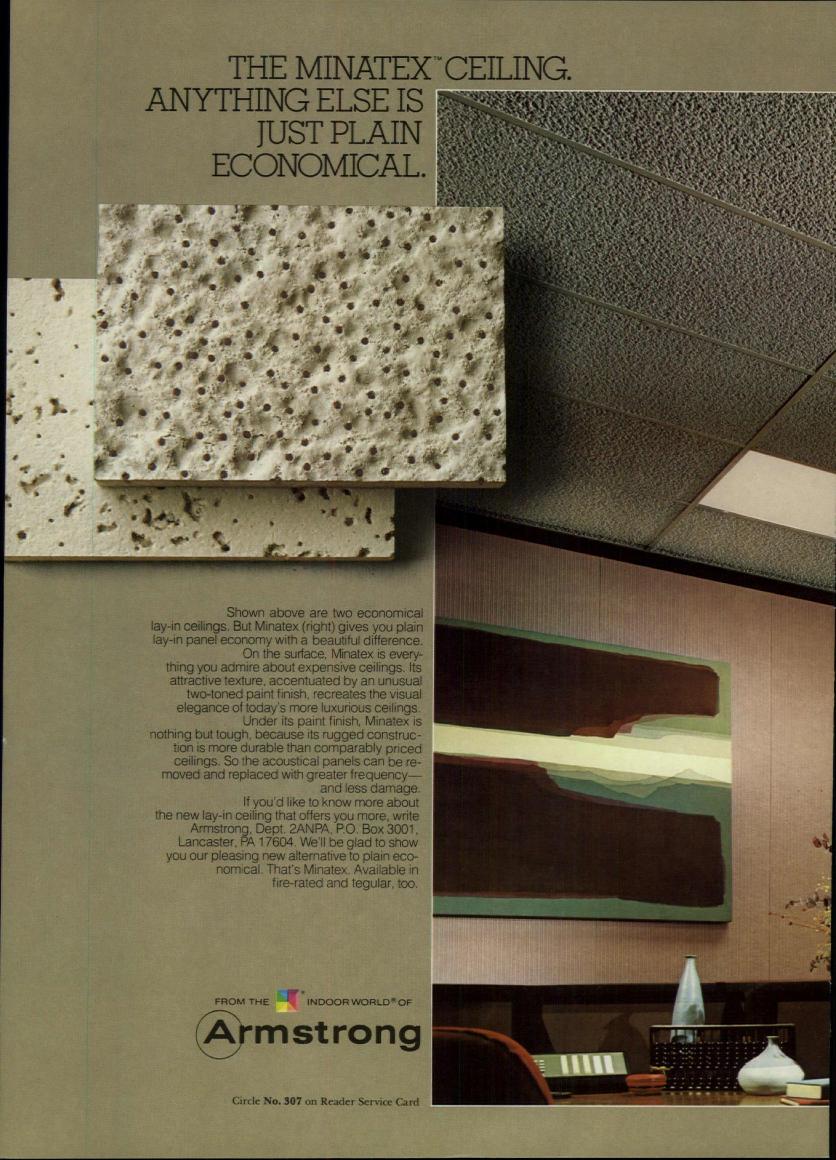
Progressive Architecture

October 1982







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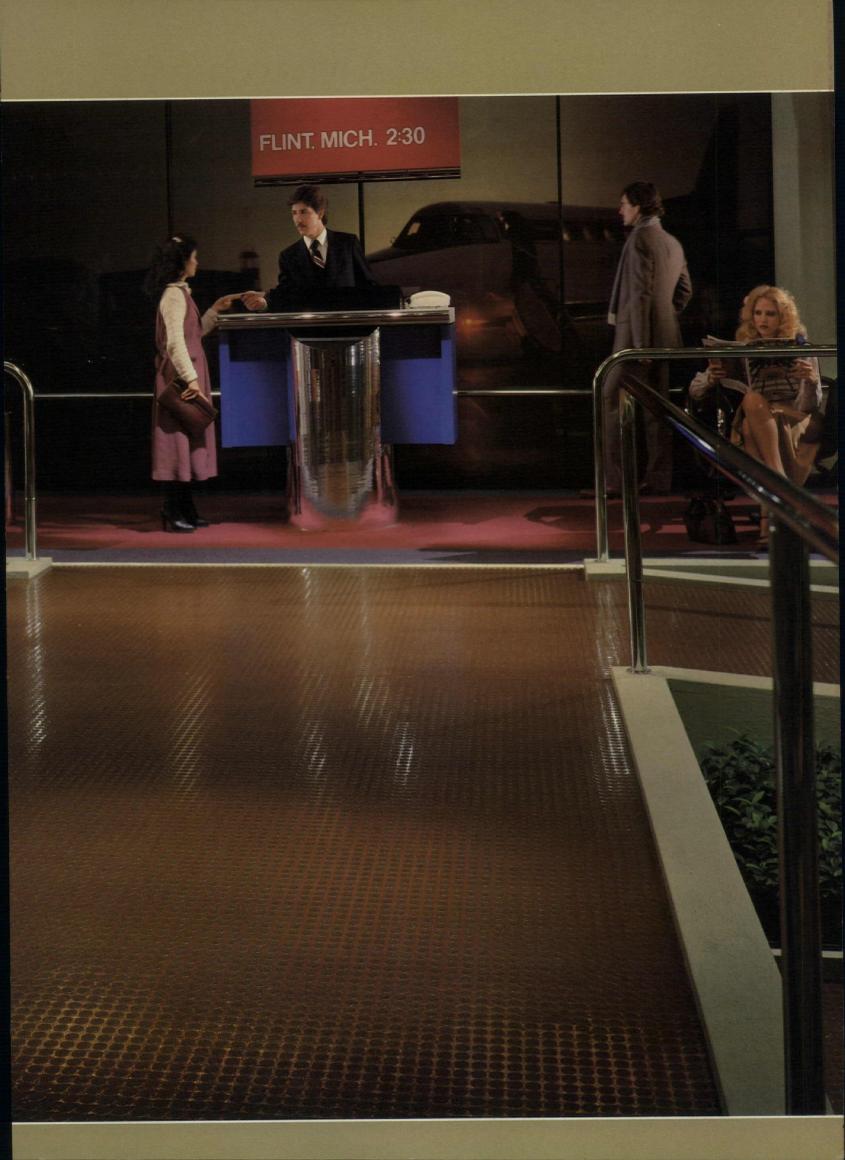
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Cover: Subsidized housing complex in Basel, by architects Diener and Schett.

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Spaces of Abraxas in Marne-la-Vallée, a suburb of Paris, is a complex of three residential buildings by Ricardo Bofill and Taller de Arquitectura. Barry Bergdoll

Modernity for eternity

Three separate housing complexes in France, two in Marnela-Vallée and one in St. Denis, are the work of Henri Ciriani. Hélène Lipstadt

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Architects Diener and Schett retain careful Swiss detailing but reject Swiss-like preciousness in an 88-unit subsidized housing complex in Basel. Ulrike Jehle-Schulte Strathaus

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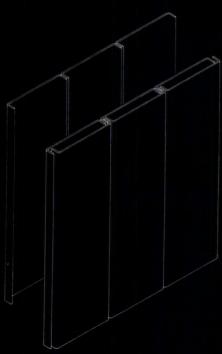
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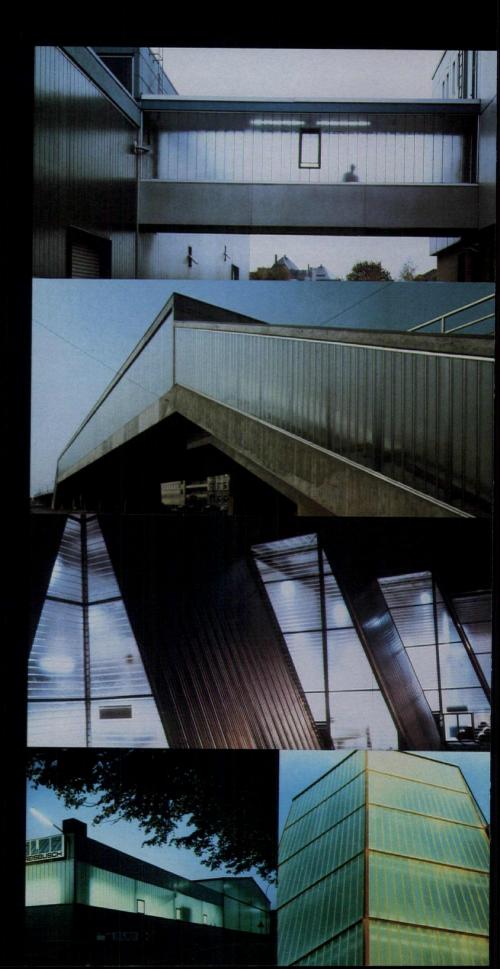
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Habitations

The design of the world's urban housing takes place against a background of disenchantment with building patterns once heralded as 20th-Century breakthroughs.

The metropolises of the industrialized world have required many millions of urban housing units. During the explosive city growth of the 19th Century, a couple of very workable models for such housing were established: the rowhouse and the low-to-medium-rise apartment block. These formed continuous street walls, with clearly articulated entries leading to anywhere from one unit to a few dozen. Except for shared internal courts in some parts of the world, these buildings offered virtually no private outdoor space. For outdoor activity, residents were expected to turn to plazas, parks, and boulevards—and trips to the country.

Notwithstanding the occasional involvement of prominent architects and planners in producing such housing, it was essentially a vernacular product, shaped mainly by petty capitalists and bureaucrats. Today, it is the kind of housing most architects and planners seek out—either in older residential neighborhoods or in commercial and industrial structures converted to yield much the same

urban pattern.

In our century, this durable residential pattern was challenged by two alternatives familiar to us all: the single-family house tract and the highrise, tower-in-the-park apartment structure. The pros and cons of these alternatives have been debated for decades, but some simple generalizations can be made. Though apparently divergent, both of these 20th-Century types seem to be a delayed overreaction to fears of unsavory, unsanitary overcrowding; in both types, sunlight, private outdoor space, and isolation from commerce were stressed, with the inadvertent sacrifice of such virtues as transportation convenience, efficient land use, and sense of community. The two types had their opposing camps of ideological supporters, but both seem to have viewed the individual unit as too selfcontained. And oddly enough, in much of the world, the highrise alternative ended up out on the periphery of the metropolis, along with the single-family houses-mainly because its proponents met unexpected resistance to supplanting earlier patterns in the city cores-even where bombing had damaged the urban fabric.

It now seems hard to see why so much effort was made to replace a decent, workable urban residential pattern with one that is wasteful of resources and socially divisive. In America, of course, we find it hard to shake the dream of the rose-covered, single-family cottage—sustained for decades by Federal loan policies and highway building; increasingly, though, it is being embodied in rowhouse estates, with gates and parking lots and without real streets. The apartment highrise persists in a few appropriate

situations—mainly for the elderly or the wealthy in areas of high density; highrise family housing survives mainly as an embarrassment to architects and planners.

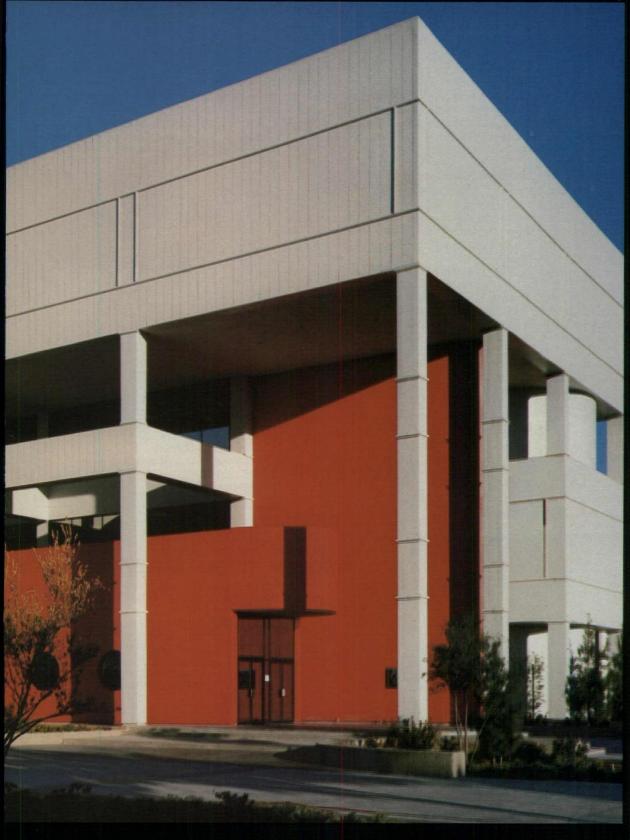
Not all of our 20th-Century visions of residential progress have failed. I recently had the opportunity to visit the fabled Tapiola, outside Helsinki, and it looked as seductive in reality as in photos. Most of its housing is, in fact, lowrise/high-density, and all of its open spaces have assigned, identifiable purposes. Its buildings and landscaping, in place for over 20 years, vary from good to excellent in design quality and seem to be well used and respected. The new communities I was able to visit outside Stockholm vary widely in design quality and social success-and even though the grimmest architecture turns up in the most socially troubled locality, we must not let ourselves ascribe too much social power to design. There, as in American instances, factors of demand and management-who occupies the housing and why, how it is maintained, etc.—can reinforce or counteract building deficiencies. When all is said and done, however, the pre-1940s housing precincts of Helsinki and Stockholm are more appealing than the peripheral developments and seem to offer a more valid model for the future—particularly a future of small families and limited energy resources. The same can be said for Boston, New York, or Washington. And in some places-San Francisco, for instance—the old pattern is already being substantially replicated.

The works featured in this issue vary in their urban patterns—and in their quality and validity, as well. The editors and contributing writers are, it seems, most satisfied with those that reestablish urban street patterns, and our cover indicates that—if somewhat abstractly. For more on the housing featured in this issue, I refer you to the

Introduction on page 73.

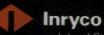
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Views

Corrugated metal castle

P/A's interest in odd ball designs (the August 1982 cover is a prime example) is always a source of amusement in our office. Sometimes it is also a source of delight, such as the article in the same issue discussing examples of the African architectural vernacular heritage. It is a wonderful article and it is good to see the focus shifting to the vernacular architecture from the arrogance of the modernists who believed that their pet box could be dropped from the sky to any location, foreign or domestic.

From this perspective, the review of the Ireland house in San Francisco is an irritating presentation of a true kitsch of a building. I certainly respect anybody's taste and if his preference is for corrugated metal siding, so be it. But a respectable architectural magazine should present it as an example of horrifying architectural aberration, clearly indicating to the reader that this is something to be avoided.

Ms. Woodbridge starts the article saying that "David Ireland does not call himself an architect." I appreciate this honesty on Mr. Ireland's part, but I object to P/A's giving him credit as an "architect." That he certainly is not, and

this is clearly visible on his design. He is unable to understand the urban character and fabric of a neighborhood. What he does inside of the house is entirely up to him, and his interiors may even have some artistic merit. But the boxy metal exterior which looks like a refinished warehouse (complete with fake loading doors and other paraphernalia) would bring disgrace to any architect. Laszlo Papp, FAIA

Environmental resolution

New Canaan, Ct

In your article on the 1982 AIA national convention in Honolulu, you state: "All eight resolutions put forth for convention consideration were submitted by California chapters." This is not accurate.

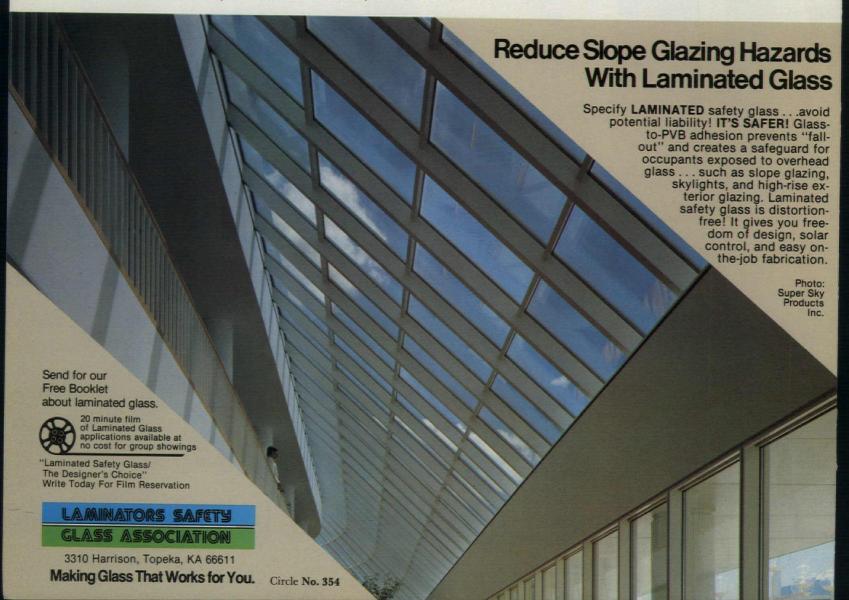
The Portland Chapter/AIA proposed a resolution on the preservation of the Columbia River Gorge and asked for AIA support of federal legislation which will define the Gorge as a National Scenic Area. The members of the Portland Chapter/AIA consider it imperative to save the Gorge from unplanned development. The Northwest Regional Council of Architects, the Southwest Washington Chapter/AIA, and the California Council of Architects seconded the resolution. The resolution was passed by the delegates, and it has become public policy of the Institute.

Martha Bergman Chapter Executive Portland Chapter, AIA Portland, Or

Correction

In a letter concerning Center Ithaca (P/A, July 1982), Jon Meigs, Planner of the City's Department of Planning & Development, notes that "Perry, Dean, Stahl & Rogers don't deserve criticism for the kiosks and stalls. . . . The kiosks were done locally and signage was a tenant responsibility."

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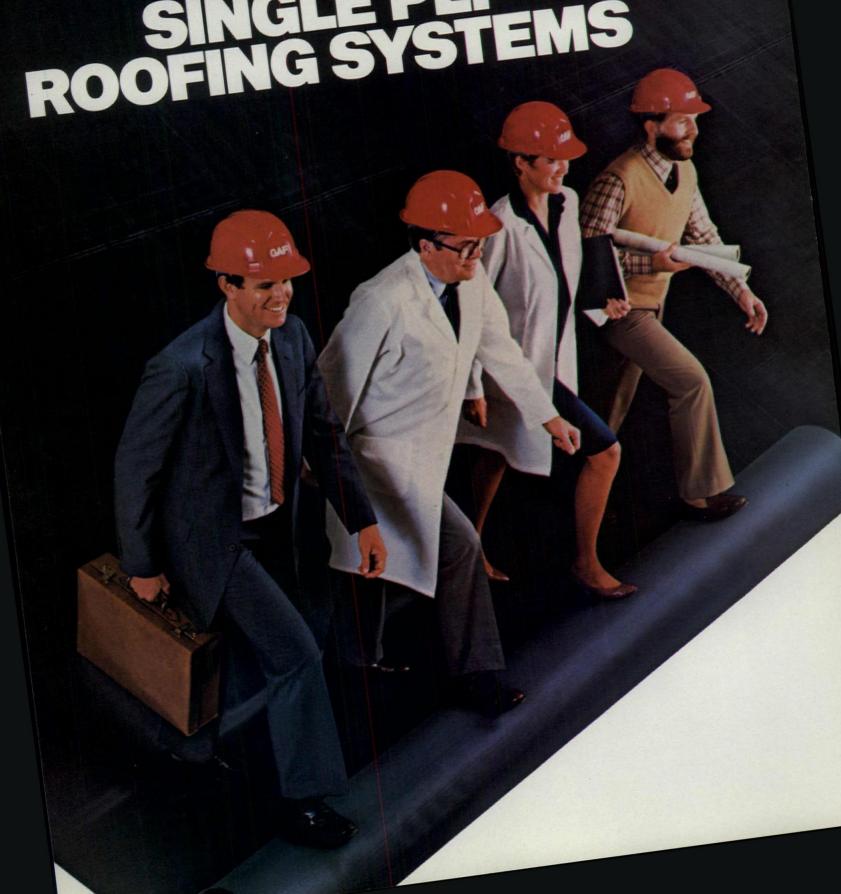


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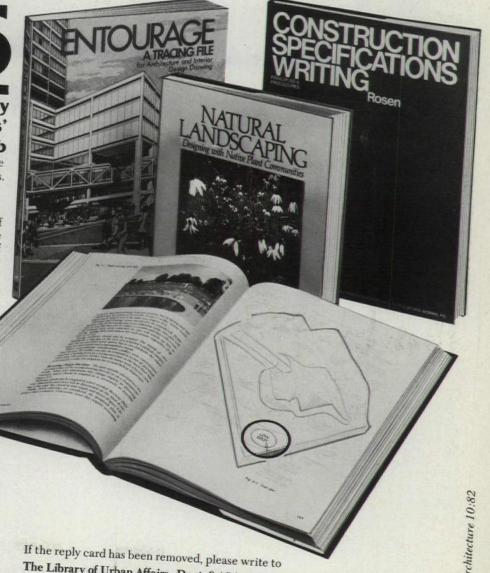
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Designs may be any of the following types: (1) Product design (e.g., TV cabinet); (2) Contract design (e.g., office work station); (3) Residential design (e.g., dining table); (4) Miscellaneous (e.g., a decorative or useful object).

Design must be original, not known to be substantially identical to any existing design. Designer must not be under contract to or in negotiation with any manu-facturer for this design. Design is not to be submitted to any manufacturer until after winners are announced. Design must not have been executed for academic credit. Formica Corporation employees, consultants and their families are not eligible

PUBLICATION AGREEMENT
Winning entrants agree to make available further information, original drawings or model photographs as necessary, for publication and exhibition. Formica

Corporation retains the world rights to

first publication of winning designs Designer retains rights to actual design.

SUBMISSION REQUIREMENTS Entries must be postmarked by February 15, 1983.

Drawing(s) and/or model photo(s) of the design should be mounted on one side only of one 14" x 17" foam board presented horizontally.

There are no limits to the number of illustrations mounted on the front side of the board. No actual models will be

Each submission must include a 5" x 7" index card mounted on the front side of the board with the following information typed on it: intended dimensions of the design, color,* brief description of important features, design assumptions and intentions, and entrant's pseudonym. Submissions will be returned to all

To maintain anonymity, no identification of the entrant may appear on any part of the submission, except on one 3" x 5" index card which must be sealed in an envelope labelled with entrant's pseudo-nym and attached to the back of the rod board. Information on the sealed card must include entrant's pseudonym, name, address and phone number. *Colors must be limited to 12 COLOR-CORE colorways. For free samples, call toll-free number, (800) 543-3000.
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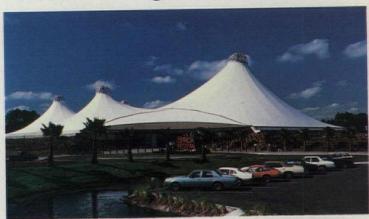
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Weese designs

Rumor has it that Harry Weese has designed a 210-story multiuse tower for a client

in Chicago.

Weese is also working with I.M. Pei & Partners on a joint venture in Dallas: 3½ million sq ft of office space in three towers, a 350-room hotel tower, and 100,000 sq ft of retail space.

Major repairs for Gund Hall

Don M. Hisaka & Associates of Cambridge, Ma, and Cleveland has been selected to undertake a project of repairs to George Gund Hall, home of Harvard University's

Graduate School of Design.

The building, designed by John Andrews of Andrews/Baldwin Architects, is only ten years old, but has been beset by problems. A study performed by Prentice Chan & Ohlhausen of New York investigated the need for repairs to the building's enclosure systems, alterations in the mechanical systems, improvements in lighting and acoustics, and a series of interior space alterations to improve the teaching facilities.

Andrews will serve as personal advisor to Dean Gerald McCue, chairman of the

School's Building Committee.

Acoustics renewed

Lincoln Center's New York State Theater reopened in September after a summer renovation principally aimed at improving its

acoustical qualities.

Acoustical engineer Dr. Cyril Harris, in collaboration with architects Johnson and Burgee, was in charge of the changes. These included the quietening of the airconditioning system, the incorporation of solid plaster into the original open-grid ceiling, the addition of cylindrical wood sound diffusers along the walls, the construction of a new proscenium that includes a large plaster reflector, and the enlargement of the orchestra pit. Seats and carpets were replaced and the walls painted.

¶ The result: as witnessed during a recent dress rehearsal of the City Opera's The Merry Widow—rich and clear sounds, both

vocal and orchestral.

No scandal, please, we're British

Owen Luder, the president of the Royal Institute of British Architects, caused a minor scandal by making a statement that should have remained private about an important competition.

Viewing the seven as-yet-unjudged final entries to the National Gallery extension competition in London (p. 29), Luder was reported (by The Times of London among

others) to have said,

British parlance.

¶"I hope they have the courage to choose that one (Richard Rogers'). That is the work of a man who has said, 'That is what I think the answer is, and sod you.' The others have all been overawed by the site."
¶ The public was outraged at Luder's impropriety at preempting the official judges. Sod, by the way, is a four-letter word in

[Pencil points continued on page 42]

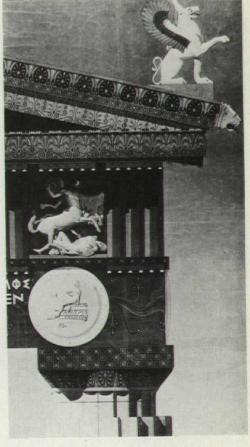


Paris-Rome-Athens, the 19th-Century axis

"Paris, Rome, Athens: The Travels in Greece of French Architects of the Nineteenth and Twentieth Centuries," an exhibition organized by the Ecole Nationale Supérieure des Beaux-Arts, Paris, was seen there from 12 May to 18 July 1982. Currently on view at the Alexander Soutzos Museum in Athens, from 15 October to 15 December 1982, the show will be seen next year at the Museum of Fine Arts in Houston, from 17 June to 4 September.

The fashion for the grandiose and adroitly executed architectural drawings produced by the students of the Ecole des Beaux-Arts, sparked by the 1975 exhibition at New York's Museum of Modern Art, has regained France. The Grand Prix projects shown in New York represented but a beginning, however. Digging deeper into its rich archives, the Ecole has unearthed a stunning series of drawings made in Italy and Greece, which have provided enough material for several exhibitions. These present not only the dramatic changes in drawing styles over the course of the Ecole's 150-year history, but are also revealing barometers of various attitudes toward Classicism within the Beaux-Arts "tradi-

"Paris-Rome-Athens," installed most appropriately in the polychromatic interiors of Felix Duban's 1850s Quai Malaquais building of the Ecole, is the



"Parthenon restoration" by Loviot (top and above).

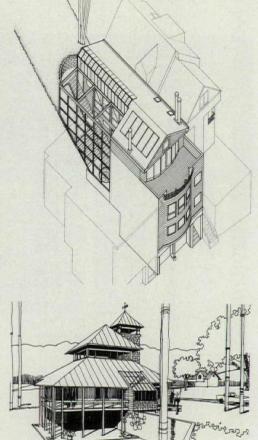
last in the three-part series, which began in 1980 with the vibrant Italian watercolors of Viollet-le-Duc and continued with the show of grand-scaled archaeological reconstructions of Pompeii, recently installed in the J. Paul Getty Museum at Malibu, Ca. The current collection comprises the drawings produced during all the *envois* (the archaeological studies required every fourth year) devoted to Greek monuments. These are reproduced in a hefty catalog, which includes scholarly essays on the history of French archaeology in Greece, the debate over polychromy, and a French point of view on the so-called "Neo-Gree" style.

While the organization of the exhibi-

tion according to individual sites highlights different interpretations offered by various architects and documents the progress of archaeological research, it tends to obscure the impact of the changes in the student envois. The opening paradox remains the most intriguing. Since Leroy and Stuart & Revett's publications of the 1750s and 1760s, Greek monuments formed a part of every architect's historical awareness. But when Henri Labrouste's sober studies of the Greek Doric temples at Paestum in Southern Italy reached Paris in 1828, they were seen as such a potent challenge to accepted doctrine that Quatremére de Quincy, dogmatic secretary of the Academy, saw to it that no student traveled to Greece for the next two decades. The Greek ideal was not to be tarnished by discrepent evidence. Labrouste's study, far from initiating or nourishing Neo-Classicism, sounded its death knell by interpreting timeless monuments as records of a specific moment in the development of a civilization. By the time the ban on travel to Greece was lifted, polychromy and the baseless Doric order were no longer the controversial issues they had been in the late 1820s. Labrouste's reconstruction seems restrained indeed when we are confronted with Charles Garnier's study of the Temple of Jupiter at Aegina (1835), every bit as luxurious as his famous Paris Opera (1862-75), or the shrill primary blue and red of Loviot's study of the Parthenon (1879-81).

Greek sites were especially favored in 1879 and the 1880s, years that dominate the exhibition and in which the French made great headway in archaeological investigation in Greece. After 1905, pensionnaires were even required to spend one of their years in Greece. Yet these later reconstructions, for all they reflect greater archaeological sophistication, are facile in presentation. In their bravura and tendency to painterly effects, they lose much of the tension of the drawings of the 1840s and 1850s, decades in which the architects engaged the ancient monuments as compelling witnesses of essential architectural truths. By the early 20th Century, the envois had come under heavy attack as irrelevant to contemporary urban problems and technological demands. Tony Garnier, winner of the Grand Prix in 1899, certainly owed a tremendous debt to Mediterranean Classicism; but he spent his time as a pensionnaire amidst the classical sites preparing his famous "Cité Industrielle," an imaginary acropolis of an altogether different sort. [Barry Bergdoll]

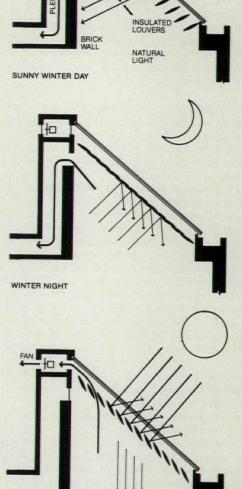
Barry Bergdoll is conducting research in Paris for his doctoral thesis from Columbia University's Art History department.



Passive Solar awards

Seven winning awards and 18 merit awards for the Second National Passive Solar Design Competition were presented at the National Passive Solar Conference in Knoxville, Tn. Sponsored by the Passive Systems Division, American Section of the International Solar Energy Society, the competition was cosponsored by P/A and the Passive Solar Industries Council and managed by The New England Solar Energy Association.

Chosen from among 435 entries, the 7 award winners shared several passive solar strategies. The brick Albany County Airport Terminal by Einhorn, Yaffee, Prescott, Krouner features a



San Francisco Residence (top left). The Lake House, Florida (lower left). Skylight, Albany County Airport (above).

SUNNY SUMMER DAY

central skylight with operable insulated louvers to control sunlight and trap heat for thermosiphoning. With a similar skylight/return-air plenum combination, The Society for the Protection of New Hampshire Forests Conservation Center by Banwell, White & Arnold contains water-filled tubes for thermal storage and reflective window louvers with phase-change material in the ceiling. Jorge Y. Ramos & Associates, with The Architects Collaborative, used models to study daylighting and ventilation before arriving at the notched plan for the Government Service Insurance System Headquarters in Manila.

Other than the Lake House in Florida by Ronald W. Haase, which responds to its climate with broad overhangs and a thermal chimney stair tower, the residential awards focus on direct solar gain and thermal storage. Their strategies

Progressive Architecture 10:82

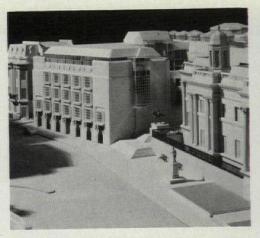
range from south-facing windows in the New York Con Edison Demonstration House by Alfredo DeVido, to the thermal storage of hollow concrete floors in the Wildwood Place Townhouses in Seattle by Eric Meng Associates, to the passive solar air system with rock storage in a San Francisco retrofit by William Leddy.

The 18 merit awards pursued a wider variety of energy ideas, if just for their greater number. Projects achieved daylighting goals through narrow plan forms as in the trapezoidal Land O'Lakes Offices by Architectural Alliance; stepped sections in the H.B. Fuller Company Labs by Hammel, Green & Abrahamson with Dubin-Bloome Associates; light shelves and a light court in the huge Lockheed Missiles & Space Company Building 157 by Leo A. Daly Company; skylights in the Utah Projects Office Complex by Niels E. Valentiner & Associates; monitors in the earthsheltered One University Plaza by Walter F. Roberts Jr.; and light scoops in the colorful Window Rock Elementary School by James Joseph Doolan. Other strategies used in the commercial projects include a collector wall in the hightech Indre Østfold Meieri by Dag Borgen; shading and passive ventilation in the vernacular Botswana Technology Center by Norris & Temple; and a direct gain greenhouse in the gabled New Canaan Nature Center Horticultural Education Building by Buchanan & Associates/Donald Watson.

Nine residential merit awards were given. They included the shingled Sisko House by Kelbaugh & Lee, with its trombe walls; the villalike Maoli House by Richard Fernau and Laura Hartman, Bluestem Meadows by Ray D. Greco, Westland Avenue Renovations by Crowley/Powers & Associates, and the Wisconsin Street Houses by Van Der Ryn, Calthorpe & Partners with their emphasis on passive ventilation; Inde-pendence IV Potter Residence by Mass Design with its solar greenhouse; the Brooks Residence by Robert E. Hicks with its operable collector tubes; and the Chilless Residence by Chilless Nielsen Architects, and an Arizona residence by Jack Travis, with their earth tempering.

Generally, the projects show a sophisticated handling of energy issues. Not all of the projects, unfortunately, integrated those issues into a memorable architectural design, especially where energy conservation became the primary determinant of the building form.

[TF]



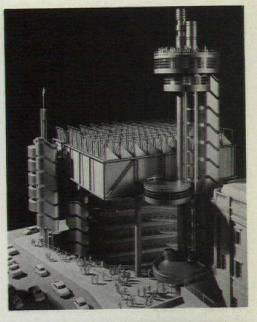




Britain: Gallery competition, RIBA/AD exhibition

The varied faces of British architecture were displayed in two events in London this summer. While "British Architecture 1982," an exhibition at the Royal Institute of Architecture, claimed to "constitute a comprehensive survey of the state of the art of British architecture today," it scarcely reflected the restrained approach followed by the architects competing to design a new wing for the National Gallery

The exhibition at RIBA combined winners of the design awards program of the magazine Architectural Design with selected entries, invited participants, and student projects. Displayed in a framework designed by two alumni of the Archigram movement, the exhibit suggested that the economically strained British still believe that a shining future can be plugged modularly into steel skeletons, or that stripping façades of cornices and scale, modern fashion, is a truly cleansing experience. While Norman Foster, Richard Rogers, and their disciples are happily building "com-





National Gallery wing by Arup Associates (top left), SOM (middle left), Ahrends Burton & Koralek (left), Richard Rogers & Partners (top right), and Spratley & Cullearn (above).

puterized" factories around the world, James Stirling and his disciples are attempting to reintegrate their technological interests into more humanistic frames. AD Gold Medal winner Zaha Hadid, like many of the student entrants, is still playing with the surrealist fragments of modernist salvation as if it were a giant Lego set, while a minority of the architects attempt to create pastiches of what the British refer to as "bad taste American Post-Modernism." Notable among this last group is the eclectic work of AD Silver Award winner

Terry Farrell. In contrast, faced with a site of na-

tional importance, those selected to compete for the design of a new wing to the National Gallery showed considerable restraint, for the most part. The six firms, whose designs were to provide gallery space on top of speculative office space on a site just off Trafalgar Square, were SOM/Chicago, Spratley & Cullearn, Sheppard Robson, Arup Associates, Ahrends Burton & Koralek, and Richard Rogers & Partners. The designs were exhibited at the National Aaron Betsky, a freelance writer, is in his final year in the graduate architecture program at Yale University.

A hanging arc bridge prototype

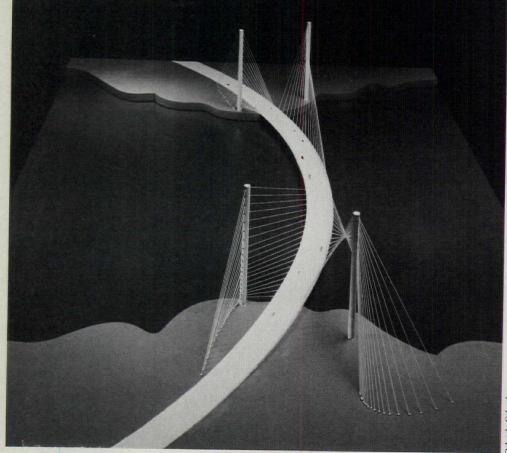
The hanging arc bridge, designed by T.Y. Lin International, Hanson Engineers, and Skidmore, Owings & Merrill, originated as a solution for the Ruck-A-Chucky Bridge in Auburn, Ca, and won the First Award in P/A's 26th Design Competition (P/A, Jan. 1979, p.

68). It has recently been developed further to include the more general case of a 1300-ft bridge crossing on level ground.

The hanging arc bridge consists of high-strength steel cables arranged in a hyperbolic paraboloid formation to create an array of tensile forces which produce pure axial compression in the curved deck. The vertical force components balance the weight of the deck. The horizontal components are designed to reduce to zero the horizontal bending moment at critical sections.

A Master of Science thesis project in the Department of Architecture at Illinois Institute of Technology, by Bankiurkumae Mehta with Myron Goldsmith as adviser and T.Y. Lin and M. Elnimieri as consulting engineers, indicates that the hanging arc bridge may be transformed from a structure hanging from the sides of a steep valley to a structure hanging from two towers. The additional cost of the towers is expected to be offset by a reduction in the quantity of high-strength steel cable necessary to hang the deck. Both steel and concrete are feasible materials for the towers and curved box girder deck. Either solution would be constructed by cantilevering from each side abutment toward the center, controlling bending moments during construction with horizontal erection cables. Bridge geometry accommodates repetition of elements and form work.

The hanging arc bridge, a new bridge type, is apparently a viable economical and technical solution for long-span curved brides, in either mountainous or level environments.



Ruck-A-Chucky Bridge.

ACSA's record summer institute

The Association of Collegiate Schools of Architecture drew a record 65 faculty members in late July to its fifth summer institute on energy and design, hosted annually at the Massachusetts Institute of Technology with support from the U.S. Department of Energy. There were no signs that energy is receding as a concern for architectural educators, and American Institute of Architects president Robert M. Lawrence let it be known that practicing architects have not lost any resolve either. "Those who put their faith in the market are just as apt to become beggared as they are to become rich," he said in a keynote address, "and one thing is clear: the market has no interest in our well-being. Architects, on the other hand, must.

Institute attendees, representing more than 25 schools in the U.S., Canada, Mexico, and Puerto Rico, also heard preservationist James Marston Fitch describe an "umbilical" relationship between energy and buildings. John Burgee discussed several of his firm's recent projects and decried the view that energy concerns are somehow distinct from the general concerns of

good design.

The core of this year's program involved six intensive day-long workshops on a variety of teaching methods. Architect Edward Allen led a session on exercises for beginning design students. Murray Milne of UCLA offered a course on "friendly" computer programs for design students. John Reynolds of the University of Oregon led groups through a sequence of energy design analysis methods, while Chris Benton of Georgia Tech conducted a series of laboratory exercises on the thermal environment. Donlyn Lyndon and Douglas Kelbaugh concentrated on ways to teach energy issues in

the design studio.

To many participants the most challenging workshop was led by Michael Joroff of MIT, who has spent three years with his colleagues adapting to architecture case method teaching techniques used routinely in business and law schools. The MIT cases thus far concern energy, but Joroff is working on a series about architect/client relationships and public policy issues. "The case method of teaching has tremendous potential for architectural education," he said.

The program also included luncheon talks by lighting designer William Lam, MIT professor Harvey Bryan, and DOE's new buildings division director, James Smith. Attendees toured projects around Boston and visited Tim Johnson's innovative solar projects on the MIT campus. ACSA's executive director Richard McCommons called the program "our most successful to date" and expressed hopes that the annual institute would continue beyond its originally scheduled five years.

[Thomas Vonier]
[News report continued on page 34]







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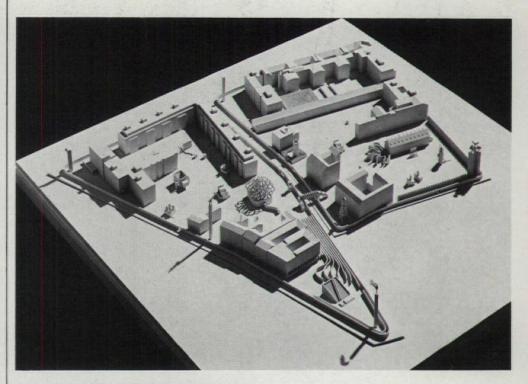
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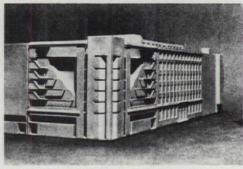
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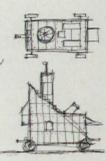
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IBA update

Arrangements are proceeding for IBA, the International Building Exhibition planned to take place in the streets of Berlin in 1984 (P/A, Jan. 1982, pp. 197–204). Contract drawings are being prepared, and while all buildings will not be completed two years from now, all contracts are expected to be signed and all sites (about three dozen blocks in all) cleared by the target year. Huge models of all the IBA designs will be exhibited that summer, probably in one of the 1930 building exhibition structures, festivities will be held, and several of the projects should be completed.

Among those projects scheduled to proceed in the near future are O.M. Unger's housing near Lützowplatz, James Stirling and Michael Wilford's Science Centre along the Landwehr Canal, and Moore Ruble Yudell's scheme for a recreation center, a cultural complex, and housing in Tegel.

IBA projects recently commissioned include offices and housing on two adjacent sites by Raimund Abraham; a two-block scheme (called a "Berlin Masque") by John Hejduk that combines many different types of towers (clock, bell, watch, observation, wind, water, and guest), as well as a public theater, a pantomime theater, an arbitration hall,

Hejduk's "Berlin Masque" (top and detail above). Abraham's "Gate House" (left).

housing (some of it mobile), shopping booths (for small items), and a lottery woman (?), all very poetically described by the architect; and a 100-unit housing project by Richard Meier.

An exhibition of the impressive drawings submitted for the IBA competitions has been traveling in Europe, and is scheduled to be shown in the U.S. in early 1983. [SD]

Robert Jefferson appointed P/A Assistant Editor

Robert Jefferson, editorial assistant at P/A, has been promoted to the position of Assistant Editor. During Jefferson's year at *Progressive Architecture*, he has made editorial contributions to the News Report and coordinated special sections such as Designer's Saturday, in addition to his duties as assistant to the editors. His new position will enable him to increase his editorial activities.

Jefferson holds a bachelor of science degree in journalism from Northwestern University.

[News report continued on page 39]



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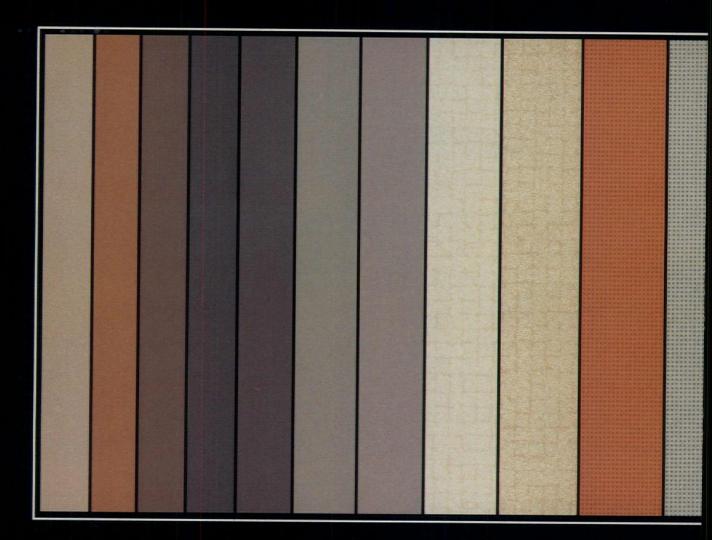


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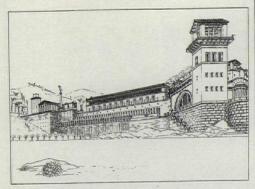


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Pliny's Villa, as seen by Krier.

Dreams reconstituted

The French Institute of Architecture (IFA) recently renewed a custom from past centuries by holding a competition "d'emulation." Artists, architects, and archaeologists were invited to design a building significant in ancient times by following the literary descriptions of it. Participating architects included Bernard Huet and Leon Krier, the latter of whom presented a project for the Laurentian Villa described by Pliny the Younger.

George E. Kassabaum: 1920–1982

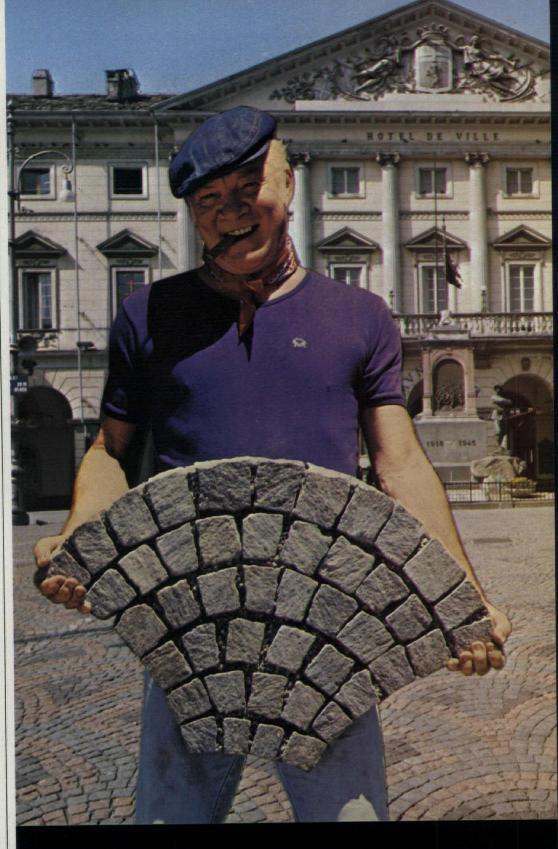
George E. Kassabaum, president of Hellmuth, Obata & Kassabaum, Inc. (HOK), died in St. Louis in August.

Kassabaum, one of the three founding principals of the 27-year-old architectural firm, was a Fellow of the American Institute of Architects and served as National President of the AIA in 1968-69. He also served as chancellor of the College of Fellows of the AIA in 1977-78. A graduate of Washington University in St. Louis, he served as a member of that school's board of trustees and received the Alumni Citation in 1972.

He was named Missouri's "Architect of the Year" in 1978. He was an Honorary Fellow of the Royal Architectural Institute of Canada and La Sociedad de Arquitectos Mexicanos. He served on the federal Advisory Committee on Housing for the Elderly, on General Services Administration architectural advisory panels, and on numerous design award juries.

Under Kassabaum's direction, HOK earned a reputation for completing client projects within prescribed budgets and time limitations. He was responsible for project administration, including construction documents, cost estimating, scheduling, and construction. He was recognized nationally for his system of cost analysis and controls and for his concern for the quality of architectural services provided to clients.

[News report continued on page 55]



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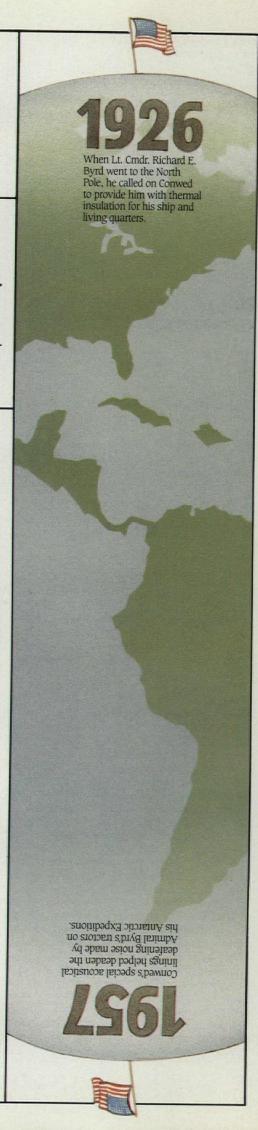
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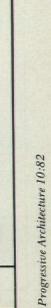
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Making mountains . . .

Calgary, Canada's boomtown, is hosting the 1984 winter Olympics, and big plans are being made.

These include new hotels, sports facilities, a new mountain, and a \$60 million coliseum.

Montreal collects post-40s

The Museum of Decorative Arts in Montreal is in its second year of a five-year program to collect important decorative arts pieces from the period 1940–1960.

An exhibition of some of the 80 objects collected so far opened in September at the Château Dufresne, the museum's home.

Architecture Week in Portland

The mayor of Portland, Or, has proclaimed the week of Oct. 11-16 as 'Architecture Week.' Events include:

¶ presentation of local AIA design awards; ¶ dedication of the new, private Oregon School of Design (keynote speaker: Pietro Belluschi);

¶ a conference on ideology and contemporary architecture, featuring talks by Anthony Vidler, Kenneth Frampton, Kurt Forster, and Alan Colquhoun;

¶ an awards program and symposium entitled 'Collaborations: Artists and Architects Designing the 80s,' juried by Vincent Scully and Alice Aycock;

¶ and a Beaux Arts ball.

Schinkel shown

The International Schinkel Symposium, to

be held in Hamburg in January, has managed to attract the large and important Schinkel exhibition organized by East Germany last year (P/A, July 1981, p. 25). The exhibition itself will be shown from November to January and is expected to attract more than 200,000 visitors.

¶ Among those invited to participate in the Symposium are Ackerman, Ettlinger, Johnson, Sekler, and Pundt from the United States; Stirling and Krier from Great Britain; Ungers and Klotz from West Germany; and Riemann from East Germany.

New code

Andres Duany and Elizabeth Plater-Zyberk, with Robert S. Davis and Richard Rothman, have completed the design of a new town for northern Florida.

¶ The plan has a radial layout, which 'disintegrates' towards the edges as circumstances demand.

¶ Several architects will be invited to design the various civic buildings. The houses and commercial structures will be individually commissioned by the owners.

Inaugural symposium

A major symposium, 'American Architecture: In Search of Traditions,' will be the inaugural event of the Center for the Study of American Architecture at Columbia University, New York.

¶ The symposium, to take place April 21-24, 1983, will be directed by David De-Long, Robert A.M. Stern, and Helen Searing. Participants will include William Jordy, Denise Scott Brown, David Handlin, and Vincent Scully. Accompanying the symposium will be an exhibition of the architecture of different regions in America, with guest curators including Deborah Nevins and John Zukowsky.

A publication will document the events.

¶ The Center for the Study of American Architecture, established in conjunction with the Graduate School of Architecture and Planning and the Avery Library at Columbia, has been granted initial funding by the University and the NEA, and is seeking larger funds for research, teaching, and curatorial positions, and for acquisitions.

HHPA pulls out of Palm Court

A year ago, the owners of the former Biltmore Hotel in New York reached an accord with the New York Landmarks Conservancy to re-create the building's Palm Court, much of which had been demolished as the building was being gutted to be converted to an office building.

But now, more demolition has taken place, making it impossible for restoration consultants Hardy Holzman Pfeiffer Associates to recreate the space as they had planned. HHPA has pulled out of the effort, and preservationists are charging the owners with having violated the accord.

The world's most comfortable sidewalks The International Academy for Standing and Walking Fitness has honored the city of Long Beach, Ca, for having the best sidewalks in the world . . . and Academy members have tried thousands.

¶ The texture variation created by a series of circular and straight grooves makes the [Pencil points continued on page 46]

49/64" PCM-1125-75

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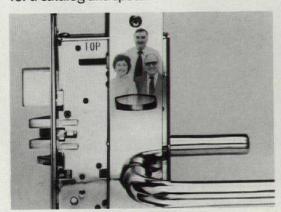
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difference, according to podiatrists.

¶ It is the Long Beach Mall, dedicated in August, that uses these sidewalks. The mall was designed by SOM/Portland in collaboration with Parsons, Brinkerhoff, Quade & Douglas, Inc., and CHNMB Associates, Inc.

¶ SOM/Portland is also working on transit malls in Charlotte, NC (a commission won in competition), and in Seattle.

On Portland's waterfront

The initial public offering of parcels for private development in the South Waterfront Project in Portland, Or, occurred in late September.

¶ Street improvements and a 150-200 slip marina are under construction in the 73acre, \$175 million mixed-use project that will extend Waterfront Park south to the Marquam Bridge and allow development of one of the last remaining parcels of downtown riverfront property.

¶ The major focus of the area will be 500 units of housing and a Waterfront Center with restaurants and shops overlooking a five-acre park, the marina, and a public

¶ The city's Development Commission is responsible for \$16 million of park, riverfront, and street improvement in the area. ¶ Master planners: Benkendorf & Associates.

Pei, Erickson lose to TRA

TRA of Seattle and Howard Needles Tammen & Bergendoff, Inc., of Bellevue, Wa,

were the winners in the competition to design a \$90 million convention center for Seattle, Wa.

¶ Competing teams included I.M. Pei & Partners and John Graham Co.; Arthur Erickson Architects and NBBJ; and The Callison Partnership.

EFL Fellowship winners

Educational Facilities Laboratories has announced the winners of its \$80,000 1982 awards program, which is funded by the New York State Council on the Arts. Fellowship recipients are:

¶ Diana Balmori, historian and designer, Oswego; Adele Chatfield-Taylor, historic preservationist, New York; Andrew Dolkart, architectural historian and preservationist, New York; Sally Eauclaire, writer/curator, New York;

¶ Philip Langdon, journalist, East Aurora; Rebecca Shanor, urban planner, New York; Beth Sullebarger, planning consultant, New York; and Dennis Williams, behavior and environment consultant, New York

Asian Games

The Indian government is building five new stadiums, ten new luxury hotels, and seven highway overpasses for the Asian Games to be held in New Delhi in November.

¶ It is one of the biggest public works projects in the city's history, and it has used a minimum of machinery and a maximum of human labor.

Little orphan Nixon

Several communities, including Nixon's native town, have rejected the notion of

providing a home for the documents and memorabilia of the Presidential years of Richard M. Nixon.

¶ But according to an attorney representing Nixon, there are several towns (mostly in the mid-West) that are interested in housing the Nixon Presidential Library.

¶ A recent bid for the collection was made by Leavenworth, Ks, best known for its Federal penitentiary. A presidential library, one suspects, is a better tourist attraction than a jail.

Nader's quarters

Architect Richard Ridley is converting an old auto showroom/garage on Capitol Hill into offices for Ralph Nader's Public Citizen, Inc. It will have interior skylit 'streets.' Rental space will enable Nader's group to operate the building cost free.

20th-Century landmark stamps

The final block of the four-year, 16-stamp series of U.S. postal stamps commemorating American architecture was dedicated in September.

This block of stamps depicts Fallingwater at Mill Run, Pa, by Frank Lloyd Wright; Illinois Institute of Technology, Chicago, by Ludwig Mies van der Rohe; the Gropius house in Lincoln, Ma, by Walter Gropius with Marcel Breuer; and Dulles International Airport in Chantilly, Va, by Eero Saarinen.

Viewing Tokyo's Disneyland

A group partaking in a two-week study tour of landscape architecture in Japan in November will be among the first outsiders [Pencil points continued on page 50]



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to see the new Tokyo Disneyland in Urayasu, scheduled to open next March. The group will also visit the Shinjuku Business Center, Tama New Town, the Expo Memorial Park in Osaka, and Senri New Town, and will visit the Inland Sea as well as Hong Kong and the People's Republic of China.

La Belle Epoque

The important turn-of-the-century period in Paris, La Belle Epoque, will be celebrated in an exhibition organized by Diana Vreeland for New York's Metropolitan Museum of Art, December 6 through next August.

The fashion exhibition will be augmented by examples of the decorative arts and paintings of the era.

Treasure trove of middle-class life The Margaret Woodbury Strong Museum, a collection of arts and artifacts dating from 1820 to 1930, is opening in Rochester, NY, on October 12. ¶ Information: 716-263-2700.

Cheap at half the price?

The Trump Tower on New York's Fifth Avenue is still under construction, but retailers are lining up to lease atrium space. No wonder. Rentals range from \$150 to \$400 per sq ft.

Die-hard Houston relenting?

Houston may no longer maintain its distinction as the only major U.S. city without zoning. First small step: its City Council took action this summer requiring 25-ft setbacks from the rights-of-way of major thoroughfares, and 10-ft setbacks from local streets for all new development.

Reason: While traffic congestion is worsening, street-widening is impossible with lot line buildings.

Another possible control: greater offstreet parking requirements for new developments.

RepublicBank resists

RepublicBank San Antonio has rejected Michael Graves's design, commissioned by the San Antonio Conservation Society, for an office complex that would save the historic Texas Theater (P/A, Aug. 1982, p.

The design seems to have inspired the town's punsters: 'punkitecture,' 'The Tin Man,' 'the ultimate pie in the sky,' and Gotham City's grotesque take-off on the Empire State Building' are among the

names they have called it.

Not the sort of building suitable for anything as boring and functional as cashing your paycheck' said one local reporter. Now that's quite a blow to an important segment of American architectural history. Other critics have more soberly questioned the conversion of the theater into a public assembly hall.

The Conservation Society seems to have

given up.

UNESCO Prize 1984

The International Union of Architects, in preparation for the 1987 International Year of the Homeless, is holding an international competition for students of architecture.

The theme: to devise a method by which user-groups from any context can plan their own dwellings and groupings, and to apply the method to design a concrete example. Mailing deadline: July 31, 1983.

Information: UIA, 51 rue Raynouard, Paris 75016, France.

Lost America retained in postcards

A book of 12 postcards—serrated for fast mailing-featuring color photographs by John Margolies of former American emporiums, will be published in mid-October by Dial Press.

Photographs will include a Deco bowling alley in San Diego, a Whale Car Wash in Oklahoma City, a shoe-shaped shoe shop, and more . . .

RIBA conference

Nonarchitects addressed members of the Royal Institute of British Architects at the RIBA conference in July.

They discussed the problems created by rising unemployment and increased leisure, finding that the United Kingdom is moving towards a private sector, small business service economy.

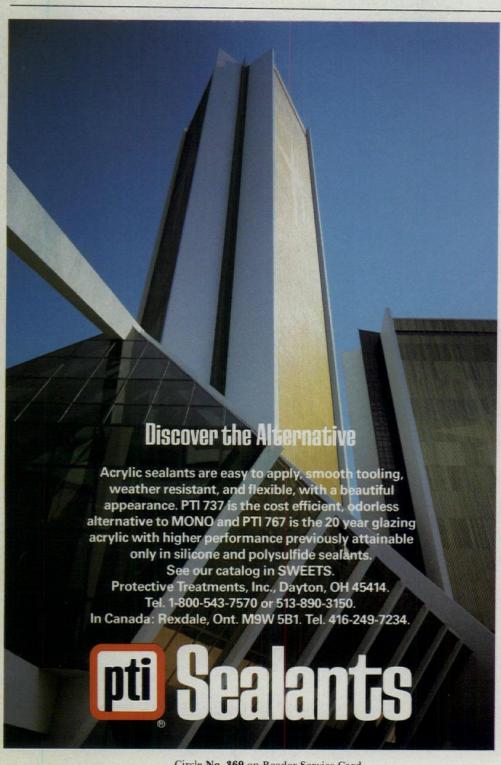
They predicted that buildings will be used longer and for more functions.

¶ MIT professor Donald Schon deplored the separation of research from practice, built into the education system.

VRSB exhibition

'Buildings and Drawings,' a survey of work by Venturi, Rauch & Scott Brown during the past 25 years, is being held until mid-October at the Max Protetch Gallery in New York.

[Pencil points continued on page 55]





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R.F.P. in downtown Portland, Or

The Portland Development Commission has released a request for proposals for the Morrison Street Project, a three-block area in the heart of downtown.

The multiuse development program calls for a base of between 240,000 and 350,000 sq ft of high quality retail space plus hotel and office use, and encourages residential

Atlanta's oldest building burns

The Shrine of the Immaculate Conception, the first building built in Atlanta after Sherman burned the town to the ground, has been gutted by fire caused by faulty wir-

The building, whose parish had dwindled to 150 members, will probably not be re-

A sheik in Maryland

Martin & Jones have designed a \$1 million, 12,000-sq-ft house for an Arab sheik in suburban Barnesville, Md.

The house, standing on the foundations of an old log house that burned, is now under construction.

Culture stations

Four model 'cultural stations' have been designed to project the identity of prominent New York cultural institutions into the subway stations that serve them.

The Fifth Avenue/53rd Street station, as designed by Pentagram Design and Pomerov Associates, will have displays from the five museums (including the Museum of Modern Art) and the library it serves.

The Lincoln Center station, as designed by Richard Dattner Architect, will use closed-circuit television to show what is on stage at the theaters above.

The Astor Place station will incorporate a new ticket sales center as well as new graphic references to the historic interior. Design team: Milton Glaser & Prentice and Chan, Ohlhausen.

The Eastern Parkway station will have colorful graphics by Edwin Schlossberg and Two Twelve Associates.

From draftsman to painter

Elmer Bennett, known for his crow quill drawings in the original Pencil Points magazine as well as the early Progressive Architecture, has a new career.

At age 85+, he is developing a reputation in Concord, NH, for his landscape paintings. He has had numerous exhibitions in the town and has been written up in the local newspaper.

International Center grows

New international embassies, no longer able to find space on Washington's Embassy Row, are sprouting on a 47-acre site on upper Connecticut Avenue.

The Israeli embassy there is two years old, the Bahrain and Kuwait embassies are now complete, and ground has been broken for the Jordan chancery and the headquarters of the International Telecommunications Satellite organization. Yemen, Ghana, and Qatar have 99-year lease agreements. [SD]

Calendar

Exhibits

Through Oct. 16. "Model Citizens Post-Modernism," Express/ Against Network, Ohio Building, 59 Greene St., New York.

Through Oct. 23. Crystal Clear: New Glass from Sweden. Parson's School of Design, New York.

Through Oct. 31. Inside State Street: Color Photographs of Building Interiors by Kathleen Collins. Chicago Historical Society.

Through Oct. 31. Italian Re-evolution. La Jolla Museum of Contemporary Art, La Jolla, Ca.

Through Oct. 31. Uncommonly Frank: Gehry's Houses and Furniture. Institute of Contemporary Art, Boston.

Through Nov. 14. Sketchbooks of Le Corbusier. National Academy of Design, New York.

Through Nov. 30. The Work of Atget: Old Paris. Museum of Modern Art, New York.

Through Nov. 30. Louisville Past and Present: The Architect's Hand. Louisville Art Gallery, Louisville, Ky.

Through Jan. 2. Scandinavian Modern, 1880-1980. Cooper-Hewitt Museum,

Oct. 14-Nov. 14. "Urban Obsessions." Philippe Bonnafont Gallery, San Francisco.

Oct. 15-Nov. 21. Panos Koulermos: "Context and Response." Los Angeles Municipal Art Gallery at Barnsdall Park. Oct. 23-Nov. 21. Transformed Houses. UCLA School of Architecture and Urban Planning, Los Angeles.

Oct. 27-Nov. 28. "H.H. Richardson: Residential Projects, 1879-1886." Farish Gallery, Rice University, Houston.



Hoffmann's Purkersdorf Chair.

Nov. 17–Jan. 9. "Josef Hoffmann: Design Classics." Fort Worth Art Museum, Fort Worth, Tx.

Competitions

Oct. 25. Intent to participate deadline, Walker Group Second Annual Student Competition to promote innovation and awareness of retail design. Contact Competition Director, Walker/Group,

Inc., 304 E. 45 St., New York, NY 10017 (212) 689-3013. Entry deadline: Nov. 22.

Nov. 1. Entry deadline, Compact Home Design Competition. Contact Compact Homes, Garden Way Publishing, Charlotte, Vt 05445.

Nov. 15. Rome Prize Fellowship deadline. Contact American Academy in Rome, 41 E. 65 St., New York, NY 10021 (212) 535-4250.

Dec. 29. Entry deadline, International Open Competition for the Creation of New Office Furniture. Contact Concours Mobilier, Commissariat General du Concours, Pavillon de Marsan, 107 rue de Rivoli, 75001 Paris, France.

Dec. 31. Proposal deadline, General Electric Lighting Design Competition for Architecture and Interior Design Students. Contact Daniel Hayes, GE, Nela Park #4635, Cleveland, Oh 44112. Jan. 10. Entry deadline, Fourth Biennial Downtown Development Awards Competition. Contact Mary Dalessandro, Coordinator, New York (212) 889-5666. Jan. 15. Nomination deadline, National Trust for Historic Preservation 1983 Honor Awards. Contact National Trust, 1785 Massachusetts Ave. NW, Washington, DC 20036.

Jan. 26. Entry Deadline, P/A Third Annual International Furniture Competition (see ad, page 135).

Conferences, seminars, workshops Oct. 24-27. Maintenance and Stabilization Conference. Association for Preservation Technology, Banff, Canada. Contact Walter Jamieson, APT (403) 284-5431.

Oct. 25-26. First Annual Pacific Northwest Computer Graphics Conference. Eugene Conference Center/Hilton Hotel, Eugene, Or. Contact Computer Conference, 111 Susan Graphics Campbell Hall, University of Oregon, Eugene, Or 97403-1204.

Oct. 26-31. Orgatechnik, 4th International Office Fair. Cologne, West Germany

Oct. 29. "Differing Perspectives: The Views of Four Design Giants," sponsored by AIA Interior Design Committee in conjunction with CANEXUS. Toronto, Canada. Contact Pete McCall (202) 626-7465.

Nov. 4-6. 1982 CCAIA 37th Annual Convention/Marketing Program, San Francisco Hyatt Regency Hotel. Contact CCAIA, c/o Professional Management Group, 220 Redwood Highway, #222, Mill Valley, Ca 94941 (415) 563-6605.

Nov. 5-6. Dutch Architecture Between the Wars Conference. MIT School of Architecture and Planning, 77 Massa-chusetts Ave., Cambridge, Ma 02139. Contact Stanford Anderson (617) 253-1351.

Nov. 11-13. "Stained Glass International/1982." New York Statler Hotel. Contact Interglassmetal Corp., 110 E. 42 St., New York, NY 10017 (212) 682-7681.

Nov. 16-17. Light and Color for Human Performance. University of Alabama, Birmingham. Contact (205) 934-7451.

[News report continued on page 56]

Perspectives

St. Paul's Lowertown in progress

The revitalization of a 25-block former transportation and manufacturing center in St. Paul, known as Lowertown, is an increasingly important success story. It is the result of a partnership between the city and the private, nonprofit Lowertown Redevelopment Corporation (LRC) created to stimulate and direct economically sound development that is architecturally and environmentally sensitive. The projects, when completed, should create a whole new downtown community.

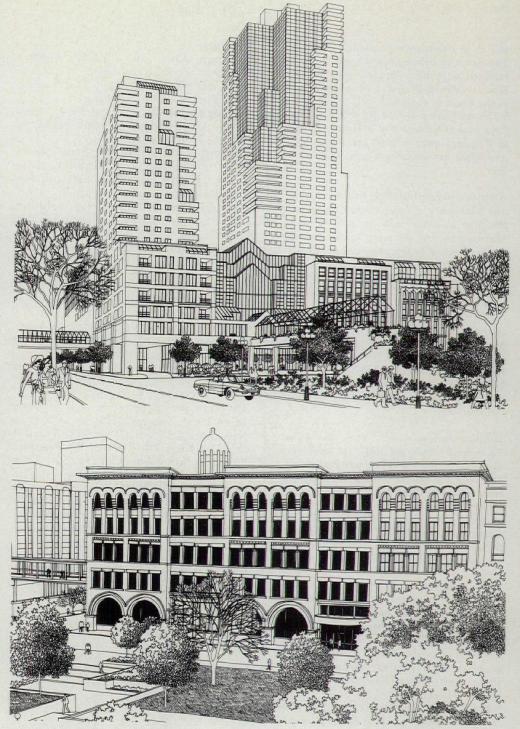
Backed by \$10 million from the local McKnight Foundation, the LRC has facilitated the completion, commitment, or planning of over \$160 million in new development in the past few years. The result-greater psychological and physical links between Lowertown and the

rest of the City.

Crucial to the creation of what LRC director Weiming Lu calls a "critical mass" is the multimillion dollar "Block 40" development. The most significant new development in the area, both for its size and for its architectural and functional complexity, the project contains new construction, adaptive reuse, and renovation. The complex will eventually include a 60,000-sq-ft YMCA, 150,000 sq ft of offices and shops, 6 theaters, 3 skyways, and a 650-car parking ramp. Architects Miller Hanson Westerbeck Bell of Minneapolis plan to carefully disassemble and rebuild the façades of two historic structures on the site to retain the character of the old with the new. Overall cost of the complex is estimated at \$75 million.

Handsome turn-of-the-century façades almost completely surround the new Farmers' Market, which has been bustling all summer with buyers searching for fresh produce. After a bitter fight over the city's plans to relocate the 129-year-old market to accommodate a new hotel, all sides seem satisfied with the new market. Designed by Nemeth Associates, St. Paul, it includes 158 stalls arranged in long rows within a blocksquare site. Translucent fiberglass canopies cover walkways and stalls, providing graceful, light-filled shelter and recalling the shape of the original iron-framework roofs. One of several UDAG grants secured by the city helped fund a portion of the costs.

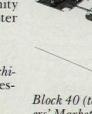
Federal grants are also being sought to fund the \$5 million renovation of the city's classical, 19th-Century Union Depot. Built in 1925 for \$11 million, the now-vacant structure will be renovated to house offices, restaurants, and shops in the 60,000-sq-ft "headhouse" build-



ing. Preliminary design work has been done by Rafferty Rafferty Mikutowski of St. Paul.

And the handsome Romanesque Park Square Court building in Lowertown will undergo a second renovation (10 years after a less-than-successful first stab) to enhance its aesthetic and economic profile. The Minneapolis firm of Miller Hanson Westerbeck Bell are re-peating their successful Butler Square atrium approach, gutting the central core of the building and creating a fullheight, light-filled well surrounded by offices and shops. A new entrance will face Mears Park, a much-used amenity and one that remains a tranquil center of this burgeoning "urban village." [Joanna Baymiller]

Joanna Baymiller, a freelance art and architecture critic, writes frequently for Progressive Architecture. [News report continued on page 60]





ers' Market (above).

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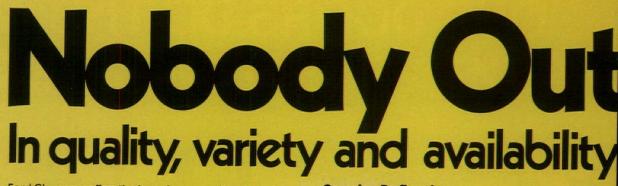
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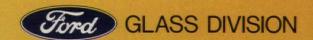
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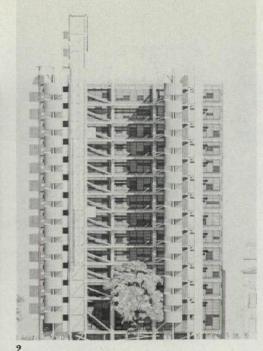
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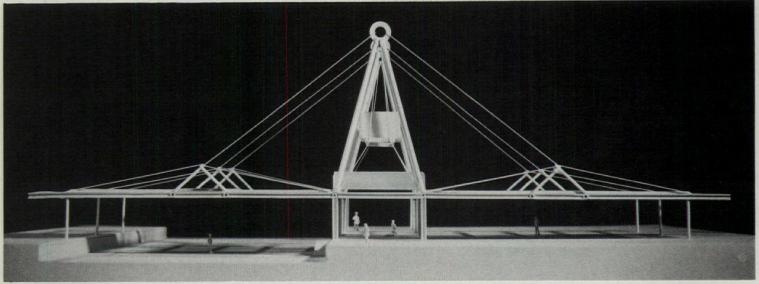


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3 Hong Kong & Shanghai Banking Corporation Headquarters, Hong Kong. Architects: Foster Associates, London, England. Three steel "masts" frame this 41-story, 770,000-sq-ft office building on one of the few open public spaces in Hong Kong. Elevators lead only to double-height spaces between blocks of office floors, which are connected internally by escalators. Cladding and mechanical systems are designed to be modular and flexible. Costs are estimated to be double what a building of standard construction of this size would cost. With site work and foundations underway, completion is scheduled for 1985.

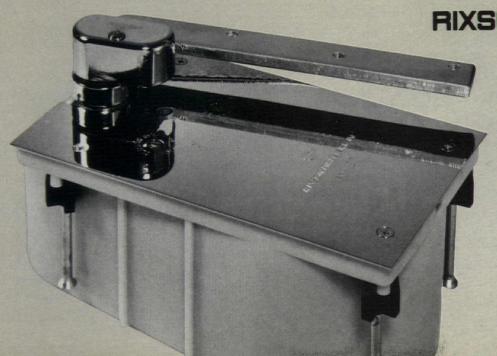
4 Renault UK Spare Parts Distribution Centre, Regional Office and Training School, Swindon, England. Architects: Foster Associates, London, England. Steel columns on a 24-m grid support an articulated umbrella structure and form the basic organizational system for Renault's 20,000 sq m of warehouse space and 400 sq m of office space. Modular design is intended to facilitate space planning and integrated use of partitions and service accessories. The building, which is slated for completion in March 1983, is painted "Renault yellow."





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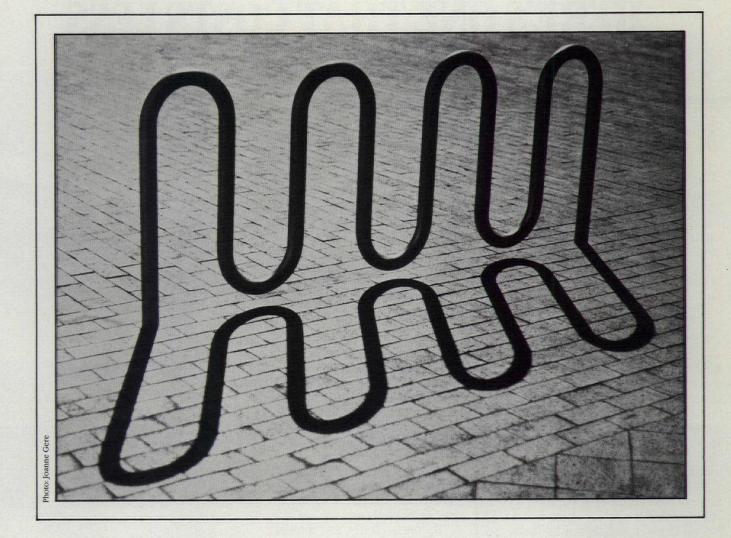
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Initial Lamp Lumens Lamp Life (Hrs) Ballast Factor/ Thermal Factor	3150 20,000 .95	3450 15,000 1.00	3450 15,000 .99		
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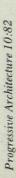
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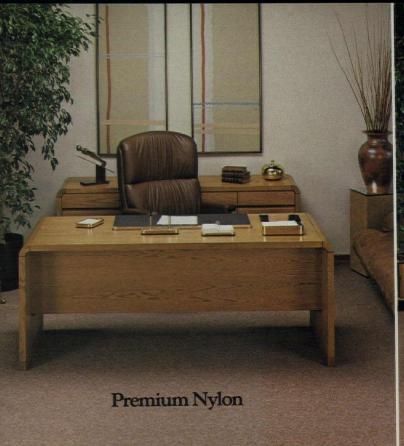
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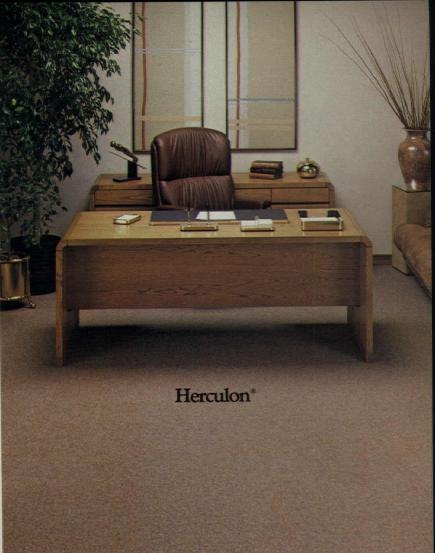


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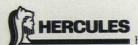
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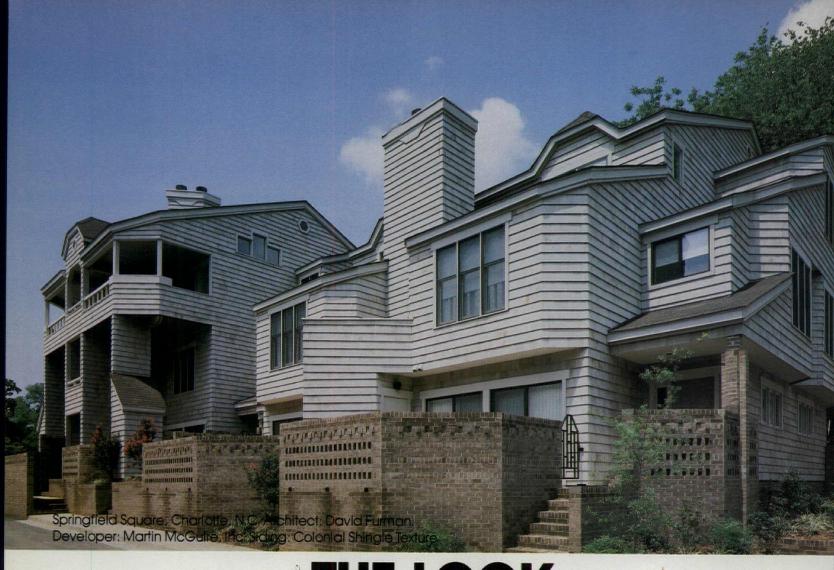
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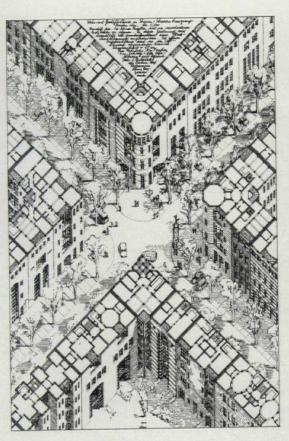




International housing: Street wise

Housing complexes in several countries reestablish important urban values while reconfirming the architectural potency of the building type.

Rob Krier's drawing (right) shows a detail of his restructuring plan for South Friedrichstadt in West Berlin. A section of the plan, with Krier's White House (p. 90) at its center, has been realized.



Shelter is undeniably a crucial human need. Its provision has been taken so seriously in our century, in fact, that the mere mention of the building type, housing, has tended to evoke a holy hush. Lest its designers be accused of offering indulgences, its architecture has often proven to be as apparently healthful, but flavorless, as enriched white bread. Perhaps the early CIAM fathers (or the later lesser lights they influenced) retained a Victorian attitude that whispered, "Hush, children are present. Housing, like mothers, must appear sexless."

The architects whose housing complexes are featured in this issue take no such modest stance. Their buildings are not self-effacing: They possess a distinctive, even dramatic, presence. Where early Modernists were preoccupied with providing a frame (as simple and unfrilled as possible) for salubrious space, setting minimum standards for rooms and striving to leave open all of outdoors (or as close to infinite space as the realistic site allowed), these architects have assumed additional concerns, and have shifted the focus of their attention. They have concluded that infinite space is as comforting to urban creatures as infinite freedom, and that undifferentiated, unadorned physical backgrounds are as symbolic of democracy as the singlecandidate ballot slip.

These buildings, it should be noted, defy classification in any one stylistic category. They range from Modern (Valle's housing in Udine) to classicizing (Bofill's Spaces of Abraxas near Paris) to vernacular (Correa's low-income housing in New Delhi). The outward expressions of the buildings reflect each architect's personal vision. Bofill and the Taller de Arquitectura have developed an industrially produced, classically inspired, grandly scaled garb for their housing complex. Rob Krier, obsessed by the desire to offer variation, has perforated the thick façade of the White House in Berlin in a multitude of ways, asymmetrically reflecting the asymmetrically disposed and varied units within; and he has placed an eroded earthly angel on guard over the low and haunting arch leading to the semipublic court. Ciriani's housing complexes display a dramatic tension between the skin's thickness and linearity. And Gino Valle, in his housing in Udine, uses dramatic color to break down the scale of the structure and to humanize the component parts.

Furthermore, these architects have confronted entrenched urban planning philosophies. Rejecting the prototype of the suburb as a misguided and ultimately souldestroying approximation of the bucolic environment, Bofill has molded insistent urban spaces complete with a monumental entrance, theatrical oval space, forced vista, and palace. Rob Krier's White House, a part of his Dream Plan for South Friedrichstadt in Berlin, also takes on (but in a gentler way) the post-war urban planning vision that disrupted the texture of the area, and reestablishes the neighborhood's street-hugging pattern, incorporating Berlin's traditional outdoor spaces within the block. And Valle's Santo Stefano di Buia highlights the traditional importance of the Italian street by creating an urban square.

In their urban and architectural intentions, these buildings make a clear gain, but not a complete one. While Krier shows an understanding of public and semipublic spaces, he seems less sensitive to private space, creating rather unsettling "sitting" rooms en filade. Ciriani and Bofill, preoccupied with external formal expression, do not always provide reasonably generous and well-proportioned rooms. But the lessons their buildings present can be built upon: They have responded confidently to the human need for a solid, defining urban framework; and they have reconfirmed the architectural potency of the building type, housing. [Susan Doubilet]

Subsidized Doric

Barry Bergdoll

Ricardo Bofill and Taller de Arquitectura's Spaces of Abraxas is a tightly knit urban complex of three residential buildings in the Marne-la-Vallée suburb of

The 584 subsidized apartments for sale and rent include 126 in the semicircular 9-story Theater. 441 in the 19-story Palace facing it, and 17 in the 10-story Arch between the two (the interrelationship between the three is seen in the photo, top right, this page, and in the first floor plan of the complex, over). The buildings, termed "structurist Classicism" by Peter Hodgkinson of the Taller, are built of reinforced concrete bearing walls and integrally colored panels.

"Daily life should not be banalized, but exalted to become rich and meaningful." Ricardo Bofill has declared in explaining his monumental housing complexes in two new towns outside Paris, Marne-la-Vallée and Saint Quentin-en-Yvelines (P/A, Oct. 1981). If suburban life lacks drama, why not house it in a theater. By placing residents on an urban stage, life at the distant end of the commuter rail line might be invested with that same sense of public presence and eventfulness that animates traditional urban culture. This flagrant refusal of a century's vain hopes of pastoral escape, the motivating illusion that underlies suburban sprawl as well as the newtown countercriticque, is a controversial proposition. But Bofill and Taller de Arquitectura have thrived on controversy and public polemic since they first broke into the French architectural scene in the early 1970s. with their projects for Cergy-Pointoise (La Petite Cathédrale) and the ill-fated commission for Les Halles. The three components of the Spaces of Abraxas, as Taller calls the 9-story "Roman" Theater, 19-story Palace, and the central Triumphal Arch, present a vast cliff of precast concrete. Set on a ridge overlooking the Marne Valley, the Spaces of Abraxas is a Piranesian-scaled gateway to the Parisian eastern suburbs, a prefabricated romantic garden folly that brings instant history and identity to a place where architects have reveled in the opportunities of tabula rasa.

Traditionally the railroad and the car have shaped the suburb, and architecture has devolved from the prerequisites of the regional transportation pattern. Marne-la-Vallée, one of the most recent of Parisian new towns, is no exception. In 1976 the autoroute arrived from Paris, followed by a new branch of the commuter railroad in 1977. These two transportation arteries form the backbone of Marne-la-Vallée, a linear axis in counterpoint to the winding Marne valley.

The Spaces of Abraxas, at the western limit of the first of Marne-la-Vallée's four clusters-each centered on a rail station-seeks to return the definition of urban form to architectural design. With nearly 600 subsidized apartments (mixed sales and rental) on a confined site, the project has an urban density, creating framed views by forced perspective, and massing a monumental entrance to the linear new town. Looming



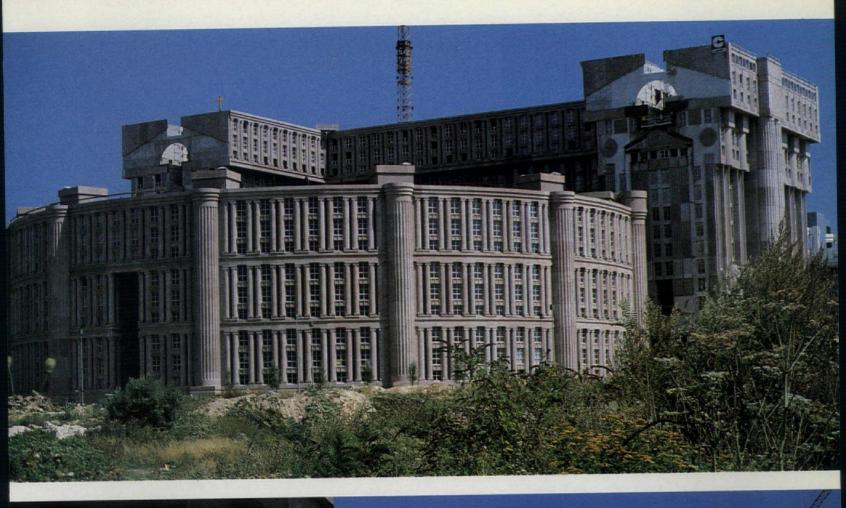
ahead for miles along both highway and railroad, Abraxas-named for the Mesopotamian symbol of both good and bad-is a contradictory landmark that has already come to symbolize the town, as the Communist town fathers required in the initial brief. This inversion of traditional hierarchies of architectural functions is, Bofill maintains, fundamental to his revision of urban form: "The urban design of our era will take the structure, if not the dimension, of the historical city into account. It will, however, invert the symbolic values. Everyday life will take the center of the stage, while the public edifice and facility will recede into the background."

The Arch

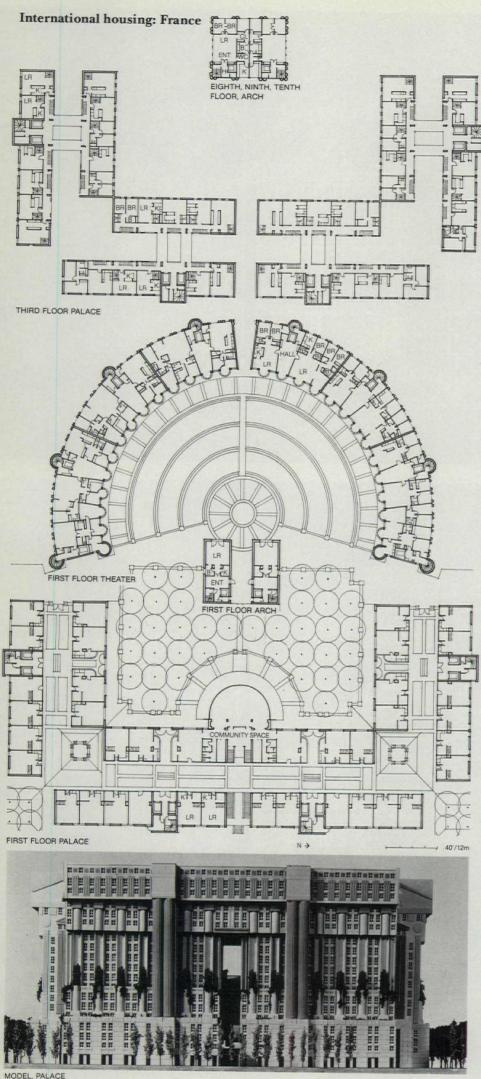
The search is now on for 17 families who want to occupy center stage in the apartments of the Arch, which forms the center and focal point of the complex and is called by Bofill a 'stage curtain that shelters exhibitionists."Also sought are prospective owners and renters to witness this spectacle from the 126 apartments (studio to six rooms) in the semicircular Theater, or from behind in the towering bleachers of the Palace, harboring 441 apartments (studio to five rooms, many duplex) behind its four-story base and eleven-story fluted columns.

The complex is squeezed tightly into a roughly pentagonal space between the ring road, which describes a hexagon around Marne-la-Vallée's commercial center, and a four-story concrete parking garage that forms a most unceremonious link between the Spaces of Abraxas and the town center. When landscaping of the site is complete, the Palace and Theater will rise above a dense planting of trees that should partly obscure the parking lot. Vines, shrubs, and trees are also to be integral parts of the façade composition, especially of the Theater, which also

Barry Bergdoll, a Ph.D. candidate in architectural history at Columbia and a graduate of Cambridge University, is the author of biographies of German and French architects, including those of Schinkel and Gilly in the forthcoming Macmillan Encyclopedia of Architects.







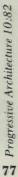
features a roof garden to be enjoyed as much by its own residents as those of the apartments in the upper stories of the Palace, for which it forms a foreground to a sweeping view of the Marne valley. The inner side of the arc of the Theater defines an amphitheater on four levels. The vine-draped Arch—romantic, not triumphal, Bofill insists—provides the principal stage set, the Palace a monumental Classical backdrop.

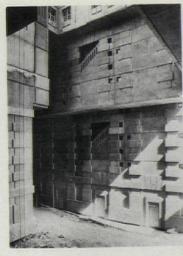
The Palace

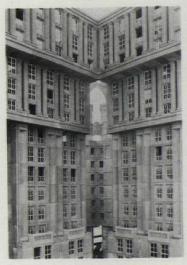
A half-H in plan, the Palace is the Cour d'Honneur of a French palace blown up to a scale worthy of Boullée's or Ledoux's grandest fantasies. While its tripartite vertical articulation proportioned by a classicist 1/4-1/2-1/4 scheme and its fine "masonry" work tie it clearly to French tradition-a major selling point for middle-class clientele-the latterday Archigram roots of its primary conceptual designer, Peter Hodgkinson, are not difficult to discern. The Palace is an Archigram megastructure got up in Classical dress for a night at the theater, complete with internal streets and gangway galleries leading to individual apartments. Functions are articulated but disguised. Like huge pistons, the colossal Doric column stair towers are pulled out from the building; industrial units, they have no subtleties, such as entasis, and even dispense with recognizable capitals. Moreover, they have a disturbingly unresolved relationship to the governing ordonnance of the façade, which is determined by the 20-ft constructional grid of the precast panels rather than any time-honored Classical rule. This Classical "dress," however, is one of the project's chief triumphs.

Extensive experimentation with precast and integrally colored concrete panels (Coignet system), both here and at Taller's Arcades-du-Lac complex (P/A, Oct. 1981), endow these projects with a solidity and presence rare in the ticky-tacky constructions of French suburbs. Meticulously detailed and joined, the concrete panels not only have a thick feel appropriate to the Classical vocabulary of the façades, but serve to lend greater rigidity to the poured concrete structure on which they are mounted. Yet for all the solidity of the rusticated base, the façade is composed as a series of witty negations of Classical syntax. In the middle section, shrubs replace part of the shafts of monumental columns, where niched troughs reinforce the absence of the missing section, that key symbol of Classical organization. In the double entablature, of three-story elements, this top-heavy Palace trafficks even more cavalierly with the Classical language it purports to reinvest with significance. Two-story-high triglyphs support a cornice punctuated by windows and blue ceramic tile panels, and giant broken pediments are bent around the reentrant angles between the side wings and the main block. Silhouetted against the sky, these Baroque pediments make a display of the very thinness of Classical appliqué.

Bofill aims to exploit and develop the Classical motifs he uses so freely, dismissing critics as pedantic quibblers. But has he really in-

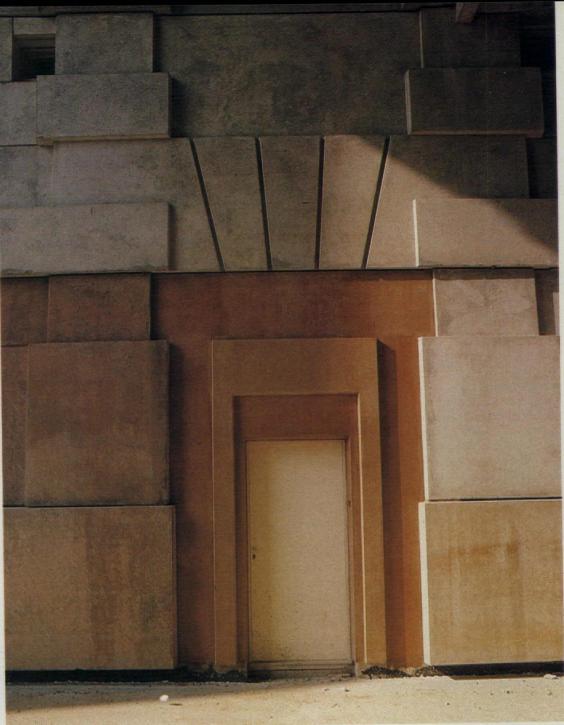


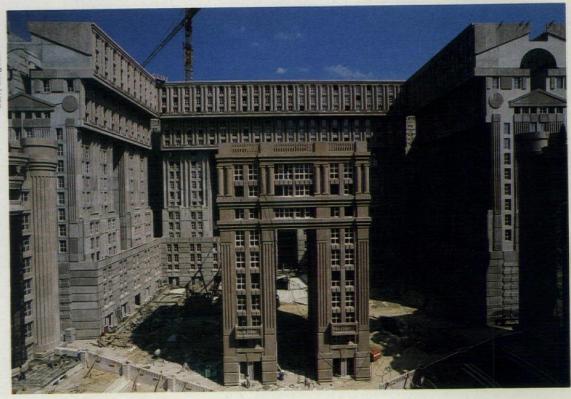






An interior "street" of the Palace (top) is seen in detail (top right). Other views (above) show one corner of the Palace from the inner courtyard, and the opposite side of the same corner, where the "voided" columns are clearly visible from the street. The Arch (right) is seen against the Palace, with the ends of the Theater visible at the sides.





International housing: France

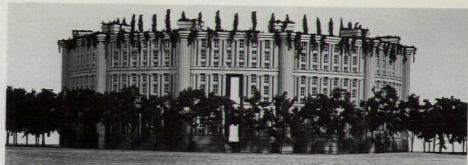
vested traditional forms with new meaning? Do they even serve to organize the composition aesthetically? The colossal Doric columns echo the major order of the Theater, but they do not succeed in harmonizing the two principal components of Abraxas. The Palace and Theater are awkwardly juxtaposed, in both progression of scale and geometrical configuration. The Theater describes an arc slightly greater than a semicircle, abutting the rectangular geometries of the Palace at an unresolved angle; the Palace in turn does not defer to the Theater, but offers only an overpowering four-story base to the Theater's glittering interior façade.

The Theater

The Theater's two façades present a dramatic contrast. The outer convex one features three superimposed tiers of paired columns, all of equal size and indeterminate order, a Speerlike reductivism relieved only by a horizontal system of blue-tiled balcony fronts and blue tile intercolumniations. (Blue is the color prescribed by the town as the linking element in the cacophonous landscape of Marne-la-Vallée's center.) In contrast to the closure and horizontal grid of the exterior façade, the sweeping concave of the interior façade is enlivened by a parade of reflective glass bay windows. Seven stories tall and topped by awkwardly faceted balconies and parapets that will eventually sport cypress trees, these mirror columns provide a jazzy Art Deco note that will seem jarring to some, but a welcome relief from Roman sobriety to others. The arc of the Theater is broken only by one of Bofill's favorite additions to the Classical vocabulary, the "urban window." A huge cut in the building, it affords a funneled perspective glimpse along the major axis through the Arch and the Palace. It is symbolic of the linear central axis that controls the development of Marne-la-Vallée beyond Bofill's gateway, but it is a planner's abstraction. The monumental vista ends abruptly in the concrete horizontals of the parking garage. In the opposite direction, however, the vista is a beautifully modulated and controlled sequence of framed compositions and polychromatic progression from the masonry pinks of the Palace to the deep browns of the Arch, the view finally opening out through the Theater into the landscape beyond.

Like one of Piranesi's Carceri, another element of the collective architectural memory evoked here, the theatrical central space is ultimately oppressive. Overworked and overwrought, claustrophobic in its crowding of elements, blocked vistas, and unsettling disjunctive scales, there is yet an undeniable fascination and thrill in the space. But as in Piranesi's prisons, the drama gives way to angst when we begin to search for an escape, a moment of respite.

From the 1960s, Bofill and his Taller have taken a formalist approach to design. The industrialized Classical mode of their recent French projects has merely substituted a new



MODEL, THEATER

geometric rigor for the expressionistic freedom of their earlier Catalan work (P/A, Sept. 1975). Bofill, fond of evoking Adolf Loos's famous comments on monuments, admits, "Today, I define architecture as the art of structuring spaces, of creating new symbols, of developing the Classical language."

The Spaces of Abraxas is indeed as much an event as a place. Thinking about the project, however, seems to have stopped short with the model-a major attraction of last year's Venice Biennale. The plans are an afterthought, forced into the overpowering forms conceived as backdrops for an outdoor theater and the building blocks of a vast urban sculpture. This is especially apparent in the smaller rental units in the Palace's base. Reached from the dank recesses of the lower of the two internal streets, these apartments are meager in scale and detailing, their layouts unimaginative and awkward. Admittedly, the larger apartments on upper floors are duplexes and afford fine views, but it is the apartments in the rear façade that command views of the true urban spectacle-the constant arrival and departure of commuters and shoppers in the parking garage across the narrow access road that separates the Palace from the commercial center. Even though the apartments in the Theater are more generous in layout, and pleasant in the double orientation of their floor-through plans, they are determined by the pie-shaped configurations of the arc-shaped ground plan. From the arbitrary placement of the bay windows in the bedrooms, it is readily apparent that Bofill and Taller have designed from the façade inward. Bays often occur in the extreme corner of the room, providing a strange space difficult to use, and even requiring a maladroit deflection of the wall in the adjacent room. Such inattention to the private aspect of the design makes one skeptical of Bofill's frequent sociological polemic. Exalting daily life with such theatrical bravura, he has in fact made but few concessions to its enrichment beyond the view from the window.

The idea of inhabiting a folly in the garden of the Palace might seem, in keeping with the new age of Mitterand, to extend a nobleman's privilege to the people. But the people have no château to retire to when the novelty wears thin. Bofill's architecture dramatizes the everyday in a most enthralling way, but for the permanent residents the project has a disturbingly authoritarian character. This is a play that will have no intermission.

The 7-story-high glass bay windows facing the courtyard of the Theater (right) are topped by faceted balconies and parapets; the arc of the building is broken only by an "urban window," which allows a view along the major axis of the complex.

Data

Project: The Spaces of Abraxas (Palace, Theater, Arch), Marne-la-Vallée, Noisy-le-Grand, France.

Architects: Ricardo Bofill, Taller de Arquitectura; Peter
Hodgkinson, Jean-Pierre Carniaux, Thierry Recevski, Xavier
Llistosella, Patrick Dillon, project and conception; Ramón Collado, Hilario Pareja, realization.
Technical assistance: Uteba, Yves Serra, Gros, Sogelerg of the Bureau d'Etudes Techniques; Jean-Pierre Aury, architectural concrete.

Clients: Comptoir National pour l'Habitation 2000, Palace; SA Habitations Loyers Moderées les Trois Vallées, Theater and Arch. General planning organization: Ètablissement public d'aménagement de la ville nouvelle de Marne-la-Vallée.

Site: confined pentagonal area within hexagonal commercial core, bordered on two sides by ring road and on another by a four-story parking structure.

Program: 584 subsidized apartments for sale and rental,

with underground parking for 156 cars (in the Theater). Structural system: loadbearing concrete, precast and treated concrete panels.

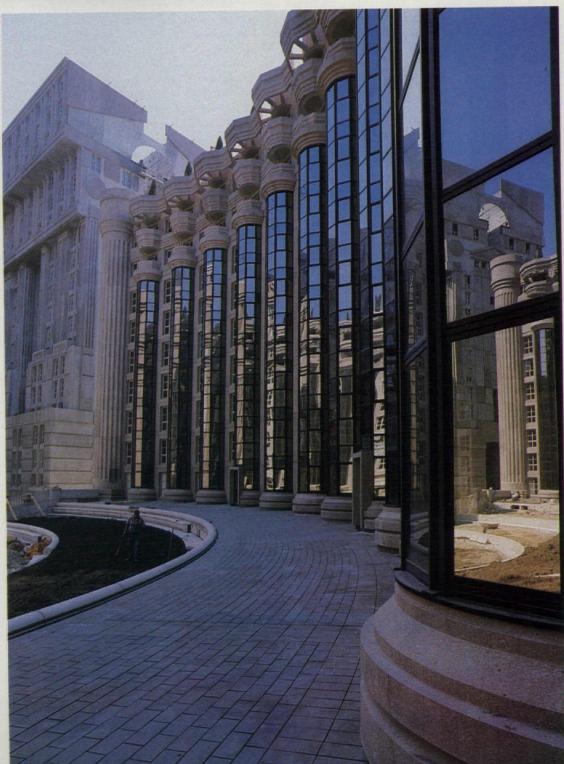
Major materials: precast and treated concrete, tile, wood, reflective glass.

Contractors: Coignet-Enterprise, Palace; Enterprises Bouygues, Theater and Arch; Enterprise I.B. Morin, façades and prefabricated furniture for Palace and Arch; Préfabrication E.P.I., façades for Theater; Dubois, curtain wall for theater. Costs: 3000 FF per sq m (approx. \$46.50 per sq ft).

Photos: Deidi von Schaewen.







The following is excerpted from an article entitled "Palaces for the People" by Peter Hodgkinson.

Within the tectonography of the "Taller de Arquitectura," the Spaces of Abraxas must be considered the most daring, unorthodox, and risky. It openly pretends to be a gigantic work of art; it consciously inflates what is considered conventional subject matter to the limits of pretentiousness; its gigantic doors are wide open for every type of critic's dart, from "pompierism" to plain opportunistic gimmickry, but large-scale housing projects will never justifiably be the same again, for Abraxas shows that for the same money, time, and material you needn't build those hideous modern cemetery blocks.

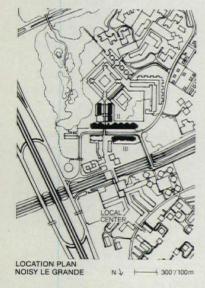
These reworked, often surrealistic interpretations of the Classical language reach levels of manneristic complication, but when studied as a code of behavior, demonstrate that even the most elemental Classical vocabulary can make a building appear totally modern, totally of today. This is an important test, for while many of the current projects of the Post-Moderns can be seen as fashionably relating to the past, this project intrinsically relates to the future. It is the Cape Canaveral of the Classical space age, the return of a people's ritual, a group of buildings that communicate space, telling the fable of an ancient epic rediscovered to serve man anew.

The lack of entasis in the columns is due to the fact that the very size and height of the buildings with three-quarter or one-half columns reaching up 6, 9, 18 floors would invalidate such visual compensations as ordained by Vitruvius (or 1500 years later by Palladio) who adamantly related the higher entasis factor to the lower orders, decreeing that a composite order (the highest) needed little entasis as the very height of the column visually diminished the top. The Tallers' columns follow their own constructive motivations as the strict doctrine of the treaties envisages no such scale.

Modernity for eternity

Hélène Lipstadt

Architect Henri Ciriani combines social purpose with formal invention in three housing complexes in the Paris region: Noisy II and III in Marne-la-Vallée and Cour d'angle in St. Denis.



Three recent public housing schemes by Henri Ciriani exemplify one of the more surprising characteristics of the young French architecture that has flourished since 1978: its association with buildings commissioned in new towns by public and semipublic institutions—and, above all, with housing. French housing projects, often small in comparison with those of other countries, are financed by a patchwork of public and private interests, frequently working in tandem. As a result, project managers enjoy a certain degree of freedom from ingrained bureaucratic habits, freedom they have passed on to their architects.

The results are astounding. At times, anything has seemed acceptable, anything but the barre, that thin strip which began its career as the exemplary form of Modernism, but has fallen on evil days since it was taken up by the planners and manufacturers of massive urban renewal and mediocre, authoritarian public housing. The unexpected and fruitful partnership of experimental architects and public institutions has occurred when the latter, be they Communist municipalities or the entirely capitalist Fover du Fonctionnaire et de la Famille, have sought to formulate individual statements about the quality of the environment they administer. It would seem that they, as much as or more than the architects, have been intent upon distinguishing their buildings, not only from the standard Parisian speculative apartment house, soberly inserted between party walls behind a façade of dressed stone, but also from the undifferentiated forms of earlier public housing,

Despite its unsavory reputation, Modernist housing has strong defenders in France, among them, Henri Ciriani. His prophecy: the barre must reappear, in a rehabilitated form. His Modernist credo reposes on the following articles of faith: French Modernism was "directly identified with the struggles of the Left. . . . France was the first country in the world for the quality of public housing . . . there was nothing escapist about the Modern Movement: it has to satisfy the needs of mass housing." Further, "Architecture is harmony, well being, the power to give people beautiful objects, transformations, modulations so that a wall is not always the same in the sun." Finally, "My position is simple. I work at creating competence, which is the only way to reach a level where architecture can be made comprehensible to all and be democratic."

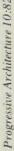
This credo results in a set of dicta, design strategies invested with the strength of dogmas. "I center my research around three main points: use of a monumental frame to requalify urban space . . .; study of the line as an architectural response; and work on thickness, that is, the stratification of frontal space so that it represents the dialectic of thickness and transparency." Thus confident of the existence of a politically untainted Modernism, Ciriani feels free to proceed as a formalist, finding inspiration in the work of Le Corbusier. "Where he left off, I continue." Contradictions between his belief in an entirely autonomous architecture and the satisfaction of social needs? Ciriani sees none. Difficulties, at least, in meshing these apparent rivals? "For the others, not for me." During the ten years between Ciriani's arrival in France from his native Peru and his first major French commissions in 1978, his faith never

Modernist from the start—his education was pure Bauhaus, imported from Cornell-Modernist he remains. Yet the label Post-Modern has been applied to his work, an equation that Ciriani invites by his strong formalism. Even if one leaves the stylistic distinctions to the taxonomists and merely enjoys the prospect of a new Jencksian category developed for Ciriani alone, there remains an unavoidable matter to be examined. As an architect and a teacher, Ciriani holds his theories, political and artistic, to be of a piece and permits no deviations. The unquestioning faith of the elect cannot be tested in this world; the degree to which their good works reveal their privileged state, however, can be judged. It is thus fitting that Ciriani's first three major French commissions be studied in the light of the perfect harmony he claims to have achieved between the social and the aesthetic.

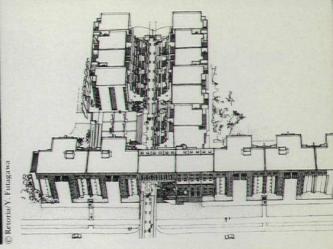
Noisy II, Marne-la-Vallée

At Noisy II, the Foyer du Fonctionnaire et de la Famille, the discreet Medici of so much new architecture, requested 300 units of subsidized housing, consisting of apartments of three or four rooms for two groups of purchasers: 180 units were intended for those eligible for loans from the National Society of Habitations à Loyers Modérés (H.L.M.) and

Hélène Lipstadt, who holds a doctorate from the Ecole Practique des Hautes Etudes en Sciences Sociales in Paris, is trained as a social historian and anthropologist. She has written about Karl Friedrich Schinkel for P/A (Oct. 1981).

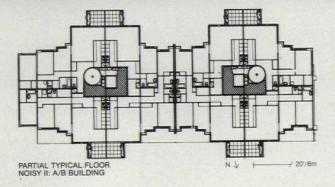


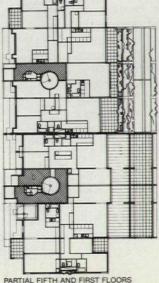






Michel Desjardin





PARTIAL FIFTH AND FIRST FLOORS NOISY II: C BUILDINGS

Noisy II's massing (aerial drawing, top) includes a long block on the north, called "A/B" and two wings to the south, identified as "C" Buildings. These wings present stepped-back balconied walls along a promenade that leads from local node, through "A/B" block (background, top left) to a community garden (site plan, op-posite). "C" buildings are entered from outer sides (above), through entries marked by various types of arches.



form the building which rehabilitates the barre, the 180-m (590-ft) A/B Building; 120 units of the same size were required for more favored applicants whose purchase price is controlled (P:S:I.). These are divided into two parallel structures, confusingly named, together, the C Buildings. All were to have balconies and all were to be fitted into eight stories.

Ciriani did the master plan for this module of the Marne-la-Vallée new town, Noisy-le-Grand, which meanders along the course of the new autoroute and railroad line. His goal was to create a Pièce Urbaine, an urban relationship not only for his buildings, but for those of the architects commissioned to build 600 more units on the site. The pedestrian walk he imposed on the empty 18-acre site leads from the railroad station, bridges the typical wiggle of a new town road, pierces the long barre of the A/B building through a giant portal, and emerges to form the axis between the fraternal twins of the C Buildings. Drivers, segregated to the access road, perceive A/B as a giant wall on a podium, formed by the garages. In the A/B Building, Ciriani's formal media are the 5.6-m load-bearing concrete bay typical of French construction, a .50 x .50 m sheet of stick-on red industrial tiles which serves as a module, along with color, and above all, light.

The C Buildings rise from the pedestrian walkway like tiers in an amphitheater, with



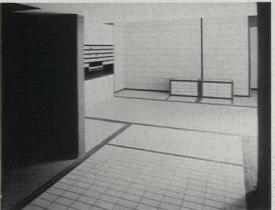


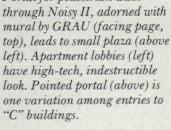
Noisy III (above) faces the long block of Noisy II across a vehicular street lined with garage podiums (left). Its lattice of south-facing balconies recalls Noisy II, but the dark mass behind suggests something more plebeian. West end of slab (facing page) is sculptural statement for those approaching by car.

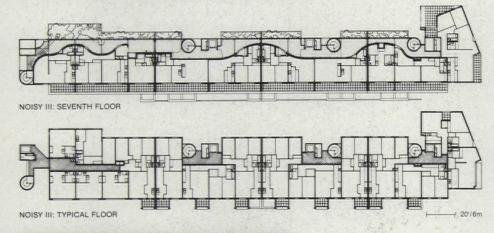




Portal for pedestrian walk









scooped-out terraces below, stepping back to narrow basketlike balconies above. Planted by the owners, these form hanging gardens. Two-story entrances to the C Buildings, monumental and whimsical at once, form giant arches, here round, there pointed, below which open asymmetrically pivoting square doors. These doors, and the entries, reveal Ciriani's prowess in layering planes as well as space, and the merest letter box is a tour de force which many a luxury building would envy. Regulations also provide opportunities for displays of prowess, like the elegant sandwich made of required party walls separated by green drain pipes.

The plans, overall, are less enviable, although extremely varied—60 models in all. Deep balconies form shadowed and shallow rooms, and indentations bite into furnishable spaces.

A persistent and justified criticism of Ciriani's dialectic of thickness and transparency is that it squeezes out the middle term, internal space and personal comfort. Further, the C Buildings are exempt from participating in the urban game of street frontage. The ruling axis merely serves as promenade, and the entrances are elsewhere. More important, the A/B Building is dauntingly monumental, and one wonders if the owners share Ciriani's nostalgia for the barre and its association with the public housing they perhaps have left behind. Lavishing details upon the C Buildings and separating them from the barre makes the distinction between the two groups of owners architecturally apparent.

Noisy III

Across the road in Noisy III the application of the formalism of Noisy II to 88 rental units of traditional public housing results in an unfortunate reversal of priorities. The narrow barre is here relieved only by the undulations of the roof garden apartments, an homage to Le Corbusier that the inhabitants with the nibbled-on spaces will scarcely understand. Further, access to the building from the pedestrian walkway requires one quite literally to slip through the gap between Noisy III and its neighbor, again casting doubt on the role of the walkway as an urban street. Noisy III repeats many of Noisy II's motifs, but they are applied with neither the whimsy nor the rigor of the first building, and seem to form a didactic exercise of the principles there established. The industrial tile module of Noisy II, which reappears in Noisy III, has made Ciriani's reputation as a magician who pulls elegant detailing out of a prefabricated hat. Yet, surprisingly little of either building is prefabricated, at most 15 percent.



Cour d'angle, Saint Denis

For the French, Saint Denis, known to us as the birthplace of Gothic in the 12th Century, has come to signify undistinguished and disorderly public housing complexes, a social victory (10,000 units in 20 years) and an aesthetic failure for the Communist municipality. Previously, fleets of buildings were set afloat without benefit of battle plan. Now Ciriani has been called in not only to provide 124 units of traditional public housing, but also to bring order into the chaos of recent construction.

The Cour d'angle is just that, a courtyard and a corner. The court is a perfect square, in its geometry and in its function as a public amenity. The strong form of the corner closes an important crossroad and repairs the urban tissue ripped asunder by carelessly implanted services and housing whose dots and dashes continue to the horizon. The Cour d'angle provides a strong new skyline for Saint Denis, red, white and blue-the blue of the Gauloises cigarette packages. The narrow, longer wing (90 m, 295 ft) supports a frieze which covers two of the eight stories. Formed of two-story lozenges, 5.6-m squares turned on their corners, with smaller openings, all red-and-white striped like the building, it screens a field of blue. The corner appears as a lower white concrete building, solid on its side elevation, lattice-opened on its façade, which rips around to inflect, following the 80-degree street line, and then, like a wave breaking, curls upon itself, dips into the mass of the building, and reemerges as a lace of squares garnishing a five-story pool of Gauloises blue. On the higher, southern wing, much recalls Noisy. The claustra balconies are neatly stacked in two tapering towers. The court façade busies itself with closing the mall of green left free by the 11- to 18-story neighbors, and rectifying the 80degree angle of the street.

In the corner, he has placed an internal street, a crease in the thickness of the fold. Like a fault line, it reveals the strata of alternating openings, windows and inner balconies, some blue, some red, some glazed, some open, most bound by the guard rails whose triplicate lines underscore the strictness of the geometry. Here the stairwell is a pool of light that cascades from the glass roof and ricochets off the colored openings. The willfulness of Noisy III and the whimsy of Noisy II have been supplanted by an unrelenting logic, governing the interpenetration of planes, colors, and forms.

Ciriani has created a monumental and superlative addition to French architecture at the cost of 2000 francs per sq m (\$40 per sq ft). Again, however, rooms are small, plans cramped, and the internal hierarchy of circulation off the internal street confused and arbitrary. To these criticisms, the client, M. Lelièvre of the Logement Dionysien, responds with a defense of Ciriani. Speaking for the tenants, he expresses their satisfaction with the urban, sculptural, and above all, aesthetic qualities of the building, as well as with the much criticized supply of natural light. He maintains that the Cour proves that the satisfaction of needs now includes a growing sensitivity to aesthetic qualities and architectural creation. The Modern movement's cherished goal, the improvement of man through his habitat, has apparently been achieved. And herein lies a danger.

When a public housing scheme is given the status of an immutable work of art, the ultimate clients, the tenants, will have yet another requirement to satisfy—the architect's intention—reintroducing the old authoritarianism. Ciriani would seem to want his buildings untouched, for he claims to build for eternity. Saint Denis has earned another monument, but only time will tell whether eternity will guarantee the Cour d'angle the stature it has accorded to its Gothic basilica. \square

Data

Project: Noisy II, Noisy le Grand, Marne-la-Vallée, France

Architect: Henri Edouard Ciriani, Paris.

Client: Foyer du Fonctionnaire et de la Famille.

Site: 18 flat acres in new town. Program: 300 studio to fourbedroom subsidized apartments for sale, with terraces or covered balconies; underground parking; communal facility.

Structural system: 18.5-ft bays of load-bearing concrete crosswalls and slabs.

Mechanical system: electric heat and ventilation.

Major materials: metal-molded exposed concrete, white rendered concrete block, industrial red tile, plasterboard sandwich panels, wall-to-wall carpeting, vinyl tile, decorative ceramic tile.

Consultants: O.T.H. Habitation, interiors, structural, mechanical.

General contractor: S.E.T.B. Costs: about \$9 million.

Project: Noisy III, Noisy le Grande, Marne-la-Vallée, France.

Architect: Henri Edouard Ciriani.

Client: Interprofessionnelle de la Region Parisienne.

Site: 105' x 345' level field.

Program: 88 studio to threebedroom subsidized apartments for rent, a communal facility, an 11-studio-apartment facility for the disabled, 100 underground parking spaces.

Structural system: 18.5-ft bays of in-situ precast reinforced concrete slabs and bearing cross walls.

Mechanical system: fuel-fired central heating, electric ventilation.

Major materials: south façade lattice of prefabricated light gray concrete, facing tiles, double glazing, plasterboard sandwich panels, wall-to-wall carpeting, vinyl tile, decorative ceramic tile. Consultants: C.E.R.C., structural, mechanical.

General contractor: Bouygues. Costs: about \$3,850,000.

Project: La cour d'angle, St. Denis, France.

Architect: Henri Edouard Ciriani

Client: Le Logement Dionysien. Site: 24,548-sq-ft former industrial area surrounded by high- to low-rise housing.

Program: 129 apartments, 246





Cour d'angle's complex forms bring street walls and an enclosed court to an area dominated by tall housing blocks (background, below). Fragment of curved grid wall (facing page) celebrates acute street corner. Boundaries between articulated blocks on east side are deliberately disjointed (far left); inside court (left) bend in wall is just as frankly expressed.



Data continued

parking spaces on two underground levels, 2 infant care centers, a communal facility, and a square.

Structural system: 18.5-ft bays of in-situ precast reinforced concrete slabs and cross walls.

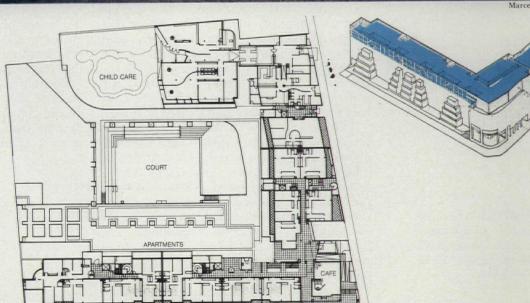
Mechanical system: gas-fired central heating serviced by city, electric ventilation.

Major materials: white prefabricated concrete, red facing tiles, plasterboard sandwich panels, carpeting, vinyl and ceramic tile.

Consultants: C.E.R.C., structural, L.A.F.I., heating, ventilation.

General contractors: Tassoni, E.CO.BA., S.C.G.D. (at various stages).

Costs: about \$6 million (not final).



COUR D'ANGLE: STREET FLOOR

NT - 20'/6m

In the image of the city

Ulrike Jehle-Schulte Strathaus

Diener and Schett retain careful Swiss detailing, but reject Swiss-like preciousness, taking the city as the point of departure for an 88-unit subsidized housing complex in Basel.



In their design for an 88-unit housing complex in Basel, two Swiss architects have acted in a manner uncharacteristic of their countrymen. Rather than indulging in nostalgia, Roger Diener and Wolfgang Schett have clearly differentiated between urban form and the villagelike mise en scène found in many recent Swiss designs, and have opted for the first in no uncertain terms. Yet they have managed to retain a Swiss-like concern for detail.

The architects take the city as their point of departure. On the one hand, abstractly, they start from the city as the place where a dialectic relationship between the individual and society, between intimacy and anonymity, between the private and the public spheres manifests itself. On the other hand, concretely, their design is based on the urban patterns of the Matthäus District in Basel, one of the high-density neighborhoods in the northern part of the city. They resort to the typology of the perimeter building common there, but isolate their own U-shaped element from the existing building substance. The autonomy of the new is stressed by this separation, while its integration in the historic structure is emphasized.

The gradations of the external spaces can be read as part of the public or the private realm. The space separating the new building from the old becomes a pedestrian link within the district, its role emphasized by a tree-lined concourse. The courtyard with gardens forms a semipublic part, and the row of two-story studio houses refers to a domain somewhere between individual and collective, and represents the kind of structures that are traditional in such a setting. Verandas, balconies, and—especially impressive—the large roof terrace offer alternative exterior spaces.

The integration with the neighborhood is furthered by the individual formal elements of the building, down to the smallest details. The two lower stories, containing duplex apartments, are expressed as a base, with the prefabricated, grooved concrete cladding and sheet-metal shutters recalling the bases of the surrounding 19th-Century buildings. The corners, as in traditional housing, are given special treatment, but also accentuate the bend at this point of a street, the Bläsiring.

The plans of the apartments follow Modern concepts of standardization, and take into consideration production techniques. The basic outline is a square, subdivided in different ways in the duplex units and in the two-



bedroom flats above. Flats have both a street and a courtyard orientation. Diagonally placed walls allow large entrance zones and relatively big rooms, giving the resident a certain degree of functional flexibility. Large, double-glazed verandas on the courtyard side create what amounts to an additional room. The small apartments, intended as flats for the aged, are situated in the corners of the complex and enjoy panoramic views of the street.

The treatment of the windows derives from the methods of construction. Square "holes" are punched in the load-bearing brick walls on the street side, and strip windows occur in the brick-infilled steel-framed wall on the courtyard side. The wood-framed windows, flush with the façade, recall traditional windows, and mirror the light of the street, while on the inside they create a recess with a reveal emphasized by white interior shutters that frame the view and reflect light inward.

Daylight is carefully considered in other areas as well, and the effects are modulated by the color scheme. The stairwells receive daylight from above, climaxing with the roof terrace. The brick masonry walls are painted

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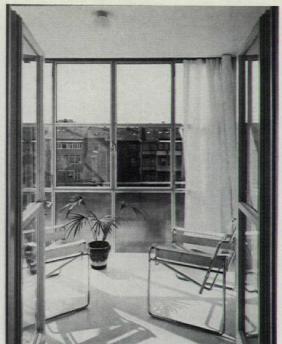


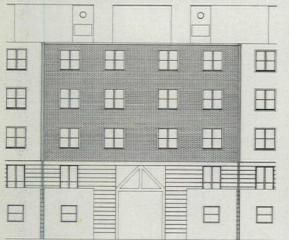


The five-story project follows the traditional pattern of this typical 19th-Century residential and industrial district, forming a closed wall of apartments to the street and a courtyard within. Apart-ments are provided in various sizes, small for the elderly and disabled, three to six rooms for families and larger community living units. Duplexes line the base; some upper floor apart-ments have glassed-in porches projecting into the courtyard (top left). Top right: Efringerstrasse elevation. Left: Bläsiring elevation. Facing page: Corner of Bläsiring and Efringerstrasse.

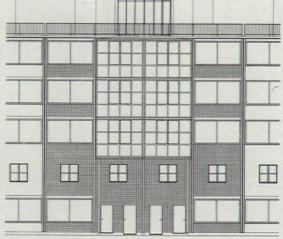








STREET ELEVATION



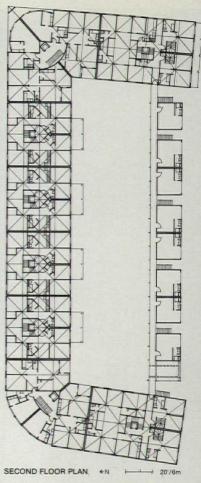
COURTYARD ELEVATION

a Mediterranean bluish-white, and the window frames, pale blue and water-green, are the only elements with real color. The white captures the moods of the weather; in bright sunlight the effect is dazzling. The chromatic range invests the whole with a unique character, and recalls Irish or French architecture.

Details are carefully handled. In the stairwells, the first step of the concrete stairs is of white Italian marble fashioned *in situ*. The lighting fixtures and ceiling cladding are developed with precision, the bathrooms have a white strip of tile reminiscent of 19th-Century spas, and the knobs on the kitchen cabinets are chosen with care. The mailbox is set diagonally in a wall opening, and the railings, roof parapets, and other metal fittings reveal similar meticulous attention.

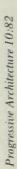
Modern and traditional allusions are made cleverly. The suspended terrace envisaged by Hannes Meyer and Hans Wittwer in their 1926 project for the Peters school in Basel is recalled at a significant point, at the location of the kindergarten. Other images—the classical Modern tradition, especially in housing, and traditional elements of the district-are reflected abstractly. The influences of teachers Aldo Rossi and Luigi Snozzi are apparent in the methodical procedure, not in the formal detailing, of Diener and Schett. Analysis of the given parameters, understanding of history (especially Modern), and the decision to work with conventional products are features of their design approach. They maintain close contact with the builders and artisans during execution, and allow refinements to occur on the site. It should be remembered that the building contains not luxury flats, but subsidized standard accommodation. The "extras" result from the architects' attention, not from elaborate materials or production methods.

The urban atmosphere of this complex will be extended to the neighboring block, where another Diener and Schett design is planned. May it give courage to the realists among architects and second thoughts to those prone to nostalgia. □

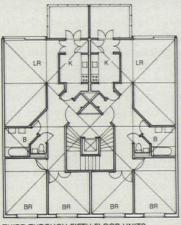


Facing page: One nontraditional addition is a passage leading through the block (top), providing access from major streets to the courtyard and the workshops that line one side of it. Bottom: At the corner of Bläsiring and Hammerstrasse, the elevation detaches and forms what is visually the façade of the project, with stores at ground level.

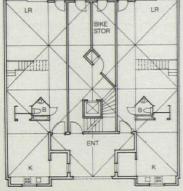
This page: Close-ups of the projecting porches from outside (far left) and inside.



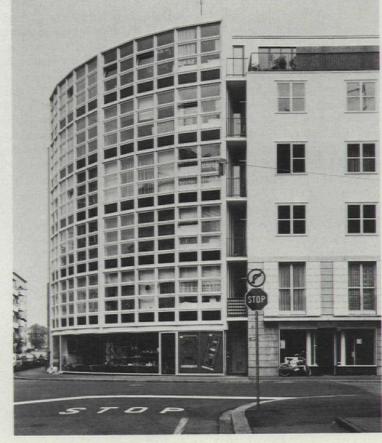




THIRD THROUGH FIFTH FLOOR UNITS



FIRST FLOOR UNIT



Project: subsidized housing, Basel, Switzerland.

Architect: Diener & Diener, Basel, Switzerland. Design team: Roger Diener, Wolfgang Schett, Dieter Righetti, Lorenz Guetg.

Site: half-block, 58,256 sq ft. Program: 134,500 sq ft of apartments; 27,000 sq ft of public area, including passage through the block and collective roof terraces; 9500 sqft of shops, and a 1600-sq-ft public kindergarten.

Structural system: outside walls are double-leaf cavity construction with internal wall of masonry; external wall of precast concrete slabs at base, masonry above.

Mechanical system: combined oil and gas.

Photography: courtesy of the architect.

The White House

Gerardo Brown-Manrique

Rob Krier's White House apartment block realizes part of his Dream Plan for a section of South Friedrichstadt in West Berlin, defining the block's perimeter while creating a mid-block court.

The main façade of the White House (right) is asymmetrically fenestrated, reflecting the variety of housing units within. The low arch in the setback central "bridge" section leads to a communal courtyard, traditional in Berlin housing.



The White House housing project by Rob Krier, located on Ritterstrasse in Berlin, is sited amidst what seem like wastelands in the South Friedrichstadt and Kreuzberg areas of West Berlin-sections that carry the scars of the 1945 destruction and subsequent uncoordinated reconstruction during the decades of the 1950s through 1970s. The postwar urban texture of Berlin thus shows a city being rebuilt with freestanding high-rise towers in isolation from their surroundings. Rob Krier's building and the complex of which it is a part, built before the organization of IBA 1984 but now incorporated into its plans (P/A, Jan. 1982, pp. 197-204), must be seen in relation to the historical structure of this particular area of Berlin as well as to Krier's own urban vision for its rebuilding.

The urban structure of Berlin throughout the 19th and early 20th Centuries was of a rather homogeneous fabric, albeit an overcrowded and somewhat insalubrious one. The Berlin of the *Mietkaserne* (barrackslike apartment blocks) was nonetheless a clearly delineated city with streets and squares faced with a constant building wall, disrupted only in particular cases, such as in South Friedrichstadt where the Anhalter Railway Station once stood.

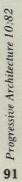
The southern expansion of Friedrichstadt occurred between 1732 and 1738 and was based on plans by Philipp Gerlach. As its southern terminus, the existing Friedrichstrasse and Lindenstrasse met with a newly laid road, Wilhelmstrasse, at what became known as the Rondel, then Belle-Alliance-Platz, and now Mehringplatz. Except for the converging streets, the street pattern formed a regular grid. This 18th-Century plan thus forms the basis for the present urban grid,

and until World War II was also the basis for the urban texture of South Friedrichstadt.

It is in this context that Rob Krier has proposed his Dream Plan for South Friedrichstadt, and within this a master plan for the area bounded by Lindenstrasse to the west, Alte-Jacob-Strasse to the east, Oranienstrasse to the north, and Hollmannstrasse to the south. Krier is attempting to reintroduce to this area a structural quality that recognizes and mediates between two polarities: between private and public, between individual and collective. In proposing a revised urban structure in his Dream Plan, he is attempting to form urban blocks of a smaller scale than now are found on the site, more along those that are found in the northern half of Friedrichstadt, north of the wall that separates the two halves of Berlin.

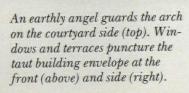
Krier maintains the definition of the urban block and reintroduces group spaces to the inner block, both in the Ritterstrasse complex and in the Schinkelplatz project being built immediately to the north. His basic notions about urban design were published in Stadtraum (Stuttgart, 1975; published in English as Urban Space, New York, 1979). His predilection for investigating every possible variation and alternative in plan, be it for urban

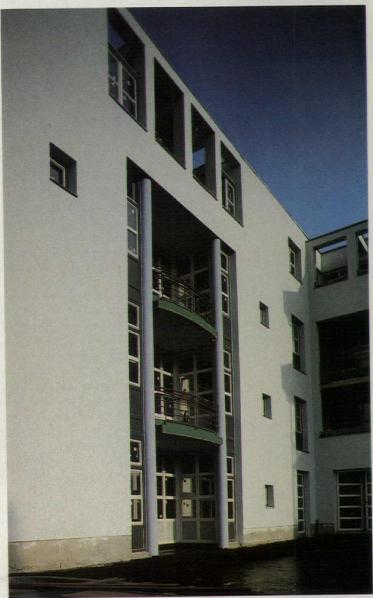
Gerardo Brown-Manrique is Associate Professor, Department of Architecture, Miami University, Oxford, Ohio.









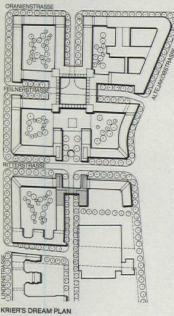


Progressive Architecture 10:82

International housing: West Germany

A view of Ritterstrasse (below) shows buildings by others in the foreground, Krier's White House in the distance. Site plan (bottom), with the White House shaded. Krier's drawings (opposite page) show his design intentions with respect to vertical layering and proportioning.





plazas or the rooms within a house, goes beyond what one finds even in the work of O.M. Ungers, in whose office Krier worked in 1965-66. His seemingly endless alternatives for urban spaces described in *Stadtraum* can be found in his Dream Plan for South Friedrichstadt. Perhaps basing his own proposal on the 18th-Century plan for the area, Krier includes every shape imaginable for public spaces.

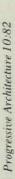
In the master plan for the Ritterstrasse complex, however, one again finds a series of spaces created at the intersections of streets and pedestrian ways, but now in a much more controlled manner, always as rectilinear spaces. The complex is conceived as a perimeter block structure, with access to the interior court through the mid-block segment of the overall structure. Four groups of architects participated in the design of the complex, so that, as Krier explains in Architectural Design (Jan/Feb 1982), ". . . a number of jobless architects, including myself, may find work and put an end to the production of mass-produced dwellings . . ." and "so that every occupant will be able to identify his own home ... (and) so that a multiplicity of ... houses will once again . . . constitute the image of the street." The result, however, is mixed. Clearly, Krier's building stands out, not only because of its central place in the complex and its architectonic qualities, but because Krier has apparently diverged from what had been established as commonalities. On the other hand, the overall appearance of the complex seems to fail in responding to the intentions, as have other group efforts. Some of the Werkbund experiments between the two world wars, for example, do not meet expectations of new ideas in town planning, and only individual buildings are seen as pivotal. In such efforts, there must be a concerted effort to create uniformity within diversity, of which the Karl-Marx-Hof in Vienna is perhaps the best model.

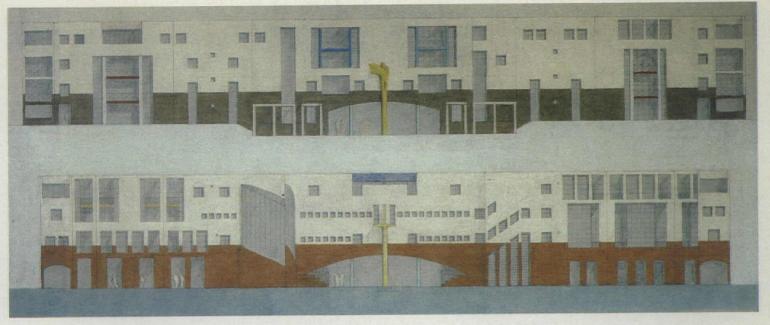
The Ritterstrasse complex reads fully as a series of individual buildings. What appears in elevation drawings as continuous cornice line and common base element are in reality a series of elements protruding from each block and a brick base that at times clashes with the color scheme of the complex. But Krier seems to disassociate himself from the group in fact by designing his building as the only one without a brick base, and by pulling the center portion back from the street wall. One can argue that these two central actions help to reinforce the notion of the building as a bridge and a gateway: a bridge between the two halves of the complex and a gateway into the pedestrian precinct that is being created in the master plan. This argument is easily accepted from a conceptual point of view, and is clearly an intention on Krier's part, even in the way in which the fenestration of the apartments in the central segment occurs. The repetitive square windows, much smaller than those in the two sides, punctuate the lower two floors of the bridge, while the larger openings of the top floor almost read as the crenelations at the top of some medieval city gate. But this gate is nearly un-

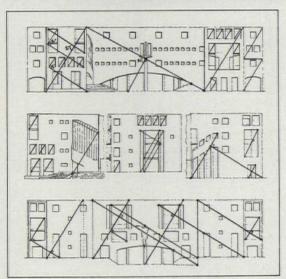
inviting and is easily seen not as an entry into a pedestrian link through the mid-block, but rather more as an uninviting gesture that allows a view into the group outdoor space within the block, yet does not dare one to enter. In terms of the separation of public, outside domain, and private interior area, of course, Krier could not have given a more clearly conceived clue. He sees the space between the two wings of his own building, however, as the beginning point of interior buildings leading towards the Berlin Museum at the southern edge of the study area, perhaps thus creating a space similar to that of the Goethepark interior street elsewhere in Berlin. If this is the case, it will be difficult to accept the gateway as one that is more than a teasing gesture.

The building is much more successful than it may appear, however, considering the urbanistic shortcomings of the complex. Architecturally very crisp and clear, it is still subtle in its playful disregard for rules of symmetry. Though the two halves appear the same overall, because of the way in which the units are arranged, they are clearly different. The tower on the left is perforated by two double-story voids above four single-story ones, these above a base arcade with two openings. The tower to the right has a central, double-volume void with four openings at the top, three as an arcade at the bottom. At the junction of the left tower to the central bridge, one finds a playful glass wall protruding into the court, while the other junction is simply perforated to indicate the stair's location. The façades to the interior courtyard, on the other hand, are rigidly symmetrical, and only the reversal of the color scheme within the double-volume openings differentiates right side from left.

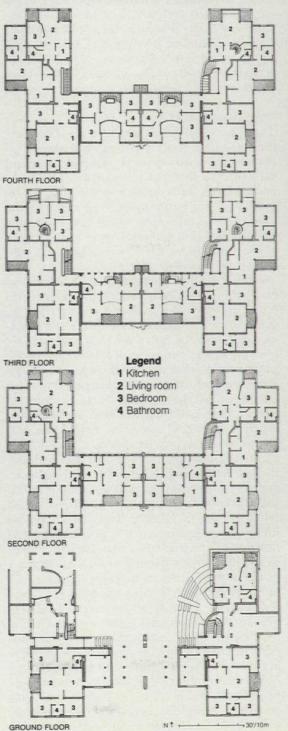
The various specifics of the façades are the direct result of the variety of unit plans that Krier uses in the White House, which is a welcome alternative to the typical social housing that has been built near it in the past. The combination of alternative unit plans allows for the diversity in building plan, where spaciousness, terraces, and gardens are appreciated by the residents. On the other hand, the units, varying from one-bedroom flats to four-bedroom maisonettes, share one general characteristic. All the individual sleeping areas are accessible only through the group living spaces, even in the case of the maisonettes. This may be seen as a problem or a benefit, of course, particularly for families with teen-aged children, as some residents have pointed out.







Finally, the overall building can be seen as a thick façade that is selectively perforated, within which the various units are stacked, and placed to provide a variety of views and spaces within. The rigid white perimeter façade is accentuated and articulated by a variety of elements within the basic skin-glass, colored spandrels, and window frames-and the greenery that the residents have added to the balconies. Its clarity and degree of resolution place it among the best social housing built in Berlin during the last 20 years, and any objections that one might raise as to the shortcomings of the Ritterstrasse complex overall must be tempered in relation to the White House's own qualities. In the final analysis, every part of the Krier building has been carefully developed, and as a total effort this first realization of his notions for urban housing must be commended. No doubt the urbanistic intentions of the Ritterstrasse complex will become crystallized when the adjacent Schinkelplatz project is completed, and if the southern segment, part of the IBA 1984 exhibition sites, is built.



Data

Project: The White House housing project, South Friedrichstadt, West Berlin.

Architect: Rob Krier, Berlin, Vienna.

Site: the central section of a large block, part of a master plan comprising several blocks.

Program: 23 apartments, with from one to three bedrooms, some on two stories.

Major materials: painted stucco on block.

Photography: courtesy of the architect, except as noted.

Coloring blocks

Two recent projects in Udine and Buia, Italy, by Gino Valle show his concern for urban form, environmental enhancement, and coloration.

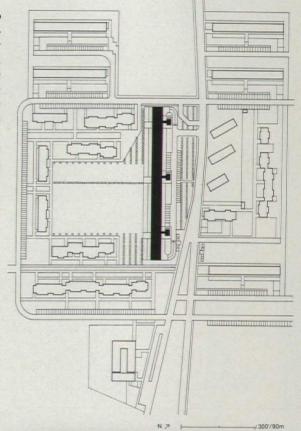
Two residential projects completed by Gino Valle within the past few years are quite different types, but they are surprisingly similar in terms of their conception and construction. One is a monolithic medium-rise slab in the Peep section of the city of Udine, and the other is a group of low-rise townhouses in the small village of Santo Stefano di Buia in Udine province. Yet both share Valle's interest in refined technological production, his concern for the dramatic use of color, and his care in designing the projects so that each could enhance or contribute more to the environment than might normally have been expected.

Peep, East Udine

The largest of the projects, in the Peep section of East Udine, is a long, 100-unit structure of seven stories (plus parking basement) with one- to three-bedroom flats on the second, fourth, fifth, and seventh floors. The ground floor is an open loggia, while the third and sixth floors, which are essentially open circulation galleries serving the floors above and below them, also contain a few studio apartments.

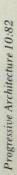
How this somewhat unusual arrangement came about is directly related to the environment in which the building is located. The suburb of three- to six-story apartment buildings dating from the mid-1950s is divided by a major axis in the form of a main road running from southeast to northwest. The design guidelines for the new building called for it to be placed parallel to, and on the southwest side of, the road. But if the building, which is much larger than any of its neighbors, had been conventionally designed, it would have formed a veritable wall between the road and the rest of the neighborhood to the northeast. and to the open green and apartment buildings surrounding it to the southwest. Valle felt that such a massive structure would be much more appropriate if it were interpreted more as a screen than as a barrier, which led to the three open floors that run its length.

The screen concept, however, was not the only justification for the open floors. They also provide a transition between completely private and completely public spaces in the form of semipublic areas that become territorially defined by the transverse stairwells serving the apartments above and below. In this respect the building is quite different from its neighbors, which have no such spaces and generally represent nothing more than an urban type transposed to the suburbs.

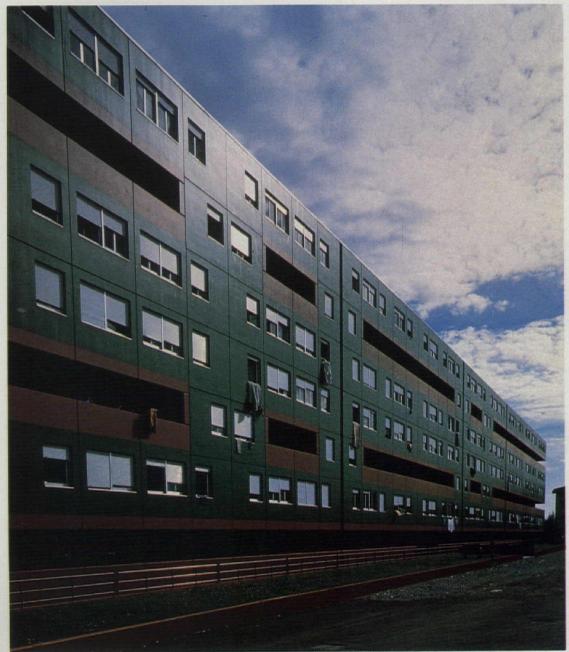




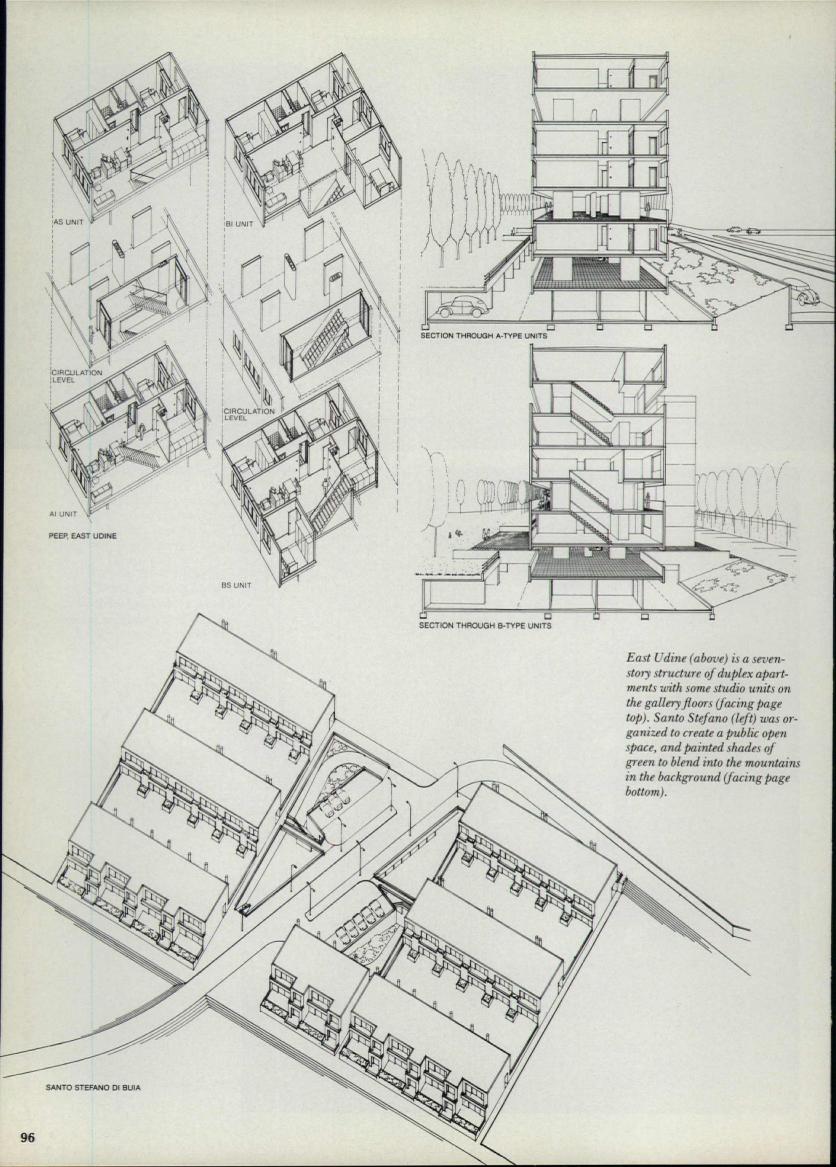
That is not the only way Valle's building differs from those around it, though. While the others are generally of simple brick construction, stuccoed and painted some innocuous earth tone, this box-frame tunnel bay structure of reinforced prefabricated concrete is clad with metal panels painted in red and green acrylic. The color, though, is not simply decorative, but serves to break down the scale of the huge structure and to humanize it by giving separate identity to the circulation (red) and residential (green) part of the building.

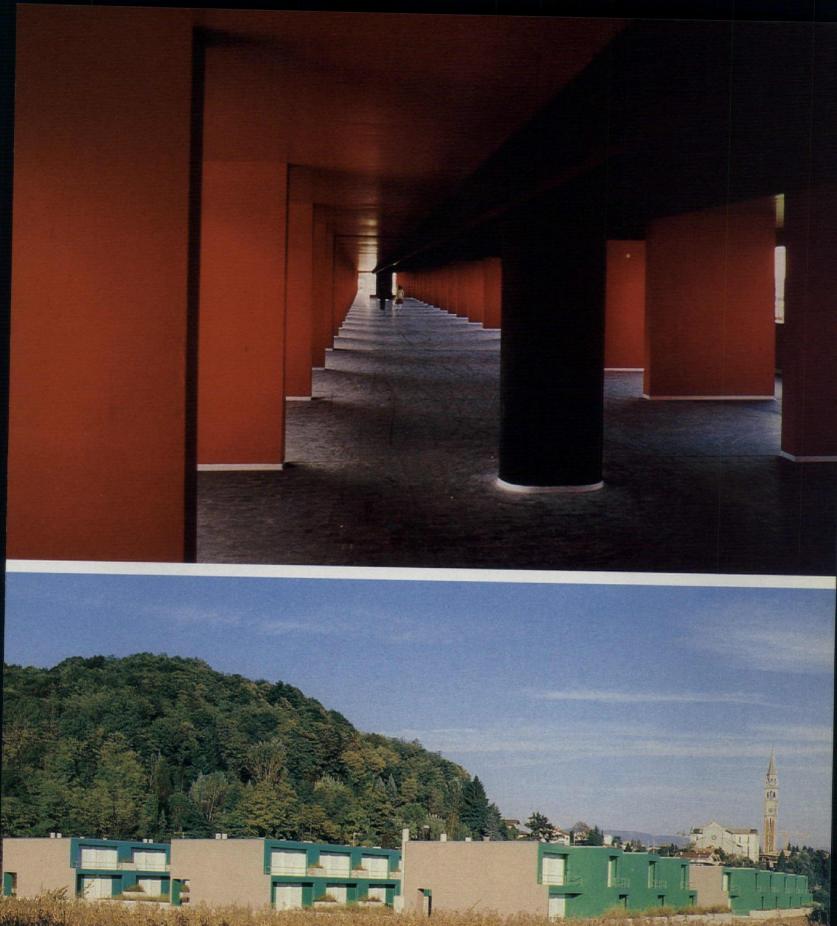






The 100-unit housing block in East Udine reinforces the urban fabric by paralleling the main road and by enclosing, more in the manner of a screen than a wall, a common green at the back of the building (see site plan, facing page). In the color scheme, red designates the public galleries, vertical and horizontal circulation, while green identifies the private spaces.



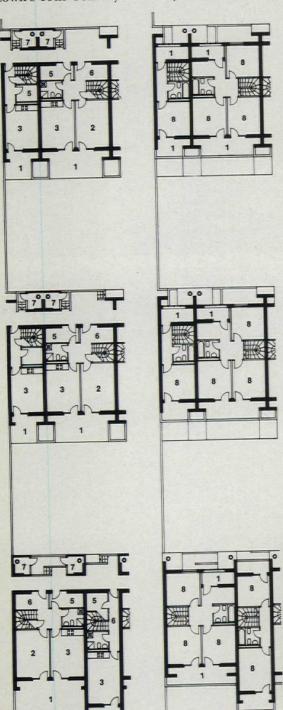




International housing: Italy

Santo Stefano di Buia

The same themes that are carried through in the Udine housing block can also be seen in the smaller 42-unit row house complex at Buia-a village in the Friuli area near Udine that was devastated by an earthquake in 1976. As with the larger project, the hierarchical ordering of the complex into public, semipublic, and semiprivate spaces begins with a major thoroughfare. In this case, it is a road that leads from the village, via an open space at the foot of some low hills, to the town's 19th-Century cemetery to the west. At



SECOND FLOOR

5 Lumber room

6 Hall

7 Boiler room

8 Bedroom

the building area, however, the road takes a north-south direction through the middle of the site. Valle thought that rather than trying to deny or minimize the existence of the road, which traditionally had ceremonial importance to the townspeople, the new building complex could be made to reinforce it. Consequently, rather than pushing the lines of row houses all the way up to the road, he pulled them away from it and used the resulting space as a kind of urban square. It serves as a meeting area, as a place for guest parking, and for entrances to the residents' underground garages.

Three rows of houses extend from the east and three from the west of the square. The one- to three-bedroom units are all duplex apartments constructed with an earthquakeresistant frame of reinforced concrete bearing walls and prefabricated slabs. They face south, and the upper "boxes" of each unit are slipped back. This gives a private balcony to the front of each apartment, and forms a covered semipublic pedestrian walkway at the back, where a system of detached, individual-unit boiler rooms with stacks forms a kind of monumental gallery along the north side of each row of houses.

The ends of the rows and the inner face of the pedestrian walkway are painted a neutral mauve, but the back doors on the walkway are a brilliant red. And in contrast to that, the front and back façades are green; the three that stand against the hills are painted in three graded tones that range from a rather grassy to a somewhat forest green. From the village, this has the effect of minimizing the appearance of the complex as the colors transform it into a smooth transitional element when seen from the meadow against the darker texture of the wooded hills beyond.

Even a quick view of these projects leaves little doubt that Valle is an avowed Modernist as well as a sophisticated technologist. But unlike many of a like mind, he has a highly refined sense of such things as hierarchy, place, and environmental concern. He is basically a humanist, and although it is sometimes forgotten, that is part of what the Modernist tradition was about in the first place. [David Morton]



Project: I.A.C.P. Public Housing, Peep, Udine, Italy. Architects: Studio Architetti Valle, Udine; Gino Valle, principal in charge; Giorgio Macola, Maria Loretta Tondolo, assist-

Client: Instituto Autonomo Case Popolari, Udine.

Site: a flat area, on the outskirts of Udine, developed for public housing.

Program: 100 flats of studio to three-bedrooms ranging in size from 340 to 1050 sqft.

Structural system: box frame of reinforced concrete, tunnel construction with metal panels, earthquake resistant.

Mechanical system: individual gas-fired boilers.

Major materials: prefabricated concrete panels, neoprene joints, internal polystyrene insulation panels, gypsum board.

Consultants: Conti Associates, structural.

General contractor: S.I.D.E., Udine and Piemonte, Buia. Cost: 2,300,000 Italian lire

Data

Project: Confindustria Housing, Santo Stefano di Buia,

Architects: Studio Architetti Valle, Udine; Gino Valle, principal in charge; Piera Ricci Menichetti, partner.

Client: Associazione Industriali,

Site: an open meadow crossed by a road connecting the town center and cemetery.

Program: 42 duplex units of one to three bedrooms ranging in size from 645 to 1340 sqft.

Structural system: reinforced concrete bearing walls, prefabricated slabs, earthquake resistant. Mechanical system: individual oil-fired boilers.

Major materials: woodframe windows and doors, internal polystyrene insulation, gypsum board.

Consultants: Rizzani, struc-

General contractor: Piemonte,

Cost: 1,354,000 Italian lire (1979).

Photography: Carla De Benedetti, Gino Valle, Sandro Marpillero, for both projects.

At Santo Stefano, individual boiler units form a kind of monumental colonnade along the backs of the buildings.

FIRST FLOOR

Legend

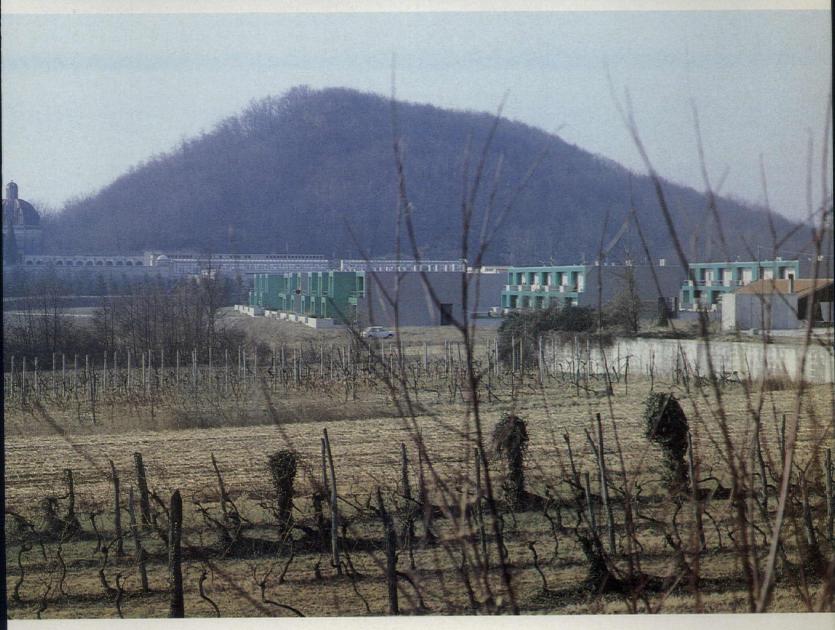
2 Living room

3 Kitchen/dining room

1 Terrace

4 Bath





Open the box

Designed for vastly different clients and income levels, three housing schemes share a concern for climate.

Two-story garden terraces form the most striking elements of the massing at Kanchanjunga, as well as allowing through ventilation and a habitable outdoor "room." If there is any thread of similarity in the three projects on the following pages, it is not a formal one, in the strictest sense. It is, rather, a conceptual commitment of architect Charles Correa to what he calls "open-to-sky" space, something he considers crucial to life in India. Correa notes the proliferation of the box and its implication that architecture is something one is either *inside* or *outside*. In India, as in other warm countries, the range of choices between the box and outside is considerable.

In Correa's words, "Today, unfortunately we have forgotten the profoundly emotional symbolism of . . . processional movement. Overly influenced by the architects of the West, we have been caught in the intricacies of their game . . . the box, and those signs/symbols which can be communicated (i.e., tattooed on) through surface-patterning. Because of . . . everyday experiences, people in tropical countries have developed totally different attitudes to built form. Thus while the symbol for education in North America is the little red schoolhouse, in India—as in most of Asia—it is a guru sitting under a tree."

While the climates of Bombay and Delhi are not identical, both demand spaces that can help residents deal with daytime heat. Variations of the open space idea carry through the three schemes shown here, as does the idea of different spaces being used at different times of the year, and at various times of the day. And the housing itself covers the economic range from luxury through middle income, to low cost.

Kanchanjunga

Two main points of departure determined the final form of the Kanchanjunga Apartments on Cumballa Hill in Bombay. The three-acre site contained a "beautifully manicured garden and a large bungalow built in the 1930s by one of India's leading textile owners." So, while some may decry the building of a high-rise tower, its effect was mitigated by the decision to leave the garden intact. The second aspect was a reflection of the historic practice of surrounding the main living spaces with a protective zone of spaces like verandas, places that could, at appropriate times of day and in appropriate seasons, form major living areas.

In Bombay, the best orientation is said to be the west—toward the cooling breezes coming



off the Arabian Sea. To the east is a view of the harbor toward the mainland. It is also true that the western exposure brings the monsoon rains and winds; therefore, the design highlights two-story terrace gardens that deflect sun and rain from the inner spaces and provide outdoor "rooms" in good weather. At Kanchanjunga, all of the floor-through luxury units have both east and west views, and cross ventilation. This is particularly important in a hot and humid climate, where the average yearly temperature is 88 F.

In section, the apartments interlock the five different apartment plans and allow a rich mix of units from three-bedroom to sixbedroom, with areas from 1800 sq ft to 4200 sq ft. From the slip-formed core, reinforced concrete slabs extend, and shear walls on the east and west support the cantilevers and diagrammatically spell out the building's cross section. Only two units share each elevator lobby, and the stair core is pressurized for fire and odor protection.

With openings on three sides of each, the apartments offer spectacular views. And in addition to the main terrace garden—in some cases two—each bedroom and kitchen has its own balcony. Given the fact that this is luxury housing, it is not surprising that all other amenities (pool, clubhouse, children's play, garages, etc.) are also provided.

Progressive Architecture 10:82









Project: Kanchanjunga Apart-

Architects: C.M. Correa, Bombay; design team, Prakash Date and Tony Carrasco. Associate ar-

ments, Bombay, India.

chitect, Pravina Mehta.

walls and slabs.

glazed tile.

Site: Cumballa Hill, 3 acres overlooking Bombay.

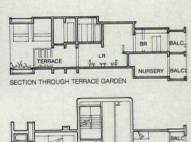
Program: condominium of 32 luxury apartments varying in size from 3 bedrooms (1800 sqft) to 6 bedrooms (4200 sqft). Structural system: slip-formed concrete core, reinforced concrete

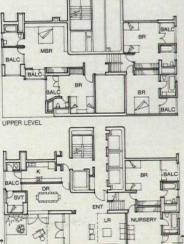
Major materials: reinforced

concrete, brick, marble, terrazzo,

Consultants: Shirish Patel Associates, structural; Maneck N. Dastur, mechanical; E.G. Menon, sanitation; Kishore Pradhan, landscape. Costs: \$2.23 million.

Photography: Joseph St. Anne.



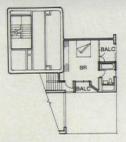


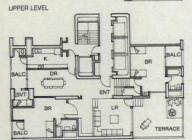


LOWER LEVEL

APARTMENT TYPE A AND C

10°/3m





APARTMENT TYPE B

LOWER LEVEL APARTMENT TYPE D

101

Tara

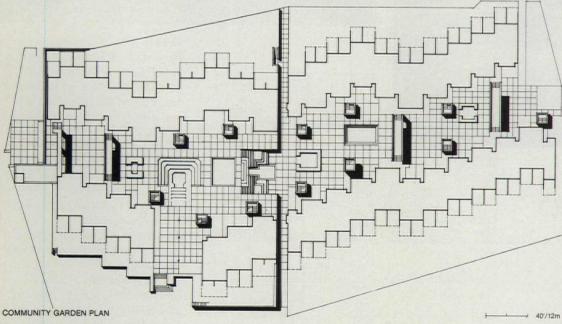
Unlike the humid climate of Bombay, Delhi is hot and dry. The Tara Group Housing, therefore, has a different kind of open space treatment in its jutting terraces. This is because in a hot, dry climate, night sky radiation often makes outside space the coolest place to sleep. In Bombay, dew can be so heavy as to preclude this, but not in Delhi.

Tara is middle-class group housing, and Correa wanted to avoid using a high-rise solution to get the 160 units on the 3.7-acre site. With this density of 50 units per acre, zoning laws required that construction be confined to 35 percent of the site. Instead of making a tower, Correa chose to stack two decks of narrow, double-story units, which step back as they rise. This aids in protecting each other from the climatic conditions and allows the roofs of the lower ones to become the terraces for those above.

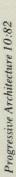
The central area between the buildings becomes a major community space for all of the families, and contains running water and trees that provide humidity to cool the dry winds. In addition, each unit has a terrace of 110 sq ft, protected by a pergola.

The two-bedroom apartments are 910 sq ft, measuring 10 ft wide, 50 ft long, and 20 ft high. For the three-bedroom units, 1410 sq ft of area is accomplished by interlocking them in an L-shape so that they use two bays in width on one level, and one bay on the other. Because of the low-rise construction, elevators were unnecessary, and the construction methods were simple, making the units extremely economical (\$8/sq ft) to build in the late 1970s.

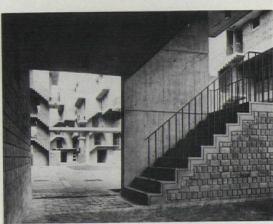




Central to the Tara housing concept is the open court, or "community garden," which provides water and greenery between rows of units (left and above). Each unit has its own terrace, either at grade or on the roof of the unit below, with the concrete structural frame protruding over it to form a pergola (opposite page, top). Brick wall infill also articulates the stairs that reach grade, and other stairs and bridges visually enliven the court from every direction.



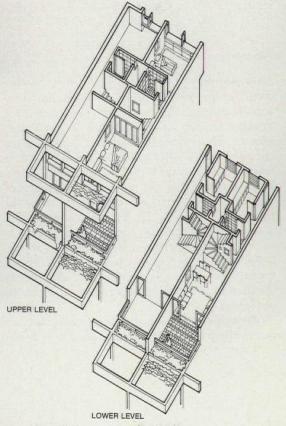












Data

Project: Tara Group Housing, Delhi, India.

Architect: C.M. Correa. Design team: C.J. Athaide, N.R. Mazmundar. Associated architects, Jasbir Sawhney.

Client: Tara Housing Society. Site: 3.7 acres near Nehru Centre, Delhi.

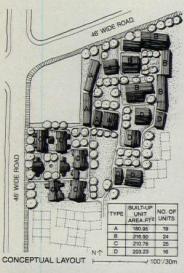
Program: middle-class group housing, 160 units of 2 and 3 bedrooms each.

Structural system: reinforced concrete frame, exposed brick walls.

Major materials: concrete, brick, terrazzo.

Consultants: Mahendra Raj, structural; Kanwar Krishen, electrical; S.G. Deolalikar, sanitation; Ravindra Bahn, landscape.

Costs: \$1.48 million.
Photography: Dinesh Sareen.



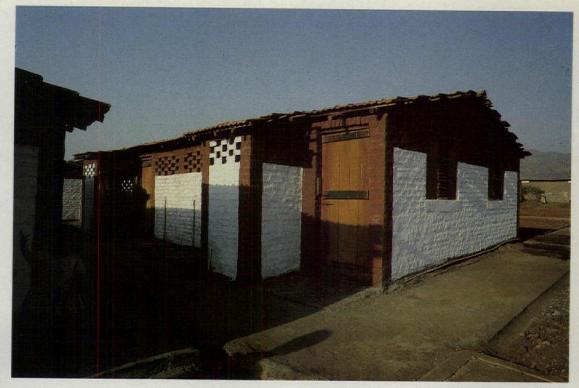


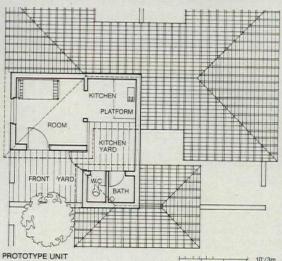
Project: low-income housing, Turbe, New Bombay, India. Architects: Architectural & Engineering divisions of CIDCO (City and Industrial Development Corporation); consulting architect, C.M. Correa. Site plan and first 10 units: C.M. Correa, consulting architect; D.G. Parab, senior planner; A.M. Sule, associate planner.

Client: CIDCO. Site: 1.25 acres of flat land. Program: 84 houses on plots of 270 sq ft each, floor areas ranging from 184 sqft to 216 sqft, with two units of 324 sqft on two levels.

Structural system: bricks and cement.

Major materials: brick in special mud mortar, woven reeds plastered with mortar, tiles and asbestos cement sheet roof, jungle wood and split bamboo windows. Costs: vary from \$565 to \$695 per house; \$2.60-3.25 per sq ft. Photography: Nachiket Kalle, Andrew Fernandes.





New Bombay

Truly at the other end of the spectrum from Kanchanjunga, this low-income housing is for families in the lowest bracket of per capita income. In it, Correa proposed that his ideas about "open-to-sky" spaces be used as a tradeoff for actual built and enclosed space. His thesis was that in a warm climate many of the essential functions can-and do-take place out of doors. "In Bombay, where these activities can continue through nine months of the year, we estimate that such open spaces are about 60 percent as usable as a closable room," he says. "For verandas, the utility coefficient is slightly higher, i.e., at about 80 percent.

With this rationale, the design was worked out to determine the optimal land-use alloca-



tions for the overall site and for the individual units. This site of 11/4 acres is calculated to contain 84 families with each family having 270 sq ft of land. Of that total, 100 sq ft is closable, 60 sq ft is veranda, 30 sq ft is water closet and bath, and 70 sq ft is open.

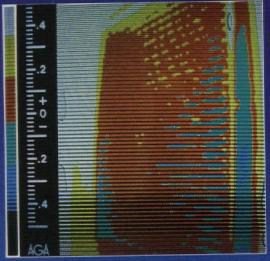
Working with local artisans, Senior Planner D.G. Parab and Associate Planner A.M. Sule built the first 10 units for \$3/sq ft of covered area. Along with the structure itself, these figures include a biogas plant for the w.c., and a solar cooker made of bamboo and aluminum foil.

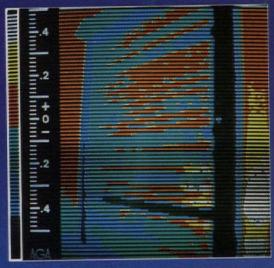
With these units as prototypes, a competition was organized to see what other improvements and variations could be made. Four teams entered to build the remaining 74 units. Except for the two-story construction, the units averaged less than \$900 each.

Correa notes that the color decorations of doors, windows, and thresholds is a centuries-old custom in India. Sometimes done with flowers, sometimes with paint, and sometimes with natural earth pigments, the patterns are evolved with participation of the families. [Jim Murphy]

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KINNEAR INSUL-TITE TOOOR





LEADING COMPETITOR'S INSULATED DOOR

These infra-red photos (by an independent laboratory using ANSI/ASTM C-236-66) show the significant difference in heat loss between an opening protected by a Kinnear INSUL-TITE door system and a leading competitor's insulated door. Note: The color scales at the left of each thermogram span the differences in heat loss (from low to high) by grades of color (none to black). You can see the minimal heat loss in the Kinnear door indicated by a preponderance of red shades; a dramatically higher heat loss in the competitor's door is shown by the blue shades. Note also; the black in the jamb at the right of the competitor's door indicates an almost total heat loss.

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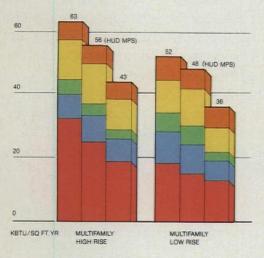
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Dwelling with energy

The fourth article in our P/A series concentrates on energy strategies for multifamily dwellings. Solar control and design features play a surprisingly influential role in energy use, while enhancing both private and public space.



Contributors: A number of individuals and organizations have contributed to the development of this article. Principal researchers: Harry P. Misuriello, Principal, W.S. Fleming & Associates; Joseph J. Deringer, President, Gilford, Deringer and Company.

Researchers: James Binkley, Chief, Architectural and Engineering Systems Branch, DOE; John Stoops, Project Manager, and Ray Reilly, Program Manager, Battelle Pacific Northwest Laboratories; John H. Cable, Principal, The Ehrenkrantz Group; Roger Easley, Consultant to Battelle; Santiago Moreno, Mike Gilford and Richard Meilan, with Gilford, Deringer and Company; Verna D. Hawkins, W.S. Fleming & Associates.

This effort has been funded by Battelle Northwest Laboratories under a program sponsored by the Buildings Division of the U.S. Department of Energy. For a complete description of this article series, see P/A, April 1982, p. 110.

While considerable investigation has gone into the energy-efficient design of many building types, multifamily buildings seem to have remained outside the mainstream of research. This is surprising because multifamily residences are among the most predominant building types. This lack of attention is partly due to their hybrid status. As income properties they can be classified as commercial buildings, yet they share many characteristics with single-family residences. The results of the redesign of multifamily buildings discussed in this article may help fill some of this research gap.

The research in this article is based on the sample and redesign of 25 multifamily buildings ranging in size from 17,000 sq ft to 282,000 sq ft. As indicated on the map in Fig. 1, they are located primarily in the cold and temperate zones. Because they were selected during a period of recession in construction, about half of the high-rise buildings are HUD financed. The low-rise multifamily sample was chosen separately and may contain biases. Therefore, this sample may not be nearly as representative of national construction as the samples for other building types in this series.

These buildings encompass rental apartments, condominiums, housing for the elderly, and even a dormitory. As there were no significant or distinct energy strategy categories found in these subtypes, we have retained the original DOE classification of these buildings as either low-rise (four stories and under) or high-rise. Overall, both multifamily types experienced about the same 30 percent energy use reduction in the redesign.

Energy use in common spaces

With multifamily buildings, it is important to differentiate energy use in the public or common spaces from energy use in the living units, as their control can require different strategies. Lighting, heating, cooling, and ventilating for stairwells, corridors, elevator lobbies

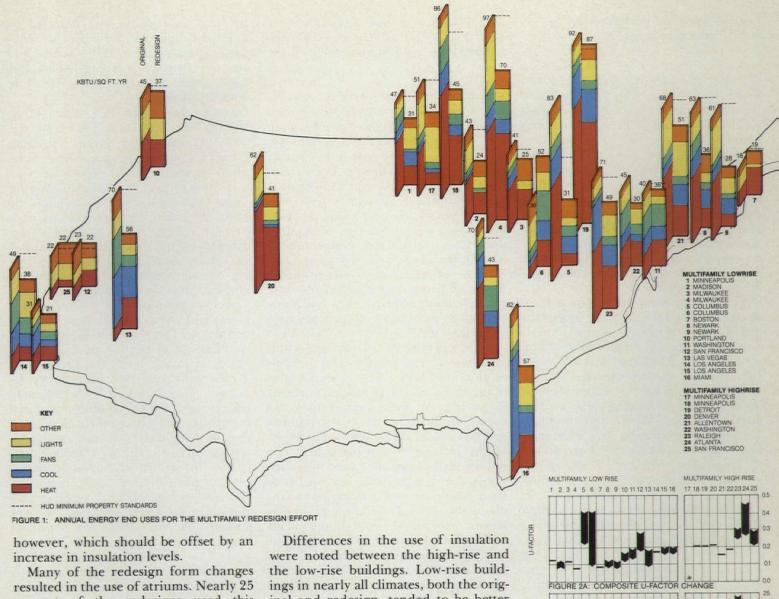
(and elevators) is usually a common obligation, paid for by the building owner, management group, or condominium association. Typically, these loads are active 24 hours a day. Lease arrangements for energy cost responsibility can vary widely. In many instances, domestic hot water is heated by a central facility at common expense, as are heating and air conditioning in some rental properties. Although the magnitude of commonspace energy usage can vary from one building to another, monitoring responsibility and management can provide a high degree of control. Thus many of the redesign strategies were oriented towards common usage.

Design strategies

The multifamily redesigns contain many examples where major reworkings of the original design concepts were accomplished in every aspect of the project, from the site plan to the unit plan. This was found in all high-rise and low-rise subtypes regardless of rental or ownership arrangement.

Site and orientation: Multifamily projects can require extensive site planning to overcome a variety of constraints. Project economics often determine the number and type of units required for successful marketing, operation, and return on investment. Site topography and access to views are also influential. In these matters, a ground rule of the redesign experiment was to adhere to the clients' original requirements. In nearly half of the redesigns, both highand low-rise buildings were reoriented for solar access and control. In many instances, substantial site design changes followed. A typical example is highlighted in Fig. 3C.

Form and envelope: Substantial building form changes occurred in nearly half of the redesigns. Most changes were for control of solar gains, while others were for control of conduction. One popular form used was the "sawtooth" plan illustrated in Fig. 3A. Where site constraints prohibited a major reorientation of the building's main axis, this approach was used in both high-rise and low-rise buildings to obtain solar access for individual units. Such envelope treatment can increase surface area,



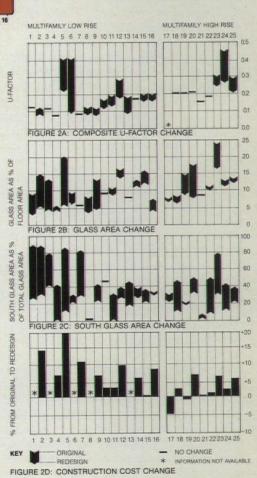
Many of the redesign form changes resulted in the use of atriums. Nearly 25 percent of the redesigns used this strategy, and it was found in both highrise and low-rise buildings of all ownership types. One of the atrium designs is shown in Fig. 3B. Form compaction to minimize surface area for conduction control in northern climates was found in about one-third of the redesigns.

Conduction: As with other residential buildings, the control of conduction gains and losses is important in multifamily buildings because of the high level of occupancy at night when outdoor temperatures are at their lowest and interior space setpoint temperatures are typically high. In other words, multifamily buildings experience a higher temperature differential for longer periods of time than other commercial building types. Surprisingly, few redesign teams used night setback strategies to reduce this temperature difference.

Differences in the use of insulation were noted between the high-rise and the low-rise buildings. Low-rise buildings in nearly all climates, both the original and redesign, tended to be better insulated than did their high-rise counterparts. Significantly more wall and roof insulation was found in the original low-rise buildings than in the high-rise. Although nearly all buildings changed wall, roof, and glass "U" values, the overall composite "U" values for 40 percent of the buildings remained unchanged from the original design. This is because increased glass area used to increase solar gains for heating offset insulation increases in the roof and walls. The interaction of these factors is shown in Figs. 2A, 2B, and 2C.

In common spaces, the use of buffer zones and other unconditioned areas reduced the net thermal load in 16 of the buildings where the temperature in up to 20 percent of the floor space was allowed to "float." The largest decreases in conditioned floor space occurred in the high-rise buildings.

Windows and solar control: The original multifamily designs had, on the average, glazing area equal to about 10 to 15 percent of their floor area. Glass areas were reduced in 8 of the 9 high-rise redesigns, while the low-rise rede-



(Top) The multifamily research results were compared to the HUD Minimum Property Standards (MPS). The redesigns outperformed the original buildings when designed to meet the MPS requirements. (Above) The most significant change in envelope characteristics shown above is the selective reorientation of south-facing glass area.

Energy-conscious design series Multifamily dwellings

signs increased glazing areas, often substantially (see Fig. 2B). The selective reorientation and redistribution of glass was found in half of the cases for both high-rise and low-rise. In nearly all of the redesigns, there was a distinct trend (see Fig. 2C) to add more glass to the southern exposure and to decrease glass area on the north, east, and west. In many instances north, east, and west glazing was eliminated entirely in conjunction with building reorientation and new south-facing unit plans. Depending on climate, the design teams chose double or triple glazing.

The effectiveness of solar control strategies should not be underestimated. For example, a recent analysis of a Washington, DC, high-rise building #22 (see Fig. 3A) found that the redesign changes to improve the original wall, roof, and glass "U" values resulted in a 5 percent heating and cooling energy saving. When the redesign strategies of reduction and reorientation of glazing and internal and external shading were evaluated, however, an additional 20 percent heating and cooling energy reduction was obtained.

With only one exception, the design teams did not provide night insulating devices for unit glazing, even when glass area was increased substantially. This may have been due to the cost and availability of such devices at that time. Nevertheless, as current passive solar design literature points out, night insulation can significantly improve thermal efficiency in cold climates.

Other strategies included external shading and reflective roofs. Over 90 percent of the redesigns used external shading for control of solar gain, most often accomplished through the use of overhangs, louvers, and balconies on apartment units that were stacked. Reflective roofs were used more frequently in low-rise apartments, with their relatively large roof areas, than in the high-rise buildings.

Passive solar applications: The use of passive solar strategies was mostly limited to low-rise applications in public spaces. Only a few substantial passive solar applications using thermal mass storage at the unit level were observed. Storage walls were used in two instances in conjunction with atriums. Solar

greenhouses were also used in three instances, but were added onto the original buildings as additional public space.

HVAC systems

One significant trend in the multifamily redesigns was the switch to heat pumps in 8 of the 25 buildings. The three original buildings that used heat pumps also retained them in the redesign. Virtually all major types of heat pump systems were used, the most common being a through-the-wall air-source unit with electric resistance heat backup. However, many of the redesign heat pump applications were water source systems of both the closed and open loop type. The use of heat pumps was primarily for space conditioning within the unit. In the common spaces, two- and fourpipe fan coils or other air systems were generally used.

Little was done by the redesign teams in terms of mechanical system controls at the unit level. Few design teams changed day and night heating setpoints or cooling setpoints. Night setback was used infrequently. In the common areas, controls were used to deactivate HVAC systems during off hours. The redesign teams also attempted to reduce ventilation energy. In the low-rise buildings, 60 percent of the design teams used natural ventilation through various means, including thermal chimneys and ceiling fans. However, only 25 percent of the high-rise design teams did so. Unfortunately, the computer model could not assess these strategies.

Other design strategies

Several energy end uses that are important in multifamily buildings were not sufficiently analyzed. Certain factors in the treatment of multifamily lighting energy, domestic hot water consumption, and "process" energy for appliances make the energy results less realistic than for other building types in this series.

Lighting: The multifamily lighting data are inconsistent, as many designers ignored lighting supplied by tenants while others took it into account. Thus the lighting results presented in this article are subject to wide variations and probably understate actual lighting energy requirements.

Nonetheless, a number of strategies were used. Nearly all of the original buildings had high percentages of incandescent lighting. In the redesign, the trend was to replace as much incandescent lighting as possible with fluorescent fixtures, especially in common areas. In about a third of the cases, incandescent fixtures in kitchens and baths were replaced with fluorescent fixtures, and in a few instances (mostly housing for the elderly), fluorescents were used in the living areas as well. In public spaces, many of the design teams used HID

lighting. Daylighting was reported in approximately one-third of the redesigns, often by way of skylighted central atriums. In some buildings, sunscoops were used in stairwells to provide natural lighting.

Domestic hot water: Difficulties in obtaining consistent input data from the redesign teams and a data handling error caused water heating energy to be underestimated by a factor of 10. Normally, water heating energy (including water heater standby losses) should be about 20 to 25 percent of annual multifamily energy use. Although a significant end use, the redesign teams did not place particular emphasis on trying to reduce domestic water heating energy. Only two of the redesigns used timeclocks on the water heating equipment, and only one redesign team attempted to use heat recovery from air conditioning to meet a portion of the hot water load.

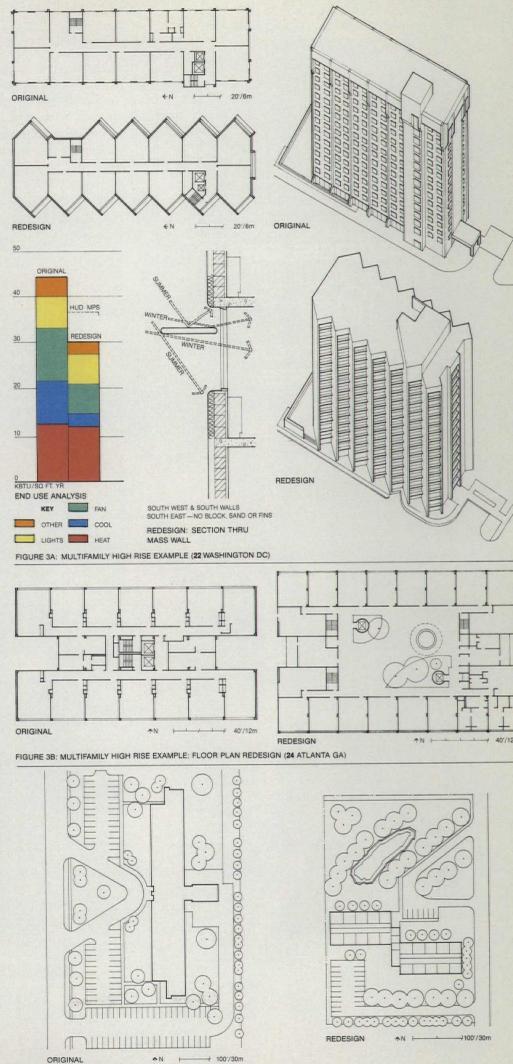
Appliances: Appliance usage is an important consideration in multifamily energy use. Recent studies by utility companies and others show that laundry, cooking, and personal appliances can use up to 35 percent of total annual energy in residential buildings. However, appliance usage was treated as "process" energy in the redesign experiment (see P/A, April 1982) and was not included in energy analysis or in the end use data.

Observations and conclusions

The problems in treating lighting systems, appliance usage, and domestic hot water in the redesign experiment highlight the difficulty of treating multifamily buildings as a "commercial" type. Although they often resemble commercial buildings in key characteristics, multifamily buildings also have strong similarities to single-family residences: they are "skin-load" dominated. Lighting and other internal loads are relatively unimportant to their thermal balance in comparison to commercial buildings. They are effectively occupied 24 hours a day, 7 days a week and especially at night. The economic structure is difficult to predict. Tenants and building owners may share some, none, or all of the costs for common and unit energy usage.

Most of the redesign changes used were architectural in nature. Strategies for siting, orientation, configuration, shading, and other envelope treatments are very important. Perhaps more so than for other building types, multifamily buildings have the potential of combining exciting architecture with efficient energy use at each stage and scale of design consideration. □

(Top) This 14-story, 128,000-sq-ft, 158unit housing project for the elderly is in the Washington, DC, area. A severely restricted and narrow site, compounded by side-yard setback requirements, precluded any change from the original north/south orientation. The redesign solution was to "sawtooth" the building in order to reorient apartment unit glazing to the southeast and southwest. The envelope treatment differs by orientation to control the time lag of solar gains through the building structure. The southwest and south "mass" walls are 8-in. sand-filled C.M.U.'s and exterior batt insulation underneath an aluminum skin. The southeast unit walls contain no C.M.U.'s or sand. The northeast and northwest walls are windowless, of lighter construction and have 4 in. and 8 in. of batt insulation respectively. For solar control, overhangs are carefully placed in front of the unit windows to allow winter sun to enter the living space. A portion of the solar radiation is reflected from the top of the overhang to the dwelling unit's concrete ceiling, which serves as additional thermal storage. In summer, the overhangs provide shade. Building fins protect the west dwelling units from the afternoon sun, while the east units have no fins to block the sun for morning heat. Other design strategies include: modular boilers and chillers for the two-pipe fan coil units; a rotary heat exchange wheel for ventilation; air conditioning; replacement of toilet exhaust fans with wind turbine ventilators; improved HVAC controls; and replacement of incandescent fixtures with fluorescent fixtures. Taken together, this combination of design strategies resulted in a 33 percent energy saving achieved at first-cost increase of about 1 percent. (Middle) A central atrium was added to this 220-unit apartment building, altering the original 14-story floor plan of stacked dwelling units along a double-loaded corridor. Gross floor area was reduced by less than 2 percent, but gross wall area was reduced 20 percent, reducing conductive heat loss and gain at the Atlanta, Ga, site. The new atrium permits circulation areas to be unpressurized, saving fan energy. Clerestory windows at the top of the atrium provide significant natural lighting. (Bottom) The desire for solar reorientation on a constrained building site led to a major reworking of the original design concept for this multifamily project in Delaware, Oh. Each building section in the redesign is two stories high on the southern exposure and four stories high on the north- and south-facing atrium, and mass heat storage was located between the two exposures. Fins and overhangs protect the interior on a seasonal basis. The surface area of the building was reduced from the original design, and berming was added on the north exposure.





Arid extra dry

Arid climates present unusual design problems. Thermal lag, thermal movement, ventilation, humidification, shading, and orientation are but a few of the issues that must be considered when designing in the desert. For the architect, dealing with those issues requires not just mechanical, but architectural solutions.



The King Abdul Aziz University in Mecca, Saudi Arabia, by SOM employs several arid climate design strategies: massive walls for thermal lag, wooden screens for shading, vegetation for humidification, louvered blinds for ventilation, light surfaces for reflectance, and courtyards for trapping night air.

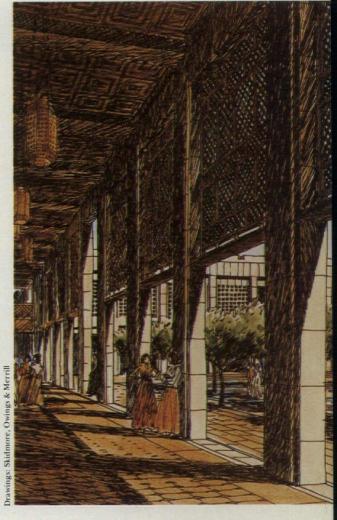
Our arid regions have blossomed with new construction. Yet, we lack a consensus on how to respond architecturally to the extremes of the desert. Should that climate become the main determinant of architectural form or should it remain, as in more temperate regions, one of many design factors? Should conserving energy in the desert lead us, in the words of Indian architect Charles Correa, to a "new architecture" that demands "an alternate lifestyle," or should "our best energy tactics," in the words of Arizona architect Fred Osmon, "remain invisible," with minimal disruption of people's lives?

Up to World War II, architects in this country had little choice in the matter. The lack of sophisticated climate control systems required that buildings employ passive cooling techniques, with desert inhabitants avoiding activity during the hottest part of the day or leaving the desert entirely during the summonths. Modern air conditioning changed all of that. It not only promoted the use of arid regions for year-round living, but it also allowed architects the luxury of using forms and materials developed for more temperate climates. We now realize how short-sighted and how short-lived that approach was. With the cost of energy, except in certain Mideast countries, making complete dependence upon artificial cooling prohibitive, we now must relearn traditional methods of passively cooling buildings.

That relearning process begins with an understanding of arid climates. Deserts share certain characteristics: low levels of precipitation; daily temperature swings as great as 60 F, with hot days and cool nights; almost constant winds predominantly in an east-west direction, with occasional dust storms; a low relative humidity; intense solar radiation; and

a sulfate-rich soil.

Beyond those similarities in the macroclimate, every site has a different microclimate that requires analysis of solar radiation levels, surface albedo, local wind patterns, and relative humidity. For example, land at a valley bottom will be cooler and often less exposed to winds than land along a valley's slope or rim; a site near water or vegetation will have smaller diurnal temperature swings and higher humidity than an arid site; a site with groundcover will have lower temperatures and less glare than a site with exposed sand. These qualities become important, not only when choosing buildable land, but in siting a structure or laying out a development.



Quantitative information on a site's microclimate is available in the United States from the National Oceanographic and Aeronautical Administration, which maintains data on average temperatures, humidity, and wind velocity for over 300 U.S. locations. That information can be used in conjunction with a bioclimatic chart to determine the amounts of shade, humidification, and ventilation needed at a specific site (P/A, Nov. 1979, pp. 102-107). The chart, however, may be of little help in the most extreme desert conditions. With a temperature of 100 F and a relative humidity above 20 percent, the interior of a building cannot provide, through shading or ventilation alone, thermal comfort to its inhabitants. Artificial cooling or a protective building envelope therefore becomes essential

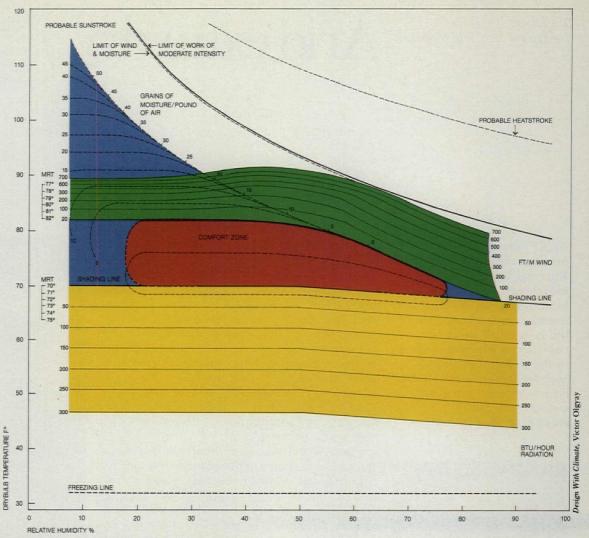
The latter solution has been used for centuries by the native populations of arid regions. Their architecture responded to the

Design for hot, arid climates

Developed by Victor Olgyay, this bioclimatic chart shows the interrelationship of shading, ventilation, and humidification in attaining thermal comfort. For example, if the temperature is 75 F and the humidity 30 percent, people will feel comfortable without further intervention. If the temperature is 95 F and the humidity 20 percent, then humidification (15 grams of moisture/lb of air) must occur. At 110 F and 30 percent humidity, no amount of passive intervention will bring thermal comfort.

Material	Thickness, Inches	Time lag Hours
Stone	8 12 16 24	5.5 8.0 10.5 15.5
Solid concrete	2 4 6 8 12 16	1.1 2.5 3.8 5.1 7.8 10.2
Common brick	4 8 12 16	2.3 5.5 8.5 12.0
Face brick	4	2.4
Wood	½ 1 2	0.17 0.45 1.3
Insulating boar	rd ½ 1 2 4 6	0.08 0.23 0.77 2.7 5.0

This chart shows the time lag for homogeneous assemblies of the materials. For assemblies of two materials or for light construction, add ½ hour to the sum of their time lags. For three or more materials or for heavy construction, add one hour to the sum of their time lags.



BIOCLIMATIC CHART FOR U.S. MODERATE ZONE INHABITANTS

climate in two ways, either through the provision of a thick masonry shell, as in the pueblos of the Southwest and the walled cities of the Sahara, or by an open, lightweight shading device, be it an Indian ramada or a nomad's tent. The tent, however, offers fewer modern applications because of its impermanence and lack of year-round thermal protection. Nevertheless, some notable modern examples have been built in the desert.

Frank Lloyd Wright used the concept at his Arizona camp, Ocatillo, where canvas-roofed buildings had movable flaps at their peaks to exhaust hot air and perforated knee walls to draw in cool air off of the desert floor. While that strategy worked well, it did not have to work year-round, since Wright lived at Ocatillo, and later at Taliesin West, only in the winter months. The recently completed Haj Terminal in Jeddah, Saudi Arabia, by Skidmore, Owings, & Merrill, takes its cues from the traditional Islamic bazaar or souk. Its Teflon-coated Fiberglas cover hangs from cables supported by corner posts. The tent shades people from solar radiation while its concave form and central oculus allow hot air to rise along its inner surface and out the top. Raul de Armas of SOM likens the terminal to a parasol and notes that "in the desert, during the hottest part of the day, it is often the most comfortable place to be.'

Traditional masonry architecture, however, is still more commonly used. Its methods of tempering the desert climate include using thick masonry walls and domed

roofs to retard heat gain; light-colored finishes to reflect solar radiation; small, deeply set windows with few openings to the north, east, and west to keep out the direct sun and wind-blown sand; courtyards to trap cool night air and to act as a chimney to exhaust hot air; roof terraces for outdoor living at night and during the winter; gardens with running water to cool and humidify the air; window screens and louvers to allow night ventilation while retaining privacy; clustered buildings to reduce surface area and shade outdoor spaces; irregular street patterns to block strong winds; earth sheltering to moderate indoor temperatures; and zoned plans with variously insulated and oriented rooms for use during different seasons.

Understanding the principles behind those design strategies is not nearly as difficult as translating them into modern technology to suit today's needs. Some of the problems and possibilities in this respect include:

Thermal lag: Thermal lag occurs when a material, because of its mass, absorbs and reradiates heat slowly. In an arid climate, this will keep a building cool during the day because of the time required to absorb solar radiation, and warm at night as that heat reradiates into the interior.

Progressive Architecture 10:82

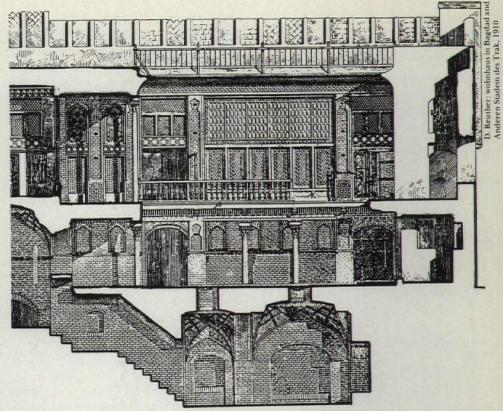
The material most often cited for its thermal lag properties is adobe, although homogeneous walls of stone, concrete, or brick and wall assemblies of, for example, face brick, wood studs, and insulation can work equally well. One difficulty when designing a wall comes in adjusting its lag time. If the material retains the heat of the sun for too long or too short a time, the interior will alternate between being too hot and too cold. Another difficulty comes in locating the insulation. Uninsulated walls work best in semiarid regions, which do not experience the intense radiation of the desert. In an arid climate, an uninsulated masonry wall, over the course of a 7-to-9-month desert summer, will gradually decrease its lag time until it never cools down, continuously radiating heat like an oven. By placing insulation on the outside of the wall, protected from ultraviolet deterioration or physical damage by a stucco or masonry veneer, the insulation will protect the wall's mass from solar radiation and prevent overheating.

While best from an energy standpoint, that procedure raises some objections. New Mexico architect Antoine Predock, among others, objects to the idea of exterior insulation over adobe. "It is the nature of adobe to want to reveal its surface undulations; it's better to use another material than to cover adobe with a smooth finish." When adopting traditional methods and materials, in other words, the real challenge comes with increasing their efficiency without losing their aesthetic.

Foundation walls should have insulation on at least one face and preferably two. That not only prevents the wall from acting as thermal bridge, it insulates the ground beneath the building from outside temperature swings that affect the subsurface temperature several feet below grade. Once insulated, the ground beneath the building will maintain an average temperature of around 70 F, which will help moderate indoor temperatures if the floor slab remains uninsulated.

The most important and often the most difficult location for a high thermal lag assembly is the roof. The traditional masonry domes and vaults of Asian and North African architecture had good thermal lag properties because of their light color and rounded shapes, which reflected and dispersed the sun's heat. A concrete deck with a light-colored insulated roofing system could serve much the same purpose today. Where cost or construction makes a concrete roof unfeasible, a well-insulated wood truss roof with a white shingle and 1 sq in. of vent to 1 sq ft of attic space will suffice.

SOM and the National Bureau of Standards recently conducted a study on thermal lag in which they built a test structure of solid concrete block walls faced with plaster on the interior and rigid polystyrene insulation, an air space, and face brick on the exterior. The roof had precast hollow-core concrete panels plastered on the interior, and rigid polystyrene and concrete pavers on the exterior. The test chamber exposed the structure to July temperature extremes, typical of the



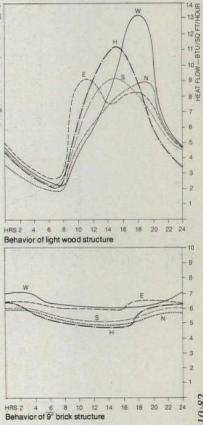
Saudi Arabian desert. While the outside temperatures ranged from 68 F to 120 F, the interior of the structure rose only 5 F from 74 F to 79 F over a 24-hour period. That occurred without benefit of artificial cooling. The study concluded that an "externally insulated masonry . . . structure has a substantial capacity to store energy with very small temperature changes within the space . . . (with) nighttime cooling . . . provided . . . solely by ventilation."

Seasonal zoning: The zoning of buildings according to different times of the day or different seasons has a long tradition in arid climates. The pueblos had enclosed rooms for use during summer days and winter nights, with roof terraces and open courts for use during more temperate times.

The same seasonal adjustment to people's living habits occurred in the Mideast. The traditional Baghdad house provides an excellent example of a building offering a variety of thermal options for its inhabitants, all through passive means. During the hottest part of a summer day, people would retreat to the first floor and cellar, where thick masonry walls provided sufficient thermal lag and the shaded courtyard retained the cool air from the night before. In the evenings and during summer nights, the inhabitants would use the sheltered roof terraces. In the winter, the wood-framed, uninsulated upper floors, which would heat up quickly in the sun, provided adequate warmth. Thermal comfort came from the way people used a building as much as from how they built it.

The question of how people use buildings has direct bearing on passive cooling. While it is not difficult for an architect to zone a building to respond to different seasons, it is far more difficult to insure that the building will be used as intended.

This section through a traditional Baghdad house shows the pierced parapet screens, the wood-framed upper floors, and the masonry lower floors. Note the holes in the courtyard floor, allowing nighttime air into the cellar.



These graphs show how massive construction evens out temperature swings when compared to light wood-framing. The graphs plot the heat flow of the four walls and roof of two buildings in Iraq in July.

- Legend
- 1 Bedroom
- 2 Court
- 3 Living room
- 4 Conversation
- 5 Dining room
- 6 Terrace
- om 7 Barsati ation 8 Sitting



The Abu Dhabi National Library and Cultural Center by TAC has few openings, with glass areas deeply recessed. Compare it to the glass towers in the distance.

That problem, for opposite reasons, occurs continually in the oil-rich Mideast. With little incentive to save energy, people there insist on mechanically cooling their buildings. Yet, with a long tradition of passive cooling, those same people often will leave doors and windows open all day. One architect likened his job to "designing air-conditioned tents." The most energy-conscious design, if not also conscious of its user's traditions and habits, will defeat its purpose.

An example where the two work together well is the Parakh House in Ahmedabad, India, by Charles Correa. Shaded by both horizontal and vertical sun screens, the house has daytime living quarters on the first floor in the middle of the building, protected from solar radiation by bedrooms and a service bay. Nighttime and winter living occurs in the cross-ventilated bedrooms and the shaded outdoor terraces. Apart from its ingeniously zoned plan, the house closely fits the living patterns of the Indian people.

Not having a tradition of seasonally zoned architecture, however, does not make it an unworkable strategy. A building can respond to the daily temperature swings of the desert without requiring any change in the living habits of its users. For example, a structure's daytime spaces might have exterior insulation on massive enclosing walls for thermal lag, while its nighttime spaces might have uninsulated wood-framed walls for rapid heating and cooling. Aside from the potential energy savings, varying the wall assemblies within a building offers savings in framing and insulation costs.

Reflectance: The use of light colors to reflect heat is perhaps the most obvious way of passively cooling a building. The whitewashed walls of North African villages have such a powerful aesthetic that we almost forget their climatic origin. It takes a poorer region such as the deserts of Yemen to remind us that, even when the exterior walls of a building are unpainted, people will paint their roofs white to reduce heat gain.

The opposite should occur with the landscape. The less reflective the ground surface, the less chance unwanted light will enter a building. Planting the area around a structure with materials having a low albedo, such as trees and grass, while avoiding lightcolored sand or concrete pavement, will reduce the building's cooling load.

Lisa Heschong in Thermal Delight in Architecture expands upon the use of color in arid climates by discussing its psychological as well as physical benefits. Blue-green colors, as well as light breezes, soft high-pitched sounds, and open decoration can make people feel cool. That feeling also depends upon their upbringing, for different cultures feel cool at different temperatures. While the effectiveness of those ideas will vary among individuals, such nonarchitectural means of cooling should not go unheeded, for the fiction of being cool may be as important as the fact.

Fenestration: Minimizing the fenestration in desert buildings reduces both the direct solar gain and the infiltration of air-borne dust. At the same time, it can increase artificial lighting requirements and the heat gain associated with that. The design issue thus becomes one of shading a building's fenestration rather than controlling natural light through the elimination of openings. In the Mideast, which has a history of protective fenestration devices, the recessing of entrances under arcades, the placing of windows flush with the inner face of thick masonry walls, and the protecting of openings with louvered shutters and carved screens all reduce the amount of solar radiation entering a building.

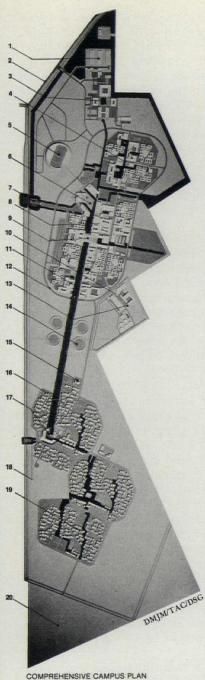
SOM's housing prototypes for the industrial city of Yanbu in Saudi Arabia employ several interpretations of those traditional devices. The brise-soleil, the broad window overhangs, and the recessed balconies protect the fenestration on the south elevations from the high midday sun. The east and west elevations, because of the difficulty in blocking the low morning and afternoon sun, have few openings or large louvered screens to diffuse the light.

Wherever possible, SOM oriented the buildings 8 degrees east of south to ease shading requirements. Since most arid regions lie between the 15th and the 37th latitudes, orienting a building in a southeastern direction places the fenestration on both the north and south elevations beyond the reach of the intense afternoon sun.

Other recent projects in the Mideast show the influence of traditional fenestration strategies. In SOM's King Abdul Aziz University in Mecca, Saudi Arabia, not only did the architects specify the use of local Riyadh stone with a stuccoed surface because of its thermal lag potential, but they designed wooden window seats and carved screens along major walkways and at window openings that closely match the traditional mashrabiyas. The Architects Collaborative, at the Abu Dhabi Library and Cultural Center, took the approach of minimizing the number of windows. Easily accommodated by the program, that decision resulted in deeply set windows in the exposed upper level, and large glass areas recessed behind wide ground-floor arcades. Reducing the amount of fenestration also allowed a more complete utilization of the poured concrete walls' thermal lag properties.

Ventilation/humidification: Discussion goes both ways on the need for natural ventilation and humidification in arid climates. Antoine Predock thinks that "cross ventilation is very important, just for the psychological impact of air movement." Charles Correa used planted courtyards in the Tara Group Housing, so that "the units would be clustered around a humidifying element to lower air temperatures." Air movement makes us feel cool by removing body heat through convection and perspiration through evaporation.

Others, nevertheless, question the value of cross ventilation in an arid climate. James Marston Fitch reminds us that beyond "a given temperature . . . the air will add more



1 Nursery 2 Campus access road

3 Community facilities 4 Girls academic 5 Stadium 6 Campus center 7 Main campus entrance 8 Boys academic 9 University activities center 10 Maintenance and central utilities 11 Green Spine 12 Loop road 13 Central food storage 14 Agricultural experiment area 15 Rectors' villa

16 Housing for staff and faculty 17 Community center 18 Housing entrance 19 Housing for staff and faculty

20 Sewage treatment

Date palms and a fabric-topped space frame shades walks and roads at King Faisal University. The landscape plan is by TAC's Landscaping Department.

heat to the skin than it can remove by evaporation." Victor Olgyay agrees that since excessive evaporation helped create deserts in the first place, "wind effects have relatively small importance."

In practice, most architects follow both sides of the issue. Air conditioning, still a marketing requirement in this country and in the Mideast, cools and dehumidifies air above certain temperatures, while the increased use of operable windows reduces cooling loads through the use of ventilation and humidification at more moderate temperatures.

Recent findings have shown that two equal-sized windows at opposite sides of a room will allow the maximum volume of air to move through a room. A smaller inlet and larger outlet window will decrease the volume but increase velocity, and with it, the rate of evaporation. The lower the inlet, the cooler the air drawn in and the cooler people will feel. On the exterior of a building, an overhang or a vertical fin at a window with a continuous slot between it and the building will funnel air into the window while equalizing the air pressure and increasing air movement. When the prevailing winds are not parallel to a window, a horizontal opening rather than one square or rectangular in shape will increase air flow.

The King Abdul Aziz University project shows how research can aid in designing for arid climates. SOM and the Fluids Group at the Illinois Institute of Technology constructed a 1:700 scale contour model of the university's site and a 1:50 scale model of a typical housing unit at IIT's Environmental Wind Tunnel. The contour model allowed the team to study the impact various stages of the university's construction would have on local wind patterns. Of particular note was their study of the housing units. The plexiglass model of the building contained three stories of student rooms, an internal courtyard, a roof terrace, and a thermal chimney-a vertical air shaft common in arid climates to improve air circulation. The model allowed the architects to insert various elevation alternatives as well as various courtyard and chimney locations. They studied air circulation in the building by filling the model with smoke, releasing air currents into the wind tunnel, and measuring the rate and manner in which the smoke evacuated the

The study concluded that the size of the courtyard did not matter, but that its location on the upwind side of the building greatly improved air movement; that a short solid parapet allowed more air movement than a taller pierced parapet; that the thermal chimney enhanced internal air circulation by 30 percent when located on the downwind side of the building, furthest from the courtyard; and that each room, if equipped with an operable window and a vent into the corridor, could be cooled and ventilated even if all other windows in the building were closed. The SOM-IIT study has value not only for its

findings on the impact that courtyards and thermal chimneys have on air movement, but for its proving that a large-scale structure can be adequately cooled and ventilated through passive means in a desert environment.

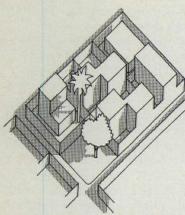
A host of other passive and simple mechanical devices exist to aid in the ventilation of desert structures. The most commonly used is the evaporative cooler, which cools and humidifies by drawing ambient air through wet fiber pads or a water spray. Evaporative coolers, while not requiring much energy, do however require a fair amount of water for their operation. Another technique, called a diurnal heat exchange, draws cool night air into a basement or rock storage area, letting either a thermal chimney or a fan circulate the air through the building. A variation of that idea are cool tubes. Placing a 12-in. to 15-in. pvc pipe well below grade, sloping away from the building a few hundred feet, with one end terminating in a vertical shaft above grade and the other end entering the structure above the floor slab, allows air that has been cooled by the ground to be drawn into the building and circulated either naturally with a thermal chimney or mechanically with a fan. While these techniques have worked successfully in residential settings, the change in scale required for their use in large, nonresidential buildings has barely begun; air conditioners and heat pumps still dominate that market.

Shading: Preventing solar radiation from reaching a building has an obvious impact on reducing cooling requirements. Traditional methods of shading buildings include using trees, using a double roof that encourages air movement between two surfaces and reduces the temperature of the actual roof, and clustering buildings to cast shade on each other.

Vegetation, when relied upon for shade, has the usual problems of taking time and being uneven in growth, as well as the unusual problem of requiring time to become acclimated to desert conditions. At the King Faisal University in Al Hasa, Saudi Arabia, designed by a consortium consisting of Daniel, Mann, Johnson & Mendenhall, The Architects Collaborative, and Design Services Group, a palm-shaded circulation spine links various parts of the campus. Aware of the acclimation problem with vegetation in the desert, the architects plan to replant mature date palms from the nearby Al Hasa Oasis. The proximity of the oasis and the area's agricultural tradition may justify that use of vegetation for shading; in most arid climates, however, shading through architectural means offers greater reliability. Even at King Faisal University, the design calls for a fabric-topped space frame shading the major activity area.

Double-roofed buildings, while having a long tradition in arid sections of China as well as in our Southwest, have few modern examples. Nevertheless, Le Corbusier's High Court at Chandigarh, India, employed the concept at a grand scale, with the large concrete canopy shading the actual roof of the building and channeling air currents between the two. Charles Correa's Parakh House uses

Design for hot, arid climates



An axonometric of housing units at Yanbu by SOM shows how buildings and walls can shade most of the outdoor spaces if properly arranged.

This conceptual sketch by Kenneth Labs, shows some earth sheltering strategies, including trapping cool air in courtyards and tubes, insulating the grade beyond the building, and shading and irrigating the ground's surface. The cost effectiveness for cool tubes (D) has not been established in arid regions.

- COURTYARD TO TRAP NIGHTTIME AIR MISTING DEVICE FOR EVAPORATIVE COOLING PERFORATED SUNSCREEN DURING DAYTIME COOL TUBE-FOR EARTH COOLING IRRIGATION PIPE TO COOL GROUND
- NSULATION (R-24) TO MODERATE SOIL TEMPERATURES MATER SPRAYING TO REDUCE SURFACE TEMPERATURE
- SHADE TREES UNINSULATED WALLS AND FLOORS

a secondary roof, as does the campus mosque at the University of Petroleum and Minerals in Dhahran, Saudi Arabia, designed by Caudill, Rowlett & Scott. The lack of examples, however, probably has less to do with the validity of the concept than with justifying to a client the expense of constructing two roofs.

Clustering buildings has become the most common strategy for providing shade, for it reduces cooling loads without the cost of extraneous shading devices. The compact villages of the Mideast and the pueblos of the Southwest offer ample precedent for that strategy, reducing their exposed surface area and saving on building materials in the process. The housing units at Yanbu by SOM connect into a variety of clusters, with the buildings casting shadows on courtyards and walks. While economical, clustering does require a certain tolerance of close living quarters, which are more easily accomplished in the Mideast than in this country.

Earth sheltering: Employing the earth as a thermal tempering device has many modern examples, but few exist in desert climates, due to the relatively high ground temperature (75 F to 80 F) in the summer.

Investigations into the subject by Kenneth Labs, Baruch Givoni, and others have led to a series of design strategies for earth sheltering in arid climates. Their suggestions include trapping nighttime air in sunken courts with horizontal screens that close during the day and misting devices to humidify the air, cooling the ground surface with water spraying and shade trees, irrigating the subsoil and extending roof insulation (R-24) beyond the building to moderate soil temperatures, leaving the walls and floor uninsulated, and placing pebble-filled vertical tubes 6-10 ft from a structure to collect nighttime air and cool the adjacent ground.

An important consideration when using concrete below grade in most desert regions is the high mineral content of the soil. Because evaporation exceeds precipitation, rain does not have a chance to leach out soluble salts, such as calcium carbonate and calcium sulfate, requiring that a type 5 sulfateresistant concrete be used with a minimum amount of tricalcium aluminate in the mix.

Another characteristic of desert soil is its impermeability. The desiccation of the desert through evaporation often results in a lime-

gypsum crust forming on the ground's surface. This crust can absorb little water, demanding that building drainage be channeled, collected, and adequately disposed of. With water shortages a perennial occurrence in arid climates, the collection of rainwater into holding ponds or storage tanks has become increasingly common.

The problems with desert soil are among several issues that affect specifying and detailing buildings in arid climates. Some of those issues include thermal movement, where daily temperature swings require a greater number of expansion joints, greater tolerances in cladding connection details, and greater attention to the joining of dissimilar materials; air infiltration, where frequent dust storms require care in weatherstripping doors, sealing windows, and filtering air intakes for mechanical equipment; and construction quality control, where the hot, dusty environment requires special precautions when pouring and curing concrete or when installing prefabricated components.

Conclusion

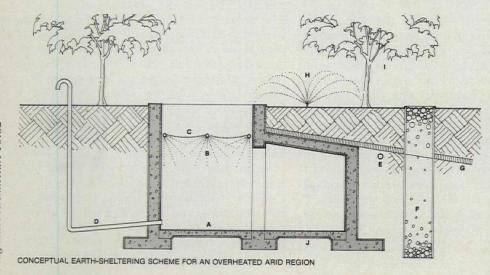
Designing in an arid climate cannot help but affect the form and detail of a building. Any effort at passive cooling, even if just to reduce air-conditioning loads, leads to materials, assemblies, and exterior details that differ from those common in more temperate regions.

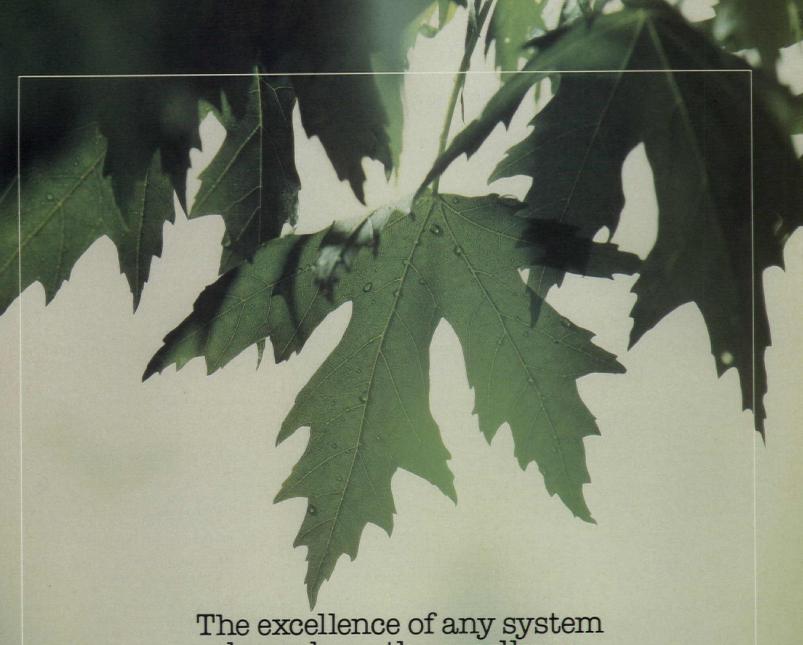
That architectural response, however, has its limits. Climate cannot become the sole determinant of architectural form or the sole catalyst for changing people's living habits, for we've seen how easily a building's inhabitants can sabotage its passive energy strategies if the design does not respond to the social and cultural climate as well. Morse Payne of TAC goes so far as to say that "addressing social traditions almost automatically addresses the climate. The two are often that close."

It may be true that much design for arid climates has little relation to design strategies in more temperate regions; it is not true in terms of the design process. If responding to the desert climate means that we no longer design the shell for an engineer to temper artificially, that we reassert architectural as opposed to mechanical methods of providing thermal comfort, then designing for arid climates offers a lesson for us all. [Thomas Fisher]

Acknowledgments

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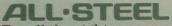
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Progressive Architecture 10:82

Court review of zoning board decisions

Norman Coplan

When architects or others knowledgeable about land use are members of a zoning board of appeals, courts tend to uphold board decisions, rather than overrule them. The power of a zoning board of appeals to vary the application of a zoning ordinance is often the subject of litigation. Although such power is discretionary, that discretion may not be arbitrarily exercised. When members of the board are architects (or other knowledgeable persons in respect to the problems of land use), the courts are more likely to uphold the exercise of such discretion rather than substitute their judgment for that of the board. Reflective of this attitude is the recent case of *Muller v. Williams*, 451 N.Y.S. 2d 278.

In this case, the Appellate Court reviewed the decision of a city zoning board of appeals to grant use and area variances of a zoning ordinance to permit the construction of a federally financed medium-rise building for housing for senior citizens. The property was located in an area zoned for (1) detached single-family residences; (2) two-family residences; (3) duplexes; and (4) parks, open space, and recreational facilities.

In considering the propriety of granting the use variance, the Court set forth the three major requirements that must be established to support it: the land cannot yield a reasonable return for the allowed purposes; the plight of the applicant is due to unique circumstances and not to general conditions in the neighborhood that might reflect the unreasonableness of the zoning ordinance; the use sought by the variance will not alter the essential character of the locality.

The petitioners opposing the application for a variance contended that the landowner was required to introduce substantial evidence in the record and to demonstrate factually by "dollars and cents proof" an inability to realize a reasonable return under existing permissible uses, and that he had failed to meet this burden of proof. On the other hand, the property owner emphasized the fact that the proposed construction was in a locality that already included shopping facilities, houses of worship, health services, banking, transportation, and other accessible amenities required by the elderly. The applicant further relied upon the testimony of the presidents of senior citizen groups as to the dire need in the city for additional housing for the elderly.

The petitioners opposing the variance also argued that the property owner had failed to offer proof that he could not economically utilize his property for such allowed uses as libraries, museums, art galleries, and childcare centers, and that in the absence of such proof, a variance should not be granted authorizing a use not expressly permitted under the zoning ordinance. The Court, however, pointed out that such uses were not "allowed uses" under the zoning ordinance, but rather "special permit" uses, and that proof negating their availability to the property owner was not necessary. The Court

further emphasized that where public uses are permissible, a property owner is not required to show that the property is unsuitable for such uses.

The petitioners also argued that the procedures followed by the board were unlawful in that the public had been denied full opportunity to present its views. The Court also rejected this contention, stating that the proceedings had encompassed several hearings during which all persons, including objectants, were given full opportunity to be heard. It was true, conceded the Court, that the public was not allowed to participate in the final two meetings. The Court found that these two final meetings, however, although open to the public, were essentially deliberative in nature and that the purpose of the meetings was for the members of the board to evaluate all of the evidence that had been submitted, to discuss the application among themselves without interruption, and to vote on it. "We cannot say," stated the Court, "that the public was denied full opportunity to present its views.'

The Court concluded that the record adequately supported the determination of the zoning board of appeals that economic hardship existed for allowed uses, that the land was unique, that the hardship was not self-imposed, and that the essential character of the locality would not be altered. The record, stated the Court, "shows that the landowner offered substantial proof of each of the three criteria . . . including the specific 'dollars and cents' proof required."

In reaching its conclusion, the Court noted the background and competency of the members, stating:

"The issue is whether the Zoning Board of Appeals erred in its decision. We note that this board is composed of highly competent individuals including two architects, a college professor, a State commissioner, and other knowledgeable persons, who performed their duties in a diligent and exhaustive manner. Since a zoning board is given discretion in the granting or denial of variances, the court's function is limited, and a board determination may not be set aside in the absence of illegality, arbitrariness or abuse of discretion."

Although it is certainly possible that the Court would have reached the same conclusion if the members of the zoning board of appeals did not have professional background in this area, the fact that architects and other knowledgeable persons made up the board undoubtedly reinforced the Court's conclusion that it should not interfere with the board's judgment.

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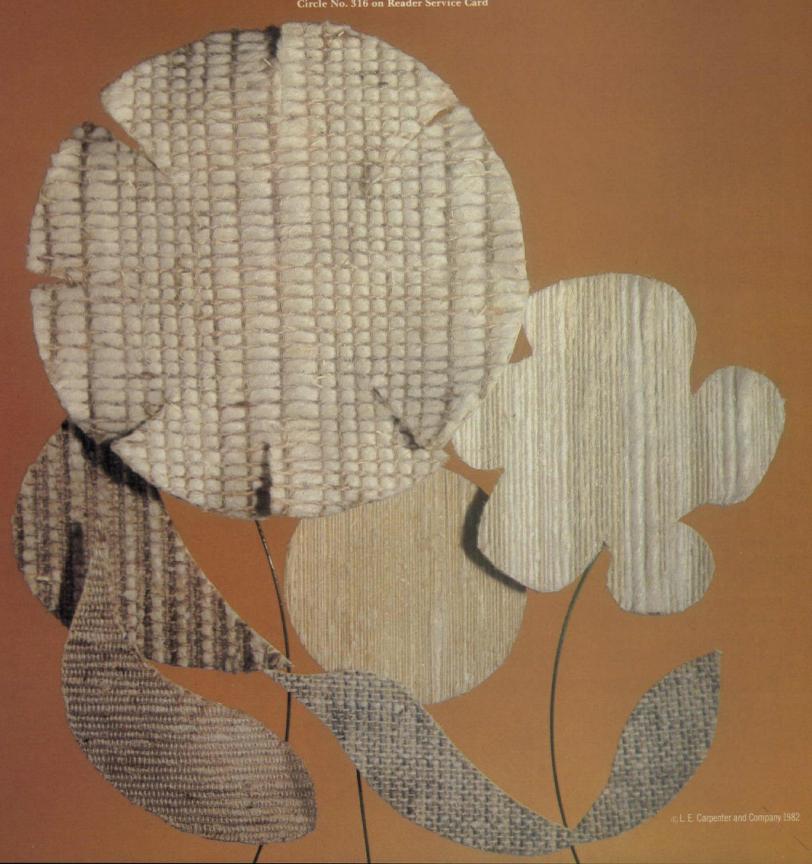
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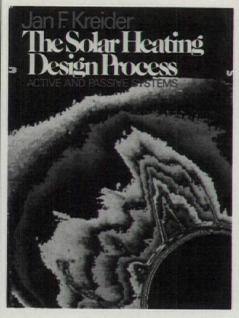
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Books



The Solar Heating Design Process: Active and Passive Systems by Jan F. Kreider. New York, McGraw-Hill, 1982. 456 pp.,

Reviewed by Michael M. Sizemore, a partner in Sizemore/Floyd and author of Energy Planning for Buildings.

The Solar Heating Design Process; Active and Passive Systems is strong on "process," with an emphasis on active liquid solar systems and a little light on passive solar methods. If you seriously intend to design or build an active solar heating system, then you need this book. There are enough good procedures, checklists, and tidbits here to enable you to avoid many mistakes that are certainly more costly than the book.

It is gratifying to see how much has been learned about active solar systems and their integration into conventional architecture during the last few years. But it is sobering to see how much expertise and care is still required to ensure proper results. One might hypothesize that if the considerable care expended on solar systems was applied to conventional buildings, just that care would probably cut the energy costs 30 percent. Reading the book even superficially gives insights into some of the most challenging building technologies today that spin into solar buildings.

The book is organized into the typical five-phase building design services of programming through construction administration. A first fast reading would give a hopeful novice solar designer a sense of what lies ahead. But when the designer progresses from theory toward construction, the second reading becomes more useful. It is full of checklists, observations, and experiences covering details that a designer can miss, and which will stop a project from working. Between the first and second reading, however, the novice might expand his knowledge with other readings. To understand the details thoroughly at this point one needs a previously established vocabulary.

The most appreciative audience for this book will probably be new solar designers who are unfamiliar with the building design process used by architects and engineers and who

[Books continued on page 128]

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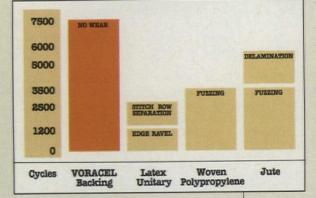
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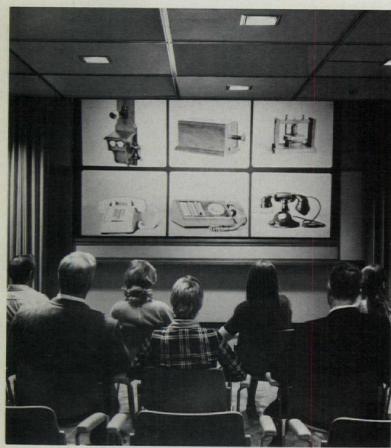


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The text concerning passive solar use deals only with residential applications. About 30 pages deal with passive while 160 deal with active. This ratio matches the emphasis of the

book.

The author's "P-chart" is included, which provides a simple way to optimize solar savings fraction, glazing area, and return on investment for a passive solar application. While it uses only a 65 F indoor base temperature and disregards varying mass quantities, it very quickly gets a designer pointed in a more accurate direction than other past "simple methods." When Kreider edges into overall building design, the material becomes a little weak. Contrary to the text, daylighting does not necessarily require north glass, and "greenhouses" have very different thermal needs, solar needs, and forms than do "attached solar spaces" which, I believe, is what the author really is referring to on page 136.

Any supporting data that a solar designer can use to make solar a good financial investment are listed as well as defenses against possible objections—from tax advantages to insurance issues to ultraviolet fading in direct gain passive spaces

issues to ultraviolet fading in direct gain passive spaces.

It is unfortunate that passive solar design methods have not been written about as well as active systems have in this book. Passive design methods have attracted architects the way active systems did not. Through the DOE Passive Commercial Buildings Program we should begin to receive instrumented results of the passive research effort. This program demonstrates that energy systems in a building must always be seen in a context of overall building design and design process, the nature of the activities within, the amenity value of a solar building, first costs, and constructability.

In conclusion, the book only conveys good information about solar systems, but does so within the context of the overall building design process. So it is not just a valuable book because of the specific expertise displayed, but it also shows a process by which a specialized consultant can most effectively contribute to the overall design effort.

Tape talks

Pidgeon Audio Visual Library of Slide/Tape talks, produced by Monica Pidgeon in association with Leonie Cohn. World Microfilms Publications, 62 Queen's Grove, London NW8, 6ER. Series 1 through 5, \$79; series 6 and 7, \$84.

The Pidgeon Audio Visual Library of Slide/Tape Talks on art, architecture, design, landscape design, and urban design is now in its seventh series. Each series includes between five and eight speakers, and each talk is recorded on a separate cassette tape. In addition to the tape, each talk is accompanied by 24 color slides and printed information, which are packaged along with the tape in a book-type format for convenient storage.

The entire series now includes 51 speakers from all over

the world, with such names represented as Ricardo Bofill, Roberto Burle Marx, Serge Chermayeff, Kenneth Frampton, R. Buckminster Fuller, Frank Gehry, Esther McCoy, Charles Moore, Oscar Niemeyer, Cesar Pelli, James Stirling, John Summerson, and Bruno Zevi. They talk mainly about their own work, but the range of subjects includes history, theory, planning, reminiscence, search for language or identity, high-

or low-tech, climate control, and building for developing as well as for industrialized countries. The advantage of these recorded lectures is that one can listen to them repeatedly, with the aid only of a cassette player and a 35mm slide projector. Complete listings are available from the address above.

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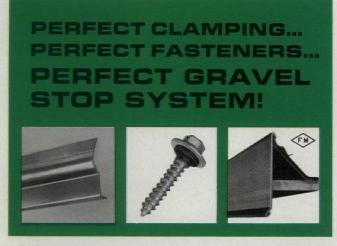
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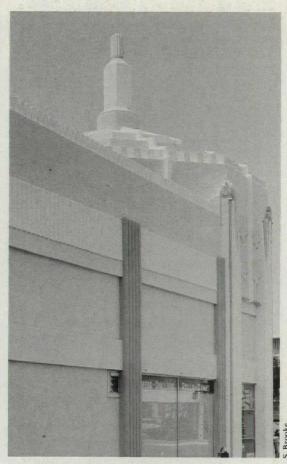
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Friedman's Bakery, Miami Beach.

Reuse of urban districts will be one area of concentration in this year's annual special issue on preservation and reuse; accomplishments in Miami Beach, Saratoga Springs, and Vancouver will be featured. Other articles will focus on reuse of a Los Angeles landmark building, restoration of a Richardson interior, and the implications for preservation of the 1981 tax act.

Skylight restoration will be the subject of one technical article, closely related to the preservation/reuse theme.

Design for cold climates will be the subject of a second Technics feature, a sequel to this issue's coverage of design for hot, arid zones.

P/A in December will feature a special section of articles on Money and Design. Several outstanding new buildings and interiors will also be examined, and an article in the energy design series will take up hotels and motels.

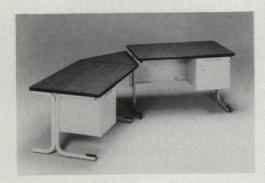
Products and literature

Products



The Lineation Collection of tables in high-gloss polyester are suited to open plan or executive areas. Round, square, or rectangular tops are set on cylindrical bases. Tops are two-tone designs by Otho Duke or three-tone designs by Bettye Young. A single accenting pinstripe delineates the edge, which can either match or contrast with the color of the top. Color selection includes a range of grays, greiges, browns, and mauve/plum and 30 individual colors. Gayeski Furniture Coordinates.

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The modular bronze mirror directory features a clear coverplate over a mirrored bronze acrylic backplate and

matching tenant strips. Hardware includes theft-proof caps and spacers. The strips are held by magnetic backing, making it easy to add, delete, or rearrange the board. Tenant names and suite numbers are 3/8-in. Helvetica Medium type. Allenite Sign Div., Allen Marking Products, Inc.

Circle 102 on reader service card

Guidelights safety lighting uses lowvoltage lamps enclosed in tubing to mark stair edges, aisles, and corridors at floor level. The lights can be enclosed in aluminum extrusions for use on bare floors as a means of temporary or permanent traffic control. There are three handrail designs: transparent tubes containing tiny lights; anodized aluminum tubing grooved to accept lighting strips that shine up or toward the wall as wallwashers; and a crescent shape that fits most existing rails and can be attached either mechanically or with adhesive. Tivoli Industries. Circle 103 on reader service card

The Berlin chair is offered in two versions: #183 has an upholstered back and seat; #184 is a sling chair available in leather. Brayton International. Circle 104 on reader service card

Chair model C66E05, designed by Umanoff-Huin Associates, has a walnut frame with radiused edges for a soft look. Seat and back are upholstered. With an oak frame, it is Model C26E05. Madison Furniture Industries. Circle 105 on reader service card

The Chairman outdoor lighting is available with a choice of lamping, from incandescent to HID. Attachment can [Products continued on page 135]

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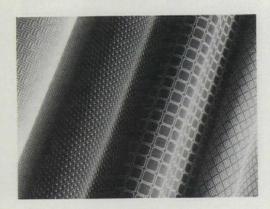
Zip.



Products continued from page 133

be post top, wall mount, suspended, or multiple arrangements. Fixtures are solid cast aluminum. The manufacturer suggests its use on campuses, in shopping malls, for office buildings, along walkways, and in similar areas. Voigt Lighting Industries, Inc.

Circle 106 on reader service card



Design Plus contract carpet is woven in four designs, each in five colorways. Looking like upholstery fabric, the low profile carpet is woven of solution-dyed nylon yarn. According to the manufacturer, it offers excellent colorfastness and easy stain removal and is engineered for high traffic. Robertex Associates, Inc.

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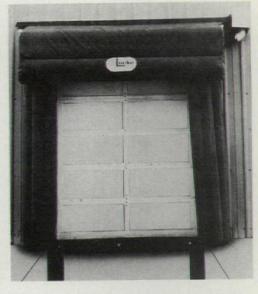
Alpha dormitory/residence hall furniture consists of chests, dressers, beds, desks, night stands, wall-hung bookcases, wardrobes, and chairs. All exposed surfaces are covered with durable, scratch-resistant laminate in a wood-grain finish. For variety and color, tops and drawer fronts of dressers and chests are available in plastic laminates or paints in a color choice. R-Way. Circle 109 on reader service card

Custom interior panels and enclosures include prefinished sheet metal covers for perimeter heating, venting, and airconditioning equipment, aluminum linear bar grilles, column enclosures, window sills/soffits, and other specialty sheet metal items. They are suitable for office buildings, hospitals, and similar projects. Linear-Flo Systems Co., Architectural Panel Div.

Circle 110 on reader service card

Earthscape tile in eight semimatte glazes has an uneven surface with flecks of random burnt accents. The 6" x 6" tile is suitable for countertops, floors, and walls, as well as around fireplaces. Trim

tiles are also available. Huntington/ Pacific Ceramics, Inc. Circle 111 on reader service card



Inflatable dock seal, Model P-1, has a spring-loaded head section that keeps the deflated seal frame against the outside wall. Seal head and leg sections inflate in seconds when they are in use, resulting in a tight, windproof seal that keeps heated or conditioned air inside the dock area. It is made from tough neoprene-coated nylon. The seal allows unobstructed access from trucks 12′-13′-6″ high and up to 8′ wide. AirLocke Dock Seal.

Circle 112 on reader service card [Products continued on page 136]

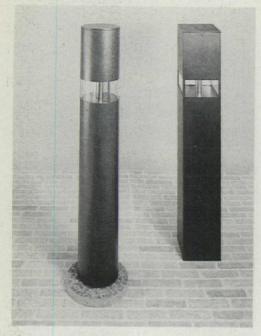
International Furniture Competition sponsored by Progressive Architecture with winning projects to be displayed at NEOCON 15
June 1983, The Merchandise Mart, Chicago

For further information see P/A, Sept., 1982, p. 21, or write to P/A Furniture Competition, P.O. Box

1361. Stamford, CT 06904.



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The Delta Bollard, available round or square, has a one-piece extruded aluminum housing and a shock- and impact-resistant acrylic lens. Added lenses and shields for beam cutoff allow one area to be highlighted and others to be shielded. Bollards are fully gasketed to be weathertight. Standard finish is anodized or painted bronze or black: other colors are optional. Elsco Lighting Products, Inc.

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STOLAN decorative interior wall coating of synthetic resin can be used in residential or commercial applications. It has a tough surface and is impact and chip-resistant. STOLAN, a water-vapor-permeable material, can be applied to virtually any sound substrate. It can be tinted to a number of colors and can be applied in many textures. STO Energy Conservation, Inc. Circle 114 on reader service card

The Safety-10 energy-saving exit sign uses no electrical energy, no batteries, and requires no wiring or conduit. It is said to be visible in the dark from a distance of 250 ft and is guaranteed for 10 years. Installation is simple, requiring only screws and a screwdriver. The system uses Betalight®, consisting of a glass envelope coated internally with a phosphor and filled with tritium gas. The gas discharges low-energy beta particles that strike the phosphor, causing it to emit light. Saunders-Roe Developments, Inc.

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Vellum and polyester films for CAD/ CAM plotters have surfaces that are receptive to high-speed plotter ink pens. Standard drafting pens or pencils can be used to make later additions. The vellum film reproduces well with either blueprinting or microfilming. Both are available in either sheets or rolls. To request a free sample of vellum or film, write on professional letterhead (state sheet or roll size used and type of plotter) to Stanpat Products, Inc., 366 Main

St., Port Washington, NY 11050, Att.: Stephen T. Murtha.

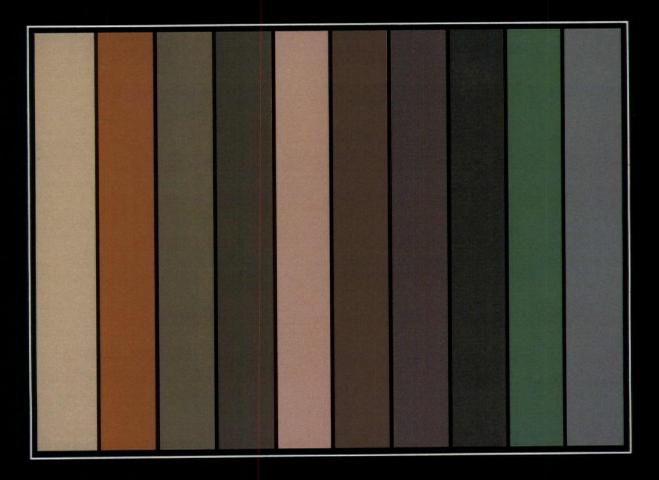


A dual adjustable table for electronic equipment has electrically operated height adjustments for each work surface. With 500 lb of lift, it will position heavy equipment, such as graphic design terminals. The table is available in 4-ft or 5-ft widths. Structural Concepts Corp.
Circle 116 on reader service card

The TRAC System consists of a keyboard and a transaction recorder. Placed near a copying machine, it allows professional firms to keep track of copy-[Products continued on page 138]



This is Nevamar



Collection with design trends when as particularly with more formed as in 180 638 1380

ing expenses related to active accounts. Periodically the tape is processed on a computer, which summarizes the amount to be charged to each client, and a monthly accounting entry can then be made. The system is said to be cost justified where volume exceeds 6000 copies per month. TRACsystems. Circle 117 on reader service card

TG-1 Technical Pens have a spiral air channel that overcomes the problem of clogging. When a pen is not in use, two silicone balls in the cap maintain gentle pressure on the point to seal it; and a humidifying element surrounds the point with moisture to prevent drying. There is a stainless steel point for use on vellum and tracing paper, a tungsten carbide point and a sapphire-jeweltipped point for use on drafting film. FaberCastell Corp. Circle 118 on reader service card

Dual- and triple-glazed patio doors are thermally improved for use in cold climates. Within the frame and sash members are thermal breaks to prevent transfer of cold or heat. The doors are offered up to 12 ft wide. There is an optional automatic patio door operator that is activated by a remote control switch, digital keyless entry, or standard doorbell switch. General Aluminum. Circle 119 on reader service card

Kingfile vertical files hold up to 1200 drawings on individually labeled suspension strips. The pin-and-pipe as-sembly from which the drawings are hung separates easily for removal of any drawing. An index in the lid identifies the file contents. According to the manufacturer, the file requires less than half the space of a horizontal file of similar capacity. H. Schreiber Co.

Circle 120 on reader service card

T-Plus® coupling connects branch lines for hot or cold water or air on pipes under pressure, without stopping the flow in the line. The coupling is a malleable iron mechanical tee for schedule 40 steel pipe, designed to be installed by professionals. Delta Faucet Co. Circle 121 on reader service card

Waterproofing systems of polyurethane include Auto-Gard for parking structures and rooftop parking areas; Peda-Gard for walking surfaces; and Perma-Gard for between-slab, foundation, and other floor finishes. Since the materials are applied as fluids, there are no seams or joints. The systems protect against the effects of weather, temperature fluctuations, ultraviolet light, and chemical attack. The Neogard Corp. Circle 122 on reader service card

Gafstar® floor tiles and backings for sheet vinyl products, free of asbestos fibers, are offered in several new styles. In the 4800 Series is Southwick sheet

vinyl (shown), with a finish that resists stains and discoloration from sunlight and heat. It is a vermilion geometric design on Mushroom, Nectarine, or Brownsugar. Tarkett, Inc. Circle 123 on reader service card

The R-Brick® Panel System consists of kiln-fired 1/2-in.-thick face brick applied to insulating polystyrene foam board. For exterior or interior installation, the panels can have 1-in., 11/2-in., or 2in.-thick foam board with R-values of 5, 7½, and 10 respectively. Standard 8" x 2¼" x ½" bricks or modular 75%" x 2¼" x ½" bricks are made into papeles ½" bricks are made into panels: standard, 42½" x 16½"; modular, 48" x 161/2". R-Brick Panel System, Inc. Circle 124 on reader service card

Literature

Building components catalog offers panels and accessories. Among the panels are Molenco-Rib, Span-Rib, Hi-Cor, standard corrugated, farm and ranch, concealed fastener panels, Insul-Wall sandwich panels, and corrugated perforated aluminum. Also offered are flat sheets, purlins, light-gauge steel stud framing, accessories, and hardware. Trims and panels are finished in Pennwalt's Kynar 500® coating. Moncrief-Lenoir Manufacturing Co., Building Components Div. Circle 200 on reader service card [Literature continued on page 142]

Blueback N.I.P. from STANPAT

Fits any plain paper copier: 3100, 2300, 3400, 5400, 107, 775, 880, 520, 150, 200, 7200 and more..

Stanpat Products, Inc. brought speed and economy to the drafting tables back in 1941. Who else but the pioneers in the pressuresensitive applique business would you expect to come through with new Blueback N.I.P.* (New Improved Product)! It's a uniquely-backed copying applique that works on Xerox, IBM, Savin, Kodak, Minolta - you name the copier.

Stanpat's new Blueback N.I.P. is a vast improvement over the old polyester sheets. This new breakthrough in the drafting applique field won't distort or curl; won't jam in the machine and "fits-em-all." You'll also get a clearer, cleaner, sharper reproduction, too.

Prove it to yourself. Call or write for a free sample. Then try it, and watch it work! Available in 8½ x 11, 8½ x 14 and 11 x 17 one hundred per boy. It's another.

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Circle No. 374 on Reader Service Card

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Insulating Curtain Wall® is the accepted solution for effective window energy control for one simple reason: It's the most cost-effective way to SAVE ENERGY DOLLARS for large glazed areas.

R-9 to R-12 (depending on size)

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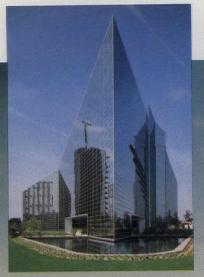
Field Proven for Seven Years

To order the solution to your window energy control problems, call Toll-Free 800-525-8698.

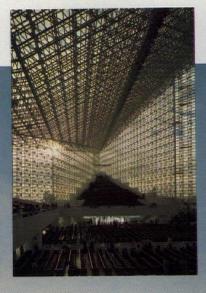


Thermal Technology Corp. of Aspen, Inc. 600 Alter Street P.O. Box 682 Broomfield, CO 80020 303-466-1848

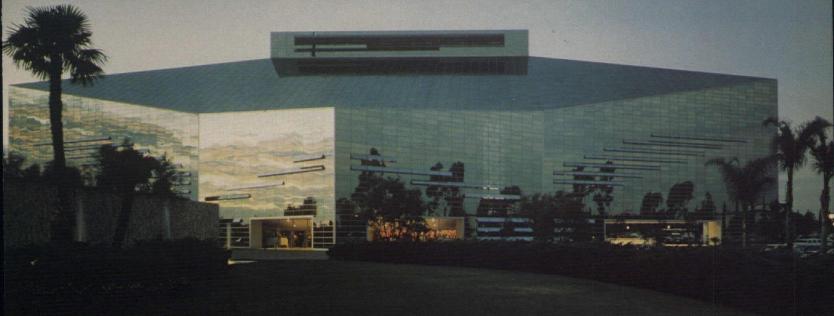
Sweet inspiration.











When architects design a church, they strive to create a structure that will inspire the religious convictions of the congregation and the admiration of the surrounding community.

Johnson-Burgee have succeeded admirably with the Crystal Cathedral in Garden Grove, California.

The Crystal Cathedral is a

monumental, all-glass curtainwall on an exposed steel space-truss frame. 10,500 lights of silver LOF Vari-Tran® mirror-finish glass reflect the building's natural surroundings. While inside, the entire sanctuary "opens" to the wonders of earth and sky.

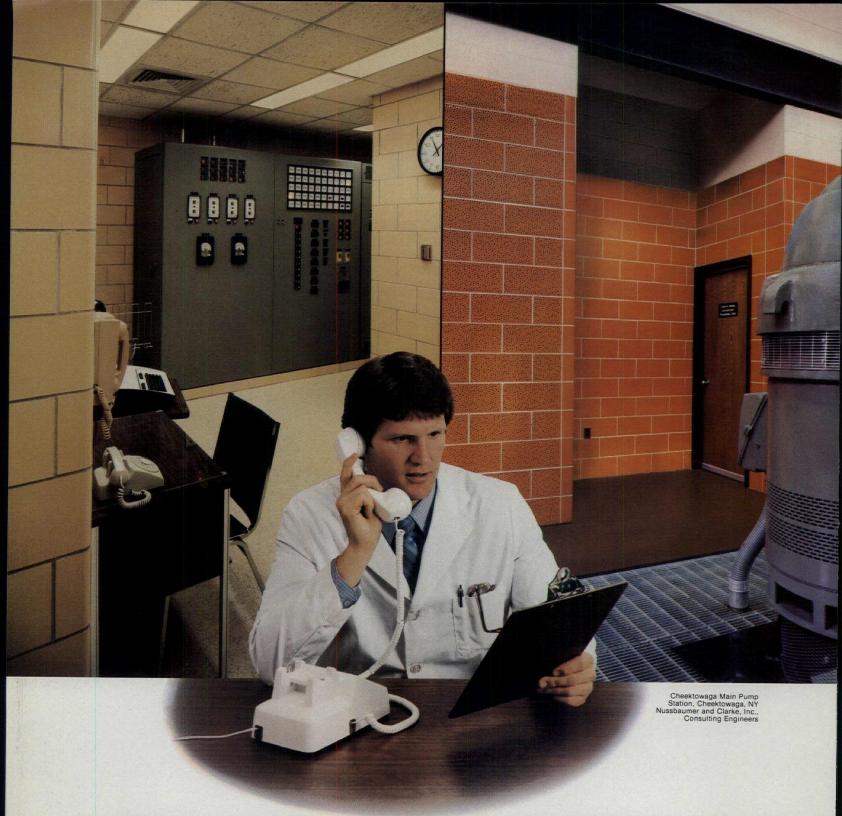
The Crystal Cathedral's glass is much more than beautiful. Its mirror finish reflects southern

California heat to help keep the interior comfortable. At the same time, it admits plenty of natural daylight to reduce artificial lighting expenses.

Want to know more about LOF high-performance glass? Write to Larry Moeller, Libbey-Owens-Ford Company, 811 Madison Avenue, Toledo, OH 43695.

LOF Glass

A Libbey-Owens-Ford Company



When men and machines must work side by side: Acoustical SGFT

In the pump room at the Cheektowaga Main Pump Station, noisy motors are hard at work. In the adjacent control room, silence reigns. One reason: acoustical structural glazed facing tile from Stark. Acoustical SGFT absorbs and greatly reduces the transmission of sound while providing an aesthetically pleasing and virtually maintenance-free environment.

Acoustical SGFT consists of a kiln-fired ceramic clay body with a

randomly perforated ceramic glazed face. Fiberglass pads are inserted into the tile during manufacture, providing a noise reduction coefficient of .55 and a sound transmission class of 46 for a 4" wall. The ceramic face of acoustical SGFT gives it permanent color, makes it fireproof and easy to maintain, saving the owner maintenance costs over the life of the building.

In the adjacent control rooms, regular SGFT was specified to aid in minimizing sound transmission while providing a permanent, colorfast, easily maintained wall that will never need painting.

Yet with all their advantages, these SGFT products are probably less expensive than you think. Because they provide both wall and finished face in one unit, they can be installed in one step by one trade, reducing on-site labor.

For immediate product information, see Sweet's section 4.4/St, or for complete cost comparison data, call or write: Stark Ceramics, Inc., P. O. Box 8880, Canton, OH 44711. Call toll free

stark

1 -800 -321- 0662. In Ohio, call collect (216) 488-1211.

CPT shows how your word processor of today can be the first step to your automated office of tomorrow.

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Unfortunately, that's where most

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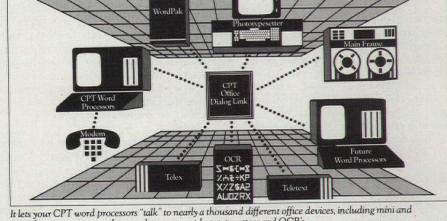
CPT system. You

pany that hasn't

They've accepted their new word processors as "fancy typewriters." They don't realize they're on the threshold of an even bigger idea-called office automation.

CPT has long recognized this potential in the office. That's why all CPT word processors are designed to let you add new powers - a step at a time.

You may wish to start with CPT's entry-level word processor and expand your system later. With CPT, your investment is always protected, because you can upgrade to the more powerful CPT word processors in just minutes, right in your office



It lets your CPT word processors "talk" to nearly a thousand different office devices, including mini and main frame computers, other word processors, phototypesetters and OCR's.

Specialists in your different departments will soon discover the computer power inherent in an advanced word processor. CPT software will let them do complex math, sort files and make up new lists, as their original documents are being prepared.

Electronic storage is another CPT

breakthrough.

For individual workstations, CPT has just announced the Disk Unit series, which can store up to 2,600

Perhaps the most remarkable step to the automated office of tomorrow is CPT's newly developed Office Dialog Link!

Unlike the present "office networks" offered by other companies, the Office Dialog Link lets your CPT word processors "talk" to other brands of equipment.

Up to 984 office machines can be joined by the Office Dialog Link at

So what starts out to be a better way to type - is in reality a better way to do business. And that's what "office automation" really means.



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CPT takes the mystery out of word processing.



Asymmetric lighting brochure illustrates units that light walls, ceilings, and floors uniformly from a position near one edge of the surface. Applications illustrated include offices, art museums, corridors, monuments, stores, lobbies, and sports facilities. The 16-page brochure includes a discussion of asymmetric reflector design and techniques. Elliptipar, Inc.

Circle 201 on reader service card

Colored concrete roof tiles are described in a six-page full-color brochure that discusses aesthetics, production and installation, durability, energy efficiency, and cost factors. Colored with Bayferrox pigments, the tiles come in earth tones and bright accent shades to simulate Spanish clay tiles, slate shingles, or cedar shakes. Dead air space between each tile and the subroofing resists heat buildup in summer and heat

loss in winter, according to the brochure. Mobay Chemical Corp., Inorganic Chemicals Div.

Circle 202 on reader service card

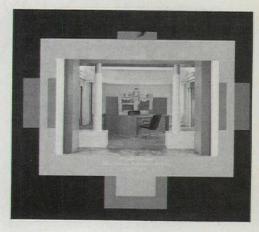
Customform mansards, soffits, fascia, and roofs of aluminum alloy are described in a 16-page brochure. It provides specification information, detail drawings, and profiles of formed and extruded battens, roofing and panel systems, and cornices. Baked enamel, Kynar, and Duranodic finishes available are illustrated in color. Color photos of installations are included. Merchant & Evans Industries, Inc. Circle 203 on reader service card

Bollards, both round and square for outdoor lighting, provide low brightness without glare. They are described and illustrated in color in an eight-page brochure that includes photometric data, specifications, and ordering information. Gardco Lighting. Circle 204 on reader service card

'A Touch of Glass' brochure of leaded, hand-beveled glass illustrates designs available for doors, sidelites, and woodframed screens. The 24-page brochure also shows pedestals with four sides of beveled glass designs, or two designs and two glass panels with beveled edges. Beveled Glass Industries. Circle 205 on reader service card

Track lighting catalog illustrates several styles in a variety of shapes, such as spheres, tubes, squares, and cylinders. The 40-page catalog includes floor and

table reading lamps (two that coordinate with track lighting styles) and gallery lamps. Information and illustrations are also provided for track, track accessories, installation, and recommended lighting levels. TrakLiting, Inc. Circle 206 on reader service card



'Sunar 82' color catalog offers comprehensive coverage of the company's office systems, furniture, and objects. Also available is a completely redesigned specification and price book. "The Sunar Textile Collection" includes a color guide, swatches of all upholstery and leather, and color photographs. A book of black-and-white pictures of most Sunar products, scaled for paste-up, completes the four-part portfolio. To request copies, write on professional letterhead to Walter J. Rydd, Vice President, Sales, Sunar, 18 Marshall St., Norwalk, Ct 06854.

[Literature continued on page 144]



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Circle No. 373 on Reader Service Card

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If you're trying to stay ahead in the architectural/ design field today, you're facing pressures you've never faced before.

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Station, the system puts computer
power right at your fingertips.
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or scaled up and down—limited
only by your imagination. Once
they're complete, drawings can be
automatically produced on a
digital plotter in just minutes.

Easy to integrate.

No matter what your design specialty is—architecture, facilities



planning, interior design—you'll appreciate how quickly Touch 'n Draw™ goes to work in your practice. That's because it has all the specialized symbols and commands you need. At present, a library of over 1,000 drawing symbols is available, covering all of the specialty areas—electrical, mechanical, landscape, furniture, etc.—required for complete working drawings.

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For the cost of a single draftsperson, you can now have a Touch 'n Draw™ system. Typically, one system does three to five times the drafting work possible manually—and considerably more than that on repetitive tasks. That means now you can add design and drafting power to your office, without adding manpower. And reduce turnaround times dramatically too.

Easy to grow with.

No matter how large or small your design workload is, a Touch 'n Draw™ system will be easy to grow with, as your business grows. Upgrading is simple—from a single station to the most complex, multiple-station system—so your initial investment is protected as

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Touch 'n Draw™ could be your blueprint for success in the '80s, right now. To find out how, contact us today for a descriptive brochure or a demonstration.



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Arrigoni Computer Graphics, Inc. 170 Knowles Drive Los Gatos, CA 95030 (408) 370-1400

Progressive Architecture 10:82

'An Introduction to Halogen Lighting,' an eight-page brochure, explains how halogen lighting works and its advantages over traditional incandescent lighting. The brochure was written by Howard Hershberger, I.E.S. lighting consultant. Products illustrated and described include floor and table lamps, track lighting, and wall- and ceiling-mounted lights. Artemide, Inc. Circle 207 on reader service card

Modular units for service facilities can be grouped in floor-to-ceiling height and desired width in any convenient location. The system includes drinking fountains, fire hose and fire extinguishers, ash trays and waste receptacles, telephones, directory boards, clocks, and other panels. It is described and illustrated in a 12-page brochure that also shows colors and finishes available. Accessory Specialties, Inc. Circle 208 on reader service card

Ceramic floor tile catalog illustrates in color several grades of tile, some with slip-resistant surface, for use where traffic is light, moderate, moderately heavy, and heavy. Sizes range from 4" x 8" to 12" x 16". A chart provides information about colors, sizes, and glaze class. Specifications are also included. Interceramic.

Circle 209 on reader service card

Window catalog illustrates 38 aluminum window styles, each provided with

description, performance data, and detail drawings. Illustrations of window hardware are also included in the 22-page catalog. Finishes are light, medium, and dark bronze, white, or black paint; light, medium, and dark bronze, black, or clear anodizing. EFCO Corp.

Circle 210 on reader service card



Cascade Sanitaryware catalog features several styles of water-saving toilets—three requiring 1.6 gallons of water and one requiring only .8 gallon per flush. The eight-page color brochure also in-

cludes wash basins, bidets, tubs, and shower trays. A chart illustrates colors available. Ifo Sanitar AB. Circle 211 on reader service card

'Entrance Accessibility for People Who Are Handicapped' concentrates on two important considerations: width of clear opening and reducing the force needed to open the door. The 16-page brochure discusses required opening size and describes and illustrates door openers/ closers and assisters that reduce opening force required by as much as 75 percent without reducing closing power. There are also closers that are fire and smoke actuated yet open from 0 to 100 degrees with no spring pressure. LCN Closers. Circle 212 on reader service card

Lab and pharmacy refrigerators and freezers in freestanding, wall-mounted, and undercounter models are offered in a six-page color brochure. Freestanding model sizes range from 12 to 55 cu ft; wall-mounted and undercounter styles range from 1.5 to 9.6 cu ft. Cabinet temperatures are kept to 35–39 F for refrigerators and -4 F for freezers. Jewett Refrigerator Co., Inc. Circle 213 on reader service card

Roadway and area lighting systems catalog illustrates fixtures and provides photometric data and information about poles, brackets, and finishes. The 38-page brochure includes product details, ordering information, and a sample specification for each of seven fixtures. Sterner Lighting Systems, Inc. Circle 214 on reader service card



This monumental, 1,392 page volume is divided into four sections. Book I: History of Architecture covers the origin of architecture, the architecture of ancient cultures and foreign countries, and British architecture throughout the reign of George III. Book II: Theory of Architecture includes construction, building materials, and mediums of expression. Book III: Practice of Architecture deals with Grecian and Italian architecture, principles of proportion, medieval architecture, and public and private buildings. Book IV is the appendix.

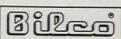
Paperbound, only \$10.95; now at your bookstore, or send check or money order to Crown Publishers, One Park Ave., N.Y., N.Y. 10016. Please add \$1.40 postage and handling charge. N.Y. and N.J. residents add sales tax.



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THE UNIVERSITY OF WISCONSIN-MILWAUKEE is seeking a Dean of the School of Architecture and Urban Planning beginning July 1, 1983. The School has over 900 students and 35 faculty and offers a B.S. in architectural studies, a Master of Architecture, Master of Urban Planning, and a Ph.D. in Architecture. Candidates should have teaching and administrative experience, an active background in architecture and/or planning, and a research orientation. Send resumes to: Professor William H. Smith, Chair, Search and Screen Committee for Dean of the School of Architecture and Urban Planning, 116 Chapman Hall, University of Wisconsin-Milwaukee, P.O. Box 413, Milwaukee, Wi 53201, by November 15, 1982. An Equal Opportunity/ Affirmative Action Employer.

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Interested candidates are invited to submit a resume and examples of their work to: Michael Bobrow, Principal and Director of Design.

BTA

Bobrow/Thomas and Associates 1001 Westwood Boulevard Los Angeles, CA 90024 Visiting Lecturer Position—Spring 1983. The University of Arkansas School of Architecture is seeking applications for two one-semester (1 January-15 May) faculty appointments to teach architectural design, landscape architectural design or basic design. Must have M. Arch or MLA degree or interesting professional experience. Salary negotiable. Please send resume with the names of at least three references to: C. M. Smart Jr., Dean School of Architecture, Vol Walker Hall 209 University of Ar, Fayetteville, Arkansas 72701. Deadline for application is 10 November, 1982. The University of Arkansas is an Equal Opportunity/Affirmative Action Employer.

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invites applications for the position of

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The position is full time, or possibly part time (amounting to 3/4 full time).

Applicants should submit a complete curriculum vitae along with all relevant documents, *no later than 15 November 1982*.

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The College of Environmental Design is seeking applicants for faculty positions. Positions are available starting September, 1983. The College has programs in Architecture, Urban Planning and Architectural Engineering. The College offers an exciting challenge for new educational initiatives. Candidates with strong specialization in any of the following areas are encouraged to apply.

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All specialized areas of

Physical Planning; Natural Factors, Quantitative Methods, Transportation, Housing, Planning Theory.

A minimum of a Master Degree in addition to three years of teaching and/or practical experience in any of the relevant fields is required but a Ph.D. is preferred.

Language of instruction is English.

Minimum regular contract for two years, renewable. Competitive salaries and allowances. Air conditioned and furnished housing provided. Free air transportation to and from Dhahran each year. Attractive educational assistance grants for school-age dependent children. All earned income without Saudi taxes. Ten months duty each year with two months vacation with salary. There is also possibility of selection for University's on-going Summer program with good additional compensation.

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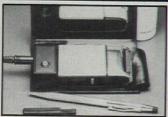




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universal shaver that operates on foreign as well as domestic voltage . . driving moccasins by Gucci . . . a minicassette recorder which weighs only 6 oz but retains professional dictating quality . . . a bugproof, bulletproof, and bombproof attache case . . . a TV with a 1½-in. screen . . a currency converter . . . a yen holder . . . a digital-alarm pillbox . . . a sterling silver traveling bar [\$75,000, but you supply the liquor].

These are among a sampling of what's new and unusual—perhaps unique—in travel gear and accessories. Some are practical, some not-so-practical. Most items are on the small side, and are easy to carry along.

Today the typical corporate traveler takes a soft-sided (Cordura nylon's a favorite) garment bag or a carry-on bag, plus perhaps an attache case.

Those attaches can be pretty fancy. Hammacher Schlemmer, a New York store selling "uncommon things," offers a security attache case (\$595) equipped with all sorts of anti-theft devices: "Turn power switch on before setting case down and any movement of it will trigger a piercing alarm," and so on.

If this doesn't offer sufficient security, there's the Secret Connection SC 401 from CCS Communication Control Inc., New York. A step up from its 007 Bionic Briefcase, this one features everything from a bomb detector and tracking device ("even if

BY JAMES E. BRAHAM

you're kidnapped, this electronic transmitter can electronically track you down") to a miniature lie detector, a wireless telephone (25-mile limit), and a scrambler. Prices range from \$600 to \$25,000.

Skip the gadgets and you can still pay from \$85 up to \$2,200 for an attache showing off the most exotic skins (Neiman-Marcus, Dallas). Coming down to earth, Samsonite Corp. offers what it calls an exclusive "right side up" feature (latches won't open upside down) on attaches priced from \$50 to \$100.

Pocket computer. Dictaphone Corp. is raving over its lightest recorder ever—the Dictamite (\$275). It weighs 6 oz and will fit in your shirt pocket.

Pocket computers also are designed for the businessman on the go. The Sharp Electronics Corp. model comes with a color printer and expansion module, all for \$625. The ultimate in carryable computers is the new Compass Computer (Grid Systems Corp., Mountain View, Calif.). It boasts a thin, flat 5-in. screen and enough memory to store all the words of a long novel. It folds into a 9¼-lb magnesium package that fits into a briefcase. The price? Only \$8,150.

Panasonic Co.'s newest 11/2-in.,

black-and-white TV (\$260) also has an AM-FM stereo radio with stereo headphones, a detachable magnifying lens and sunscreen hood, and weighs only 1½ lb. The company's 400-watt portable disc hair dryer (\$30) is only 1-in. thick and fits in your palm.

Anyone stuck with a 110-volt American appliance on European trips should appreciate the Worldwide Converter (Hammacher Schlemmer, \$35). You won't need it for the Eltron Shaver (Braun A.G., West Germany, \$150), which adjusts automatically to different voltages and cycles, and can be used as a rechargeable shaver.

Braun also makes a sterling silver electric razor (\$850). Even the Trac II shaver comes in sterling (Tiffany & Co., \$210).

Tracking expenses? An electronic currency converter (Neiman-Marcus, \$45) comes in a leather passport case, and has a second memory that totals daily expenses. If you're in Japan and wondering where in the world to put all those yen, be advised of Cartier's yen holder. It features three pockets for yen—plus space for credit cards—and comes in calf (\$160) and lizard (\$440).

The traveler trying to keep abreast of time zones might consider Seiko's quartz travel alarm (\$69.50). It has hands and a digital panel; each can be set for different zones. Among the firm's quartz travel watches (\$150 to \$300) there is one for the real jetset-

Pictured above are a sterling silver Trac II shaver, \$75,000 traveling bar, digital-alarm pillbox, 22-karat gold-plated tire gage, world timer travel alarm, \$8,150 carryable computer, mini electric shaver, and 1½-in. TV.

ter; it can be set for three different time zones.

Chopard's 18-karat gold bracelet watch (Neiman-Marcus) features two tiny, separate dials for different zones. It's a trifle more expensive-\$7,500. L. L. Bean Inc., the Freeport, Me., mail-order house, offers a Picco world timer travel alarm with a rotating ring on the face indicating 24 time zones and 19 major international cities. It weighs only 2 oz and costs \$23.

How's Henri? "The most expensive travel guide in the world" is what Neiman-Marcus calls its INWorld Guide (\$125), a little black leather book that advises where to dine, stay, shop, and golf-or even gambleanywhere in the world. Restaurant ratings include the maitre d's name.

A portable smoke and fire detector is a sensible item to pack for any trip. First Alert (Pittway Corp., \$20) clips easily to your hotel room door.

Should your trip involve some driv-

An extraordinary recreational vehicle

ALLURE THAT CAN FASCINATE EVEN THE VETERAN RV OWNER

INSPIRED AERODYNAMIC DESIGN

The flowing lines of a London Aire reduce air drag substantially, providing it with ideal stability in handling and

LIGHTWEIGHT ALUMINUM SUPERSTRUCTURE The London Aire has a completely welded trusstype superstructure. It has a totally enclosed

dove gray aluminum exterior and has ACRA-TRAC™ suspension with uniform wheel loading and a superior ride.

WARM AND LIVABLE INTERIORS

A completely livable, natural oak interior with a delightful kitchen, commendable bath, and comfortable living and sleeping areas.

Add all the comfort and construction features of the London Aire together and you have an extraordinary vehicle to enjoy for years. WRITE FOR 4-COLOR CATALOG.



London Aire, Newmar Industries, Inc. P.O. Box 30, Dept. 244, Nappanee, IN 46550-0030



Circle No. 390 on Reader Service Card

Small Firm's New Golf Ball Draws Hole-in-One Letters from All Over U.S.

Seller Guarantees Ball Will Cut 5-Strokes-or Money Back

Okay for Tournament Play

NORWALK, CT—A small company in Connecticut is selling what might be the most hook-free, slice-free ball in golf. Independent tests prove its perfect balance is light years ahead of the best balls on the market. Its center of gravity is 97.5% perfect, compared to 58% for Top Flight, 28% for Titleist and worse for Hogan and MaxFli. This huge advantage on balance makes the ball less likely to spin off course, and surely accounts for the best proof a company could ask for: hole-in-one letters from all over the U.S. As you can imagine, these men and women think the ball is the best thing that has

happened since they began playing.

The ball also has up to 21% more rebound power than Titleist, Top Flight, MaxFli and Hogan. It comes off the

floor like a jack rabbit!

The ball's name is Guidestar and it's sold by the same small company that shook the golfing world with The Hot One™—a golf ball that purposely broke the Rules of Golf to give golfers more distance. Unlike The Hot OneTM, however, golfers can use Guidestar in tournament play.

In light of independent tests and all those hole-in-one letters, the company guarantees Guidestar will cut at least five strokes off an average golfer's score. If it

doesn't, they will take back the balls, even if they are used, and refund their price promptly.

They also guarantee Guidestar's patented construc-tion makes it the most durable ball in the world, and to prove it will send a buyer three new ones free if he ever cuts one. All he has to do is return the damaged ball with 50¢ for postage.

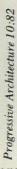
Guidestar also has an option for golfers with less than perfect vision: Hi-VisionTM yellow. A yellow ball is far easier to spot on the fairway, in tall grass, rough and shallow water. As tennis players learned long ago, it is easier to track in the air and helps you hit an object more squarely by increasing eye/hand coordination. Golfers who have used yellow golf balls report a much faster game, fewer lost balls, even better shots

If you want to save money on lost and damaged balls and (who knows) watch breathlessly on par 3's as Guidestar's perfect balance carries your tee shot toward the cup!-then try this new, patented ball. White or Hi-Vision™ yellow you can't lose—a refund is guaranteed if you don't cut at least five strokes.

To order Guidestar send your name and address to the National Golf Center (Dept. G-064), 18 Lois Street, Nor-

walk, CT 06851. Include \$19.95 (plus \$1.75 shipping) for one dozen; \$18 each for two dozen or more. Six dozen cost only \$99. No shipping on orders of two or more dozen. If you want Hi-Vision $^{\text{TM}}$ yellow, be sure to say so, otherwise they will send you white.

To charge it give them your card's name, account number and expiration date. No P.O. Boxes, please; all shipments are UPS. CT and NY residents add applica-Bost Enterprises, Inc. 1982 ble sales tax.





INCLUDES CARRY CASE! Manufacturer's

Suggested Retail 35.00

OUT THEY GO AT ONLY:

Price subject to change after 60 days. Offer void outside 50 United States.

Dept. B-846-2215



tion until you stop it.

AUTOMATIC REPEAT! Memory buttons mark start and

finish of portions you want played back repeatedly. Tape automatically keeps rewinding and replaying that por-

AUTOMATIC REPLAY! Select up to 3 different points on tape for automatic replay. Playback will begin automatically at each point.

PRE-END ALARM! An LED blinks when 3 minutes of tape remain; flashes rapidly when 1 minute remains.

AUTOMATIC SHUT-OFF! Mechanism stops at end of

tape in Record, Play, Fast Forward or Rewind modes. SHORTING PLUG! Allows you to erase a recorded portion without having to add a new one over it.

Toll-Free: 1-800-328-0609 If busy signal, or after busin if in Minnesota, call 1-800-228-2606 24 hours a day, 7 days a w

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MANAGEMENT

ing, you may want to pack a pair of driving moccasins (Gucci, \$95). They're in kidskin with flexible soles, like slippers.

Women appreciate the portable door alarm (Hammacher Schlemmer, \$25); it fits around a doorknob and even a finger's touch will set off an 85-decibel horn. Should you have trouble sleeping on the road, the same firm offers Environmental Sound-X. For \$150, you can listen to "the soothing sounds of rainfall, surf, and water-

Suitcase golf. Golfers who travel light might be interested in the Super Stick (Hammacher Schlemmer, \$60). This 38-in. club folds down to 24 in. to fit into a suitcase; the clubhead adjusts to resemble 17 different irons.

The same store offers the Genesis Exercise Computer (\$175). Worn like the wristwatch it is, the Computer shows your pulse rate and will automatically sound an alert when you reach a desired training rate. An easy-to-use blood-pressure tester (\$125 including batteries and carrying case) and a Criterion digital-alarm pillbox (\$50) are other Hammacher Schlemmer specials. The miniature pillbox alarm reminds that it's time for your pill.

What motorist wouldn't appreciate a pair of seat covers made from the highest-quality New Zealand sheepskin (Monarch Trading Co. of New Zealand, \$165 a pair-or \$335 tailor-made)?

The driver with everything might like a 22-karat, gold-plated tire gage (Neiman-Marcus, \$18).

For traveling in really high style, David Orgell, a Beverly Hills speciality shop, offers a sterling silver (with gold-lined interior) traveling bar. Contents include a dozen sterling silver cups, ice container, tongs, and cocktail strainer-and there's space for 4 qt of liquor. Price: \$75,000. You supply the booze.

Finally, should your trip take you off the beaten track and you need something with which to lug all this gear, Early Winters Ltd. has just the item for you. A gentle, graceful llama, described as able to "carry heavy loads (up to 120 lb) long distances at high altitudes, with a minimum of food and water." The price for your very own llama? \$1,200 to \$2,000, f.o.b. Seattle.

For greater roof reliability, specify the superior strength, stretch and flex of Reemay.



REEMAY Roofing Fabric

It's a spec you can have confidence in, because it's superior to felt in four key ways that result in a more reliable, longer-lasting roof.

2 times stronger

REEMAY* spunbonded polyester is twice as strong as fiberglass felt. It holds together over seams and joints and gives you a more durable membrane.

20 times more stretch

REEMAY elongates 43% its normal size, while fiberglass breaks at 1.8%. That means REEMAY adapts to extreme heat, cold and ponding weight. It resists cracking and splitting for a more failure-proof roof.

1.000 times more flexible

REEMAY exceeds 100,000 flex cycles without cracking. Fiberglass fails at 100 in the same test. Over

REEMAY vs. FELTS	Organic Felt, 15 Lbs.	Fiberglass Felt	REEMAY S-2024
1 Strength, pounds	1	10	22
2 Elongation, percent	1.5	1.8	43
3 Flex-life, cycles to failure	2	100	100,000
4 Weight, pounds/100M sq. ft.	45,000	36,000	4,050
All materials tested in 3 plies in asp	halt.		

years of freeze/thaw cycles, REEMAY holds up to provide long, reliable service life.

9 times lighter

Lightweight REEMAY adds very little to load-bearing requirements. And it helps keep the lid on construction costs, because it goes down faster and easier. One 9 lb. roll gives the same coverage as a 150 lb. roll of felt.

Used with most common cold mastics, for multi-ply, built-up roofs, remarkable REEMAY Roofing Fabric gives you a more trouble-free, more lasting roof. Add REEMAY to your spec file today. Call or write for complete details: 800-441-7515. Du Pont Company, CRB-21E1-A, Wilmington, DE 19898.

*DuPont registered trademark



Circle No. 330 on Reader Service Card

THE GE OPTIMISER LIGHTING SYSTEM COSTS MORE. BUT IT'S LESS EXPENSIVE.

Specifier Series No. 1

This new General Electric
Optimiser lighting system combines
energy-efficient 28-watt lamps
with specially-designed,
hybrid solid state 2-lamp
ballasts to save
34% in energy
costs compared to
typical
standard
fluorescent
systems. Yet,
in most fixtures,

TYPICAL 4-LAMP ENCLOSED TROFFER PERFORMANCE*				
	PERFORMANCE MATRIX			
LAMP TYPE BALLAST TYPE	4-STANDARD 2-STANDARD	4-F34 ENERGY SAVING 2-ENERGY SAVING	4-OPTIMISER LAMPS 2-OPTIMISER BALLASTS	
Initial Lamp Lumens	3150	3050	2550	
Lamp Life (Hrs.)	20,000	20,000	15,000+	
Ballast Factor/ Thermal Factor	.95	.94	1.07	
C.U. LLD (Mean)	.75 .876	.75 .876	.75	
(Typical Office)	.732	.732	.768	
Watts/Fixture	176	137	116	

*Based on GE Tests

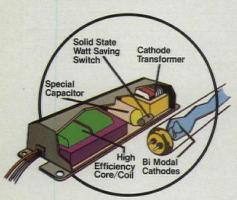
there is only a slight

light levels.

(about 3%) reduction in maintained

The performance-matched Optimiser lamps and ballasts increase system efficiency by 39%.

A typical 4-lamp troffer with standard lamps and ballasts uses 176 watts. The same fixture equipped with the Optimiser System



uses 116 watts. In the average office lighting application, the energy

savings per fixture will be \$12.60 per year (3000 ABHR, 7¢/KWH).

And because the Optimiser fits all standard 40-watt four-lamp fixtures, it's especially suited to retrofitting, in addition to its many applications in renovation and new construction projects.

Technically speaking.

The key to the Optimiser System's performance is the combination of improved electromagnetic circuitry and field proven electronic components in the ballast matched to a specially designed lamp. The heart of the system is a solid state switch in the ballast that cuts off power to the lamp's bi-modal cathodes once the lamp is on. The lamps continue to operate at full light output without cathode heater voltage. The result is a highly efficient fluorescent system that operates at 34% lower wattage than standard.

This also means the Optimiser ballast operates up to 30°C cooler than standard ballasts. Which results in extended ballast life and, depending upon the particular HVAC system, may lower air conditioning costs.

116 watts means reduced watts per sq.ft. with 97% light output.

TYPICAL INITIAL & ANNUAL OPERATING COSTS (NEW FIXTURES)			
LAMP BALLAST	4-STANDARD 2-STANDARD	4-F34 ENERGY SAVING 2-ENERGY SAVING	4-OPTIMISER LAMPS 2-OPTIMISER BALLASTS
Number of Fixtures	122	122	122
Maintained fc (10,000 Sq. Ft.)	70	67	68
(Labor & Material)	\$15,362	\$15,684	\$17,973
Annual Operating Cost 3000 Hr/Yr	\$ 4,984	\$ 4,069	\$ 3,784
7¢/KWH Watts/Sq. Ft.	2.15	1.67	1.42

It's obvious the Optimiser System is more sophisticated than the standard fluorescent system. In the matrix above Optimiser proves to be the most cost effective system. For your next lighting project compare Optimiser and you'll see how a lighting system that costs a little more initially can be a lot less expensive to operate in the long run.

If you'd like a complete package of information or just have some questions about the Optimiser System, call us toll free at 800-321-7170. (In Ohio, 800-362-2750.)

We bring good things to life.

GENERAL & ELECTRIC

October 28-30, 1982
Inn on the Park, Toronto, Canada

CANEJUS

High Tech High Touch

Designers, architects, facilities planners and decision-making executives, don't miss this chance to participate in Canexus 1982.

Seminars

A number of outstanding architects and designers from both Canada and the United States will address the demands of high technology in designing today's interiors. This year's Canexus theme, "High Tech/High Touch", is a formula to describe the way we should respond to this advancing technology. As high tech is introduced into society, there must be a counterbalancing human response – the high touch.

Tours and Exhibits

An exhibition at the Innonthe Park and tours to factories and showrooms will provide a forum not otherwise available to the specifying community or to office and contract furniture manufacturers.

Canexus is a united effort to introduce products and share information with industry decision makers, sponsored by the following members of the Canadian Business Equipment Manufacturers Association (CBEMA):

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