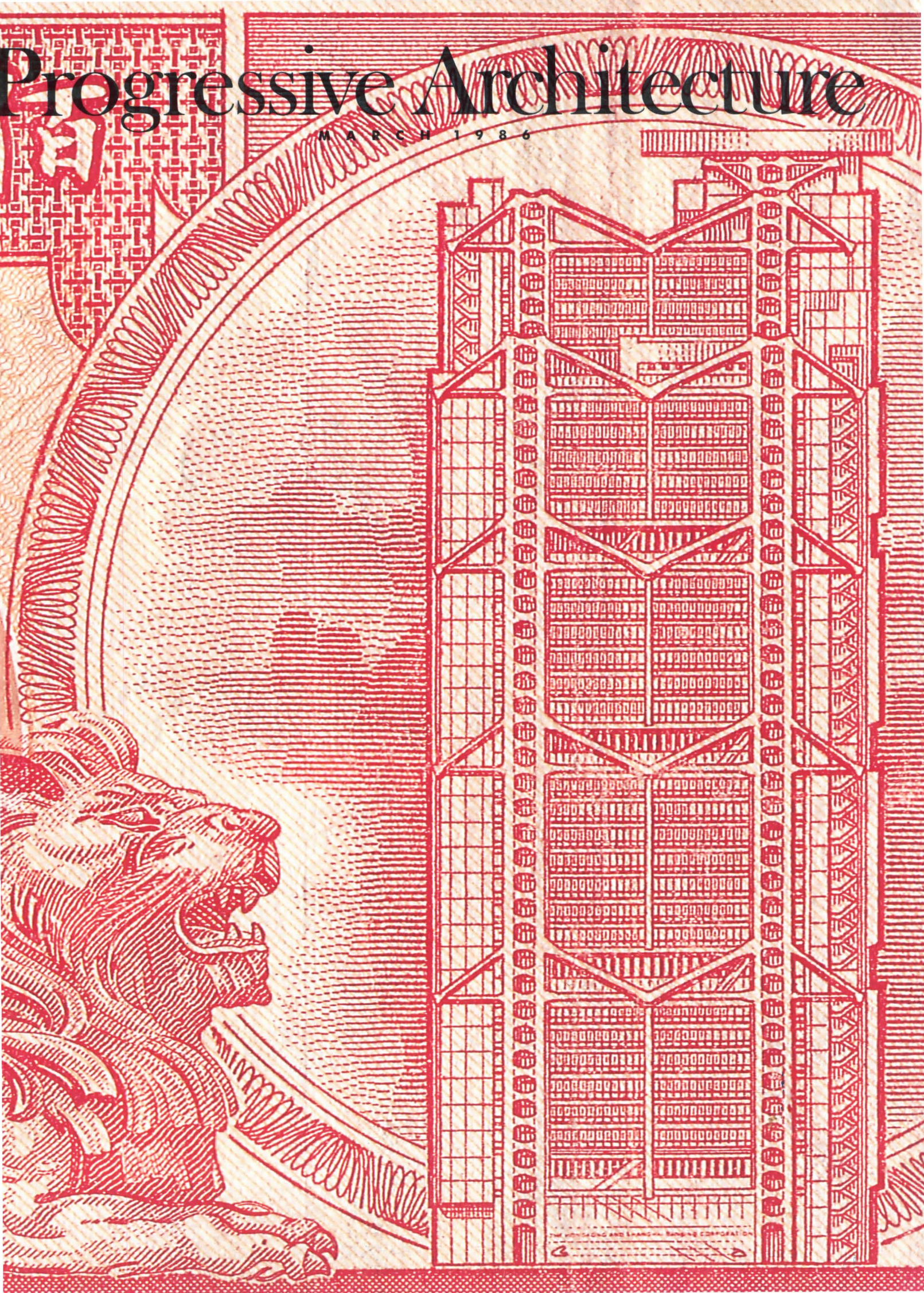
Progressive Architecture

MARCH 1986



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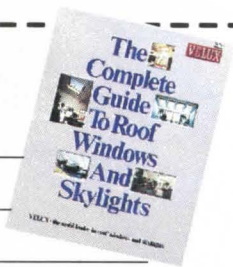

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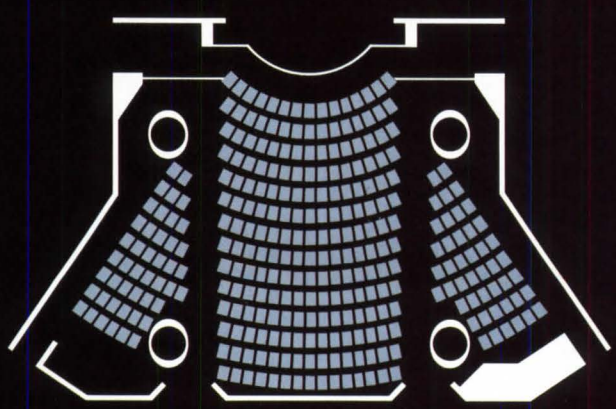

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ABP MPA

ARCHITECTURAL DESIGN

Editors in charge: Susan Doubilet and Thomas Fisher

SPECIAL SUPPLEMENT

DEPARTMENTS

Cover
The HongkongBank's new headquarters by Foster Associates, this month's feature, is depicted on Hong Kong's banknotes.

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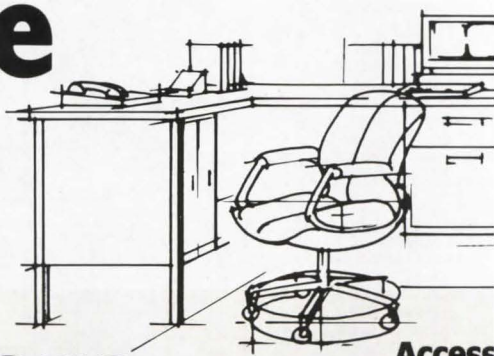

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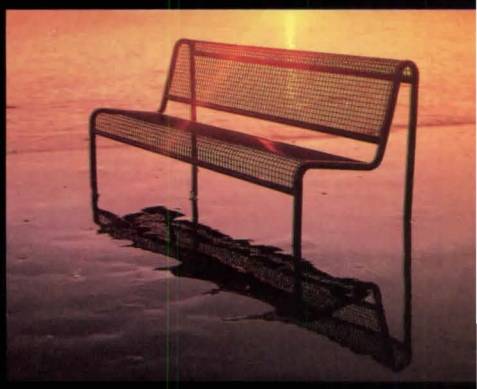

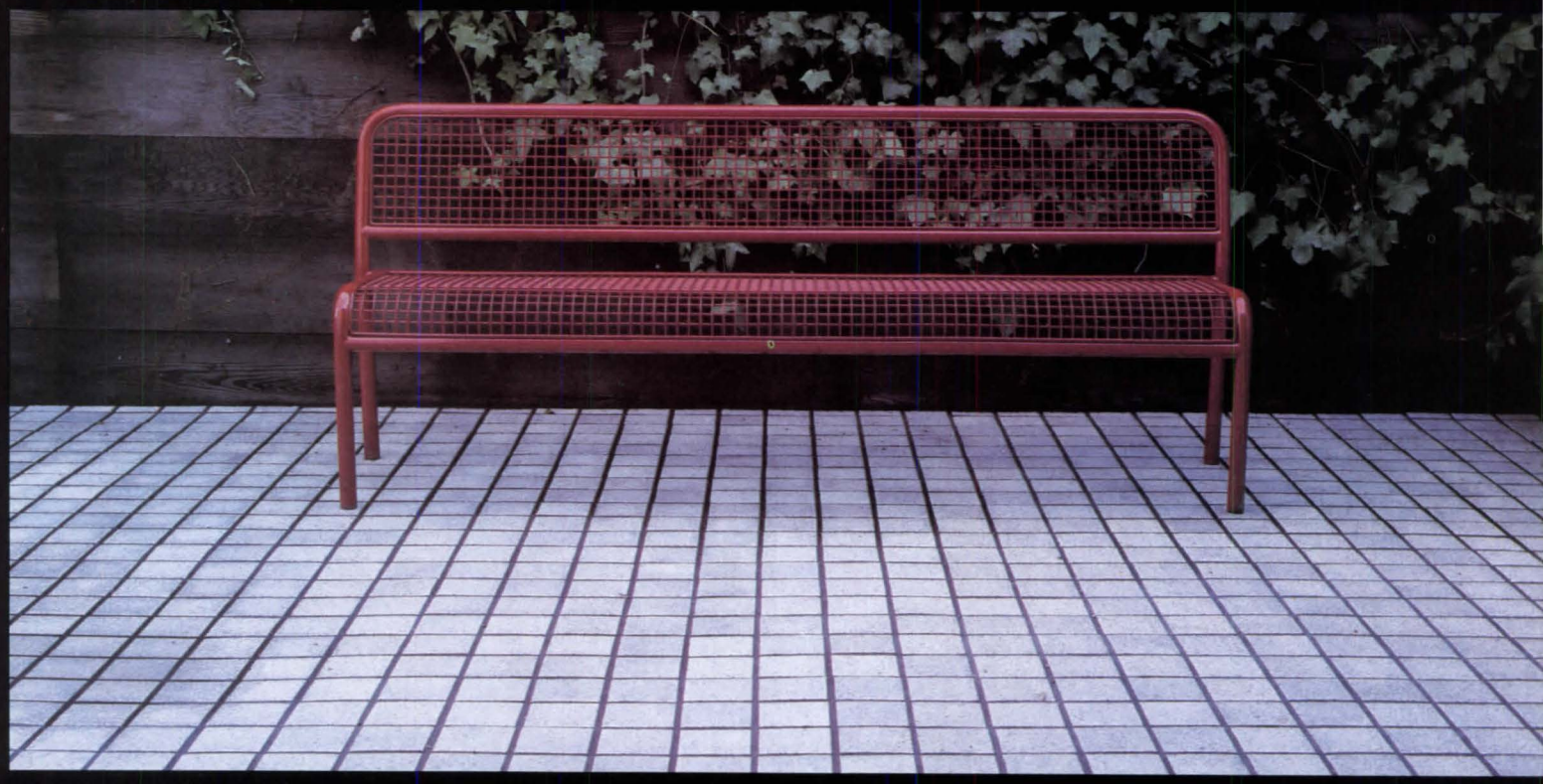

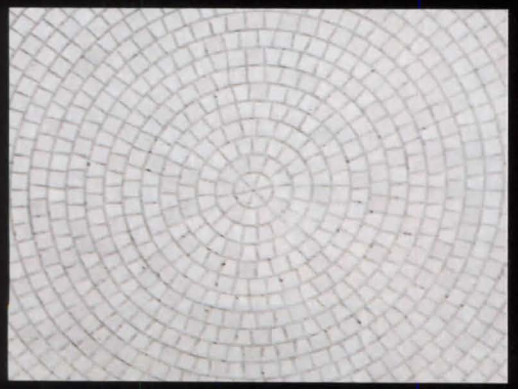

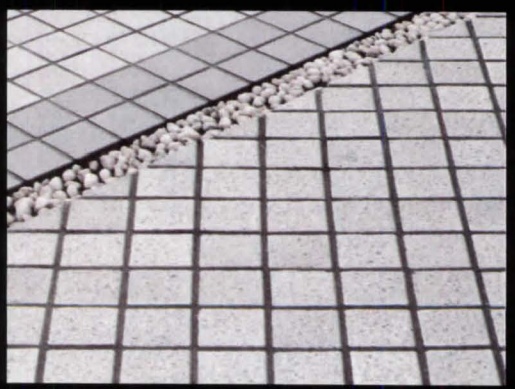

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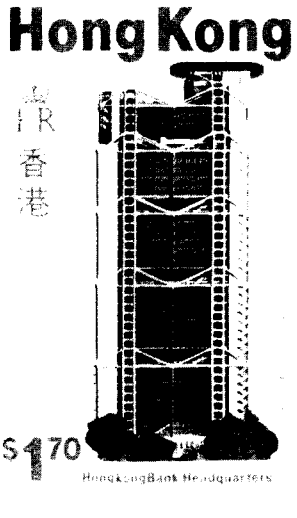
Building of the Year?



HongkongBank as illustrated on Hong Kong postage stamp.

Our dedication of all feature pages in this issue to one building has much to do with admiration—even more to do with information.

WHEN we decided, in planning our editorial calendar for 1986, to devote the entire feature section of P/A to a single building, we were in a sense identifying it as P/A's building of the year. But our selection of the HongkongBank by Foster Associates for such unprecedented coverage is not a gesture of recognition—not an award, as such. While we obviously have great admiration for this building, our exceptional editorial treatment is based largely on the depth and diversity of worthwhile information that this structure embodies—which we want to pass on to you.

There are many ways in which a building can be exceptional. And this one qualifies on several counts, all of which we feel are worth examining in print. It is a serious reexamination of a timely architectural program, in this case the accommodation of office workers; it is a demonstration of technical virtuosity; it is a high point—perhaps it will turn out to be *the* high point—of its architect's career; it is a notable example of enlightened patronage by the client. (In my recollection the closest parallel, in all these respects, is the Dulles Airport terminal of 1968 by Eero Saarinen & Associates.)

Beyond its significance as a single structure, this building has also taken on a role as a symbol of its city—as is amply demonstrated by its appearance on Hong Kong currency and postage stamps. It does not, however, make a creative contribution to the city's urban form (as does, notably, the Procter & Gamble headquarters by Kohn Pedersen Fox Associates—the subject of an extended feature in the October 1985 P/A). The urban form of Hong Kong will accept only limited contributions, and the conditions it imposes are examined in this issue.

Another way that a new building can have exceptional importance is as an exemplar of one architectural school of thought. HongkongBank clearly deserves a place in the development of the High Tech movement alongside the Centre Pompidou in Paris, by Renzo Piano and Foster's one-time partner, Richard Rogers. To place this building knowledgeably within the evolution of High Tech, we have included in this issue an interview with historian-commentator Reyner Banham.

By singling out a High Tech landmark for special treatment, our editors definitely do not mean to herald a style of the year—or, more to the point, a reactionary shift of the year. It would be all too easy to see this publication and the simultaneous opening of a major Mies van der Rohe exhibition at the Museum of Modern Art in New York as part of a wider critical reaction against Post-Modern historicism, ornament, and contextual concerns. But our timing of the HongkongBank's publication is based simply on the date when finished photographs could be obtained, not on any extraneous agenda. We are not hereby jumping on or off any bandwagon—much less trying to drive one.

While P/A is widely identified as promoting Post-Modernism—because rival magazines ignored the works of architects such as Venturi and Graves for so many years while we were publishing them—we have continuously given attention to a full spectrum of architectural effort. Among our more substantial articles on work of the British High Tech movement have been those on the Centre Pompidou (May 1977, pp. 84–89), on some of the previous major works of Norman Foster (Feb. 1979, pp. 49–64), and on the PA Technology Facility by Richard Rogers, with Kelbaugh & Lee (Aug. 1985, pp. 67–74).

A different architectural design direction will get special attention from P/A this fall, when we are planning to publish an issue on the work of Frank Gehry. While a special issue of P/A on a single building is without precedent, we have occasionally published an entire issue on the work of one firm. (One recent example: the issue on Johnson and Burgee in February 1984.) Like this special issue, the one on Gehry is not meant to confer any laurels. We have been regularly featuring Gehry's work since 1974. This year, he will be completing a number of projects that exemplify his architectural thinking, and an issue built around them can place his contributions in clearer perspective.

We are journalists, dealing with what is happening, sifting what we consider significant out of myriad events upon which we can have only a slight influence. What we choose to publish is, we hope, the material of greatest pertinence to the challenges currently facing architects and designers. Everything we publish is presented, collectively, as the Subject Matter of the Year. ■

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Views

P/A Awards: Imagination, too?
Juror Richard Rogers', RIBA, comments on the U.S. Embassy in Oman (P/A, Jan. 1986, p. 93), implying a linkage in P/A jurors' minds between professionalism and lack of imagination, falls into the category of suspicions confirmed. Perhaps its essence should be incorporated as a caveat in the submission requirements for future P/A Award programs. Might clear things up a bit.
R.D. Melim, AIA
Poulsbo, Wash.
[What Rogers said was, ". . . it is also the most professional of the submissions we're considering. But the latter also implies that it doesn't show great imagination." This was his observation alone, as the other jurors' comments show, and not a premise of the P/A Awards program. It is, however, a troubling linkage that most of us have encountered before.—Editor]

P/A Awards: Ultimate Home
Regarding your 33rd Annual P/A Awards and the "Award" for "Home Sweet Home," the design should be commended for conveying a consistently uniform feeling of chaos . . . a total impression of disorder in plan, elevation, axon, even the method of presentation itself. I have never seen such an excellent example of unintelligible, jumbled and disordered spaces. I give the designers credit . . . and I would love to see the furniture that goes with it.
David C. Ashley, AIA
Ashley Associates
Syracuse, N.Y.

Liability Experience
I noted with interest Norman Coplan's article "Law: Liability Insurance Crisis" (P/A, Nov. 1985, p. 65). Mr. Coplan suggests that limitation of liability clauses are almost impossible to negotiate into a design professional's contracts and even if accepted would be of limited value. Our experience in representing major Chicago-based design firms has been that such contractual limits are obtainable and very useful. We have been very successful in getting owners to accept such clauses, especially when the limit is related to the insurance crisis. In today's insurance atmosphere, owners understand that architects cannot reasonably obtain the insurance to cover all their potential risk. These owners also aren't interested in the assets of the firm or their principals in the event of trouble. While these claims coming through owners may not be as frequent as third party claims, the dollar volume represents a very high percentage of claims paid.

We have also been successful in getting contractors to limit actions against the architect if the contractor is allowed to preserve his remedy against the owner. This kind of clause is very effective to prevent the architect from being used by the contractor when the contractor's dispute is really with the owner.
Paul M. Lurie
Lurie Sklar & Simon
Attorneys and Counselors
Chicago, Ill.

Revival of Confidence
As a long time reader, starting with *Pencil Points* during the 1920's, I have continued to receive *Progressive Architecture.*

Some issues have caused me to doubt if the traditions of *Pencil Points* as a professional journal have been abandoned.

Your November 1985 issue is a great production. You have convinced me that you publish a fine architectural publication without a collection of buildings that cause visual discomfort.
Albert Melniker, AIA
Albert Melniker & Associates
Staten Island, N.Y.

TV City Symbolism
My four-year-old daughter Lisa's reaction to the photograph of Helmut Jahn's proposal for Trump's TV City (P/A, Jan. 1985, p. 25):

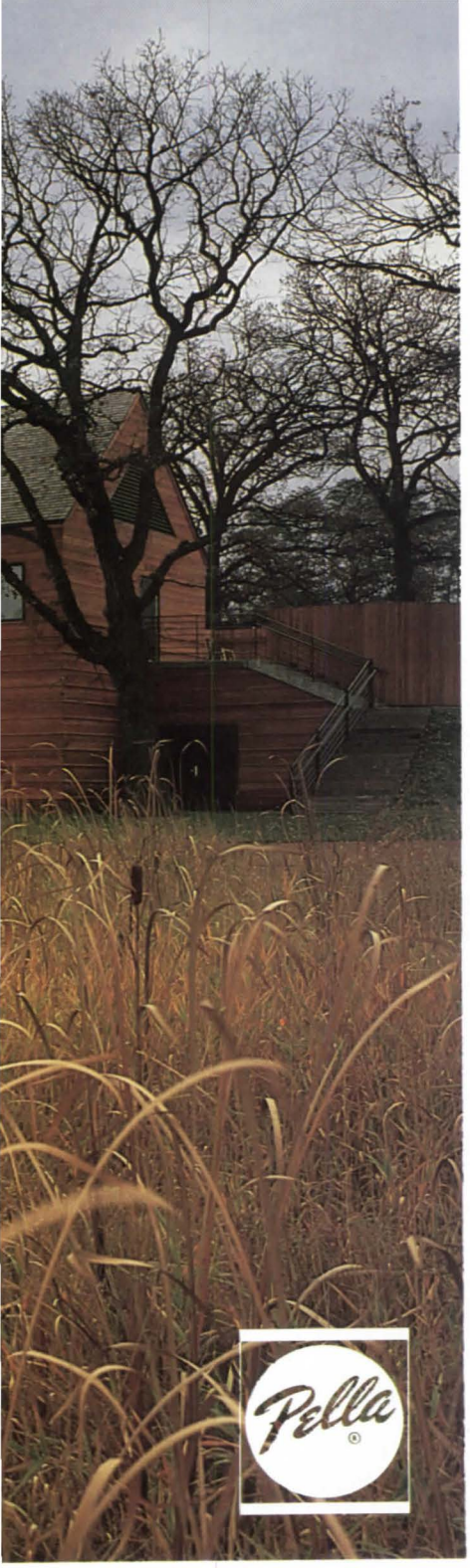
"Look Daddy, a menorah!"
Leon Goldenberg
Cleveland, Ohio

Madison Square Garden clarification
Some of us at P/A knew well that the site of the new mixed-use development in Manhattan by S.O.M. (P/A, Dec. 1985, page 38) was not the "original Madison Square Garden site," but merely the site of a previous arena of that name. A letter from Howard N. Wallick of Brooklyn, a graduate student in the Columbia University School of Architecture, points out that this land at Eighth Ave. and 50th St. was occupied by the *third* M.S.G. from 1925 to 1968. The first two (1879 and 1890) were on Madison Square, at Fifth Avenue and 26th St. The fourth, current "garden" is at Eighth Ave. and 33rd St., above what remains of Penn Station. There is now talk of replacing that one on yet another site.

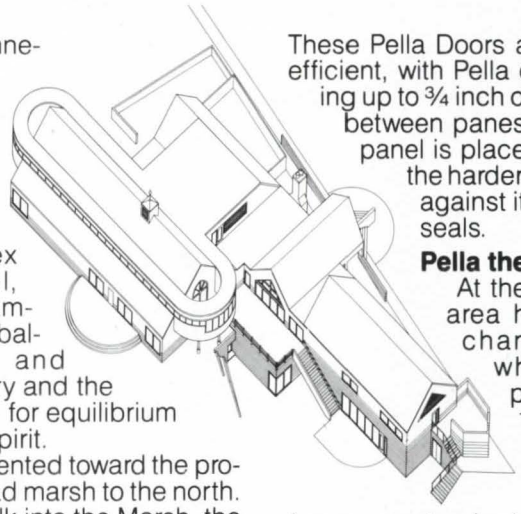
TV City Site: Credit Correction
P/A's News Report article on Donald Trump's Television City proposal for Manhattan's West Side (Jan. 1986, p. 25) did not give accurate credits for the previous scheme, known as Lincoln West. Planners for that proposal were Gruzen/Vinoly, a joint venture of The Gruzen Partnership and Rafael Vinoly. Individually, those two firms were among the New York architects working on individual parcels before the site was sold to Trump. Peter Samton of The Gruzen Partnership reminds us that Donald Trump made a proposal for this site in 1977, envisioning more than 5000 middle-income apartments, on which the Gruzen firm was associated.

Photo credit correction
The photo of Evanston Public Works (P/A, Jan. 1986, p. 143) was the work of Barbara Karant, Karant & Associates, Photography, Inc.

Credit extension
Jeffrey Heller was partner in charge for the Galaxy Theater in San Francisco (P/A, Dec. 1985, pp. 88–89), Kaplan/McLaughlin/Diaz, architects.



The Marsh finds a center of balance on a challenging site. And Pella Windows and Doors prove physically fit.



The Marsh™ in Minnetonka, Minnesota, is called "A Center for Balance and Fitness." And everything about the building reflects this theme. In this unusually complex project, Hammel, Green and Abrahamson have created a balance of action and reflection, the solitary and the communal, a center for equilibrium of body, mind and spirit.

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A major shaper of the building was the site, wedged between a busy thoroughfare and the marsh below, and dotted with mature oaks. HGA designed the building around an existing house which was later razed to make room for the volleyball court. The site also had to accommodate an outdoor running track and a children's play area.

The indoor running track, which lends such character to the exterior, was actually added late in the program. A ribbon of Pella Awning Windows at eye level gives the relatively narrow track the feel of an outdoor space, especially with the windows open. As for maintenance, Pella Awning and Casement Windows at the Marsh are easily washed from indoors.

Pella doors used as windows.

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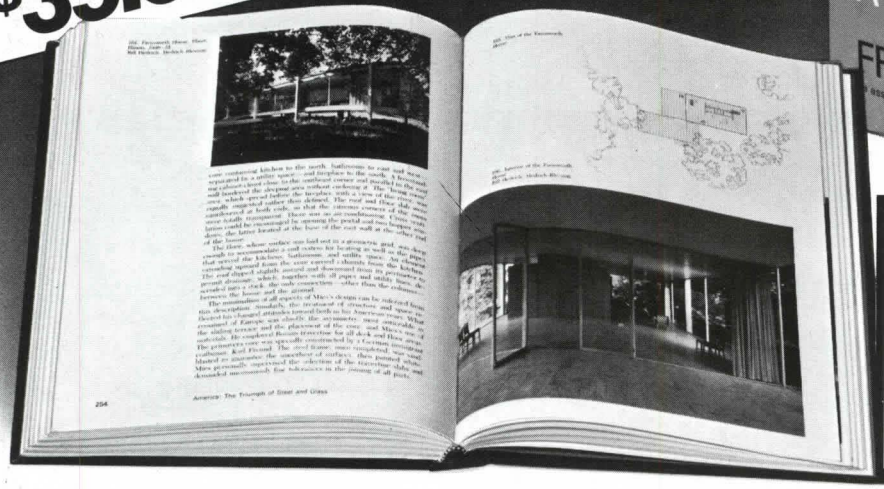
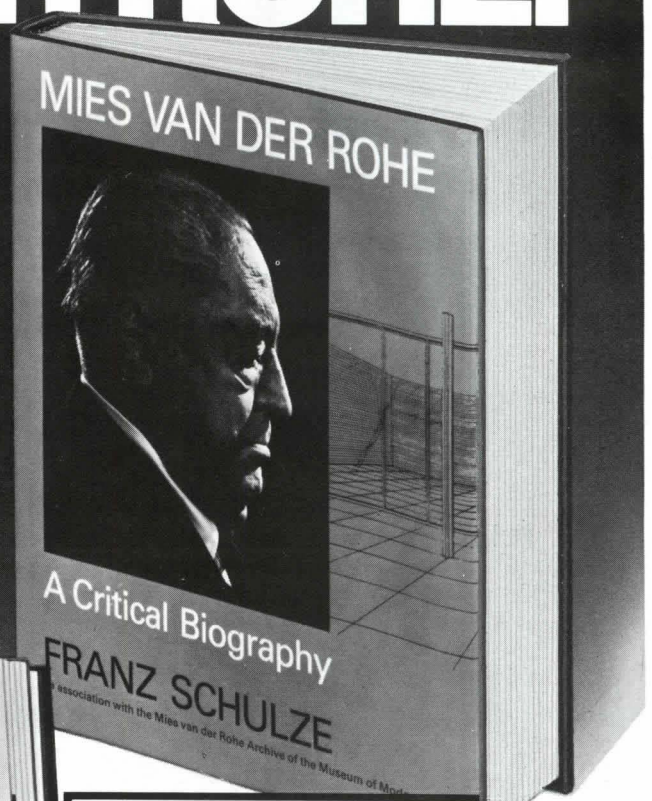




"Franz Schulze's biography is a herculean effort to present Mies' work in terms of both character and context. The substance is impressive."

—The New York Times Book Review

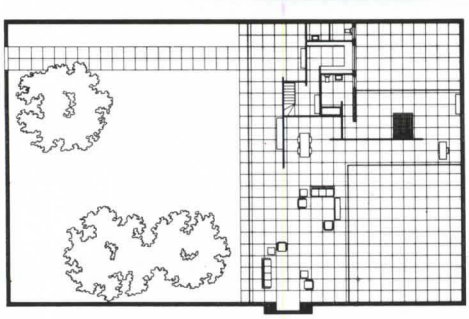
Few names figure more prominently in the pantheon of 20th century architects than that of Mies van der Rohe. More than an architect and designer, Mies was a great thinker whose rational approach profoundly influenced his age.

In this critical assessment, Schulze answers the most important questions pertaining to Mies and his development as a designer—to his eventual impact on the arts of our time. He reveals a fascinating image of the man behind the legend—not merely a cool rationalist but a complex artist, a brilliant and vexing thinker, and a thoroughly enthralling human being.

Franz Schulze has written a first-rate book. To enumerate its strengths is to make a checklist of virtually ever page. From now on, anyone interested in Mies will have to begin with Schulze."—*Christian F. Otto, Department of Architecture, Cornell University*

Schulze has compiled an authoritative and valuable portrait that examines: ■ *Aachen:* Youth in Imperial Germany, 1886–1905 ■ *Berlin:* Problems of a New Century, 1905–1918 ■ *Europe Out of the Ashes:* Response to the Modernist Challenge, 1919–1925 ■ *Weimar at the Flood:* 1925–1929 ■ Depression, Collectivization and the Crisis of Art, 1929–1936 ■ *Departure and Flight,* 1936–1938 ■ *Revival:* Modernism without Utopia, 1938–1949 ■ *America:* The Triumph of Steel and Glass, 1949–1958 ■ *Recessional,* 1958–1969

219 black-and-white photographs are included of drawings, plans, models, and buildings—many of which have never been published before. These together with an intriguing text give life to the man and illuminate the refinement and subtlety of his art.



Plan and elevation of the House with Three Courts project. About 1934 (studio drawing c. 1939)

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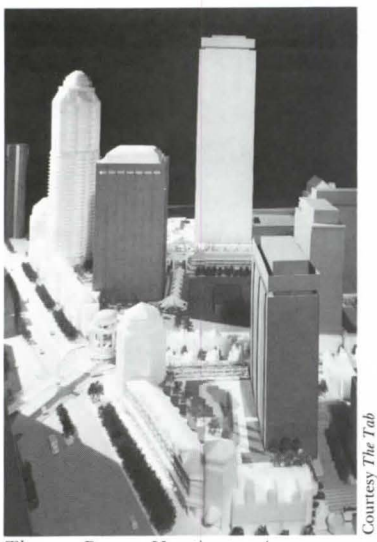
P/A News Report



Courtesy *The Tab*

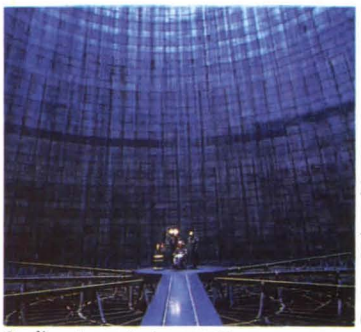
The new Pru on Huntington Ave.

Prudential Makeover

Months after lighting a candle for its 20th birthday, the builders of Boston's first highrise complex began to make plans grafting a new design onto the old. The Prudential Life Insurance Company commissioned HOK, St. Louis, to reconstruct or reorganize its 32-acre site and add half again the square footage.

Although the $500 million plan has emerged only gradually in a fog of partial presentations, some subsequently retracted, the model and all statements by the client this winter disown the present Pru, "a windy world of its own," in the words of historian Walter Muir Whitehill. Built on the old railroad yards between the South End and Back Bay, the Prudential complex, begun in 1959, was the city's attempt to lure developers downtown when downtown was

(continued on page 25)



Courtesy Universal Studios

Cooling-tower torture room.

Brazil: The architecture

Much has been written about the movie *Brazil,* and the notorious battle, involving director Terry Gilliam, producer Arnon Milchan, and Universal Studios, the film's American distributor, over its release—a story that seems to have ended happily all around: the film drew Oscar nominations for best art direction and best original screenplay. But film-in-

(continued on page 22)

Sharon Lee Ryder

Filming "Pride of Place" in New York City.

Pride of Place: Addressing the Dilettante

Two years or more in the making, Robert Stern's TV series airs in eight weekly segments this spring, starting March 24 on PBS (March 29 in New York). "Pride of Place: Building the American Dream" was funded by Mobil, directed by Murray Grigor, whose "Architecture of Frank Lloyd Wright" won a Silver Medal in the N.Y. International Film and TV Festival, and produced by Malone Gill Productions, whose extensive credentials include "The Ascent of Man" with Jacob Bronowski, "Civilization" with Kenneth Clark, and "Cosmos" with Carl Sagan. As is customary for this type of TV series, the show is accompanied by a book (Houghton Mifflin, publisher) that both

(continued on page 23)

Venturi Gets the National Gallery

Robert Venturi of Venturi, Rauch & Scott Brown, Philadelphia, has been selected to design the extension to the National Gallery on London's Trafalgar Square. Venturi was chosen from a short list of six architects, including American Henry Cobb of I.M. Pei & Partners; and British architects James Stirling, Michael Wilford & Associates; Colquhoun & Miller; Piers Gough of Campbell, Zogolovitch, Wilkinson & Gough; and Jeremy Dixon and William Jack, Building Design Partnership.

The Gallery commission has been the object of constant controversy and curiosity since 1981 when the British firm Ahrends Burton & Koralek won an architectural competition with a mainstream modern design. Despite subsequent revisions, the style and size of their addition remained a lightning rod for critics of all colors, including Prince Charles, who departed from royal protocol to characterize the scheme as a "monstrous carbuncle on the face of a much-loved friend."

When the Sainsbury family, supermarket magnates, donated $35 million to the National Gallery last year, the trustees took the opportunity to abandon the ABK design and start afresh. While their original program called for office construction to pay for the museum expansion, the post-Sainsbury program is all museum, with temporary and permanent gallery space, a new public entrance, restaurant and sales shop, together with substantial renovation of the venerable 1838 Gallery designed by William Wilkins.

While all six finalists were asked to prepare preliminary sketches for the extension, Venturi's scheme is not to be made public at this time. (The other architects are free to release theirs.) Gallery trustees emphasize that this time around they've selected an architect, not a building. ***Daralice D. Boles*** ■

Pencil Points

The City of Charleston, S.C., **plans a competition for an aquarium and visitor facility. Five architectural teams selected on the basis of qualifications will compete in a charrette on site. Contact Jonathan Barnett, Professional Advisor, Design Competition, Department of Planning and Urban Development, 116 Meeting St., Charleston, S.C. 29401 (803) 577-6970, ext. 325. Deadline for qualifications is April 18.**

The Metropolitan Club **is the latest New York institution stricken with St. Bart's syndrome (P/A, March 1984, p. 19). Club officials are considering a deal with developer George Klein's Park Tower Realty Corporation for an apartment tower to be built over the classical Fifth Avenue clubhouse, a designated landmark designed in 1893 by McKim Mead & White.**

Kaplan/McLaughlin/Diaz, **San Francisco, have been commissioned to develop an urban design plan for the revitalization of downtown Sacramento, Calif., focusing on the city's CBD.**

South Ferry Plaza sponsor, **the Public Development Corporation of New York, has responded to criticism of the public review process for the project by appointing an advisory panel. New York architects Jonathan Barnett, Theodore Liebman, Peter Samton, Terrance Williams, and planner Michael Zisser will study architectural and planning issues relating to the controversial development proposed for the foot of Manhattan (P/A, Dec. 1985, p. 21).**

Arts + Architecture **has temporarily ceased publication. The California-based bimonthly, published from 1911 to 1967, was revived in 1981 as a nonprofit corporation. Editor Barbara Goldstein is now actively seeking private investors.**

Inigo Jones's Queen's House **at Greenwich is being restored. A key work in the introduction of Palladian architecture to England, the 1616 villa is now part of the National Maritime Museum.**

Walt Disney Productions **plans to build a $1 billion EuroDisneyland theme park/resort complex in Marne-la-Vallée, east of Paris.**

Courtesy Universal Studios

Architecture as set design: Bofill's Espaces d'Abraxas.

Brazil *(continued from page 21)*
dustry lore aside, *Brazil* will be remembered for its design, which not only enchants with its fantastic imagery and wealth of minutely observed detail, but which also offers a wickedly funny commentary on 20th-Century architecture. Gilliam, the British Monty Python group's sole American (he created the outrageous animation in their films and TV series), turns his interested but skeptical eye on architecture in *Brazil* to produce a wonderfully skewed vision of the built world that perfectly suits (and sets) the mood of this "post-Orwellian" black comedy about a minor bureaucrat who runs afoul of Big Brother.

The movie offers a vision of the future as the past: "Everywhere in the 20th Century all at one time," according to Gilliam, whose skillful hybrids of new and old and of real and unreal "make the familiar unfamiliar." The totalitarian state's torture room is actually the interior of a 250-foot-high cooling tower at the Croydon Power Station in South London. The privileged classes dine at an elegant restaurant—in reality the central hall of Mentmore, the Rothschild estate in Buckinghamshire. The film's hero lives in a Post-Modern housing block that turns out to be Ricardo Bofill's Espaces d'Abraxas (P/A, Oct. 1982, pp. 74–79), in Marne-la-Vallée, France. (Gilliam calls the project "extraordinary; it *looks* like a set. I found it fascinating but also dehumanized.")

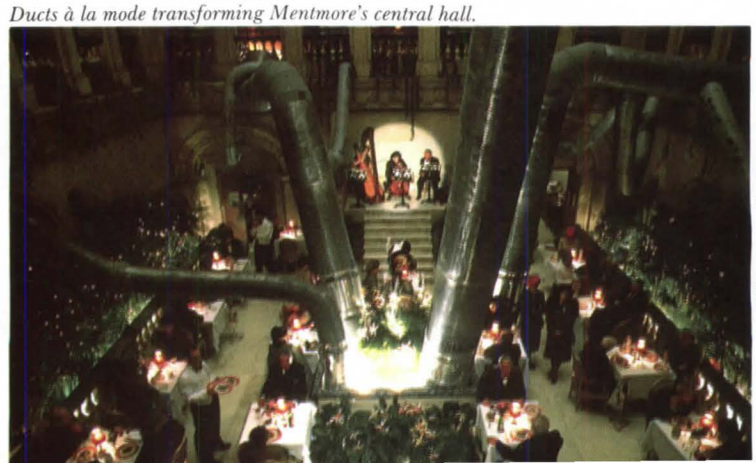
Inside these buildings, Gilliam presents his view of the world as a "mixed technology." Giant ducts ("in decorator colors to suit your demanding taste") snake through every interior, from the lowest clerical office to the grandest living room. Glass block finds its way into every scene in the movie, in a hilarious send-up of the now-ubiquitous building material. Everything in the production, which was designed by Norman Garwood and art directed by John Beard and Keith Pain, seems to have come from a garage sale—the atmosphere is *1984,* but the look is more like 1948.

Gilliam's gift for animation creates a memorable scene in which the hero, flying in a dream over a bucolic landscape, sees the green earth torn apart by giant brick monoliths that spring up to form "an instant Manhattan." Behind the bland anonymity of paneled walls, an HVAC system malfunctions, becoming a breathing, rumbling beast, reflecting Gilliam's fondness for "taking things that we take for granted and turning them inside out."

Gilliam, who once wanted to be an architect, spent a summer of his youth working for a large West Coast firm, but quickly grew frustrated at "seeing so many great ideas compromised." Granted, Gilliam's film architecture has none of the constraints of real buildings, but that's precisely why he only "builds" on-screen: he knows, better than many architects, the difference between fantasy and reality.

Pilar Viladas ■

Ducts à la mode transforming Mentmore's central hall.



Courtesy Universal Studios

Courtesy Universal Studios

Photos: Wolfgang Hoyt © Esto

Pelli and Armajani collaborate on a cap for Yerba Buena.

Topping Off Yerba Buena

Barring an unimproved market for office space, Yerba Buena Gardens, San Francisco's long-running downtown redevelopment project, will soon have a 750,000-square-foot office building designed by Cesar Pelli & Associates, which is to begin construction next year. The 30-story building, fronting on Market Street and closing the Grant Avenue vista from the north, will occupy the eastern end of the three-block project master-planned by Zeidler Roberts.

Plans show a ground-level public lobby and retail area, which extends into the adjacent galleria, intended as the main entrance into Yerba Buena Gardens itself. The tower will rise to the official 400-foot height limit as finished space. Above that, its nonfunctional top will rise another 127 feet, or 12 stories.

Pelli has collaborated with artist Siah Armajani on the building top, a sculptural tour-de-force of steel pipes painted white with green for emphasis. (The two joined forces with sculptor Scott Burton and landscape architect Paul Friedberg for the Battery Park City esplanade in New York.) The tower's rectilinear, open-work top composes and recomposes, pulls apart and comes together, depending on the point of view.

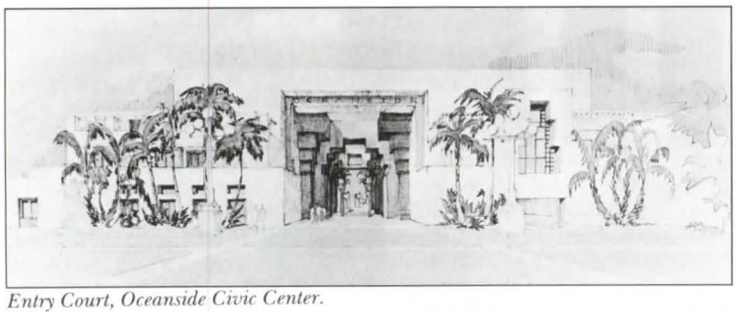
Pelli and Armajani are at pains to point out that this is no "hat," but rather an integrated part of the building that visually sinks its teeth into the floors below by means of steel members running down the walls. The walls themselves will be a creamy beige that Pelli considers the color of San Francisco. The massing also echoes the fine grain of the downtown buildings in its use of traditional bay windows.

The Redevelopment Agency has approved the schematic design, and design development will proceed through July. Restudy and refinement may subtly change the design; but major alterations are unlikely.
Sally Woodbridge ■

Oceanside Competition

Charles Moore/Urban Innovations Group of Los Angeles with Danielson Design Group of San Juan Capistrano have won a two-stage competition to design a Civic Center for Oceanside, Calif. Five architectural teams selected from a field of 12 semifinalists had competed for the commission: UIG/Danielson; Arquitectonica, Miami, with Friedson/Robbins, San Diego; ELS, Berkeley, with Winn/Cutri, San Diego; Heller Leake, San Francisco; and Kaplan/McLaughlin/Diaz, San Francisco.

The $15–20 million complex, which will house all city and harbor district offices, a library, and fire station, is planned for a three-block downtown site. The winning design, selected by an 11-member jury consisting of 5 professionals and 6 community leaders, pays tribute to an existing Irving Gill building now used as the main fire station, which is to be restored and incorporated into the new plan. But, says Moore, their design is "beyond Gill. . . . It's Gill-like; spartan on the outside, and warm and gooey inside." The new 130,000-square-foot Civic Center, to be completed by 1988, Oceanside's Centennial year, is to be financed by redevelopment bonds. ■



Entry Court, Oceanside Civic Center.

Mobil

Stern with Philip Johnson at Hill-Stead, Riddle's home in Farmington, Conn.

Stern *(continued from page 21)*
amplifies and illustrates weekly episodes. This report is based upon the complete galleys for the book, due out March 17, and a screening of the first two episodes, all that were available as P/A went to press.

Stern has structured his series by subject so that each episode is a self-contained segment on campuses, dream houses, suburbs, resorts, interiors, skyscrapers, and cities. The first episode, entitled "The Search for a Usable Past," sets up his central theme, demonstrating through isolated examples from Thomas Jefferson's Monticello to Philip Johnson's Glass House and Michael Graves's San Juan Capistrano Library how American architects (and their clients) have struggled first to invent, then to defy, and finally to rediscover an authentic American past.

Stern is helped along in this endeavor by a series of guests, many of whom seem more at ease in front of a TV camera than does their host. A lively lecturer or audience provacateur, Stern is surprisingly stiff on the screen. Jacquelin Robertson fares better in a genuinely insightful dialogue with Stern at Monticello that delves into social history, considering, for example, Jefferson's ambiguous attitudes about slavery, as reflected in his servants' quarters. Philip Johnson, too, entertains with epithets on his cousin Theodate Pope Riddle, architect of Avon Old Farms School, Avon, Conn. ("She frightened me nearly to death") and his own constructions in New Canaan, Conn. ("all I wanted to do was to do a better house than Mies was doing.").

Other guests, however, are permitted to indulge in "architecture talk," sprinkling their commentary with buzz words and name-dropping. Johnson's quip that a desk in Riddle's study has "a top like certain buildings" may not need explanation given AT&T's widespread coverage in the general press. But can the average viewer be expected to understand Stanley Tigerman's exegesis on "rotated grids" and "housing typology" at the University of Illinois, Chicago Circle? Will he or she follow Charles Jencks's convoluted critique of IIT and its "temple of architecture"?

Just who is this series' average viewer anyway? Stern assumes a lot of his audience; he speaks of Mies van der Rohe and Le Corbusier by their familiar (to the profession) nicknames, cites "the Italian architect Palladio" while neglecting to mention his century. Passing references to Mies and Corb would matter less if they weren't the villains of the piece. Long identified in the architectural world as a major champion of the Post-Modern movement, Stern here attempts to popularize Post-Modern theory. Edited to terse TV text, however, the complex rise and demise of the Modern movement is at once oversimplified and yet ambiguous. Subtle distinctions are left unexplained, assertions unsubstantiated. Why, for example, is Johnson's Glass House praised and Mies's IIT excoriated? (Even architects will have trouble with that one.) What does Vincent Scully mean when he darkly remarks that the promulgators of the International Style had a "vested interest in incompetence"? Scully names no names, but will his audience know just who promoted the International Style and why?

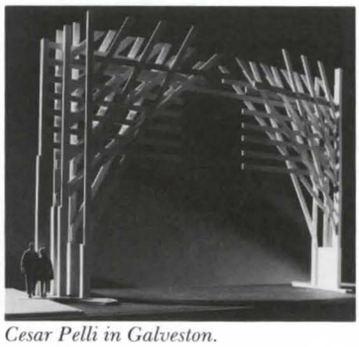
These are major flaws in an otherwise well-structured series aimed apparently at a culturally sophisticated, well-informed lay audience. Stern's overall vision is sweeping, his choices apt. His cameramen, confronted with a subject that doesn't move, move themselves, or Stern. Future episodes with special guests architect Morris Lapidus, critic Paul Goldberger, developer Gerald Hines, and others promise to entertain (and educate) laymen and architects alike.
Daralice D. Boles ■

George Heinrich

Ice Palace just prior to completion.

St. Paul's Palace

It's up; and by the time you read these words, it will be down, demolished within weeks for safety reasons. Ellerbe Associates' Ice Palace in St. Paul, Minn., snagged a P/A citation this year (P/A, Jan. 1986, pp. 98–99). Centerpiece of the city's annual Winter Carnival, this year's palace was to be the biggest ever. But the weather just would not cooperate; with construction delayed by warm temperatures, the completion date was extended from Jan. 22 to Feb. 6, and the planned 150-foot tower cut back to 127′-10″. There's some debate as to whether that still breaks the record, which stands at 125 feet or 132 feet depending on your source. Be that as it may, the $1.5 million ice sculpture, paid for by donations of money and time, earned plenty of national coverage. ■



Richard Payne

Cesar Pelli in Galveston.

Galveston Arched

Seven architects have donated their services to the city of Galveston, designing seven arches that span the streets of a mile-long section of Galveston's historic Strand district. Eugene Aubry, Helmut Jahn, Michael Graves, Charles Moore, Cesar Pelli, Boone Powell, and Stanley Tigerman participated. Their arches, unveiled in time for the 1986 Mardi Gras (Feb. 1–11), will remain on view through the state sesquicentennial celebrations in April. ■

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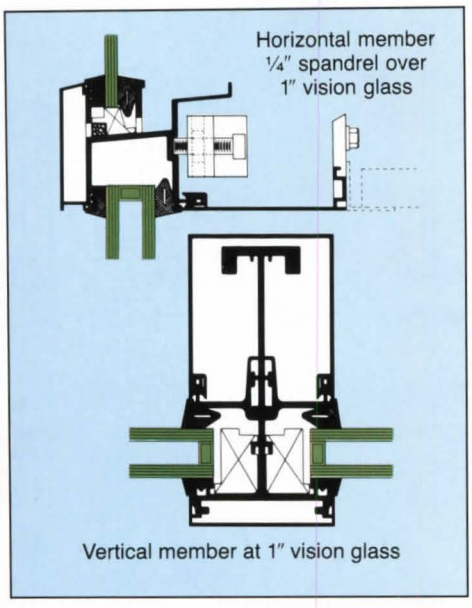

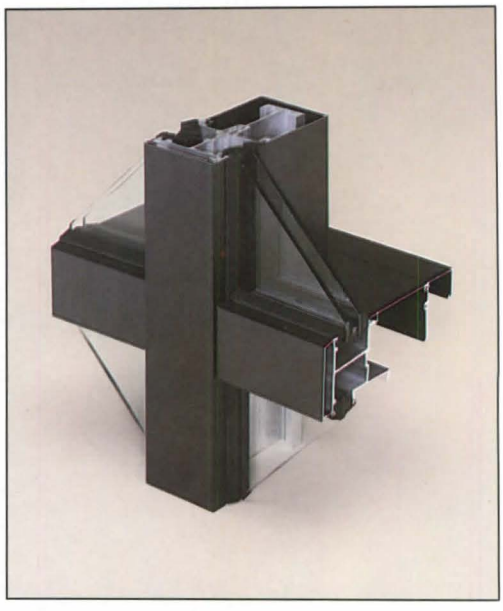

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China's new "open door" policy has attracted Western investment and with it Western architecture. The author examines a series of specific projects now under way or already completed, details some of the pitfalls for Western architects practicing in China, and examines the urban planning implications of China's massive development campaign.

Top to bottom: Sobel/Roth, World Trade Center; Portman, Shanghai Center; Hwang/3DI, Trade Tower.

Building in China: The Promise, The Problems

The landscape of the "new" China is one of dramatic modernization. Extensive new construction and urban development illustrate China's determination to become a major competitor in the world economy by the year 2000. New hotels and trade centers designed by Western architects symbolize the change in policy under Deng Xiaoping regarding once-forbidden Western influence.

Yet the new role of the West raises many questions. Are Western buildings appropriate models for future construction in China? Do imported designs provoke a loss of indigenous tradition and culture? As China charts its transition into a future with modern technology, can the fragile identity of the Chinese city be maintained?

In 1985, three proposed trade centers were announced in China. Together, they represent more than $800 million in foreign investment.The proposed heights of these projects —all high-rise, curtain-wall construction—would not draw attention in Manhattan, Houston, or Atlanta, but on their skylines they will be very prominent.

The centers are intended primarily for foreign use. The **China World Trade Center** in Beijing, to be completed in 1988, will be the largest complex to be built with foreign investment to date. The only American architectural firm invited by the Chinese government to participate in an international competition, Sobel/Roth, an international division of Emery Roth & Sons, New York, believe they were selected because of their experience with the World Trade Center in New York. Their center, which includes two hotels, an apartment complex, and a 40-story office tower, will be the tallest in Beijing when completed. This joint venture of the Kuok Brothers of Hong Kong and the China Economic and Trade Consultants Corporation represents $500 million in foreign investment. Nikken Sekkei Ltd., a Japanese firm, will prepare contract documents and supervise construction. Sobel/Roth now anticipate a second project in China—a condominium and office complex in Shanghai.

The **Shanghai Center,** a project of John Portman Companies, Atlanta, will be a multiuse facility including hotel, office, retail, and apartments. The tallest of three towers will be 48 stories. The center is financed by Portman Companies in joint venture with the American International Group and the Hong Kong-based CCIC Finance Ltd. Construction will be supervised by Kajima, a Japanese engineering and construction company. Completion date is set for 1988, although construction has not yet begun.

The **Trade Tower** complex, a project of Henry Hwang & Partners and 3D International, Houston, is also based on a mixed-use program. The complex will include the tallest building in China, at 62 stories. It is to be located 60 miles from Hong Kong on the trade fair grounds in Guangzhou (Canton), where much of China's foreign trade is conducted in April and October of each year.

Design Attitudes

These trade centers constitute the second major wave of Western architecture and development in China. Starting in 1977, the Chinese invited Western proposals primarily for hotels. The first hotels to be built in the new China—Becket's Great Wall Hotel, I.M. Pei's Fragrant Hills, and Clement Chen's Jianguo Hotel—illustrate three distinct design attitudes and their very different results.

The Great Wall Hotel in Beijing responded to the Chinese desire for a modern architecture expressive of advanced technology. When MacDonald Becket was host to a group of Chinese officials in the late 1970s, they pointed to the Dallas Hyatt (also

designed by Becket) as the model for the Great Wall Hotel. Like *Portman, Becket* acted as both developer and architect for his project. (The practice is common among architects working in China.) Becket's hotel, completed in 1983, is one of the most technically sophisticated buildings in China today. Becket says he argued with the Chinese that foreign visitors would want to see more traditional architectural features, and an attempt was made to include Chinese pavilions in the complex. The hotel's image on the Beijing horizon, however, is that of a Western reflective glass building. The hotel was the first curtain-wall structure in China, and fabricators Charmebel of Belgium used the project as a training ground for Chinese laborers.

I.M. Pei's Fragrant Hills Hotel offered an alternative approach, drawn from traditional Chinese architectural vocabulary and using local materials and details. Pei's building has impressed critics in China, but ironically, the Chinese, who initially selected the site, now criticize the hotel, which has not been as financially successful as originally anticipated because of its rural location northwest of Beijing. Since its opening in 1983, Fragrant Hills has suffered considerable deterioration, attributable to the inferior quality of building materials and to poor maintenance, both typical problems of recent construction in China. Nevertheless, Pei has given China a positive alternative model to consider.

Clement Chen, a Chinese-born American architect practicing in San Francisco, feels that contemporary architecture in China is "like a person who has been starving for a long time. He doesn't need a gourmet meal; he needs something that will nourish him." Chen's 1978 Jianguo Hotel, located near the heart of Beijing, is a modest but immensely popular project. Chen attributes its success in part to extensive training of the Chinese employees in hotel and restaurant management by a large staff of foreign hotel employees. Chen's hotel was the first joint venture undertaken by China with foreign investors, and many of the basic principles formed at that time continue to guide other joint-venture projects in China. Chen places the responsibility on the architect to make efficient use of available local resources. This sentiment has been echoed by other architects, concerned that China not be used as a showplace for Western architects.

Urban Renewal Revisited

While massive urban renewal has been discredited in the States, the Chinese remain dedicated to large-scale development. Shenzhen, a 372-square-kilometer special economic zone, is perhaps the single best example of change in China. Adjacent to Hong Kong and attempting to mirror its image, this district may become the model of Chinese cities in the future. Shenzhen has changed rapidly from a small agricultural village of 23,000 in 1979 to a boom town of 200,000 residents plus 200,000 commuters. Investment in Shenzhen comes primarily from Hong Kong. The largest number of joint-venture projects in China—812 out of a total of 3000—are located there. Some 50,000 housing units have been built in the past five years. The rapid pace of development has required the use of agricultural land for urban development and the displacement of villagers, who were compensated monetarily by the government.

As is already evident in Shenzhen, the Chinese government's enthusiastic push to modernize produces problems similar to those posed by urban renewal in the U.S. Nationwide, the government is attempting to meet chronic housing needs (one third of the Chinese population is underhoused) with mid-rise, high-density housing. Rapid building and repetitive design may result in both displacement and dissatisfaction. Massive road construction also threatens to destroy the traditional fabric of the Chinese city. The city wall of Beijing has been replaced by a ring road lined with repetitive, prefabricated concrete, multifamily housing structures. Some Chinese architects and planners call this "the new city wall." Across China, cities stand to lose unique qualities that cannot be recaptured or found elsewhere in the world, if careful planning on the local level is not made an integral part of the effort to improve and modernize. Lessons learned by Western architects in the Middle East in the 1960s and 1970s should be carefully considered in reference to China's contemporary development.

Issues of Practice

Practice in China for the Western architect entails more than design. Recent experiences highlight many atypical requirements, particularly large investments of time. Robert Sobel spent a year negotiating the China Trade Center in Beijing, and MacDonald Becket traveled to China thirty-three times in the course of building the Great Wall Hotel. A small group of Western architects have set up office in Beijing; however, those architects with only one project in China may not find this a feasible arrangement. Sobel/Roth, for example, completed all design work in their New York office. Some firms have also trained Chinese architects in their home offices during the course of a project.

The Chinese International Trade Investment Corporation, a state-owned firm, is the Chinese representative in most joint ventures. Most Western architectural commissions are negotiated through the China Ministry of Foreign Economic Affairs and Trade (MOFEAT) or the China Tourist Service. Frequent alterations and additional design requests are not unusual. The site for the Great Wall Hotel, for example, was changed three times.

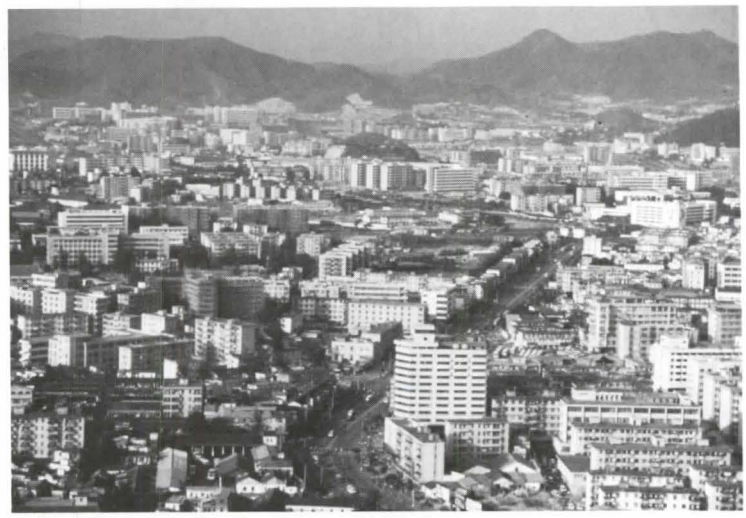
Although abundant, unskilled labor requires training and an added investment of time. Many architects criticize Chinese workmanship as uneven. All the projects mentioned above involve a nearly 100 percent Chinese labor force with foreign craftsmen brought in on a trade-by-trade basis to train and supervise. Local labor costs to the developer are routinely increased artificially by the Chinese government, although the laborer himself is not actually paid more for work on these projects.

Many of the materials typically specified by Western architects are not available in China. All mechanical equipment must be imported. Transporting materials within China can greatly affect a project's construction schedule (the Great Wall Hotel ran approximately eight months behind schedule, primarily due to lag in material delivery).

Technology Transfer

The introduction of American production facilities in China may provide better access to building materials. For example, glass products in China are very scarce and not of high quality. PPG Industries will open a production facility in late 1987 in Shekou, a Chinese enterprise zone near Hong Kong. The facility will meet new demands for architectural glass in China as well as throughout the Far East.

Japan, with its production capacity and proximity to China, already supplies building materials, technical assistance in developing working drawings, and construction personnel. Japanese design/build firms such as Shimizu or Takenaka are actively seeking projects in China. Currently, Japanese trade with China is three times that of the U.S., although the Chinese criticize a lack of willingness on the part of the Japanese to share



Gary Hack

Becket Companies

Susan Stueb ing

Top: the city of Shenzhen; left: Becket, Great Wall Hotel; above: Pei, Fragrant Hills Hotel.

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technical expertise.

Training in planning and architecture is perhaps as important for the Chinese in the long run as is the transfer of technology. According to Gary Hack, chairman of urban studies and planning at MIT, who recently taught a studio in urban design at Qinghua University, Beijing, and was a keynote speaker at a mayors' conference on planning in China, "Planning as we know it does not exist in China." Professor Hack explains that the routine tools of urban planning—predictive skills, systems of control, and regulation—are not taught in China. Ideological precedent or pragmatic allocations have been the planning guidelines to date. The absence of adequate economic and distribution forecasts has aggravated overcrowding and traffic congestion, two major problems in Chinese cities today.

Deng Xiaoping's new policies, such as the allocation of land to the free market and to Western joint venture or other non-government building projects, have brought new pressures to bear on The Ministry of Urban and Rural Development. The government is considering the development of new planning programs in the schools; however, the educators themselves must first be trained to teach planning, and a number have been sent to study at American universities. Increasing the number of students educated in architecture is also a top priority. Because of the high demand for architects, students in China work on real projects, not hypothetical programs, while in school. Use of CADD systems could also compensate for the shortage of trained architects, particularly for large, repetitive housing developments.

Some critics feel that the Chinese architecture schools must identify a specifically Chinese character of modern building. Professor Hack suggests that much of historic Chinese architecture was an architecture of the elite, and suggests that contemporary architecture in China find expression "in the spirit of the past," rather than in a literal replication of it. Western models should be evaluated with this broad goal in mind. ***Susan Stuebing*** ■

The author is a graduate student in architecture at MIT. She studied at Qinghua University in Beijing last summer as part of an academic exchange arranged by the MIT East Asian Architecture Program.

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Report from Hong Kong

Hong Kong's experience with public housing runs counter to current ideas about such housing in the West. This article examines why Hong Kong has succeeded where the West has failed.

Housing Lessons in Hong Kong

Public housing, according to its critics in the United States and Britain, breeds crime, stigmatizes the poor, and strains limited government funds. Yet Hong Kong, a British territory, proves just the opposite. Its public housing accounts for a third of the government's annual expenditure, accommodates almost half the population, and suffers very little crime or vandalism, though the housing is similar in form to that which, in the West, has been blamed for encouraging criminal activity.

The question of why Hong Kong has succeeded where so many have failed finds no simple answer. The territory's public housing program began in 1954 when, over the course of one year, fires in squatter settlements left over 100,000 people homeless. The Hong Kong government first placed the homeless in temporary shelters, and then in six- and seven-story walkup housing blocks made of concrete and set in narrow rows. Those blocks offered each family one 81-square-foot room, space on the public balcony for cooking, and common latrines and water taps on each floor. In a few years, the government built 140 such blocks, each containing 384 housing units.

That large volume of public housing construction continues in Hong Kong today, with the government building about 40,000 units a year, most of those in new towns constructed in outlying valleys and connected to the city by trains and highways. What has changed since the 1950s is the quality of the housing. Instead of 81 square feet per family, unit sizes now range from 320 to 540 square feet, with separate bedrooms or sleeping alcoves. Instead of communal toilets and cooking balconies, the unit have private toilets and kitchens and private balconies for washing and drying clothes. Instead of narrow rows of repetitive blocks with few social or recreational facilities, the typical housing estates have a variety of high-rise block types arranged around recreational space, adjacent to schools, community buildings, shopping malls, and markets often built by the government.

Much of the recent public housing construction in Hong Kong has occurred in the new towns (top) or in urban locations as a replacement for the housing built in the 1950s (middle). The government provides temporary housing for people waiting for permanent units (bottom).

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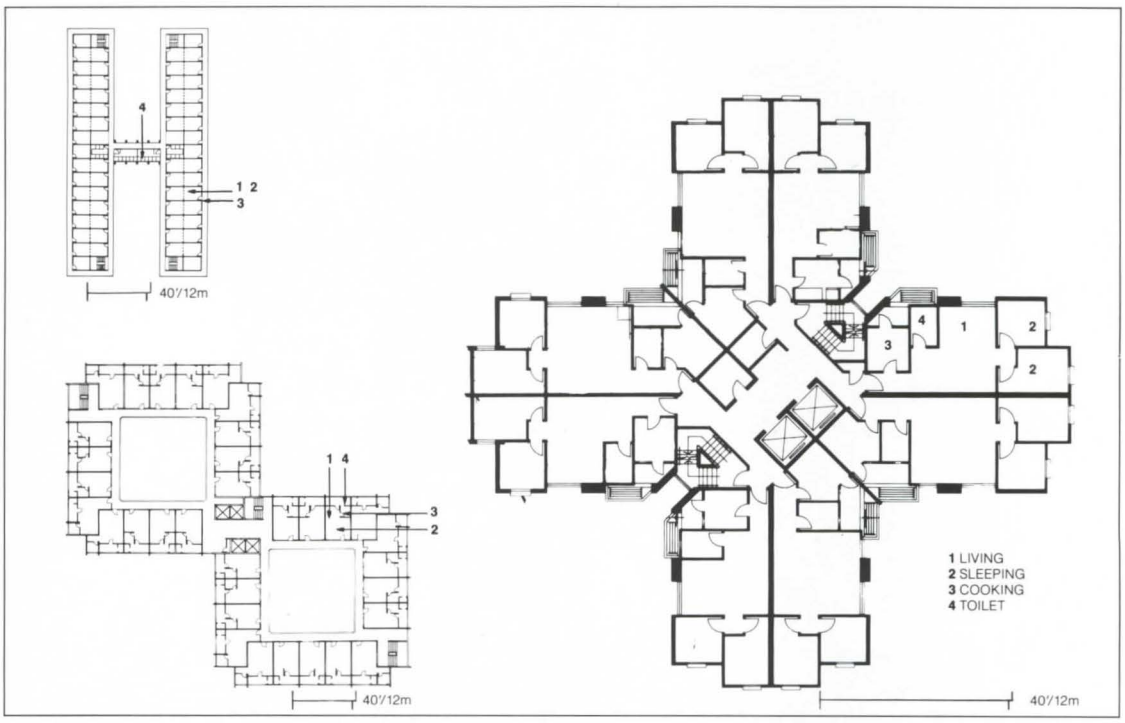
In light of our own experience, Hong Kong's public housing shouldn't succeed; it shouldn't be so well liked and cared for by its inhabitants. In the West, current wisdom holds that we should avoid putting families in high-rise structures or placing them in relatively small apartments. Other taboos—spreading "nondefensible" open areas among buildings or concentrating subsidized units in large projects—also are common practice in Hong Kong.

That those arrangements work in Hong Kong certainly has a lot to do with the people. Most public housing residents have come from worse accommodations in China or in Hong Kong's squatter settlements; for them, the housing, however minimal, constitutes a vast improvement in living conditions. Most residents also have gainful employment, so that public housing becomes but a first step up the economic ladder.

The large number of people living in public housing (expected to be about 70 percent of the population in ten years) helps reduce any stigma attached to subsidized projects. And the relatively low incidence of vandalism and violent crime in the larger society helps reduce its incidence in the housing estates.

But attributing all the success of public housing in Hong Kong to its residents minimizes other factors that have contributed to its success. Chief among them is tenant management. The housing authority employs large numbers of resident managers who know the inhabitants personally, who can respond quickly to their needs, and who are responsible for collecting rents and helping people get needed social services. Even in the squatter settlements, managers conduct daily patrols to help people



The earliest Hong Kong housing (top left) had communal toilets and one room per family. Later housing (bottom left) had larger units with separate kitchens and toilets. The housing now going up (above) is the first to separate living rooms from bedrooms.

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deal with personal problems as well as to remove any new construction that might have occurred overnight.

The housing authority also has established a home ownership scheme, offering units for sale at cost to residents. That program greatly benefits lower-middle-income families who could otherwise not afford to buy a flat. It also brings greater stability to the housing estates by varying the economic mix and increasing residence longevity. Regardless of cultural differences, people care more for property they own rather than rent.

The same result occurs when residents make their own improvements to their housing. When handed over to a new occupant, the typical public housing unit in Hong Kong has bare concrete floors, walls, and ceilings and only the basic bathroom and kitchen fixtures. That not only reduces the cost of housing, but allows people to personalize units that most hope one day to own. The extent and quality of tenant improvements—partitioning off rooms, laying elaborate tiled floors, adding cabinets—proves the success of that strategy.

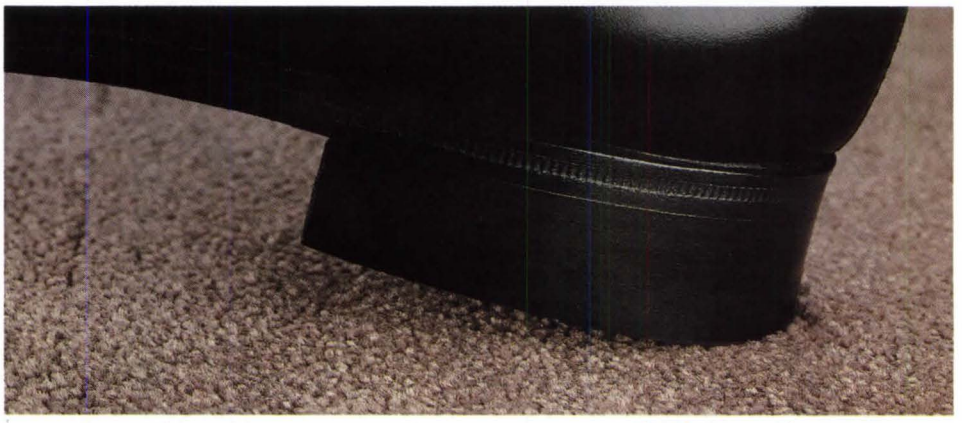
The newest public housing in Hong Kong is as tall as 35 stories (top left), and incorporates elaborate recreation buildings (top), shopping malls (above), schools, playgrounds, and a number of other public facilities, all built by the government.

The housing authority further involves people in the care of the larger housing estates. It organizes tenant groups in each building to deal with such problems as security and cleanliness and encourages tenant improvements to the grounds, such as stocking the fish ponds or caring for plants.

What can we, in the West, learn from the success of Hong Kong's public housing? Some factors, such as the respect for authority and hard work among Chinese people, are not easily transferred to the West. Other factors, such as the personalized management of housing, are. Reducing the anonymity of management, increasing the involvement of residents in the operation and maintenance of their buildings, encouraging people to improve and eventually buy their units—such efforts can make life in public housing much more tolerable, regardless of its location.

What is perhaps most surprising about Hong Kong's experience is that the very housing types we, in the West, find unworkable, work there. Similar buildings, obviously, do not elicit similar behavior. While that proves that other factors—social, cultural, and economic—play a vitally important role in people's response to public housing, it prompts us to qualify our condemnation of high-rise, large-scale housing projects. Given changing circumstances, what works in Hong Kong might one day work here. ***Thomas Fisher*** ■

Finally, carpet tiles



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P/A Calendar

Kentucky Dam, TVA Architecture, National Building Museum, through May 25.

Exhibits

Through March 23
About Place: Contemporary American Landscape. Institute for Art and Urban Resources, P.S. 1, Long Island City, New York.

Through March 28
Werner Seligmann: Recent Work. Gund Hall Gallery, Harvard Graduate School of Design, Cambridge, Mass.

Through March 29
Louis Sullivan: Stencils and Terracottas. Max Protetch Gallery, New York.

Through March 30
New Public Architecture: Recent Projects by Fumihiko Maki and Arata Isozaki. San Francisco Museum of Modern Art.

Through April 1
1986 Design Council Awards. Design Centre, London.

Through April 6
Oskar Schlemmer. Baltimore Museum of Art.

Through April 6
The Architect and the British Country House. Octagon Museum, Washington, D.C.

Through April 13
Memphis/Milano. Cooper-Hewitt Museum, New York.

Through April 15
Mies van der Rohe Centennial Exhibition. Museum of Modern Art, New York.

Through April 27
Naum Gabo: Sixty Years of Constructivism. Solomon R. Guggenheim Museum, New York.

Through May 25
Built for the People of the United States: 50 Years of TVA Architecture. National Building Museum, Washington, D.C.

Through June 30
Dwellings of West Africa. Lowie Museum of Anthropology, Berkeley, Calif.

Through September 30
The Great World's Fairs and Expositions, 1851–1939. Miami-Dade Community College, Miami.

April 20–July 20
Tokyo: Form and Spirit. Walker Art Center, Minneapolis.

Competitions

March 31
Nomination deadline, Changing Light: 6th Annual Arango International Design Exhibition. Contact Arango Design Foundation, 3235 McDonald St., Coconut Grove, Fla. 33133 (305) 661-4229.

May 2
Deadline, Industrial Design Excellence Awards, IDEA 86. Contact IDEA 86, Industrial Designers Society of America, 1360 Beverly Road, Suite 303, McLean, Va. 22101-3671.

May 31
Deadline for First Stage entries, Pershing Square Design Competition. Contact Professional Advisor, 523 W. Sixth St., Suite 200, Los Angeles, Calif. 90014 (213) 624-5115.

June 4
Entry deadline, Project DARE (Designing for Area Resource Efficiency). Contact Rebecca Cobos, Dept. of Resource Management, 3000 IH 35 South, Fountain Park Plaza I, Austin, Texas 78704 (512) 441-9240.

June 6
Postmark deadline, 10th Annual Halo Lighting Awards. Contact The Hanlen Organization, 401 North Michigan Ave., Chicago, Ill. 60611 (312) 222-1060.

Conferences

March 13–14
Affordable Housing Workshop. Hyatt Islandia, San Diego. Contact American Institute of Certified Planners, 1776 Massachusetts Ave., N.W., Washington, D.C. 20036.

March 16–20
Jerusalem as a Laboratory: International Workshop on Heritage and Conservation. Laromme Hotel, Jerusalem. Contact International Workshop on Heritage and Conservation, Organizing Committee, % Atzeret Ltd., P.O. Box 3888, 91037 Jerusalem, Israel.

March 19–21
West Week: Art, Technology & Design. Pacific Design Center, Los Angeles. Contact Jim Goodwin, PDC, 8687 Melrose Ave., Los Angeles, Calif. 90069 (213) 657-0800.

April 10–13
Incontri Venezia: Fabrics for Furnishing. Hotel Excelsior, Venice. Contact Editori Creatori SRL, Sede Legale, Villa Belinzaghi, 11012 Cernobbio, Italy.

April 13–15
Frank Lloyd Wright and Contemporary Architecture. College of Architecture and Planning, The University of Michigan, Ann Arbor. Contact the Conference Department, University of Michigan, 200 Hill Street, Ann Arbor, Mich. 48104.

April 30–May 2
Capital Design Week Spring. Washington Design Center. Contact Francie Kavanaugh, WDC, 300 D Street, S.W., Washington, D.C. 20024 (202) 554-5053.

May 3–6
Pan-Pacific Lighting Exposition. DataMart, San Francisco. Contact Andrea Hoppe, Conference Director, 2 Henry Adams St., San Francisco, Calif. 94103.

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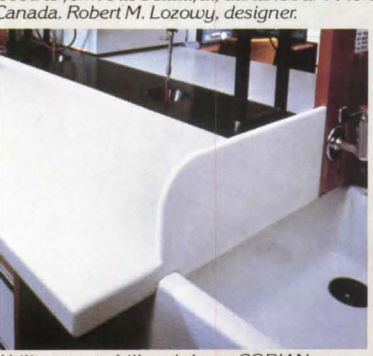

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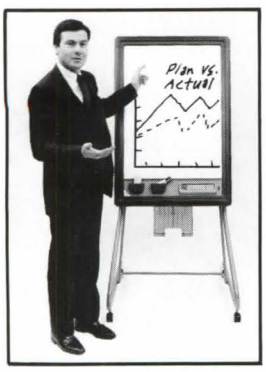

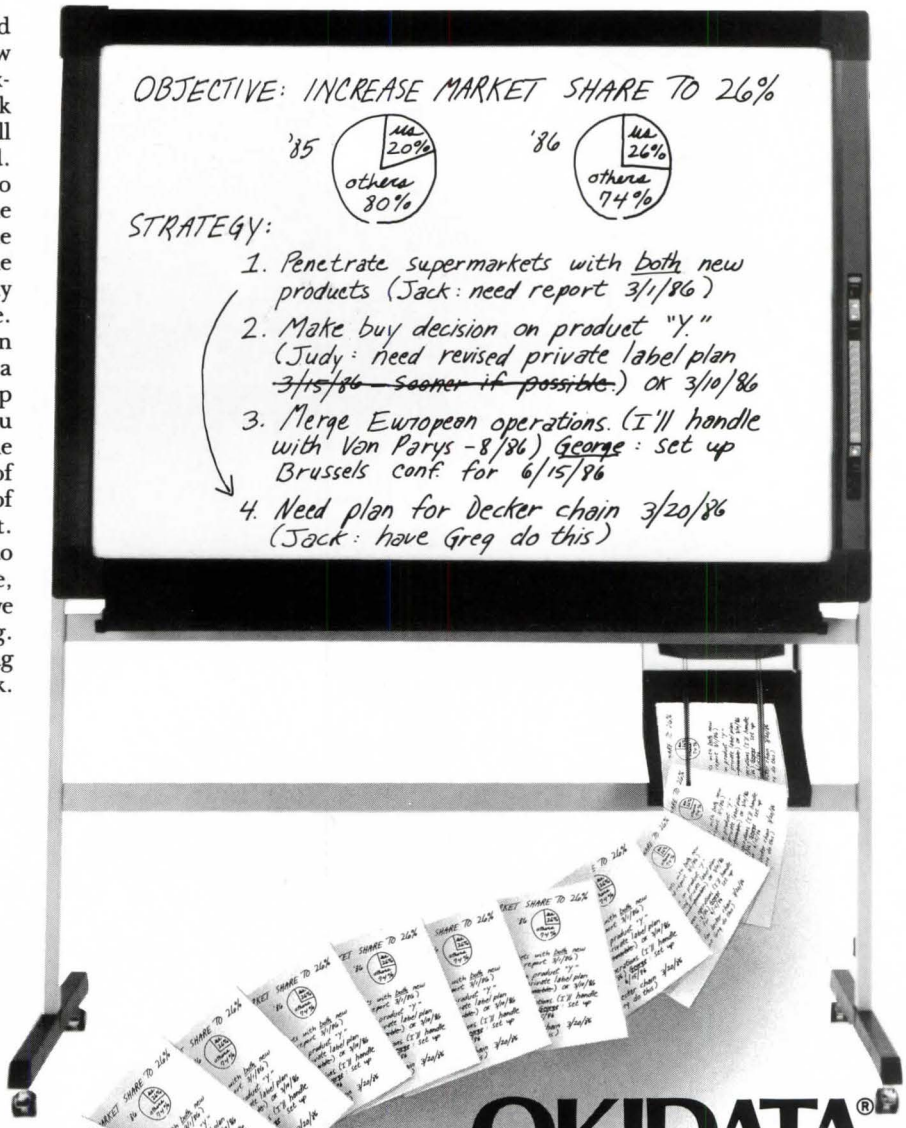

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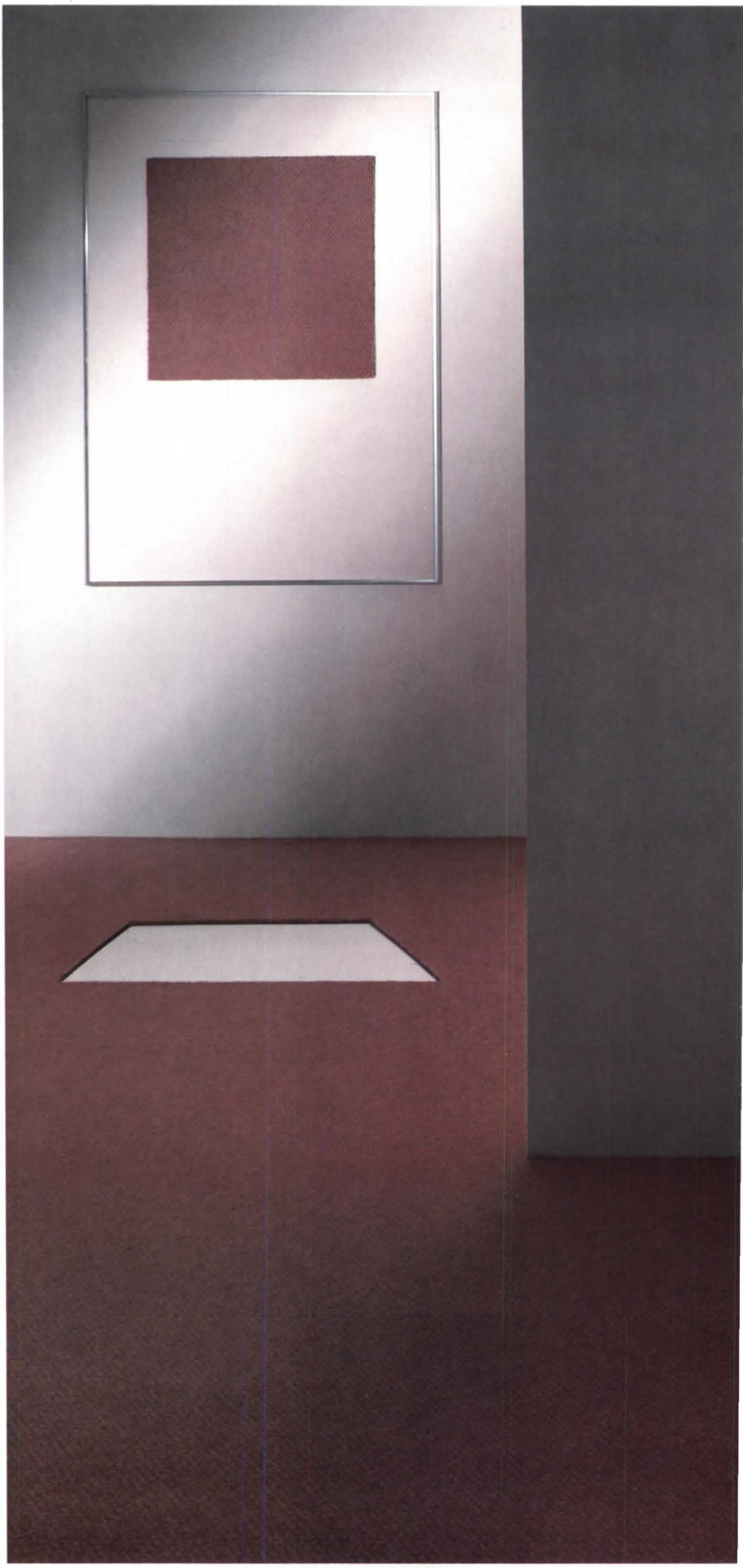

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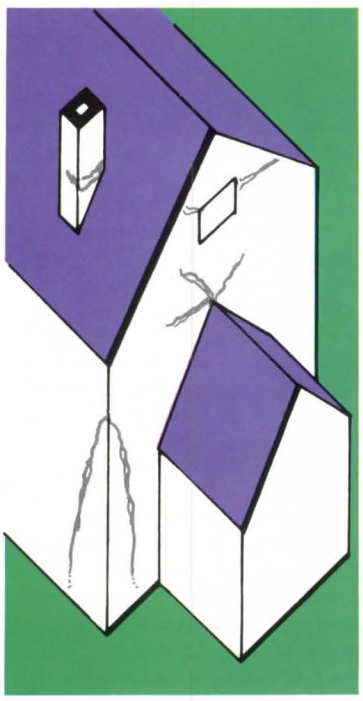
P/A Practice

Law: Robert Greenstreet puts legal liability in perspective.
Specifications: Walter Rosenfeld suggests that computer-based specifications will help alleviate the shortage of construction specifiers.



Law: Legal Liability in Perspective

During the 1970s, it was not uncommon to hear that over one third of practicing architects were likely to be sued each year, and that the figure was likely to increase by a further 20 percent a year.[1] Much of that information, however, tended to concentrate on *why* the situation had developed without too much attention being paid to *what* the threat was; thus, in the absence of any reliable data base clarifying and quantifying the nature of legal liability, it remained largely undefined, and as such, was all the more disturbing by its vagueness.

Today, liability is still prominent as a focus for debate, although the major development in the last few years appears to be in the level of investigation and understanding of the threat. In addition to a general increase in related publications,[2] there has been much research that has helped to define more accurately the parameters and character of the architect's liability. A considerable amount of the work, by the insurance industry, has proven to be an invaluable source of information. In addition, several independent research projects address the liability issue from a variety of perspectives.[3]

The information that has been generated provides a useful basis upon which to assess both the extent of the problem and the nature of the risks involved. First, it appears that the early estimates of the incidence of legal action and its projected increase were relatively accurate. The AIA reports that in 1978, 35 claims per 100 insured firms were reported by architects, and that by 1984, this figure had risen to 44.[4] These figures, of course, do not take into consideration action taken against uninsured architects or claims that were settled without recourse to the insurers. A sharp rise in legal activity was also noted in the Wisconsin study, which suggested an approximate increase of 300 percent in legal action involving the architect over a 20-year period. Second, information concerning the nature of the architects' liability has provided a clearer indication of the characteristics of each lawsuit, and has helped to identify the areas of greatest concern. Perhaps most interesting is the high proportion of claims generated by alleged errors in the design phase. Assumptions that the majority of cases arise from construction-related problems are at variance with a number of sources. For example, the AIA estimates that 78 percent of property damage suits blame errors in the design and/or contract documents for building failure, while the Wisconsin study found that, of the cases taken to the State Supreme Court and Court of Appeals in the last 20 years, 35.8 percent cited defective design as the cause for action, as opposed to 25 percent claiming inadequate inspection. Of these cases, 25 percent cited both design and inspection roles as being inadequately fulfilled. The Colorado study also found that the design phase was the major source of litigation:

"The projects sampled in this study experienced an overall additive claim rate of 6% (i.e., 6 cents on the dollar) and, furthermore, 72% of these increases were due to design error or owner initiated changes. The more volatile issues so prevalent in the literature (delay, differing site conditions, maladministration, etc.) account for only 28% of the claims."[5]

The combined findings of these sources tend to suggest that architects seeking guidance on litigation-free practice may wish to pay more attention in the future to aspects of design than may otherwise have been considered necessary.

In addition to this finding, the information highlights the danger areas where architects typically become involved. The cases indicate an expansion in

(continued on page 56)

Specifications: Getting to First Base

Construction specifiers, for many years at the center of quality control activity for architectural offices, are becoming increasingly difficult to locate, hire, retain, or replace. Big city newspapers, professional magazines, special seminars and courses, as well as "head hunters," all give evidence of a shortage and indicate the emphasis being placed on finding and training competent professionals for this important role.

What is worse, the shortage comes at a time when architects, stunned by substantial increases in liability insurance premiums, are focusing their attention more than ever before on just this issue: improving product quality through better contract documents, including, of course, project specifications.

Often, when the labor-intensive parts of a business become too costly, or when the needed workers are too hard to find or too expensive to support, ways are found to mechanize, automate, or do away entirely with the process that presents the problem. We now seem to be approaching this stage in the production of specifications, and in a manner not fully anticipated even by the prophetic Stanford Research study of 1967 (P/A Practice, Sept. 1982). There was substantial evidence to support such a conclusion at the recent national convention of the Construction Specifications Institute in Orlando, Fla.

Dodge Information Systems, publishers of Sweet's product catalog file, announced its commitment to producing a major electronic product information database within the next four years. A computer-based version of Sweet's would be a basic resource in connection with CADD-produced contract drawings and an important step toward computer-originated specifications.

(continued on page 60)

Law *(continued from page 55)*
liability not simply in the number of cases argued involving architects each year but in both the range of duties expected to be fulfilled and in the heightened expectation of the architect's performance. Areas of contention that have become more prominent in the last few years include third-party claims, cost estimates, and responsibility for shop drawings, although perhaps the two areas that stand out most clearly both in the number of cases involved and in their serious implications to the profession are the limitation of liability and implied warranties. In the first, cases reported throughout the United States[6] have involved statutes of limitation and repose, which have been interpreted in some states to render the architect accountable for errors for a virtually limitless period of time. Even death appears to be no protection against these claims: In one of the more extreme cases, the decision to allow the liability period to commence when the fault was discovered (and not at the end of the construction period, as was generally held in the past) has resulted in a claim *against the estate of a deceased architect,* the residue of which is providing security for his widow.[7]

The question of warranties, or the degree to which architects should be expected to guarantee their work, also raises some concerns. Strict, or automatic, liability has yet to be completely successful in arguments against architects in the courts. Nevertheless, recent decisions in the field of product liability[8] have been used to suggest that complete building elements, such as roofs, are in fact products, and as such should render their designer strictly liable for their performance. This expansion of the architect's duty, in this case to a point where no fault needs to be proven to attach liability, is reflected in a number of cases, and suggests that the difference between a warranty and satisfactory performance is becoming less apparent. Two cases were decided this year that are representative of the high standards expected of the architect. Both seem ridiculous in their claims, and in fact both were decided in favor of the architects (who of course still had to pay legal fees and may have lost the deductibles).

The first case, brought against an architectural firm for negligent design of a prison facility,[9] was instigated by the family of a prisoner who had committed suicide in his cell. The plaintiffs claimed that the architects should have designed the cells in such a way as to preclude the likelihood of self-inflicted damage. In the second case,[10] a zoo employee was injured while feeding an elephant, and sued the architect for failure to design the cage properly.

Both instances, although seemingly frivolous, were considered to be sufficiently substantial to make an adequate case against the architects' failure to exercise reasonable care in the designs. Although these cases failed, similar ones in the past, which at the time seemed unlikely to succeed, were successfully brought against the architects, thus increasing the standard of care for the profession as a whole. Such cases, therefore, tend to highlight the boundaries of "safe" practice for the present, while indicating new areas of concern for the future and bringing the concept of implied warranty closer to reality.

Given the high level of legal liability, what has the impact been on the profession in real terms? Apart from general anxiety engendered by involvement in legal action and potential loss of reputation, the most dramatic, quantifiable impact can be calculated in insurance rates. Although it is a relatively new phenomenon (Errors and Omissions insurance became available in the United States only in 1956, although policies were drafted by Lloyds of London soon after World War II), insurance costs have risen to the point where even securing a policy has become a major problem. The AIA reports that of 12 firms in the United States that used to insure architectural firms, only three continue the practice, and the likelihood of rejection of a policy request ranges from 25 to 86 percent. For those lucky enough to find a carrier, increases in annual premiums have continued and are projected to rise by as much as 350 percent next year,[11] although insurance al-

(continued on page 58)

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Law *(continued from page 56)*

ready accounts for an average of 4 percent of the gross income of a practice, second only to payroll as a practice expense.

It has been suggested that at least part of these increases should be passed on to the client. In a highly competitive and expanding profession[12] with a relatively constant workload, however, firms may not wish to risk losing work by increasing their fees. The result is likely to be lower wages, particularly at the entrance level, where incoming architects are paid a median wage of $12,000 a year in comparison, for example, with newly registered nurses who, with only three years of post-high-school training, are making $18,000 a year.[13] In fact, many offices may not pay new members a salary at all, but offer an hourly rate to employees who therefore receive little or nothing in the way of benefits, such as health insurance, life insurance, or retirement provisions.

Given the current liability situation then, is the profession actually in a worse state than it was ten years ago? Although the intensity of legal action tends to suggest that this is the case, there is some room for optimism for the future. The research that is being undertaken, as well as providing a detailed and sometimes daunting picture of the liability situation, also reveals some information that provides grounds for encouragement. For example, national insurance figures suggest that more than half of claims are settled without payment to the plaintiff, and that in two thirds of the cases, the architects are victorious in court. Cases settled in Wisconsin also indicated a reasonable success rate for the architect in defending suits, which suggests that instigation of legal action by a plaintiff is still by no means an automatic loss to the architect. Furthermore, there has been a marked increase in cases instituted by architects in the reclamation of unpaid fees which, in the Wisconsin survey, reflect a 75 percent success rate.

In addition to these encouraging figures, the increased understanding of the liability threat has raised the consciousness of the profession as a whole. This has led to the proliferation of guidance and warnings in the form of books, newsletters, articles, and workshop seminars,[14] which are directed towards the self-protection of the individual practitioner through understanding of the dangers and pitfalls involved in practice.

Perhaps more significantly, liability has become a major issue at the professional level, and the AIA has launched a massive campaign to prepare its members for litigation-free practice. Furthermore, it is aggressively forwarding new initiatives for reform in state legislation regarding liability, and is looking into new alternatives in practice insurance. It is also heartening to note that the Department of Justice has recently established a panel to investigate the tort system in the United States, one potential outcome of which could be the capping of monetary awards in certain cases.

In conclusion, legal liability continues to be a serious and growing threat to the architect, although it is encouraging to see that the threat is now more clearly perceived and understood. In addition, recent action at both the individual practice and institutional levels may give hope for a more stable and secure future in the profession. ■

Robert Greenstreet

The author is an architect currently teaching at the University of Wisconsin-Milwaukee. He is author of Legal and Contractual Procedures for Architects, Second Edition *(Architectural Press 1984) and coauthor of* The Architect's Guide to Law and Practice *(Van Nostrand Reinhold 1984).*

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(continued on page 60)

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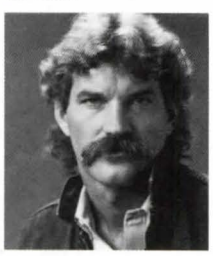

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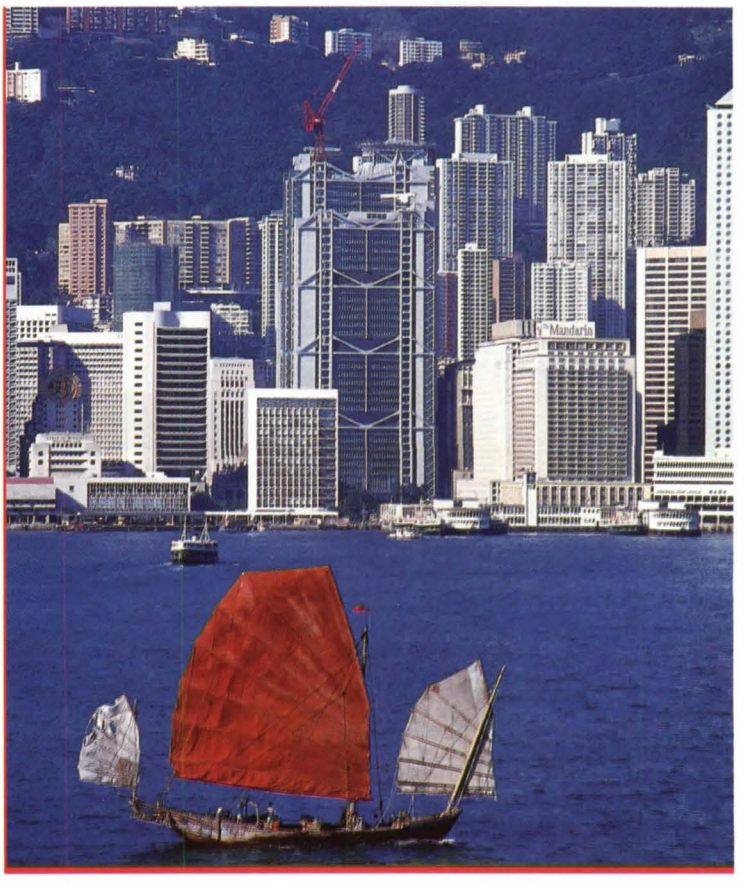


P/A hails Foster Associates' HongkongBank for its beauty, stylistic and social implications, and technical virtuosity. The following 43 pages include a thorough analysis of the project, photographs and drawings beginning on page 78, and a technical discussion beginning on page 100.

IN this issue, P/A takes the unprecedented step of devoting its entire feature section to a single structure—the new headquarters building of the HongkongBank (formerly known as the Hong Kong and Shanghai Banking Corporation), designed by Foster Associates of London for a prime location overlooking the harbor in Hong Kong.

There are a number of reasons for this attention, not the least of which is the sheer beauty and perfection of the artifact. Many architects are known for their almost fetishistic passion for the perfect object, whether it be a fine watch, a well-proportioned ashtray, or—in the case of Norman Foster himself—the perfectly balanced glider plane. These architects will wonder over the finely detailed stairways, the glazing details, the carefully proportioned structure of the bank, and more. For their visual pleasure, and to familiarize our readers with the building, an album of photographs and drawings is offered as the central section of the issue.

But there are other compelling reasons for this extensive coverage, as well. While we are no longer in the throes of the most heated debates over Post-Modernism, the issue of "style" has by no means been resolved. The merits of Modernism are still variously defended and applied, whether in the serious, revivalist manner of Richard Meier, the playful manner of, say, Arquitectonica that combines fantasy and Modern motifs, or the Late Modern manner of I.M. Pei, whose Bank of China is now rising on a site very near its rival, the HongkongBank. High Tech, represented by Norman Foster and others, assumes some of the tenets of Modernism, but pushes on to take its place as a stylistic alternative at the opposite extreme from the Post-Modern pole—the one relying on fine bones, the other on applied cosmetics, but both with a calculated aesthetic end. Foster's bank, arguably the best recent example of the High Tech movement, provides the opportunity of looking at that movement and its cultural implications. This first section of our issue includes an interview with architectural historian Reyner Banham (p. 75), as well as a discussion of Foster's career and the steps that led him to rethink the very organization of the skyscraper. Also included is an overview of Hong Kong itself, written by Hong Kong journalist David Bonavia (p. 74).

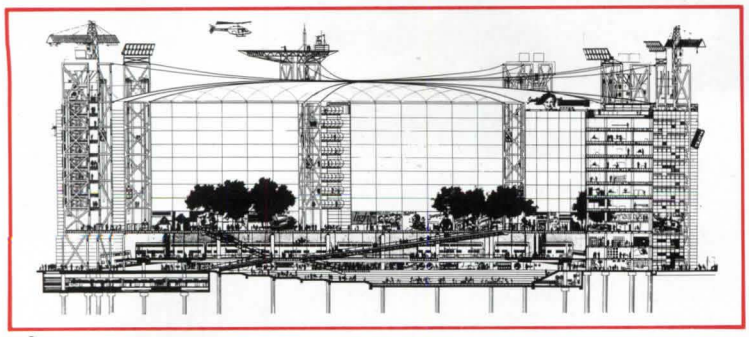
In the final section of this issue is a discussion of the systems by which the bank is formed. Almost every element of this glass and aluminum-clad building, from its unusual pin-connected suspension structure to its precise, robot-made cladding, from its sunscoop to its underfloor air distribution, from its mechanical modules to its signage system, has been custom designed with intensive investigation into every aspect of each problem. For most of the elements, full-size mock-ups were built to test their effectiveness. It must also be noted that the cutting-edge technologies represented in this building could not have been achieved without a close relationship with the engineering consultants, notably Ove Arup & Partners, structural engineers, and JRP (Central) Ltd., mechanical engineers, as well as a courageous and trusting attitude on the part of the client, the HongkongBank itself.

The Basic Facts

The new HongkongBank building is the headquarters for the bank's international and Hong Kong operations, and serves as a local branch as well. It stands on a prime piece of property in Central Hong Kong, overlooking to its north Statue Square and the Star Ferry terminal, both stable functions which are likely to retain the new building's view of the harbor in perpetuity—as far as that word has a meaning in Hong Kong, as Bonavia makes clear.

The building rises 590 feet above Des Voeux Road on its north side—47 floors above ground, four below—and has a gross area of over one million square feet, with net floor areas of up to 29,000 square feet. Its entire ground floor, excepting transportation and mechanical shafts at its sides, is devoted to a public plaza (an amenity permitting the bank a bonus of 20 percent in area), which is generally open around the clock, but which can be shut off by shutters during a typhoon. Directly above the plaza, and accessible from it by a splayed pair of escalators that pierce through a curved glazed floor, is the main banking hall. This hall surrounds the base of an atrium rising to the 13th floor, with light brought into its center by means of a mirrored external sunscoop. The banking hall is also directly accessible from the street by means of an escalator outside the building envelope at its west, the only remnant of what was to be a connection to the Downtown area's skywalk system.

The structure of the building is its most striking aspect, visually and functionally. Both for reasons of flexible office planning and to allow clear views of the harbor from all points, the floors are virtually column-free. Four mast towers, each composed of four tubular steel columns connected by haunched beams to act as Vierendeel trusses, rise on either side of the building, the front and back pairs located outside the building envelope. At five intermediate levels, suspension trusses suspend the weight of the floors in the zone below. Functional zones correspond to these five structural ones: The truss levels are double height and have specialized common functions, and the high-speed elevators, located at the west side of the building, are programmed to stop at them. From these floors, vertical circulation is via escalators, to provide a more sociable way of moving through the zones than by elevator. Each zone accommodates a single bank func-



Hammersmith Centre, section

Norman Foster

Renault Centre

Ken Kirkwood

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tion or several related ones, and the concept is that the zones are "social villages," subsets of the bank as a whole, with which the employees identify. At the double-height levels are terraces, which serve not only for recreation but also as the code-mandated refuge areas in case of fire (Hong Kong's streets would be dangerously clogged if all buildings were evacuated onto them). At the very top of the building, above the special rooms for the bank's chairman and his visitors, is a curved, elongated form originally intended as (and possibly eventually to become) a helipad.

The building has a number of setbacks as mandated by the Hong Kong building code to limit shadows. On the north, it is set back at level 30 and on the south at level 37, while on the east there are a number of deep insets between the module/riser banks. The latter insets create the interesting appearance of a series of slender mechanistic slices, which will disappear if the building needs, and is allowed, to expand. As Hong Kong is planning no enabling code changes at present, this strategy follows the theory, if not the practice, of furthering the building's flexibility.

Just as elevators and structure are kept to the sides of the building, so are mechanical services. At the east and west, aligned with the structural masts, are modules, manufactured in Japan, which contain toilet facilities as well as individual air-conditioning plants for each floor. The mechanical system is also unusual in that for cooling, seawater is brought in from the harbor through a specially built tunnel, and at each level the conditioned air is distributed under and fed upwards through specially designed raised floors. External sunshades and inter-glazing blinds contribute to the energy effectiveness of the building (see pp. 92–93).

Foster's Development

"People are always surprised when they see a new Foster design," says Norman Foster, "because they have a preconceived idea of a 'Foster building,' and there is no such thing. If there is one aspect that unifies all our buildings, it is the suitability of the building to the requirements. We do an unusual amount of research, not only into the technological systems that we eventually use, but also to develop the program, before we ever develop a physical image of the structure."

A number of concerns can be traced from his earliest buildings, designed after he returned from studying architecture at Yale University, to his most recent. One is an interest in preserving natural resources, seen in some early (mid-1960s) housing and single-family house schemes in Cornwall, which are partly dug into their steep sites to preserve energy as well as retain the terrain profile. A more recent scheme, the Athletic Hall for Frankfurt (P/A, May 1982, p. 56), is also partly underground, though its superstructure is less conventional than those earliest projects. His interest in conservation of natural resources also explains the obsession he has had for lightweight materials, an obsession shared with his colleague and friend Buckminster Fuller. These materials use far less of the earth's mass, he has explained, than masonry or concrete, materials for which he has shown disdain in the past. (Now, in the interest of "context," he is employing stone at the Mediathèque to be built in Nîmes, P/A, Feb. 1985, pp. 23–24.) The conservation concerns show themselves in the HongkongBank in the attention paid to energy as evidenced in the design of the glazing and sunshades.

Less convincing is Foster's approach to "context" in, for example, the Willis, Faber and Dumas County Head Office (facing page) in Ipswich, 1975. True, the building follows the irregular form of the site perimeter; but the idea that mirrored reflections of neighboring buildings create a sympathetic context for the reflected originals is a dubious argument, whose flaws have been underlined by other, less artful examples (see also p. 75).

The interest in the perfectly made and assembled product is evident early in Foster's work. The Olsen Centre at the London Docks, 1967, has a carefully detailed reflective glass wall, the first such in Britain. The IBM Advance Head Office in Hampshire, 1971, built originally as a temporary structure but still being used and recently refurbished, is a rationalized component building with a membrane skin of solar glass. The Willis Faber building carries the perfect glass skin to its ultimate coolness: Mullions and gaskets disappear; the façade is only glass, metal plate fittings, and silicone seals. Foster has generally been far less exhibitionist about his structural virtuosity than his former partner Richard Rogers of Centre Pompidou fame, who is known for "letting the nuts and bolts all hang out," as Reyner Banham has said. Even Foster, however, takes an exhibitionist turn, but still a rationalist one, in the Renault Centre (above) in Swindon of 1983, and in furniture (facing page) recently designed by his office. The HongkongBank takes a median approach: Its structure and mechanical modules are brought to the exterior, but modestly cloaked and in a stately pattern.

Hand in hand with the concern for the perfect assemblage is the interest in flexibility. In the Sainsbury Centre for Visual Arts (above) in Norwich, 1978 (P/A, Feb. '79, pp. 49–64), the envelope is a kit of parts, which includes cladding, structure, lighting, and environmental control. The cladding system, for example, comprises four types of panels, molded in superplastic aluminum developed by the aerospace industry, which can be removed or replaced by unfastening six bolts. At the HongkongBank, flexibility is incorporated in its planning principles—virtually columnless space, infinitely variable air conditioning and electrical outlet locations, and a kit-of-parts partition system—as well as in its mechanical modules, which were conceived to be removable (but in fact only the systems inside can be removed).

Rethinking the social organizations of buildings is another task that Foster has undertaken. At Willis, Faber and Dumas, Foster developed several notions that were applied later in the bank. He saw the office environment as a potentially cohesive social environment, and promoted this by emphasizing escalator, rather than elevator, transportation, because it encourages interaction, and by offering amenities such as a pool and a roof-top garden. For Hammersmith Centre (above), an unbuilt competition winner from 1978, he also developed a complex social and commercial balance under a single roof. Not coincidentally, it, too, was to have a raised floor with underfloor air distribution.

Social Implications of the Skyscraper

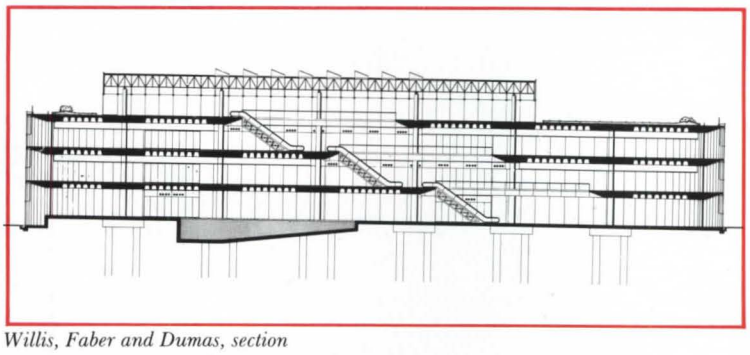
In the early days of the skyscraper, the facade was treated as a stacking of smaller buildings—a direction quickly scotched by Sullivan's dictate that a skyscraper should look "tall."

Subsequent developments, however, have looked to the idea of a collection of identifiable parts, at least in a building's internal organization, in order to humanize the highrise. Le Corbusier, for example, in his schemes for Algiers and the Unité d'Habitation, attempted to

Table, detail

Richard Davies

Willis, Faber and Dumas County Office



Ken Kirkwood

Willis, Faber and Dumas, section

break down the social scale of tall buildings by distributing public activities vertically within the building. More recently, stacked elevators have necessitated skylobbies in buildings, while Michael Graves, in his Humana Building (P/A, July 1985, pp. 21–22), has taken a humanistic approach: He has provided kitchens and lounges for employees on every floor, with views overlooking the city of Louisville.

At the HongkongBank, the "stacked village" approach, with escalators used to circulate within any one zone, has been mentioned above, and its merits are discussed in detail in the Systems section (p. 100). One aspect is worth noting for the conflict between ideals and reality: The double-height spaces were to be identified with each village, suggesting an egalitarianism unusual for a corporation. That it did not work out quite that way—one double-height zone holds executive dining, another, employee dining—seems to indicate that the corporate form some predict for the future—a network rather than a pyramid—has not yet arrived.

Psychological Implications of Technology

Technology, writes the social philosopher John Ogilvy, has come "to play the same role as nature, namely that of a hostile environment out of which man must carve enclaves to make his home." The response to that condition among architects in the last decade has been twofold. Some have looked to natural means—to the passive heating and cooling of buildings, for example—for solving technological problems, an inversion of the traditional relationship. Others, Modernists and Post-Modernists alike, have retained technology's nature-taming role, but have minimized its expression and form-giving potential.

Ogilvy suggests a third approach. "To transcend one-sided dependence on either nature or technology," we must "demystify" and "decentralize" technology "to return man's tools to the men and women who now see only . . . products." Here lies a major contribution of Norman Foster's work. While its mechanistic imagery recalls the idolization of technology common among the early Modern architects, and while some projects, such as the Willis, Faber and Dumas office building discussed above, with its dark glass skin, recalls the "blackbox" mystification of technology, Foster has done more than most architects to demystify and decentralize technology.

At the HongkongBank, several devices have the effect of demystifying technology: the construction of full-size mock-ups for the client to understand and evaluate; the articulation of various systems so that the distinction, say, between structure and cladding is immediately apparent; and the enclosure within glass of the working parts of automatic doors, escalators, and elevators. All help to reveal to the untrained observer how the building went together and how it works.

The decentralization of technology, too, plays an important role in the HongkongBank. The distribution of mechanical equipment and toilets into small units along the sides of the building at every story improves the accessibility and eases the repair and replacement of those services. Placing the heating and air-conditioning ducts in the floor, with individual outlets at each workplace, has a similar effect. The decentralization of the technology increases people's control over, and to some extent their understanding of, their thermal environment.

As many commentators have noted, technology can oppress as well as liberate us. Denying the form-giving power of technology, looking at it as just a tool rather than, as Ogilvy puts it, "an autonomous agent (with) a life of its own," plays to its oppressive side. Decentralizing its control and demystifying its operations are two ways of regaining our command of, and thus our liberation from, technology.

Having stated this, it must be admitted that there remain two contradictions implicit in technological expressionism, one aesthetic and intentional, the other social: Artistically depicting a rational technological system often means taking technologically irrational steps. In the HongkongBank, clear rather than silver reflective glass was used, though the latter would have yielded the lowest energy consumption, because Foster had an aesthetic and psychological effect in mind: He wanted to expose the inner workings of the building and accentuate the structure for the general public viewing it from outside. And another example: Because Foster wanted to align the mechanical and structural masts to appear "logical," the structural beams interfere with the most direct routing of the mechanical ducts. As Tony Hackett of Foster Associates points out, the aesthetics, after all, are the end; the engineering is the means.

The second contradiction implicit in the openness of the technological expressionism is the issue of control: True, some people are in control, but only a few. In the bank, everyone can be seen; every visible personal object is expected to suit the overall pattern. All window shades must be angled alike. Furthermore, openness itself can be threatening: The major space, the atrium, must be approached with caution, as its minimal detailing and glass-sided balustrades can impart vertigo.

The contradictory aspects of control are ironic when one considers the origins of High Tech: The plug-in city of Cedric Price and Nathan Silver, among others, implied individual freedom. As happened with Mies and others before him, Foster's acceptance by the corporate world has turned utopian concepts inward, toward an emphasis on ever finer and more beautiful details and materials.

Urban Implications

Urbanistically, the HongkongBank can be categorized, though imperfectly, in three different ways. It is a street building, on streets that avoid, even more than most in Central Hong Kong, a comfortingly continuous urban profile. It is a framework building, incorporating the Japanese Metabolist attitude of buildings as frameworks to accommodate growth and change, but the only likely change (the addition of office space in the setbacks on the building's east side) depends on unlikely code changes. And it is a Modernist object in space, not because of surrounding plazas on its own site (it fills its entire site) but because of the existing, but motley, plazas to its north, originally planned to be redesigned as part of the bank's scheme.

In experiencing the bank in the urban sequence, the major disappointment occurs, paradoxically, where it offers the most: at its ground-level plaza. Virtually the entire ground is free for pedestrian passage, with no commercial, and minimal architectural, interference. But there are detailing problems, as well as basic conceptual ones.

The greatest loss is in the flooring. Intended to be constructed of steel-supported glass block, the plaza flooring was specified as flame-cut granite at the eleventh hour for technical reasons, and to the architect's disappointment. Not only does this halt the passage of

Richard Bryant

sun downward from the atrium through the plaza to the basement banking hall, rendering that room an ordinary underground space instead of a naturally lighted one; it also deadens the plaza space, as the pedestrian seems to be compressed between the curving glazed underbelly of the atrium and the uninterestingly detailed floor.

Furthermore, the uninterrupted public passage under the building precludes a sense of grand processional entrance. The two angled escalators (so positioned at the directive of the Chinese fung-shui, or environmental diviner, as are a number of other elements in the building) that lead up through the curved belly into the banking hall do provide an excitingly surrealistic effect, but do not make up for the paucity of the generalized plaza experience, paltry in comparison to associations with grand bank entrances and to the very expectations aroused by this proud and dramatic glass and aluminum structure.

The Implications for Architectural Practice

The leading practitioners of High Tech, with Richard Rogers and Norman Foster as the most prominent, are for the most part British. Reyner Banham offers psychological reasons. Detailing, he says, is the British compensation for having lost the Raj. As they looked in at themselves rather than out at the world, manias surfaced!

There is a more pragmatic reason as well. Innovative detailing takes more time—time is money, and British architects collect higher fees, for which they generally produce more drawings with a greater level of detail, and take on more risks than architects in the United States. A spokesman for the Royal Institute of British Architects points out that, unlike the AIA, RIBA publishes a schedule of minimum fees. (As an example, the RIBA minimum fee for a large purpose-built office building, falling into the British Class 3, is 6.1 percent.) It is not enforced, but most architects follow it, and some exceed it. Almost all British architectural fees are based on a percentage of the construction cost, unlike in the U.S., where flat rates and fee-bidding are becoming common.

Fee-bidding does not seem to be a progressive approach to improving the image and importance of architects. Foster's approach—more hard work and more risk, albeit for more money—might be a better answer.

One might well ask, how many clients would pay an architect to custom design almost every detail, to develop new products, to construct full-size mockups, as the bank did? And how many architects, facing growing liability, increasing fee competition, and shrinking construction schedules, would engage in such time-consuming and potentially risky activities? Paradoxically, the very costly process that Foster follows may offer solutions to our troubled profession.

In Britain, as in this country, architects have come under increasing criticism for their lack of technical knowledge and managerial skill. University of London economist Marion Bowley has written that "the traditional organization of the (architectural) profession is not appropriate for providing the design services required today," and "a new profession is required in addition to, or in replacement of, the existing one."

Foster Associates have demonstrated a possible model for that "new profession": In designing the bank, they involved engineers even as they developed their schematic design, and the solution was as much an engineering solution as a design solution. Appearance and technology were closely wed, down to the finest details. Each of the various architects in the firm specialized in some aspect of the building—the sunscoop, the cladding, the flooring—which greatly increased accuracy in detailing, costing, and scheduling of the project. If the building industry is to advance, says Bowley, "designers (should be) taking positive steps to initiate innovation," and in the bank, the architects took an active role in developing new products.

The building of full-size mock-ups (their costs covered separately by the bank) had similar technical and managerial benefits. "Mock-ups," says Roy Fleetwood of Foster Associates, "let you make your mistakes early, before they become costly. It also involves clients in making decisions about the building." Since most suits against architects result either from a failure in the architects' assembly of components or in their communication with owners and contractors, and since some courts have begun to hold architects as strictly liable for their buildings as manufacturers are for their products, mock-ups can greatly reduce injury and litigation. In contrast to many architects, who have relinquished responsibilities to avoid risk, Foster Associates offer a more positive approach: Greater involvement, greater care, and more testing can reduce exposure to litigation.

"All clients," says Roy Fleetwood, "want the most value for their money. If architects cannot convince a client that the process we've followed increases the value of building, then they aren't trying hard enough." ***Susan Doubilet, Thomas Fisher*** ■

A Hong Kong Overview

Few skylines have changed faster in the last quarter century than Hong Kong's. The main geographical features—Victoria Peak and the Kowloon "Nine Dragon" Hills—sometimes seem the only constant elements in the picture. Along the waterfronts and up the hillside march toothlike high-rise buildings, containing light industry, housing, and offices. At the bases of virtually all Downtown office buildings are several levels of shops, connected by a third-floor skywalk system. Despite the large supply of real estate, rental for a luxury apartment may reach US$7500 a month (see p. 39).

The intense pace of development has been achieved primarily through Hong Kong's export boom since the 1950s, after businessmen fled there from China in the face of Communist victories in the Civil War. Now Hong Kong is the world's third most important financial center as well as a tourist haven, where high-class consumer goods can be purchased duty free. Hong Kong's free-and-easy economic system and low taxation have resulted in periodic cycles of boom and bust, mainly through excessive bank loans for speculative real estate. The booms have not resulted in exciting modern architecture—the new HongkongBank building being an exception. The demand for land, in fact, has resulted in the destruction of what few historic buildings there were.

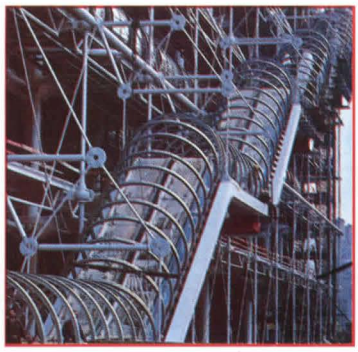
Hong Kong, with nearly 6 million population (99 percent Chinese), used to be considered an apolitical society administered by a British-dominated government with little recourse to democratic procedures. This is changing. In 1984, Britain and China signed a Joint Declaration specifying the return of all of Hong Kong to Chinese sovereignty in 1997, the date of expiry of Britain's 1898 lease on Hong Kong's large and economically vital New Territories on the Chinese mainland. In a unique experiment, China has agreed to let the territory retain for 50 years its capitalist economic system and its British-based legal system. The territory, after all, can serve as China's window on the outside world, through which it can absorb modern technical and managerial experience. Beijing has already turned its border zone of Shenzhen into a free-enterprise industrial park, which receives investment and equipment from Hong Kong, Japan, and the West, enabling it to process light and medium industrial goods for internal distribution and export. Other areas are also designated as "special economic zones" and are developing closer links with Hong Kong (see p. 31).

According to the 1984 agreement, the territory, to be named the Hong Kong Special Administrative Region, will have full internal autonomy under a government composed of local people, while China will assume responsibility for its defense and non-trade-related foreign affairs. The British are attempting to institute a democratic electoral system in Hong Kong prior to 1997, which Beijing considers a breach of the spirit of the 1984 agreement and a possible threat to the investment climate.

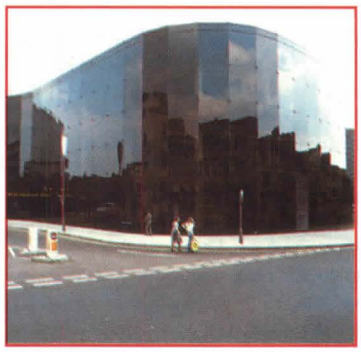
A new boom in Hong Kong is gathering strength already, as its population overcomes "1997 nerves" and the recent recession. Famous for its resilience in past difficulties, it is once again demonstrating the inherent strengths of a free market economy trying to stay afloat and grow in a disconcertingly fast-changing world.
David Bonavia ■

The author is the China Specialist Writer at the Far Eastern Economic Review, *Hong Kong Correspondent of* The Times *(London), and author of several books on China and Hong Kong, including* The Chinese—A Portrait.

Tim Street-Porter



Reyner Banham



Foster Associates

For Banham, two buildings define the expressive extremes of the High Tech style: at one end, Centre Pompidou (far left and middle) in Paris (Richard Rogers, Renzo Piano, 1976) is an "expressionistic demonstration of how a building works"; at the other, Willis, Faber and Dumas (left) in Ipswich (Norman Foster Associates, 1975) is a "black box . . . an arcane mystery."

P/A editors Daralice Boles and Susan Doubilet interviewed British critic and historian Reyner Banham in New York, where he delivered a pair of lectures on High Tech. Banham considers whether the style, British-born and bred, could ever catch on in the United States.

Now teaching at the University of California Santa Cruz, British architectural critic and historian Reyner Banham is perhaps best known for the now classic texts *Theory and Design in the First Machine Age* and *The Architecture of the Well-Tempered Environment*. His most recent book *A Concrete Atlantis* considers the origins of early Modernism in American industrial architecture. Banham's writings on High Tech and many other topics, originally published in *Architectural Review*, *New Statesman*, and other journals, are collected in *Design by Choice*.

P/A: Let's talk first about the sources of the High Tech movement and its history.

Banham: The High Tech wave has run against the grain of intellectual expectation. The view from 1975 was that this kind of stuff was not going to happen any more. Credit for its continuing really lies with two or three people—the old Rogers-Foster partnership—and with figures in the background, like Cedric Price, whose influence has been enormous. Price is one of the great inscrutable figures in English architecture: he's always been there. He's been admired by generations of younger radicals—still thinks himself the radical of course, constantly asking of architects "do you have to do it that way?" He is a kind of technical radical who has always tended to speak as if he was not interested in aesthetics but was concerned with buildings that worked and would inexpensively work better. Price has been very important, and it's interesting that both Rogers and Foster have started to include Price in their list of official forerunners nowadays. It's now possible to talk about that history in a way that it wasn't, say, five or six years ago, which is a sign of the growing self-confidence of the movement. There is also something about Rogers and Foster that reassures businessmen of a certain kind.

P/A: Do you mean something about them personally, or something about their practice?

Banham: Both. Norman Foster fulfills the image of the business architect, whereas Rogers is more the fine-art architect. It's interesting, too, the way they've carved up the market. In the first instance, Foster got the more obviously money jobs.

The other background figure is James Stirling. The technical freedom in Stirling's early work—even though the range of materials and the level of servicing was never strictly High Tech—the radical way of reassembling the building parts, and the willingness to use something like an off-the-shelf glazing system made the architect very conspicuous.

P/A: What kind of influence do Foster and Rogers have in England?

Banham: Neither of them teaches much, and the intellectual establishment in the schools, including people like Peter Cook, is not interested in that kind of architecture. Both offices were in a very isolated position until Michael Hopkins appeared on the scene to prove that the torch could be handed on to another generation. It's interesting with Hopkins particularly, that although he's out of the Foster office, his work has tended much more in the exoskeletal mode associated with Rogers.

P/A: Is High Tech just another style?

Banham: I don't think one could sustain it, if it was simply a matter of borrowing appearances. In some ways, neither office has sustained it. With Lloyd's of London (Rogers) and the HongkongBank (Foster), both architects are moving into a different aesthetic. Even if there's the same kind of structural exhibitionism going on with Rogers, the disappearance of color makes a tremendous difference. On the other hand, I think the one continuing cultural significance is the desire to convince clients and passersby, visually, that this is a building that really works, that works like a machine. The occasional passing quotation from the Crystal Palace, as for example at Lloyd's, is more a profession of faith in the tradition than the equivalent gesture would be in the work of Cesar Pelli. When the Rogers office or the Foster office does an apparent quote from a 19th-Century structure, it is a quite considered, deliberate statement that they belong to that grand old Rationalist tradition, a lineage that's well established in the history books. There is also a crucial but not often observed link between the official Miesian tradition and this particular architecture.

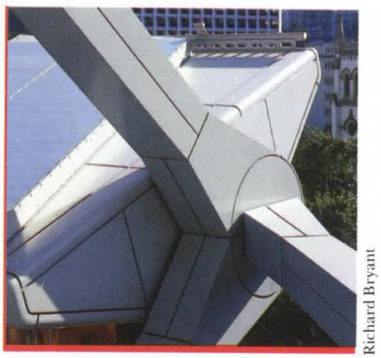
P/A: You described that connection in a recent lecture as one of detail.

Banham: The Rogers/Foster generation and the immediately preceding one tended to see the reform of post-war English architecture beginning with honesty and integrity in the use of materials and mechanical details. A key building was the Smithson's school at Hunstanton (Norfolk, 1949–54). It's interesting how often conversations go back to that building. It is Miesian, unlike anything else done before it in England, and anything subsequent. It was a hotly discussed building, bitterly disliked in many quarters. But it was disliked in the sort of way that some more recent Rogers and Foster work has been disliked: because it puts its arrogant tropes on show. There is a tradition there of not quite *épater la bourgeoisie* but *épater la profession*, wishing to step beyond the accepted norms of what you do and what you don't do in architecture. However, these architects themselves have created a new set of standards, in terms of detailing and exhibiting the building's mechanical system, and I think some of them begin to feel vaguely trapped in it.

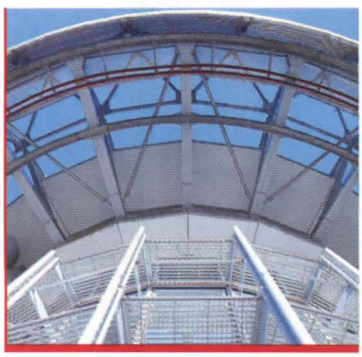
P/A: You say that with the HongkongBank, Foster has moved to a different aesthetic. What separates the bank from the bulk of Foster's work? Is Renault (p. 70) the real aberration, and Hongkong part of the continuum?

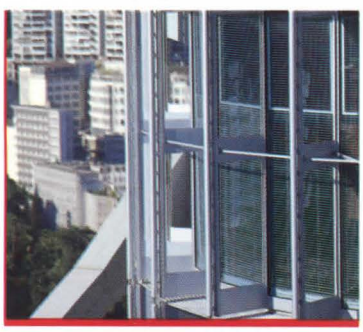
Banham: Renault is really more like Foster's furniture design, and all the space vehicles that preceded it! Furniture had been Foster's alter ego or barely suppressed id as a designer until it broke out in something like Renault, and then . . . back to the box. But the Hong-

The HongkongBank (facing page), as seen from Victoria Peak to its south, rises proudly among the high-rises of Hong Kong's Downtown. In the background is the Hong Kong harbor. The building's aluminum-clad steel structure is clearly expressed on its south face (as on its north, p. 69): The vertical masts consist of tubular steel columns connected to function as Vierendeel trusses, and the five suspension trusses at double-height stories each carry the weight of the zone of floors below (see p. 101). Up the building's west side (left in the photo) run the banks of aluminum-clad prefabricated mechanical modules (see p. 104) and between them, the elevator lobbies protected by sunshades. At the very top is an element designed to be a helipad (it may eventually function as such). Also in evidence are two of the building's permanent maintenance cranes (top left) and, at the lowest suspension truss, the sunscoop (middle left, and right), designed to reflect sunlight into the building's atrium (p. 107). The base is devoted to a public plaza, with nearly equivalent entrances on the south (bottom left) and north sides.



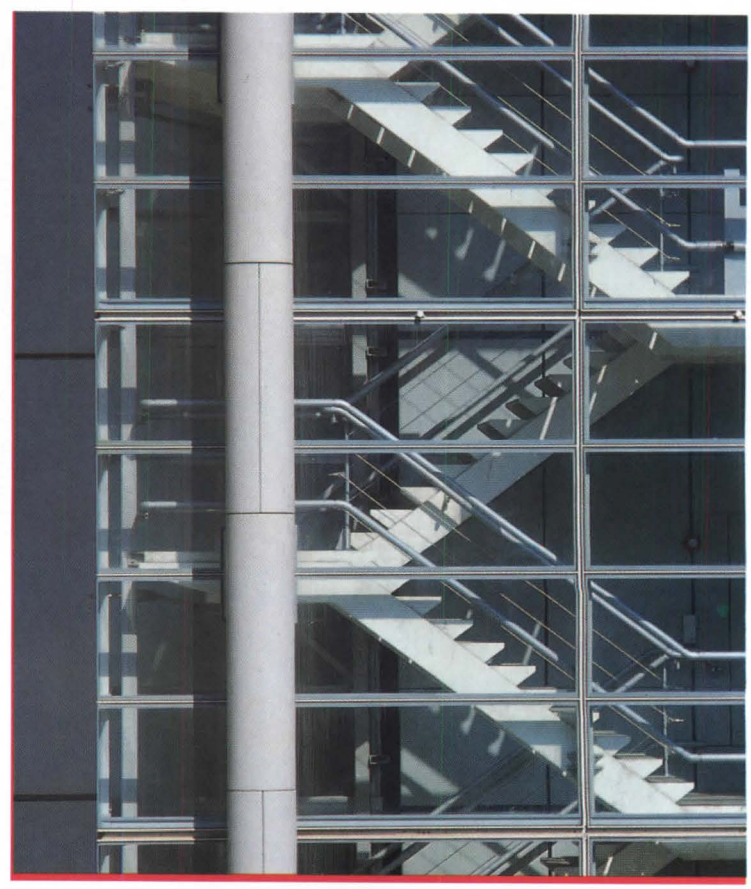
Richard Bryant





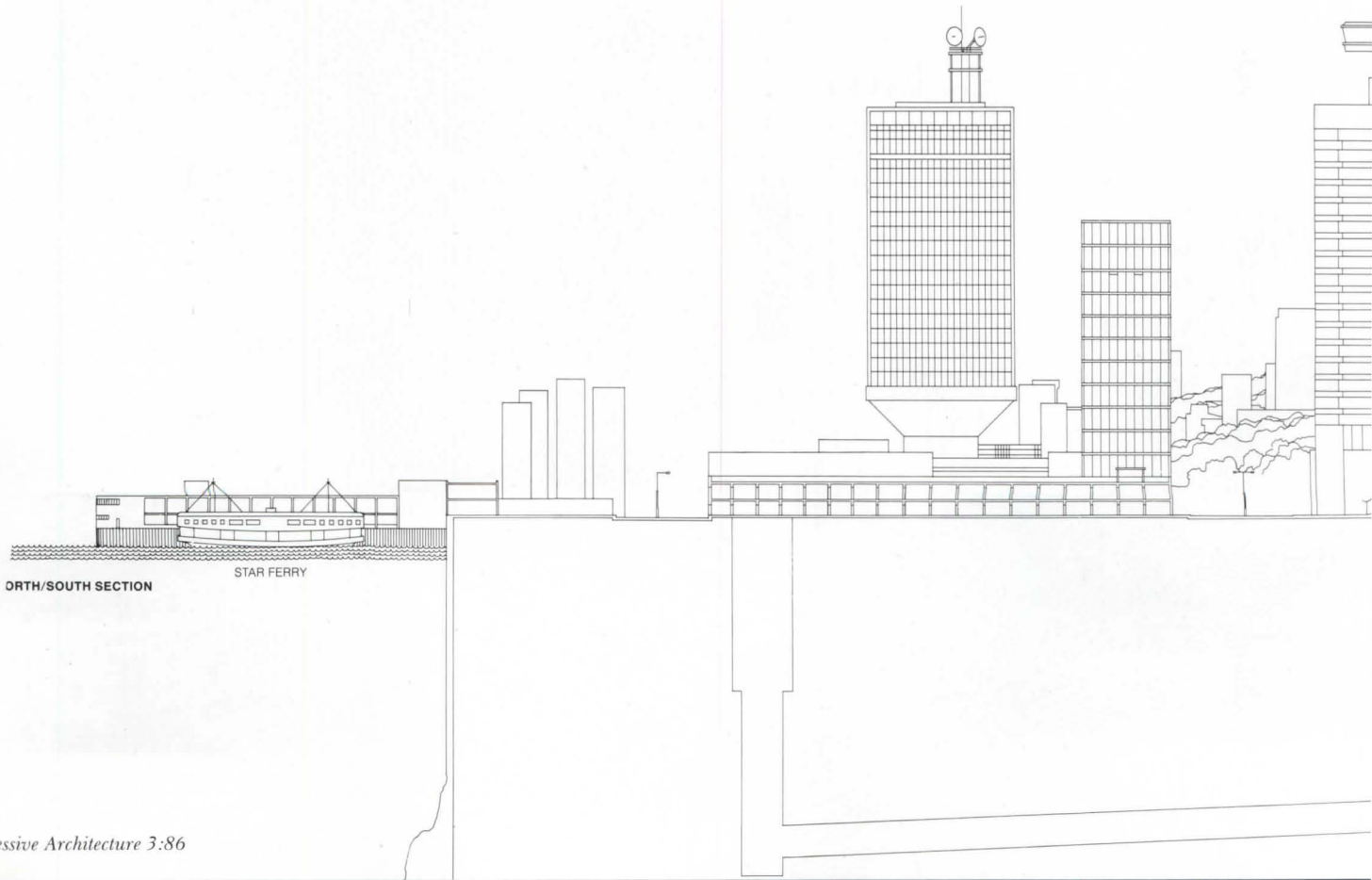
The east side of the building (facing page) reveals most strikingly its technological nature. Deep insets between the banks of modules, responding to the zoning code's mandate for setbacks to minimize shadows, allow the bank to be seen as "mechanistic slices." At the building's side is the present Bank of China (its new headquarters is now rising to the southeast); at right, the domed building is the Courthouse; and in the background is Victoria Peak. The helipad (top right and left), not yet functional, was designed to have a streamlined effect, and at one point was to have the bank's logo running electronically around it. Beneath are floors that were originally intended to be open to set off the helipad but were finally glazed at the bank's request, in order not to waste space. They now form part of the reception rooms for the bank's chairman (middle left).

Outside each double-height space is a terrace (middle right) used not only for recreation but also as refuge areas in case of fire. Evident is the suspension truss, as well as the typhoon bracing for the windows. The glass-enclosed escape stairways (bottom right and left) are finely detailed.

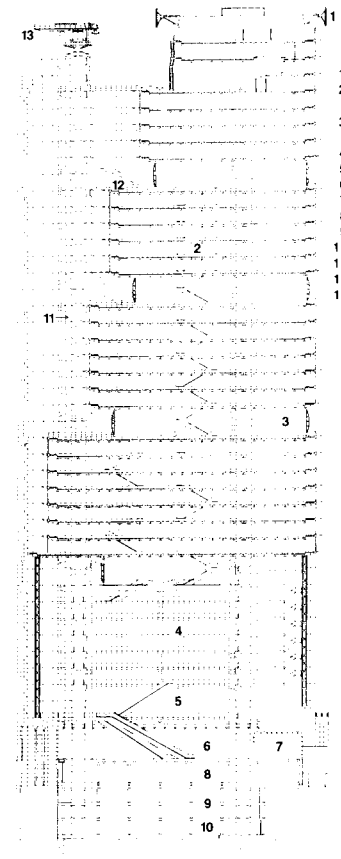


The site plan (right) and north-south section (below) show the swath of open space that extends from the Star Ferry in Hong Kong's harbor to the HongkongBank. The section also indicates the location of the seawater tunnel and sunscoop, and the height of the building relative to surrounding structures. The east-west section (facing page, top left) reveals the stepping back of the floors along the building's east side to meet zoning requirements. Despite these setbacks, the stacks of service modules along the east side of the building rise vertically, making the building look rectilinear when viewed from the north (facing page, top middle) or like a series of thin, "mechanistic" slices when viewed from the east (facing page, top right).

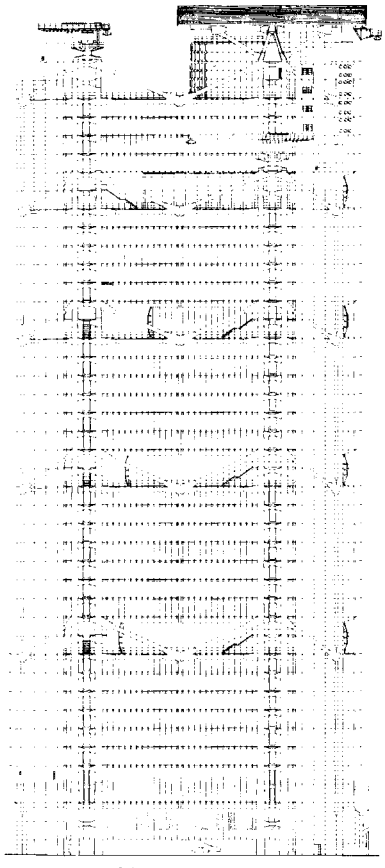
SITE PLAN



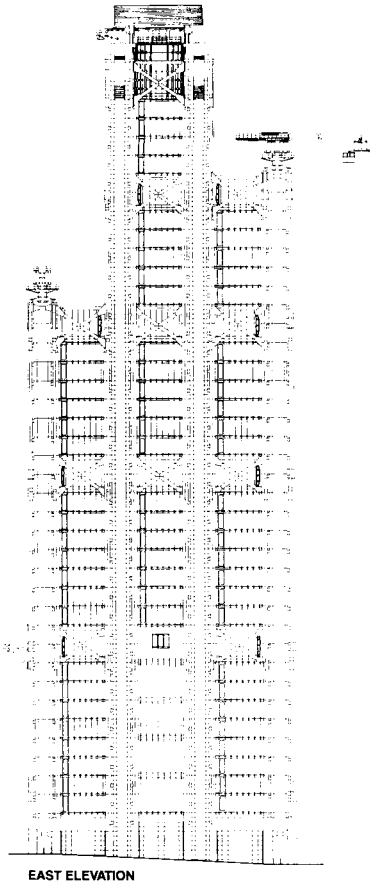
ORTH/SOUTH SECTION



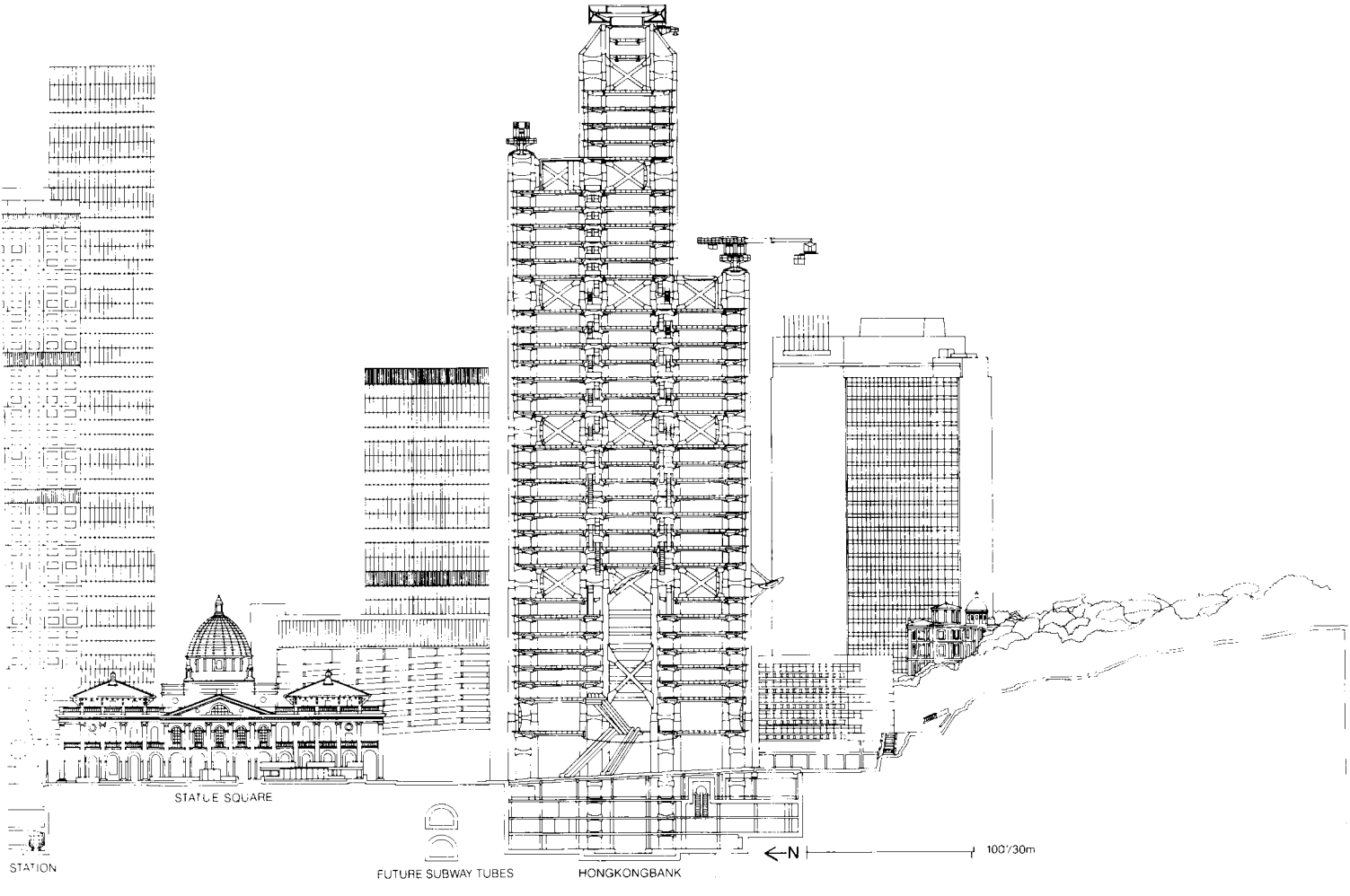
EAST WEST SECTION

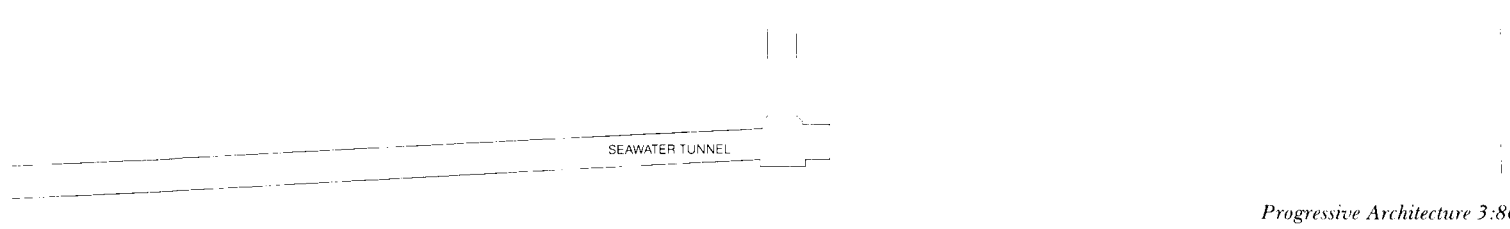


NORTH ELEVATION

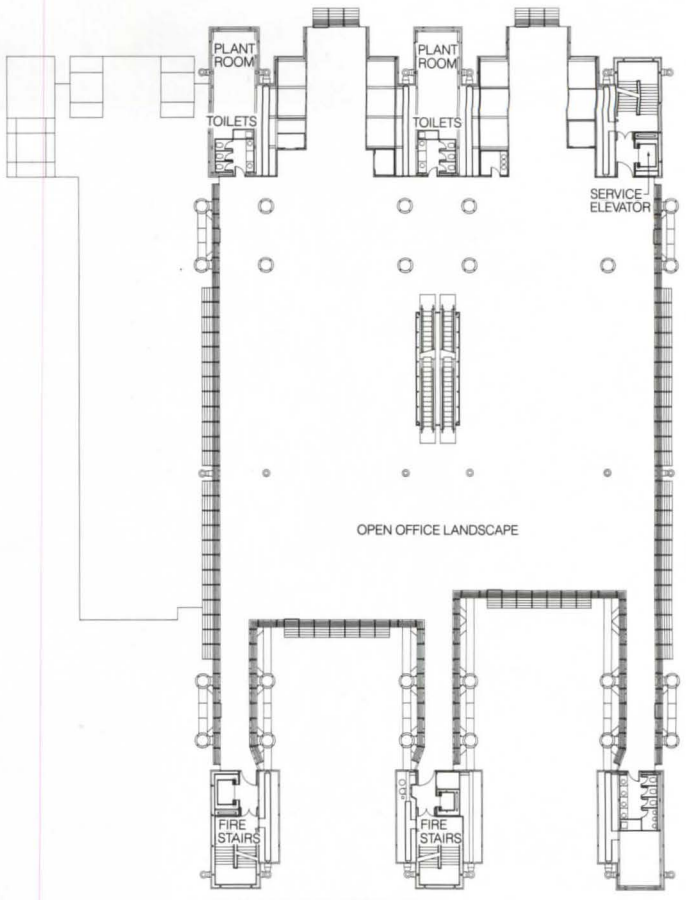


EAST ELEVATION

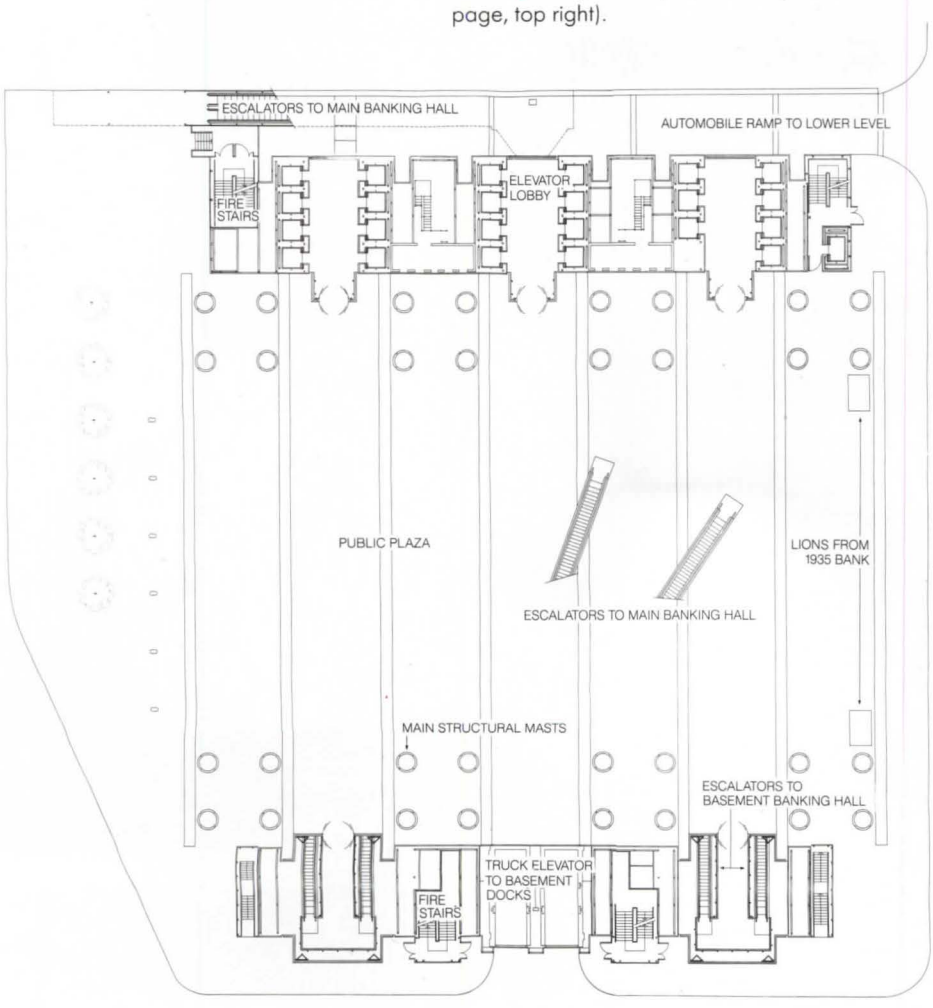




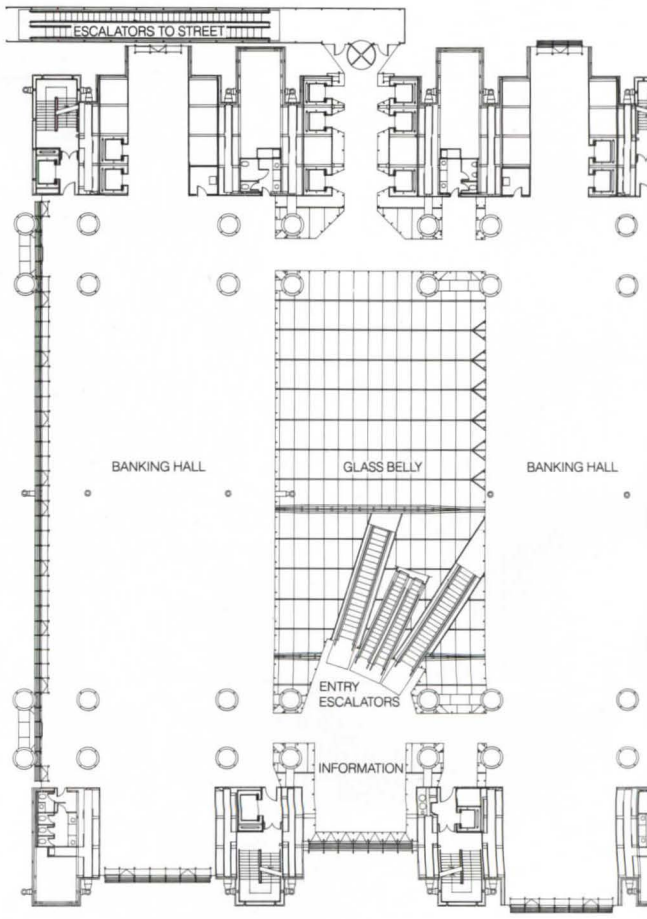
The floor plans (this and facing page) show how the building steps back as it rises. The plaza (below) is largely open except for passenger elevators and mechanical risers on the west side, and service elevators, basement escalators, and mechanical risers on the east side. Floors three through twelve have an atrium in their central bay (below right and facing page, bottom left). Floors thirteen through twenty-nine fill the entire three-bay, 180-foot width (facing page, bottom right). From the thirtieth through the thirty-sixth floors, the building steps back to two bays (right and facing page, top left) and above the thirty-seventh floor, used mainly for executive functions, the building is only one bay wide (facing page, top right).



TYPICAL TWO BAY OFFICE FLOOR

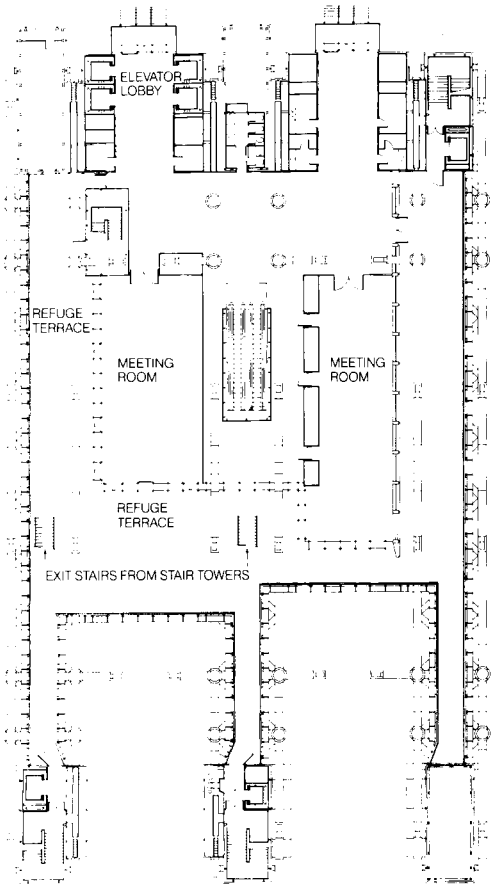


PLAZA LEVEL

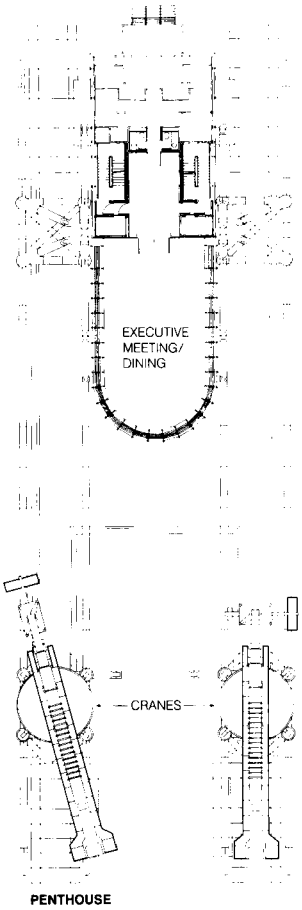


MAIN BANKING HALL LEVEL

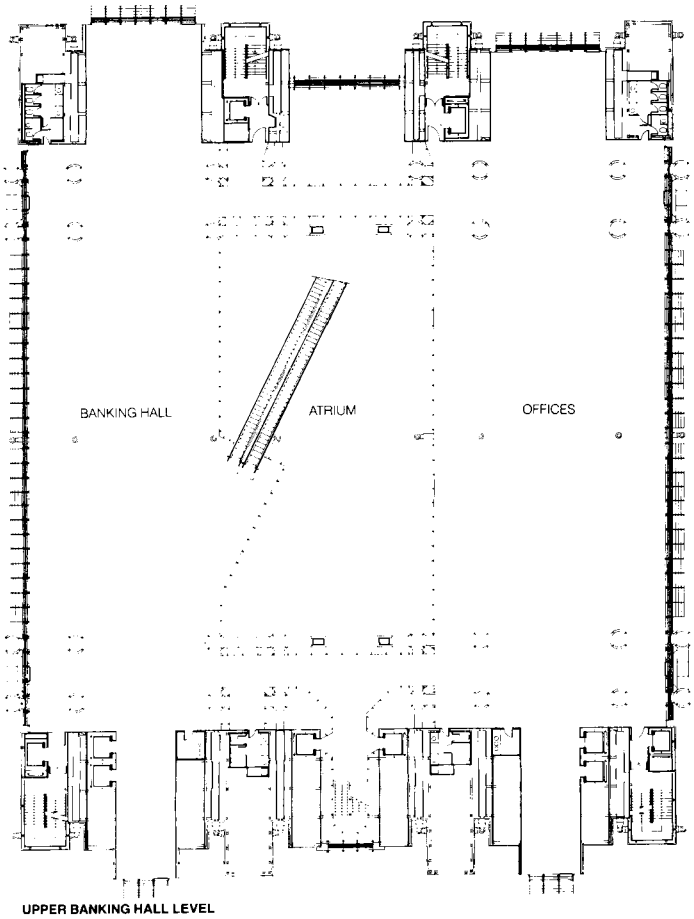
→ N 40'/12m



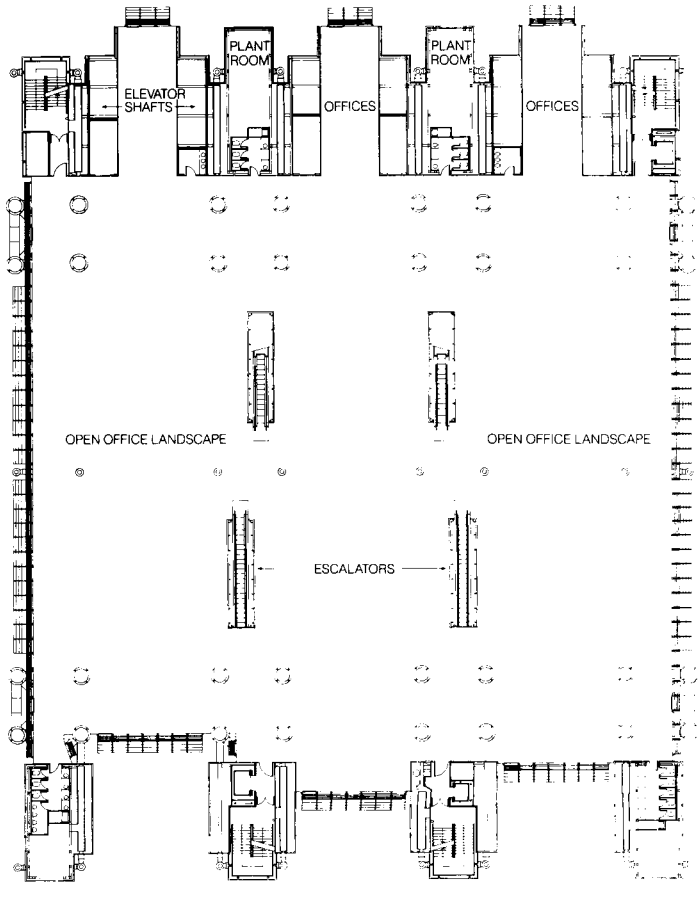
TWO BAY WIDE DOUBLE STORY SPACE



PENTHOUSE



UPPER BANKING HALL LEVEL

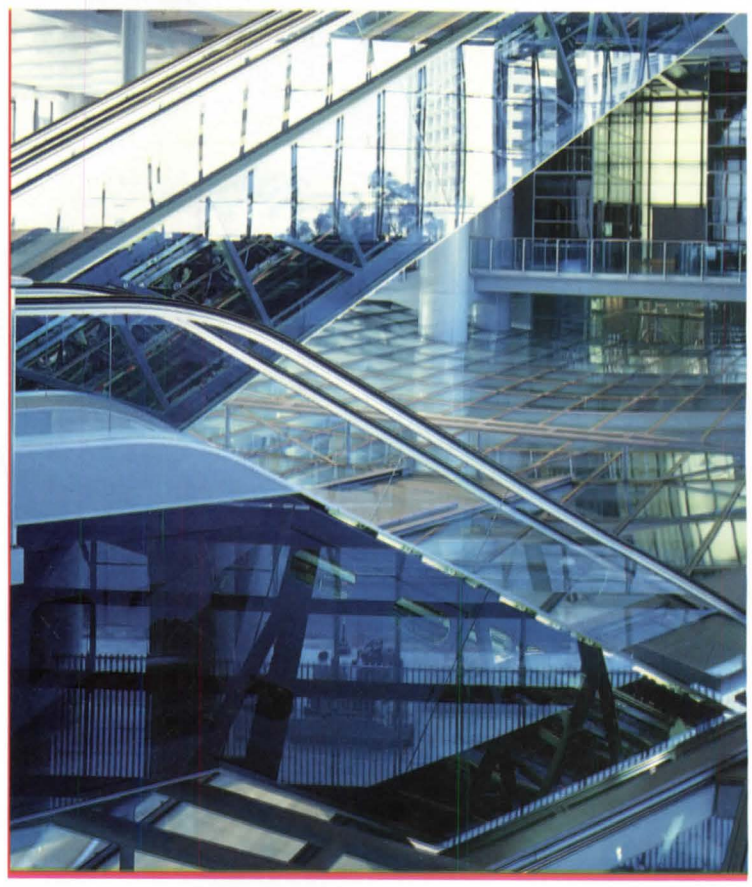


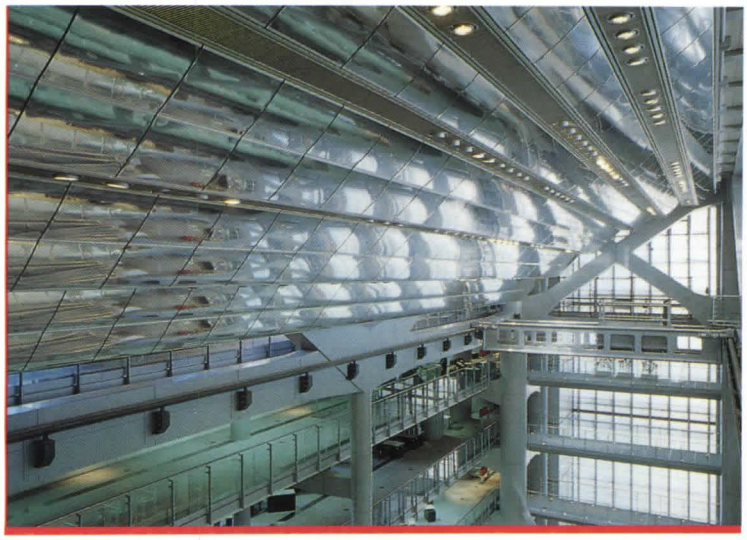
TYPICAL THREE BAY OFFICE FLOOR

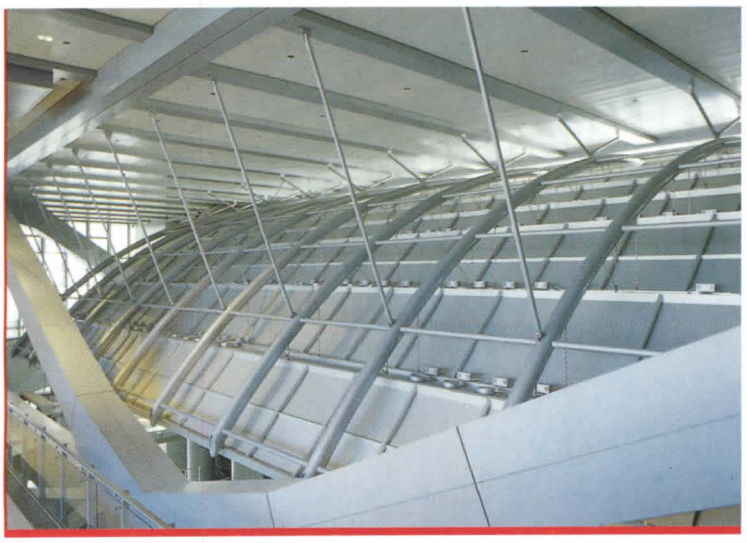
The plaza, occupying virtually the entire base of the building, can be closed off on its north and south sides by typhoon shutters (left). To maintain a pleasant environment in the plaza, glass walls always enclose the top part of the openings, but in case of high winds or typhoons, glass panels can be lowered partially or entirely (p. 102).

A glass ceiling (facing page) separates the plaza from the interior atrium that rises to the thirteenth floor of the building. To minimize reflections and thereby to increase the sense of transparency, the glazed "underbelly" was given a catenary curve, which had the additional advantage of structural strength. Two escalators, located at angles suggested by the local fung-shui (environmental diviner) connect the plaza and the banking hall above, and an additional pair lead to the upper banking hall (bottom right).

Also at the plaza level, circular glass vestibules (top right) lead to the lobbies for the high-speed express elevators. The mechanism for their sliding doors is clearly revealed behind glass, and is controlled by electronic eye.







The atrium (facing page) extends from the ground-level plaza to the thirteenth floor, through the center of the building. Light from the glass east wall (bottom left) illuminates the atrium during morning hours. The sunscoop, with its reflecting mirrors (top left) suspended from the top of the atrium (middle left), shines midday sun into the atrium and, through the glass belly, onto the plaza below. The one reservation some people have expressed about the atrium is vertigo from upper levels.

Framed by massive structural members, the atrium provides a space reminiscent of the traditional banking hall. The one crucial difference is that, except when riding the escalators that connect the plaza to the two banking levels, customers and employees move around rather than through the center of space, mitigating its impact.

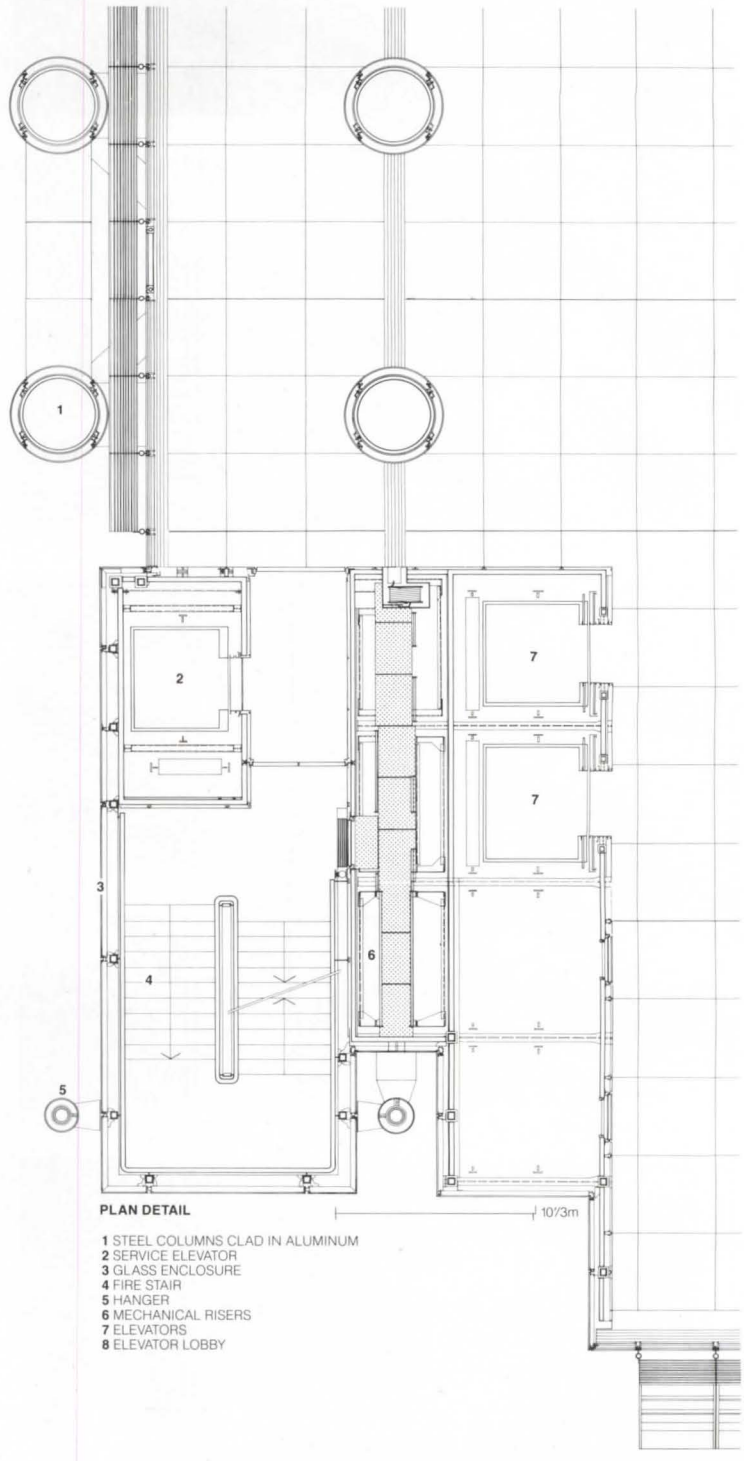
The reflector at the top of the atrium (top left) contains halogen downlights for illuminating the atrium on cloudy days or at night. Walkways along the back of the reflector (middle left) allow maintenance personnel to replace bulbs. A trolley that runs along a horizontal track below the reflector allows personnel to clean the mirrored surface.

The glazed east end of the atrium (facing page) has been dubbed the cathedral window not only because of its size, but because of the patterns created by the vertical mullions, horizontal walkways, and diagonal wind bracing. The pots of "lucky bamboo" on the walkways were placed there temporarily at the recommendation of fung-shui (environmental diviner) consultants to protect people from the bad luck represented by the cross bracing. Permanent plantings, located according to fung-shui principles, have yet to be installed.

The office floors throughout the building (top left) have few full-height partitions in order not to block views of the harbor on the north and Victoria Peak on the south. Enclosed offices, only at the center of the building, have glazed north and south walls.

The main banking hall (middle left) and upper banking room (bottom left) overlook the atrium and contain custom-designed teller counters, beautifully detailed with black marble surfaces, glass signage, and stamped aluminum coin trays. Extensive television monitoring and easily secured escape routes eliminated the need for screens in front of the tellers. The architects made the counters deep enough to prevent a customer from reaching the cash drawers. Between teller stations stands a counter (right) that conceals equipment used by the tellers and contains, on its top surface, rear-illuminated signage and other customer-related material.

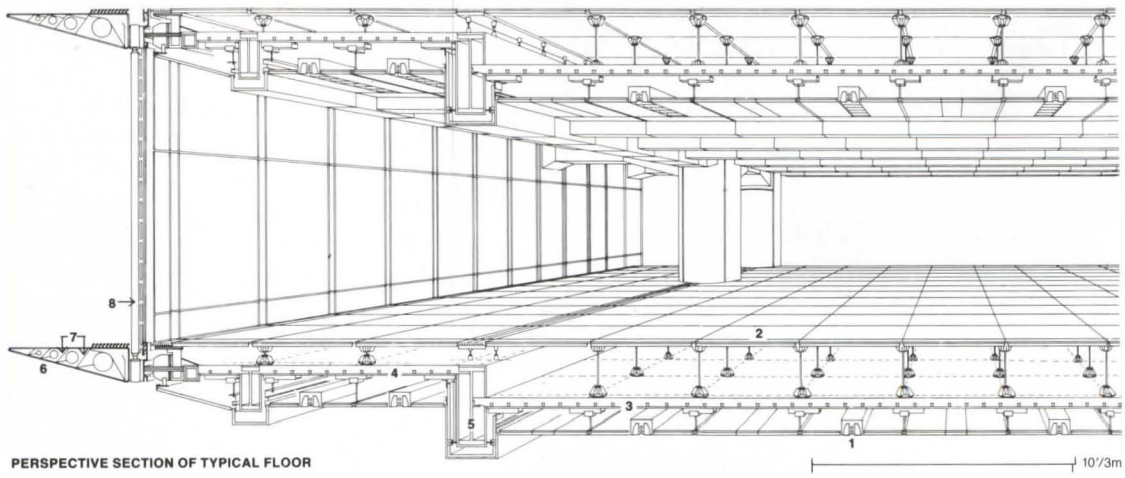
The plan detail (right) shows the northwest corner, while the isometric (facing page, center) is a representation of the service modules on the east, as well as the Vierendeel masts, suspension trusses, diagonal wind bracing, and round hangers that make up the building's main structure. The isometric also shows a typical refuge terrace and double-story space. The penthouse (facing page, top) contains executive dining rooms and the bank chairman's flat, as well as a helipad, terrace, and service cranes. The perspective section (below) indicates the major elements within each floor: the raised flooring, steel beams, concrete and metal deck, and metal ceilings. Opposite it (facing page, bottom) is a section showing the location of mechanical ducts beneath the raised floor and lights and sprinklers above the ceiling.



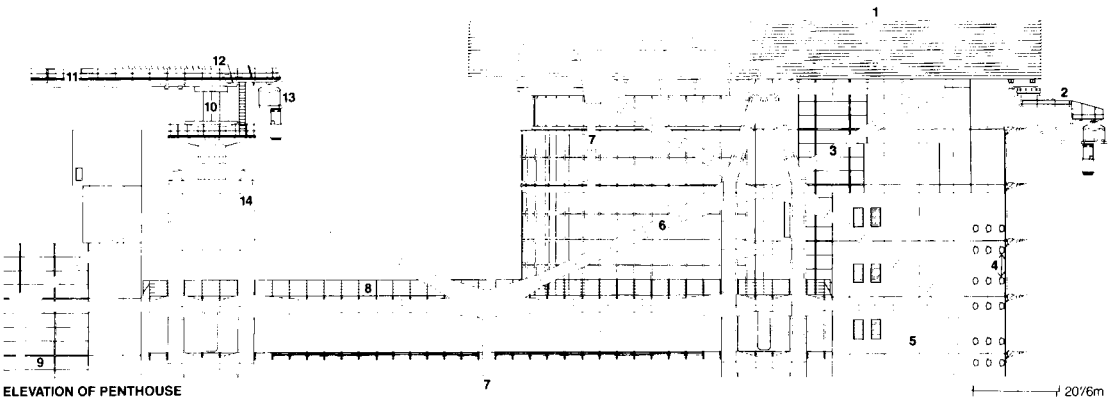
PLAN DETAIL 10'/3m

1 STEEL COLUMNS CLAD IN ALUMINUM
2 SERVICE ELEVATOR
3 GLASS ENCLOSURE
4 FIRE STAIR
5 HANGER
6 MECHANICAL RISERS
7 ELEVATORS
8 ELEVATOR LOBBY

1 LIGHT FIXTURES
2 RAISED FLOOR
3 DROPPED FLOOR SLAB
4 REINFORCED CONCRETE ON METAL DECK
5 PRIMARY STEEL BEAM
6 CAST ALUMINUM BRACKETS
7 ALUMINUM SUNSHADES
8 ALUMINUM MULLIONS



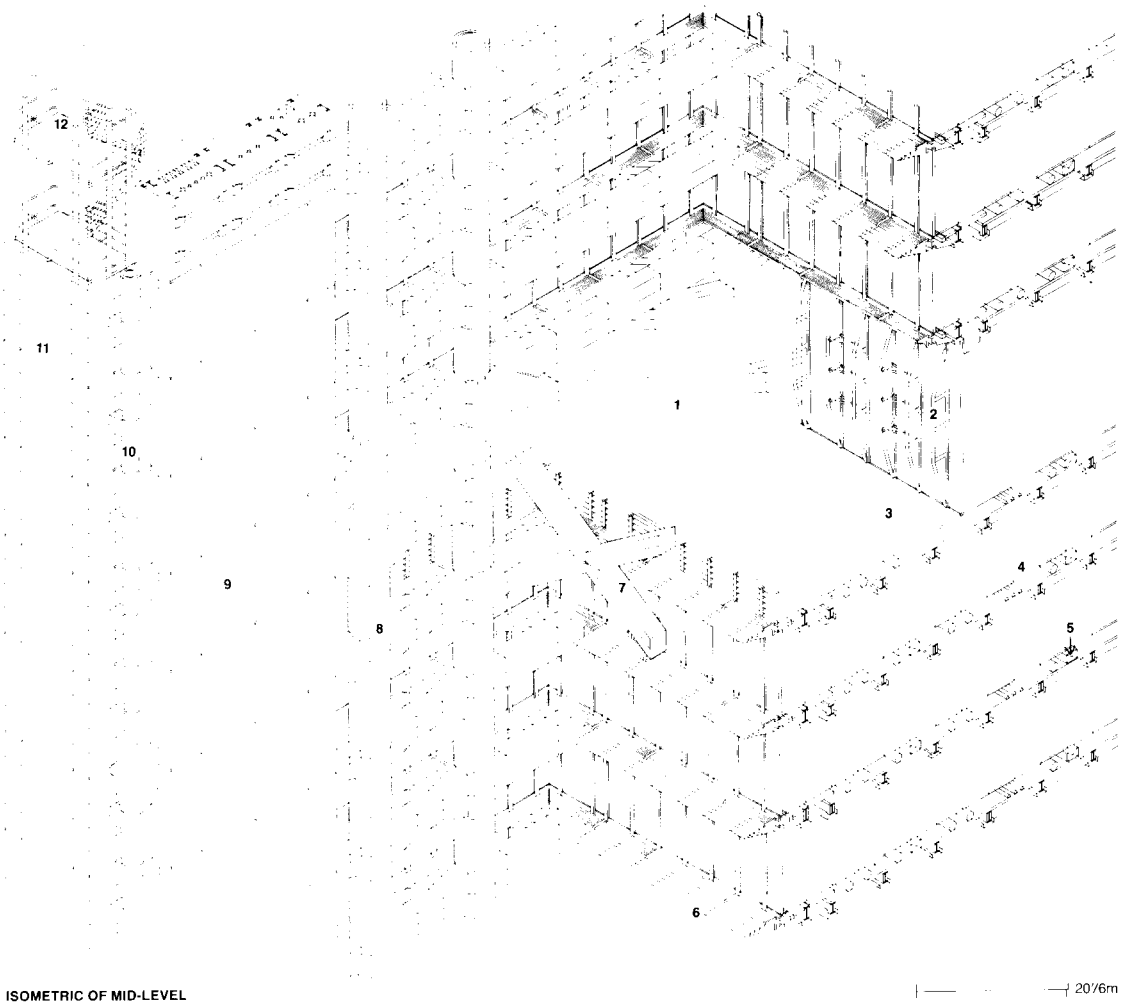
PERSPECTIVE SECTION OF TYPICAL FLOOR 10'/3m



1 HELICOPTER PAD
2 MAINTENANCE CRANE
3 INVERTED HORIZONTAL TRUSS
4 AIR INTAKE AND EXHAUST
5 TOILET AND PLANT ROOM MODULE
6 HORIZONTAL TRUSS
7 HANGER
8 REFUGE TERRACE
9 GLASS ENCLOSED FIRE STAIR
10 CONTROL CAB
11 HORIZONTAL TIE
12 PERMANENT MAINTENANCE CRANE
13 ROTATING ARM
14 VIERENDEEL TRUSS MAST

ELEVATION OF PENTHOUSE

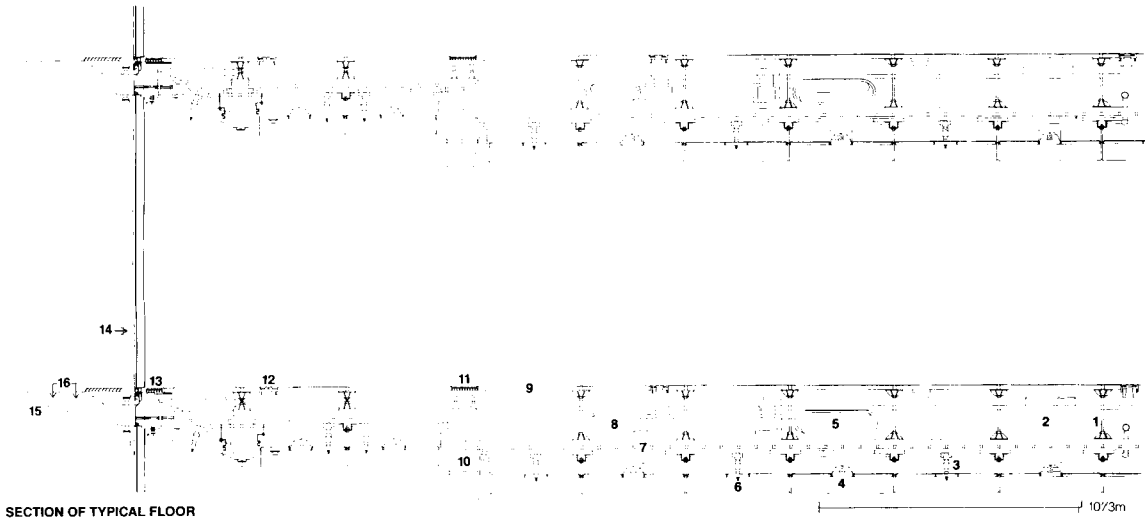
20'/6m



1 HORIZONTAL TRUSSES
2 TRUSSED MULLIONS
3 REFUGE TERRACE
4 RAISED FLOOR
5 SUBFLOOR HVAC DUCTS
6 ALUMINUM SUNSHADE
7 WIND BRACING
8 VIERENDEEL TRUSS MAST
9 MECHANICAL RISERS
10 HANGER
11 GLASS STAIR ENCLOSURE
12 FIRE STAIR

ISOMETRIC OF MID-LEVEL

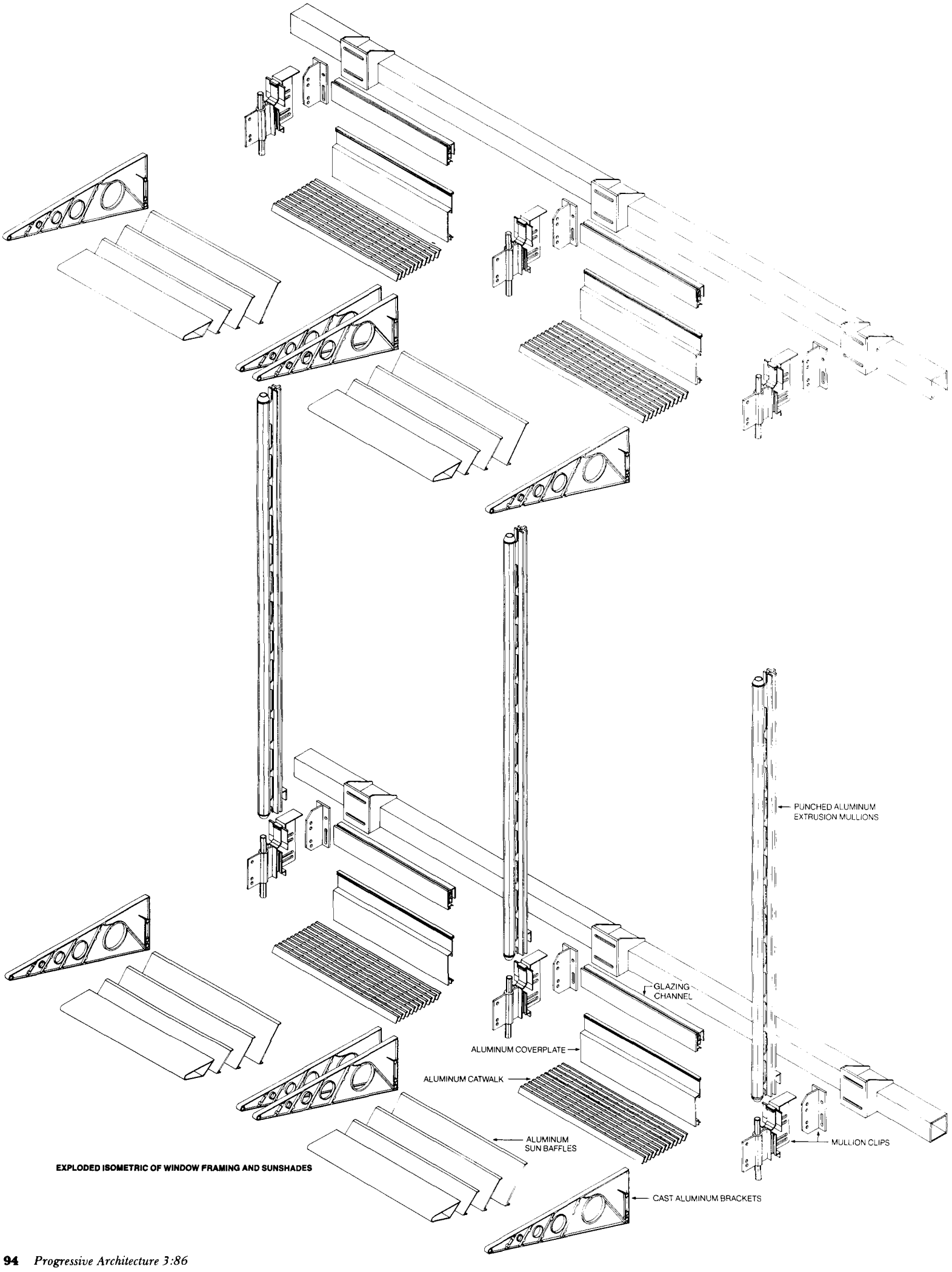
20'/6m



1 RAISED FLOOR PEDESTAL
2 RETURN AIR PLENUM
3 SPRINKLER PIPE
4 DOUBLE TUBE FLUORESCENT FIXTURE
5 CONSTANT VOLUME AIR SUPPLY DUCT
6 SPRINKLER HEAD
7 REINFORCED CONCRETE FLOOR SLAB ON METAL DECK
8 VARIABLE VOLUME AIR SUPPLY DUCT
9 RAISED FLOOR PANEL
10 PRIMARY STEEL BEAM
11 RETURN AIR GRILLE
12 VARIABLE VOLUME AIR SUPPLY GRILLE
13 CONSTANT VOLUME AIR SUPPLY GRILLE
14 EXTRUDED ALUMINUM MULLION
15 CAST ALUMINUM BRACKET
16 ALUMINUM SUNSHADE

SECTION OF TYPICAL FLOOR

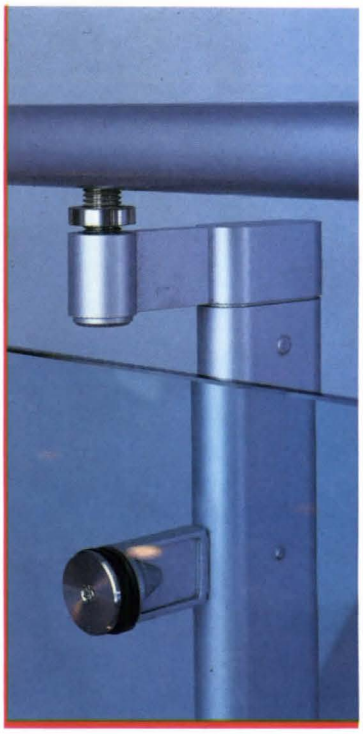
10'/3m



EXPLODED ISOMETRIC OF WINDOW FRAMING AND SUNSHADES

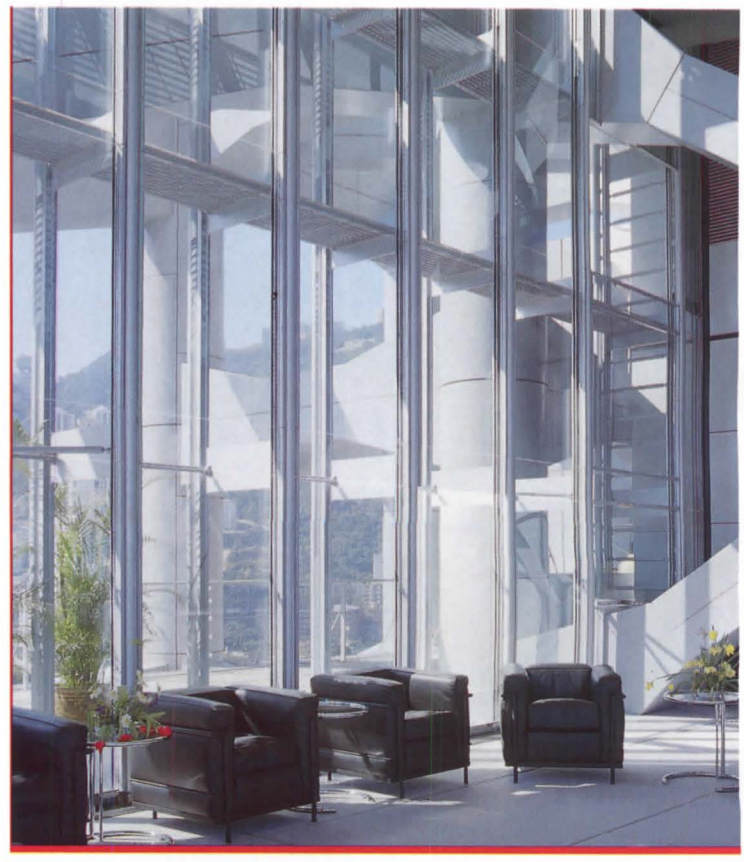
Visitors and employees alike move by elevator to the various double-story spaces in the building and, from there, by escalator to the intervening floors. At the central elevator core, Foster has pulled the floor away from the elevator shafts, allowing a view of them rising through the building (middle and bottom left). The dramatization of movement continues in the double-story levels (top left), where switch-back escalators, along with trusses and hangers, sweep through the space, and where glass elevator shafts and escalator undercarriages reveal the motion of machinery.

The articulation of parts, like the expression of movement, is a theme reflected in even the smallest detail in the building. The railings (right) offer one example of that, where elements that have different functions—handrail, fastener, support, and balustrade—have clearly separate positions. As the drawing of the cladding reveals (facing page), that articulation of elements represents a conception of the building as an industrialized object, made up of finely crafted, machine-made parts.



Richard Bryant

Richard Bryant

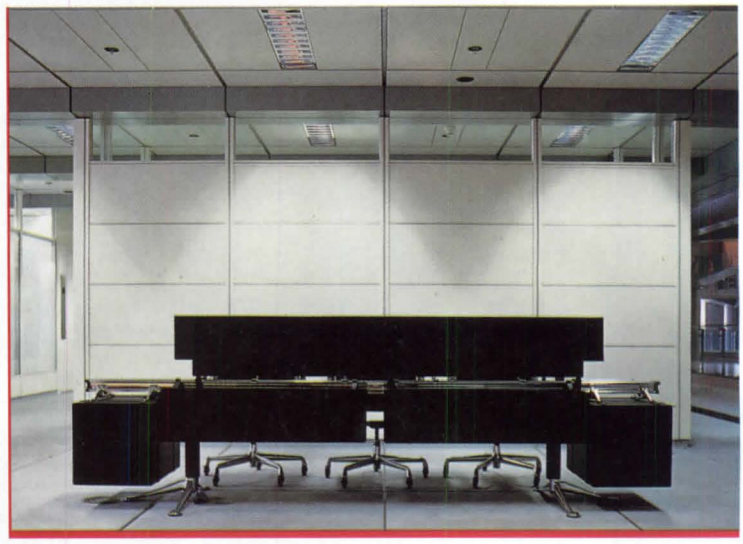


While the diagonal wind bracing and main support trusses do intrude upon the double-story spaces (right), they create an almost Piranesian effect (facing page). Foster has used the structural elements to best advantage, enclosing spaces (top right) with trusses and framing entries (middle right) with cross bracing. Because Hong Kong does not have the regulations that we have in the U.S. governing hazards to the blind, planters or other warning devices were not required under the diagonal bracing. Foster intended the double-story spaces to function like village centers, serving the employees on the floors immediately above and below. Implied in that egalitarian mingling of people is a nonhierarchical corporate organization. The bank, though, uses the spaces along more traditional lines, with executive dining in one space, for example, and employee dining in another.

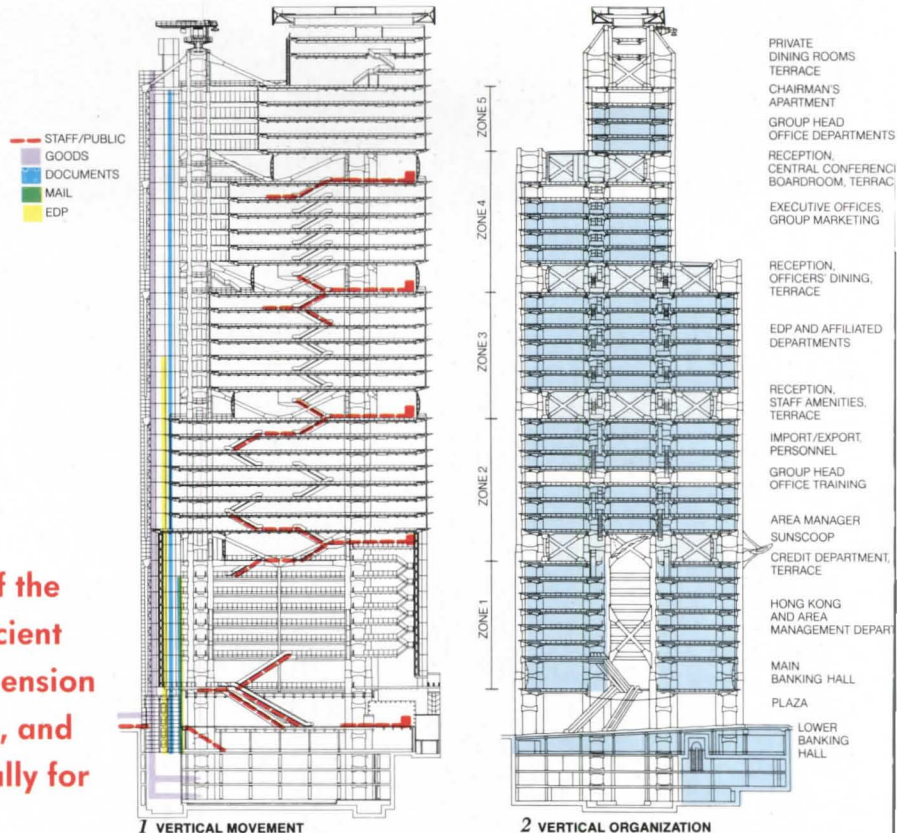
The aluminum cladding, made with custom-made stamping machines operating at a tolerance of 1/64 inch, fits the structural members precisely (facing page). A similar precision went into the fabrication of the glazing and mullions (bottom right). The double-height glazing has robot-welded trusses providing it with adequate wind resistance. Along the topmost spaces, shutters roll down an inner series of tracks in the event of a typhoon.

The office interiors are well lighted (top right) with perforated blinds set between two lights of glass to control daylight and glare. Black desks, gray carpets, and red desktop accessories provide the offices with a very subdued color scheme. The custom-designed partition system (middle right) consists of modular steel panels secured by vertical framing members four feet on center. The bank has a warehouse full of parts designed to accommodate attachment of partitions at the varied edge conditions created by the exposed structure.

Fire stairs (facing page) occupy some of the modules hung off the east and west sides of the building. Within those modules, a document transport system is made up of red "cars" that run along an electric track. Toilet and mechanical rooms (bottom right and left) occupy other modules. Prefabricated in Japan, they arrived at the site fully fitted out and went up at the rate of nine a week. The distribution of toilets, stairs, and mechanical equipment into several small modules on each floor facilitated their rapid installation and reduced pipe runs. But their compactness has its drawbacks, such as not allowing room for privacy vestibules at the front of the toilet modules or for some standard size equipment in the mechanical rooms.




exit



1 VERTICAL MOVEMENT

2 VERTICAL ORGANIZATION

Innovation occurs in almost every aspect of the bank's design and construction. For its efficient seawater cooling system, its bridgelike suspension structure, its socially oriented organization, and just the many products developed specifically for it, the bank will be long remembered.

A completed building may be influential or inspirational. But the process of a building's development—the maturing of the design, the refinement of details, the review and selection of products, and the progress of construction—is most informative, particularly to architects, who spend most of their time enmeshed in process-related problems.

No work proves that point more than the HongkongBank. Regardless of how engrossing is the completed building, with its endless variations on the themes of transparency and articulation, it is inseparable from the process that brought it about. The following articles discuss that process, beginning with an account of the building's organization and interior spaces and proceeding to a description of its structure: how it was designed, tested, and erected. From there, a recounting of the mechanical system's development, from the seawater tunnel to the ducts under the raised floor, leads to a similar exposition of the cladding, glazing, and daylighting systems.

In almost every one of those areas, innovations in materials and methods have occurred. Because of that, the process of designing the HongkongBank may in some ways even surpass the product.

Vertical Organization

To break down the anonymity of the tall building, Foster's first principle was to divide the 47-story structure into five above-ground zones, each served by a double-height floor. Apart from the escalators leading directly from plaza to banking hall, a total of 23 express elevators deliver staff and clients to the double-height floors, which correspond to the major structural transfer levels; circulation continues from these floors, upwards or downwards, via escalators, 60 in all (1). The escalators are intended to provide a more social means of movement within departments than the elevator, as well as a more efficient one—no waiting time is needed. And the elevator lobby space can be usable working space on the single-height floors.

The zoning is well suited to the building's programmatic needs, permitting individual identities for its local, area, and international corporate headquarters functions. It is also adaptable to the needs of the various departments (2): The lowest zones hold the largest departments receiving the most visits from customers, while the highest are smaller and require greater privacy. The reduction in zone size, and in distance between trusses, also contributes to the "forced perspective" expression on the exterior, emphasizing the skyward thrust of the tall building.

The double height levels (pp. 96–97) contain reception areas, fire refuge terraces, and specialized functions such as dining, recreation, and conference rooms. They were originally expected to hold functions specifically identified with their respective zones, but this did not transpire. These levels themselves can also be zoned in a number of ways. At double level 11/12, for example, express elevators deliver passengers to the mezzanine level 12. From there, two reception areas can be reached: people circulate via escalator either downwards, to the reception area for the credit department at level 11, or upward, to the reception for the area manager. Elsewhere, elevators deliver passengers to major reception areas at the base of the double-height spaces.

The zoning would also have permitted easily achieved separation of rentable space, which was originally planned for floors 13 to 19. Economic conditions—rental income is not as high as originally forecast—as well as increasing bank needs have reversed the decision to let space to outsiders.

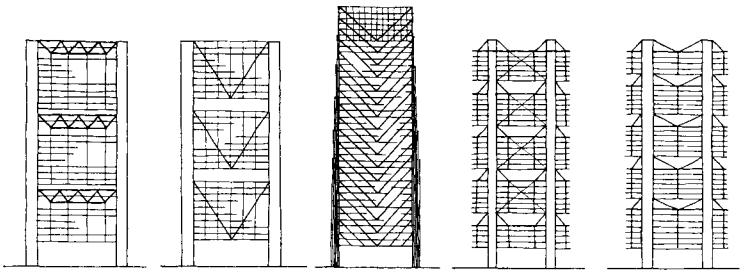
The express elevator system allows computer-controlled schedule changes for peak and off-peak times. It also allows for fairly subtle security screening, mainly at the double-height lobbies.

Elevators and escalators were specially designed with the aesthetic ideal found in virtually all parts of the building: to reveal the mechanical workings (p. 95). The machinery of the escalators is seen through sides and balustrades of glass, lightly tinted gray for maintenance reasons, at the bank's insistence, despite Foster's original desire for clear. The elevator shafts, too, are glazed to reveal the workings, and while the cabs are also glass-walled, they are not transparent. Instead, the walls are glass sandwiches with a fibrous center, producing a shoji, or Japanese screen, effect. Thus, they are seen as lighted cubes passing through the space, but do not provide the chills and thrills of, say, a John Portman elevator, which Foster feels would have been inappropriate given their high speeds. The elevator panels were redesigned from the standard Otis model, so that their wiring is visible through a glass panel.

V.I.P. visitors are driven to the west side of the building, where a separate elevator takes them from a special lounge at first basement level to their destination.

For the delivery of freight, two heavy-duty 18-ton-capacity hydraulic hoists run from the ground level to the three basement floors at the building's east side. Trucks, for example, can enter the hoists at ground level and exit at a lower level, where a turntable angles them for unloading and then for their return. Cabs, 24 feet deep, are of soundproof construction.

Another vertical transportation system—for document handling—was designed into the building. The system, made in West Germany, is a development of the pneumatic tubes once used in department stores. Electric tracks run up the east side of the building, and cars—



3

80 now, and eventually up to 400—are sent up from the central station in the basement to stations on 34 floors. There, they leave the shaft through fire shutters and park on a horizontal track, which can accommodate up to five parked cars. From there, documents can be sent to other floors by dialing numbers on any car (see p. 99).

Horizontal Organization

To allow the greatest planning flexibility on each floor, and to retain light, orientation by identity with the outside, and clear and spectacular views northward to the Harbor and southward to the Peak, the architects held all mechanical and transportation shafts to the east and west sides of the building. Structure, too, is kept to a strict minimum: At most, four structural columnar "masts" pass through any floor. The structural system divides the floors into east-west bays of about 10,000 net square feet each—three bays up to level 29 (with the atrium cut out of the central bay from levels 3 to 12), two bays in the seven stories above, and one bay at the top levels (plans, pp. 84–85).

To retain views for most workers, cellular office space, filing, record rooms, and conference room are kept to the central bay on three-bay floors. If more cellular office space is needed, a linear strip is allowed along the inner section of the outer bays. This subdivision of space does have the benefits of separating, in a basically open plan, general office space from circulation space, and of providing a means to screen visitors. Cellular offices are almost always provided with glazed north and south walls for views.

On the two-bay floors, escalator circulation occurs at the middle, with linear strips of cellular office space on either side. On the top floors, where guests are generally VIPs, circulation is by elevator only.

The net-to-gross ratio on the largest (35,000 square feet gross) floors is 1:1.2. To achieve the greatest efficiency, core areas were ruthlessly designed to a minimum. The virtual absence of columns obviously also contributes to efficiency, as does very careful overall planning, necessary given the non-centrality of the core. On the other hand, points out Ian Davidson of Foster Associates, studies reveal that central core buildings have a high percentage of "hidden" secondary circulation within rental spaces. He also says escalators can be considered an efficient circulation system beyond the lack of waiting time because you move vertically and horizontally at the same time. To save energy, the escalators are activated by pressure pads.

Office Layouts, Furniture, Signage, Lighting

Foster Associates and the bank used an agency to lay out office floors using CAD. First, in preparation, department areas were allocated relative to the given program. Then, based on Quickborner Bürolandschaft techniques, forms were filled in for each department, providing data as to visits, paper movement, and telephone contacts, and summary diagrams were prepared. Next, Foster Associates scrutinized appropriate furniture systems for durability, price, and fit with the bank's needs, and decided upon a mix-and-match system with the bulk from five different manufacturers, benefiting from the low unit prices for desks and storage pieces in certain systems, while avoiding costly add-ons. For the desired open feeling, Foster Associates recommended using only one height of screens, 60 inches high. (The bank ordered, in addition, a number of higher screens, which it now realizes was a mistake.)

Finally, zones were established on each floor using bubble diagrams, CAD was used to plan the layouts (workers were allotted at least 160 square feet each, twice the Hong Kong norm), information was sent to the site to establish outlet locations, and furniture was ordered.

For the cellular offices, a partition system—vinyl-coated steel panels on aluminum channels—was custom-designed by Foster Associates and built in Japan. In order to accommodate the potentially high deflection of the structure, it is a suspension system with a two-inch movement joint at the floor. It can accept double or single glazing or solid panels, or a combination of glass and solid. Flat magnets fit on the partitions to hang art work, worksheets, and so on, and the architects have demonstrated how to organize hung material. Because of the vast number of ceiling conditions, including beam penetrations (15 and 16), the "universal" partition system has a great number of parts that must be stored for potential changes, and a User's Manual has been prepared for its use. (The building's User's Manual includes sections on office planning, lighting arrangements, electrical changes, visual rules to prevent clutter, and so on: There is a vast quantity of paper and data, with nine different data management systems, including Telex, Reuters, and the bank's own systems.)

The banking hall counters of laminated black Belgian marble (p. 91) were designed by Foster's office and fabricated in Italy, with a full set of mock-ups prepared before the real thing was built. The bank was persuaded to allow the omission of a full-height glass security screen, partly because cash storage is minimum in the hall, and partly because limited exits render security relatively simple. Furthermore, the depth of the counters precludes strangers from reaching the cash drawers. The counter system is a kit of parts: 24-inch and 36-inch-wide rectangular working units can be combined with narrow trapezoidal pieces to create a sinuous curve. A variety of storage and worksurfaces are provided, as well as suspicion buttons and changeable electronic signs giving functions and tellers' names. A depressed stainless steel transactions tray took months to develop, its stamped surface etched through a new process.

The signage system, which was developed in West Germany, is variable. "Hidden messages" are contained within glass or acrylic panels, and are individually revealed, as appropriate, by illumination from behind, controlled by an automatic system. There are a zone and an elevator directory at each floor, signs above the escalators, and a central directory at the plaza. Foster Associates controlled the graphic design of the signs, while the Chinese messages were translated from the English by a Professor of Chinese at Leyden University in Holland.

The lighting system for typical floors, devised with the help of consultant Claude Engle, is a highly flexible one. It consists of a grid of triphosphor ceiling fixtures, each of which can take one or two lamps, one above the other, and can be adapted for fluorescent or halogen lights. Depending on the type and number of tubes, light levels can be varied from 300 up to 800 lux for different uses.

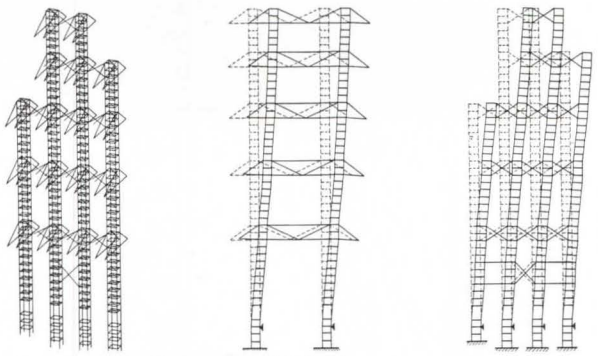
Structure

The HongkongBank's suspension structure is actually several suspension structures stacked one on top of the other. Suspended high-rise construction is not a new idea, although no building has used it to the extent or in the configuration here. Nor is suspended construction the most efficient for high-rise structures, since loads must travel

4 *Model of Hong Kong in wind tunnel*

Boundary Layer Wind Tunnel Laboratory

5 *Building model used in wind tunnel*



6 *Computer simulation of wind deflection*

farther—up a hanger, along a truss, and down a column—to reach the ground. But Foster Associates and Ove Arup & Partners have used suspension to best advantage. By stacking several smaller suspension structures on top of each other, they have reduced the travel distance of most loads while retaining the benefits of suspended construction: opening up the ground level, minimizing the foundation area, and reducing the floor space devoted to structure.

The original motive for using suspended construction came from the bank's requirement that its 1935 banking hall remain in operation during construction of the new building. The winning competition scheme by Foster and Arup had concrete cores along both sides of the building supporting three two-story-high trusses which, in turn, supported floors suspended over the banking hall. The later decision to rehabilitate an annex building for bank operations made the retention of the banking hall unnecessary. But the suspended structure remained, allowing the provision of a public plaza under the building, which served as a good-will gesture to a city in desperate need of urban open space and as a way of increasing the code-mandated floor area ratio from 15:1 to 18:1.

The building's design went through several revisions before taking its present form. According to Ken Shuttleworth of Foster Associates, initial changes to the original competition scheme included elimination of the concrete cores, and redesign of the awkward spaces among the double-story trusses. V-shaped hangers replaced the horizontal trusses, and steel masts replaced the concrete supports. Unfortunately, the V-shaped hangers, forming "chevrons" on the building's façade, proved unacceptable because, according to fung-shui, they symbolized money down the drain. Subsequent revisions led to the final "coat hanger" scheme, with its steel masts supporting suspension trusses and vertical hangers (3).

The structure, as built, has eight supporting masts arranged in two rows of four. Each mast consists of four tubular steel columns linked by haunched beams at every floor to form vertical Vierendeel trusses. (The beams were eliminated at the plaza level to give pedestrians adequate headroom.) Cross-bracing at every floor level in the masts and at the double-story spaces between the masts increases the structure's stiffness. The huge columns taper in diameter from 4.6 to 2.6 feet and their walls decrease in thickness from 3.9 to 1.5 inches—a response to the reduced loading as the building rises.

The suspension trusses, located at each of the five double-story spaces, have rectangular members made of two thick plates connected by thinner web plates. From those trusses hang steel tubes, ranging from 11.8 to 5.9 inches in diameter, that support the primary beams under each floor. Between those primary beams span perpendicular I-beams, over which lie metal decking and concrete floor slabs 3.9 inches thick (see section details, p. 93). Since the Hong Kong building code does not recognize metal deck as reinforcement, additional reinforcing was laid in the concrete slabs, turning the metal deck into little more than permanent shuttering.

The size of the loads, as much as 2000 tons in some structural members, made bolted connections impractical, says Tony Fitzpatrick of Ove Arup & Partners. Some connections would have required as many as 150 bolts. The engineers thus recommended the use of pin connections such as those used in bridge construction (7). While the solid steel pins are themselves as large as 15 inches in diameter, they greatly reduce the size and ease the fastening of connections among the masts, trusses, and hangers.

The change from bolted to pin connections shows how much the apparent functionalism of the building was tempered by pragmatics and aesthetics. The move to pin connections came after the signing of the cladding contract, making it an expensive proposition to redesign the cladding to fit better the smaller connections. Besides, Foster preferred haunches at each structural connection, says Fitzpatrick, because they reflected traditional expectations, if not the reality, of the joints. Steel outriggers, attached to the pin-connected plates, now support the oversized cladding at the major structural joints.

The masts serve a role other than that of supporting the suspension trusses. At the top of the building, two masts support an inverted suspension truss, which supports a platform intended for use as a heliport. A permanent crane hangs from that platform for use in cleaning the glass around the bank chairman's penthouse apartment. (see elevation detail, p. 93).

Four additional cranes stand on top of Vierendeel masts to support cleaning platforms and to move computers and other heavy equipment in and out of the building. The cranes, which can rotate 359 degrees, feature a telescoping horizontal jib that extends over 78 feet (the longest horizontal jib in the world, according to Tony Hackett of Foster Associates) and a rotating ring and arm at the end of the jib from which hang the cables. Every point on the outside of the building is accessible by at least one crane.

Wind Testing

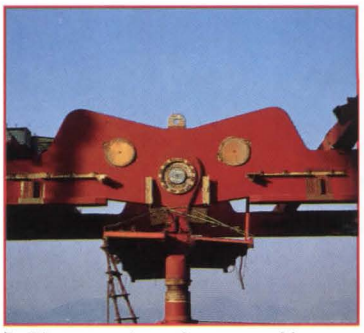
"The HongkongBank has been a customized Rolls Royce effort," says Professor Alan Davenport, director of the University of Ontario's Boundary Layer Wind Tunnel Laboratory; and so unusually exhaustive wind engineering studies were performed on its design. The laboratory, which was established by Davenport in 1965, has carried out wind studies on a high percentage of the large and prominent buildings of the past two decades and, as Associate Research Director David Surry points out, it has pushed the field from serving a remedial function to being in demand now for design. Probably nowhere has this been as elaborately demonstrated as at the HongkongBank.

First, the wind climate was studied, as Hong Kong has the highest incidence of tropical storms in the world, and those in the Pacific are very intense. Data were obtained from the Hong Kong Observatory, as well as from monitoring devices on a small island just off the main Hong Kong island, with corrections made for local differences.

Then, the topography was studied to determine how much shelter was provided by mountains to the south of the site (a great deal, as it turned out, confirming the wisdom of the mariners of old, who located their harbor here). A topographical model of the island and the adjacent mainland, scaled 1:2500, was built and tested in one of the lab's wind tunnels.

Next, aerodynamic studies were made to determine the forces that the winds might create on the structure as a whole—overall loads, deflections, accelerations—and on the skin itself. Two models, both at a scale of 1:500, were tested in the wind tunnel: a force model, shown above, in the wind tunnel (4), and with a force balance at its base (5); and a surface pressure model, with 520 pressure taps.

The data were then synthesized to produce very explicit loads, and to predict how the building would perform over a 50-year period, from the point of view of structural stability as well as human



7 Pin connections of trusses and hangers

8 Polymer cement corrosion protection

comfort: How many incidents of discomfort would occur, for example, from swaying due to wind in normal situations and even in typhoon periods. In the latter situations, Hong Kong offices normally shut down and people quickly return home, so these occasions are not considered crucial from the occupant's comfort point of view; but even in these situations, the bank is expected to perform satisfactorily. The data were developed in conjunction with Ove Arup & Partners and applied by them, with the resulting structure described above. In general, the Hong Kong code was more conservative than predictions derived from the wind studies, and the code requirements had to be followed. In a couple of cases, however, the authorities allowed design loads to be reduced in response to study data: The edge loading condition on glazing was permitted to be reduced to a still very conservative 100 psi; and the stiffness requirement, particularly in deflection, was reduced, saving a great deal of structural steel.

Supplementary studies were performed on other areas of the design, the foremost being on the exterior pedestrian levels—refuge terraces and ground-level plaza. The bank wanted the plaza environment to be very pleasant, with no gusts, and the lab did studies of this area at a scale of 1:100. In the original design, the building had a very small footprint, with porosity on all four sides. The east and west sides were subsequently closed as a result of wind predictions, but two entirely open sides, one across from the other, still presented problems. A number of possibilities were studied, including the use of canopies (but it was impossible to make them big enough to be effective), baffle walls, and jet air curtains. The latter solution, developed for the first time for a large space with two facing openings, was finally considered viable, but at a date too late to be applied, at least for the HongkongBank. The solution that was eventually applied called for hanging walls (p. 86), always enclosing at least the upper part of each opening, but with panels able to be dropped further in case of moderate winds, or completely in the case of a typhoon.

Another area of study, looked at in conjunction with the mechanical engineers, was the atrium. Foster originally wanted it to be entirely open to the plaza below, but that would have made a space obviously impossible to air condition. Even with small openings, as was eventually agreed to, the inversion problems had to be carefully studied.

Other areas of study included the air flow on what was to be (and may still become) the helicopter pad, as well as the monitoring of the entire building, as built. A simple set of accelerometer and anemometer (wind meter) has been installed, likely to contribute still more to the science of wind engineering, in the progressive spirit with which the bank building was conceived and developed.

Steel Treatment

The HongkongBank's two previous buildings on this site met the bank's space needs for about 50 years. With that history in mind, the bank wanted a 50-year life for the new building's structure—a requirement that, in the treatment of the structural steel, demanded the modification of some products and the outright invention of others.

Because the steel takes very large loads at finite locations, says Tony Fitzpatrick of Ove Arup & Partners, it could fracture at the joints. That led to the specification of desulfurized steel, which has greater ductility and toughness. It also led to the use of very thick steel; the steel at the base of the masts—3.9 inches thick—tested the bending capacity of the fabricator's equipment.

Because of the building's location near salt water and its large amount of exposed structure, the corrosion and fire protection of the steel was particularly important. Painted corrosion protection systems, says Fitzpatrick, last no more than ten years. Encasing the steel in two inches of concrete, the thickness normally required for external steel, was ill-suited to the variety of steel shapes and an obstruction to the attachment of the aluminum cladding. That led to the development of a new corrosion-resistant product: a steel-fiber- and polymer-modified cement coating. The steel fibers give the cement greater adhesion, and the polymer—styrene butadiene rubber—gives it greater density and thus greater resistance to water vapor penetration. As a result, one half inch of the modified cement offers the same protection as two inches of unmodified cement.

The modified cement went on both the exterior steel and the major internal structural elements. Contractors first blast-cleaned the steel and then pressure-washed it to remove any salt deposits prior to gun-applying the polymer cement in two layers. The first layer contained steel fibers (5 percent by weight) to ensure the coating's adhesion. The second layer omitted the steel fibers to reduce costs. Most coating of the steel occurred off site to speed up erection time; only structural joints and cladding attachments received the cement coating in situ (8).

Secondary steel members in the building's interior received a variety of other corrosion protection treatments. Aluminum-filled epoxy paint was applied to hangers and truss members; floor beams were galvanized and chromated; other areas were either galvanized or flame-sprayed with zinc.

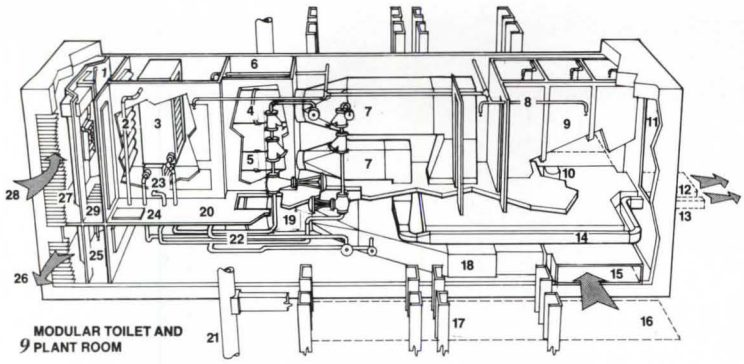
Fire protection of the major structural elements utilized ceramic fiber blankets, held to the steel by a stainless steel mesh. Floor beams and decking received more conventional fire protection: fire-rated board for the beams and sprayed-on vermiculite for the decking. Where steel remained exposed, such as the fire stair rails and window mullions, it received intumescent coatings—4 to 6 mm for a one-hour rating, 13 mm for two hours.

Foundations

The building site straddles Hong Kong's original shoreline and later landfill. Because of that, the soil consists of about 23 feet of loose fill, 13 feet of sandy marine deposits, and 88 feet of completely decomposed granite on top of the granite bedrock, with groundwater lying anywhere from 6 to 9 feet below grade. Those conditions, plus the number of older buildings with shallow basements adjacent to the site, made digging the foundations and building the basement a challenge.

To increase the speed of construction, it was decided to build up and down at the same time: The superstructure went up as the foundation and basement went down. The advantages of that approach included a reduction in the amount of lateral ground movement, since the concrete basement slabs provided better support than steel bracing and a speeding up of the construction schedule, since the erection of the superstructure did not have to wait for the completion of the excavation. A slower and more costly excavation was the primary drawback.

Excavation began with the digging of a three-foot-thick diaphragm



1 MIXING PLENUM **2** FILTERS **3** COOLING COIL **4** VAV SUPPLY FAN **5** CV SUPPLY FAN **6** FAN COMPARTMENT **7** PRIMARY ATTENUATORS **8** SPRINKLER PIPEWORK **9** TOILET COMPARTMENT **10** CV AIR CONDITIONING SUPPLY TO SUB-FLOOR **11** ACCESS FROM BUILDING **12** VAV AIR CONDITIONING SUPPLY TO SUB-FLOOR **13** CV AIR CONDITIONING SUPPLY TO SUB-FLOOR **14** CV DUCTWORK **15** RETURN AIR FROM OFFICE VIA SUB-FLOOR **16** OUTLINE OF RISERS **17** RISER FRAMES **18** RETURN AIR DUCTWORK **19** RETURN AIR FAN **20** RAISED FLOOR **21** VERTICAL HANGER **22** PIPEWORK SERVING COOLING/HEATING COILS **23** HEATING/COOLING COIL **24** SUB-FLOOR ACCESS HATCH **25** EXHAUST PLENUM **26** EXHAUST AIR **27** "WIND TUNNEL" **28** FRESH AIR INTAKE **29** RECIRCULATION CONTROL DAMPER

***10** Exterior view of modules*

wall around the site. The contractors had planned to dig the masts' foundations after the diaphragm wall was complete, but obstructions, which delayed the wall's completion for four months, forced them to proceed with the mast foundations in hand-dug caissons. Once they completed the diaphragm wall, they grouted its base to form a watertight enclosure that minimized the drawdown of groundwater and the settlement of adjacent buildings.

As the area within the diaphragm wall was excavated, the contractors poured the concrete basement floor slabs. Here, the perfectionism that characterizes so much of Foster's work ran afoul of the inherent limitations of a material. Foster wanted the underside of the uppermost concrete slab, which forms the ceiling of the basement banking hall, to be uniform enough to remain uncoated. While the underside of that slab is as good as any concrete finish in Hong Kong, the finish Foster sought, according to the contractor, is just not possible with concrete. The bank ended up coating the slab's underside with a sealer.

Circular steel columns, encased in circular precast concrete cladding that was filled with a sand-cement grout, support the basement floor slabs. Because the masts, which carry the full weight of the building above grade, had foundations independent of the below grade columns, the basement did not have enough dead load to resist the uplift of hydrostatic pressure. The designers considered dewatering the area within the diaphragm wall to reduce the water pressures, but the bank foresaw too many maintenance problems. (As it is, a drainage cavity surrounds the basement to catch any water that might leak through the diaphragm wall.) The engineers ultimately decided to anchor the basement to the bedrock. That involved placing tie-downs through the base of the columns, a solution that relieved the hydrostatic pressure against all but the lowest floor slab.

Seawater Tunnel

Water for the building's air conditioning and flushing comes from Hong Kong's harbor, piped through a 1150-foot-long, 20-foot-diameter tunnel buried 245 feet deep in solid granite. While a project that size, for one building, is extraordinary, it makes sense in the context of Hong Kong.

Because of the high utility costs, office buildings have used harbor water for cooling for the last 20 years. The mechanical engineers for the bank, JRP (Central) Ltd., evaluated other cooling options, based upon air-cooled condensers, and found that the air-cooled schemes used 30 percent more electrical energy than water-source heat pumps. Harbor water, says Deryck Thornley of JRP, also provided a more reliable cooling source, an important consideration given the bank's dependence on computers housed in the building.

Space saving further tipped the scales in favor of water-source heat pumps. Air-cooled condensers would have demanded about 27,000 square feet of prime floor space at the top of the building plus extensive riser space. The heat pumps occupied much less space and could be located in the basement.

If the use of harbor-water heat pumps saved energy and space, the decision to build a tunnel to convey water from the harbor to the building saved the tearing up of the public open space in front of the building and served as a potential source of revenue for the bank. Between the building and the harbor stand a subway station, two projected subway tubes, and a public square. The depth of the subway lines and the desire to minimize surface disruption forced running the tunnel through the granite bedrock—a costly procedure but one that at least eliminated the need for tunnel bracing or compressed air.

The size of the tunnel reflects its origin as a joint project between the bank and the Hong Kong government to house water pipes for several downtown buildings. The government eventually pulled out of the project, but the bank decided to continue with it at its present size with the idea of one day leasing piping space.

The operation of the harbor water system is fairly simple. Pumps draw water, which varies in temperature over the year from 60 to 82 F, through filters in an inlet station just off shore. The water moves through 27-inch pipes to titanium plate heat exchangers in the basement of the bank; another pipe serves the building's flush water needs. While the system can be used to heat the building, it mostly provides a cooling source, raising the temperature of the returning water only about 5 F in winter and 10 F in summer. Those temperature differences, says Thornley, are too small to affect the ecology of whatever life is left in Hong Kong's harbor. (In fact, filtering the harbor's dirty water has been the major problem encountered with the system.) From the heat pumps, vertical piping circulates chilled water up the risers on the west side of the building to the chillers located at the back of the service modules.

Modules

The mechanical services on each floor occupy prefabricated modules hung off the east and west sides of the building. While other structures have used similar modular service units, none have used them on such a large scale on a high-rise building.

There are 139 modules in all. The number on each floor decreases as the building steps up, with four units on lower floors and two on upper floors. Size differs according to the side of the building they occupy. The modules on the east side are 11.8 feet wide and 30 feet long, containing toilets at the front and miscellaneous mechanical equipment, such as heat exchangers and domestic hot and cold water tanks, at the back. Those on the west side have the same width and toilet compartments at the front end. The HVAC equipment at their back, however, required that the west side modules have a 40-foot length.

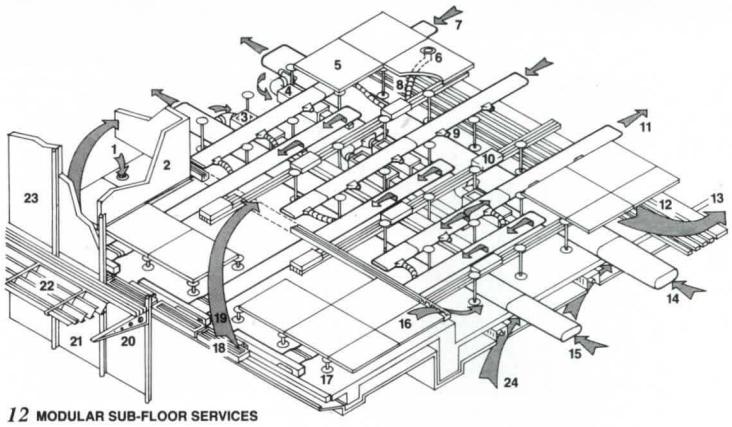
Those relatively tight dimensions have both good and bad consequences. The good comes from the small amount of floor space that the modules require, contributing to the building's excellent net to gross ratio. Less desirable is the lack of privacy screens at the toilet room entries and the lack of space in the small plant rooms for some standard HVAC equipment.

Foster Associates envisioned the modules, initially, as standardized, structurally independent units, capable of replacement when needed. Standardization ran up against the varied size and square footage of the building's floors. It cost less to tailor the mechanical equipment to the thermal requirements of each floor than to standardize the equipment in each module. With two lengths of modules, says Ken Shuttleworth of Foster Associates, two types of air supply locations, two types of toilets, ten different air-handling units, and a variety of ancillary equipment, only two or three modules are ever alike.

The idea of plugging modules in and out came from the recognition that, because the mechanical equipment has a design life of about 25 years (half that of the building), some provision for replace-

11 Installation of raised floor/HVAC

1 CIRCULAR FLOOR GRILLE WITH TEMPERATURE SENSOR **2** OFFICE PARTITION **3** CAV TERMINAL UNIT **4** VAV TERMINAL UNIT **5** FLOOR TILE **6** CIRCULAR VAV SUPPLY GRILLE **7** SECONDARY VAV DUCT (SUPPLIED FROM PRIMARY DUCT IN OPPOSITE BAY) **8** FLEXIBLE CONNECTORS TO FLOOR GRILLES **9** UNUSED SPIGOTS PROVIDED WITH REMOVABLE END CAPS **10** UNDERFLOOR DISTRIBUTION UNIT **11** SECONDARY VAV DUCT **12** ELECTRICAL AND COMMUNICATIONS TRUNKING **13** RETURN AIR THROUGH SUB-FLOOR **14** VARIABLE AIR VOLUME PRIMARY DUCT **15** CONSTANT AIR VOLUME PRIMARY DUCT **16** LINEAR RETURN AIR GRILLE WITH TEMPERATURE SENSOR **17** FLOOR SUPPORT **18** PERIMETER SUPPLY GRILLE **19** PERIMETER SUPPLY AIR **20** CAST ALUMINUM BRACKETS **21** PERFORATED REFLECTIVE MID-PANE BLINDS **22** EXTRUDED ALUMINUM SUNSCREEN **23** DOUBLE GLAZING SYSTEM **24** APPROXIMATELY 20% CONDITIONED AIR RETURNED FROM HIGH LEVEL VIA LUMINAIRES



12 **MODULAR SUB-FLOOR SERVICES**

ment had to be made. The lack of standardization among modules, though, plus the added surface area and cumbersome attachment of plug-in units made the idea unfeasible. Instead, equipment can be replaced piece by piece from within the building. To ensure that that would work, Foster Associates had full size mock-ups of the modules built and the actual equipment moved in and out.

The initial idea of using stressed skin construction proved unfeasible too because of the number of pipe and duct penetrations through the skin. Box frames, composed of two trusses running the length of the modules and spanned by a composite steel and concrete deck, was the simplest alternative. Stub beams projecting from the trusses connect to the hangers that support the modules. The 25- to 30-ton modules also partly support each other.

Because the Japanese had considerable experience building and packaging prefabricated units, a consortium of Japanese companies manufactured the modules. Each module arrived at the site clad in a stainless steel skin and completely fitted out, allowing installation to occur at a rate of nine a week. Some equipment had to be lowered through the roof for it to fit. Electrical and mechanical risers, which stand next to the service modules on the outboard side of the hangers, also are prefabricated in two- and three-story segments (10).

The modules contain an ingenious air-handling system. Two "wind tunnels," one for intake air and one for exhaust air, occupy the full width of the modules' back side. Intake air passes into a mixing plenum, through filters, over cooling coils, and on to the variable air volume ducts running through the subfloor. Return air comes through the subfloor plenum, into a duct beneath the modules' floor, and either recirculates to the constant volume air system that feeds the building's perimeter or exits through the exhaust louvers (9).

The module locations presented a major conflict between mechanical and structural systems. The modules' alignment with the masts required that the air ducts in the modules' subfloors cross the masts' beams. The architects and engineers considered puncturing the beams to allow the ducts to pass, but that presented other structural problems. They looked at moving the modules to the space between masts, but that led to conflicts with cross bracing blocking the modules' doors. The solution—one that the mechanical engineer Deryck Thornley laments—squeaks the ducts under the beams or passes them around the masts through cramped riser chases.

Where the modules work well with other systems is in the removal of smoke from the building. To get 100 percent fresh air into the building quickly, a fire official can signal the fresh air dampers to open, the supply air fans to operate at full volume, and the exhaust fans and recirculation dampers to close down. Exterior smoke doors located throughout the building open to exhaust the smoke, and the staircases are pressurized to aid in the evacuation of the floors affected by a fire.

Because of the narrowness of the streets in Hong Kong, the fire codes require that refuge areas be provided within buildings to prevent occupants from crowding the streets and hampering fire fighting operations. The terraces at each double-story level serve that refuge function in the HongkongBank. The fire stairs exit onto the terraces rather than allowing people to continue down to the street.

Raised Floor

Raised floors (11, 12) were clearly inevitable in the building, given the cabling needs of electronic banking. To make further use of this floor cavity, as well as to avoid an additional deep cavity above the ceiling (where only lighting, fire detection, and sprinkling devices were ultimately located), and for ease of access to ductwork for maintenance and change, the architects and engineers investigated the possibility of distributing air conditioning under the floor. Floor-mounted air-conditioning grilles have been used for years in computer rooms, but the comfort criteria for such rooms have been lower than for office accommodation. In all, a number of problems had to be solved: the achievement of desirable criteria, without discomfort zones at the outlets; the distribution within the floor cavity, given the three-bay structural system; the flexibility of the ducting, as the office spaces were intended to be totally flexible and the partitions changeable; and the flexibility, appearance, and structure of the floor panel system, including the air-conditioning and electric outlets in them.

Fresh air is drawn through louvers in the building cladding into the modules (see p. 93), where it is treated by the individual air-conditioning plants and blown by fans into the floor void. Here, it is distributed by a continuous linear diffuser (fed by constant and variable air volume units) adjacent to the perimeter glazing, or through circular supply diffusers (fed by variable air volume supply ducts) in the floor panels (12). Additional air supply outlets from columns or workstations, suggested by manufacturers in West Germany and originally considered, were found to be unnecessary. Air is exhausted through linear floor grilles and (about 20 percent) through the ceiling light fixtures. Temperature sensors are located in the return air floor grilles. For the necessary comfort levels, the circular diffuser, made in West Germany, is quite large, about eight inches in diameter, and the grille has a face of concentric rings over internal radial vanes to induce swirl in the emerging air jet. To meet fire regulations, the outlet's major elements were die cast in aluminum. (The flush floor-mounted outlets for power, telephone, and telecommunications, located over special segmentally divided boxes, are made to look exactly like those for air conditioning.) Because the air outlet locations are variable, positions where they can create discomfort—directly, say, under a chair—can usually be avoided. Full-scale air distribution tests were carried out in a simulated office space before the design was finalized, to confirm the system's effectiveness.

The mechanical servicing system follows the dictates of the structural system, whose primary beams run east-west and divide the floor into three bays, each with a 26-inch-deep subfloor void (nine inches at the perimeter zone). The primary ductwork, then, runs east-west (from the on-floor air-conditioning plants) in the lower 14 inches; secondary ductwork runs in the 8-inch zone above, leaving 4 inches for outlet location (see detail section, p. 93). For ease of manufacture and installation, each section of services was broken down into easily handled modules, which were checked through trial assemblies before being brought to the site. The variable air volume supply ducts feeding the circular grilles are flexible hoses that can be directed to any of a number of locations.

Size, support system, composition, and finish material of the panels themselves were debated long and hard. A two-foot square, a two-by-four-foot panel, and a four-foot square were considered, as well as larger sizes. The four-foot square was chosen: A larger one would have required intermediate stringers; a smaller one would have meant too many joints, which would have been visually disruptive

13 Mullions at double-height spaces

14 Aluminum sunshades around building

and uncomfortable for those on movable chairs. Only in computer areas, where weights and access needs are greater and deflection criteria more critical, are two-foot squares used. For planning flexibility, a panel with up to two outlets can be put in any square of the floor grid.

The four-foot panels had to support a uniform load of 100 psi, plus a concentrated load (partitions) of 1100 pounds. For the composition of the panels, the architects looked at a number of alternatives, including die-cast aluminum. They finally concluded that a laminated panel with an aluminum honeycomb core and an edge stop of aluminum would have the necessary strength and lightness (45 pounds per four-foot panel), and with a plastic wiper in the edge stop, could achieve the tolerances required acoustically and for the floor's service as a plenum (though it leaks slightly more air than expected). While the honeycomb laminate system had been widely used in the aerospace industry, finding a producer for an architectural project, which required a large run but less finicky standards than the aerospace industry, was not easy. H.H. Robertson Company agreed to enter into a contract, which included developing and testing the product. The bank owns the copyrights to the panel system.

Meanwhile, the pedestals supporting the panels were developed. These are spaced at four-foot intervals, each one carrying a corner of four panels. They are screwed into cast aluminum base plates fixed to the concrete with an epoxy adhesive, and they have their own built-in leveling devices. Each panel has a maximum dimensional tolerance of +0 inch and −0.40 inch, and an entire floor can be leveled to a tolerance of 0.20 inch.

A carpeted surface with a backing is used almost throughout, bringing the panel up to necessary acoustic standards despite the lightweight honeycomb core. The choice of carpet was crucial: Its pile had to be exactly as high as the panel edge, and dense enough to maintain this height, in order to avoid discomfort (and danger) to workers in chairs on casters. Rubber and wood are alternative finishes. The edge stop, however, did not work well with stone, which is used in the Banking Hall. There, a reinforced stone panel merely sits on top of the honeycomb, held down by its dead weight alone.

Cladding

The bank's aluminum cladding holds the record as the largest single contract ever signed for aluminum cladding on a building (4.5 million square feet) and the largest amount of fluoropolymer coating ever used on a building (26,000 gallons). What's most impressive about the cladding, though, is not its quantity but its precision.

That precision has much to do with the sophisticated equipment adapted to or developed for the project by the fabricator, Cupples. Conventional rolling, cutting, and welding procedures, says Phillip Bonzon of Cupples, were not acceptable. Curving aluminum plate in rollers not only took too long and had insufficient accuracy, but it couldn't handle the cladding's complex geometries. Cladding in the masts, for example, must negotiate several intersecting tapered and curved forms. Cupples developed a new segmented die that, with several runs of a single 3/16-inch piece of aluminum, could stamp out the complex cladding shapes to a tolerance of 1/64 inch. Conventional cutting and punching machines also operated too slowly and inaccurately, so Cupples purchased a programmable, numerical cutting machine that nibbled, punched, and milled the aluminum with an accuracy of .001 inch. The same occurred with the welding process. The need for full penetration welds, especially on the trusses supporting the double-story glazing, led to the use of two industrial robots to weld, simultaneously, both sides of the joints (13).

Even where advanced machinery was not involved, fabrication methods were chosen that offered the maximum precision. The large panels cladding the service modules would not have been sufficiently flat if made of aluminum plate, so the architects specified aluminum honeycomb panels with light gauge aluminum sheets adhered, under heat and pressure using epoxy, to an aluminum honeycomb core. Vacuum-evacuated die casting, rarely employed for architectural applications because of its expense and required lead times, was used to fabricate the sunshade brackets because it provided thinner castings, better surfaces, and higher production volumes.

That sparing of no expense applied as well to the cladding's finish: a top quality fluoropolymer coating. Applied electrostatically to pretreated metal and cured at 450 F, the fluoropolymer offered superior resistance to fading, chalking, weathering, and chemical attack, as well as the two conditions most damaging to Hong Kong buildings: humidity and salt spray. Fluoropolymers also offered, says Tony Hackett of Foster Associates, a greater variety and consistency of color than any other coating.

The major structural elements and service modules received a two-coat finish, consisting of a corrosion-resistant primer and a fluoropolymer topcoat. Aluminum extrusions, such as mullions and rails, had a clear fluoropolymer topcoat applied over the primer and a metallic color coat; the topcoat protects the metallic flakes in the color coat from corroding.

The color of these coatings went through several variations over the course of the building's design. Red and gray are the colors of the tellers' uniforms and the colors people in Hong Kong associate with the bank. The architects considered using those colors on the exterior of the building, trying red accents on everything from the structure to the gaskets around the windows, but none of those schemes really worked, says Ken Shuttleworth of Foster Associates. The red accents seemed either too intrusive or too fine to have much effect. In the end, the bank decided that it did not want any red on the building; the color's "Chinese" connotations did not befit the bank's role as an international corporation.

The color scheme finally selected has the structure painted a medium gray, and the modules a slightly lighter gray. Extrusions have a silver metallic color. If the red accents erred on the emphatic side, the colors of the building as built err too much in the other direction, with too little contrast in colors, especially between those on structure and service elements. The office interiors, with their gray carpets and red accessories, give some indication of what the exterior color contrast might have been.

Glazing

The HongkongBank is almost completely glazed—a response to both the client's desire to conserve energy and maintain views, and the architect's desire to expose the building's structure and internal activity. Those goals conflicted at different points in the design process.

For example, the mechanical engineers, JRP (Central) Ltd., studied the effect of various glazing types on the energy consumption of HVAC equipment and found that silver reflective glass produced the lowest annual consumption. Reflective glass, though, ran counter to the visual transparency desired by the architects. That, plus the

15 Head detail of an interior partition

16 Detail of the exterior glass skin

saving in energy possible through daylighting, led to the specification of clear glazing.

Conflicts also arose over the glass detail. Wanting to integrate windows and blinds into a single unit, Foster Associates worked with Corning Glass to produce a photosensitive glazing that, when exposed to slots of ultraviolet light, produced fixed, opaque "blinds" within the glass itself (see P/A, June 1985, p. 159). Although a brilliant idea, it ran counter to the client's desire for unobstructed views of Hong Kong's harbor and was thus vetoed.

The window design finally arrived at is as complicated as the photosensitive glass was simple. The typical window has a fixed, outer light of clear glass; an air space containing conventionally hung, perforated blinds; and a slightly tinted inner light of glass. The inner light of glass sits in a frame that swings in to allow the cleaning of glass and blinds. Where structural members penetrate the building's skin, the glass remains fixed and the blinds, which here sit in edge frames, slide down for cleaning. The joint between fixed and movable glazing posed a problem. The architects considered using a wiper-type seal but decided to leave the joint unsealed when studies showed only an 8 percent loss in thermal efficiency. It's a percentage, says engineer Trevor Farnfield of JRP, almost within normal construction tolerances anyway (16).

For reasons of aesthetics as much as for energy conservation, the blinds have only two positions, switched at specified times during the day. In the open position, the blinds reflect daylight into the building's interior, while their perforated surfaces reduce glare. The architects considered motor controls for the blinds' operation, but the bank opted for manual controls.

Other movable glazing in the building has a simpler operation. Glass smoke doors, which have curved, shiplike frames with offset pivots, occupy two percent of the exterior wall—a percentage required by code. Maintenance personnel can open them to evacuate smoke from the building in the event of a fire, or to gain access to the building's exterior for its cleaning or repair. Aluminum sunshades, which protect the glazing from the direct summer sun on every floor, have enough strength to support maintenance personnel and enough width to prevent employees from feeling the vertigo common with full-height windows (see section details, p. 93). (The sunshades extend across the north elevation, not only because of their role as maintenance platforms, but because the sun reaches that face during summer months.) (14)

The plaza level contains glazing as elegant as that on the upper floors. A fixed glass "curtain" hangs above the north and south ends of the plaza. Behind it, exposed cables and counterweights operate hanging typhoon screens—panels of glass with vertical translucent stripes etched in their surface. The screens close off the plaza during typhoons and are capable of withstanding wind and rain of 150 psf.

The elevator and escalator lobbies that line the east and west sides of the plaza have space frame structures supporting flush glazing. Entry to those lobbies is through semicircular automatic glass doors. The doors, which have two rather than the four operating leaves normally provided by the manufacturer, have an intricate operating system of horizontal cables and pulleys exposed behind curved glass transoms.

The escalators that connect the plaza to the banking hall pass through a curved glass "belly" at the bottom of the atrium. The belly's double glazing (the top layer of laminated glass; the bottom, of tempered glass) hang from curved steel ribs, their shape, says Roy Fleetwood of Foster Associates, determined by the lightest structure necessary to span the opening. Lightweight trusses support the glass where the escalators interrupt the structure.

Foster Associates had wanted to glaze the plaza floor as well, so that the basement banking area could receive some daylight from the sunscoop. While they got quite far in the development and testing of a glass block system, they couldn't guarantee that the system would be leak- or slip-proof in time for the letting of contracts.

Inside the building, glass remains ever present. The only place where glass isn't welcome is in the atrium railings, where the openness and the height induce vertigo in all but the most fearless. With so much glass, walking through the building is like walking through some transparent human body: you see how the various systems move, how they operate, and how they interrelate.

Light Scoop

The conventional solution to daylighting the center of a building 230 feet wide, 180 feet deep, and 590 feet high would be some sort of top- or side-lighted atrium. The unconventional solution, and one never tried before at the scale used by Foster in the HongkongBank, beams daylight into the center of the building by mirrors.

The beam daylighting system has as its goal not energy conservation but the enhancement of the building's atrium and plaza. The daylighting draws people through the plaza and into the bank, and makes working and doing business in the bank more pleasant. The system, particularly the sunscoop that projects conspicuously off the building's south elevation, also serves as a powerful symbol of the bank's support of innovation.

The sunscoop, a welded space frame clad in aluminum, weighs about 30 tons and is supported by steel beams attached to the Vierendeel masts at the 12th floor. On its upper surface sit 480 mirrors adhered to 20 aluminum blades, each with its own motor. A microcomputer, with software containing the solar timetables, operates the motors, which move the mirrors as the sun angles change with the seasons. (The mirrors do not track the sun's daily movement to allow for variation in light conditions within the building's 170-foot-high atrium.) The atrium's translucent-glazed east end also contributes to that variation. It illuminates the atrium directly up to about 11 A.M., at which time the sunscoop takes over.

The sunscoop's mirrors bounce the light through the double-story space at the 11th floor to an array of concave anodized aluminum mirrors positioned over the atrium; their shape was determined by daylighting studies using large scale models (see section, p. 83). Hangers from the floor structure above support the concave mirrors. The adjustment of daylight levels in the atrium utilizes the window blinds along the south side of the double-story space, which open or close upon signal from the system's microcomputer. Enhancing the daylight and illuminating the atrium at night are halogen lamps, recessed in horizontal sections between the mirrors. Those horizontal sections double as walkways for the replacement of lamps. A trolley, oversized because it was initially thought that it would lift equipment through the atrium, moves along a horizontal track beneath the mirrors and allows their easy cleaning. ***Susan Doubilet, Thomas Fisher*** ■

HongkongBank
Systems

Richard Bryant

Project: *HongkongBank Headquarters, One Queens Road Central, Hong Kong.*
Architect: *Foster Associates, Hong Kong.*
Client: *One Queens Road Central Ltd. (wholly owned subsidiary of HongkongBank).*
Site: *a 53,000-square-foot urban site that gently slopes up from north to south. To the south of the site is the base of Victoria Peak; to the north, Station Square; and to the east and west, older bank buildings.*
Program: *new headquarters for HongkongBank. Program called for a banking hall, vaults, offices for various administrative departments, a computer center, dining and conference facilities, executive offices, and an apartment for the bank chairman. The building contains 1,067,467 gross and 757,757 net square feet for a net-to-gross ratio of 1:1.4 (1:1.2 on largest floors).*
Structural system: *The structure consists of eight steel masts, each with four tubular steel columns connected at every floor by steel Vierendeel beams. Steel suspension trusses and cross bracing occur at five locations up the building. From the trusses are suspended tubular steel hangers that support steel beams and composite reinforced concrete and steel deck floors. The basement structure and diaphragm wall are made of reinforced concrete.*
Major materials: *aluminum and glass cladding; aluminum honeycomb raised floor panels; carpet or marble floor coverings (see Building Materials, p. 165).*
Mechanical system: *central centrifugal chillers cooled by seawater. Heating by seawater source centrifugal heat pumps. Modular air-handling units on each floor. Air distribution from variable and constant volume control units through floor outlets.*
Consultants: *Ove Arup & Partners Hong Kong Ltd., structural; J.R.P. (Central) Ltd., mechanical; Arup Associates with Tim Smith Acoustics, acoustical; Boundary Layer Wind Tunnel Laboratory, University of Western Ontario, wind studies; John Yellott, Arizona State University, solar energy; Claude Engle, lighting; Bartenbach and Wagner, Innsbruck, daylight; Dieter Jaeger, Quickborner Team, Hamburg, office planning; Jolyon Drury, maintenance; Cini-Little Associates, catering.*
Quantity surveyor: *Levett Bailey with Northcroft, Neighbour & Nicholson.*
Management contractor: *John Lok/Wimpey Joint Venture.*
Costs: *$700 million (HK$5 billion), all inclusive.*
Photography: *Ian Lambot except as noted.*

As the sun fades in the sky over Hong Kong, the city is transformed. The lights of thousands of buildings trace its shoreline and its Peak, and delicately lighted ferry boats crisscross the harbor. In the multitude of repetitive towers, the HongkongBank's distinctive form stands out as a beacon of architectural and corporate confidence.

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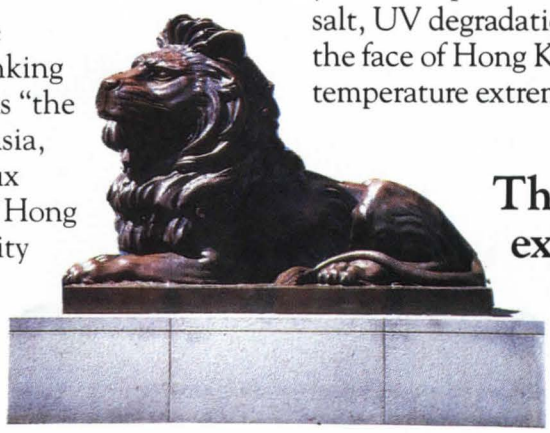
The new headquarters of The Hongkong and Shanghai Banking Corporation, known simply as "the Bank" throughout much of Asia, rises 47 levels above Des Voeux Road, in the neighborhood of Hong Kong's Star Ferry terminal, City Hall, and local British military headquarters. Opening this year, the new building is the largest curtainwall project ever built—and the largest single use of any fluoropolymer coatings in history. The coatings: Duranar® by PPG.



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Architects: *Foster Associates Hong Kong*
Structural Engineers: *Ove Arup and Partners Hong Kong Ltd.*
Management Contractor: *John Lok and Partners Ltd., Hong Kong, with George Wimpey International, Ltd., London*
Curtainwall Engineering, Fabrication, and Erection: *Cupples Products, St. Louis, Missouri; Division of H.H. Robertson Company*

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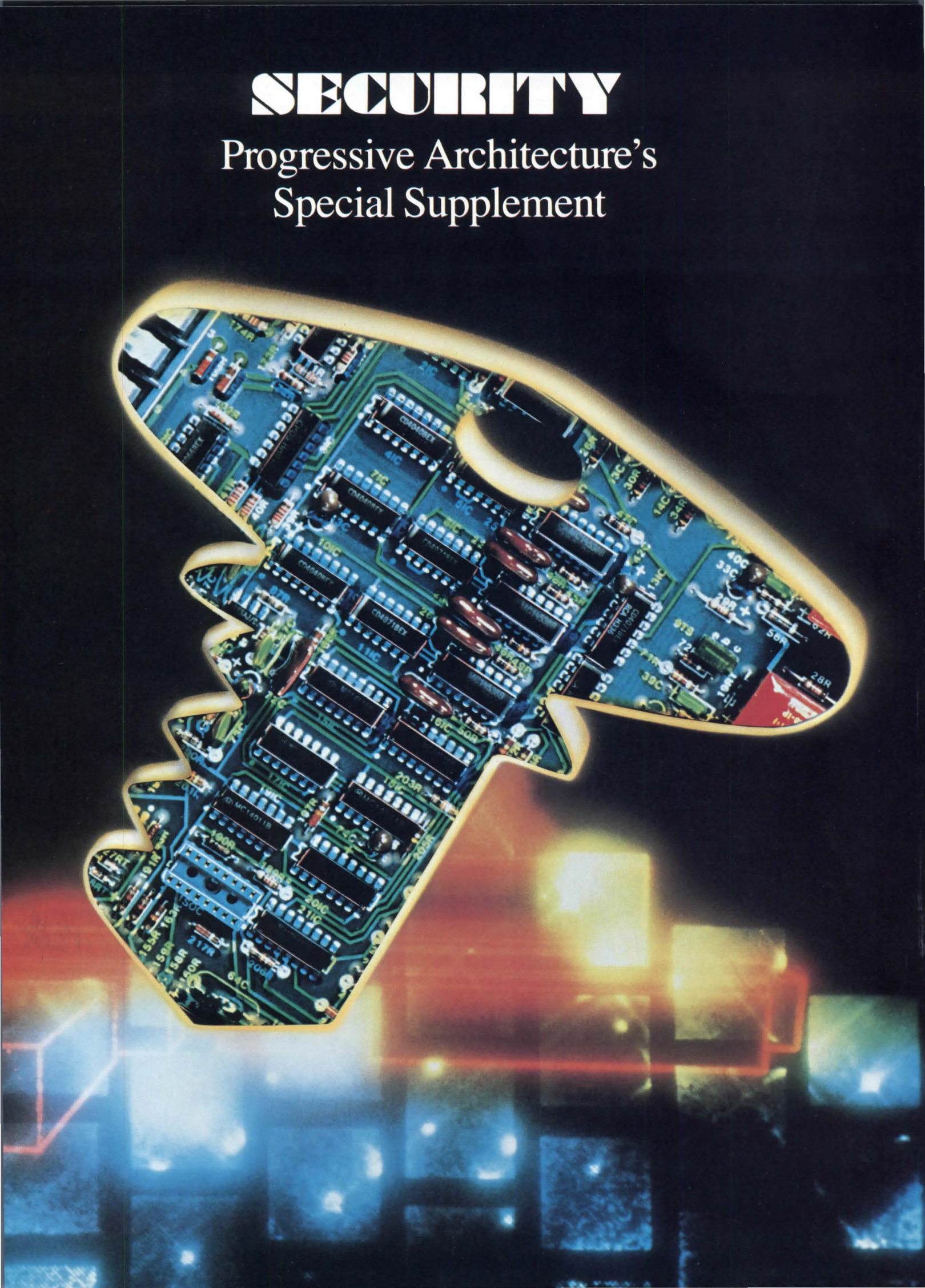

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March 1986

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Features

Departments

Security is in Demand From the White House to Our House

The demand for security adds new complexity to the architect's task

From an embassy bombing halfway across the globe to a bank robbery across town, an ever-growing atmosphere of violence, crime, and espionage has made security as important a feature of new buildings as aesthetics or energy efficiency. A growing number of owners and developers are demanding that their buildings be made safe from threats ranging from vandalism and unauthorized entry to electronic surveillance and car bombs.

Architects called upon to provide for security must not only find a compromise between aesthetic design and defensible space, but must create interiors that work in harmony with such devices as closed-circuit television cameras, magnetic card readers, and motion detectors. It is a responsibility that adds new complexity to the architect's task.

From nuisance to selling point

"The typical client still doesn't realize how important security is, although many are headed toward a greater awareness," said Robert Messmer, AIA, senior vice president, Hellmuth, Obata & Kassabaum, St. Louis, and a director of Security Source One, a joint partnership of HOK, Blount International, Ltd., and the Norshield Co. Messmer, who has testified before Congress on the need for a union of "good security and good architecture" for U.S. facilities abroad, maintains that world events inevitably will lead to a nearly universal demand for some level of security in commercial and office buildings as well as government buildings and defense plants. "Not a day goes by that the front page does not feature a building that has been bombed, threatened, or otherwise harassed. Many corporations and developers have been naive about this, but they're beginning to realize they must take action."

Thomas Callen, manager of product management, Rusco Electronic Systems, a designer and manufacturer of card access and alarm monitoring systems, based in Glendale, Calif., said that a growing awareness of terrorism and crime has sharply altered the perceived value of secure design. "Ten years ago, security measures were largely viewed as a nuisance by building owners and tenants. Corporation executives especially resented having to go through metal detectors or access control systems," Callen recalled. "Today people understand and accept these systems. In fact, the presence of a security system has become a positive selling point for many buildings."

Not all architects have responded effectively to the new demand for security, however. "There is a growing awareness among architects of the need for secure building design, but it's far from where it should be," said John E. Siedlarz, senior vice president, Penn Central Technical Security Co., Marlton, N.J., a security engineering firm. "Most buildings are still designed for aesthetics rather than security, and consequently include many features that make them difficult to keep secure."

Messmer agrees. "The typical architect just does not consider security. In many instances, nothing is done to make the building secure until something happens to the client. By that time, security measures cost twice as much and work only half as well," Messmer said.

The solution, Callen said, is to make security considerations an integral part of the design process. "By the time the architect knows the function, size, and budget of the proposed building, he or she should be in contact with a security consultant, if the architectural firm doesn't already have its own security experts."

Some design conventions insecure

A concern for security may in some instances lead to the scrapping of conventional design features.

Architects are increasingly called upon to create interiors that work in harmony with a variety of security devices. A control panel monitors the status of security systems at a large police facility.


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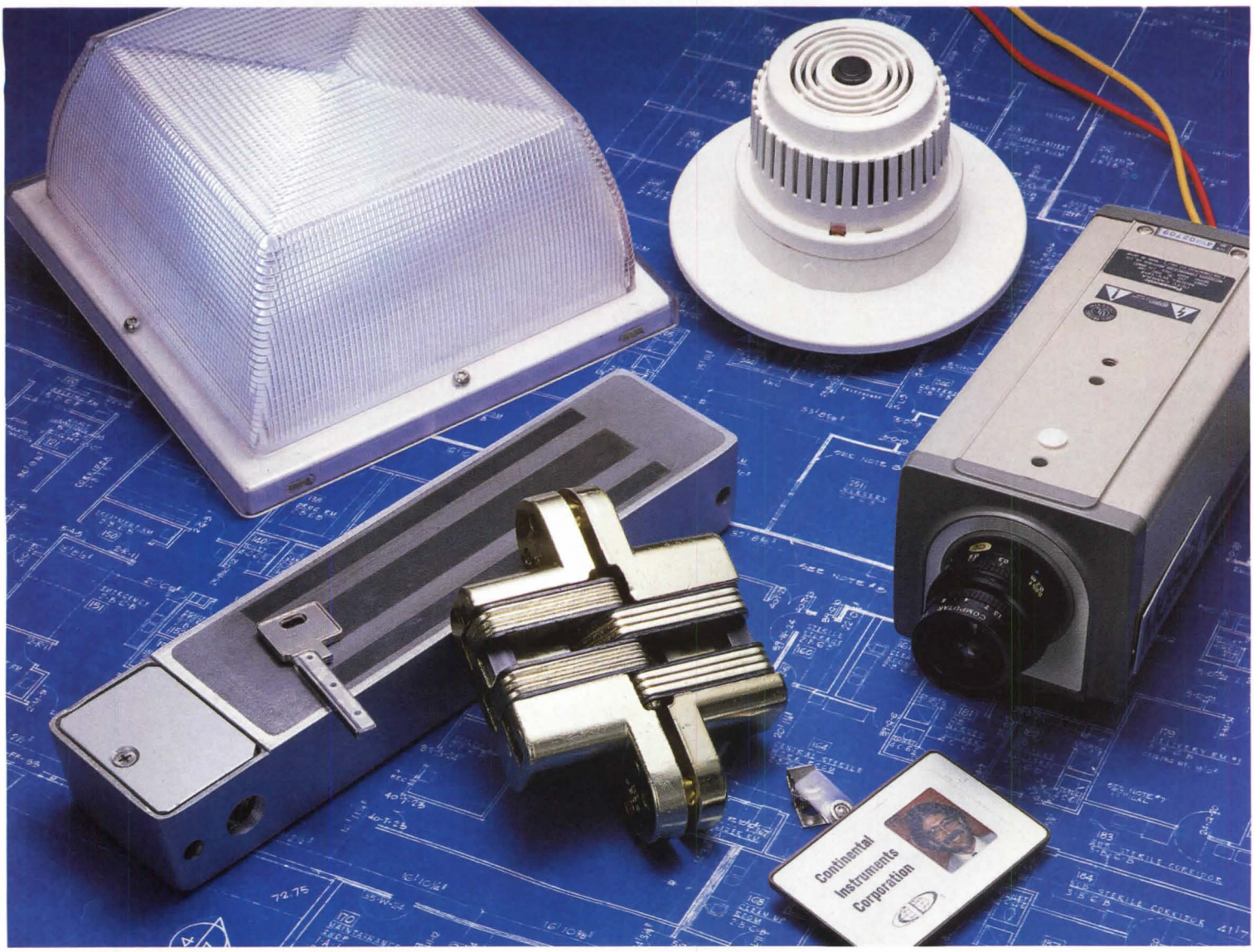

Security may most easily be reconciled with aesthetics when security requirements are addressed early in the design phase. Clockwise, from above left: abuse-resistant lighting fixture; ionization smoke detector; closed-circuit television camera; computerized access card; tamper-proof hinge; programmable key; electromagnetic locking device.

"Atriums can cause a lot of trouble, especially when access control is a concern," Callen said. "The typical atrium has too much open space and too many public entrances and exits to control effectively. Escalators between floors are also a problem, since they may be used even when turned off."

"Exclusive concern for aesthetics can produce buildings that are very difficult to protect," Siedlarz said. "A number of government buildings, for example, are built on stilts, or feature large amounts of exposed glass. Some buildings are positioned too close to the street, and others make no provision for controlling traffic access."

Nevertheless, a secure building need not be unattractive, Messmer maintains. "I'm not naive enough to say that you can make a building secure without losing any good design," he said. "But compromises are possible, and the amount of good design you lose depends on the quality of the architect."

"We're not suggesting that *all* buildings must be designed as fortresses," adds C.B. Kuhla, vice president of business development, Penn Central Technical Security Co. "There are many ways that physical security requirements can be made aesthetically acceptable."

Making security attractive

"The goal of the security program should be to make the building difficult to break into, damage, disrupt, etc., so that the target becomes unattractive and a potential thief or terrorist will go down the street and try someone else," Messmer said. He listed several ways in which this may be done that are consistent with good architectural practice:

- Provide adequate lighting for exteriors and lobbies, denying assailants the cover of darkness;
- Avoid using extensive glass facades on lower floors;
- Keep parking facilities well away from buildings;
- Design curves and right angle turns into access roads, so that vehicles cannot build up enough speed to break through barriers and gates;
- Use magnetic or computerized card access systems rather than more vulnerable conventional key locks;
- Cover concrete barriers with plants or other attractive materials;
- Select multiple-laminate polycarbonate glass, which is identical in appearance to conventional glass, to provide bullet and blast resistance for vulnerable windows.

"It is easier to make these features attractive when they are integral to the original design," Messmer said. "It's when you get into a retrofit situation that you get ugly ducklings."

Security device manufacturers, for their part, are also attempting to make their products more aesthetically pleasing, Callen said. "Devices like ultrasonic and passive infrared motion detectors look much better than they did just five years ago," Callen said.

Some security measures are simply resistant to beautification, however. "Certain bank security features, such as completely enclosing teller win-

The solution is to make security considerations an integral part of the design process

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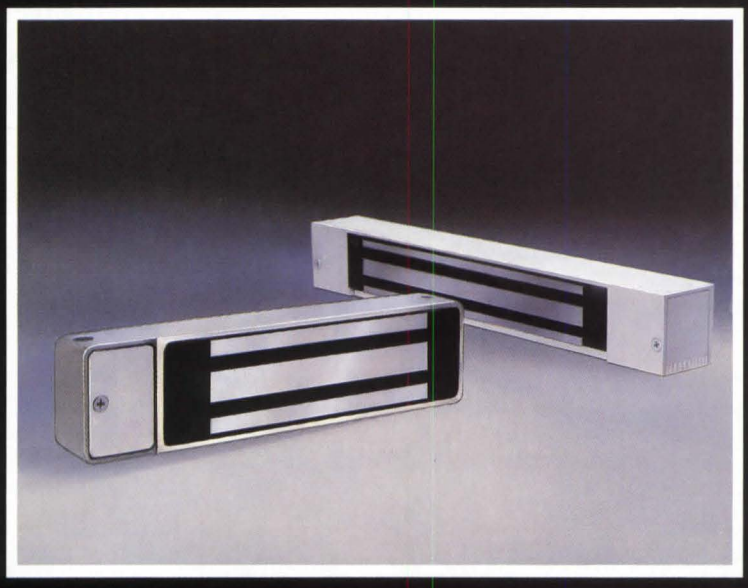

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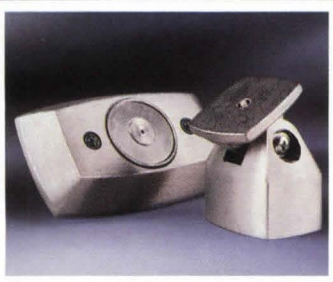
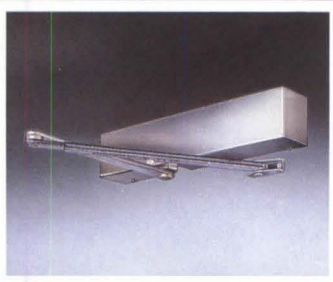




dows in bullet-proof glass, will always diminish the feeling of friendliness and openness in an interior design," said architect Charles Guariglia, vice president, Bank Building Corporation, a leading design/build firm based in St. Louis that specializes in financial institutions. "There really isn't any way to soften that impression."

Nevertheless, Bank Building's experience has demonstrated that thoughtful design can accommodate most security needs without detracting from the beauty of a building, Guariglia said. "Even such simple steps as making sure that tellers are not hidden behind pillars, restricting camera surveillance, or that exterior walls are free of shadowy nooks and crannies, can contribute to building security and can often lead to a *better* design," he said.

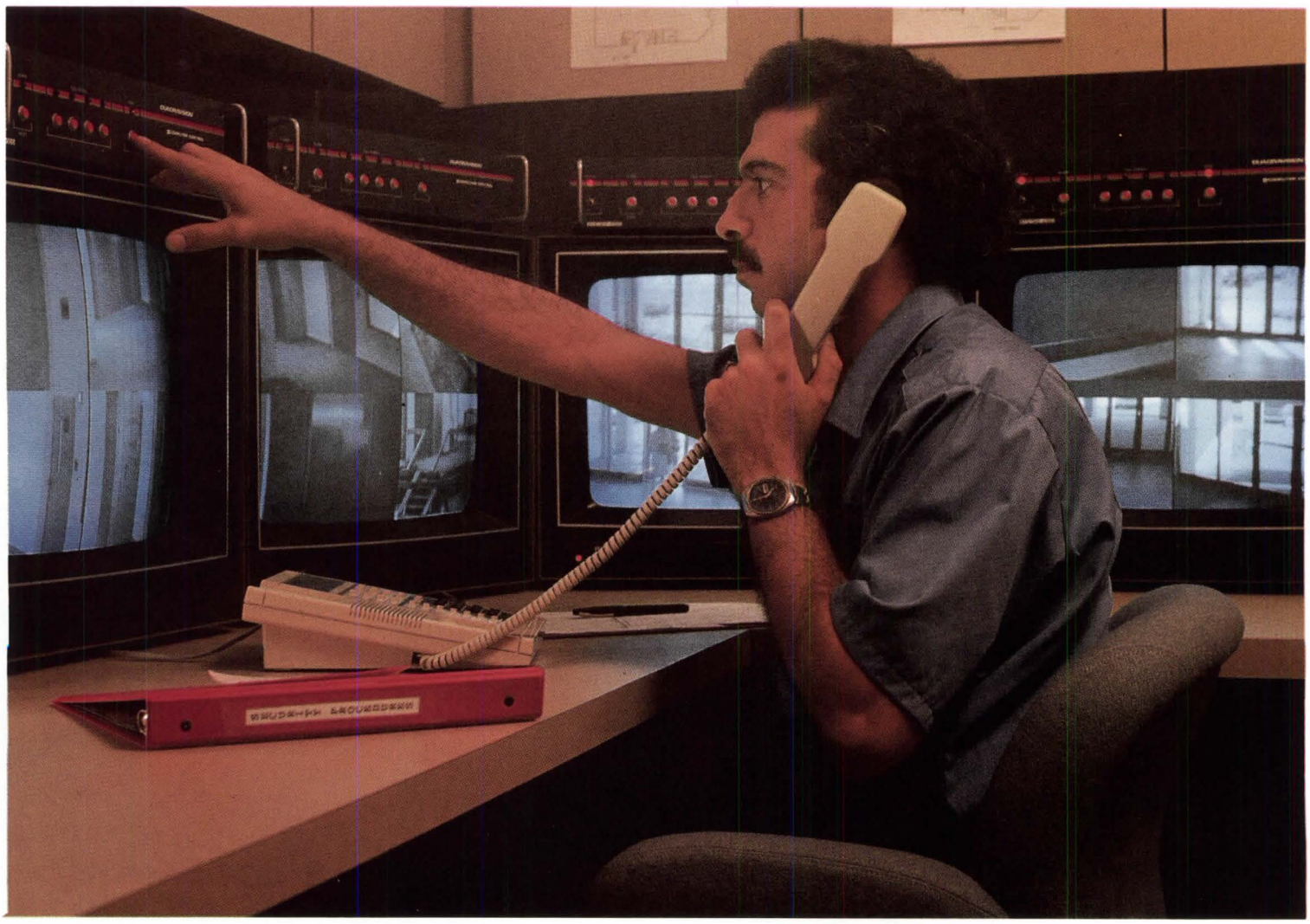
Selecting a consultant

In some instances, an architect may need to call upon the services of a security consultant. "If the architect determines, on the basis of the client's requests and the use of the building, that security is not of enormous concern, the architect can rely on the informational services of the various security device manufacturers," Siedlarz said. "If the building's requirements are more unique, however, the architect should get outside help."

Finding a qualified consultant, however, may prove challenging. Many security firms—especially those that do a good deal of work for the federal government—are often hesitant to release the names of projects they've been involved in. While the secrecy is justified in some instances, in others it can simply be a smoke screen for a firm with no real track record, Siedlarz said.

"Certainly many firms will have completely confidential clients, but if a firm tells you its entire client base is confidential, you should begin to be suspicious," Siedlarz continued. "The references the firm gives you may not be able to discuss the project in detail, but they will be able to tell you whether it was completed late or on time, within budget, and so on," Siedlarz said. ■

Finding a qualified security consultant may prove challenging



Bank Building Corporation's design for a large financial administration center in Largo, Fla., had to accommodate an extensive closed-circuit television system.

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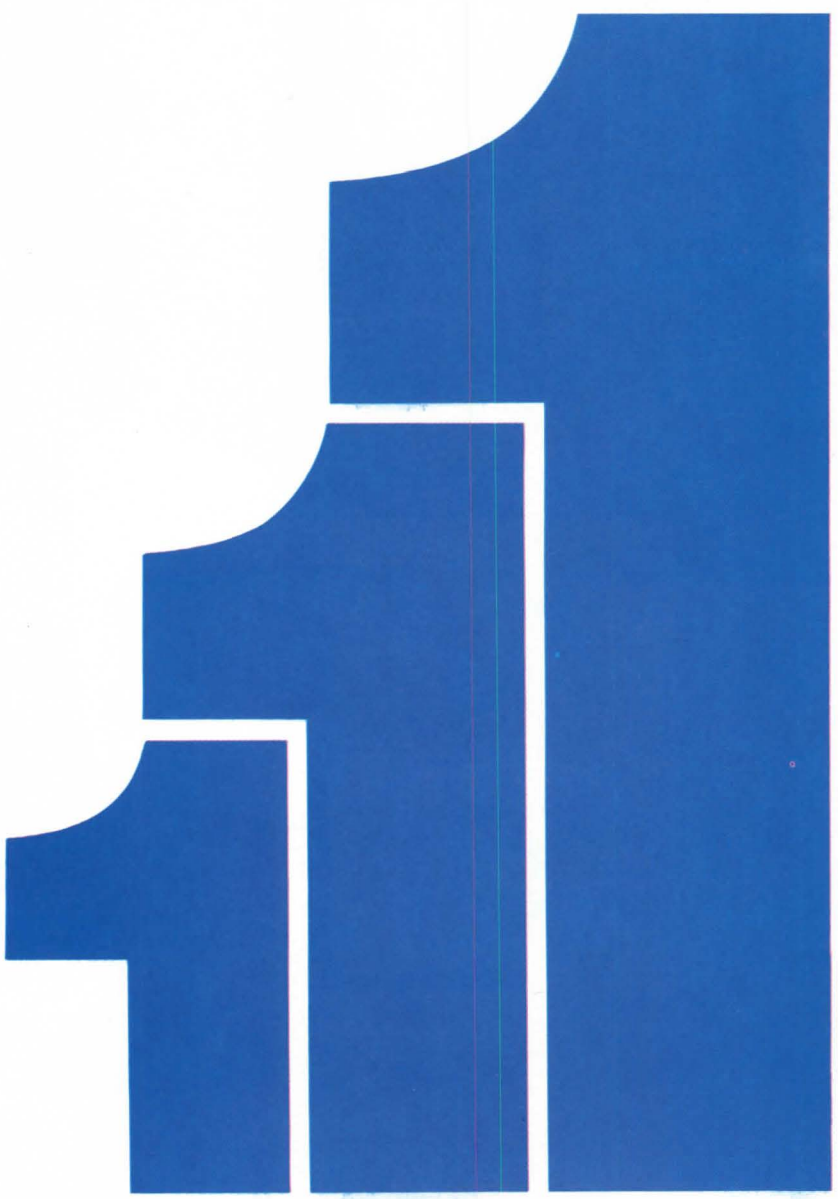

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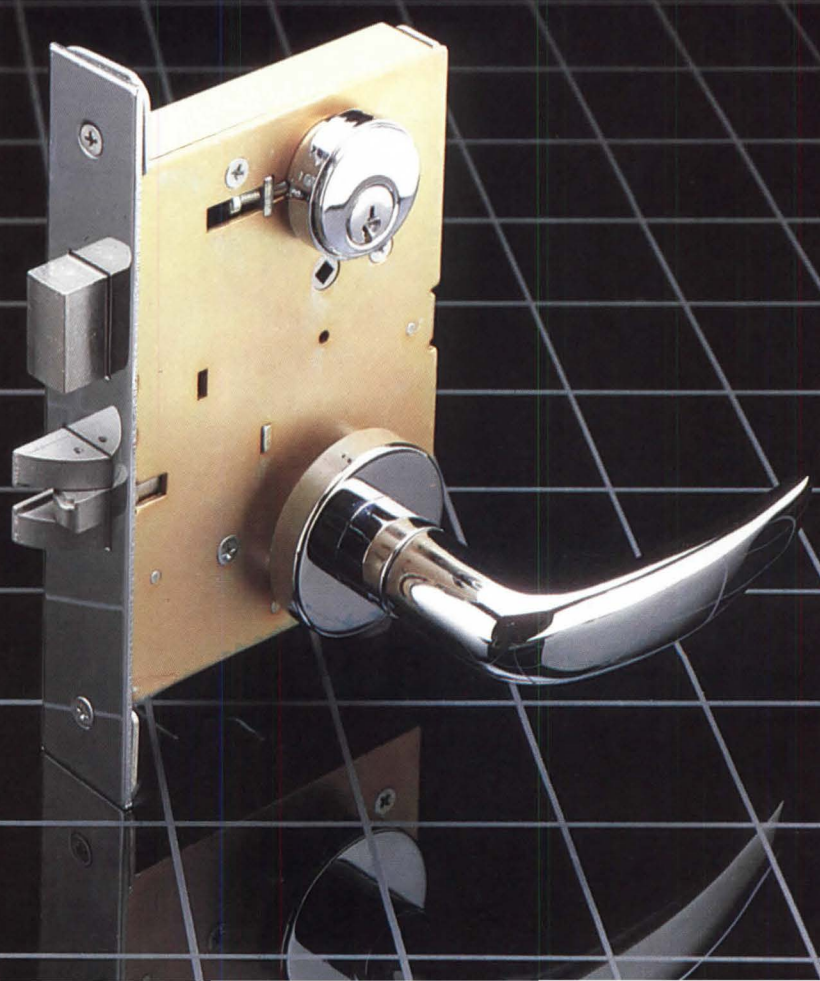

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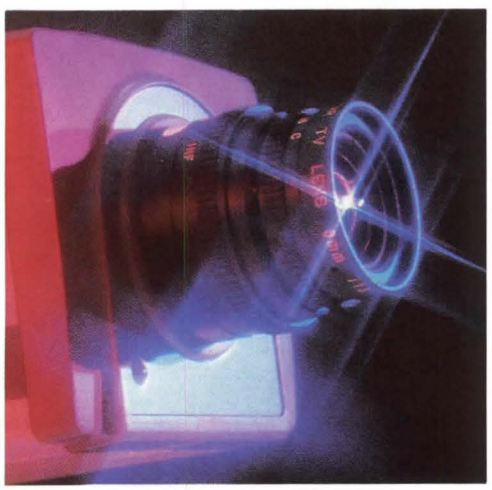


Closed-circuit television screens over the teller area at Southeast Bank's main branch in Miami, Fla., serve to remind potential thieves they are being watched.

As events at home and abroad foster a growing feeling of vulnerability among government agencies, corporations, and private citizens, security is becoming a priority for an increasing number of building developers and owners. More than ever before, architects are being asked to address diverse security requirements as an integral part of building design. Systems and applications differ according to highly specific client security needs. In many instances it has become the responsiblity of architects to select from a large and ever more sophisticated assortment of available security devices—programmable locks, closed-circuit television cameras, motion and heat detectors, and more—and integrate them into a single coherent system. Frequently, a building's security system must also incorporate fire safety and energy control systems as well.

Computer systems of various degrees of complexity are usually relied on to coordinate and monitor the complex array of signals issued by components in a system, and to present information on system status in an understandable format. These systems may be simple, hard-wired panels of alarm lights or sophisticated computer consoles.

Hospital system grows to meet demand

Although the emphasis in hospital security frequently centers on detaining patients in psychiatric wards, these institutions have many other security requirements as well. "Hospitals also need to keep unauthorized people out of sensitive areas such as surgical wards, prevent the spread of infection by restricting movement through certain areas, and protect expensive equipment and supplies," said William Wilkerson, of Derthick, Henley and Wilkerson, an architectural firm based in Chattanooga, Tenn. "Additionally, doctors may want to keep track of the movements of certain acute-care patients."

Wilkerson was asked to provide these kinds of security for Memorial Hospital in Chattanooga in 1976. The system has been expanded to cover additional rooms, so that by 1982, 250,000 square feet of the 325-bed hospital were monitored by the system. Movement in the hospital is monitored through a series of door and hinge switches, and access is controlled with automatic locks, latches, and releases. In addition, panic buttons are located at strategic points so that staff members can alert security personnel in the event of emergencies.

Cameras in the lobby at Southeast Bank are triggered by infrared motion detectors.

These devices are linked to a main console located in the hospital's telephone switchboard area. "The console can be programmed to control the times various devices are operational," Wilkerson explained. "The devices are grouped into zones, and each zone may be programmed independently."

Wilkerson says he specified the system, manufactured by Von Duprin, Inc., Indianapolis, for aesthetic as well as technological reasons. "At the time, the Von Duprin system was state-of-the-art," Wilkerson recalled. "We also liked the hardware, which could be built into the doors and walls instead of being surface-mounted."

Since its initial installation a decade ago, the system has demonstrated certain limitations, Wilkerson said. The system's command functions were built into its hardware rather than software-generated. "Consequently, many functional modifications had to be made at the Von Duprin factory rather than on-site," he explained. Nevertheless, the system has functioned so reliably that the hospital chose to expand the original system in 1982 rather than replace it with a newer model. "We continue to get very good service from the Von Duprin equipment," Wilkerson reported.

Microwaves scan perimeter

The need to protect large outdoor areas frequently requires the use of sophisticated sensing equipment. Such is the case with the Montgomery Ward Corporate Center in Chicago. The three-building complex, comprising a 28-floor corporate headquarters, a seven-story, approximately one-million-square-foot merchandise building and an eight-story, approximately two-and-one-half-million-square-foot data processing center, required protection for a perimeter that measures approximately one and one quarter miles.

"The complex borders a high-crime area, and there was a concern about theft," explained Tassos Zervakis, an engineer with BLM Engineers, Chicago, who helped design the physical security system installed at the site in 1985. "The site is also bordered by the Chicago River, and there is some danger of barges and other vessels breaking through the river-side wall," he said.

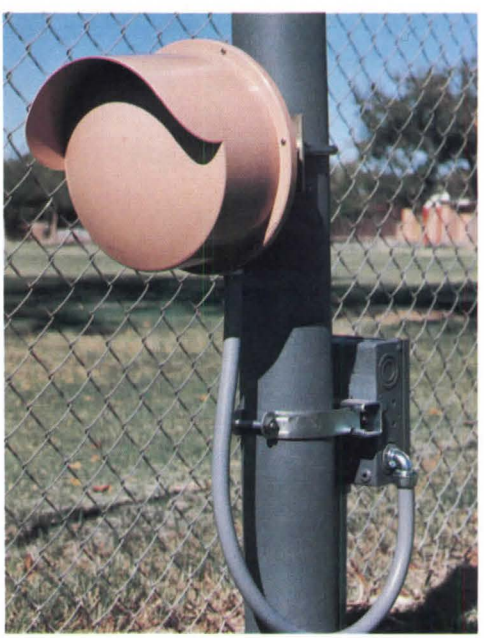
The first defense in the security system for the data processing center is a microwave detection system, manufactured by Southwest Microwave, Inc., Tempe, Ariz. The microwave links consist of a series of transmitters which broadcast a narrow microwave beam to receivers approximately four feet behind a perimeter fence. Although the detection system will ignore minor interferences from rain, fog, blowing paper, etc., it will sound an alarm when interrupted by a human-sized object.

"If intruders get past the microwave beam, they run into an infrared motion-detection system, which is backed up by a series of 36 closed-circuit television cameras," Zervakis said. "Any alarm triggered by the system is detected in the security command center, located in the corporate headquaters."

The two-man command center includes two 15-inch and 16 nine-inch video monitors, control panels for the electronic detection equipment, and video tape recorders to keep a record of all incoming data. The fire safety equipment at the complex is also linked to this center, as is the computerized temperature control system. Emergency telephones in each elevator in the complex are connected to the command center via direct line. From the center, security personnel are in radio contact with guards throughout the complex. Finally, all entrances to the complex, including railroad gates, overhead docks, and garage gates, as well as the facility's card access system, are monitored at the center.

According to Zervakis, some experimentation was needed to insure that the microwave detection system operated properly in the physical layout of the complex. "We found we could not place the microwave links very close to the fence without getting interference from objects outside the fence," he recalled. "On the other hand, if the links were placed too far back, it became easier to scale the fence and avoid the beam altogether."

As complex as the system may be, Zervakis reported that it is working well so far. "The various detection devices have been functioning well together," he said. "The owners are very satisfied with the way the system works."



Microwave transmitters like the one above provide perimeter security at Montgomery Ward Corporate Center in Chicago.

System to span entire state

State-of-the-art telecommunications have made it possible for security systems to transcend the physical confines of a single facility. The security system based at Southeast Banking Corporation's headquarters, Miami, Fla., is one example. The bank's Security Control Center not only stands watch over the main facility's vaults and safes, but also monitors the bank's branch facilities in southern Florida, the offices of the corporation's subsidiary

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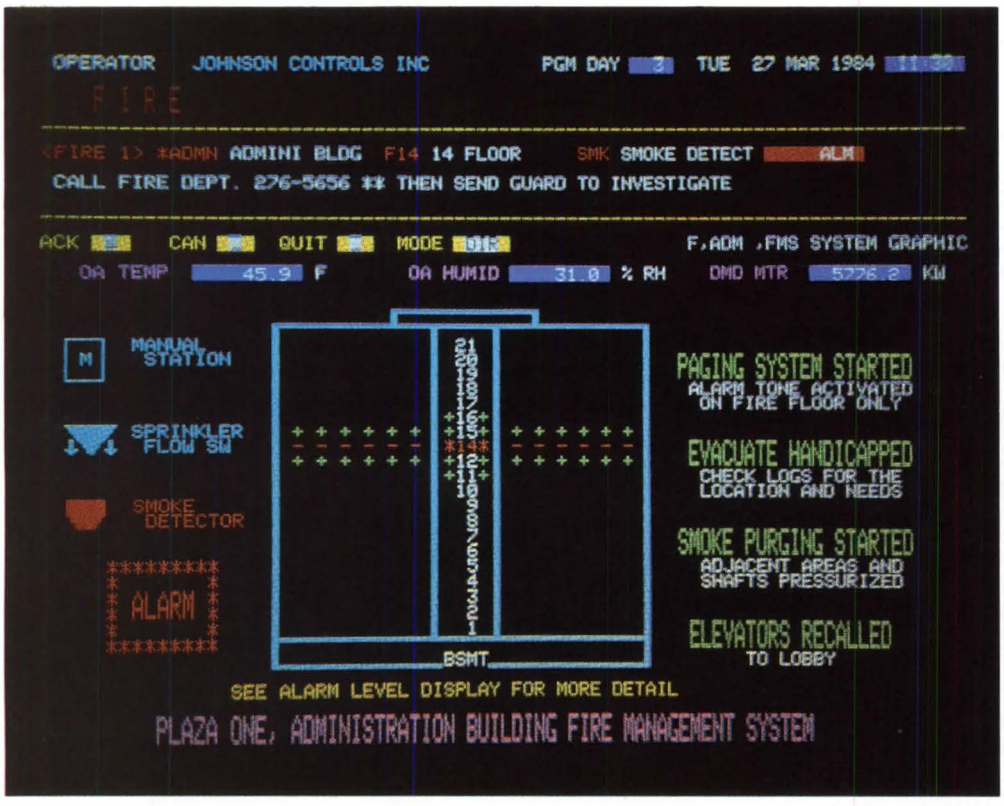

The computer system installed at The Crescent, Dallas, allows security staff to monitor hundreds of sensors and access control devices (left). Unobtrusively placed closed-circuit television cameras scan a corridor at Southeast Bank (above).

companies, and even the homes of its top executives.

Bill Williams, vice president and director of security, Southeast Bank, said he designed this highly centralized system in the interest of efficiency and reliability. "We wanted to bring all of the security functions on board and do it ourselves. We could have contracted the security work out, but we feel our own people are more trustworthy," Williams said. "In addition, we wanted to be aware of any failures in the system as soon as they occur."

According to Williams, the system is anchored by a COMSEC monitor console, manufactured by Mosler, Hamilton, Ohio. The console monitors the status of heat, vibration, and motion detectors in the branches' vaults and lobbies. The system also controls a 53-reader card access system and monitors automatic teller machines. Finally, the COMSEC system reports on the status of perimeter protection, fire detection, and infrared motion detection systems in the homes of several of the bank's executives.

Despite the complexity of the system, it may be run effectively by a single operator at most times, Williams said. "If an alarm goes off, the computer displays the precise problem on the monitor screen along with specific response instructions," Williams said. "Essentially, the operator does what the computer says to do."

The system, which has been in service since May, 1984, has not produced any major problems, Williams said. "Outside of a few minor glitches, it has worked as well as we could have hoped," he said. Williams plans to expand the system eventually to monitor all of Southeast Bank's 164 branches.

Dallas complex requires large system

While some security systems must monitor far-flung facilities, others are designed to deal with the requirements of enormous multi-use building complexes. The Crescent, Dallas, has developed one such system to maintain security in its three office towers, luxury hotel, and extensive retail area.

Access to the office towers, which together comprise 1.25 million square feet of space, is controlled by a series of card readers manufactured by Johnson Controls, Milwaukee. The firm installed all security equipment at The Crescent. "When a card is fed into a reader, the information is immediately analyzed by our computer system in the central security office," explained Wayne Posey, director of security, The Crescent. "The computer can be programmed to allow specific card-holders access to specific areas at various times of day. It also keeps a record of which cards were used to gain access to which areas."

In addition, 136 closed-circuit television cameras located throughout the complex are monitored in the security control room. "When motion is detected by sensing devices at one of the camera sites, the picture is brought up on the primary monitor in the security office," Posey said. Alarm buttons located at Assistance Stations in The Crescent's garage, first office levels, and retail area are also monitored in the security office, and people at the stations can communicate with security staff via intercom.

"Security consultants worked with our designers throughout the planning stages of The Crescent," Posey said. "We were able to achieve a layout that provides sufficient security throughout the complex." He reported that the two-operator security consoles are doing a good job of coherently presenting the status of the various security devices, which began to come on-line in the fall of 1985. ■

Computer systems are usually relied on to coordinate a complex array of security components

Unfortunately, most security systems are based on the same idea.

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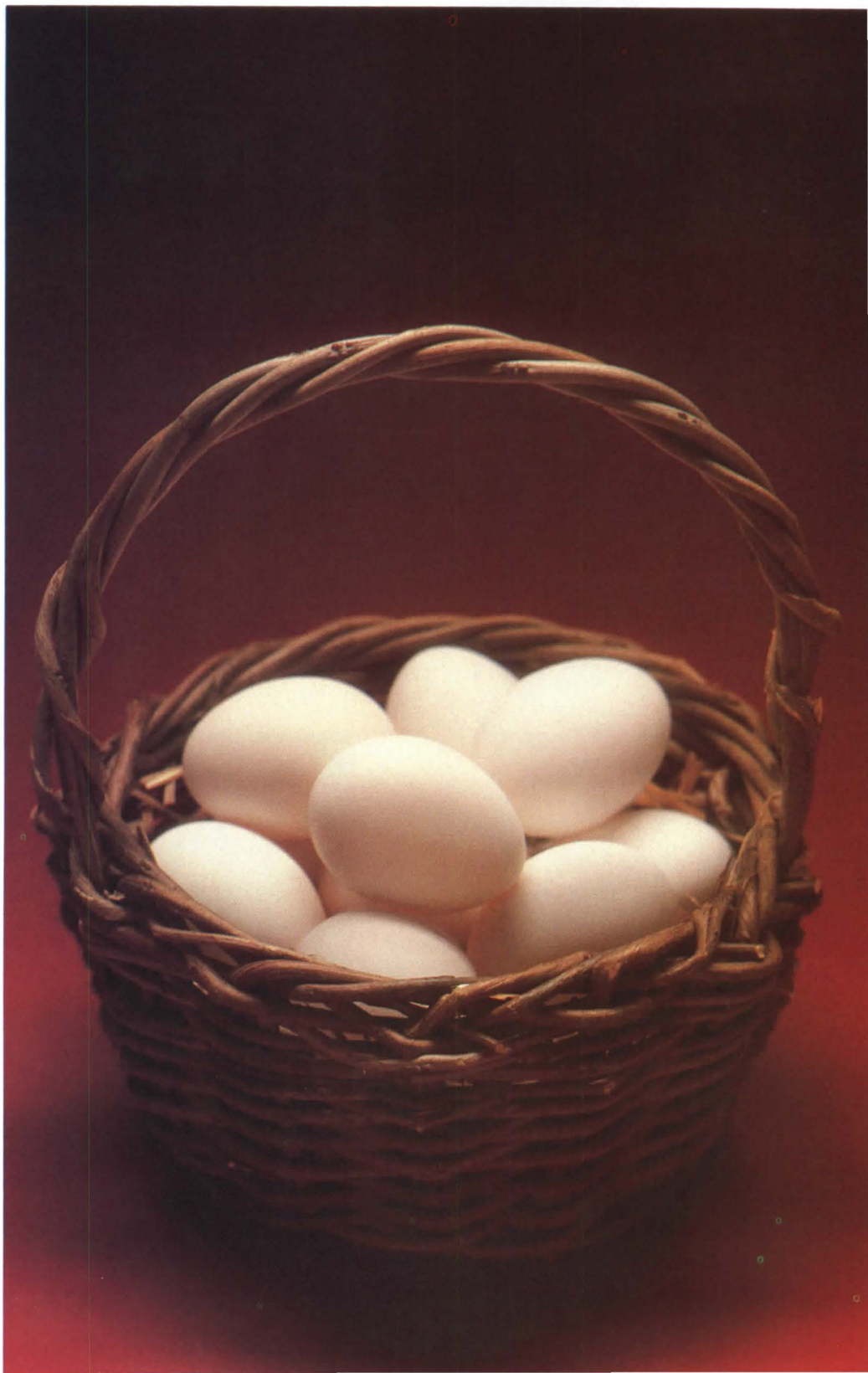

Circle **No. 365** on Reader Service Card

Access Control Options Range From Locks and Keys to Light Beams and Card Readers

New technologies allow the architect to design a system for nearly any level of security

An architect's options for access control have never been more varied. While conventional locks and keys are still the mainstay for many access control requirements, a host of new technologies are now available, allowing the architect to design a system for nearly any level of security. Card readers, special "keys" that operate in programmable locks, and advanced systems for visual identification are only some of the new control options being used to solve specific security problems. Many of these systems influence the design of lobbies, passageways, and doors, and building design must accommodate these requirements.

Light beams control access

The growing popularity of multi-use buildings can create special access control problems, especially when one of the tenants must protect costly equipment or proprietary information. The 44-story One Bell Center in St. Louis presented such problems for its developer and primary tenant, Southwestern Bell. "The building was originally intended for mixed occupancy," recalled Ron Gilmore, staff architect for Southwestern Bell. "Instead, our own operations at the Center expanded to take up all of the upper floor office space."

The change created a system in which 4,500 Southwestern Bell employees must be cleared through a lobby with three separate entrances, which also provides access for retail businesses on the ground floor. "We need to protect company documents and equipment on upper floors, so keeping unauthorized individuals out of these areas is very important," Gilmore said.

To control the access of so many workers at a fairly uniform, rapid rate, Southwestern Bell architects created a "core" lobby area, through which individuals must pass to get to elevators. "Employees entering the building must pass through one of 16 portals," Gilmore said. "At the entrance to each portal they present an access card which is scanned by a light beam."

Proximity card readers at One Bell Center, St. Louis, scan employee passes with a beam of light.

The card reader, manufactured by Schlage Electronics, Santa Clara, Calif., passes the card information to a computer designed by Digital Equipment Corporation, Maynard, Mass., for analysis by a special software package created by Kidde Automated Systems, Westlake, Ohio. If the pass is accepted, the card reader signals permission to pass, and the employee walks through two additional light beams. "If an individual tries to cross those beams without first getting clearance at the reader, the light beams will detect it and an alarm will sound," Gilmore explained. "A red light flashes at the portal, so that unauthorized entrants can be easily intercepted by a security guard."

According to Gilmore, perfecting this hybrid system created some software problems. "Additionally, we need to experiment in placing the light beams so that they will be far enough apart to prevent false alarms, by an employee swinging a briefcase for instance, but close enough together to prevent two people entering at one time," he said. Nevertheless, Gilmore said he has confidence in the new system, which will become fully operational later this year.

Dormitory security maintained by "smart" locks

Some access control systems allow for a high degree of flexibility. In selecting a lock system for a new six-building student housing complex at its Anchorage campus, University of Alaska officials needed to consider more than the security needs of the 320 students who would live there; the housing may also be used if Anchorage is selected as the site of the 1992 Winter Olympics.

"We needed something more flexible than a conventional lock-and-key system," recalled Stan Vanover, the university's construction contract manager for the student housing project. "We wanted to allow students to gain access to the main dormitory entrance and to their individual rooms with a single key. We also wanted to be able to change the lock on a particular door without replacing the cylinder," Vanover said.

Although university planners considered using a conventional card access system for the housing units, it opted instead for a Gibraltar System 2000, manufactured by Falcon Lock, Huntington Beach, Calif. "The System 2000 works with a device that actually looks like a key, but instead contains a magnetic strip that can be given a specific code," Vanover said. Each lock in the system can be programmed to accept only keys with specific codes. A lock can also be programmed to remain completely nonfunctional if a student plans to be away for an extended period.

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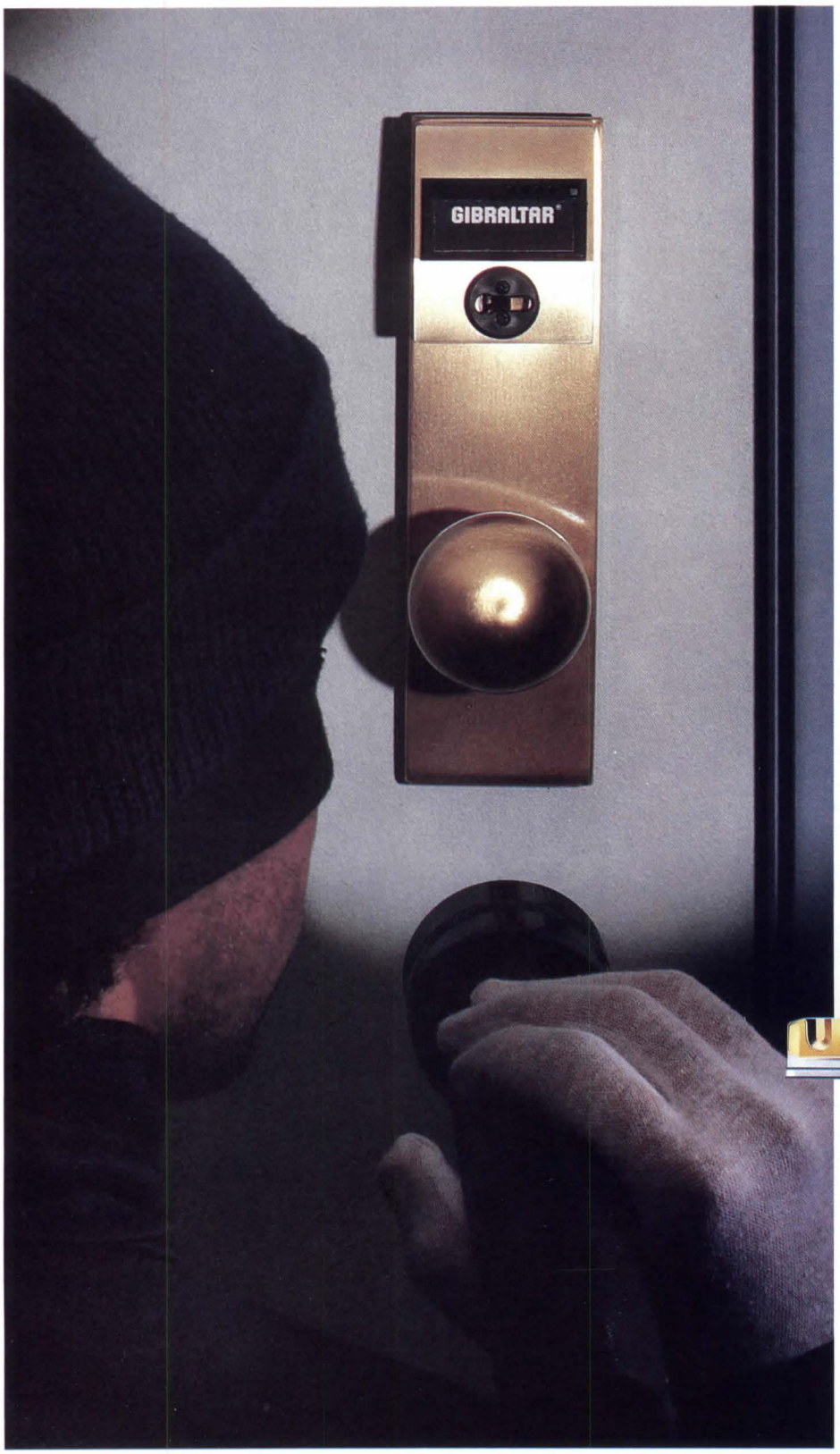

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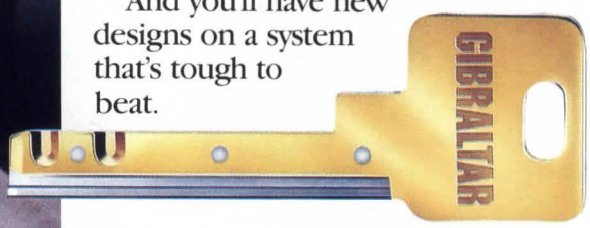

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According to Vanover, the locks were installed quickly, and no modifications on door or entrance way design were required. One problem did arise, however—the exterior locks as originally configured could not cope with the prolonged cold of the Anchorage winter, and special cold-resistant circuit boards were installed.

Vanover admits the students have had to adjust to the new lock system, which was operational in time for the start of classes this winter. The system is, however, working well so far. "We've had a few bugs in the system—dead batteries, broken keys, and so on—but so far it has lived up to our expectations. We also have gotten plenty of technical support from the people at Falcon," he added.

Electromagnets key to system

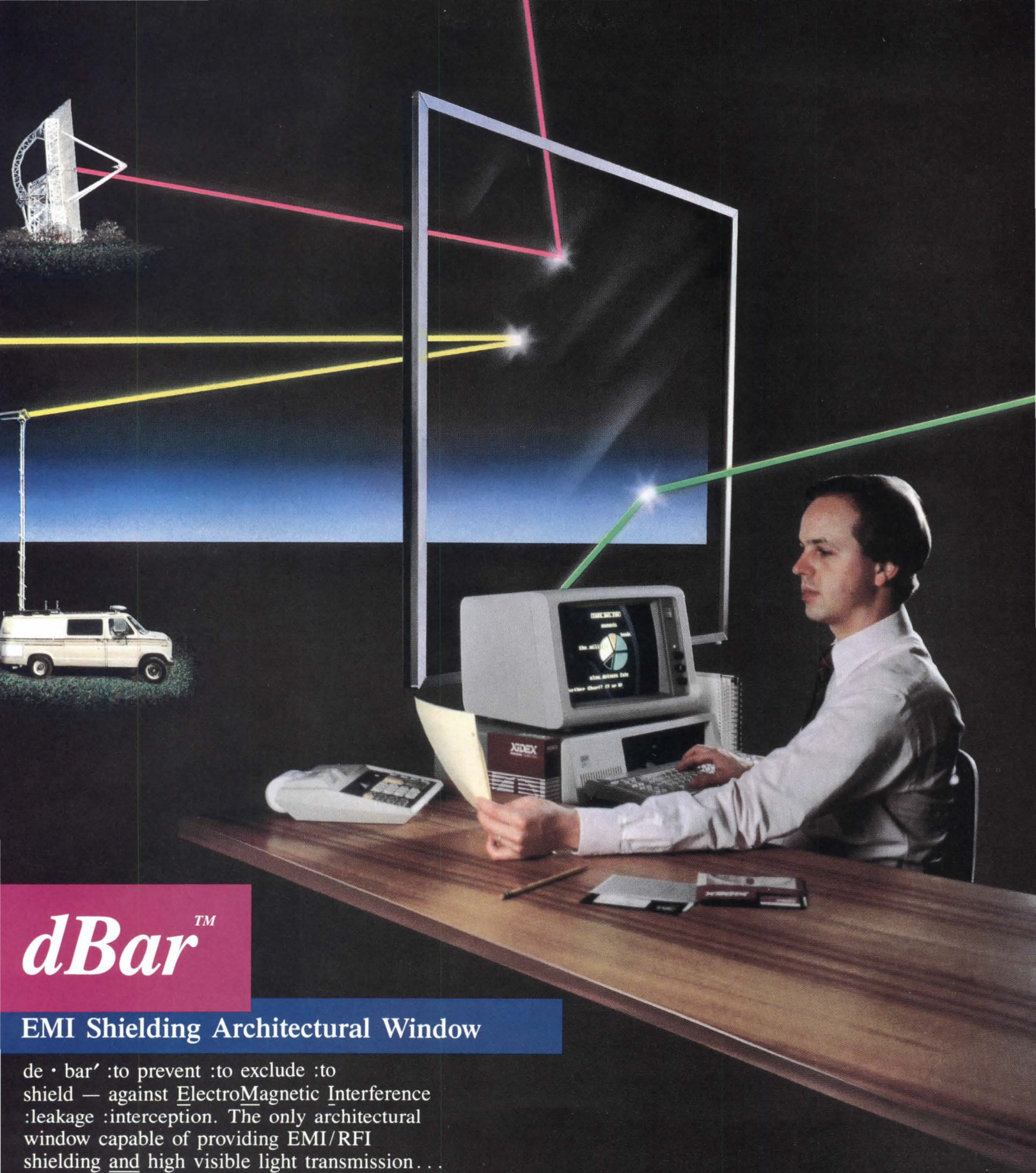
The design for Marquette Center, Rolling Meadows, Ill., calls for two 12-story office buildings connected by a one-story commercial area. "The challenge presented by this design was to control access from the commercial area into the office towers," explained Mike Cornwell, an architect with Schipporeit Inc., Chicago, the firm that designed the complex for its developer, Marquette Properties, Chicago. "The tower entrances are locked after business hours, but we want to enable tenants to have access to the building after hours."

The solution is provided by a series of TigreLok electromagnetic locking devices manufactured by Rixson-Firemark, Franklin Park, Ill. When activated, the locks hold the entrance doors shut with 1,200 pounds of holding force.

When an individual wants to gain access after hours, he or she pages the guard at the security desk, located in the lobby at the other side of the tower, via an intercom, Cornwell explained. "A closed-circuit television camera allows the guard to visually identify the individual, and the electromagnetic locks can then be released by remote control," he said.

Cornwell is pleased with the way the electromagnetic locks harmonize with the design of the doorways. "We selected the Rixson TigreLoks because their narrow chassis work well with the all-aluminum door frames and the limited space available," Cornwell said. "In addition, the system requires a low voltage draw, so it is easier to feed the necessary wiring down the door mullion." ■

The extensive security system at One Bell Center is monitored at a centralized location on the facility's ground floor.



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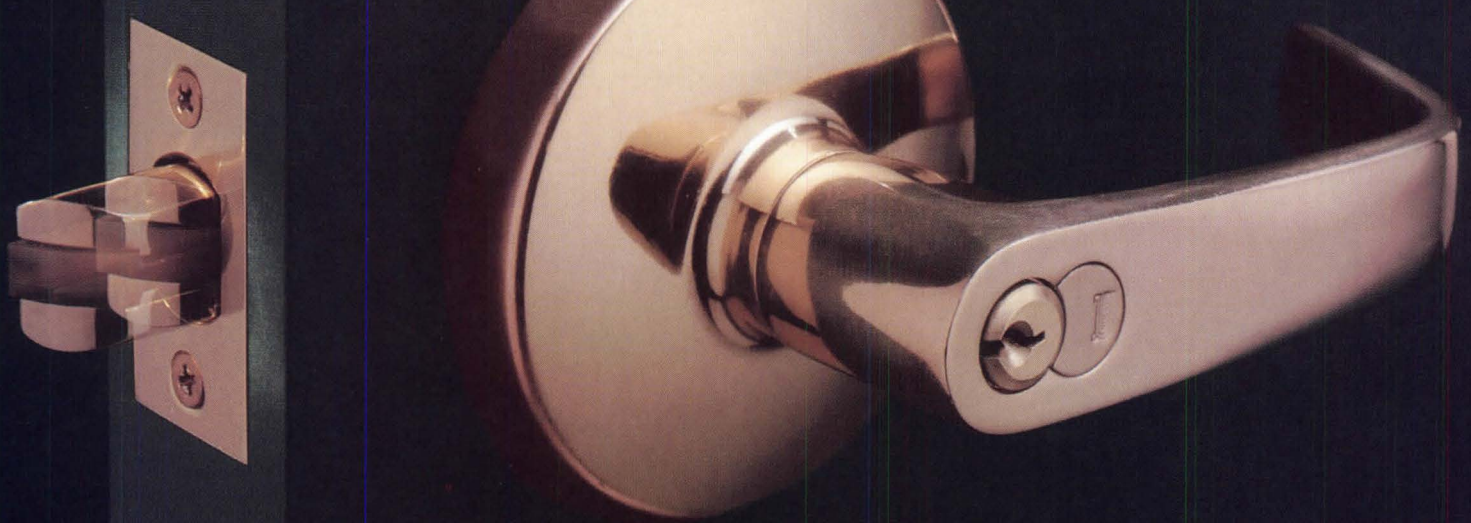

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Building Materials, Hardware Play a Big Role in Security, Fire/Life Safety

Security is a broad term that encompasses such areas as access control, physical protection of people and other assets, fire and life safety, etc. While the intensifying discussion of building security generated by today's headlines inevitably focuses on high-tech, high-profile technologies such as microwave scanners and infrared motion detectors, a significant contribution to physical security and fire safety can be made by other, less glamorous products. Many other devices and materials, in specific applications, enhance security and enable buildings to significantly enhance fire safety. Polycarbonate glass laminates, concealed hinges, tamper-resistant lock cylinders, and smoke-activated door closers may not be the stuff of spy novels, but their application can have an enormous impact on the integrity of a security system, and can play an important role in the design of the building itself. Indeed, careful specification of these products can contribute to a sound integration of pleasing aesthetics and improved security and fire safety.

Ticket booth protects vendors

Occasionally a building's security needs are addressed in the selection of wall materials and glazings. A new sales booth at Metro Center Station in Washington, D.C., presented a number of security-related design problems. The booth needed to be sufficiently secure to protect its occupants and contents, yet also needed to harmonize aesthetically with the interior of the station. "The booth had to be large enough to accommodate the activities it needed to house, including the sale of bus passes, distribution of schedules, and so on," said Robert H. Lee, AIA, project architect for the Washington Metropolitan Area Transit Authority. "However, the access to the area of the Metro Center Station in which the booth was to be built was too restricted to allow the use of pre-fabricated building components."

Lee selected ballistic-resistant glass and wall materials, manufactured by Chicago Bullet Proof Equipment Co., Park Forest, Ill. The 850-square-foot structure was completed in November 1985. Although Lee was unable to release specific details on the material composition of the wall panels, he noted that he encountered no special problems in working with the material. "Construction went fairly

Many devices and materials, in specific applications, can enhance security and fire safety

Bullet-resistant materials such as those in this transit station ticket booth were used to provide security at the new sales booth at Metro Center Station, Washington, D.C.

smoothly, given the limited space we had to work in, and considering the fact that we had to build the structure piece-by-piece," Lee said.

A special "metro brown" was selected for the booth's exterior, enabling it to match the predominant colors in the station's interior. "We feel the project turned out well," Lee said. "The specialized materials needed to secure the booth were flexible enough to permit an aesthetically acceptable design and overcome considerable construction obstacles," he added.

Concealed hinges combine security and aesthetics

When the National Gallery of Art in Washington, D.C., wanted to close off a curator's area containing a number of valuable drawings and documents, it was faced with both a security problem and an aesthetic challenge. "The gallery wanted to create a barrier between a public viewing area and their storage area," said James Blount, an architect with Keyes, Condon & Florance, Architects and Planners, Washington, D.C. "The problem was to design a door that didn't look like a door."

The solution was provided by creating a large panel door that matched the walls of the viewing gallery. The large door pivots on a set of five Soss concealed hinges, manufactured by Universal Industrial Products Co., Pioneer, Ohio. "The hinges are quite massive, and the entire mechanism is installed entirely within the door," Blount explained. "When the door is completely closed, the hinges are invisible and the panel looks like another part of the wall."

Blount said that the concealed hinges also enhanced the security of the door. "Because the hinges are hidden when the door is closed, it is extremely difficult to gain access to any pins holding the hinges together."

The gallery was pleased with the result, Blount said. "The design of the door enabled them to make use of new storage space without disrupting the look of the gallery area," he said.

Hinges monitor access, provide fire safety

Sometimes an unassuming piece of door hardware can provide dual functions in a security/fire safety system. Such is the case with a special spring hinge used in the entrances to the Riverfront Apartments, a two-tower, 604-unit apartment complex in Detroit. The hinges, manufactured by McKinney Manufacturing, Scranton, Pa., both automatically close doors and keep track of when they have been opened.

"The doors to the apartments in the two towers were all fire-rated, which means they must be kept closed at all times," said Douglas Hawkins, vice president, Airtec Corp., the Detroit-based firm that developed hardware specifications with the project architects, The Gruzen Partnership, New York. "For aesthetic reasons, the architects did not want exposed door closers used for the entrances. But because the specifications for door hardware were made after the door frames had already been installed, it would have been prohibitively expensive to install concealed door closers," Hawkins recalled.

The third alternative—using spring hinge door closers—also presented problems, because at the time no fire-rated spring hinges existed. "The people at McKinney actually developed fire-rated spring hinges specifically for this project," Hawkins said.

The spring hinges had one other special feature—an adjustable magnetic field, which triggers a magnetic switch when the door is opened a specified distance. The feature makes it possible to provide security for each apartment in the complex, Hawkins explained. "When the door is opened wider than 15 degrees, a light for that room goes on in the guard station located in a separate building outside the towers," he said. "The tenant then has ten seconds to go to a key pad in the apartment and punch in a personalized code. If no code is punched in, or if the code is incorrect, security personnel are sent to the apartment."

Hawkins said the special hinges were important in solving both security and fire safety problems at the towers, which were ready for occupancy in the fall of 1984. "The hinges were installed easily, and the wiring required no major modifications of the door frame. And they've contributed to the buildings' reputation as one of the most secure apartment complexes in Detroit," Hawkins added.

Door closers enhance fire safety

The central feature of Murphy/Jahn's design for the College of DuPage Student Resource Center, Glen Ellyn, Ill., is a large central stairway running through all three floors of the 210,000-square-foot

Smoke-activated door closers installed at the College of DuPage Student Resource Center, Glen Ellyn, Ill., prevent the spread of fire by closing doors when smoke is detected.

An unassuming piece of door hardware can perform dual fire/security tasks

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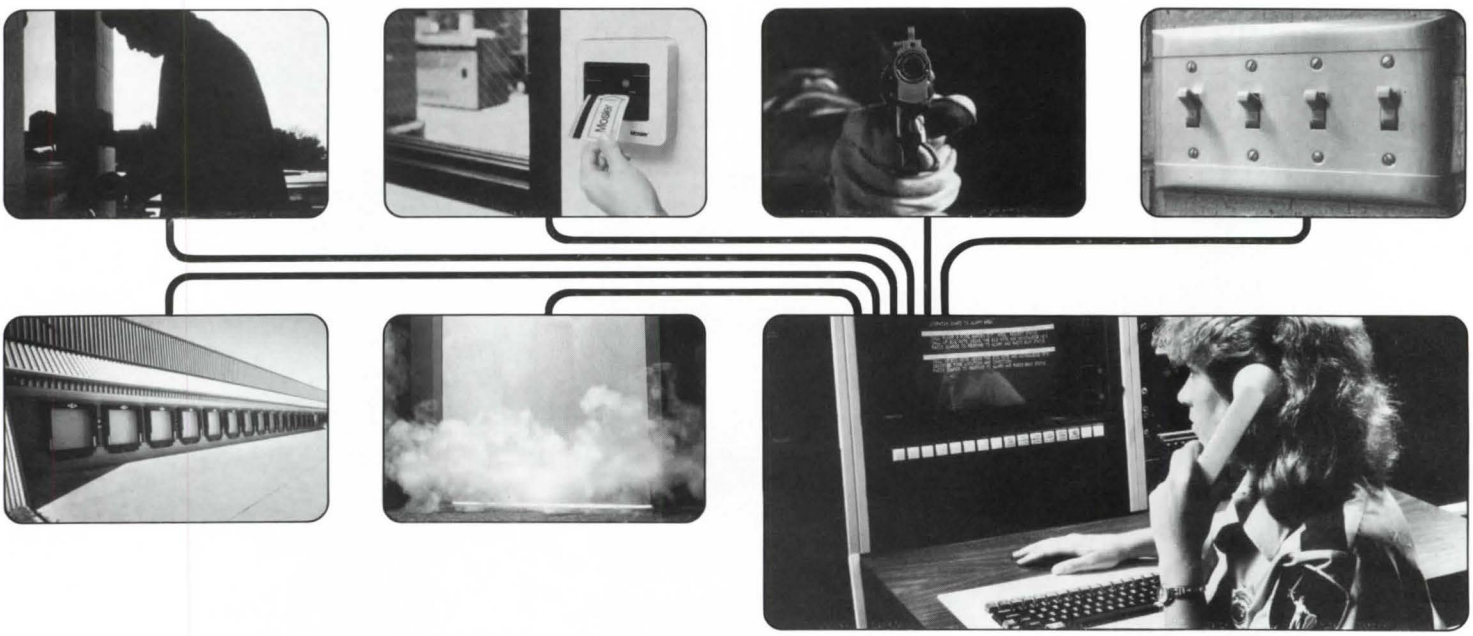

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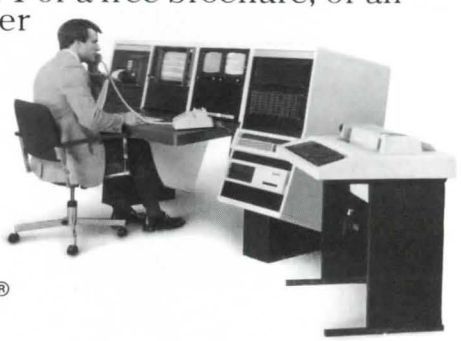

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High-performance, abuse-resistant light fixtures such as those pictured above help deter vandalism at Camp Verde High School, Camp Verde, Ariz.

Protecting personal safety is one of the fundamental requirements of any security system

facility. According to Dennis Recek, project manager for the facility, the stairway presented special challenges in the area of smoke control.

"Code officials required that the building be designed in a segmented fashion, to prevent the spread of smoke during a fire," Recek recalled. "This included providing large doors at the entrances to the stairway that would be closed in the event of fire."

In order to maintain smoke control yet retain the open feeling of the central stairway, Murphy/Jahn specified that the doors to the stairway be equipped with special smoke-activated door closers, manufactured by LCN Closers, Princeton, Ill. In normal use, the closers hold the doors completely open, allowing free access from the stairway. When dual volume ionization smoke detectors built into the tracks of the openers sense the presence of a fire, however, all doors are immediately closed, containing the spread of smoke.

According to Recek, the use of the closers made it possible to retain the integrity of the design for the facility while meeting fire code requirements. "No special design modifications were needed to accommodate the door closers," Recek said. "They have been in place since the building's completion in 1983, and we have had no problems with them to date," he added.

Lighting must both deter and resist vandalism

Protecting personal safety is, of course, one of the fundamental requirements of any security system. Security experts agree that adequate lighting is an important factor in deterring vandalism and personal attack in unsupervised areas, and providing proper lighting fixtures for this purpose should be an integral part of building and landscape design. When lighting fixtures are placed in isolated areas, however, they often must be able to withstand vandalism themselves. For Camp Verde High School, Camp Verde, Ariz., completed in 1985, this was a special problem. "The high school is located in an isolated area, in a community with a fairly small police force," said James Flynn, of James Flynn and Associates, Scottsdale, Ariz., the firm that designed the high school. "Additionally, the community gets very excited about football and other school sports, and feelings can sometimes get out of hand."

Flynn designed the high school with a view to

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Physical Education Building, College of DuPage, Glen Ellyn, IL; Architects: Wight & Co., Downers Grove, IL.

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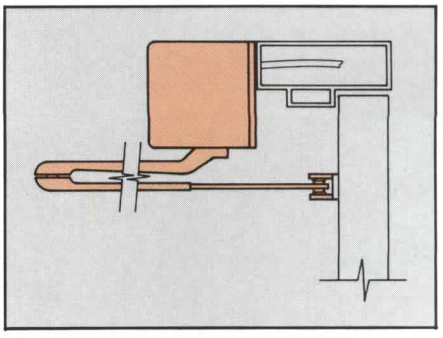
For more information about the LCN Auto-Equalizer and other closers designed to solve entrance accessibility problems, call your LCN representative, see Sweets Section 8, or write LCN Closers, Princeton, IL 61356, (815) 875-3311. In Canada, Ingersoll-Rand Door Hardware, Mississauga, Ontario L5E-1E4, (416) 278-6128.



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minimizing vandalism. "The school is designed around a courtyard, and all windows in this building face this center space, with no exposed glass on the perimeter of the building," Flynn explained. "The exterior walls are painted concrete masonry, which can be cleaned easily in case of graffiti."

Providing adequate lighting was important to protecting people and property, Flynn said. "We wanted to keep the area very well lighted, but we needed a fixture that would withstand abuse," he said. Flynn specified abuse-resistant high-output lighting fixtures manufactured by Kenall Manufacturing Co., Chicago. The fixtures feature an injection-molded polycarbonate lens that resists breakage.

Twenty of the fixtures are placed around the exterior parapet walls, and have so far kept vandalism to a minimum. "We've used this kind of fixture on many schools over the years, in both exterior and interior applications, and they have always performed well," Flynn said.

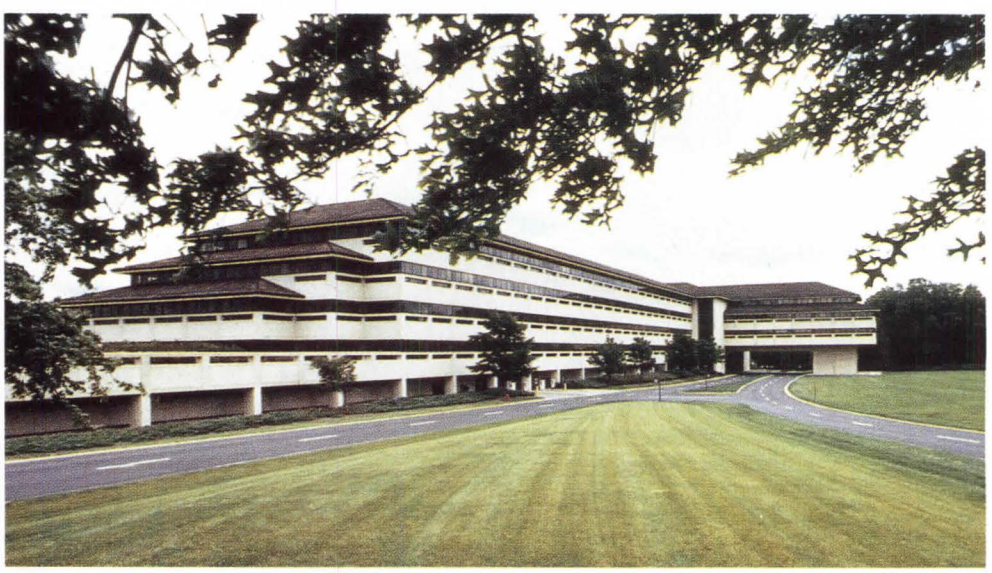
Lock cylinders discourage unauthorized keys

A standard problem with conventional lock-and-key systems is unauthorized key duplication. If a lock cylinder requires a widely available key blank, a building owner has little control over who can obtain copies of the key.

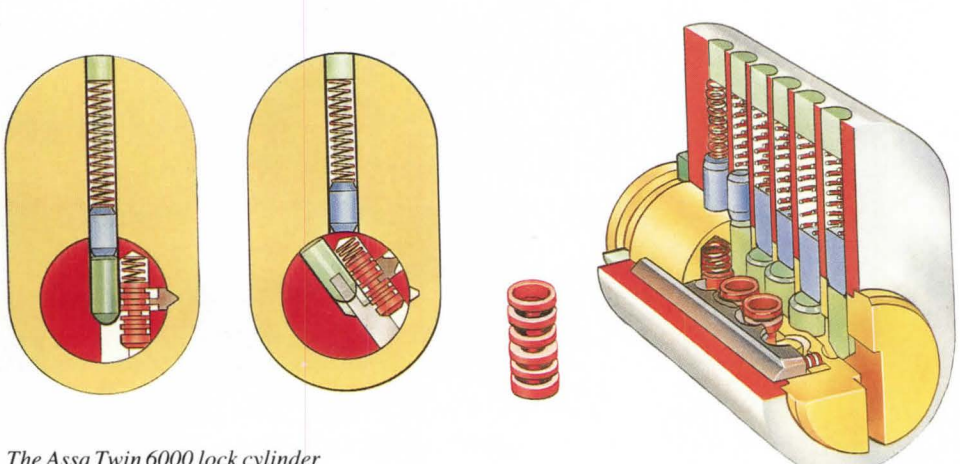
In an effort to avoid the problem of key control in AT&T Communications Headquarters, Basking Ridge, N.J., security planners specified the use of Twin 6000 lock cylinders, manufactured by Assa, Inc., Downers Grove, Ill. "We selected the Twin 6000 cylinders for two reasons," said Ken Noll, administrator for security, AT&T. "The lock is practically impossible to pick, and Assa provided us with an exclusive master key system." Both benefits are made possible by a special coded side bar inside the cylinder. "The side bar code is unique to our master key system, so we are the only people with access to key blanks," Noll said.

Noll said that this restricted access to key blanks is central at AT&T's key control system. "Only two staff members are authorized to order key duplicates," he explained. "Each key must be signed out, and that information is logged on a computer." Employees who fail to return keys face a stiff fine, Noll said. "Even so, if somebody does manage to duplicate a key, Assa will provide a completely new master key system. That's a big plus," he said.

Noll is satisfied with the performance of the 4,600 cylinders, which were installed last May. "The corporation is planning to install similar cylinders in the rest of its offices," Noll added. ■



Security at AT&T Communications Headquarters, Basking Ridge, N.J., is supported by 4,600 high-security lock cylinders.



The Assa Twin 6000 lock cylinder features a special side bar (above left) that "cams out" when a key with the proper side bar code is inserted, allowing the cylinder plug to turn (above right). The lock mechanism consists of a standard pin tumbler system, side bar, and special side pin (far right). The key is designed both with a system code and a side-bar code, making the key difficult to duplicate without the proper blank.

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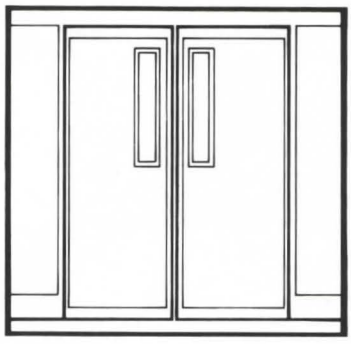

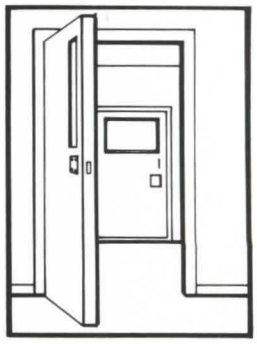

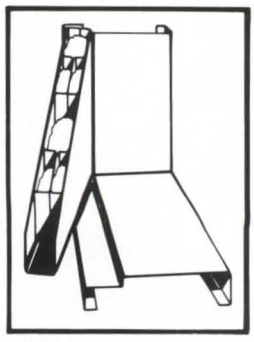

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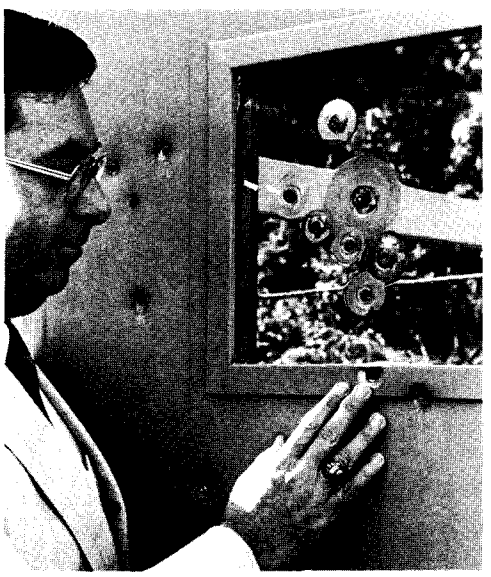
New Products and Literature

Bullet-resistant security door and lights are designed to withstand high-powered small arms fire, manufacturer states. Made with GE Lexgard, the door and lights carry the Underwriters' Laboratories bullet resistive rating for small arms such as the .44 and .357 Magnum. Door utilizes 14-gauge reinforcing on the inner and outer face, plus reinforced frames. Door and lights are designed for use in banks, credit unions, gas stations, teller islands, restaurants, municipal buildings, currency exchanges, and other high-security applications. Amweld.

*Circle **450** on reader service card*



Courion institutional windows are described in a four-page catalog. Series 1020 high/medium security detention windows provide contemporary design and maximum degree of security with concealed detention grill, vendor states. Series 1040/1050 medium/low security detention windows include continuous-turn operating ventilation mechanism. Windows are available in steel, stainless steel, or aluminum. Catalog includes general specifications for operable steel detention windows. Courion Industries, Inc.

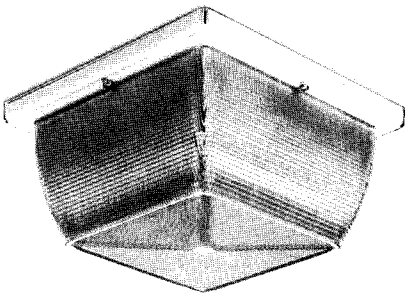
*Circle **451** on reader service card*

Correctional and detention equipment is described in an eight-page color catalog. The P-2000 pneumatic door device, which permits positive door control by guards from a remote location, is featured. Catalog also provides information on controls and surveillance equipment, locks and hardware, security doors, furniture and fittings, and accessories and specialties. Fries Correctional Equipment, Inc.

*Circle **452** on reader service card*

Acme Dunbar wall and ceiling luminaires are designed for vandal-resistant and maximum security applications. Crack-resistant polycarbonate lenses, heavy gauge steel or aluminum housings, and tamper-resistant torx-head screws allow fixtures to withstand extreme abuse, manufacturer claims. Acme Dunbar luminaries are U.L. listed for most wet locations and carry a one-year guarantee against vandalism and defects in material or workmanship. Lithonia Lighting.

*Circle **454** on reader service card*

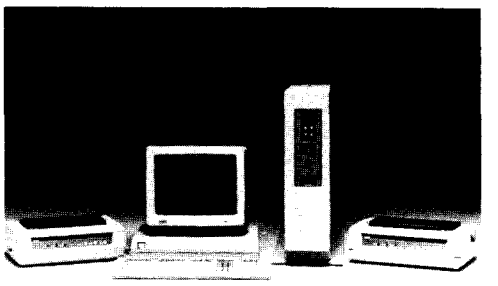


FuturaLok™ Electronic Security System integrates a computerized keycard system with mortise locksets. The system uses a card with a magnetic strip that can be programmed by an encoder. A centralized computer system records all transactions on a printed management report, including information on time, date, type of keycard, the person who made the card, the terminal number, and room number for each transaction. Vendor states the system is especially suited for hotels, because the code of each lock changes every time a new guest checks into the individual room. Locksets are separate battery-operated units with LED indicator lights. Corbin Division, Emhart Hardware Group.

*Circle **455** on reader service card*

SE 7128 computerized security management system uses proximity electronic access control for up to 32,000 employees, vendor claims. The system can control as many as 128 doors and monitor up to 512 alarm points. System includes a Digital Equipment Corporation Micro PDP®-11 computer, up to two interactive display terminals and two printers. Access control subsystem uses non-contact proximity card readers that may be surface mounted, attached behind glass, or concealed within a wall. Schlage Electronics.

*Circle **456** on reader service card*



Prefabricated threat-resistant structures can resist penetration up to and including fire from high-powered military rifles, manufacturer claims. Bullet-resistant window assemblies, doors, walls, panels, and steel or aluminum preassembled buildings are available. Manufacturer also produces prefabricated in-plant offices, assembled buildings, interior partitions, mezzanines, and other special enclosures. Henges Manufacturing, Inc.

*Circle **459** on reader service card*

Detention equipment is detailed in a new eight-page catalog. Products described include entrance or corridor doors, hinged cell doors, sliding cell door with fully selective locking and operating devices, electronic control consoles, emergency release cabinets, single sliding fence gates, and various room and cell furnishings. A partial list of major installations is included. Stewart-Decatur Security Systems, Inc.

*Circle **462** on reader service card*

Paragon™ abuse-resistant lighting fixture is a low-wattage, high-intensity-discharge fixture combining superior energy-efficient performance with the maintainability required for high-abuse, low-level applications, vendor says. Injection molded polycarbonate refractor directs light up and out to illuminate all surrounding surfaces, eliminating shadows and making areas safe from threats of vandalism and threat of physical attack. Square, uniform light distribution allows for wider spacings, so that in most applications 30 to 50 percent fewer fixtures are needed to properly light an open area, manufacturer claims. Kenall Manufacturing Company.

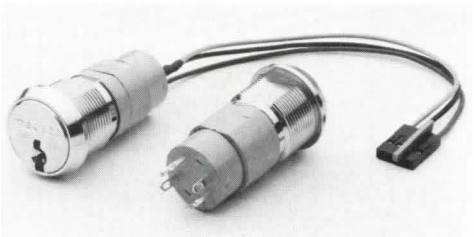
*Circle **465** on reader service card*

Automatic gate operators and accessories are highlighted in an eight-page color brochure. Slide gate and swing gate operators for heavy-duty, medium-duty, and light-duty applications are described. Available accessories include time delay systems, electronic gate locks, digital solid state radio controls, card readers, intercoms, single and three-button control stations, and post-mounted keyswitches. Dimensions and recommended capacities are listed. Stanley Automatic Openers.

*Circle **463** on reader service card*

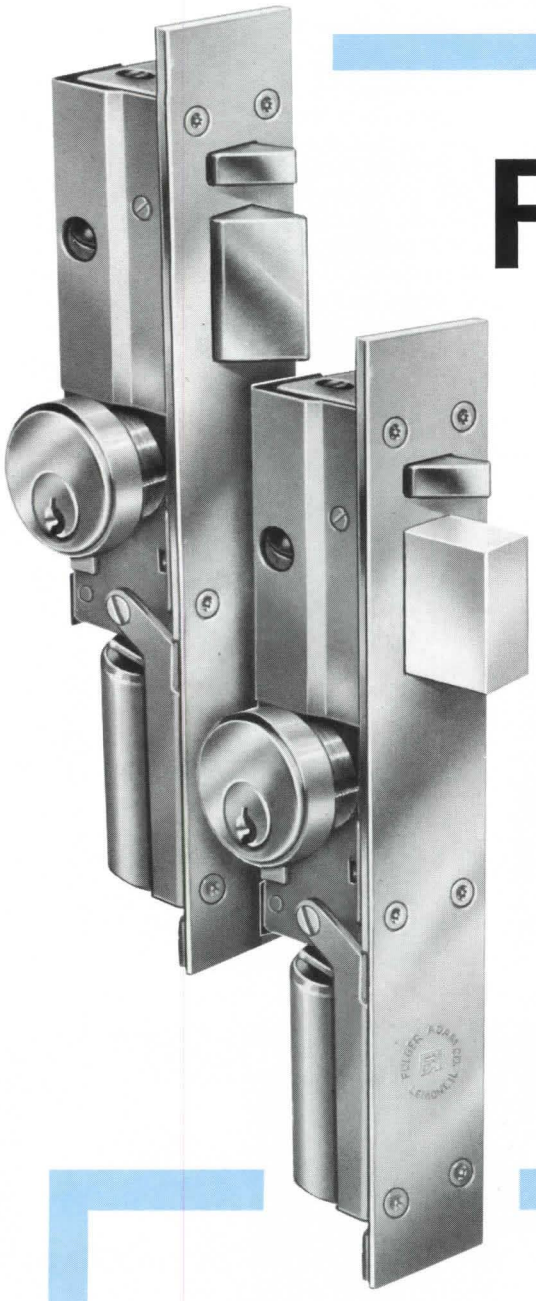
24K-Series miniature rotary switch lock combines pick-resistant lock cylinder with multifunction switch. Shortened length offers design flexibility not previously available in a high-security switch lock, manufacturer claims. The switch is listed with C.S.A. and U.L., offers up to eight-position switching, 45- and 90-degree indexing and includes built-in anti-static up to 22 kv. Device carries a contact rating of four amps at 125 volts AC or 28 volts DC, and two amps at 250 volts AC. Medeco.

*Circle **469** on reader service card*



HandsFree™ Proximity access control system can read access card from a distance of over 28 inches, vendor claims. Cardholders wear or carry a ProximityPass™ or PocketPass™, which never need be held in the hand. Proximity interface box may be concealed in a variety of locations. Entire system is weatherproof, contains no batteries and is installed without coaxial cables. An LED display tunes the sensor. ProximityPasses are available with photo I.D. and badge clip, and will not affect magnetic stripe bank cards. Continental Instruments Corp.

*Circle **466** on reader service card*



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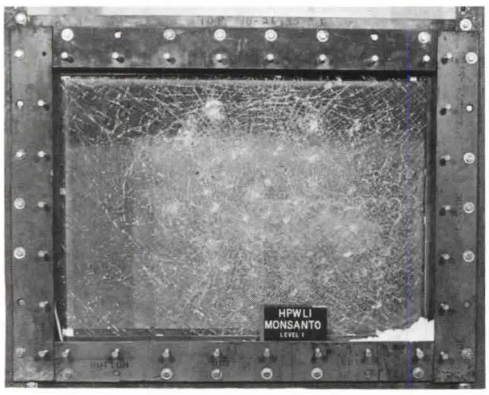
Saflex SX polyvinyl butyral interlayer for glass and polycarbonate laminates provides burglary and bullet resistance in a variety of security applications, manufacturer states. SX sheet can be processed on conventional glass laminating equipment, and screens out most incident UV energy to help protect the polycarbonate from degradation. Manufacturer reports laminates with Saflex SX show good compatibility and durability in accelerated and actual outdoor exposures under thermal cycling conditions. Monsanto Chemical Company.

*Circle **457** on reader service card*



Shielding Architectural Window is a double insulating glass window that provides shielding against electromagnetic interference from internal and external building sources, manufacturer states. The windows prevent leakage of electromagnetic waves from emitting devices inside a building as well as interception or jamming of those interior waves by sources outside a building. Manufacturer recommends product for any building that must achieve electromagnetic compatibility, such as embassies, government buildings, military installations, and electronic facilities. Southwall Technologies.

*Circle **458** on reader service card*

Security glazing for correctional facilities featuring Lexgard® laminates is featured in an eight-page brochure. U.L.-listed, bullet-resistant grades of Lexgard® laminates offer no-spall, multiple-shot protection in high-risk areas such as guard stations, day and control rooms, and holding areas, manufacturer claims. Results of ballistics/physical/flame attack tests are reported, and recommended laminates for various correctional applications are discussed. General Electric Company Plastics Group.

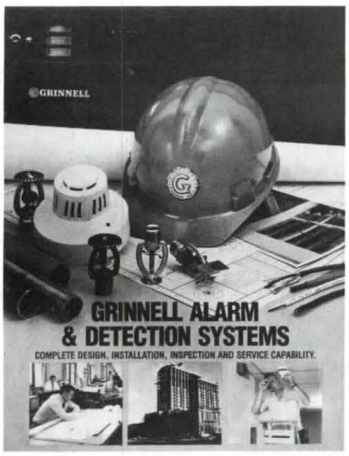
*Circle **460** on reader service card*

Gemini access control system features a card/key reader module and a microprocessor with eight separate control levels to electronically activate a door's locking and unlocking functions. Access levels include executive level master control cards, one-time use cards, dual-key "Safe Deposit" mode for high security, and five user levels. Card/key reader module features built-in LED to indicate lock status and a magnetic strip reader and microprocessor to activate commands. The reader can be wall mounted or mounted inside standard door frames. Architectural Control Systems, Inc.

*Circle **471** on reader service card*

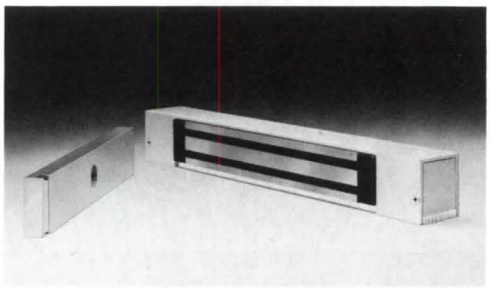
Fire alarm and detection systems are discussed in an eight-page color brochure. Vendor offers complete design, installation, inspection, and service capability for a variety of commercial and industrial applications. The design and installation of fire alarm and detection systems are discussed, as are a number of prominent installations of the systems. Grinnell Fire Protection Systems Company, Inc.

*Circle **461** on reader service card*



TigreLok electromagnetic locking device keeps doors locked with 1,200 pounds of holding force. Locks in the series have a low-profile design that allows architecturally pleasing appearance and easier installation, vendor states. Locks conform to NFPA 101 regulations and may be used to legally lock egress doors to control traffic. Armature contact assures proper alignment. Built-in surge protection prevents lock malfunction, and the device is fail-safe. A door position switch, which provides for remote monitoring, is also available. Rixson-Firemark.

*Circle **464** on reader service card*



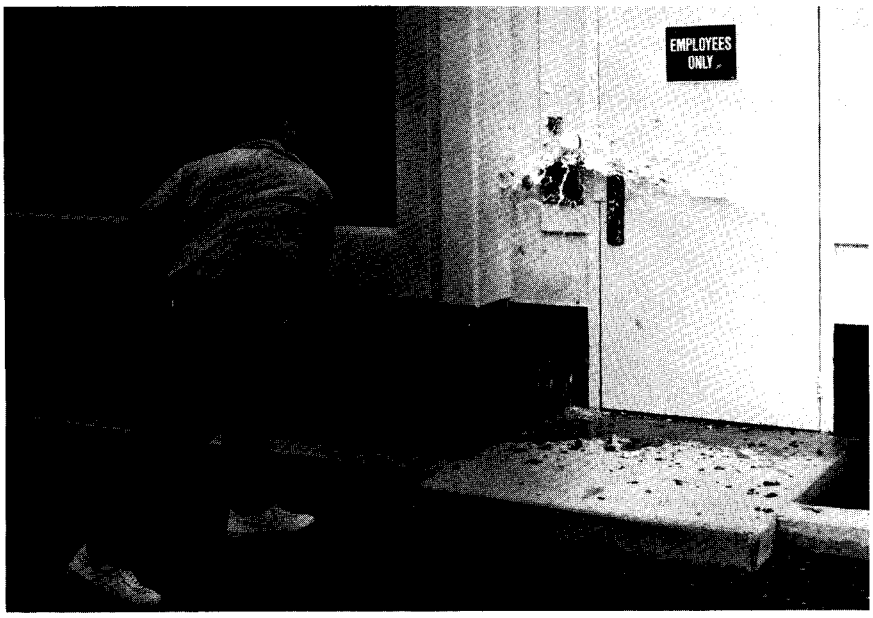
Lex-a-Lite "Top Security" Grille lets light and air in, but keeps cigarettes, dust, bottles, bricks, and burglars out, manufacturer says. The Lex-a-Lite is made of continuous polycarbonate plastic strips run through a link pattern of aluminum-sheathed steel rods with end links that lock into the guides when pressure is applied. Counterbalance system employs oil-tempered helical torsion springs housed in a permanently lubricated steel shaft. Motor drives are available as an option, as is a reversing door edge to open motor-driven doors when grille strikes a person or obstruction. Wayne-Dalton Corp.

*Circle **467** on reader service card*

COMGARD MX1000 *security system monitors* up to 1,000 remote sensors and responds automatically to alarm conditions, vendor states. The system is managed by a single operator at a central processing control unit. User-programmable design enables operator to customize the system and make on-site modifications. COMGARD MX1000 includes remote field transponders and an uninterruptable power supply. Central processor has four communications modules that control transponders, signal inputs, and output. Operator interface keypad, liquid crystal display, and printer are also included. GTE Government Systems.

*Circle **468** on reader service card*

Vandalproof Access Control!



Schlage Electronics (SE) access control systems frustrate vandals because there are no card slots to fill or jam. Instead, the systems use "Proximity", a non-contact card reading technology, invented by Schlage Electronics, which has been in production for over 10 years.

Access is granted when a credit-card-size Command Key is presented within two to four inches of a sensor encased in rugged, weatherproof Lexan® .

Employees seldom have to remove their card from purse or wallet to gain access. Operation is smoother, and there are fewer lost or stolen cards.

SE Proximity has been proven in commercial, industrial and governmental facilities around the world.

In the last five years alone, over 2 million employees have begun carrying SE Command Keys. Most still have them, since Command Keys are guaranteed for five years.

SE reliability is legendary. Many systems have gone years without needing service or attention. In fact, the card reading sensor has a Mean Time Between Failure (MTBF) of over 30 years. Continuous operation is further ensured by the largest network of factory trained dealers in the industry.

Professional quality access control is never "cheap", and SE systems are competitively priced.

With the annual cost for a 24-hour guard post at $60,000, or more, SE systems pay for themselves quickly.

They also have a low profile. Sensors can be surface mounted, attached behind glass, even concealed in a wall.

The newest "dial up" systems are compatible with, and programmable by, remote teleprinters, guard centers or alarm central stations.

For more information and a copy of our authoritative booklet — What Every Executive Should Know About the Ins and Outs of Access Control — call or write.

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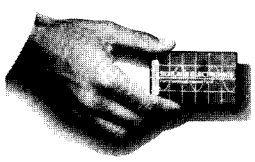
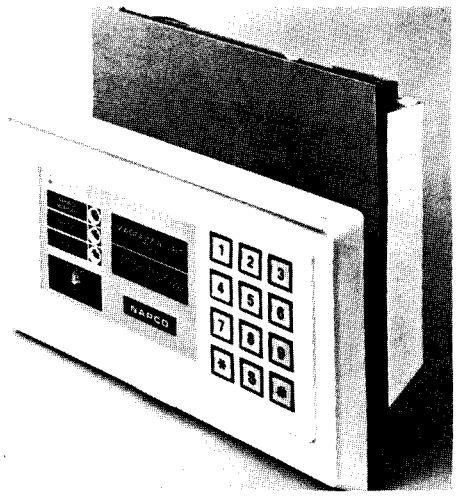


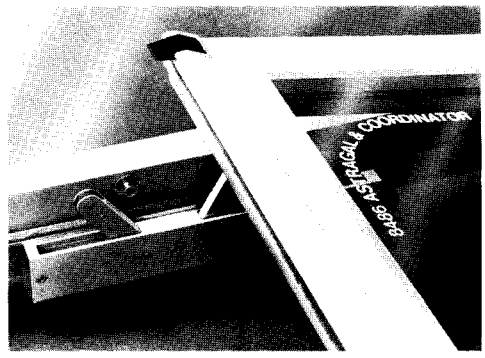
3260 Scott Boulevard
Santa Clara, CA 95054-3011
(408) 727-5170

Circle **No. 376** on Reader Service Card

Magnum Alert-700 is a totally self-contained security system designed for use in apartments, condominiums, low-budget residential areas, offices, and small businesses. Standard features include three programmable burglary zones, two 24-hour zones (panic and fire), selectable exit/entry delay timer, manual shunting, auto shunting, day zone supervision, priority arming, and auto reset. Napco Security Systems.
*Circle **470** on reader service card*



Security Astragal/Coordinator prevents the insertion of wires, shims, etc. into the gap left between pairs of bull-nose, narrow-stile glass doors equipped with exit devices. An extruded astragal is blind-riveted to the nose of the active leaf, which is also equipped with a mortise exit device. The inactive door has a concealed vertical rod device that latches to the header and threshold. A two-lever coordinator is mounted on the header to assure that the overlapping active door closes last. The astragal/coordinator is available in anodized satin aluminum, dark bronze anodized, and black anodized. Adams Rite Manufacturing Co.
*Circle **472** on reader service card*



PanicGuard® doors with Paneline® exit device contain concealed rod exit panels on the inside of the door. In case of an emergency, door quickly opens with slight depression of panel. When doors close, astragal bar moves back into place, interlocking the two panic entrance doors. Burglary tools cannot reach lock mechanism, vendor claims. Door frame incorporates a continuous stop at the jamb and threshold to prevent entry of foreign objects, and lock cylinder is recessed and protected by pull handles to prevent removal. Optional matching dummy panels for vestibule doors and fixed rails for sidelites and center lites are available. Kawneer Company, Inc.
*Circle **453** on reader service card*

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Few Florida communities promise the rich selection of residential designs and solid real estate investments found at Saddlebrook, the Golf & Tennis Resort near Tampa.

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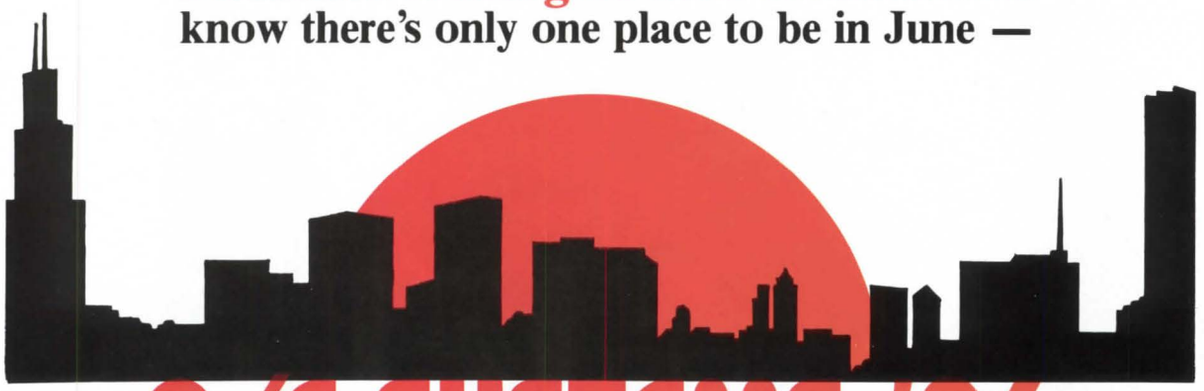
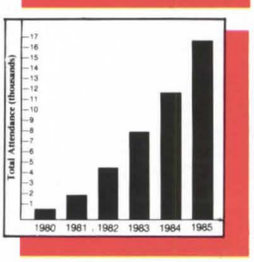


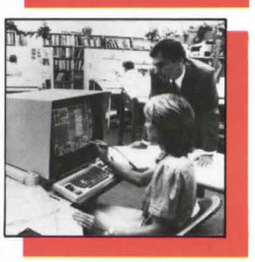
A/E SYSTEMS '86

The computer and management show for the design and construction industry.

June 23-27, 1986

McCormick Place, Chicago





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Circle **No. 393** on Reader Service Card

P/A in April

Courtesy Maki and Associates

Spiral media center, Tokyo. Architects: Maki & Associates.

Spiral media center by Maki

How does Fumihiko Maki distill the geometrical and social hurly-burly of a Tokyo shopping street into a rich yet serene work of architecture? See the lead feature in P/A's April issue.

Three Buildings for Treatment

Programs for social and medical care have elicited outstanding architectural solutions from firms in widely different parts of the U.S. From Philadelphia, a P/A-Citation-winning center for eating disorders, by Atkin, Voith & Associates; from South Florida, an ordinary medical office building made stately by Duany & Plater-Zyberk; from Alaska, a homelike shelter for abused women by The Miller/Hull Partnership of Seattle.

Energy and Human Occupancy

Energy conservation, featured in the April P/A for several past years, will be examined this year for its effect on users. P/A will initiate a new series of methodical Post-Occupancy Evaluations with investigations of some noted "energy" buildings and how they perform. A Technics feature on heating, ventilating, and air-conditioning systems will focus on human comfort.

Future Issues of P/A

May will bring a P/A Inquiry feature on the rehabilitation of public housing, a Technics article on high-tech labs, reports on some fine completed architecture, and a report on the latest annual P/A Furniture Competition, with a special section on NEOCON. June will bring extensive coverage on computers, along with a supplement on the A/E Systems conference/exhibition—and, of course, some works of architecture not published elsewhere.

DESIGNING THE FUTURE

How does the Hartsfield Atlanta International Airport manage 45 football fields of facilities? With CADVANCE. The PC-based professional architectural Computer-Aided Design system.

DMA Architects Inc. maintains the entire airport design on CADVANCE—including more than 130 gates at 5 concourses, 4 runways, and an underground transit system. And that lets DMA's 5-person firm operate at a 25-person level.

DMA uses each of CADVANCE's 127 layers to define one aspect of the drawing. From walls to plumbing. From landscaping to aircraft configurations. So it's easy to consider proposed modifications. Recently, for example, four alternative International Concourse gate configurations were developed in 20 minutes.

Hartsfield has been called the airport of the future. And CADVANCE helped make it happen. CADVANCE is the latest in a continuum of CalComp design products from PC-based software to large systems. No wonder CalComp has the most CAD products installed among architects and facilities planners. Call (800) CALCOMP for the name of your nearest CADVANCE dealer. Or write: CalComp, 200 Hacienda Drive, Campbell, CA 95008 (TELEX 188746).

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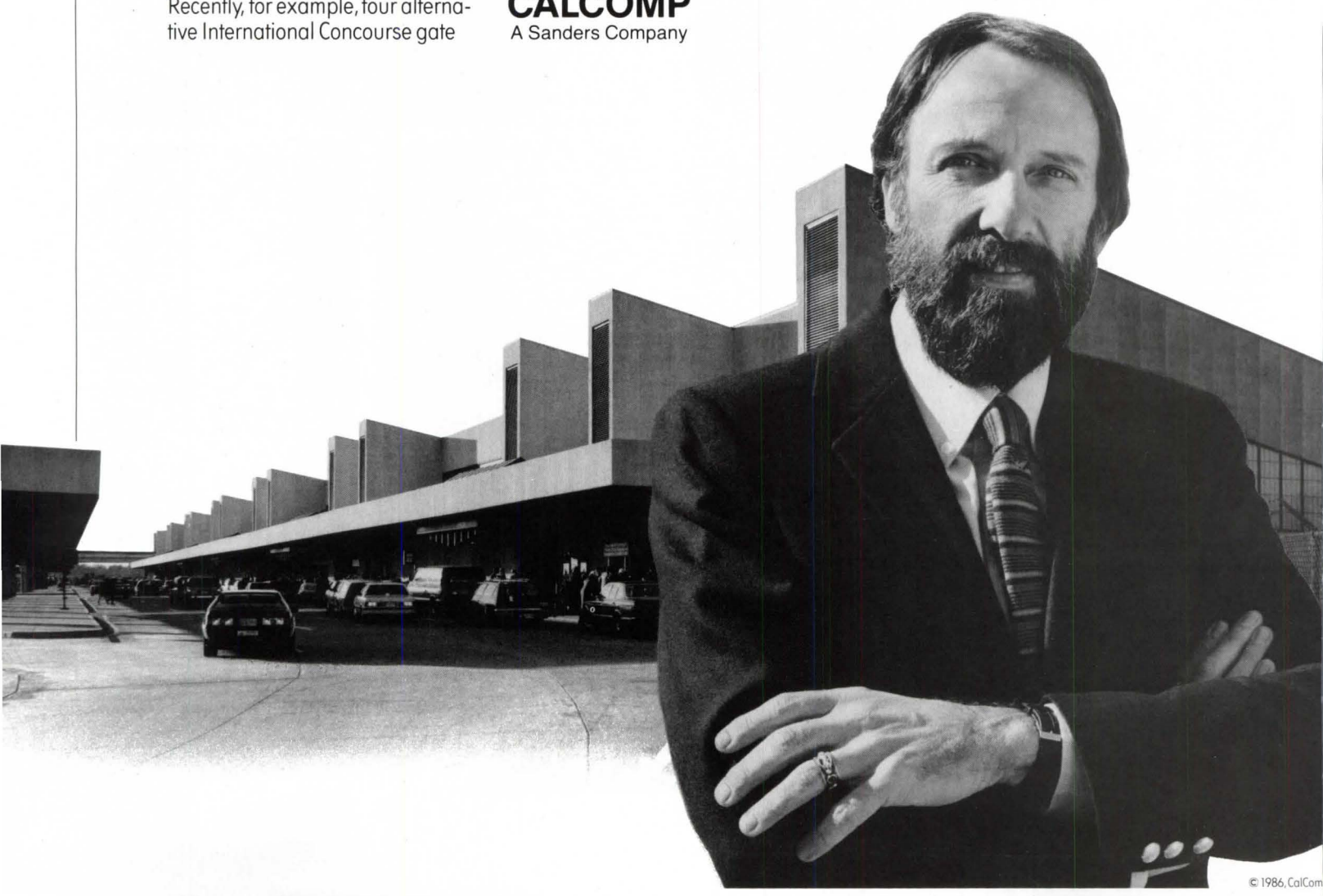


CADVANCE

THE ARCHITECTURAL CAD SYSTEM.

New Products and Literature

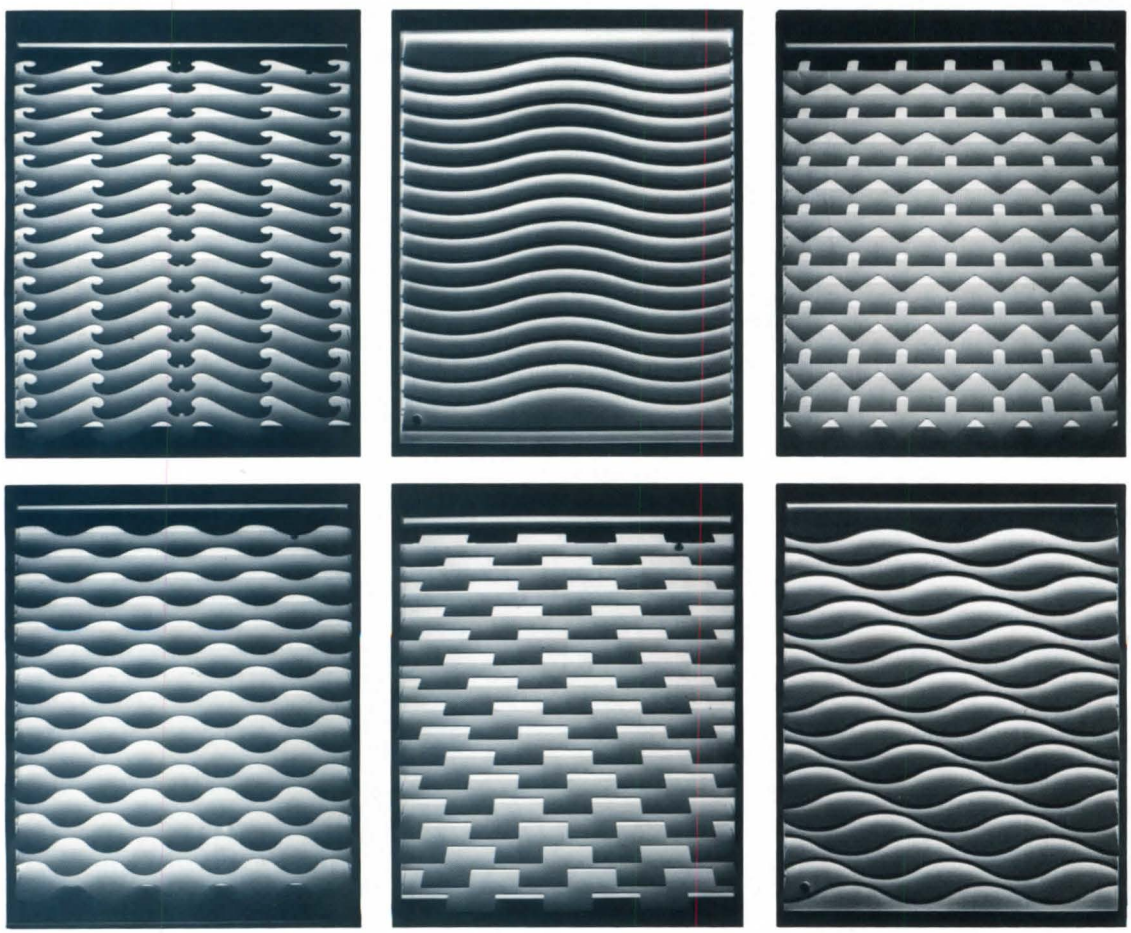
Daylight Control

Shoji panels, left, for window coverings, interior partitions, doors, and light covers have frames of cedar, mahogany, or poplar, and a choice of inserts. Among inserts that can be selected are batiks, grasscloth, rice paper, and silk, as well as COM. Installations are on sliding tracks, accordion fold, or shutter style. The panels are custom designed and hand crafted. Design Shoji.

Circle 101 on reader service card

Silhouette Shutters, below, produced by Ruggles, Inc., are offered in 24 different leaf edge profiles, from subtle curves to bold, cut-out designs. Brass pins through the leaves attach to the operating rod, of brass or painted steel, out of sight at the back corner. Leaves pivot on brass pins through the stile. A mechanical friction device is built into one leaf, to which an operating knob is attached, to hold the shutter in any position. Leaves are a nominal ⅜″ x 4″ x 20″ minimum, 34″ maximum width. Standard material is pine, furnished unfinished, primed, natural wood with clear lacquer, or stained or painted to customer's specification. Hardwoods and other softwoods are also available on special order.

Circle 100 on reader service card



Workforce™ heavy-duty faucets for commercial use are available in single-lever or two-handle models. The two-handle model has blade handles for easier operation by the handicapped. The line includes a slow self-closing faucet, with adjustable flow duration, to meet water conservation requirements. The Scald-Guard® bath faucet has four safeguards: pressure-balanced control; cold water opening first; limit stop for presetting maximum temperature; and wider comfort zone. Delta Faucet Co.
Circle 102 on reader service card

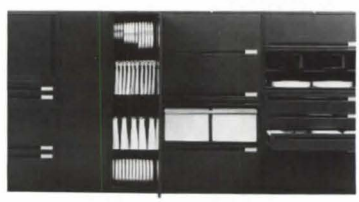
Glyphix I and Glyphix II laminates, influenced by textile and wallcovering patterns, are small, directional geometric motifs. Glyphix II adds a soft, overlapping diagonal stripe to Glyphix I design to create a pattern-on-pattern effect. Glyphix I is offered in shades of rose, beige and blue; Glyphix II in mauve, mint, and green. Nevamar Corporation.
Circle 103 on reader service card

Drafting board lights Model ZLS are equipped with a parabolic louver that reduces glare and stray light. Molded of high-impact plastic in a gridded pattern, the louver reduces reflection from the work surface back to the draftsperson and prevents light from spilling off the board. It is available as an option for new lights or to upgrade lights already in use. The ZLS light attaches to the back of the drafting board for unrestricted carriage movement. Waldmann Lighting Co.
Circle 104 on reader service card

Lepoix 85 toilet seat, designed by Louis Lepoix, is contoured for comfort and has an inlaid metal logo available in gold or silver. The standard, easy-to-clean hinges of stainless steel are supplied in gold, silver, or colored finishes. Custom design service is available for corporate, institutional, or hotel logos as an alternative to the Pressalit logo. Pressalit Inc.
Circle 105 on reader service card

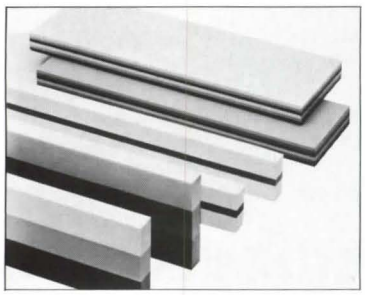
Vycon Contract 54™ wallcovering collection includes basic textures, printed textures, custom colors and patterns, and multicolor prints. Shown above are Moire Plaid and Ombre from the prints; Woven Silk from the silk group; and Monarch and Empire from the stipples. The patterns are available in Type I and II weights for hotels, banks, hospitals, nursing homes, and office buildings. J. Josephson.
Circle 106 on reader service card

Two computer work surfaces with keyboard stepdowns integrate with System 2Plus computer support products. One is a 30-inch-deep straight surface available in 36-, 48-, and 60-inch widths. The stepdown keyboard platform, for either right- or left-hand configurations, is 12 inches deep, 24 inches wide, and comes with support and suspension brackets. The second is a corner keyboard stepdown for corner work surface, which provides a transition between 24-inch or 20-inch deep surfaces. Tops, fronts, and sides are high-pressure laminate, available in seven finishes. Panel Concepts.
Circle 107 on reader service card

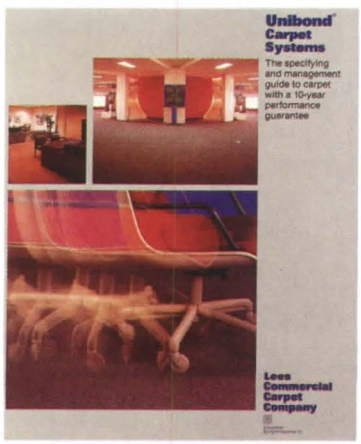


Storage Center™ lateral files and office organizers can accommodate combinations of conventional and computer-related materials, such as printout binders, magnetic tapes, and disks. Drawers can be customized to fit a particular storage need, and the 2-, 3-, 4-, 5-, and 6-drawer-high versions allow the system to grow as additional space is needed. Office Specialty.
Circle 108 on reader service card

M4500 A/V Media Cabinets of oak-grain or white laminate, with lockable doors, hold about 5000 slides and provide ample space for textbooks, projectors, accessories, and other material. A pull-out illuminated working surface has two 5000°K daylight fluorescent lamps that automatically switch on when the drawer is pulled out. Accessory drawers store slide boxes or other materials, and a pull-out suspension filing drawer accommodates pamphlets, catalogs, and papers. Leedal Inc.
Circle 109 on reader service card



Color-Tiers edge strips and sheets have residential and commercial uses including surfaces and edging on counters, cabinets, shelves, desk tops, display fixtures, tables, and signage. Color-Tiers edge strips and sheets can be created from 36 solids selected from the Color Grid® and the Color Trends™ collections to accent, contrast, or complement design. They are also available in six in-stock combinations. Formica Corporation.
Circle 110 on reader service card



Commercial carpets in cut pile and all-loop textures are described in a six-page color brochure. They are designed for use in heavily trafficked commercial areas including airports, shopping malls, public spaces, schools, and open plan offices. Test data, charts, and specification information are included in the brochure. Lees Commercial Carpet Co.
Circle 200 on reader service card

The 1986 Painting Systems catalog for specifiers and applicators details the complete range of Sherwin-Williams coating systems for architectural and industrial maintenance use. The 64-page catalog is indexed by product name and type and contains a complete description of product uses, characteristics, surface preparation, and application requirements. One section details basic considerations in writing specifications, and charts list paint recommendations for specific substrates. Sherwin-Williams Stores Div.
Circle 201 on reader service card

Mixed Media Library Units store printout reports, manuals, and other information media that are used together. The freestanding open files can be equipped with a variety of snap-on components including hanger bars for center-hook filing in Documate® devices, pull-out reference shelves, periodical shelves, and locking bin drawers. Units, available in four heights, can be arranged side-by-side or back-to-back. Wright Line Inc.
Circle 111 on reader service card

Imperial Series dishwashers include: Custom, Model KDC-21A; Imperial, Model KDI-21A; solid-state Imperial Selectra, Model KDIS-21; and convertible portable Custom, Model KDC-61A. Control panel graphics have been completely redesigned. Panel inserts are brushed aluminum and black with coordinating black and orange accent lines. Sure-Clean Automatic Water Heat System, standard on all Imperial model dishwashers, heats incoming wash water by an internal 800-watt element. KitchenAid Div., Hobart Corp.
Circle 112 on reader service card

Insul/Crete™ exterior wall insulation and finish brochure details the easy installation and benefits of the system applied directly over Styrofoam™ insulation and reinforcing fiberglass mesh. The eight-page, full-color brochure has cutaway product illustrations, installation information, and photographs of actual projects. Blue Styrofoam insulation is lightweight, yet strong and durable, with a closed-cell structure that promotes high R-value and helps to minimize water absorption. Insul/Crete is an impact-resistant, polymer-modified cement with chopped fiberglass strands added for strength and durability. The Dow Chemical Company.
Circle 202 on reader service card

Saxony Fabric is a classic heathered flannel of 65/35 wool and polyester in high- and low-value tones, designed exclusively for Westinghouse Furniture Systems. There are 14 new colors—nine soft value and five darker tones—each complementing all Wes-Tone fabrics. Westinghouse Furniture Systems.
Circle 113 on reader service card

Traditional Lighting Catalog shows 42 luminaires, 25 posts, and more than 40 accessories such as brackets, finials, and bases. The four-color, 28-page catalog has high intensity photometrics and over 100 photographs. TrimbleHouse.
Circle 203 on reader service card

Metallic Finishes, variations on the classic Dryvit® Outsulation® finishes, can be used as a full Dryvit system or as an exterior or interior finish over approved substrates. Available in Quarzputz®, Sandblast®, and Freestyle® textures, the trowel-applied finish features 12 integral colors with the glint of metal. The 100 percent acrylic-based formulation resists weathering, color change, mildew, peeling, and staining. Dryvit System, Inc.
Circle 114 on reader service card

System 2/90 Signage adds aluminum inserts that combine with the structural rail to provide an all-metal option, except for ABS moulded end caps. Insert heights are 1, 2, 4, and 6 inches, with all standard lengths available. Standard finish is satin anodize in bronze, natural, black, and gold. Open Plan Accessories.
Circle 115 on reader service card

Natural Classics wallcoverings consist of 96 patterns in a range of soft colors. Textiles are linen and wool from Belgian mills and hand-loomed silk from India. They are Class A fire rated and Scotchgard treated. Widths range from 27½ inches to 55¼ inches. Vicrtex Wallcoverings.
Circle 116 on reader service card

Sigla series lamps have a dark gray painted metal base or clamp, and a fiberglass flexible structure with an insulating black sheath, and are adjustable in height and angle. A switch in the base controls two light intensities. Designed by René Kemna, for Sirrah of Italy, the series consists of a table lamp, a floor lamp, and a clamp-on lamp. Collezione Simon Ltd.
Circle 117 on reader service card

Nordica textile wallcoverings, designed by Anne Nomtak and imported from Sweden, coordinate with cotton fabric patterns and sheer window fabrics. The collection is all Class A fire rated. MDC Wallcoverings.
Circle 118 on reader service card

Antislip safety stair and walkway products catalog presents several types of stair treads that comply with OSHA and other safety surface specifications. There are models, some of which are available in colors, that are suitable for concrete or metal stairs. Drawings show details of tread installations. Wooster Products.
Circle 204 on reader service card

Interior and exterior door catalog illustrates several styles of doors, with sizes, glazing options, and wood species available. The 16-page brochure also includes side lights. Specifications and installation instructions are provided. Sun-Dor-Co.
Circle 205 on reader service card

The Imperial Executive chair, designed by Christian Heimberger, combines a steel skeleton inner frame with a polyester and foam-filled seat cushion over an anatomically shaped molded plywood foundation. It has two upholstery options: plain or channeled back; and multiple base options, including five-prong bases in a choice of woods or metals, and glides. Schafer Bros., Inc.

Circle 119 on reader service card

Northern Comfort chair, by Charles Gibilterra, features a stainless steel swivel/tilt base and cushioned back support, seat, and arm rests. It is available with leather covering or it can be specified with fabric covering. Options include high-back or low-back versions and base in neutral stainless, Brutone bronze, or Rich-Low bronze. Brueton Industries.

Circle 120 on reader service card

Architectural Fascia and Roofing Panels brochure covers metal batten seam, standing seam, batten tee, and low-profile panels. Metals are 24 gauge steel or aluminum; finishes shown on color charts can be Kynar 500® or polyester. Galvalume® aluminum zinc alloy and cold rolled copper panels are available on special order. Fashion, Inc.

Circle 206 on reader service card

Optix transparent blinds filter 100 percent of damaging ultraviolet light and cut glare, while retaining the view. Installation photos of the one-inch, two-inch, and vertical blinds and descriptions are included in a new brochure. Nanik.

Circle 207 on reader service card

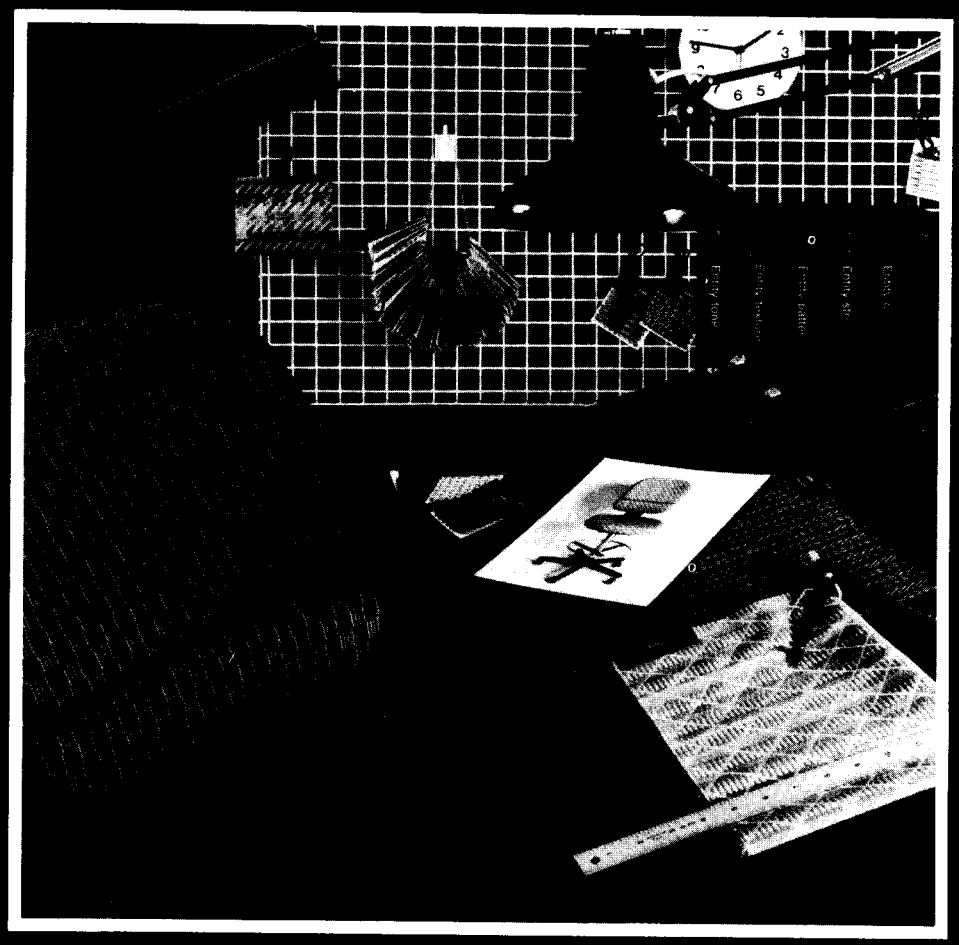
Vu Rite™ visual systems architectural panel combines projection, color writing, and magnetic posting in a single board. Panels convert flat areas into communications walls in board rooms, conference centers, hospitals, and classrooms. They can also be used to create special effects in hotels and restaurants. The matte white, bidirectional, lenticular vinyl surface is heat embossed into thousands of reflective surfaces per square inch. A visibility range of 180 degrees makes wide angle viewing possible. Eberhard Faber, Inc.

Circle 121 on reader service card

Building Materials

The HongkongBank, Hong Kong (pp. 67–109). *Architects: Foster Associates, Hong Kong.* Steel frame: British Steel/Dorman Long. Refuge terrace steel: Wai Hing. Exterior cladding: Cupples. Interior fire-rated walls: Getz. Demountable partitions: Naka/C. Itoh. Metal decking: British Steel. Raised floor: H.H. Robertson. Marble flooring: Tecnomarmi Maiera. Terrace waterproofing: Tricosal. Plaza doors: Tajima. Steel doors: Naka/C. Itoh. Rolling shutters: Roller Shutters. Vault doors: Guardforce. Metal ceilings: Naka/C. Itoh. Silicone sealants: General Electric. Insulation: Pittsburgh Corning. Shaft walls: U.S. Gypsum. Exterior coating: PPG. Hardware: Hori. Stairs: Kawada. Kitchen equipment: Catering Equipment. Communications equipment: Phillips. Fire Protection: Morceau. Basement service and fire protection: Drake & Scull. Refrigeration supply equipment: Caricor. Subfloor services: Ryoden Mitsubishi. A.C. supply outlets: Trox Brothers. Electrical supply outlets: Ackerman. Service modules and risers: HMT Consort. Hydraulic lifts: Schindler. Turntable: Jardine. Loading dock equipment: Associated Engineering. Escalators and elevators: Otis. Building management controls: Johnson Controls. Fire detection and alarm: Thorn EMI Security. Document handling: Telelift GMBH. Refuse collection and disposal: Centralsug. Maintenance cranes: Stephens & Carters. Signage: Erco. Lighting: Siemens/Erco. Carpets: Hong Kong Carpets/Interface Interiors. Desks: Ahrends. Tables and chairs: Ahrends and Herman Miller. Storage units: SunarHauserman. Window blinds: Tachikama. Acoustical equipment: Spectrum Audio.

IN GREEFF TASTE



en·ti·ty—the essence; having distinctness of being and character. For example, ENTITY, Greeff's innovative contract fabric collection. Woven from the finest natural fibers—wool, silk, linen, cotton and mohair. Seen in public spaces, offices, hospitality areas...and in Greeff showrooms.

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Circle No. 343 on Reader Service Card

a+U EXTRA EDITION

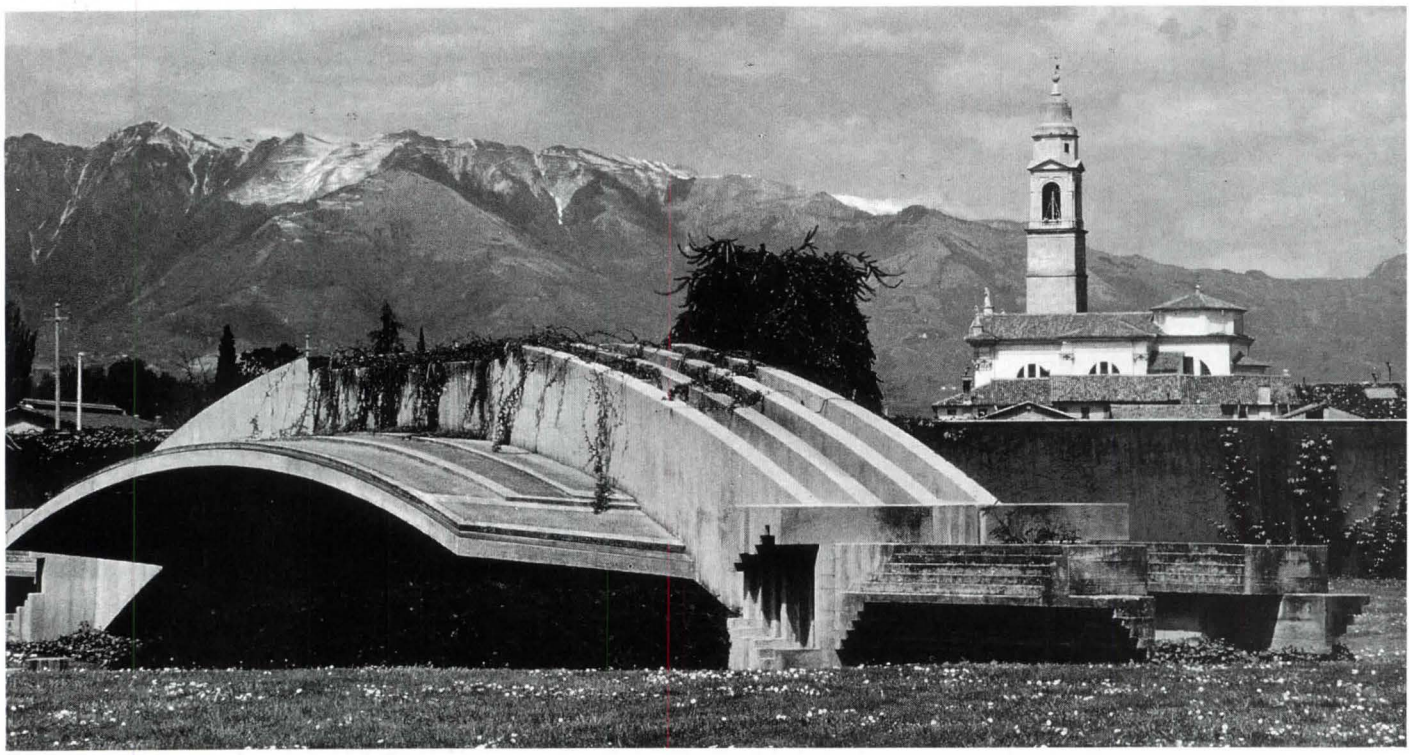
1985 OCTOBER

CARLO SCARPA

Describing the entire aspect of Scarpa's work with many color photos and drawings

〈Works〉

Possagno Plaster-Cast Gallery	Balboni House
Castelvecchio Museum	Brion Family Cemetery
Olivetti Showroom	Banca Popolare di Verona
Querini-Stampalia Foundation	Ottolenghi House
Gavina Showroom	Carlo Scarpa's Drawings



〈Essay〉

Francesco Dal Co

〈Chronological List and Bibliography of Carlo Scarpa〉

Sergio Polano

〈Photos〉

Antonio Martinelli

〈Short Essays〉

Fumihiko Maki, Hiromi Fujii, Tadashi Yokoyama, Shin Takamatsu

About the time Philip Johnson was finishing that historic document of his, Scarpa was designing a work that might well have illustrated the book. However, the over two hundred projects that Scarpa did subsequently, do not attempt to establish the identity of modern architecture, even though he used the structural technology of modern architecture. Subtle differentiae appear in each work. Scarpa was more interested in developing a poetics through an architectural vocabulary than in discoursing on modern architecture.
The well known interest in Frank Lloyd Wright and the love of Japanese gardens and architecture were not the source of Scarpa's design but reflected his interest in an architectural vocabulary.

Format: 292mm x 219mm 264 pages (173 color pages). Price: ¥5,500 + ¥1,500 (seamail postage)

Publisher: **A+U PUBLISHING CO., LTD.**

Distributor: **THE JAPAN ARCHITECT CO., LTD.** 2-31-2, Yushima, Bunkyo-ku, Tokyo,113 Japan

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(continued on page 170)

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Planning Committee: Fumihiko Maki, Kōji Taki, Hiroshi Hara, and Osamu Ishiyama

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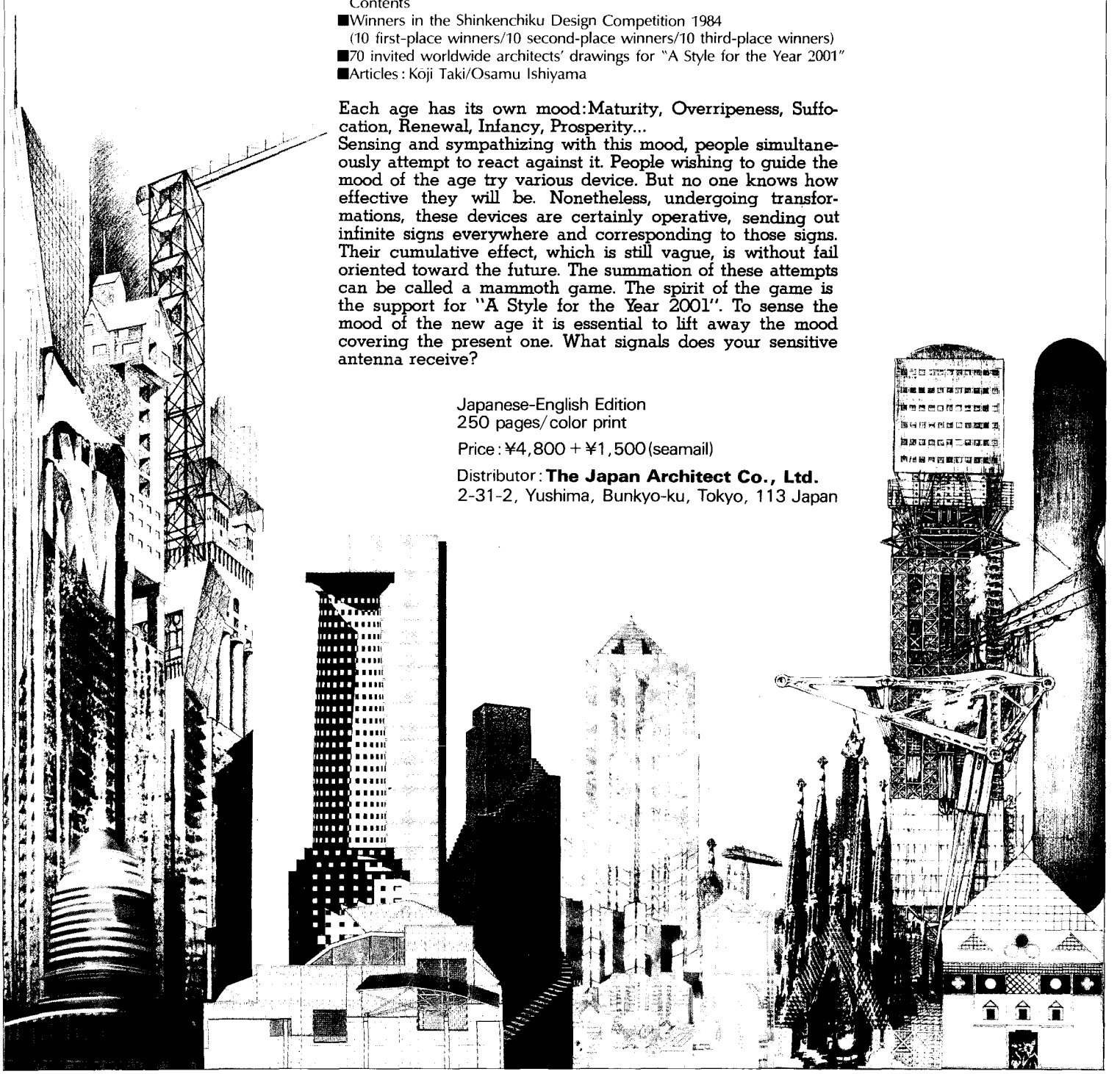

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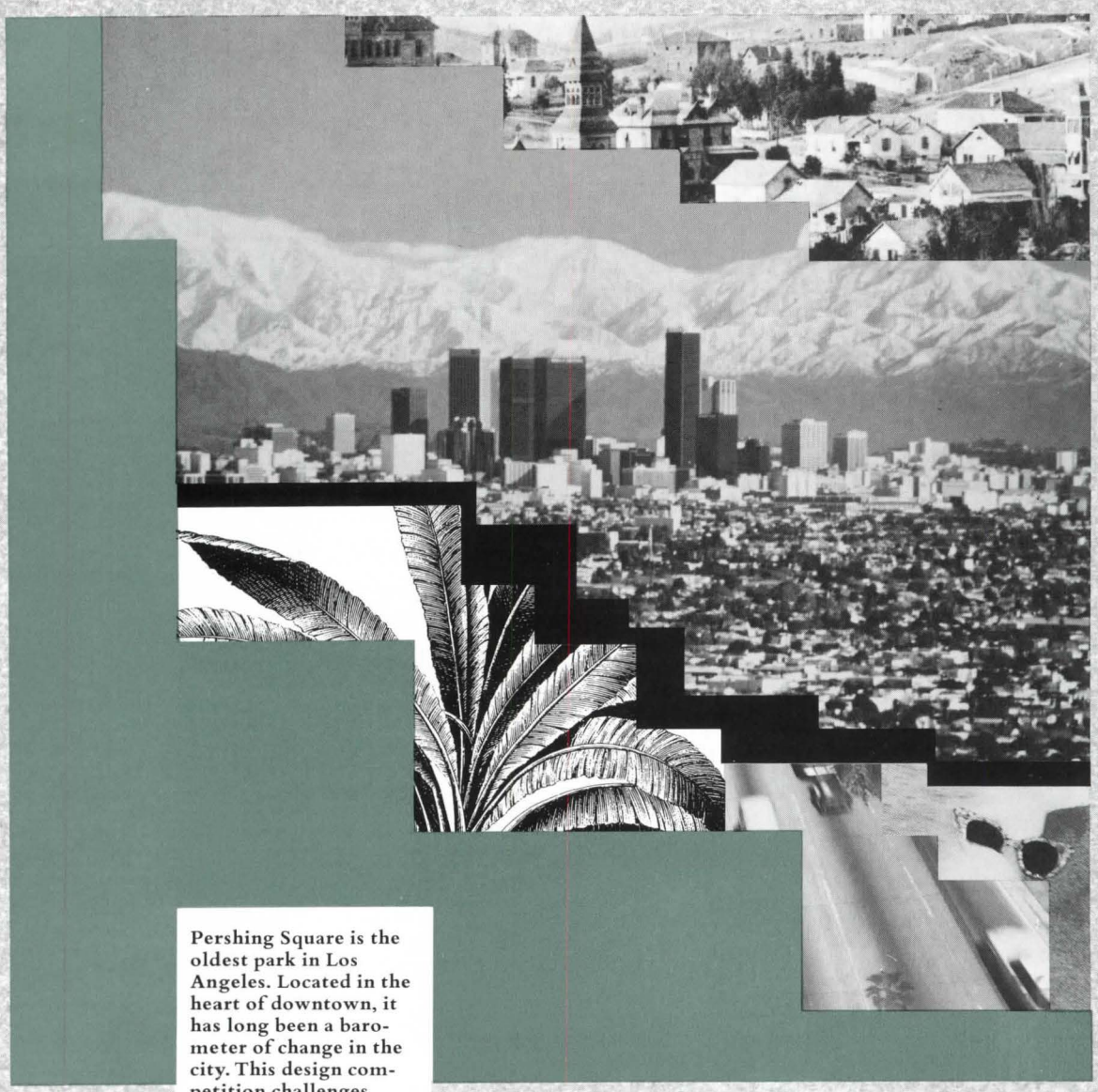
Design Competition for Pershing Square

The Park in the Center of Los Angeles



Pershing Square is the oldest park in Los Angeles. Located in the heart of downtown, it has long been a barometer of change in the city. This design competition challenges artists and designers to propose a new central square for L.A.; to create a center in a city notorious for not having a center; to reflect the international flavor of the city; and to celebrate the heritage of Los Angeles and the promise of its future. The new park should take advantage of the wealth of plant material able to grow in Southern California and create a setting, botanical in quality and unlike any other open space in downtown Los Angeles.

ELIGIBILITY

This is an open international design competition. It will be conducted in two stages.The first stage is anonymous and is open to urban designers, architects, landscape architects, artists and any other related disciplines or interested parties. Five finalists will be selected to compete in the second stage. Eligibility for the second stage will include (1) a demonstrated ability to legally provide professional design services in the State of California, (2) a demonstrated familiarity with Southern California climatic conditions, plant material and lifestyles, (3) a commitment to have at least one member of the design team located in California should the team be awarded the contract.

REGISTRATION

Program packages will be available March 15, 1986. Entrants may register and obtain the program by sending complete name(s), address and telephone number along with a registration fee of US $55 to the Competition Advisor. Program includes video cassette. Checks should be made to "Pershing Square Management Association". Registration closing coincides with the first stage deadline, May 31, 1986. The second stage finalists will be announced June 12, 1986 and will submit their refined proposals July 31, 1986. The winner will be announced August 15, 1986.

SUBMISSION

The first stage of this design competition seeks conceptual ideas for the new park in the center of downtown Los Angeles. Submission will be a maximum of two 30" x 40" boards. First stage drawings will include a plan, cross section and other views of the site. Drawings may be in any medium and may include color and narrative text. In the second stage, plan refinements, technical and budget information and a model may be required.

SPONSORS

This design competition is sponsored by the non- profit Pershing Square Management Association and the Design Arts Program, National Endowment for the Arts, in conjunction with the City of Los Angeles, through the Office of the Mayor, Department of Recreation and Parks, Community Redevelopment Agency and the Cultural Affairs Commission.

AWARDS

It is the intent of the sponsor to negotiate a contract for the design of the square with the authors of the winning entry. Irrespective of contract negotiation, the winner shall be paid a cash prize of US $10,000 Each of the five second stage finalists shall receive a Certificate of Outstanding Merit and a US $7,500 honorium to defray competition expenses.

For further information and registration write:

William H.Liskamm, FAIA
Competition Advisor
Pershing Square Management Association
523 West Sixth Street, Suite 200
Los Angeles, CA 90014

Or call:

Competition Secretary
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