Progressive Architecture

February 1976 An IPC Reinhold Publication

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Midland College, Midland, Texas, Architect: Preston M. Geren Architect & Engineer and Associates, Fort Worth, Texas, Ceiling System: Armstrong Symmetry Luminaire

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Datacenter/The Equitable Life Assurance Society of the United States, Easton, Pennsylvania, Architects: Kahn and Jacobs, New York City, Ceiling System: Armstrong C-60/60 Luminaire

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National Bank, San Antonio, Texas, Architects: Environmental Professionals Corporation, San
Texas, Ceiling System: Armstrong AW 3600 Luminaire

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Palmyra Area High School, Palmyra, Pennsylvania, Architects: Lawrie and Green, Harrisburg, Pennsylvania,
Ceiling System: Armstrong C-60/30 Luminaire

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Armstrong

The Brigantine® floor from Armstrong. At Liberty Junior High School, they've even put it in the gym. Because it's even tougher than the kids who try to beat it up.

If there's one word that describes most teenagers, that word is "active." So when you've got a junior high school with an enrollment of 600, you can easily imagine the kind of collective activity that takes place. Day in and day out.

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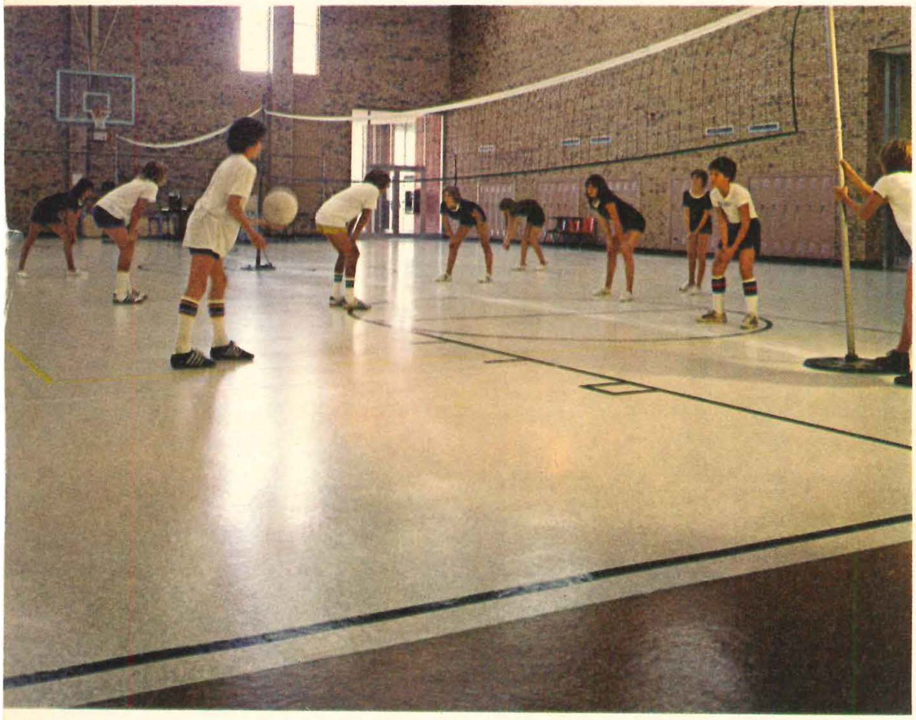
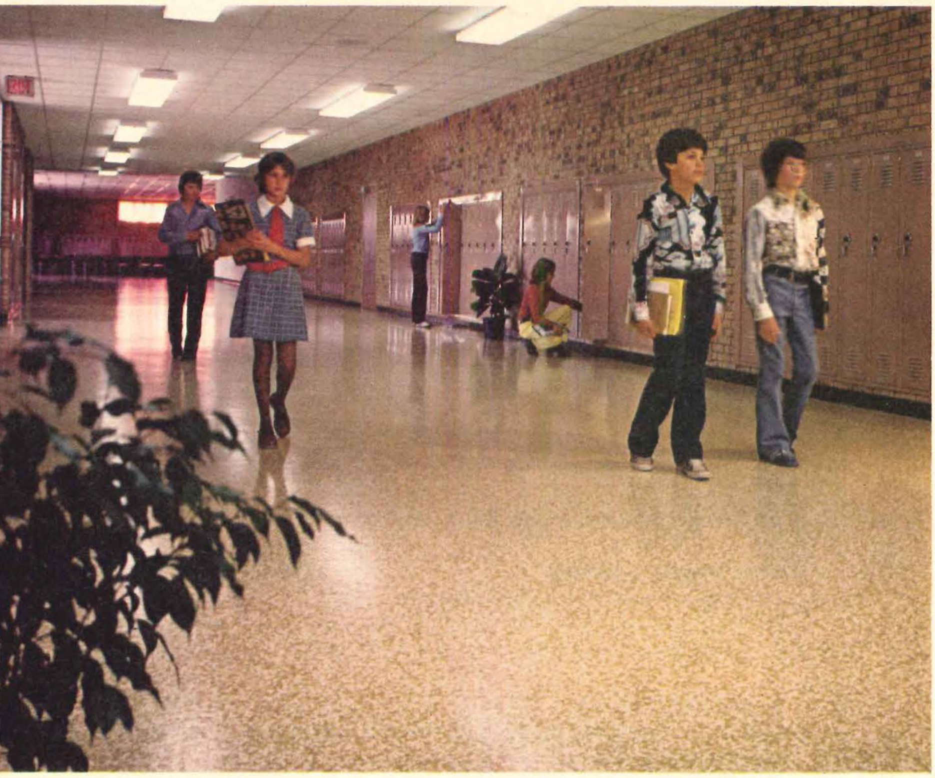


In fact, school authorities are so confident of Brigantine's staying powers, they've even put it in the gym. Where the daily grind includes gym classes, basketball games, foot races, and volleyball



—using tape for lane markings. And where Brigantine is taking it on the chin and asking for more.

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ABP CMC

February 1976

Progressive Architecture

Cover: Pembroke Dormitories (p.47) as seen through a roof-top opening. Photo by Jonathan Green reproduced accurately, except for the repetition of several courses of brick to fill out the cover format.

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Low on the totem pole.

Progressive Architecture: Editorial

Award-winners made real

February 1976

Last month, we brought you the projects and studies chosen by our annual awards jury; this month, a diversity of completed works chosen by our editors. There is a connection, however, between our January contents, determined by invited professionals, and the subjects we select for our other eleven issues. For we take on a special obligation—and find it a special satisfaction—to report on winning projects upon completion.

This month's features include two previous award-winners—two quite different works by the architects loosely affiliated under the banner "MLTW." The Pembroke dorms took a First Award in the 17th P/A Award competition (Jan. 1970 P/A)—the last time a P/A jury singled out one entry for top honors; the private house in Virginia received one of the awards in the 22nd P/A program (Jan. 1975 issue). Designed five years apart—one under MLTW partner Don Lyndon of Cambridge, Mass., the other by William Turnbull of San Francisco—these projects share characteristics common to all MLTW work: complexity, ambiguity, respect for the immediate setting, references to the local building vernacular. They are two in a long series of MLTW designs that P/A has published as both competition-winning schemes and finished buildings, dating back to Charles Moore's own house (Jan. 1962 and May 1963 P/A) and the Sea Ranch (Jan. 1965 and May 1966 P/A). The well-known Kresge College at U.C. Santa Cruz, which won a Citation from the same jury that gave Pembroke a First Award, suffered fewer administrative delays between design and completion (Jan. 1970 and May 1974 P/A).

It is, not surprisingly, in the smaller of the two MLTW works in this issue, the house, where the formal ideas are most clearly and meticulously realized. The dormitories, on the other hand, are so packed with interrelated design intentions that the viewer can hardly hope to sort them all out, or resolve all the questions they raise. Because of Pembroke's complexity, we have brought three efforts at interpretation to bear on it: Jonathan Green's superbly descriptive photographs, an analytical text by Prof. William Jordy, and an architect's view by Lyndon himself.

Notwithstanding all the words we have given to Pembroke—more than anyone involved intended—I feel obligated to say something of my own reactions to visiting the place. Its relation to its surroundings is, as Jordy says, a model of sensitivity; its own spaces are excellently organized for their uses; but most vividly remembered, of course, are the surface color and courtyard sculpture. One could go on almost indefinitely raising additional points about how these elements *function*—how, for instance, the glazed brick shop fronts brighten the shady side of their street or how the sculptural elements frame views. But as visual objects in themselves, the glazed brick defies our expectations concerning structural materials, the sculptural elements are relentlessly mechanistic. A comparison to Santa Cruz seems inevitable: there the colors, textures, and ornament that articulate the design are sensuously seductive; here they resist the (at least this) viewer's sympathies.

I am reminded of the years I had the good fortune to live in Aalto's dormitory at MIT. Parts of that building were—and are—ravishing; other passages remain tantalizingly unresolved, obstinately divergent from the user's reasonable expectations.

We have given Pembroke prominent coverage in this issue, not because it is successful beyond question, but for the extent to which it raises—and explores—questions. To a large extent, the same is true of other buildings we are publishing this month. In some of these buildings, a concept may be carried to an advanced stage of refinement, subtly attuned to user expectations. (I think particularly of Frank Gehry's Rouse office interiors.) But all represent challenges to prevailing conventions. All of them, to borrow words from an early P/A awards jury, represent "points of departure, rather than points of arrival."

John Morris Dixon

Letters from readers

Views

Praise of mixed use

I want to congratulate you on the December issue of P/A. All the pieces were well written commentary on projects worth reporting.

I thought the piece on mixed-use buildings was particularly good. The comparison of the three projects, the wealth of background material, and the critical comments add considerably to our knowledge and understanding of the projects. A neat turn of phrase helps too.

A critical and somewhat skeptical eye and pen is really needed in the architectural publications. I hope you will continue to provide it.

Now that living over the store is again an approved urban building model, it would be good to see mixed-use buildings—both large and small—reported on a continuing basis.

Edgar Waehrer, AIA, Architect
Portland, Ore.

Pittsburgh theater: corrections, etc.

Architects Damianos & Pedone of Pittsburgh have pointed out errors in our article concerning the Allegheny Community Theater (Nov. 1975 issue, pp. 52–53) and requested clarification of the project's history. P/A's article was primarily about the installation within this theater by stage designer Peter Wexler for the Pittsburgh Public Theater, an organization which occupied the space this past fall. P/A did not interview Damianos & Pedone, who were architects for the building renovation.

P/A misspelled the name of the firm Damianos & Pedone and should have located the building in Pittsburgh, rather than Allegheny, Pa., which is not a municipality.

Architects Damianos & Pedone maintain that the theater space Wexler had to work with was not, as P/A stated, a "bare cupboard." They point out that the theater had a new steel-framed wood floor, with removable sections permitting access at any point from the green room below, two actors' galleries, an exposed ceiling lighting grid, completely equipped, catwalks, five control rooms, a computerized lighting console, special acoustical ceiling treatment, and air conditioning. In addition, the building contained rehearsal rooms, green rooms, dressing rooms, actors' lounges, shower and toilet facilities, assembly/construction room, costume storage, general storage, loading docks, offices, public lobby, and public restrooms.

On the matter of seating, Damianos & Pedone point out that telescoping mobile seating tiers were in the building, along with 400 upholstered stacking chairs. Their feasibility study for re-use of the building called for an experimental theater limited to 250 seats, but the city of Pittsburgh (the actual owner) demanded that it accommodate up to 400 for lectures, films, etc. (Wexler's 300-seat installation does not make use of these platforms or seating.) They also assert that the space had, in fact, been used during the year before Pittsburgh Public Theater moved in, for some 20 weeks by theatrical groups and on other occasions for community functions.

The architects maintain that the "existing space with its Romanesque brick walls," which Wexler left exposed, was in fact the product of their design for the remodeling of the building, which called for demolition of the deteriorated interior of the Music Hall originally occupying this space. [Editor]

Shock of restoration

Have just read and enjoyed your November article and color photographs sharing the restoration of the Orpheum Theater in Omaha, Nebraska.

My late father was Head Stage Electrician for this beautiful masterpiece; thus, I grew up spending many hours in the audience and backstage with the performers and employees. My five brothers and sisters entertained on the stage as a family orchestra to fill in when certain acts were snowbound and couldn't reach Omaha for their performance.

It is almost shocking to believe that Leo A. Daly Company and the citizens of Omaha could locate craftsmen having the ability to restore the intricate design and materials to their original beauty.

William C. Howland, Architect
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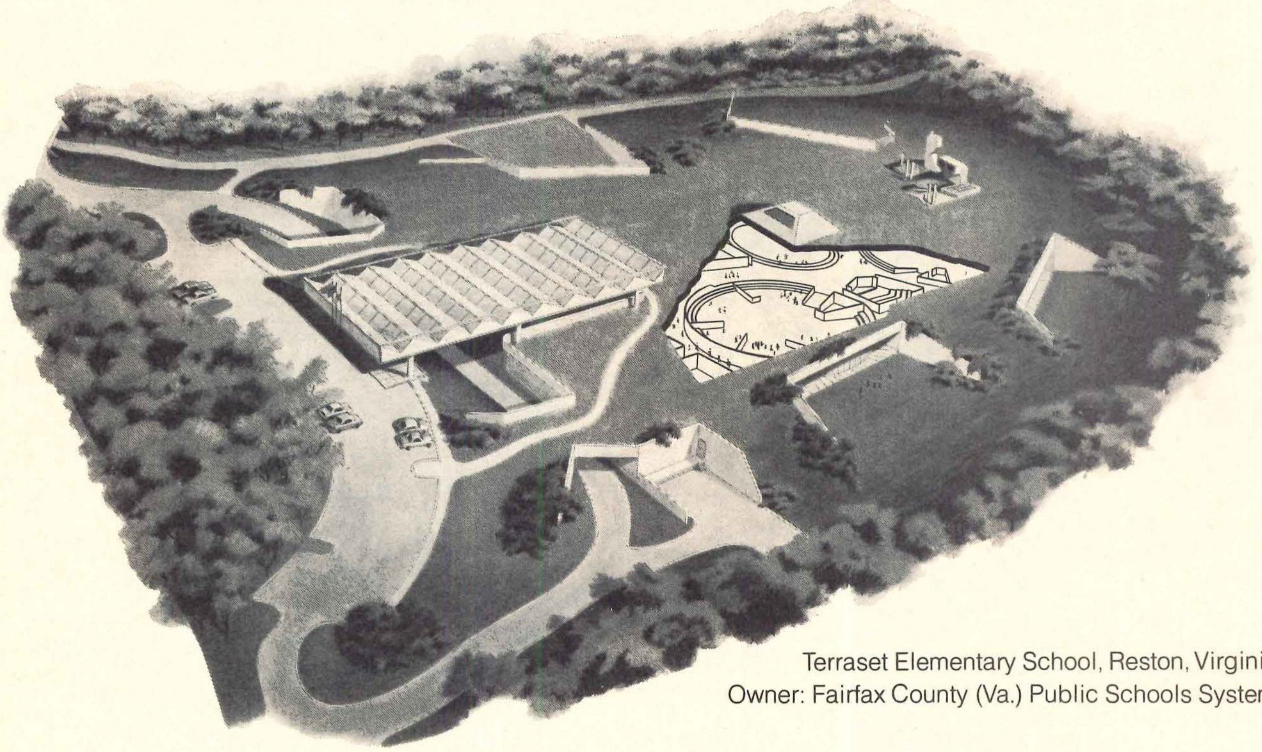

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Dr. Robert Wehrli, Chief, Architectural Research Section, National Bureau of Standards, Washington, D.C.

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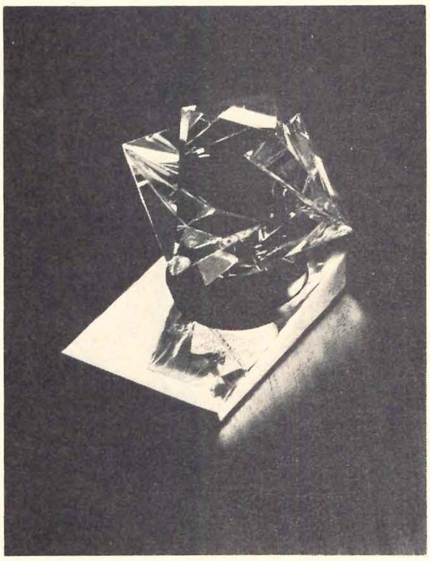

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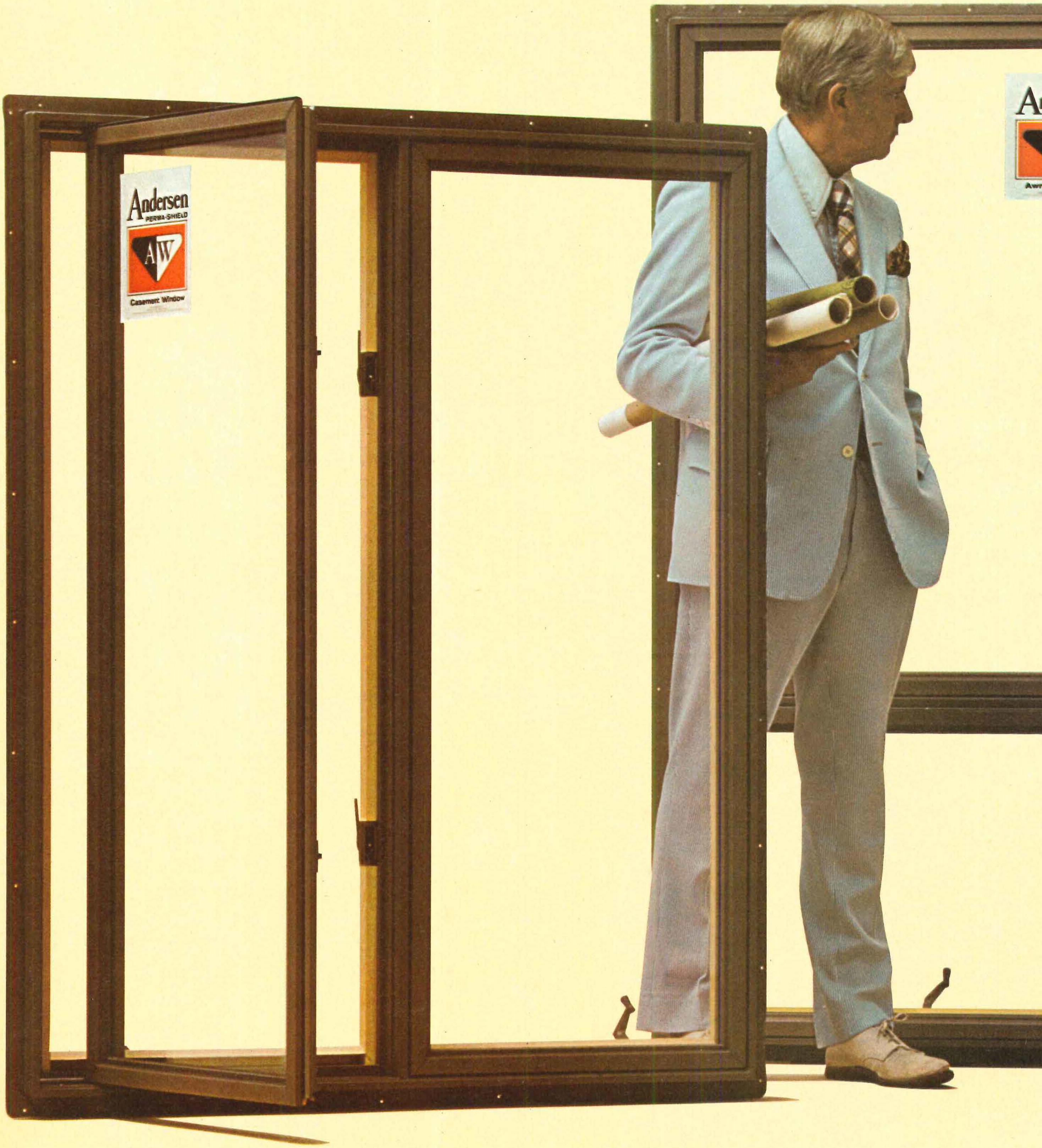

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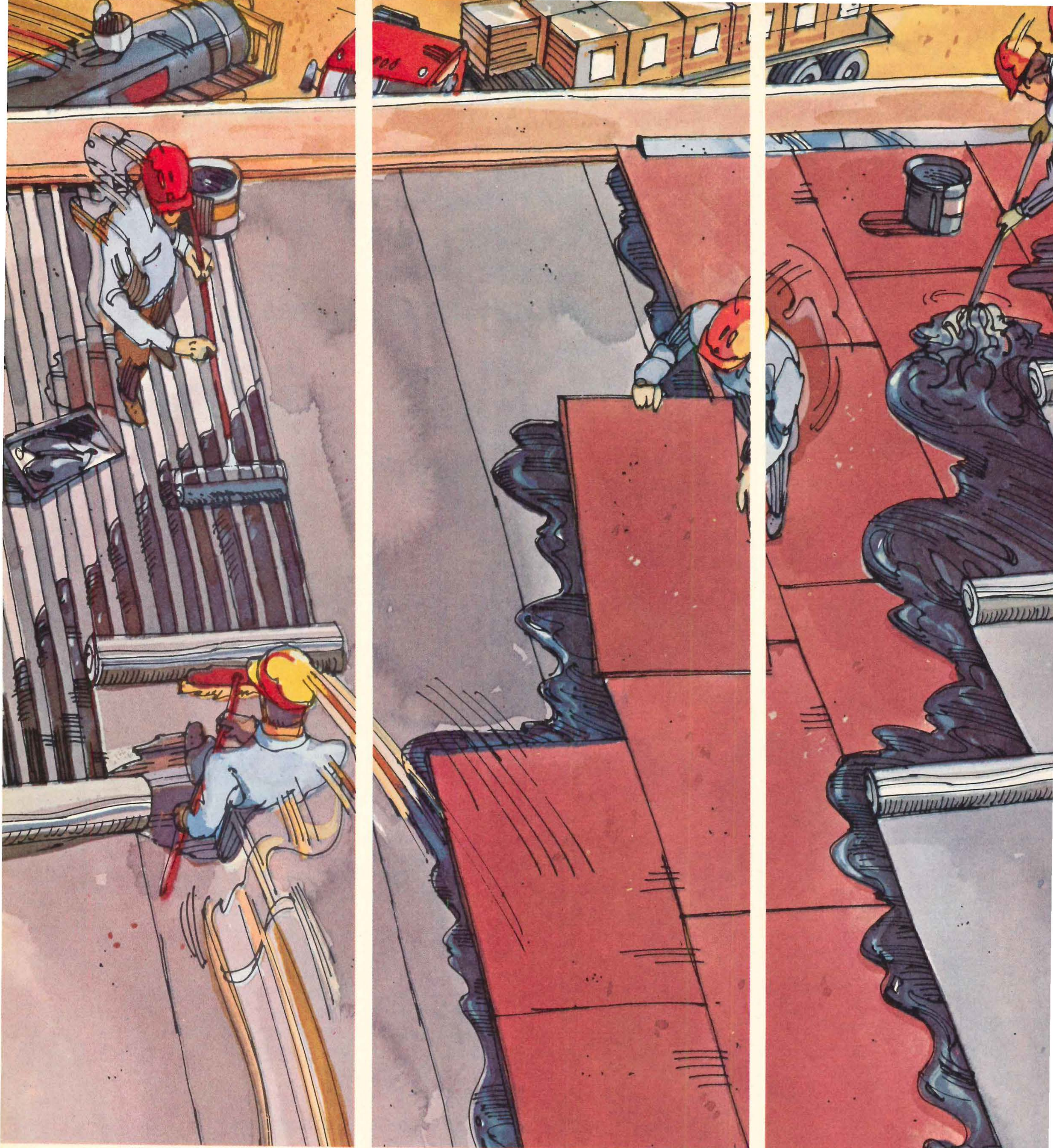

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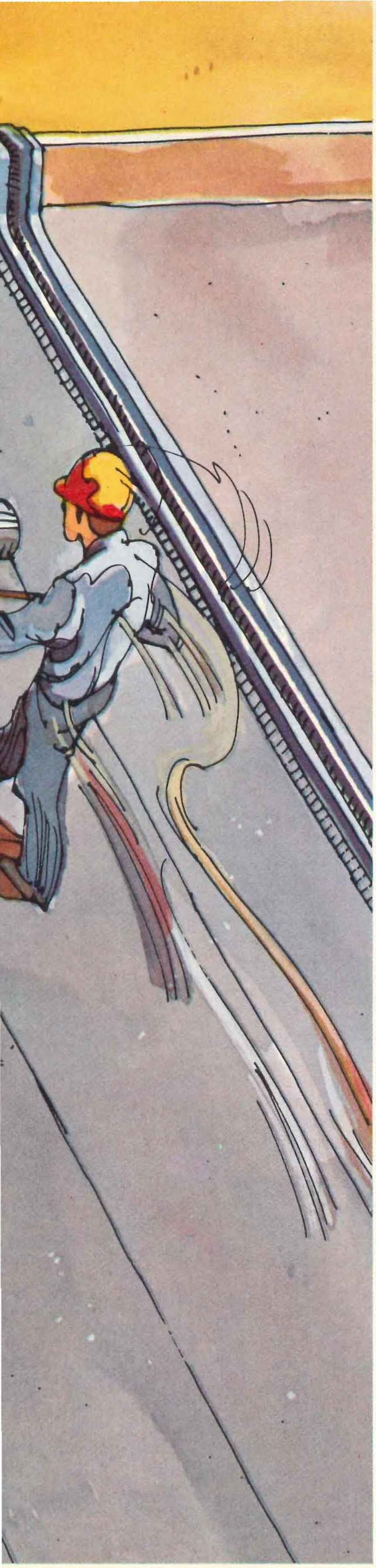

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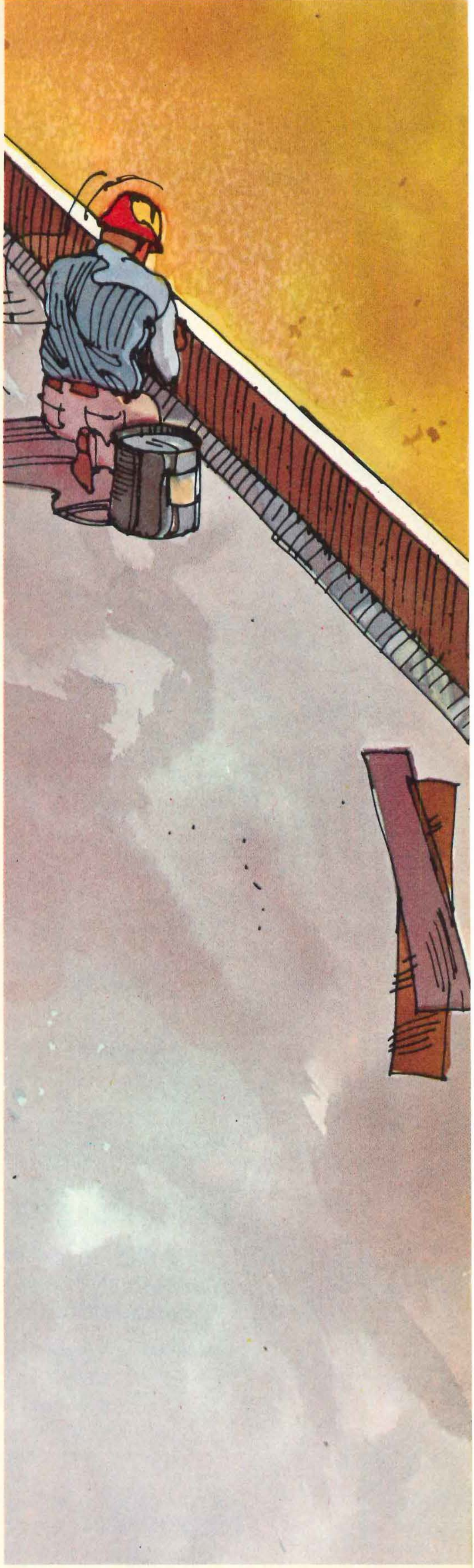

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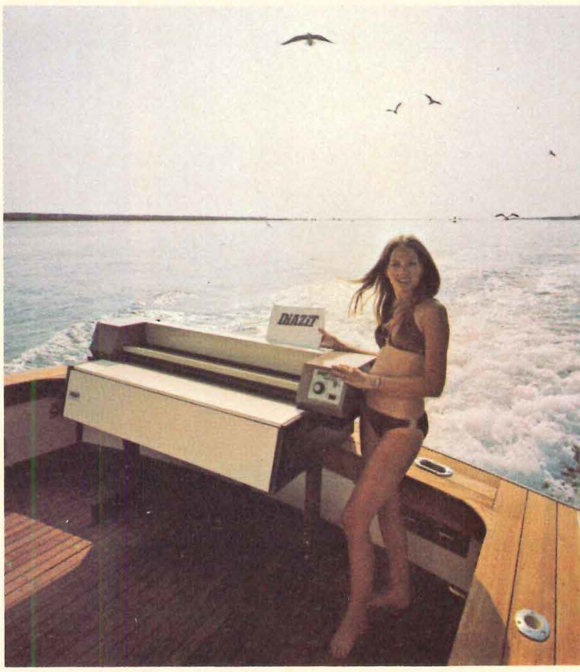

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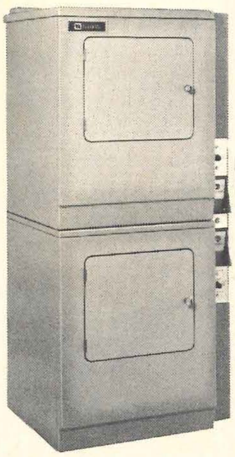

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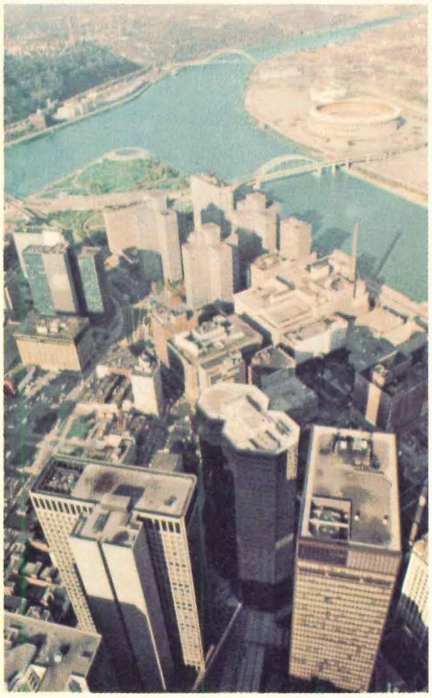

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News report

Changes foretold at P/A Awards luncheon

William Caudill, chairman of the board of Caudill Rowlett Scott in Houston and keynote speaker for the Progressive Architecture 23rd Annual Awards Presentation held last month in New York, predicted five years of drastic changes in which architects may see advertising forced upon them by the courts and accountability accented as malpractice suits become more frequent. Caudill said he was eminently qualified to speak at the Awards event since he'd "entered more submissions and got fewer hits than anyone here."

First on his list was energy: "Architects blew it in the sixties and forgot everything they learned in the fifties. In the fifties we wouldn't dare put glass on the west." Government intervention in the form of regulations "in the name of protecting the people" will be increasing as will the impact of consumerism on design. He also sees greater use of recycling and multifunctional and systems buildings.

Caudill, a proponent of the team concept which has led his firm successfully into fast track building, began to practice with John Rowlett in 1946 and three years later established an office. Early the firm was known primarily for educational buildings, but since forming its health facilities division in the early 1960s, projects in this area provide nearly half the firm's work.

In his talk Caudill jokingly made clear that CRS coined neither the phrase fast track nor fast buck.

He holds degrees from Oklahoma State University and Massachusetts Institute of Technology and has taught at Texas A&M and Rice universities, serving as director of the Rice School of Architecture from 1961–69.

Keynote speaker William Caudill (above, left) greeted by editor John Dixon after the talk. James Batchelor (below, podium) and Deana Rhodeside, co-winners of Award for applied research, with Phil Hubbard, publisher of P/A.

Awards luncheon in the Terrace Room of the Plaza Hotel, New York. Floyd Hall

Clockwise (above): Award winner William Sain, Jr., juror Raquel Ramati, P/A senior editor David Morton, advertising executive Mitchell Krauss, and Rolf Ohlhausen, architect on Ad Award jury.

Paul Rudolph (center) with winners Tom Beeby (left), Kirsten Beeby, and Jim Hammond.

Bob Stern (left) receives design Citation from John Dixon, the editor of P/A.

Charles Moore (left), *New York Times* critic Paul Goldberger, and winner Rodolfo Machado.

Malcolm Holzman is being greeted by P/A editorial assistant Judy Wasson.

Publisher Phil Hubbard (left) presents Ad Awards to Hugh Abercrombie of PPG and Ed Servick, account executive.

As wrap-up speaker last year at the AIA convention in Atlanta, Caudill extemporized on the theme *Spaces for the Species, a behaviorists's approach to design.* "I came out of the sessions with a headache—disturbed and insecure," he remarked. "I didn't know the swing of the door can make people happy or unhappy; that bad buildings encourage suicide; or that old people die sooner at the end of a corridor." At the P/A luncheon he singled out architectural researcher John Zeisel, project director for a study that won a P/A citation, saying "Zeisel scares the hell out of us."

Last year's featured speaker, Philip Johnson, also expressed dismay over the emphasis on user needs versus design. Commenting on an ambulatory care study that won a First Award in research last year, Johnson said, "I may need it but I can't grasp it."

Caudill warned against totally committing design to one overriding idea. "In the fifties it was functionalism. Then at the 1959 AIA convention form came in; concrete was the medium and the message, and juries seemed to *weigh* the submissions. Now the emphasis is process, . . . but there are encouraging signs of a more balanced approach.

"Functionalism, formalism, process are not nasty words to me, but I can't accent one. It takes all three. It's time to re-affirm architecture as a life-improving, life-contributing profession."

Air structure for Uncle Sam's GSA

A seven-firm team of architects, engineers, and administrators has designed an all-weather, inflated building nicknamed MEG (for megastructure) for the General Services Administration. The GSA's Public Buildings Service commissioned the team in 1974 to conduct a feasibility study of a building that would conserve energy and lend itself to rapid, weather-sheltered construction.

Promoting the advantages of the air structure, a slide presentation called "There's a Tree in My Office" contrasts the parklike atmosphere of the prototype with a typical office high rise. Only executives have access to windows in the high rises, claims the presentation, whereas the air structure creates an all-around open environment for everybody. Not so—at least judging from the model. Within the megastructure are multi-level office floors, and it's fair to guess that executives still will have the uppermost and peripheral exposures while support staff works in artificially lit rooms.

A display of the model will be publically available for an indefinite length of time in the GSA's main lobby, 19 and F streets NW, Washington, D.C.

Members of the study team were Building Sciences Inc., project administration; Cambridge Seven Associates and Davis Brody & Associates, architects; Weidlinger Associates, Geiger Berger Associates, and Cosentini Associates, engineers; and Tishman Research Corporation, construction and building technology. Consultants to the team were Bolt Beranek & Newman, acoustics; Claude Engle, lighting; Rolf Jensen & Associates, code evaluation; and Carlton B. Lees, horticulture.

Technology for GSA prototype similar to that of new stadium (above) in Pontiac, Mich., by O'Dell/Hewlett & Luckenbach of Birminghan, Mich.

GSA model shows flexible office floors under pneumatic roof.

Gunnar Birkerts and Detroit awards

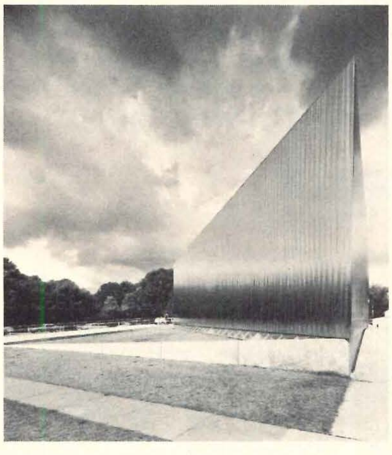
Gunnar Birkerts was named recipient of the Gold Medal awarded by the Detroit Chapter of the American Institute of Architects. The chapter also recently presented awards for six outstanding buildings, and Gunnar Birkerts & Associates was one of the firms cited.

Birkerts, born in Latvia, worked in the offices of Eero Saarinen and Minoru Yamasaki prior to establishing his own practice in 1959 in Birmingham, Mich. His Contemporary Arts Museum in Houston, Tex., was published recently in P/A (Mar. 1975, p. 52), and a commercial office building was published in the fall (P/A Sept. 1975, p. 58). Birkerts won the Gold Medal, the highest award offered by the chapter, for his professional leadership; the honor award went to the firm for the Contemporary Arts Museum.

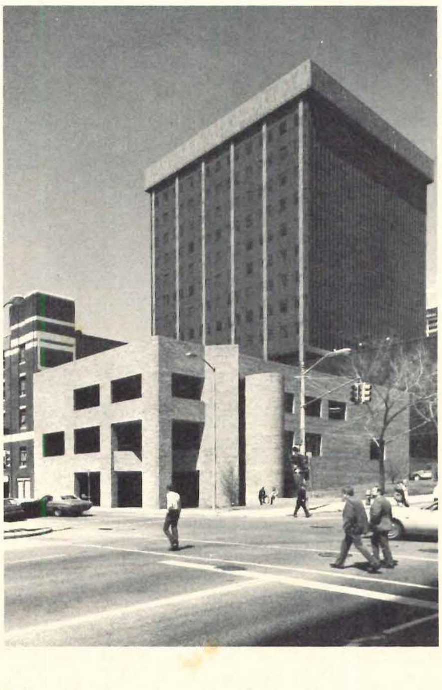
Other honor award recipients are James Alan Cardoza, Detroit, for the St. Antoine Street Park, Detroit; Rossetti Associates, Detroit, for the 601 Washington Boulevard Building, Detroit; Giffels Associates, Detroit, for Allison Park Research Center, Hampton Township, Pa.; and Frederick Stickel Associates, Troy, for both the Michigan State Police Academy, Lansing, and the First Church of Christ, Scientist, Port Huron, Mich.

[continued on page 28]

Balthazar Korab

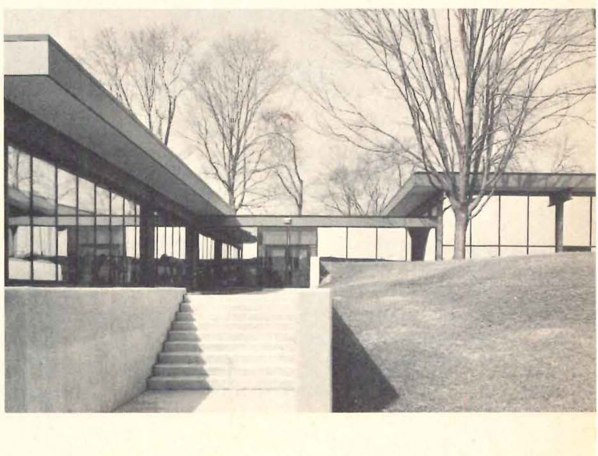


Arts museum (above) by Birkerts. Office building (below) by Rossetti Partnership.



Balthazar Korab

Christian Science church (above) by Stickel Associates. Research center (below) by Giffels Associates.



A change for the better.

Nothing is more constant than change. Buildings change to meet the times. And the products that create change become different too. That's what's happening in remodeling today. Even change is no longer the same. Today's remodeling is a matter of architectural revision, requiring the knowledge and creativity of good design minds.

Remodeling is a sensible alternative to rising building costs, land costs and the scarcity of suitable locations. There's a whole new field of application opportunities just waiting for the right design. And these new opportunities mean a whole new field of clients too.

Kawneer Architectural Products offer a wide range of remodeling ideas in aluminum for new design opportunities. This variety includes the exclusive I-line series framing, featuring the very narrow 1" sightline. Kawneer facings provide a complete spectrum of textures and profiles needed to create exciting and tasteful exteriors and entrances. These pages contain just a few examples of how times are changing.

A renaissance in remodeling by Kawneer

And for more about the renaissance in remodeling, write for our new brochures, *Remodeling with Kawneer.* It can be a big help with clients who are ready to make a change. Write Dept. C. Kawneer Company, 1105 North Front Street, Niles, MI 48120.

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Recycling: A Specialty

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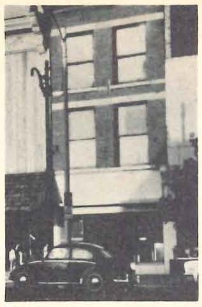

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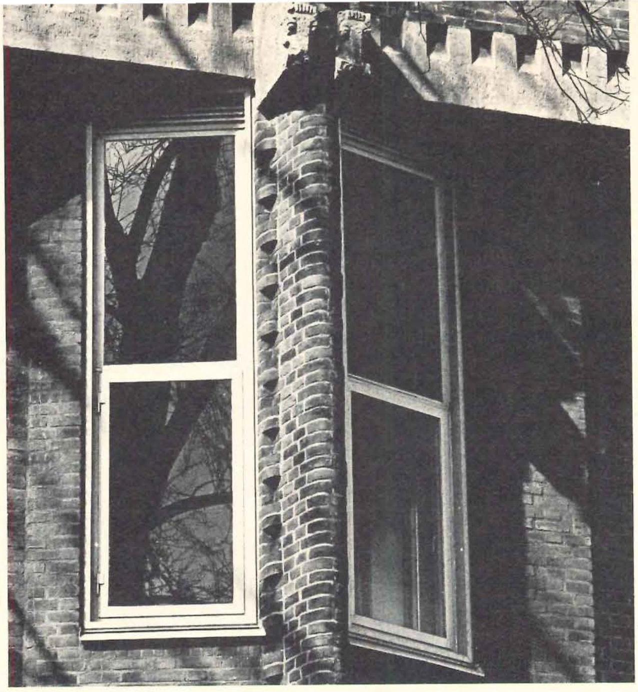
Many businesses are right where they want to be. Their location is a valuable asset. But they need to make a change to meet a changing business world. And, they want to continue doing business as they change. Remodeling with new ideas in aluminum from Kawneer is a good solution. A new look. Continuous operation with minimum interruption. A change for the better. Done better.

Reflections of the present

Customers see a company from the outside in. To them what's out front is what's inside. Reason enough for any business to consider putting on a new face as people and times change. Suddenly, a retail merchant can step out of the past into a visually exciting and appealing present.

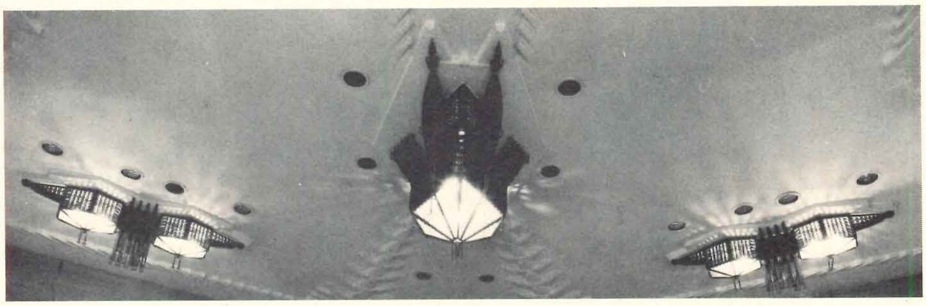
News report

Report from Amsterdam

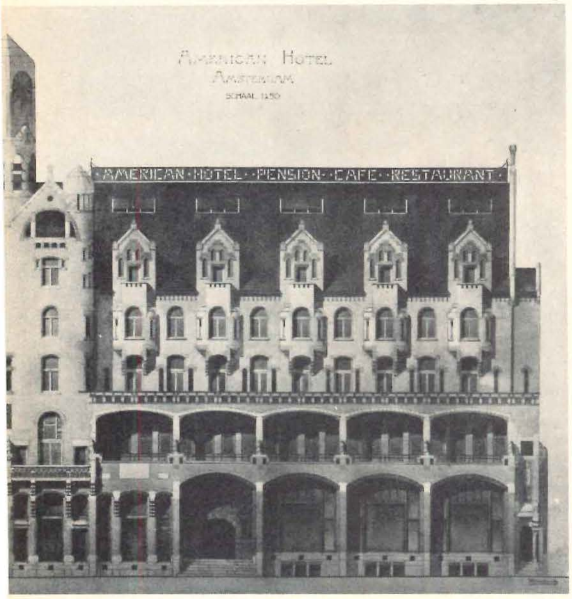


Aart Klein

Brick detail, Amsterdam School, from show at Stedelijk Museum.



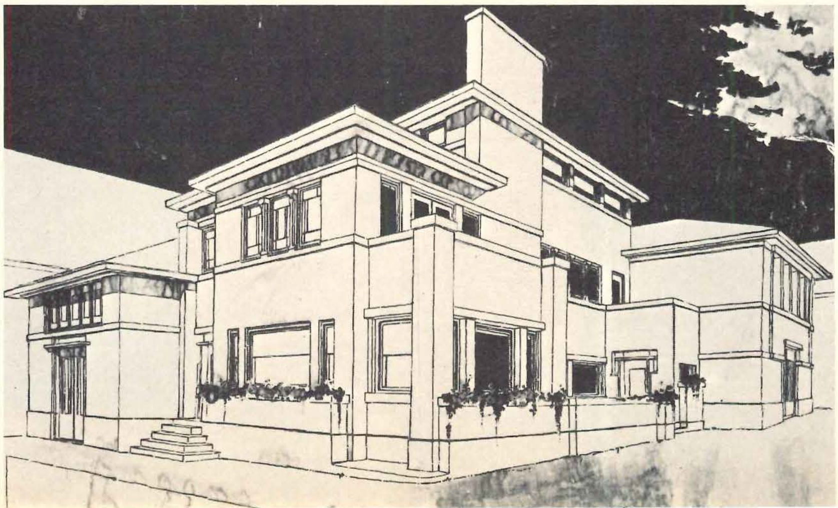
Light fixtures from Scheepvaarthuis by Van Der Mey, 1913.



American Hotel, 1898–1902, by William Kranhout.

Office building, 1928, from "Americana" exhibit.

Wrightian influence shows in Jan Wils' design, 1918.



It's hard to beat the Dutch

As everyone knows, the Dutch excel at tasks requiring collective effort. They outdid themselves last fall in presenting four major architectural exhibitions devoted to various phases of Dutch architecture in the 20th Century. Other nations of Europe have observed Architectural Heritage Year in different ways (usually by issuing postage stamps), but this endeavor was unique.

The most extensive of the shows undoubtedly was at the Stedelijk Museum in Amsterdam, a show devoted to the group of designers known as the Amsterdam School, which flourished from 1910 to 1930. Although the school's best-known building probably is the fantastic Scheepvaarthuis of Van Der Mey, 1913, the most important designers undoubtedly were Michael De Klerk and Piet Kramer. These architects built large sections of the postwar housing estates in the southern and western quarters of the city; happily the museum provided a map showing the exact sites of the most important buildings. Some are within walking distance of the Stedelijk while others are easily accessible by streetcar.

Most of these buildings generally could be described as Expressionist; they are characterized by some of the most inventive brick detailing imaginable. The exhibition itself is sumptuous, making extensive use of colored slide sequences, furniture, and leaded glass. As a testament to its success, the public flocked to the show. This may have been a result of its local flavor, but the crowds certainly make one question the American belief that people will not go to architectural exhibits.

Gemeentemuseum, last major building by Hendrik Berlage, in The Hague.

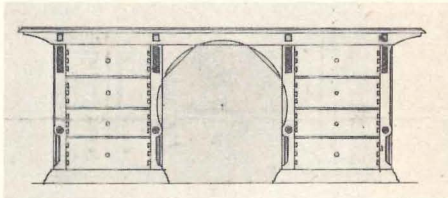
The other exhibit in Amsterdam was held at the recently organized Dutch architectural archive at Droogbak. This show featured the work of architects closely associated with the Amsterdam School. (Of these, the most important probably was William Kranhout, known for his striking American Hotel on the Leidseplein, a section of the city most familiar to tourists.) More modest than the Stedelijk exhibit, it is characterized by a number of superb drawings and a few fine pieces of furniture. The burgomaster's chair by Kromhout has the quality of an imperial throne. De Bazel's glass design for Leerdam also is worthy of close attention.

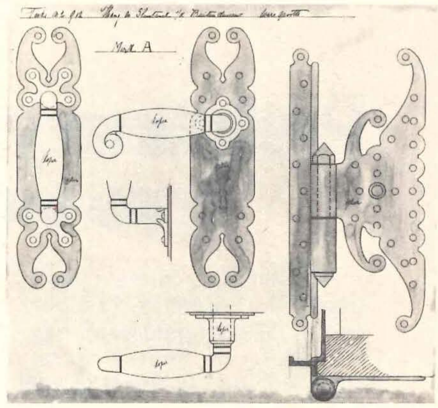
For the visitor from the United States the most interesting of the shows unquestionably is "Americana" at the Kroller-Muller Museum in Otterlo. This exhibit deals with the continuing fascination of Dutch designers with American architecture from the late 19th Century to about 1930. Details of the story long have been known, but the narrative now has been filled out by the astonishing amount of research done by the museum staff, particularly Paul Hefting and Auke van der Woud.

The leading character in their story is, of course, Frank Lloyd Wright, and the abundance of photographs and drawings of Wright's work provides amazing impact. Oud, Van't Hoff, and most of all, Jan Wils, went through distinctly Wrightian phases. Some of Wils' drawings, in fact, look as if they might have come from the Oak Park Studio. With Oud one can more easily see the absorption of the Wrightian spatial aesthetic into De Stijl. The same movement is visible in the sideboard of 1919 by Gerrit Rietveld. It is currently on display in the Stedelijk and might perhaps have been borrowed for this occasion. The absence of furniture in this exhibition is one of the few aspects that might be criticized. One would think that some of the chairs designed by Dudok might also have been available.

The fourth exhibit in the series is devoted to Hendrik P. Berlage, and appropriately it is housed in the architect's last major building, the Gemeentemuseum in The Hague. Thanks to the pages on him in Giedion and Pevsner, Berlage is known to the American public as the designer of the Amsterdam Stock Exchange, one of the really important buildings of its time in Europe (1898–1903). He was, of course, much more than a one-building architect. His career included many other notable works, much excellent town planning, and, as with others of the Amsterdam School, a good deal of furniture and some interesting typography. All of this was attractively displayed. Since the exhibit was devoted to the work of a single architect, it was possible to follow his career in great detail all the way from sketches made on a student trip to Italy to his very last drawings. This attention to Berlage certainly is warranted since he was a father figure for an entire generation of Dutch architects; in effect, he was Sullivan and Richardson rolled into one, and he had the moral authority of Mies van der Rohe. The catalog is by Professor Pieter Singelenberg of the University of Utrecht, author of a first-class biography on Berlage.

A word about the catalogs. All four are handsome documents, well illustrated, beautifully printed, and about a hundred pages in length. They are reasonably priced at $5.50 each. For the American visitor the chief difficulty is that the texts are entirely in Dutch; unhappily, the English summaries are mimeographed and not particularly informative. Nonetheless, the visual material by itself is powerful testimony to the enormous vitality of Dutch architecture in the first three decades of this century. It is strongly rumored that the "Americana" exhibit will come to this country as a part of the Dutch contribution to the Bicentennial. If this happens, the catalog will be translated, and the show should be augmented with some Prairie School furniture and a few pieces from Holland. The Dutch then will have accomplished exactly the kind of discreet promotion of the national image talked about and seldom achieved. [Leonard K. Eaton]
Mr. Eaton is a professor, History of Art Department, University of Michigan.


Berlage furniture design, 1895.


Hardware by Berlage for the Stock Exchange.

600-room addition for Manila Hotel

Philippine architect Leandro Locsin has designed a $30 million, 600-room addition to the Manila Hotel, which opened in 1912, but had been neglected in recent years. The new building, underwritten by the government and the Philippine Airlines, will open in time for the meetings of the International Monetary Fund in October.

The addition is perpendicular to the existing hotel so that only its slenderest portion is visible behind the front elevation of the older, Spanish style hotel, which was designed by William Parsons of New York, consulting architect to the Philippine government.

For years the Manila Hotel was the social center for Filipino-American activities, and in 1935 Gen. Douglas MacArthur lived with his wife in the hotel penthouse. In 1942 the Japanese [continued on page 32]

depend on Bethlehem

Preliminary frame analysis showed a steel core would provide significant savings

A preliminary frame analysis, conducted by Bethlehem's Sales Engineering Buildings Group, helped the architects of First Federal Plaza Bank building in Rochester, N.Y., to achieve optimum framing economy.

At the outset of the building's design, a concrete core was considered. But the preliminary framing analysis, requested by the project's structural engineers, Rupley Bahler Blake, showed a steel core would provide significant savings.

John Goodman of the consulting engineers says, "The structure was designed in steel with four wind bents in each direction. Two are located at the exterior face of the tower and two at the interior face of the core."

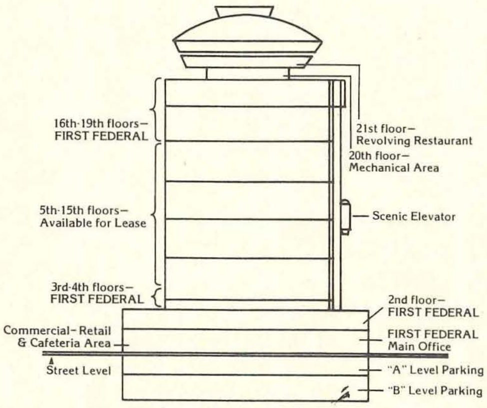
These rigid bents are used to resist the horizontal force of the wind. Because of the spacing of the columns within the two interior bents, vertical X-bracing was needed in two of the bays in each bent to limit total sidesway at the tower roof to five inches.

A control joint, surrounding the tower and low rise, isolates the tower so that low-rise columns will not have to resist tower movements, Mr. Goodman said. At each of the tower's exterior columns there is a second column supporting the two levels of the low rise. These double columns are joined to a common concrete pier below the plaza.

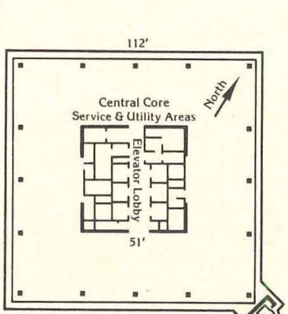
Bethlehem Steel provided 3,050 tons of structural shapes and 40 tons of high-strength bolts for the building frame. The floor system is lightweight concrete slab on steel deck.

Early involvement helpful. Our preliminary framing analysis program can be most beneficial to you and your client if the study is conducted before finalization of architectural parameters. This way, our Buildings Group and your structural engineer can develop an optimum frame design with minimum restrictions.

We'll be happy to tell you more about our preliminary framing analysis program along with the other technical and advisory services we can offer. Just ask for the sales engineer at the Bethlehem Sales Office nearest you. Bethlehem Steel Corporation, Bethlehem, PA 18016.

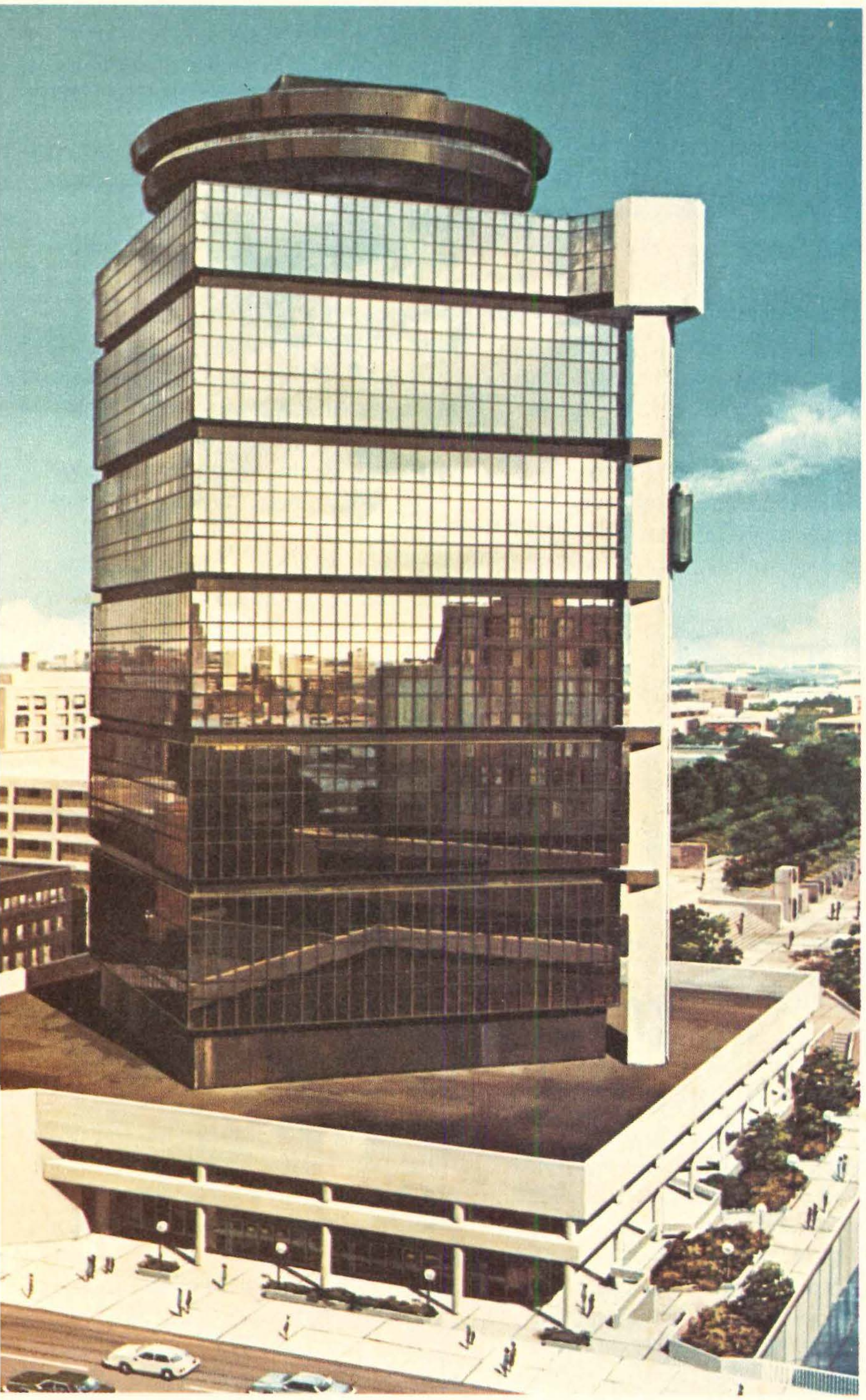


East West Elevation



Typical Tower Floor Plan

Owner: First Federal Savings & Loan Association, Rochester, New York; *Architect:* Corgan & Balestiere, P.C., Rochester, New York; *Project Manager:* Balcor Assoc., Rochester, N.Y.; *Structural Engineer:* Rupley Bahler Blake, Rochester, New York; *Fabricator-Erector:* F. L. Heughes & Co., Inc., Rochester, New York; *General Contractor:* Stewart & Bennett, Inc., Rochester, New York.



Architect's rendering depicts the First Federal Savings and Loan office building in Rochester, N.Y. When completed in late 1976, the structure will feature a revolving roof-top restaurant, an outside glass-enclosed elevator, and a mirror exterior which will reflect the surrounding community.

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Architectural building description

Rising twenty-one stories on the west bank of the Genesee River, the $20-million First Federal Plaza adds its unique statement to the skyline of Rochester, New York. It acts as a terminal at the south end of the attractive Genesee Crossroads Park. With its completion, it will make this park accessible to pedestrians from Main Street, one of the main arteries across the City. The project site is located within one of Rochester's Urban Renewal Districts.

With more than a dozen easements, it created a structural and architectural challenge. Adequate access to the park from Main Street was one of the main concerns to the architects, Corgan & Balestiere, P.C., of Rochester. To accommodate this, almost one third of the site would have to be dedicated as park access. This turned out to be impossible since the remaining space would not have been adequate for placing a high-rise building, or it would be within 30 ft of a six-story building to the west of the site. To provide the desired leasing area and maintain adequate access to the park from Main Street, the architect provided a covered arcade on the Plaza level with parking below and second floor overhang above.

In order to retain unobstructed views from the neighboring buildings to the west and the lower tower floors, the architect rotated the tower 45 degrees to Main Street. Contributing to this strong design solution are the diagonal shapes in the park to the north and a Y-shaped pedestrian bridge across the river.

The exterior of the two story base will be clad with precast concrete with tan aggregate, and glass.

The tower skin consists of bronze reflective insulating glass with matching spandrel sections. The skin is interrupted every three floors by a recessed colored band that matches the curtain wall mullions and extends to support the precast concrete shaft that contains an exterior glass-enclosed elevator cab. A circular revolving restaurant cantilevers above the nineteen-story tower, separated by a mechanical floor.

The reflective insulated mirror exterior is more than an aesthetic item, says Richard Cott, representative for First Federal. "It has great energy saving qualities. This glass reduces the amount of heat transmission by two-thirds. Thus, there is much less heat loss in the winter and much less heat gain in the summer."

News report continued from page 29

Manila Hotel tower containing 600 rooms overlooks Manila Bay to the west (above). The hotel (below) shuttered after start of WW II.

Imperial Army took over its occupancy.

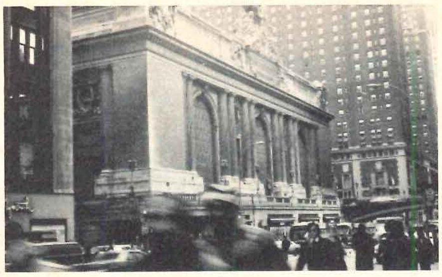
The new addition matches the old inside and out: a green roof tops the white exterior; the original metal roof was painted green, said Locsin, to resemble oxidized copper. The interiors, by the American firm Dale Keller & Associates, duplicates the tropical furnishings of the islands and employs native shells, wood, and other materials as much as possible.

Just as the original hotel was the first in the Far East to be furnished with a telephone and intercom in each of the 149 guest rooms, so the new hotel will be equipped with modern conveniences for the tourist and businessman. An "Executive Center" will have full secretarial, duplicating, and communications services.

Grand Central wins a court victory

The landmark status of New York's Grand Central Station was upheld in a recent court decision that prevents the building of a 55-story office tower over the Beaux-Arts terminal (P/A March 1975, p. 21).

In December the Appellate Division of the New York State Supreme Court voted 3-2 to overturn a lower court's ruling in favor of Penn Central, which had sued the New York City Land-



Grand Central Station.

marks Preservation Commission for refusing to give its approval of the high-rise tower. At that time the court said preventing this development was depriving the bankrupt railroad of income. Reversing that decision, presiding judge Harold Stevens said the railroad's economic hardship "must be subordinated to the public weal."

Personalities

Delbert A. Langhorst, AIA of Cincinnati has been appointed a member of the National American Institute of Architects Codes and Standards Committee for 1976.

Calvin B. Dalton, president of Dalton Dalton Little Newport, Cleveland, Ohio, has been named to the U.S. Chamber of Commerce Council on Trends and Perspective.

Frank J. Matzke, FAIA has been appointed executive director of the Illinois Capital Development Board.

Patrick J. Ullmark, AIA, of Grayson Associates, Inc., Architects and Planners, has been named to the Community Development Program Rehabilitation Standards and Criteria Advisory Committee for Newton, Mass.

The International Association of Lighting Designers has elected the following officers for 1976: James Nuckolls, president; Jules Horton, vice president; Carroll Cline, secretary; Lesley Wheel, treasurer.

Calendar

Through Mar. 6. Bicentennial exhibit of Minnesota art and architecture, sponsored by the University of Minnesota Gallery and the Minnesota Society of Architects, at Dayton's 8th floor auditorium, Minneapolis.
Through Mar. 27. "Form, Space, and Symbol in Chicago Architecture" exhibit, Cooper Union, New York City.
Through June 13. "Designing a Nation's Capitol" exhibit of extant original drawings entered in the 1792 first federal architectural competition, at the Octagon, Washington, D.C.
Mar. 24-25. Symposium on building construction, National Bureau of Standards, Gaithersburg, Md.
Mar. 26-May 9. Major retrospective of sculpture by Anthony Caro, Museum of Fine Arts, Boston, Mass.
Mar. 28-May 9. "Naives and Visionaries" exhibit, Amon Carter Museum of Western Art, Fort Worth, Tex.
Mar. 31-Apr. 2. National conference on the conservation of the older courthouse, sponsored by the National Trust for Historic Preservation, the National Clearinghouse for Criminal Justice Planning & Architecture, the University of Illinois Department of Architecture, the National Association of Counties, and the National Endowment for the Arts. The conference will be held in St. Louis, Mo.
Apr. 7-9. Conference on creative play environments for children, University of Wisconsin-Milwaukee campus.
Apr. 11-Oct. "Three Centuries of American Art" exhibit, Philadelphia Museum of Art.
Apr. 13. Exhibit of ten architectural models by Andrea Palladio, University of Virginia, Charlottesville.
Apr. 19-23. Second southeastern conference on application of solar energy, sponsored by Louisiana State University, Hilton Inn at Corporate Square, Baton Rouge, La.
May 2-5. Annual convention of the American Institute of Architects, Philadelphia.
May 10-16. National Historic Preservation Week.
May 19-24. Annual meeting of the Society of Architectural Historians, Philadelphia.
May 24-28. International Symposium on Lower-Cost Housing Problems, Regency Hyatt Hotel, Atlanta, Ga.
May 25-28. Seventh annual conference of the Environmental Design Research Association, University of British Columbia, Vancouver.
June 5-Sept. 6. "The Eye of Thomas Jefferson," major Bicentennial exhibit of the National Gallery of Art, Washington, D.C.
June 13-18. International Design Conference in Aspen.
June 21-23. Twentieth annual convention and exhibit of the Construction Specifications Institute, Philadelphia.
[continued on page 34]

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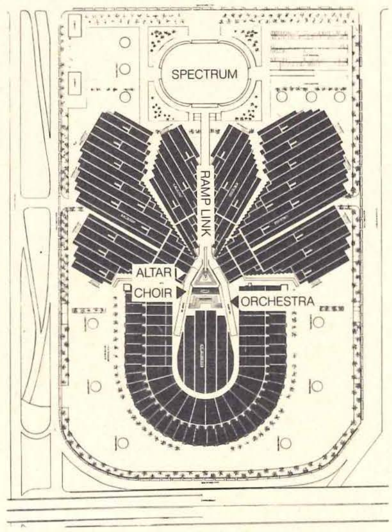
News report continued from page 32



Winning design for JFK Stadium and Spectrum.

Eucharistic Congress altar competition

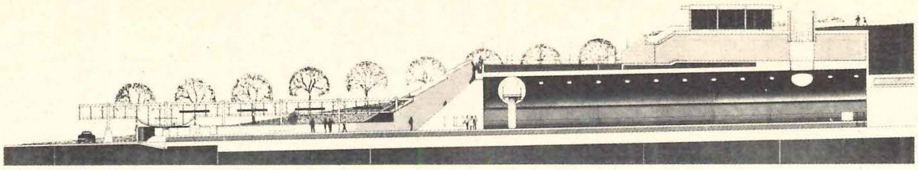
Winners in the national competition to design temporary altars for the International Eucharistic Congress to be held in August in Philadelphia have been announced. Peter H. Frink, a specialist in theatrical architecture, and Robert J. Beuchat, both of Philadelphia, are first-place winners.

Their triangular-shaped altar will be located in John F. Kennedy Stadium; a ramp will connect the stadium with a nearby arena, the Spectrum, where participants in the religious events will prepare for the services. The altar itself will be 45 ft off the ground so that it may be viewed from a distance of 800 ft. Below will be tiers for a 200-piece orchestra and 1000-voice choir.

The second-place winner is Danhart/Heim Architects of Philadelphia. Third prize was shared by Tagi Garbizu and Thomas Penn of New York. The seven-man jury included Romaldo Giurgola, Ware Professor of Architecture, Columbia University; Peter Blake, chairman, Boston Architectural Center; Benjamin Thompson, former chairman, Harvard Graduate School of Design; Eduardo Catalano, professor of architecture, MIT; sculptor Harry Bertoia; August Kommendant, visiting lecturer, University of Pennsylvania; and the Rev. John J. Miller, liturgy committee, 41st International Eucharistic Congress. Mario Romanach of Philadelphia was professional advisor for the competition.

[continued on page 36]

In progress



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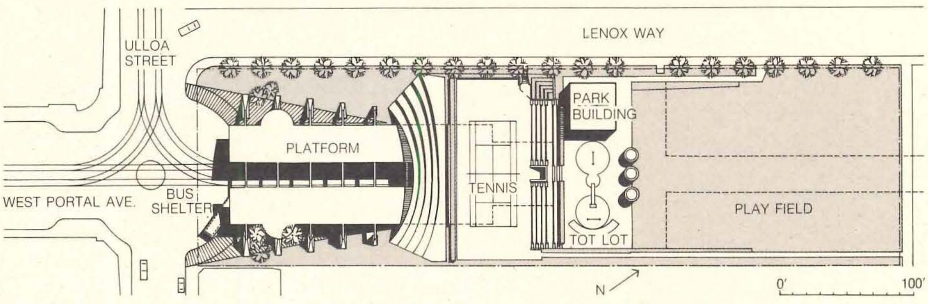
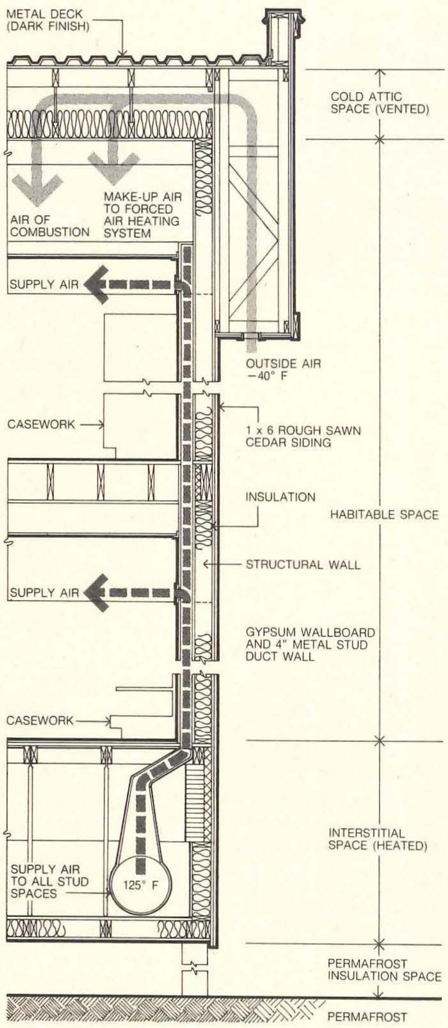


SITE PLAN



EXTERIOR WALL SECTION.

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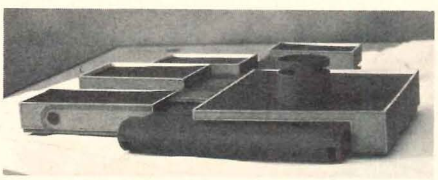


1 MUNI/METRO station—The last subway station in the rejuvenated MUNI/METRO project of the city of San Francisco is being built in an existing streetcar tunnel, which will be removed toward the end of construction. The exposed portion of the station will be open at street level near a shopping district. Special items such as ticket kiosks and benches will be clad in bright colored porcelain enamel panels. Above the buried portion of the station will be leisure and recreational spaces on landscaped terraces. Present streetcar service will continue while the poured-in-place concrete shell is being built around the tunnel liner. Architects are Reid & Tarics Associates of San Francisco.

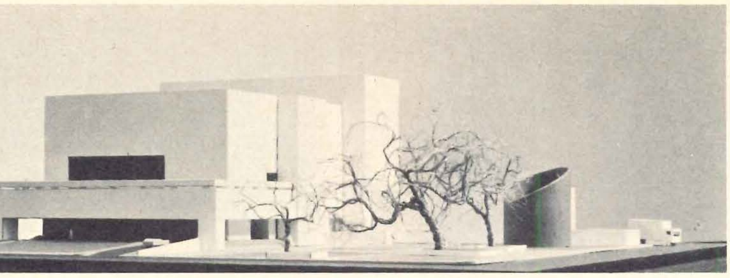
2 Alaska shopping center—A multi-use shopping facility for the northernmost city in the United States—Barrow, Alaska—has been designed by Kelly Pittelko Fritz & Forssen of Los Angeles for the Arctic Slope Regional Corp., one of a dozen Eskimo-owned corporations organized under the Alaskan Native Claims Act. Since the project was intended to give local labor educational experience, materials commonly used were specified even though they had to be flown to the site piece by piece. Wood, particularly, was used inside and out for its insulative qualities and psychological warmth. Each of the components is treated separately along a central spine so that new construction may take place without interrupting use of the spaces already built. The center will contain a supermarket/department store, theater, bowling alley, laundry, and restaurant. A combination observation tower and water storage tank was included to give vertical orientation in this otherwise flat, bleak town.

3 Theater high spot—A 1500-seat auditorium whose lobby will be used for social functions, the Frances Ann Lutcher Theater in Orange, Texas, was designed by Page Southerland Page of Austin. It will have four levels; a terrace and a porte cochere to shelter against frequent tropical cyclones. The main lobby will have overhanging walkways and lightwells and will be open to the levels above.

4 Winnipeg "park-kade"—A multi-use structure has been developed by the Ikoy Partnership of Winnipeg, Manitoba, Canada, for the provincial government. The prototype was conceived for downtown Winnipeg, which has become a low-density area dotted with parking lots. The park-kade would be a recreational facility and seven-level parking garage providing 1000 spaces for government employees. Across the street is the Winnipeg Convention Center, which the garage also would serve. An Italian piazza type of use is planned for the street level of the facility: in the summer it would be turned into an indeterminate-shaped lagoon, and in winter, an ice pond. Surrounding the activity zone would be a bazaar-like offering of shops.

5 Post Office prototype uses solar heat—The Environmental Design Collaborative, Philadelphia, Pa., has designed a 6000-sq-ft Customer Service Unit for the U.S. Postal Service. The building, to be located in Ridley Park, Delaware County, Pa., is heated and cooled by a solar collector system using existing technology. Because the collectors always face south, the system is designed to work independently from the building, which must work on a number of sites. At Ridley Park, the building is diagonal to the collector field. The skin is a porcelain metal panel system, and deep soffits shade tinted, insulated glass windows, which are not operable. Construction, scheduled to begin last December, will be completed in early June.

6 Shah builds in New York—Construction will start in June on the Shah of Iran's first major office building in the United States. The building will be built by the Pahlavi Foundation on Fifth Avenue at 52 St., a block from Olympic Tower, the just-completed joint venture of the late Aristotle Onassis and Arlen Realty. Architect for the 36-story Iranian tower is John Carl Warnecke & Associates of New York. New York's new Fifth Avenue Special District zoning law influenced the design of the tower so that each side responds uniquely to its function and setting. For example, a 40-ft setback on the seventh floor maintains the cornice line set by Rockefeller Center. The main entrance, leading into a three-story-high public mall lined with shops, a zoning requirement, will be on the 52 St. side. Facing will be of reddish brown granite. The building will be a center for Iranian business in New York and will contain a Petroleum Club and Persian restaurant.



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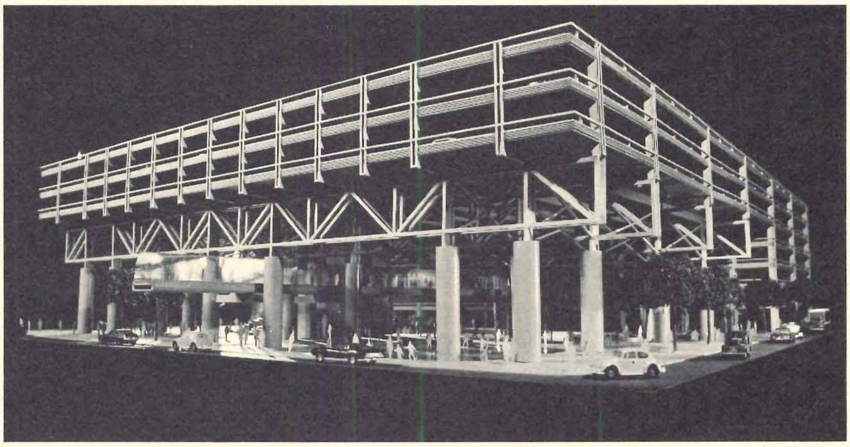

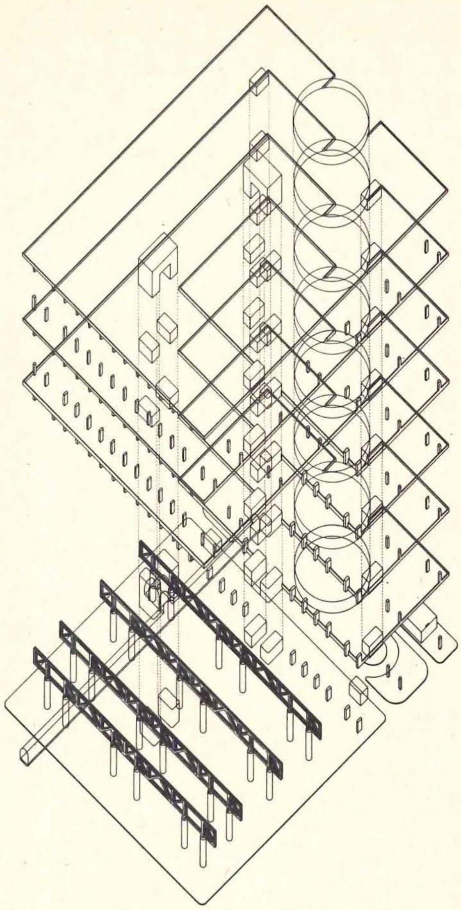

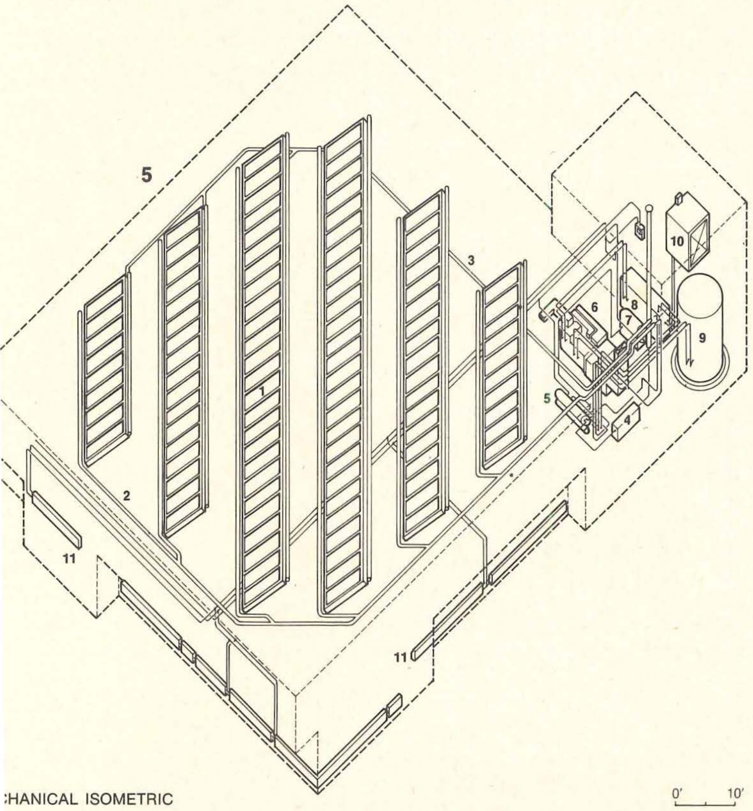

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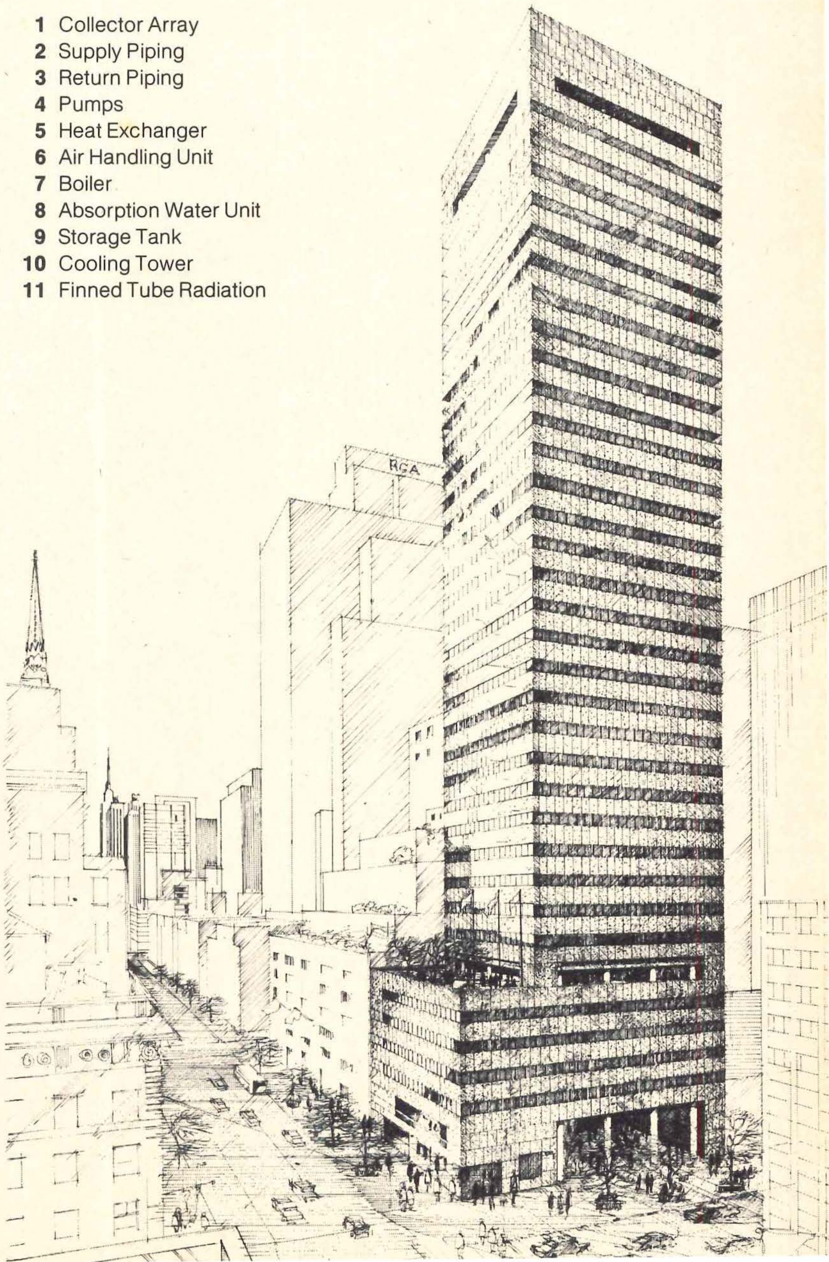
3 Return Piping
4 Pumps
5 Heat Exchanger
6 Air Handling Unit
7 Boiler
8 Absorption Water Unit
9 Storage Tank
10 Cooling Tower
11 Finned Tube Radiation



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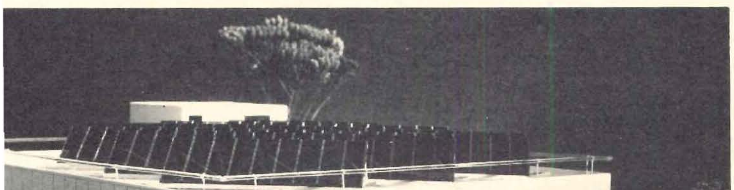

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Medications (Stat)		•	•	•
Unit Dose Medications		•	•	
Narcotics			•	
I.V. Admixture		•	•	
Medical Records		•		•
Lab Blood Samples		•		
Instrument Kits		•		
Dietary Items		•		
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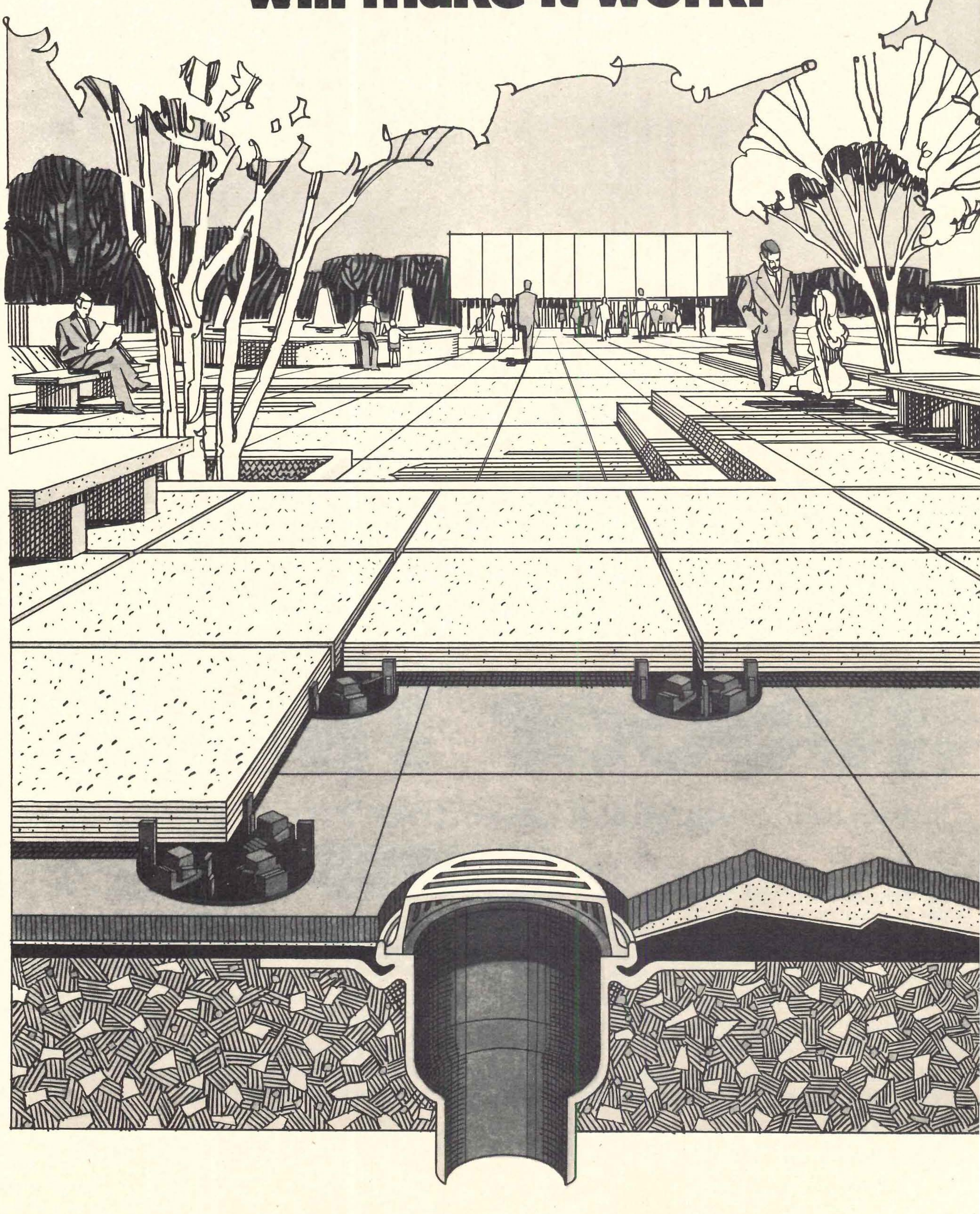

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The open joints also provide easy
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low the surface. No tearing up concrete.
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new, with no patching to mar the
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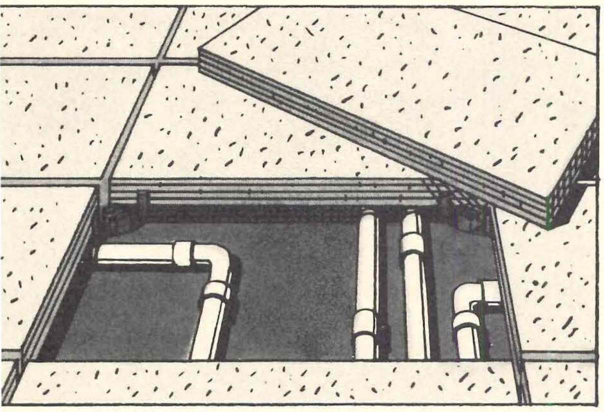

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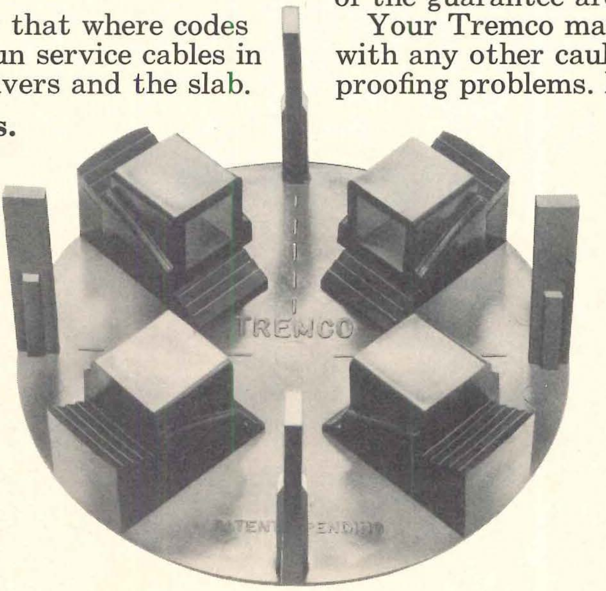

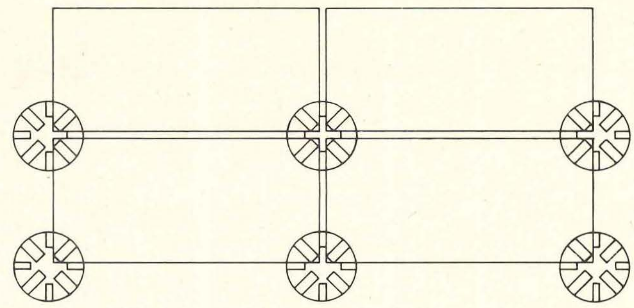

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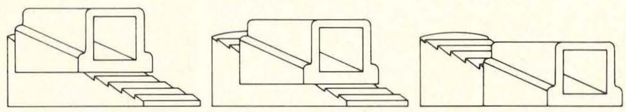

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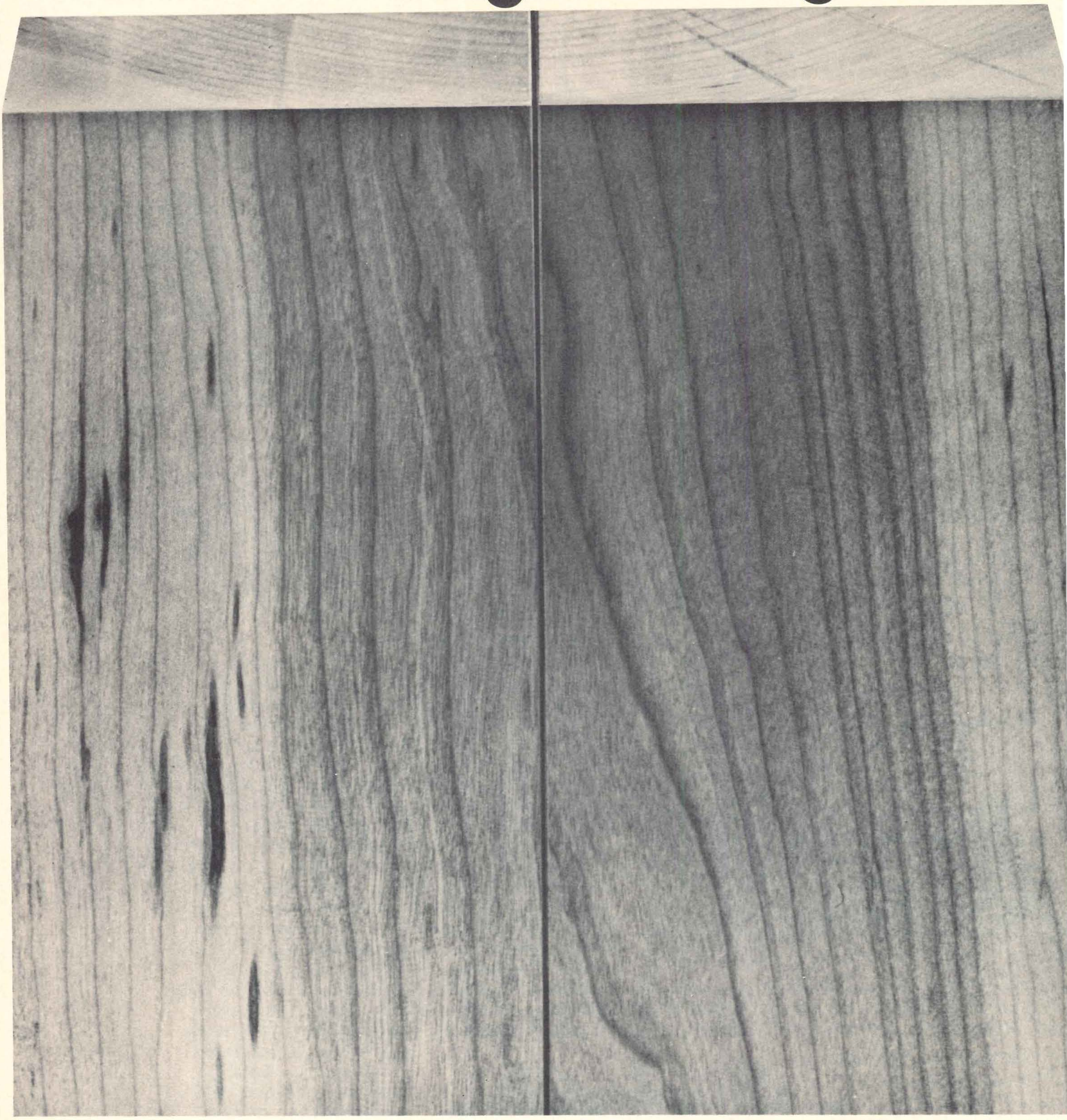

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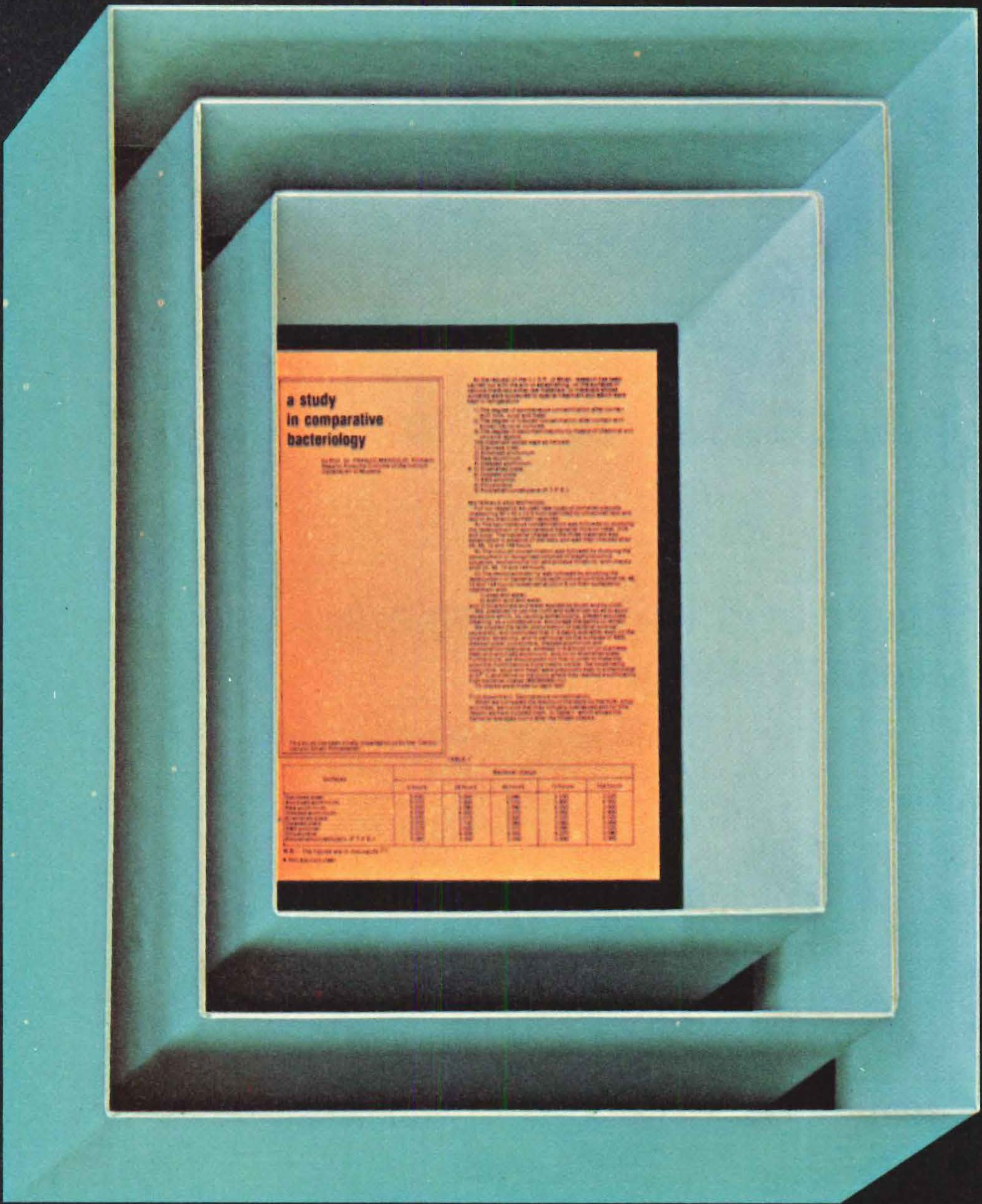

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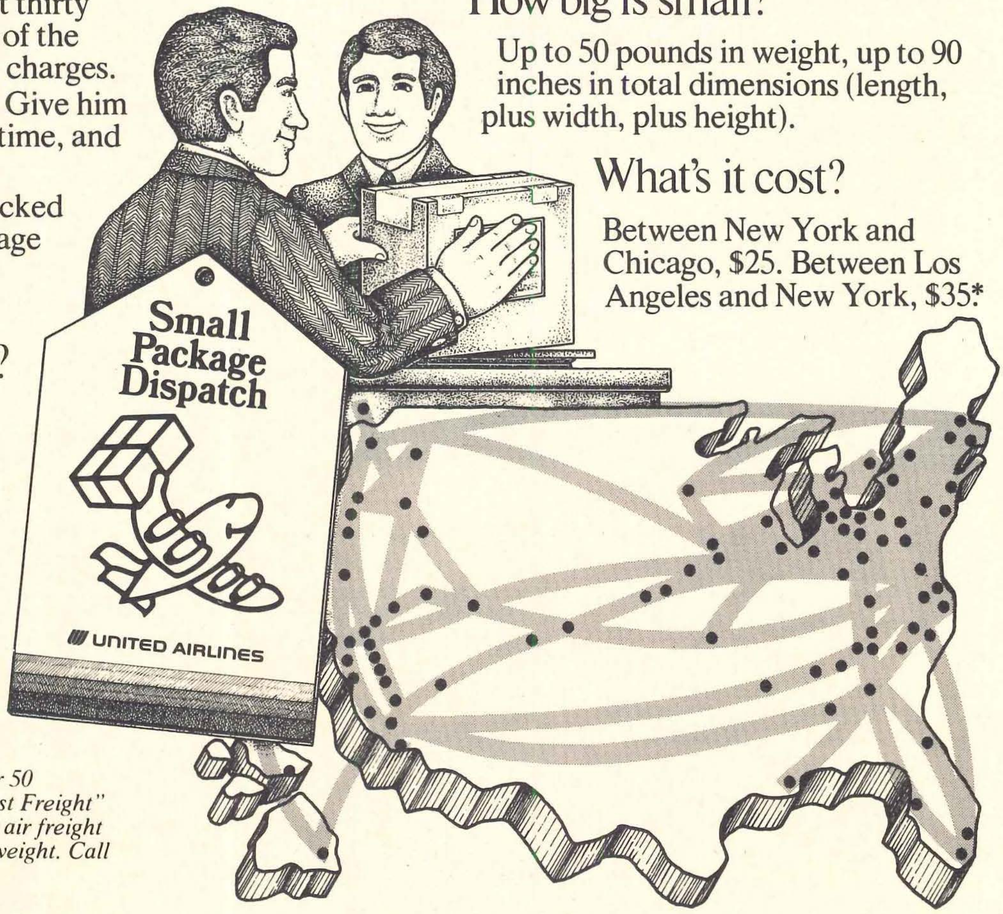

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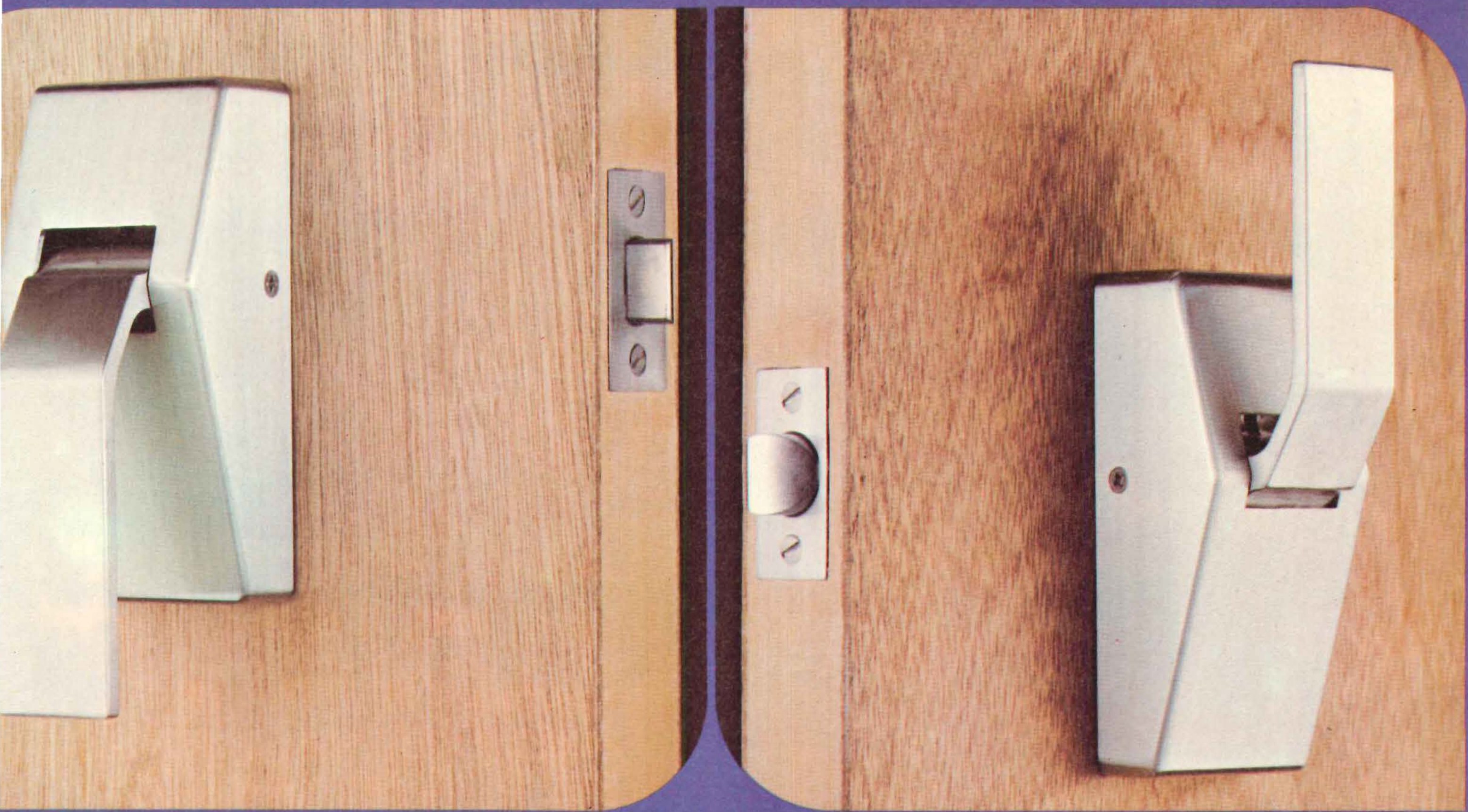

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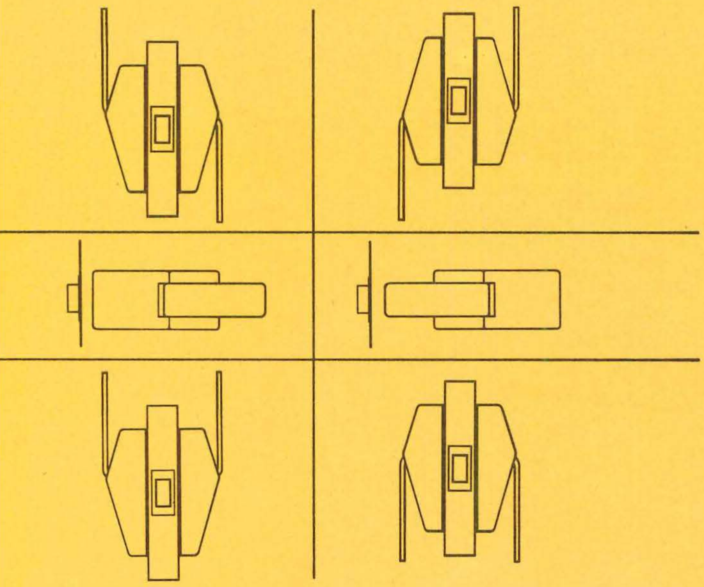

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Pembroke Dormitories, Brown Univ., Providence, R.I.

Making the ordinary extraordinary

William H. Jordy

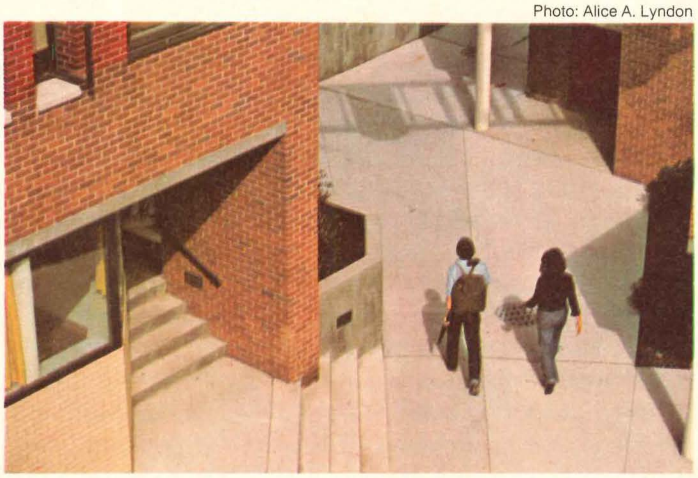
Winner of the First Award in the 1970 P/A competition, MLTW's student housing for Pembroke College—now completed substantially as originally designed—is spare yet complex, straightforward yet subtle.

Like the strident patchwork on student blue jeans, the scattered planes of glazed colored brick first catch the eye. Green, blue, cream, and red oppose the dull red of conventional brick. Even from a distance they establish an emphatic sense of place, climaxed inside the complex by an openwork metal structure supporting a festive sculpture of lights and pipes.

Reaction against the heroic posturing of would-be "form givers" had just begun to take hold in 1970 when the new Pembroke dormitories at Brown University by MLTW/-Moore, Lyndon, Turnbull took first place in P/A's annual awards competition. Five years and several vicissitudes later, students have finally moved in. As completed, the dormitories embody in a handsome and instructive manner a combination of sources of inspiration pervasive in current design: enthusiasm for popgraphics; respect for the integrity implicit in ordinary building for commercial and minor institutional purposes; finally, a predilection for the complexity of mass, silhouette and level in Mediterranean towns.

Together with Robert Venturi (who happened to have been one of the jurors for the 1970 competition), Moore, Lyndon, and Turnbull have been especially influential in publicizing by word and work the values of learning from pop/ordinary sources. Unlike Venturi, they have also made use of hilltown variety. Even as they worked on the design of the Brown complex, they were engaged on a similar, but larger, complex for the University of California at Santa Cruz (P/A citation-winning project, Jan. 1970 P/A; completed buildings, May 1974 P/A). As a romantic village

Photo: Alice A. Lyndon



Residents among color patches and shadow patterns of Pembroke court.

which winds down a wooded hillside with the flamboyance of a Hollywood film set, Santa Cruz sharply contrasts with its tightly sited, laconically urban variant at Brown. At Brown the prosaic quality of the deliberately mundane underpinnings of the design is foiled by counter measures which are at once forceful, subtle, and witty, while remaining essentially true in character to the mundane premise.

Such paradoxical intent in design is bound to be somewhat controversial in its impact, especially when the paradox so insistently obtrudes in the fireworks of the color. If many find the liveliness exhilarating, others think it brash, although familiarity wins converts. Like other architecture making sophisticated use of pop and vernacular elements, this can be (and is) immediately enjoyed for its festive surface. But one is immediately aware that there is more to the color than mere decorative exuberance, important as this function is.

Among their varied functions, the popgraphic elements provide diagrammatic keys to the basic starting points for the design: initially in the kaleidoscopic scatter of the planes on the street elevations contrasted to the focused quality of the centralized symmetry within. Beyond this basic differentiation of outside and inside, design considerations began with the specific requirement to house 200-250 students on a corner site at the edge of the University campus, and to include some shops at ground level. Donlyn Lyndon, the partner in charge, together with his erst-

Author: William H. Jordy is a Professor of Fine Arts at Brown University. He has written articles for the *Society of Architectural Historians Journal, Architectural Review,* and *Architectural Forum.* He is the author of *American Buildings and Their Architects: The Impact of European Modernism in the Mid-20th Century* (1972, Doubleday & Co. Inc.).

Pembroke's buildings play different roles in three physical contexts: matching rhythms and walled front yards of residential street to north and maintaining the line of storefronts on commercial street to east (photos below and facing page, top), forming a series of real and implied courtyards inside the block (facing page, bottom). Syncopated symmetries are echoed in turn-of-the-century front of Cushing Hall (above, in view from court). Vivid glazed brick panels emphasize various axes; lettuce green false fronts on shops (an elusive color in photos) reflect their plans, have built-in blue base line for signs.

while partner Charles Moore (who had little to do with the project beyond the phase of preliminary design) made two immediate decisions.

First, the new dormitory would not repeat the barracks-like composition of existing dormitories immediately adjacent to it. Instead the complex would be broken up into a complicated massing consonant with a number of houses with separate entries. These would be further subdivided into locked clusters of rooms internally so as to effect a further breakdown of the houses into groups of eight to ten students, and to provide the additional possibility of conversion into apartments should future student demand make such arrangements desirable.

Second, the two street elevations of the new dormitory would respond to their immediate surroundings. These are disparate, and the elevations record the disparity. The longest elevation on Thayer Street extends the principal University shopping area, which contains the usual nondescript but lively jumble of low commercial buildings intermixed with converted houses, all interlarded with signs. The shorter elevation on Bowen Street fronts the edge of a residential district of commodious houses ranging in date and style from 1870s Victorian mansard to 1920s Neocolonial Revival. And hinging these two environments, on the corner of Thayer and Bowen immediately opposite the new dormitories, there is a remarkable, if unprepossessing, turn-of-the-century dormitory, Cushing Hall. An anonymous brick structure in a nominal "Queen Anne" style, Cushing almost conceals within its modest demeanor a fascinating off-beat composition: a narrow gable at one end of the building is set against a wide gable at the other; off-center entrances at the ground against centered dormers on the roof—as if anticipating the preferences of the architects who would eventually build opposite it.

Two images on two streets

On Thayer Street the field of green brick distinguishes the stores from the dormitory above and simultaneously maintains the horizontal continuity of shopfronts along the street. Built into the wall, rather than tacked onto it in the manner of conventional shop fronts, the spectral quality of the flashy two-dimensional communications design becomes more positive than the "realness" of the building. At the roofline, the band of blue brick reinforces the horizontality at street level. More importantly, the blue band works to reestablish a sense of the building against the shop fronts. If signboard fronts eclipse the "building" by calling attention to the "shops," why shouldn't the building retaliate by using the very same graphic means to make a "cornice," thus reinstating architectural meaning with the brash communication devices by which architecture is customarily undone? In this instance the glazed blue also plays with the light and color of the sky, and becomes a "sky" for the building.

Both green and blue bands are, like most of the building forms in this complex, interlocked in a play between two- and three-dimensional elements. Thus the blue field of the cornice is cut at one point by a dull red brick projection, and notched repeatedly by the windows that thrust into it.

Pembroke Dormitories, Brown Univ.

Likewise, the green field of the shop fronts rises at each projection of the dormitory above, so that the two-dimensional form reinforces the three-dimensional form in signaling the separate houses that ride the continuous platform of shops below.

Hence both green and blue planes are analogous to the other signs on Thayer Street, but these signs carry within their laconic splashiness layers of architectural meaning both formal and metaphoric. At the same time their strident color and their integral planarity with the wall celebrate—by making conspicuous—the homely nature of the brick wall construction, even to the revelations of bonding at the edges of the colored planes, sometimes on the flat, sometimes folded around corners. (The bond pattern does not appear at the edges of the blue planes—really a crinkled blue surface flecked with black—because a darker mortar is used with this brick in order to fuse the plane visually.)

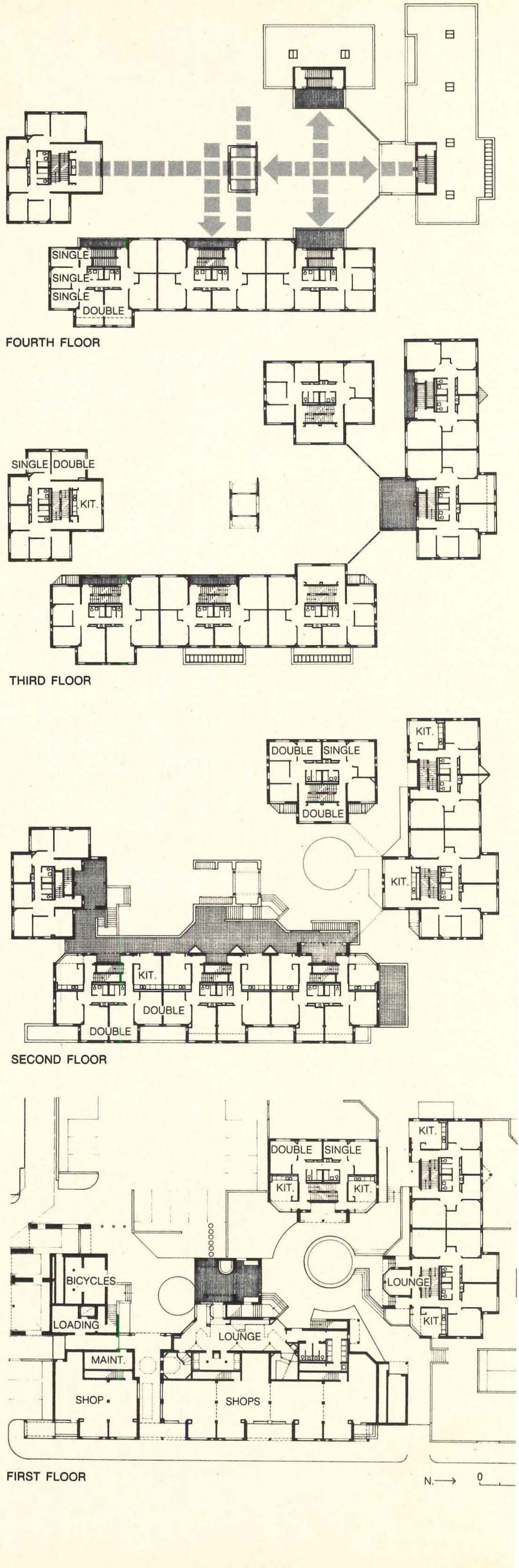
In all these respects the use of brick recalls the way in which Victorian designers often employed brick polychromatically for embellishment by building it into the wall. Rather than Victorian polychromy, however, which tended toward surface patterning, Lyndon is more likely to cite as precedents the planar changes of color and material that frequently appear in vernacular building. He mentions the way in which wooden additions frequently butt a brick building, or a brick-fronted house may employ clapboard for its less prestigious elevations.

Syncopation in color is extended by the way in which three different sizes of window variously cut into the color planes or hew to their edges, jostle in their alignments, or make symmetries and stretch them to the breaking point. A nice subtlety is the placement of all the large planar windows just behind the wall surface (economics prohibited their slight projection as Lyndon had wished), while small vertical casement windows are inset. Often in pairs, where they indicate bearing walls which are transverse to street elevations, they are also set back to prevent the spillage of noise from one room to another when windows are angled open. Because of the setback these windows alone require slightly projecting drip sills, which together with the shadow and the coupling, convert them into visual exclamation marks within the wall.

Façades within façades

The Thayer Street elevation of the complex stops before reaching the corner of Bowen. Originally a separate faculty house (omitted for budgetary reasons) was to have closed this open corner. But now Lyndon is rather happy that his openness gives special prominence to Cushing Hall across the street, so that the new dormitory makes its bow to the admired patriarch in the neighborhood.

Around the corner, on Bowen Street, a radical change of environment radically alters the nature of the dormitory elevation. Here the four-story elevation cued by the commercial nature of Thayer Street acknowledges the residential situation by dropping to three stories and discreetly moving back from the sidewalk behind an enclosing wall. Instead of the long horizontal planes which continue the theme of the shop fronts on Thayer Street, the Bowen Street elevation responds to the vertical blocks of the outsized houses op-



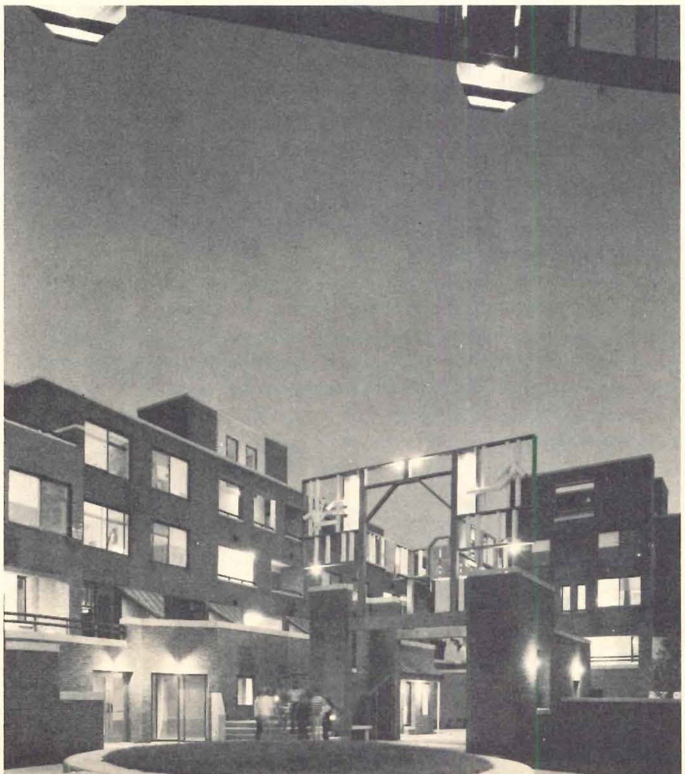
posite. Two symbolic "gates" in the wall (not for entering) center on two distinctly different symmetrical arrangements of the wall within the single elevation, thereby echoing the houses opposite in a spectral manner, while simultaneously suggesting the breakdown of the dormitories into similar "houses." One of the phantom façades-within-a-façade is marked by a projection from the basic plane of the wall; the other is set back on this plane. Lyndon avoids the too obvious split in the elevation that might have been expected from this arrangement by providing the projecting "façade" with flanking setback "wings" the width of a window unit which, because they occur in the plane of the recessed wall, alternately extend the symmetry of the projected field and disappear into the wall, thus scumbling the break that the two fields might make.

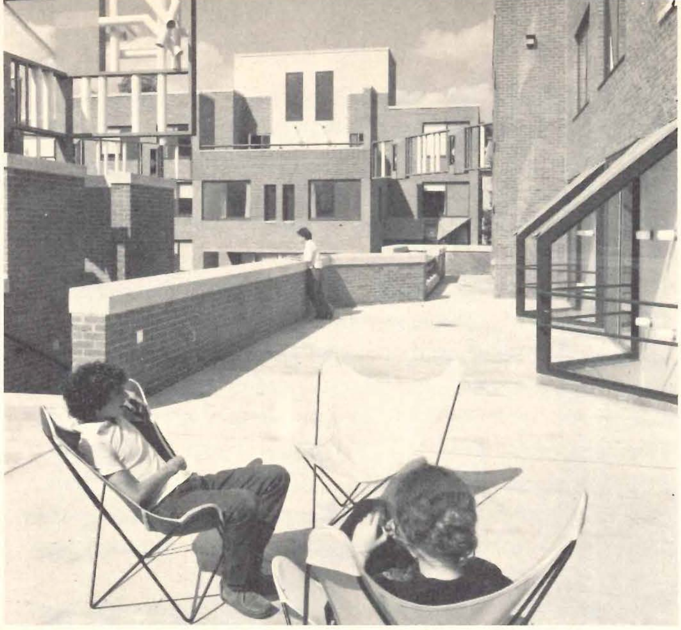
Whereas the projecting phantom façade is flat (except for an applied fire alarm on center), the recessed phantom pops a markedly three-dimensional triangular bay window at its center, its substantial cylindrical support as a literal marker of axiality. The centering function of the bay window is confounded by its halving into two rooms so that the single bay reveals two entirely different interior treatments to the passerby.

Inside the complex, in the courtyard, the same witty play between the real architecture and its graphic counterpart continues. The deliberate façadism of the exterior walls gives way to a more three-dimensional composition of house fronts, terracing, balconies, bay windows, and towers—all surrounding the colorful metal-framed centerpiece with its tubes, boxes, and lights—part sculpture, part billboard, part lighting fixture (recalling the way Marcel Breuer replaced the traditional bell tower with a "bell banner" for his monastery chapel in Collegeville, Minn.).

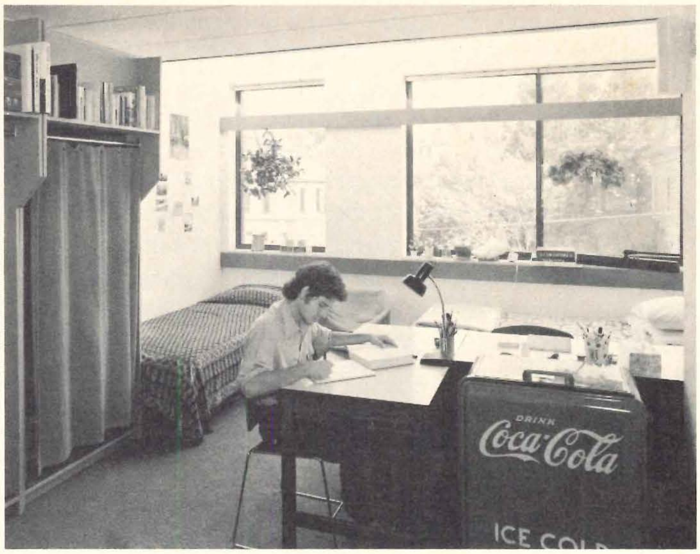
Actually the complex has three overlapping centering de-

Painted steel gateway is focus of views into court (photo above, from north) and routes through it (right). Night lighting (below) is supported on gateway and similar framework spanning between buildings. Metal canopies under gateway (right) cover outdoor telephones and entrance to main lounge. Wings of gateway support white pipe sculpture by Alice Lyndon in a form recalling the Hindu temple gate at Sanchi.





Bays along terrace light lounge below by day, emit light by night.



Typical bedroom features movable wardrobe, hanging strip across windows.

vices: First, of course, there is the climactic openwork sculpture. But the sculpture, as a pseudo-"house" combines with three other projecting fronts at the Bowen Street end of the complex, and with connecting lattice bridges, to make a secondary centering on a square open space—just outside the primary centering device, but using this as one of its defining elements. Finally, the towerlike massing with its elevated porch at the Bowen Street end of the complex works with similar skyline massing at the opposite end of the complex and midway along the Thayer Street elevation to center the scheme in yet a third way, which nevertheless remains slightly eccentric to the other two centering devices. Wherever one looks centering devices, axes, and symmetries organize the composition, but they are invariably skewed, with subtle tensions.

Do the students like their quarters? Generally they seem enthusiastic about the rooms, particularly for their variety of shape and flexibility for furnishing, as well as for the clustering of rooms into groups. They especially appreciate alcoves in the halls outside the rooms which have become informal meeting places with music from open rooms nearby, as Lyndon intended. The major lounge in the complex is easily by-passed, and all lounges are small, so students get to know their immediate neighbors, but find it difficult to become acquainted with the larger community. Balconies are also underused because too many are not projected into the sun, but set back inside the building in shade which is too cool for the New England academic year.

If the vibrant and varied use of color inside meets with general approval, the colorful exterior receives mixed response, although more favorable than not. The virtues of the sculptural centerpiece as a focus are acknowledged, but this especially has its critics. Many don't care for its jazzy mechanical look, especially its insistence as an object for those for whom it constitutes the "view" and who are additionally afflicted by its lights in their windows at night. Specific pluses and minuses aside, however, students seem to like the spirited quality of the place.

For those who would learn from Lyndon's design, Venturi's most vernacular work provides the inevitable comparison—his New Haven fire station, for example, where Venturi virtually omits arcane historical allusion in favor of unalloyed "ordinariness." Venturi emphasizes façade images more than Lyndon does. Partly for this reason, and partly because he underscores the fact with a built-in supersign that curls beyond the limits of his building, Venturi shows a greater commitment to monumentality, however ironic the commitment may be. And finally, because of these concerns, Venturi's images tend to be the more intense and focused.

By contrast Lyndon's façade allusions interlock with the three-dimensional complexity of his composition as a whole, and are sufficiently partial and fragmentary that they alternatively reveal themselves and dissolve, isolate themselves and combine. Even the most emblematic elements in Lyndon's design participate in an immediate give and take with the ambient environment.

Despite the environmental appeal, however, despite complexities and subtleties that can only be suggested here, the wonder is that the elements composing Lyndon's design remain so straightforward and spare. □

Data

Project: Pembroke Dormitories, Brown University, Providence, R.I.
Architects: MLTW/Moore, Lyndon, Turnbull (initial design); Lyndon Associates, Inc., Cambridge, Mass. (final design through construction); Donlyn Lyndon, principal in charge; Marvin Buchanan, project architect.
Client: Brown University; Siu Chim Chan, director of physical plant.
Program: living quarters for 196 students (60 single rooms; 68 doubles); 13 student kitchens; total gross floor area, 69,000 sq ft; retail space, 13,400 sq ft (including storage and 1200 sq ft of covered parking).
Site: 39,750-sq-ft street corner at edge of university, abutting active retail street to the east, street of large detached houses to the north, existing university buildings to west and south.
Structural system: precast concrete plank floors and roof on masonry bearing walls; steel stud interior walls.
Major materials: exterior walls faced with plain and glazed brick; built-up roofing; expanded polystyrene insulation; steel casement and aluminum sliding windows; double-glazed wire glass skylights in aluminum frames; floors carpeted, except end-grain oak block in main lounge.
Mechanical system: heating by fan coil units, using university hot water; provision for future air conditioning from central chiller.
Consultants: Weidlinger Associates (Patrick Morreau, associate), structural; Dubin, Mindell, Bloome, mechanical; Placemakers, Inc., interior design; Alice Atkinson Lyndon, sculpture.
General contractor: J.L. Marshall & Sons, Inc.
Construction cost: $2,357,000 (bid), $2,472,000 (actual) excluding furnishings and fees.
Photography: Jonathan Green, except as noted.

Architect's comment

The architecture of the Pembroke Dormitories was governed by four prime considerations: building within a tight budget, providing students with choice, reinforcing the order of places adjoining the site, and bringing attention to the people who live there. Besides that, we wanted it to be a nice place.

1 Building within the limits of HUD sponsored financing: The dormitories were constructed under a Federal loan program, within the designated dollar limit per student. Construction is simple, with precast concrete planks, brick-faced masonry walls, steel stud partitions and gypsum board surfaces inside. Planning is based on a repetitive three-story organization with six to eight rooms per floor arranged around a set of bathrooms and a scissor stair entry. Room sizes are small, and common space limited, although each unit includes either two kitchen/lounge areas or one large one, and there is an informal Common Room Hall for the whole complex, off of which are two seminar/lounge rooms, a vending machine shrine, and a small laundry. The use of the ground floor of Thayer Street for self-supporting commercial space contributed to the project's fiscal balance.

2 Providing students with opportunities for choice and personal expression: It should be possible for students (or any residents) to take possession of their own spaces and to be part of a social unit small enough so that their actions and preferences count. Each unit floor has 6 to 11 students and is lockable. Rooms are about equally divided between singles and doubles in varying combinations.

Within the basic building system we have introduced a number of simple variants: bays, projections, window placement, skylights, room shape, and corridor colors. These variants, combined with building position and outlook, make virtually every room distinguishable.

Within the rooms, options have been left open. When students rearrange a room it should make a real difference, not just fill pre-ordained niches. Wardrobes have been used rather than closets, so that they can be disposed differently within the rooms: separating areas or flat against the wall, in front of windows or blocking the door. The wardrobes have a bright façade and a dull finished back, so their position counts. The color of the rooms is a warm tan—neutral but not bland. An angled corner, small enough to repaint, has been painted bright yellow. Two 2x6s span across the window wall, one at the sill and one near the head, so that students can hang things from them or nail panels to them. Curtain rods are attached to their backs. Windows are generally large so that students who think them too large can cover them with curtains, panels or wardrobes (which they don't). Alcoves in the corridor are left to the group to claim for their own devices.

3 Making the form and use of the buildings accountable to the places they front: Each boundary of the site has a distinctly different character, and each face of the building adjusts to those differences. Cushing Street to the south is a service and loading alley; the new building has cars and trucks at street level there. Thayer Street on the east is a characteristic college shopping street; that face of the building is a row of shops entered through a glazed brick sign-patched façade that distinguishes the shops from the bulk of the dormitory above.

By allocating this part of the site to commerce it was possible to extend the established pattern of storefront public space along a busy street and also to gain privacy for the rooms above (and space for the inner court) by placing the building quite close to the street, so that the shops and their façade shield second floor rooms from sidewalk view.

Along Bowen Street the established pattern was strikingly different, an easy pleasant street of walls, hedges, front stoops, and big blocky houses of a variety of sorts, mostly handsome. The Bowen Street side of the complex is accordingly lower and shorter, scaled to the domestic rhythms of the street, set back behind walls and ivy. The western boundary of the site is left largely open, to give light and outlook to the adjoining brick box dormitories. On the northwest corner an older house has been retained, renovated to accommodate students; it provides a welcome intrusion of forms and details from another time. (Earlier published designs showed an additional dormitory building on its site, which was carefully sited to allow retention of the old building as an alternative.)

All of the buildings face the court, and each entry stair is marked by inset buff brick walls and by the fundamentally symmetrical placement of rooms and windows around it. This recurrent pattern projects itself forward into the space, but the form of the buildings is also accountable to the court. On three sides pavilions made up of porch, rooms, and terrace step forward from the building to form three faces of a square courtyard (a direct crib from Islamic architecture). Their front faces are red glazed brick to emphasize their relationship. The fourth side is formed by a gate filled with light fixtures and sculpture.

But this square is only one of a multiple set of orderings. (See preceding article.) At no point does one order dominate to the exclusion of others. People should be able to choose their alliance.

4 Bringing attention to the life of the place by framing the daily scene: Paths through the complex all lead through the central courtyard: under the building from Thayer Street, through the light gate to entries facing the court or up across the terrace to entries above the common rooms and stores. The court, with these paths, the round platform in the middle, and terraces that face it on the upper levels, makes a place that sharpens the perception of community—highlighting the actions and movements of people on their way to and from classes, establishing numerous opportunities for casual encounter and greeting, providing places outdoors for the occupants of every entry. Stairways are shaped to focus attention on people using them, niches, porches, and benches to lodge people on the edges of the space, and precast caps for all the terrace walls so that they will be comfortable objects on which people might lean.

The light gate in the center casts networks of shadow across the space, further pictorializing the scene. The sculpture it bears plays with the shifting sun and inhabits its framed openings. The form of the light gate at once completes the square inner court and occupies the larger court formed by the whole complex. It shifts the focus of attention from individual incidents to the collection of paths that lead through it. Its form and colors, the sculpture appearing in its frame, lay claim to the whole place as a theater for the everyday activities of Pembroke residents.

These considerations, and getting upwards of 200 students on the site, were our deliberate intentions. Obviously in any project many other factors affect decisions: hard, cold ones like changes in program and budget, chance dreamy ones like the recollection of the gate at Sanchi, or the variation-packed turn of the century row houses on Boston's Beacon Street that Marvin Buchanan and I often drove by on the way to work—and many more. My own involvement at MIT in the shifting sands of student attitudes during the late 1960s obviously affected our approach to the problem. Marvin Buchanan's clear head accounts for still more. His sometimes simultaneous engagement in design for Moore/Turnbull's Kresge College at Santa Cruz offered us all the chance to compare notes frequently. Finally, the patient and watchful eyes of John Nicholas Brown, chairman of the Brown University Planning and Building Committee, contributed tough questioning, his invaluable understanding and support, and an ever-insistent standard of judgment.
[Donlyn Lyndon]

Madeira Science Building, Greenway, Va.

Sunny side up

With energy conservation high on the client's priority list, Arthur Cotton Moore Associates designs a quiet science lesson for the students at the Madeira School.

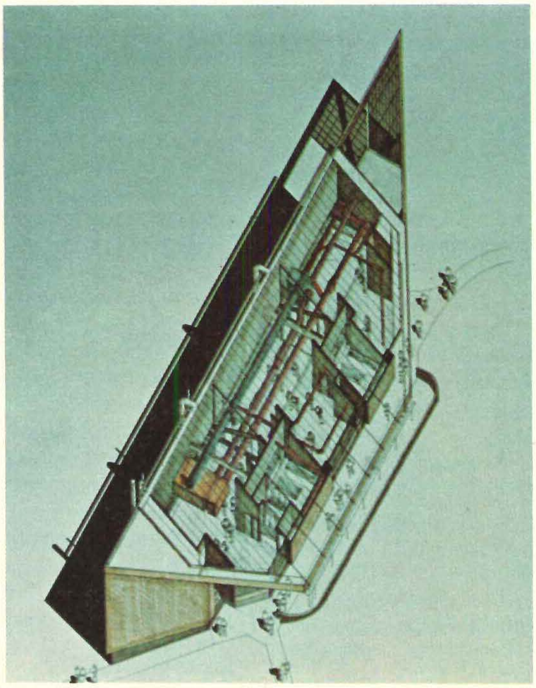
As Wolf Von Eckardt, the architecture critic of *The Washington Post,* put it, "After years of talk about applying solar heating to a large building, Madeira and Arthur Moore just went and did it." The client "did it," as well, by the interest in preservation of natural resources expressed in early meetings. What they did, collectively, was create a striking example of how solar energy can define form.

The major design element of the new science building at the Madeira School—located in the Virginia suburbs of Washington, D.C.—is obvious. A solar collector roof, coupled with long overhangs and careful orientation, led the design process. Program input also stressed flexibility, that venerable programmatic virtue, visual control, and maximum amounts of laboratory and support space. Another parameter was the lighted campus path system, high in priority since an incident in Madeira's recent past. Other constraints followed the normal pattern of most building programs; budgets and practical enclosed volumes shaped some of the decisions.

A parallelogram in plan, the building is set into an unwooded area between older and newer campus buildings. It is sited with the collector roof facing southeast at as steep an angle as the interior volume could practically justify. The upper ridge edge of the single-pitch roof is a skylight, and the lower roof edge overhang forms a shelter over the path. Glazed openings between the laboratories and the path open the facility to views from pathway to lab, and vice versa. At the east end point is a greenhouse.

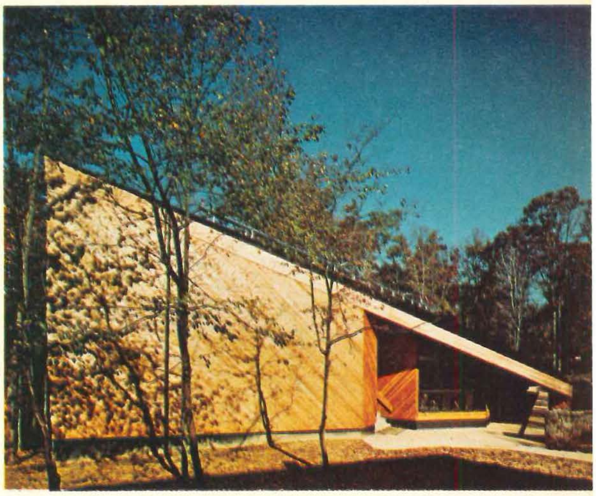
Inside, one large space, subdivided by sliding glass doors and flanked by prep rooms, houses the laboratories. Through the upper space pass light from the skylight, HVAC ducts, and lighting fixtures. The ducts have been painted in what, by now, has become an accepted fashion—but here, as a celebration of the solar heat source, the colors seem more a part of one overall statement.

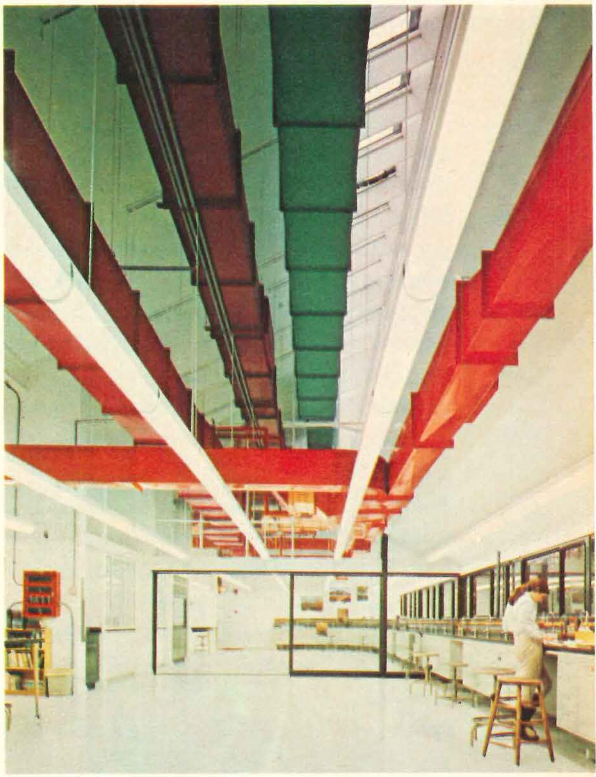
More than just a formal design element, the parallelogram shape was chosen to minimize the impact of the solar roof's size (4600 sq ft). By bringing its edge down lower than the adjacent grade, the scale is reduced even farther. The lighted path nestles under this leading edge, and joins the ridge skylight to create dramatic strips of light at night.



The heart of the design, the collector, uses a special oil to capture the heat and transfer it to a 10,000 gallon water tank. This eliminates a major problem of corrosion prevalent in water-and-anti-freeze collectors. The system is to provide 60 percent of the building's heat, backed up by an oversize boiler in the adjacent gymnasium. Also linked to the system is the swimming pool, which can be heated during the spring and fall with excess heat generated. Domestic hot water can be provided for the neighboring gym during those seasons, as well, alleviating some of the necessity to fire the boiler. The building's temperature can be sustained for two or three sunless days without help from the boiler.

Located as it is near the seat of federal government, the Madeira project, albeit for a private girls' school, would have seemed of natural interest to *somebody* in Washington. Not so, Moore reports. Attempts to get any kind of input from those government agencies charged with helping



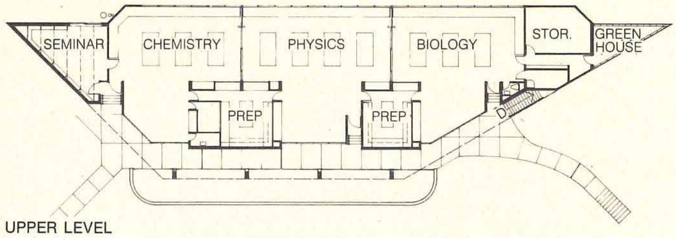


Collector (center, left) was tilted at as great an angle as could be justified by the enclosed volume in the labs (above) and exterior massing.

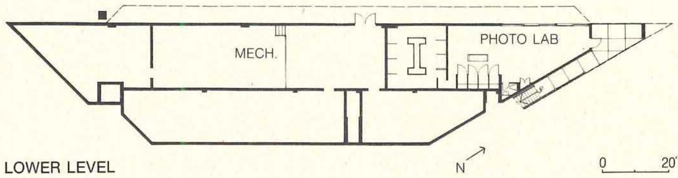
David Cox

Science building and its symbiotic neighbors, the gym to the left and the pool in front. The greenhouse is articulated in the lower point.

Madeira Science Building



UPPER LEVEL

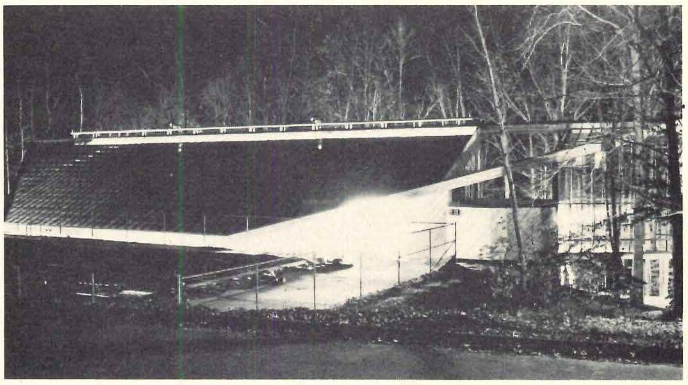


LOWER LEVEL

research and develop alternate energy sources were met with a deafening silence. No phone calls returned, and certainly no help offered.

Madeira's science building got built despite the agencies, despite those who may be foot-dragging in the interest of other power lobbies. As Von Eckardt said, "The Madeira science building is no earth-shaking technological breakthrough." It is, however (as he noted), a delightfully unpretentious, positive, and timely contribution. Its design skillfully avoids making more of the technology than it deserves, a very real temptation for most designers. While it is obviously a solar heated building, it is a quiet one, getting quieter as the cedar siding turns gray with age.

Even if large flat-plate collectors are not to be *the ultimate* energy answers, even if they're not new or earth-shaking, it is, as P/A has said many times before, encouraging to see energy-conscious programs turned into realities. When they also turn out to be good architecture, aesthetically and functionally, it's doubly rewarding. Science at Madeira has a new teacher. It doesn't talk much, but it says a lot. [Jim Murphy]


David Cox

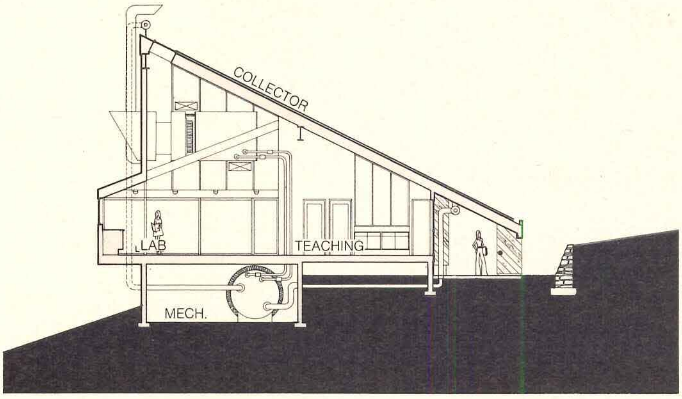
At night, glazed ridge and classroom wall (above) outline the collector. The sloping site allows for photography lab entrance below greenhouse.


David Cox

Data

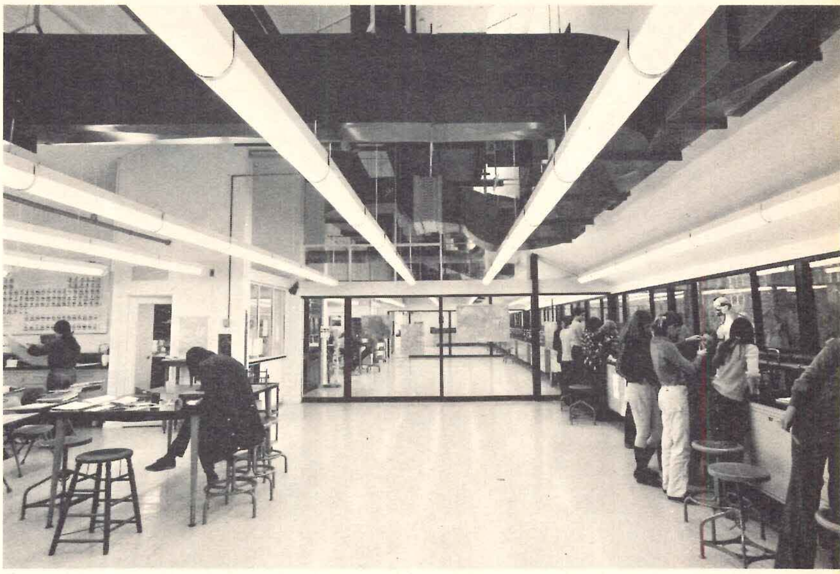
Project: science building, The Madeira School, Greenway, Va.
Architects: Arthur Cotton Moore Associates, Washington, D.C.
Program: science facilities for private girls school of 300 in grades 9–12. Client stressed flexibility and preservation of natural resources.
Site: open area on wooded 400-acre site 12 miles from downtown Washington, D.C.
Structural system: steel columns, wood framing and roof, concrete block foundation walls.
Mechanical systems: solar heating, backed up by boiler in adjacent building. Solar collector uses special heat-transfer oil to collect heat, which is stored in a 10,000 gallon hot water tank. Hot water and forced air heating.
Major materials: exterior, glass over brass collector plates over silicone membrane roof, red cedar siding; glass greenhouse; interior, gypsum board walls and ceiling, vinyl asbestos tile and ceramic tile floors, sliding and fixed glass partitions.
Consultants: structural, James Madison Cutts; mechanical and electrical, Flack & Kurtz Consulting Engineers.
Client: The Madeira School.
General contractor: Commercial Industrial Construction, Inc.
Cost: $591,000, $60/sq ft (includes equipment, landscaping, greenhouse, and energy system).
Photography: Norman McGrath, except as noted.

Pipe manifolds supply and withdraw the special oil used to transfer heat from the collector to water storage tank. Appearing along the ridge and under the roof soffits, they form conscious but tasteful design elements.



SECTION

David Cox



A rousing place

A southern California building on a lake in Maryland with an interior organized around somewhat Beaux-Arts principles proves not inappropriate for its occupants.

The building of a headquarters building for a company who had undertaken to plan and build two new towns would seem a relatively simple matter, after the complexities of coordinating and executing such major land development. But perhaps the process was a little like an architect trying to design his own house. Knowing what all the options are does not always simplify the choice, or even make it easier.

At various points in the design process, the building took different configurations, occupied different locations on the site, and was to be built of various materials; but, through all that, the initial concept of the Rouse Company and its architect, Frank Gehry, for its organization and use, remained consistent.

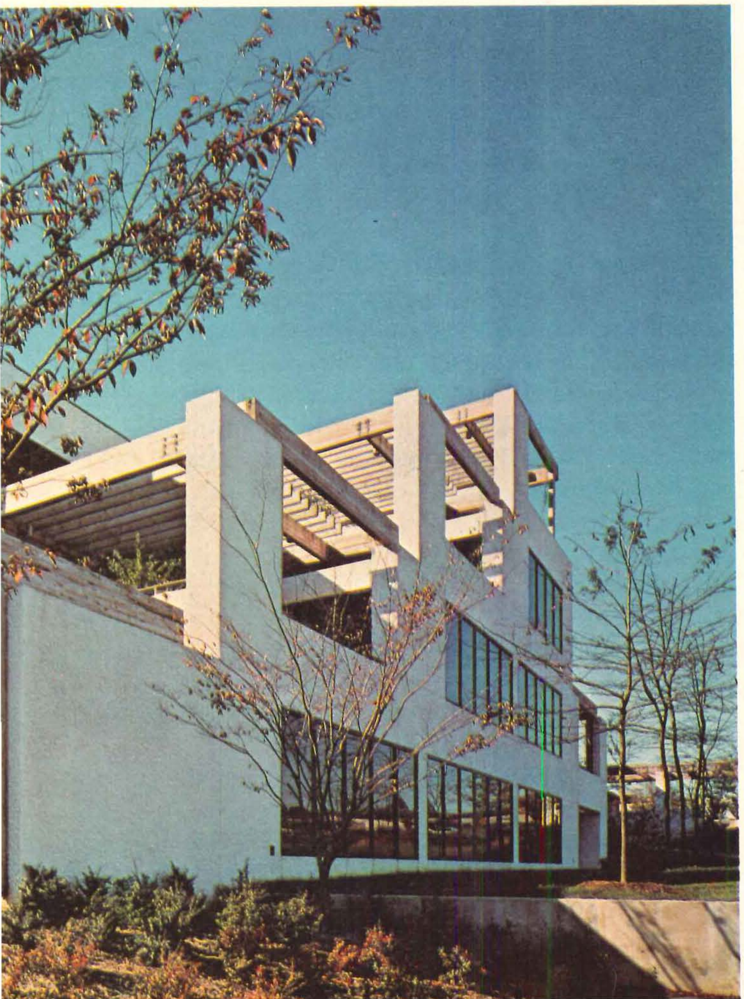
During the economic prosperity and growth of the late 60s when the building was first proposed, it was to have been a three-phase project with an initial 250,000 sq ft of office space, plus commercial and civic facilities, as well as development of a major public square. Two recessions later, the three-story completed building has 150,000 sq ft of office space and includes a large public meeting space; plans for expansion have been laid to rest for the moment.

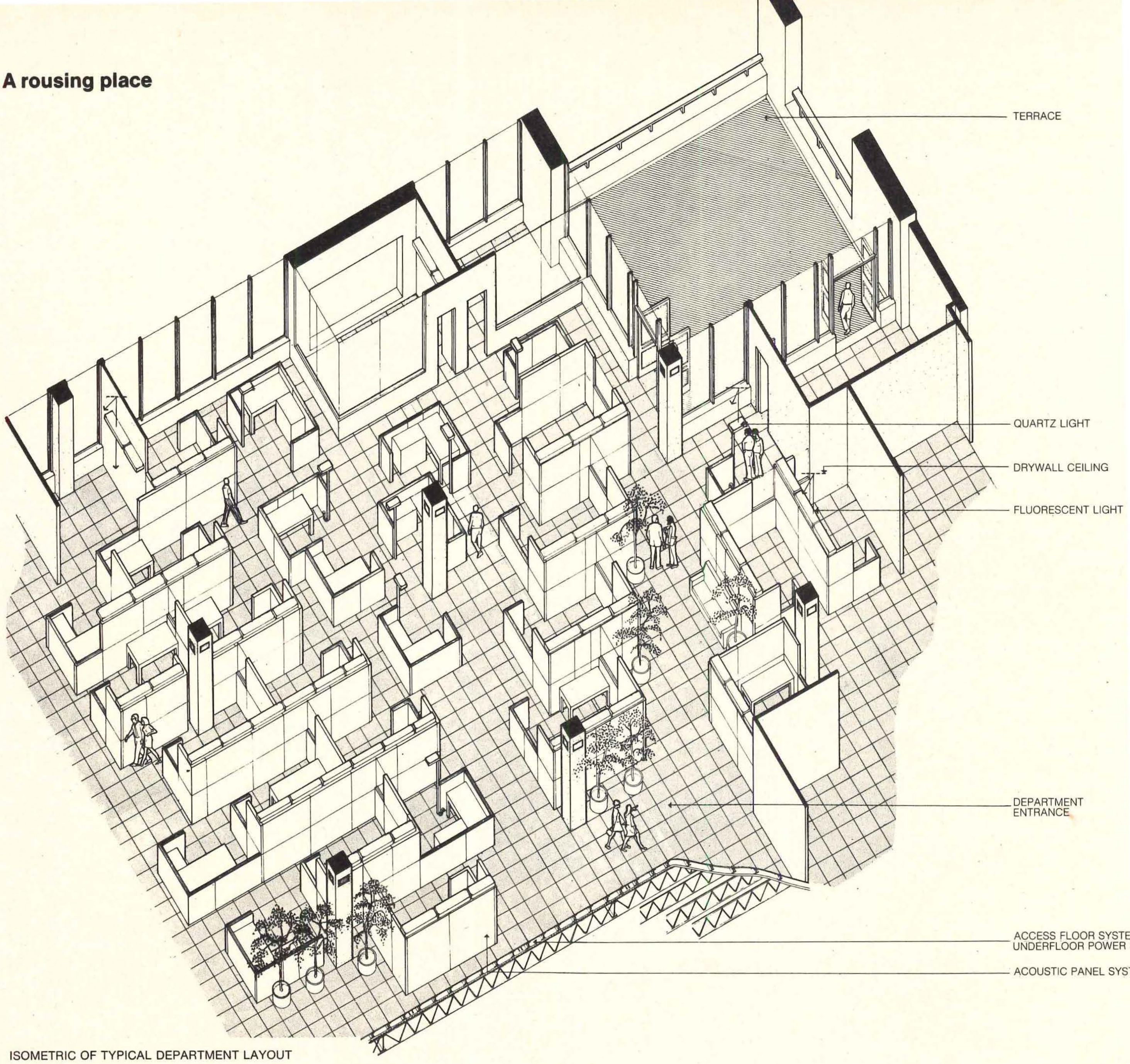
Because of the economic condition, one major consideration for the company in planning the new facility was its ability to secure financing based on the building's market potential for leasing to another tenant. While many of the early schematic studies, favored by the Rouse Co., were well-suited to the speculative building market, the architect felt that the overall objectives of the company in terms of the kinds of environments wanted, the desired interaction of the people who work there, and the kind of flexibility needed for future growth and change would be better accomplished in a less conventional type of structure. Diagrammatically, the building form evolved from a conventional linear plan with a high ratio of perimeter wall to usable floor area into a square, centroidal plan with less than half the ratio of window wall to floor area, but with large, loftlike interior spaces providing greater flexibility for interior layouts. There were other economic benefits as well. Less perimeter wall reduced HVAC system loads and the centroidal plan allowed for shorter mechanical runs.

One major drawback, however, to this type of building configuration was the large amount of interior space without natural light, a factor of concern not only in the potential for leasing, but also in the type of environment it created for the employees of The Rouse Company. James Rouse, President of the company, had originally wanted the facility to be all open-plan, but when objections were voiced by some of the management, the decision was made to develop an interior system which could accommodate a variety of office types. The architect's spatial conception for the interior space, given the small ratio of window wall to floor area and the need for some private offices, was to use common areas such as lounges, circulation spaces, and secretarial spaces as a series of "events". Instead of lining the window wall with enclosed offices—typical of very hierarchical organizations—circulation axes would be cut through the space to the window wall creating framed views to add to the variety of visual experiences. A skylit atrium space, besides being the pedestrian link between floors, floods the interior spaces with natural light. The "building," as such, was conceived as merely an envelope, constructed as simply as possible in order to cut construction costs and insure an adequate budget for the design and execution of the interiors. In an effort to keep down escalating building costs, construction was begun on the shell once the basic building systems had been established. A 30′ x 30′ steel bay module was fixed, along with a raised flooring system for an electrical raceway and a ceiling plenum, with intake and exhaust located in the columns, to handle the HVAC.

One of the major design decisions affecting the shell of the building was the decision to use a system of reflected light in place of the standard lay-in tile with fluorescent fixtures overhead. Having seen the first Joseph Magnin store designed by Gehry in 1966, the management of Rouse agreed with Gehry's concept for their own interior—a clean neutral background which would allow the people in the space, along with their artifacts, a more prominent role in the establishment of a visual aesthetic. The ceiling plane, no longer dependent on a lay-in grid system, could be a flat white sheetrock plane which, besides being visually unclut-

The almost incomplete form implied by the massing suggests the capability of the building to expand almost infinitely.



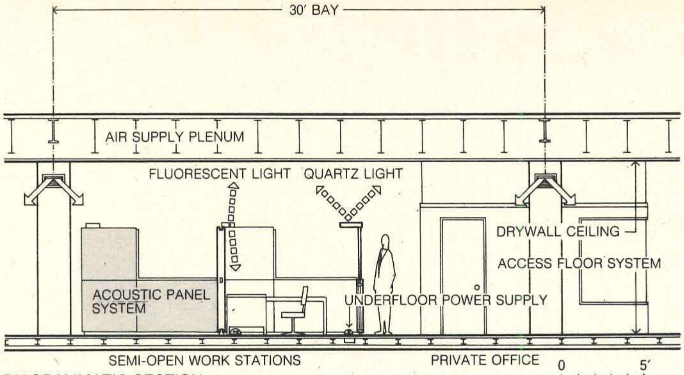


ISOMETRIC OF TYPICAL DEPARTMENT LAYOUT

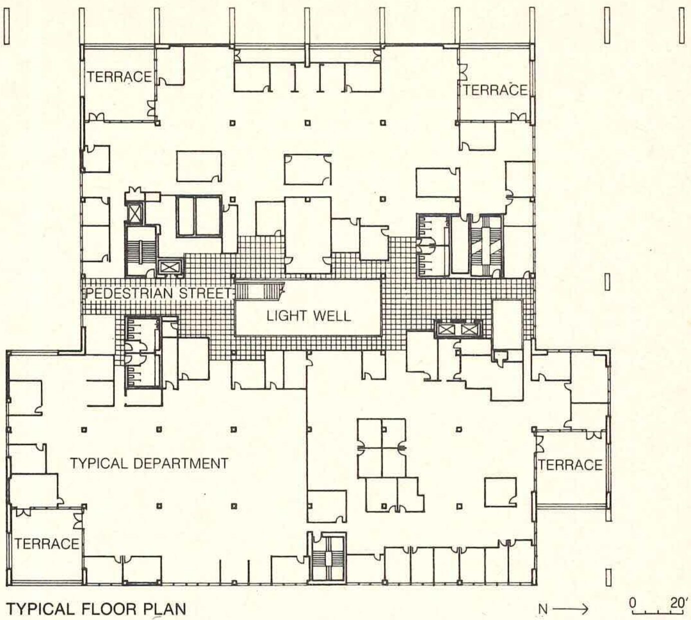
tered would provide the necessary reflective surface for achieving adequate lighting levels. The indirect lighting fixture and its integration into the architecture of the Magnin stores, however, was not appropriate for Rouse Company use, so that, while the conceptual ideas were the same, a new fixture had to be developed. Solutions worked out in the office ranged over various alternatives including hanging fluorescent fixtures upside down. But none of these early approaches removed the usual clutter from the ceiling, so the decision was finally made to bury all electrical cable under a raised floor, and the present clip-on pole and fixture were developed. The fixture is designed to hold two quartz lamps, either 300 or 500 watts, so it was possible to vary the lighting levels according to the task, anywhere from 600 to 1000 watts. In addition, it was also planned that dimmers would be installed on each fixture to allow for individual adjustment, but, in the end, this refinement was eliminated. A clip-on fluorescent fixture was also designed for the workplaces with high walls, to add vertical surface light and give a feeling of contrast.

One other problem had direct impact on the design of the interiors: The Rouse Company intended to reuse all its existing furniture, so that a partitioning system had to be developed which could not only provide various types of enclosures—from open to enclosed offices—but would also be compatible with existing equipment and somehow act as a unifying element in the overall visual concept. And as with any open plan, acoustical privacy became a concern, since the presumed end-all solution—the lay-in acoustic tile ceiling—had been abandoned. Among the recommendations by the acoustical consultant Christopher Jaffe (who felt that acoustical ceilings would not necessarily have provided the right ambient environment, anyway) were three types of partition construction a room ambient reverberation control partition, a source noise control partition, and a speech privacy control partition.

As eventually designed by the Gehry office, the partitioning system is a modular fabric-covered panel in 3′, 4′ or 5′ lengths, by 3′-3″ high, that can be joined horizontally as well as vertically. A deliberate effort was made to avoid the



DIAGRAMMATIC SECTION

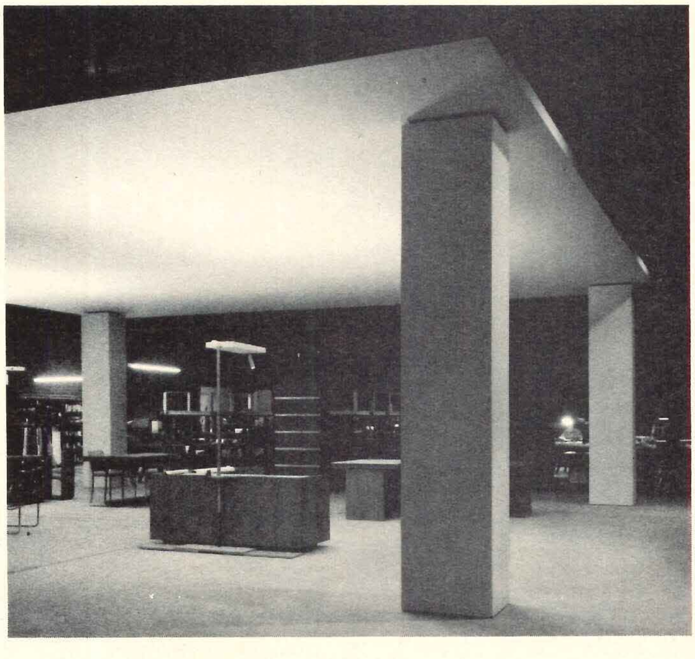


TYPICAL FLOOR PLAN

''modular'' quality of most office systems by using a concealed-spine joint and by maintaining a uniform surface. The 3'-3'' high panels are used for secretarial areas and for low open workplaces. Two 3'-3'' panels, stacked vertically, are used for an open office when visual privacy is needed. Private offices are designed, using either the 3'-3'' high panel and clear glazing with butted corner joints, or the 6'-6'' high panels with glazing when visual privacy as well as acoustical privacy is needed. The use of the glazing for private offices, particularly with the lower panel heights, maintains the sense of openness at the same time that it adds another visual dimension by introducing transparent, yet reflective, material. In some of the offices with the lower glass walls, venetian blinds have been added to allow for more individual control over the degree of privacy. Once the particular panel system had been developed, specific department layouts had to be designed, consistent with the original spatial conceptions. The architect's original intent had been to develop a system so simple in its parts that people could assemble, disassemble, and move it about as needed, and this is, in fact, what can be done. But the Rouse Company thought it better if the architect did the initial layouts and they offered his services to the various departments. Depending on the amount of interest, concern, and involvement on the part of the employees, the solutions range from rather ordinary to spatially exciting. There were, however, some general parameters established by the architect which lend an overall consistency to the design. Each department is entered off the main atrium circulation space, the point of entry serving as the reception area. Circulation space through each department was treated as a street lined with trees and lamppost lighting and used to maintain vistas through the space. The individual workplaces, although square or rectangular, were, in most cases, offset rather than aligned, to create diagonal paths, more variety and informality.

While the conceptual attitudes towards the spatial organization seem rather Beaux-Art, the actual execution of these ideas (though adhering to the concepts) lacks any of the monumentality usually associated with such notions. The overall impression is one of a carefully established balance between an almost endless spatial variety and a consistent set of design components. The clustered, villagelike character of the various departments has a warmth and ease rarely encountered in work environments. But the ultimate test of any intent in a design comes with its use. Many changes have been made by the in-house group since the building was occupied in the fall of 1974. Nothing here is precious. The tools provided work so well that the architect can return a year and a half later and say, ''you know, they really did all right.'' [Sharon Lee Ryder]

Diagrammatic section through building (top, left) shows distribution of mechanical systems. Photo of model (below) shows the upside-down fluorescent fixture approach for the indirect lighting system. Photo of final system mock up (bottom) was built to full scale in the architect's office.

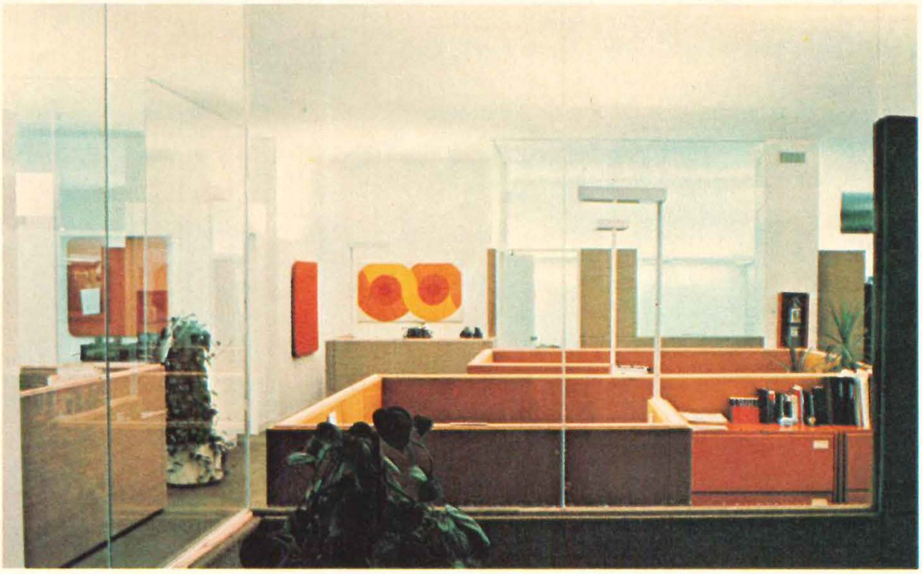


A rousing place

Data

Project: The Rouse Company Headquarters.
Architects: Frank O. Gehry & Associates, Inc. Design team: Frank Gehry, Gregg Walsh, Donald Carlson, Mark Appleton, Barton Phelps.
Site: Columbia, Maryland.
Structural system: 30′ steel bays on concrete foundations.
Mechanical system: HVAC distribution through ceiling plenum; intake and exhaust through columns. All electrical distribution under raised floor.
Major materials: steel, concrete, concrete block with white stucco finish.
Consultants: lighting, Irving Schwartz; structural, Garfinkel & Kurily; mechanical, Boyles & Boyles; landscape, The Rouse Company, Morton Hoppenfeld. On-site supervision, Implementation, Inc.
Costs: building, $20-25/sq ft; interior systems and furnishings, $16/sq ft.
Photography: Norman McGrath.

Atrium space (below), private office (above) with blinds for privacy control.



Firemen's Training Center, New York, N.Y.

Crossing signals

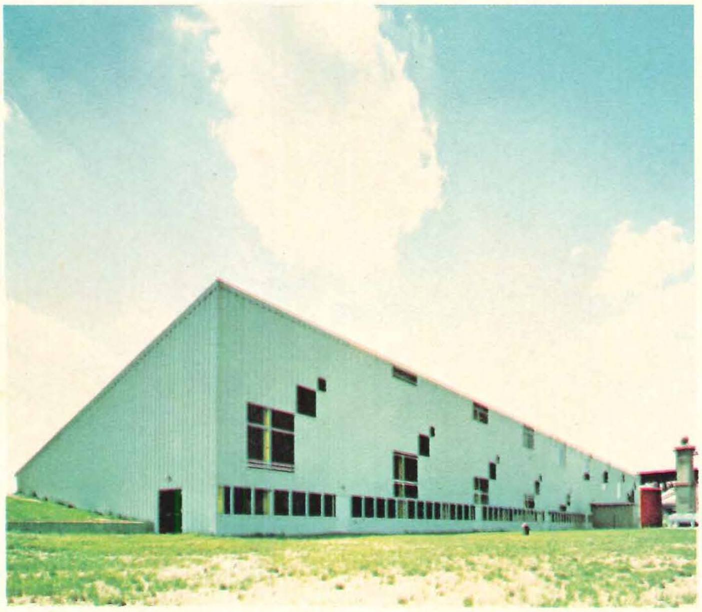
Paul Goldberger

At Hardy Holzman Pfeiffer's Firemen's Training Center in New York, the familiar is found in unfamiliar places, and things that look most real are least real.

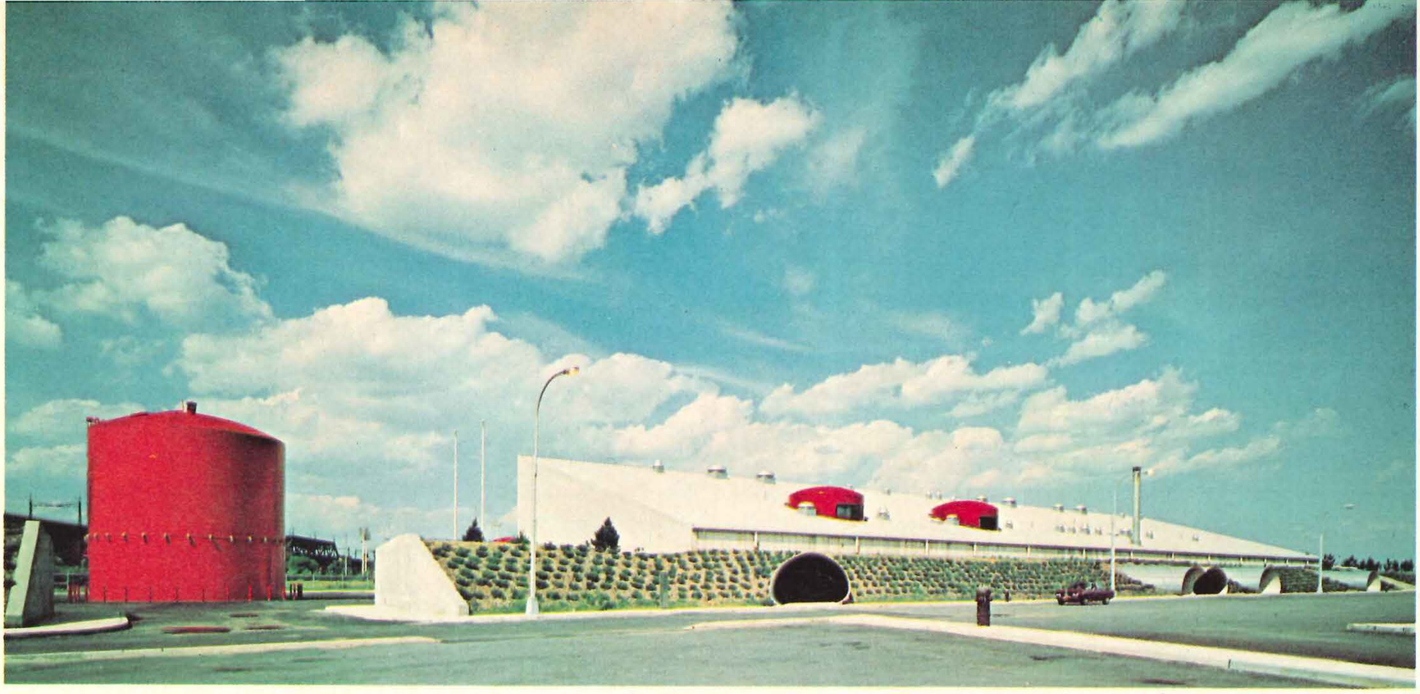
Hardy Holzman Pfeiffer, as a firm, does not welcome categorization. Its work is probably closer to the brashness of Charles Moore than anything else, but that hardly explains it—theirs is more an architecture of collage than Moore's is; it is rich in visual elements that gains its validity as much from juxtaposition as from its inherent meaning.

A case in point is the Firemen's Training Center on Ward's Island in New York City, a nine-building complex built by the New York State Urban Development Corporation as a turnkey developer for the city. (As a result of bu-

Author: Paul Goldberger is architecture critic of *The New York Times.*



Brick training buildings (below) "burn down" in training sessions.



The corrugated metal administration and education building (this page and facing page top) is entered by sewer ducts through bermed earth.

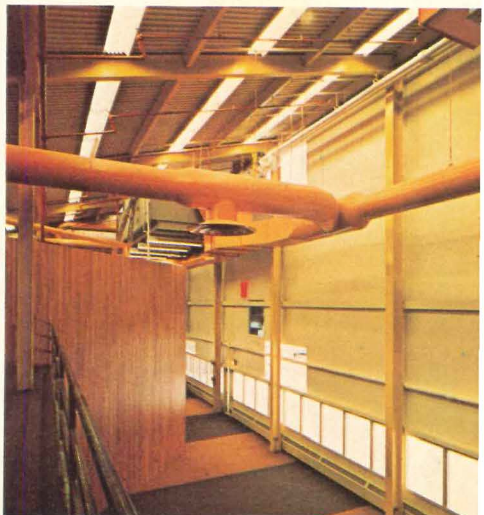
reaucratic complications, the city has yet to take over the $11.2 million complex, finished almost a year ago.) The training center consists of two entirely separate sections—an administrative and teaching building, built of corrugated metal and glass, with loudly colored interior spaces, and the actual training buildings, mock-ups of real buildings designed to "burn down" again and again in training sessions. The administrative building is long and narrow, with a roof that is sloped so steeply as to merge into a mound of raised earth on the south side, while rising to the equivalent of several floors on the north side. Its entrances are huge red-painted sewer ducts set into the sloping roof.

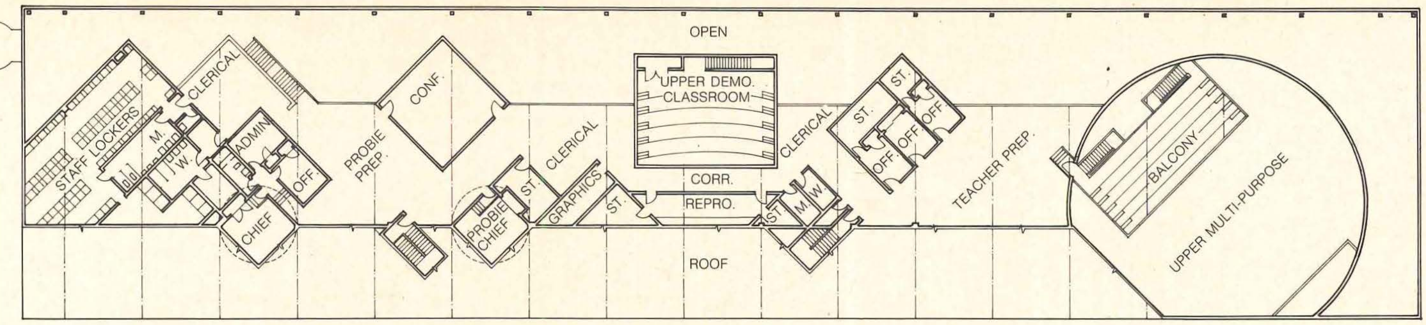
The duct entrances are a typical Hardy Holzman Pfeiffer element—an industrial form, given new meaning by its unexpected color and by its even less-expected role as an entrance. Large tanks operate in a similar vein—two are thrust through the center of the roof as offices for the administrators of the training center, while another serves as vestibule for the public entrance around the higher side of the building. Again, the familiar is in an unfamiliar context.

The notion of familiar in an unfamiliar context is even more true of the training buildings, which are affectionate imitations of the sort of real buildings firemen encounter in the line of duty. There is a mock tenement, a frame-type dwelling, a storefront, and a loft building, all in a row that suggests a city street somehow dropped into the emptiness of Ward's Island. The buildings are brick-faced, and the brick is striped—a decorative gesture that works well.

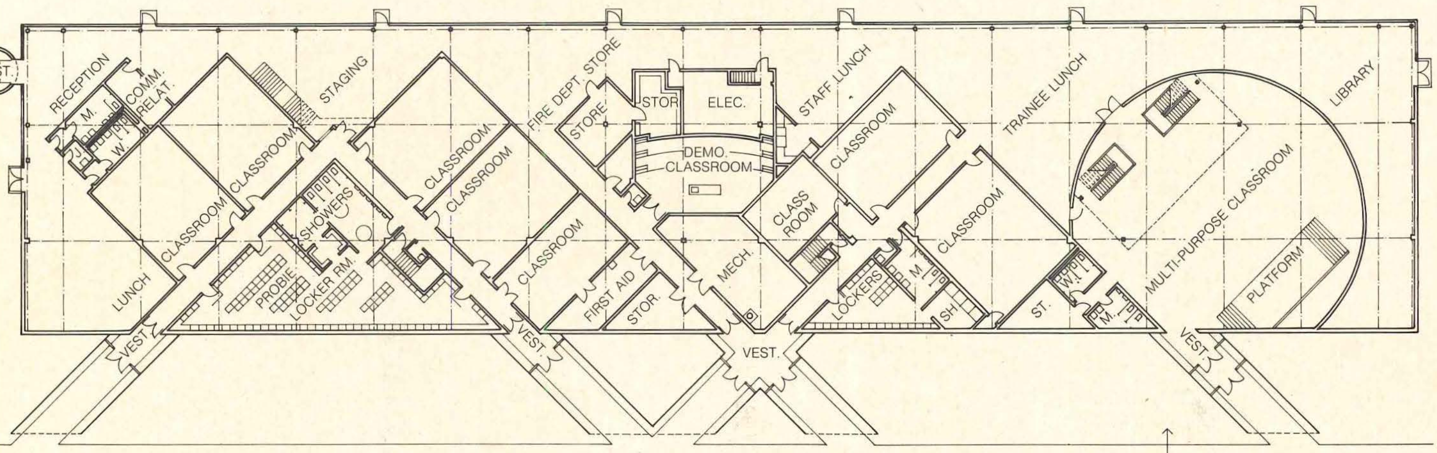
One irony of the project—and one cannot imagine that this did not delight the architects enormously—is that the training buildings, which are not real at all, look real, while

Inside the administration and education building (this page; plans facing page) room-size structures are set in a row along the 365-ft-long interior street. Each room is freestanding and each is sheathed in a different material.





MEZZANINE LEVEL



LOWER LEVEL

the education and administrative building, which has a very real and traditional function, is far more radical in appearance. Furthermore, the very juxtaposition of these two types of buildings within the same complex is yet another part of Hardy Holzman Pfeiffer's collage like approach.

Like all successful collages, the training center is hardly a random assemblage. It is put together with a very traditional architectural intelligence, and this is why the administrative building, which seems sometimes on the verge of being rather silly, never goes over the edge, but continues to appear convincing. The red-duct entrances, for example, read at first glance like a joke, but in fact are a sensible and relatively cheap way to interpret in modern imagery, and within the constraints of modern economics, the idea of a formal entrance. It is more fun than just slapping a door in the front, and yet more practical than most other means of giving the building a hint of formal architectural experience.

Similarly, the interior of the education building, which has a surprisingly grand interior space running its 365-foot length, consists mainly of room-size structures set in a row as an interior street. Each is a freestanding object and is sheathed in a different material, such as tile, carpet, brick and wood. The gestures here are equally amusing, yet equally good at creating a sense of identity for each individual function within the space (the room-structures contain classrooms, conference areas, and multipurpose assembly space). And the "street" itself, the major space that is painted in bright colors and has the exposed mechanical equipment one has come to expect from Hardy Holzman Pfeiffer, creates a sense of grandeur and of community without using the traditional solutions of a large formal hall or central court. The street also has the advantage, thanks to its size, of being able to double as a housing for certain training functions in inclement weather.

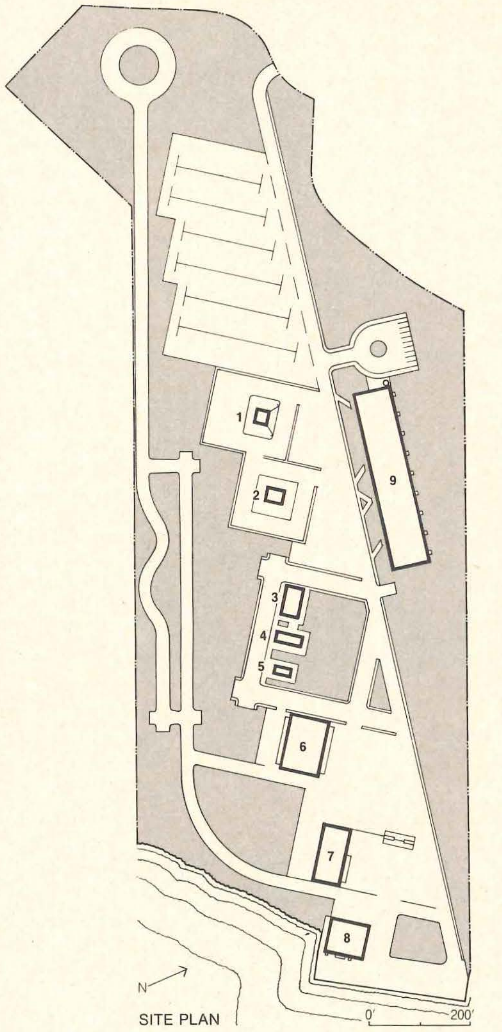
The training building has one other gesture that seems more purely a case of design affectation—the fenestration pattern on the high, or north, side. This wall has a strip of windows at eye level, as well as a pattern of large, medium and small windows above the strip, repeated along the wall at lower and lower levels until they disappear. The large windows are of clear glass, the medium ones are of dark gray glass and the small windows are of red glass. The inspiration, say the architects, was a filmstrip, and indeed the windows do seem like an animated pattern.

The gesture of the fenestration system has no real purpose. But it is entertaining and, while it tells us nothing about what goes on inside, neither does it interfere with what goes on inside. It adds to the normal function of a window (which, by the way, it fulfills well, since there are interesting views to be seen through the strip window) an additional experience that is not forced or overbearing, but pleasantly amusing.

Done by lesser hands it would in fact be overbearing, but that is the point—Hardy Holzman Pfeiffer's collages work because the firm is generally skillful enough to exercise a certain restraint as it composes its assemblage, and conservative enough to want to put most of its affectation to the service of traditional architectural ends, like the red ducts enhancing the experience of entering, the interior street enhancing the sense of community within the building, and the mock tenements and mock storefronts of the training buildings enhancing a sense of real urbanity.

Even the eccentric plan of the education building can be explained in terms of traditional goals. The classrooms had to be plain, boxy spaces by order of the fire department; to give the building a sense of spatial variety as well as to facilitate movement between the parts of the education building and the different training buildings, classrooms were grouped at 45-degree angles to the walls of the building, yielding diagonal axes for circulation which emerge out of the building at opposing angles through the red ducts.

To the conservative bureaucrats of the New York City Fire Department, of course, these explanations mean little, and talk of Hardy Holzman Pfeiffer's compositional skill, an



equally important factor in the building's success, carries no more weight. The Department claims to be unhappy with the building, and thus far has refused to take possession of it from the U.D.C. (The U.D.C. built the facility because its Roosevelt Island development necessitated demolition of the department's former training center.) The problems are things that relate to the specifics of training, like the wrong kind of lifts, hatch covers in the wrong places, or doorways other than those the Fire Department wanted, and they seem to come more from the conflict of competing bureaucracies than from any basic architectural mistake. The user was not the client—had they been one and the same, the problem might have been avoided. (Although then the building might not have been built at all, since the Fire Department had been pushing for a more conservative design from the start, while the U.D.C. as developer was the real advocate of the present scheme.)

It is all an object lesson in the bureaucratic politics of design in New York City, made still more complex right now by the city's fiscal crisis. Work is now going on to correct the problems that the Fire Department says prevent the building's proper use, but not the least of the ironies here is that once the city finally does take the building over from the U.D.C. (expected to be sometime this spring) there won't be much need for it. For one of the effects of the fiscal crisis is that no new firemen are being hired, and thus, except for mid-career programs, there will be little training to be done for a while in the new training center. □

Aerial view of site looking toward Manhattan shows driver-training roads.

Data

Project: Firemen's Training Center, New York, N.Y.
Architect: Hardy Holzman Pfeiffer Associates; Michael Ross, programming; C. E. John Way, Paul Buck, project architects, education building; M. Herbert Staruch, Neil Dixon, Marvin Wiehe, project architects, training buildings; James Sarfaty, Edward Dickman, Andrew Pettit, construction supervision.
Program: school for education and training firemen, with facilities for academic teaching, physical training, and driver education.
Site: Ward's Island, in the East River between Manhattan, Bronx, and Queens.
Structural system: reinforced concrete foundations. Steel frame and girders, open web steel joists, metal decking, education building; reinforced concrete (with special admixture to resist high heat), training buildings; brick and block, metal deck with concrete, metal deck on joists roof, service buildings.
Mechanical system: hot water boilers, baseboard radiation heat; chiller and air handler air conditioning, education building.
Major materials: insulated metal panel interior and exterior walls, acoustical metal deck ceiling, gypsum board on metal stud partitions, education building; brick exterior walls, exposed concrete and fire brick interior walls, exposed concrete ceiling, fire brick partitions, training buildings; brick exterior walls, glazed block interior walls, hung acoustical ceilings, gypsum board on metal stud partitions, service buildings.
Consultants: Lehr Associates, mechanical; Le Messurier Associates, structural; Golder Gass Associates, soils engineer.
Client: New York Urban Development Corporation, for the Fire Department of New York City.
Costs: $11.2 million.
Photography: Norman McGrath.

Nanticoke Central Fire Station

Quiet dialogue

In Nanticoke, Pennsylvania, a new fire station by Wassell Associates and Jon Michael Schwarting has the first appearance of being very simple.

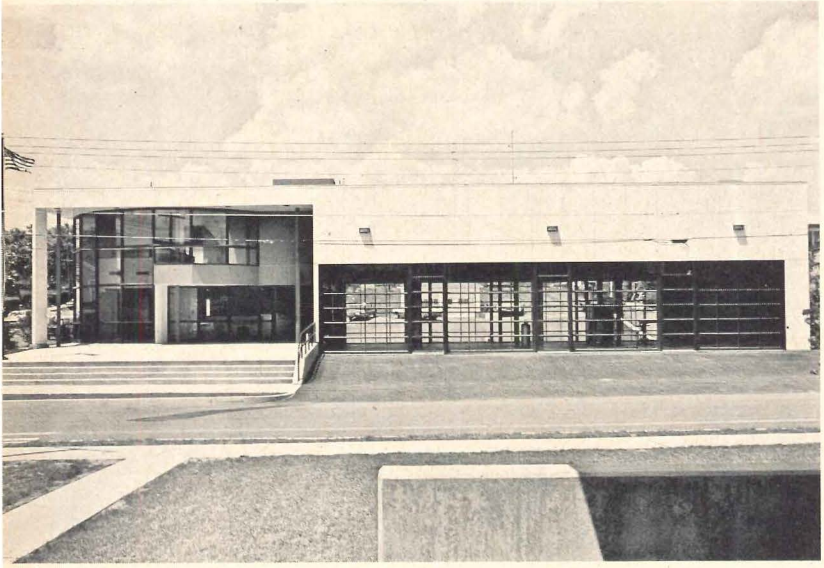
After floods ravaged Nanticoke, Pa. (the Wilkes-Barre area) a few years ago, the town's three existing fire stations still stood. But they were very old, outmoded, and quite dilapidated. With federal relief money available for reconstruction, the town could take the opportunity to build a new fire station that would combine the facilities of the three old stations into one building.

The program for the Nanticoke Central Volunteer Fire Station sounds simple: provide an economical building that combines a social center for a small community with firehouse facilities for six trucks and bedrooms for four drivers. The finished building also looks simple: a steel column and beam structure with concrete plank floors is enclosed with compressed asbestos panels, glass windows, and gas station doors. But, however simple the building was programmatically, and is physically, it is not simple in its incorporation and expression of architectural ideas. In fact, it is deceptive in just how "loaded" it actually is.

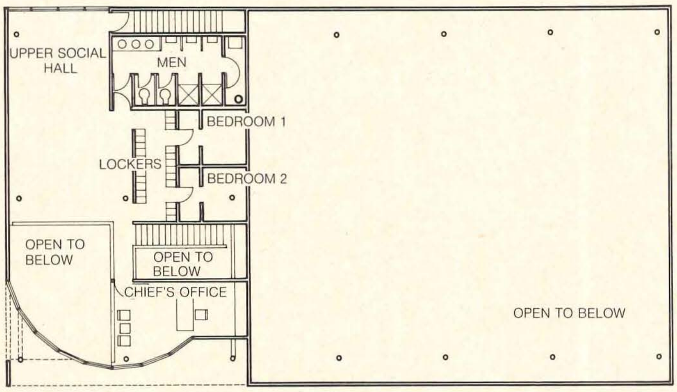
The building is located at the intersection of two major

The underplayed main façade exploits the presence of fire trucks garaged behind standard gas-station doors.

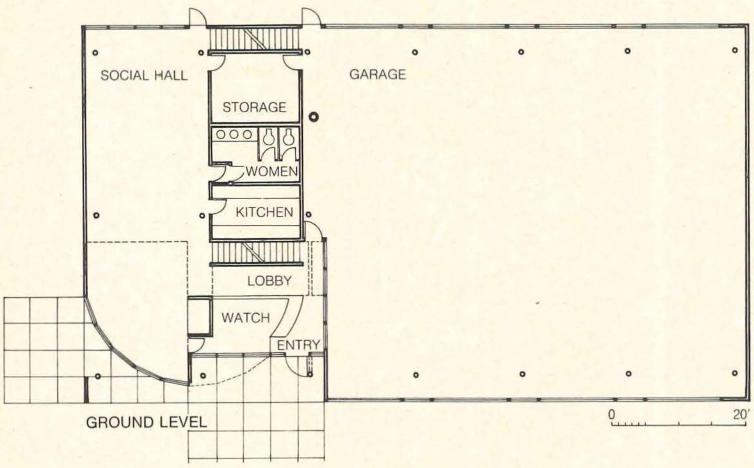
Nanticoke Central Fire Station



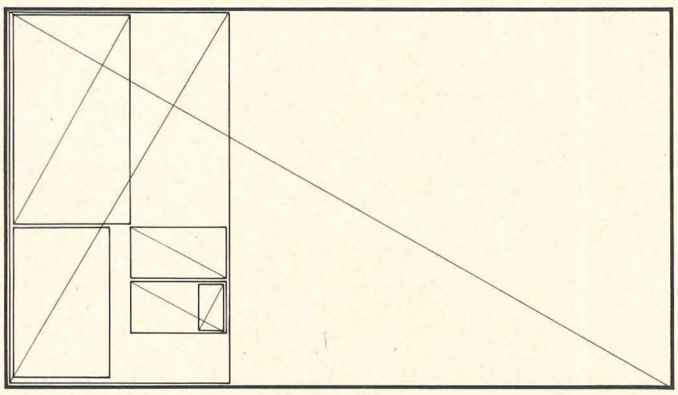
Literally transparent, fire trucks enter from rear and exit from front.



SECOND LEVEL



GROUND LEVEL



PROPORTIONAL SYSTEM

streets near the old town center. The fire station faces the new city hall across the street; at the corner of the building facing the intersection, a large-scale, curved, inset glass façade clearly defines the pedestrian entrance and also makes explicit the public nature of the social hall immediately behind. The 90 degree curve of the glass wall also functions as a visual and conceptual link to relate the building back to the town center. For ease of circulation, fire trucks enter at the rear of the building and exit from the front. Standard gas station glazed overhead doors are used to express the nature of the building—allowing the trucks to be visible from the outside, where the façade has been intentionally underplayed to exploit the dominance of this design element.

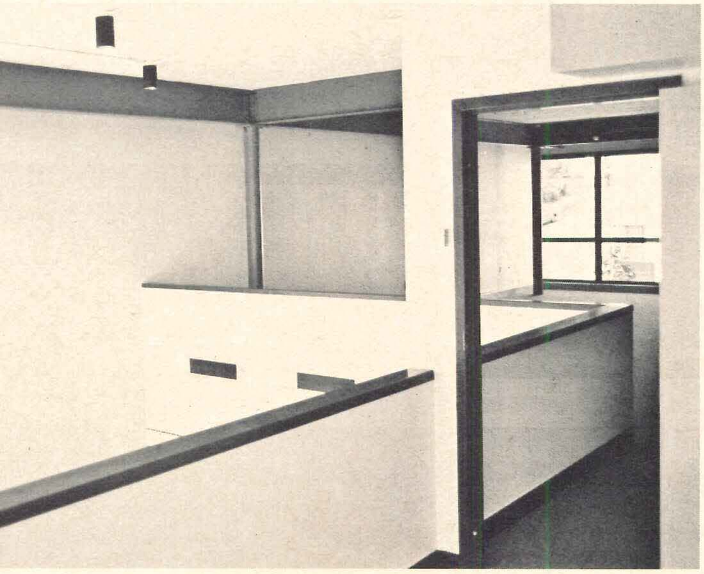
Inside, major functional areas are defined by a system that repeats, at various proportional sizes, the rectangle of the overall building. Conceptually, the space is structured as a "house-within-a-house," where the living and social areas are combined as a separate, almost free-standing form within the structural column grid of the larger building. "This idea of house-within-house interests me as a means of expressing the nature and function of form," explains associate architect and project designer Jon Michael Schwarting, "when it's appropriate, as it is here" (and as it also was in his own residence, P/A, Oct. 1974, p. 94).

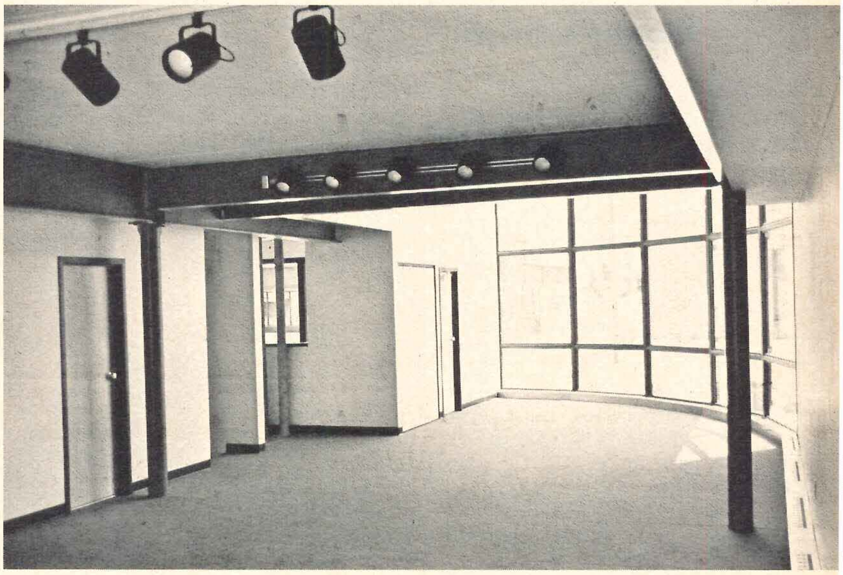
As the building involves itself with architectural ideas of form, meaning, and expression, it also acknowledges historical tradition. Its geometry refers to the rectangular residence and round chancellery of Le Corbusier's unbuilt project for the French embassy in Brasilia. In the fire station, the large-scaled residence entry is retained, the facade eroded, and the round chancellery is pulled, on axis, into the opening, while maintaining a scale on the exterior similar in proportion to that of the embassy.

In itself, a fire station is not a complicated program. This building might seem more involved with purely architectural concerns than its basic program would necessarily call for. But it can be, and has been, argued that it is just these kinds of concerns that distinguish architecture from building. At the most basic level, however, the simple programmatic requirements of providing a highly functional and inexpensive solution have been simply met. [David Morton]

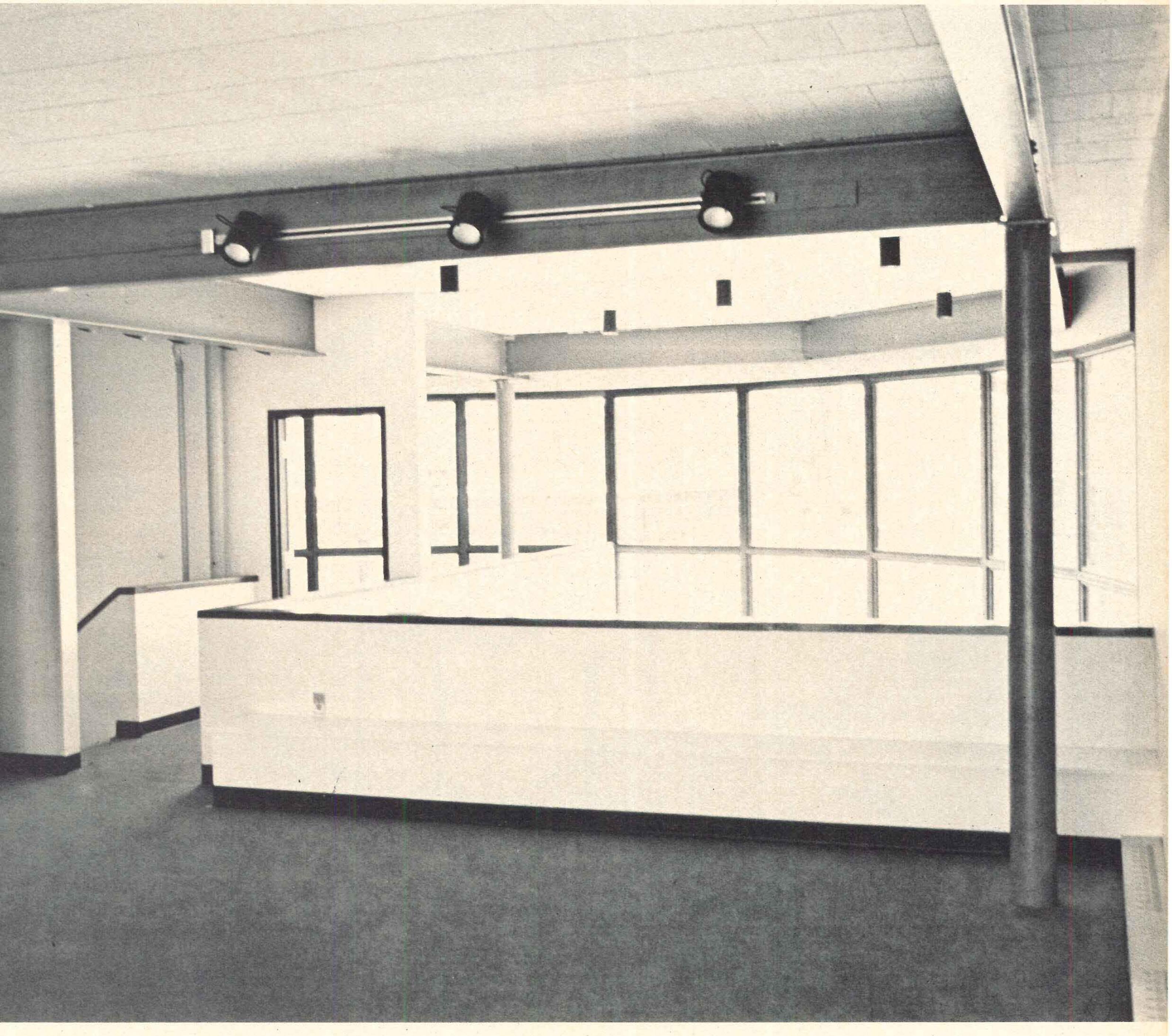
Data

Project: Nanticoke Central Fire Station, Nanticoke, Pa.
Architects: Wassell Associates; Jon Michael Schwarting, associate architect, project designer.
Program: combination fire station/social hall to replace three existing, but outmoded and dilapidated facilities.
Site: near town center, among low-density low-rise residential and commercial structures.
Structural system: steel columns and beams, concrete plank.
Mechanical system: forced warm air, air conditioning.
Major materials: exterior compressed-asbestos panels screwed to metal studs; gypsum board partitions.
Consultants: John L. Churnetski, mechanical; Lamprecht Consultants, structural.
Client: city of Nanticoke, Pa.
Costs: $402,605., $39.16 per sq ft.
Photography: Jon Michael Schwarting.



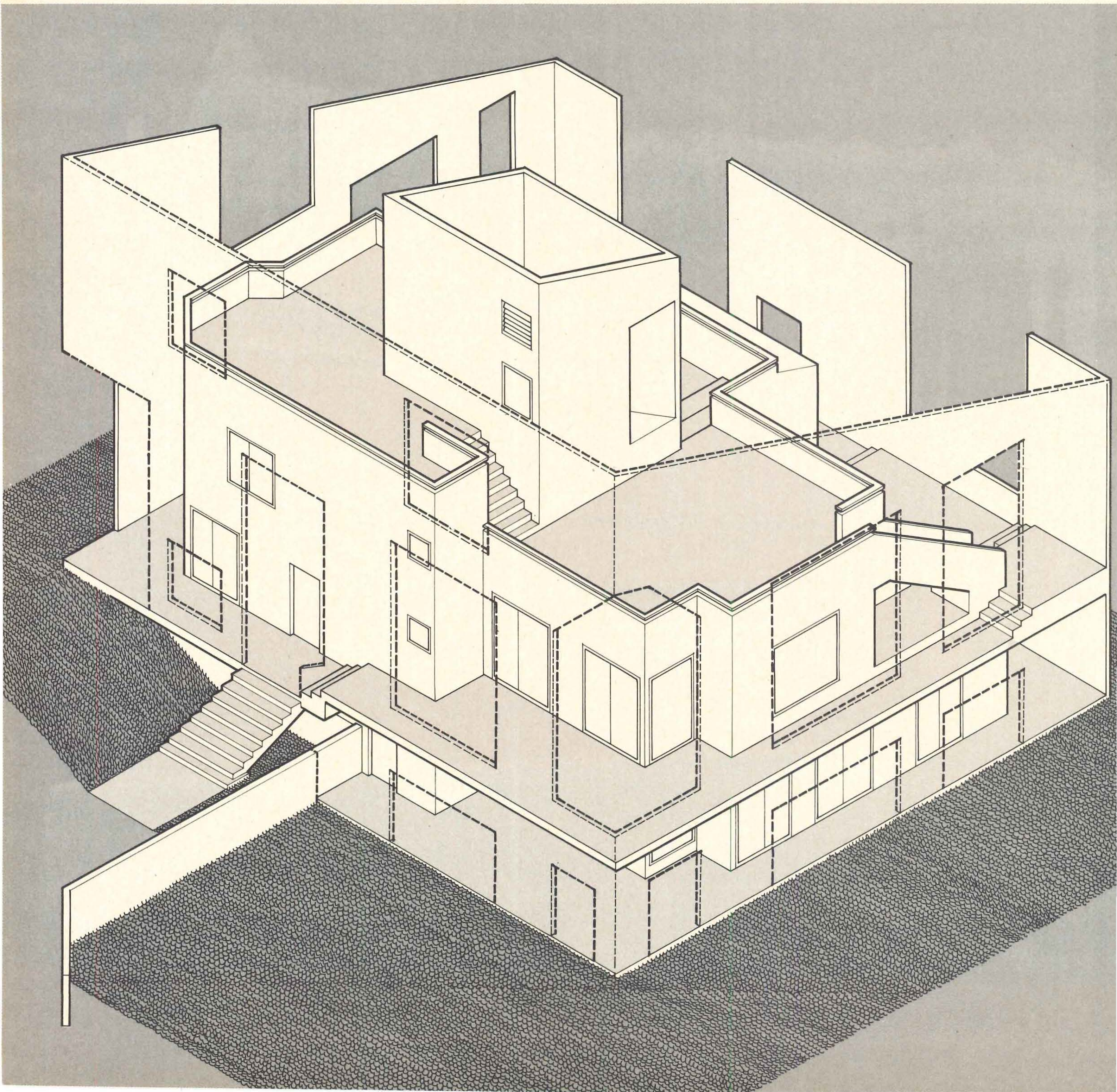


Chief's office behind doorway (below) extends to glass wall and looks back to upper social hall (above left) above social hall (above right).



Zimmerman House

Outside in

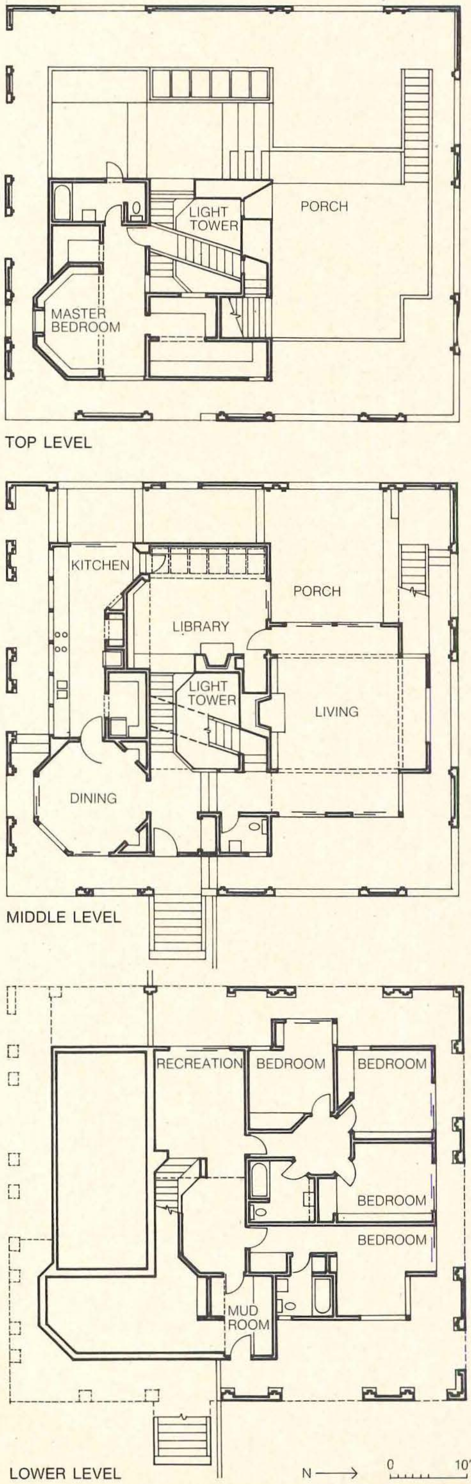


The Zimmerman house in Fairfax County, Virginia, by architect William Turnbull, uses a southern vernacular to resolve some very basic programmatic conflicts.

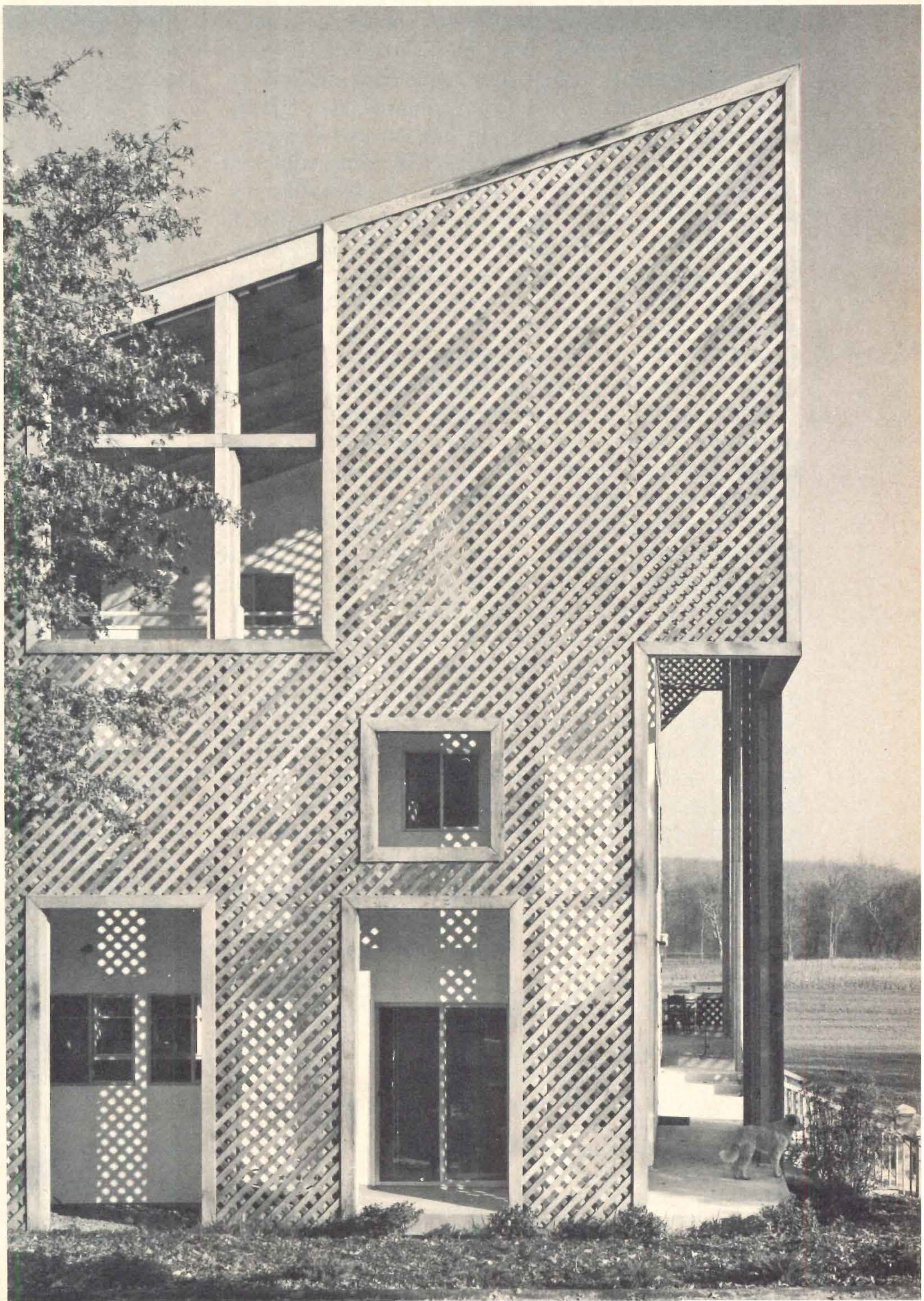
Discussing the nature of houses in this year's P/A Awards Program, juror William Turnbull said that a house must embody the people's dreams and desires, their aspirations and expectations. The architect's role becomes one of clarifying and translating abstractions into physical forms that, on the one hand, solve functional problems of living, while on the other, transcend that realm into the world of dreams.

The process of translation is, at best, ambiguous and, in this case, rather complicated by the fact that the program, as outlined by the clients, contained basic contradictions. The wife, recalling a childhood spent at her grandmother's rambling wood frame dwelling on the coast of Maine, wanted lots of porches wrapping all around the house. The husband on the other hand, wanted a house that was sun-drenched and light-filled. To further complicate matters, the couple needed formal room arrangements for entertaining, but wanted to live in an informal manner.

Often times, houses act as catalysts, not only for the clients' ideas of how they want to live, but for the architect's own conceptual attitudes in seeking a solution. "Houses are where new ideas are born," said Turnbull in this year's awards jury, "where things get explored because they happen over a short period of time." Turnbull's attitude toward the role of houses could not be better seen than in this house for which he won a citation in the previous year's awards program. Here, there is a singular idea, explored to its fullest and the result is a synthesis of the program's conflicts into one whole statement. The conception, in Turnbull's mind, was of a "house as porch" (or



Punched-out openings in lattice frame views of landscape from house within.



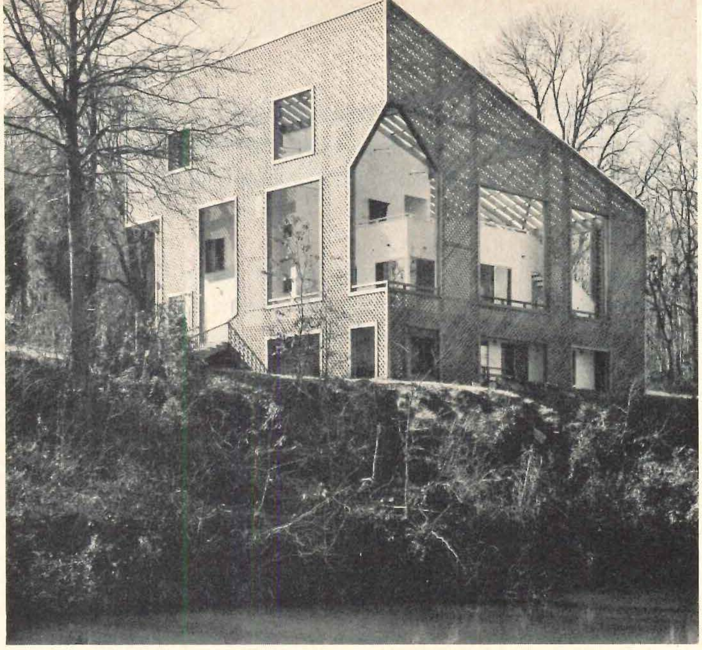
porch as house?), an idea quite literally at home in the South, where the climate dictates outdoor, breeze-swept living spaces shielded from the sun. The "porch" is clearly expressed in the free-standing façade of the lattice, broken only by randomly spaced, large, punched-out openings. Inside the porch is the house, an entirely separate white stucco structure which is both lived in and on: The flat roof surfaces of the inside house are used as patios and are shaded from the sun by the lattice enclosure on four sides and by the skylight roof of the "porch." In response to the program, there clearly exists a deliberate ambiguity between indoor/outdoor. The quality of sun-dappled patterns of light and shadow suggest the sun-filled Mediterranean, an image further perpetrated by the white, boxlike stucco structure of the house and roof patios.

The interior spaces are organized around a central light tower which serves as a stairwell. The children's bedrooms and play areas are on the lower level with direct access to the (real?) outdoors; living spaces are on the middle floor and entered directly from the front entrance; the parent's quarters are on the top floor. The formality of the house comes from the allocation of various functions to different domains, the inclusion of certain types of spaces like a library, and from certain architectural inflections such as the axiality of the living room and the octagonally shaped dining room, with appropriate niches. But again, as with the ambiguity between inside and outside, there is a deliberate ambiguity between informal and formal. While each room retains a formality in its character, the arrangement of these rooms and the consequent necessity of going through one to get to another creates an informality of use. The central circulation space is used only for entering and for vertical access, and not in the more historical tradition—a monumental space off which the formal living spaces open.

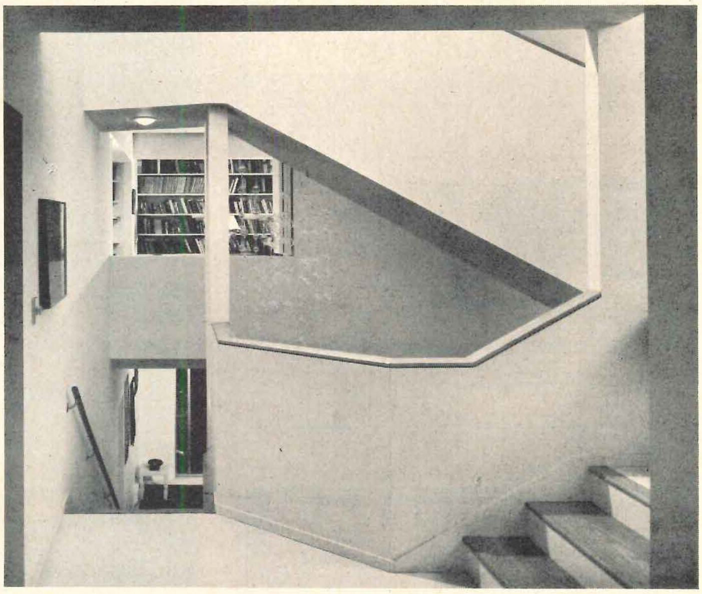
The house is set in a cluster of trees on five acres of land in Fairfax County, Virginia. Its "porch" façade, left natural, contrasts gently against the white stucco structure within. At times the lattice is transparent; at other times, opaque. The oversize cut-out openings erode the otherwise totally enclosing quality of the lattice and frame views of the landscape from the house inside. In many ways, the house is remarkably southern in its lattice porch imagery, in the casual formality of its arrangement, and in its architectural inflections. Conceptually, even in its ambiguities, the house stands as a clear statement of its intentions, as a resolution of programmatic conflicts realized in a totally consistent manner. And the concept does, in the end, fulfill almost childlike fantasies, for instead of having to leave the gazebo and go home, we find "home" inside. [Sharon Lee Ryder]

Data

Project: Zimmerman House
Architect: William Turnbull, Jr.; Steve O'Brien, associate; Bob Mobley, field architect.
Program: house for a State Department couple with young children.
Site: five acres of land in Fairfax County, Virginia.
Structural system: wood frame on concrete foundations.
Major materials: wood, stucco.
Consultants: structural, Ron Shaeffer, Zook Z. Lee.
Costs: withheld at request of client.
Photography: Cervin Robinson.

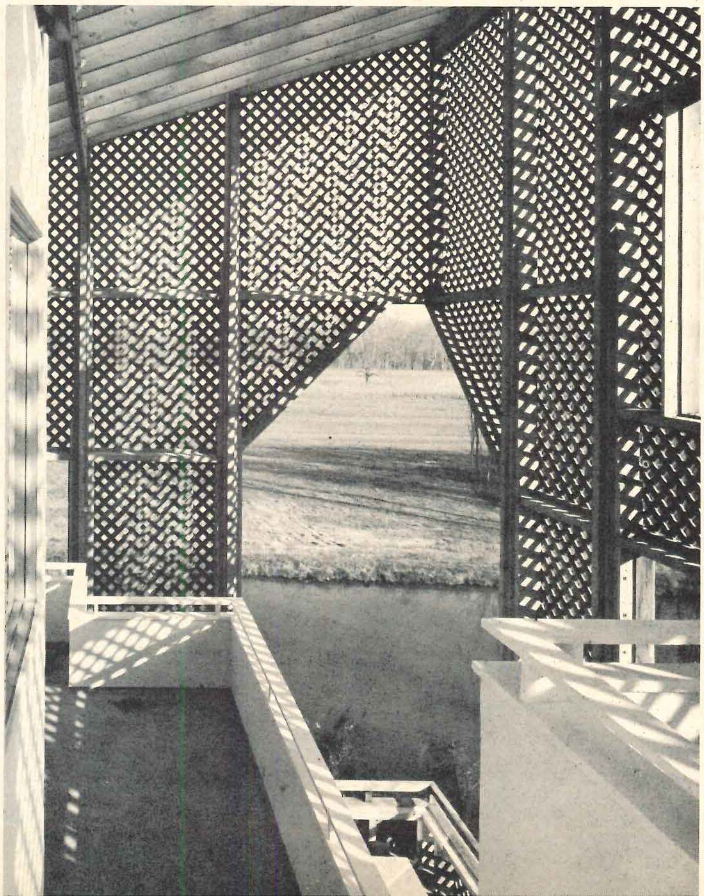


Partial transparency of the lattice porch façade (above).



Interior stairwell and light tower (above).

Play of light and shadow on the exterior stucco house structure (below).



Entrance façade (above and below) reveals the juxtaposition of two scales.

International Terminal, Logan Airport, Boston, Mass.

Passenger haven

No-frills architecture with serene interior spaces dignifies the processes of international travel for passengers at Logan Airport's newest terminal.

Among the motley architectural images surrounding the automotive heart of Boston's Logan Airport, the long straight canopy of the John A. Volpe International Terminal is a welcome relief. Architects Kubitz & Pepi and Desmond & Lord have shown that there is, after all, a refined alternative to the Star Trek swoops and Scheherazade vaults. Fellow architects, among others, will find satisfactions beyond mere relief in the minimal architectural envelope.

The long, unbroken surfaces of the structure are literal indications of a layered, linear plan, with uninterrupted interior spaces stretching its entire 792-ft length. The terminal is an elongated transfer mechanism, its inner functions stacked three tiers high in the limited depth between access road and aircraft apron.

There was not a square foot to waste at Logan Airport, which has already encroached to the limit on the surrounding Boston Harbor. Its passenger terminal complex, laid out back in the 1950s as a distorted horseshoe plan around a central access loop, has vastly outstripped predicted passenger volumes of that era and sprouted all manner of ad hoc appendages.

This international terminal replaces an earlier one completed in 1963 and expanded in 1967. In 1966, before that expansion was opened, the steep increase in international travel through this airport led to initial planning for this terminal. (As the closest U.S. airport to Europe with good domestic connections—and less severe congestion than New York's JFK—Logan's volume of international passengers swelled from 127,000 in 1960 to 1,450,000 in 1973.)

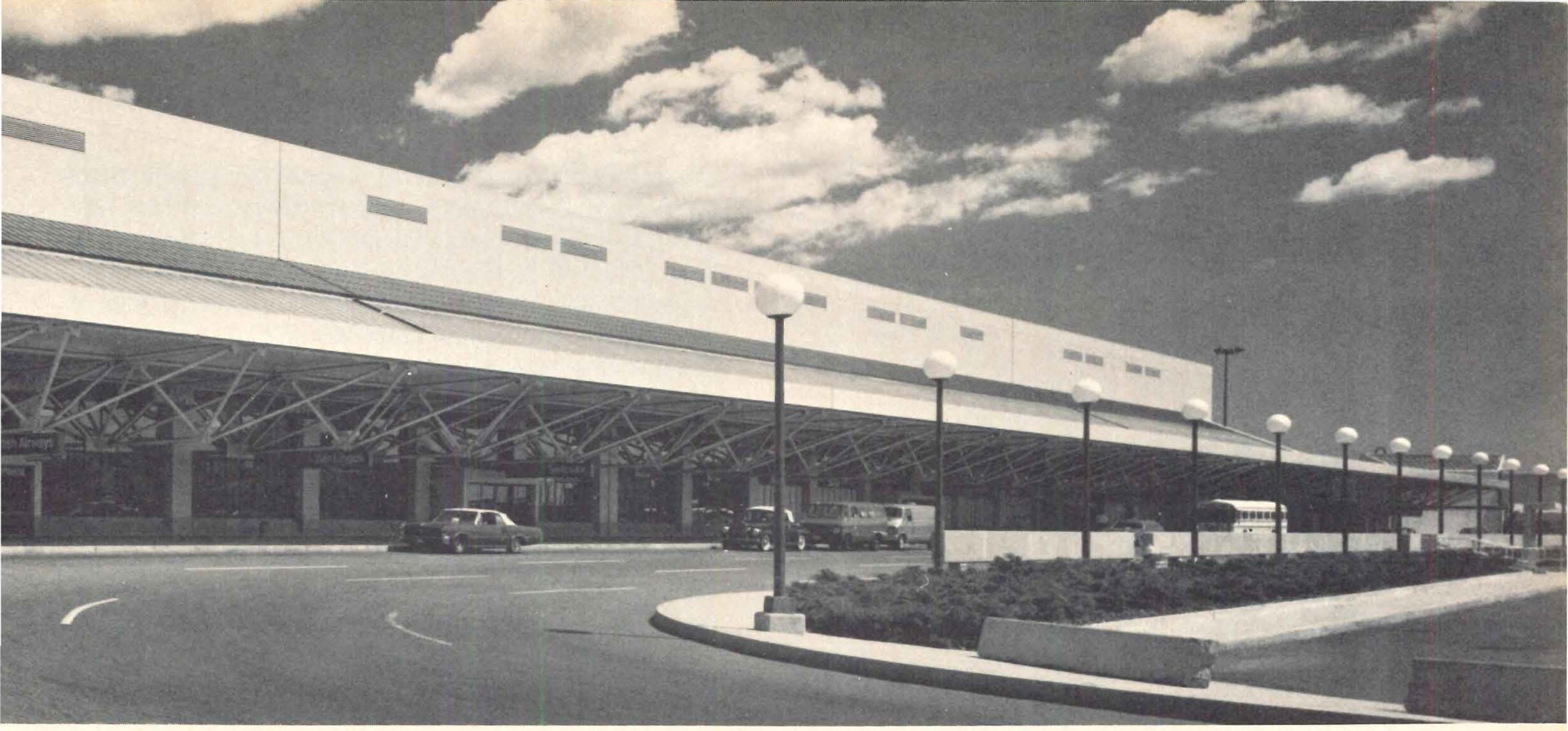
In the initial planning for this terminal, several configurations were studied for fitting 10 new loading gates into Logan's cramped acreage. The horseshoe-shaped drive-to-gate concept then being planned for Dallas-Ft. Worth and Kansas City was considered, but the need for customs and immigration processing negated the presumed advantages of this scheme—its short, dispersed paths for passengers (advantages that vaporized, anyway, as security procedures funneled passengers through a few checkpoints). The most radical concept was a mobile lounge system, with a new inbound terminal using the existing one outbound, but the site was so constricted that the planes would have been next to the terminals anyway.

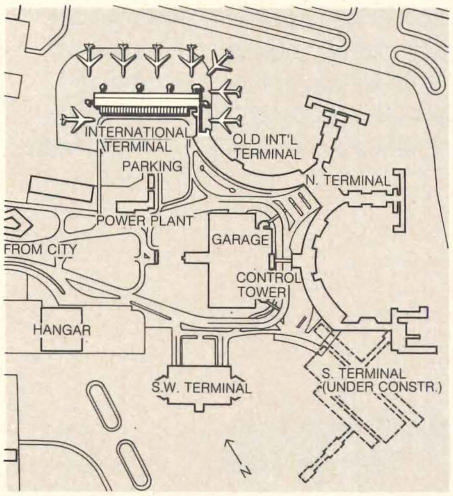
The linear scheme that was adopted simplifies a couple of accepted planning conventions. Instead of the typical two-level vehicular approach, a single roadway was possible here because of clearly separate peaks of arrival and departure operations; elimination of elevated roadways and ramps saved an estimated $2 million. Inside, separate departure lounges have been eliminated in favor of a single vast lounge with a 792-ft. frontage overlooking the apron, in which passengers can spread out comfortably while maintaining visual contact with their assigned departure gates—and their aircraft as well, if they wish. The lobby, too, is a single, uninterrupted space.

The spaces through which deplaning passengers must pass are, unfortunately, not so expansive—tending to emphasize the confinement of immigration and customs procedures. Incoming travelers first assemble in an immigration processing room on the field side, with expansive windows overlooking the field, then descend into a baggage claim area where the terminal's limited curb-to-apron dimension is most critically felt. This setting for the final, frustrating efforts of baggage retrieval and customs inspection is made claustrophobic by the absence of openings; windows toward the expansive lobby—strongly recommended by the architects—were ruled out by customs officials, who will no longer permit public observation of their activities. As a result, incoming travelers have no intimation of the bright, banner-decked room just outside, and anyone waiting for passengers has no hint of when they will emerge, through which of the understated exit doors. These expressionless doors in a flat wall are hardly adequate preparation for tearful reunions.

The lobby as a whole, however, is an exhilarating room. The eye is drawn upward toward the skylight strip, located and louvered so that it provides year-round daytime lighting—with no need for artificial supplement—yet never shines in the eyes of personnel at floor level. After dark, uplights wash the ceiling, against which the trusses are then seen in intricate silhouette.

The frankly mechanistic details of the swooping trusses

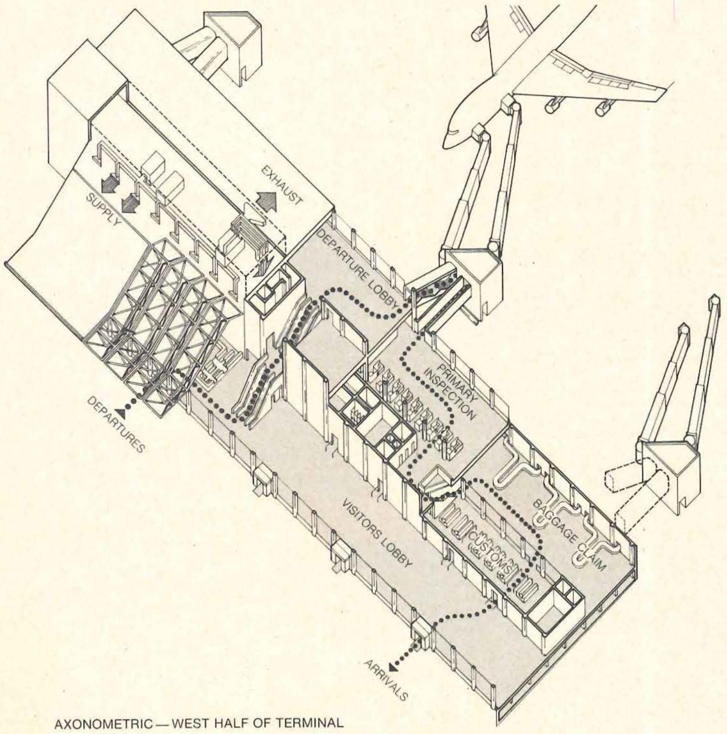




SITE PLAN 0 500'

The Volpe Terminal's 800-ft straightaway among the loops of Logan Airport's passenger complex is emphasized by its unbroken, sharp-edged volumes, clad in light gray porcelain-enameled steel and flush tinted glass. The steel space truss that spans the long lobby extends out to curbside (right). The building's distinct identity is equally apparent from the field side (below), sustained even in the sleek, tubular satellite corridors and boarding bridges, the latter a Dutch product used at only a few air terminals in the U.S.

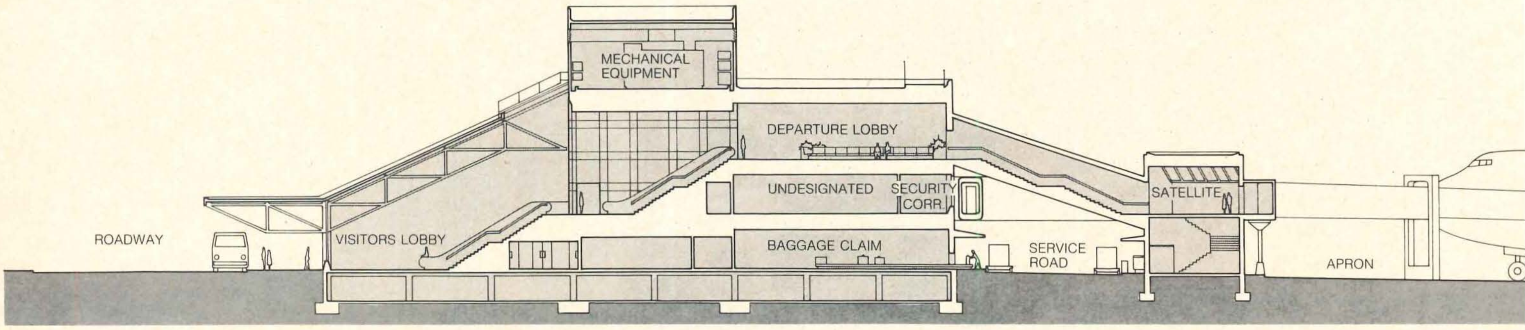
International Terminal, Logan Airport



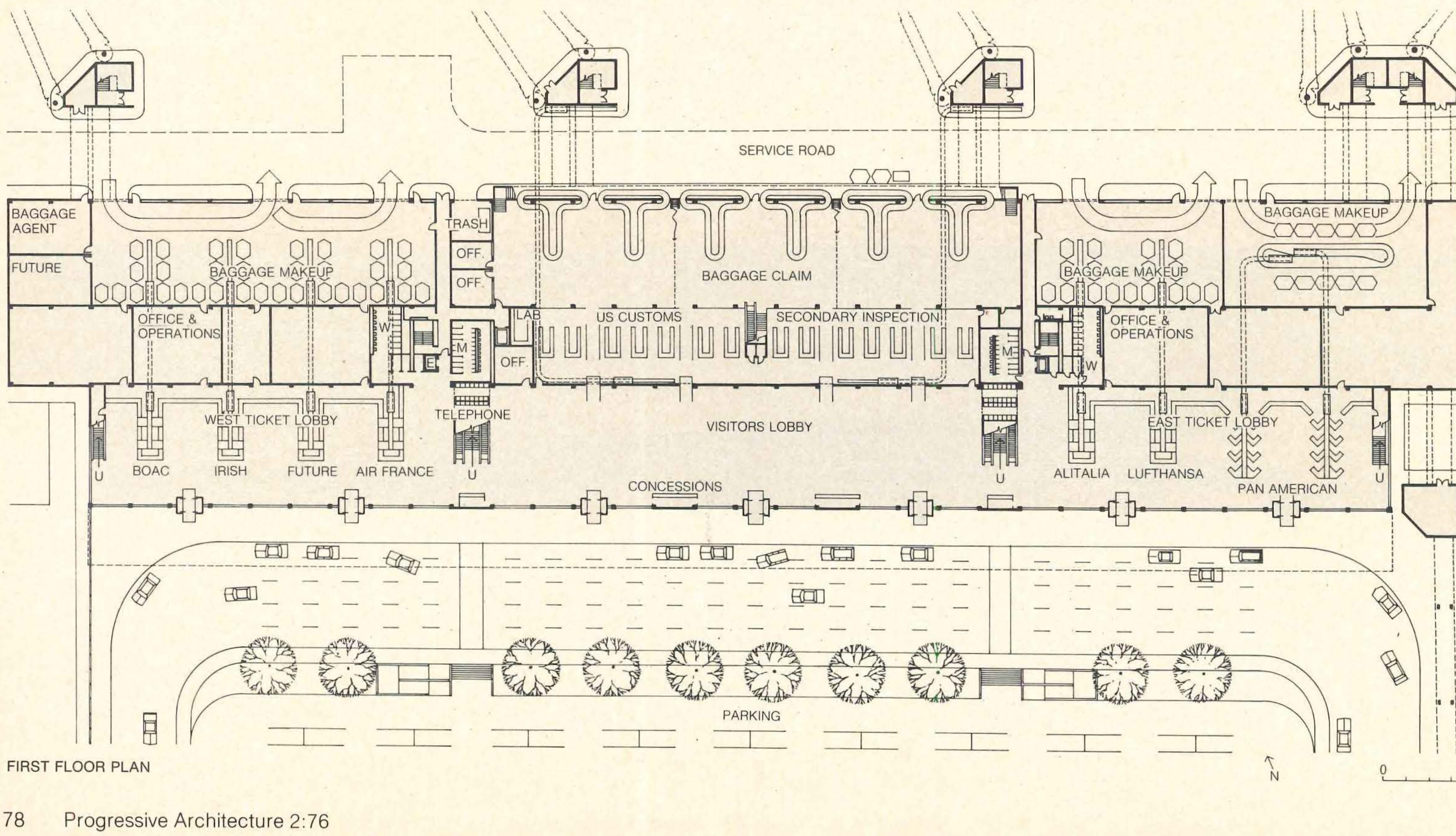
AXONOMETRIC—WEST HALF OF TERMINAL

are played off against minimal surfaces of pale gray porcelain-enameled steel and a rugged-looking slate floor. Banners under the skylight in the arrivals area relieve the austerity with vivid, festive colors—their motifs ranging from regional sailboats and pumpkins to the bristling façade of the City Hall. Throughout the public spaces, the same cool palette of materials is maintained. Ceilings beyond the main lobby are all of a metal slat system—seen more frequently in Canada and in Europe—which handily accommodates air distribution and public announcements and gives a visual buoyancy to ceilings that are low for the expanses they cover.

The restraint and architectural order of this building are qualities rarely found together in airport architecture. I.M. Pei & Partners' serenely refined pavilion for National Air Lines at New York's Kennedy Airport comes to mind, but that is more monumental in both scale and materials. There are other no-frills, non-monumental terminals—O'Hare at Chicago, to cite a big one, or the ingenious terminal at Tampa—but they fall short of the grace and subtlety seen here. Aside from the rather mean baggage and customs area (and that process may be beyond architectural redemption, anyway) this building offers the kinds of architectural experiences the air traveler is bound to appreciate. [John Morris Dixon]



SECTION A-A

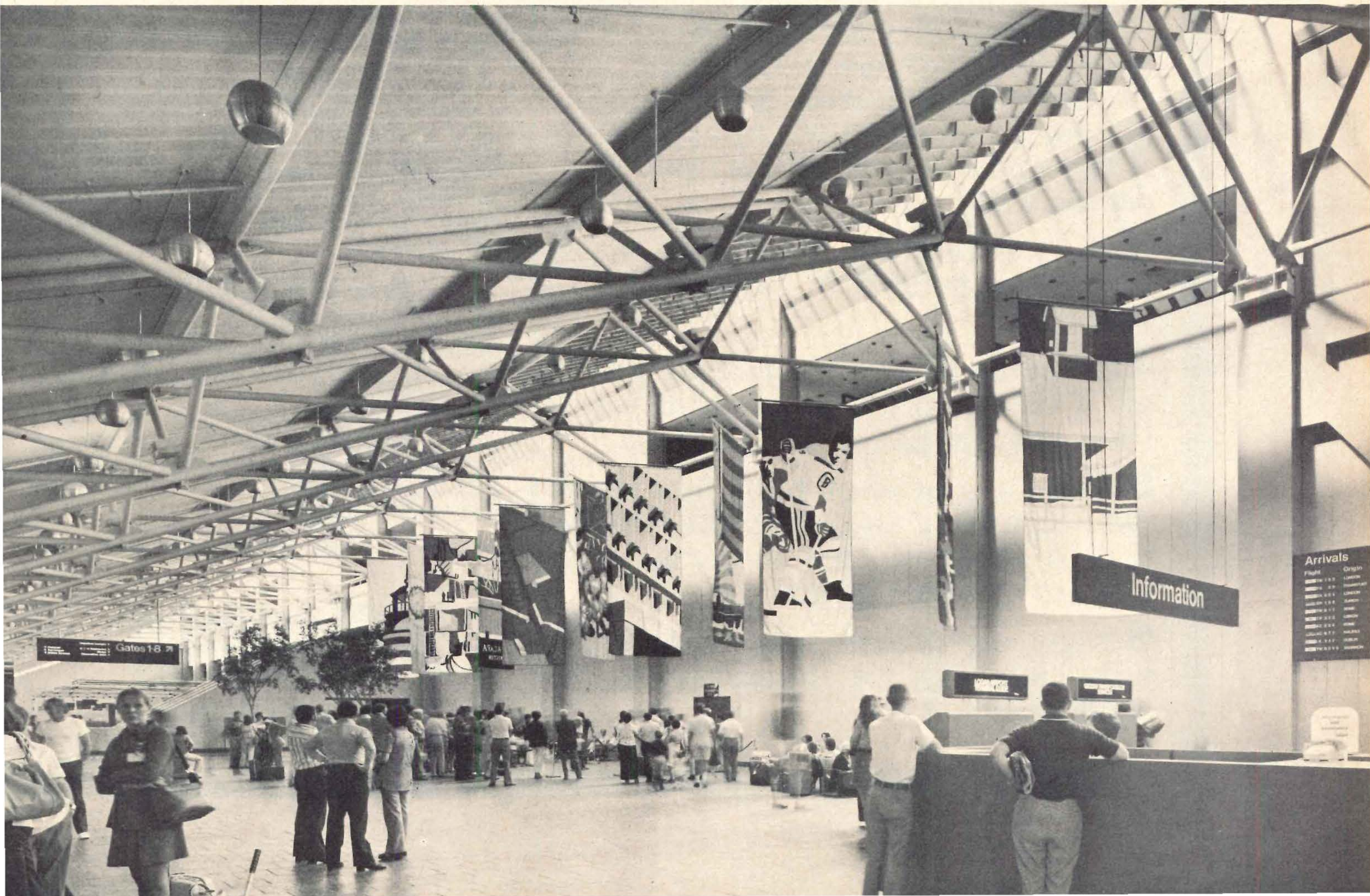


FIRST FLOOR PLAN

Data

Project: John A. Volpe International Terminal, Logan International Airport, Boston, Mass.
Architects: Kubitz & Pepi, Wellesley, Mass., and Desmond & Lord, Boston, Mass., joint venture architects; Frederick T. Kubitz, Franklin M.V. Pepi, Alphonse R. Mancuso, Thomas A. Amsler, partners in charge.
Client: Massachusetts Port Authority.
Program: ten passenger gates with a capacity of eight jumbo jets or 13 conventional aircraft at one time; processing of 1200 in-coming passengers per hour through customs; 350,000 sq ft of floor area; 1,000 ft of curb for automobiles; 780-car parking field.
Site: northwest end of a chain of terminals surrounding central airport access and parking facilities; roadway connections and parking demand helped to define a linear building site, stretching 800 ft along apron.
Structural system: Tubular steel space truss over main concourse, protected by sprayed-on intumescent fireproofing; steel frame elsewhere, some portions in composite action with concrete flat slabs.
Mechanical system: 390,000 CFM air-conditioning system, with heating coils and steam humidifiers; supplementary perimeter fin-tube radiation.
Major materials: porcelain-enameled steel wall panels, indoors and out; slate flooring; 4-in metal slat ceiling system; built-up and stainless steel batten roofing; bronze anodized aluminum window and door frames.
Consultants: Nichols, Norton & Zaldastani, Inc., structural engineers (Llewelyn S. Bolton III, associate in charge of design); Joseph R. Loring & Associates, mechanical/electrical engineers; Fay, Spofford & Thorndike, civil engineers; Armen DerHohannesian (Chief of Aviation Planning, Mass. Port Authority), landscaping; Amsler & Hagenah, Architects, graphics.
General contractor: Perini Corporation.
Costs: $22,520,000 (bid, 1971), including roads and parking.
Photography: Steve Rosenthal.

Inside the lobby (below) the space truss sweeps up over a clear span of 64 ft to a skylighted peak. Its 6-in. steel tube members are slotted into circular ½-in. steel gusset plates. Colorful banners and uniformly dark blue counters are set off against gray porcelain-enameled panels on all wall surfaces. Restrained departure areas (above right) offer broad views of airport operations; restaurants and shops overlook lobby.



SITE... FORM... FUNCTION...

One of the most difficult architectural tasks is the successful incorporation of a highly functional contemporary building into a traditional and eclectic setting. This was the problem confronting Ezra D. Ehrenkrantz and Associates when they were commissioned to design three dormitories to be located in Harvard Yard, the University's hallowed inner campus; the success with which they resolved it has already been nationally acclaimed.

Meticulous attention was given to every building component, and we are particularly gratified that TCS (Terne-Coated Stainless Steel) was specified for all roofing. The governing considerations here were the material's unsurpassed longevity; its exceptional resistance to even the most severe corrosive attack, and its predictable weathering to a uniform dark gray which would be compatible with existing roofs on the campus.

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ROOFER: BURGESS & BLACHER COMPANY, AVON, MASS.
(Photograph by Steve Rosenthal)

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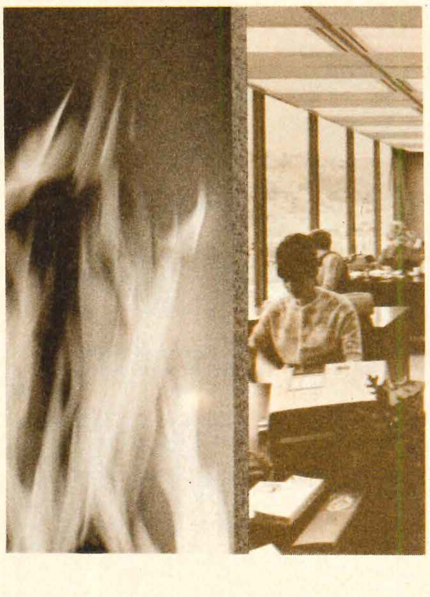

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Technics: Specifications clinic

Built-up bituminous roofing

Josephine H. Drummond

The client is pleased if his roof doesn't leak, but a good roofing system is no small achievement. Here is a brief discussion of problems in designing built-up systems.

Clients are usually pleased with their new buildings if the air conditioning works and the roof doesn't leak. When the smoke clears away, the notice of completion is signed, the lien releases are in, and final payment is made—if these two areas are functioning properly, everyone lives happily ever after. This article addresses itself briefly to the second item: built-up roofing and waterproofing.

Something happened to asphalt during the energy crisis. Just what happened is not completely known. Roofing manufacturers were forced to buy asphalt from any source that would sell it rather than from known suppliers. At the same time, oil refiners were motivated to produce all the high-distillate materials they could from the crude.

The asphalt left was different from what it previously was. Its quality became unpredictable. The chief chemist of a major roofing materials manufacturer told me he did not know what was in the asphalt he was getting. Moreover, by the time he found out, the chemistry had changed again.

ASTM test methods check roofing asphalt for certain properties only, such as melt point, flash point, specific gravity, and viscosity. Full chemical analyses are not generally made by the manufacturers of asphalt or roofing materials. Thus there are many unknowns in the material that forms the weathering portion of most built-up roof systems and waterproofing membranes.

What difference does all this make? It can wreak havoc with tried and true methods of application. On one project the specs called for an asphalt membrane over a lightweight structural concrete slab. The membrane was to be bonded and protected by a wearing slab also of lightweight concrete. The project was large, and the membrane application continued at intervals over many months.

Application started before the onset of the energy crisis. At one phase where roofing was begun early in 1974, the asphalt began to blister shortly after it was placed. Testing labs tested; roofing consultants consulted; concrete and waterproofing specs, sources of material, and methods of application were scrutinized and discussed endlessly.

The consensus: something was different about this asphalt from that on other sections, and this asphalt and this concrete appeared incompatible. Isolating them with a slip sheet later only introduced a new problem—finding leaks in an unbonded membrane.

Built-up roofs are not intended to bear traffic unless provisions are made to distribute the load. Walkways can be installed or full protective construction, such as wearing slabs or surfaces, can be provided. Roofing over firm substrates can safely withstand more traffic than roofing over soft yielding insulation. If rigid insulation is used, the material, number of layers, and taped or untaped joints can have a significant effect on the physical performance of the roofing. Simply specifying the C value of insulation without regard to its other properties may allow a roofing contractor to bid any material and thus save the owner (or roofer) a few dubious dollars.

Some roofing systems do not fare well with ponding water. Many structural systems, particularly on very large buildings, allow sufficient deflection in the roof deck to make ponding inevitable. Under these conditions, a roofing system should be selected which is less susceptible to deterioration in ponding water; or positive drainage should be provided by other means. Asphalt is also affected by exposure to sunlight, especially in the southwest where rain is nonexistent for months on end. Protective materials such as heavy cap sheets or heavy layers of gravel or slag should be used to shield the bitumen from ultraviolet light.

The types of built-up roofing systems are legion and the properties of each type differ at least in some respects. Numerous components are assembled in various ways to form the system. Each of these is available with modifications for different roof slopes, air pollution control, and so on. For example, bitumen can be coal tar or asphalt. Felt can be woven or unwoven in rag, asbestos, cotton, or glass fabric, in various weights and thread counts.

Selecting the best system for a particular application may be difficult. Each roofing manufacturer offers dozens of them for each life expectancy. The importance of understanding the materials and the way they interact with the building and climatic conditions cannot be over-emphasized. Manufacturers' literature, other professionals, and industry representatives can be useful sources.

Comparisons of roofing materials and structural systems utilized on similar projects in the area can serve as a guideline. Consideration of the roof as a system rather than a series of isolated materials will call attention to potential problems which might otherwise be overlooked. Flashing, equipment anchorage and supports, roof penetrations, accessibility for future re-roofing: all are parts of the system and must receive their due. As with most other decisions we make daily in our practice, the roofing system which is selected on the basis of an intimate understanding of the components, their behavior, and interaction, will be the system most likely to perform satisfactorily. □

Author: Josephine H. Drummond, CSI is Specifications Writer/Construction Administrator, Gruen Associates, Los Angeles.

Architecture accelerando

The entire building industry wants to be the parents—or midwives—at the birth of construction management. Whoever wins, the architect will surely benefit.

Standing Room Only in the delivery room. Everyone in the building industry thinks he is the father of construction management (CM). The architect. The engineer. The architect/engineer (A/E). The general contractor (GC). They all confess. They all have a hand on the child.

Why the clamor? Genealogy? CM resembles everyone in turn and no one in particular. Custody? Everyone would like to share its profits. More important is the emerging character of CM. Whoever is declared the parent, CM will surely benefit the architect.

One truth should be self-evident by now. CM is a *managerial* service that integrates the programming, design, and construction phases of the building program under the auspices of a single administrative body, the CM, to deliver a project to the owner within the realm of his expectations. By claiming the *process* of building (i.e., the technical and social dynamics that assign and administer responsibility for the project within the building team) as its province, CM fills serious managerial voids that have plagued the industry for years.

Voids: delayed deliveries, cost overruns, pop-out windows. These oversights may shock the public. Not the industry, however. Time was when the traditional procedures functioned in spite of themselves because the materials and methods were so predictable. There were surprises, of course. Architects, contractors, estimators, manufacturers, suppliers, underwriters, and owners could grudgingly absorb their repercussions when their source and magnitude were mercifully few.

Times have changed. The industry is confounded by traditional practices that refuse to work properly any more. Let us examine the venerable program sequence of architecture—a testimony to the state of the industry today. It is not a completely pessimistic appraisal, as we shall see.

The sequence begins and ends with the architect for obvious reasons. He alone transforms the owner's conceptual needs and institutional resources into a building program. Although he shares design responsibilities with the engineer and any number of consultants, he is solely responsible for coordinating the composite design. He assigns his plans, component schedules, and specifications *fait accompli* to the GC and inspects the construction for contract compliance. There are 12 basic steps to architecture: 1 Planning, 2 Programming, 3 Schematics, 4 Design development, 5 Construction documents, 6 Specifications, 7 Bidding, 8 Contracts, 9 Subcontracts, 10 Shop drawings, 11 Construction, 12 Payments A summary of these basic steps follows.

Planning. Owner and architect or special consultant balance owner's wants and needs against owner's anticipated timetable and finances to determine if a building program can solve owner's problem. A concise conceptual program image showing size, quality, and location is produced from this.

Programming. Owner's needs are refined by size and type of space, function, spatial, and functional interrelationships, and site development. Services, broad material classes, and special equipment are considered by the owner and the architect or consultant.

Schematics. Architect in consultation with engineer produces schematic visual design from planning and programming data. Overall massing, general appearance, relative positions, and physical relationships are defined by materials and systems. Basic exterior and interior products whose use sequentially precedes others are possibly negotiated at this point.

Design development. Architect details plans for each floor as their schematics are approved. In this context mechanical, electrical, and plumbing engineers lay out paths and dimensions. Building materials and systems are described in specific technical terms although no manufacturers are named.

Construction documents. Architect and consulting engineer receive owner's approval of progress reports and owner's order to proceed with final production or working drawings. These plans, elevations, sections, details, component schedules, and specifications form the construction or contract documents which precisely state what materials and methods shall be employed to execute owner's program.

Specifications. Architect thoroughly describes general and specific conditions, materials, and methods contractor will employ. He has three paths to specification. Open specification names product and preferred suppliers with "or approved equal" clause or list of preferred alternate products. Closed specification names proprietary product. Performance specification names product by functional characteristics only, giving qualified manufacturers opportunity to develop product that meets specification; costly product testing restricts method largely to federal work.

Bidding. Architect advises owner of bidding or negotiation methods, invites qualified bidders to submit proposals, supplies bidders copies of construction documents, and answers bidders' questions. He then presents received bids to owner, who selects bid with architect's advice.

Contracts. Architect advises owner on contract forms and sees to their fulfillment. Usual contract commits GC to general conditions, specifications, component schedules, and working drawings written by architect. They are legally binding and subject to change only with written authorization of both owner and architect.

Subcontracts. As supervised by GC, subcontractors perform specialized segments of job under bidding contracts approved by architect as before.

Shop drawings. Contractors must submit shop drawings and samples (if required) to architect for approval, set drawing and work schedules, and change them as deemed necessary by architect.

Construction. Architect inspects site and sends progress reports to owner. For added fee, architect also manages construction, possibly letting subcontracts until such time as GC is selected and is assigned subcontracts.

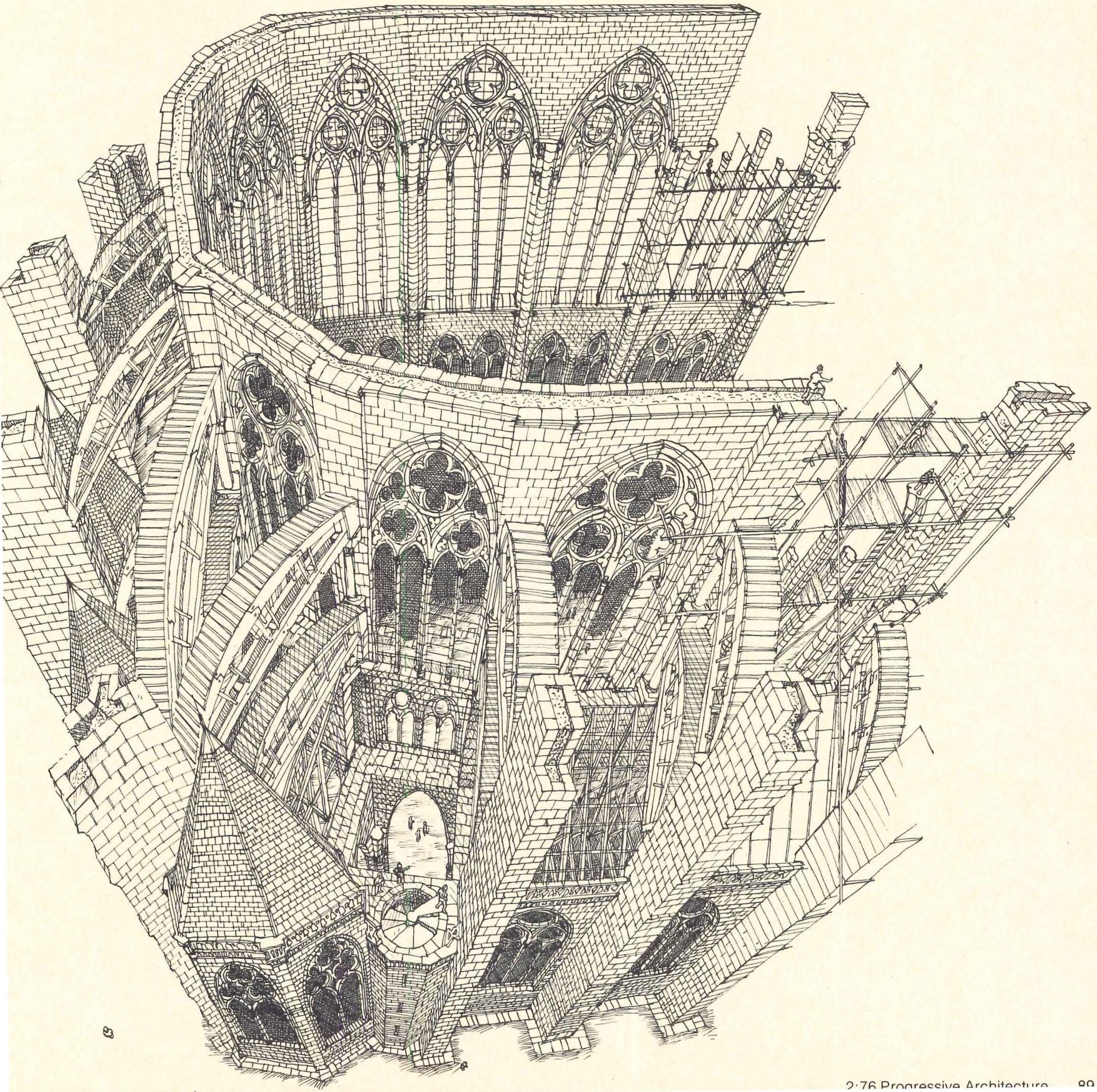
Payments. Contractor submits applications for payment and documentation of transaction to architect, who checks them against actual work and issues him certificate of payment for approved work, which is in turn submitted to owner.

Wind this up and it still performs quite well. Not always, however. Conditions are frequently attached. Conditions such as: technological sophistication of construction and mechanical/electrical/plumbing systems, quality and quantity of accessible markets for construction goods and services, finances and liabilities of project participants, complexity of owner's problem, and legal responsibilities.

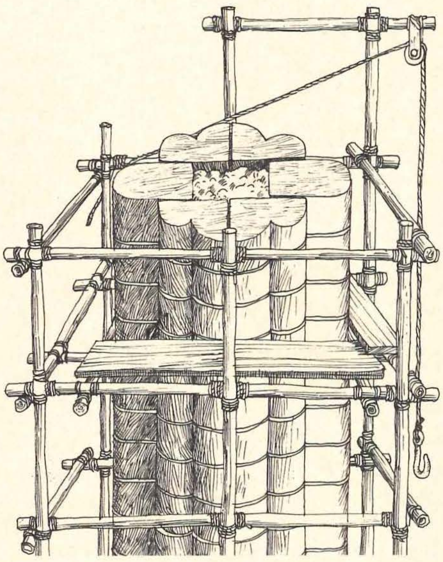
What has visited the building industry resembles what floating currency exchange rates have done to the international financial community. Heretofore well-defined relationships between industry members only approximate their former stances now. Uncertainty was always endemic to construction. But never like this.

The maturing of the technological age and the birth of a truly international economy have strained and loosened the bonds that once tied construction quality, timing, and cost together. New products and processes tax the architect's expertise in design and specification. Material shortages and inflation evoke unprecedented changes in familiar products, constrict the supply of others, and drive still others out of economic reach. Construction labor's continuing dissatisfaction with wages and working conditions makes many projects too costly to build while encouraging others to complete ever higher percentages of assembly off site. (The factory versus

Architecture has few rivals for the magnitude of human and material resources it commands. This illustration and all others in the Technics section this month (From the book *Cathedral* by David Macaulay, published by Houghton Mifflin Company, Boston. Copyright © 1973 by David Macaulay) suggest the complexity of construction activities that produced the Gothic cathedral. Here the choir is taking form.



Construction management



A pier of the nave in construction. It will be tied to the vaulting and flying buttress.

field labor cost margin still persists.)

The growing cost of money for construction loans and long-term mortgages batters a harsh financial ceiling on the rising prices of land, materials, and labor. Environmental regulations and legal responsibilities are proliferating in the name of more socially responsive design, but they inevitably pit an unseen body of new "owners" against the architect: Environmental Protection Agency, Occupational Safety and Health Administration, Dept. of Housing and Urban Development, local zoning ordinances, costly professional insurance, and more. As if this were not enough, the cloudy ideologies of contemporary institutions frequently produce an owner who is unable to define his problem to the architect unskilled in communications and conceptual thinking. On the other hand, there is now the sophisticated owner who retains a "captive" architect; the architect may find this owner cum architect more demanding than any other previous owner.

Quick Henry, the Flit! To his credit, the architect has responded to these difficulties for some time. New technical and managerial tools and techniques have poured out of the studio in an attempt to quell the more unruly elements of the process. But builders of late Romanesque architecture did not realize they were fashioning the elements of a Gothic style. Neither did the architect, engineer, or GC grasp the significance of such improvisations as fast track, phased construction, negotiated contracts, pre-purchasing, critical path method (CPM), value engineering, conceptual estimating, and computerized accounting and specifications.

A new equation of construction checks and balances was born. Quality of construction equals available goods and services expended at a given cost over a period of time. What is so new about this? Absolutely nothing—except that no one on the building team had previously considered himself responsible for solving such an equation. No one except the owner, who appropriated supplemental funds or sacrificed certain aspirations of time and quality to balance it.

In his faltering ability to bear these growing burdens, the owner has searched for an individual whose greatest professional obligation was not to one of the elements of the equation but to all of them. Not the architect, whose concern for quality of construction could cost dearly in delayed occupancy or budget overruns. Not the engineer, whose concern for technical efficiency could be notoriously expensive and insensitive to aesthetics. And not the GC, whose concern for overhead and profit could undermine the design's standard of quality.

Enter the CM. The who? The one member of the building team whose primary interest is balancing the elements of the construction equation, not maximizing any element alone. Which makes him *primus inter pares*, the owner's agent, charged with managing the entire building program for the satisfaction and protection of the owner. He may originate in one of the three traditional camps of the building team, but he is no longer one of them now.

As many designers, contractors, and owners are now corporate entities, so is CM. For behind the principals who represent a CM firm to members of the building team is an intelligence network charged with gathering, analyzing, and reporting data to and from all concerned team members. Titles like project director, project manager, cost analyst or estimator, scheduler, field manager or senior CM, field inspector or field secretary-clerk, and CPM consultant are the tips of an iceberg that describes the various functional aspects of CM. None alone is "CM."

Yet even a group portrait is elusive, as the two profiles of CM firms following this discussion will reveal. The profession is young enough and, for now, supple enough to tailor its own methods in the style of its numerous origins. However, some generalizations are possible.

Will it hurt? CM exists to control the building process. In reasoning from a whole to specifics, which necessitates thinking about all social and technical aspects of the owner's problem from pre-design to post-occupancy, CM monitors all vital elements of construction quality, time, and cost at their many levels of specificity during the entire life of the project. All is probability; altering one element's relationship to the whole requires adjustments to the whole. This contrasts with the traditional view of the elements as relatively fixed quantities to be dispatched sequentially as their moment appears in the 12 stages.

CM is labor intensive. It draws top level representatives of the building industry into a team whose professional resources, special interests, and individual attitudes are united in advancing the owner's welfare. What needs, opportunities, and constraints will confront the team are openly and continuously debated by team members in an effort to increase the owner's control and diminish his risk.

As team coordinator, the CM maintains the designs, schedules, and budgets that express quality, time, and cost in a flexible yet transparently logical format that all team members can understand and cope with. The CM also communicates technical transactions and reports on behalf of the team to the owner, whose intense involvement prepares him to make firm commitments about the nature of his needs.

CM repeatedly tests its assumptions about designs, schedules, and budgets through a broad array of instruments. Codes, markets for local and regional distribution of goods and services, technical reports on new materials and products, Dodge and Means reports, in-house historical cost files, and progress reports from team members are among the indices of a project's health. Estimating is probably CM's most impressive tool: how much a given design concept will cost, as well as standard quantity take-offs from more finished schematics and working drawings, preclude many design problems in the earliest days of design.

CM is pragmatic and demanding. Since it is not bound by any particular order of construction events save those that best serve the owner, it seeks and generally finds combinations of quality, time, and cost often denied to rigid procedures. Not that CM is a miracle. Rather, it is a habit of identifying events before they occur and charting a complex course of least resistance through them. All team members must be ready to answer for their acts—and to act fast.

What have you done with the architect? No doubt the architect feels some loss of symbolic authority as the nominal leader of the building team when the CM represents the owner. Yet he could see the CM as a very sophisticated owner. Because the new CM building process tells a story of a better professional environment for him.

CM does not eliminate the need for the 12 basic steps of architect, nor does it supplant the architect's duty to perform them. For example, CM planning and programming usually seek the same problem definition from the owner that the architect wants. Knowing how to draw out the owner's vital statistics and how to transform them into a binding commitment for a specific building project will surely require architectural participation. It should not offend the competent architect to acknowledge the presence of estimators, CPM consultants, value engineers, and others in these explorations. (This is a hypothetical project, of course, as is the traditional procedure which precedes it.) Not only can he share certain professional responsibilities he is not especially qualified to exercise, but his design will carry greater conviction having been analyzed for its larger implications.

CM schematics and design development further reinforce the validity of the architect's design concepts. Every scheme, material, or product he considers will be tested by CM operators against the resources available to the project. Intelligent trade-offs and alterations can be made well before they accrue inescapable penalties. In effect, the architect confronts realities of the marketplace in his earliest drawings.

And for dessert? CM construction documents and specifications generally spare the architect the rude awakening of a cost overrun, unseen material shortages, or irresponsible changes by owner or contractor. Since the CM tests all design elements against the owner's needs and resources, regional and local construction markets, and construction indices, the architect is assured that his documents have a very high probability of fruition.

CM bidding, contracts, shop drawings, construction, and payment relieve the architect of some unwanted obligations by giving the owner another professional party to whom direct responsibility for construction management is assigned. The architect must still guard the integrity of his design by approving shop drawings, evaluating change order proposals, and inspecting the site, but mechanics of bidding, contract and construction management and bookkeeping are largely the CM's duty.

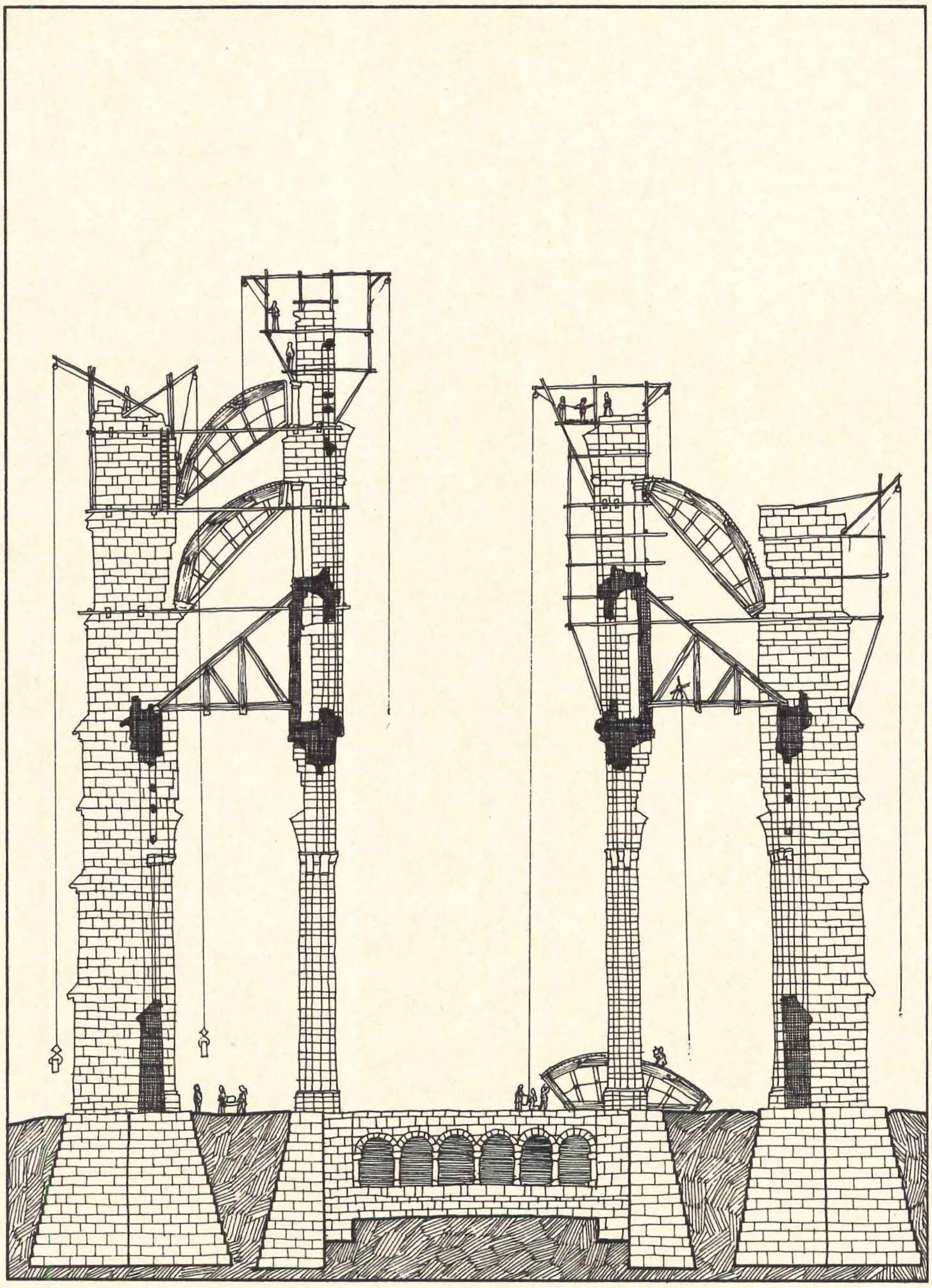
Do CM projects eliminate the GC? It depends on the CM, who could be a GC himself. Whether a CM or a GC under CM guidance controls the individual contractor, the increased control of a project in construction means greater stability for the architect's role in construction activities.

Fountainhead, revisited. So some fairly well-defined professional services are coalescing out of the CM polyglot. If the architect wishes to offer these services, he will need a staff whose expertise in toto he most likely does not have. As CM appears to be a large scale manpower operation, many architects may lack the financial capacity to be CMs. But CM is apt to stay, and architects should be ready to cope with it. Or does CM want the architect?

Once shorn of the emperor's new clothes, the architect still stands out for the service he delivers best: design. And its manifestations: working drawings, component schedules, and specifications. These documents will bear his stamp and his authority as never before.

For design remains a very elusive activity. The plaything of time and money, it frequently resists their precision. New technical and managerial tools may have eased the pain of uncertainty. But the owner, CM, and GC gladly yield the drafting board and specifications manual to the designer. Sentimentality aside, the name on the cornerstone will still read: The Architect.

Visitor from outer space. If anyone needs a garland of sympathy just now, it is the CM. Nobody quite knows who he is. The CM Committees of the American Institute of Architects, Associated General Contractors of America, and American Consulting Engineers Council acting separately and in concert have greatly calmed the ideological storms seeded by CMs defining themselves too strongly in their professional images. Yet the questions linger.



Temporary wooden frames called centerings shape and support the stones of the arches until their mortar sets. Here they are placed atop flying buttresses.

That CM is truly nobody's private domain is finally dawning on the building industry. An important statement by the Joint Conference of AGC, AIA, and ACEC CM Committees on August 15, 1975 shows how much CM has matured. The critical passage says, "A background in construction contracting, architecture, and engineering can all provide a basis of experience for entering the field of Construction Management. However, the basic minimum capabilities of contractors, architects, and engineers do not necessarily and automatically provide an individual with all of the skills required of a competent CM." The statement concludes that CM is a multidiscipline function appropriate to qualified architects, engineers, and GCs which no party should attempt to reserve by law.

Meanwhile, individual firms and GCs have claimed CM capabilities. Their services have already won frequent distinction in the form of substantial time and cost savings for their owners. Some of the more important CM practitioners today include: Smith, Hinchman & Grylls; McKee, Berger, Mansueto; Turner Construction; CM Associates; Heery Associates; Gilbane Building; Kitchell Contractors. And the list will surely grow.

Will the story end happily ever after for CM and the building industry? Certainly there has been no rush to save the becalmed industry by either the private or the public sector. Assaulted on all sides by economic, social, and political forces often beyond its control, it needs all the internal reinforcement it can get. In the presence of CM, the long postponed reordering of the construction process has found a judicious surgeon. Neither fish nor fowl. A CM. [Roger Yee]

Architecture alla breve

Joining the style of CRS to a creative management of standard practice, this CM firm reshapes the building process.

It could happen to you. You, parents of precocious children. Here was a mere infant teaching his parent the practice of architecture. The infant: CM Associates, the CM firm of CRS Design Associates, the family of environmental design services based in Houston, Texas. The parent: Caudill Rowlett Scott, the architecture firm that founded CRSDA. Together: the ingredients of a classic family quarrel.

That was five years ago. Even then, the astonished parent ("We got you this job! So do as you're told!") and the audacious offspring shared many affinities. In 1976, CM Associates (hereafter CMA) still bears the unmistakable philosophical stamp of CRS: a deft and knowledgeable handling of group dynamics otherwise known as "team" practice, programming as a specialized service (separate from design), careful discrimination among client/user wants, needs, and limitations, a profound understanding of the building process, and elaborate communication channels that combine words, visual concepts, gaming, mathematical models, statistical analysis, and computers to maximum effect.

CMA stands on its own merits, nevertheless. It has mastered the dialects of programming, design, and construction in such a way as to merge them into one language, one continuous formal process. To give it verbal force, the firm has fashioned the kind of innovative management techniques and tools one would expect of a CRSDA company.

The paraphernalia is often breathtaking. Yet the CMA style is perhaps most exceptional for methodically eliciting and combining the best efforts of all building team members in defining and pursuing the owner's goals. By ordering, monitoring, and regulating the vital signs of team activity, the firm can control the entire building process. This it does with consummate ease.

Many CMA concepts are admittedly not new; William Pena and John Focke stated the basic elements of CRS team decision in programming in the celebrated CRS *Investigation No. 18* (1969). There is an identifiable, logical, and reproducible social process to effective group decisions, they insisted, by which the architect/engineer can systematically draw the client/user from conceptual generalities to physical specifics in search of an increasingly finer definition of what he wants, needs, and can afford. More traditional design and construction phases were presumed to follow this phase of enlightened pre-design.

What enabled CMA not only to slip into the work flow but to assume full responsibility to the owner for the total building process as well, was the inability of any traditional participant to manage the entire process. In its diagnosis, CMA identified many weak and missing links. But the greatest opportunity for management reform was felt to be the general contractor's role in the team.

Hence, when CMA establishes itself as the owner's agent to advise him and to manage his AE and contractors, it assumes direct control of all primes and subcontractors. Whereas AEs receive informal "Memos of Understanding," outlining their responsibilities to CMA, contractors are issued binding contracts.

Sing for your supper. How does CMA earn its fee? By controlling what it perceives as the three basic phases of CM: operations, costs, and agreements. Around this core CMA wraps its management program and procedures.

Operations, which include planning, scheduling, and controlling, are what CMA calls the "initiative" phase of CM. What is the objective, how it shall be achieved, and when in the project time frame its myriad events should occur are determined by the building team under CMA advisement.

CMA planning is not unlike CRS "problem seeking." It convenes the building team to define the owner's goals, develop a strategy, and establish communications techniques. The owner's goals, the main criteria of decision making, are measured in cost, scope, quality, and time. Once these goals are ranked and weighted for priority, they are expressed in terms of schedule, budget, responsibilities, and methods of contracting.

Down the critical path. CMA scheduling is based on CPM, as is common among CM firms. CMA control is the intelligence operation the firm needs to monitor its project, for which pertinent information is drawn from building team members, suppliers and manufacturers, cost specialists, and other valuable sources.

Cost management can be one of the great mysteries of architecture. CMA establishes economic guidelines for the building team at all phases of the program. Its scrutiny of proposed and actual project costs is a far cry from the estimator's traditional quantity takeoffs: budgeting, value engineering, estimating, procurement, and project accounting. A portrait of the project in financial motion is generated this way, and the financial status of the project, its estimated and actual contracted amounts, and the budget for each contract pass through an automated accounting system that transforms them into a detailed cash flow statement for CMA, the owner, and the team.

Finding what a project may cost is first assayed by budgeting. When the project's scope has been defined by building type, schedule, location, and special costs, a probable range (high, medium, and low) of costs is produced by CMA's computer program, BLITZ, from a vast historical data file.

The resulting figure is compared to an estimate of costs based on preliminary project decisions about systems and geometry. If the results coincide with each other and the budget, basic concepts about the project are judged to be sound. The cost determination proceeds to value engineering and schematic design, confident that "x" dollars may reasonably build "y" project.

What to do with your blind date. Value engineering is meeting the owner's values at least possible cost, in CMA's view. Having defined his values, CMA establishes a cost model, compares pre-design data and building systems estimates to it and the values it represents, and if compatibility is established, approves further progress with working drawings.

If compatibility is not achieved, an interdisciplinary team is formed to find alternatives by identifying and selecting from alternatives for each target area. The selections are then compared to budget and owner's values. The process recycles until compatibility emerges.

Definitive estimates are derived from an analysis of building systems quantities, empirical factors of economics, location, and development, the unit cost file, and the historical bid/estimate file. They are expressed in terms of building systems the architect may select, contracts the CM can anticipate, and functional areas the owner can relate to his costs. As design is refined, these estimates are adjusted to reflect their increasing validity.

CMA markets the project for the owner in a manner appropriate to his needs and to the industry's position for a given time and place. As CMA eliminates the GC's role in bidding (plus his overhead and profit), all costs and materials are clearly visible. The time-consuming search for padding and poor negotiation in the GC's lump sum bid is handily prevented.

In managing countless informal, tacit agreements as well as formal, legally binding contracts, CMA reminds the owner that only legal counsel can advise him of the enforceability of his contracts and the liability of his actions. CMA does agree to insure that agreements cover needed services, that all responsibilities among building team members are understood, and that agreements are tracked, updated, and modified to the full comprehension of the individuals in question. However, in effecting compliance with contracts, CMA prefers persuasion through team interaction to coercion by contractual penalty. The owner and his attorney must of course pursue the wayward contractor themselves if all else fails.

Two is company. The building industry contests the paternity suit of CM, but there is little doubt how CMA began. CRS recognized the advantages of CM techniques long before their incorporation within a formal discipline. The team concept, "fast track" (coined by CRS, New York), CPM, and pre-purchasing were the same *enfants terribles* of professional necessity as "problem seeking" was.

CMA services thus evolved as logistic and statistical support for CRS teams. However, the shift in emphasis from design to project management shook CMA out of the CRS cradle. While the firm often collaborates with other CRSDA companies, it primarily serves others outside now.

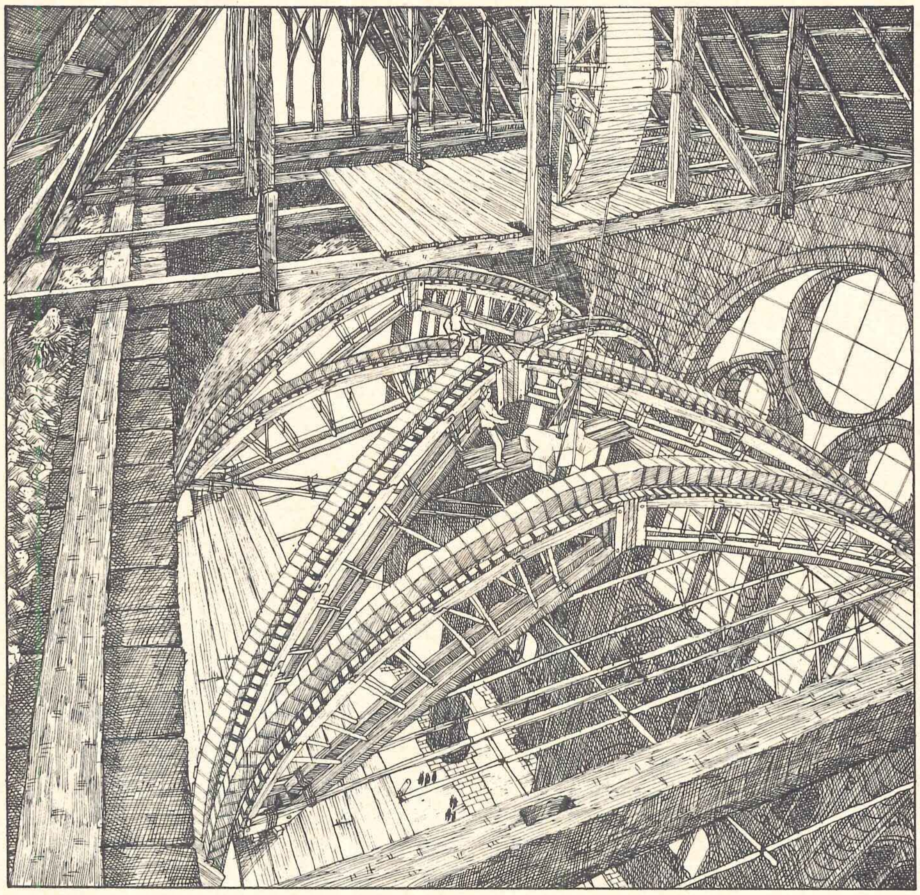
To complement its understanding of how architecture is created, CMA draws on a vast data base. Its historical case file, unit cost file, change orders, Dodge, Means, and other construction indices, and the wide ranging price inquiries any busy CM firm makes give impressive authority to its cost management controls. Few single AEs or GCs could claim so large a statistical resource pool.

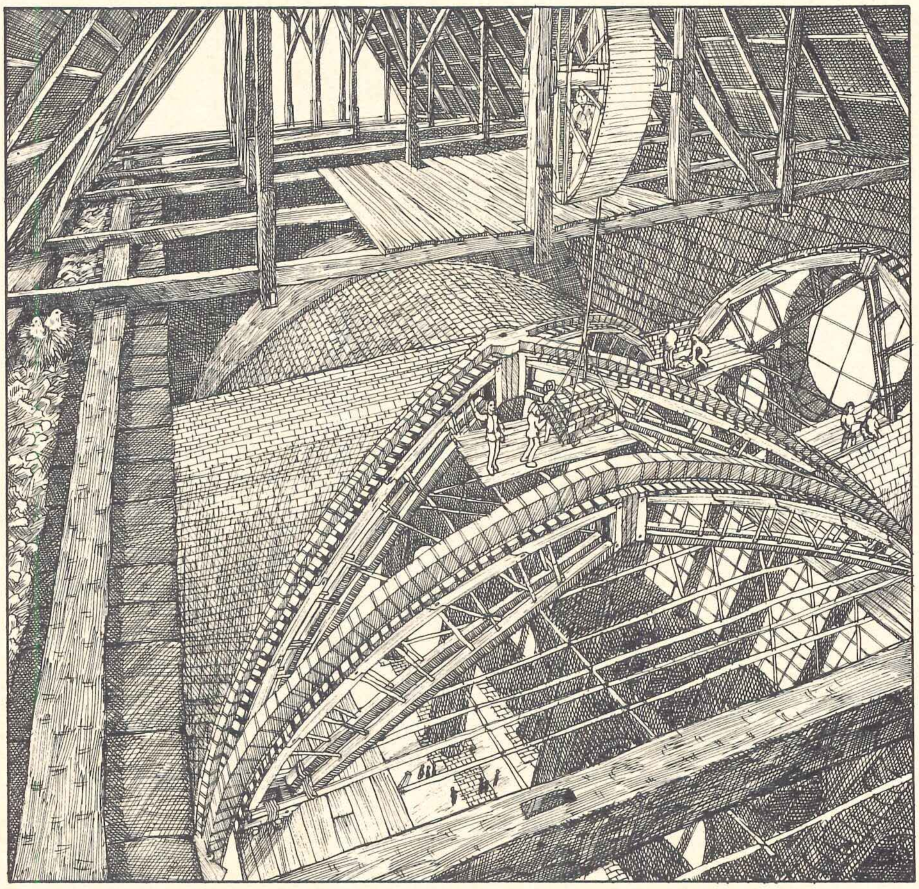
The look that sells. In addition, the firm has deliberately shaped its project documents and procedures into a terse, straightforward and graphically accomplished package. CMA believes that all project communications should be intelligible and accessible to the owner. That this has succeeded can be seen in the consistent format of its sales brochure, contract document, and project manual. And in the enormous flow of paper work that symbolizes its clientele.

CMA is the *wunderkind* of CRSDA. From a 1971 CRS spin-off whose first job was a CRS high school, the firm has gained its majority by winning clients and repeat customers on its own. Its staff has increased from 6 to 141 professionals educated in such fields as architecture, engineering, CM, industrial design, accounting, communications, marketing, systems analysis, and economics.

Under Charles Thomsen, President and Chairman of the Board, Francis Whitcomb, Vice President and General Manager, Joseph Scarano, Vice President for Direct Promotion, and F.D.M. Thomas, Vice President, CMA has become CRSDA's fastest growing subsidiary. In closing fiscal year 1974–1975, it enjoyed its third consecutive year of rising profits; revenues amounted to $3.8 million on $2.8 billion worth of construction in the U.S. and overseas (especially in the Middle East, where CRSDA services are in great demand).

So the circle is nearly closed. The building process obeys the owner through CMA. Could the owner ever be synonymous with the CM? Not with CMA, says the firm at this time. But it believes still higher levels of unity are possible in the building industry. One needn't be a Texan to interpret that. [Roger Yee]





Masons hoist stones of the ribs, voussoirs, onto centering and mortar them in place. A keystone locks the ribs together at the crown of the arch. Then carpenters span the spaces between centerings with wood lagging on which masons lay a course of webbing stones. Two teams work simultaneously from both sides of the vault, building lagging and then webbing. They finish up at the center.

Architecture allegro

The owner's project—threatened by menaces of time and cost—is rescued by this design oriented CM firm.

A lovely building program sprawls on the tracks, tied firmly to the rails by implacable project constraints. Her guardians, the owner, his designers, and builders watch helplessly at point-blank range, sputtering with frustration. On the horizon, a train bearing heavy penalties of time and cost looms steadily larger. Suddenly—what on earth?—an architect appears. At the head of a posse of CMs.

Fanciful as the above may sound, such a challenge faced George Heery, Atlanta-based architect, in the wave of industrial expansion that inundated the Southeast after World War II. Businessmen needed light-to-medium industrial construction (with a particular emphasis on distribution centers) on time and at cost. Design/build firms were anxious to serve them. So was George Heery.

The history of his firms, Heery & Heery, Architects and Heery Associates, Inc. (hereafter referred to as HAI), CMs, confirms what few industry observers would easily concede then. That an architect equipped with new management tools could outperform design/build in time and cost. Not only has HAI fashioned those tools, it has also established an important service for the design-oriented professional.

HAI "construction program management" is a logistic building process supported by explicitly defined and binding contractual obligations that all participants in the building process must accept. Much as a chess piece covers the playing field in a prescribed operation, so does each member of the building team. The intention is not to stifle creativity. Instead, it is to acknowledge the supremacy of the owner's goals and limitations, which HAI preserves with "time/cost control."

The firm's strategy is to identify the owner's goals for their priorities, strengths, and weaknesses, to block out a timetable and a budget to achieve those goals, and to enforce the building team's adherence to the project's boundaries. This they accomplish with management techniques and tools which carry strong incentives and stiff penalties. What is notable about this approach is the clearly delineated room it leaves each team member to devise his own means of contract fulfillment, with the aid of other team members and HAI. It has worked very well.

The basic components of time/cost control reflect a belief that the most important construction decisions are pre-design and design. While the architect, engineer, and contractor are not singularly qualified to assume full project responsibility to the owner, the A/E is felt to have special advantages. The ten components of time/cost control: 1 Developing a compatible program and project budget, 2 Selecting the A/E, 3 Pre-design project analysis, 4 Applying early cost and methods input, 5 Maintaining an integrated cost control system, 6 Assisting the owner in design review, 7 Insuring the incorporation of appropriate time control contract provisions, 8 Controlling computer assisted scheduling, 9 Completely managing bidding and contract award, and 10 Maintaining a qualified CM team on site.

You look familiar. These operations strongly resemble more traditional project phases but fundamental differences appear quite early. To begin, programming is developed by HAI and the owner prior to the designation of an A/E. The conceptual problem statement is formed by developing the owner's needs and design criteria, presenting tradeoff studies and options, drawing up detailed project schedule and estimated budget, and formulating a design program. To these, owner and HAI commit themselves, and only then is an A/E needed.

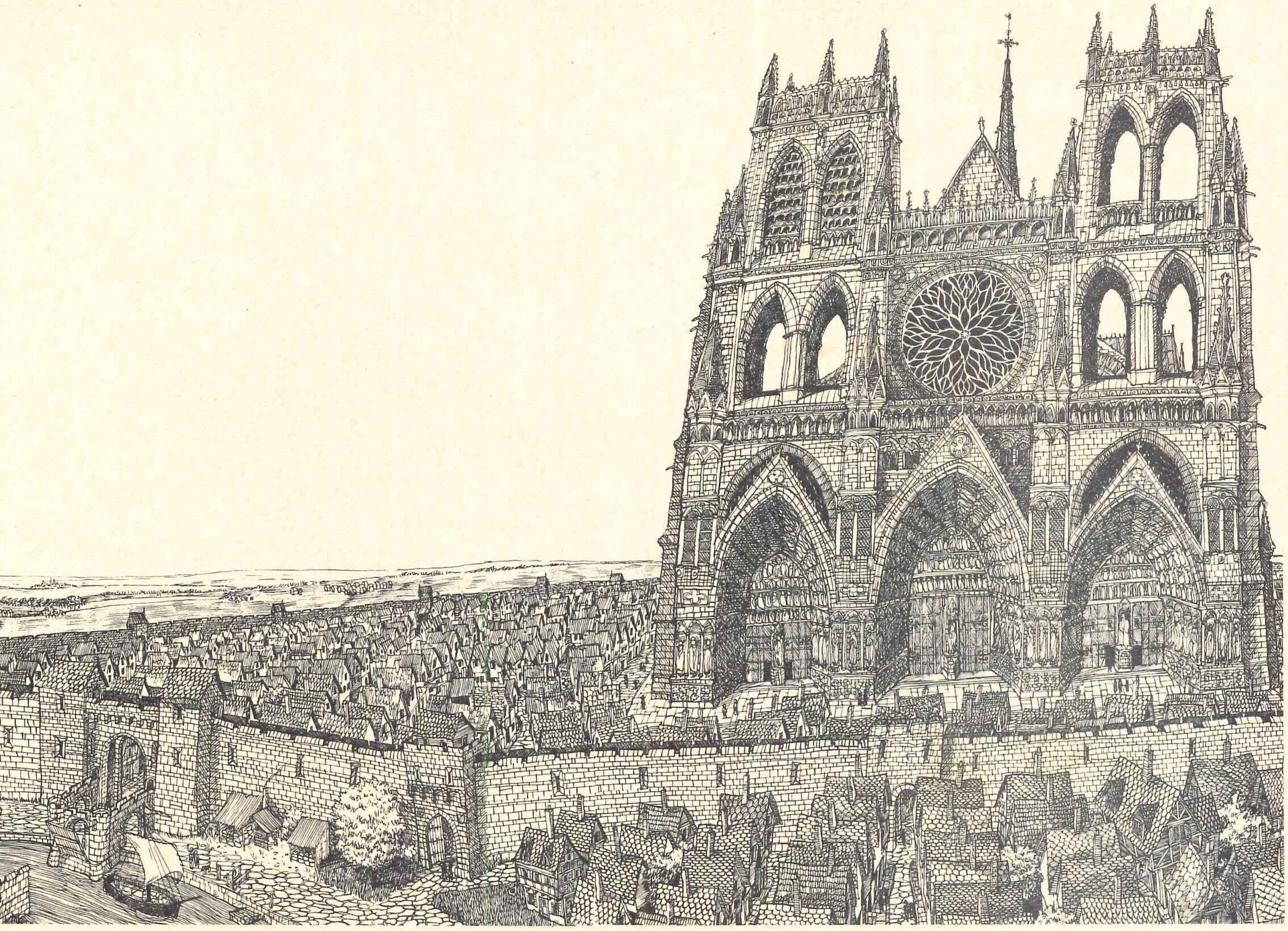
While HAI only advises the owner in selecting an A/E, it exercises its professional judgment in screening candidates by researching and interviewing suitable firms and briefing the owner in advance. (Heery & Heery disqualifies itself from consideration in HAI work.) Once an A/E is chosen, he is contractually committed to the program budget and schedule.

Then a pre-design project analysis follows, essentially clarifying directions and mutual understandings within the building team. In the multidisciplined "think tank," opportunities, constraints, and basic strategies are identified as fully as possible. HAI encourages such solutions as can include efficient industrialized building systems, discourage unnecessary owner's changes (he is always informed of time/cost consequences in changes), compress schedule, or reduce cost. Such devices as phased construction, pre-purchasing, early bidding, and performance specifications may be part of the CPM network that HAI prepares at this time.

Just looking over your shoulder. Before starting up an integrated cost control system, HAI applies early cost and methods input to A/Es, including advice on construction sequencing, materials and methods, trade-off research, and analysis of design consequences for time/cost control. With the establishment of the cost control system, a comprehensive time/cost profile is maintained that is refined in step with the design. It is a complex effort.

The program and budget are constantly tested for balance. All parties to the budget are firmly committed to it (contractors must suggest alternatives at bidding for the designer to evaluate, though change orders are discouraged and require HAI-A/E sign-offs and close surveillance). Building components are each assigned a budget figure by estimators and project designers even at the conceptual stage. Quantity surveys are made from at least schematic design onward.

However, the essence of time/cost control effectiveness may be its continuous rechecking and value engineering. A component budget is generally raised only as another is correspondingly lowered, in full view of the owner. At every point the designer is informed what his design represents in time and cost by estimators skilled in highly sophisticated, often quite abstract, conceptual analysis. HAI runs timely comparisons of updated historical costs by building types against current


The Gothic cathedral is completed—perhaps a century or more after men and material were first dedicated to its creation.

prices for the building's various parts. In addition, the owner's review of design progress is facilitated by HAI technical reviews of progress reports that speed up approvals, A/E presentations coordinated by HAI, and HAI preparation of owner's advice to the A/E.

Jaws. Miracles are well-prepared accidents in HAI's opinion. This avoidance of happenstance prompts the firm to make extensive use of contract provisions to implement time/cost control techniques. Though these provisions give formidable teeth to the firm's authority within the building team (ultimately the owner's authority, of course), they frequently act more as solemn reminders.

Calendar date proposals and scheduling, tailored and concise extension conditions, progress payment scheduling, liquidated damages clauses (i.e., what a team member's delay cost the owner), superintendent requirements, CM independent right of condemnation on site, and better change order provisions for the owner are among the many contractual obligations that insure the unanimous concern of the building team in meeting the owner's time/cost objectives. The computer assists them with scheduling support: CPM generated provisional networks issued with specifications, pre-bid scheduling required of contractors, and other operations to fine tune the schedule.

Contract bids and awards are completely managed for the owner by HAI. Methods of selection, identification of serious bidders, tracking of issuance and bidder activity, pre-bid conference for competitive interest evaluation, and bid analysis, contract preparation, award and issuance of notice to proceed are ways by which HAI insures the best packaging and marketing of the project. While this is not true of all CMs, HAI can work with GCs, though it may have negotiated all or part of the bid packages separately for later assignment to the GC.

HAI services on site are characteristic of most CM operations. This is consistent with its emphasis on controlling pre-design and design. Nevertheless, its presence on site enables it to exert no less control than before. As the one owner's agent in the field, it regulates decision-making in a decisive way: administering contracts, expediting shop drawings and other paperwork, inspecting contractors' work, coordinating contractors, maintaining CPM, ruling on requested time extensions, and coordinating testing and specialty inspections.

Soft pencils anyone? If reading this makes you anxious for Architecture, you may find solace in the choice of Heery CM services, which can be secured as an A/E-CM contract, Heery & Heery, or as CM alone, HAI. But take either CM firm, and the time/cost control techniques are remarkably successful.

Though the second Heery firm became a separate entity in 1966, both share the same concern for the exigencies of the contemporary industrial and commercial owner. Late in 1975, Heery offered this service in still another form as Heery-Farrow Ltd., a joint venture with the Farrow Group, an established construction and development company in England. The new firm will market construction program management (as Heery describes CM) to the European Economic Community.

HAI enjoys a well-earned reputation for its meticulous performance. The success of its methods in the U.S., Europe, the Middle East, and South America can be seen in its rising revenues. This amounted to some $4 million on $308 billion worth of construction in 1975—the efforts of a staff of 116 professionals from architecture, engineering, and contracting guided by George T. Heery, Chairman, Louis N. Maloof, President, David O. Kelly, Vice President, Operations, and Robert W. Petrash, Vice President, Project Management.

And what about the onrushing train? Flagged down. And the lovely building program? In the arms of the smiling architect. And the constraints? Apprehended and surrounded by a grateful gathering of CMs, the owner, his designers, and builders. What else is there to say? [Roger Yee]

Aspects of living

Handbook of Housing Systems for Designers and Developers *by Laurence Stephan Cutler and Sherrie Stephens Cutler. New York, Van Nostrand Reinhold Co, 1974, 227 pp., $17.50.*

This handbook is designed to help today's builders, developers, and architects meet the critical housing need by performing more efficiently with new design, building, and management techniques that could increase the scope and productivity of their efforts. The book describes how to evaluate specific housing systems and explains building systems as a process. It then gives details of a low-capital systemization—the Ecologic System—and illustrates how to establish and market a system according to human ecology and user needs. Throughout, the graphics and plans provide a "kit of parts" so that the reader can actually participate in the systems design and building process.

The Bathroom *by Alexander Kira. New York, The Viking Press Inc., 1976, 264 pp., $18.85, $7.95 paper.*

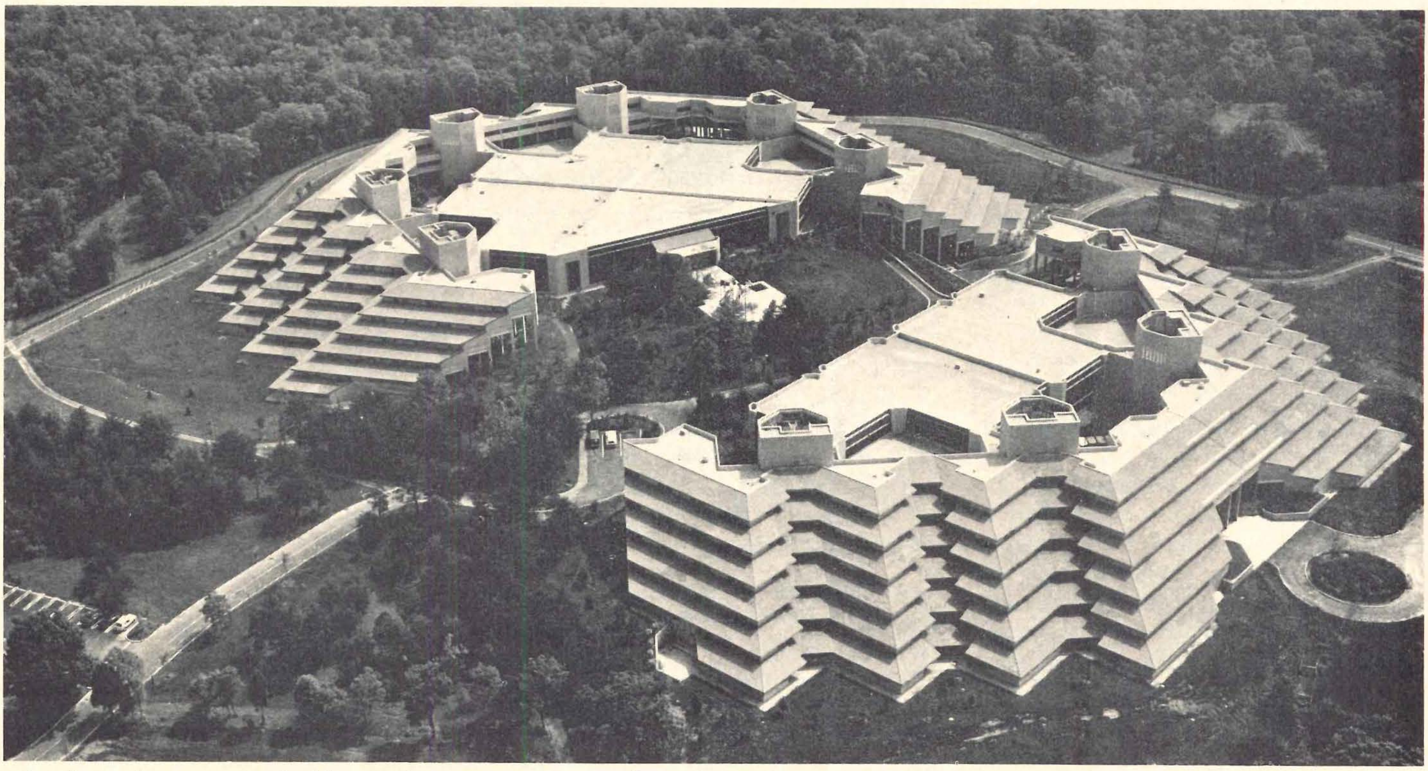
Ten years ago, after seven years of research, Alexander Kira's study of bathroom design was published, which quickly came to be recognized as a classic work. The author showed that the bathroom was not only inconvenient to use and clean, inadequate in terms of safety and hygiene, but that it was also unquestionably the most badly designed place in the house for the functions it was supposed to serve. Despite the enthusiastic reception given the first edition of this study, the bathroom still needs considerable improvement and now, after a decade of continuing study, the author has prepared a greatly revised and expanded new edition. Although progress has been made by manufacturers, and serious attention has been given by architects and designers, public awareness of bathroom design is still not widespread enough if significant changes are to be made. In this new edition the author analyzes each function of the bathroom—without mincing words or making moral judgments—and provides a discussion of the history of our attitudes and the possible ways in which we can achieve the most effective design. Two new sections have been added, devoted to public facilities and to facilities for the aged and disabled.

Apartments for the Affluent: A Historical Survey of Buildings in New York *by Andrew Alpern. New York, McGraw-Hill Book Co., 1975, 166 pp., $24.50.*

A 54 (yes, 54) room triplex on Fifth Avenue is just one of the homes illustrated in this volume which portrays more than 70 of Manhattan's most famous apartment houses, from the first one, in 1869, through those of the present day. In this first work to document the development of luxury apartments, buildings have been selected that represent a certain type, or because of their uniqueness.

Case Study No. 16*

Xerox Runs Off Five Campus Originals: Living/Learning Modules That Save Students' Time and HVAC Energy



Air view of two main buildings of Xerox center. Students live in terraced perimeter surrounding flat-roofed learning areas.

With innovations such as octagonal classrooms and electric heat recovery, this new industrial training facility features a cohesive layout that encourages employees to learn from one another as well as from their teachers.

Leesburg, Virginia. Along with a number of other brilliantly run U.S. firms, Xerox Corporation is studied and analyzed as a classical model of good management in the classrooms of Ivy League business schools. When it decided to build its own campus back in 1971, however, Xerox did not return the compliment by emulating traditional college architecture. Instead it came up with a totally unique approach that is as inventive in its own way as the company's famed copying process.

A standard vision of the American college scene is one of large numbers of students hurrying across the grassy expanses between dormitory and classroom buildings set here and there at random. The physical exercise involved certainly does the students no harm, especially when there are four leisurely years to spend and time is not of the essence. In industrial training, however, where courses range only from a day or two to a few weeks, time is very much a factor and campus walkabouts could be considered dispensable items in tight schoolday schedules. Xerox and its architects thought so, at least, and invented their own solution: the "living/learning module."

Free Association. The module is a physical structure containing classrooms, laboratories, residence rooms, recreational areas and other needed support facilities. Two or more modules can be freely combined in one building. Each module serves about 200 people, a number large enough for efficient application of physical plant and teaching facilities—yet small enough for a stabilizing, congenial sense of community among the members and for attention to the individual needs and progress of each student.

When the architects elected to couple the living and learning spaces, an intriguing opportunity was presented to the team of design engineers. The classrooms and laboratories were to be highly loaded with electronic teaching aids, test equipment and working models of the company's own machines. The engineers were given the challenge of recovering the energy dissipated by this equipment and using it to provide space heating for the living spaces.

River View. The Xerox International Center for Training and Management Development sits on a wooded hillside overlooking the Potomac River, near the historic village of Leesburg and about 30 miles from the nation's capital. Overall, the site comprises 2265 acres, but the facility uses only about 40 acres of the available land. Two terraced buildings are the essence of a complex totaling more than one million square feet and accommodating over a thousand students at a time plus a staff of 500. These buildings contain five of the living/learning modules (three in one building, two in the other).

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

The unique architectural approach opened for the engineers the intriguing possibility of transferring excess heat from spaces where students would work during the day to where they would sleep at night.

Entering any one of the modules from its courtyard, the visitor finds himself in a dramatic three-story-high carpeted mall known as the "commons" area. Each commons contains a different variety of facilities which are used by all of the students. A service desk, newsstand and game lounge are housed in module 1; a snack bar/cocktail lounge in module 2; a large dining room in module 3; barber shop, health services area and game lounge in module 4; and a library in module 5.

The service desks accommodate the registration of newcomers as well as the distribution of mail, check cashing and valet services. Game lounges are well planned for student relaxation, furnished with amenities such as grand pianos, billiards and table tennis equipment, card tables and softly cushioned seating arrangements. These lounges and the pub area are where students gather during evenings and weekends.

Tiered Suites. Ringing each high-bay mall or commons are six levels of glassed-in space where the students reside. The living quarters on these tiers are divided into suites for six people. The focal point of a suite is its generously proportioned lounge. Upholstered butcher block sofas, swivel armchairs, television consoles and indoor plants give these lounges a living room atmosphere that reflects the wooded environment of the site.

Six private bedrooms open directly onto each lounge. Carpeting and brightly colored blinds and bedspreads make these small but efficient rooms pleasant retreats for sleeping or studying. Between each pair of rooms is a full-sized bathroom shared by the two occupants. All bedrooms are outside rooms with unobstructed views of the lush Virginia countryside.

One of the two major items of furniture in a sleeping room is a single bed with a custom designed headboard containing a lockable storage compartment for the student's use. The second item is a large, well-lighted desk that runs the full length of one wall. In a sense, the desk could be considered as part of

Architect Peter Gerridge isn't particularly upset when, now and then, a casual visitor leaves with the wrong impression.

the HVAC system. One side of the desktop is supported by the customary drawer case. The opposite side, however, rests on the cabinet of a free-standing, floor-mounted heat pump unit that supplies the room's heating and cooling. The louvered outlet grille for the unit is flush-mounted directly into the laminated plastic work surface.

Don't Stop Now. The visitor who stops his tour at this point might come away with the impression that he had just seen one of the newer hotels built around soaring lobbies designed to spellbind guests with architecture as drama. Or, perhaps, a fine resort motel. "We certainly wouldn't be displeased if people did get that impression," says lead architect Peter Gerridge of the Kling Partnership. Kling's several divisions handled the entire design. "We wanted the modules to be interesting and comfortable places in which to stay. For several reasons.

"First, the training that goes on here is rather intensive, and after an eight-hour day in class, the students need some relaxation. The center is far away from any type of downtown entertainment, so we had to help them provide their own. Second, we aimed to provide a structural environment that would help relieve any sense of boredom. The average employee may return here many times during his career, and we hoped to make him want to come back. But our most important design objective was to provide structures that encourage employee interaction. Xerox feels strongly about this. A lounge where, for example, a sales representative and a service engineer converse informally about their particular approaches to the company's objectives can be just as important as the classroom in promoting on-the-job performance and harmony."

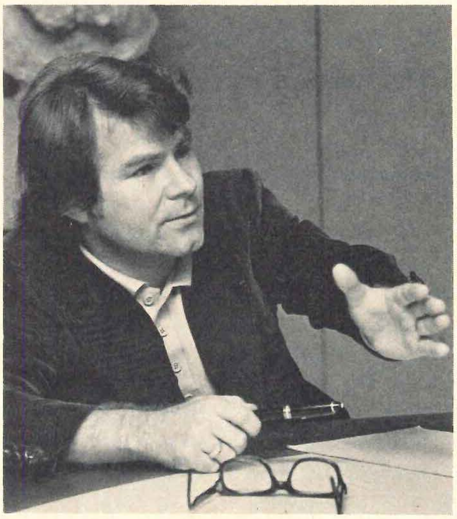
Learning-in-the-Round. To get to class each day, the students leave their rooms, cross the commons and enter the "learning area." This is a three-story space that contains sales and service classrooms and labs.

The Leesburg classrooms are unusual—octagonal in shape rather than rectangular. Because it has no identifiable "front," the octagon dispels the traditional image of the instructor standing at the head of the class as the dominant figure. The effect is a learning-in-the-round atmosphere that encourages student involvement. Instructors guide the work, but there is also plenty of crosstalk among the students as the lesson proceeds.

Another reason for embracing the octagon is simply that it has more sides and all of them are put to work. One wall and the space behind it are occupied by audiovisual aids, including a rear screen projector, a television receiver and videotape cassette unit and storage racks for tapes and slides. Others are lined with tackboards and chalk slates.

Some small classrooms have adjoining studio/like rooms for taping the role-playing exercises used in sales training. Here a pair of students can act out a customer sales situation and later participate in a group critique as the tape is played back on the audiovisual equipment. Larger classrooms for technical instruction have adjoining labs where students receive hands-on training on current Xerox machines.

Engineering Helps. The design of the electrical and mechanical systems was carefully coordinated with the overall objectives for the living/learning modules. Lighting, for example, is a blend of various types of equipment, each chosen only after some consideration



Electrical engineer Peter Knuppel sees a place for mood lighting even in a down-to-business educational center.

of psychological effect. "We lighted learning areas to 130 footcandles with fluorescent fixtures," reports Kling/ Lindquist electrical engineer Peter Knuppel. "We did this, of course, to provide the conditions needed for efficient work in the classrooms and labs. But we wanted the students to experience a change in mood, an uplift, when they left the learning areas for the day. So we went to the softer tones of lighting afforded by incandescent fixtures in the living spaces. The multistory commons areas presented a special problem which was solved nicely through the installation of a low-brightness system using 250-watt quartz floodlamps."

Space conditioning for the two-module building and for the three-module building is supplied by two separate closed-loop water-to-air electric heat pump systems. The total of 1700 individual units in the two buildings makes the Leesburg installation one of the largest based on the closed-loop principle. Unit sizes range from ¾ to 20 tons. The smallest of these are of the cabinet type with integral thermostats and are located in the students' bedrooms. Larger areas, such as the lounges and classrooms, are served by ducted units installed above ceilings or in equipment closets.

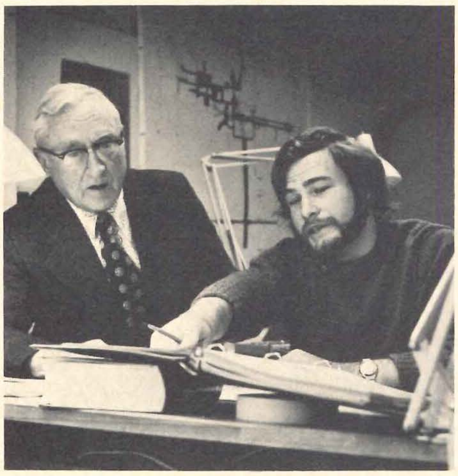
All of the heat pump units in a building are coupled into a common closed loop of circulating water. In the cooling mode, the heat pumps reject heat to the circulating water; in the heating mode, they extract heat from it. It is the closed loop that makes possible the heat recovery capability of this system. The highly loaded learning areas are almost continually on cooling even in cold weather. Heat rejected to the water by the equipment in the learning spaces is then available when required for the commons or residence spaces. Supplementary heating is provided by two 1500-kw electric boilers in the three-module complex and by two 1020-kw boilers in the two-module building.

No Limits on Loops. The efficient operation of water-to-air heat pumps entails some very specific flow requirements in terms of gallons per minute. So the success of any installation hinges on the design of the hydronic circuits with emphasis on adequate pipe diameters. As a general rule, pipe size in the main loop is directly proportional to the total tons of heat pumps served. Over the past several years, main loops four, six and eight inches in diameter and serving a hundred or more units have become commonplace.

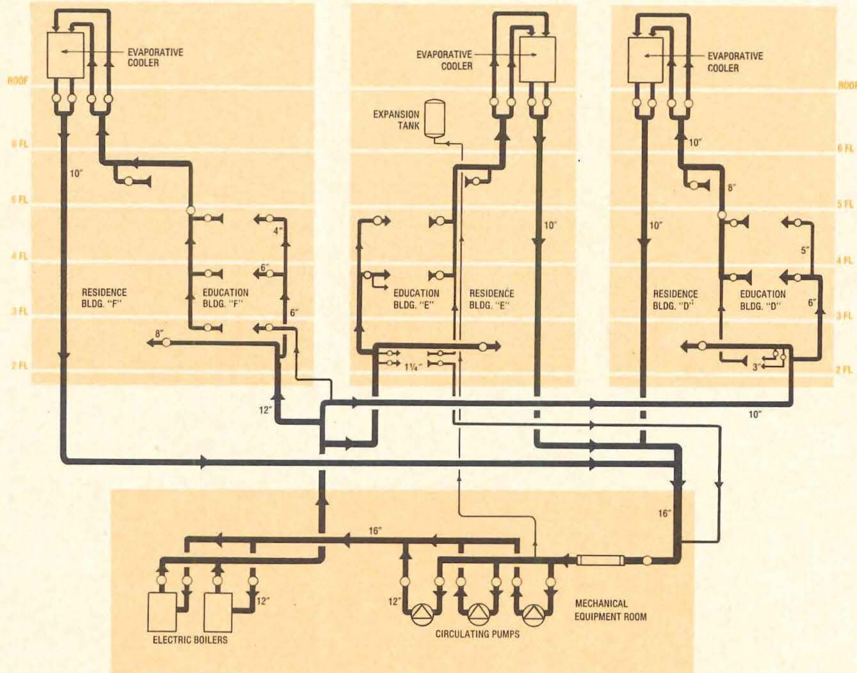
From a statistical standpoint, it would appear that the greater the number of units in a single loop, the more often balanced conditions would obtain in the random mix of units on heating and cooling. But large numbers of units need great volumes of circulating water, and one wonders just what are the practical limits on system size.

Manager of plant engineering Henry Spector salvages energy for use long after the crowds have left the meeting hall.

"We haven't seen the maximum limit on loop size," says HVAC engineer Howard Shaner, associate with Kling/ Lindquist, Inc. "Not yet at least. We have more than 1000 units in the system for the larger of the two living/ learning complexes at Leesburg. We



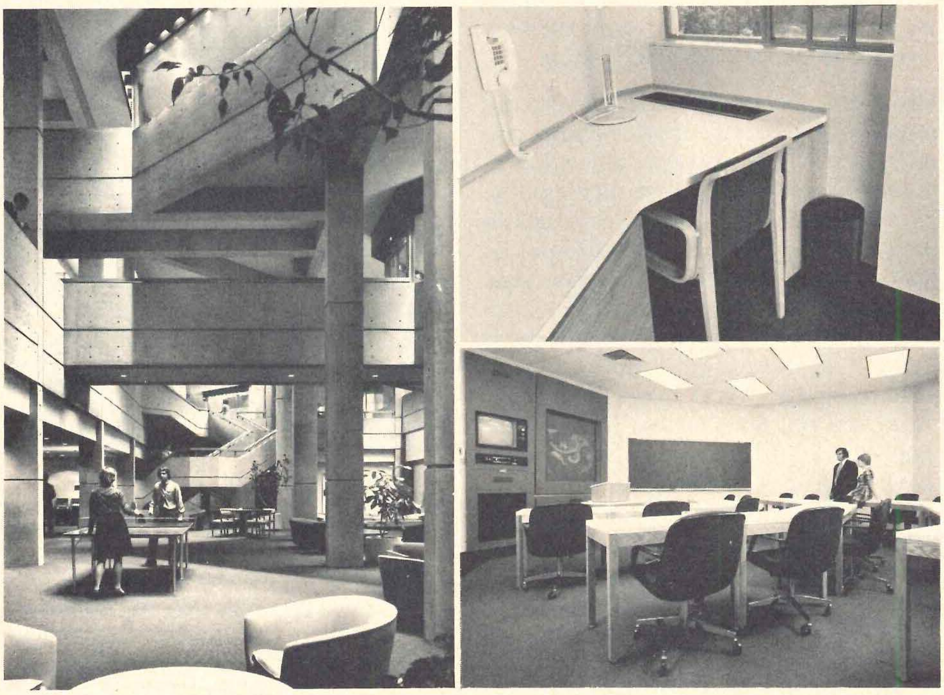
HVAC engineers Howard Shaner and Rodger Halterman are still probing for the upper limits on closed loops for heat pumps.



PIPING LAYOUT FOR THREE-MODULE SYSTEM

Schematic diagram shows the interconnection of the hydronic piping network in the three-module complex. The smaller pipe sizes installed in individual zones feed into progressively larger branches which terminate in the 16-inch-diameter welded steel main trunk. Water circulation throughout the entire network is maintained by two continuously operating pumps and one standby machine located in the mechanical room.

Situated near the circulating pumps are two electric boilers whose function is to provide supplementary heating whenever recoverable heat is insufficient to offset the cumulative heat losses of the structure. The boiler resistance elements are energized in sequence as water in the main trunk approaches 65F, which is the lower limit of the recommended range of operating temperatures. The upper limit is 90F, and whenever water temperature approaches that maximum, the roof-mounted evaporative coolers are phased into operation. For faster response to temperature fluctuations, each cooler is controlled independently by a sensor in a feeder pipe in the branches nearest it. The original plan to operate the coolers in response to temperature in the main trunk was shelved when it was determined that there was a lag of several minutes before a change occurring in a branch was reflected in the water temperature in the 16-inch main.



Innovations in the center include high-bay recreational lounge in commons (left); desk partially supported by heat pump cabinet (top right); octagonal classroom (bottom right).

could have treated this three-module complex as six separate buildings (see box). However, our early studies proved that one large system would be more economical and we didn't hesitate to design it that way. We're looking forward to applying this same heat recovery concept to even larger structures."

Orderly Approach. Kling/Lindquist engineers designed the hydronic network as an orderly progression of increasing pipe sizes. Starting with branches as small as 1¼-inch diameter in certain zones, the network feeders expand gradually and culminate in a massive welded-steel main trunk 16 inches in diameter.

An added benefit of loops of this magnitude is that the volume of contained water is great enough to offer considerable thermal inertia. This tends to stabilize the system despite hour-to-hour shifts in the operating modes of various zones. Also, heat stored in the water provides a flywheel effect that helps meet heating needs at night and during weekends when there is less recoverable heat available or none at all.

"The sheer magnitude of the loop did oblige us to make a couple of design compromises," remembers engineer Rodger Halterman. "We might have chosen a single evaporative cooler for the three-module complex but we couldn't obtain one large enough. So we had to divide the cooling job among three identical units, one for each residential structure."

The original intention was to control the three evaporative coolers in unison by means of a single sensor immersed in the 16-inch-diameter main trunk. During shakedown trials of the system, however, it was determined that a three-minute lag occurred before a temperature rise in the water flowing in the branches of any one of the modules was reflected by a rise in the water temperature in the main trunk. Accordingly, the system was retrofitted for independent control of each evaporative cooler from a sensor installed in a branch pipe close by.

Crowded Room. Several hundred yards away from the module complex is a separate recreational building. Space conditioning for this structure is also provided by a closed-loop system. "You might consider this an unusual application for the heat recovery concept," says Xerox manager of plant engineering Henry Spector. "Most of the volume of the building is taken up by two college-size gymnasiums. Ordinarily there is only a modest amount of heat exchange among the four large packaged heat pump units in each gym as they operate to equalize temperature conditions throughout the building.

"However one gym is designed to double as an auditorium and is equipped with demountable seating for 500 people. When this room has a capacity crowd, we strike it rich. We can recover enough heat to take care of the remainder of the building for hours."

DESIGN SUMMARY*

GENERAL DESCRIPTION:
Area: 1,020,000 sq ft
Volume: 11,150,000 cu ft
Number of floors: six
Number of occupants: 1000 resident students, 500 nonresident staff
Types of rooms: classrooms, laboratories, private and general offices, bedrooms, lounges, kitchen, dining room, TV studios, mechanical rooms, storage

CONSTRUCTION DETAILS:
Glass: single
Exterior walls: ribbed-face concrete block or mahogany siding over steel frame, 1″ urethane insulation (R-7), gypsum board; U-factor: 0.1
Roof and ceilings: clay tile over built-up roof, 2″ rigid insulation (R-7), suspended acoustical tile ceilings; U-factor: 0.1
Floors: concrete slab on grade
Gross exposed wall area: 150,000 sq ft
Glass area: 20,000 sq ft

ENVIRONMENTAL DESIGN CONDITIONS:
Heating:
Heat loss Btuh: 35,940,000
Normal degree days: 4300
Ventilation requirements: 100,000 cfm
Design conditions: 10F outdoors; 75F indoors
Cooling:
Heat gain Btuh: 30,080,000
Ventilation requirements: 100,000 cfm
Design conditions: 95F dbt, 79F wbt outdoors; 75F, 50% rh indoors

LIGHTING:
Levels in footcandles: 25-130
Levels in watts/sq ft: 1-5
Type: fluorescent, incandescent, quartz

CONNECTED LOADS:

Heating and Cooling (3340 tons)	12,000 kw
Lighting	3,000 kw
Pumps and Fans	500 kw
Water Heating	1,000 kw
Cooking	300 kw
Machines and Misc.	11,700 kw
TOTAL	28,500 kw

PERSONNEL:
Owner: Xerox Corporation
Architects: Vincent G. Kling & Partners
Consulting Engineers: Kling/Lindquist, Inc.
General Contractor: Frank Briscoe Co.
Electrical Contractor: Beach/Fischbach & Moore, Inc.
Mechanical Contractor: Courter-Poole & Kent, Inc.
Utility: Virginia Electric and Power Company

*For all five modules.

New Flush-Front, Low Decibel MONDRIAN LOCKER

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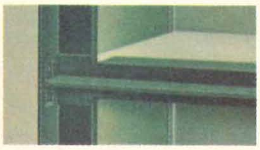

Cross frame members are stronger than kids. Welded for rigidity.

Recessed latching and locking is safer, looks trimmer.

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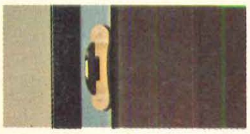

Soft-touch latching keeps MONDRIAN lockers twice-as-quiet. Rattleproof.

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WIN

A VALUABLE MONDRIAN style painting created by John Pearson, internationally famous artist. Pearson, here, confers with Dave Anderson (left), Manager Locker Sales, Republic Steel.

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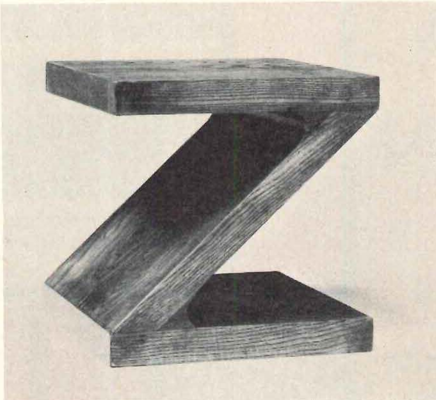
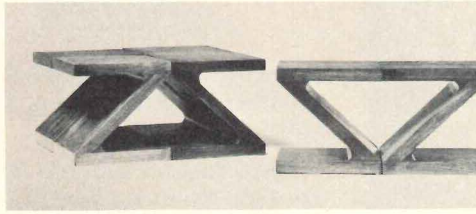
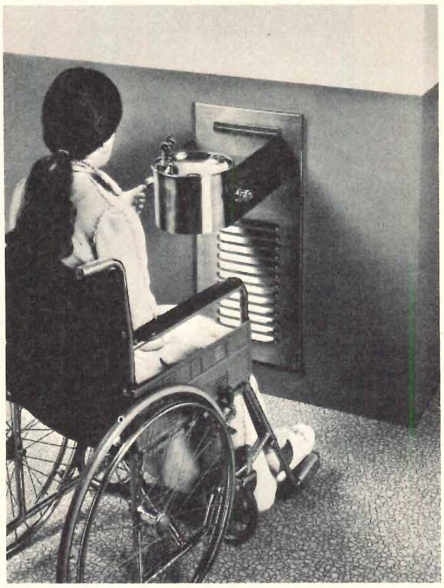
Products and literature

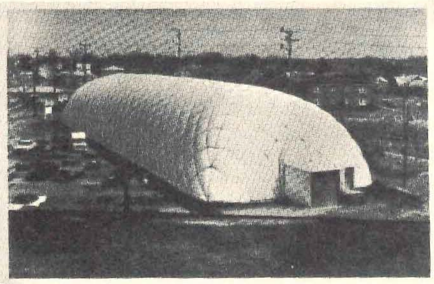


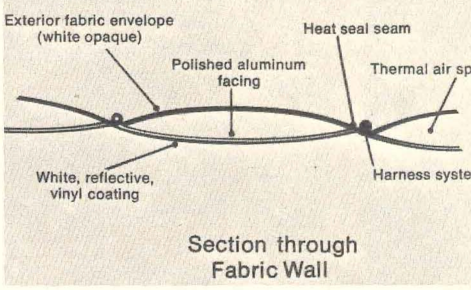
Multi-purpose tables





Water cooler





Multi-purpose tables. The "Z" tables shown was designed by Eve Frankl ASID who was awarded the 1975 Resources Council Product Design Award in the furniture category. Made of solid ash with a natural or stained oak or walnut finish, the tables are stackable, and may be used individually or meshed into larger units. They are available through designer showrooms. The David-Edward, Ltd.
Circle 101 on reader service card

Waterless flush toilet. Self-contained closed loop flush system, uses an oil-based crystal clear flushing fluid which is purified and reused over and over again. It is intended for residential and public use applications and particularly where septic tanks are prohibited or impracticable. Sar Industries, Inc.
Circle 102 on reader service card

Light control louver. Each wall of every 1½"x1½" louver cell is a mirrorlike specular curved surface that reflects light downward. The angle of curvature of every louver cell wall depends on its orientation to this linear light source. It is available in four different finishes from American Louver Co.
Circle 103 on reader service card

Wash-off drawing film is a wet-erasable material for making drawing copies. Films are silver-sensitized, negative-working materials on a semi-translucent base which can be used for reproducing both line drawings and screened halftones. Film is available in a wide variety of sheet and roll sizes, with a matte finish on one or both sides and in either contact or projection speed. Chemco Photoproducts Company.
Circle 104 on reader service card

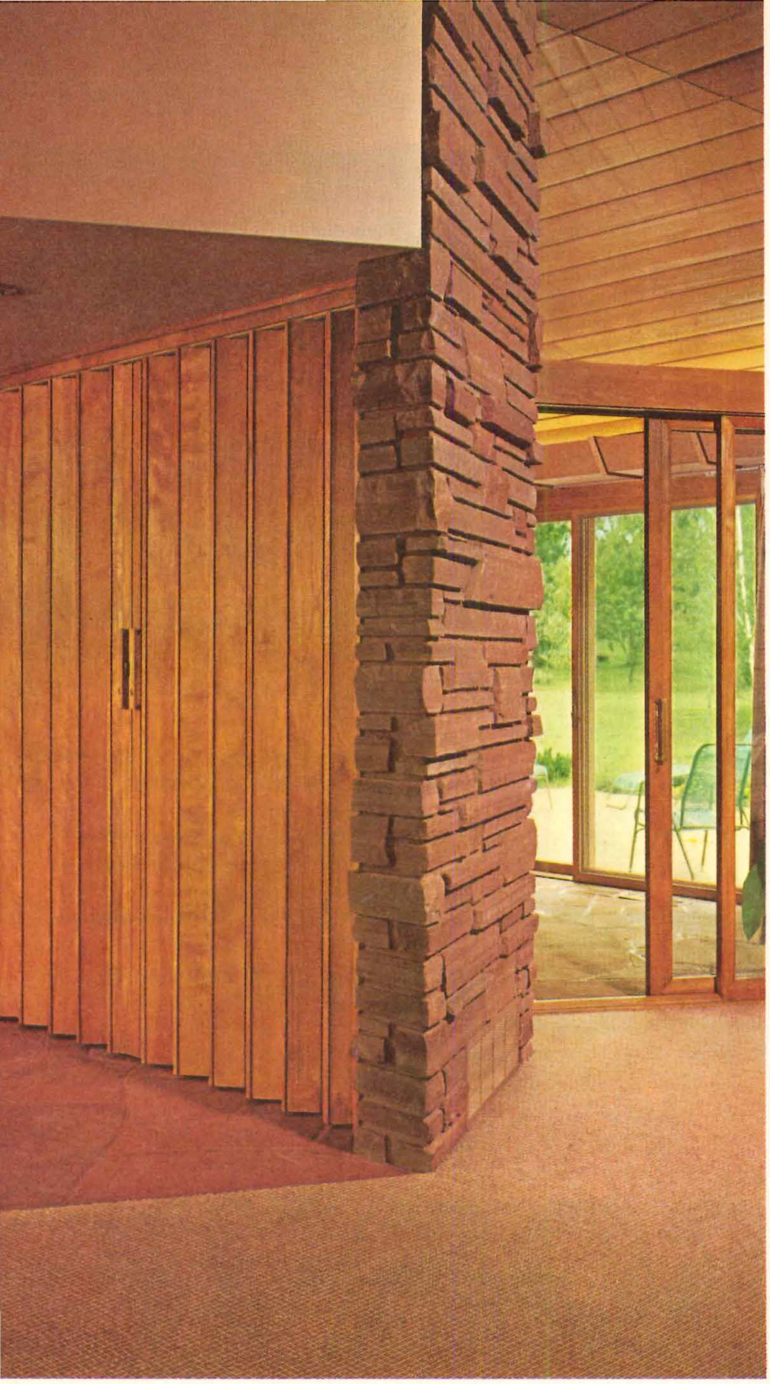
Security device announces entrance of a vehicle in residential or commercial driveways. Electronic circuit is sensitive to vehicles passing within five ft of the sensor and will activate a beeper in the residence or other facility. Sensor may be located up to 1000 ft from the control unit, and it may be concealed at the side of a road rather than embedded in the pavement. An optional accessory is available which will automatically switch on floodlights upon detection of a vehicle at night. Delaware Science Associates.
Circle 105 on reader service card

Water cooler for wheelchair users has stainless steel exterior surfaces, with paired, self-closing level handles located one on either side of the fountain. Model shown is suitable for installation in public buildings. Haws Drinking Faucet Co.
Circle 106 on reader service card

Mural-size graphics. Anything that can be photographed—including art or printed matter can now become a four-color graphic by a computerized process that images with pigmented paints, states manufacturer. The technique is based on computer scanning of a color transparency and transmitting the color information to micro paint spray guns. Cloth, paper, or other substrate material travels under the guns on a rotating drum. According to the maker, any subject, any size, and any color combination are possible, even colors different from those of the original. Graphics may be painted on ten standard materials including: high gloss paper; hessian, a burlap like fabric; Lunnon, similar to linen; and on several designer fabrics of rayon and nylon. 3M Company.
Circle 107 on reader service card

Thermaliner. The liner is of polished aluminum with a white vinyl coating facing the interior area to reflect indirect lighting. Heat sealed to the exterior envelope, panel by panel, a four- to six-in. air space is created between the two fabrics. Maker states that use of this liner provides an airtight structure. Air-Tech Industries, Inc.
Circle 108 on reader service card

Lighting systems. Rails, bars, and beams are similar in function and form but vary in size and light output. All are compact, linear, fluorescent elements that comprise long straight runs or modular ceiling grids. Each type includes a separate series for indirect and direct illumination and models for each series are surface, suspended, or wall mounted. Units are of extruded aluminum with satin anodized finishes, have extruded clear prismatic acrylic lenses, and come in lengths up to 24 ft. Configurations may be triangles, rectangles, pentagons, hexagons, and other geometric patterns possible with miters, butt joints, or corner blocks. Peerless Electric Co.
Circle 109 on reader service card
[continued on page 104]



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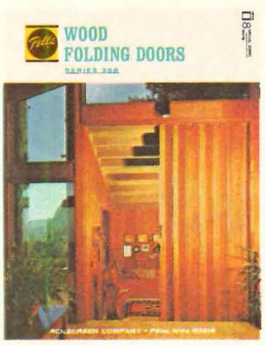

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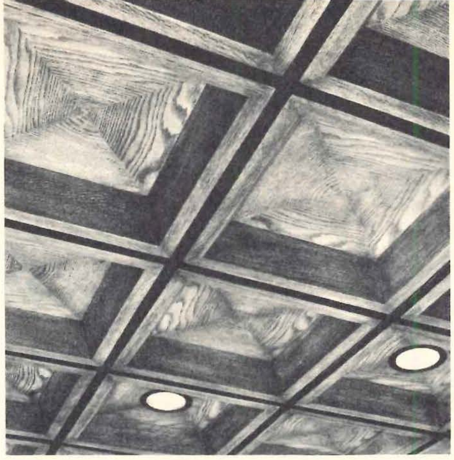
Also Available Throughout Canada This coupon answered within 24 hours.

Products continued from page 102

Lighted ceiling. Material that is rated noncombustible by ASTM E-136-65 gives three-dimensional grain structure of natural oak. Two-ft square coffers are suspended on a matte black inverted T-bar grid. Lighting is provided by standard downlights or wall washers which can be placed within any coffer. Standard module is 24"x24" with special size modules possible. Integrated Ceilings, Inc.
Circle 110 on reader service card

Safety locks provide four dead bolts acting in four different directions simultaneously, driving into the floor, top, left and right side of the door frame. Mechanism and security rods are made of high strength steel. Lock is said to be jam proof, and it operates with keys or by an interior knob. Installs in wood, metal, fiberglass, solid core, hollow or foam filled doors, in any location on a door. Quadlok.
Circle 111 on reader service card

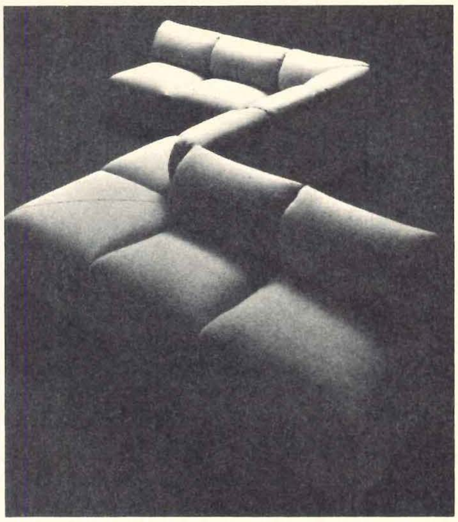
Drapery hardware that has the baton used to hand draw draperies on the outside of the draperies is said to help reduce soiling and to prolong the life of drapery fabric. The hardware, which is designed for hotels, motels, and other high-abuse areas, can be wall or ceiling mounted. Kirsch Company.
Circle 112 on reader service card



lighted ceiling

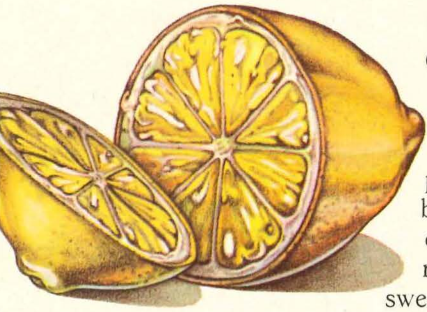
Natural stone tiles and slab flooring and wall panels are produced in the Netherlands and distributed nationally in the United States. Alta Quartizite tile comes from quartz-biotite rock and is a medium shade of gray-green. Tiles range from 5½"x11½" to 23½" square. Thicknesses may be either ⅜" or ⅝" nominal, plus or minus one/eighth inch. Gran-Quartz International, Inc.
Circle 113 on reader service card

Unitized weatherstripped steel door frame (for masonry construction) is UL approved. The frame is available finish painted in any of ten standard colors, galvanized, and in rust inhibiting beige primer. Steelcraft Manufacturing Co.
Circle 114 on reader service card

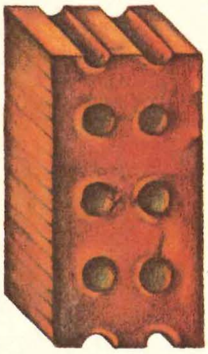
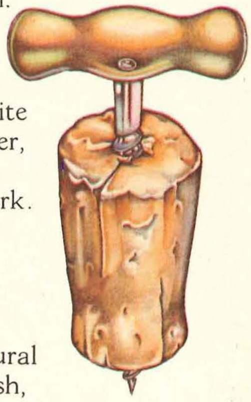


Seating. Various components, with and without arms, can be used as single and double units for individual chairs and settees, in groupings of three- or four-position sofas and occasional chairs, or as corner assemblies, U-shaped groupings, and angled configurations. The frame is metal, padding is foam polyurethane and dacron fiberfill; components may be upholstered in a variety of fabrics and leathers. Fabric covers are zippered. Atelier International, Ltd.
Circle 115 on reader service card
[continued on page 106]

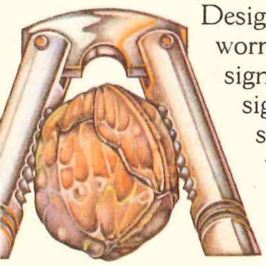
A few words about Marlite® doors...




Give us the word on what color you want. White, polar white, swan white, designer's white, solid white, misty white, meerschaum, oyster white, dove grey, antique white, champagne, parchment, beige, portland grey, putty, oatmeal, burnished gold, pongee, parrot green, biscuit, pale gold, antique gold, gold, citron, honey suede, lemon, daffodil, mayan gold, mayan yellow, butterscotch, sweet lime, green- brier, indian gold, kumquat, pumpkin, orange peel, lettuce, harvest gold, apple green, patriot red, chinese red, orange, brick, sky blue, frosty blue, forest green, delft blue, raspberry, cranberry, russet, space blue, vivid blue, wild iris, cerise, independence blue, terra cotta, burgundy, regimental blue, black, black pearl, plum, brown, tuscan brown.

Talk to us about textured and dimensional finishes. Mini-weave, planked corcho, natural cork, stucco, white prism, fresco, slate, black slate, herringbone, fossil, leather, blue denim, natural cane, intaglio, shantung, cordoba natural cane, tipped leather, planked corcho, natural cork.


Speaking of woodgrains. Designer's teak, light wormy chestnut design, chapel oak design, dark wormy chestnut design, shell pecan design, concord gray weatherboard, darby brown weatherboard, walnut design, gray barnside®, rosewood design, swedish cherry design, american walnut design, brown barnside®, executive walnut, colonial maple, oak, figured rosewood, english oak, silvan teak, natural butcher block, barrel oak, distressed pecan, natural silvan teak, golden ash, frostwood design, weathered yew, knotty cedar design, denver walnut design, pecan design, lotus teak, presidential dark walnut, light teakwood, carpathian burl, wormy chestnut, shenandoah fruitwood.


Leathers, abstracts and marbles worth a 1000 words. Executive leather, HIA brown leather, palomino leather, harvest leather, avocado leather, black leather, white leather, pompeii, cathedral, DaVinci, blue cathedral, white onyx, golden antigua, harvest sonata, lime antigua, spring sonata, brown antigua, avocado cascade, burnt orange antigua. And many, many more.

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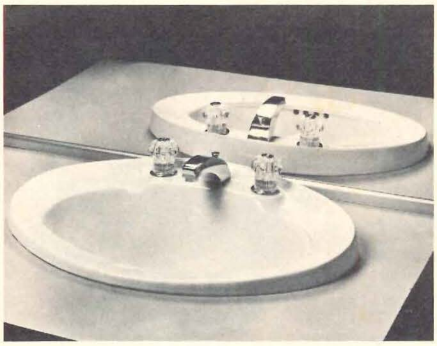


Roof window

Movable filing and storage system. Manufacturer of FULLSPACE XL states that it features a newly designed steel carriage frame and larger solid steel wheels making 9000-lb load capacities per carriage now possible. Units glide from side to side, opening only the aisle required. A wide range of options are available to meet many specific needs. Lundia, Myers Industries.
Circle 118 on reader service card
[continued on page 108]

Oversized bath lavatory. The vitreous china, self-rimming oval countertop unit is 25 in. wide and 18 in. deep and has a rear rim that slopes downward so that splashed water will drain into lavatory. It is drilled for either a 4-in. centerset or an 8-in. combination fitting and has twin soap dishes, concealed front over-flow and anti-splash rim. Universal-Rundle Corp.
Circle 116 on reader service card

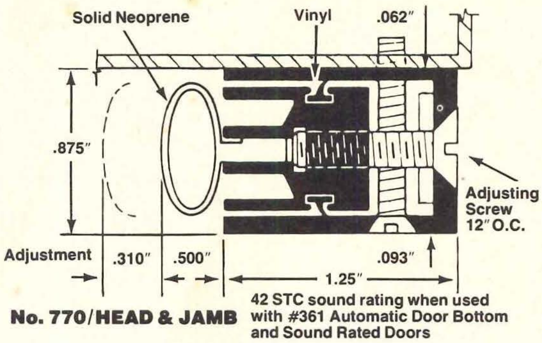
Roof window. According to manufacturer, it is easy to install and clean (180 degree window rotation) and provides fuel savings because of insulated glass and weatherproofing. It is adaptable to new or existing buildings. Sun screening, venetian blinds, and remote operation are optional features. Velux America Inc.
Circle 117 on reader service card

Nothing else like it:

Zero's newest Compress-O-Matic

The most effective stop-applied acoustical seal in the industry is the Zero Compress-O-Matic®. Used with sound-rated doors and automatic door bottoms, it earned a 35-42 S.T.C.

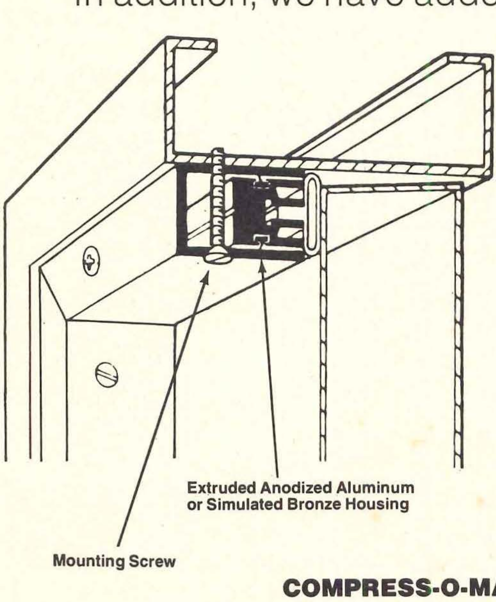
Now Zero has added a new dimension to its Compress-O-Matic series: an adjustable acoustical seal for doors *without* stops. We call it our Compress-O-Matic 3001.



Our initial test of a first-run sample of this new Zero seal attained a 42 S.T.C. rating. Based on this test, we believe that the Compress-O-Matic 3001 will eventually rate out in the 45 S.T.C. area! It's easy to see why:

For one, the Zero 3001 can be adjusted approximately every 11″. And because of the special elliptical shape of the extruded, solid Neoprene used, a compression is obtained as the adjustments are made. Result? The tighter the contact, the better the acoustical result.

In addition, we have added vinyl fillers on both sides of the insert and have increased its weight 2½-times that of our standard adjustable stop 170. All this prevents sound leakage and produces better acoustical results.



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Until you've tried the 3001, you don't know what quiet is.

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Products continued from page 106

Pre-built modular bathroom is self-contained room equipped with fixtures and external plumbing, water, and electric hookups. Molded fiberglass is used for walls, ceiling, and tub; module forms its own sealed shipping container. Four models are available. Each is 8'x6' with varied arrangements of the bathroom elements for different floor plan preferences. Two half-bath models are also available, each 6'x4'-6". A choice of colors is offered. Full-bath units weigh less than 1000 lbs. Plasco, Inc.
Circle 119 on reader service card

Perimeter venting installs above and between window glass and drapery. Made of extruded aluminum or zinc-plated steel with exposed surface painted and other surfaces primed. In addition to providing ventilation between window and drapery, Acousti-Vent Drapery Pocket provides a base to which the drapery track can be attached with self-tapping screws and/or using bolts and washers in the slotted areas. Maker states that providing ventilation between glass and drapery to equate the temperature, helps reduce glass expansion, breakage, reduce fogging, window cleaning costs, and uncomfortable cold down-drafts. Fry Reglet Corporation.
Circle 203 on reader service card

Literature

Rolling doors. Four-color catalog illustrates and describes all types of rolling doors and grilles including fire doors, security doors and grilles and more. Updated catalog includes specifications, selection charts, and installation details. The Cookson Company.
Circle 201 on reader service card

Connectors/hangers. The 1976 catalog includes complete line of code-approved connectors complete with dimensional details and load values. Featured are FN formed seat joist hangers, the W purlin hangers, the HSA strut or shear connectors, and the BV knee brace. Simpson Co.
Circle 202 on reader service card

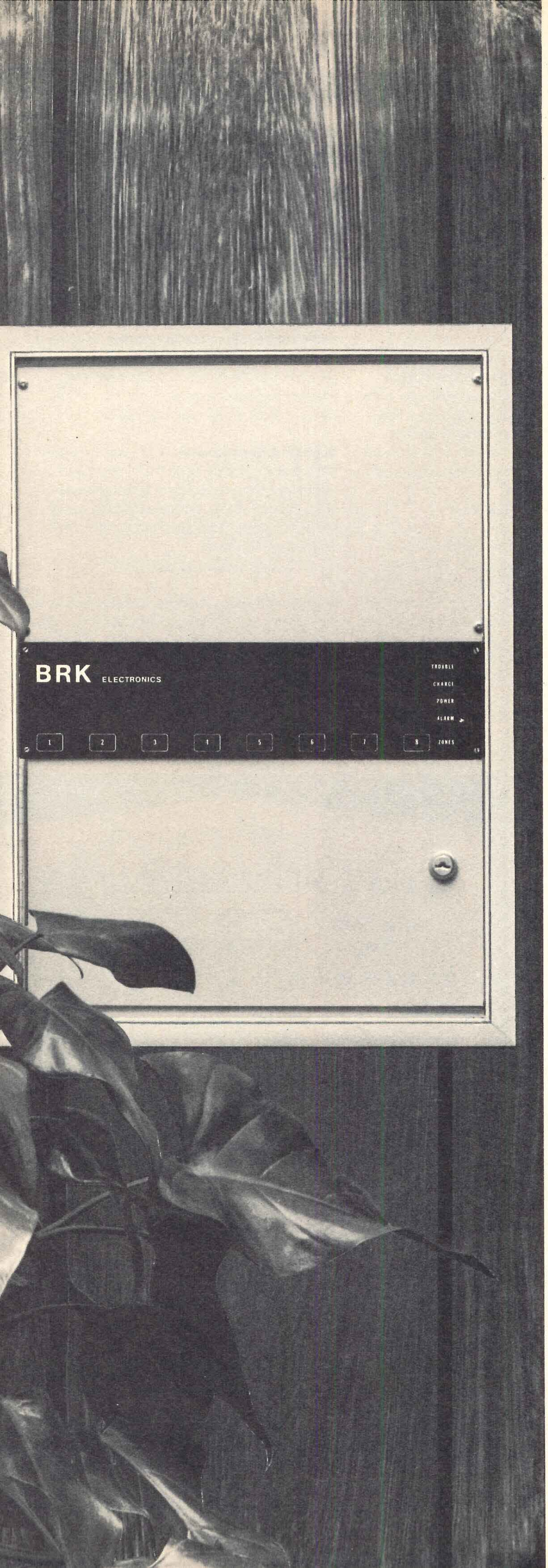
Walkway covers. Four-color brochure describes and illustrates walkway covers, suspended canopies, fascia systems, and optional equipment such as railings, fences, light fixtures. Also included are installation details, specifications, loading tables. E.L. Burns Company.
Circle 204 on reader service card

Polymer concrete precast panels are described and illustrated in full-color brochure that also provides performance data. Product is suggested as a lightweight alternative to cement concrete precast panels. Surfaces are available in aggregate, textured, or special finishes and panels can include integral polyurethane or foamed glass insulation. Architectural Research Corporation.
Circle 205 on reader service card

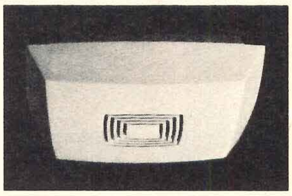
Stud wall system of concealed slotted standards is described in four-color brochure. Consisting of metal studs and slotted standards which are integrated into drywall fixture walls, the system allows use of all walls for hanging cabinets, shelves, desks, coat racks, lab equipment, lamps, bookcases, pictures, etc. Brochure includes specification sheet, gives sizes and capabilities of standards and brackets. Garcy Corp.
Circle 206 on reader service card

Drainage-waste-vent system. RufWall is a cast iron system which uses No-Hub pipe, fittings, and couplings along with specially designed multi-outlet and special purpose fittings. Room units meet local codes, have no wasted joints or space, and may be fabricated off-site or at the point of installation, according to company brochure. Said to be suited for multiple floor buildings where people spend the night such as apartments, hotels, motels, dormitories, condominiums, prisons, hospitals, retirement centers. Tyler Pipe.
Circle 207 on reader service card

Finnish plywood. 12-page technical bulletin details both birch-faced and all-birch film overlaid plywood especially suited for concrete formwork. Stress factors, strength values, section properties, and loading tables are illustrated in charts and graphs. Finnish Plywood Development Association-USA.
Circle 208 on reader service card
[continued on page 110]



Unique answer to multi-family fire detection.



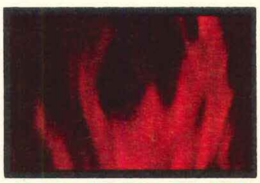

BRK's new MCP741 Master Control Panel and advanced ionization detectors solve many of the special problems of apartment house fire detection.

Basically, a BRK system consists of at least one ionization detector in each apartment, and a centrally located Master Control Panel, to which the ionization units are connected by a simple 2-wire circuit. The ionization detectors will sound an alarm in the affected apartment, as well as a general alarm at the Panel and throughout the building.

Each ionization detector has terminal strips to which heat sensors and rate-of-rise detectors can be connected. There's a *battery conversion* feature, too, allowing the ionization detector to be cut out of the building's system and operated on battery power alone. If an apartment has too many nuisance alarms that disturb the whole building, its detector can be placed on battery operation, confining alarms to that apartment only.

To insure each apartment's privacy, while allowing tests of its detector, BRK has key-operated test stations for hallway location. The key not only tests for "power on", but also checks the unit's circuits and sensitivity. Hallway pull boxes are also part of the BRK system, and are connected to the MCP741 Control Panel. This advanced solid-state panel accommodates up to 8 zone modules, each capable of handling up to 60 detectors. Overall, the system can accommodate hundreds of ionization detectors, plus an almost infinite number of heat and rate-of-rise detectors and pull boxes.

Other features include remote annunciation, battery backup power and float recharge system in the control panel, UL listing of detectors and panel, easy installation, and reliable operation. For more facts write or phone BRK Electronics, Div. of Pittway Corp., 525 Rathbone Ave., Aurora, Ill. 60538. Phone: (312) 892-8721.



BRK ELECTRONICS

First in Fire Warning

Literature continued from page 108

Pressure-creosoted wood products are described in brochure, "Creosote Makes Wood Permanent." It identifies the product's use in utility and transportation applications, commercial, agricultural, and marine construction, and includes in technical notes the lumber species and recommended AWPA Specifications for creosote and creosote solutions. Koppers Company.
Circle 209 on reader service card

Architectural glass. Brochure discusses insulating, tempered, laminated, and custom bent glass, provides the architect and specifier with information on each product line, includes suggested product specifications, fabrication, and performance data, possible variations, and applications. Size and design limitations are also discussed. Viracon, Inc.
Circle 210 on reader service card

Window/gliding door catalog for 1976 has been released. Included in catalog are data on company's line of casement, awning and gliding windows; double-hung windows; gliding doors; exterior shutters, and prefinished basement/utility windows as well as prefinished wood gliding doors. Cat. No. 761 contains installation data, glazing options, unit sizes, and many window and gliding door combinations. Andersen Corporation.
Circle 211 on reader service card

Bacterial growth on building materials. The Research Clinic of the Hospital Institute in Modena, Italy, has released a study showing the rate of bacterial growth on the surfaces of various building materials. Products studied were stainless steel, anodized aluminum, raw aluminum, dressed aluminum, enameled plate, dressed plate, ABS polymer, polystyrene, and polytetrafluoroethylene. Spontaneous contamination, induced contamination, and decontaminability of the different materials were observed and recorded. Alliancewall Corp.
Circle 212 on reader service card

Re-roofing base. Material is a specially formulated, fiber-reinforced perlite concrete which can be applied over old graveled built-up roofing or insulation. According to manufacturer, it permits mechanical fastening of base sheet over non-nailable decks and allows normal traffic during re-roofing. Literature describing product is available from Grefco, Inc.
Circle 213 on reader service card

Architectural coatings. A 24-page brochure describes water-base coatings as well as solvent-base polyester-epoxy high solids coatings, a block fillter, and a sealer. A water-base acrylic-epoxy coating in gloss and semi-gloss sheens is newest addition to line and it is currently available in white and pastel tinting bases. Request Booklet No. 83, "Pitt-Glaze Coatings" from PPG Industries.
Circle 214 on reader service card

Concrete forming systems. Illustrated brochure gives technical and job-site pictures, describes vertical forming capabilities using various forming systems. Specialty applications using these systems and accessories are included. Symons Corporation.
Circle 215 on reader service card

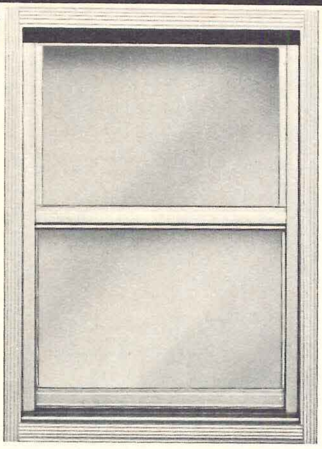
Laminated wood pedestrian bridges for crossing rivers, streams, highways, and other obstacles are illustrated and product data given in brochure entitled, "Koppers Wood Pedestrian Bridges." Featured are company's services for pedestrian bridges, including standard designs, design or fabrication assistance for special applications, and erection of laminated wood bridges. Koppers Company, Inc.
Circle 216 on reader service card

Waterproofing material. Four-page brochure describes hydrocide elastomeric membrane waterproofing material which is a ready-to-use sprayable liquid that can be applied to vertical or horizontal below grade surfaces, states maker. Sonneborn-Contech.
Circle 217 on reader service card

Energy control. Four-page illustrated brochure describes computerized system which operates heating and air conditioning equipment and can be adapted to fire safety monitoring and control, security, and control of electrical and mechanical equipment in building. Johnson Controls.
Circle 218 on reader service card

REPLACEMENT WINDOWS

KEEP OUT...



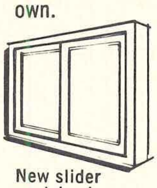
HEAT . . . for lower summer cooling costs.

COLD . . . for lower fuel costs.

DUST/DIRT . . . save on maintenance.

AIR . . . low air infiltration.

NOISE . . . with insulating glass the only traffic in your place is your own.



New slider models also available.

L-P replacement windows keep out everything but the view for any shape opening in any type of construction . . . custom fit.

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Weather-Seal Division

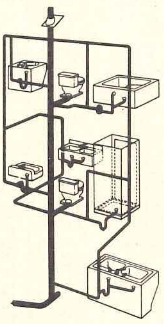
Commercial Products: 324 Wooster Rd. N. Barberton, Ohio 44203 216/745-1661

Send for free color brochure complete with specifications.

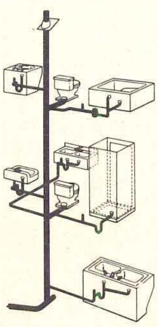
Circle No. 363, on Reader Service Card

ELIMINATE SECONDARY VENTS WITH THE V-200 AUTOMATIC PLUMBING VENT

THE OLD WAY



THE V-200 WAY



NSF-24

74-33

THE V-200 DOES NOT REPLACE THE MAIN STACK

SINCE 1968 THE V-200 AUTOMATIC PLUMBING VENT HAS BEEN USED TO VENT HUNDREDS OF THOUSANDS OF FIXTURES IN HOMES, FACTORIES, OFFICES, BARBER AND BEAUTY SHOPS, SHOPPING CENTERS, APARTMENTS, RESTAURANTS, HOSPITALS AND DENTAL CLINICS.

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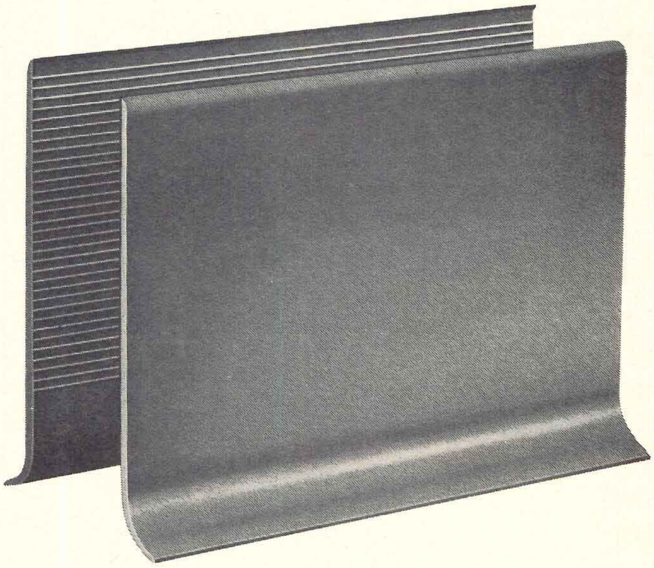
Circle No. 332, on Reader Service Card

VPI solid vinyl wall base and "dead-set" adhesive



no shrinkage

When you spread the VPI special #300 adhesive and apply VPI solid vinyl cove or straight base, you'll discover trouble-free performance. VPI adhesive is exclusively formulated to prevent lateral movement, eliminate shrinkage.

no cracking

Bend VPI wall base around corners. Form it over wall or floor irregularities. Here's flexibility and dimensional stability so consistent that corners can be wrapped without fear of cracking or stress whitening.

no weakening

With VPI #300 adhesive, VPI wall base holds tight. There's no chemical reaction to create voids that allow the base to pull away from the wall.

Select from ten contemporary colors. Compare competitive quality, service, and on-the-wall cost. Discover built-in profit and easy, forget-about-it installation. 51-280R

no wonder!...

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P/A Book Store

Described on the following pages are architectural books that are now available to you from leading publishers. Each has been selected for its usefulness to you in the various aspects of your professional practice.

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1 Construction Inspection Handbook

By James J. O'Brien,
512 pp., 140 illus., . . . $17.95

Outlines the duties, requirements and interests of the construction inspector. Describes the "whys" as well as the "how-tos" involved in observation of construction quality. Including handy checklists to work from, the book shows you exactly what should be reviewed and inspected.

Circle B601 under Books.

2 New Uses for Old Buildings

By Sherban Cantacuzino,
280 pp., illus., . . . $29.95

'New Uses for Old Buildings' presents an architectural concept whose time has come. There are many unused or under-utilized buildings existing today whose construction and detail — which can never be recreated — should be preserved. But today's increasingly sophisticated demands for standards and services, as well as tighter codes for fire and safety, make the conversion of an old building to a new one a formidable task.

Circle B602 under Books.

3 Perspective: a new system for designers

By Jay Doblin,
68 pp., illus., . . $7.50

The first system developed to solve the kind of drawing problems encountered by designers. Eliminates the complex mechanical drawing that an architect normally employs in his traditional way of working with plans and elevations. The system offers a simpler method of visualizing any three dimensional object accurately and quickly.

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4 Marinas: A Working Guide to Their Development and Design

By Donald W. Adie,
336 pp., illus., . . $39.95

Boating occupies an increasingly important position in the major growth industry of leisure. Because boating involves vast expenditures, and the need to conserve and use water resources wisely, these facilities demand high expertise in planning and design, w this up-to-date guide provides.

Circle B604 under Books.

5 Architectural Graphics

by Frank Ching,
128 pp., illus., . . . $9.95

This book presents graphic technic available for conveying architec ideas. Included is know-how on ec ment and materials; drafting; arch tural conventions for orthograp paraline and perspective drawi devices for rendering tonal/tex values and context; graphic sym and lettering; freehand sketching diagramming; and effective prese tion of design proposals.

Circle B605 under Books.

6 Architectural Rendering The Techniques of Contemporary Presentation

By Albert O. Halse, 326 pp., illus., 2nd edition, 1972 . . . $24.50

This completely up-dated revisio the most widely used guide to arct tural rendering covers all wor phases from pencil strokes to finis product — and shows how to ot the desired mood, perspective, and color effects, select proper ec ment and work in different media.

Circle B606 under Books.

7 Construction Design For Landscape Architects

By Albe E. Munson,
256 pp., illus., . . . $11.50

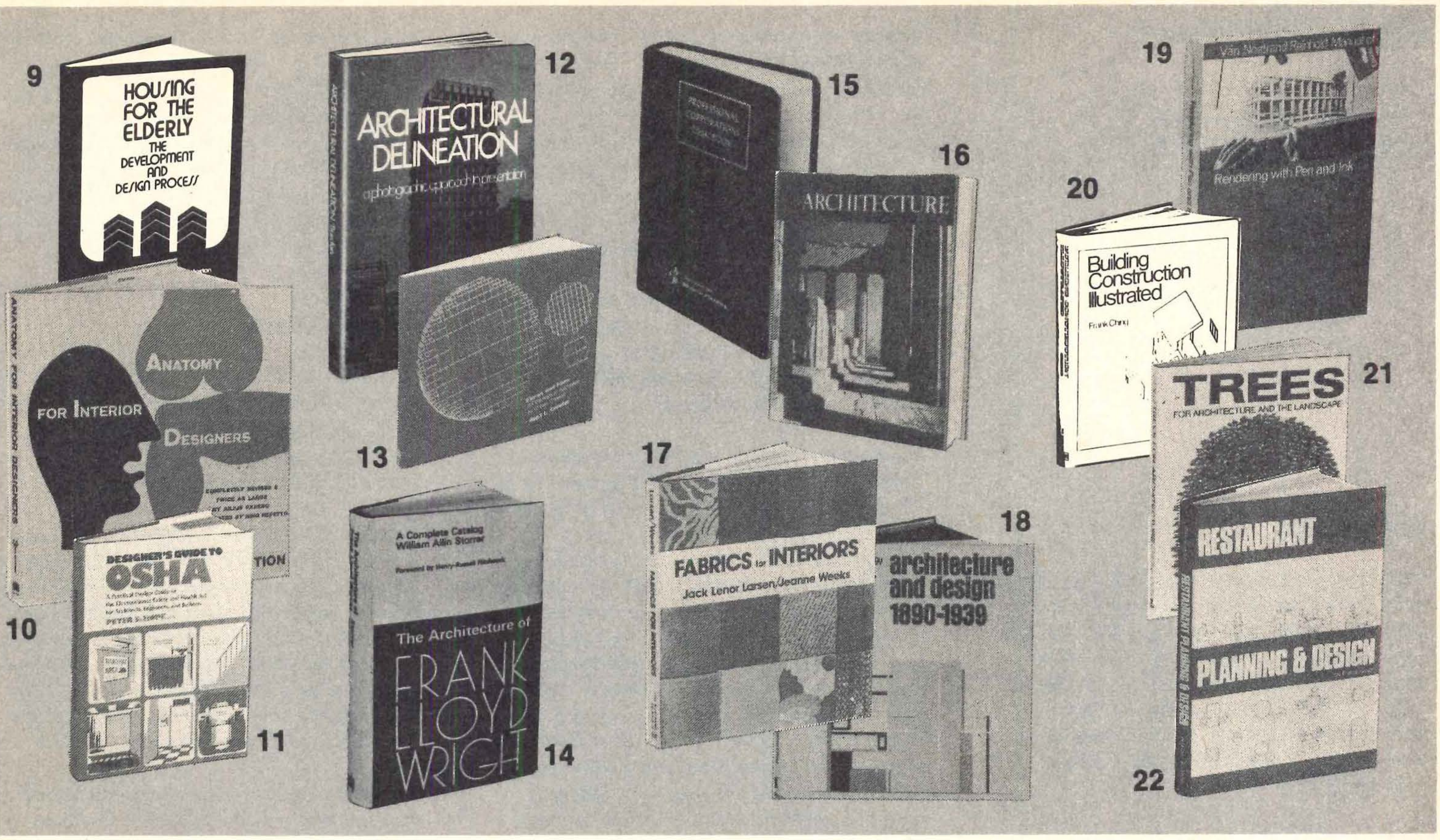
This volume is a complete guide tc preparation of a building site for struction or landscaping. The book written for use as a rapid refreshe the practicing landscape architec well as a handy reference guid short-cut methods that will be o terest to the civil engineer doing improvement plans.

Circle B607 under Books.

8 Residential Designs

Edited by David E. Link,
192 pp., . . . $14.50

Hi-rise or low cost, condo, multi-far custom or townhouse, here's a de book that shows you the very be



/ class. Complete collection of gns with over 200 illustrations ring techniques used by some of ation's leading builders, planners designers.

e B608 under Books.

ousing for the Elderly

aac Green, Bernard E. Fedewa, es A. Johnston, William M. son and Howard L. Deardorff, op., illus., . . . $13.95

book provides ready-to-use elines for producing high quality ng for older Americans. It shows kinds of housing that meets the cal, social and perceptual needs enior citizens. Emphasized are of shelter, environments and ser- required by independent elderly ts as well as those who need d health and social services.

e B609 under Books.

Anatomy for Interior Designers:

Edition
lius Panero,
p., illus., . . . $9.95

is a comprehensive book of ic standards for designers of in- s. It contains all the data the r needs for designing around e, designing people in and ning things for people to use: the of design, residential and com- al applications, lighting, material rizontal and vertical movement, je space, furniture, windows, and .

B610 under Books.

Designer's Guide to OSHA

ter S. Hopf, A.I.A.
p., illus., . . . $17.50

practical volume translates 's tens of thousands of words asy-to-use drawings, diagrams, and graphs. With OSHA viola- increasing, engineers obviously a working guide to compliance overnment job safety and health ards. This book fills that need. All al is presented in the same se- e as the OSHA regulations are n.

B611 under Books.

12 Architectural Delineation A Photographic Approach to Presentation

By Ernest Burden, 288 pp., illus., 1971 . . . $21.95

In this illustrated book, the author demonstrates a simple, flexible method of using photography to depict architectural projects in true perspective. Also how to create models for photography and how to put together an effective slide presentation.

Circle B612 under Books.

13 Energy and Form

By Ralph L. Knowles,
198 pp., illus., . . . $27.50

This is a scholarly, theoretical book, a major work that will be used for years to come. The projects described concentrate on reducing environmental problems in individual or groups of buildings by controlling shape and structure, scale and surface, volume ratio, location and orientation, isolation and insulation.

Publisher will bill you direct before shipping any book.

Circle B613 under Books.

14 The Architecture of Frank Lloyd Wright: A Complete Catalog

By William Allin Storrer, $9.95

The first fully complete catalog of every building designed by Wright that was actually constructed — 433 in all — includes a photograph of practically every one of them, and a descriptive note on the materials used, the plan, and the circumstances of construction.

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15 Professional Corporation Desk Book

Published by: The Institute for Business Planning, Inc.
427 pp., illus., . . . $29.95

You see at a glance which form of practice is best for you — partnership or corporation. The Desk Book compares the opportunities and pitfalls of each. It singles out retirement planning, especially in light of the new Pension Reform — the biggest single reason why so many professional men have opted for a corporate form of practice.

Circle B615 under Books.

16 Architecture

By David Jacobs,
191 pp., illus., . . . $10.00

Stunning modern photographs juxtaposed with plans, cross sections, scale models and historic views form a vivid counterpoint to the authoritative text. A five-page chronology relates events in the history of architecture to other cultural and political developments.

Circle B616 under Books.

17 Fabrics for Interiors

By Jack Larsen and Jeanne Weeks,
208 pp., illus., . . . $14.95

Completely geared to current trends, this book can make the difference between costly mistakes and successful, personalized interiors. It explains functions and requirements of fabrics for wndows, furniture, walls and ceilings.

Circle B617 under Books.

18 Architecture and Design, 1890-1939

Edited by Timothy Benton and Charlotte Benton; with Dennis Sharp,
264 pp., illus., . . . $12.50

This concentrated study of the rise of the Modern Movement in architecture and design covers the half century during which attitudes toward these practical arts were changing dramatically. Based solely on original source material, this book contains extracts from the writings of such influential men as: Adolf Loos, Henry Van De Velde, Hermann Muthesius, Walter Gropius, Le Corbusier, Mies van der Rohe, Bruno Taut, Louis Sullivan, and Frank Lloyd Wright.

Circle B618 under Books.

19 Rendering With Pen And Ink

By Robert W. Gill,
368 pp., illus., . . . $6.95

This paper-back edition is a copiously illustrated guide to the techniques and methods of rendering, including sections on perspective, projection, shadow, reflections, and how to draw cars, ships, aircraft, trees, and human figures. The author also describes the very wide range of instruments and equipment currently in use.

Circle B619 under Books.

20 Building Construction Illustrated

By Frank Ching,
320 pp., illus., . . . $17.95

Charmingly hand-lettered by the author, this book presents step-by-step techniques in residential and light construction. Containing over 1,000 drawings, it covers materials, finishes, fastenings, posts, trusses, slabs, wood joists, light steel/aluminum, structural calculations, planning and site work, cost estimating, and construction sequencing.

Circle B620 under Books.

21 Trees

By Robert L. Zion,
168 pp., illus., . . . $12.95

An inexpensive paperback version of the book with virtually everything you want to know about using trees to complement the buildings you design. Both aesthetic and practical considerations are given, including tree characteristics, as well as cost considerations, planting, maintenance, rate of growth, and city and seashore recommendations.

Circle B621 under Books.

22 Restaurant Planning & Design

By Fred Lawson,
180 pp., . . . $24.95

Develops in detail the elements that go into successful restaurant planning. Not only provides a step-by-step guide in design procedure for the architect and designer, but presents essential technical information in convenient form which will be of value to all catering administrators.

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Assistant Professorship in Architecture: The School of Architecture of the University of Maryland is accepting applications from qualified persons for a position as Assistant Professor to teach design studio and upper-level course in visual design. M. Arch. or equivalent required; some teaching experience highly desirable. Professional experience helpful. Applicants should have an interest and demonstrate competence, in visual design theory, especially as it applies to architectural design. Letters of inquiry and resumes should be sent to Mr. Dale Hutton, Chairman, Faculty Search Committee, School of Architecture, University of Maryland, College Park, Maryland 20742. Resumes will be received until *March 31, 1976.* The University of Maryland is an equal opportunity employer.

Distinguished Professorship in Architecture: The School of Architecture of the University of Maryland is accepting applications from qualified persons for a one-academic-year, full-time appointment as distinguished professor, to teach an upper-level studio and one additional elective. Applicants should have experience and credentials commensurate with the title of the position in teaching and/or architectural design. Salary in $25,000 range, plus discretionary support fund. Letters of inquiry and resumes should be addressed to John W. Hill, Dean, School of Architecture, University of Maryland, College Park, Maryland 20742. Resumes will be received until March 31, 1976. The University of Maryland is an equal opportunity employer.

Faculty: New School of Architecture Florida A&M University invites applications in area of, advanced design, building Science, Industrialized building, Building Technology, design and project management, building programming, systems building, Design methods: Unique opportunity to Assist in Development of New Programs: Interest in Research Necessary: Tallahassee, Florida 32307.

Faculty: Teaching position in Environmental Controls and Management. Applicants should be a specialist in architectural illumination, architectural acoustics, or mechanical thermal energy systems with a working knowledge in all. Research or related consulting experience useful. Deadline: March 1, 1976. Apply: Department of Architecture, 208 Gould Hall, University of Washington, Seattle, Washington 98195. The University is an equal opportunity employer.

Faculty Positions: In architectural design. Applications and nominations are sought by Texas A&M University for positions on the Environmental Design faculty available 1 September 1976 on a nine-month basis. *Job Description:* To instruct at the undergraduate level (beginning and/or advanced classes) in the subject area of architectural and environmental design, working drawings, and graphic presentation. A Master's degree from an accredited school is required as well as a professional license or intent to obtain professional registration. Candidate should have office practice experience. Salary is commensurate with full-time, nine-month employment at Instructor, Assistant Professor and Associate Professor ranks. Texas A&M University is an Equal Opportunity/Affirmative Action Employer. *Application:* Applications should include a resume, academic credentials and letters of reference. A portfolio, or slides, should be available if called for. These would be promptly returned. Applications or nominations should be sent to: Robert P. Darlington, Head, Department of Environmental Design, College of Architecture and Environmental Design, Texas A&M University, College Station, Texas 77843.

Syracuse University: School of Architecture will have one full time permanent position and one part time temporary position open for fall of 1976. The positions are in the undergraduate Architectural Design Studios. Applicants for the permanent position should have a strong secondary Architectural capability. Registration in one or more states is preferred. Rank: Assistant or Associate professor depending on qualifications and experience. Please send resumes and references to Professor Paul Malo, Chairman, Appointments Committee, School of Architecture, Syracuse University, Syracuse, New York 13210. Syracuse University is an Equal Opportunity/Affirmative Action Employer.

Two: (2) positions available in FIDER accredited program of Interior Design. Subject areas: design basics, delineation, specifications, professional practice, contract design and other related areas. Master's degree required, professional experience highly desirable. Equal opportunity employer. Contact Paul J. Lougeay, Chairman, department of Interior Design, Southern Illinois University-Carbondale, Illinois. 62901.

Volunteer Peace Corps/VISTA: Architects/planners needed for Peace Corps projects i Latin America, Africa, Asia; VISTA projects in 25 U.S. cities. Housing projects, design schools, hospitals, community centers, rehab., university teaching, regional planning, etc. Expenses paid, travel, medical, vacation and living. U.S. citizen. Singles or couples only. Information: Lynn Rothenber ACTION, ORC Box A-2, Washington, D. C. 20525.

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Architect: All phases experience Business Development, Office & Project Managemen 20 years top national firms & private practice, hi-rise commercial, corporate, retail, hotel, medical, public, residential. Multi-licensed, BA, MA. Desires responsible care executive or partnership progressive firm. Can bring contacts, clients. Reply to Box #1361-911, *Progressive Architecture.*

Architect: Heavy in specifications. Some contract-office administration. Seeks broad experience in latter, or combined with former, or in specifications alone. Medium siz office desired. Reply Box #1361-912, *Progressive Architecture.*

Architect/Hospital Consultant: Presently w excellent national A/E firm. Responsibilitie include: development, programming, plann and design. Seeking partnership opportuni Knowledgeable, articulate, adept at bringir diverse groups together for planning purposes. Enjoy a collaborative environment. Broad educational background, including Masters Degree in Hospital Planning. Age family; AIA/AHA. Box #1361-913, *Progressive Architecture.*

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Photogrammetric Engineer, Surveyor: Pres y professor with moderate practice, owns ipment/instruments. Seeks association/ nership with architect/planner firm anding into engineering. Advanced reework includes environmental and site- lysis, transportation planning. Firm must w continuous supply of work or name romise same. Mid-Atlantic States. Box 61-917, *Progressive Architecture.*

istered Architect: B.Arch., 32, family, 10 rs diversified experience including 5 years d of own architectural and construction . Thorough practical experience from top ottom in design, production, manage- nt, finance, and construction of residential k. Seeks responsible position with inno- ve architectural firm. Reply to Box #1361- , *Progressive Architecture.*

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