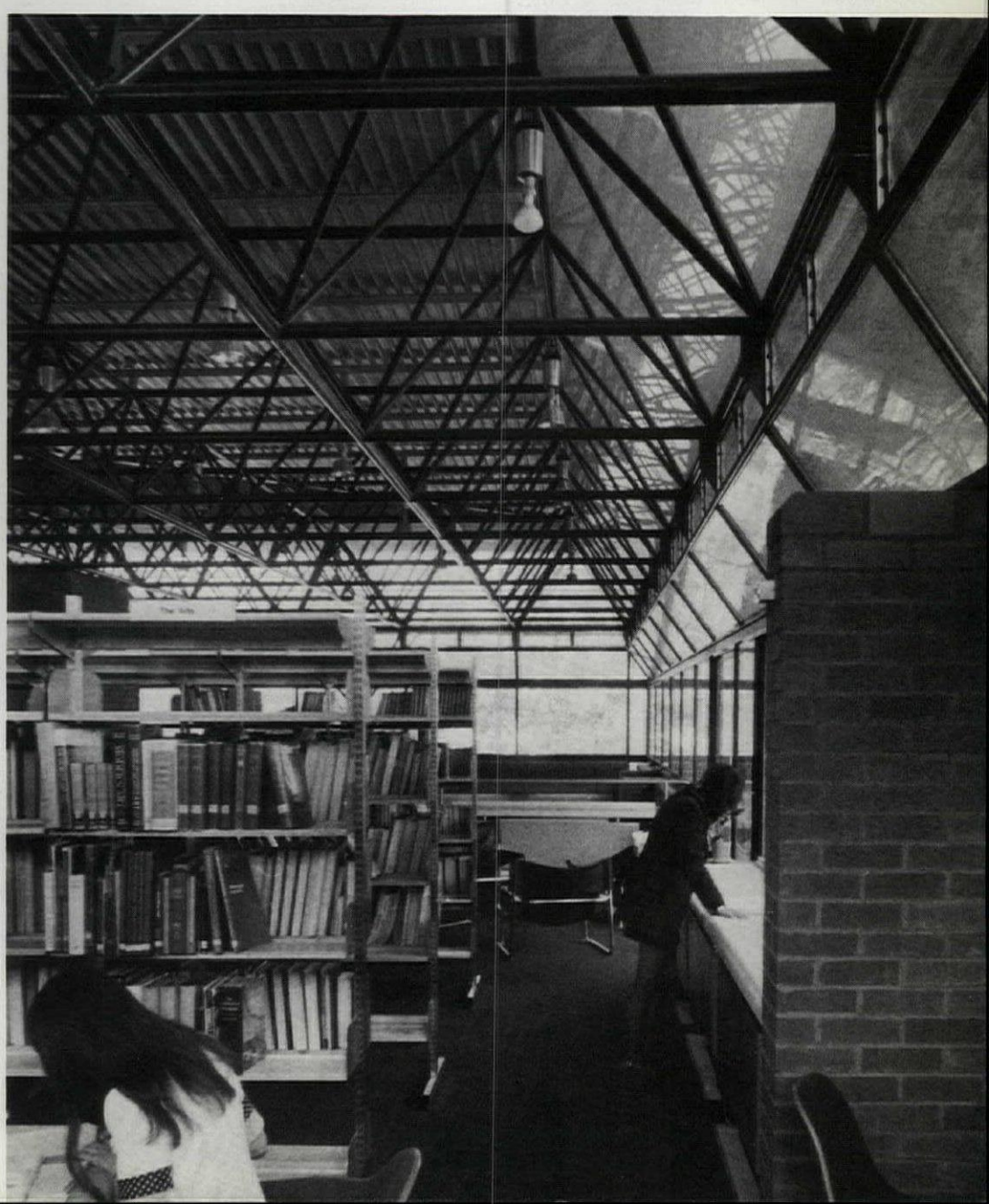
SUB-GROUND FLOOR





Above right, the space frame has a maximum clear span of 80 feet above the separate structure below. At right, brick elements repeat the angle of the space frame members. Far right, an interior space directly under the 5′-6″ deep roof structure. Angled glazing is fitted between space frame members.





St. Andrews College

St. Andrews College in Booterstown, Dublin, covers an extremely large area, predominantly single story, with an extensive and intricate perimeter, set in a thickly wooded site so that, disconcertingly, you never really feel you have seen "the building." It is not a thing but a place: an open, uninstitutional interior full of ideas about the nature of teaching and learning, of movement, light and sparing but effective color.

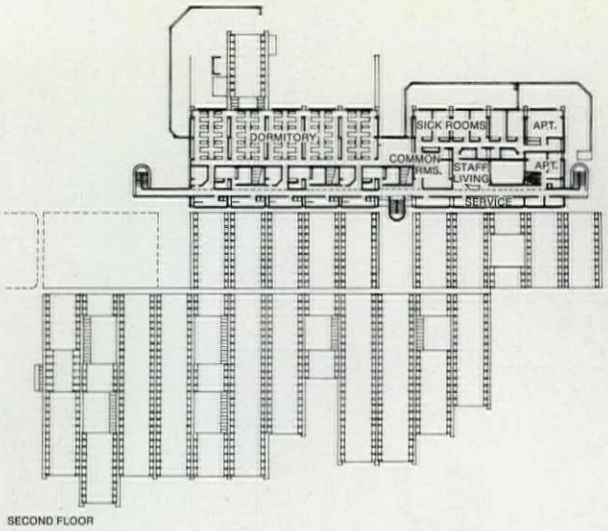
There are two main spines of circulation that run parallel either side of two combined assembly halls (the largest spaces at the center of the building). At right angles to the westerly spine route, cross-ways lead to single story clusters of teaching rooms planned around an informal house-room. The cross-ways are alongside open courtyards, the houserooms are glazed on two facing walls, so that the system of secondary circulation (repeated in varying ways throughout the teaching parts of the building) never suffers the atmosphere of institutional corridors.

The structure consists of reinforced concrete columns and beams at 22 ft. 0 in. centers with plywood box crossbeams at 4 ft. 0 in. centers capped by a continuous rooflight. The roof structure also distributes services which are easily accessible at any point on the grid. Fluorescent tubes on the underside of the plywood box beams provide artificial lighting.

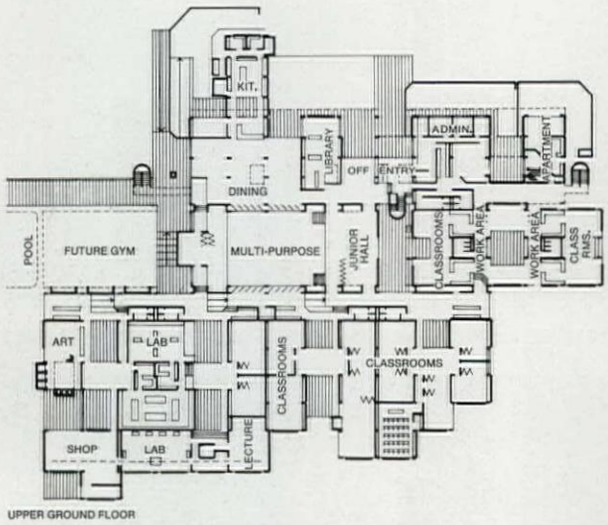
It is the kind of system for structure, daylight and services that, given a relatively simple skin enclosure, would work very well. But the perimeter, corners, re-entrant angles and junctions are not simple at all. On the contrary they appear to be the consequences rather than the objectives of the design process.

Like many ABK buildings, you are aware that the architects enjoy wrestling with these complexities: trying for that difficult and magic combination of idea, plan, structure, services, lighting, materials, color and furniture which will at last come together in an inevitable and satisfying way. Only at St. Andrews it never quite does—there is always that one elusive degree of complexity that remains unresolved.

These dissonances in the orchestration, or the feeling that the conductor is not in absolute control of his players, do not in the final analysis inhibit thematic ideas that are developed to give a rich and varied choice of interpretation to the user. From the smallest study/tutorial spaces (which can be enclosed and private or opened into their adjacent classrooms) right through to the assembly halls, eastern spine and dining area which can be opened up into one vast social space, it is a building whose success will not be measured by the junction of one material with another, but precisely by choice, interpretation and use.

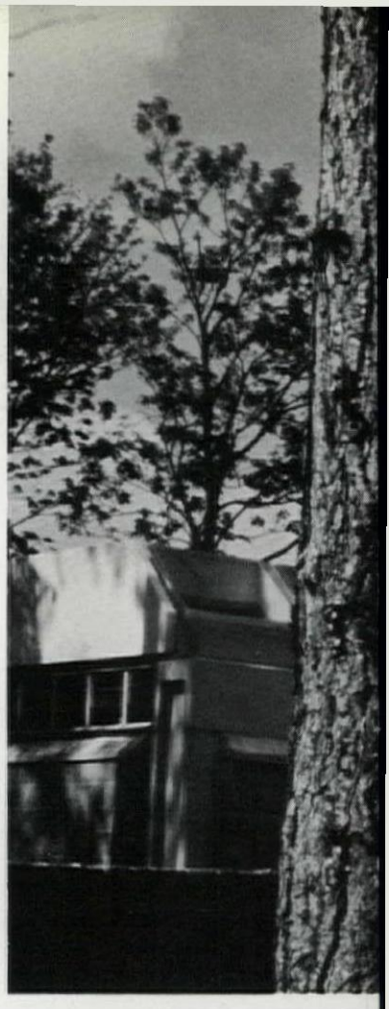


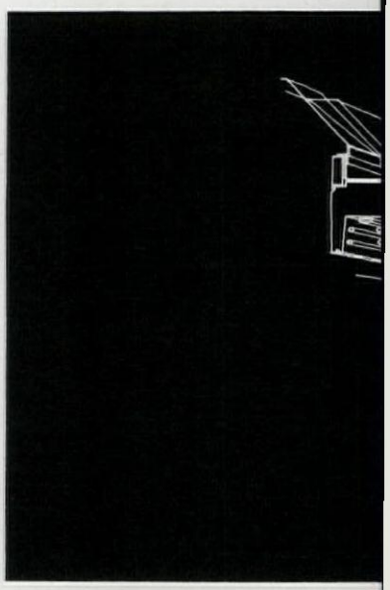
SECOND FLOOR



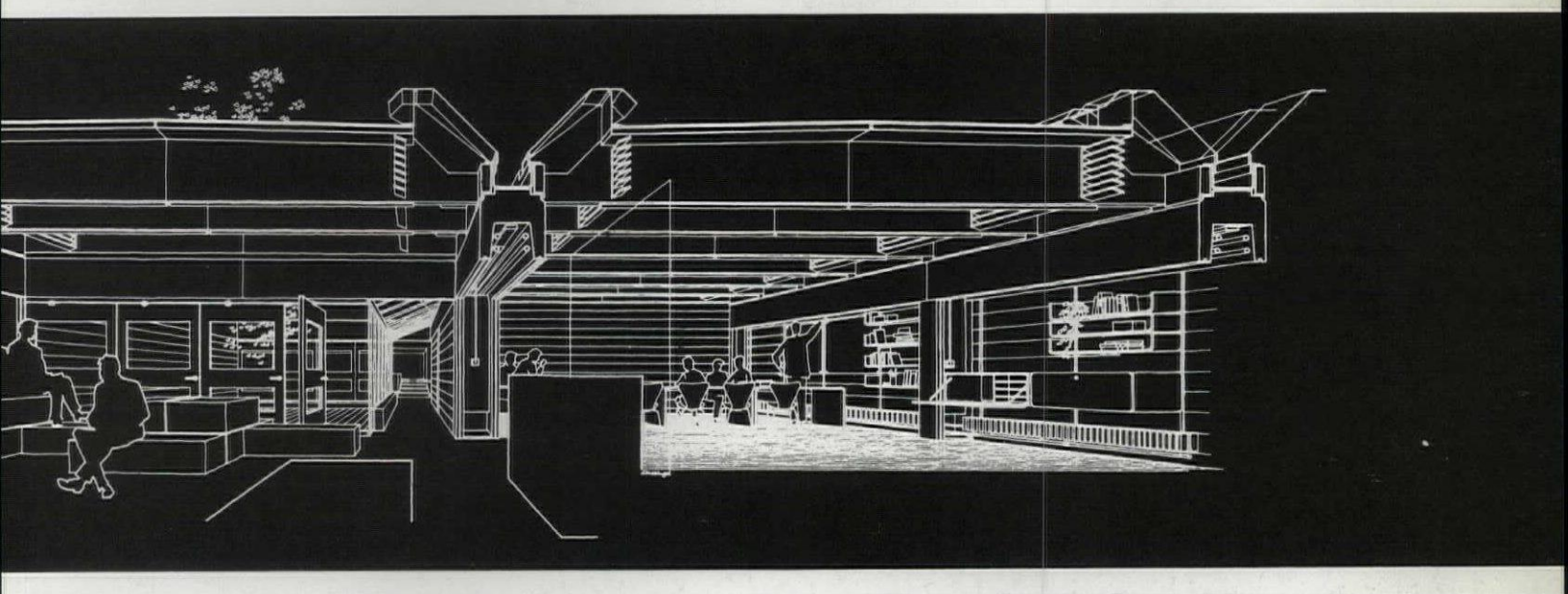
UPPER GROUND FLOOR

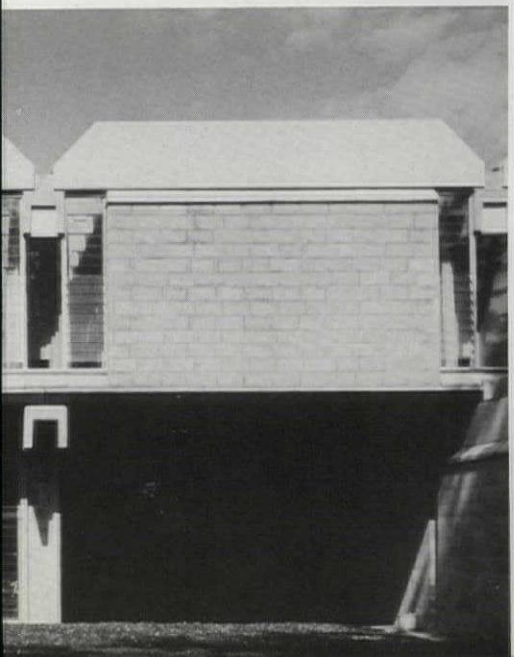
Right, simple materials in complex combinations: The basic structural/lighting system of concrete beams edged with skylights is repeated throughout the school and made apparent both on exterior elevations and in interior spaces.

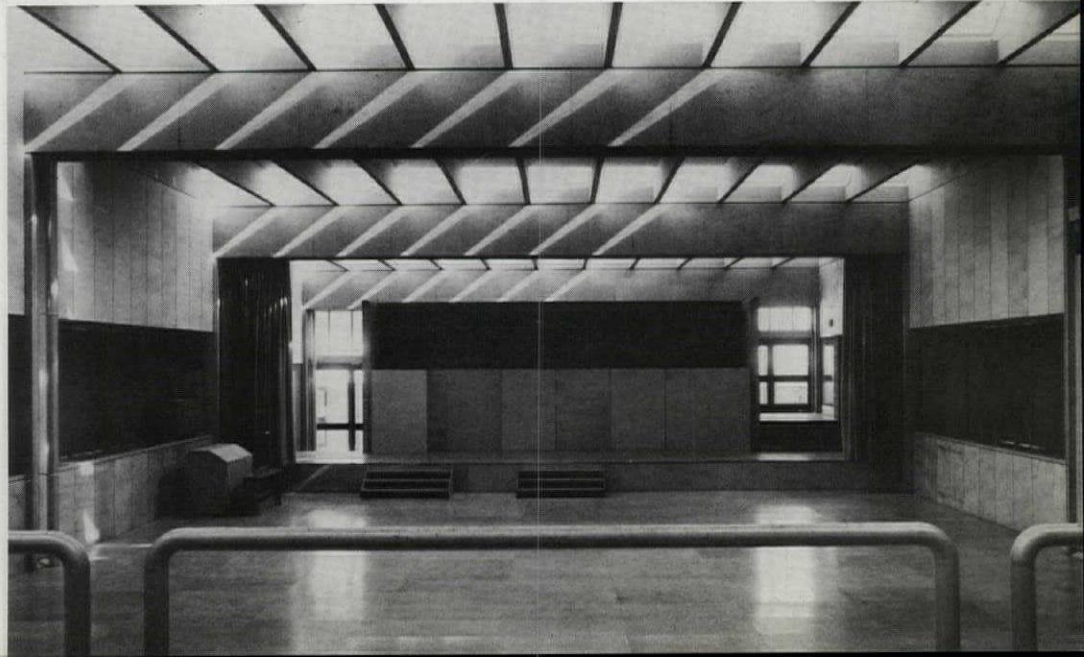




Photographs (except first page): John Donat



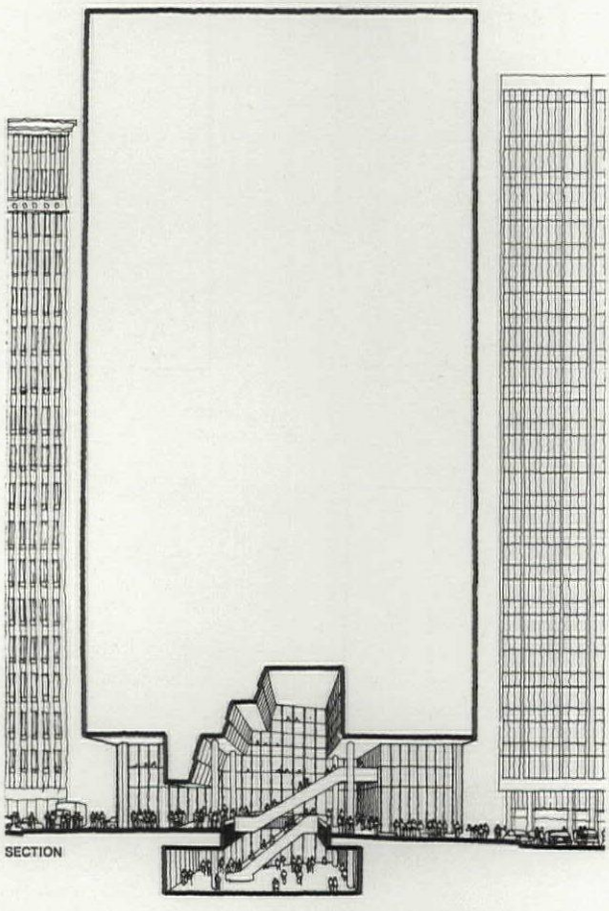




GALLERIA

The 21 story building at 100 William Street brings a renewed touch of humanity and dignity to New York's financial district

by Edward K. Carpenter



Left, the view through the open galleria, across William Street, is terminated by a Wall Street landmark: York and Sawyer's 1924 Federal Reserve Bank. The view at upper right is into the galleria from the intersection of William and Platt Streets.

Five blocks north of Wall Street in Manhattan's financial district stands a new 21-story office building on a small (18,435 sq. ft.) site bounded on three sides by the narrow, congested streets of old New York. Yet on the tight site, the architects, Davis, Brody & Associates in association with Emery Roth & Sons, introduced a bit of yesterday brought up to date—a galleria. Actually a covered pedestrian space—the 80-foot-high interior space is easily the most striking feature of 100 William Street.

Covered pedestrian space is merely what has become jargon for a galleria passing through a building, usually open at each end and lined with retail shops. Yet in this case, the retail facilities are located on two levels, one below the street, and the galleria's height penetrates the office tower so that three floors overlook the space. And 100 William Street is the first in New York City to take advantage of a local ordinance providing builders with additional rental space, based on a multiple of space taken by a galleria.

Indeed the law, which has seen some revision since the building was completed, was hammered out by the City Planning Commission, the Office of Downtown Development and Davis, Brody & Associates-Emery Roth & Sons while design was actually underway. Basically, it offers a bonus of 11 square feet of building space for each square foot of covered pedestrian space. At 100 William Street, this space came to 5,028 sq. ft. and, multiplied by 11, permitted owner Sylvan Lawrence to add 55,308 sq. ft. to his building.

To qualify, the covered pedestrian space must be a minimum of 25 feet wide and 150 feet long. If longer than 150 feet, it can be 30 feet wide. Other refinements in the law state that shops flanking the covered pedestrian space must not include banks or travel offices. Moreover, 50 percent of the space must be filled with retail shops of no more than 25 feet frontage; the remaining 50 percent can have up to 40 feet frontage.

There is also a bonus square footage allowed for a connection with a subway. Plans went ahead to connect 100 William Street to subway lines beneath John Street. But after steel work had started up, it was discovered that, because of a bank vault and generating equipment beneath the street, a connection there would be prohibitively expensive, and the plans were temporarily dropped. Knockout panels at basement level will make such a connection feasible at a later date.

At the time the law was originally forged, it made no distinction between gallerias open to the street at either end and those closed behind doors and air conditioned. But the difference is indeed great. A closed galleria becomes part of the building, an open one part of the street.

Edward Carpenter is an architectural writer and a Contributing Editor to Design and Environment.

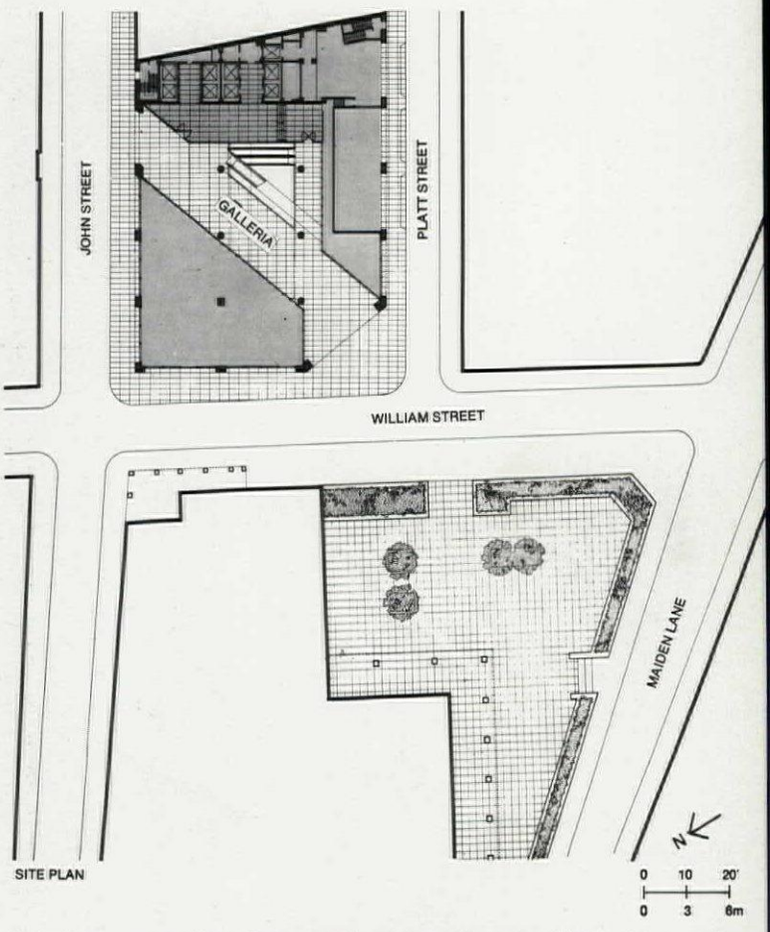
The architects, their client Sylvan Lawrence, and the City Planning Commission's Urban Design Group realized the advantages of the open galleria, used it, and touted it. And eventually the legislation was amended to make open-ended, covered pedestrian spaces mandatory.

At 21 stories 100 William Street is not a tall building, yet its thrust is vertical. The vertical line of the pillars at its base carries straight to the roof, and its narrow strips of horizontal windows offer perfectly proportioned punctuation to this vertical momentum.

Although the eastern elevation rises straight and uninterrupted from street level to roof, it appears to rise from a carefully defined pedestal base, like its neighbors. To the east, the site is backed by conventional office buildings of an earlier era distinguished by carefully defined bases and ornate horizontal bonds of exterior decoration, which break the rhythm of the ascending floors of offices. The architects retained this effect by setting back the first and second story windows within the wide spaced pillars of the base. As your eye runs up the facade, you notice that the third story windows are also recessed, slightly, so that your eye is drawn gradually to the sheer vertical rise that races from that point to the roofline. Seen along John Street, the building, though sleek and contemporary, fits the mood and the framework of the other buildings on the block.

Part of this blend comes from color. The older buildings in the area are of stone and brick, either red or buff. The seven and a half foot high slate slabs on the facade of 100 William Street are gray, but a high mica content gives the building a sparkle that is almost ornate, like the terra cotta ridges and inlays of the older buildings. The effect is not unlike that of a stately banker with a twinkle in his eye.

Though much handsomer than any of its immediate neighbors, its height and bulk fit the area exactly, neither diminishing its own stature and elegance nor overpowering the lesser virtues of others. It is a building of great strength and dignity, tempered, because of its covered pedestrian space, with humanity . . . something any city could use more of.



SITE PLAN

Left above, an escalator from street level to an insurance firm's offices on the second floor. Right, the corner of the building facing a small existing plaza has been sliced at an angle above the galleria entrance, thus providing a more inviting aspect. On the following pages, the tallest area of the galleria seen from the third floor level, and the building's rough slate facade seen with SOM's Chase Manhattan building and some older Wall Street neighbors in the background.

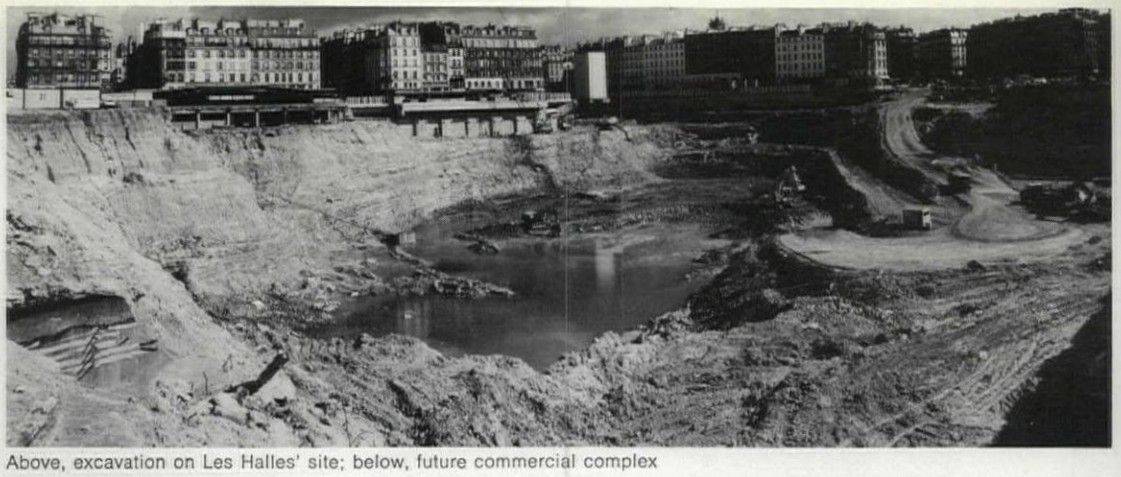
Facts and Figures

100 William Street. 100 William Street, New York, New York. Owner: Sylvan Lawrence Co. Architect: Davis, Brody & Associates (Job Captain: Alexander Purves); Emery Roth & Sons, Associated Architects. Engineers: The Office of James Ruderman (structural); Jaros, Baum & Bolles (mechanical and electrical). Consultants: Chermayeff & Geismar (graphics). General Contractors: Diesel Construction Co. Building area: 361,050 sq. ft. (total gross); 331,830 sq. ft. (floor area for zoning purposes).

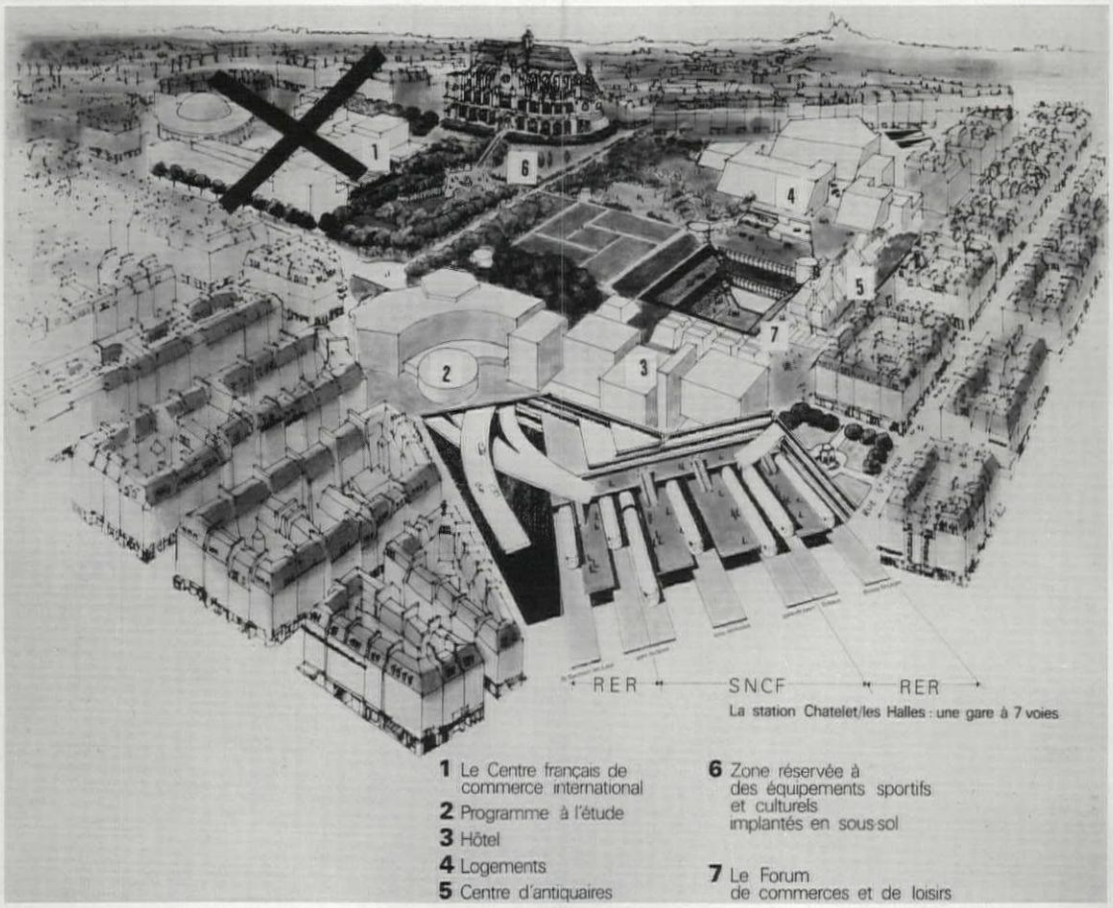
Photographs: Robert Gray, except pp. 108 and 110 by Norman McGrath.
Building suppliers listed on p. 130.

news+

Continued from page 43



Above, excavation on Les Halles' site; below, future commercial complex



Urban earthwork

A spectacular 25-acre excavation pit marks the site of Les Halles, Paris' covered central market. The 1,200 food wholesalers have been moved to the outskirts of the city. Baltard's historic 19th-century cast-iron and glass pavilions have been demolished.

The future will bring a modified commercial complex, nestling in a traffic-free environment of sunken gardens and pedestrian walkways. The plan, approved by the City Council and undertaken with the help of city, state, and private funds is to be completed by 1980. There will be an underground shopping center (July '73 issue page 13), underground parking facilities and automobile access roads, plus a multilevel, underground mass transit center of a network that is to connect the major points of the city and outskirts, and the city's railroad terminals. A 400-room hotel, some apartments and antique shops may be built. But a major urban blunder has, for once, been averted: President Valery Giscard d'Estaing has just vetoed plans for a costly and overweening international trade center, a glass and steel blockbuster that would have been totally out of place on the site.

Girded by the uniform facades of 19th-century houses; by St. Eustache, the gothic-style, 16th-century church, properly visible for the first time in centuries; and the 19th-century rotunda of the Commercial Exchange, the Place des Halles could be one of the world's most beautiful squares. To make sure, the President has engaged an urban planner.

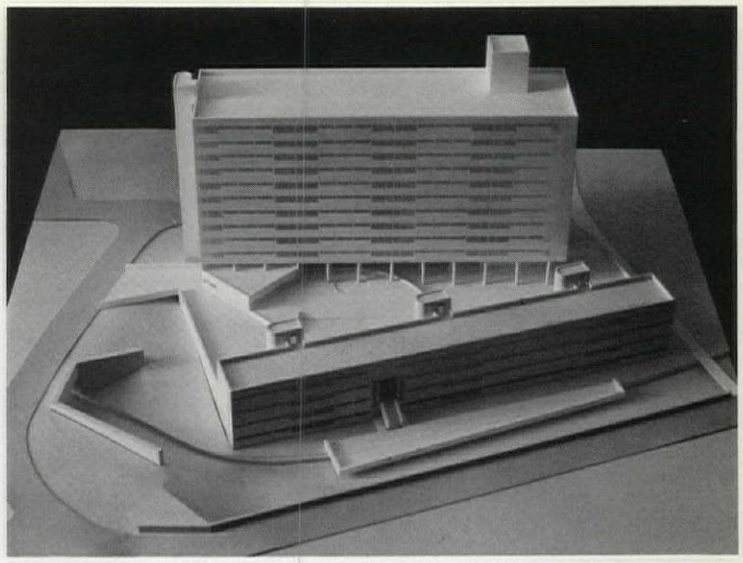
The veto has not affected the development and rehabilitation of the Plateau Beaubourg, another 25-acre area one half mile to the east. Technically a part of the Halles project, Beaubourg will be one part renovation (to contain mixed-income housing, offices, shops, and social services) and one part cultural bastion: the Centre Beaubourg. The Centre, by prize-winning architects Piano, Rogers, and Franchini, of the firm of Ove Arup, will enclose in a floor space of some 70,000 square meters, the National Museum of Modern Art and the National Center of Contemporary Art—along with other creative facilities—(i.e. the largest library in Europe, a design center, exhibition halls, theaters, cinemas, concert halls, studios for multi-media experimentation, and peripherally the Institut de Recherche et Coordination Acoustique/Musique, to be headed by Pierre Boulez.)—Eva Wyler

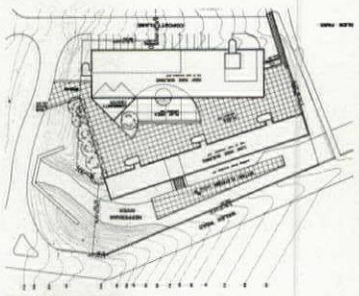
Eva Wyler is a free-lance writer on art and design.

Bicentennial bits

Numerous projects are beginning to bubble up all over the U.S. in anticipation of the country's 200th birthday. A few of the latest are:

- The French government will stage sound and light programs at Mount Vernon, the home of George Washington in Virginia. Marshall Lafayette, who did so much for the young nation in its early struggles for independence, visited George Washington there.
- The Olivetti Corporation of Ivrea, Italy, (PLUS, Sept. '73) is planning to publish an elegant book on the history of American hand tools, as a gift to the people of the U.S. on their 200th birthday. The tools are being photographed by Hans Namuth; the book is being designed by Irwin Glusker, penultimate Art Director of *LIFE;* and the text will be written by Marshall B. Davidson, an editor at American Heritage Publishers and formerly curator of the American wing of the Metropolitan Museum of Art.
- The automobiles in the District of Columbia, will have red, white and blue license plates.
- The Statue of Liberty's torch is being repaired. New batteries?
- An exhibit, "The Age of Franklin and Jefferson," is being designed by Charles Eames. It will travel to Paris, Warsaw and London before touring the U.S.
- A red, white and blue American Freedom Train, with documents, artifacts and folk art, will "bring the Bicentennial to every town and village in the country." Well, those that have tracks anyway.
- Fifty-one books, with the history of each state, and one for the District, are scheduled to be written by a distinguished citizen of each state. The million-dollar project is under the editorial direction of the American Association for State and Local History and is funded by the National Endowment for the Humanities. W. W. Norton & Co. will publish the volumes over a two-year period. "We don't expect to get rich," says a Norton senior editor.





St. Casimir

Now in working drawings is this 212-unit housing group for Yonkers, New York, by architects Charles Gwathmey and Robert Siegel. The roof of a two-level garage will serve as a central plaza above which there will be two buildings: one two floors high on its plaza side, the other primarily open for its two lowest floors, with ten floors of apartments above. The taller building will thus completely overlook the lower one, and apartments in both will have views of the Nepperhan River at the foot of the steeply sloping site.

Named for a neighborhood church, the St. Casimir housing is being developed by the New York State Urban Development Corporation for families of low and moderate income. Construction will begin in the fall.—S. A.

Two-car, trial-run commuter trains

The state of the art

A train consisting of two cars is making test runs in five U.S. cities (New York, Boston, Cleveland, Chicago and Philadelphia). Its advantages, besides soft seats and big windows, are said to include very smooth braking and take-off, and noise control. The cars, called "The State of the Art" cars, will fit most existing subway rails and will deliver a more comfortable ride.

The gleaming stainless steel train has already finished its trial on the New York subway system. It ran on various routes, unannounced, startling that city's long-suffering commuter population, many of whom have grown up believing that subway trains run on square wheels. Most passengers were delighted. We heard one remark to his friend as he got off, "Man, this train really blows my mind." Others, distrusting what they saw as the doors opened and revealed the plush carpeting, refused to get on, preferring to wait for the next, more familiar grimy train. The project is sponsored by the Urban Mass Transportation Department of the Department of Transportation.

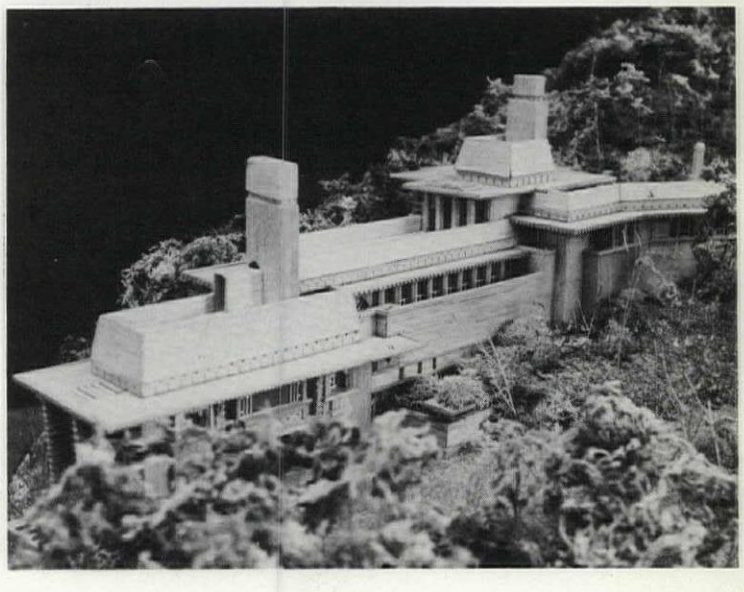
These trial-run cars are probably the last new cars any of the test cities will see for a good long time. The U.S. House of Representatives voted during the summer to defeat a move to give $800 million in Federal subsidies to urban mass transit systems. The voters, it seems, don't live in center cities

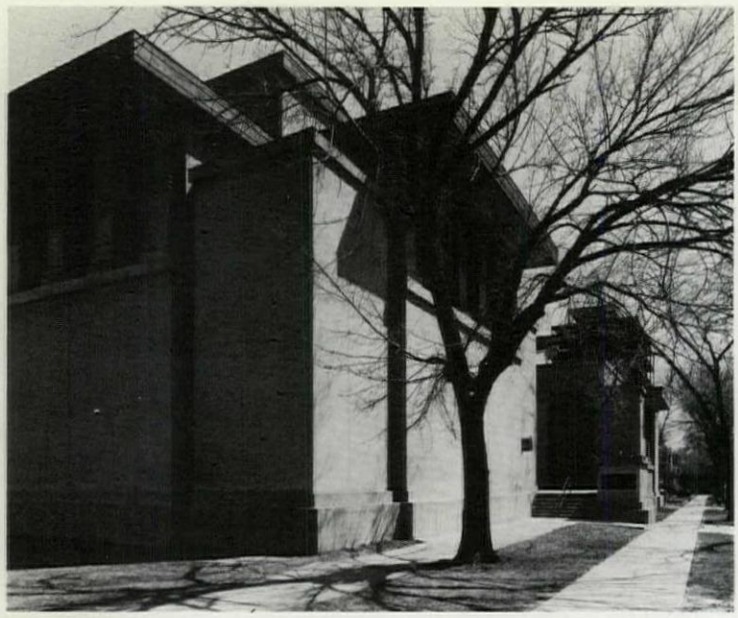
Wright in Japan

An exhibition called "The Architecture of Frank Lloyd Wright in Japan" took place in June at the Takumi Gallery in Koriyama City. Shown here is a model of the Yamamura House, now the guest house of a steel company. It has been declared an Important Cultural Property by the Japanese Government, which failed to so designate Wright's Imperial Hotel, destroyed in 1968.

A group under the direction of Masami Tanigawa, associate professor at Nihon University, has made surveys of the remaining Wright buildings in Japan, and their detailed drawings were on display; originals do not exist.

The 1918 Yamamura House is the most recently built structure to be officially preserved. A reinforced concrete building, it is on a sloping site in Ashiya, not far from Osaka. It survives, together with the Jiya Gakuen School and the fragments of the Hayashi House, as the legacy of Wright's Japanese interlude.—H.W.



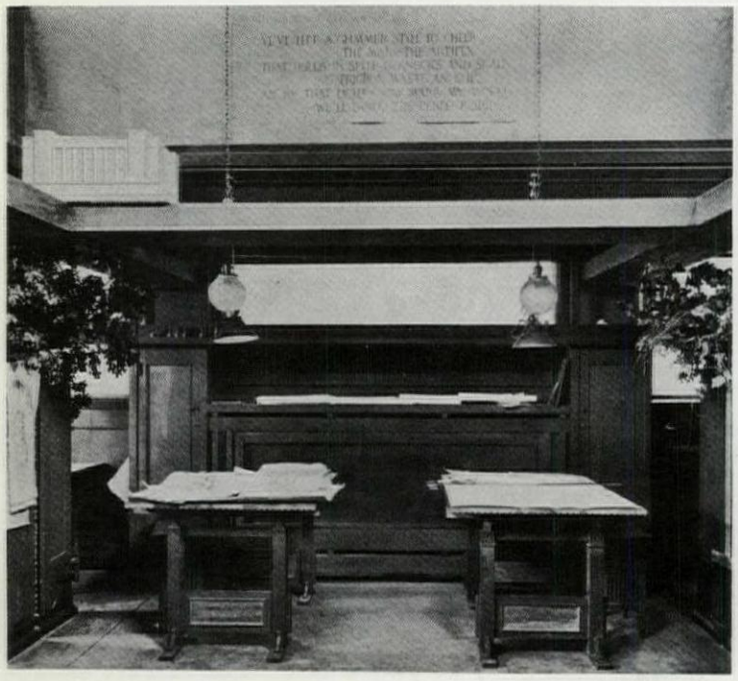


Unity seeks aid

Frank Lloyd Wright's famous Unity Temple, built in Oak Park, Illinois, in 1906, has undergone several years of restoration and maintenance work, but more work is needed, and an estimated half million dollars is required to give the building a secure future.

A major offer toward that goal has come from the Edgar J. Kaufmann Charitable and Educational Foundation, already the largest single contributor to Unity's restoration efforts and also the donor of the endowment which maintains another Wright masterpiece, the Kaufmann family's "Fallingwater." The Kaufmann Foundation offer to Unity is for $250,000 towards an endowment fund, the offer being good for three years, during which time it must be matched by an equal amount from other sources. Such other donations (tax deductible) should be sent to Unity Temple Restoration, c/o Poplett and Thomson, 130 S. Oak Park Avenue, Oak Park, Illinois. Unity is, of course, a pioneering building in the use of reinforced concrete and a work of undisputed genius; its fate should not be allowed to remain precarious.

Elsewhere in Oak Park, a newly-formed citizen's group has purchased and will restore the Frank Lloyd Wright home and studio. Wright designed the house in 1889 when he was 22, and he lived in it with his growing family for 20 years. It was built with a $5,000 loan from Adler and Sullivan, the Chicago architects who employed him, and who later fired him upon learning that he was designing houses there in his off hours. The group intends to restore the house and studio down to the smallest detail, to recreate them exactly as they were during Wright's occupancy. Since Wright, ever adjusting, enlarged and altered the place several times while living there, it may be a difficult task. His oldest child, Lloyd, also an architect, has agreed to assist in the restoration.



Saving the stations

At one time Indianapolis was known as "Railroad City." Then, as times changed, and almost no trains stopped there, its Railroad Station fell into disrepair. But when it was suggested that the 1888 Romanesque Revival terminal be torn down, the City and Private Development got together and arranged to save it by restoring it and giving it a set of new uses.

In honor of this event and other recent station "saves," and in the interest of the 20,000 stations that still need attention, on July 22-23, Indianapolis again became "Railroad City" to two hundred and twenty-five people who gathered there from all over the United States for a "Reusing Railroad Stations Workshop." It was a "call-to-action" meeting, well organized by the National Endowment for the Arts (NEA) in Washington, and Educational Facilities Laboratories (EFL) in New York, and well attended by architects, mayors, planners, legislators, bankers, developers, preservationists and Amtrak. To prepare for it, NEA funded a book ("Reusing Railroad Stations"—a how-to/report-in-progress, researched and written by Hardy Holzman Pfeiffer Assocs.) and a classy documentary film called "Stations" (which showed something of the history of railroad stations and the problems that face them today).

The conference was a great success. Preservation almost always starts too late, and buildings are saved by confrontation rather than strategic planning. The participants at this meeting were suggesting a more systematic approach that would institutionalize the preservation of railroad stations and thereby set a precedent for other threatened landmarks. As one of the speakers said on the first day, "What we are *really* talking about at this conference is taking all worthy old buildings and *using* them."

There were constant reminders that preservation has become a real profession. The one-upmanship of the old days has given way to serious discussion of costs, politics, new uses, and laws. There were no sentimental slide shows. Of course, the analytical approach exposed some of the practical, legal, and economic problems that have not been solved, but it is useful to know what they are. And it is already time to watch out for overkill: for instance at Union Station in Washington, D.C. (one of the few busy terminals left in the U.S.) the trains are being moved out to make way for a new use, the National Visitors Center, which will be opened in time for the Bicentennial. It is clear that new uses must bear some basic relationship to original functions, and it is surprising that the Federal government will not begin by supporting *in situ* passenger service facilities, especially in view of its present commitment to Amtrak. There would still be plenty of room for auxiliary activities.

Railroad Stations are remarkable embodiments of American history and the American way—they express all the inventiveness, arrogance and industry that were behind the development of this country and our love for money, splendor and speed. And now they symbolize the problems that attend the preservation of all landmarks: they come in all sizes, shapes and styles, they require imaginative redesign and reuse, they must be able to pay for themselves. The Conference Workbook to be published by EFL will be useful to anyone serious about saving old stations.
—Adele Chatfield-Taylor

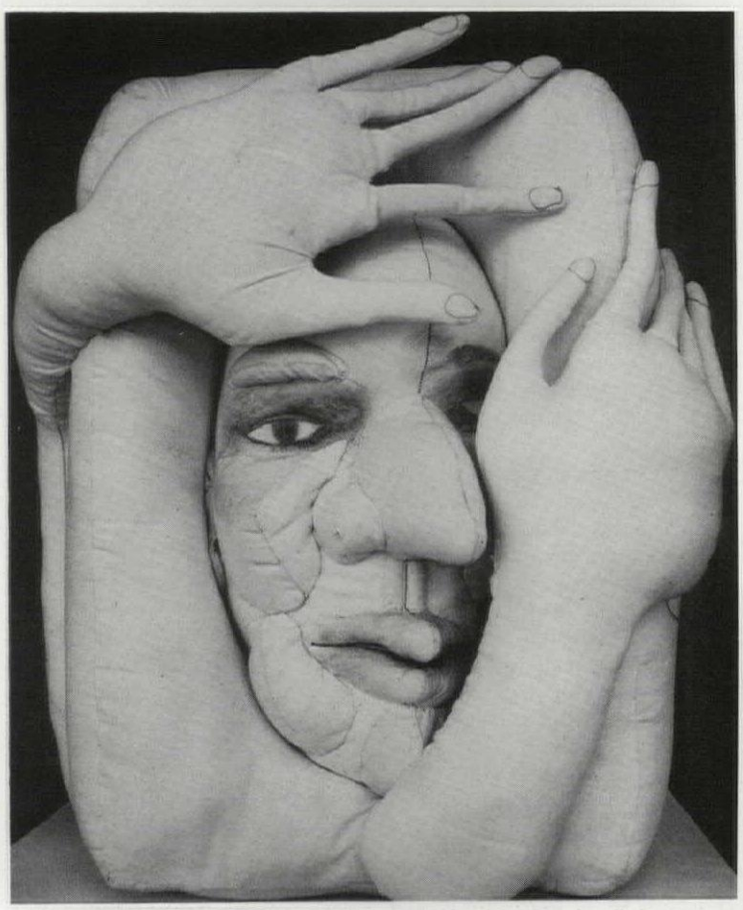
Adele Chatfield-Taylor is a preservationist with the New York City Landmarks Commission.

Conference in Israel

An international meeting on Housing for the Emerging Nations will be held in Tel Aviv December 17-20, 1974. The conference is sponsored by the International Technical Cooperation (ITCC) and the Association of Engineers and Architects in Israel. For details, write ITCC Secretariat, 200 Dizengoff Street, Tel Aviv.

People

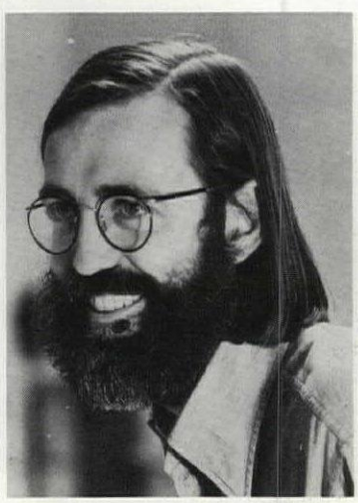
• Charles M. Correa, our Field Editor in Bombay and a distinguished architect (who joined with two colleagues to create a plan now under construction for a second Bombay to house two million people across the harbor from the present city), was named in a recent article in TIME (Europe edition) as one of 150 young (under 45) international leaders. The criteria for choosing these "faces for the future": civic or social impact, considerable accomplishments, promise, expectations and instinct.



• Lesley Jean Goldberg, sculptor and teacher, will be given a one-woman show of her "soft people" at New York's Arras Gallery in December. Miss Goldberg herself is at center right, above, and the other photographs show some of her work—padded anatomical fragments assembled in surprising (and sometimes slightly erotic) ways. Her pieces are both comic and moving.

• Kunio Maekawa, one of the first and most vigorous Japanese exponents of modern architecture, was one of the recipients of Japan's prestigious Academy of Art Award for 1974. He went to Le Corbusier's atelier immediately upon graduation in 1928, and since his return to Japan, has steadfastly championed the modern movement. His works include the Kyoto and Tokyo Cultural Centers, the Janome Building and the recently completed Tokyo Kaijo Building. In honoring him, the Academy cited in particular his Saitama prefectural Museum, built in 1971. —H.W.

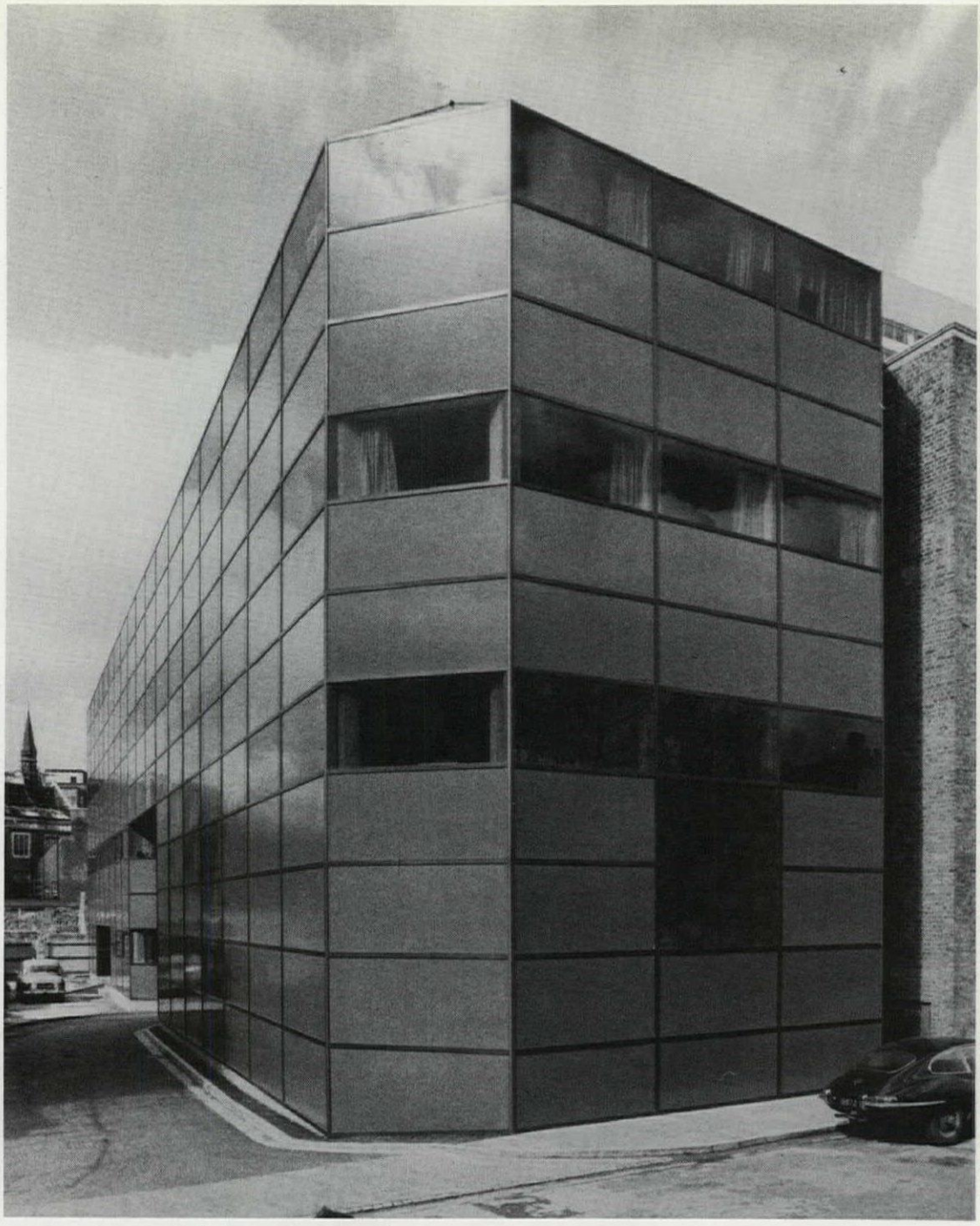
• Robert Jensen, architect/critic/writer, has joined PLUS as Field Editor in Rome. Jensen just won the Rome Prize in Environmental Design and will be living and working at the American Academy in Rome for the next two years. He has written articles for all the major U.S. architectural journals. An issue of *Architectural Record* (Dec. '71; "New Life for Old Buildings"), for which he was supervising editor, won the National Magazine Award of the Columbia University School of Journalism for the "best single issue of any magazine in 1971." He wrote "China Today: an Interview with Henry Liu" for the first issue of PLUS, Feb. '73. In addition to his work as an architect and writer, he has taught Architectural History at Queens College, New York City, and has spent one summer at Arcosanti in Arizona working with Paolo Soleri.



• Gyorgy Kepes, painter/author and founder/director of MIT's Center for Advanced Visual Studies, has been invited to spend a year at the American Academy in Rome. Professor Kepes, who is Professor of Visual Design Emeritus (and there aren't too many of those) is retiring as director of the Center in October. While in Rome, he plans to write two books: one on light as a creative medium in architecture and urban life, and the other on public art. He will return to MIT at the end of the year.

Photographs: Page 37 UPI; Page 38 (top) Agência Estado Mençao Obrigatoria; (left) David Atkins. Page 39 (left) Masao Arai; (right) Roger Goldstein. Page 40 (top) *Washington Post*. Page 41 (right) Taisuke Ogawa. Page 42 (top) Woody Kepner Associates, Inc. Page 43 (left) Keystone. Page 114 (top) Laurent Rousseau. Page 115 (lower right) Tanigawa Kenkyu-shitsu. Page 116 (top) Richard Nickel. Page 117 (left) John Veltri; (top) Masao Arai; (bottom right) Kathleen Jensen.

SURVEY

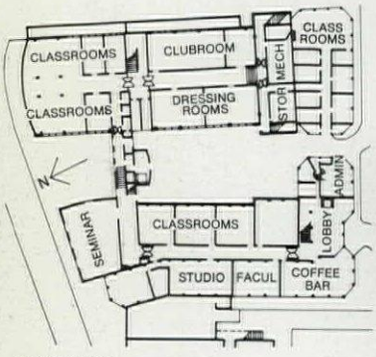


College extension in U.K.

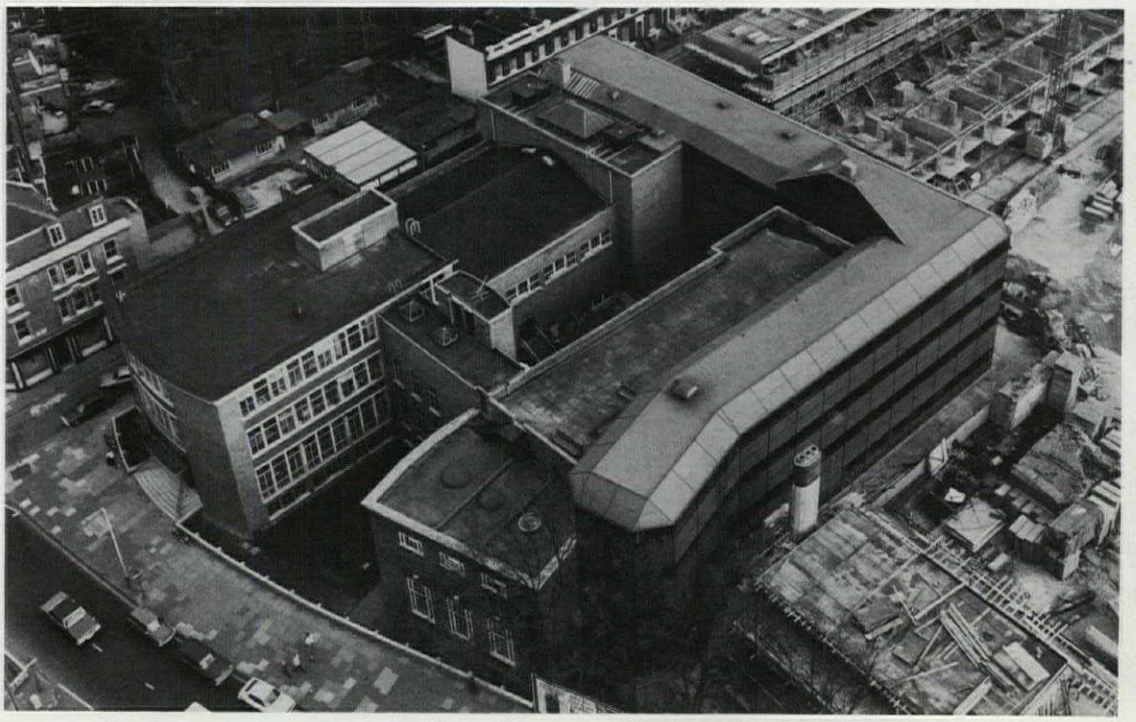
LONDON—John Winter's exterior to Morley College wraps a taut skin around the existing building no more than one room deep, filling just about every square inch of site available. As a planning solution it is ingenious and straightforward. Architecturally the quality of the skin (which is all of the building you ever see) is very successful and looks far more costly than it was.

Morley is an aided adult education college in the Westminster Bridge Road, and its origins go back to classes held backstage at the Old Vic in the 1880s. A third of its students are studying music, which made sealing the building against outside noise a prime requirement.

The addition contains a theater lab, television studio, library extension, tutors' room, bar, and classrooms. The angled corners of the new facade reflect the fact that many of the new classrooms are octagonal in plan, a design which faculty and architect think brings a desired informality to classes.—J.D.



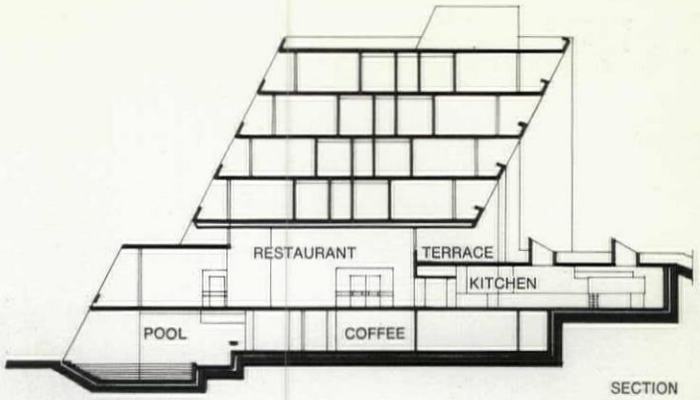
GROUND FLOOR



Photographs: Page 118 John Donat. Page 119 Wayne Soverns, Jr.

Resort hotel in Cyprus

LIMASSOL—Despite the agonies of war, construction on Cyprus prepares for an expanding tourist industry. The Amathus Hotel faces the sea on a steeply sloping hill among olive and cypress groves. The guest room floors are held above the ground as a bridge between two strong masonry end walls. Earth is bermed up on the walls of the lower floors to blend the mass into the rugged landscape. The basement level holds all of the "back-of-the-house" services, and shops and cabanas. The sandblasted finish of the poured-in-place concrete, and the bedrooms and balconies being staggered one above the other, are appropriate to the Mediterranean setting. The hotel was designed by The Architects Collaborative Inc. of Cambridge, Mass., and Fotis J. Colakides & Associates of Limassol. Near the acropolis of the ancient city of Amathus, it will have 220 rooms.



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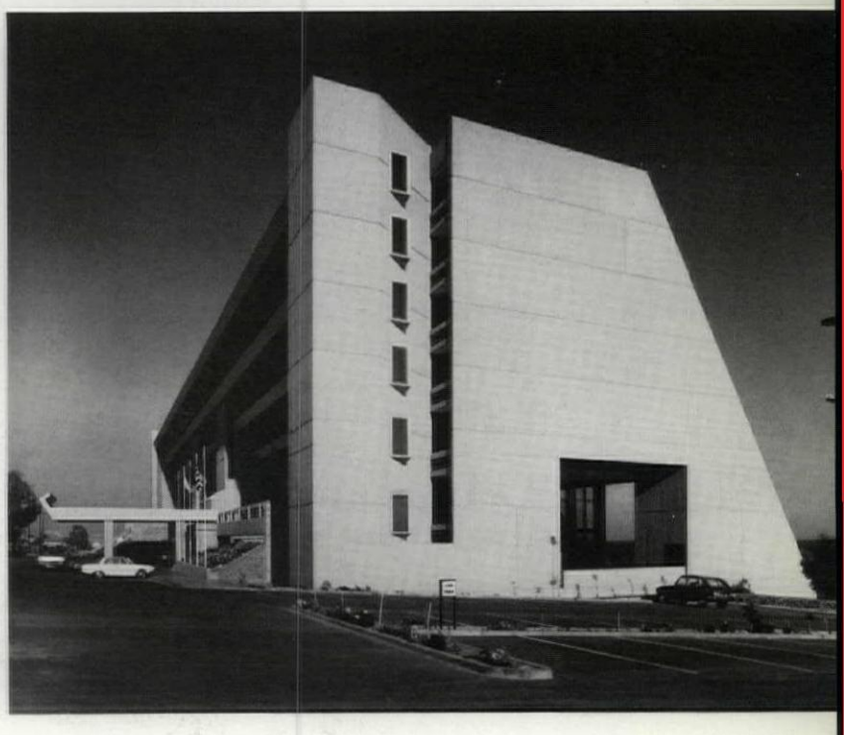

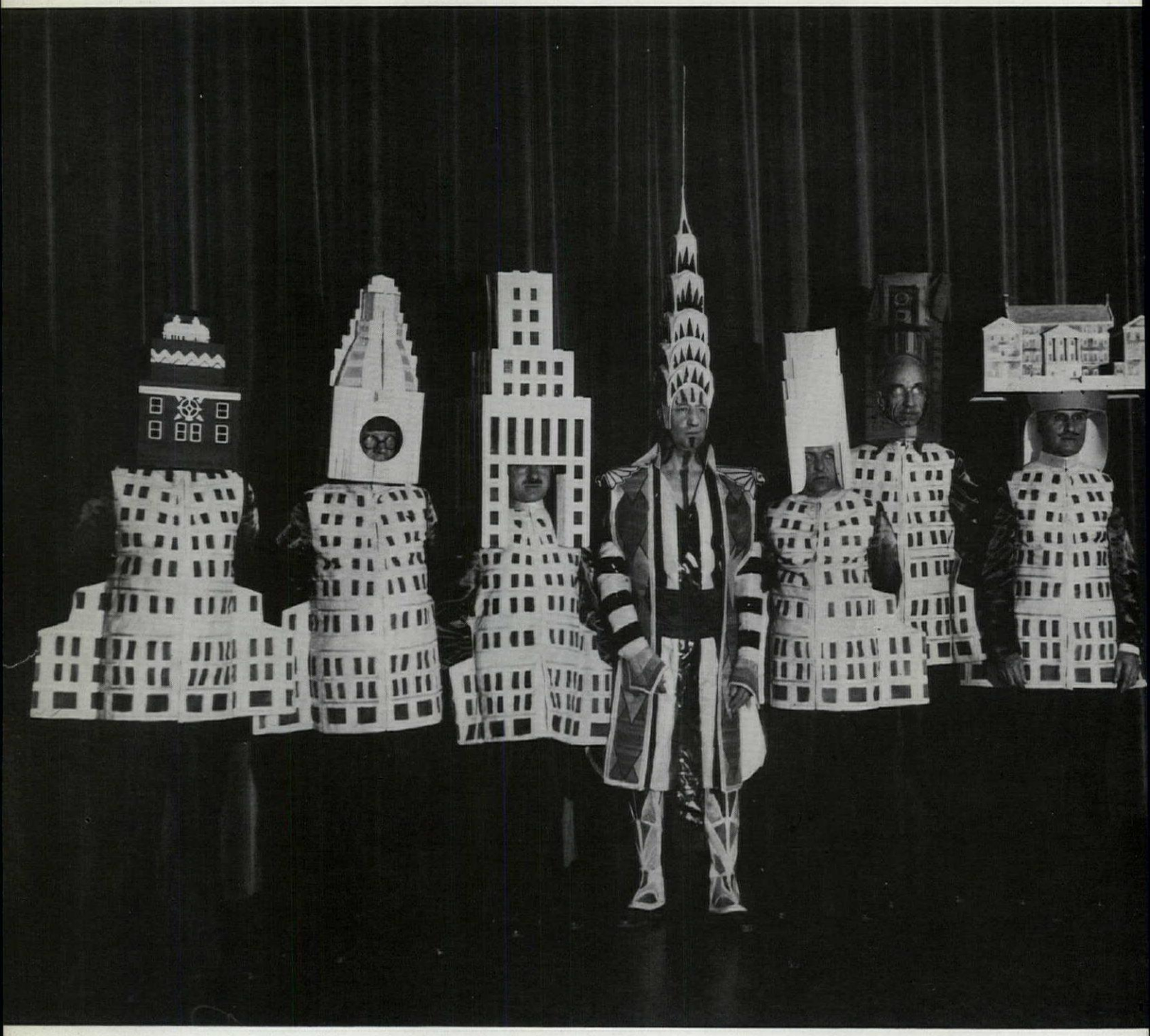

Footnote

Our recent story on the Chrysler building (May/June issue) prompted Mrs. Ely Jacques Kahn, the widow of the renowned architect (third from left), to dig out this 1931 photograph with the caption "Famous architects forming a miniature skyline of New York as they don their Beaux Arts costumes." Each architect is wearing his own building. Left to right, A. Stewart Walker, Fuller Building; Leonard Schultz, Waldorf-Astoria; E. J. Kahn, Squibb Building; William Van Alen, Chrysler Building; Ralph Walker, Wall Street Building; D. E. Ward, Metropolitian Life Building; and J. H. Freedlander, Museum of the City of New York.

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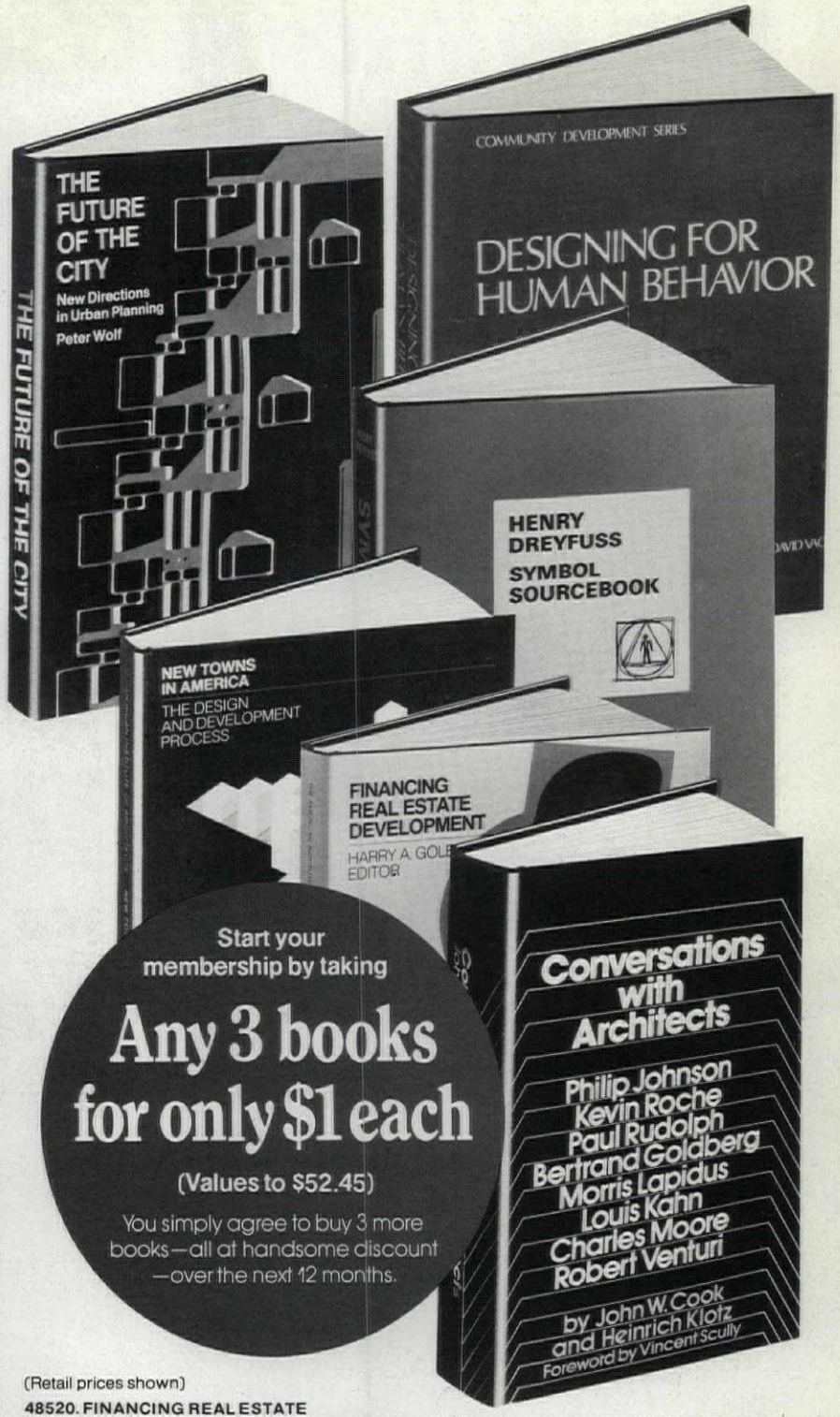

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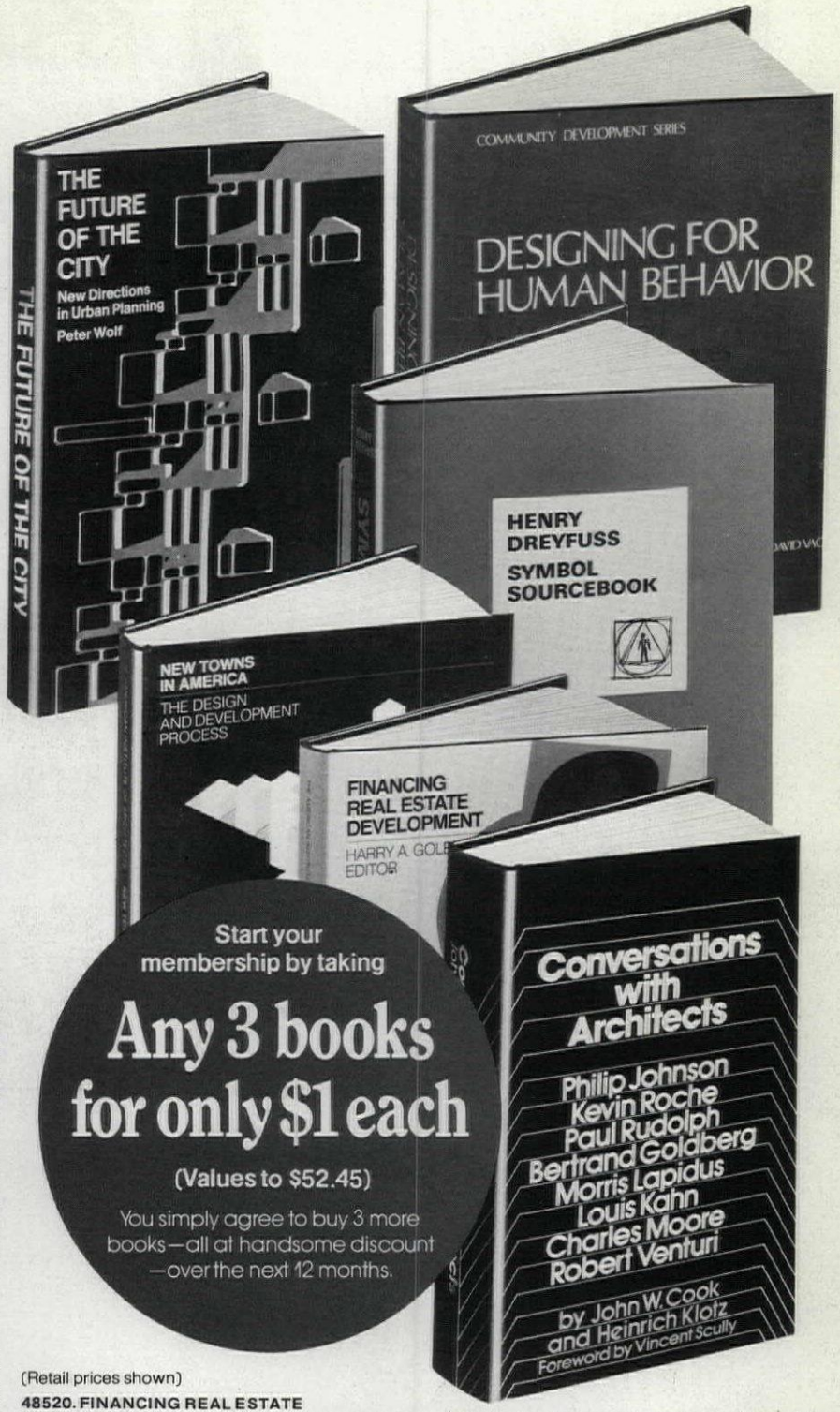

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VOCABULARY

Continued from page 71

"a psychedelic, inflatable space with built-in electronic relaxation program." [16] I suggest that the above sentence would have been all but unintelligible to most critics only twenty years ago.

Yet on the whole, the so-called hard sciences of physics, chemistry, biology, etc. may have become a bit less important to writers and designers. Instead, the soft sciences of linguistics, psychology, and sociology have become primary generators of both analytical analogies, and general vocabulary. Some of this interest may be attributed to the emergence of what is generally known as the *urban crisis*. Indeed, an adjective whose constant use ought to qualify it as one of the architect's favorite words is the word urban. Computer technology too, has had its effect; words such as input, output, system, programming, and computer simulation being especially popular.

New critical architectural analogies abound. Politically, buildings are seen as oppressive, colonial, racist, fascist, authoritarian, or as Philip Johnson justifiably complains, what seems to have become synonymous, monumental.[17] A most commonly repeated and thoughtlessly used adjective, relevant, comes directly from the political activism of the Sixties.

Linguistically, critics ask us to consider that buildings communicate messages through a *vocabulary* of forms, and that these messages are revealed through a *semiotic* analysis.[18] Mathematically, we are reminded that buildings are complex problems whose solutions may be found through *systematic programming* of *sets, subsets, hierarchies* and other systems as *coordinated* on a *multidimensional matrix* or through *topological* mathematics. Anthropologically speaking, building designers should design various *urban prototypes* according to *proxemic* data so that the imperative of *territoriality* might be preserved. Sociologically, design deals with *socio-plastics*. Psychologically, environments have images that orient people in space, time, and culture. Meanwhile, artistically, we are all urged to adopt a *non-judgmental* attitude and learn from the new forms of a *commercial vernacular*.

A realistic appraisal of ideas contained in today's terminology requires of the practicing architect and/or critic a circus-like mental juggling act of prodigious proportion. To reverse Mies' famous dictum, more and more is beginning to mean less and less!

Let me attempt to put this muddled situation back into the larger perspective of twentieth century vocabulary development.

The critical vocabulary of the twentieth century seems to have at least five primary sources: 1) from antiquity, 2) in response to genuinely new materials and methods of construction, 3) from the architectural historian-critic, 4) by analogies to other intellectual disciplines, and 5) from the practicing architect.

From antiquity come such important criteria words as *proportion, clarity, unity, commodity, utility,* as well as other inherited descriptive words—vault, dome, arch, etc. While still important, these words are featured less prominently today than in the pre-World War I period. In contrast, the rate of word generation encouraged by new processes and materials has steadily increased—*streamlined, cantilevered, standardized, mirrored, modular, geodesic, glistening,* etc. From the historian-critic come International Style, Shingle Style, space-time, etc. The last two sources of vocabulary, however, deserve closer attention.

The analogy source of new terminology has been at once most popular and most confusing. Early in the century, analogies to human characteristics were common. Buildings were routinely damned or praised on the basis of their supposed dignity, warmth, intelligence, honesty, morality, nobility or sincerity. Today's equivalent of this practice, as Constance Perin has pointed out in her challenging book, *With Man in Mind,* is the indiscriminate use of the word *human* for designs that one likes and *inhuman* for those that one doesn't. Any explanation as to how a particular design feature may be "constructive or destructive to life, . . . relative to what ideas about being human" as she puts it, is inevitably lacking.[19]

In the Thirties and Forties, other analogy words were created for a growing critical lexicon. From the biological sciences were successfully borrowed *skeleton, skin, cell, backbone, spine,* etc.; from science and technology came *scientific, efficient, machine-like, antiseptic, synergetic,* etc. But words such as *plasticity, organic, fascist, semiotic, semi-lattice, topological,* etc., that have reasonably specific meanings within their own disciplines were borrowed with less happy results. They have no specific, agreed-upon, architectural definition.

Laying aside for the moment the question of whether in fact such terminology actually is applicable to architecture, properly understanding the original term (often highly technical), translating it into an architectural construct, and then finding appropriate examples and/or designing new architecture to illustrate it has proved problematic. Thus the whole process of analysis by analogy, containing as it does original understanding, architectural translation, example selection, and finally design, involves at least four areas of often subjective interpretation masquerading as scientific. If fault can be found with some of the writings of Christopher Alexander, it is on this ground that I would begin. It is easy to understand how a particular word, having undergone a four-step process, can so easily be the victim of multiple interpretation.

But there is another issue here that the analogies seem to ignore. Architecture must ultimately be an emotional and intellectual experience basically unique unto itself. Analogies, however useful they may be in provoking discussion, aiding in analysis, and facilitating education, must in themselves be somewhat narrow. A theory based on such an analogy must at best be incomplete; at worst restrictive of creative exploration.

Another source of vocabulary is the practicing architect. Writings of Sullivan, Wright, Corbusier, Peter and Alison Smithson, and Denise Scott Brown and Robert Venturi all show examples of either vocabulary formation or reinterpretation. Since the Renaissance, architects themselves have been important sources for theory and thus vocabulary. In more recent times, Peter Smithson has stressed the importance of what he calls the *theory-practice cycle.*[20] The argument that practice is of vital importance to the formulation of theory is a convincing one. But in the desperate dash for commissions, a detached and scholarly approach is usually the first casualty. Language and vocabulary are created to sell, not explain. Thus the introduction to *Learning from Las Vegas* explains that while the book is a theoretical work, it is also an apologia for the more recent work of Venturi & Rauch. The practice of each designer or design group inventing vocabulary to promote its own latest creation has resulted in what one clever writer, Rupert Spade, has aptly dubbed "semantic drunkenness." [21]

There is another disadvantage in the theory-practice cycle. Vocabulary and theory developed by an architect inevitably are measured against the projects produced. This practice, which after all sounds like common sense, can lead to accepting bad theory and vocabulary with good architecture, and vice versa.

As new vocabulary is added to the profession, the older words do not generally drop out. Instead, their meanings become devalued and continue on to cluttter up the scene. In addition to *modern* several key words such as *flexible, functional,* and *organic* have undergone radical changes of meaning during the last fifty years, sometimes even without critics taking much notice. Still other words have acquired so many meanings that they have become totally ambiguous. In the early Fifties, Katherine Gilbert counted at least four

distinct meanings for one of the architect's favorite adjectives *clean*—ranging from hygiene, to abstraction carried to the limit.[22]

A few words such as *strong, simple, pure* just have never received architectural definition. They merely exist and have been associated with particular buildings over the years. The situation becomes a vicious circle—old words having been so emasculated that writers think they must invent new words in order to mean anything at all, and these words in turn adding to the general confusion.

Another practice that leads to confusion is the clustering of popular words for effect. A phrase such as "functional organic order of the urban megasystem" could easily pass for an intelligible one—yet is it really? I have presented it here merely as a collection of currently fashionable words. Designers and popular architectural journals are especially guilty of this practice, but it infects more serious critical appraisals as well. Word clustering consists of little more than a hopeful display of glittering generalities, masking a lack of anything new or thoughtful.

Every discipline has its share of jargon, and there is no reason to suppose that architecture or architectural criticism should not likewise employ its own. The issue is whether, as it is currently constituted, critical vocabulary helps or hinders professional and public understanding. It is hard to imagine the emergence of an agreed-upon theory of contemporary architecture (a moment's reflection will assure the reader that we now have none) until the problem of an appropriate critical vocabulary has been attended to.

---

1. This article is a condensed version of a paper written for an advanced graduate seminar at Harvard, "Problems of Theory and Criticism in 20th Century Environmental Design," with Professor Eduard Sekler.
2. Montgomery Schuyler, *American Architecture and Other Writings*, 2 Vols. (New York, 1961), Vol. II, pp. 628-629.
3. Le Corbusier, *Towards a New Architecture* (London, 1927), p. 27.
4. Henry Russell Hitchcock Jr., and Philip Johnson, *The International Style* (New York, 1932), p. 18.
5. Hitchcock & Johnson, *The International Style*, p. 20.
6. Hitchcock & Johnson, *The International Style*, p. 26.
7. Frank Lloyd Wright, "To the Young Man In Architecture," in *Frank Lloyd Wright: Writings and Buildings*, ed. by Edgar Kaufmann and Ben Raeburn, (Cleveland, 1960). This and several other essays in the collection give one a good indication of the real bitterness of the whole debate.
8. For instance, see the recent articles in the *Architectural Forum* on the New York School.
9. "Low-moderate Baroque," *Progressive Architecture*, May 1972.
10. Michael Sorkin, "Radical Alternatives," *Architectural Record*, December 1972, p. 121.
11. Robert Venturi, Denise Scott Brown, Steven Izenour, *Learning From Las Vegas* (New York, 1972), p. 1.
12. For an interesting survey of far out vocabulary see Jim Burns's *Arthropods* (New York, 1972).
13. Suzanne K. Langer, *Feeling & Form* (New York, 1953), p. 98.
14. Eduard F. Sekler, "Thoughts about the Function of Architectural Theory & Criticism," paper presented at a conference on architectural theory and criticism at the Technische Universitat Berlin in December, 1967.
15. Venturi et al, *Learning From Las Vegas*, p. 2
16. Burns, *Arthropods*, p. 100.
17. For the whole argument see Johnson's speech reprinted in the special Philip Johnson issue of *Architectural Forum*, January-February 1973, p. 54.
18. "On Reading Architecture" *Progressive Architecture*, March 1972, p. 68. This article is a perfect example of "semantic drunkenness."
19. Constance Perin, *With Man in Mind* (Cambridge, Mass., 1970), p. 16.
20. Peter Smithson, "The Case for a Theory of Modern Architecture," *RIBA Journal* June 1957, p. 312.
21. Rupert Spade, "Semantic Drunkenness," *Architectural Design*, March 1969, p. 124.
22. Katherine Gilbert, *Aesthetic Studies: Architecture and Poetry* (Durham, North Carolina, 1952), pp. 28-33.

Reviews

Continued from page 20

wide open, inviting, with closed end-bays of glazed tile-work acting as anchors for its self-contained stance. The Yamaha Concert Hall occupies the top floor, and this singular building seems to be the ideal model Raymond had been striving for in the Reader's Digest—an excelsior—that has now created the highly sophisticated urban mix and human scale of Tokyo.

"Raymond's most beautiful accomplishment, the Gunma Music Center, Takasaki, of 1955, combines western technology and materials with Japanese esthetics. He gives full credit to his structural engineers for their innovative work: Takeshi Okamoto and Teizo Ono (1905-1957). The Gunma philharmonic peels away a space with startling, magnificent angles that bite into and push back the concrete walls—fiercely lined, as with a lightning bolt shot through repeatedly by the beneficent Kongorikishi, the Vajrapani god of thunder, who brings insight and enlightenment to your path. A wonderful association for music, an art that cannot exist without the moving dimension of time.

"The Gunma Music Center relates to the singularity and monumentality of Wright's Guggenheim Museum, New York, but with variations of the repeated pattern such as Louis Kahn allowed in forms that take shape when the need arises. The Gunma Center is a vehicle in which space becomes something that belongs to you, not to the walls. It changes, contracts and expands like the timberwork apparently floating over the Nandaimon Gate in Nara; it moves as you move within; it is of your experience.

"Wide-open spacing, swept-back sides, louvered wings. Here is a new Buddha, all-knowing, confident, inviting you forward to receive strength for your life experience."

Since World War II, Raymond has maintained an office with his partner Rado in the United States too, and a home at New Hope, Pennsylvania, where the Dutch language of the region seems to accept gratefully the kind of sensitive detailing and human consanguinity with the earth that were brought by the architect from Japan. Now that so much of Japan itself has surrendered to going "brutal," even outdoing in "brutal" its former opposite the West, how grateful we can be for such traces of the path of civilization as Raymond's superb books on detailing, marking a standard now almost impossible to achieve, acknowledging the old Japanese aim that as part of the earth humanity return to itself.

Art Now—Projekt

Reviewed by Peter Frank

Two large exhibitions this summer, one in Washington, D.C., and one in Cologne, West Germany, shared a general purpose. Art Now, mounted in the Kennedy Center for the Performing Arts in June, and Projekt '74, at the Kölner Kunsthalle in July and August, both attempted to survey the multifarious forms and trends in current art, including related work being done in the performing arts. That both shows would "fail" in this endeavor was a foregone conclusion; any such documentation even approaching completeness is impossible nowadays. For various reasons, however, both shows fell even shorter of their mark than might reasonably have been expected.

The model for these exhibits, and for others held in the past few years (such as Contemporanea in Rome), is Documenta, held every four years in Kassel (but, it is rumored, to be held in Philadelphia in the Bicentennial Year). Unfortunately for its imitators, Documenta normally has the means to succeed (in relative terms) where they do not. Documenta is an established and anything but a hastily organized show; its directors spend much of the long period of time before each exhibition taking the art world's many pulses. Moreover, the space Documenta can command is spectacularly huge.

As artworks do not shrink in size, nor artists in number, at the behest

Peter Frank, a frequent contributor to Art News, Art in America *and* SoHo News, *is co-editor of* Tracks.

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of an all-encompassing exhibit, the only aspect of such an exhibit that can be compromised in response to limitations in space and time is its general scope. The scope of Art Now was comparatively modest to begin with: restricted to Americans, it attempted only a random sampling of artists and tendencies. There were many other problems hampering the show, but Art Now could be seen ultimately as a decently proportioned, if not impeccably selected, cross-section of American art activity. Projekt was more ambitious; international in scope, it set itself more ground to cover. It had somewhat more display area than Art Now to devote to its task, but this was at least as insufficient for its own purposes. Projekt was trying to be nothing less than an off-year Documenta, and it bit off more than it could chew.

Art Now was sabotaged heavily by politics, art world and otherwise. Its organizers were caught in a squeeze between a foot-dragging Kennedy Center administration and a host of artists and dealers protesting what they perceived as the close, even cliquish associations between those guiding and advising the show and many of the artists finally included. These considerations prompted contingent measures, but these were taken too late to be much more than cosmetic. The Art Now organizers were unable to do much with the ugly warehouse-like room in which most of the artworks were displayed. The hanging was drab and piecemeal, unable to answer to the needs of the art. The pieces had to work valiantly against the space to be at all effective; many failed. Also extremely disconcerting was the excess of blank wallspace. The photography and video displays in other rooms, while not overly inspired, were satisfactory, and the space for performances was self-effacingly functional.

In fact, the performed works—music, dance, theater, film—were the most successful pieces in the show. Not only fortunate with regard to their space, the works had the added *a priori* advantage of being self-sufficient entities. Most of the visual/conceptual work, as is typical of such advanced art nowadays, could have been best understood in context with other works by the same artist, almost as if part of an environmental design or didactic program. Thrown together in a little-of-this-little-of-that potpourri without extensive documentation, the works seemed mute, diffident, and inscrutable. Richard Tuttle's quietly eloquent slab of unfinished wood attached to the wall, for instance, seemed lost in the smorgasbord; Dennis Oppenheim's quirky dancing puppet was deposited in a dark corner rather than accorded the center stage it requires to be truly effective. (The piece also lacked its proper sound and lighting; it was a travesty of its real self.) Certain self-contained pieces—Vito Acconci's *son et lumière* cabinet, Michael Heizer's sprawling accumulation of metal—worked brilliantly, in apparent disregard for their dismal surroundings; these were the exception, not the rule.

Most of the works in Projekt were happily like these last mentioned: complete explications of conceptual systems, standing successfully on their own. Supporting them further, at least at first glance, was the system of categories into which Projekt placed them all. Unfortunately, however, these categories—Verbal and Logical Systems, Information, Time, Performance, Video Activity, Video Installation, Form Systems, Perception—were too didactic, and yet too vague, for their own good.

Politics did not stunt the formation of Projekt as it had Art Now, but a political row threatened to do in the German show at its opening. Hans Haacke's recent work has involved documentation of social structures, especially museums; this documentation, although very straightforward, exhibits strong leftist overtones. His piece concerning the provenance of a Manet still life belonging to Cologne's Wallraf-Richartz Museum—revealing among other things the socio-economic standing of the chairman of the Museum's Kuratorium (i.e., Friends' Committee)—was not accepted for Projekt due to the objections of the Wallraf-Richartz's director. Haacke, without protest,

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Daniel Buren adds Hans Haacke's documentation to his own work at Projekt.

subsequently published his documentation in a Cologne art magazine and displayed it in a local gallery. Daniel Buren, the French artist who affixes his vertically striped "wallpaper" to all conceivable surfaces in a continuing assault on the very idea of esthetic quality, incorporated Haacke's piece into his own in a gesture of solidarity with Haacke's esthetic and political aims. (Buren's statement changed the slogan of Projekt —"Kunst bleibt Kunst," or "art is still art"—to "Kunst bleibt Politik," "art is still politics.") The Kunsthalle administration had the Haacke addition covered over. A brouhaha ensued. Several artists, incensed by what they perceived as censorship (of *Buren*'s piece as it stood rather than of Haacke's), obscured their own works. The issue had not been resolved by the time I left Cologne a week after the opening. However libelous Haacke's gesture might have been (his documentation was drawn, without comment, solely from public sources), the reaction of the museum staff—that is, of its more powerful members (the younger curators sided with Haacke)—was remarkable for its hypersensitivity. Even more remarkable was the ethical dubiousness of their impolitic countermeasures.

Such sprawling anthologies of contemporary art's many directions as Art Now and Projekt require years and years of preparation, tremendous flexibility (to deal with the rapid changes in art and the idiosyncracies of artists), and stupendous quantities of space, money, and cooperation from the sources involved. Otherwise the organizers might just as well publish a handbook of the avant-garde and leave it at that—the information would be disseminated on a more efficient, less centralized basis, and both the inaccuracies and the headaches would be minimized. The only advantage to a live exhibition is encountering art in the flesh (sic). The basic thrust of current advanced art is the communication of information, rather than the fabrication of objects for esthetic contemplation; the necessity of experiencing art live is no longer very great. Performance work, including film and video, is a different matter, as it exists crucially in time; series of such events are invariably valuable, and the presentations at Art Now (of music by Phil Glass; Steve Reich, and John Watts; theater by Richard Foreman and Robert Wilson; dance by Trisha Brown and Laura Foreman; etc.) and Projekt (whose program was so extensive that some events were scheduled coincidentally) were no exceptions. Otherwise, if a roundup of today's art can't be done right—that is, with the scope and flair of a Documenta—there is very little sense in undertaking it at all. It seems to me that as the international art community becomes more and more frustrated and disgusted with such mammoth turkeys, they will turn more and more to smaller exhibitions of fewer people, or to informal group shows, perhaps organized by artists themselves, such as the *salon des refusés* exhibit. Overviews of today's art galaxy are more trouble than they're worth for all concerned; today's art is better suited to intimacy and unpretentiousness.

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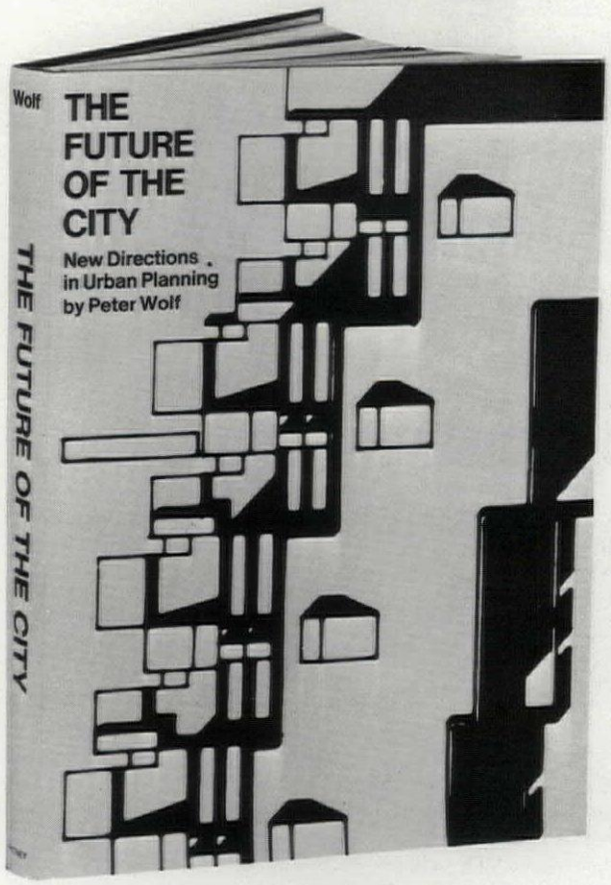

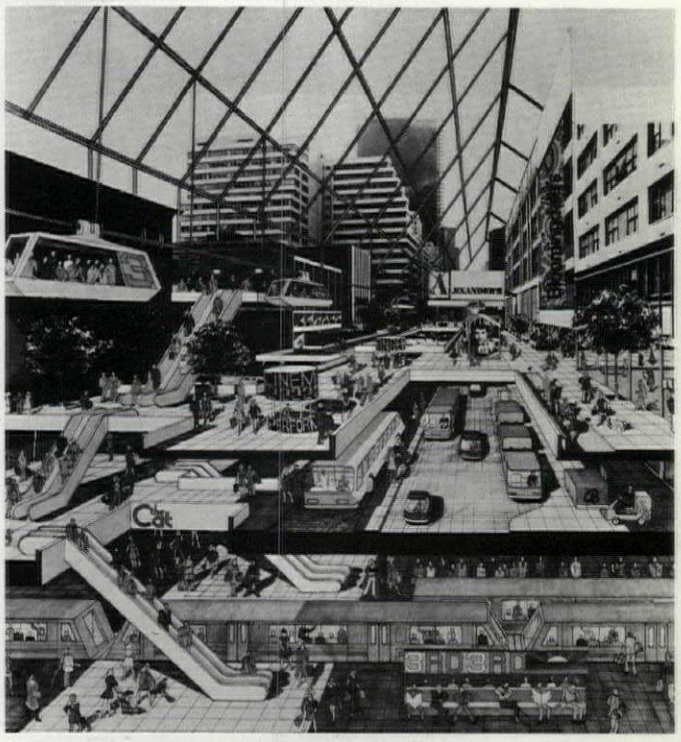

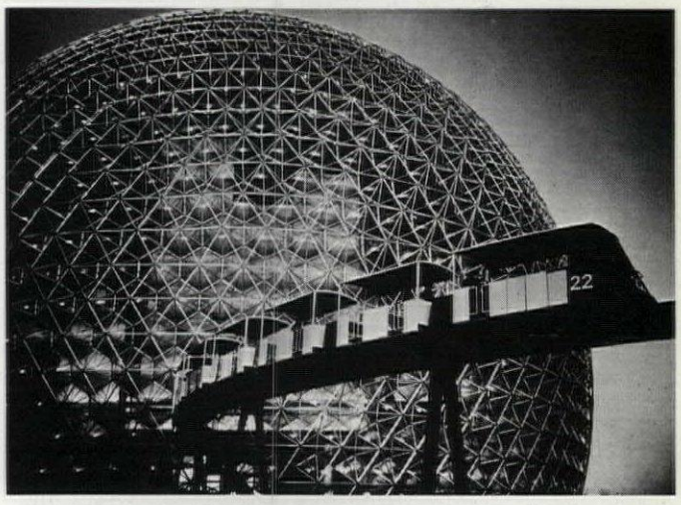

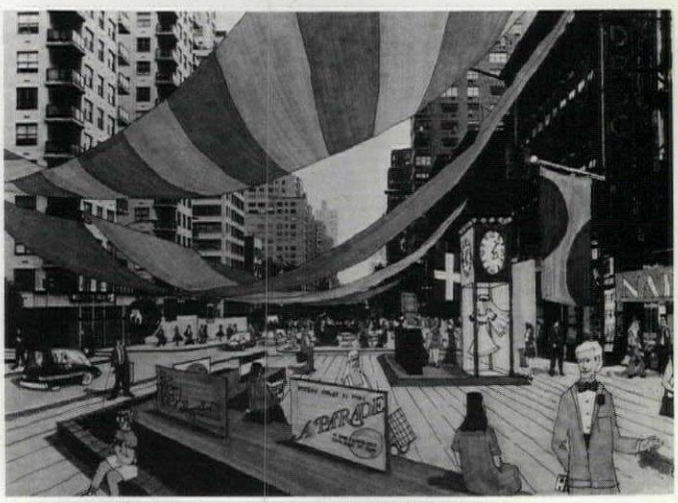

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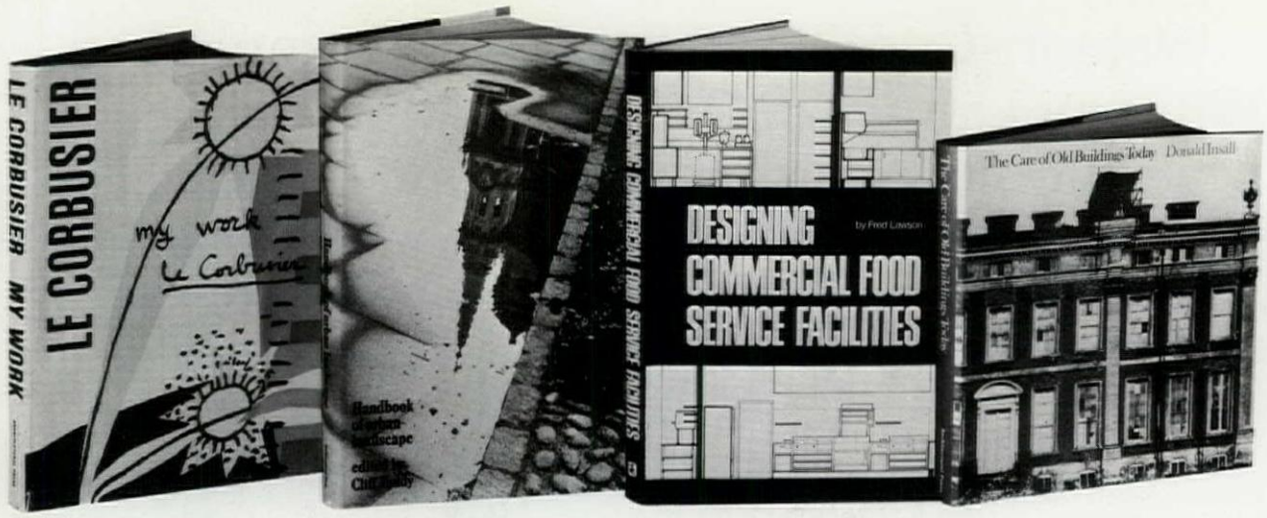

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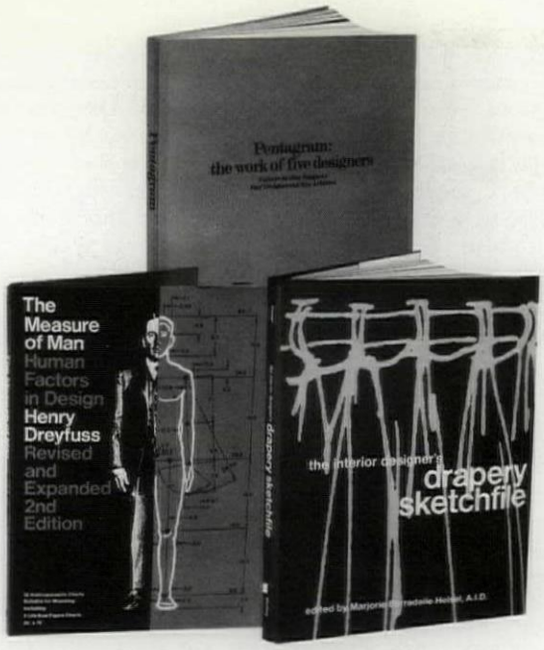

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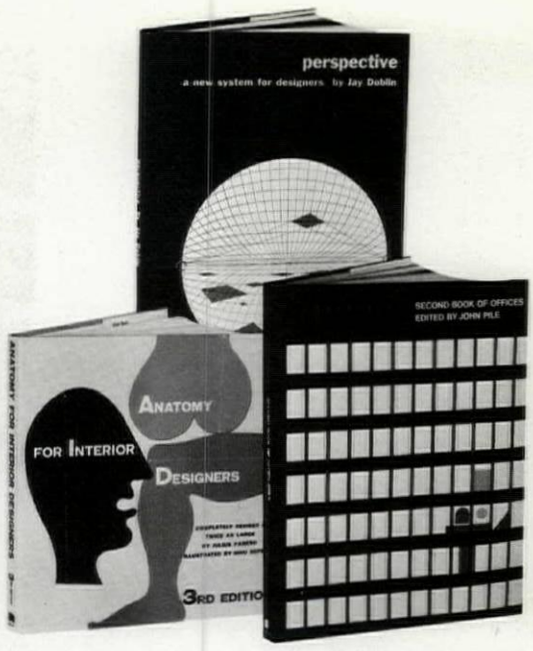

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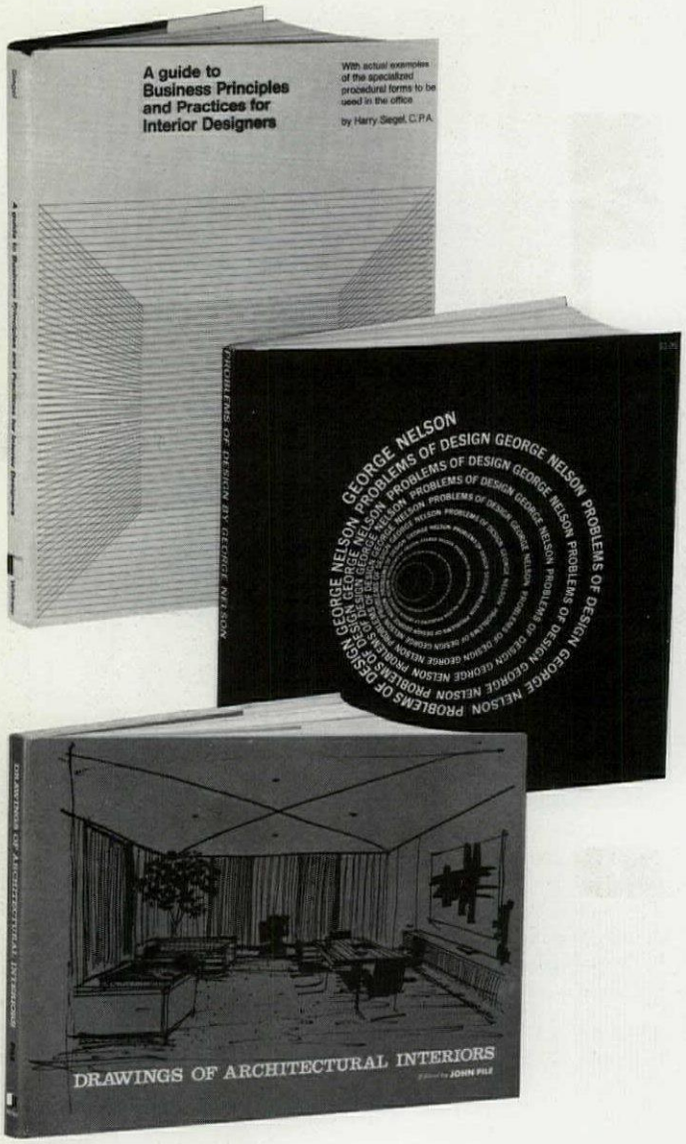

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SOTO'S ARCHITECTURAL COMMISSIONS INCLUDE: MURAL ENVIRONMENT FOR THE ENTRANCE LOBBY OF SANDOZ LABORATORIES BASEL, SWITZERLAND · MURAL AND CEILING ENVIRONMENT, DEUTSCHE BUNDESBANK, FRANKFURT · DOUBLE MURAL FOR UNESCO BUILDING, PARIS · DOUBLE MURAL AND SCULPTURE, LOBBY, FACULTY OF MEDICINE AND PHARMACY, RENNES · FOUR ENVIRONMENTS FOR PLAZA VENEZUELA CARACAS · MURAL AND SCULPTURE, INSTITUTE OF SCIENTIFIC RESEARCH, CARACAS KINETIC WALL FOR VENEZUELAN PAVILION, INTERNATIONAL EXPO, MONTREAL SCULPTURE FOR PARK OF THE SCHOOL OF ARCHITECTURE, CARACAS, VENEZUELA

Product Literature

To obtain the literature described below, circle the corresponding number on the Reader Service Card in the back of this issue, print your name and address and mail. It is necessary to affix proper postage if the card is mailed outside the United States.

ADHESIVES

Descriptive literature and volume estimator for Glue-On, a multi-purpose construction adhesive from Wilhold Glues, are available on request.
Reader Service Number 200.

AIR CONDITIONERS

A new line of packaged air conditioners is now available from Lennox Industries. Ranging in size from two to five tons, the units have been designed with major consideration for the residential replacement market.
Reader Service Number 201.

AUDIO/VISUAL EQUIPMENT

Jerome Menell Co., Inc. has announced a compact, low-cost audio/visual system that permits lighted rooms during presentations. The preassembled unit is ideal for conference rooms, training rooms, libraries and classrooms.
Reader Service Number 202.

A full-color brochure describing its Tri-Media audio/visual system is offered by Resource, Inc. The effectiveness of the system as a means of communication for training, sales and public relations is illustrated.
Reader Service Number 203.

BUILDING SYSTEMS

A new booklet from Stran-Steel Corp. details how builders can apply the concepts, materials, and techniques of metal building systems to specific building needs.
Reader Service Number 204.

Money saving construction systems are illustrated in a new cost cutter kit from the American Plywood Association. Ideas ranging from concrete forming to long span roof systems are included.
Reader Service Number 205.

A four-page color pamphlet illustrates and describes Dixisteel preengineered buildings for commercial establishments including supermarkets, stores, and restaurants.
Reader Service Number 206.

CALCULATORS

A new, personal-size scientific calculator with an array of technical capabilities has been developed by Casio, Inc. Virtually every mathematical requirement of the engineer and architect is provided for in its new design.
Reader Service Number 207.

CARPETING

Cabin Crafts Carpets introduces their Points East collection of four carpet patterns adaptable to a wide variety of residential and commercial applications in literature now offered.
Reader Service Number 208.

CEILINGS

Recently published by Guth Lighting, Division of Sola Basic Industries, is a full-color catalog designed to give architects a comprehensive view of a complete environmental ceiling installation.
Reader Service Number 209.

CERAMIC TILE

A new 16-page color brochure illustrating American Olean's complete line of 44 unglazed colors and 8 glazed accent colors is now offered.
Reader Service Number 210.

United States Ceramic Tile Company, subsidiary of Spartek, Inc., has published a color catalog describing their Crystal Tones line of ceramic tile. Color swatches and installation photos are featured.
Reader Service Number 211.

CLASSROOM EQUIPMENT

Just developed by Howe Furniture Corp. is a student training carrel that is convenient to use in a student media center, library, or classroom. The carrel is also an ideal vehicle for industrial training.
Reader Service Number 212.

CLOSETS

A new 8-page catalog and an architectural specification brochure describe the FLOAT-AWAY® line of closet systems from Kinkead Industries, a subsidiary of United States Gypsum Company.
Reader Service Number 213.

COATINGS

Three new one-part color top coatings for pedestrian and vehicular traffic areas are now available from the Adhesives, Coatings and Sealers Division, 3M Company.
Reader Service Number 214.

DOORS

Described in the Clark Door Company industrial door catalog is a line of doors offering features designed to conserve energy.
Reader Service Number 215.

An extra degree of protection is the theme of a new brochure from U.S. Plywood which compares wood and metal fire doors. Charts, photos and test situations are included.
Reader Service Number 216.

DRAFTING EQUIPMENT

Stacor Corporation has just prepared a full product line catalog of drafting furniture and equipment featuring a quick-reference table of contents with photos of all product categories.
Reader Service Number 217.

ELEVATORS

Otis Elevator Company has introduced a new line of elevator cabs that look "special" but cost about the same as standard units. A basic steel shell accommodates cabs in 20 designs with features that can be combined to offer a wide range of interiors.
Reader Service Number 218.

ENTRANCES

Amarlite/Anaconda offers a 36-page specifications catalog detailing entrances and storefront systems. Installation photos, drawings, and maintenance information are included.
Reader Service Number 219.

FIRE PROTECTION EQUIPMENT

Grinnell Fire Protection Systems Co., Inc. has designed a new automatic sprinkler that is recessed into a ceiling and enclosed to provide an attractive, unobtrusive safety system.
Reader Service Number 220.

FLOORING

AFCO Rubber Corp. has introduced a new high density floor tile of completely homogeneous synthetic rubber. Test results and specifications are provided in a two page bulletin.
Reader Service Number 221.

Two systems for installing static conductive flooring in hospital operating rooms are featured in information pamphlet prepared by Vinyl Plastics, Inc.
Reader Service Number 222.

To combat the danger of bacteria on hospital floors, James Halstead, Ltd. of England has introduced into its range of antistatic flooring a bacteriostat that inhibits the growth of microorganisms.
Reader Service Number 223.

FURNITURE

A unique conference room concept involving their mobile conference master table and saltz chair collection has been developed by Howe Furniture Corp. The design of both units makes it possible to set up spur-of-the-minute conferences, permits quick breaking down of tables, and offers compact storage.
Reader Service Number 224.

An information folder on Ion seating, featuring photographs and specifications, is offered by American Desk Manufacturing Company.
Reader Service Number 225.

GLASS

Guardian Industries Corporation has prepared a color brochure covering their lines of float, tempered, insulating, spandrel, and laminated glass. Conformance, usage and specification data for each type of glass is given.
Reader Service Number 226.

An eight-page bulletin from Ford Glass details production processes and uses for their window, tempered, and plate glass.
Reader Service Number 227.

HARDWARE

A booklet published by the Cleveland Cap Screw Division of Standard Pressed Steel Co. describes one-piece, reusable locknuts that lock positively on screws, bolts or studs.
Reader Service Number 228.

The new Yale 33 master catalog, encompassing all product line categories of Eaton Corporation's Lock and Hardware Division, is now available.
Reader Service Number 229.

LAUNDRY EQUIPMENT

UniMac Company, Inc. is making available pamphlet outlining a new on-premises laundry system especially designed for health care institutions.
Reader Service Number 230.

LIGHTING

Lightolier presents a range of modular lighting elements designed for maximum creativeness in achieving a three-dimensional ceiling look in recently released brochure.
Reader Service Number 231.

Neo-Ray offers four more Trilogy™ illuminated ceiling brochures covering Quandra, Scallop, Plaid and Tapestry systems. A colorful file folder imprinted with installation drawings and application photographs is included with each set of the six-page brochures.
Reader Service Number 232.

The Prestigeline division of Weiman Co., Inc. is now producing a new line of planter swag lights and table lamps designed to serve two purposes: terrariums for live plants and decorative mood lights.
Reader Service Number 233.

NOISE CONTROL

Industrial Acoustics Company's NOISEFOIL®, a recent development in sound-absorption systems, is given a thorough technical review in a recently prepared bulletin.
Reader Service Number 234.

PANELS

Warnel metal panels, a wide range of sculptured textures and geometric patterns embossed in bronze, copper, stainless steel and aluminum, are featured in brochure from Forms & Surfaces. The panels are ideal for exterior walls, fascias, ceilings, doors and furniture surfaces.
Reader Service Number 235.

PRECAST CONCRETE

A 24-page booklet from The Flexicore Co., Inc. discusses a growing trend in medium-rise apartment construction to precast concrete decks and wall bearing construction.
Reader Service Number 236.

RECREATIONAL FACILITIES

3M Company's Recreation and Athletic Products department has produced a brochure about Highland surfacing for indoor and outdoor tennis courts. Maintenance information is included.
Reader Service Number 237.

New literature which describes and illustrates the various types of aluminum pools is available from Overly Manufacturing Company. A detailed section on pool specifications, complete with photos and detail drawings, is featured.
Reader Service Number 238.

Armco Building Systems presents attractive metal building design ideas for indoor tennis, ice skating, roller skating, swimming pools, and gymnasiums in colorful booklet.
Reader Service Number 239.

ROOFING

Expand-O-Flash®, the Johns-Manville prefabricated roof expansion joint cover, is detailed in technical bulletin just released.
Reader Service Number 240.

SEALANTS

The broad and diversified sealing system product line of Watson Bowman Associates is described in a special brochure just published. The products meet today's special requirements for expansion and contraction on highways, bridges, tunnels, and heavy constructions.
Reader Service Number 241.

Silicone materials for sealing, bonding, and gasketing are described in a new 16-page catalog available from Dow Corning Corporation.
Reader Service Number 242.

SECURITY SYSTEMS

Southern Steel Company makes available information on their complete line of electronic components which, working individually or as a total system, can ensure complete security for any size detention facility.
Reader Service Number 243.

A color brochure from Rusco Electronic Systems contains the full story of Ruscard, an electronically-encoded plastic card that opens doors selectively and controls who goes where and when.
Reader Service Number 244.

SIDING

DIX-I-PLY exterior wood siding, a product of Dixie Wood Preserving Company, is described and illustrated in pamphlet now offered.
Reader Service Number 245.

STORAGE SYSTEMS

New high-strength, cantilevel shelving which accommodates items too long for ordinary shelving, too light for racking and too valuable for open floor stocking is explained in literature made available by the Hallowell Division of Standard Pressed Steel Co.
Reader Service Number 246.

Sunar Limited has announced the addition of a wall storage system to its all-systems line of office furniture. Basically a series of work walls or shells to which work tops, drawers and shelves are attached, the system's components can be assembled and re-arranged quickly in the field.
Reader Service Number 247.

GF Business Equipment's new Quantum system, a versatile lateral filing and storage system featuring total modularity, is described in detail in a 28-page catalog now available from the company.
Reader Service Number 248.

TIME CONTROLS

A booklet describing three variable speed multiple circuit timers for the control of electric lamps in signs, displays, exhibits and theater marquees has just been released by Bayside Timers, Inc.
Reader Service Number 249.

WALL COVERINGS

Burlap, a vinyl wall covering texture long popular in varied interior decors, is now available in a range of 37 fresh new colors. Information on the medium duty Burlap, designed for commercial-institutional use, is available from B. F. Goodrich General Products Co.
Reader Service Number 250.

A new vinyl wall covering that can be applied directly to concrete block with a minimum of surface preparation has been developed by the Coated Fabrics Group of The General Tire & Rubber Company's Chemical/Plastics Division.
Reader Service Number 251.

WALL SYSTEMS

A new, 16-page color catalog describing a versatile new line of patient-service wall systems is now available from American Sterilizer Company. Progressing from basic to full-service models, the catalog highlights one of the system's major features—ease of upgrading or relocating in a minimum of time.
Reader Service Number 252.

Marlite Custom Products and Services has reviewed its capabilities in a new brochure. This new unit offers a multiple option fabrication service for a product component, a complete interior package, or a combination tailored to customer specifications.
Reader Service Number 253.

Literature available from Richards-Wilcox Manufacturing Co. describes numerous installations of the company's operable walls and portable partitions.
Reader Service Number 254.

Keene Corporation offers data on its Penciline interior partition system. Available in 24″ and 30″ modules, the system offers flexibility with excellent sound control.
Reader Service Number 255.

A new catalog featuring specifications, applications and illustrations of portable and track-mounted movable walls is now available from Kwik-Wall Company.
Reader Service Number 256.

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