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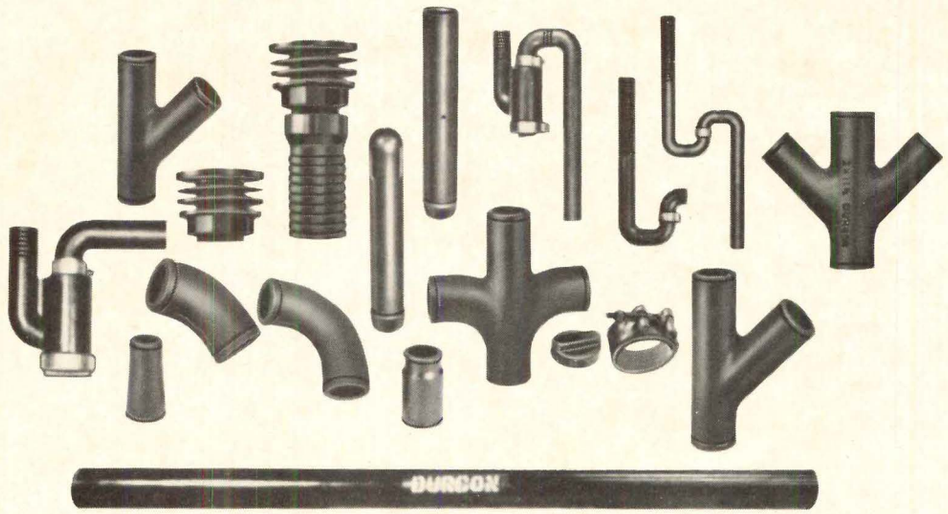

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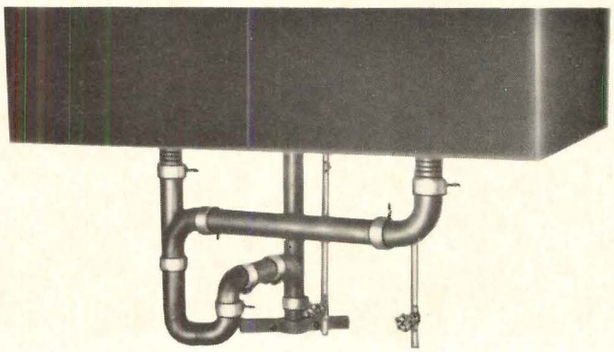

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Ventures In Design

NO. 2 IN A SERIES BY ALUMINUM COMPANY OF AMERICA

The Cylindrical Core Structure By Douglas Deeds

San Diego's Douglas Deeds, second recipient of a commission in Alcoa's "Ventures In Design" program, gave us his design philosophy in part: "I am more concerned with coming up with a real and valid solution to a human problem than styling another pretty object for the world to admire." We think his Cylindrical Core Structure is a crystallization of this philosophy.

Selection.

Alcoa's "Ventures In Design" program is intended to "create a fresh and effective method of recognizing young designers who have shown ability and promise." It is meant to create practical design innovations that utilize aluminum in functional and esthetic ways, and to emphasize the importance of good design as it applies to marketing.

We were assisted in choosing our selectees by a panel of renowned design educators including: Arthur J. Pulos of Syracuse University, James M. Alexander of the University of Cincinnati, Jack Crist of San Jose State College and John Andrews of the Philadelphia College of Art.

The designer.

Douglas Deeds received his B.A. from Pomona College in 1959 and his M.A. in Industrial Design from Syracuse University in 1961. He opened his own design office in 1962. His work has been exhibited by the U.S. Information Agency, the Pasadena Art Museum, La Jolla Museum of Art and the Museum of Contemporary Crafts. Among his awards is the 1969 A.I.D. International Design Award. His designs have appeared in publications ranging from *Industrial Design* to *Life* and *The New York Times*.

The design.

Deeds' design is a lightweight structure utilizing cylindrical aluminum cells as a core between top (compression) and bottom (tension) aluminum sheets. Because the cells fit on a curve with little discrepancy, the structure is capable of being fabricated into almost any shape including compound curves. Its possible applications include free-span roof structures such as arenas, churches, or industrial buildings, and marine or aircraft structures.

Put to commercial use, this structure could help defeat what the designer calls "creeping meatballism." That is the tendency to repeatedly compound a basic mistake in design. For instance, the tons of supporting members often needed with conventional roof systems.

The cylindrical aluminum cells provide a high compression factor compared to their light weight. As Deeds says, "A sheet of paper won't hold up anything, but the same paper rolled into a cylinder can hold up a book. And an aluminum cylinder with a wall thickness of .006 in. will hold up to 500 lb." The first thing constructed with the cylindrical core structure system was a 16 ft x 2 ft scaffold weighing only 30 lb. It easily held two people working on the curved structures. Deeds estimates that a 75-ft boat hull built with this system would weigh only 6,000 lb.

Aluminum, the designer's metal.

Deeds doubts that his design could be built with any material except aluminum. "You can't beat it for high strength-to-weight ratio, and aluminum loves to be squeezed and squashed into shape. Its ductility and deep draw potentials have already made straight wall, small diameter-to-length ratio cell configurations part of existing aluminum technology. This same ductility allowed it to be stretched and formed into the basic components of my system with a minimum amount of material.

"And fabricating techniques more sophisticated than my rather primitive method could expand its ability to be formed into desired configurations, lower the cost of manufacturing and improve the strength of the system. One thing more, the inherent compatibility of aluminum as a metal to the adhesive bonding techniques makes it a natural for this application."

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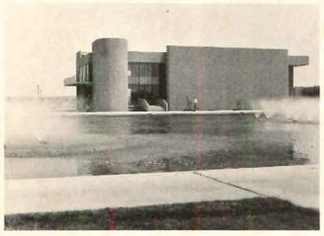

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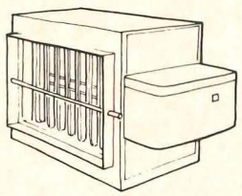

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COMING IN THE RECORD

BUILDING TYPES STUDY: GARDEN ENVIRONMENTS FOR APARTMENT LIVING

Apartment building has been the bright spot in this year's residential statistics for more than the obvious reason that this kind of housing makes more efficient use of available land. What's happened in this field is that the advantages of apartment living—especially garden apartments—are attracting adults of various age groups, and their specific wants and needs are influencing both the design of individual living units and the kind of amenities provided as part of the apartment complex. Family groups clearly don't want what "swinging singles" want, and vice versa. September's Building Types Study (401st in ARCHITECTURAL RECORD's series, begun in 1937) takes a look at some of the best of recent garden apartment projects.

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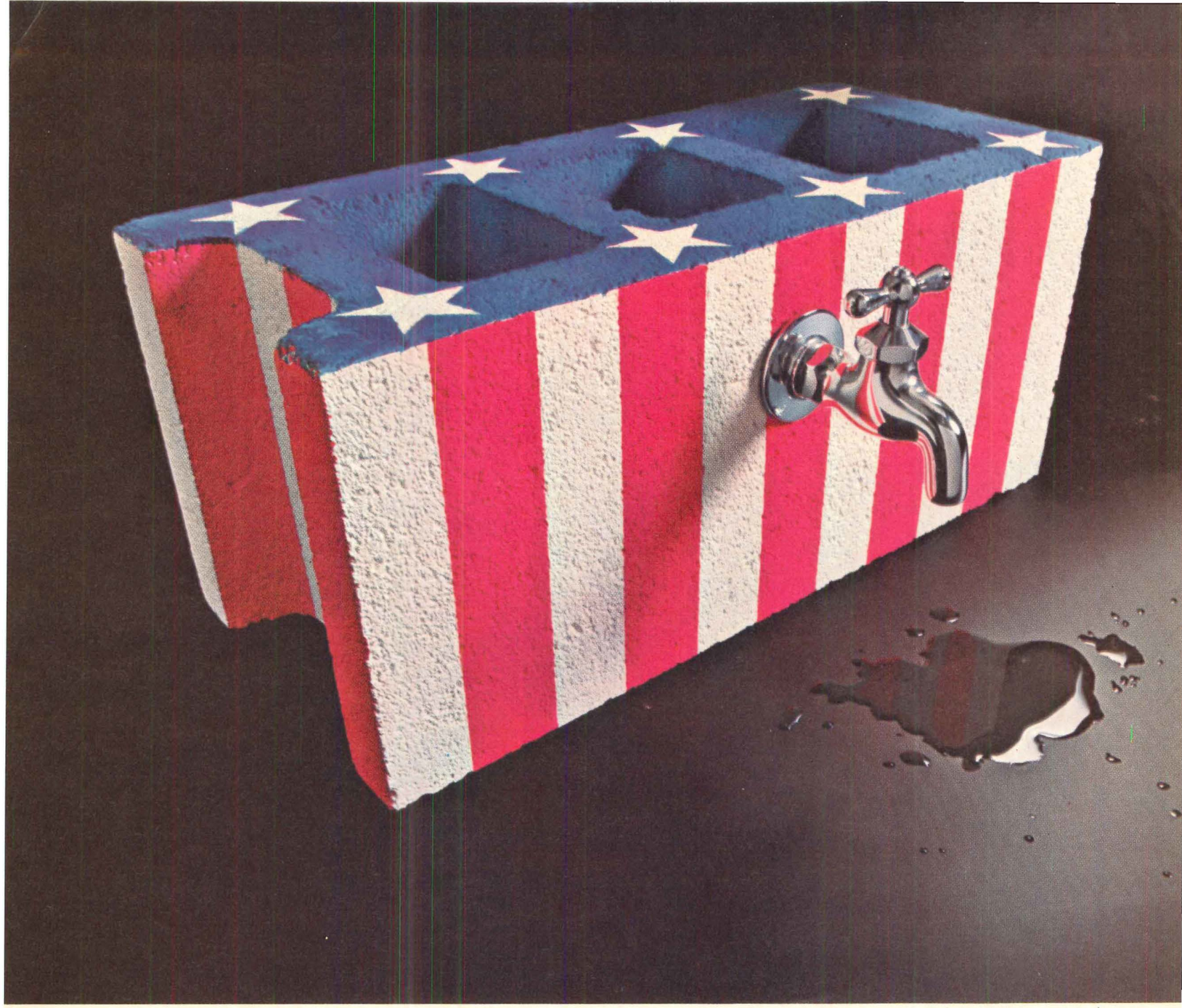

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Walter Gropius: 1883-1969

One of the great practitioners of architecture and its foremost teacher died in Boston on July 5 at the age of 86. Walter Gropius, who was an editorial consultant of *Architectural Record,* had actively conducted his far-reaching practice as one of the founding partners of The Architects Collaborative until a month before his death. At his request his body was cremated and no funeral service was held. Instead, in deference to his wishes, his family, close friends and colleagues gathered in TAC's Cambridge office, which had been decorated with red carnations, his favorite flower. They drank champagne as he wanted them to do, spoke of him in informal eulogies and read aloud several of his writings.

The gathering ended in the early evening, and a small group made their way to the Gropius-designed John F. Kennedy Federal Building in Boston's Government Center to place the red carnations on a large abstract sculpture by Dmitri Hadzi entitled "Thermopylae" and installed in the square only a week before. For Gropius, who persuaded the Federal government to commission the 16-foot-high, 2½-ton bronze, its installation—which he was not to see—was a small but important victory in his lifelong struggle to reunite the arts. The friends and colleagues who festooned the sculpture were celebrating this small victory, but in their gesture was hope that Gropius' boldest ideas may someday truly prevail through the efforts of the thousands he has taught through his writings and the hundreds who have been his pupils. The gesture was ultimately one of love for a great teacher.

If it is true that great men are admired but seldom loved, then Gropius was certainly one of the few. He had countless and notably devoted friends of all ages and conditions, famous and obscure. He was appealing—medium sized, slightly stooped, wiry, energetic—and possessed a noble face that one smitten journalist writing for The New Yorker said belonged on Mt. Rushmore. He was courteous and as deferential to all he encountered as a far younger man, even toward the end of his life when he could himself rightly have expected to be deferred to for his age alone. He had humor and kindness. He was a democrat in practice as well as in principle. He refused to play the remote and inaccessible great architect role, not only because this would have been in opposition to his belief in the effectiveness of collaboration among equals, but because he hated pretension in any form, and scorned the trappings of status. Instead he inserted himself where the action was and where he could keep a fatherly eye on things. In the old frame house which TAC occupied many years his small office was near the front door and by the stair. In TAC's new building, completed in 1967, his work space permitted him to overlook the entrance court in a position conveniently adjacent to the elevator.

He appeared to value every human creature and to respect every kind of useful effort. He paid attention to people and was interested in them. More than one journalist settling down with pad and pencil or tape recorder and fishing for a good question to get him going has been surprised to find the conversation turned around, the interviewer interviewed, the journalist's ideas sympathetically explored, his goals gently probed. This was more than good manners. Gropius' concern for the ideas and feelings of others was an essential quality of his mind and spirit. In combination with the gift of intellect and the virtues of toughness and perseverance it made him a great teacher and collaborator. Because he never subordinated this concern for people, individually or in the mass, to purely formal or stylistic ideas—however misinterpreters of the Bauhaus may argue otherwise—this single quality may also be the key to his lasting eminence as an architect.

Now that he is dead, it is time to briefly review the substance of his fame. He has, of course, received more honorary degrees and citations —including the Gold Medal of the American Institute of Architects, awarded to him in 1959 at the age of 76—than any other architect, including the other great "makers" of modern architecture—Frank Lloyd Wright, Ludwig Mies van der Rohe and Le Corbusier.

The Architects Collaborative, the firm which he founded in 1946 at age 63, with seven young partners* fresh out of architectural school has grown into one of the largest in New England and boasts a national and international practice. Six of the seven original partners survive and each has become a mature and accomplished architect—a tribute to Gropius' teaching and methods of collaborative organization with its emphasis upon independent thought and responsibility. (Two have withdrawn from TAC and head offices of their own.)

Gropius received major commissions during his TAC years, including the Harvard University Graduate Center, the U.S. Embassy Building in Athens, the University of Baghdad in Iraq—a project which called for developing the university curricula as well as planning the entire campus and its buildings—the highly controversial Pan Am Building in New York City with Pietro Belluschi and Emery Roth and Associates, the J. F. Kennedy Federal Building in Boston with Samuel Glaser Associates, the Tower East Office Complex near Cleveland and recently the Buenos Aires German Ambassador's Residence. In addition, West Germany had long since proudly begun re-importing him to proceed with the vast industrialized housing projects which he first envisioned in the Bauhaus years at Weimar and Dessau, during the brilliant and culturally explosive years of the Weimar Republic. Gropius' housing projects of the 1920's, some of which were built—taken together with his industrial buildings—were responsible for his early attainment of an international reputation. It became quickly apparent to the intelligentsia that his work did not belong in the transi-

* *Jean B. Fletcher (1915-1965)*
Norman C. Fletcher
John C. Harkness
Sarah P. Harkness
Robert McMillan
(established own office in 1963)
Louis A. McMillen
Benjamin Thompson
(established own office in 1966)

tional school of his leading predecessors and contemporaries, whose buildings were only gradually adapting to the new technology. Gropius' buildings, on the contrary, from the beginning met technological growth head on and furthered it. All the work from his own office, which he established in Berlin in 1910 at the age of 27, emerged as brilliantly original, totally developed and fully realized architectural expressions of the technological possibilities of the time. His current housing projects include master planning and building design for Gropiusstadt in West Berlin. This self-contained 650-acre township will accommodate 44,000 people in 16,400 dwelling units. It is near completion. At his death Gropius had completed the Rosenthal Porcelain Factory in Selb, Germany and was constructing the Rosenthal Glass Factory at Amberg.

Gropius' years as chairman of the Department of Architecture at Harvard's Graduate School of Design were as distinguished as his years of practice with TAC. Having left Hitler's Germany in 1934, he arrived at Harvard in 1937 at the age of 54 after three years of exile in London during which he worked in partnership with Maxwell Fry. The 15 years of his chairmanship, which ended with his retirement in 1952 at the age of 69, produced an astonishing number of leading architects, planners and architectural educators—more than were graduated by any other professional school during the same interval.

Even his embattled, often misunderstood Bauhaus years brought triumph to Gropius in the end. This famous school which was to have such influence on the teaching of architecture and the related arts was founded by Gropius in 1918 in Weimar and moved to Dessau in 1925. He remained its director until 1928 when he resumed private practice in Berlin. Last year the 50-year jubilee Bauhaus exhibition opened in Stuttgart's Wurttemberg Art Society. To the surprise of many, the work produced in the 1920's by Gropius, Klee, Kandinsky, Moholy-Nagy, Breuer, Feininger and Schlemmer and their students seemed fresh, contemporary and relevant. The exhibit moved to London's Royal Academy and additional acclaim, then to Paris and will open in Chicago this month. Those with sufficient background to interpret the show grasped a truth that had hitherto been perceived by few—that the strength of the Bauhaus was in its teaching of the process of design, rather than in the style or production of the objects themselves. Critic Reyner Banham said on the BBC: "Not the product, but man, is the end in view. . . . The true contribution of the Bauhaus to twentieth-century design may yet prove to be, not the shaping of model objects, nor the formulation of salutary ideas, but the creation of a continuing community of teachers."

As can be seen from this summary of his achievements, Gropius was granted splendid opportunities to teach and build. Unlike many gifted architects of today, sadly inarticulate and filled with longing to have their work interpreted for them, Gropius was a fine writer and an eloquent and tireless advocate of the ideas he believed in. Therefore his basic concepts, once barely understood, have through the years become widely accepted, though many seem unaware of their source. Among the most important of these ideas are: the belief in the ascendance of process over form in teaching and in practice; the importance of collaborative teamwork, both intraprofessional and interdisciplinary, as opposed to the 19th-century idea of the individual genius working in splendid isolation; the need to recognize unities in art and technology while emphasizing the need for diversity; and the necessity of destroying the divisions among the arts, including what Gropius perceived as the artificial distinctions between so-called fine and applied art.

It should not be forgotten also that long before the younger architects and students of the present discovered the poor, Gropius from his Bauhaus days had spoken of the architect's responsibility to the community. In his early writings he saw the European proletariat as the chief beneficiary of socially responsible design, but his writings and practice eventually included schemes to help the poor everywhere, in Africa, Appalachia and close to home in Cambridge, Massachusetts. Implicit in everything he wrote, however, was the concept that socially responsible design must enhance the lives of everyone within the total environment.

Gropius was never invited to shape the environment at the scale to which he aspired. He never built a city nor broadly influenced regions. Although he wrote about the organization of mass transportation systems and the problem of smoke control, no government invited his insights. In spite of all his efforts, no good economical system of prefabricated components for mass housing has yet been implemented in the U.S. The gap between art and technology must still be bridged. But Gropius never lost his freshness of vision nor his hope, and he left his associates a legacy of idealism. At the TAC ceremony which was held to honor him in death, a letter that he had written to a group of high school students was read aloud:

"For whatever profession, your inner devotion to the tasks you have set yourself must be so deep that you can never be deflected from your aim. However often the thread may be torn out of your hands, you must develop enough patience to wind it up again and again. Act as if you were going to live forever and cast your plans way ahead. By this I mean that you must feel responsible without time limitation, and the consideration whether you may or may not be around to see the results should never enter your thoughts. If your contribution has been vital, there will always be somebody to pick up where you left off, and that will be your claim to immortality."

—Mildred F. Schmertz

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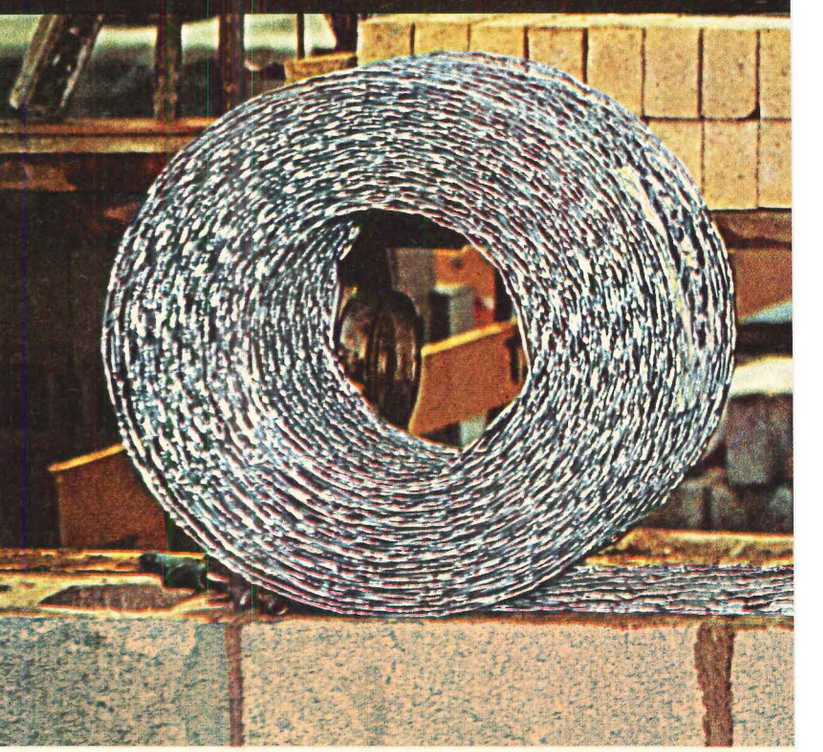

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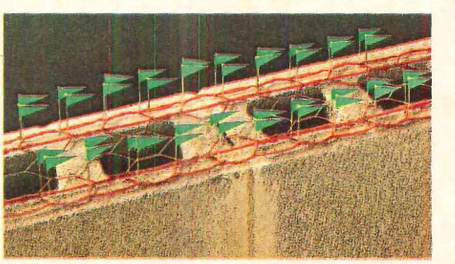

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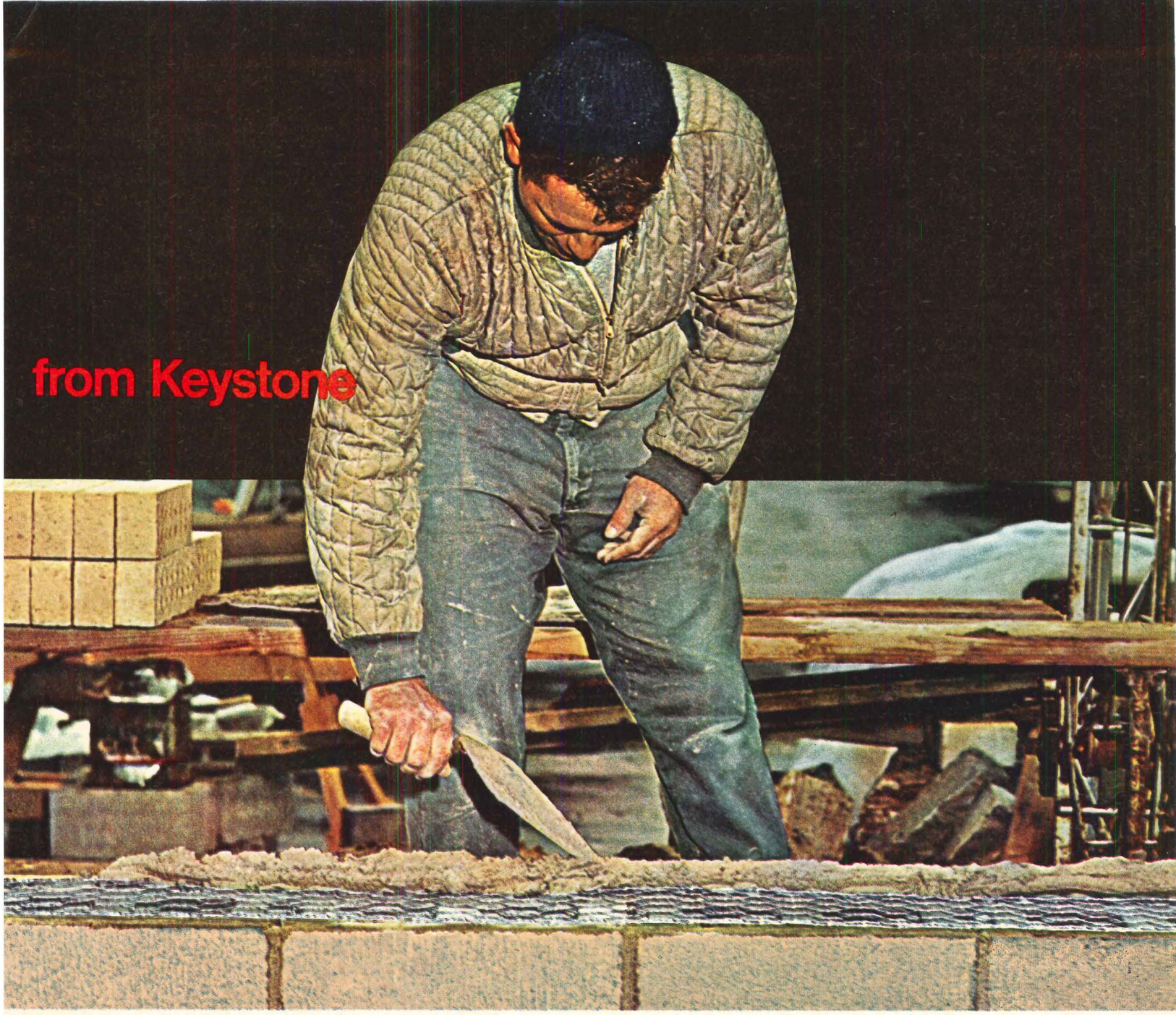

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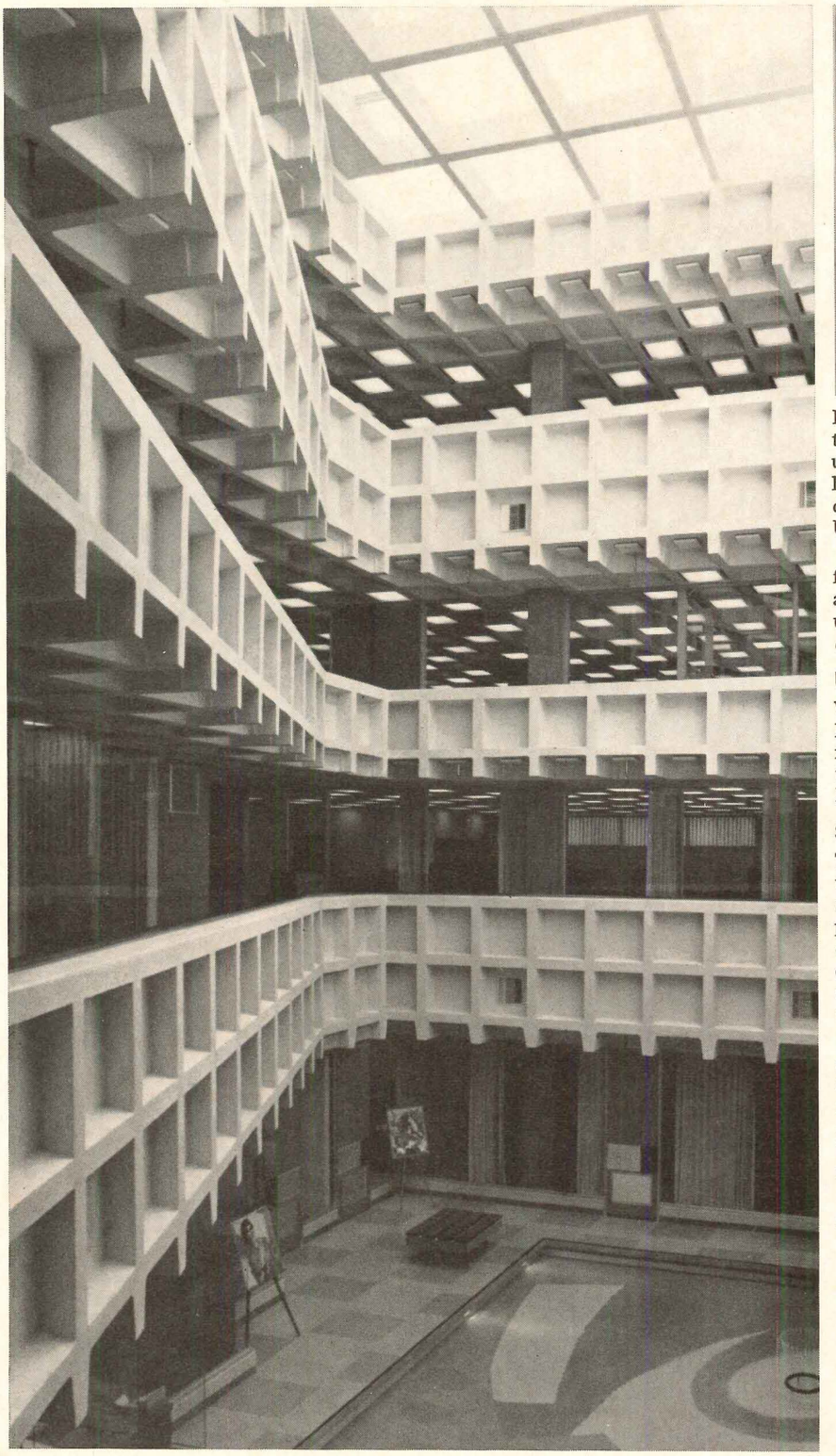

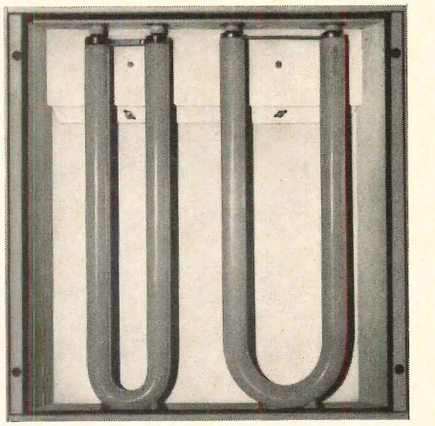

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What makes our fixture truly one-of-a-kind, however, is that it uses any major manufacturer's 40-watt U-shaped lamps... the ones with the 6" leg spacing or the 3½" leg spacing...as demonstrated above.

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This flexibility's possible because our unique fixtures have adjustable sliding sockets* that secure the lamp, provide the power. What's more each fixture needs only one standard 40-watt ballast versus the two expensive ones required on units that use straight fluorescents. A feature that saves on cost and lets the fixture run cooler.

You save on installation and maintenance as well. Recessed models feature a hinged assembly that puts all electrical components on one side. There are 3 types available: surface, air and non-air, recessed. Want us to shed more light on our new fixture family?

Write: Keene Corporation, Lighting Division, 4990 Acoma Street, Denver, Colorado.

*Patent Pending

KEENE
CORPORATION
LIGHTING DIVISION

We've just begun to grow.

For more data, circle 6 on inquiry card

For more data, circle 7 on inquiry card

by the creators of **VICRTEX®** *vinyl wallcoverings*

Our designers are making the design scene again. With the most exciting, stimulating collection of prints, textures and patterns. They're here to be appreciated. Ask your Vicrtex Wall-expert Man – or come in soon to one of our nice big idea-filled wall-covering showrooms.

New VICRWALL Sample Book available on request.

WONDERFUL NEW EDITION! Vicrwall®

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see our catalog in Sweet's — All VICRWALL Fabrics U/L Rated

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EMPIRE STATE BUILDING, NEW YORK, N.Y. 10001 LONGACRE 4-0080 • MILL: WHARTON, N.J.
In Canada: Shawinigan Chemicals Limited

Patterns © L. E. Carpenter & Co.

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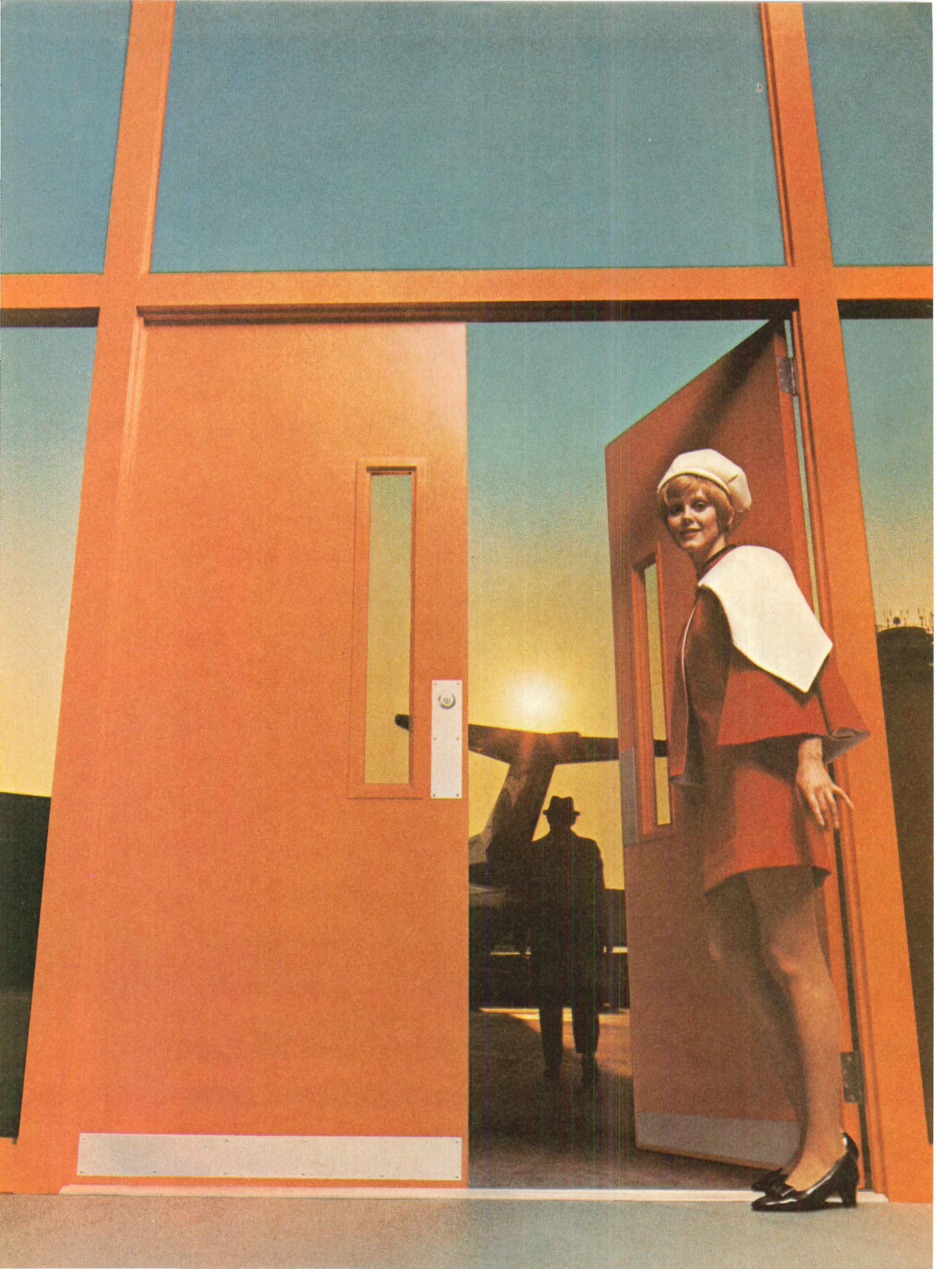

You can build almost anything around Republic standard steel doors.

The exact light and louver treatments you wish applied right at a Republic warehouse in your area. Doors and frames designed just for you—but without the delay usually associated with "specials."

They zoom to your building site—delivery is fast. Time savings come from more than mass production, adaptability, and close location. There are time savings every step of the way from our plant into your new building.

Snap-in moldings. Efficient packaging. Efficient shipment. Dimensional exactness. Republic doors and frames are delivered ready to hang—not to be cut and tried on the job.

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YOUNGSTOWN, OHIO 44505

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IF YOU THINK GLASS BLOCK STILL LOOKS LIKE THIS

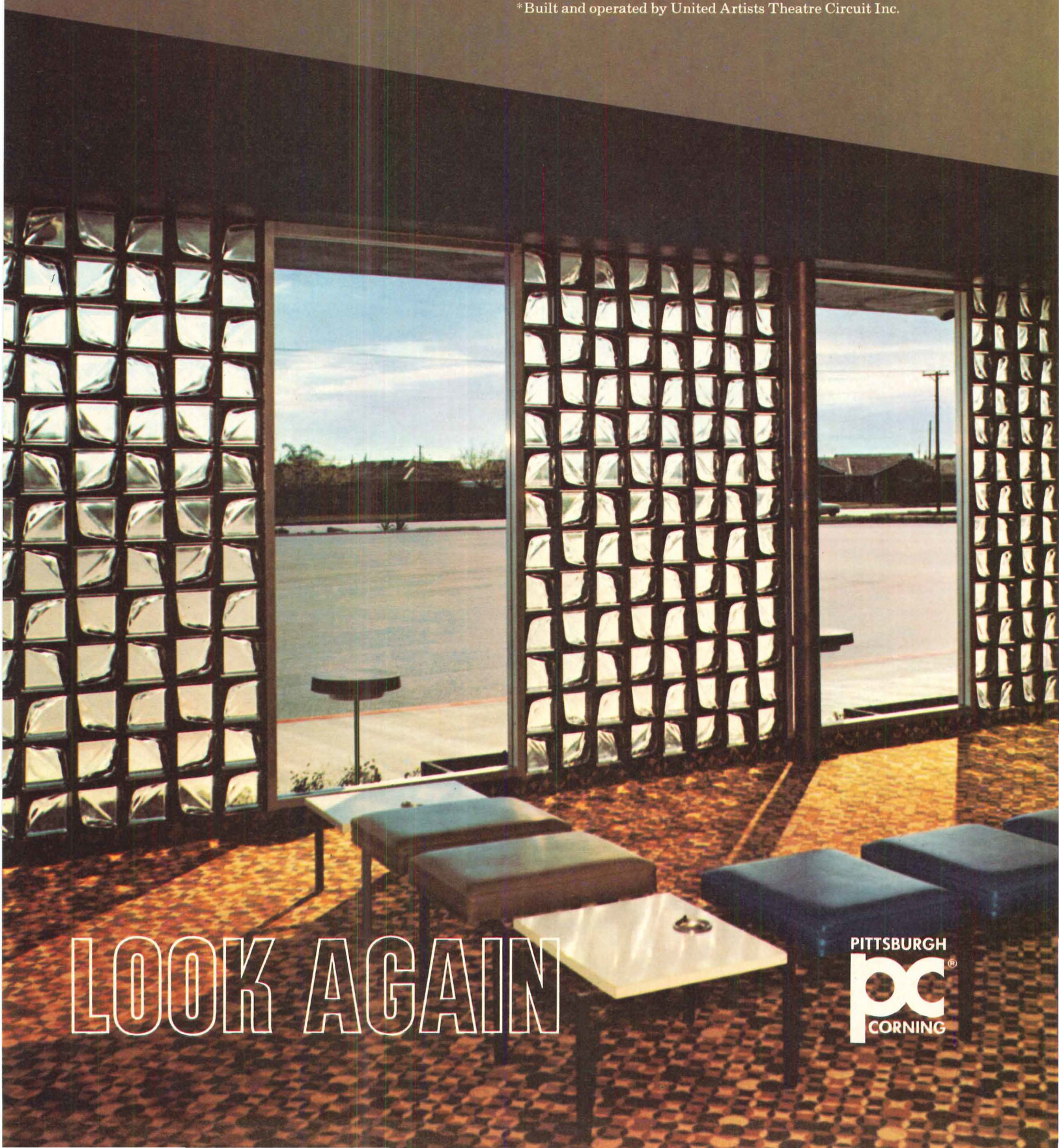
YOU'D BETTER

An exciting new show is in for a long run at the deux ciné theatre* in Corpus Christi, Texas—glass block by Pittsburgh Corning.

The architects, Kipp and Winston, took advantage of both the design and functional elements of this beautiful Chiaro pattern. Panels of modern sculptured Chiaro were alternated with panels of plate glass to create a striking illusion of openness. Chiaro allows the light to enter, while keeping the noise and dust out. Heating and air-conditioning costs are also substantially reduced.

Find out how you can get your show on the road with Chiaro, Intaglio and many other interesting glass block patterns. Write for our free catalog: Pittsburgh Corning Corp., Dept. AR-69G, One Gateway Center, Pittsburgh, Pa. 15222.

*Built and operated by United Artists Theatre Circuit Inc.



build a colorscape that lasts

With color coatings that withstand the corrosion and grit of industrial atmospheres, and stay attractive and maintenance-free for years.

Build your next metal-walled building with panels protected by the best of the color coatings. The long-lasting finishes containing Kynar 500®.

You can choose from nearly 100 colors, ranging from bright pastels to subdued bronzes. And match your color, exactly, panel after panel.

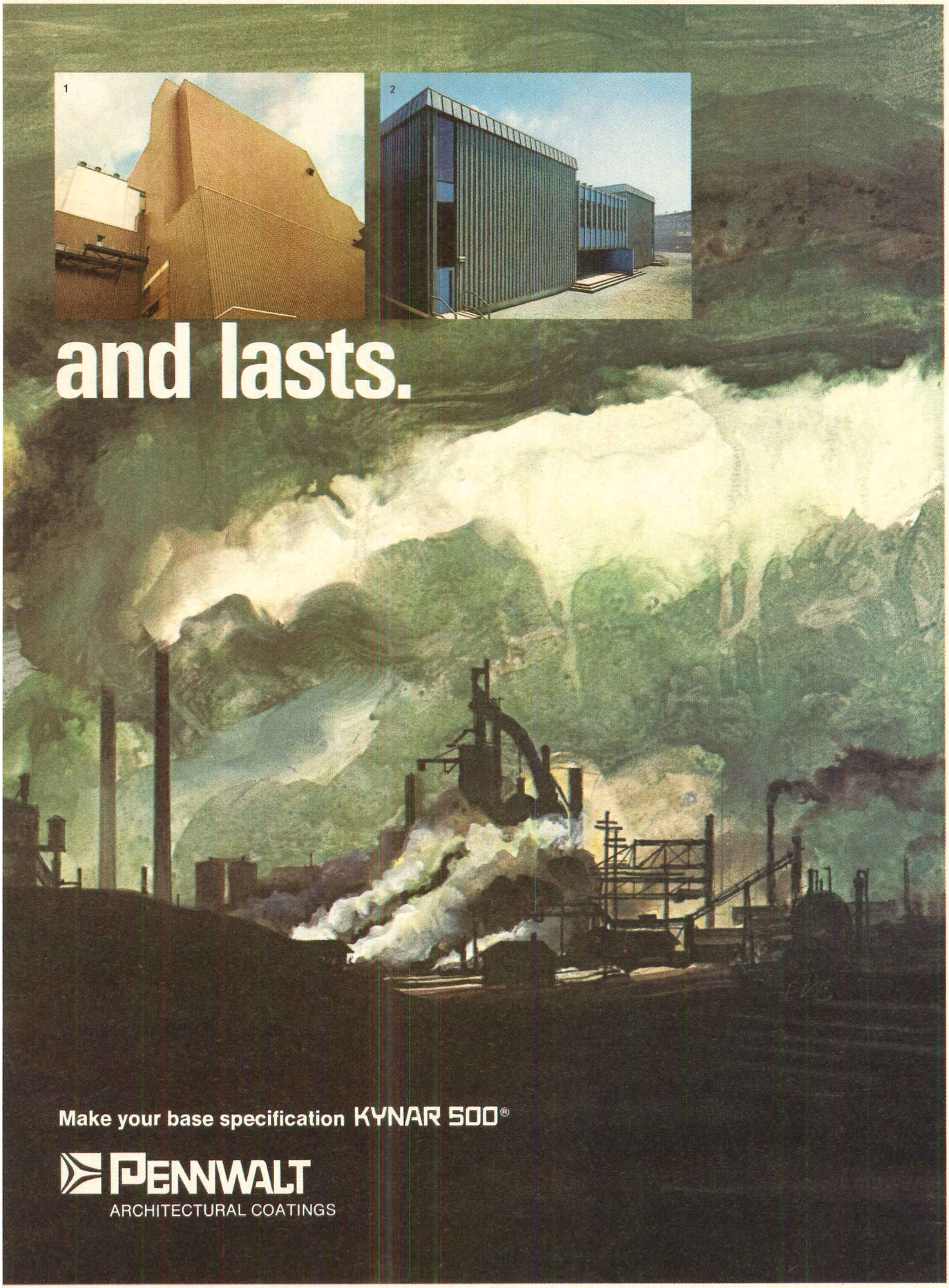
Coatings made with our fluorocarbon resin, Kynar 500, resist chemicals, corrosive atmospheres and mortar stains; won't crack or craze; and take abrasion in stride. In fact, accelerated tests by Pennwalt project 30 years of maintenance-free life.

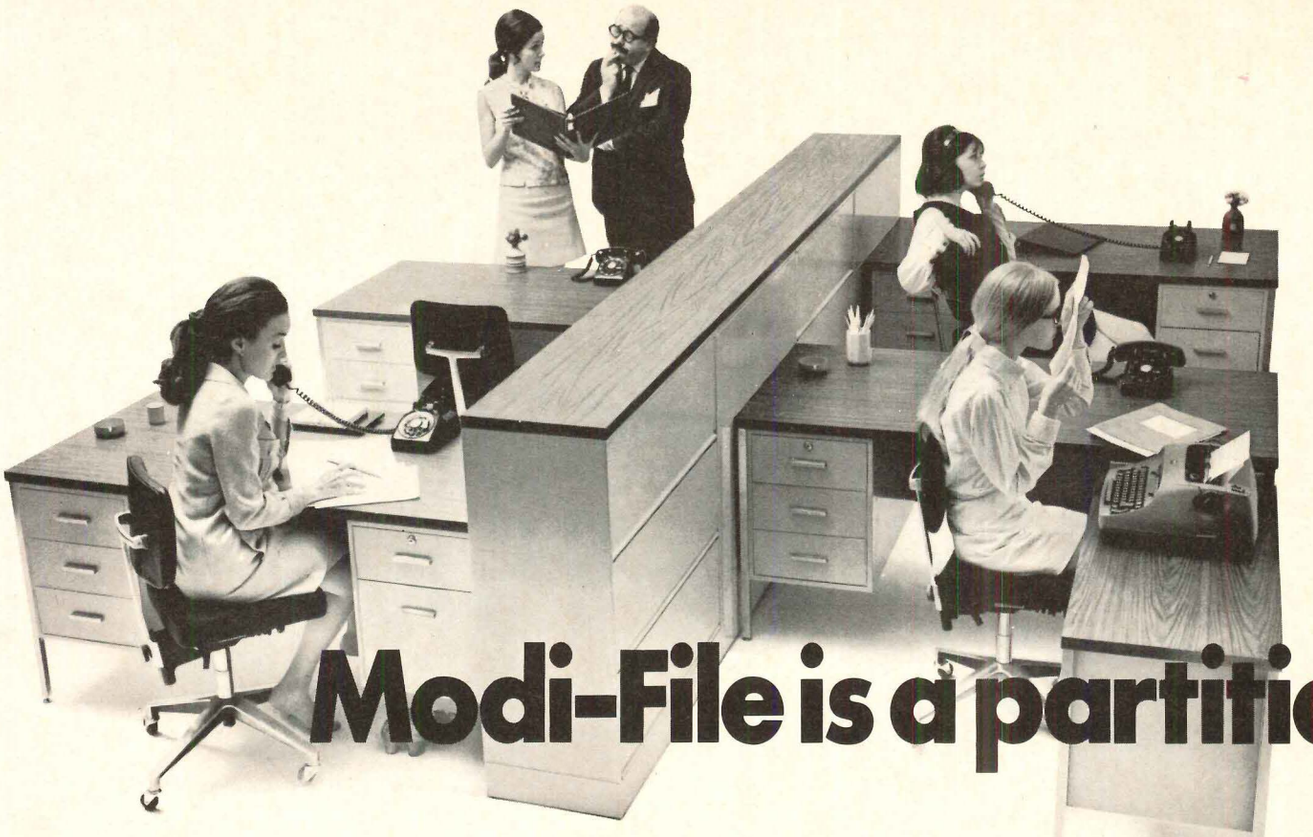
Banish the dull and ordinary. Build a colorscape with finishes containing Kynar 500. Contact the Plastics Department, Pennwalt Corporation, 3 Penn Center, Philadelphia, Pa. 19102. Tel: 215-LO 4-4700.

*Kynar 500 is Pennwalt's registered trademark for its vinylidene fluoride resin.

1 Consolidated Edison Arthur Kill No. 3 Station, Staten Island, N.Y.
Panel manufacturer and erector: E. G. Smith
Finish: DeSoto Fluropon®

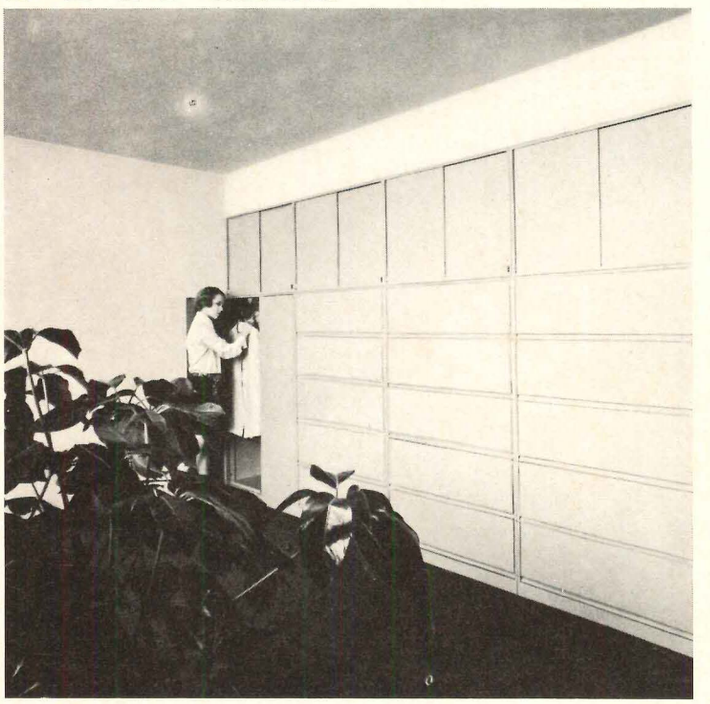
2. Laboratory and office building:
Wisconsin Steel Division
of International Harvester, S. Chicago
Panel manufacturer: Walcon Corp.
Panel erector: Jones and Brown Co., Inc.
Finish: DeSoto Fluropon®





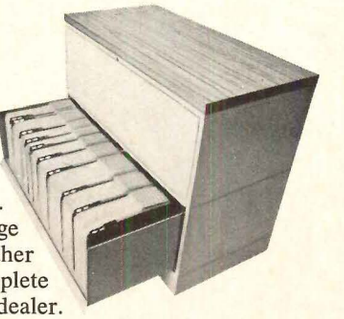
Modi-File is a partition.

A wall.



A piece of furniture.

We almost forgot. It's also a file.



It just doesn't look like one (we even eliminated the handles). That's why you can stack MODI-FILES® as a free-standing partition. Or line them up against a wall. Or disguise them as executive suite cabinets.

But deep inside, MODI-FILE is all file. Because of a unique hinge suspension that gives it more filing space for its depth than any other lateral file. In letter and legal sizes, 30 and 36 inch widths. With a complete selection of accessories (even a wardrobe unit). At your Art Metal dealer.

ART METAL
JAMESTOWN NY

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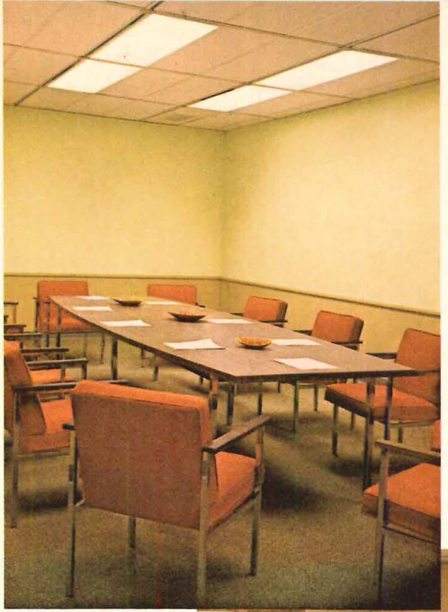


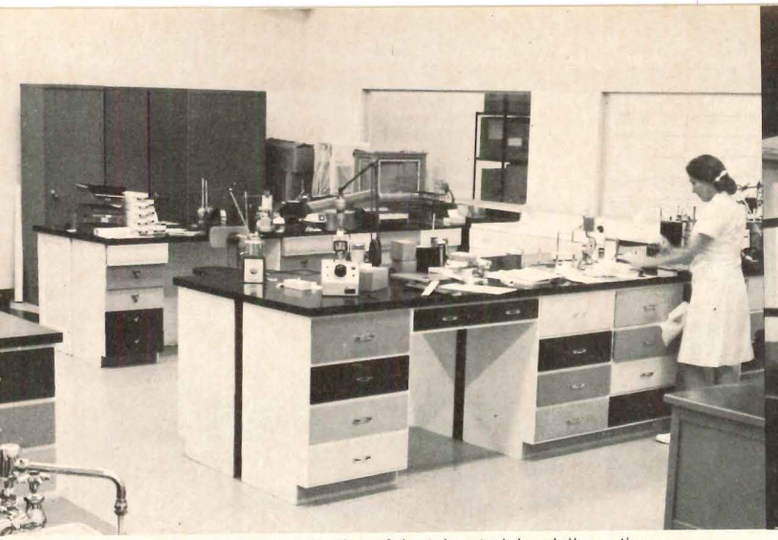
Lennox presents...

growthability in plant comfort: a case of "micro-climates" flexibility

For a manufacturer, growing room is basic in a new building design – for headquarters, branch or expanding complex. One growthability factor is a flexible heating/ air conditioning/ventilating system. This is provided easily and economically by the "micro-climates" of Lennox packaged modular systems – add-on comfort zones that can expand with the building.

continued . . .

New 200,000 sq. ft. home of Kerr Manufacturing Company, Division of Sybron Corporation, in Romulus, Michigan, near Detroit. Offices and production areas are heated, air conditioned and ventilated by Lennox rooftop equipment. Architects: Robert Geudtner & Associates. General contractor: Butler Manufacturing Company. Mechanical contractor: Commercial Heating & Air Conditioning.



Critical laboratory testing of dental materials—daily routine in Kerr Manufacturing's Chemical Quality Control—calls for accurate temperature control and fresh air ventilation. Both are supplied by Lennox modular systems.

Careful planning is shown by Kerr's data processing room, with underfloor cable space for future equipment. Such rooms are isolated—but with broad expanses of glass for a "wide open" feel. The necessary "micro-climates" are provided by DMS and other Lennox modular systems.

Kerr employee comfort and laboratory-accurate temperature control are both provided by Lennox rooftop DMS units. Eleven such units have a total output of 192 tons of cooling and 5,350,000 Btuh heating. Twenty-three other Lennox modular units supply supplementary heating and make-up air. POWER SAVER™ equipment on DMS units provides free cooling when outdoor temperatures fall below 57°F.

continued . . .

growthability in plant comfort

The "how to" of facilities expansion often is a major bugaboo for a fast-growing company. But a great deal of those growing pains can be eased by thorough growth planning — not only of the building itself, but of such mechanical systems as heating, cooling and ventilating. These growth needs can only be met completely by such flexibility as that of Lennox modular systems.

An example of this advanced planning is found in the design of the Kerr Manufacturing Company building. The new home of this 78-year-old dental products manufacturer combines the growthability of Lennox "micro-climates" with that of modular Space-Grid construction by Butler Manufacturing Company. Walls, roof and comfort of the 200,000 square foot building system can be extended to keep pace with company growth—and without interrupting existing facilities.

Kerr's spacious and strikingly appointed cafeteria (center photo, preceding page), allows employees to gather in a relaxed atmosphere. The cafeteria has two separate comfort zones, individually controlled by thermostats mounted on opposite walls. Thus, air freshness and temperature are maintained, regardless of occupancy on either side.

No design restrictions are imposed by Lennox systems. For instance, Lennox Direct Multizone System (DMS) low-profile units can be concealed on the roof with little or no enclosure needed. They never steal valuable floor space. And their light weight allows use of non-loadbearing walls.

Roof-mounting frame reduces on-site labor. And the units are completely assembled, wired and tested at the factory. This is single-source responsibility, single-source savings: Lennox.

Bell Helicopter Company's new Logistics Center at Fort Worth is 209,000 sq. ft. of international customer service. Lennox rooftop modular systems here include both single-zone and multizone heating/air conditioning units. A Bell Model 205A aircraft lifted the units to the rooftop.

Bell's Logistics Center is served by 34 Lennox hidden rooftop units, with a total capacity of 700-plus tons cooling. Architects: Kirk—Voich. Engineers: Yandell & Hiller. General contractor: Cadenhead Construction Co., Inc. Mechanical contractor: Broyles & Broyles.

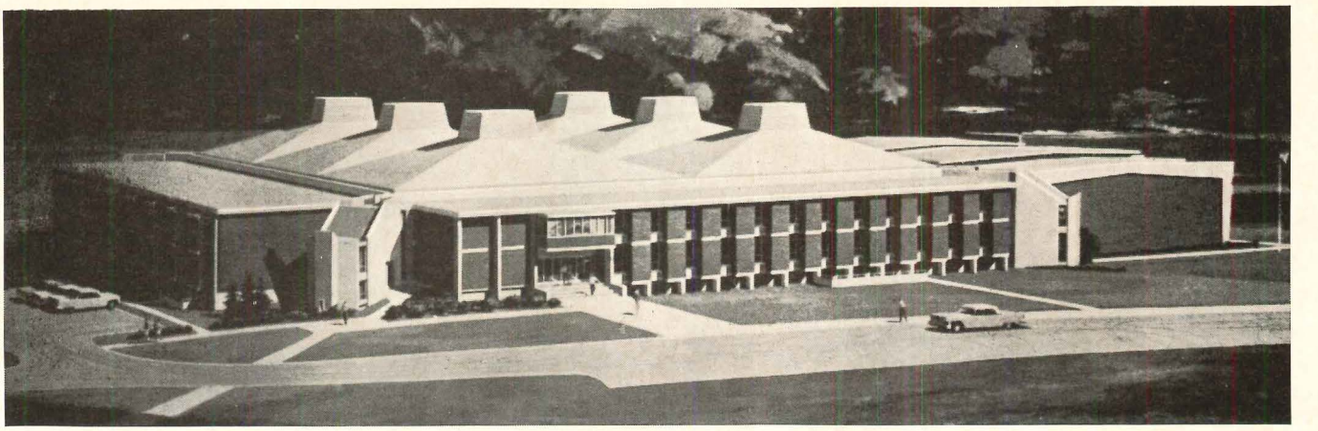
Lennox units are available for multizone or single-zone control, each compatible with the other. Gas, electric or oil heat source.

When you're planning a plant—or any other building—check first to learn why Lennox should be specified. See Sweet's 29a/Le—or write Lennox Industries Inc., 496 South 12th Avenue, Marshalltown, Iowa 50158.

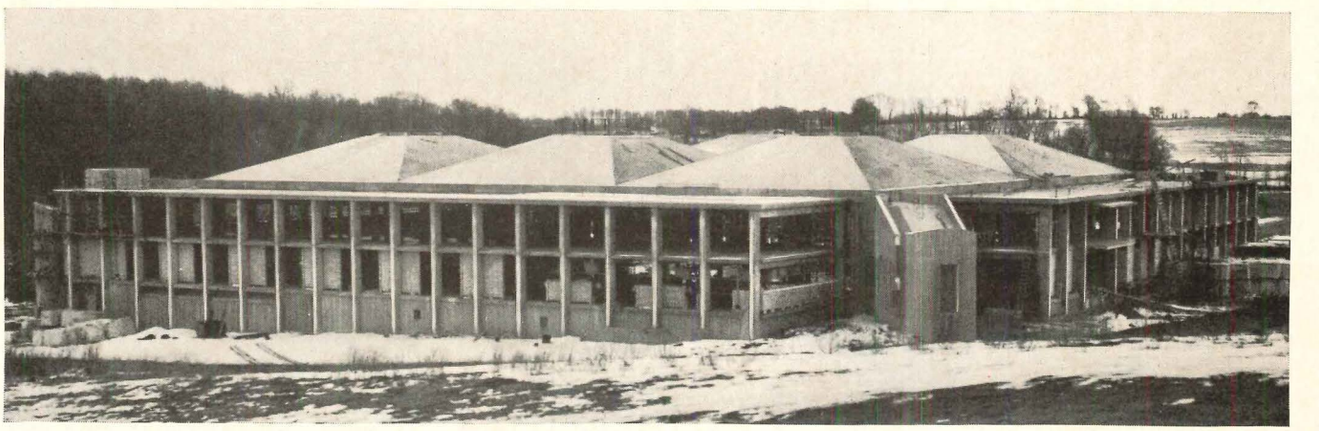
LENNOX®
AIR CONDITIONING · HEATING

Tachtronic Instruments, Inc., New Ulm, Minnesota, utilizes Lennox DMS for the critical temperature control (±1°C) required by their sensitive electronic components. The DMS automatic heating/cooling cycles also control humidity in this 24,000 sq. ft. plant. Engineers: Toltz, King, DuVall, Anderson & Associates, Inc. General contractor: Heymann Construction Co. Mechanical contractor: Osborne Plumbing & Heating.

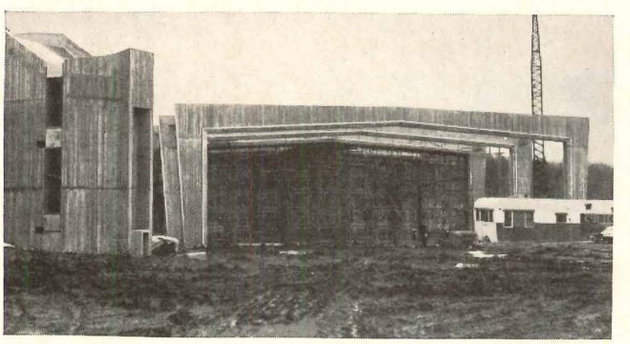
For more data, circle 13 on inquiry card



The great college expansion— concrete helps make it happen.



Concrete plays an important part in the exterior design treatment of the new fieldhouse at West Chester State College. Stair wells at the four corners of the fieldhouse feature exposed ribbed surfaces. Floors and certain columns extend through the masonry walls. The gymnasium is surrounded by a three-story structure that will house a variety of smaller activity areas, dressing room facilities, classrooms and offices. Walls are concrete masonry with brick veneer to blend with older campus buildings. Precast units provide the roof for the gymnasium. Roof of perimeter section is cast-in-place lightweight concrete.



Structural arches for natatorium rise 36′ above the ground. They are 2′ thick, with the greatest width, 6′6″, at the top of the columns. Exposed concrete of the arches complements the exposed concrete stair wells. Precast concrete is used in the roof structures.

A new fieldhouse. And a new natatorium. Designed in concrete for an interesting graceful look that blends harmoniously with the remainder of the campus. Designed in concrete for fire safety, durability and maximum service. Lehigh Cements helped make it happen at West Chester State as they've done in important construction projects all around the country. With quality materials. And on-time delivery to the ready-mix producers so they can keep the projects on schedule. Lehigh Portland Cement Company, Allentown, Pa.

Owner:
West Chester State College, West Chester, Pa.
Architect:
Smith, Chatman-Royce Associates, Paoli, Pa.
Contractor:
Cubic Construction Co., Cherry Hill, N.J.
Ready Mixed Concrete:
Trans-Materials Co., West Chester, Pa.
Precast Roof Units for Natatorium:
Formigli Corp., Philadelphia, Pa.
Precast Roof Units for Gymnasium:
Concrete Plank Co., Inc., North Arlington, N.J.
Concrete Block & Specialties:
Samson Industries Inc., Media, Pa.

LEHIGH CEMENTS

Elastomers in Industry/Engineered Construction

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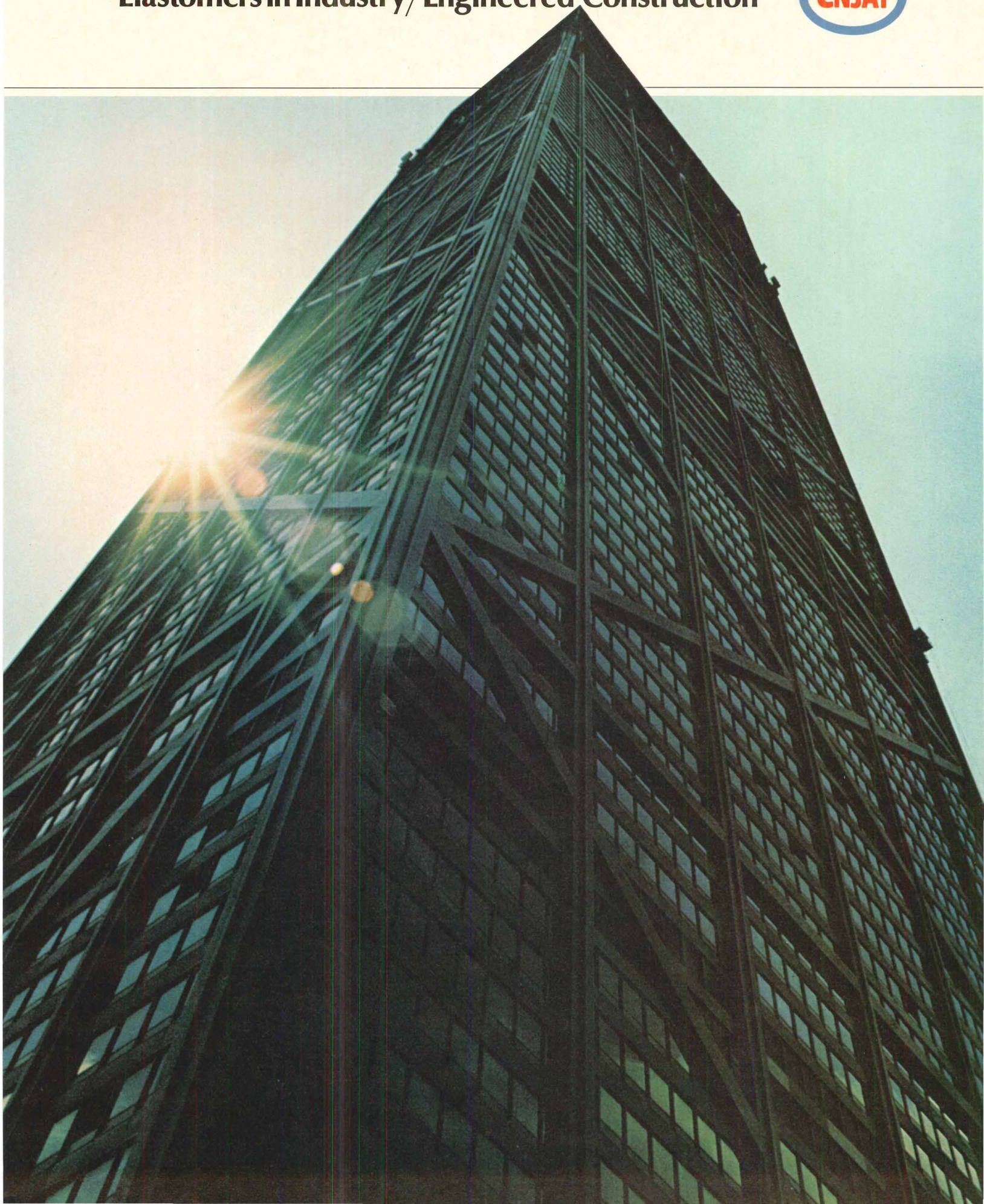


Butyl tape seals every pane of glass in new 100-story Chicago landmark

When the John Hancock Center is completed this year, this unusual structure, combining both residential and commercial space, will be the world's second tallest building.

Every one of its 11,459 panes of bronze-tinted glass will be installed with glazing tape made of Enjay Butyl rubber.

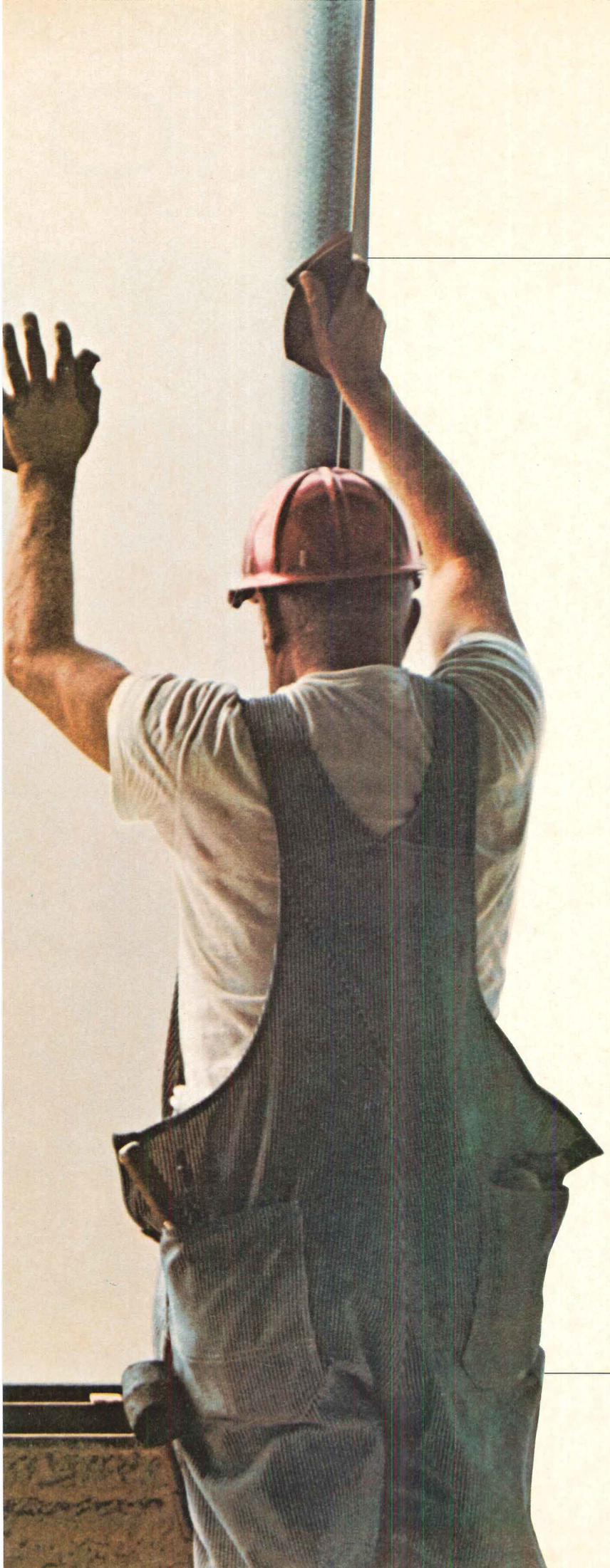
The tape is easily and safely applied around the window frame, from the inside. The window is pressed against the tape and inside channels are snapped into place.

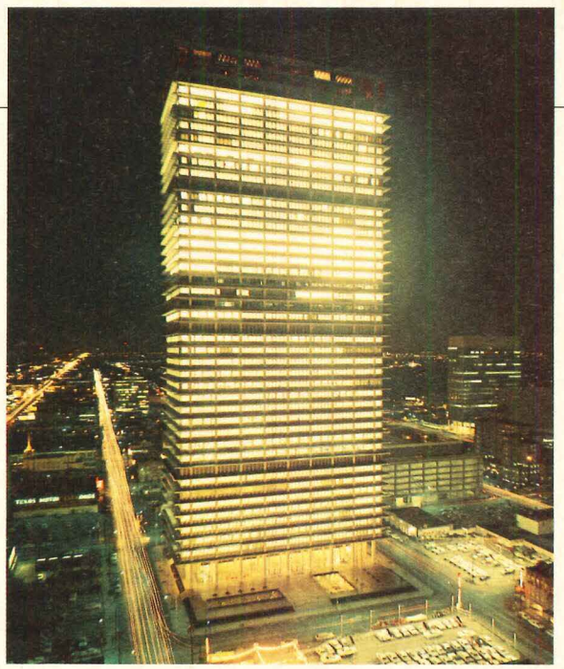
The result is a permanently weatherproof seal that shuts out the coldest blasts the Windy City can produce.

Use of this one-step Butyl tape glazing system eliminates back-up sealants and clean-up time, cuts the cost of window glazing for large buildings by 50-60%.

Owner/Developer: John Hancock Mutual Life Insurance Co.
Architect: Skidmore Owings and Merrill.
Glass and Glazing: National-Hamilton, Division of Bienenfeld Glass Corp.
Tape Manufacturer: Protective Treatments, Inc. Dayton, Ohio

Butyl tape easily unrolls from roll, adheres quickly to window frame. Workers set large pane in place over tape for quick, weathertight seal.



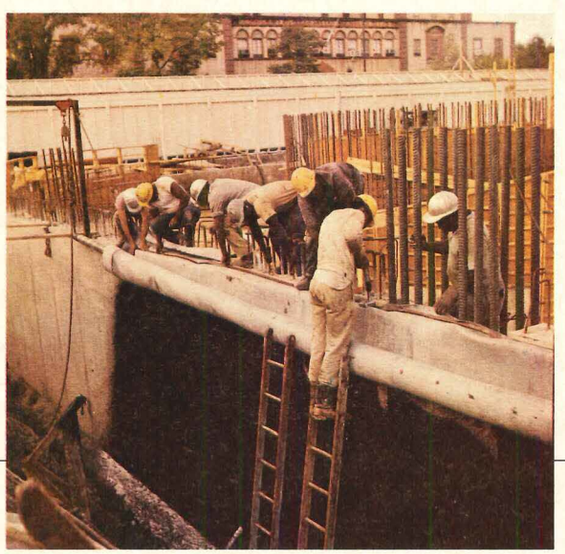


After 8 years, Butyl rubber membrane still provides perfect water seal for foundation

The entire foundation and subsurface portion of the Humble Oil & Refining Company building in Houston, Texas is encased in a one-eighth inch thick sack made of Enjay Butyl rubber. Approximately 230,000 sq. ft. of Butyl sheeting was needed for the job.

Installed in 1960 when the building was erected, this waterproof boot of Butyl still keeps the three-level basement of the building dry and leak-free.

The water table at the building site is 35 feet above the bottom of the Butyl membrane, so the lower 35-foot portion of the building is normally completely surrounded by water.



Workmen installing 20′ x 90′ Butyl sheets to form watertight sack before foundation was poured.
Butyl sheeting material manufactured by Carlisle Corporation, Carlisle, Pennsylvania.

For more data, circle 14 on inquiry card

Enjay Chemical Company
Synthetic Rubber Division
Adhesives Intermediate Dept.
60 West 49th Street
New York, New York 10020

ENJAY

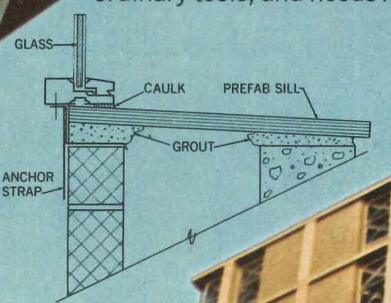
For more data, circle 14 on inquiry card

Butyl rubber caulk used throughout large new apartment complex

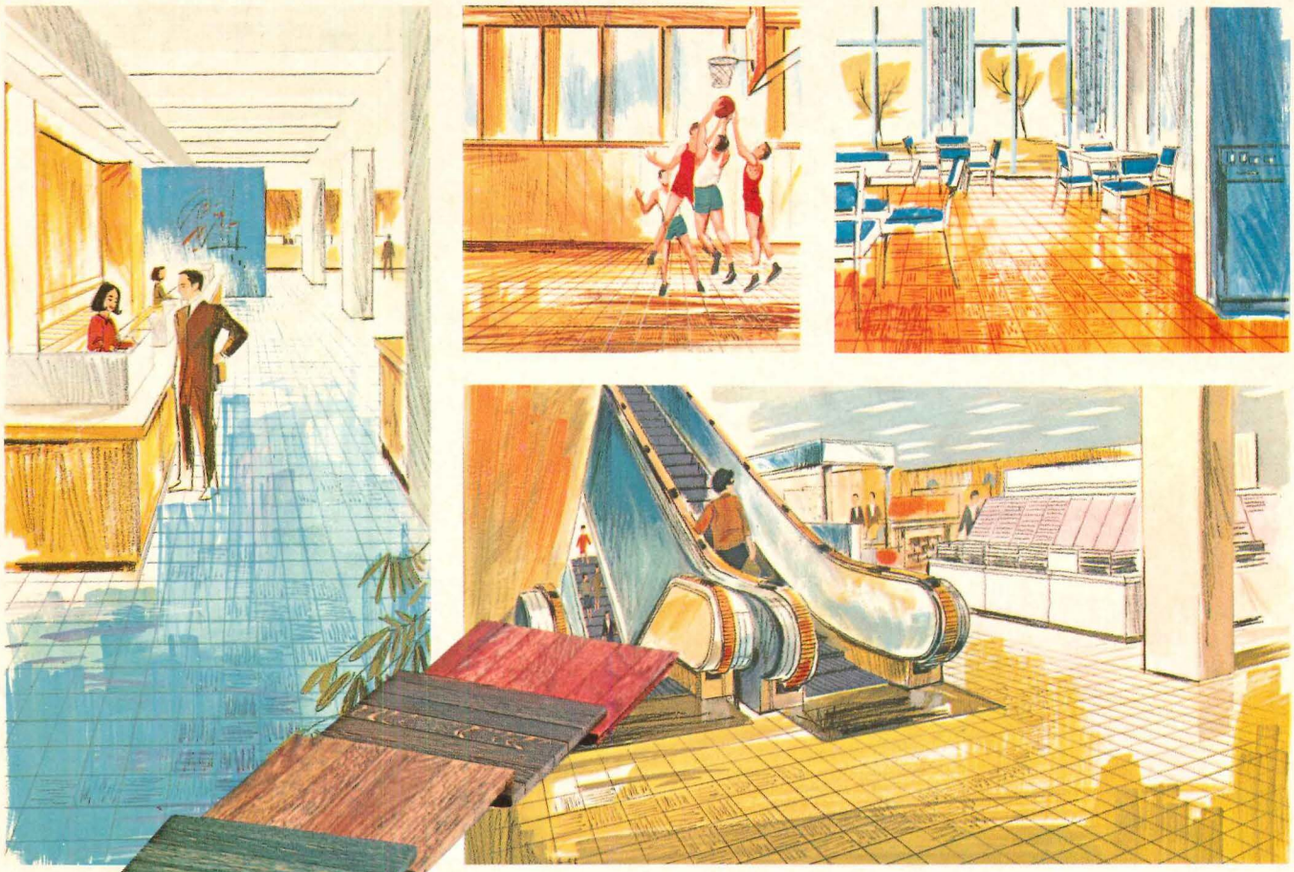
Valley View at King of Prussia, Pennsylvania—a five building, moderate rental apartment complex now building 25 minutes from downtown Philadelphia—is completely caulked with Butyl caulking.

Over 320 gallons of caulk was used for glazing the windows and sealing the door perimeters as well as the brick panel perimeters.

Caulk made with Enjay Butyl was used because of its excellent weatherability and permanent flexibility. It lasts up to 5 times longer than conventional oil based caulks over a wide range of temperatures. It is simple to apply with ordinary tools, and needs no special joint preparation.



Owner:
Field Construction Associates.
Architect: Milton Schwartz and Associates, Philadelphia, Pa.
Caulking Contractor: Crawford Caulking, South Hampton, Pa.
Caulk: Pecora Chemical Corp., Philadelphia, Pa.



Exciting New Gammite FLOORING*

more durable
than vinyl
more beautiful than
natural wood

A PRODUCT OF THE ATOMIC AGE

Gammite Flooring is a new material that exhibits the best characteristics of hard plastics and the beauty of natural wood. Its wear resistance is greater even than terrazzo tile in high traffic areas such as department stores, restaurants, and gymnasiums. And its beauty adds a new dimension to any flooring installation.

Maintenance of Gammite Flooring is negligible when compared to wood since it does not require varnishing, waxing or refinishing . . . ever. This is because the color and hard plastic extend clear through the material and can never wear off.

Gammite Flooring is available in standard wood finishes as well as exciting new decorator colors.

Our new brochure describes how Gammite Flooring is produced by atomic energy, and provides complete physical property specifications.

Radion PRODUCTS INCORPORATED

1275 Bloomfield Ave., Fairfield, N. J. 07006 (201) 228-2260

*Manufactured by Radiation Machinery Corporation

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You can specify draperies of Owens-Corning Fiberglas because they look good.

Or because they cut cooling equipment costs.

If a mind-boggling choice of handsome colors, textures and prints is what you want, you can get it in draperies of Owens-Corning Fiberglas glass yarn.

But we figure that's not enough.

Since draperies of Fiberglas* insulate, they cut down on cooling equipment and on the overall operating costs for that equipment.

Fiberglas draperies stay cleaner, are easier to wash . . . no ironing, no outside cleaning bills. They may even cut insurance costs—they're inherently firesafe.

So if you're interested in draperies that can save you more money than others, write:

Owens-Corning Fiberglas, Architectural Fabrics
717 Fifth Ave., N.Y., N.Y. 10022.

*Trademark Owens-Corning Fiberglas Corporation

FIRE-SAFE FABRICS

OWENS/CORNING FIBERGLAS TRADEMARK R

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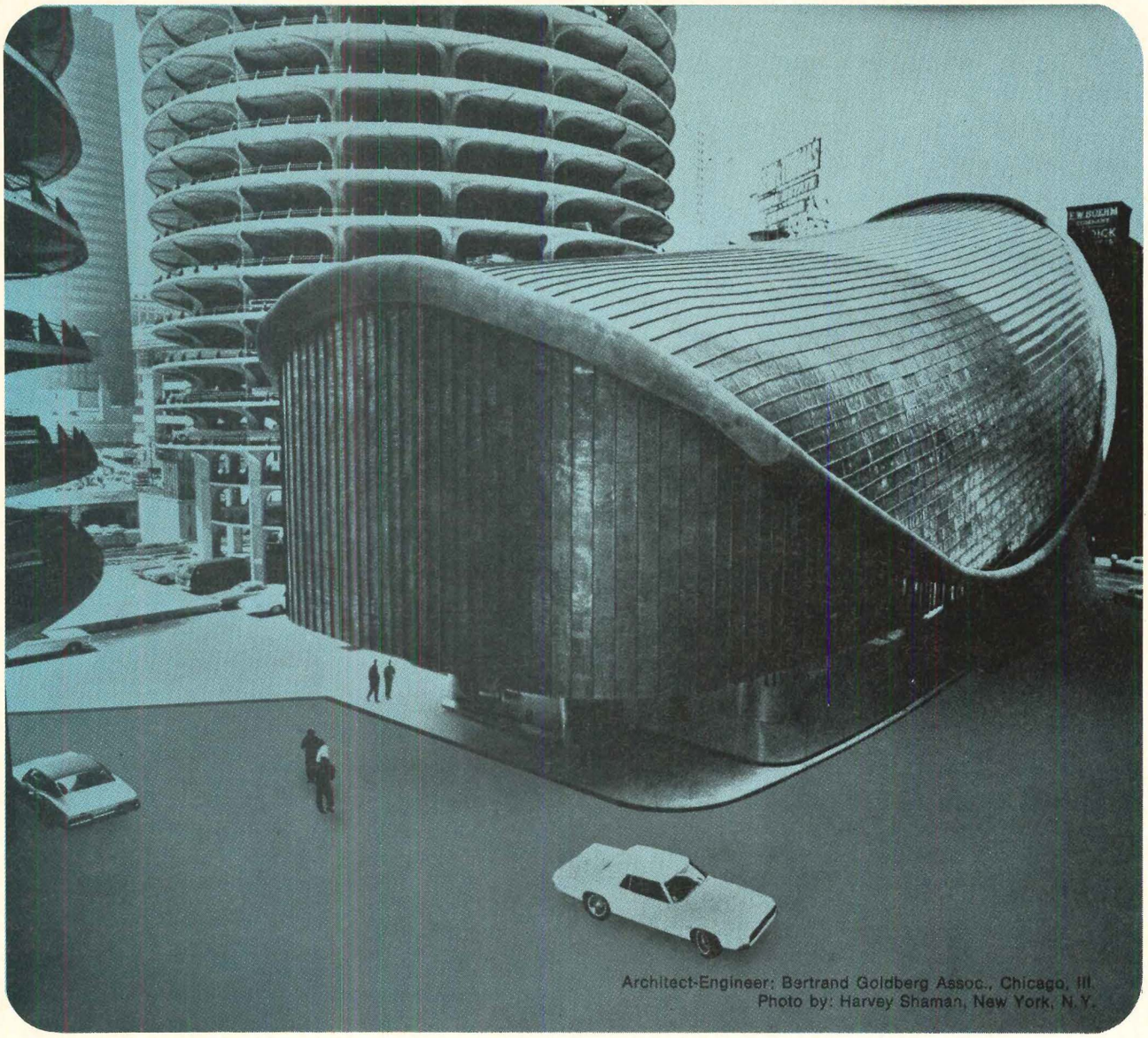
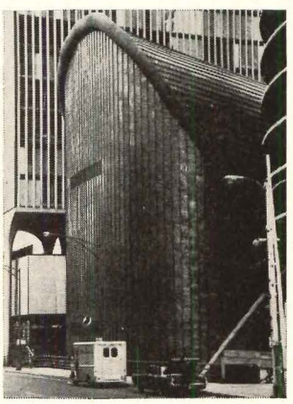


Architect-Engineer: Bertrand Goldberg Assoc., Chicago, Ill.
Photo by: Harvey Shaman, New York, N.Y.

A cocoon of Lead keeps noise out of the act



Neither the roar of Chicago nor the drumming of rain and hail on the roof will ever get on stage at the new Center For The Performing Arts building in Chicago's Marina City. The entire building is beautifully wrapped in a permanent, sound-proof, 85 ton blanket of sheet lead. ☐ This last of five buildings in Marina City houses a 300 seat theatre and TV station WFLD. Its armor of lead not only insulates it against noise but gives a permanent soft gray patina. The result is a dramatic contrast of both color and form with the adjacent concrete towers. And lead's durability, proven by the centuries, will keep the exterior virtually maintenance-free indefinitely. ☐ The density, limpness and mass of lead, its versatility of form and its workability have given it an important role in keeping buildings, rooms, planes and boats quiet.

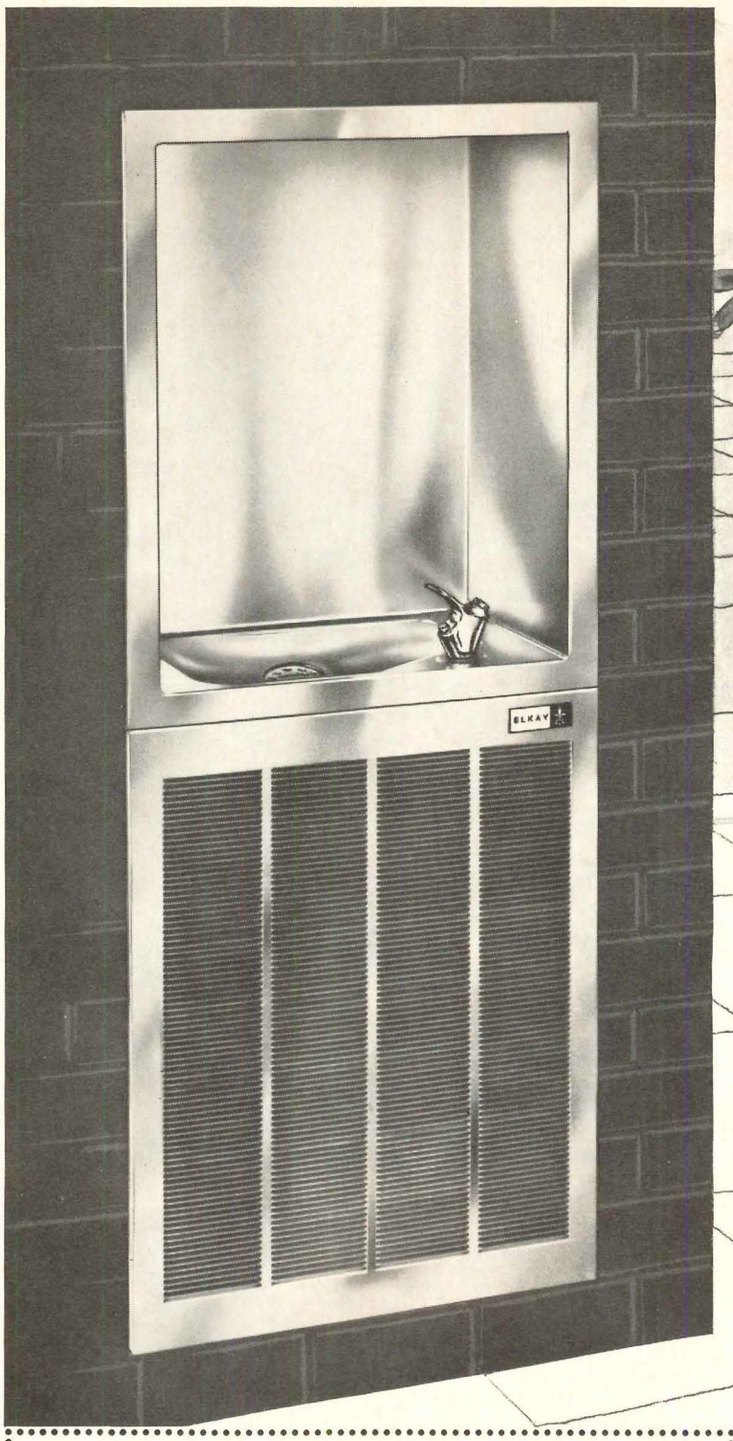
ST. JOE

ST. JOSEPH LEAD COMPANY

250 Park Avenue, New York, New York 10017

The Nation's Largest Producer of Domestic Lead and Zinc

PB-328



Space-Saving Designs in Stainless Steel Water Coolers!

Elkay offers fully recessed styling! No projections to block the passageway or take up valuable floor space! These gleaming coolers are quality built of 18 gauge (type 302) nickel-bearing stainless steel and have a deluxe LK-6K satin finish. Won't chip, crack, wear, or stain. Exclusive stream-splitter basin is splash-resistant. Sound dampened on underside. Delivers 9.5 gallons of 50° chilled water per hour when ambient and inlet water temperature is 80° F.

Measures 22" wide, 55" high and 12½" deep. Provides ample head room. Front grill available in stainless steel, laminated charcoal vinyl, or prime coated steel. Wide choice of models in Elkay's complete line. Write for Catalog DFC-2 or see our listing in Sweet's Architectural File. Elkay Manufacturing Company, 2700 S. 17th Avenue, Broadview, Illinois 60153.

Easy to Install! Easy to Service!

Front grill removes with the turn of 3 screws. Self-contained cooling unit requires two plumbing connections and an electrical connection. Easily removed without disturbing drain.

ELKAY®
Stainless Steel Water Coolers

see our catalog in Sweet's S

For more data, circle 23 on inquiry card

Students win support of A.I.A. in Chicago; sweeping changes proposed in professional ethics

The first joint convention of the American Institute of Architects and the Royal Architectural Institute of Canada was a success, and in its way, a creator of things to come. It may have established a precedent, for plans are under way for other such joint efforts from time to time, the next perhaps in Montreal. And the convention certainly acted as midwife for some issues which the A.I.A. now must continue to develop. As a direct result of student participation in this convention, the A.I.A. committed itself to raise $15 million toward the alleviation of urban problems; the efforts and confrontations toward this goal during the four days of the convention captured the emotional attention of the delegates, overshadowing conversation on the A.I.A.'s proposed new ethical standards. Yet the new standards may directly affect architectural practice in the United States more than any amount of money the profession as a whole can raise or spend.

The student efforts to get a monetary commitment from the A.I.A. to combat urban decay and the growing loss of hope among the disadvantaged began Sunday, during a scheduled "Student Speak-Out." Taylor Culver, president of the 17,000-member Association of Student Chapters, A.I.A., asked at that time for 10 per cent of the income of all members of the Institute, to be raised as a direct tax on its members. This 10 per cent figure was refined and rationalized by discussion into $15 million, and this amount formally presented at the A.I.A. general session on Monday. Debate on the issue, often in emotional and in personal terms, continued among individuals, student groups and the A.I.A. officers until the vote on resolutions Thursday morning. Resolution 19, as finally worded, and changing until minutes before its reading, stated in part: "The A.I.A. Task Force on Equal Opportunity, supplemented by a voting student social concern team [shall] meet as required with the expressed purpose of establishing programs, [and] administration structure for operating and disbursing funds in line with the $15-million goal. . . ." Resolution 19 was passed by the convention unanimously; in the discussion that preceded passage, there was only one unfavorable speech. The A.I.A. board must endorse any Task Force recommendations before they may be implemented, and the Task Force must consult with existing groups within the A.I.A. who have applied their resources to similar problems.

George C. Rockrise, a new vice president of the A.I.A., has been designated to head the A.I.A.'s search for methods of meeting its $15 million goal.

Changes proposed in ethical standards

The A.I.A.'s "Standards of Professional Practice" will undergo sweeping changes if proposed revisions to them are passed at next year's convention. An A.I.A. Task Force headed by Jack D. Train has been working for 18 months on proposals for updating the A.I.A.'s code of ethics, and presented the new code to the Chicago convention, calling for full discussions and a decision by next year's convention. The concept of "full disclosure" rather than a specific listing of "prohibitions" has been the guiding principal for changes in parts of the code, particularly those dealing with an architect's relationship with clients or with his employer.

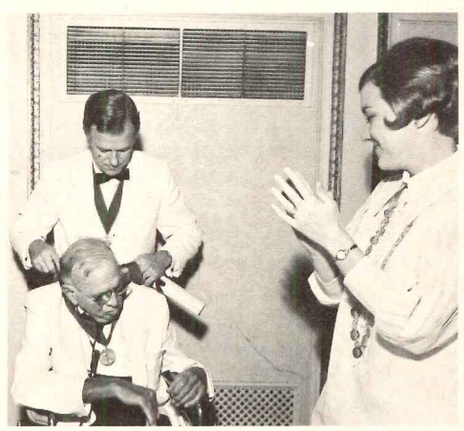
"An architect shall not have any significant financial or other interest that may be in conflict with the interest of his client or employer unless that interest has been fully disclosed and the client's or employer's approval of that interest has been recorded."

"An interest is fully disclosed when the main facts concerning that interest are either set forth in writing in a statement of the architect to his client or employer or are included in a written statement in which the client or employer records his approval of that interest."

"An architect shall not enter into a business transaction with a client if they have differing interests therein and if the client expects the architect to exercise his professional judgment therein for the protection of the client, unless the client has consented after full disclosure."

The ethical standards also broaden the architect's professional base to include the "construction industry." "An architect is not only a member of the profession of architecture but also a pro-

Entente. Taylor Culver, president of the Association of Student Chapters, A.I.A., and George E. Kassabaum, outgoing president of the A.I.A., at the conclusion Thursday evening.



Recognition. William Wilson Wurster of San Francisco at the annual banquet, receives the 1969 A.I.A. Gold Medal from President George Kassabaum, with Mr. Wurster's daughter, Mrs. Sara Douglas, looking on.

fessional in the construction industry. His obligation to reflect honor and dignity to the profession applies as well to the entire construction industry, of which architecture is a part."

Wurster receives Gold Medal

William Wilson Wurster was awarded the 1969 A.I.A. Gold Medal, the profession's highest honor, in a moving ceremony at the annual banquet Thursday evening. Mr. Wurster, a pioneer modern architect and educator and a founding partner of the San Francisco firm of Wurster, Bernardi and Emmons, has continued to practice, though a long illness now confines him to a wheel chair. His great courage in electing to go to Chicago to receive his award in person and his acceptance address were acknowledged with a standing ovation.

"This is a great day for me," Mr. Wurster said. "Somehow I must convey to you a deep appreciation of a change in the architectural thinking of our profession which now allows modest and simple structures to play a part in the award of our Gold Medal." He noted that throughout his practice his work had been not in his own image but for his clients, and he acknowledged the role of his partners in the design of the buildings for which he has become known. "We seek to play down the authorship of the ideas . . . so that everyone had a share in the decisions." Mr. Wurster remarked that he had always taken exception to massiveness and permanence in architecture, ". . . for there should always be much change, with new things coming along rich with ideas." He closed with these words: "I never want the possibility said of me that I could be like Vanbrugh, architect of Blenheim Palace in England, whose epitaph reads:

'Lie heavy on him, oh earth!
'He has laid many a heavy thing upon thee.' "

Resolutions directed toward social ills

A total of 27 resolutions were either referred to the board for appropriate action or passed directly by the convention, a record for A.I.A. gatherings. The nature of the resolutions were indicative of the preoccupations of the convention as a whole; eleven of them concerned social issues in our nation. Besides the student-initiated resolution for raising $15 million, other resolutions:

- Proposed that the new ethical standards include the principle that A.I.A. members shall not accept commissions which appear to strengthen or support racial discrimination.
- Endorsed the reports of the National Commission on Urban Problems (Douglas) and the President's Committee on Urban Housing (Kaiser), specifically urging action toward the creation of a Federal "Design Development Bank."

Investiture of new Fellows and Honorary Fellows of the A.I.A. took place Monday afternoon, in ceremonies at Rockefeller Memorial Chapel (above), University of Chicago. Seventy-six members were elevated to Fellowship; six foreign architects were made Honorary Fellows. The new Fellows of the American Institute of Architects are: Charles K. Agle, Princeton, New Jersey; Leonard D. Blackford, Sacramento, California; Samuel M. Brody, New York City; Leon Brown, Washington, D.C.; Henrik H. Bull, San Francisco; Georgius Young Cannon, Salt Lake City; M. Elliott Carroll, Washington, D.C.; Elizabeth S. Close (Mrs.), Minneapolis; Winston A. Close, Minneapolis.

Also Jack C. Cohen, Silver Spring, Maryland; Spencer B. Cone, Chicago; Eugene E. Crawford, San Rafael, California; Leonard J. Currie, Chicago; Lewis Davis, New York City; Frederic L. Day, Jr., Boston; A. Henry Detweiler, Ithaca, New York; Frederick E. Emmons, Los Angeles; Edward H. Fickett, Los Angeles.

And Joseph H. Flad, Madison, Wisconsin; Francis Gassner, Memphis; Hugh Gibbs, Long Beach, California; Kemper Goodwin, Tempe, Arizona; Walter Gordon, Portland, Oregon; Jules Gregory, Lambertville, New Jersey; Fred M. Guirey, Phoenix, Arizona; John C. Harkness, Cambridge, Massachusetts; Jay Dewey Harnish, Ontario, California; Michael M. Harris, New York City.

Also Robert O. Hausner, Deerfield, Illinois; August Frederick Hoenack, Bethesda, Maryland; Harry James Holroyd, Columbus, Ohio; William Dudley Hunt, Jr., Washington, D.C.; John M. Johansen, New York City; Raymond Kappe, Pac Palisades, California; Gustave R. Keane, Huntington, New York; William Keck, Chicago; Harris Atteridge Kemp, Dallas.

And William H. Kessler, Grosse Pointe, Michigan, Alan Kemp Laing, Urbana, Illinois; Frank J. Matzke, Albany; Bruce McCarty, Knoxville, Tennessee; Harley J. McKee, Syracuse, New York; Philip J. Meathe, Detroit; Louis Menk, Southfield, Michigan; Germano Milono, San Francisco; Ehrman B. Mitchell, Jr., Lafayette Hill, Pennsylvania.

Also Jesse O. Morgan, Jr., Shreveport, Louisiana; David George Murray, Tulsa, Oklahoma; Daniel J. Nacht, Sacramento, California; Gyo Obata, St. Louis; J. Norman Pease, Charlotte, North Carolina; John W. Peirce, Boston; John Edward Pekruhn, Pittsburgh; Walter S. Pierce, Lexington, Massachusetts; Jan Hird Pokorny, New York City.

And Robert Alonzo Ritterbush, Bismarck, North Dakota; Kenneth W. Roehrig, Honolulu; John Miles Rowlett, Houston; Van Fossen Schwab, Baltimore; Allen G. Siple, Beverly Hills, California; Richard Wilson Snibbe, New York City; Pat Yates Spillman, Dallas; Edwin T. Steffian, Boston; Joseph Stein, Waterbury, Connecticut.

Also Richard G. Stein, New York City; Calvin C. Straub, Scottsdale, Arizona; D. Coder Taylor, Kenilworth, Illinois; Mitchell Van Bourg, Berkeley, California; Lawrence J. Waldron, Seattle; Frederick S. Webster, Syracuse, New York; Arthur B. White, Philadelphia; James Richard Wilkinson, Atlanta; A. Osborne Willauer, Boston.

And Floyd Orson Wolfenbarger, Manhattan, Kansas; C. Clark Zantzinger, Jr., Philadelphia; Norman C. Zimmer, Portland, Oregon.

A.I.A. and R.A.I.C. Presidents. The new president of the A.I.A., Rex Whitaker Allen, with his daughter Suki Allen, and William G. Leithead, new president of the R.A.I.C., with Mrs. Leithead.

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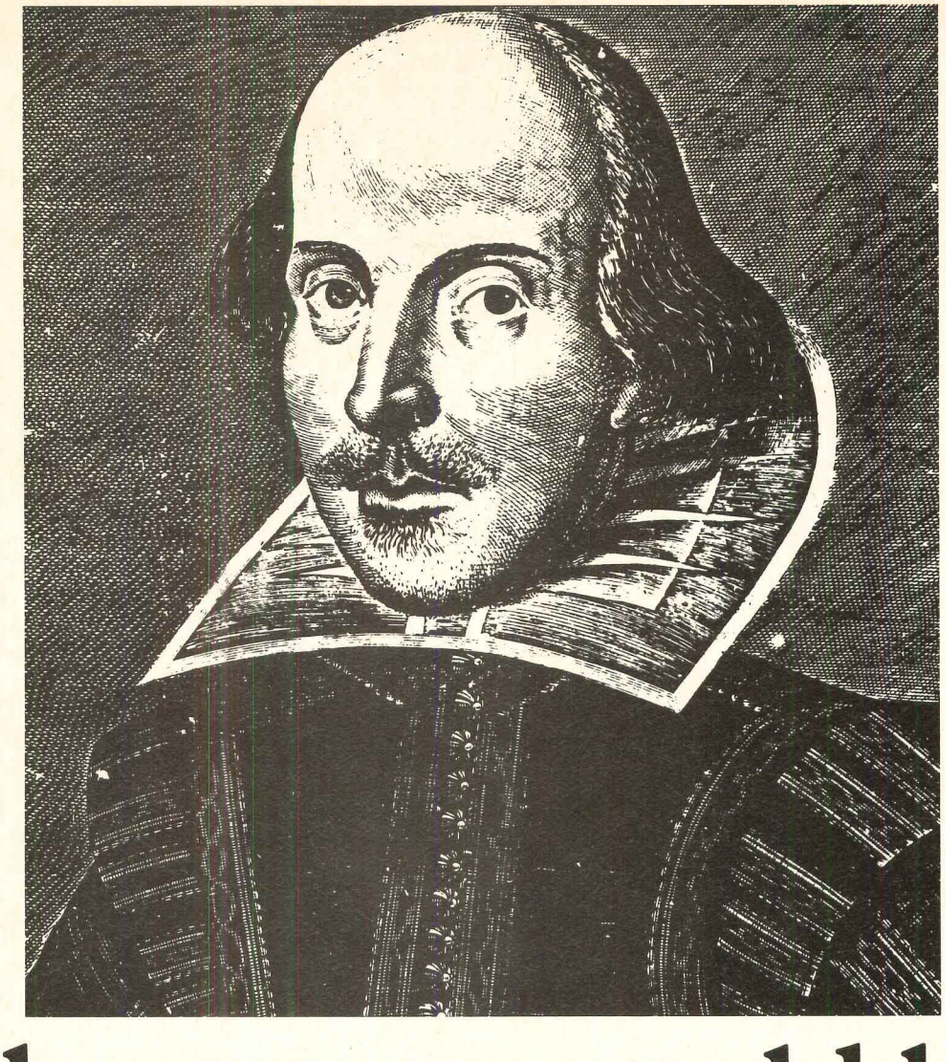

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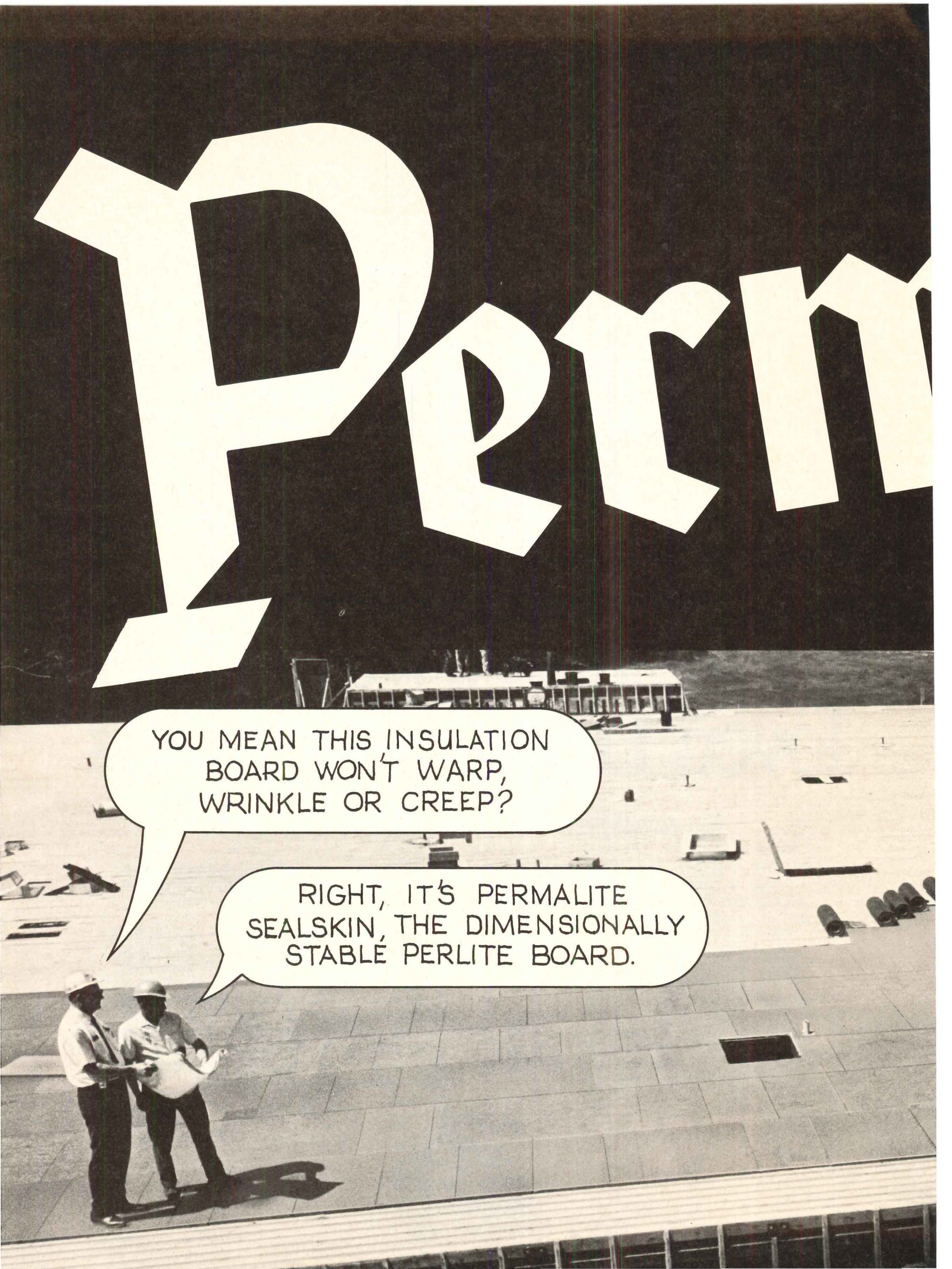
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■ Called for a reversal of our national priorities. "It has become clear that our nation can no longer afford to intervene in the affairs of nations throughout the world . . . and at the same time rebuild our decaying cities, provide an adequate supply of housing, and finance domestic programs. . . ."

Resolution 27 was submitted from the floor of the convention, and was the only one to pass without first going through the resolutions committee. It calls for the creation of store-front design centers: each local chapter should ". . . establish and fund a pilot center in a deprived neighborhood and do all in its power to effect substantial improvement in that neighborhood."

The Purves Lecture and Dietz speech

The Purves Lecture was delivered this year by Dr. Hans Selye, M.D., Ph.D. of the University of Montreal, on the subject of individual stresses in the urban environment, and what the architect may be able to do about them. Dr. Selye said that it was part of medicine's aim to relieve physical and internal stresses, but that stresses caused by the environment must be isolated and acted upon by the architect.

Albert G. H. Dietz, professor of building at M.I.T., delivered the fourth major address of the convention, on the subject, "Building Technology: Potential and Problems." Professor Dietz discussed some of the trends in building technology and the influences that constrain and control its development, citing public attitude, the existing industrial organization, and government policy as three principal controls on technology.

The workshops

Seven "workshop" panel discussions Wednesday afternoon and six Thursday afternoon offered the convention a wide variety of topics to explore. The workshops were held jointly with the R.A.I.C., as were most events of the convention, with the exception of business meetings. *"Economics of Services"* addressed itself to what should be appropriate remuneration for architectural services.

The workshop was motivated, in part, by a study completed last year for the A.I.A. which shows the profit return to principals in U.S. architectural firms to be substantially lower than in engineering, advertising, real estate development, law, medicine, and insurance.

A special workshop on *"Historic Buildings—An Urban Asset,"* was held at the Chicago Art Institute. Chaired by Charles E. Peterson, F.A.I.A., and including a large panel of preservationists, the workshop noted that there is a boom in the restoration of historic buildings and places, and was primarily concerned with the education of architects regarding restoration techniques.

The McGraw-Hill (F. W. Dodge) Party was held this year at Arlington Race Track (above). Special hospitality trains transported the 2600 architects and their guests to the track, and hence to the upper tier of the entire main grandstand, where the party was held. High points were the special race between five horses, dancing to four bands in separate parts of the stand and, of course, the greeting of old friends.

The Host Chapter Gala Party began at the Chicago auditorium, Sullivan's spectacular space. From the auditorium the party moved either by bus or by walking tour (led by Canada's 48th Highlanders Drum & Pipe Band, above) to Chicago's old Grand Central (B&O) Terminal, for the Train Shed Party. Within the terminal there was jazz in the Train Shed, a rock band in the old Carriage Court, and "smooth" music in the Roman Waiting Room.

The President's Reception this year was a reception for the new Fellows of the A.I.A., hosted jointly by President George E. Kassabaum and by R.A.I.C. President Norman H. McMurrich. It was held (above) amidst stuffed elephants and rushing fountains at the Field Museum of Natural History, Chicago, directly following the investiture ceremonies at Rockefeller Chapel.

The Keynote Address: Dr. Daniel P. Moynihan, Assistant to the President for Urban Affairs. Dr. Moynihan's speech, "Architecture in a Time of Trouble," was an address to two issues: one an attempt to set in perspective the "trouble" of the times, that same trouble for which the convention as a whole showed its overriding concern; and secondly, a call for a new and reaffirmed commitment to architecture as art, particularly public architecture. "Ours is a society that stands accused," said Dr. Moynihan, "or rather, has become self-accusatory. If one recalls only a few years ago, at the outset of this decade, how singularly self-congratulatory we were, the transformation is indeed striking. . . . Enough time has gone by now, and something so much less has come to pass, that we are all required to change our expectations, if not indeed to question our capacities."

Dr. Moynihan gave one possible, metaphorical, explanation for changing mores in the United States in the Sixties: "Of a sudden, the American Epoch is no longer young. The ease and assurance of youth is gone; the certainty that there will always be another girl, a new opportunity, plenty of energy, plenty of time. . . ." And yet, Dr. Moynihan said, "The end of youth is not the end of life, much less the end of the world. It is, or ought to, mark the onset of a period of less fun, no doubt, but far more satisfaction and much greater consequence." The second portion of his speech was directed more specifically toward architectural problems: ". . . I will argue that the American polity . . . has been impaired, has atrophied in our time because of a retreat from architecture and public building as a conscious element of public policy and as a purposeful instrument for the expression of public purposes." Moynihan argued that after the time of Jefferson there has been a steady deterioration in the quality of our public architecture, ". . . and with it a decline in the symbols of public unity and common purpose with which the citizen can identify, of which he can be proud, and by which he can know what he shares with his fellow citizens."

Ethical Standards and their Challenge. Dr. Marver H. Bernstein (above) delivered one of four major addresses to the convention, his entitled "Ethical Standards for Architects: A Challenge to Professionalism." Dr. Bernstein was a consultant on the preparation of the new ethical standards which the convention next year must consider, and his remarks seemed timely. He began by listing some characteristic problems which all professions, not just architecture, must face when preparing new ethical standards. First is a tendency to turn inward upon private, rather than public issues. "Such concern is not often matched by an interest in the attitude of responsible or informed public opinion and the responsiveness of the profession to public need. Most professions tend to be conservative, not to say hidebound, in their close adherence to established values and practices. . . . The second problem is the tendency of every profession to concentrate on establishing a system of security designed to protect the individual practitioner. . . . The security system of a profession typically stacks the cards in favor of the well-established professional." A third problem, according to Dr. Bernstein, is the tendency for a depression consciousness to persist in any profession during a climate of abundance. "One manifestation of this is low salaries for younger practitioners. . . ." Dr. Bernstein then suggested several objectives which any new set of ethical standards for architects might try to achieve. First, they should attempt to address themselves to issues which can be identified as coming in the future, rather than concentrate on issues which "have been" or "are now." He emphasized that "design and construction are increasingly organized to deal with a building project from feasibility study to completed structure, and the role of design is becoming inseparable from the construction process." Noting the rise of conglomerate, faceless organizations in our society, and the difficulty for the public to learn about architects and their work, Dr. Bernstein said, "Architects should identify with their projects. The standards should not prevent that identification, nor should they be allowed to interfere with the educational function of the profession."

Honor Awards Luncheon. The A.I.A.'s 1969 Honor Awards were presented at a filled-to-capacity luncheon Monday noon. Above, George E. Kassabaum presents awards to Ada Louise Huxtable and to Richard Meier. In addition to the 16 firms which received 1969 Honor Awards for the architectural excellence of their buildings, (June 1969, pages 40-43) there were 11 other awards presented.

- The newly established Twenty-five Year Architectural Award went to Rockefeller Center, in recognition of a distinguished design in which, after a period of time, function, esthetic statement, and execution can be reassessed. Original architects for the center were Reinhard & Hoffmeister; Corbett, Harrison & MacMurray; Hood and Fouilhoux.
- A Henry Bacon Memorial Medal went to the Fosse Ardeatine Memorial Caves near Rome as "the best example of memorial architecture portraying high emotional, moral, or spiritual concerns." Architects: Nello Aprile, Gino Calcaprina, Aldo Cardelli, Mario Fiorentino, Giuseppe Perugini.
- The Citation of an Organization was presented to the New York State University Construction Fund, for outstanding achievement by an organization in any field related to architecture or planning.
- The Architectural Photography Medal went to Julius Shulman of Los Angeles, for "recognition of high achievement in architectural photography."
- The Craftsmanship Medal was presented on Henry Easterwood, for distinguished creative design and execution where design and craftsmanship are inseparable.
- The Fine Arts Medal went to Jacques Lipchitz, in recognition of his distinguished achievement in fine arts related to architecture.
- An Industrial Arts Medal was presented to architect Carl Koch, for outstanding design for execution by machine in such fields as furniture, textiles, industrial design, or consumer products.
- The Allied Professions Medal went to engineer John Skilling of Seattle, for "outstanding achievement in a design profession related to architecture."
- The Architecture Critics' Medal was presented to Ada Louise Huxtable, architecture critic of the New York Times, in recognition of a distinguished career devoted to architectural criticism.
- The Edward C. Kemper Award, presented each year to an A.I.A. member who has contributed significantly to the Institute or the profession, went to Philip J. Meathe.
- The Architectural Firm award this year went to Jones & Emmons, Los Angeles. The award recognizes that "continuous collaboration among individuals in the firm has been a principal force for producing distinguished architecture."

A.I.A. Officers Elected: Back row, left to right: new regional directors Hilliard T. Smith, Florida; Daniel Boone, Texas; Floyd O. Wolfenbarger, Central States; Frederick W. Salogga, Illinois; Russell O. Deeter, Pennsylvania; and Arthur Froehlich, California. Front row, left to right: Vice-presidents Francis D. Lethbridge, Washington, D.C., and George M. White, Cleveland; new First Vice President and President-elect Robert F. Hastings, Detroit; President Rex W. Allen, San Francisco; Vice President George T. Rockrise, San Francisco; and Treasurer Rex L. Becker, St. Louis.

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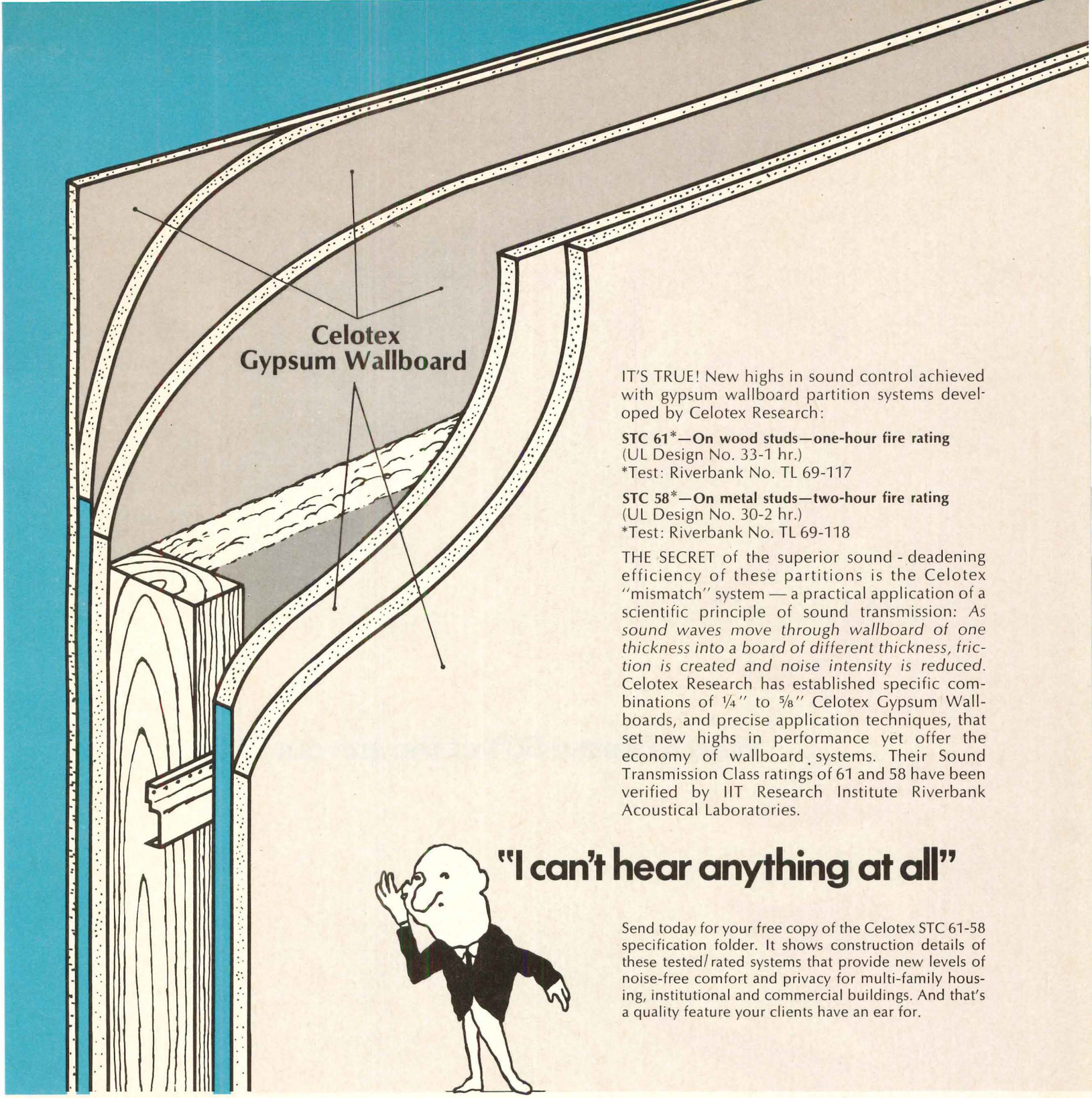

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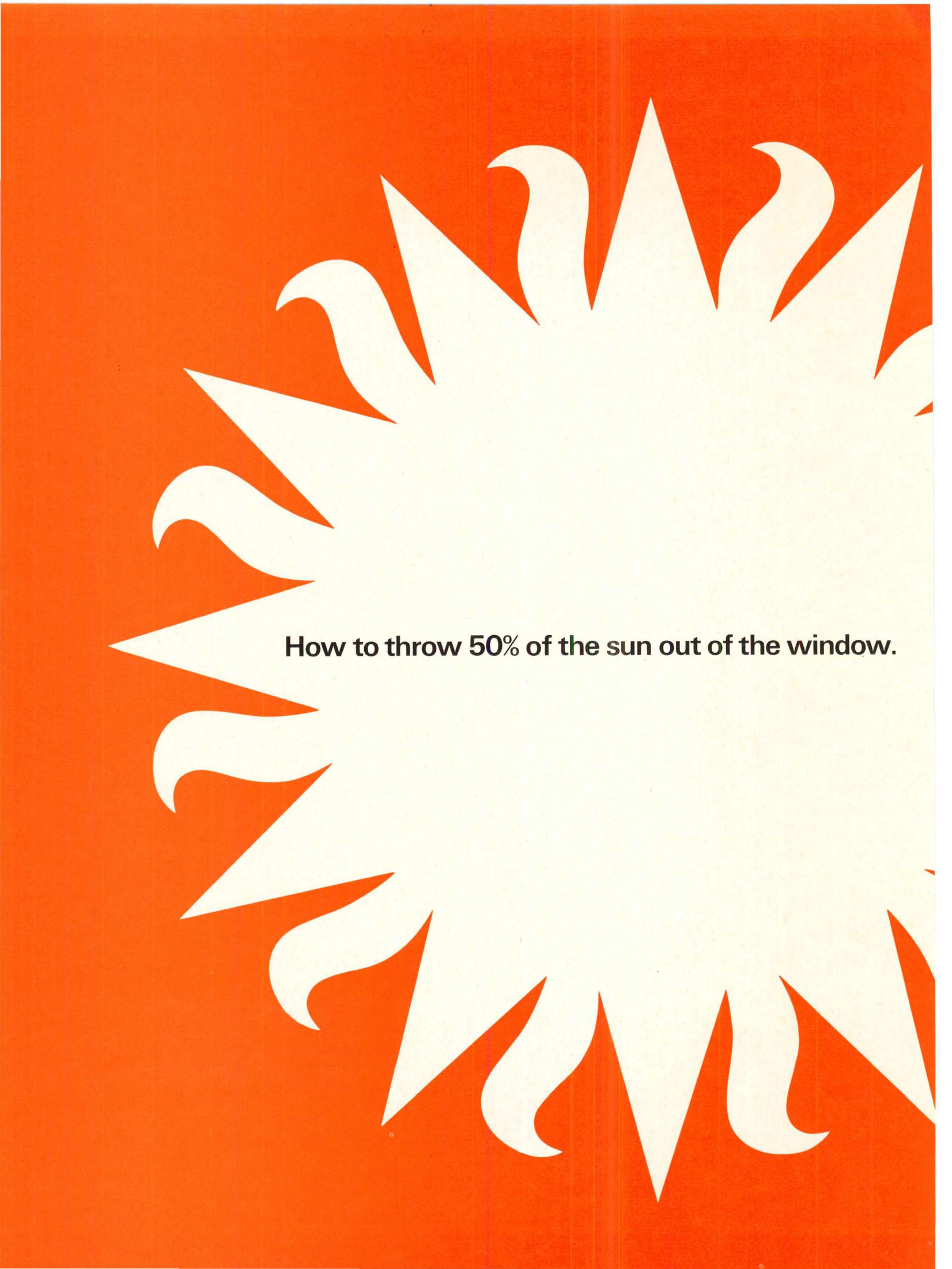
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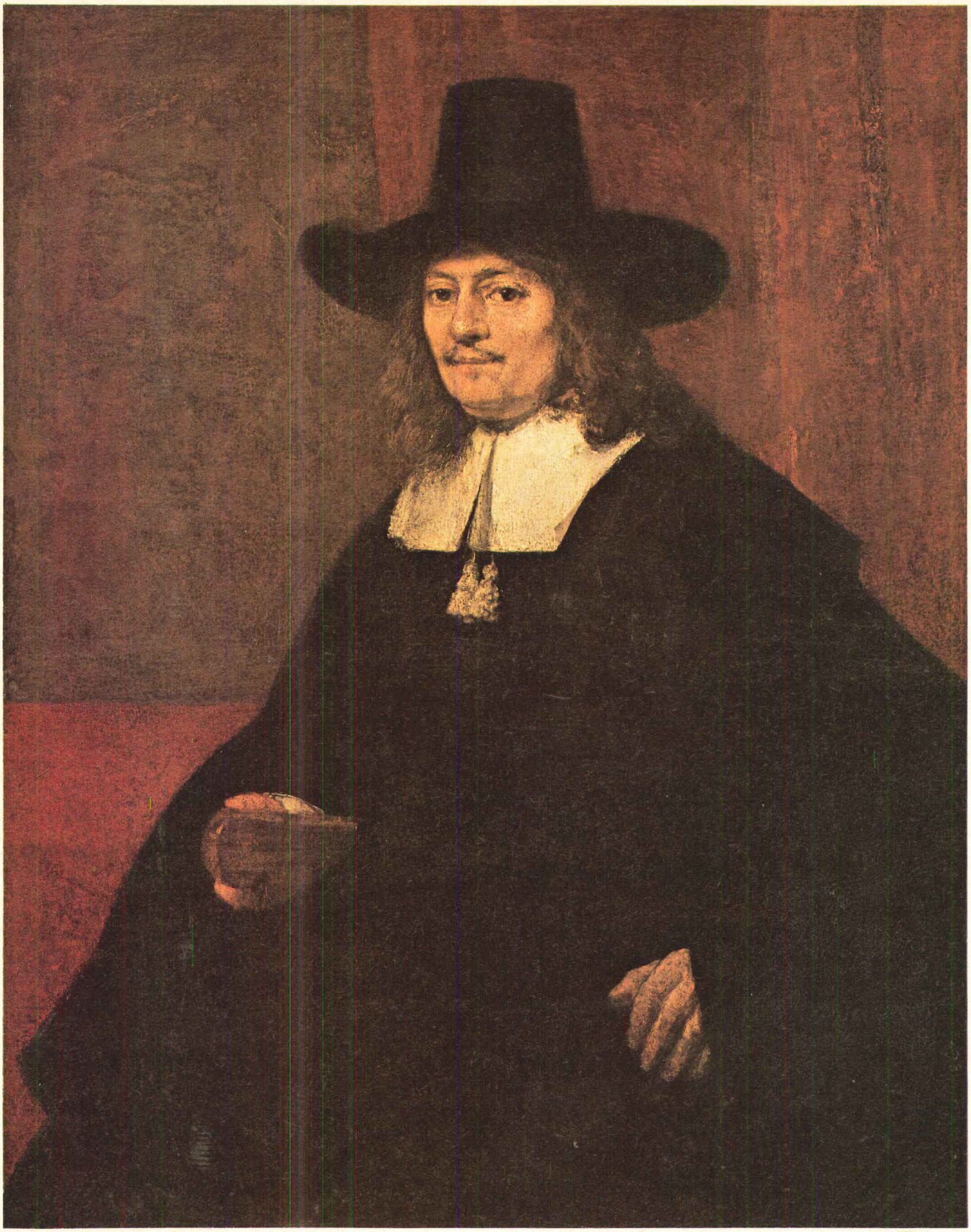

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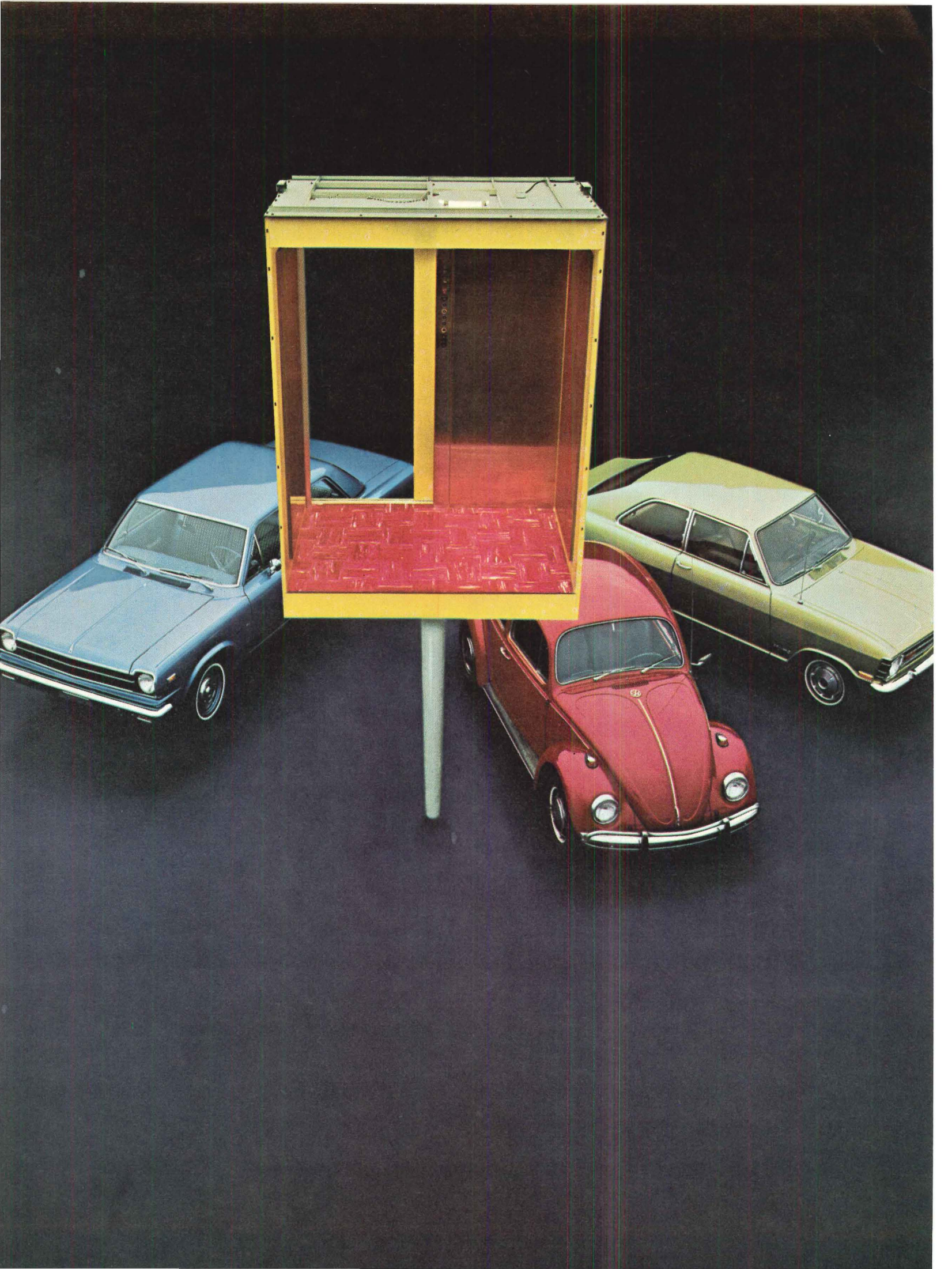

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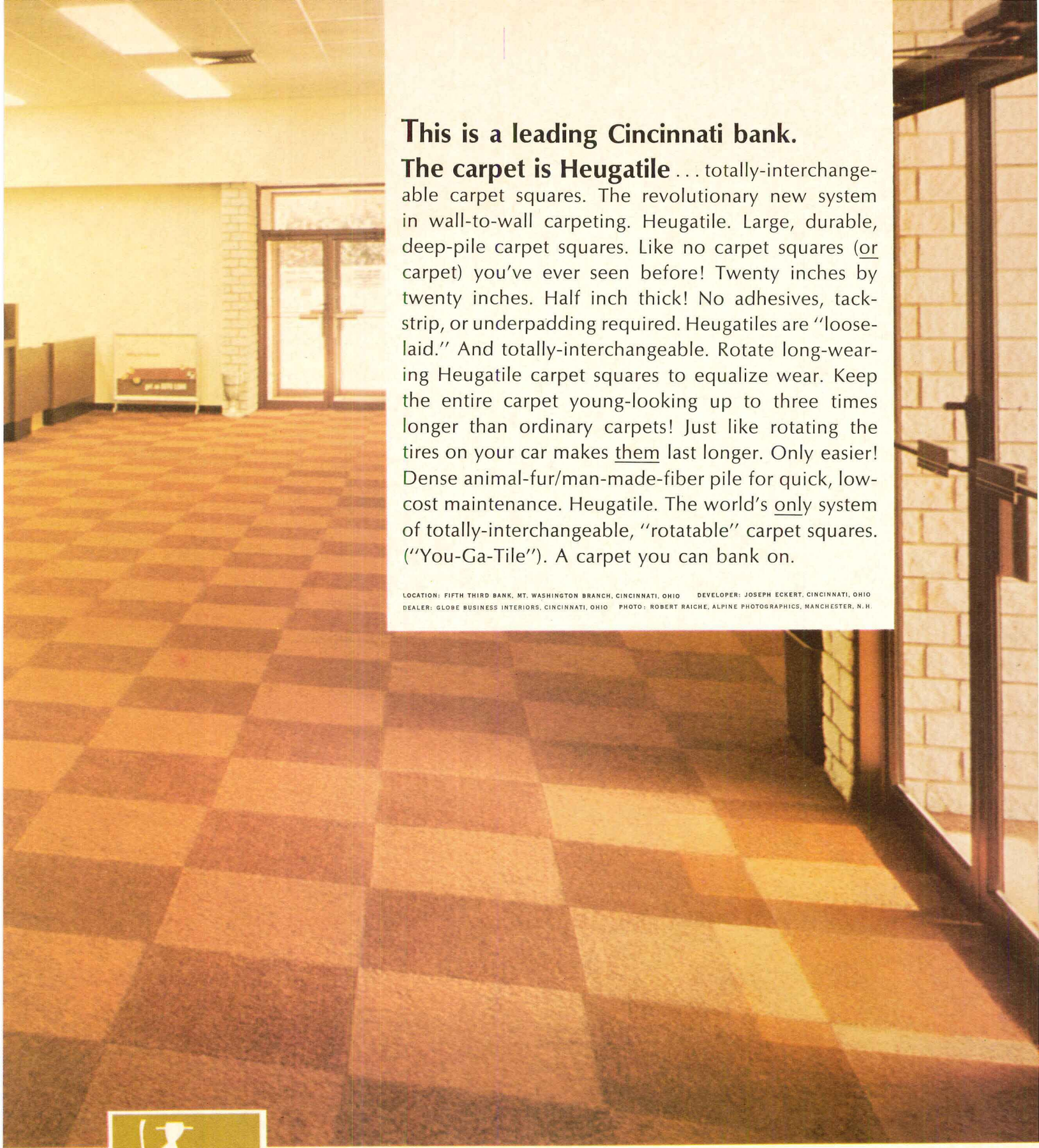

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LOCATION: FIFTH THIRD BANK, MT. WASHINGTON BRANCH, CINCINNATI, OHIO DEVELOPER: JOSEPH ECKERT, CINCINNATI, OHIO
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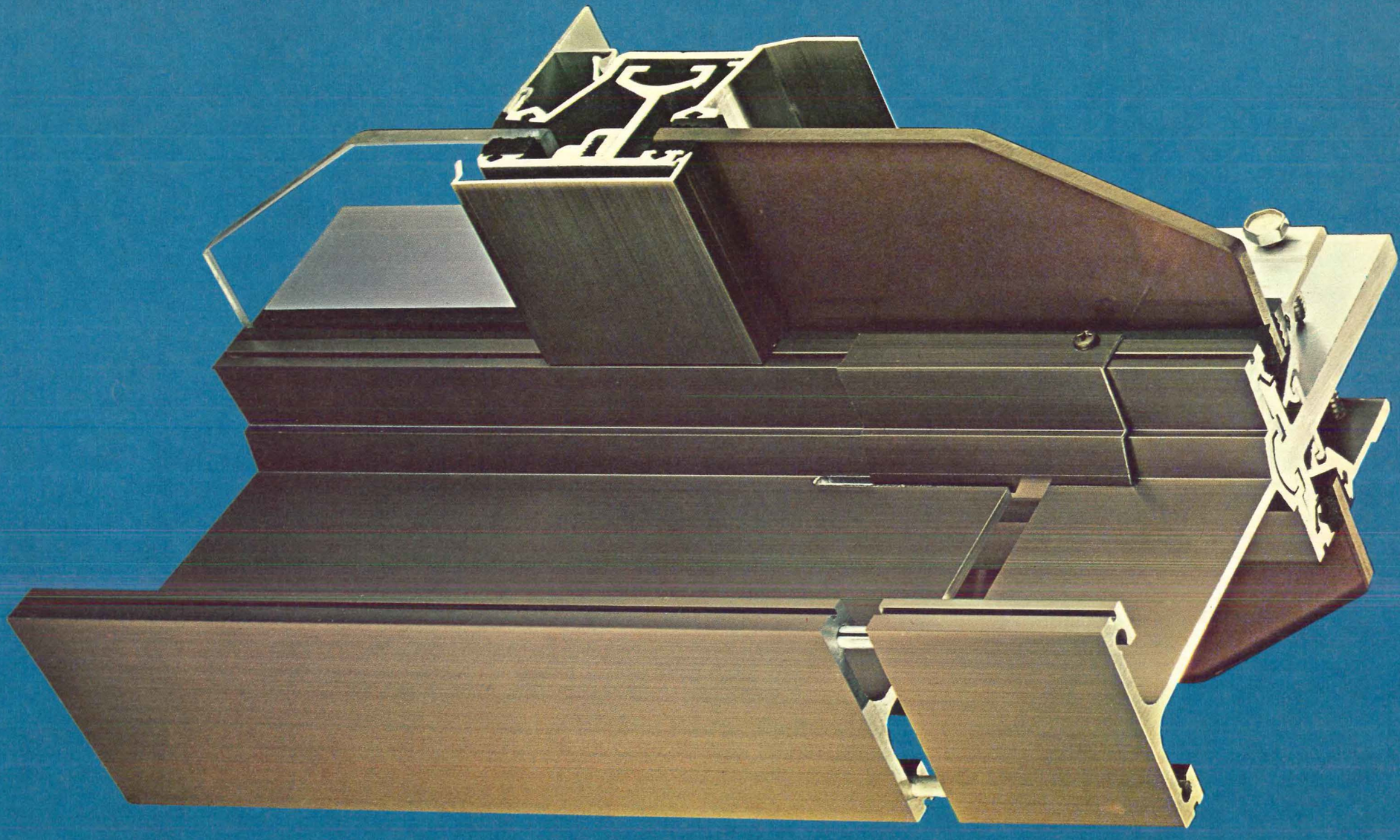
For more data, circle 30 on inquiry card



Unfortunately, we can't tell you exactly how much money you'll save with the new Pittco Seventy-Five Curtain Wall.

Until we know your specifications, we can't even predict how much extra design freedom you'll enjoy, or how many construction days you'll save. Or just how many tenants you'll gain with Seventy-Five Curtain Wall's rainscreen system.

Seventy-Five Curtain Wall's five anodized aluminum colors are coordinated with Pittco® entrance systems and storefront metals. And it accommodates any thickness of glass or spandrel. Lets you build a beautiful building inexpensively, without compromising your design.

It's interior glazed to save you expensive days of glazing and erection. A controlled-pressure glazing system cushions and seals glass tightly between neoprene strips to minimize breakage. It also makes Seventy-Five Curtain Wall foolproof.

We've put Seventy-Five Curtain Wall through a fierce series of performance tests, too. (It's met all the requirements of NAAMM Tests A, B, C-1 and C-2, for example.)

The competitive price is the big surprise. When you give us your specifications, we'll tell you exactly how much money you'll save with the new Pittco Seventy-Five Curtain Wall.

Consult Sweet's File 20a/Pp (see Pittco 7500 Curtain Wall), or write: Pittco Architectural Metals, Box 930, Kokomo, Indiana 46901.

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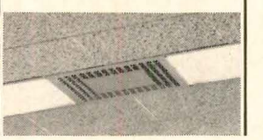
MODULAR AIR HANDLING

Threaded attachment of flexible air duct from above.

Blending modular appearance as seen from below.



Through competitive analysis and first-hand experience . . .

Quaker Oats chose Multi-Vent® high capacity air diffusers

. . . designed for modular installation and continuity of ceiling appearance

Interior wall and desk arrangements would be subject to change—these were the requirements which made movable, modular air diffusers a must as Quaker Oats set about to modernize its offices in the Merchandise Mart, Chicago.

The final choice was to use Multi-Vent High Capacity Air Diffusers. The reasons were several:

Prior investigation plus installed experience
The company's impressive computer center had previously been equipped with 24" x 48" high capacity Multi-Vent diffusers. Thorough field and laboratory investigation preceded the installation. Performance under super-critical requirements was flawless. In the new areas to be modernized, there could be no compromise with performance—"blend-in" appearance was a must.

12" x 12" diffusers unobstrusively blend with overall design decor
When you look up, you don't really see air diffusers. Eye-appealing angular throw apertures keep moving air from soiling ceiling tile. And the blend with the lighting fixtures is beautiful as this photograph of the engineering offices demonstrates.

Again, a check before purchase
Though recommended because of prior performance, the more compact modular design was laboratory evaluated. A trip was also made to an Atlanta bank to inspect an actual installation.

Installation economy bonuses are many
For instance: Multi-Vent diffusers are interchangeable with the ceiling tile. Duct work was planned and installed to accommodate future interior wall changes knowing that moving and attaching Multi-Vent units are not only a quick process but would cost less.

Time-saving air distribution balancing is a simple adjustment of a readily accessible set screw. Air loads can be re-distributed easily when needed in the event of greater concentration of personnel in a given area.

The time-saving sequence of installation alone reduced the overall cost.

To learn more about this and other successful installations of Multi-Vent air diffusion systems, do as The Quaker Oats Company did . . .

Write:

MULTI-VENT PRODUCTS DIVISION
Dynamics Corporation of America
1400 North Kostner Avenue
Chicago, Illinois 60651

DCA M

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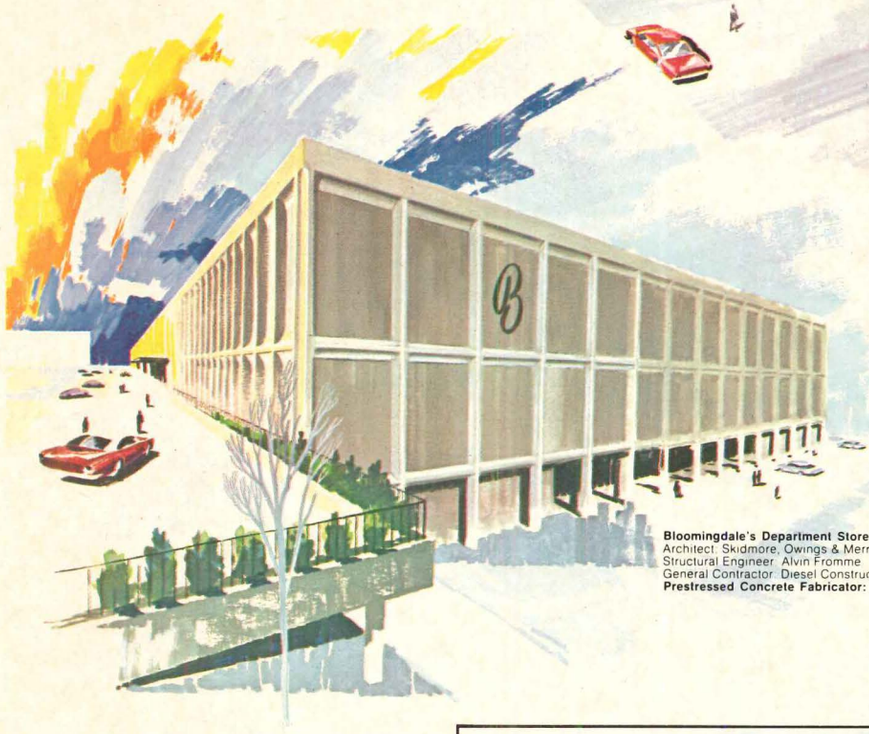
Mechanical Contractors: R. B. Hayward

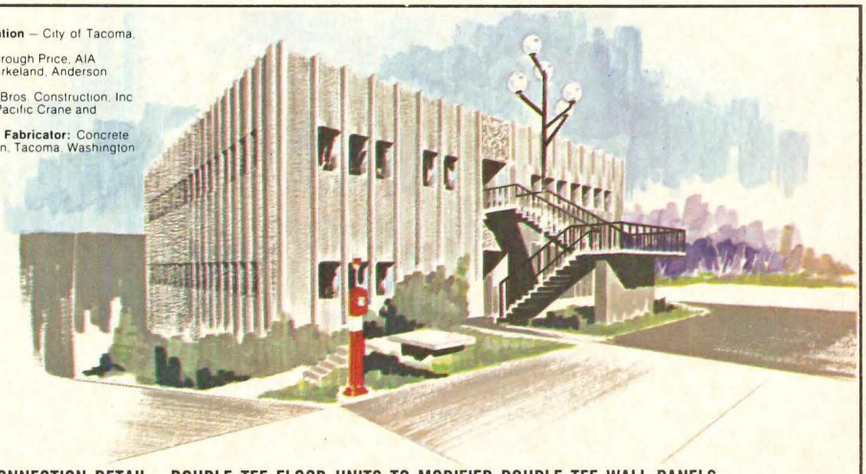
considered prestressed?

Trailways Bus Terminal — Atlanta, Georgia
Owner: Conbus Corporation
Architect-Engineer: Edwards and Portman
Contractor: George A. Fuller Co.
Prestressed Concrete Fabricator: Concrete Materials of Georgia, Inc., Forest Park, Ga.

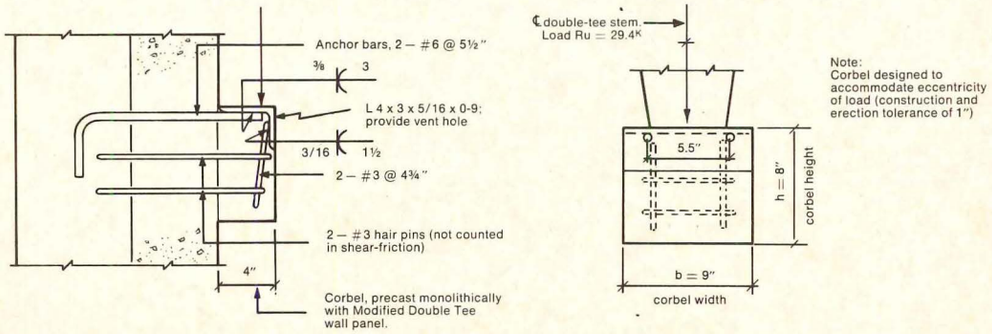


Bloomingdale's Department Store — Short Hills, New Jersey
Architect: Skidmore, Owings & Merrill
Structural Engineer: Alvin Fromme
General Contractor: Diesel Construction Co.
Prestressed Concrete Fabricator: Prefabricated Concrete, Inc., Farmingdale, N.J.

Headquarters Fire Station — City of Tacoma, Washington
Architect: Robert Billsbrough Price, AIA
Engineer: Anderson, Birkeland, Anderson and Mast
Contractor: McKasson Bros. Construction, Inc.
Prestressed Erection: Pacific Crane and Construction Co.
Prestressed Concrete Fabricator: Concrete Technology Corporation, Tacoma, Washington



CONNECTION DETAIL — DOUBLE TEE FLOOR UNITS TO MODIFIED DOUBLE TEE WALL PANELS



Note:
Corbel designed to accommodate eccentricity of load (construction and erection tolerance of 1")

BASIC DATA AND REFERENCES AVAILABLE UPON REQUEST: CF&I STEEL CORPORATION, P.O. BOX 1920, DENVER, COLO. 80201

CF&I STEEL

D-940

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Imaginative Solution:

The Precision Automatic Electric Disappearing Stairway.

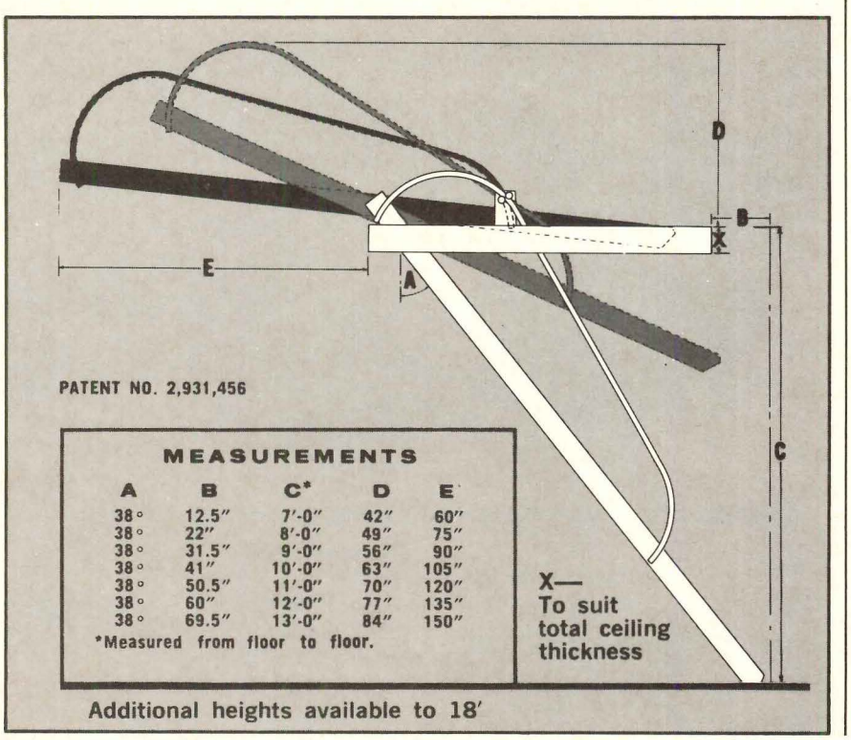
A Unique Stairway Concept: An automatic stairway that provides safe, sturdy access to important storage or work areas . . . yet silently and efficiently disappears to recover premium space.

Efficient Engineering Design. The stairway is operated by two toggle switches —one mounted on the wall below— one mounted on the motor unit above. A key switch at lower level is available, if desired.

Aircraft steel cables and a dual pulley system in conjunction with adjustable automatic limit switches guarantee precise "at rest" position of stairway, up or down.

The curving hand rails glide on twin sealed ball bearing rollers (both sides), which are stationary guides to assure perfect alignment of the stairway on opening and closing.

Power Unit. The stairway utilizes a ⅓ hp, 115 volt, 60 cycle, single phase, instantly reversible electric motor (directly connected to reduction gear drive) complete with contactors—prewired to control switches.



Available In Wood Or Aluminum. Standard specifications on wood models are: 1" Plywood Frame (Box or Angle) 1 1/16" x 6½" Straight Grain Stringers • 1" x 6½" Straight Grain Treads, Covered With Non-skid Rubber • ¾" Fir-Ply Door • 1¾" B-Label Optional.

Standard specifications on aluminum models are: ⅛" Steel Frame (Box or Angle) • Aluminum Stringers 7" x .230" Channel • Aluminum Treads 6" x .225" x 19⅜" Channel, Covered With Non-skid Rubber • ⅛" Sheet Aluminum Door • 1¾" B-Label Optional.

Automatic electric disappearing stairways can be constructed to your special requirements.

PRECISION parts corporation

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There's nothing else like it.

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Prefab

Put a Bally Λ Walk-In Cooler/Freezer in the kitchen. Be ready for the leisure crowd seeking new adventures in dining. Bally Walk-Ins operating at temperatures from 35° cooling to −40° freezing provide the facilities to plan and prepare excitable and profitable menus in advance. Learn about many other important features from our 32-page booklet and urethane wall sample.

There's an evolution in the kitchen

Bally

Bally Case & Cooler, Inc.
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This house was painted

with a hammer.

A house that's been painted with a brush looks very nice. For about 3 years.

A house that's been painted by hammering on Stratalite Thatch Siding looks just as nice. For about forever.

That's because Stratalite Thatch Siding has its paint sealed in. So weather can't do what it does to wood siding. Time can't do what it does to wood siding. In fact, its 8 colors never need painting to preserve the siding.

But will what's beneath the surface hold up? What's beneath the surface is a tough, strong and sturdy, all-mineral siding material.

It won't burn, crack, warp, peel or be eaten by termites.

But it looks like wood and it works like wood. It can be sawed, whittled or nailed like wood.

Design a house with Stratalite Thatch Siding.

For the first time the siding may last as long as the house. For more information, write GAF Corp., Building Products Division, 140 West 51 Street, N.Y., N.Y. 10020.

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gaf Stratalite™
THATCH SIDING

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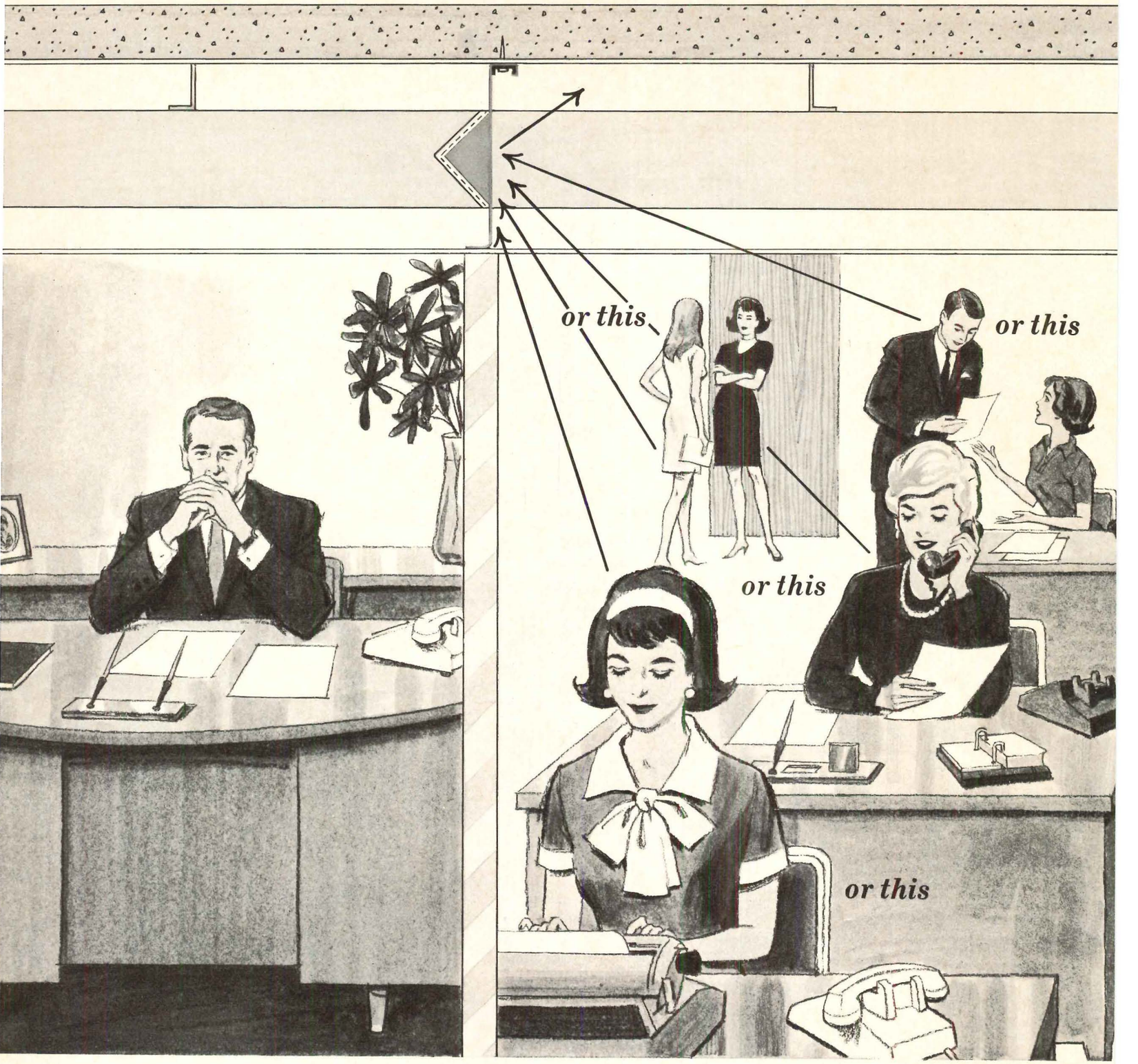
Now **don't** hear this!



Soundproof plenums with ACOUSTILEAD

Most of today's office walls are all right, as far as they go. But they don't go far enough. Because they reach only from the floor to a hung ceiling, they allow sound waves to pass through the plenum areas above partitions and to travel from one office to the next.

But hang an Acoustilead plenum sound barrier from the slab above to the top of a wall or partition and you block noise effectively. Acoustilead also ensures the STC values of sound-rated partitions.

Where dry walls are extended to the floor slab above, sound leakage around ducts, pipes and wiring makes them ineffective. These leaks can be stopped by crimping Acoustilead around the obstacles to create a sound-tight seal.

Acoustilead is sheet lead 1/64" thin. It has excellent noise-reduction qualities and can be installed easily and inexpensively. Weighing only one pound per square foot, it can be cut with scissors or knife and fits tightly around ducts and vents. Acoustilead comes in handy 4′ x 25′ rolls.

For information on Acoustilead, write to the Sound Attenuation Dept. of Asarco.

Federated Metals Division
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120 BROADWAY, NEW YORK, N.Y. 10005

ASARCO

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2300 West Loop Building, Houston. Owner: Gerald D. Hines Interests. Architects: Neuhaus & Taylor, A.I.A., Houston. Windows: Thermopane® Insulating Glass with Vari-Tran/Chrome 114. Spandrels: ¼" Tuf-flex® Vari-Tran/Chrome 114

VARI-TRAN™.... available with three silvery and three golden reflective coatings. Functional. Aesthetic. Lively.

For a color photo of building and data on Vari-Tran, write Architectural Construction Marketing, Libbey-Owens-Ford Company, 811 Madison Ave., Toledo, Ohio 43624

L-O-F HI-PERFORMANCE GLASS LOF GLASS

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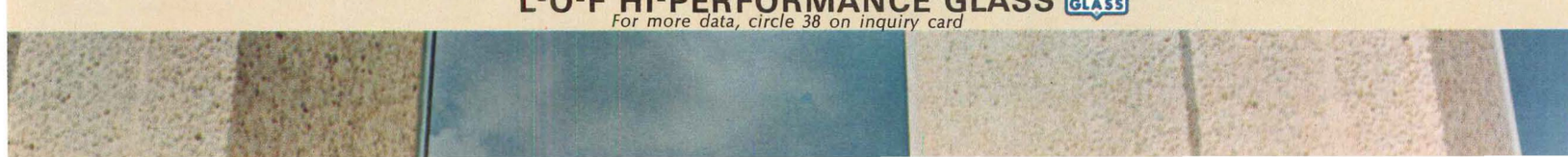
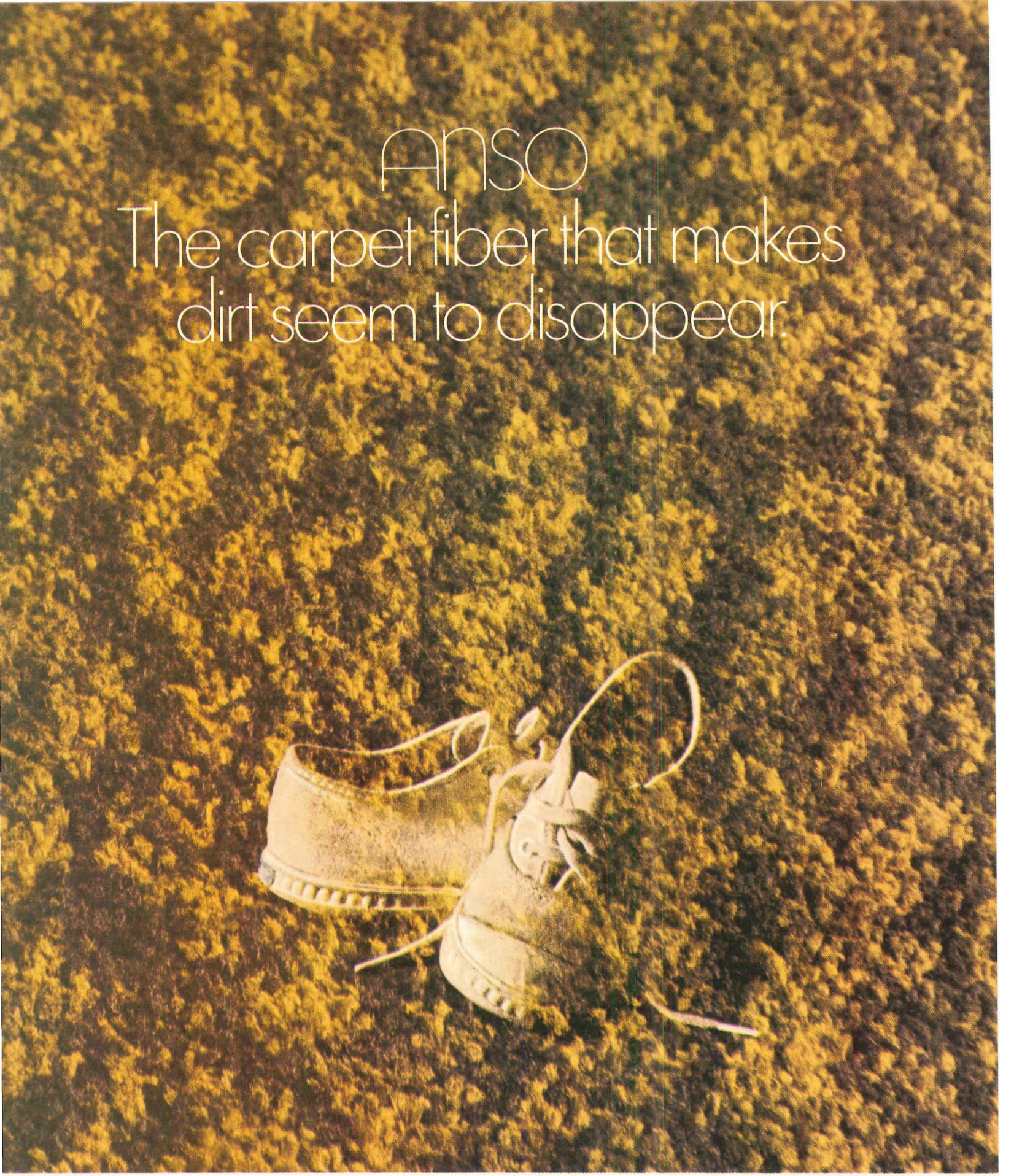


ANSO
The carpet fiber that makes dirt seem to disappear.



Why ANSO™ nylon?

Because ANSO does strange things with light. Turns it around to reflect the beauty, color, and texture of a carpet. But not the common dirt a carpet has to put up with.

ANSO is specially engineered to resist ugly soiling and extreme wear, which makes it the ideal choice for commercial carpeting.

If ANSO happens to cost more than ordinary nylon, it's worth it.

Because ANSO keeps looking new. Longer.

ANSO™

The Nylon Fiber That Makes Dirt Seem To Disappear.

Allied Chemical

Carpeting of ANSO nylon available from these fine mills: Alexander Smith; E. T. Barwick Mills; Columbus Mills, Inc.; Firth Carpet Mills; Karastan Rug Mills; Laurelcrest Carpets; Mohawk Carpet Mills; Monarch Carpet Mills; Needleloom Carpets.

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Some structures dictate the use of round columns.

You look at the design. You know the columns should be round.

Then you look at the budget and wonder if the client can afford aesthetics.

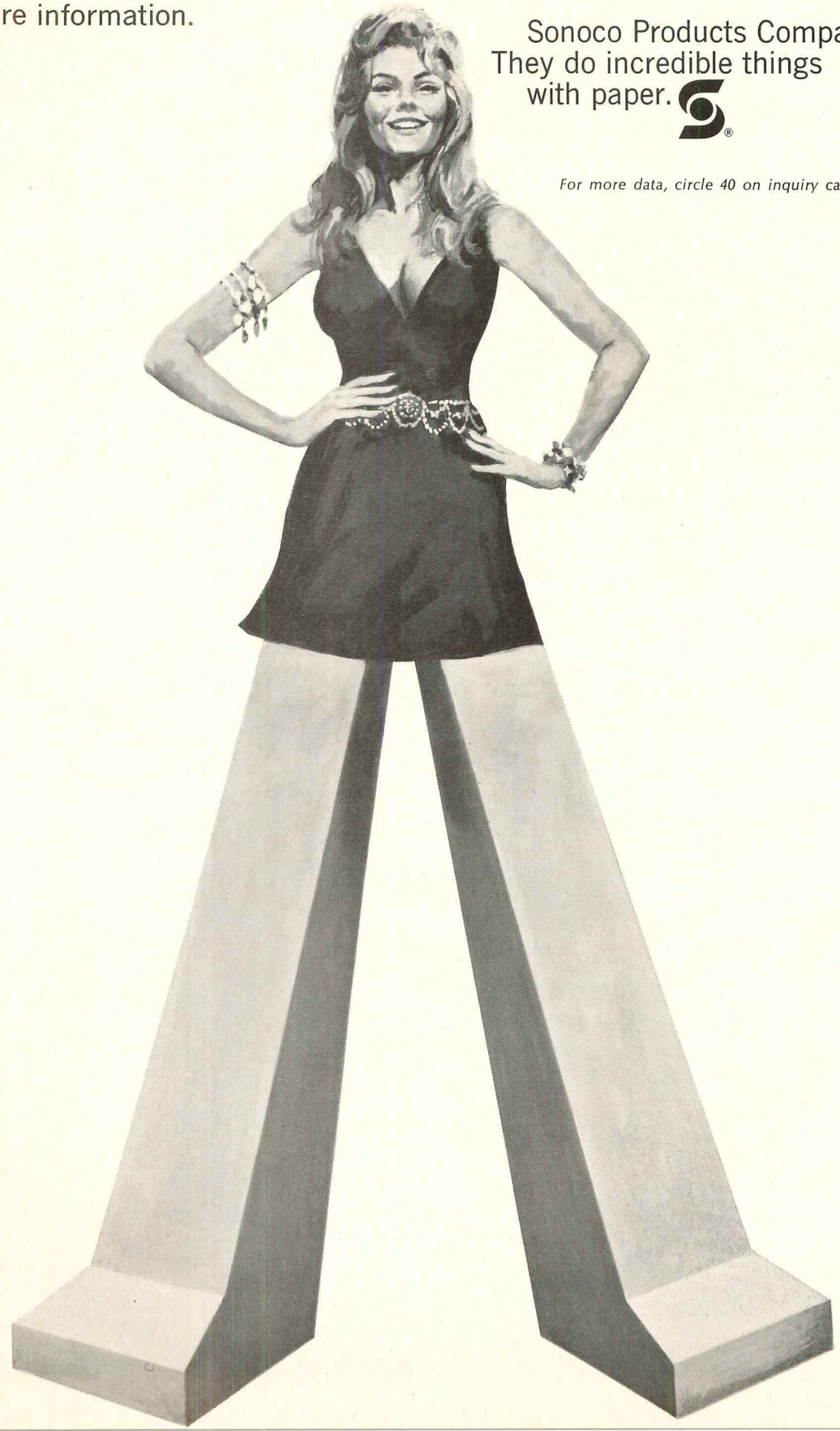
He can. If you form the round columns with Sonotube® Fibre Forms.

Fibre forms are easier to place, brace, pour and strip. So they cost less than other column forming methods.

And Sonotube forms come in larger diameters than any other fibre forms.

Sonotube forms give you more freedom to create. With fewer budget restrictions. Look into this. Write us at Hartsville, South Carolina 29550, for more information.

Sonoco Products Company.
They do incredible things
with paper.



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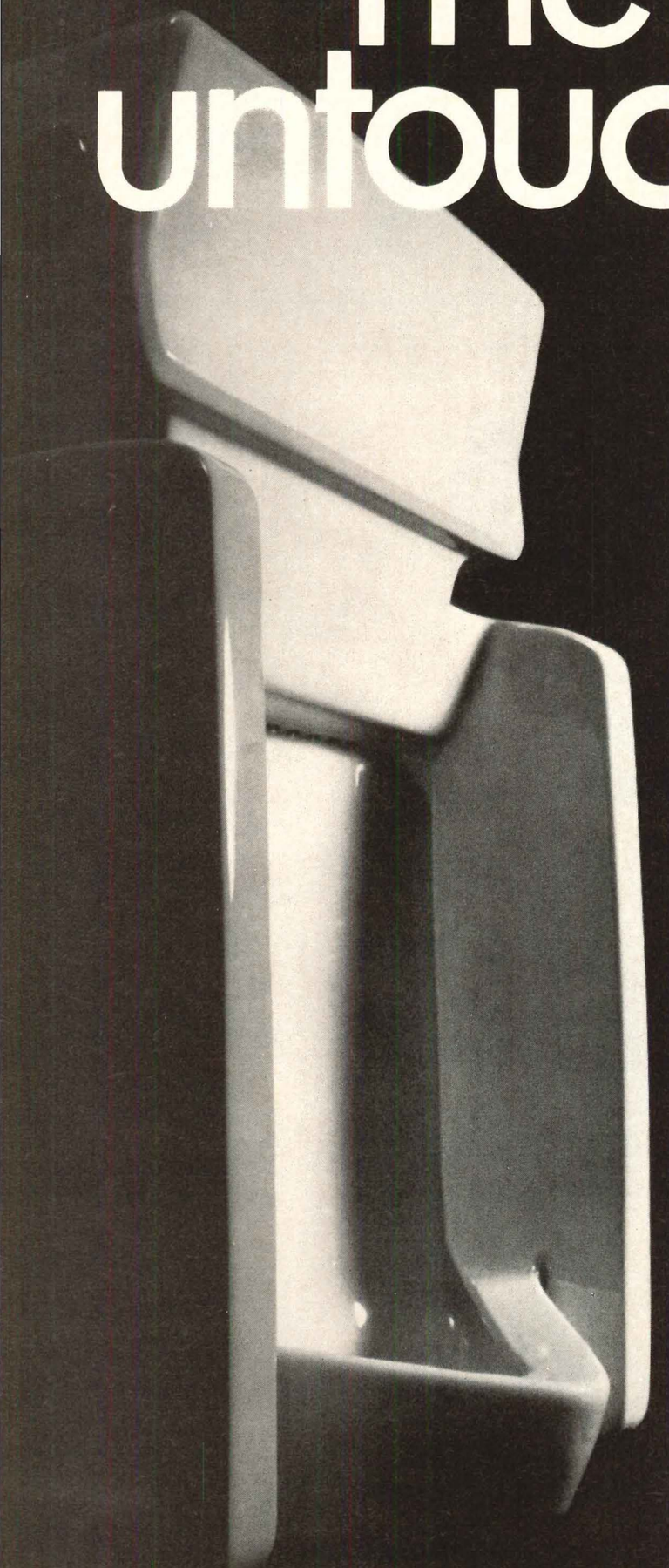
The untouchables



Look. No Handles! Proximity of the human body activates our remarkable new urinals.

We call them The Untouchables because that's what they are. They have no handles. No manual controls. So there's absolutely nothing to touch.

Our new Proximatic™ Urinal is one of a kind. It's part of a new generation of electronically activated plumbing fixtures exclusively developed by American-Standard. So simple, so fool-proof, so sanitary... every school and public building should have it.

What makes this Untouchable so untouchable? A tiny solid-state electronic sensor that responds to close human presence. It turns water on, turns water off. All automatically. And with positive control. The sensor cannot be activated from distances beyond a few inches.

It's the greatest thing that's happened to plumbing since running water. And the easiest to install. Our new Proximatic Urinal ties into any standard AC current. Can be easily installed in new or older buildings.

For more information, call your American-Standard representative or write American-Standard, 40 West 40th Street, New York, New York 10017.

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New Proximatic urinal assures positive, automatic flushing after every use. Provides perfect sanitation. Reduces water costs. Has completely tamper-proof controls. Exceptionally quiet operation.

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N.C.A.R.B. pushes toward new exam bases

The National Council of Architectural Registration Boards is bringing into sharper focus some of the implications of today's rapid changes in the architectural profession—especially as they affect methods of education, kinds of qualifying experience, state examinations, registration and certification. These effects have been the object of a long-range program of study and action launched two years ago by the Council; and some of the emerging proposals are for sharply new directions. First vice president Dean L. Gustavson reviewed aims and progress of the program before delegates of state registration boards to the 1969 national convention of N.C.A.R.B. in Chicago June 20.

Preamble to the action program now in effect, Mr. Gustavson recalled, was a review of emerging changes in the profession presented to the 1968 convention in five analytical papers by Gerald McCue, Hebert Gallagher, Philip Daniel, Sam Zisman and Mr. Gustavson. The ideas raised and possible modes of response by state boards and N.C.A.R.B. entered into structuring the Council's action program as assignments to six committees: documents, certification, interprofessional, public architect, examination and international reciprocity. Mr. Gustavson detailed the assignments of these committees and reported on their work.

The documents committee, for example, had submitted a new N.C.A.R.B. and state uniform application form and procedure that could be adapted for application for registration in each state.

The international reciprocity committee also reported progress in the signing by the Privy Council in London of the general reciprocity agreement ratified by N.C.A.R.B. last year. There was also agreement in principle toward reciprocity between U.S. and Mexican as well as Canadian registration boards.

The work of the interprofessional relations committee, certification committee and public architect committee was described by Mr. Gustavson as a considerably overlapping study of five areas of concern: 1) technician training and experience; 2) experience and examination alternatives; 3) reassessment of requirements for certification, including the possibility that professional recognition be given upon receipt of a college-of-architecture diploma; 4) re-examination of N.C.A.R.B. and state board responsibility toward recertification; 5) the public architect recognition.

Gerald McCue had been asked to crystallize some of the ideas being developed in the committees and had prepared a report and analysis which Mr. Gustavson credited as a primary resource in his overview to the assembled delegates. Following is a greatly condensed summary of that overview.

This is a fundamental review of the whole process of education, experience and examinations, said Mr. Gustavson. We need to recognize that the traditional subjects we studied, and the kinds of experience we had are much different from those of most young people in architecture today. Young graduates seem no longer content to sit as draftsmen. Increasingly, they desire to work on projects, even cities, that reflect the problems of the times. They are going to work in greater numbers for planning commissions, government organizations, urban design programs or in new technological programs using computers and so on.

If increasing numbers of architectural graduates turn away from the profession or seek new ways of involvement using their special talents, what can we do to permit them to again turn back to the profession or to find new ways to represent architecture as a profession?

We should ask ourselves what is it that makes an architect unique or of value to our society? Are our value judgments of special meaning and relevance to our society? If they are, then do we not test in our examinations too much for a technician's knowledge and not enough for a tactician's ability to separate the parts, examine them and apply the conceptual ideas and value judgments that will bring creative results? Should we make a next step in refining our examinations, in a fundamental sense, to test for our new or emerging understandings of what we are as a profession?

Another question for us is the one of generalists and specialists. Admitting we have both generalists and specialists, and will in the future have new specialists, the real question for us is: will we permit both to be first-class architects?

These questions are background to a series of proposals dealing first, in logical sequence, with education.

Studies these past two years have been concerned with what the architectural schools are teaching and what the students' interests were in subject matter. We do not pretend to have examined the curriculum of all schools or by any means to speak for the schools, Mr. Gustavson pointed out, but with that, here are some conclusions:

1. The architectural schools are trying to respond to changing ideas about practice in expanding areas of knowledge.

2. Most schools are tending to a broad interdisciplinary educational experience.

3. The architectural schools are not prepared to, nor do we believe they should, take over responsibilities from the state registration boards. Education should be free to experiment and change and not be structured by requirements or concerns that state registration boards must examine for.

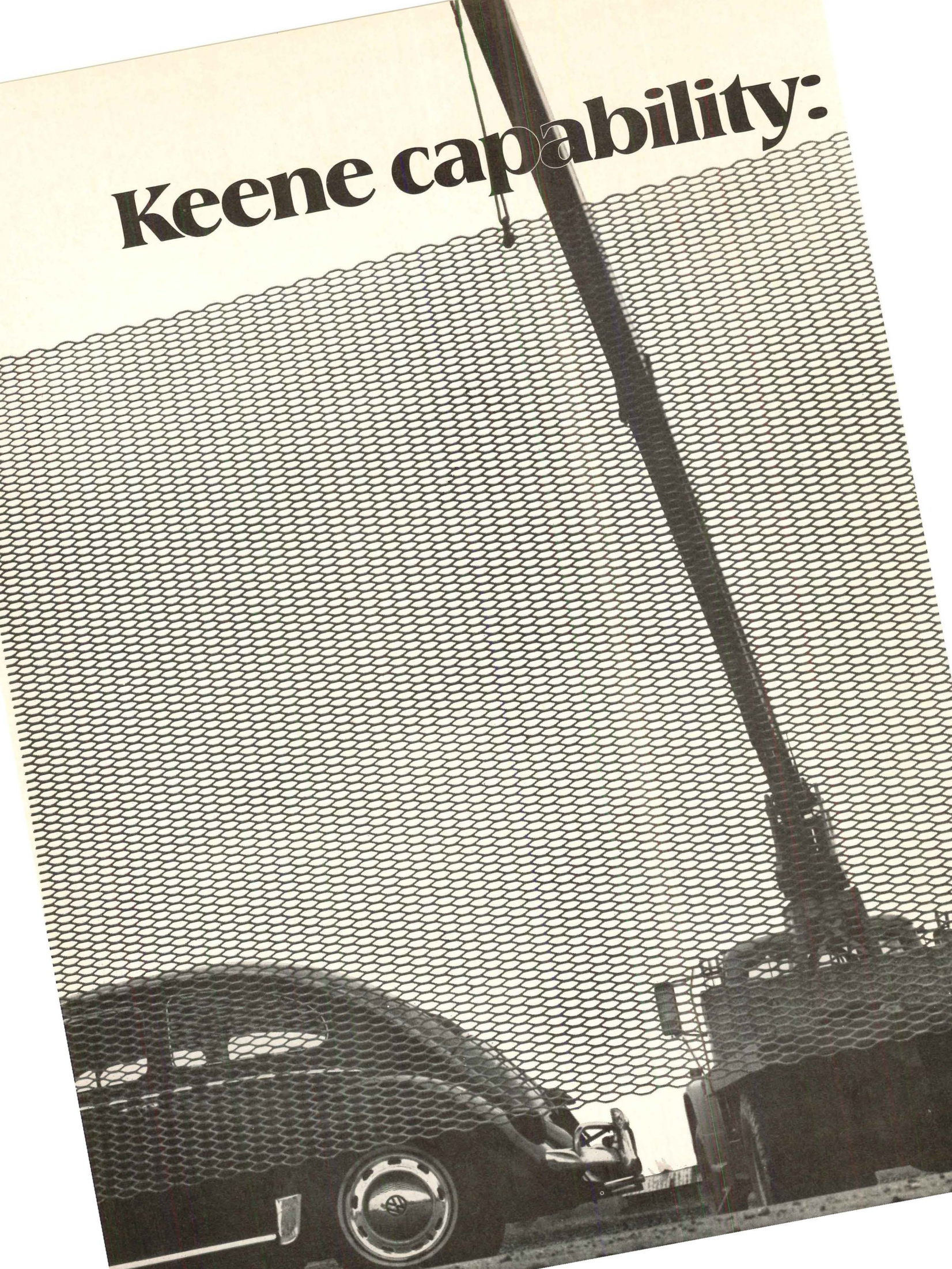
4. As the profession becomes more comprehensive, there are increasing numbers of specialists. Some schools encourage students to concentrate in a subject area after a general education. Many students graduate today with special knowledge and interest in related subdisciplines.

In fact, a review of educational routes now possible at schools of architecture shows increasing use of one in which a B.A. or M.A. in another field (law, arts, planning, etc.) completes another three years work for a Master of Architecture degree.

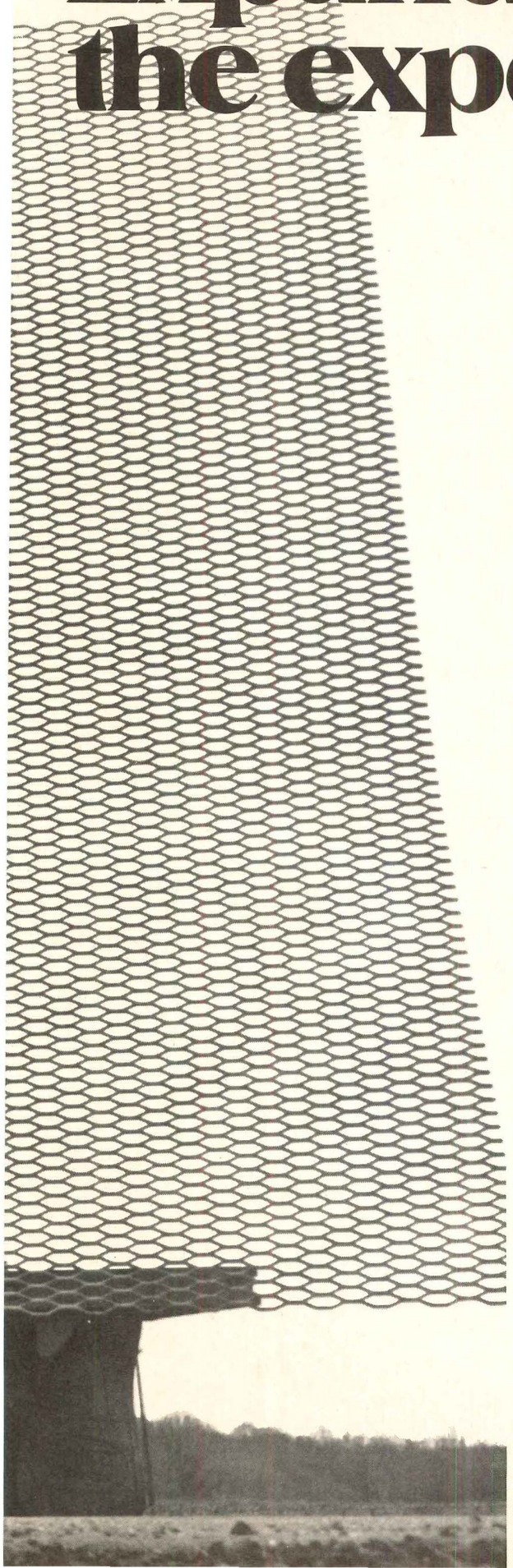
One general conclusion has been that legal registration authorities should grant some level of recognition at the time of the architectural graduate's professional degree.

Mr. Gustavson then addressed himself to matters of qualifying experience and internship programs germane to the central question: *Can and should we develop a better examination?* Drawing further upon Gerald McCue's summary paper, he presented an analysis of professional content and character, supporting an affirmative answer, the scope of which will warrant more detailed presentation in this department next month.

Keene capability:



Expanded beyond the expected.



Most architects know us for the decorative meshes we produce. Obtainable in a host of colors, metals, patterns and finishes the mesh is designed into facades, solar screens, air diffusers, indoor and outdoor space dividers.

But few of these same architects would expect the capability of our Metal Construction Products Division to extend to this, the largest sheet of expanded metal ever fabricated. Measuring 12 feet by 16½ feet the sheet can be used for industrial flooring and heavy-duty shelving. Equally unexpected is our ability to produce expanded mesh so small it is understandably called micro-mesh and finds its way into space applications.

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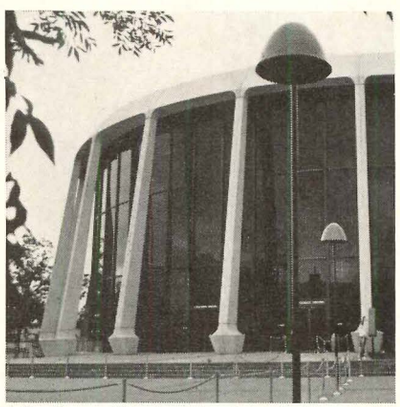
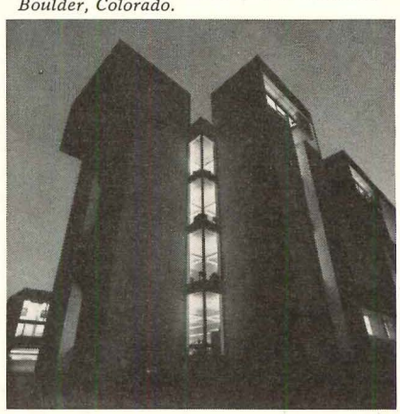
Providing what is most needed where it is least expected is a Keene characteristic. For more information on our architectural mesh and other Keene Building Products, write Keene Corporation, Metal Construction Products Division, Parkersburg, West Virginia 26101.



Confluence Theatre, San Antonio, Texas.

National Center For Atmospheric Research, Boulder, Colorado.



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We've just begun to grow.

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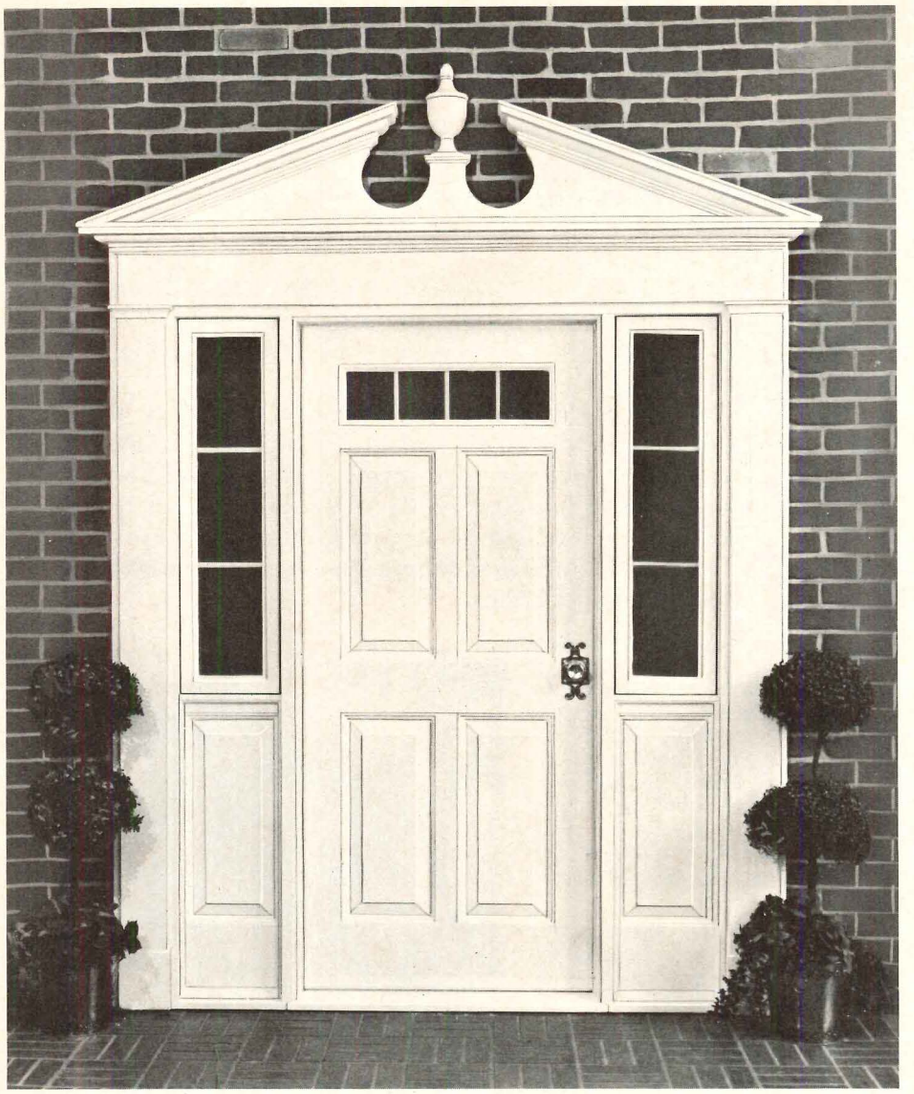
The power of attraction .....



CARADCO Doorways

the Entrance with the Insulated Door

The only traditional things about a CARADCO Doorway are its air of authenticity and its elegant good looks. No sense of counterfeit from these doors: High-rise panels, a full 1¾" thick, produce shadow magic that re-creates the sculptured look of true colonials . . . the impression of hand craftsmanship. Entrance proportions are scaled with an eye to the past, so that the entrance has all the grace and charm of its prototype, with many design variations possible.

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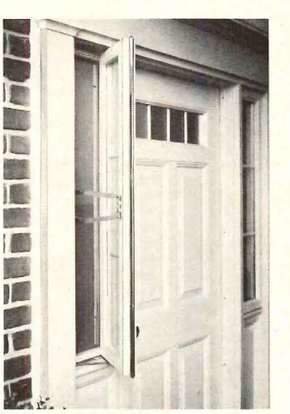
Result? A lot of thoughtful architects put CARADCO out in front.

E50-02-P E59-11P E56-01F E61L-21



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COMMENTARY

William H. Edgerton
Manager, Dodge Building Cost Services
McGraw-Hill Information Systems Company

Cost guidelines for urban housing rehabilitation

The National Housing Act of 1968 commits the Federal Government to devise some means to eliminate all substandard housing during the next decade. A substantial per cent of the 26 million dwelling units required for full compliance with this section of the act will come from rehabilitation of existing buildings; most of them are located in cities and urban areas. Both new and rehabilitation work will represent millions of dollars per year for the next ten years, and the rehabilitation work will present some special problems in cost control as it comes to the attention of more and more architects unfamiliar with remodeling pitfalls.

Scope of the work affects hidden costs in remodeling

The condition of urban buildings slated for either public or private rehabilitation can range from prime (no actual repair required) to bad (finishes destroyed or missing, mechanical systems inoperative or destroyed, damaged by water, missing windows, etc.). The rehabilitation of an older building in prime condition may involve new kitchens or baths or various degrees of remodeling to bring the building up to date or adapt it for single or multiple family occupancy. However, most rehabilitation is applied to deteriorated buildings and involves anything from complete demolition to massive removal of partitions, finishes, plumbing, heating and electrical items. In many cases, the sub-floor and floor joists are retained, together with the public stairs, depending upon their condition and building code provisions. The average costs that appear in the table (right) assume generally complete demolition of the building interior and repairs, as necessary, to the exterior walls and framing.

On small-scale rehabilitation (construction contracts less than $250,000) contractors often can employ non-union labor in many cities. This has the immediate advantage of getting the job under way where union labor may be in short supply. Further, while productivity of non-union labor may be less and construction time thus lengthened, ultimate costs can be as much as 20 per cent below the levels of union work. Buildings designed for 11 or more dwelling units with financing insured by the FHA will generally have minimum wage stipulations. Here, non-union labor can also be employed but the cost advantage, especially in unskilled work, is not likely to be a great as it otherwise might be.

Estimates and specifications must be more carefully detailed

One of the many problems of the architect involved in rehabilitation is to see that his client is confronted with as few extras as possible. This he does by careful preparation of estimates and bidding documents so that the client's budget is realistic and the bid level is not unnecessarily raised by forcing the contractor to allow for maximum contingencies. In rehabilitation work, standard estimating procedures will be complicated by the unfamiliar and hidden costs of demolition and unexpected needs for replacement of concealed members.

Floor joist replacement can be especially severe in this respect. Joists are often found that have insecure headers, longitudinal splits, notches cut out for plumbing, etc. At a cost level of $80 to $100 per joist (including removal of the defective timber), the extras for this item can mount fast.

Similarly, the conversion of existing fireplaces to woodburning condition can involve subtantial sums of money, although this might seem to the client to be a relatively minor item. With the ultimate aim of lining or relining the flue (usually required by the local code or dictated by good construction practice) the fireplace frame and mantle must be removed, the flue exposed and lined, the chimney closed, the firebox rebuilt, a new hearth laid, and the frame and mantle rebuilt or replaced. A rule of thumb for the cost of this item is $100 per flue per floor. Thus a three-story and garden floor building with two fireplaces per floor would be $200 for the garden floor, $400 for the first floor, etc., for a total cost of $2000 for the job. This is a substantial sum for creating operating fireplaces.

Roofing, flashing, pointing and waterproofing the exterior of older buildings, even during a complete renovation, can be very expensive. The specifications should be very explicit on these and similar operations to reduce unexpected extras.

Average rehabilitation costs: a guide, not for quotation

Average costs for any type of construction should be used with extreme care, especially in remodeling and rehabilitation work. However, they can be most helpful for predesign guidelines as long as they are not assumed to cover a specific building. The costs in the table are drawn from recent experience, and they are applicable within the following stipulations:

1. The contractor's profit and overhead are included trade by trade.
2. Two to twelve dwelling units are assumed.
3. Unfinished basement areas are not to be included in area computations.
4. Complete rehabilitation is assumed. The exterior shell, roof and subfloors are assumed preserved.
5. Costs are for New York City. Relationships between New York and other cities can be computed from the figures in the column headed "Cost Differential" appearing on the Indexes and Indicators on the following page.

Guidelines to New York City Average Rehabilitation Cost Per Square Foot

	Scale of construction quality			
	Low	Medium	High	Highest
	Costs per over-all square foot			
Demolition	$0.50	$0.55	$0.60	$0.60
Masonry [1]	1.50	1.60	1.80	2.00
Carpentry	1.60	1.75	2.00	2.50
Windows	.50	.50	.60	.80
Doors/Frames	.40	.40	.45	.50
Stairs [2]	—	.10	.15	.20
Plaster/drywall	1.80	1.90	2.00	2.50
Electric	.60	.75	.90	1.20
Heating	1.10	1.20	1.30	1.50
Air conditioning	.40	.40	.45	.70
Plumbing	1.30	1.40	1.50	1.75
Kitchens	.50	.60	.75	1.25
Insulation [3]	.40	.40	.45	.50
Misc. iron	—	.10	.15	.25
Floors	.70	.70	.75	1.00
Tile	.25	.25	.30	.40
Painting	.45	.50	.75	1.25
Hardware	.05	.10	.15	.30
Total/Square Foot	$12.05	$13.20	$15.05	$19.20

[1] Including necessary construction
[2] Not entire replacement
[3] Including roofing and sheet metal

INDEXES AND INDICATORS

Dodge Building Cost Services
McGraw-Hill Information Systems Company

BUILDING COST INDEXES

The information presented here indicates trends of building construction costs in 21 leading cities and their suburban areas (within a 25-mile radius). Information is included on past and present costs, and future costs can be projected by analysis of cost trends.

The indexes are computed on a basis of 40 per cent labor rate and 60 per cent materials price. Wage rates for nine skilled trades, together with common labor, are used. Prices of four common building materials are included for each listed city.

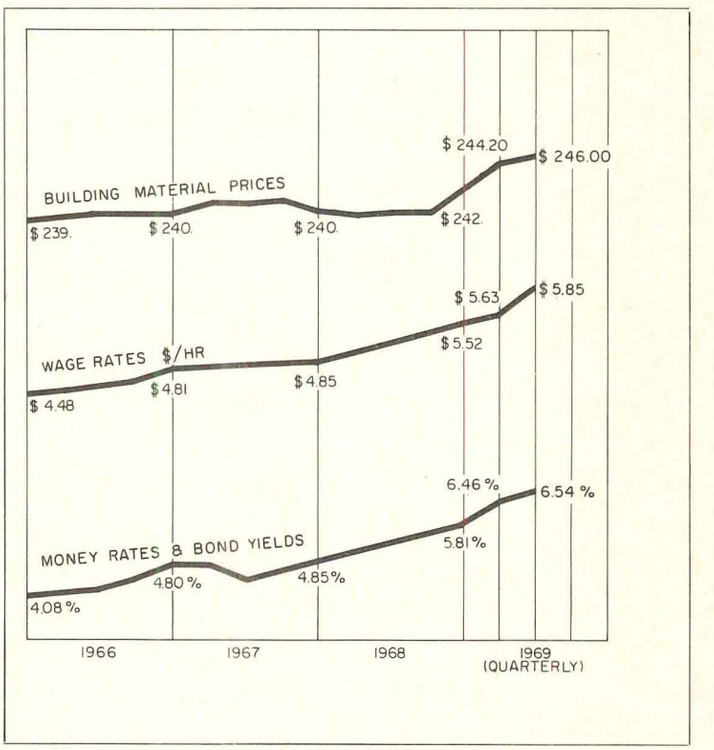
AUGUST 1969

Metropolitan area	Cost differential	Current Index residential	Current Index non-res.	% change year ago res. & non-res.
U.S. Average	8.6	302.3	322.0	+4.65
Atlanta	7.4	349.9	371.2	+5.56
Baltimore	7.9	300.0	319.1	+2.95
Birmingham	7.4	273.7	294.4	+3.75
Boston	8.4	268.3	284.0	+3.47
Chicago	8.9	330.7	347.8	+3.63
Cincinnati	9.1	297.7	316.5	+6.59
Cleveland	9.8	322.1	342.3	+5.84
Dallas	7.7	282.7	292.0	+5.63
Denver	8.2	303.7	322.8	+4.15
Detroit	9.4	317.2	333.0	+5.89
Kansas City	8.3	270.9	286.7	+5.17
Los Angeles	8.4	304.7	333.4	+3.95
Miami	8.5	300.8	315.7	+5.80
Minneapolis	8.7	297.6	316.3	+3.75
New Orleans	8.0	275.2	291.6	+5.77
New York	10.0	311.7	335.2	+3.15
Philadelphia	8.6	295.6	310.4	+4.14
Pittsburgh	9.2	284.7	302.7	+5.13
St. Louis	9.1	295.5	313.1	+4.68
San Francisco	8.7	391.2	428.0	+4.99
Seattle	8.5	273.9	306.0	+3.65

Differences in costs between two cities may be compared by dividing the cost differential figure of one city by that of a second; if the cost differential of one city (10.0) divided by that of a second (8.0) equals 125%, then costs in the first city are 25% higher than costs in the second. Also, costs in the second city are 80% of those in the first (8.0÷10.00=80%) or they are 20% lower in the second city.

ECONOMIC INDICATORS

Indicators are intended to show only general direction of changes.
BUILDING MATERIALS—The U.S. average price of a "package" of common materials.
WAGE RATES—The U.S. average wages of nine skilled trades and common labor. Fringe benefits are included.
MONEY RATES AND BOND YIELDS—An arithmetic average of the latest prime rate, short term prime commercial paper rates, and state and local government AAA bond rates.



HISTORICAL BUILDING COST INDEXES—AVERAGE OF ALL BUILDING TYPES, 21 CITIES

1941 average for each city = 100.00

Metropolitan area	1961	1962	1963	1964	1965	1966	1967	1968 (Quarterly) 1st	2nd	3rd	4th	1969 (Quarterly) 1st	2nd	3rd	4th
U.S. Average	264.6	266.8	273.4	279.3	284.9	286.6	297.5	301.5	302.6	309.3	310.0	314.9	316.5		
Atlanta	294.7	298.2	305.7	313.7	321.5	329.8	335.7	345.6	346.7	352.3	353.1	364.2	365.9		
Baltimore	269.9	271.8	275.5	280.6	285.7	290.9	295.8	302.9	304.1	307.9	308.7	311.4	313.0		
Birmingham	249.9	250.0	256.3	260.9	265.6	270.7	274.7	278.5	279.5	283.6	284.3	288.4	289.9		
Boston	237.5	239.8	244.1	252.1	257.8	262.0	265.7	269.3	270.3	276.3	277.1	278.2	279.6		
Chicago	289.9	292.0	301.0	306.6	311.7	320.4	328.4	329.4	330.0	338.7	339.5	340.4	342.1		
Cincinnati	257.6	258.8	263.9	269.5	274.0	278.3	288.2	291.4	292.5	301.8	302.6	309.8	311.5		
Cleveland	265.7	268.5	275.8	283.0	292.3	300.7	303.7	316.5	318.3	330.7	331.5	334.9	336.7		
Dallas	244.7	246.9	253.0	256.4	260.8	266.9	270.4	272.3	273.4	281.0	281.7	287.2	288.7		
Denver	270.9	274.9	282.5	287.3	294.0	297.5	305.1	304.9	306.0	311.7	312.5	317.0	318.5		
Detroit	264.7	265.9	272.2	277.7	284.7	296.9	301.2	309.2	310.4	315.5	316.4	326.8	328.5		
Kansas City	237.1	240.1	247.8	250.5	256.4	261.0	264.3	267.5	268.5	277.2	278.0	281.0	282.3		
Los Angeles	274.3	276.3	282.5	288.2	297.1	302.7	310.1	312.0	313.1	319.3	320.1	323.7	325.4		
Miami	259.1	260.3	269.3	274.4	277.5	284.0	286.1	293.1	294.3	304.5	305.3	309.6	311.2		
Minneapolis	267.9	269.0	275.3	282.4	285.0	289.4	300.2	300.0	301.0	309.0	309.4	310.6	312.2		
New Orleans	244.7	245.1	248.3	249.9	256.3	259.8	267.6	270.6	271.6	273.9	274.2	285.5	287.1		
New York	270.8	276.0	282.3	289.4	297.1	304.0	313.6	315.9	317.0	320.6	321.4	324.9	326.6		
Philadelphia	265.4	265.2	271.2	275.2	280.8	286.6	293.7	293.3	294.2	300.9	301.7	304.6	306.2		
Pittsburgh	250.9	251.8	258.2	263.8	267.0	271.7	275.0	293.0	284.2	291.3	293.8	297.0	298.6		
St. Louis	256.9	255.4	263.4	272.1	280.9	288.3	293.2	293.7	294.7	303.6	304.4	306.8	308.3		
San Francisco	337.4	343.3	352.4	365.4	368.6	386.0	390.8	396.4	398.0	401.9	402.9	415.6	417.5		
Seattle	247.0	252.5	260.6	266.6	268.9	275.0	283.5	286.2	287.2	291.6	292.2	296.1	297.5		

Costs in a given city for a certain period may be compared with costs in another period by dividing one index into the other; if the index for a city for one period (200.0) divided by the index for a second period (150.0) equals 133%, the costs in the one period are 33% higher than the costs in the other. Also, second period costs are 75% of those in the first period (150.0÷200.0=75%) or they are 25% lower in the second period.

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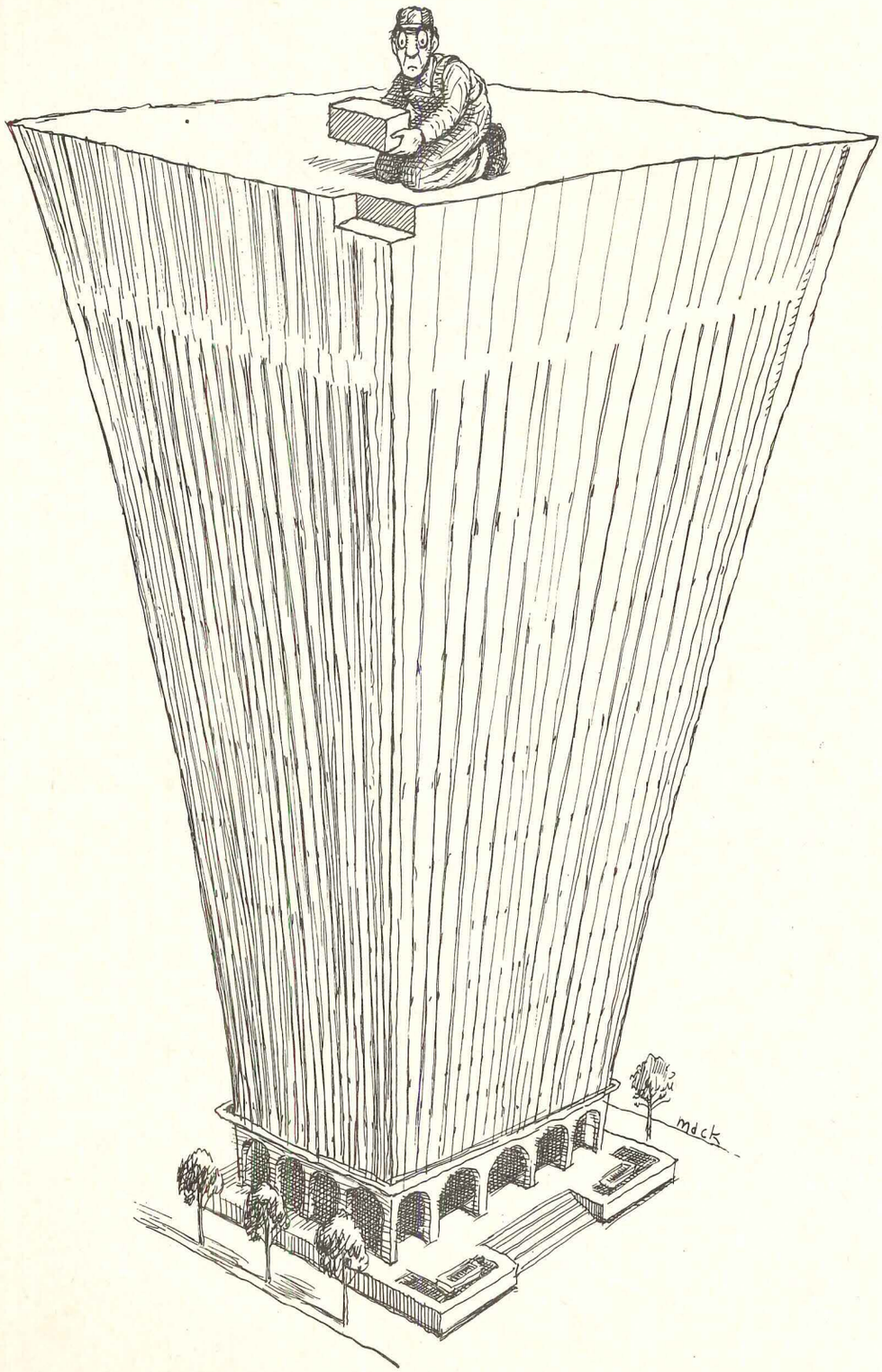

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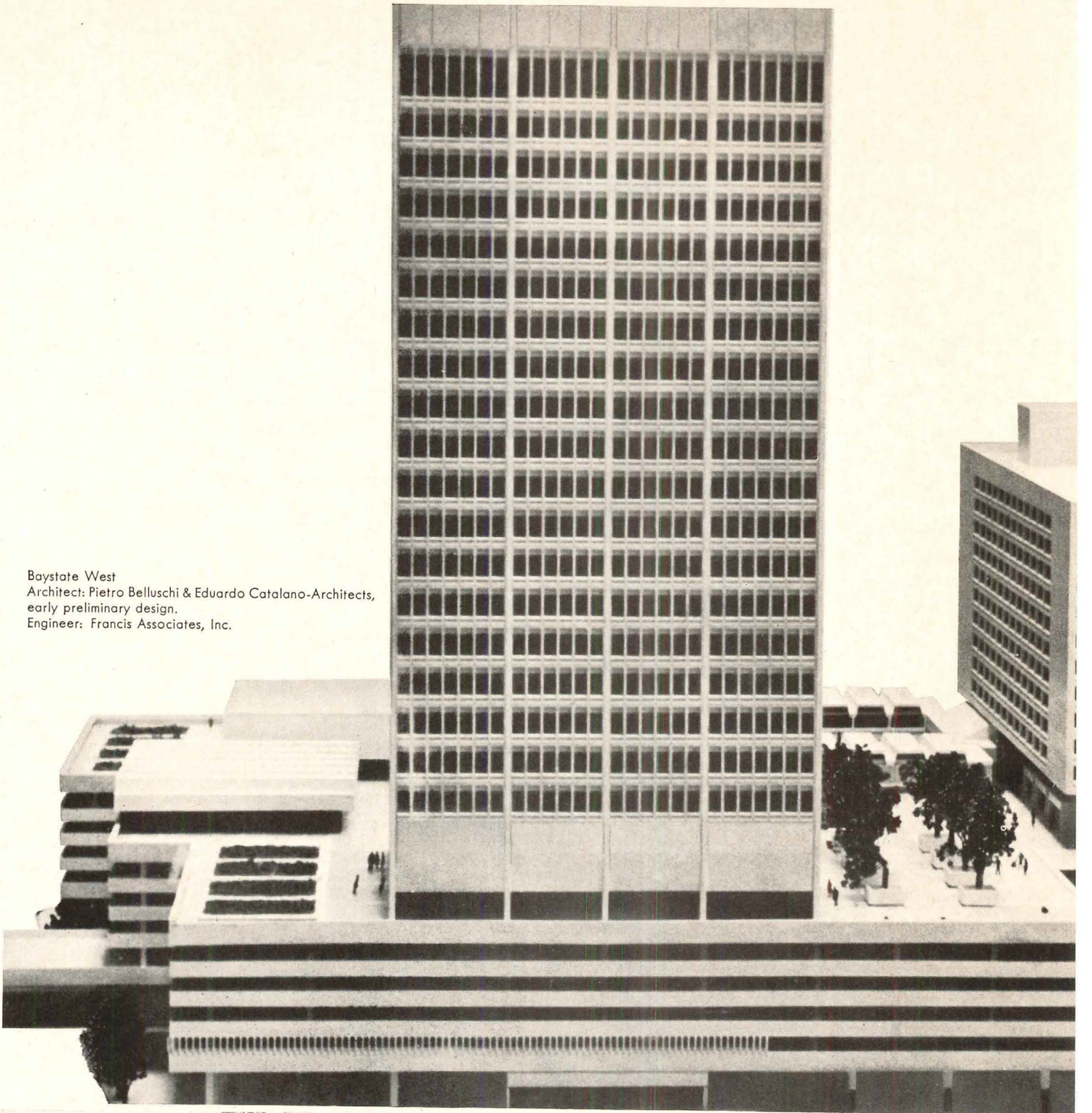
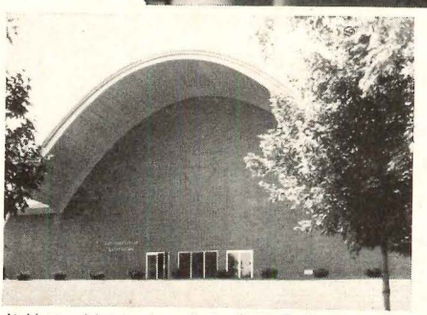


Baystate West
Architect: Pietro Belluschi & Eduardo Catalano-Architects, early preliminary design.
Engineer: Francis Associates, Inc.



Linkletter Natatorium, Springfield College
Architect: Munson & Mallis
Engineer: E. M. Sullivan

Forbes & Wallace Department Store
Designers: Raymond Loewy/William Snaith, Inc.
Engineers: Strobel and Rongved, Engineers
Herman Blum, Consulting Engineers

Springfield Newspapers
Engineer: Lockwood Greene Engineers, Inc.
Architect: Lockwood Greene Engineers, Inc.

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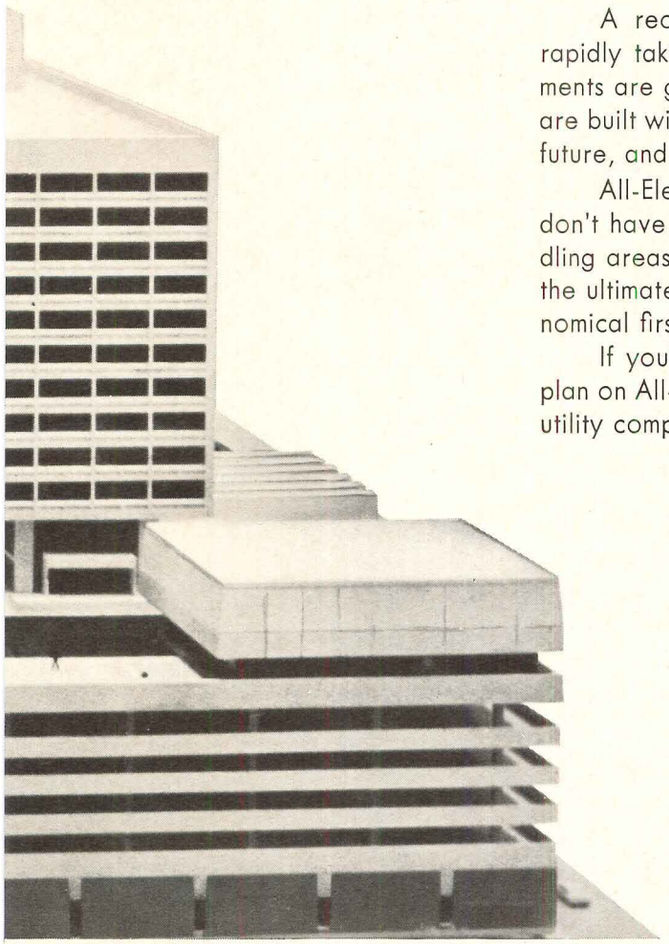

All-Electric design

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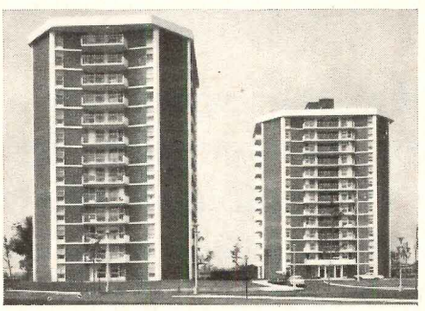
Holiday Inns of America
Architect: William Bond, Jr. & Associates, Inc.

Eastfield Mall
Architect: Daverman Associates, Inc.
Engineer: Daverman Associates, Inc.



Stephen J. Collins Elderly Housing "Twin Towers"
Architect: Caolo & Bieniek Associates
Engineer: Greenleaf Associates

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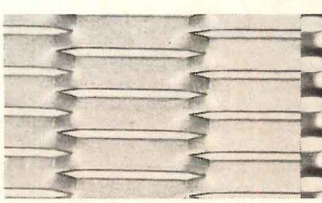
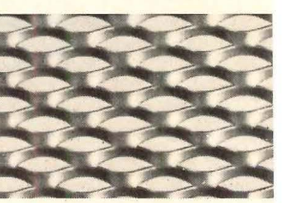
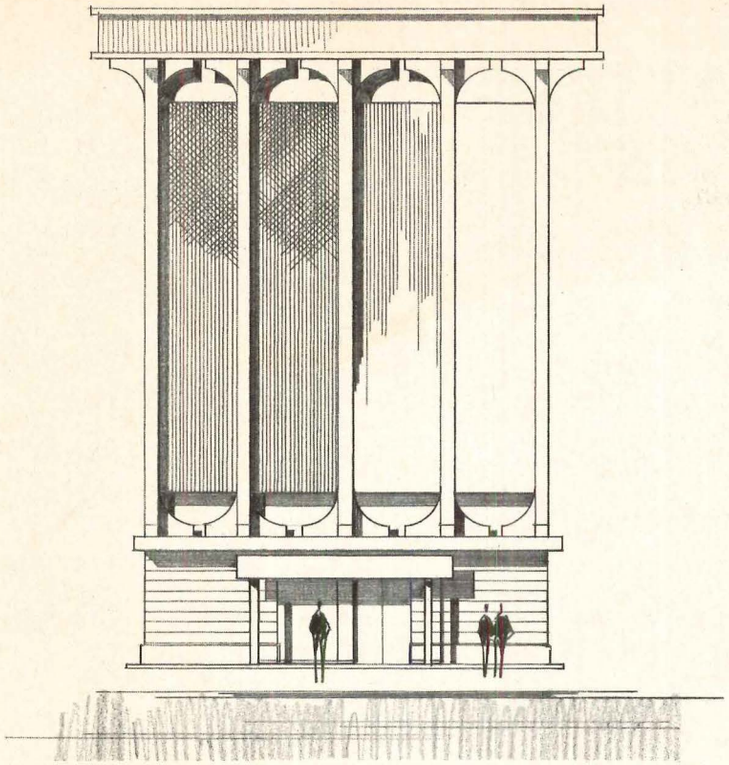
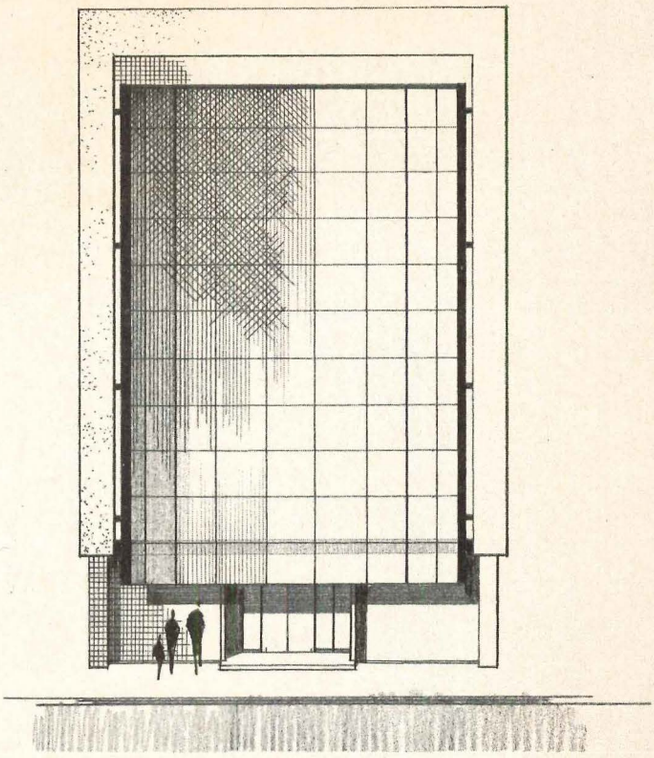


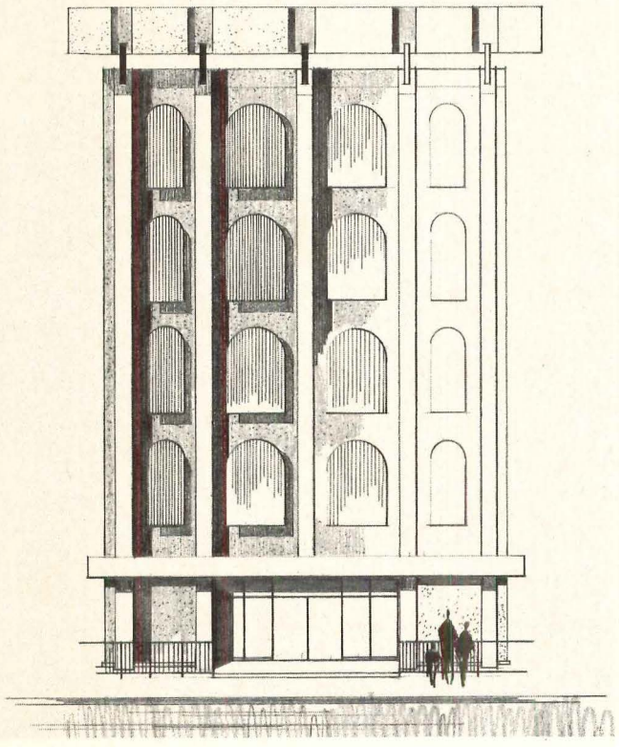
Louver mesh

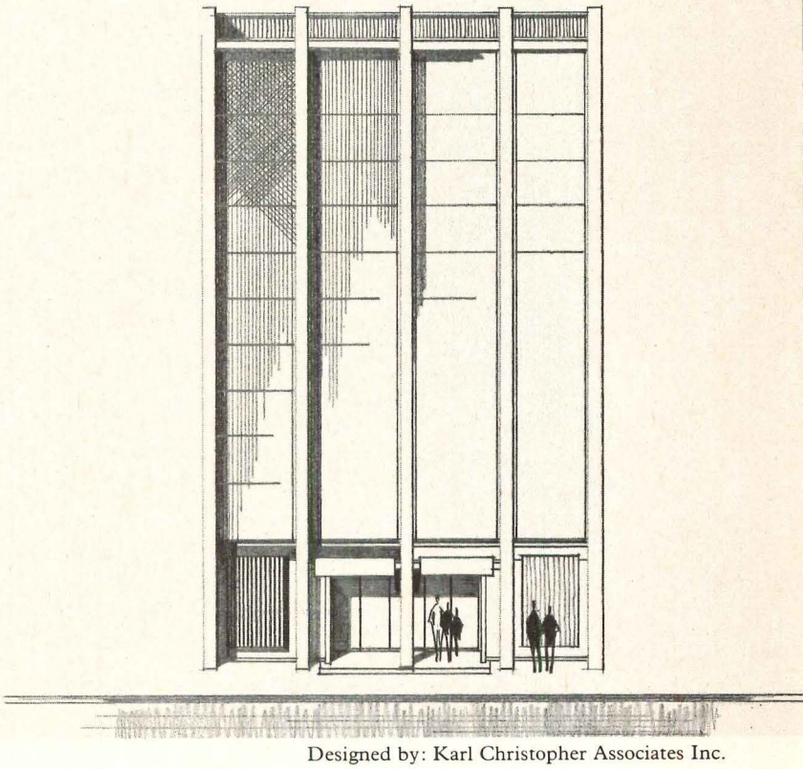


½″ facade









Designed by: Karl Christopher Associates Inc.

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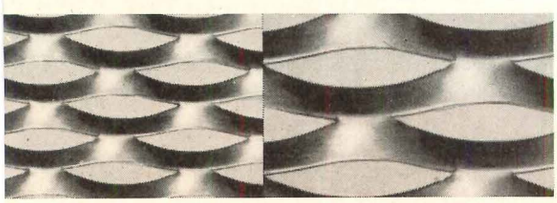

1½" facade No. 4 facade

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CURRENT TRENDS IN CONSTRUCTION

Robert M. Young
Senior Economist
McGraw-Hill Information Systems Company

Cities shape regional growth trends

So far in 1969, regional construction trends have been shaped largely by a surge of new building projects in the major metropolitan areas. The value of building contracts in the five largest construction markets grew at more than three times the rate of increase in the nation as a whole during the opening months of this year. Their share of total building jumped from the 1968 average of 18 per cent to almost 23 per cent in the first five months of 1969, thus reversing a decade-long downward trend.

The biggest gainers among the top five were the two largest cities—New York and Los Angeles. Their increases over the same period a year ago—73 per cent and 65 per cent, respectively—were among the largest for all metropolitan areas. In both cases, most of the growth has come in the form of major office building projects, such as the World Trade Center in New York and the Atlantic Richfield Plaza in Los Angeles. All types of nonresidential construction in the two cities accounted for almost 70 per cent of the total value of building contracts in these metropolitan areas. Ten years ago, when these markets made up the same 14 per cent of total U.S. construction, residential building accounted for over 60 per cent of total outlays.

This shift from housing into commercial, industrial and institutional building, and, to a lesser extent, continued inroads made by apartments into the residential market, explain most of the variations in regional growth patterns so far this year. The remarkable gains posted in New York and Los Angeles have helped push the Northeast and West far ahead of the other regions in rate of increase in the January-May period. Gains in those areas of 29 and 23 per cent, respectively, are followed at some distance by the South, up 12 per cent, and the Midwest, trailing with an eight per cent increase. In all regions, a major share of the higher volume of building has taken place in the larger metropolitan areas.

Most of the Northeast's gain has been concentrated in the New York area, where contracts for 11 major office buildings, each valued at over $25 million, have been let so far this year (including four worth over $70 million). Philadelphia and Baltimore have also enjoyed upturns in office building, as well as important educational building projects. Contracting in Boston, last year's growth leader, has slipped a bit, while building activity in Washington continues to fall short of the high levels of the mid-Sixties.

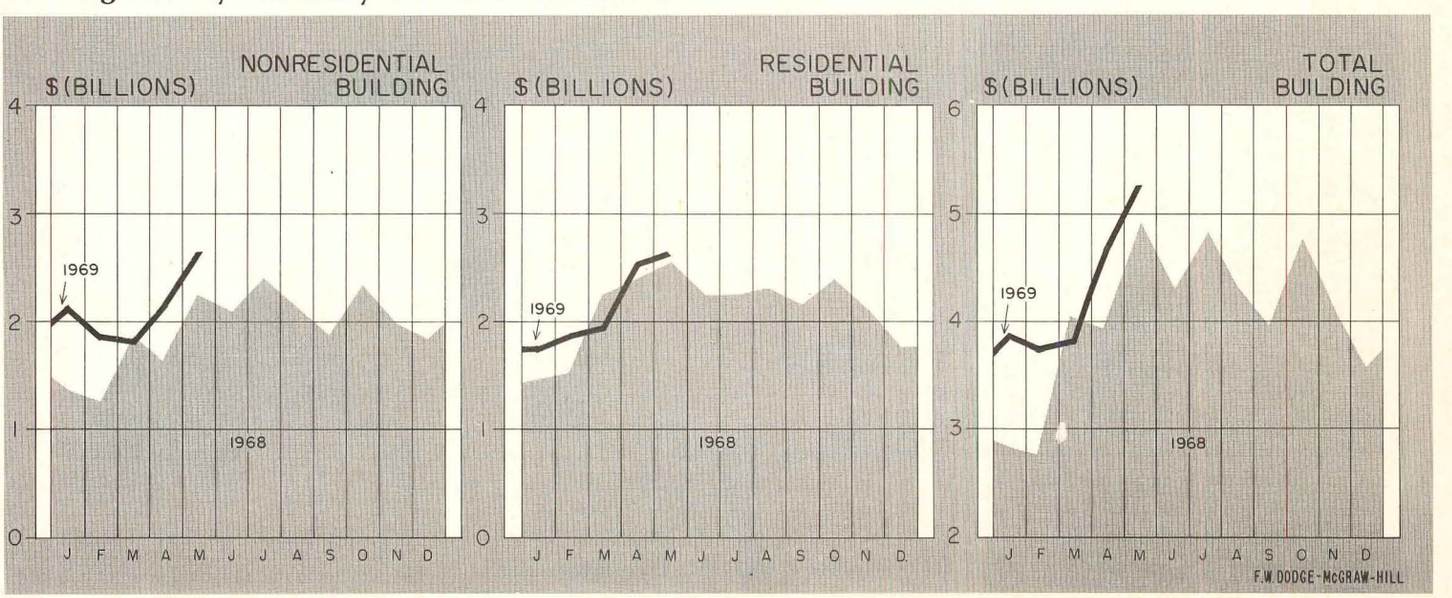
Gains in the West have been more widespread. Increases in excess of 25 per cent in San Diego, Orange County, San Francisco and Denver, in addition to the large jump in Los Angeles, may push volume for the year in those areas close to the records set during the 1962-1963 building boom. As in the East, much of the growth has come from office, hospital and industrial buildings. The office building booms that began in Chicago in 1967, then moved East in 1968, appear to have arrived on the West Coast this year. The West is also enjoying a continued resurgence in apartment building as stepped-up in-migration has brought vacancy rates to record lows.

The South is the only region in which apartment and other large residential building has outstripped gains in nonresidential construction, although both hospital and office building contract values have picked up sharply over the early months of 1969. A boom in apartment construction in the Miami-Fort Lauderdale area—much of it for seasonal or retirement use—has put the region on top in terms of growth in large residential contract activity.

Building activity in the Midwest has been characterized by fairly good gains in some areas.

The outlook for the remainder of 1969 is cloudy in all the regions. As fiscal and monetary restraint take hold, financing for all types of construction will become scarcer. While gains for the full year 1969 are expected to fall below those for the year to date, regional patterns and the concentration of building in the major cities should continue as they have in the opening months of this year.

Building activity: monthly contract tabulations



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KOHLER'S LADY FAIR SHAMPOO CENTER AND BABY BATH

BOLD NEW COLORS! (NEW ORLEANS BLUE)

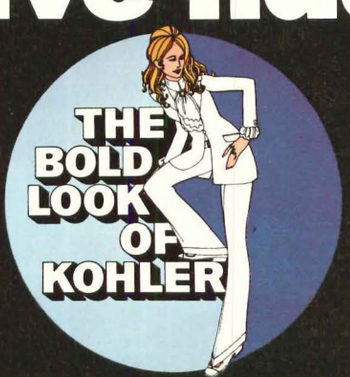
WASH YOUR HAIR... OR YOUR BABY (BUILT IN SPRAY ARM)

ONE OF OUR HAPPY BLUES

SWING AWAY SPOUT

SLOPED LIKE A BATH

Kohler says ho-hum baths have had it.



Kohler Co., Kohler, Wisconsin

Finger tip height control with positive safety lock.

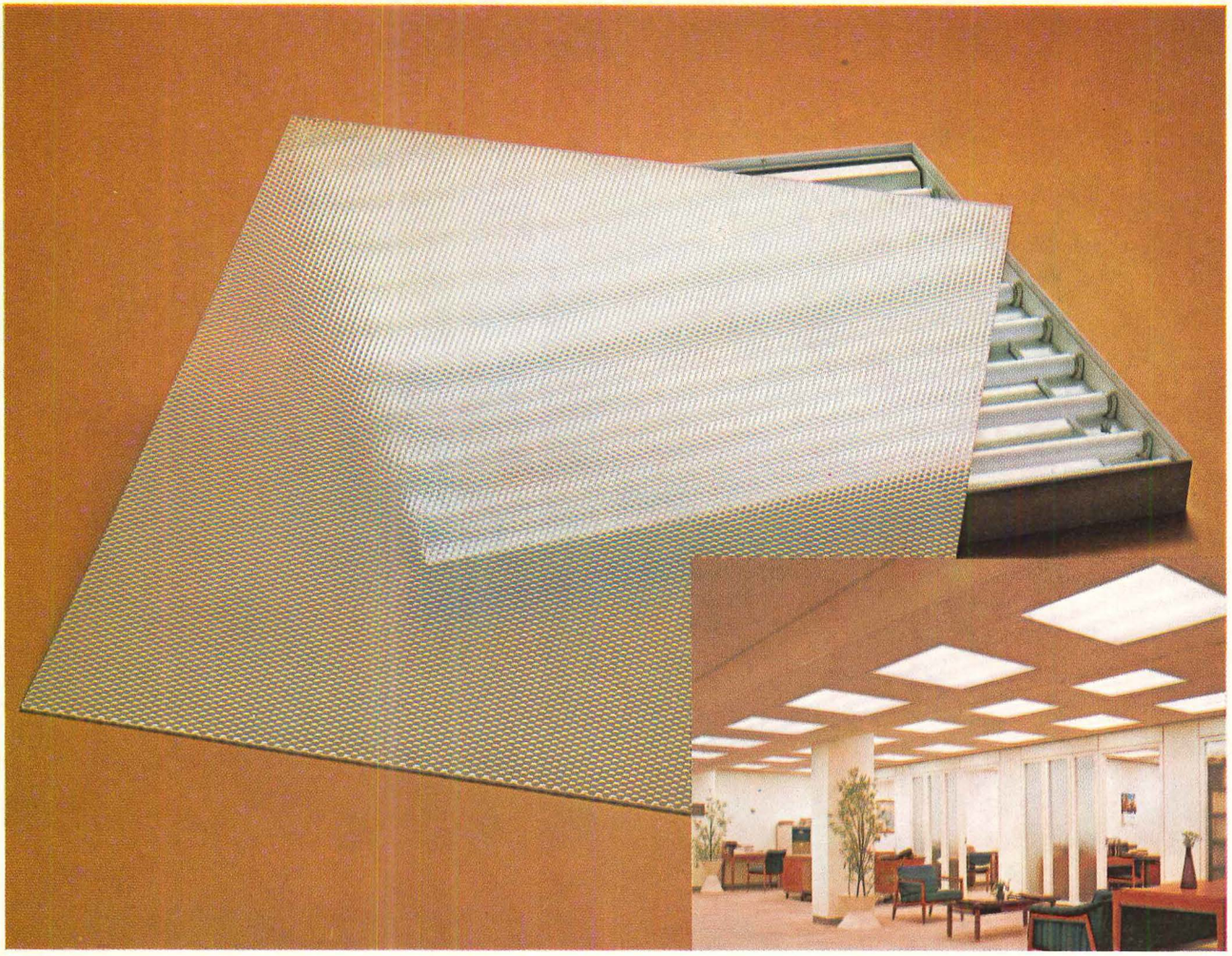
Grant's extraordinary new overhead track feeding support is fully adjustable to multiple high or low gravity feeding positions. Height and lateral adjustment control is always in convenient reach, yet completely off-the-floor and out of the way. The unique 8 hook unit locks securely at the required hydrostatic flow point. Grant's I.V. Support is incomparable for application in surgical, intensive care, X-ray, recovery and related rooms.

Available in 2 sizes; one for under and one for over 9' ceilings.
Complete data on request.

GRANT®
I.V. SUPPORT

GRANT PULLEY & HARDWARE CORPORATION EASTERN DIVISION: 25 High Street, West Nyack, New York 10994/WESTERN DIVISION: 944 Long Beach Ave., Los Angeles, Cal. 90021

You get more design freedom with PLEXIGLAS®



PLEXIGLAS acrylic plastic allows you lighting design freedom not possible with other types of lens and diffuser materials. Compared to glass, lightweight PLEXIGLAS lenses let you cover larger areas—5 feet x 5 feet in a single panel is entirely practical. Compared to other plastics, PLEXIGLAS has high, unmatched resistance to yellowing.

Lighting panels of PLEXIGLAS are highly breakage resistant, economically maintained and safe to handle. Through precise lensic control, they provide maximum light on the task and low brightness at normal viewing angles.

PLEXIGLAS is code-approved nationwide as a lighting material. Write for our technical brochure and the names of manufacturers who use PLEXIGLAS in their lighting equipment.

Plexiglas is a trademark Reg. U.S. Pat. Off.

Plexiglas is made only by ROHM AND HAAS
PHILADELPHIA, PENNSYLVANIA 19105

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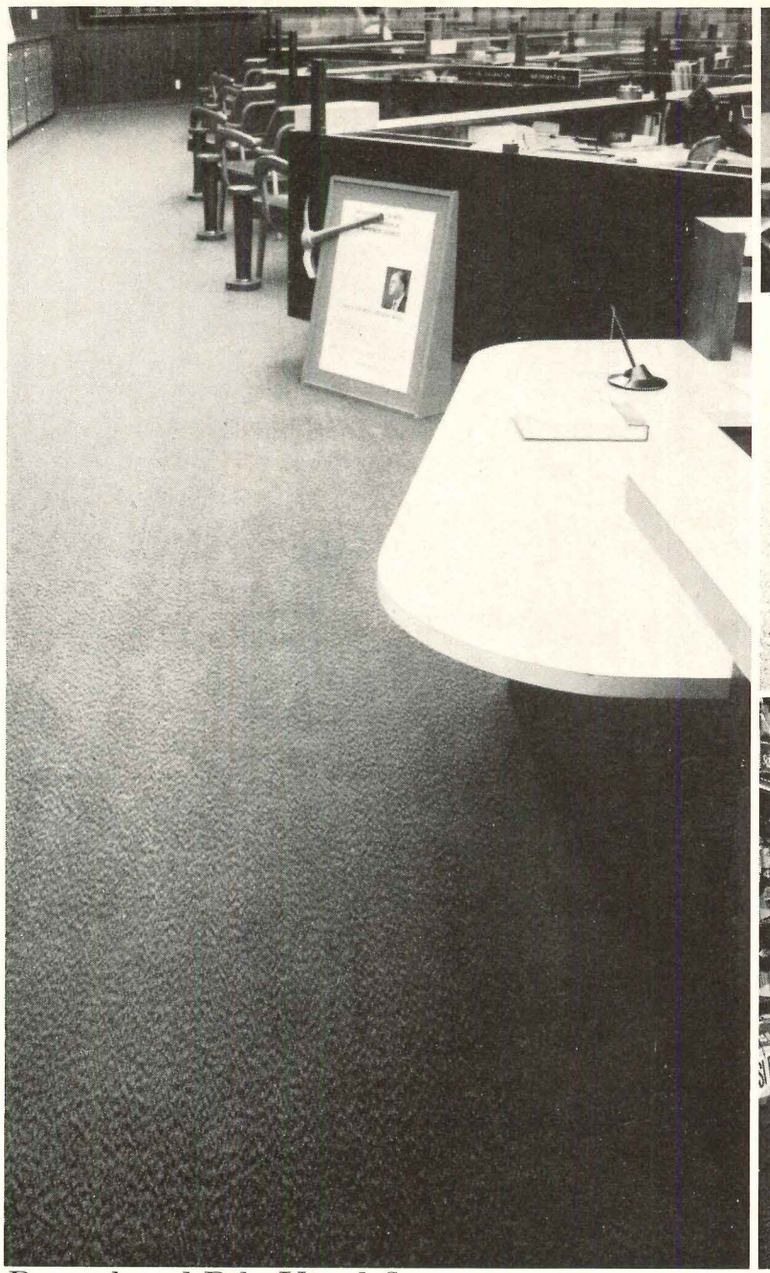
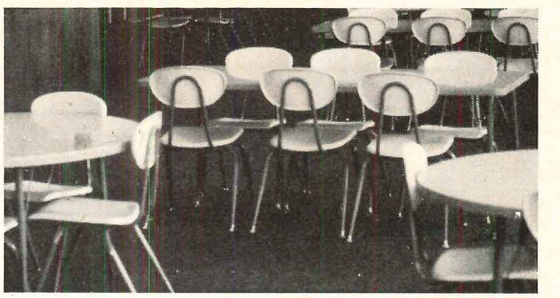
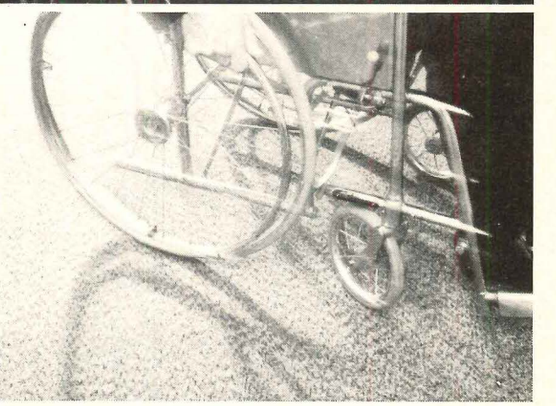
USS Cor-Ten Steel...naturally

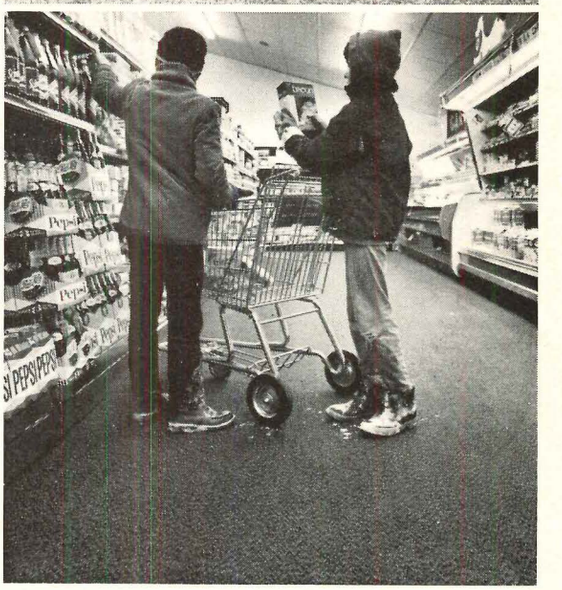
THE ALBINA NEIGHBORHOOD IMPROVEMENT PROJECT PARK
PORTLAND DEVELOPMENT COMMISSION
LANDSCAPE ARCHITECT: ROBERT PERRON, PORTLAND, ORE.
ARCHITECTS: CHARLES COLBURN, GEORGE SHELDON, PORTLAND, OREGON
COR-TEN STEEL SCULPTURE: LEE KELLY, PORTLAND, ORE.

For information on bare USS COR-TEN Steel, the original weathering steel, contact a USS Construction Marketing Representative through the nearest USS sales office, check your Sweet's Architectural File, or write to United States Steel, Box 86, Pittsburgh, Pa. 15230. USS and COR-TEN are registered trademarks.









Powerbond Pile Vinyl floor covering.
Office proof, school proof, hospital proof, store proof, etc. proof.

If it weren't for Powerbond™ Pile Vinyl's outstanding durability, low maintenance, excellent sound deadening properties, sure footedness, beauty and general superiority for use in any high traffic area, we could stop right here about what has helped push Powerbond Pile Vinyl into such wide acceptance.

But. There is more.

Behind its beauty (24 matchless colors and 3 textures) there's extraordinary ruggedness, abrasion resistance and resilience. And it's made of Allied Chemical's specially engineered commercial nylon. No scuffs, traffic patterns to show. And spike heels can't spike it. No buckling. No rippling. The pile is so dense, spills, dust and dirt stay on the surface. It can take just about anything anyone can dish out.

And in back of that is our famous 5-year wear guarantee.

You see, it's the only floor covering that combines the luxury of a super-dense pile with all the inherent practicality of vinyl. (We fuse the two together using several layers of vinyl. Because there's nothing better than vinyl for ultimate stability.)

There are a few "almost-likes" but nothing exactly like Powerbond Pile Vinyl. Which is what you'd expect from something that has set the standard for floor covering.

Please send me more information and swatches.

Name_____

Firm_____

Street_____

City_____

State_____ Zip_____

Collins & Aikman
210 Madison Avenue, New York 10016

For more data, circle 51 on inquiry card

General Electric offers new coolers, new colors...and a clever new twist.

The New Coolers—a stylish wall-mounted Space-Saver and a smartly designed PS floor model. Both with the latest in engineering excellence and designer appeal.

The New Colors—deep gray pebble charcoal textured vinyl and a soft gray regal silver enamel. Both available on the popular GE semi-recessed cooler, bringing its total color selections to five. The Space-Saver wall unit also comes in five finishes.

The New Twist—a unique removable/cleanable precooler core for improved water cooler sanitation. Only GE has it. Permits easy access to the drain . . . without removing side panels or basin top.

For more details on General Electric's full line offering, including capacities and color choices, see Sweet's Catalog. Or write GE, Dept. 761-44, 14th and Arnold Streets, Chicago Heights, Ill. 60411.

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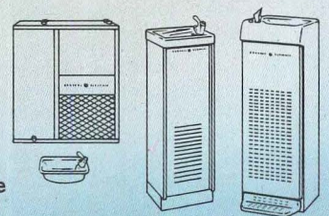

new remote

compact PT-3

rugged RS

GENERAL ELECTRIC

Foreground: Construction of Nassif Office Building, Washington, D.C.
2,000,000 sq ft of Ceco Steeldome Services
David Nassif Associates, owner / Edward Durell Stone, architect
Universal Engineering Corp., engineers
John A. Volpe Construction Co., Inc., contractors
Kirk Lindsey, Inc., concrete contractors
(Background—National headquarters building of HUD also utilized Ceco's experience in forming reinforced concrete joist construction for central core.)

Economy and speed: good reasons for choosing Ceco's Steelform

experience

Why specify monolithic reinforced concrete construction for the largest privately-owned office building in Washington, D.C.? Two big reasons:

—Construction cost advantages for poured-in-place reinforced concrete were far better than other methods.

—Ceco Steelform Service assured *speed of construction.* Delays could not be tolerated because of on-going interest obligations. Prompt rental income was required. So Ceco formed a floor every five days—a rate of 130,000 sq ft a week.

Beyond speed of construction, the Ceco Steelform system offers an avenue for creative expression in buildings of any size. You combine beauty with the strength and rigidity of monolithic reinforced concrete.

Ceco's experience results in service you will appreciate. A firm quotation is the beginning. Ceco furnishes guaranteed in-place cost figures for forming reinforced concrete floor joist construction. You do not have to guess about the variables—labor, forms, lumber costs, insurance.

Ceco service crews and supervision are available nationwide. So, too, are all materials and equipment. Your building gets an early start, progresses rapidly, is ready for occupancy at an early date. Let Ceco bring your floor framing ideas to life with dependable Steelform Service. The Ceco Corporation, general offices: 5601 West 26th Street, Chicago, Illinois 60650. Sales offices and plants in principal cities.

CECO

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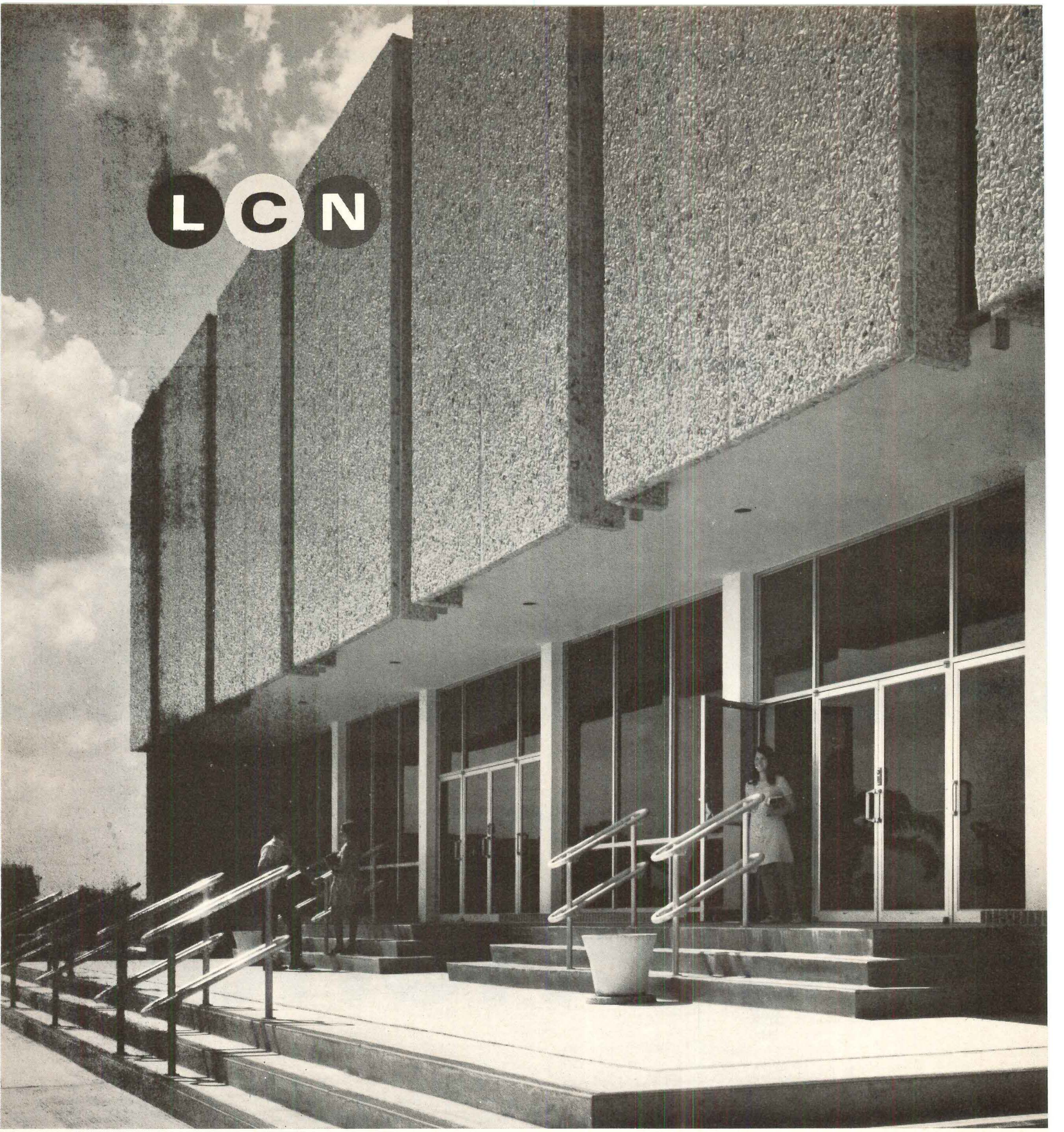
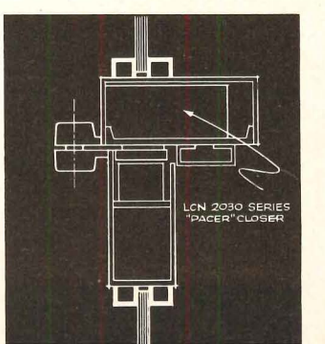


Brevard Junior College, Cocoa Beach, Florida. W. R. Gomon & Associates, Daytona Beach, Florida, Architects.

Now you can have perfect door control

without one bit of clutter. Use the LCN Pacer® that fits inside a 1¾″ x 4″ transom bar. The "Pacer" is compact, concealed, fully hydraulic, easily and permanently regulated for general speed, latch speed, spring power, and back check. For quality performance in contemporary frame styles the "Pacer" merits consideration. See Sweet's or write LCN Closers, Princeton, Illinois 61356.



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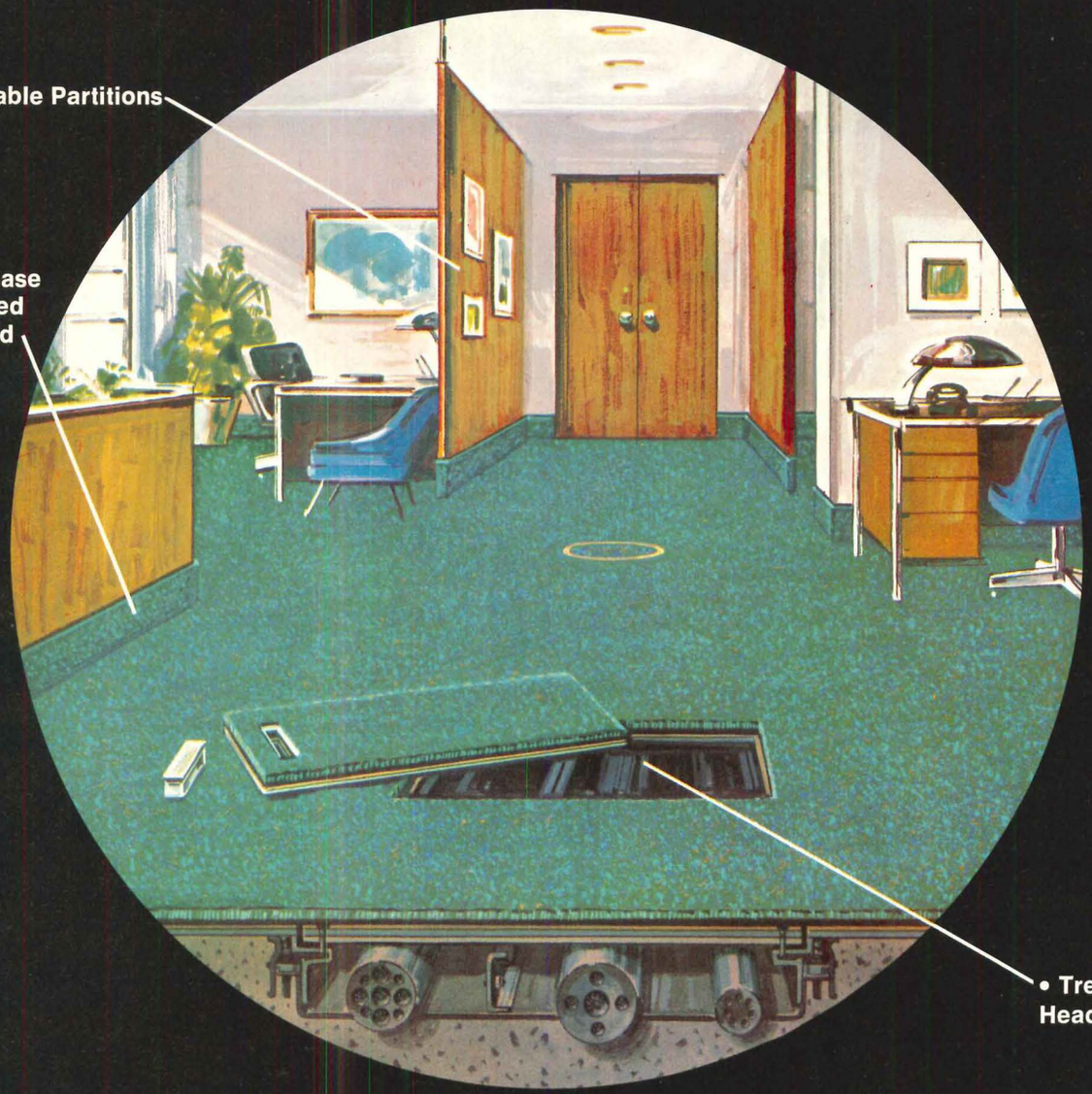
All systems are go

Carpet Systems from CCC with Acrylic 73... engineered to integrate with all architectural systems.



Carpeting is no longer a simple matter of beautiful floors. The challenge today is to integrate carpet with the total architectural environment.

CCC has this very complex problem down to a precise system—the unique Acrylic 73 Carpet System. We analyze every element involved—right from the blueprints. Recommendations are based on design, function and maintenance factors.

The result of this planning: a carpet system that lets you move partitions, gives you easy access to sub-floor systems and includes built-in static control to end the annoyance of shock.

Acrylic 73 is a total performance carpet. CCC's exclusive blend of 70% long-staple Creslan® acrylic and 30% long-staple commercial nylon combines unequalled stamina with design versatility and appearance retention.

CCC is the world's largest manufacturer of commercial and institutional carpet systems. We would like to tell you more about what we can do for you. Why not send in the coupon today.

CYANAMID Creslan® LUXURY ACRYLIC FIBER

Creslan is a product of American Cyanamid Company, Wayne, N.J.

CCC

Commercial Carpet Corporation
Dept. AR 8
10 West 33rd Street
New York, New York 10001

Attention: Mr. Walter Brooks
Please send me a copy of the booklet, "Office Carpet Systems, with Acrylic 73". ☐ Please have a CCC consultant contact me. ☐

Name_____

Company_____

Address_____

City_____ State_____ Zip_____

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Send for the new, easy-to-use AAMA Selection Guide for aluminum windows and sliding glass doors.

ARCHITECTURAL ALUMINUM MANUFACTURERS ASSOCIATION
One East Wacker Drive • Chicago, Illinois 60601
DEPT. C-89

Gentlemen:

Please send me the AAMA Short Form Selection Guide for aluminum windows and sliding glass doors. I understand that with the tables and charts available, I can easily determine which windows and sliding glass doors meet local code requirements for wind loads, water leakage and air infiltration.

So send the guide. I thank you.

NAME _____

TITLE _____

FIRM _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

AAMA

Architectural Aluminum
Manufacturers Association
One East Wacker Drive • Chicago, Illinois 60601

architectural aluminum

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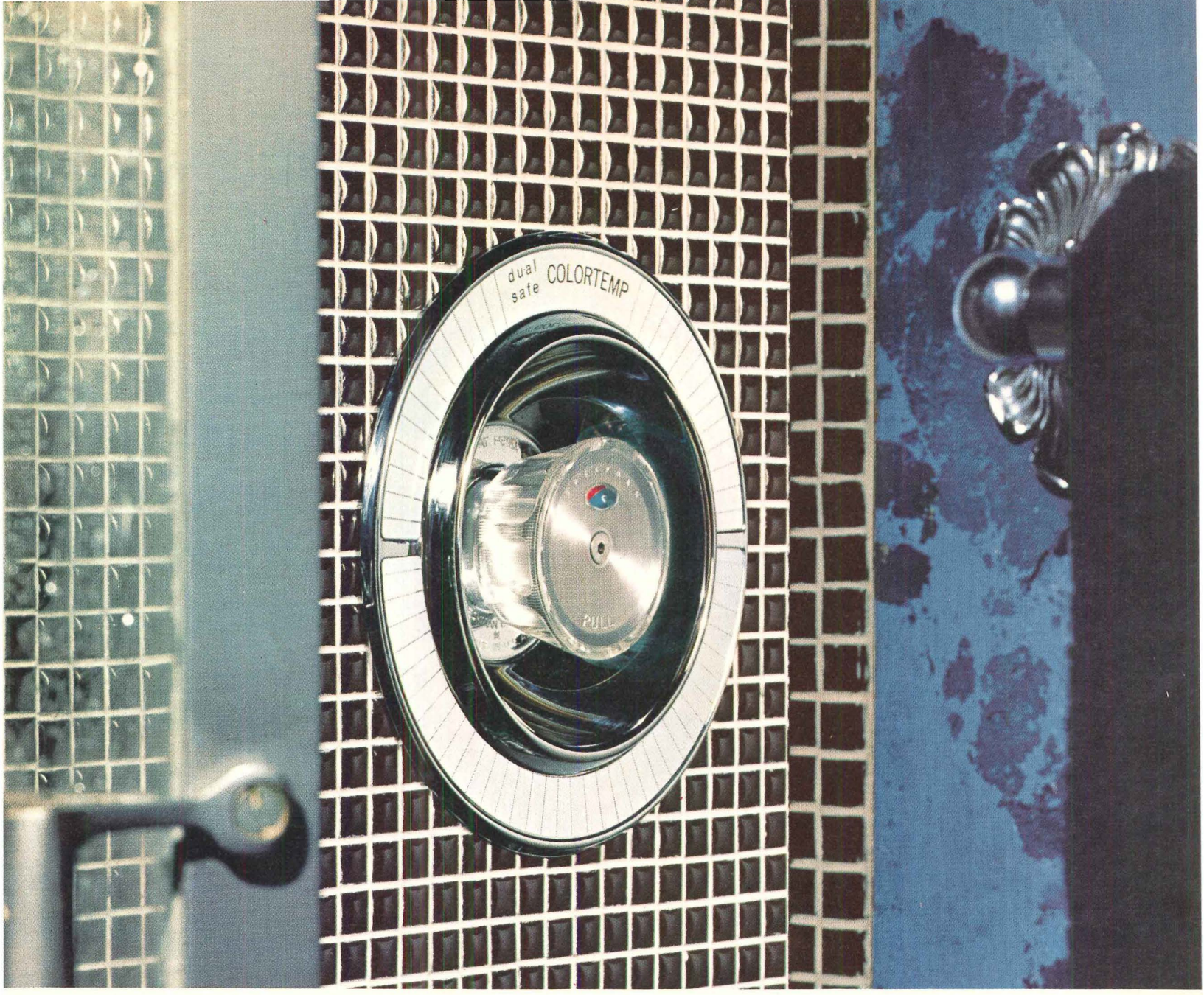

Men who specify and install plumbing fittings know the real importance of quality. That's why Speakman has been growing for the past one hundred years.

1869–1969
Speakman Quality
Spans a Century

SPEAKMAN® COMPANY · Wilmington, Delaware 19899 · In Canada write Cuthbert-Speakman, Quebec

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Doesn't anybody make refrigeration equipment with all-copper tubing and an Automatic Defrost-Vaporizer and heater wire strips and triple-seal gasketing and 5 standard finishes and self-supporting insulation and adjustable legs?

Nor-Lake does. With a full range of components and options, the only thing we won't change is the quality.

NOR-LAKE INC.
Second and Elm, Hudson, Wisconsin 54016
Phone: 715-386-2323 Dept. 3161

Pride is contagious at Nor-Lake

Over 270 models—all designed to NSF configurations.
Sweets File 23a/No.

What else should I know about Nor-Lake Refrigeration equipment?

Name:_____

Address:_____

City:_____ State:_____ Zip:_____

I need Refrigeration Equipment for_____

_____

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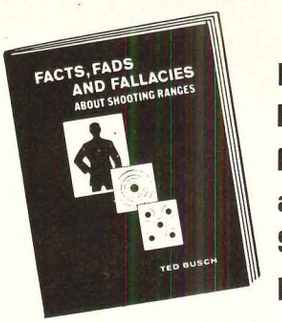
FREE BOOK
For Range Planners



FACTS FADS and FALLACIES about Shooting Ranges by TED BUSCH

The first authoritative reference for range planners. Shows how easily and inexpensively safe ranges can be installed. Discusses size requirements, target systems, bullet traps, noise suppression, lighting, ventilation and many other subjects vital to modern ranges. Exposes the myths and gimmcrackery that cause costs and maintenance to soar. Extensively illustrated including range plans. Price $2.00. Free to persons actively planning ranges.

CASWELL
since 1926—the oldest name in shooting ranges
EQUIPMENT COMPANY
1215G Second Ave., N.
Minneapolis, Minn. 55405

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Don't let your client down after the building is up . . .

Name what you have created in lasting metal letters —costs a little more but lasts a whole lot longer.

Knight will cast 3-dimensional *letters in solid bronze, brass or aluminum. Select from a wide variety of sizes, type faces and finishes. Or we'll create new letters, company trademarks, to your design.*

Write for your FREE Knight Catalog now.

H.W. KNIGHT & SON
Division of Jas. H. Matthews & Co.
14 Lane St., Seneca Falls, N.Y. 13148

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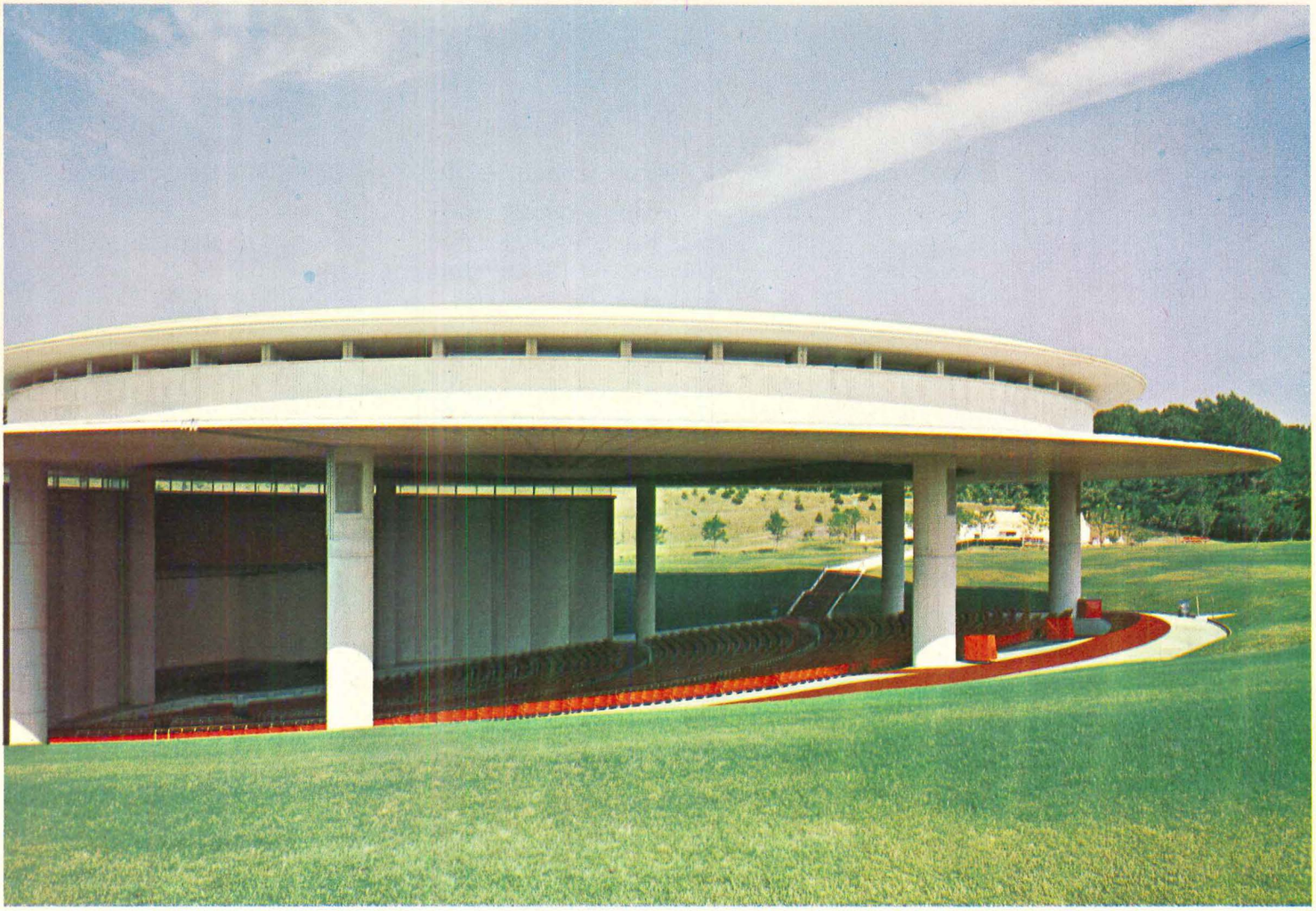

GARDEN STATE ARTS CENTER

■ ARCHITECT: Edward Durell Stone, New York ■ ENGINEER: T. Y. Lin & Assoc., New York
■ CONTRACTOR: Sovereign Construction Co., Ft. Lee, New Jersey

Esthetic design with concrete is beautifully demonstrated by the new Garden State Arts Center designed by Edward Durell Stone for the New Jersey Highway Authority. ChemComp shrinkage compensating cement was specified for the seating area where crack resistance was considered an absolute necessity, and in other areas in the complex where its superior qualities make possible a significantly better, more attractive structure. ChemComp is produced by a group of leading manufacturers of superior quality cements, and is available nationwide.

- REDUCES size and incidence of drying shrinkage CRACKS
- DIMENSIONALLY STABLE
- LOW PERMEABILITY
- INCREASES BOND STRENGTH TO REINFORCING STEEL
- 20%-50% MORE LIVE LOAD CAPACITY
- SUBSTANTIAL REDUCTION IN NECESSARY CONTROL JOINTS
- NO SPECIAL PLACING PROCEDURES
- LESS SEALING AND CAULKING OF JOINTS
- MUCH LESS LONG-TERM MAINTENANCE

Specify, profit by using

ChemComp® Cement

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Los Angeles, California 90017

Texas Industries, Inc.
P. O. Box 400
Arlington, Texas 76010

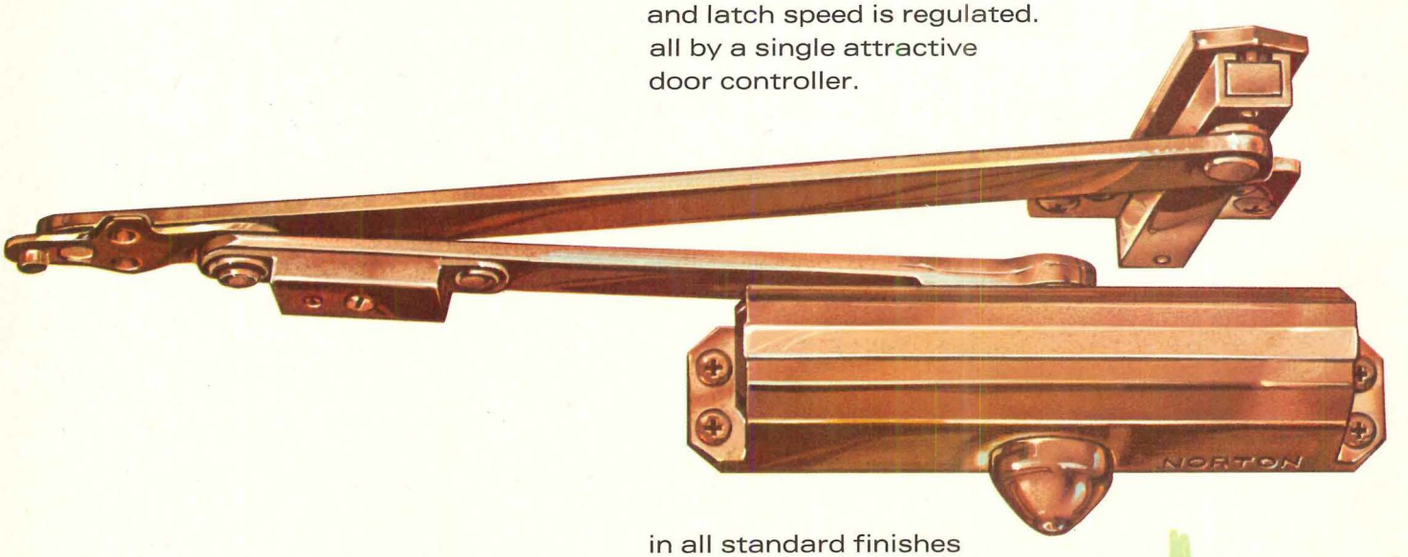
For further information contact:
Chemically Prestressed Concrete Corp., 14656 Oxnard Street, Van Nuys, California 91401
or the sales office nearest you.

For more data, circle 63 on inquiry card

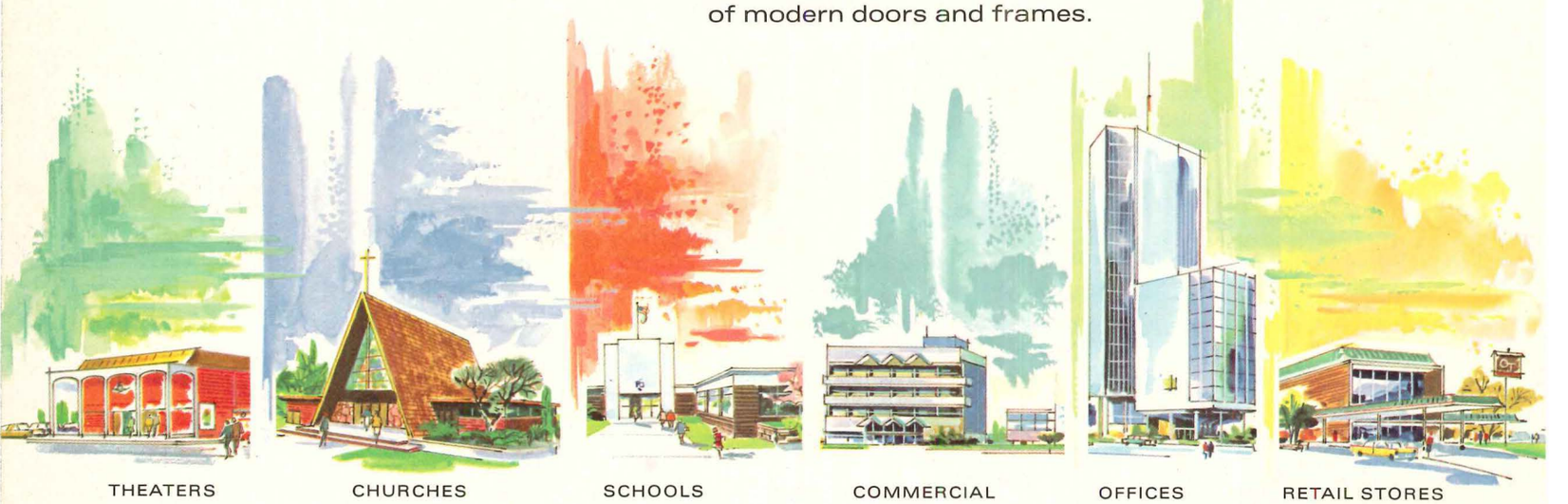
versatility

combined door closer • door holder • shock absorber

for simpler installation,
better appearance,
Norton Unitrol® controls.
for safety to door and frame,
safety to traffic with
complete door control.
door is cushioned during opening.
door is stopped at full open.
door can be held open.
door is closed. door closing
and latch speed is regulated.
all by a single attractive
door controller.



in all standard finishes
to match styling and decor
of modern doors and frames.



THEATERS CHURCHES SCHOOLS COMMERCIAL OFFICES RETAIL STORES

NORTON® CLOSERS

control doors • not design

EATON YALE & TOWNE INC.

NORTON DOOR CLOSER DIVISION
372 Meyer Road, Bensenville, Illinois 60106
Available in Canada-Norton Door Closer Division 1176

For more data, circle 64 on inquiry card

In October of 1968 we unanimously agreed to create a low-cost wall system. But with one stipulation.

That it have Hauserman quality.

Sure, if it were only a matter of producing a low-cost wall system, we could have decided to try it years ago. But we didn't dare. Because we believe you know the name Hauserman means quality. Which is what we want it to mean. Always.

So we had to wait. Until we felt technological breakthroughs would make our system feasible without any sacrifice in quality.

Our R & D Division studied performance needs. The latest achievements in technology. New mass production techniques. Finally, last October, we were ready to create a low-cost interior wall system worthy of the name Hauserman. And now it's here.

It's called READY WALL. It has the flexibility and movability needed to change as your space requirements change. It has completely re-usable components. And what's more important to both of us, it has Hauserman quality.

Actually a system of steel partitions, READY WALL is insulated, decorated and ready to be wired. And does not fasten to the floor. So it can be moved quickly and easily without leaving holes or marks.

Hauserman specialists will install it for you. And move it wherever you want, whenever you want.

If you decide on high-quality, low-cost walls, call your local Hauserman office or write to 5711 Grant Avenue, Cleveland, Ohio 44105.

Things are changing at Hauserman . . . the people who lead the way in change.

Hauserman Ready Wall:

Wall systems you can change as your business changes.

For more data, circle 65 on inquiry card

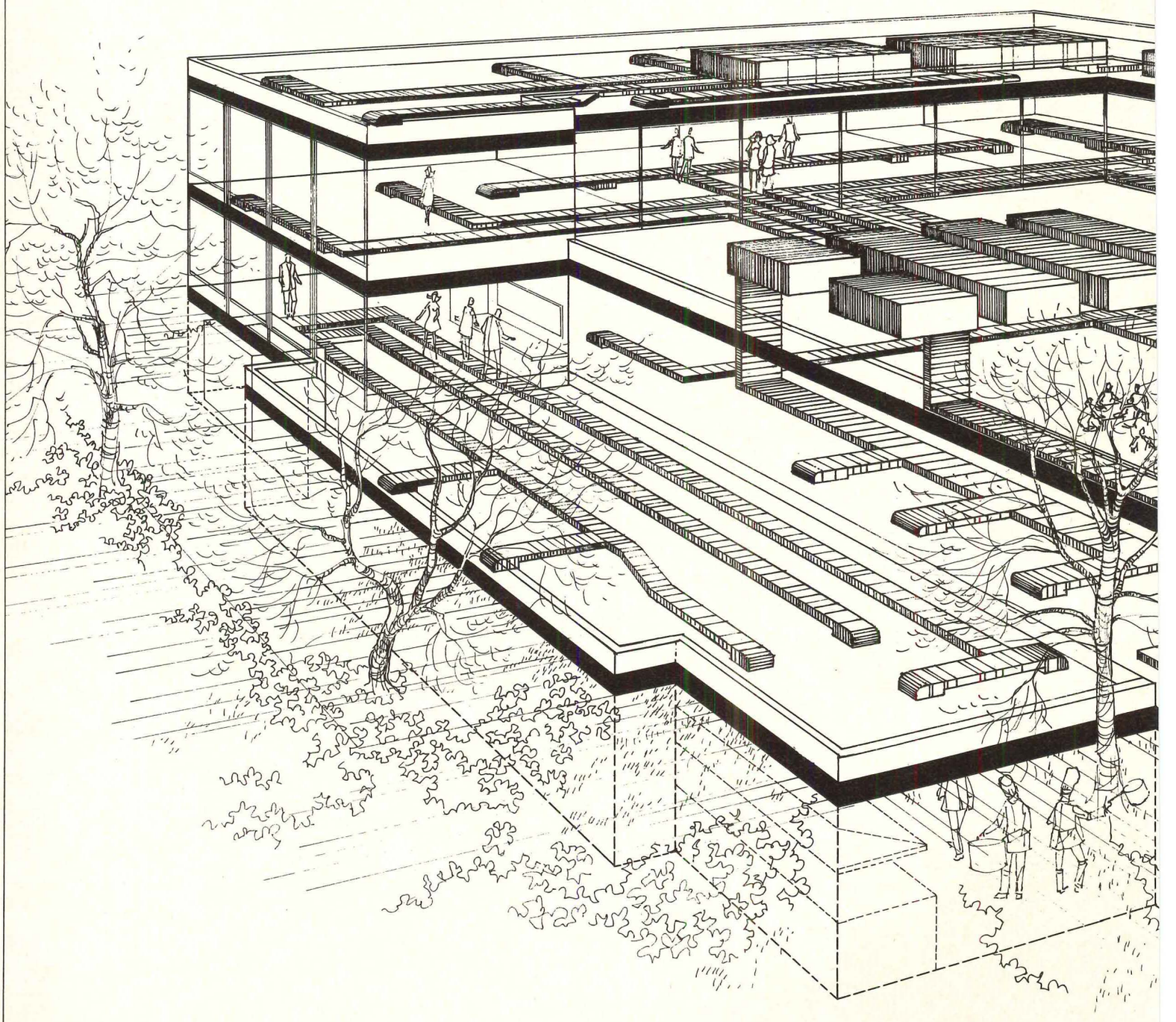
How Nesbitt helped Missouri Valley College

Missouri Valley College wanted to build the most useful and modern student activity center possible. They called in architects Radotinsky Deardoff and Associates of Kansas City, Kansas to design a building that would match the varied activities of such a facility.

There were bowling alleys, game rooms and offices—spaces for meetings, conferences, receptions and private dinners—facilities for the college news staff, the student council—even a suite of guest rooms. Finally, the design included a multipurpose room that could be subdivided for small meetings. With space flexibility as the keynote, a flexible air-conditioning system was needed.

Consulting engineers, Massaglia-Neustrom-Middleton, Kansas City, Missouri specified six Nesbitt Rooftop Multizone units to provide year-round comfort in this flexible new facility. One was used to service the ground floor spaces, two for the first floor and three for the second floor. Installed on the roof, the Nesbitt Rooftop Multizone units provided extra interior space.

Because it is virtually self-contained (direct fired heating; direct expansion cooling), on-site labor is reduced and with it, the cost of the system. For instance, at Missouri



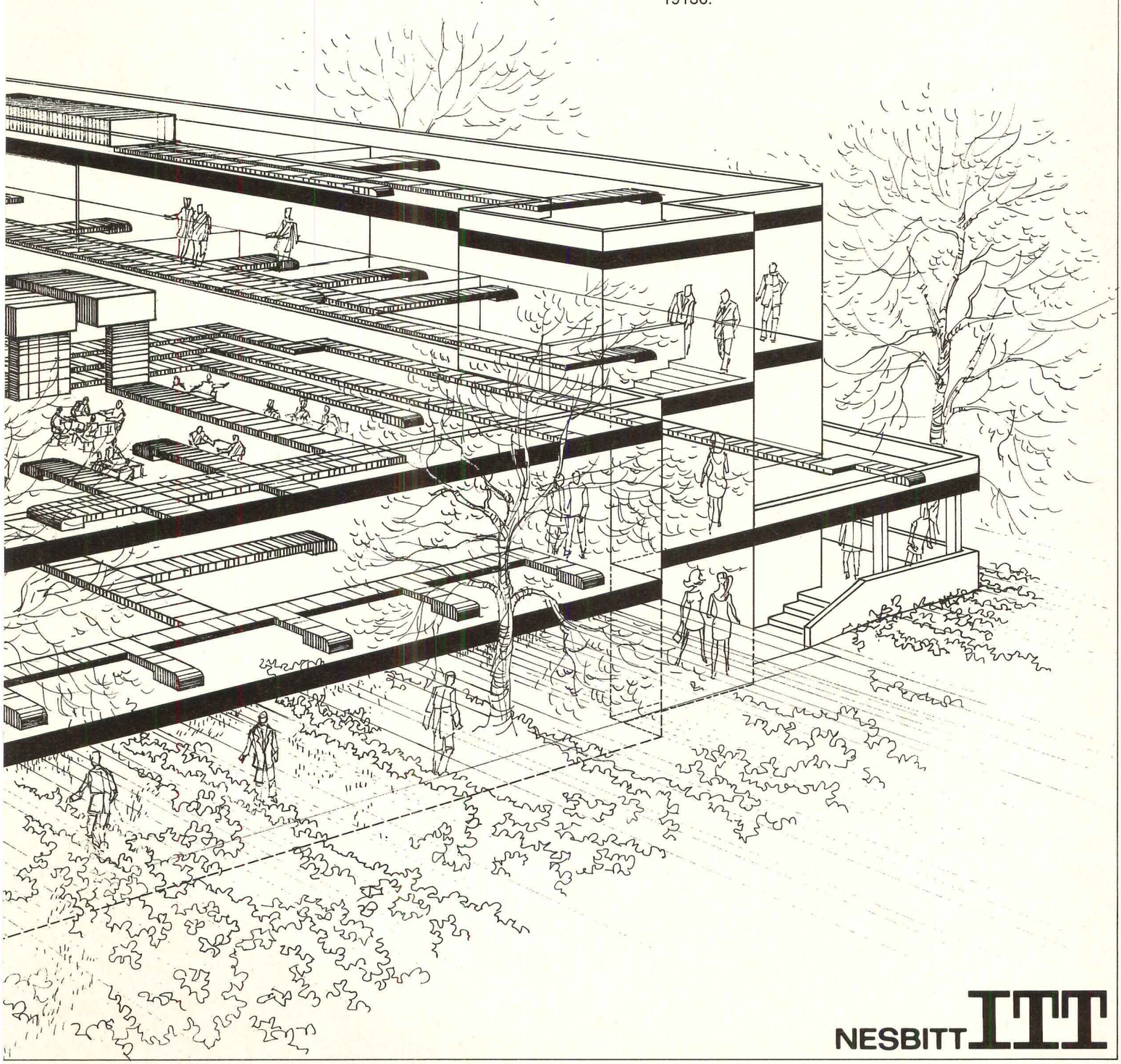
air-condition a new student center.

Valley College, the cost of the air-conditioning, heating and ventilating system including plumbing was only $4.50 per square foot of building. Each Nesbitt Rooftop Multizone unit is a complete air-conditioning, heating and ventilating system serving up to 12 separate zones, each under the control of the thermostat serving that space.

Maintaining a balanced environment in each and every area was a problem because of the varied activities and the constantly changing space arrangement and number of people occupying these spaces. The Rooftop Multizone, through its ability to provide simultaneous heating and cooling, assures complete comfort for each individual space. In addition, the unique reheat capability of the Nesbitt Rooftop Multizone is important for humidity control.

Result: A thoroughly modern building in which the "Now" Generation can feel perfectly at home, with the thermal environment to work or play in absolute, individual comfort.

For details on how Nesbitt Rooftop Multizone units can be an aid to planning—flexibility as well as economy—write to Nesbitt Operation, ITT Environmental Products Division, International Telephone and Telegraph Corporation, Philadelphia, Pa 19136.



NESBITT ITT

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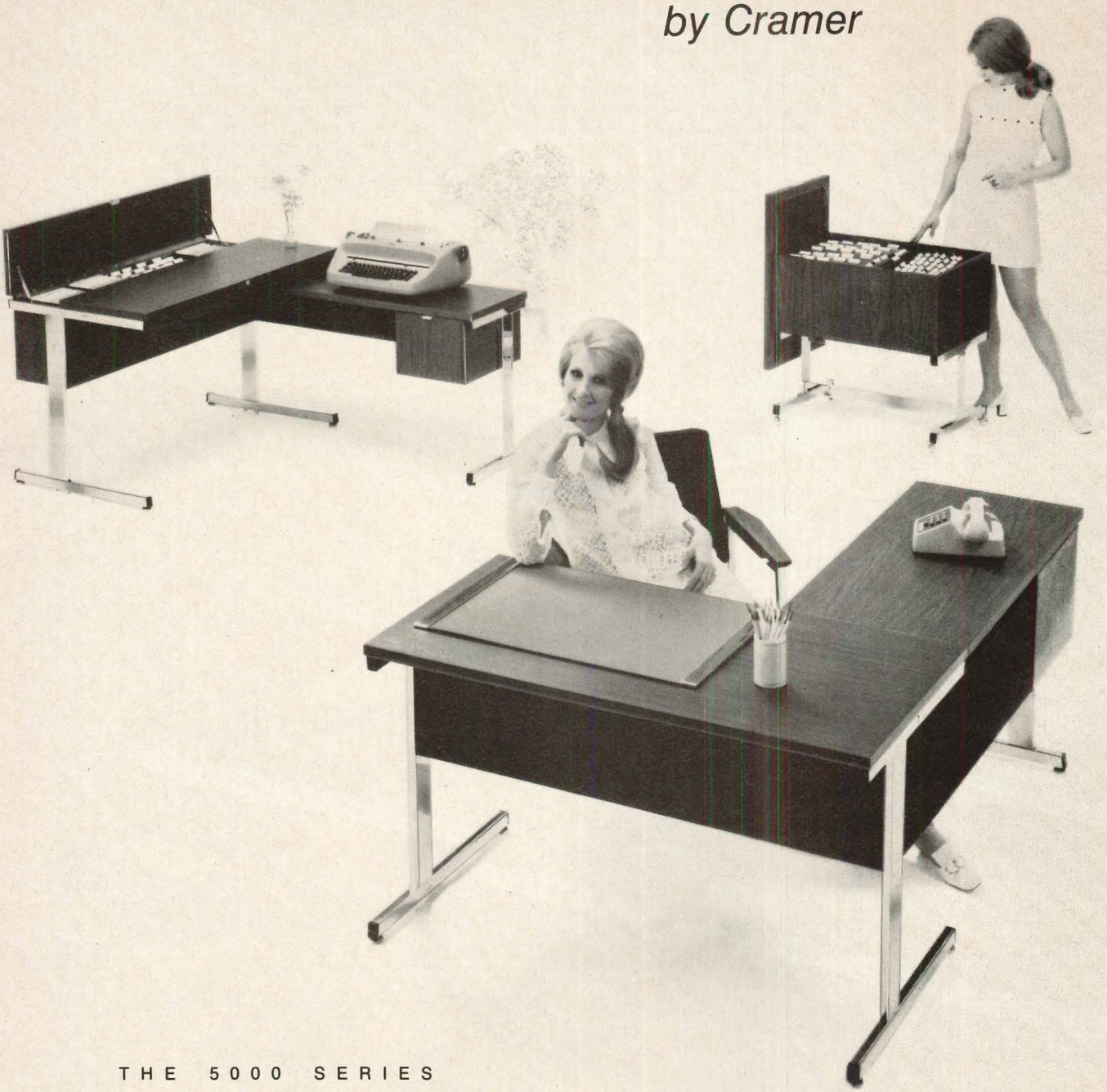
motiva

by Cramer



THE 5000 SERIES

DESIGNED FOR SPACE SAVING

Motiva solves space problems ordinary office furniture creates. Imaginative innovations promise efficiency at all office levels. Modular filing innovations give multiple combinations for letter and legal sizes—and all standard card sizes. Motiva has been designed for an effective, functional flow of general office or data processing programs. Motiva will complement your imagination. For full information...

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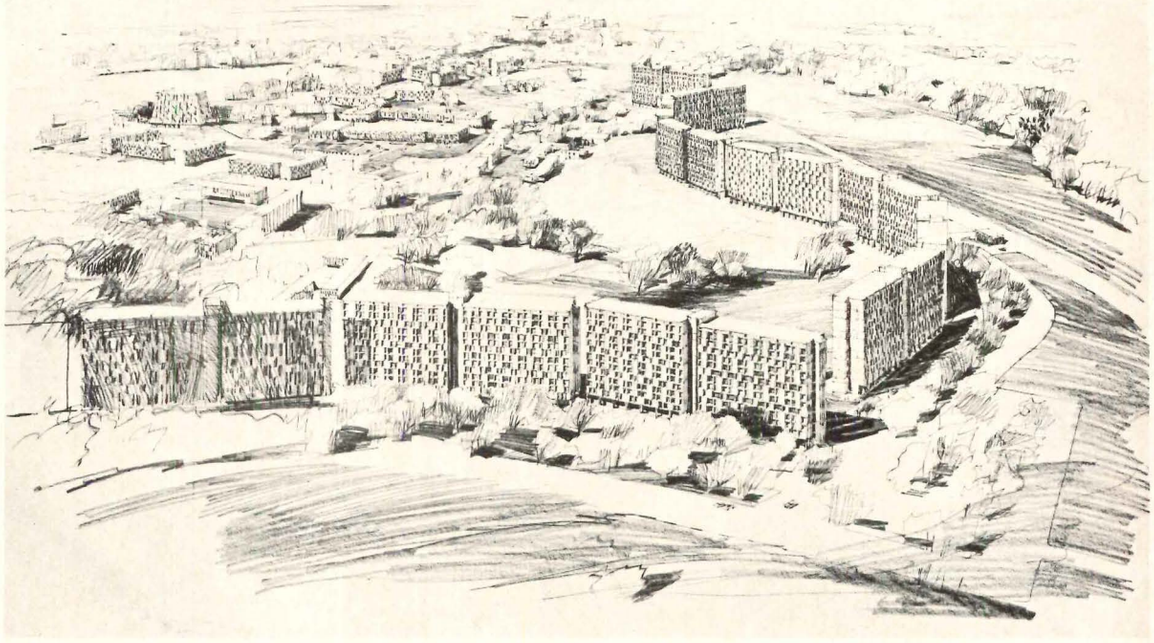
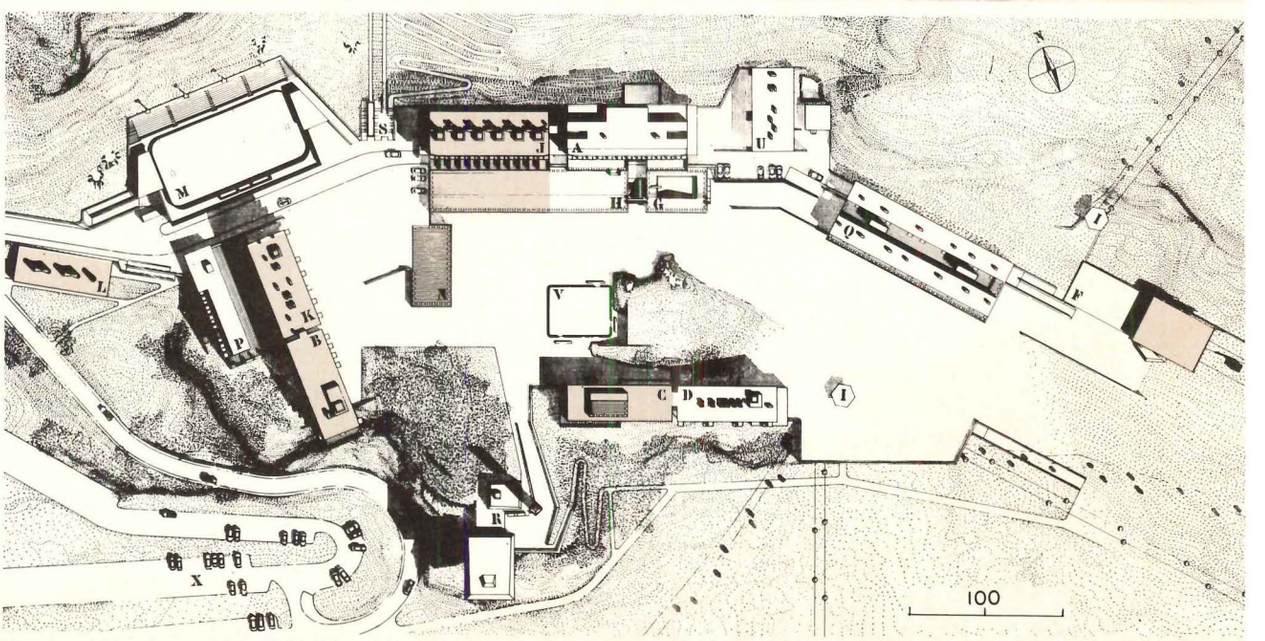


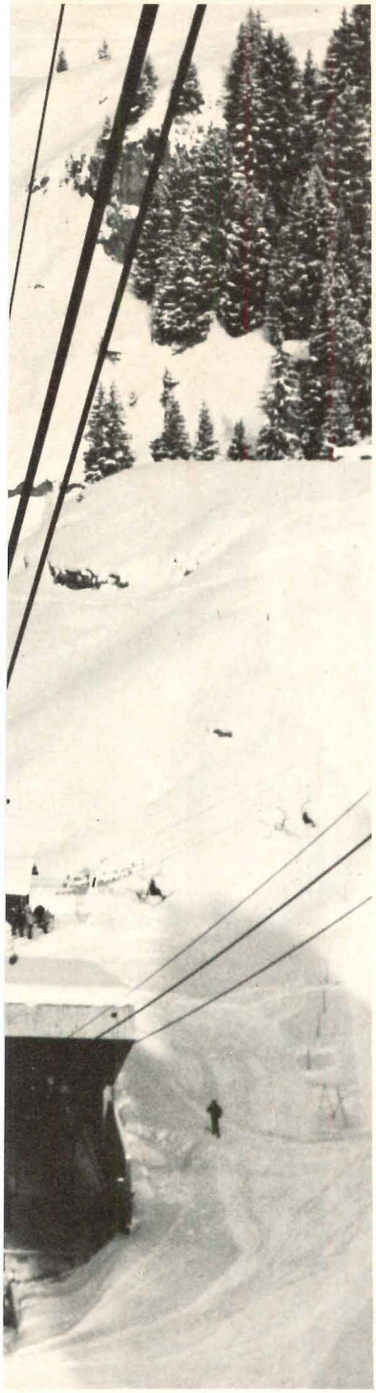
2

TWO NEW FRENCH TOWNS—A SKI RESORT CALLED FLAINE AND A HOUSING DEVELOPMENT IN BAYONNE—BOTH DESIGNED BY MARCEL BREUER AND ROBERT F. GATJE FURTHER THE TECHNOLOGY OF PRECAST CONCRETE AND THE ART OF LARGE SCALE PLANNING

PLAN LEGEND

A. 4-star hotel
B. 3-star hotel
C. 2-star hotel
D. 2-star apartment building
F. *Téléphérique* ski lift
G. Shops
H. Shops
I. Ski lift
J. 4-star apartment building
K. 3-star apartment building
L. Central heating plant
M. Bus station with roof-top rink convertible to tennis
N. Tourist office and school
P. All-purpose hall and cinema
Q. Shops and apartments
R. Church
S. Funicular and path
U. Mayor's office, post office, bank and medical center
V. Skating rink
X. Transient parking





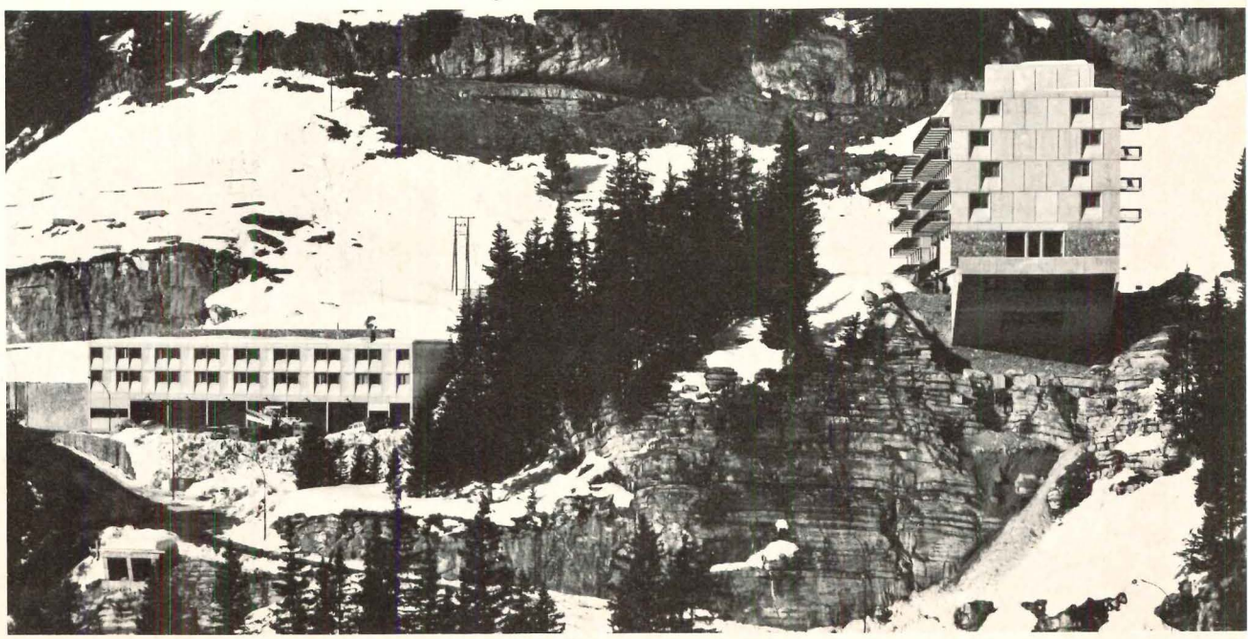
Yves Guillemaut photos

1

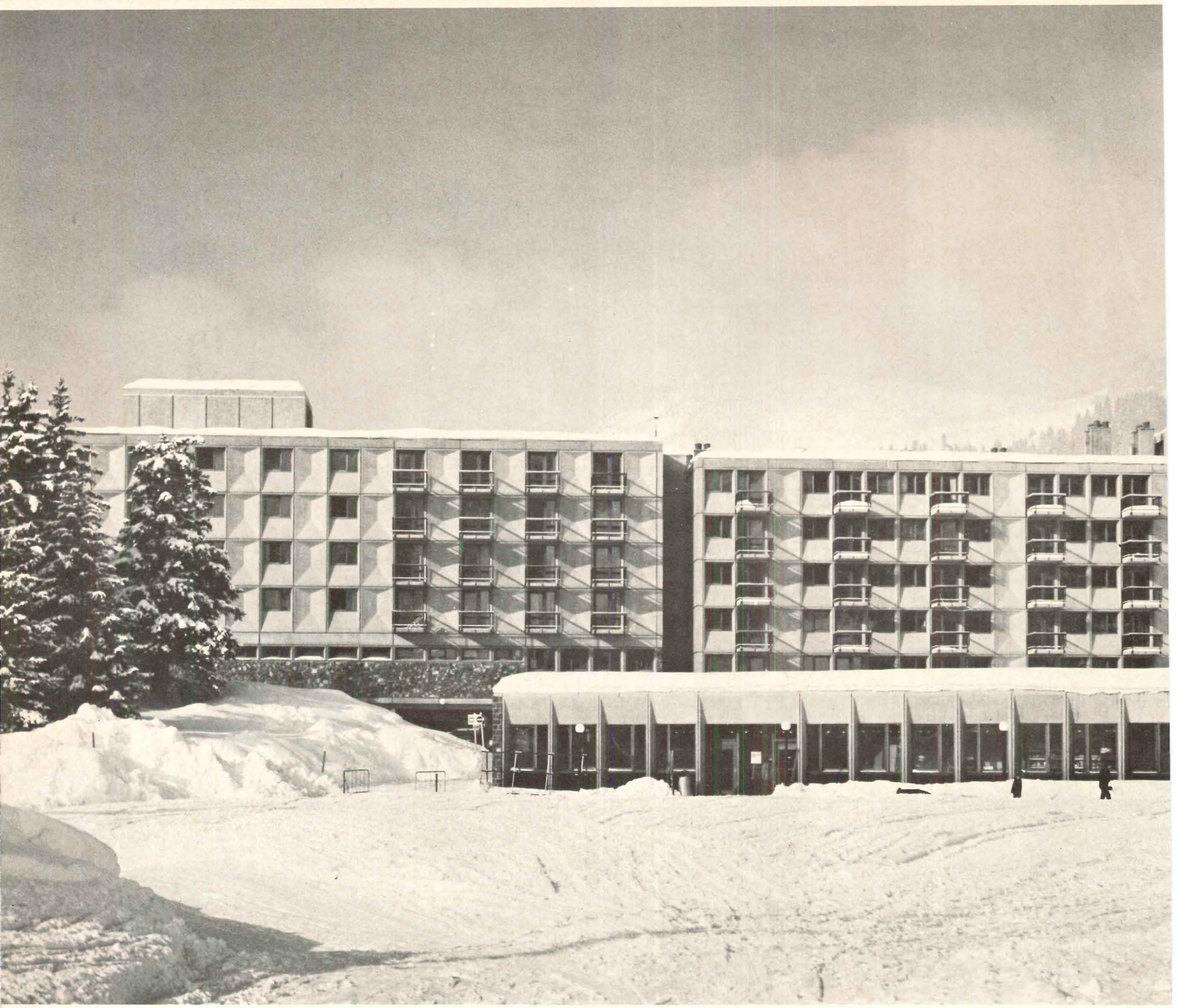
FLAINE, A SKI RESORT NEAR CHAMONIX, FRANCE
DESIGNED TO FUNCTION AS A SELF-SUSTAINING TOWN
INCLUDES A VILLAGE CENTER AND CHURCH
IN ADDITION TO HOTELS, APARTMENTS, SHOPS AND RECREATION FACILITIES

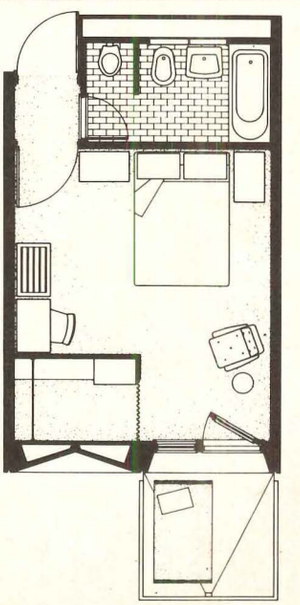
The skiers descending to the valley in the photograph (left) were among the first down the hill last winter for the opening season at Flaine. It took nine years of work, and an undisclosed but huge amount of private investment capital to turn this remote and once isolated valley into a resort which now accommodates five hundred guests and will eventually have six to seven thousand visitors and one-and-one-half thousand employes. As yet far from finished, almost the entire town is being built of precast concrete parts. A specially constructed batching plant and concrete casting facility located in a neighboring river valley about 2½ miles below Flaine, where water, power, road and rail transport are available, operates the year round. The precast concrete parts and all other building materials are transported up to Flaine by a built-for-the-purpose freight-carrying *téléférique,* which will eventually be converted to visitor use.

This nine-year effort to make the valley habitable for skiers was inspired by its ideal terrain. The broad northern slopes of the mountains to the south of the valley retain the maximum amount of snow. The terraced southern slopes of the mountains to the north provide three sun-washed plateaus forming dramatic building sites. Breuer's prismatic facades, designed for sun and shadow, add brilliance to the skier's scene as he contemplates them from the mountain top or approaches them on his downhill run. The skiers, on their side of the valley, ascending the mountain face on ski lifts or zig-zagging their way down, contribute beauty and liveliness to the views southward from the town. Another bonus of the terrain's exposure—snow-covered slopes behind the building reflect sunlight into those rooms which face north. Almost all of the buildings are on columns and some cantilever out over cliff edges.

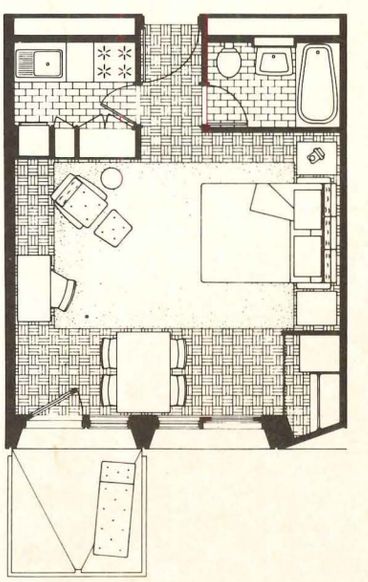


The bus station and visitor parking areas are located to the west at the terminus of the new access road. By happy geographical coincidence the ski slopes are to the north, south and east and it has thus been possible to avoid dangerous conflict between automobiles and skiers and keep cars out of the town center. Automobiles serve the hotels and apartments by secondary dead end roads only. Space under many of the buildings is used for covered parking and access roads. All buildings will be heated by hot water produced in the central heating plant and distributed through a system of underground tunnels. The hot water heating system will not dirty the snow—thus giving Flaine an advantage over soot-covered rival resorts. Buildings shown in brown are complete.

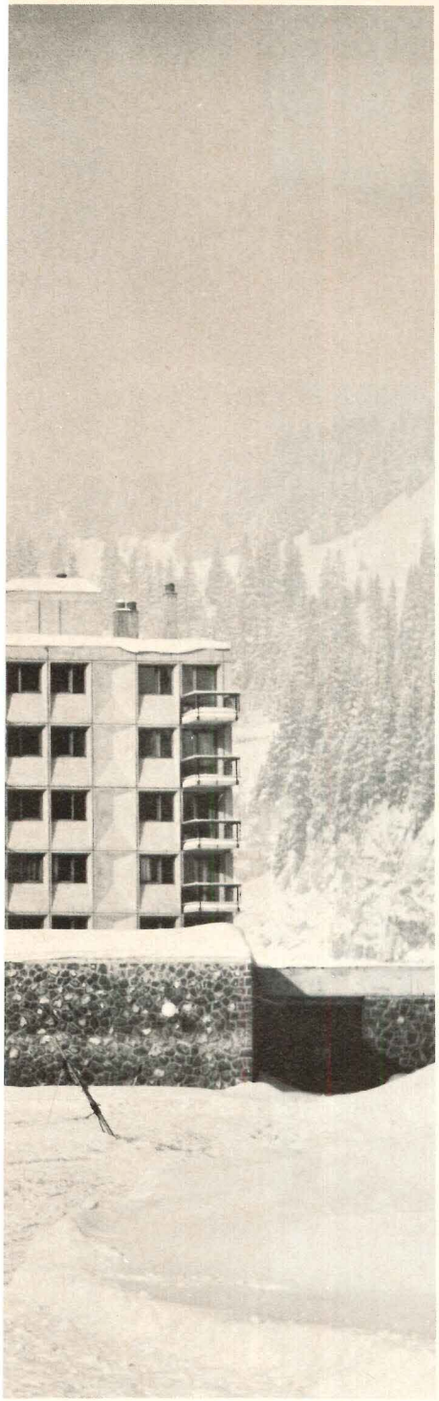


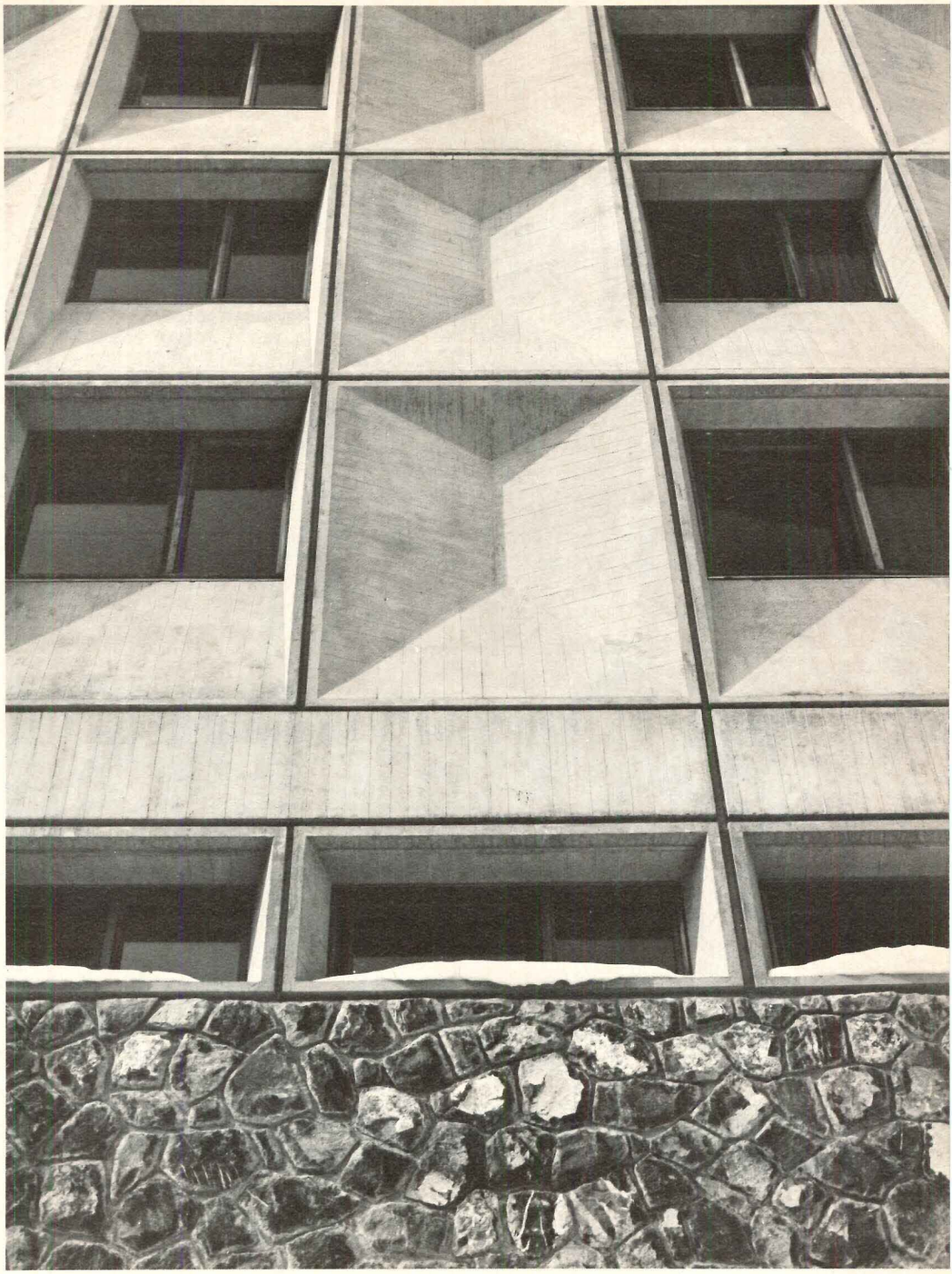


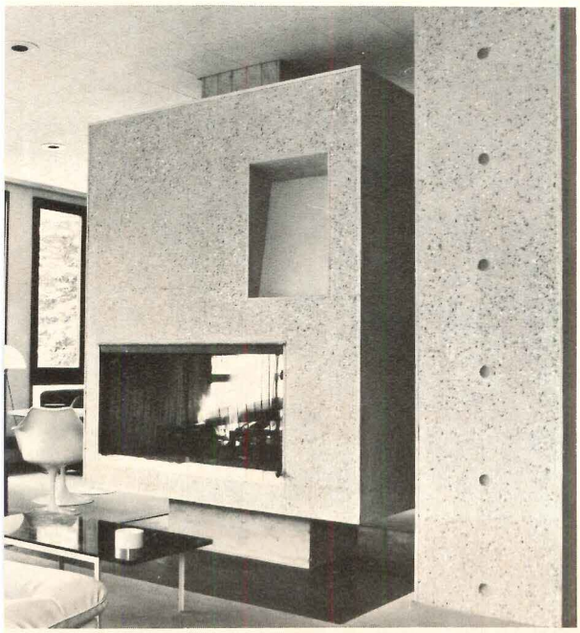
TYPICAL HOTEL ROOM



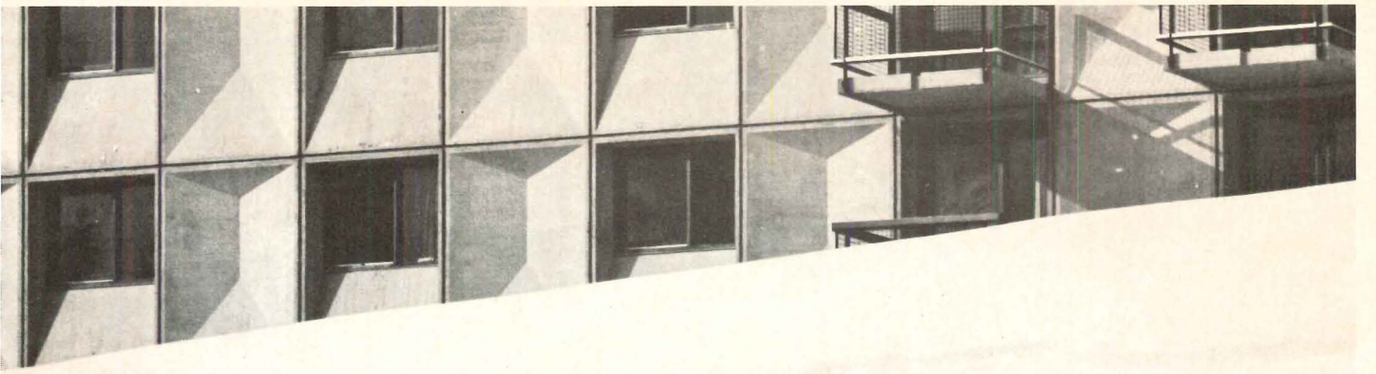
TYPICAL APARTMENT

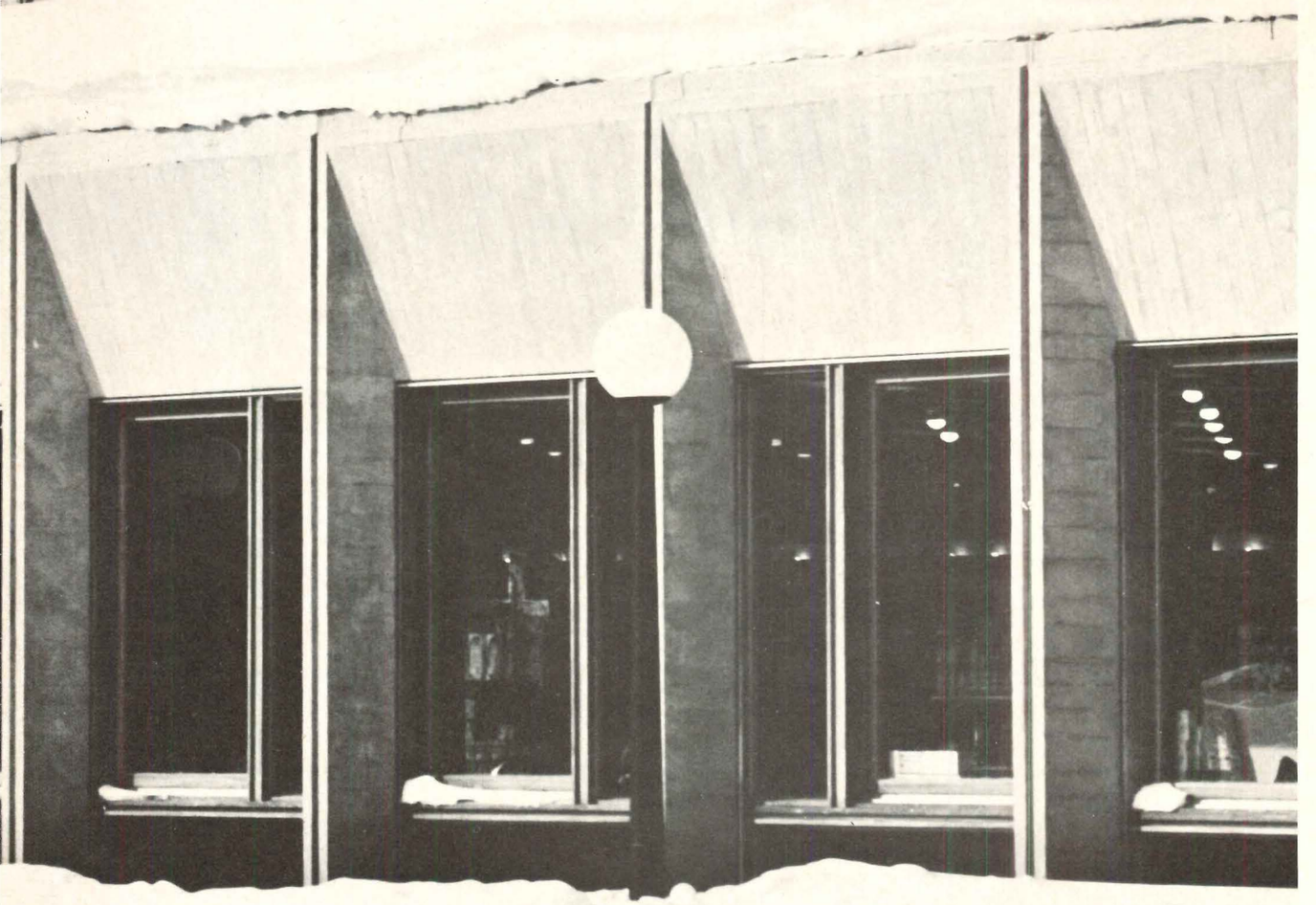


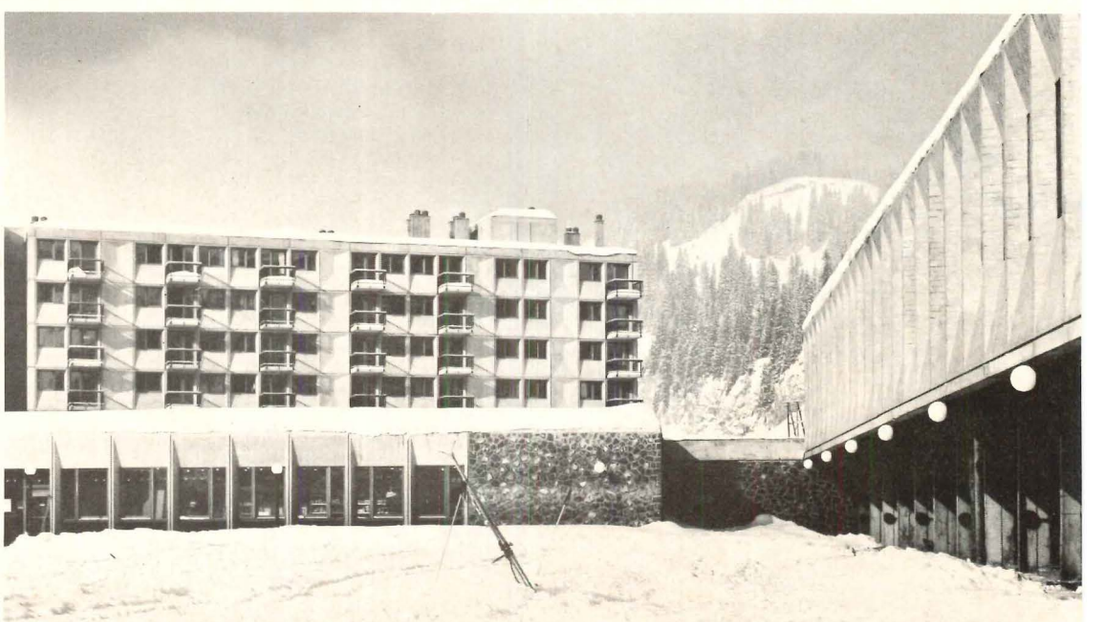


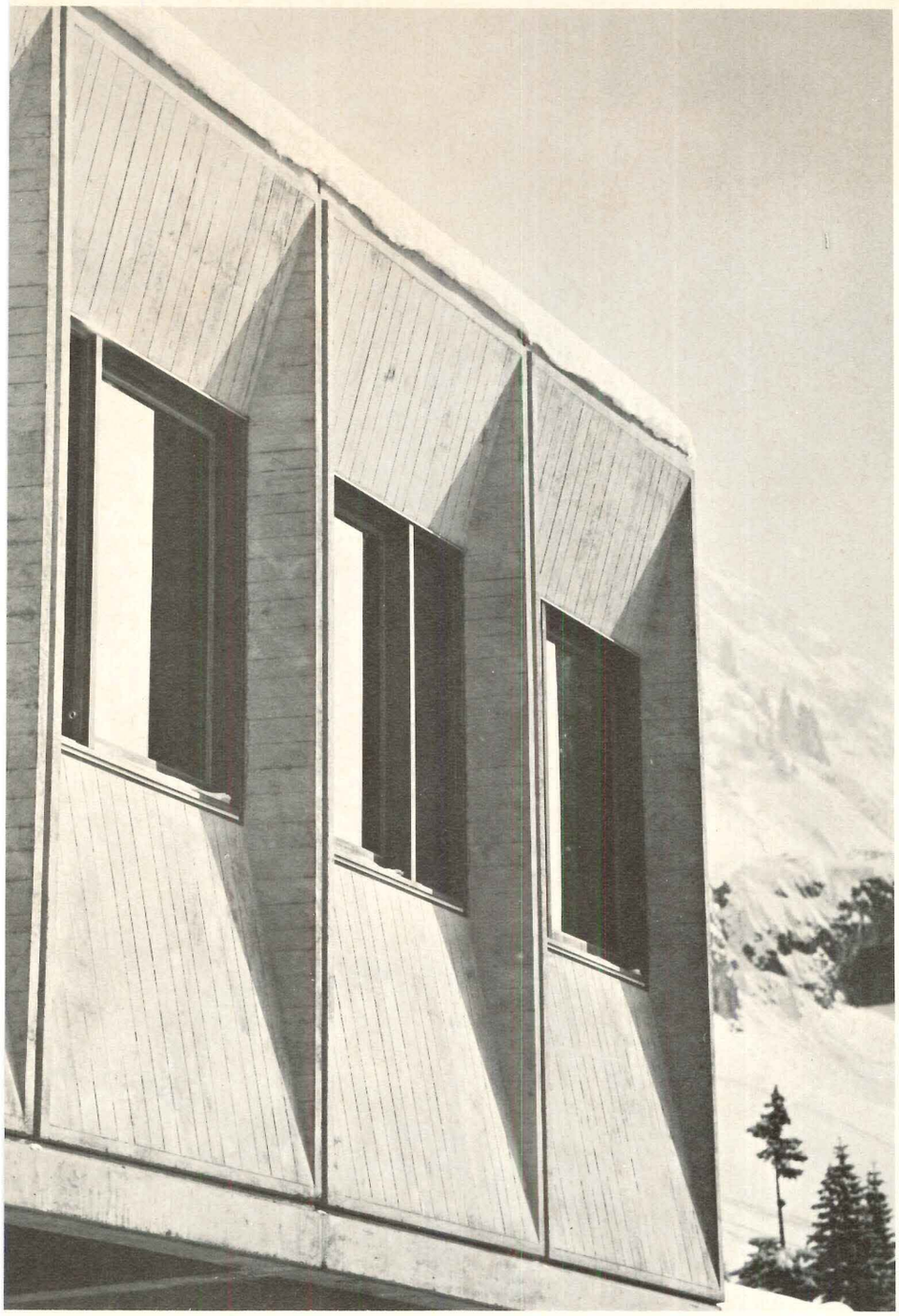


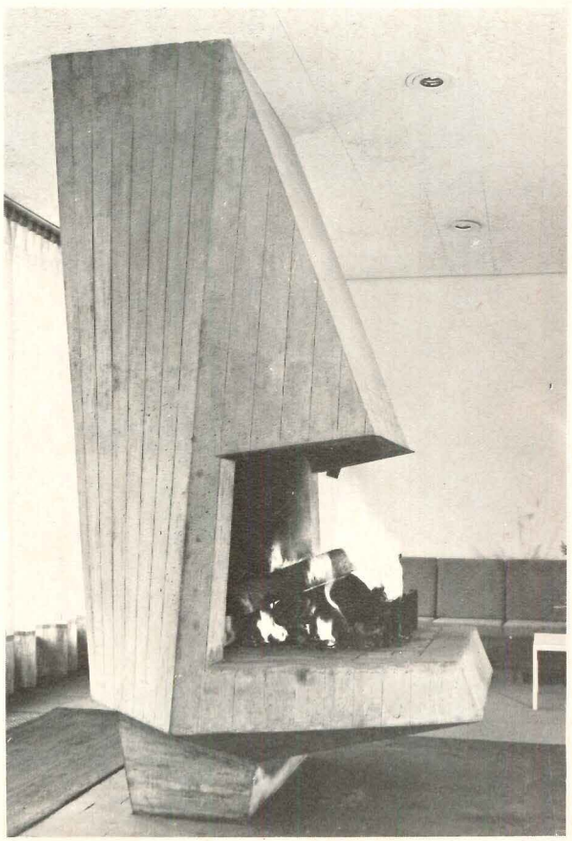
The facades shown in elevation and detail above and on the following two pages are composed of precast concrete panels with three-dimensional facets. Each type of panel has been designed to be load bearing, structural, and integrated and in scale with the module of space which it encloses. The panels form projections for sun protection and offer chases and hollows for pipes and ducts. They provide a depth of facade which has been characteristic of all Breuer's work in recent years. The elevation (above left) is of an adjoining hotel and apartment building with the tourist office and ski school in the foreground. The detail (above) shows a portion of the hotel facade. A typical fireplace is shown at left. Apartments are one-half module wider than hotel rooms.





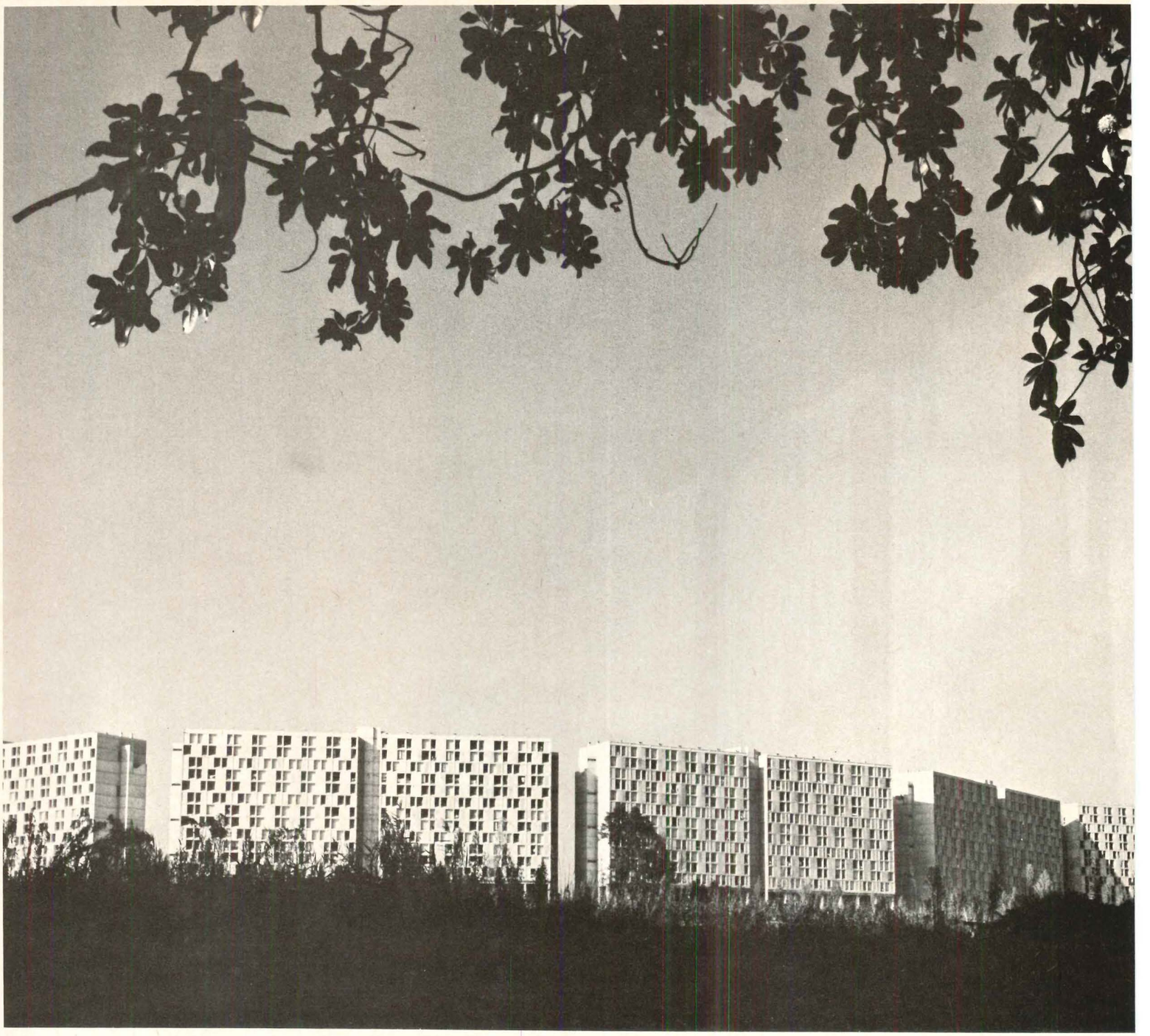


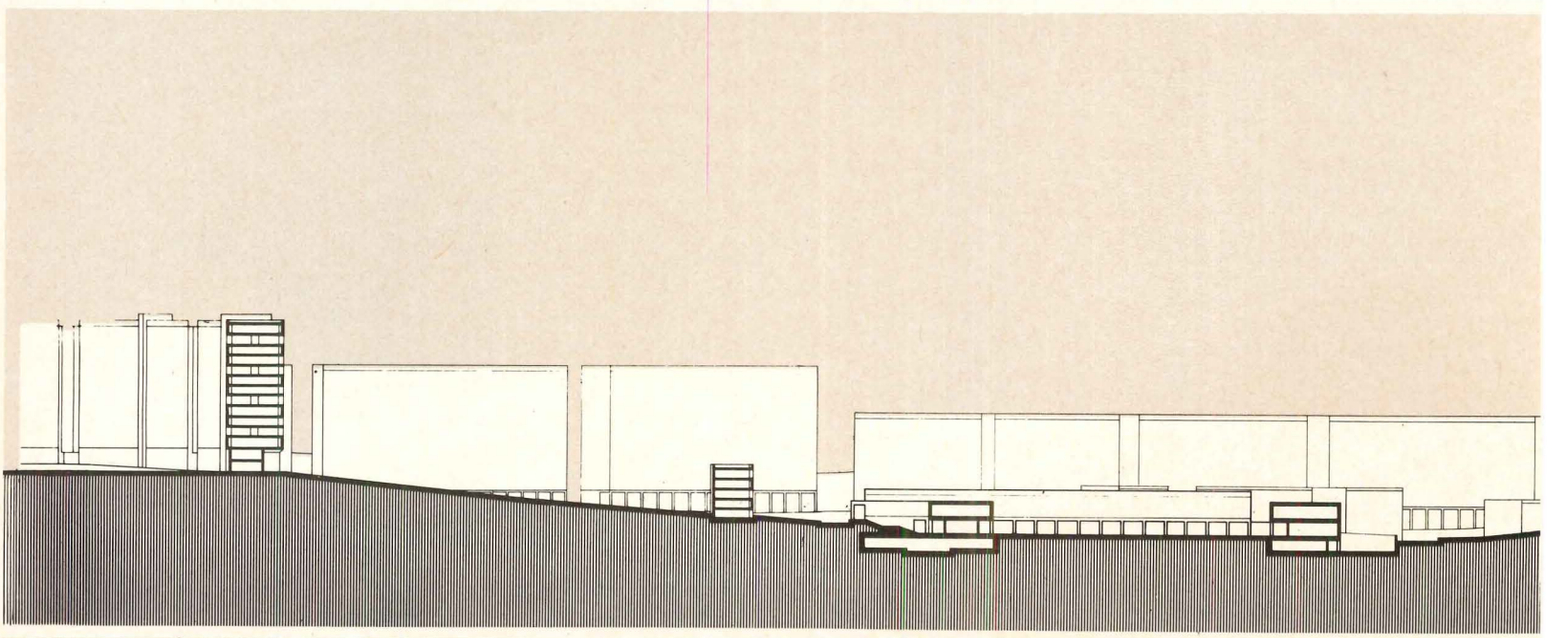




The detail (opposite page, top) is of the precast panels which enclose the one-story tourist office and ski school. Shown above is the panel system for an office floor. Unlike his precast panels, Breuer's fireplaces (right and on preceding page), as well as the bell towers of his churches, are pure sculpture. In the design of these accents he is free of the modular order which he has evolved for the structure itself. Since for almost every building, he creates at least one form for form's sake, he continually proves himself to be a sculptor of accomplishment and great sophistication.

RESORT TOWN OF FLAINE, Haute-Savoie, France. Architects: *Marcel Breuer and Robert F. Gatje;* economic planners: *B.E.R.U.* (Bureau d'Etudes et de Realisations Urbaines.)



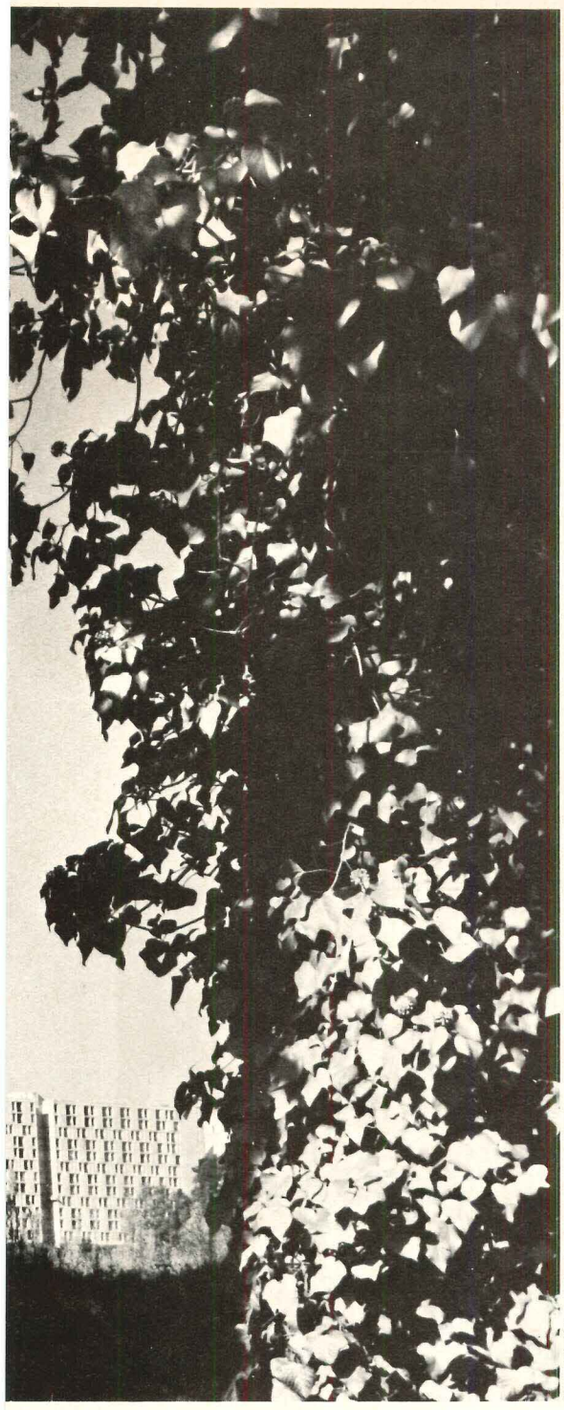


2

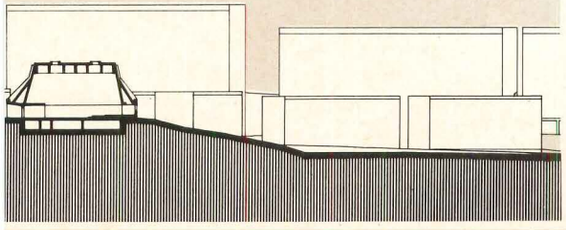
A SELF-CONTAINED COMMUNITY IN BAYONNE, FRANCE COMBINES HIGH- AND LOW-RISE APARTMENT HOUSES FOR LOW-INCOME WORKERS WITH COMMERCIAL AND ADMINISTRATIVE BUILDINGS, SCHOOLS AND A CHURCH

This 332-acre community for 15,000 inhabitants on the outskirts of Bayonne was begun in 1963. It is gradually being completed as planned without the budget induced delays which cause so many large scale town planning projects elsewhere to remain unfinished for years. As a Z.U.P. (Zone à Urbaniser Par Priorité) project, the French government gives it priority over all other kinds of housing and building projects. Legislation establishing the Z.U.P. program dates from 1952 and seeks to control urban sprawl by giving to municipal authorities powers of condemnation and traffic control, as well as financial support. In return, directors of the program require that urban expansion be organized in carefully selected well defined areas according to an established and tightly controlled program.

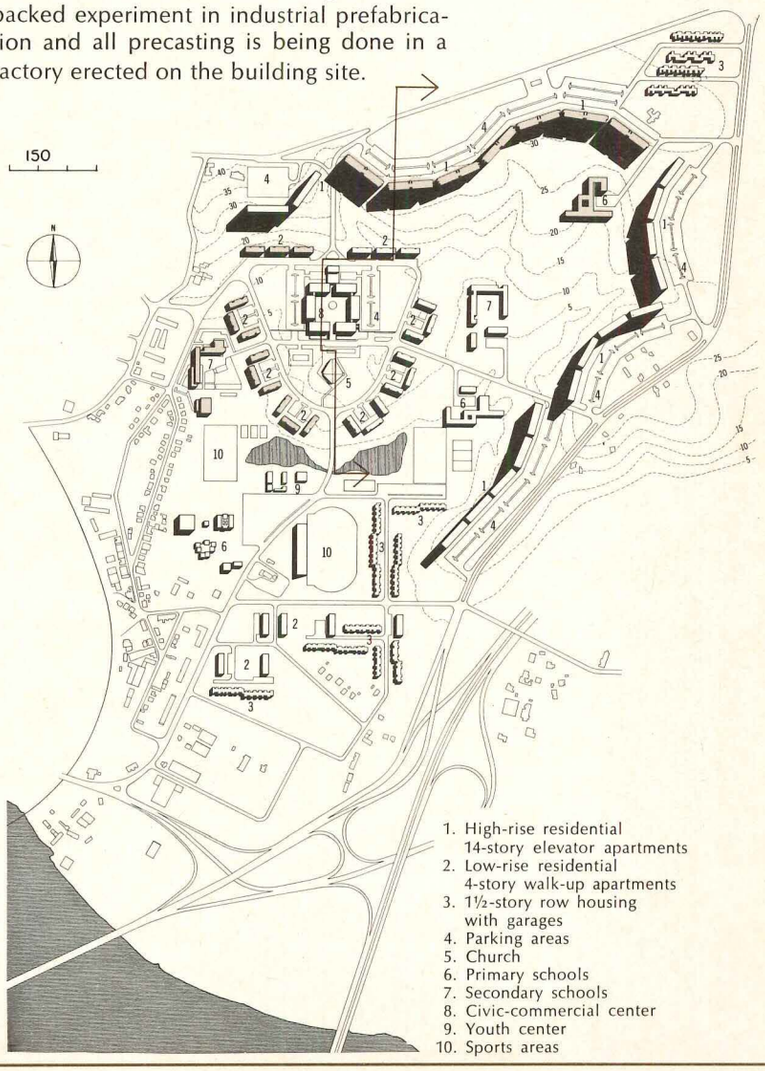
Marcel Breuer was recommended to the city of Bayonne as chief architect by B.E.R.U. (Le Bureau d'Etudes et de Réalisations Urbaines) an organization of economic planners which established the program for the Bayonne site. He is responsible for the master plan—including the planning of overland high-speed roads—as well as the design of all buildings. The entire project has been conceived as a government backed experiment in industrial prefabrication and all precasting is being done in a factory erected on the building site.



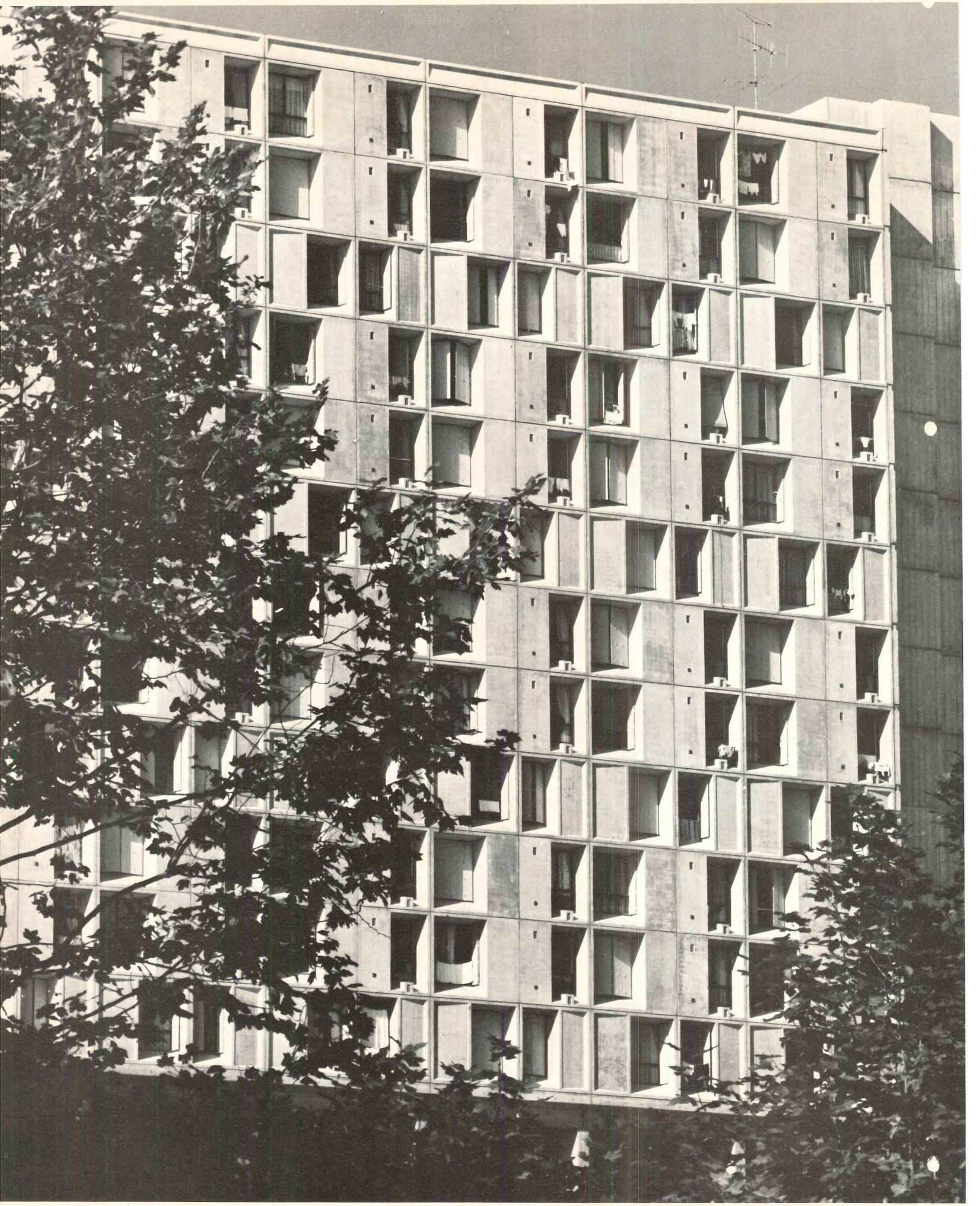
Yves Guillemaut photos



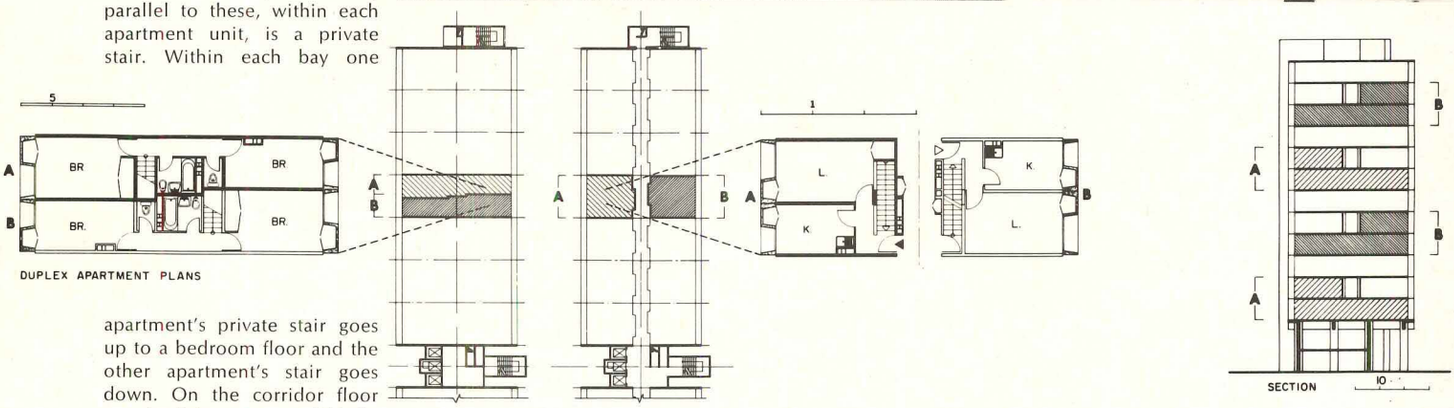
The site consists of beautifully wooded hillsides which slope to a southern view. A wooded mound near the center forms a secondary focus of attention. The buildings shown in brown have been completed. The fourteen-story apartment buildings have been placed on the perimeter along a curving line which follows the natural contours. When all the high-rise structures are complete they will house about 3,000 family units or 85 per cent of the population planned for the Z.U.P. At the center of the site are the four-story apartments. These in turn surround the core which will consist of public buildings—commercial, administrative and cultural. Shops and services which are required on a day-to-day basis will be located within the arcaded walks at the base of the high-rise apartments.



1. High-rise residential 14-story elevator apartments
2. Low-rise residential 4-story walk-up apartments
3. 1½-story row housing with garages
4. Parking areas
5. Church
6. Primary schools
7. Secondary schools
8. Civic-commercial center
9. Youth center
10. Sports areas



Because economy of planning was essential for this low income development, Breuer and his associates Robert F. Gatje and Guillermo Carreras developed ingenious methods for gaining the maximum utility from space, materials and mechanical equipment. The precast window walls are bearing. Floors, utility cores and elevator and stair towers are poured-in-place as are the end walls and the pilotis and beams which support the precast wall. Heating equipment is located within the ground floor entrance areas. The plans and section (below) and the exterior facade (left) bear careful study as they reveal an excellent skip-stop duplex apartment scheme. Above the arcades at their base (shown in the photo right) the buildings consist of four layers with three floors per layer. The first and third floors in each three floor layer contain floor-through bedroom and bathroom units, two per bay, which meet a French code regulation that apartments with more than one bedroom must have two exposures to provide cross ventilation. The middle floor is bisected by a corridor and is reached by elevators at one end and public stairs at opposite ends. Along the corridor walls are pipe chases for the bathrooms directly above and, parallel to these, within each apartment unit, is a private stair. Within each bay one

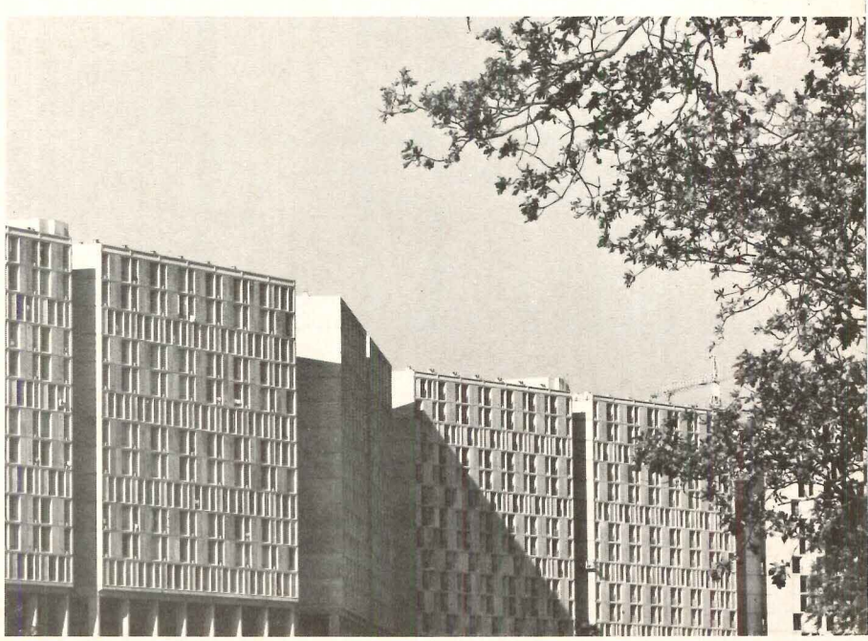


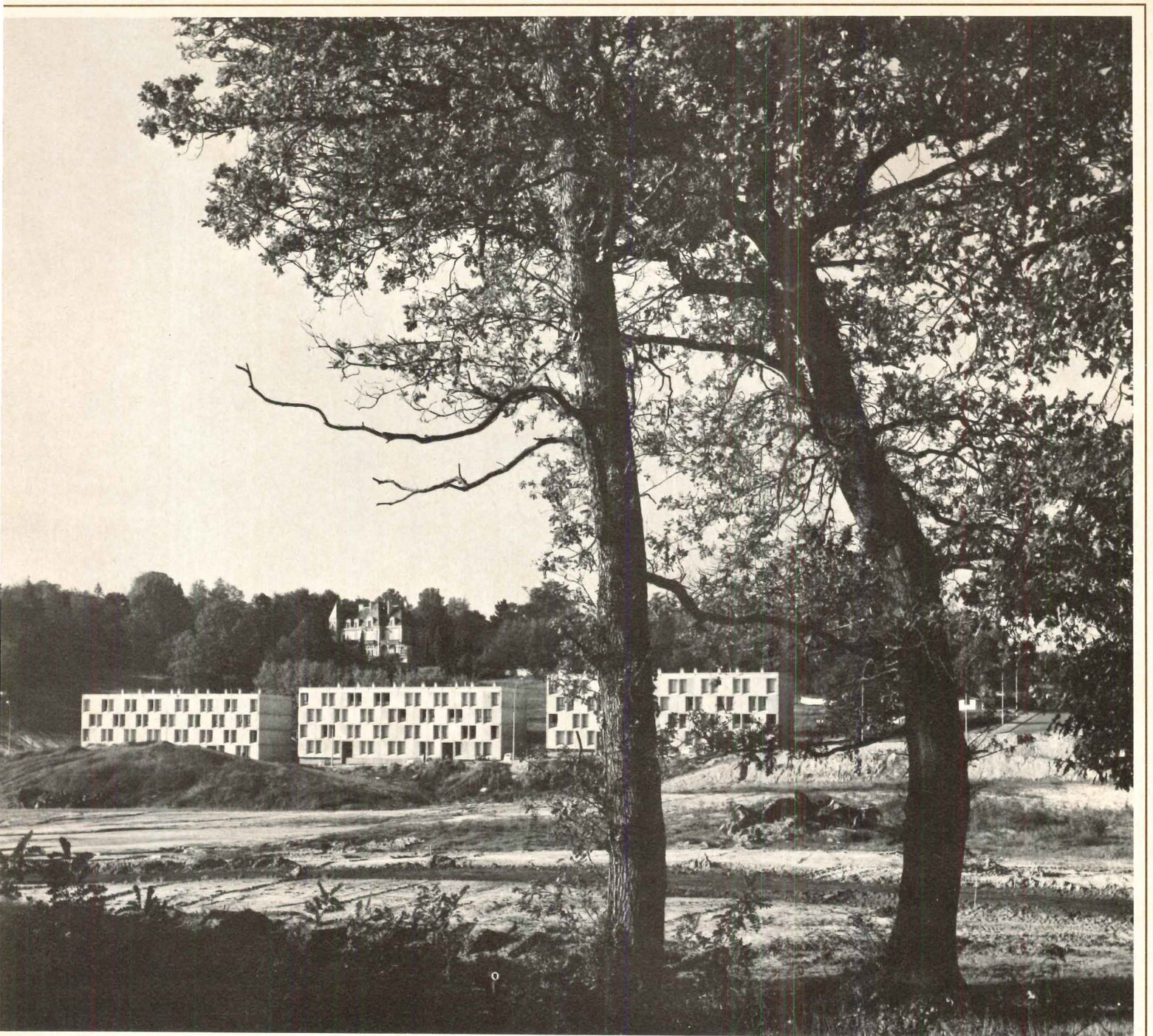
DUPLEX APARTMENT PLANS

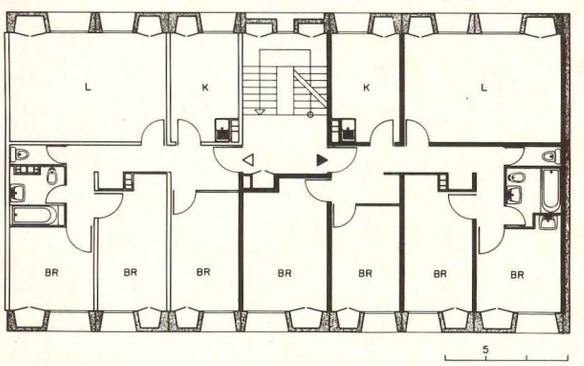
apartment's private stair goes up to a bedroom floor and the other apartment's stair goes down. On the corridor floor are the living room and kitchen-dining space for each apartment. In the overall scheme four corridors do the work of twelve and the circulation space saved becomes apartment space. Elevator costs are reduced because each makes one third as many stops. Bathroom equipment stacks back to back. Each precast exterior panel forms a deeply inset, and therefore sun-shaded, window and at the same time provides a closet which otherwise would have had to be separately fabricated.

This attention to utility, function and economy has produced a marvelous facade. As the plans show, within each bay, one bedroom is slightly wider than the one it adjoins and the living room is slightly wider than the kitchen. The difference is taken up in window widths. As the panels stack in accordance with the inner logic of the scheme a beautiful pattern emerges that is neither arbitrary, capricious nor design for design's sake. A unity has been achieved between art, function and technology—a rare achievement which Breuer attains more often than most architects.

The cost of these non-air conditioned high-rise apartments is less than $5 per square foot at 1966 prices. A direct comparison cannot be made with U.S. construction costs, however, since in France labor is cheaper, mechanical equipment and materials higher. A consistent materials vocabulary is being maintained throughout the housing. Precast window wall elements are smooth surfaced, poured-in-place end walls and stair and elevator towers are striated, and wall elements at the arcade level have rich texture.

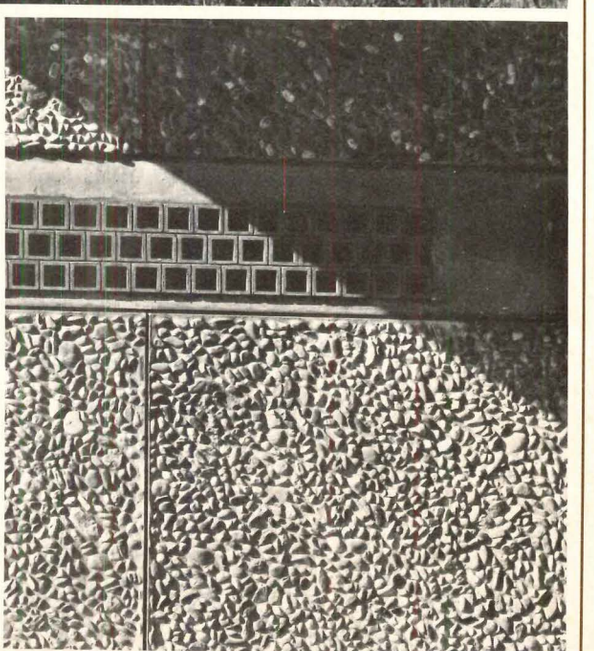






Low-rise units will be grouped to form small courtyards. They will also be lined up in groups of three. Alternating window patterns, staggered by floor, give the low-rise facades an architectural expression similar to the taller buildings. Typical four-story units are shown in the photograph (above), and in plan (left). These walk-ups consist of living room, kitchen-dining and three or four bedroom units. The textured surface (right) is a detail of the concrete panels at the base of the arcades in the high-rise elements.

Z.U.P. PROJECT, Bayonne, France. Architect: *Marcel Breuer, associates—Robert F. Gatje and Guillermo Carreras;* collaborating architects: *Eric Cercler, Bernard Darroquy and Andre Laurenti;* economic planners; *B.E.R.U.* (Bureau d'Etudes et de Realisations Urbaines.)



George Cserna photos

Banco do Brasil:
secluded prestige for a semi-private bank

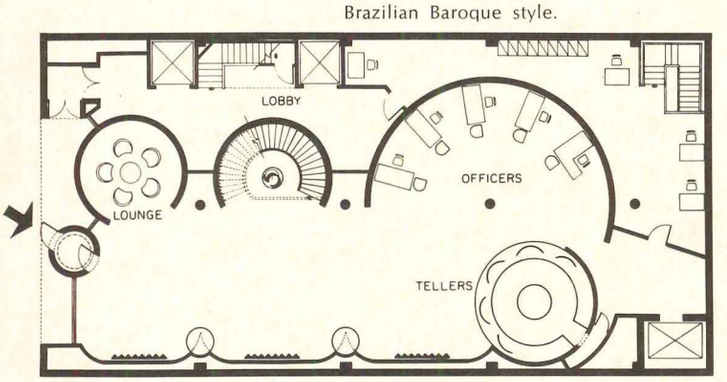
The interior designs by architect Paul Damaz and his firm reveal a strong concern for the total needs of the client, psychological as well as functional, and an unusual affinity for the allied arts.

This recently completed New York branch of the Banco do Brasil is its first in the Northern Hemisphere and represents a rather special program. The bank is a semi-private one, and the largest in Latin America—with 700 branches in Brazil alone. The New York branch has no savings department and only a limited number of private accounts. Thus there is little activity in the public banking area, and most of the business consists of large-scale financial transactions. The restrained but vital elegance of the main banking floor provides a highly suitable ambience for these functions, and is aptly dominated, not by tellers' booths, but by a spiraling staircase to the executive offices above. The curves of the interior are repeated on the fairly closed facade—whose construction fence carried Barbara Stauffacher's striking design at right.

BANCO DO BRASIL, New York City. Architects: *Damaz & Weigel—Eugene M. Hetman, associate-in-charge;* engineers: *Harold Hecht Associates (mechanical and electrical); Felcher-Atlas Associates (structural);* lighting consultant (bank floor): *Howard Brandston;* contractor: *George A. Murray Co.*

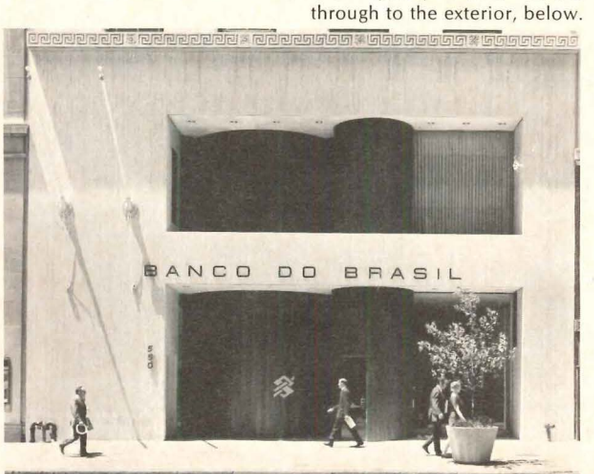
The tellers' booth and main banking area (below and right) are serene, spacious and elegant, but are placed at the far end of the floor to emphasize bank's special function.

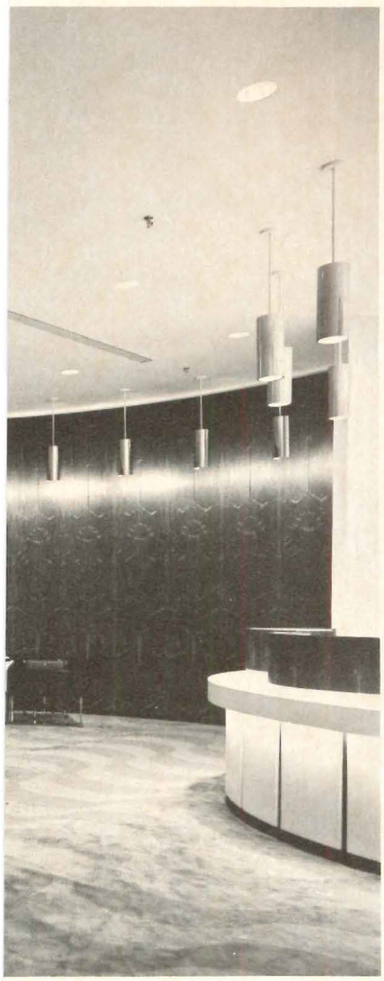
The building the bank occupies has a floor area of 50 by 100 feet, with a center row of round steel columns and a narrow side lobby. A curved wall motif, faced with Brazilian rosewood, effectively uses the space between columns, and not incidentally recalls the Brazilian Baroque style.

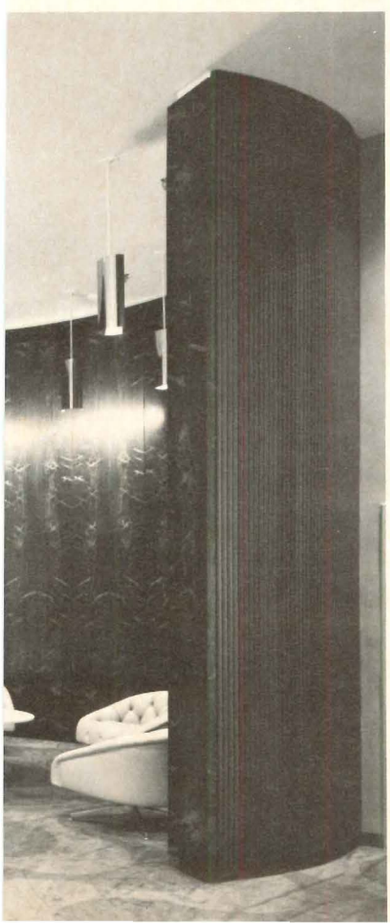


BANKING FLOOR

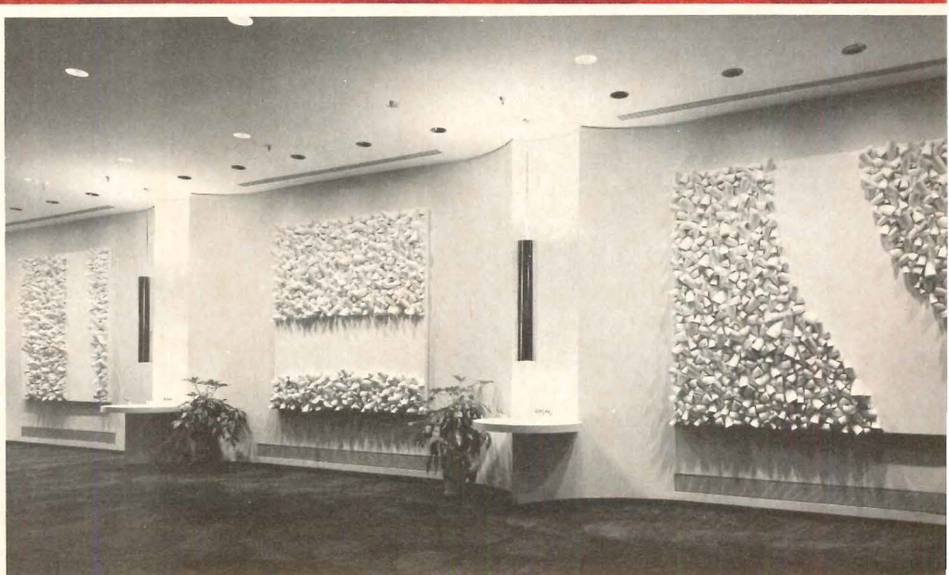
The interior design incorporates many pieces of sculpture, and itself has a strong sculptural quality which carries through to the exterior, below.



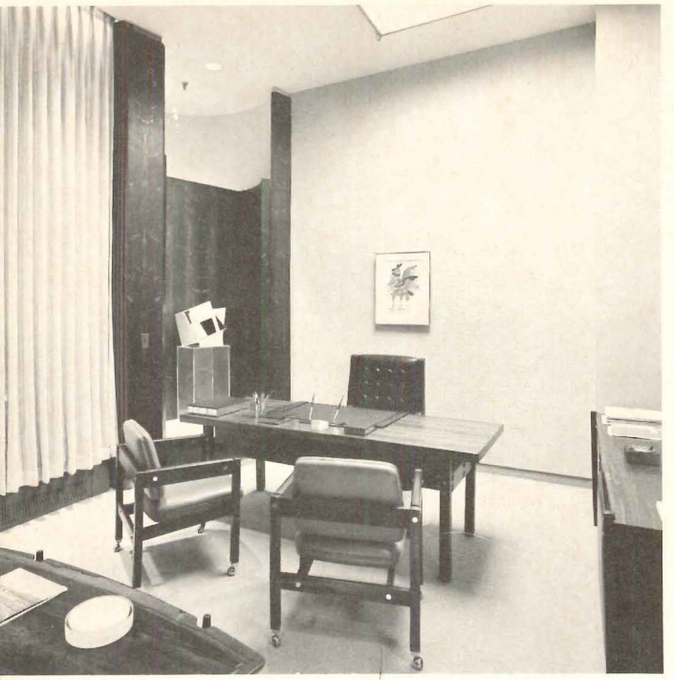




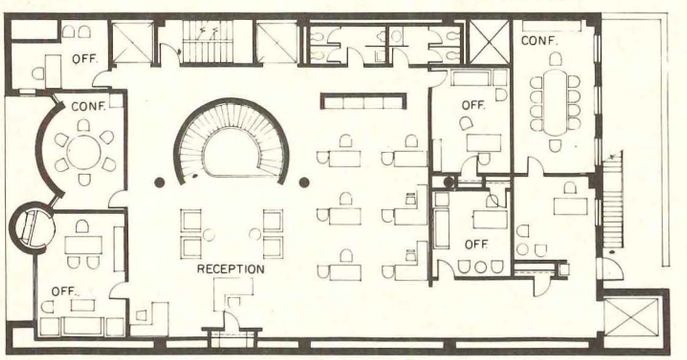
The dominant circular stair winds around a bronze sculpture by Alicia Penalba. On the opposite wall (right) are three wood reliefs by Sergio Camargo which are made of small cylindrical elements recalling the large architectural ones; note that even the lighting fixtures carry out the overall cylindrical theme. The specially woven Wilton carpet adapts a traditional Brazilian paving design.



In contrast with today's typical "open front" bank, the Banco do Brasil has little glass for greater intimacy and privacy; even this is curtained in manager's office (below).

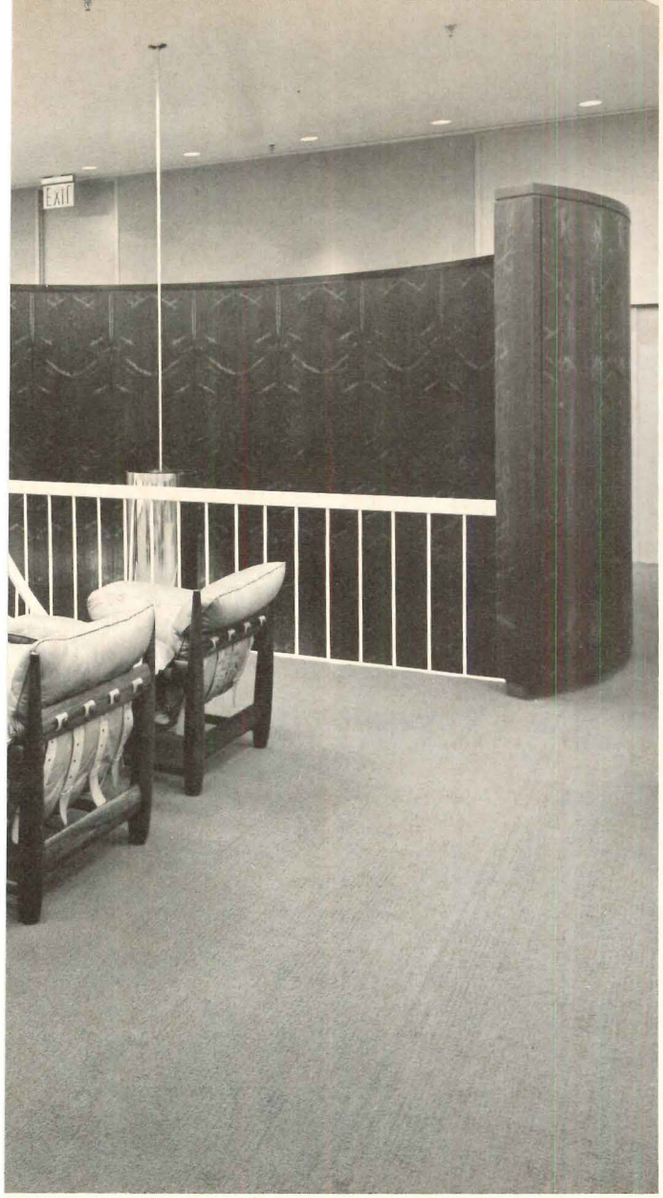


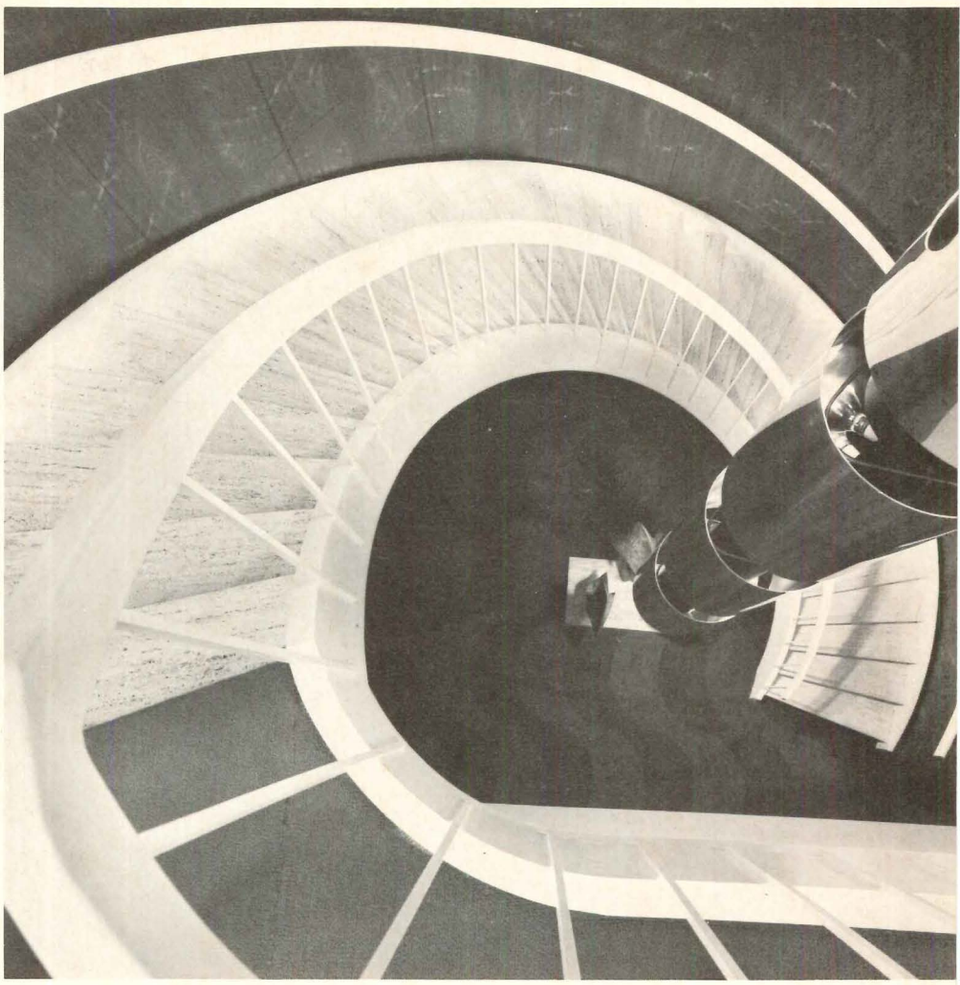
The second-level executives' floor contrasts a bit with the great elegance of the main level to create a more relaxed, almost club-like atmosphere. A large portion of the comfortable furniture used on this floor was designed and manufactured in Brazil of solid Jacaranda wood—the same rosewood as the curving walls. Colors are same as main floor.



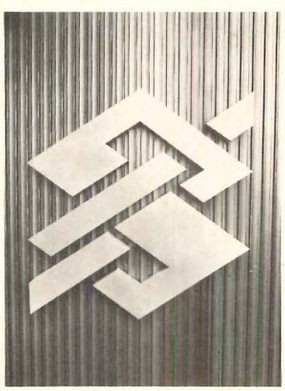
SECOND FLOOR

The facade frames curved forms of dark brown hard anodic aluminum with beige travertine; the sculptural effect is especially pronounced at night.



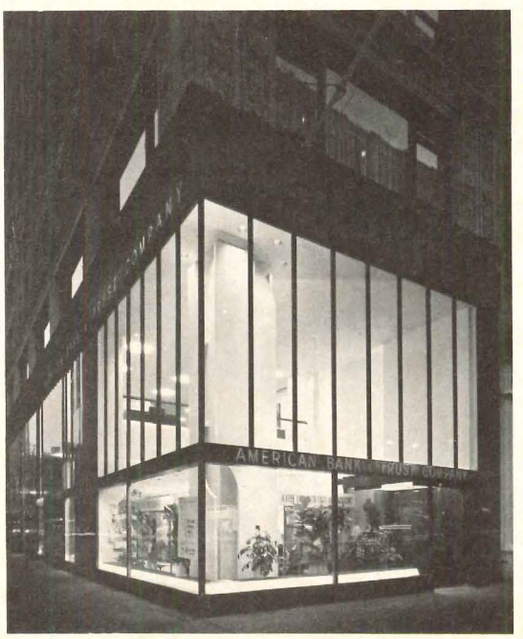


The basement of the bank has been developed with sprightly facilities for the employes, as well as for filing and storage. The main employes' lounge (left) which contains a small kitchenette, plays off bright, prime colors against a black and white enlargement of an old engraving. The graphics, including the bank's symbol (below), were all designed by the architects.



George Cserna photos

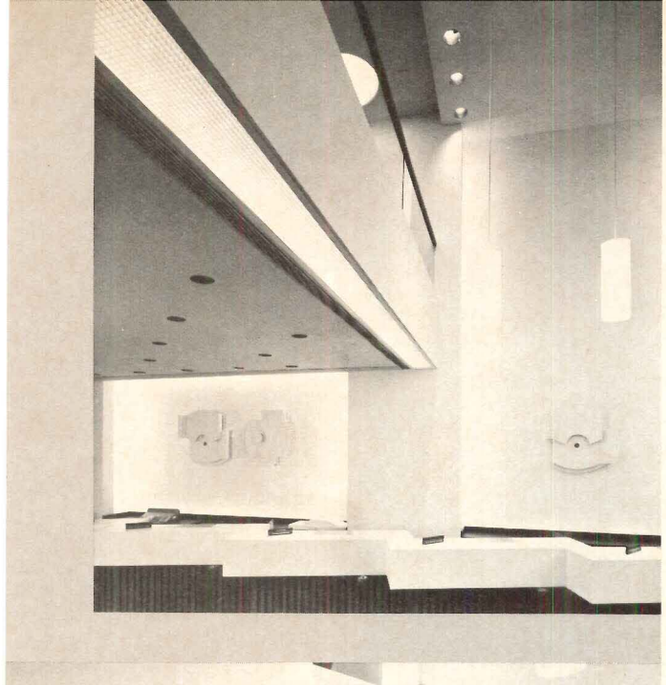
American Bank and Trust Company:
efficient sophistication for a public bank

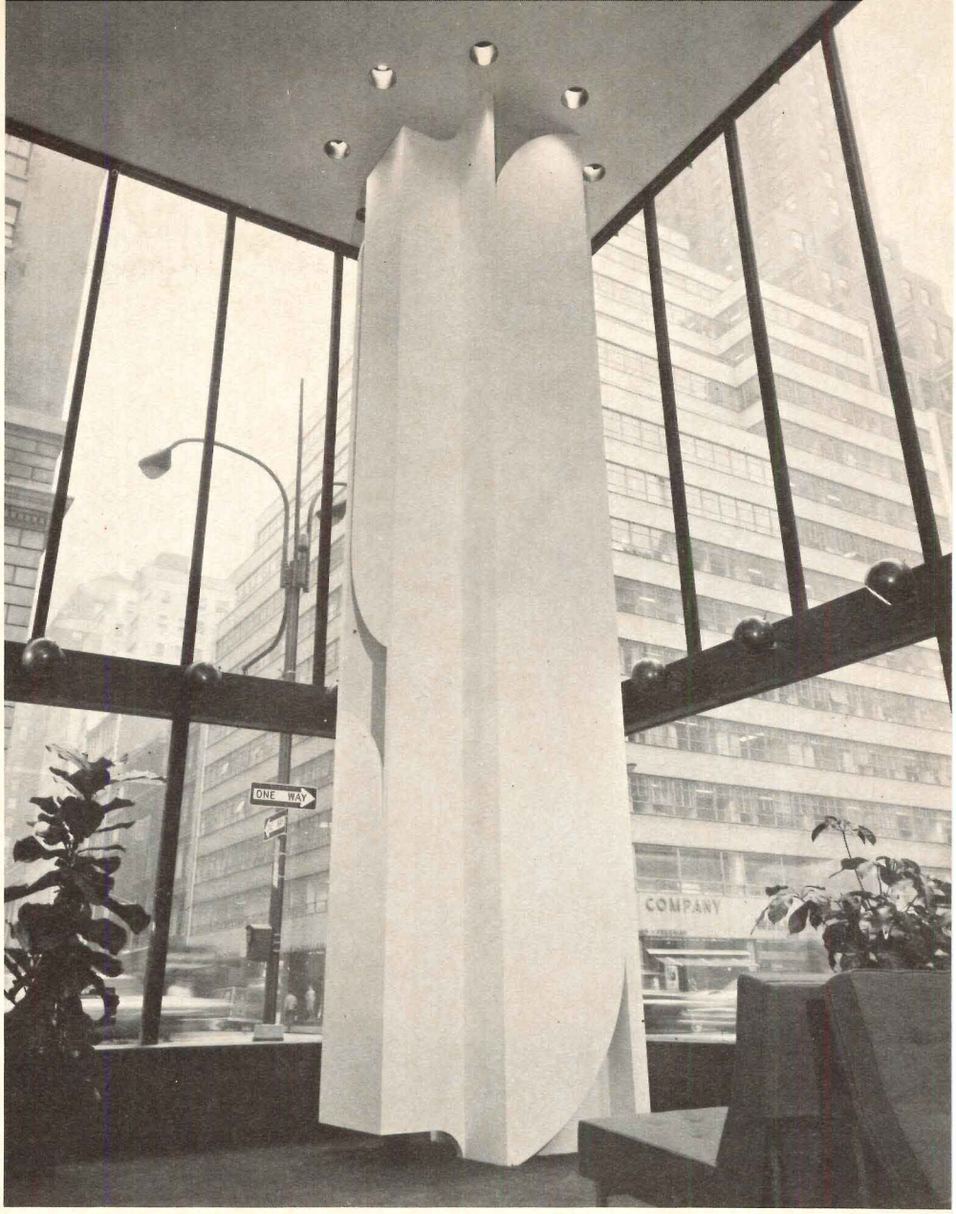


A number of ingenious devices were used to gain maximum efficiency and a sense of spaciousness in this busy bank. Transformed from a long, narrow, L-shaped space in an old building, the remodeled interiors now form a showcase of pleasing proportions and sophisticated details.

The main banking floor was provided with a maximum number of tellers' counters, and a maximum line-up space for the customers by the use of a sawtooth design; diagonal striped carpeting serves as a guide for the formation of the lines. The scheme also offered two additional advantages: it offered greater privacy as each customer reached the head of the line, and it helped greatly to visually foreshorten the long space. A two-story, all-glass facade (set in a frame of copper, bronze and red granite) also optically changes the space, as does a curved screen at the back to separate the officers' platform from the banking floor. The mezzanine floor was cut back at the entrance to give a tall vertical space and reduce the low ceiling length.

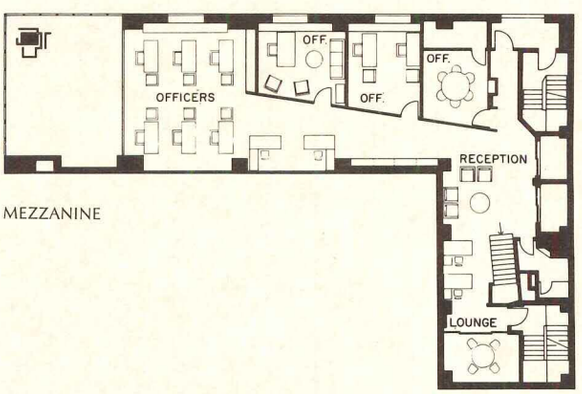
AMERICAN BANK AND TRUST COMPANY, New York City. Architects: *Damaz & Weigel—Eugene M. Hetman, associate-in-charge;* engineers: *Harold Hecht Associates (mechanical and electrical); J. Hufnagle (structural);* contractor: *Koren-DiResta Construction Company.*



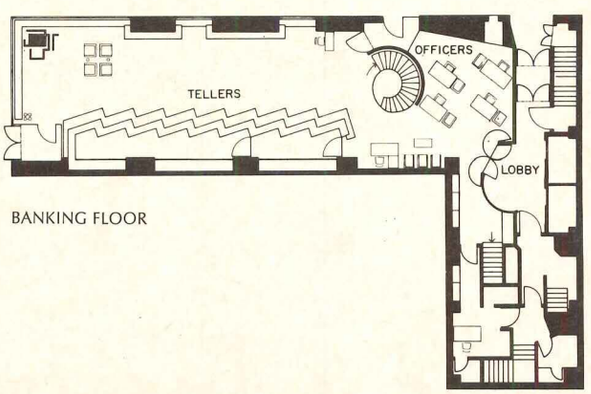


An inner stair, separate from those of the building, leads from the main-level officers' platform up to the mezzanine reception area. This space was also positioned for convenient service by the building's elevators. This level includes an officers' platform overlooking the main banking floor and three executives' offices. A walnut-covered wall screening the private offices was designed on the bias to avoid creating a corridor.

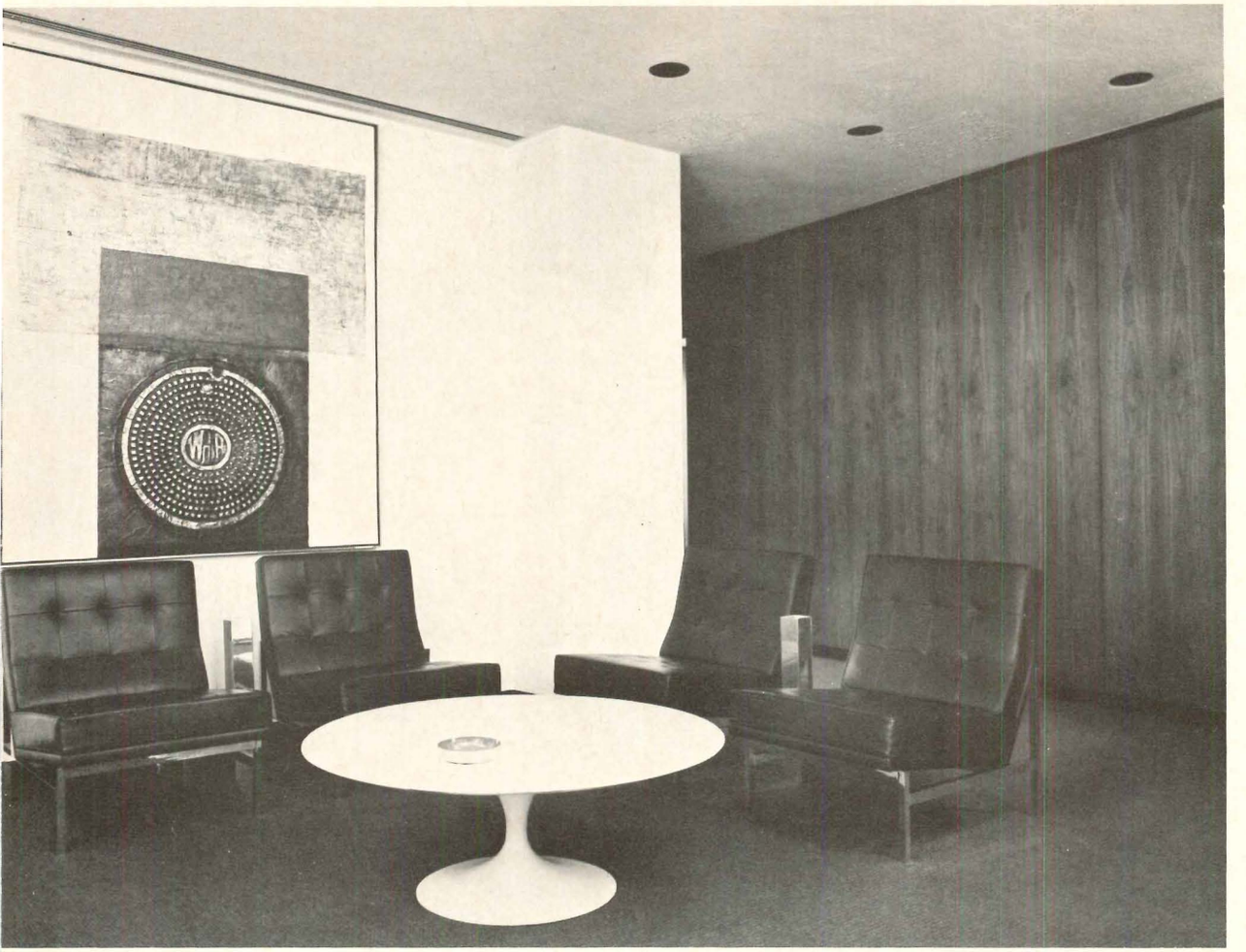
Collaboration between the architect and sculptor Eduardo Ramirez from the beginning of the project resulted in some very enjoyable adaptations of the existing structure. An unsightly column located at the corner of the building was transformed into a 22-foot monumental sculpture well integrated in the overall design (above right). Piers on the inner wall of the building were used to create niches for six companion bas-reliefs.



MEZZANINE



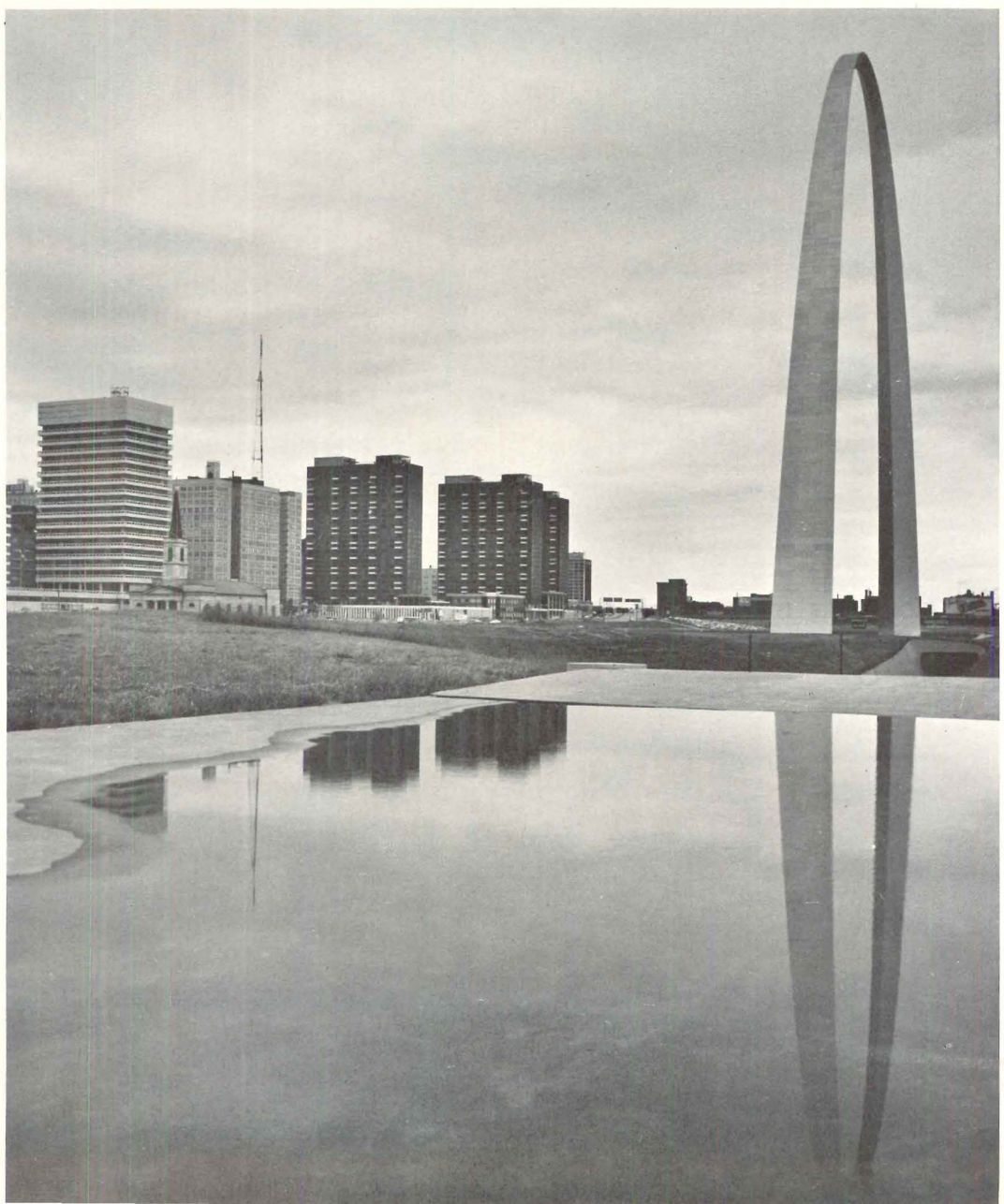
BANKING FLOOR



Paintings play a major role in the design of the interiors of the reception lounge on the mezzanine (photo at top) and in the special gallery created on the basement level for changing exhibitions of art. A circular staircase, set against a curved wall of oriental wood, leads customers from the main level, and across the gallery to the safety deposit area. The photo above shows the bank's employe lounge.

THREE NEW OFFICE STRUCTURES BY HOK

In these recent examples of a building type too often reduced to stereotype, Hellmuth, Obata and Kassabaum, with Gyo Obata as principal-in-charge of design, avoid both cliches and pyrotechnics, drawing on a design vocabulary at once straightforward and versatile. Each of the three buildings satisfies a common demand for efficiency and flexibility in interior spatial arrangement, yet each responds as well to the particularities of its program and setting.



Julius Shulman

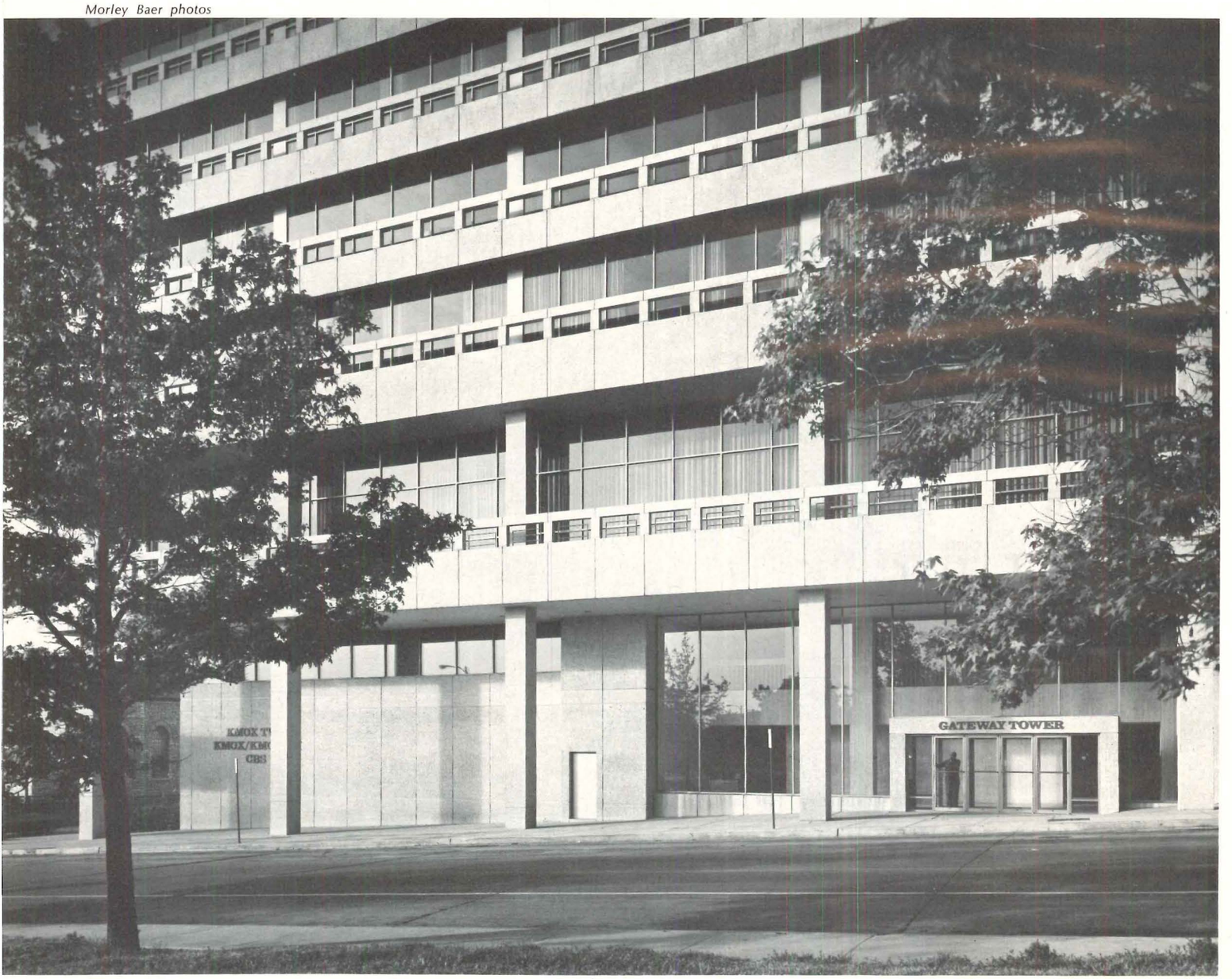
In St. Louis, a crisply elegant tower gracefully exploits its prominent downtown site

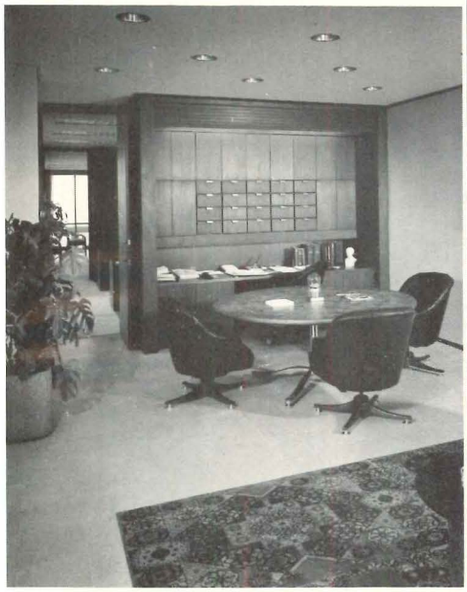
Gateway Tower occupies a choice location in St. Louis' downtown redevelopment area, overlooking Gateway Arch and the river—a situation the developer sought to enhance through design of a quality calculated to lure top tenants.

The building is composed of a block-long three-story wing devoted to radio and television studios and related offices for CBS, the principal tenant, and at one end a nineteen-story office tower designed to take full advantage of the sweeping views via glass walls and cantilevered balconies on three sides.

CBS-GATEWAY TOWER, St. Louis, Missouri. Architects: *Hellmuth, Obata and Kassabaum, Inc.—Gyo Obata, principal-in-charge of design; Herbert J. Koopman, project architect; Terry F. Cashen, project designer; Michael D. Tatum, Michael L. Willis and Kenneth H. Hanser, interior design group;* structural engineers: *The Engineers Collaborative;* mechanical engineers: *William Tao & Associates;* acoustical engineers: *Paul S. Veneklasen & Associates.*

Morley Baer photos



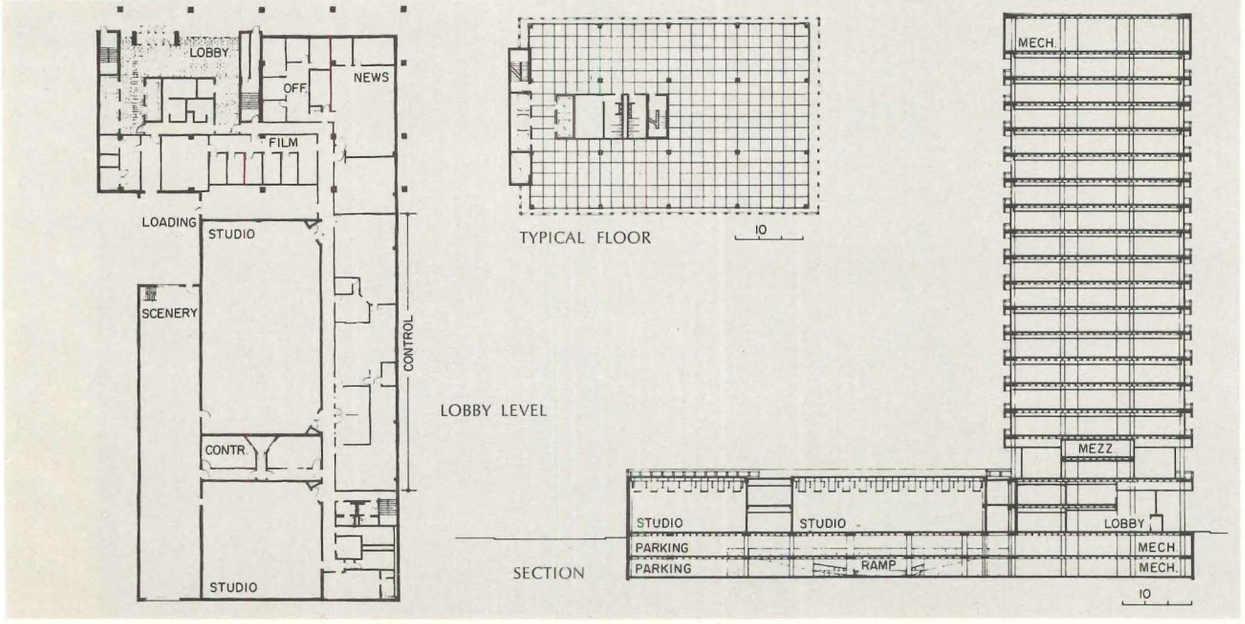


Eugene H. Fleming III

In the studio wing, offices are ranged along the street side of the building to afford them an outside view and to buffer the studios from traffic noise. Two levels of underground parking are provided below.

In the tower, vertical circulation, and mechanical and service space are concentrated along the western elevation and in a compact central core, leaving the bulk of each floor free for interior space arrangement according to the needs of individual tenants. In a typical office suite (above) designed by HOK, areas not requiring outside exposure are grouped on the interior, and offices paired at the perimeter with each pair sharing a secretarial area, so that all occupied spaces are open to light and view.

Both building elements are of reinforced concrete, sandblasted to expose the beige aggregate.



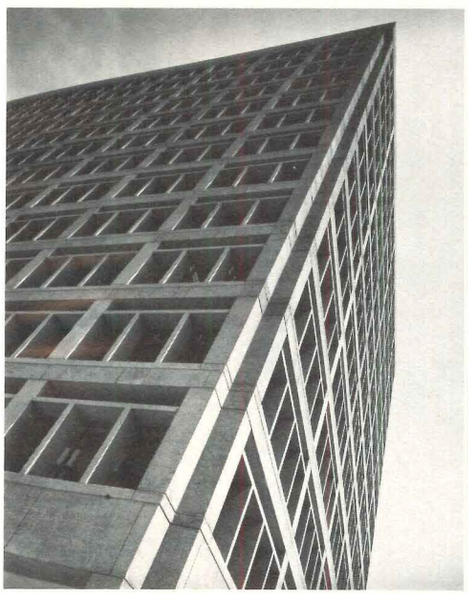
In Denver, a ruggedly handsome structure adds distinction to a Federal office complex

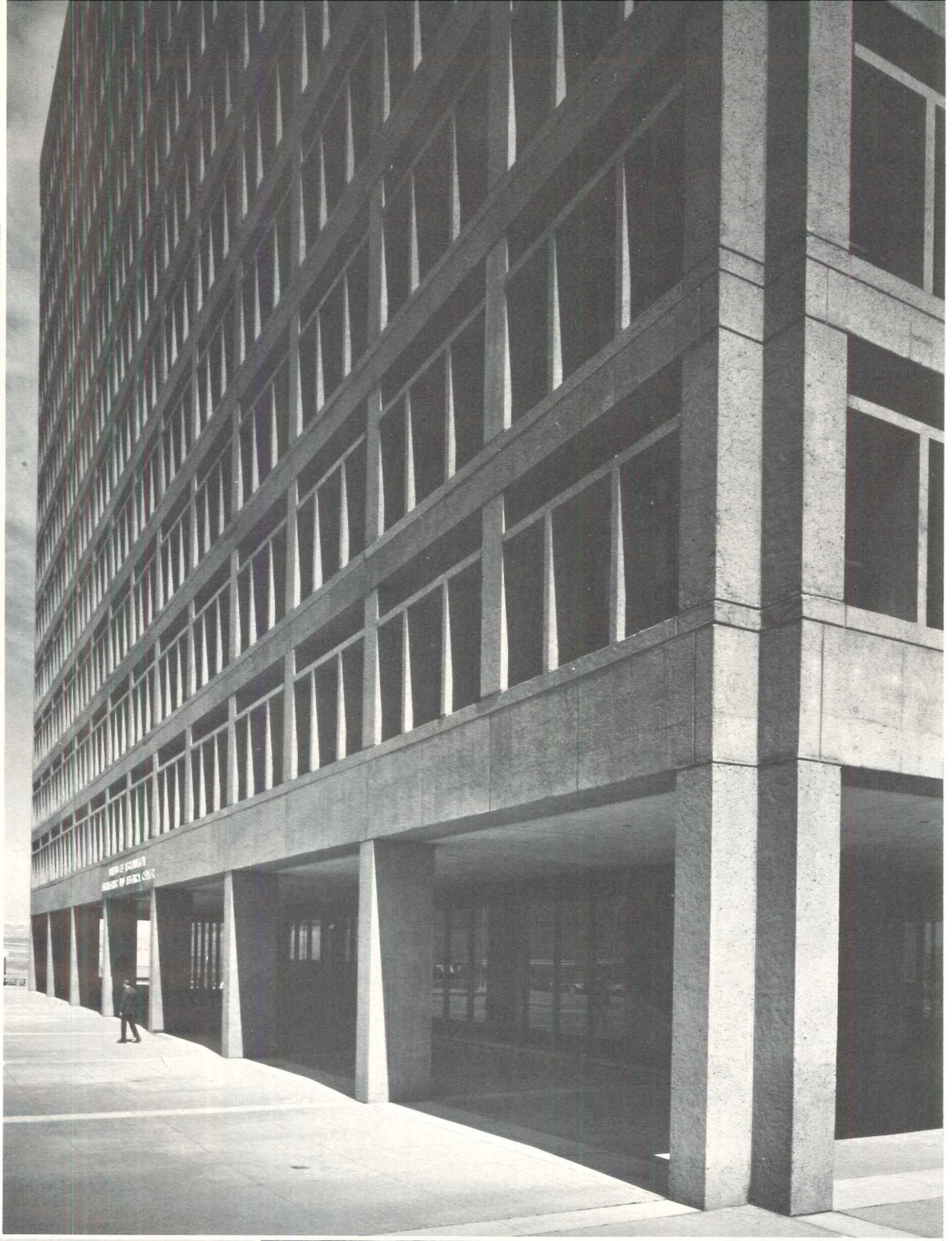
The powerfully rendered headquarters for the Bureau of Reclamation, at fourteen stories the tallest structure in Denver's growing Federal Center, consists of a twelve-story office block rising from a plaza which roofs ancillary facilities grouped on the ground floor.

Designed on an extremely tight schedule, (five months from contract to bid documents) the building nevertheless came in substantially below estimate, thanks in large part to the clearly detailed structural system which also imparts to the building its interior flexibility and the strong textural quality of its facade.

BUREAU OF RECLAMATION ENGINEERING & RESEARCH CENTER, Denver, Colorado. Architects: *Hellmuth, Obata and Kassabaum, Inc.—Gyo Obata, principal-in-charge of design; Rolf Muenter, project manager; Chih-Chen Jen and Robert E. Edmonds, project designers;* associate architects: *Scott Associates;* structural engineers: *Ketchum, Konkel, Ryan & Fleming;* mechanical engineer: *Harold P. Brehm.*

Julius Shulman photos

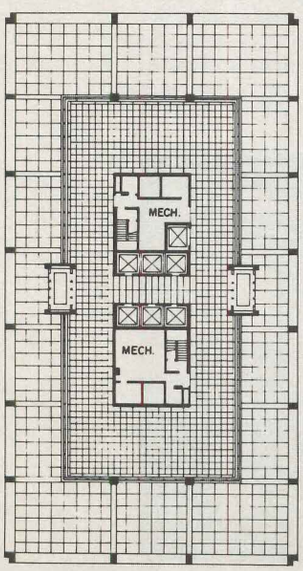




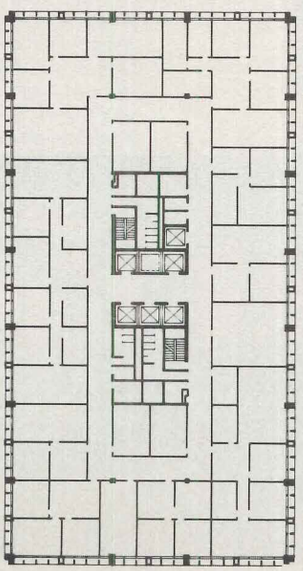
Because sun glare at Denver's high altitude is unusually intense, windows were recessed three feet and shielded by precast concrete sunscreens which produce a rich rhythmic pattern on the building exterior. On the interior, the prestressed concrete structure provides 40-foot clear spans on either side of the 30-foot-wide central core, assuring flexibility of space configuration on the office floors. The coffered slab, exposed throughout the tower portion of the building, forms finished ceiling and housing for lighting fixtures.

In addition to offices for executive staff, and the research and engineering departments, the tower houses a library and computer center. The ground floor houses the employe cafeteria, reproduction facilities (including darkrooms and print rooms), and mechanical equipment.

LOBBY LEVEL



TYPICAL FLOOR

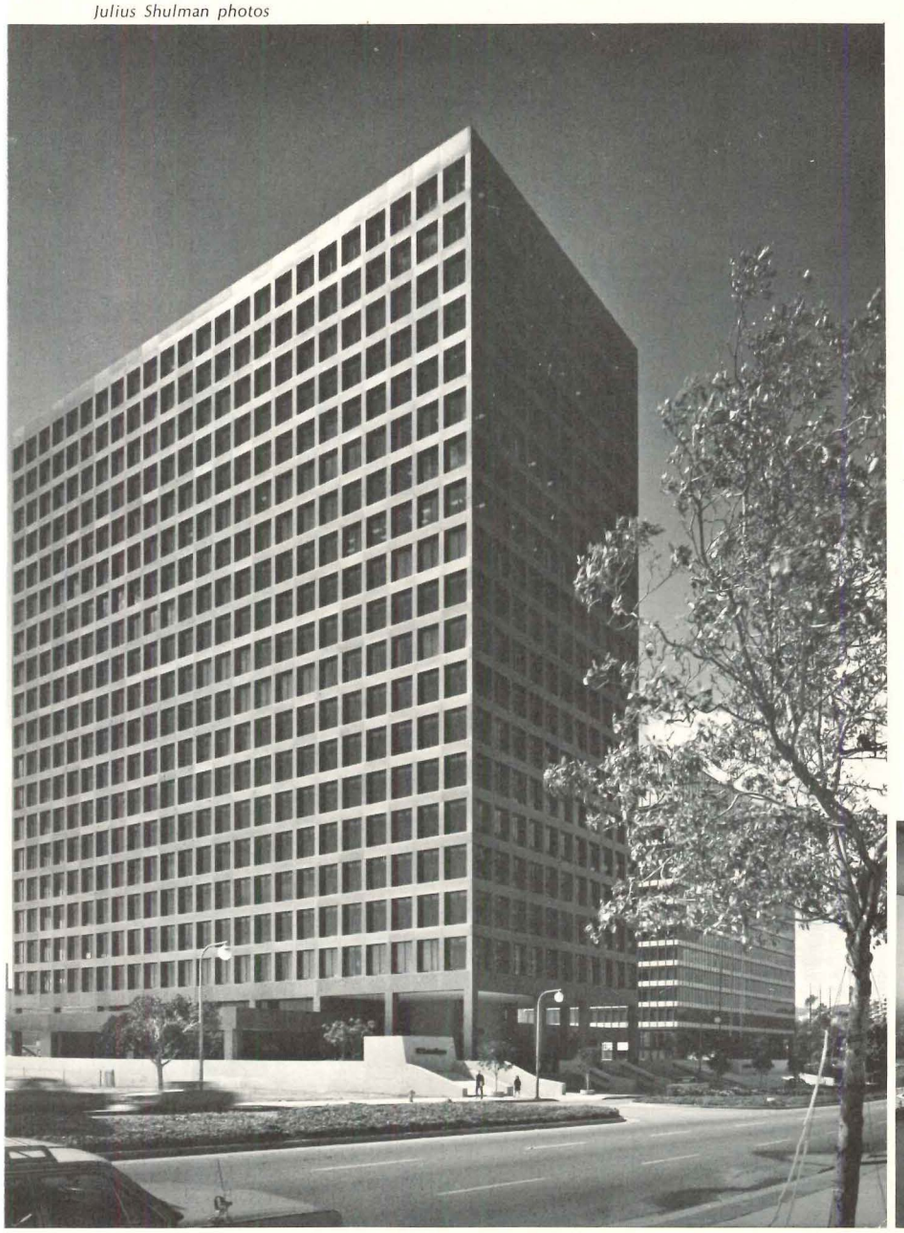


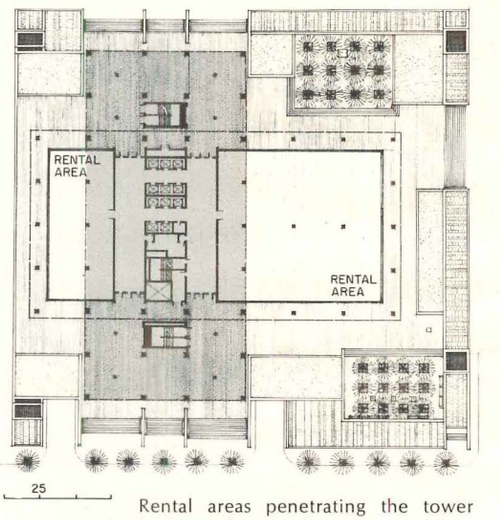
In Los Angeles, refined detail and bold pattern enliven an understated office block

A new addition to the Aluminum Company of America's distinguished Century City development, which also includes a major hotel, apartments, and several other office buildings, this sleek 20-story tower provides quarters for corporate offices and professional firms with varying requirements as to size and configuration of space. To accommodate this multi-tenant occupancy, the 100-by-240-foot tower floors consist of wholly unobstructed space distributed about a central service-circulation core, achieving an efficiency ratio of 82 per cent.

AVENUE OF THE STARS OFFICE BUILDING, Century City, Los Angeles, California. Architects: *Hellmuth, Obata and Kassabaum, Inc.—Gyo Obata, principal-in-charge of design; King Graf, project manager; Jerome J. Sincoff, project architect; James R. Henrekin, project designer;* associate architects: *Charles Luckman Associates;* structural engineers: *The Engineers Collaborative, S. B. Barnes & Associates;* mechanical engineers: *Ayres & Hayakawa;* electrical engineer: *Michael J. Garris.*

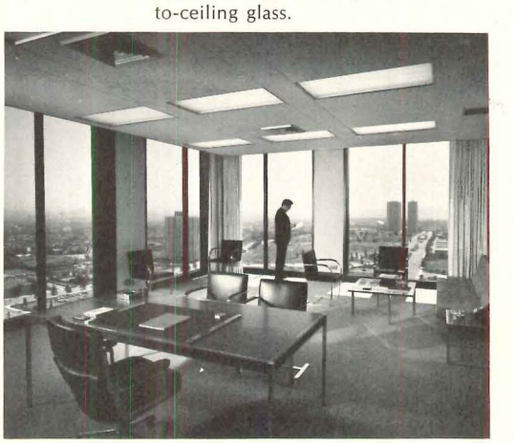
Julius Shulman photos

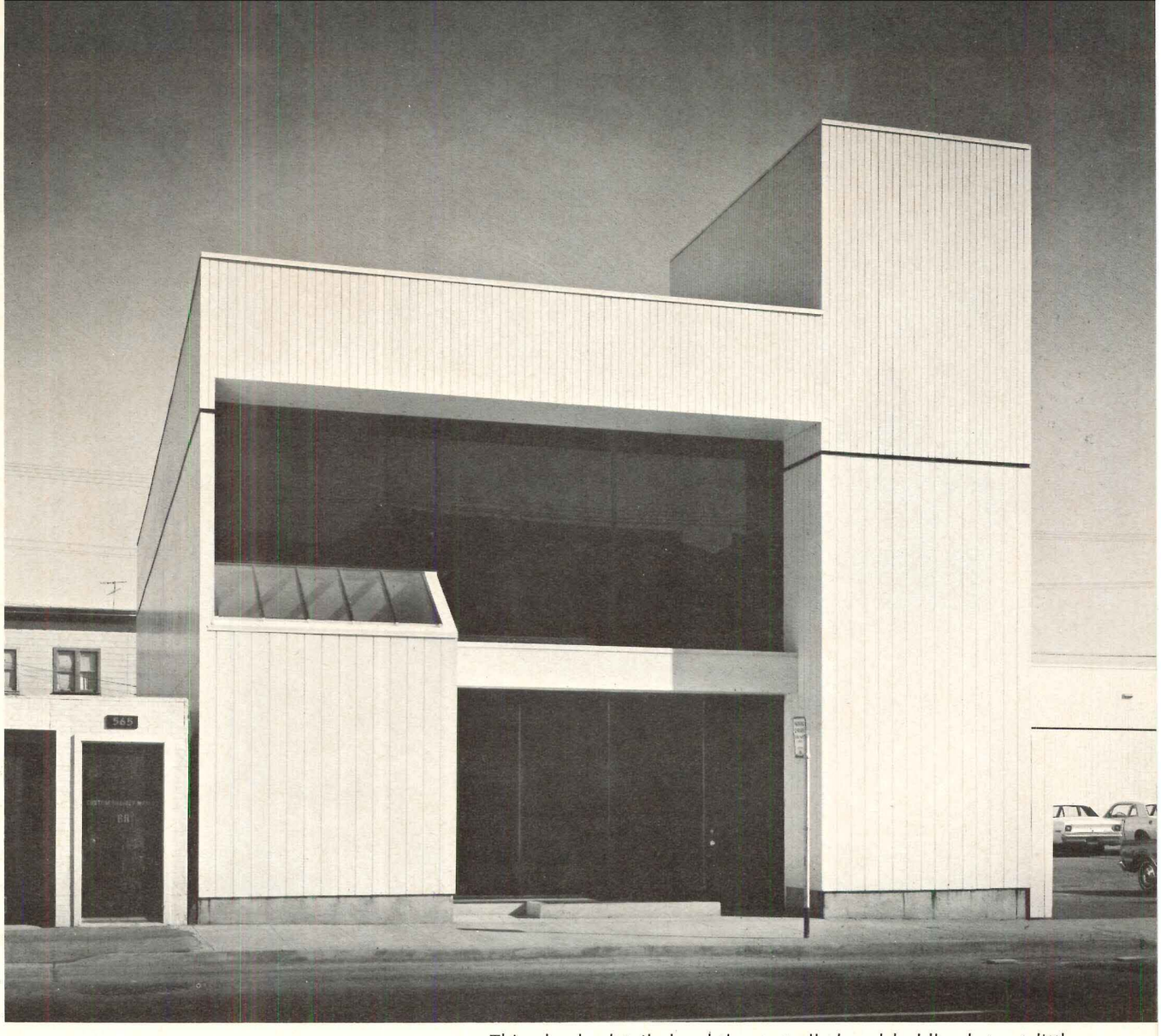




Rental areas penetrating the tower lobby at plaza level are occupied by a branch bank and an investment brokerage house, while a four-level garage below grade provides tenants off-street parking space.

The steel frame structure is sheathed in a bronze hard anodic aluminum skin which is made of flat and bent sheet and extruded sections in sizes as large as 5 by 10 feet, and punctuated by bold squares of floor-to-ceiling glass.



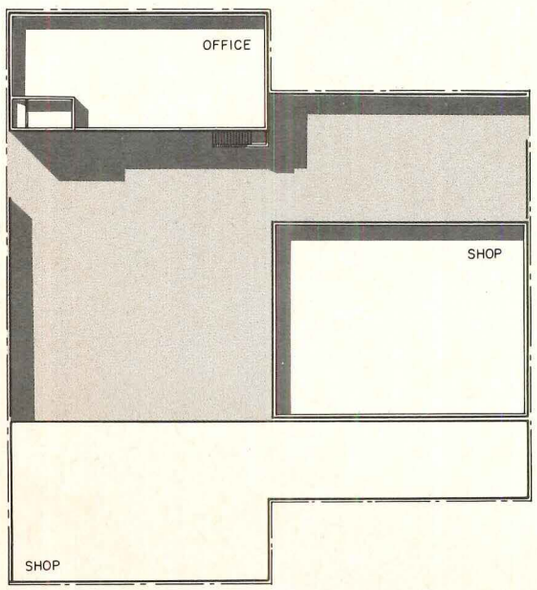


Morley Baer photos

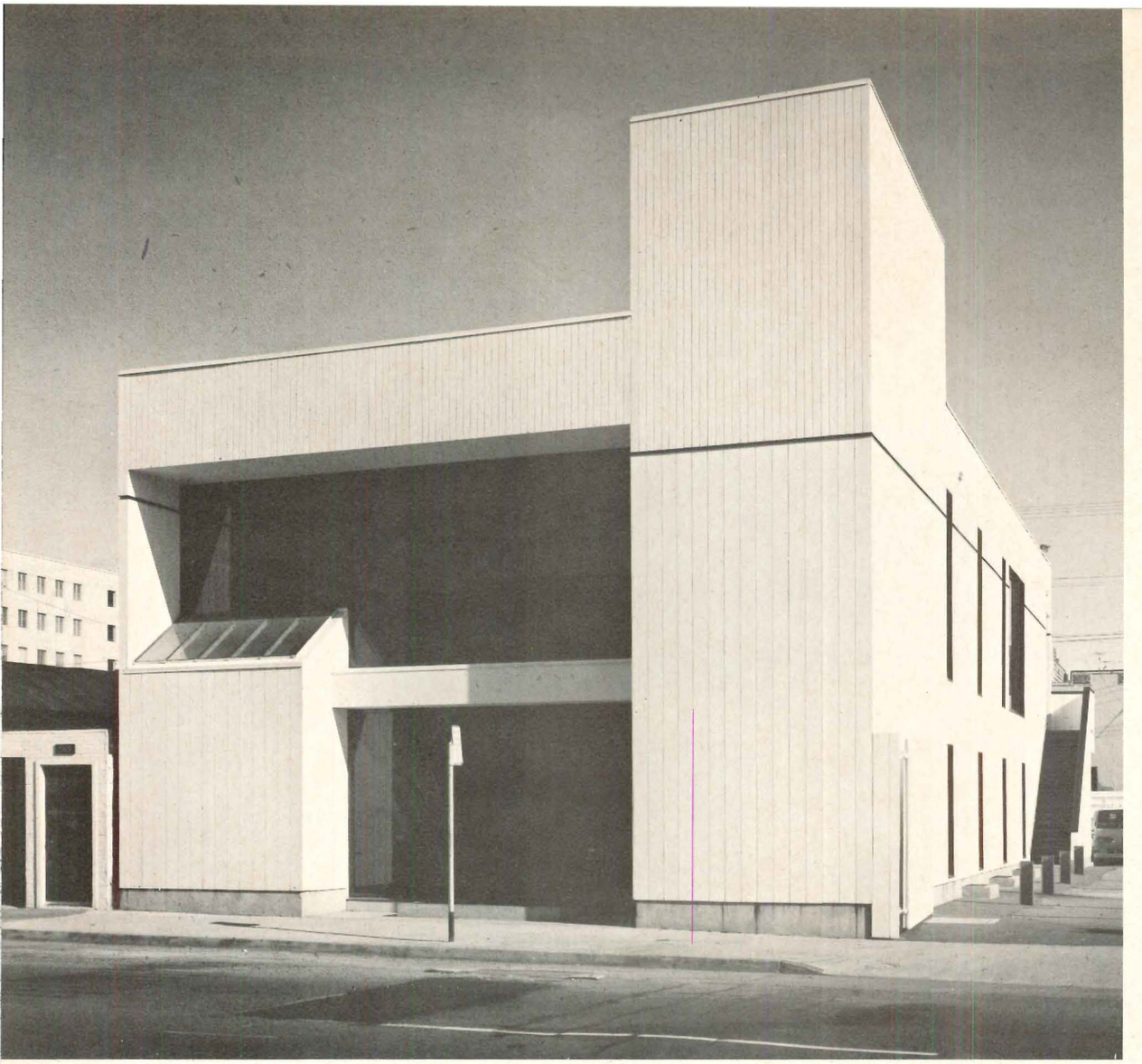
A SERVICE CENTER FOR LAUNDRY MACHINES

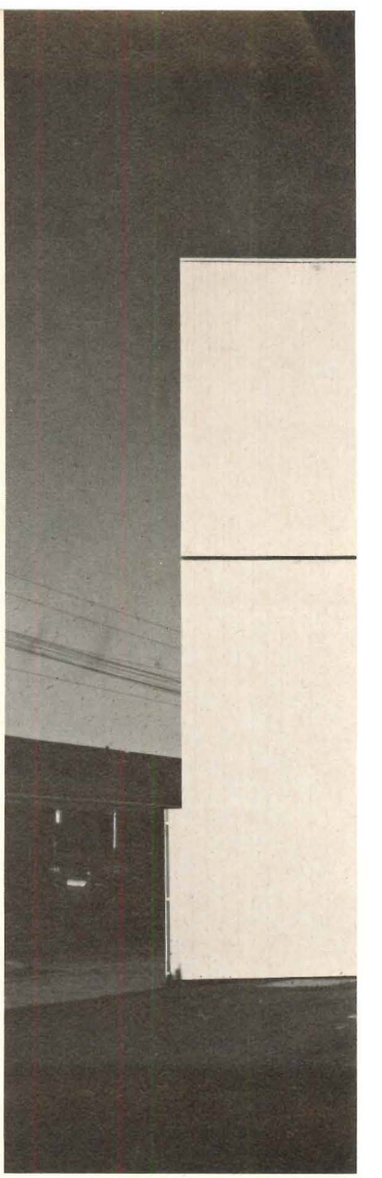
This clearly detailed, subtly controlled and boldly abstract little building is located in a San Francisco "gray" area. One of two adjacent white wood structures, it serves as the main office for an organization which services and distributes coin-operated laundry machines. The other structure, shown in the site plan at left is an addition to the already existing servicing shop. The architect of these sophisticated buildings is Howard Elkus, an associate at The Architects Collaborative in Cambridge, Massachusetts, and the client-owner is his father, the company president.

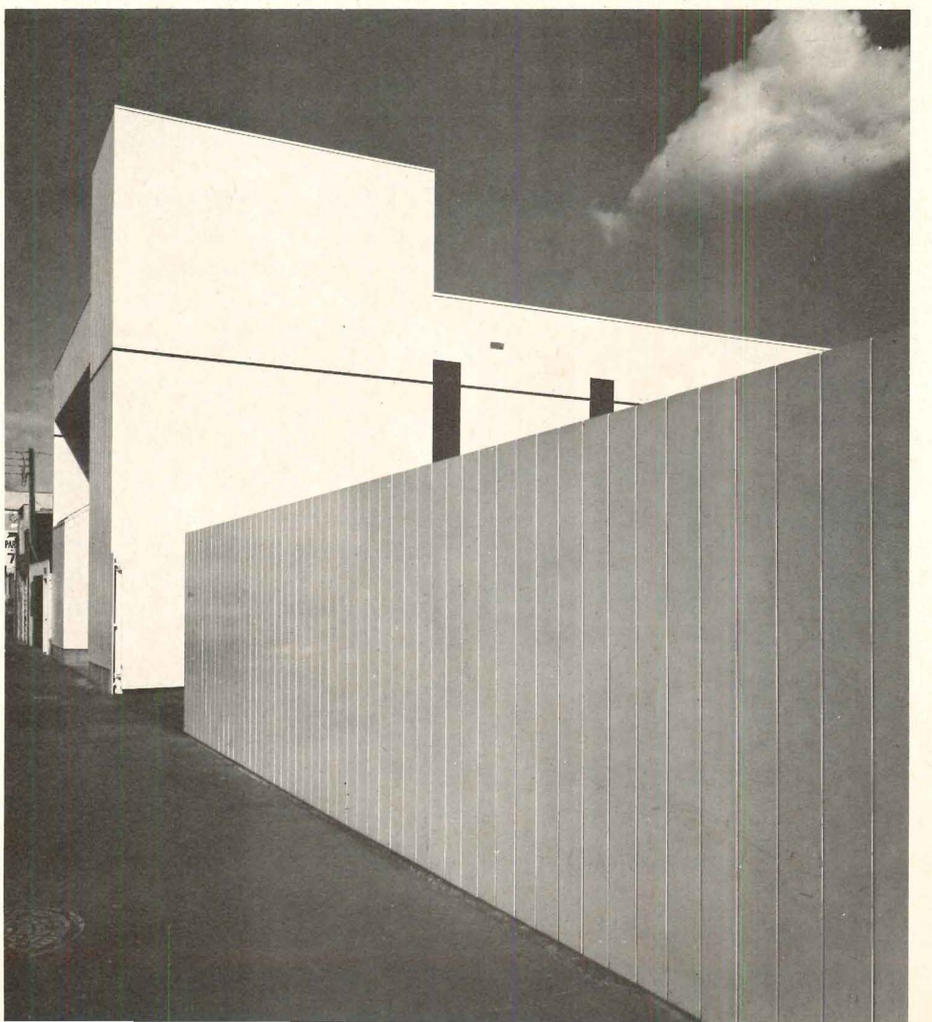
For all their elegance, the two new structures may be temporary. Located near a freeway off-ramp in downtown San Francisco, the area is becoming a regional nerve center and is adjacent to several redevelopment blocks. The possibility, therefore, of eventual reuse of the site dictated economy in the design and construction of the new facility. A successful effort was made, however, to create a building, which, though possibly impermanent, would add substance, dignity and new life to its neighborhood.



SERVICE DISTRIBUTORS, INC. OFFICE AND SHOP BUILDINGS, San Francisco, California. Owner: *Welkin Properties;* architect: *Howard F. Elkus—assisted by Juan Rodriguez-Masjoan, Frank L. Brookshire and Qazi B. Ahmed;* construction supervision: *Rod Freebairn-Smith;* structural engineers: *T. Y. Lin, Kulka, Yang & Associate;* mechanical engineers: *Fitzmeyer & Tocci;* electrical engineers: *Norman Associates;* landscape architect: *Richard A. Gardiner;* collaborating artists: *Harris Barron and Ros Barron;* contractor: *Rothschild & Raffin.*

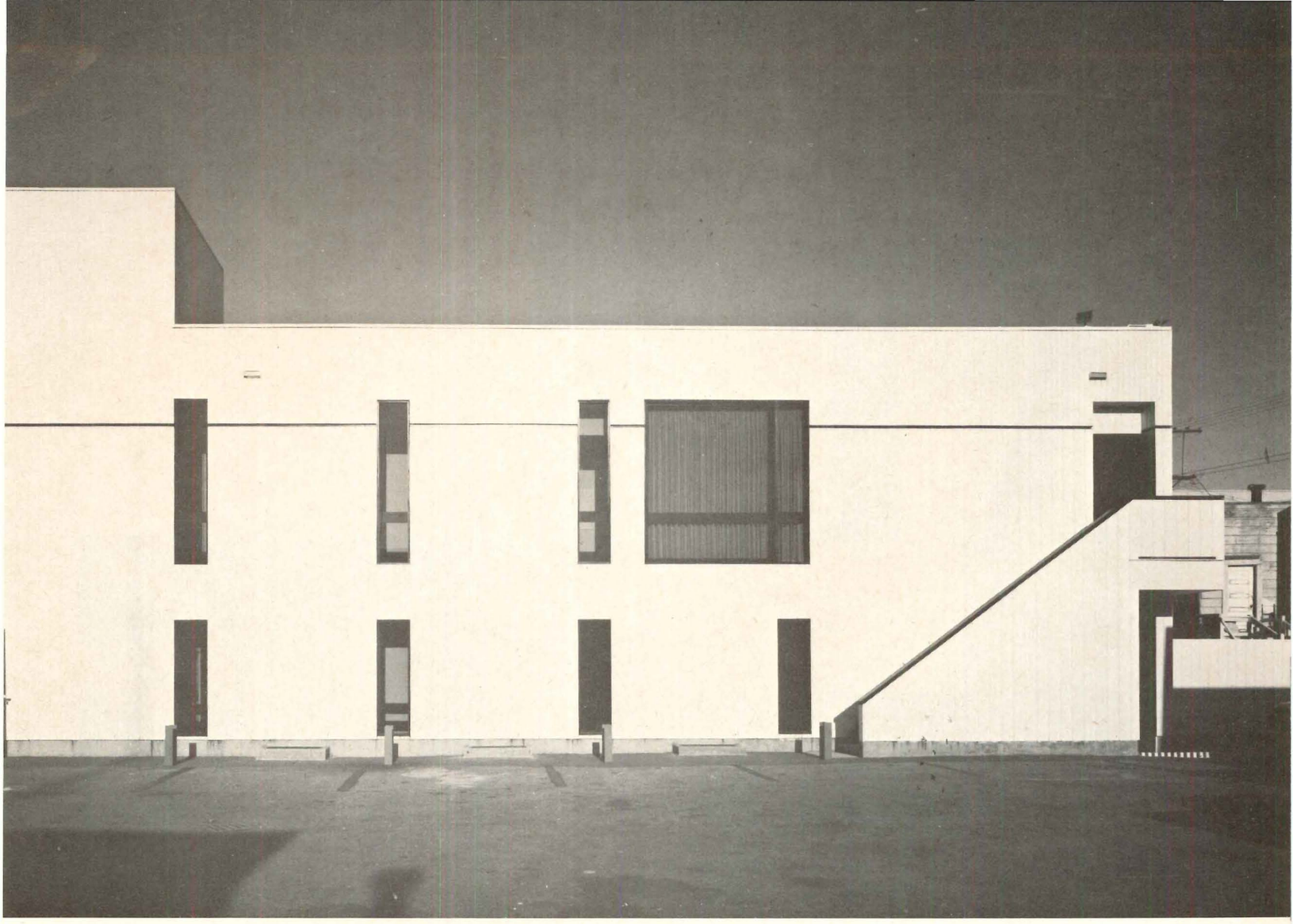


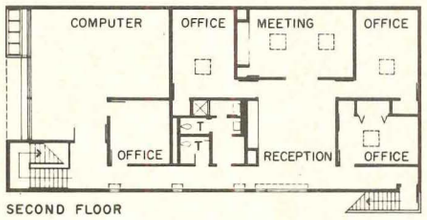




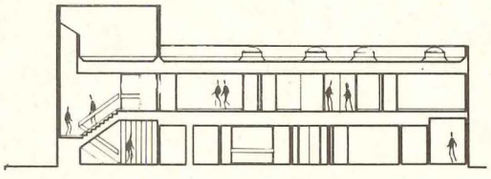
The two new structures are linked by a white wood fence which screens parking, shipping and service activity. Wood siding has been used on all exteriors for economy and versatility. The two facades of the shop addition (not shown) consist of vertical siding continuous except for doors, identical to that used on the office building and fence, and capped by a non-projecting cornice of narrower vertical boards. This cornice, used on both buildings, is separated from the walls by a narrow reveal which becomes a strong horizontal shadow line on the white facades. By emphasizing an interplay of volume and void, light and shadow, Elkus has produced a bold sculptured building which effectively captures the California sun.

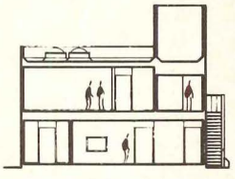
The flow of operations largely determined the spatial organization. The second floor computer center is located at the front, fully visible from the street. In the evening it functions on a time-sharing basis and is therefore independent of the administrative areas which can be closed off after office hours. General offices are located on the ground floor with executive and staff offices above.

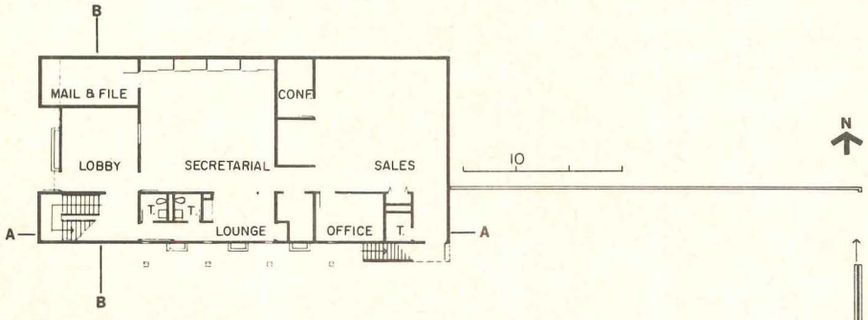


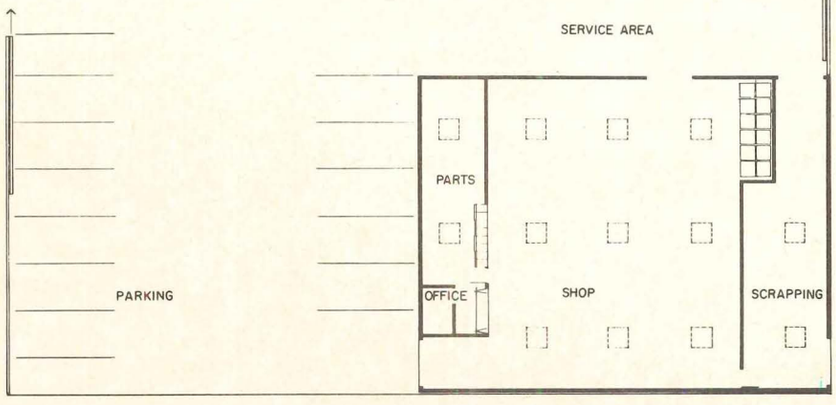


SECOND FLOOR

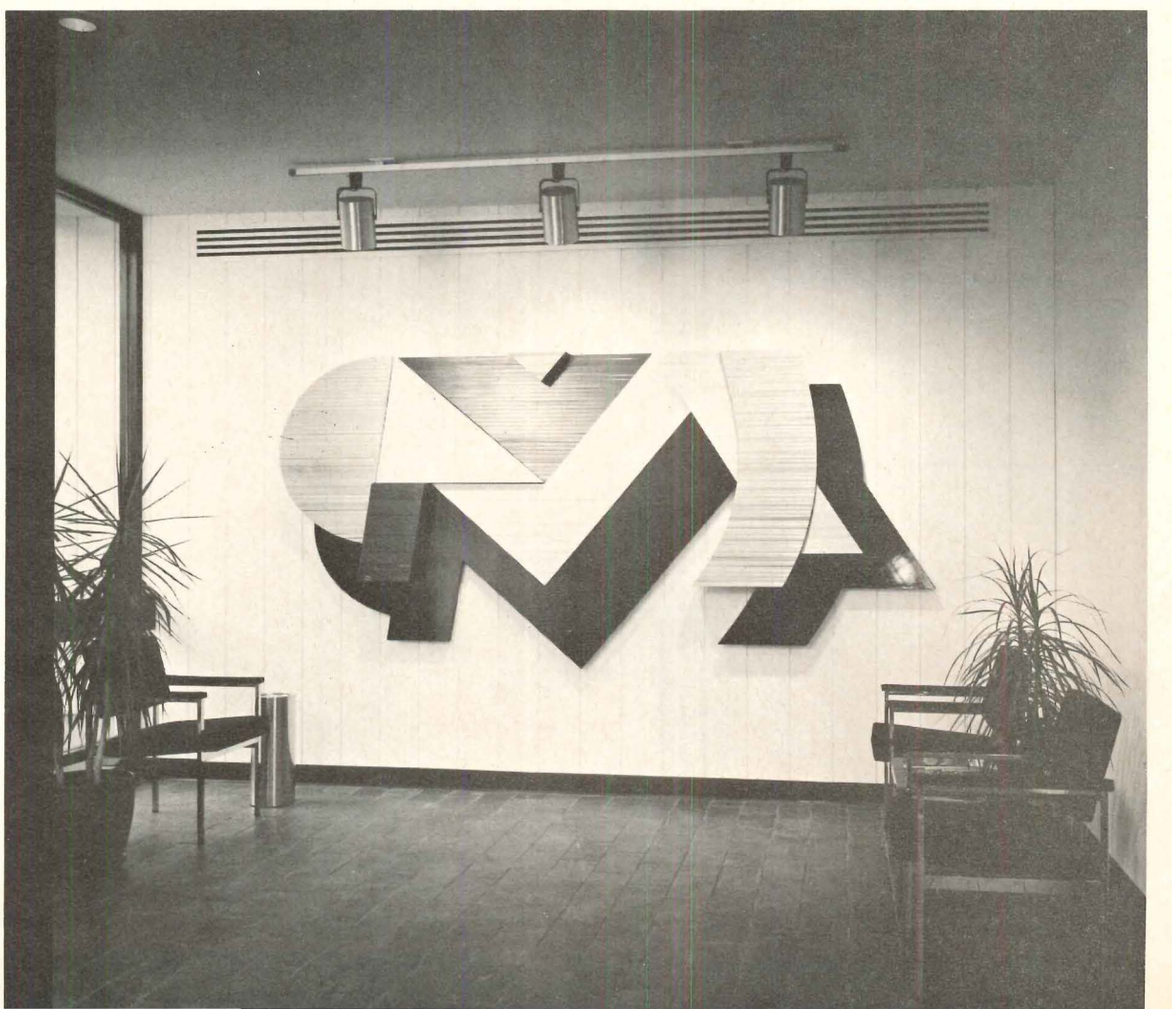

SECTION A-A

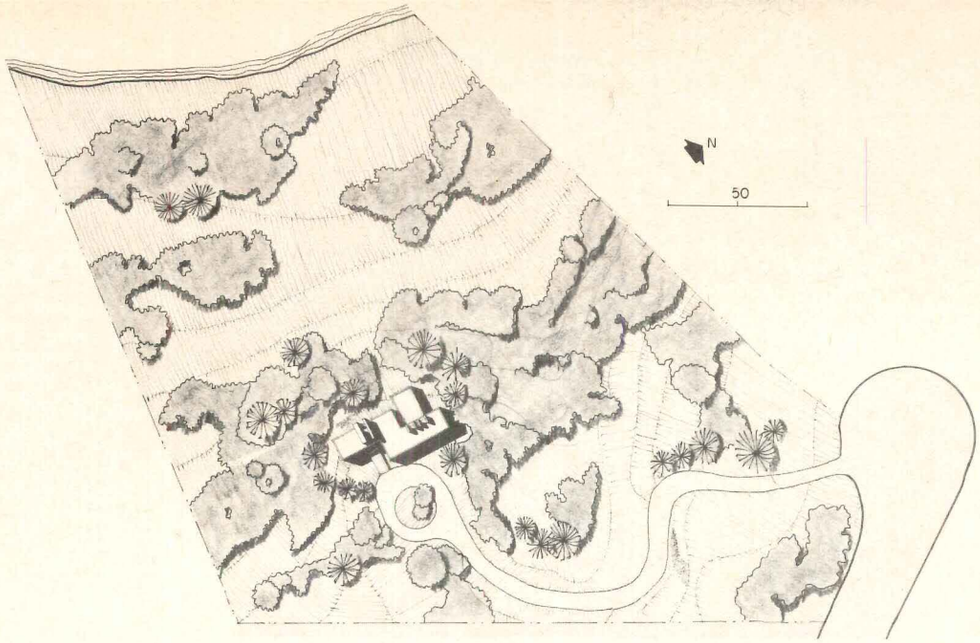

SECTION B-B





Great attention was paid to light, resulting in a sense of spaciousness within the interiors. Skylights enhance the stair tower (top) and shop area (top right). Furnishings, a logo, stationery and truck design became part of the design problem as did the role of painting and sculpture in the total project. Elkus collaborated with artists Ros and Harris Barron to seek an appropriate art expression. The results of this effort include an 80-foot mural in the shop in red and blue on the white wall. Similar in form and color is the stair hall mural which, in the words of Harris Barron, "economically describes the way up to the computer center..." Barron interprets his entrance sculpture (right) as it relates to the lobby interior as follows: "Vertical rhythms of wood planking, the elegance of restricted color (white, black, grey) and the slim black shadow space lining its way through the building detail—begged to allow chunky, multi-leveled, horizontally laminated wood relief, superfinished in juicy color, with glossy black dimensional shadow as part of the form. This constellation radiates the spirit and friendliness of the corporation within."





A NEW ENGLAND HOUSE IN THE WOODS

A natural setting of granite outcroppings, hardwood and pine trees makes an unusual counterfoil for the trim, sophisticated house in Dover, Massachusetts by architect Earl Flansburgh, which is shown below and on the following pages. Painted wood siding and concrete block are skillfully used and finely detailed to contrast with the unlandscaped plot.

The house is oriented to exploit a special view of the Charles River and take best advantage of a sloping site, and planned to fulfill typical and special needs of a young suburban family. The many requirements have been handsomely met in an uncluttered scheme in which form, materials and detail are combined in an unfussy, all-of-a-piece design.

Louis Reens photos

Expansiveness, privacy and versatility were among the owners' many requirements. The family is a young one, and includes two children. Space for adults' entertaining and children's play had to be provided, as well as space for general family use. A view of the river was an especially important design determinant. The Charles River bounds the site to the east, at the foot of sloping land which the clients own.

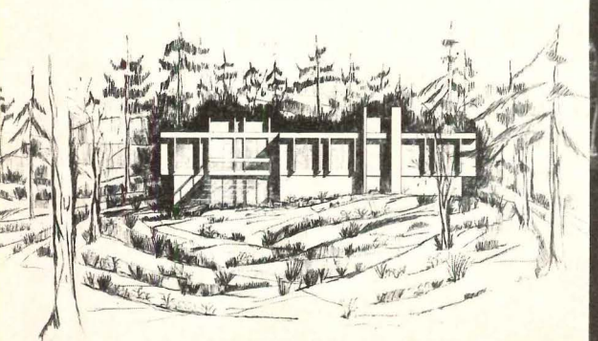
By placing the house just below the crest of a knoll which exists at the center of the site, the architect was able to expose the house to the downhill view and shield it from the uphill road. The river determined the orientation of the house and the focus of most rooms. Use was made of the slope to provide a cantilevered deck, a protected terrace and informal living space for jam sessions and dance practice. The plan is Z-shaped to emphasize the orientation while insuring good zoning of living and sleeping areas and good circulation for every room, thus making full use of the site possibilities and fulfilling the clients' requirements.

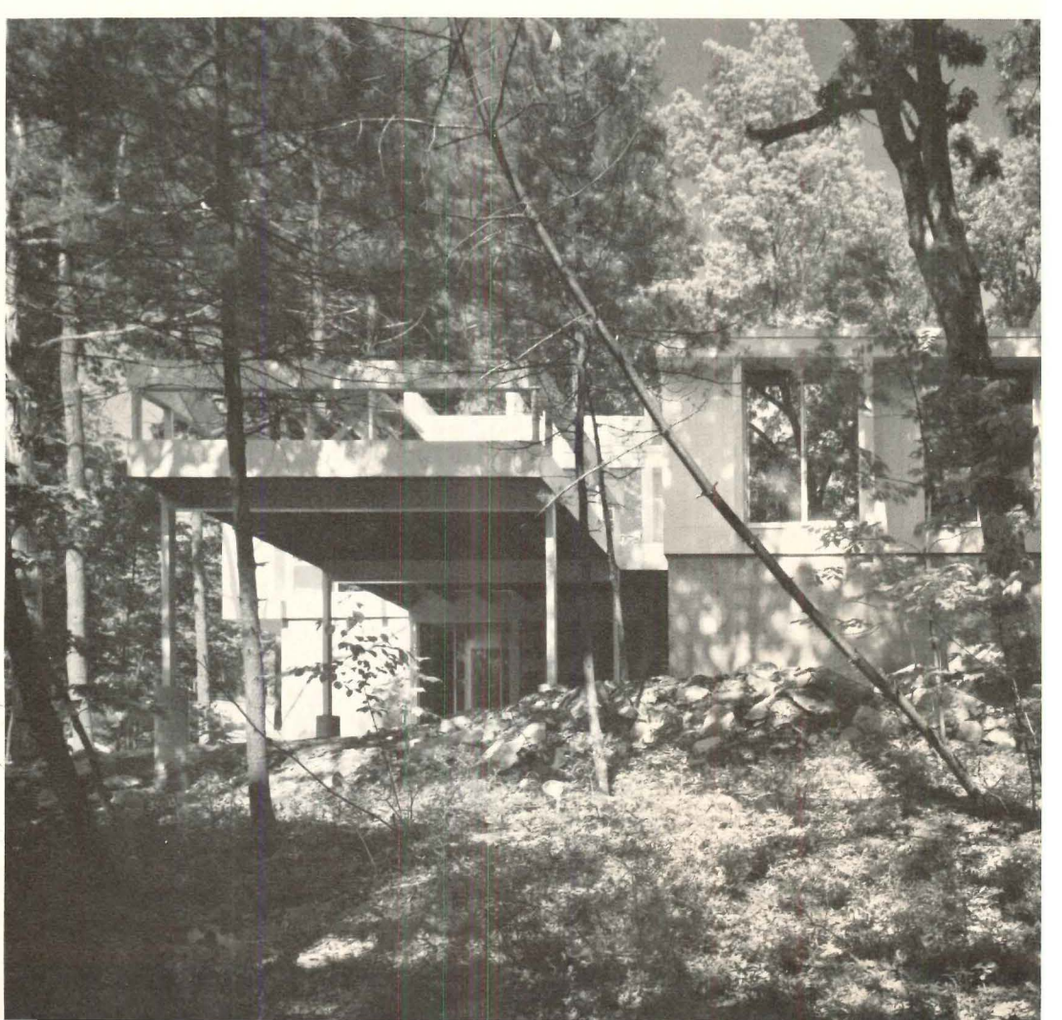
All architectural elements—materials, spaces, details and finishes—contribute to turn the program solution into the strong architectural statement on which the visual success of the scheme is based. There are two main circulation areas—stair and bedroom corridor—and these were selected for special architectural expression. Ceiling heights jump up at these areas and open out as skylights to create the major spatial interest of the house. Special concrete fins support the skylights, visually anchor the house and create the major design motif.

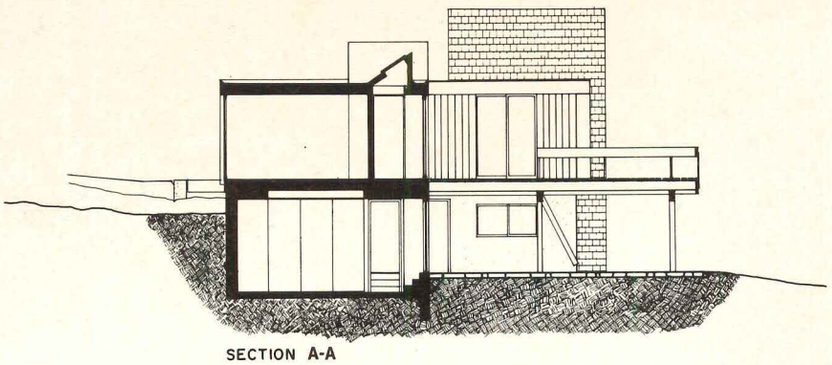
The house is wood frame using simple span and cantilever construction. Cladding is rough-sawn pine with smooth pine facing. Masonry for the chimney and fins is pumice rock concrete units. Smooth plywood is used for the baffles which shield glass on the exposed side and add a lively, three-dimensional quality to the design. By cantilevering the wood frame slightly from the concrete foundation the architect was able to visually "float" the house over the irregular land and add great strength to the overall design.

Heating is forced warm air with two oil furnaces. The house includes 3,300 square feet.

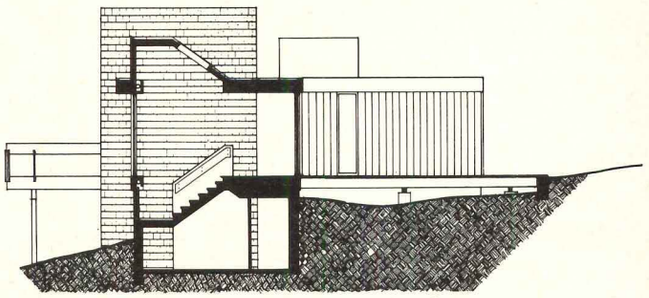
BAIRD HOUSE, Dover, Massachusetts. Owners: *Mr. and Mrs. G. Stewart Baird, Jr.* Architects: *Earl R. Flansburgh & Associates—Earl R. Flansburgh and Jane Weinzapfel, design team;* engineers: *Souza & True;* consultants: *Francis Associates;* contractor: *Sherman J. L. Brown.*







SECTION A-A

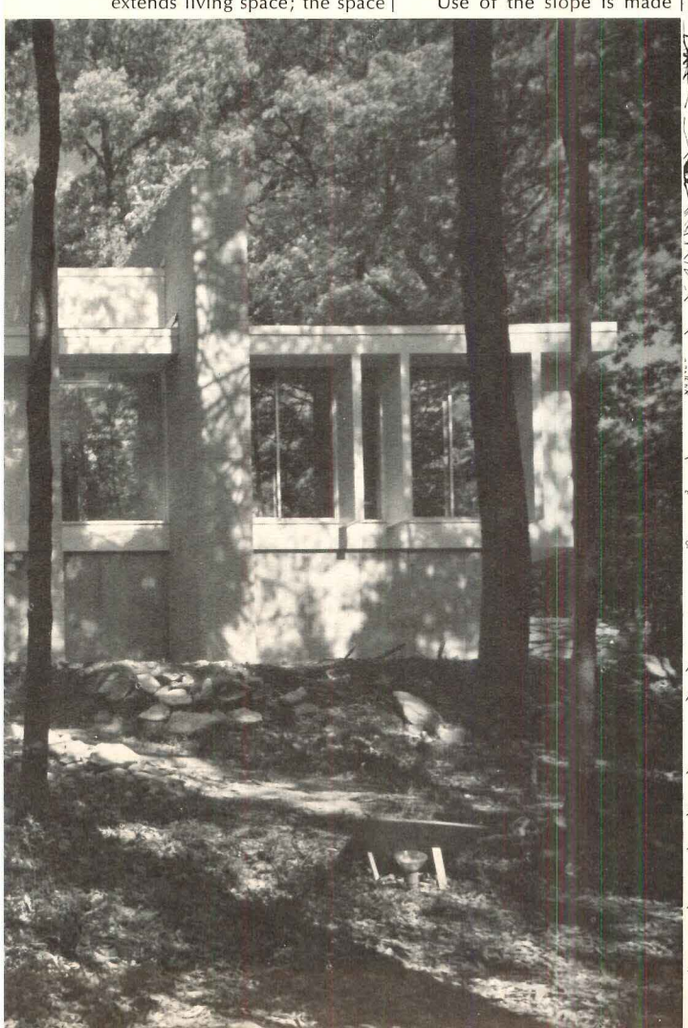


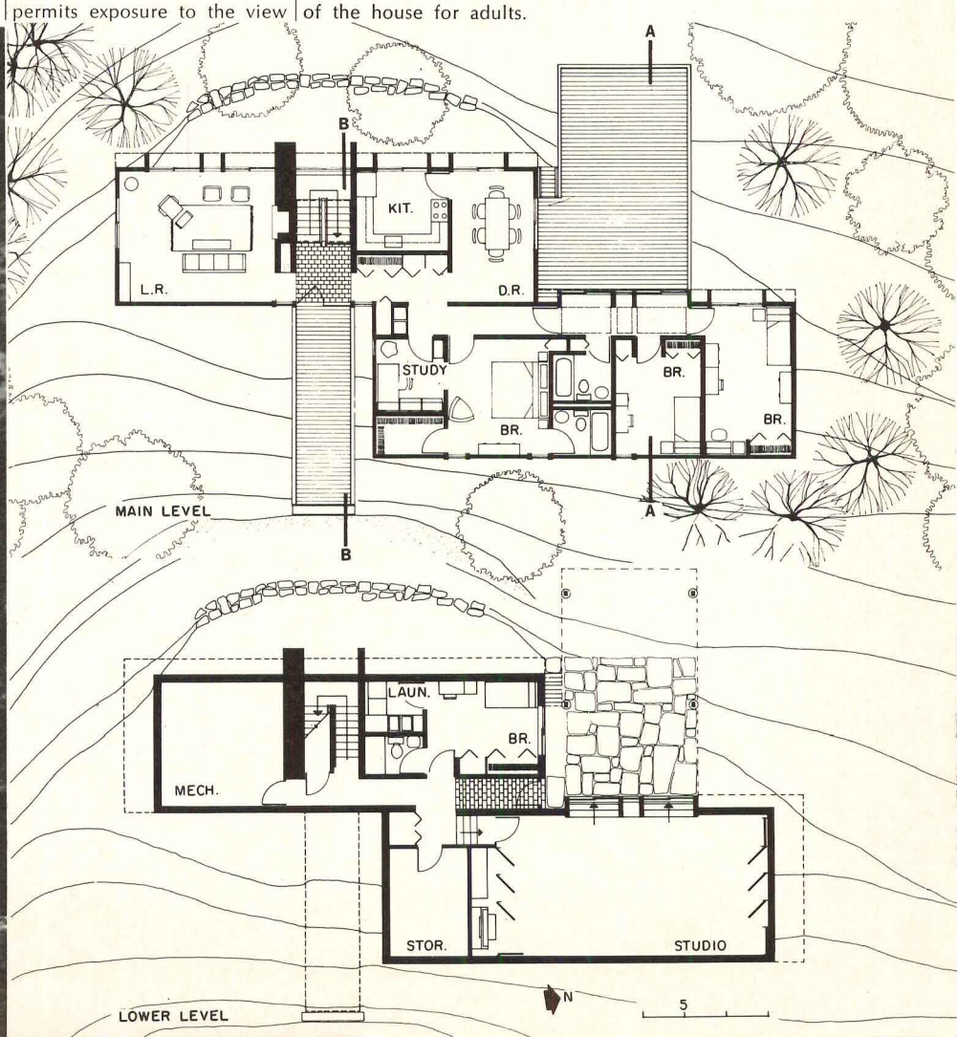
SECTION B-B

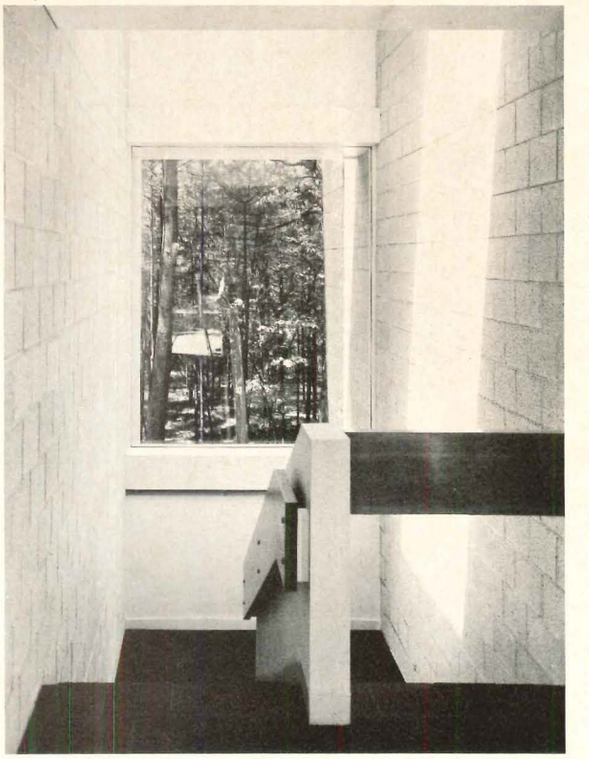
5

A blank front guarantees privacy from the uphill road, and windows give controlled views. The rear is mostly glass for exposure to the view and for a close relationship with the woods. A "tree house" deck extends living space; the space below makes a slate-floored refuge for outdoor play or a summer dancing terrace. The use of the fin motif, white-painted wood, slightly recessed foundation and constant roof line give overall design unity.

Use of the slope is made to expand living space and separate the formal entry (upper level) from more active, outdoor-indoor traffic (lower level). Skylights are located above main circulation areas and open to the east. The plan permits exposure to the view while guaranteeing zoning for privacy. The stair is placed at the entry to promote active use of the lower level. Generous storage is provided throughout. Children's rooms are placed to ease use of most of the house for adults.







The bedroom hall, entry stair and dining room shown here have large glazed areas for a great sense of spaciousness and close relationship with the site. The hall and stair are further accented with skylights. Bedrooms are disposed off the corridor, left. Visitors upon entering get a view of the woods beyond the stairwell, above. From the dining room, below, parents can keep an eye on children playing on the deck. The wall element shown has a baffle which cantilevers out to support the roof and protect the floor-to-ceiling glass from glare and winter elements. The uncluttered, white-painted architecture makes a handsome foil for early American antique furniture and silver. "Decoration" is eliminated; interest comes instead from the building itself, which reads as a three-dimensional series of planes.

RESEARCH LABORATORIES:

Designing the Unpredictable

by Robert Jensen

BUILDING TYPES STUDY 400

Buildings under the vague label "research laboratories" may house anything from comfortable offices for thinking to atomic accelerators one mile long. Thus we called laboratory buildings the "architecture of the unpredictable" in 1965, and it is still a building type which has few defining boundaries; certainly there are no commonly agreed upon architectural forms or materials which, when employed, signify "laboratory."

Designing the unpredictable has become a lucrative architectural business, however. A just-released McGraw-Hill survey of research and development expenditure indicates that, to implement research and development plans, United States manufacturers expect to spend $866 million for laboratories and laboratory equipment in 1969. Approximately two-fifths of this amount will be for laboratory buildings, the remainder for equipment, and the total is 11 per cent more than was spent on such facilities last year. For 1969, American business and manufacturing expect to devote $1.3 billion to basic research, which is 7 per cent of their total investment in the category defined as "research and development." This is a significant increase over the historical trend; it is twice as large as 1967, the latest year for which similar figures are available. The electrical machinery and communications industry will rank this year as the second largest spender for research and development, with $4.6 billion in total expenditures, and it expects to step up its pace by 1972. But it is the aerospace industry which expects to spend more money than any other group. Its $5.6 billion in predicted expenditures represents 32 per cent of all expected research and development in business and industry for 1969.

Clearly, then, architects will be increasingly involved in the design of research facilities; on the following pages we have tried to represent at least partially the diversity of the problems which they will confront. The Science Complex Site Study for Binghamton, New York (pages 136-141) explains a disciplined and innovative design methodology, capable of being applied to one room or to a region, as well as to a science laboratory. The Battelle Northwest Research Laboratories (pages 142-145) are facilities in which ambience and symbolism seem more important design criteria than any physical process; and General Electric's Space Research facilities (pages 146-150) illustrate an approach to the problems which occur when the architect is told nothing about what his building will house.

A TECHNIQUE FOR DESIGNING THE LABORATORY:

User requirements and the development of alternatives

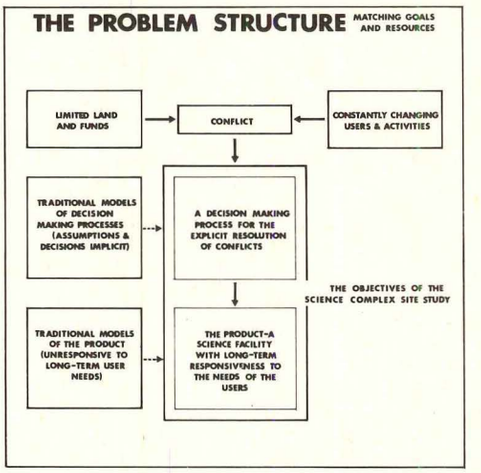
FORMAT FOR DESIGN

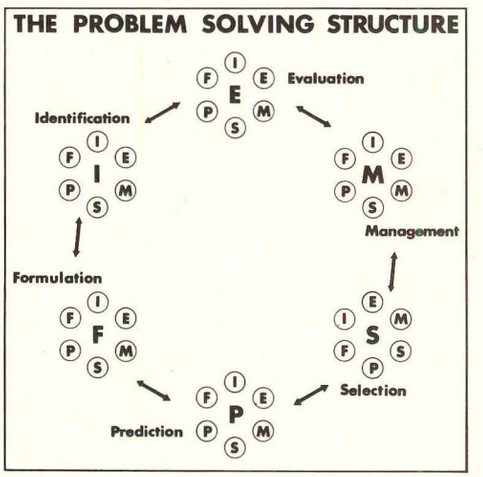
This study represents one attempt by an architectural firm to examine, explain, and improve the processes by which that firm designs its buildings. It is a site study for a new complex of science buildings to be located at the New York State University Center at Binghamton, and was completed in November of 1968 by the firm of Davis Brody & Associates. The site study was accepted by the State University Construction Fund, which commissioned the project, and working drawings are now under way in the Davis Brody offices on the buildings which the site study recommended. Emphasis in the study was placed not on the product—a site plan or a proposal for facilities—but rather on the process involved in arriving at this product; on the techniques by which a science building (or any building) should be designed.

The Davis Brody site study is simple in its main themes. They first discuss the problem (to design new science laboratories for Binghamton) within the framework of what they call the "problem structure." They then discuss a disciplined methodology for thinking about this problem, called the "problem solving structure." Having thus a definition of the problem (or at least a method for arriving at one) and a technique for resolving it, they proceed to the "application," which details how this format was applied toward creating a science complex at Binghamton.

There is nothing particularly revolutionary about their analysis of what issues add together to constitute the "problem structure." They are, broadly stated, the site and its limits, the amount of money available to build, and the constantly changing users and activities which must be housed. These issues, in turn, are defined as resources *(the site and the money available) and* needs *(people and activities to be housed), and the conflict between these needs and resources leads to both a* process *and a* product. *The process used to respond to this conflict between needs and resources is the* science complex site study *itself—what we are discussing here —and the* product *is, eventually, the completed buildings. This, then, is the problem structure—resources, needs, a process and product—as defined by Davis Brody; a diagrammatical explanation of it is presented below.*

The second phase of the study—the problem solving structure*—is more interesting, and pertinent to any methodology for approaching the problems of design in general. The following text has been taken from the Davis Brody site study itself, and edited for presentation here. All charts and graphic explanations are also by Davis Brody, and were presented in the site study final report.*





Above are diagrammatical representations of the Problem Structure and the Problem Solving Structure, as conceived by Davis Brody and utilized in their design techniques. In the Problem Solving Structure, one step does not necessarily precede another, and each may include all, as the scale of a design problem shifts.

THE PROBLEM SOLVING STRUCTURE

Identification of needs and the ability to develop and consider viable alternatives is essential to problem solving. Traditionally in the planning and design of buildings, this process is recognized and structured by the writing of the program and the architect's development and choice of a solution. Beyond this, little formal recognition is given to the myriad of interrelated steps involved in the resolution of the problem. There is little provision for either the objective evaluation of alternatives or the direct participation of all involved parties in considering alternatives or resolving conflicts as they inevitably arise.

The commonly recognized stages of design—from preliminaries and schematics on through working documents and construction—do not help to clarify the actual process of relating needs to proposals, except in a loosely chronological sense. These stages do not serve to describe the process itself.

There are, however, definite steps which are both essential to the design process and identifiable; recognition of them can be extremely helpful in structuring the solution to any design problem.

The following six steps establish such a structure:

Identification: Specifying the goals, needs, resources and priorities within the scope of the problem.

Formulation: Generating alternative proposals, strategies and procedures for the form, content and process.

Prediction: Stating likely consequences of alternatives based upon both rigorous and intuitive analysis.

Selection: Finding the alternative which best meets the requirements identified in the first step.

Management: Using the available resources of money, time and skills to effect the alternatives selected.

Evaluation: Examining consequences of the action taken and feeding back corrections for future use.

These steps identify operations implicit in any design and realization process, but without specifying a chronological order. Although certain steps proceed more easily when others are nearly complete, this structure serves more an organizational function than a scheduling one.

Understanding the structure of the whole provides a framework for the organization of material and recognition of the necessary operations without implying or requiring a strict linear development.

Application of these steps in problem solving depends largely on the scale of the operation under consideration. Hence, the Science Complex Site Study, which at one scale involved all of the steps mentioned, might, when considered at another, larger scale, be seen as only one step—for instance, as one formulation of the alternatives open to the State University at this point in its development.

The diagram of the problem solving structure (shown on page 136) depicts the structure as cycles within cycles where each step involves all steps.

NEEDS AND PRODUCT

The application *of the problem structure and the problem solving structure to the Binghamton Science Complex is the third and most specific phase in Davis Brody's site study. The* needs *of the users had to be identified and a* product*—architectural proposals for a science complex—had to be created. One did not follow from the other; rather, user needs were identified and evaluated simultaneously with the creation of formal design solutions, and those solutions were then tested for their fulfillment of user requirements. There was no attempt to make a single "most appropriate" design grow from any exhaustive list of detailed statements concerning user needs.*

NEEDS

Identification: Since needs are the direct result of users and their activities, the first step in an adequate compilation of requirements is the identification of users and activities. In this study it quickly became apparent that there are many ways to classify the users of the university science facilities—student, faculty, undergraduate, graduate, science or humanities student, staff, maintenance, library personnel, etc. The problem was to group these significantly and avoid undesired overlaps. The user categories selected had not only to classify all users but classify them in categories both adequately descriptive and exclusive enough to prompt statements that might be depended upon to have a bearing on physical design responses.

From a detailed breakdown of users, the following list of "significant user categories" was decided upon as most useful:

A. All users—this category contains all users of the science facilities and site.

B. Student/Faculty—that group of users defined by the university as members of either the student body or the faculty.

C. Instructors—those student/faculty users assuming the role of teacher, whether student or faculty.

D. Learners—those student/faculty users assuming the role of student, whether student or faculty.

E. Experimenters—those student/faculty users working in labs, whether student or faculty.

F. Supporting Personnel—that group responsible for supervisory, clerical, maintenance or various other support tasks.

G. Administrative Personnel—those supporting personnel doing office and/or clerical work either for university offices or student/faculty.

H. Library Personnel—those supporting personnel responsible for library materials.

I. Maintenance / Service Personnel—those supporting personnel responsible for maintaining grounds/facilities/equipment, making alterations, delivering goods, distributing materials, etc.

J. Other—all other users, including visitors, handicapped, etc.

A similar process was followed to determine "significant activity categories." It was necessary to establish at what level of specificity to describe activities—research experimentation is certainly a different and far more discernible activity than thought or relaxation, yet they are not mutually exclusive.

While it was important not to limit unnecessarily the range of activity categories to a point where it only included the most obvious activities, the more fundamental

USER REQUIREMENT
SCORING GRID
PROPOSAL A
PROPOSAL TOTAL 196

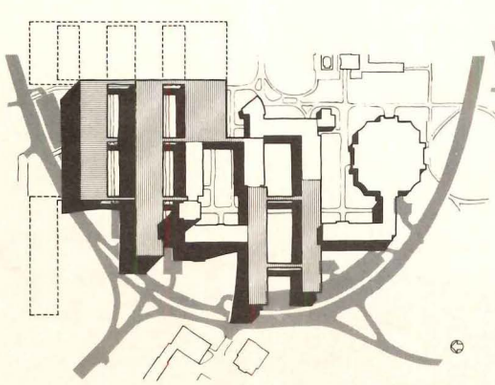
		1 ALL ACTIVITIES	2 CIRCULATION/CONTROL	3 EXPERIMENTATION/INSTRUCTION/STUDY	4 REST/RELAXATION	5 MAINTENANCE/SUPERVISION	6 ADMINISTRATION/CLERICAL	7 PARKING	• USER PROFILE
A	ALL USERS	11	79	6				6	102
B	STUDENT/FACULTY	4	6	3	6				19
C	INSTRUCTORS								1
D	LEARNERS								1
E	EXPERIMENTORS		6						6
F	SUPPORTING PERSONNEL		2					4	6
G	ADMINISTRATIVE				2				2
H	LIBRARY								
I	MAINTENANCE/SERVICE		48						48
J	OTHER		9					4	13
•	ACTIVITY PROFILE	15	150	9	8	–	–	14	196

USER REQUIREMENT
SCORING GRID
PROPOSAL B
PROPOSAL TOTAL 139

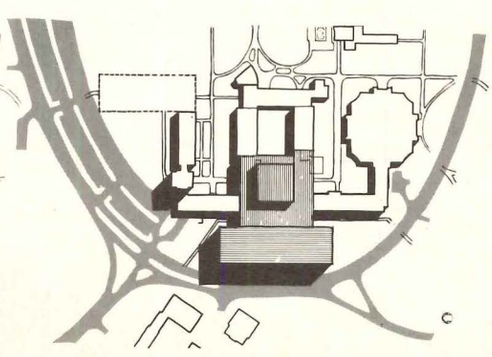
		1 ALL ACTIVITIES	2 CIRCULATION/CONTROL	3 EXPERIMENTATION/INSTRUCTION/STUDY	4 REST/RELAXATION	5 MAINTENANCE/SUPERVISION	6 ADMINISTRATION/CLERICAL	7 PARKING	• USER PROFILE
A	ALL USERS	16	45	2				2	65
B	STUDENT/FACULTY	2	4	2	4				12
C	INSTRUCTORS								–
D	LEARNERS								–
E	EXPERIMENTORS		3						3
F	SUPPORTING PERSONNEL		1					2	3
G	ADMINISTRATIVE				1				1
H	LIBRARY								–
I	MAINTENANCE/SERVICE		42						42
J	OTHER		9					4	13
•	ACTIVITY PROFILE	18	104	4	5	–	–	8	139

USER REQUIREMENT
SCORING GRID
PROPOSAL C
PROPOSAL TOTAL 194

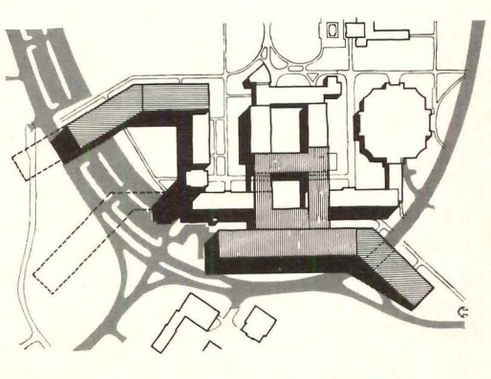
		1 ALL ACTIVITIES	2 CIRCULATION/CONTROL	3 EXPERIMENTATION/INSTRUCTION/STUDY	4 REST/RELAXATION	5 MAINTENANCE/SUPERVISION	6 ADMINISTRATION/CLERICAL	7 PARKING	• USER PROFILE
A	ALL USERS	16	76	4				4	100
B	STUDENT/FACULTY	4	6	3	6				19
C	INSTRUCTORS								1
D	LEARNERS								1
E	EXPERIMENTORS		6						6
F	SUPPORTING PERSONNEL		2					4	6
G	ADMINISTRATIVE				2				2
H	LIBRARY								–
I	MAINTENANCE/SERVICE		48						48
J	OTHER		9					4	13
•	ACTIVITY PROFILE	20	147	7	8	–	–	12	194



SITE PROPOSAL A



SITE PROPOSAL B



SITE PROPOSAL C

activities—such as creativity, innovation, fruitful exchange of ideas, etc.—seemed to go far beyond implications for direct architectural response and to indicate response outside the sphere of this study.

From a detailed breakdown of activities, the following list of "significant activity categories" was decided upon as most useful:

1. All Activities—this category contains all activities taking place within the science facilities and site.
2. Circulation/Control—the movement of pedestrians and vehicles and control of such movement.
3. Experimentation / Instruction / Study —research and educational activities including both teaching and learning.
4. Rest/Relaxation—those activities not directly related to research and education or otherwise occupying programed time.
5. Maintenance/Supervision—those activities related to cleaning facilities/grounds/equipment, making alterations, supervising grounds, attending animals, etc.
6. Administration/Clerical—those activities or faculty and staff related to programing of university or division activities as well as typing, filing and mailing in support of such activities.
7. Parking—private vehicular parking.

Formulation: Having a comprehensive identification of both users and activities provided the vocabulary for formulation of a tentative list of requirement statements. These statements, establishing desired relationships between users and activities, were uniformly constructed on the model: Someone (a user or a group of users) should be able to do something (an activity or group of activities) in such and such a manner (the relationship sought).

Selection: A four-point system of weighting requirements was adopted and each statement was evaluated according to its priority of importance on a scale ranging from zero (indicating that it was either irrelevant or unimportant) to three (indicating that meeting the requirement was essential). After a sizable list of requirements had been drawn up from research talks with the faculty at Binghamton, experience, intuition, etc., and weighted by the architects, it was sent to the chairman of the Science Division at Binghamton for evaluation by heads of the various departments. The list remained highly fluid and went through frequent adjustments in statement priority as well as modification and addition of requirements.

An example list of the user requirement statements, and the "weights" assigned to each, appears above, far right.

PRODUCT

User requirements were formulated solely as means of evaluation. No effort was made to have these requirements generate the design proposals directly. Instead, the development of proposals proceeded independently and made use of other concepts.

Formulation: Siting alternatives were directed by a compilation of restrictions drawn from investigations into existing conditions at the Binghamton campus and from formulation of the variables and constraints presented above. In addition to program requirements, the eventual design criteria included the following restrictions that had to be acknowledged by all proposals:

1. Existing buildings
2. Existing and proposed vehicular circulation
3. Existing pedestrian circulation and eventual increases due to dormitory proposals beyond the Science Complex
4. Existing and proposed service mains
5. Access to existing site utilities and service areas during construction
6. Service and emergency vehicular access to all existing and proposed facilities
7. Master plan accommodation of the view of the mountains to the north from the main campus quadrangle.

These restrictions, in addition to program area requirements and projections for future growth, provided the basis for initial massing studies. These studies were eventually consolidated into three approaches which indicated the major alternatives available for satisfying the siting requirements:

Scheme A—Low building height, maximum coverage, least dependence on or interference with existing facilities, greatest growth possibilities.

Scheme B—Least envelope, maximum interconnection with existing facilities, greatest height and massing, greatest accord with master plan.

Scheme C—Greatest use of development to reinforce existing and proposed circulation routes, greatest import in master plan by crossing loop road.

These three site proposals appear on page 137, bottom.

Formulation: The decision to generate these site solutions for the science complex by the use of an *infrastructure*—that is, by a system of building that is both repetitive yet spatially varied—was concluded after research in the early stages of the study. Analysis of existing science facilities had revealed that certain building types proved prototypical for nearly all science facilities in present use or development.

Analysis of existing and proposed program spaces in the Binghamton Science Complex provided the basis, however, for a complete investigation into all possible infrastructure prototypes. Eliminating those possibilities that were not amenable to feasible circulation patterns or utility distribution, or that represented mirror solutions or virtual duplication, reduced the list of prototypical infrastructures to four.

These four prototypes, proportioned according to the assumptions for circulation and mechanical space stipulated by the program (20% of gross, each) resulted in four infrastructure proposals (shown below, right). These were considered by the archi-

USER REQUIREMENT
SCORING GRID
PROPOSAL 1
PROPOSAL TOTAL 172

	ALL ACTIVITIES 1	CIRCULATION/CONTROL 2	EXPERIMENTATION/INSTRUCTION/STUDY 3	REST/RELAXATION 4	MAINTENANCE/SUPERVISION 5	ADMINISTRATION/CLERICAL 6	PARKING 7	USER PROFILE •
A ALL USERS	5	7		3		9		24
B STUDENT/FACULTY		5	2	1				8
C INSTRUCTORS		21						21
D LEARNERS		4	6	4				14
E EXPERIMENTORS		6	57					63
F SUPPORTING PERSONNEL								–
G ADMINISTRATIVE		4				5		9
H LIBRARY								
I MAINTENANCE/SERVICE		24	3					27
J OTHER		6						6
• ACTIVITY PROFILE	5	77	68	8	–	14	–	172

USER REQUIREMENT
SCORING GRID
PROPOSAL 2
PROPOSAL TOTAL 202

	ALL ACTIVITIES 1	CIRCULATION/CONTROL 2	EXPERIMENTATION/INSTRUCTION/STUDY 3	REST/RELAXATION 4	MAINTENANCE/SUPERVISION 5	ADMINISTRATION/CLERICAL 6	PARKING 7	USER PROFILE •
A ALL USERS	9	10		3		9		31
B STUDENT/FACULTY		12	4	2				18
C INSTRUCTORS		11						11
D LEARNERS		7	3	7				17
E EXPERIMENTORS		7	72					79
F SUPPORTING PERSONNEL								–
G ADMINISTRATIVE		8				6		14
H LIBRARY								–
I MAINTENANCE/SERVICE		24	3					27
J OTHER		3						3
• ACTIVITY PROFILE	9	82	82	12	–	15	–	202

USER REQUIREMENT
SCORING GRID
PROPOSAL 3
PROPOSAL TOTAL 197

	ALL ACTIVITIES 1	CIRCULATION/CONTROL 2	EXPERIMENTATION/INSTRUCTION/STUDY 3	REST/RELAXATION 4	MAINTENANCE/SUPERVISION 5	ADMINISTRATION/CLERICAL 6	PARKING 7	USER PROFILE •
A ALL USERS	11	8		3		6		28
B STUDENT/FACULTY		10	4	2				16
C INSTRUCTORS		15						15
D LEARNERS		4	6	4				14
E EXPERIMENTORS		6	71					77
F SUPPORTING PERSONNEL								–
G ADMINISTRATIVE		8				4		12
H LIBRARY								–
I MAINTENANCE/SERVICE		26	3					29
J OTHER		6						6
• ACTIVITY PROFILE	11	83	84	9	–	10	–	197

USER REQUIREMENT
SCORING GRID
PROPOSAL 4
PROPOSAL TOTAL 152

	ALL ACTIVITIES 1	CIRCULATION/CONTROL 2	EXPERIMENTATION/INSTRUCTION/STUDY 3	REST/RELAXATION 4	MAINTENANCE/SUPERVISION 5	ADMINISTRATION/CLERICAL 6	PARKING 7	USER PROFILE •
A ALL USERS	4	7		3		3		17
B STUDENT/FACULTY		5	2	1				8
C INSTRUCTORS		21						21
D LEARNERS		3	6	3				12
E EXPERIMENTORS		5	46					51
F SUPPORTING PERSONNEL								–
G ADMINISTRATIVE		4				6		10
H LIBRARY								–
I MAINTENANCE/SERVICE		24	3					27
J OTHER		6						6
• ACTIVITY PROFILE	4	75	57	7	–	9	–	152

tects to represent viable alternatives and to satisfy to varying degrees user needs according to implied priorities.

Prediction: At this point, with a set of weighted requirements, four infra-structure proposals and three site plan proposals, a preliminary evaluation was made to determine the advantages and disadvantages of the various proposals according to the priorities established in the user requirements.

In order to evaluate the proposals as objectively as possible, all quantifiable information was taken from drawings and recorded under the respective headings of "site measures" and "building measures."

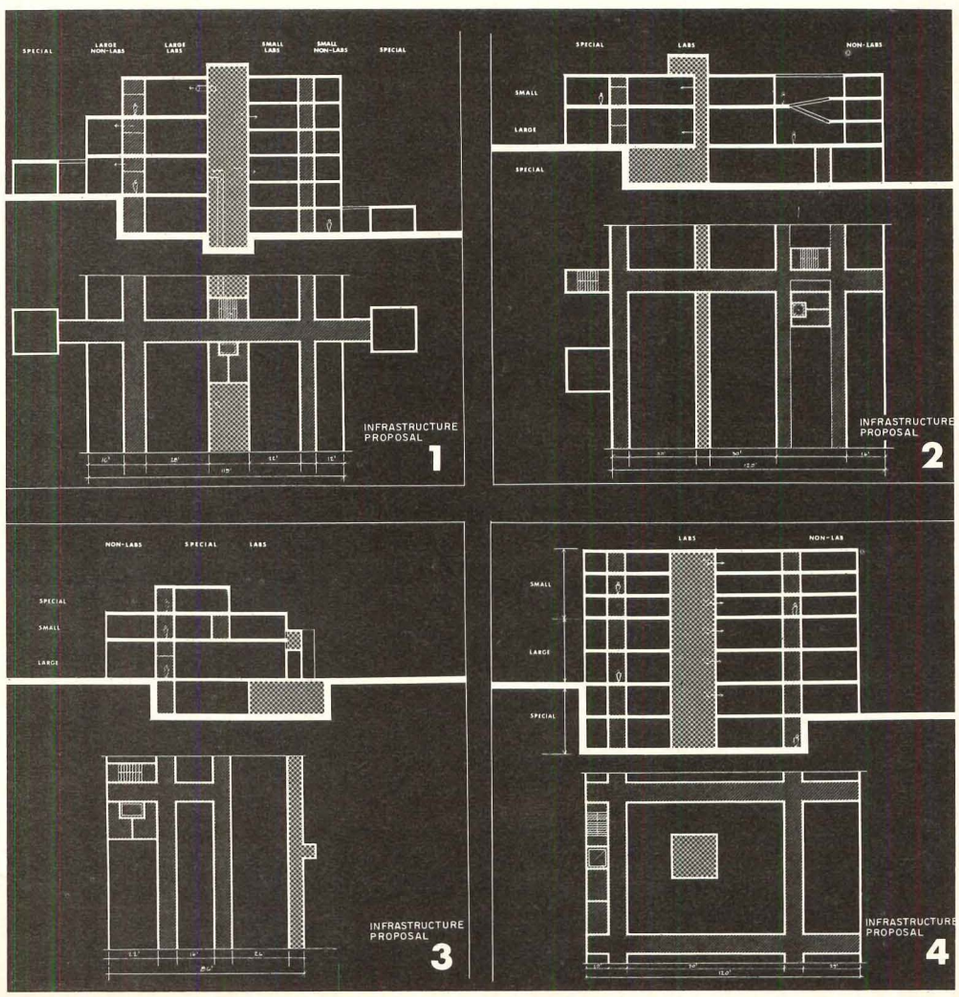
To reflect the varying degrees to which requirements were met, either as determined from the "measures" tabulations or deduced by the architects, a four-point scoring system similar to the weighting system was adopted. Zero indicated that the requirement had not been satisfied in the proposal under question; one indicated poor satisfaction; two, better; and three indicated that the requirement had been met fully. The product of this score and the weight of the respective user requirement was tabulated on a separate "scoring grid" for each proposal.

Prior breakdown of the requirements into the various user and activity categories provided a means of reflecting each proposal's total score in a way that revealed the

User Requirement Statements

Within the SITE:	User Category	Activity Category	Priority Rating
ALL USERS should be able to:	A		
■ Orient themselves to the campus center from the science complex		1	2
■ Identify building entrances from all approaches		2	2
■ Identify library as focus of science complex		2	2
■ Have acoustic and visual privacy within outdoor areas that encourages reading, casual study, etc.		3	2
■ Have access to science library when other buildings are closed		2	3
■ Reach science complex buildings from parking without suffering from weather		2	3
STUDENT/FACULTY should be able to:	B		
■ Park bicycles within protection of building		1	2
■ Return library materials when library is closed		2	3
Read/study/write outdoors in proximity to Science Complex buildings		3	1
EXPERIMENTERS should be able to:	E		
■ Get to their laboratory without regard to other building hours/functions		2	3
SUPPORTING PERSONNEL should be able to:	F		
■ Have separate access/egress		2	0
■ Have entrances/exits near their station of operation		2	1
■ Park their cars near their station of operation		7	2
ADMINISTRATIVE PERSONNEL should be able to:	G		
■ Have separate access from office to the Science Complex site		2	1
■ Relax outdoors in proximity to the Science Library		4	1
MAINTENANCE/SERVICE PERSONNEL should be able to:	I		
■ Negotiate necessary equipment throughout site		2	3
Maintain control over all exterior doors and private spaces		2	3

Within the BUILDING:	User Category	Activity Category	Priority Rating
ALL USERS should be able to:	A		
■ Continue normal activities during additions to Science Complex		1	3
■ Work without discomfort from excessive heating/cooling loads		1	3
■ Enjoy views of campus and environs		1	1
■ Locate notice spaces where upcoming lectures, events, personal notices, etc. may be posted		2	2
■ Go outside for short breaks within minimum distance of work space		2	1
■ Locate lounges/toilets adjacent to primary circulation routes		2	2
STUDENT/FACULTY should be able to:	B		
■ Pick up a cup of coffee on way to lab or office		2	1
■ Locate library materials without disturbing those studying/reading in the Science Library		2	3
■ Locate administrative personnel		2	2
INSTRUCTORS should be able to:	C		
■ Have labs adjacent to offices		2	2
■ Check in with receptionist or office controlling messages, mail, etc.		2	3
EXPERIMENTERS should be able to:	E		
■ Use large portable equipment in any lab		2	2
■ Change arrangement of equipment in so far as equipment itself will allow		2	3
■ Obtain in all labs: distilled water, deionized water, gas, vacuum, steam, nitrogen, oxygen and special electrical power		3	2
■ Have access to drains in all of labs		3	3
■ Obtain service/waste removal in any lab at a future date		3	2
ADMINISTRATIVE PERSONNEL should be able to:	G		
■ Obtain supplies within minimum distance		2	2
■ Work without interfering with student/faculty activities		2	2
■ Use lounge and toilet facilities not available to other users		2	0



The User Requirement Statements, (upper right) are selected samples taken from the much longer total list of statements created by Davis Brody. The User Categories and Activity Categories relate to those listed here in the text, and the Priority Ratings are as assigned by Davis Brody for ranking the importance of each statement. The total list remained fluid throughout the design process, but its creation and use is the first of the dual bases upon which the Davis Brody design process is founded. The other is represented by the three site plan proposals (page 137) and the four infra-structure proposals at the right. The three site plans were arrived at as being archetypes or a synthesis of some 35 sketched alternatives, and all fulfill "program" requirements as normally defined. The four infra-structure proposals represent a similar synthesis of many possible internal arrangements for the science complex. Each site plan and each infrastructure proposal was evaluated and ranked in relation to how well each fulfilled the user requirement statements. The Scoring Grid Proposals (left and page 137) show the results of this ranking. A higher total score means a better fulfillment of user requirement statements as a whole, and individual scores form a basis for knowing how well a scheme fulfills one particular user need.

implications for each user and activity category. The scoring system thus provided a user profile and an activity profile indicating the distribution within the total score and allowing for more detailed and enlightened evaluation of the proposals. The scoring grid for each site proposal is shown directly above the site scheme to which it applies (page 137), and the scoring grid for each of the four infrastructure proposals is shown on page 138.

Selection: Although the results of the preliminary evaluation were by no means conclusive, the shortcomings of certain proposals became quite obvious. Of the site alternatives, Proposal B, as evaluated by the user requirements, proved entirely inadequate in nearly every category, but the relative merits of Proposals A and C were not easily determined. Not only were the total scores virtually identical but the profile breakdowns presented similar pictures of the two proposals. As a result of this similarity it was decided that the two solutions be combined, taking the best aspects of each to produce additional proposals.

Scoring of the infra-structure alternatives produced a more marked spread indicating in part that the user requirements for the building were a sharper design tool than those for the site. Both of the taller, more compact infra-structures fared poorly in comparison to the lower infra-structures which scored highest in those categories having to do with circulation and student use. However, the infra-structure with the highest overall score, Proposal 2, failed to match the scores of Proposal 3 in either of these two categories, trading them off against advantages for administrative activities and instructors. Clearly the direction indicated for further effort was a combination of the advantages of these two proposals and less emphasis on the taller infra-structures.

Revisions: As a result of the evaluation, it was decided that the space types used ultimately to generate the infrastructure prototypes were too general and fostered many design preconceptions. This led to the conclusion that space types cannot accurately be described solely as responses to activity types but could be more usefully characterized by not only activities but also by the number of people involved in the activities and the things required for those activities. Further, it was found that "things" had to be defined by their size, weight and system demand. In other words, a student conducting an experiment requiring piped-in services has, in many ways, more requirements in common with a janitor needing a slop sink than he does with a fellow student conducting mathematical research.

These conclusions led to discarding the previous classification of programed and existing science spaces according to a functional (lab, non-lab and special space type) analysis and to adopting an analysis based on only two variables—bay height and mechanical-structural capacity. High and low bays with either normal or special mechanical-structural capacity produced four space types. A fifth type was decided upon to include any specially shaped or unusual structure. Definitions:

Low Bay—Spaces that are generally less than 400 square feet and require a clear ceiling of 9 to 10 feet.

- High Bay—Spaces that are generally more than 400 square feet and require a clear ceiling of 10 to 16 feet.
- Normal Structural-Mechanical—Spaces that are characterized by low demand on mechanical and structural systems.
- Special Structural-Mechanical—Spaces that are characterized by high demand on mechanical and structural systems.
- Other—Spaces which, due to particular activity types, extraordinary shape or loading demands, set requirements that cannot be met by the above space types. These fall beyond the capacity of the infrastructure.

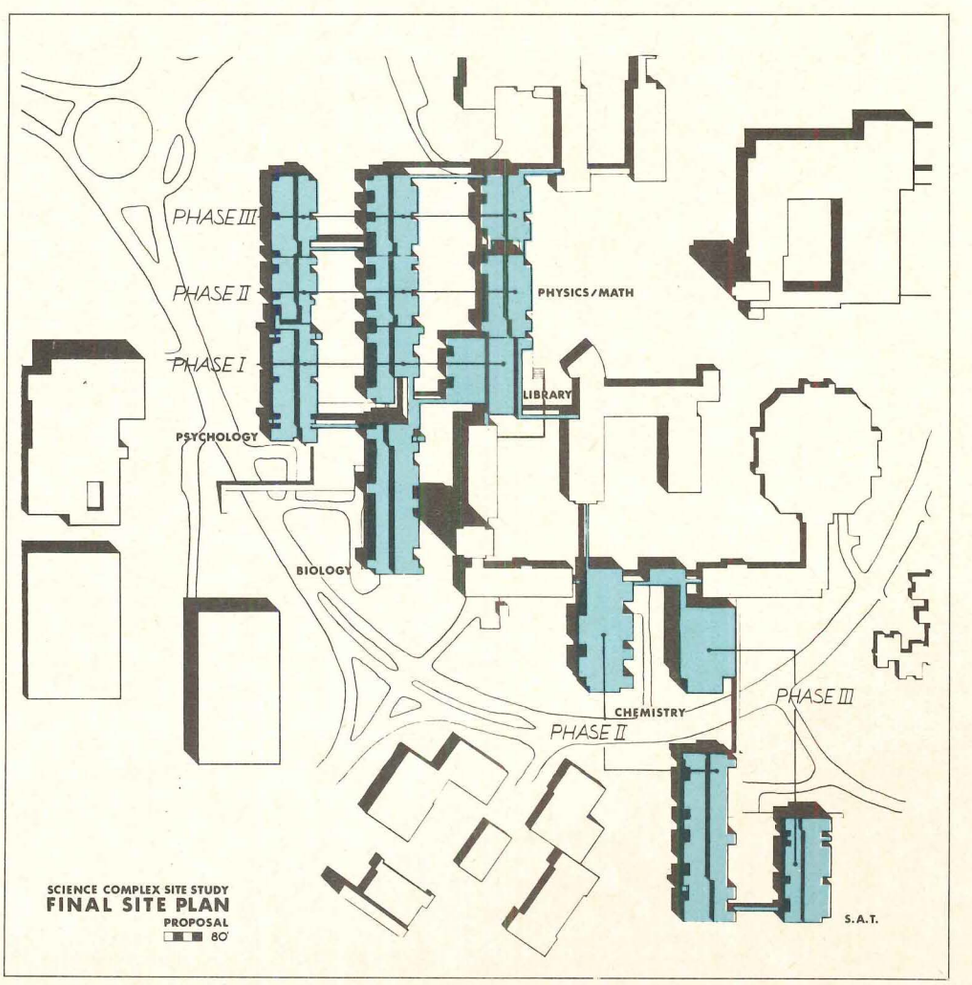
Evaluation: Using these space type variables as a tool for analysing the program spaces resulted in the final infrastructure proposal. As was pointed out above, this proposal was also the result of combining the advantages of Preliminary Proposals 2 and 3.

The final site proposal, as suggested above, developed from the three site plan alternatives evaluated previously with the site user requirements. As a result of the scores, it was decided to concentrate on developing a combination of Proposals A and C, the schemes favoring low buildings and extensive site coverage. The program requirements for phasing of the additional facilities posed difficult restrictions to this effort, however, and rendered many massing possibilities unworkable, but the final site proposal represents the best aspects of the previous proposals as is borne out by its score against the user requirements.

BENEFITS OF THE FORMAT

This, then, was the methodology evolved by Davis Brody and Associates for studying a science laboratory and its site. The site study concluded with a detailed list of specific recommendations for the new science center at Binghamton, and the university's acceptance of these recommendations has led the architects directly into detailed design and working drawings. But it is the design process, rather than the product of design, with which we have been concerned here.

Several points about the design study should be emphasized. First, the development of the three site proposals and the four infrastructure proposals took place independently from the diagnosis and development of user requirements. The designers working on these formal (as opposed to verbal) alternatives developed and used disciplined design techniques, but their methods were not far removed from those used in most architectural offices today. The difference is that these design alternatives could be and were continually evalu-



The scoring grid proposals at right give the scores of the final site plan and the final infra-structure proposal, when examined for their fulfillment of the user requirement statements. Compare these scores with those of the original three site proposals (page 138).

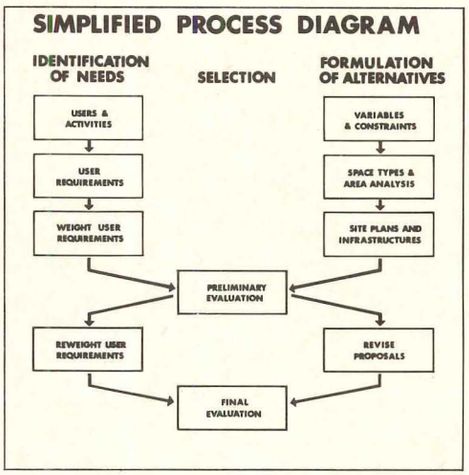
USER REQUIREMENT
SCORING GRID
PROPOSAL Final Site Plan
PROPOSAL TOTAL 287

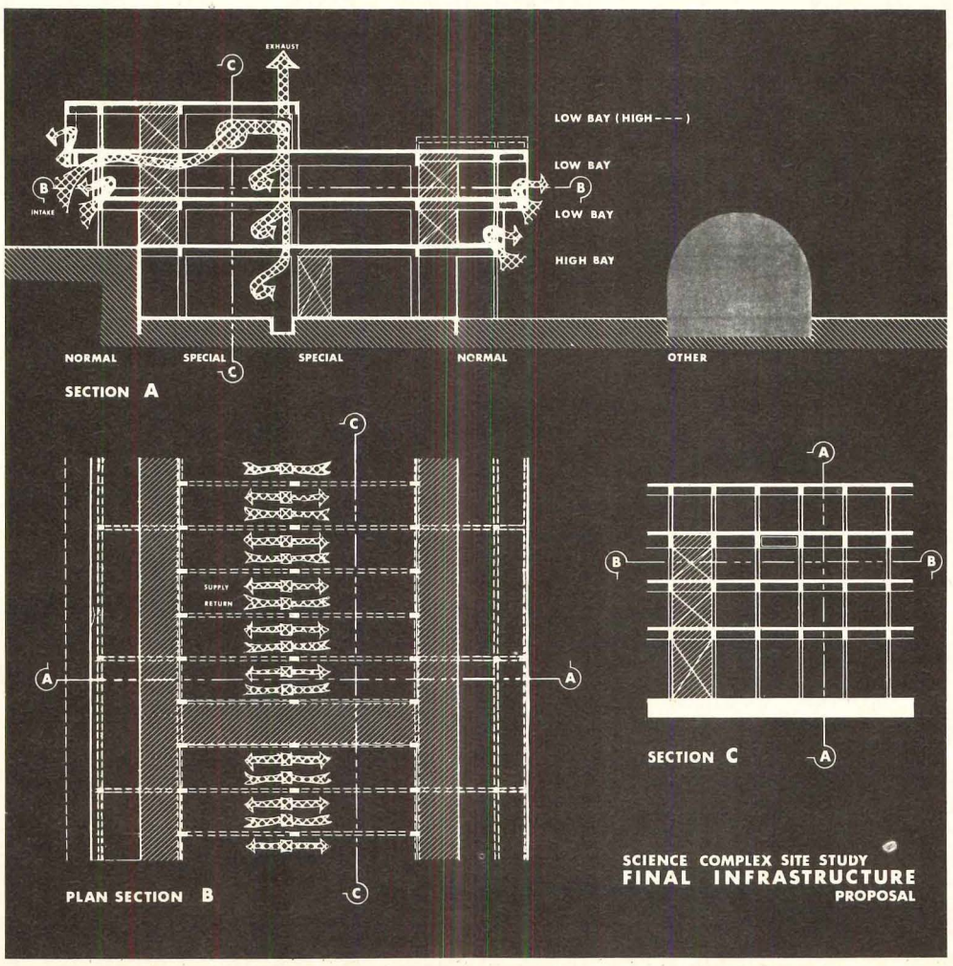
		1 ALL ACTIVITIES	2 CIRCULATION/CONTROL	3 EXPERIMENTATION/INSTRUCTION/STUDY	4 REST/RELAXATION	5 MAINTENANCE/SUPERVISION	6 ADMINISTRATION/CLERICAL	7 PARKING	● USER PROFILE
A	ALL USERS	18	111	6				10	145
B	STUDENT/FACULTY	6	9	3	6			6	30
C	INSTRUCTORS								–
D	LEARNERS								–
E	EXPERIMENTORS		6					9	15
F	SUPPORTING PERSONNEL		2					2	4
G	ADMINISTRATIVE		2		2				4
H	LIBRARY								–
I	MAINTENANCE/SERVICE		63			8			71
J	OTHER		9					9	18
●	ACTIVITY PROFILE	24	202	9	8	8	–	36	287

USER REQUIREMENT
SCORING GRID
PROPOSAL Final Infrastructure
PROPOSAL TOTAL 394

		1 ALL ACTIVITIES	2 CIRCULATION/CONTROL	3 EXPERIMENTATION/INSTRUCTION/STUDY	4 REST/RELAXATION	5 MAINTENANCE/SUPERVISION	6 ADMINISTRATION/CLERICAL	7 PARKING	● USER PROFILE
A	ALL USERS	17	40		6		9		72
B	STUDENT/FACULTY		29	4	3				36
C	INSTRUCTORS		22	13					35
D	LEARNERS		6	27	7				40
E	EXPERIMENTORS		12	106					118
F	SUPPORTING PERSONNEL								–
G	ADMINISTRATIVE		10				11		21
H	LIBRARY								–
I	MAINTENANCE/SERVICE		57	6					63
J	OTHER		9						9
●	ACTIVITY PROFILE	17	185	156	16	–	20	–	394

Below is the final site plan and the final infra-structure proposal. The basis for this infra-structure proposal was completely reevaluated from the original four, as explained in the text. This final infra-structure is based upon bay height and mechanical services requirements, rather than the space relationships and space-type concept of the earlier schemes. The "results" of the site study were these two drawings plus a long list of verbal recommendations not reprinted here. At right is a diagram illustrating the general methodology of the Davis Brody design technique.





ated for their fulfillment of needs, through the employment of specific user and activity requirements. The site study concerned itself simultaneously with making proposals and with developing ways of talking about those proposals; one did not grow from the other. The study does not imply that analysis can produce design; in fact it acts upon the opposite assumption; analysis cannot produce design, but there may be better techniques for the evaluation of design than are now common.

This design procedure seems to give two results which might be beneficial to any architectural office. First, it keeps both the designers and the client from making crucial decisions too early, particularly with buildings having complex functions. A strong-willed designer might be able to accomplish the same thing, but with complicated problems the tendency always is to move too quickly in a particular direction, closing out lines of thought which might, in the end, have been pursued more fruitfully than the one chosen.

The second benefit is more successful communication with the client. The client is brought into the design process, sees for himself the process of selection and evaluation the architect is constantly going through, and is called upon to participate in it, within a controllable format. He develops a real understanding of the complexity of the problem, of how one decision may affect all others, and he tends to wonder less about how effectively the architect is spending that "large" fee. The architects were able to convince the client, in this instance, that air conditioning throughout the laboratories would be more "economical," when weighed with the benefits accruing from this additional cost, than the non-air-conditioned structures originally planned. Davis Brody has found its design methodology successful, and is continuing to use and refine it on current projects.

SCIENCE COMPLEX SITE STUDY, New York State University Center at Binghamton. *Architects:* Davis, Brody & Associates; *Project Team:* Robert Scheu, Wilfrid Worland, Albert Pastine; *Program Consultant:* Bernard Spring.

IMAGERY AND SYMBOL IN RESEARCH:

The laboratory as a place to think

A research laboratory need not accommodate the movement of diverse groups of people, or complex functions and large machinery, or exhaust the gasses of a chemical experiment. It may, like the Battelle Northwest Laboratories on these pages, be principally a place to "think," not "do."

Battelle Institute, a large private and non-profit research foundation, decided to build new facilities in Richland, Washington, after receiving a contract to manage the Federal government's huge atomic energy research plants nearby. Naramore, Bain, Brady and Johanson were hired to master-plan and design the new facilities, the first stage of which is shown here.

The architects were confronted from the beginning with a program which called for a complicated number of individual spaces and rather small laboratory areas. It is a program to house individuals or small project groups who work alone, rather than to house people who work constantly together or require frequent and efficient access to each other. It is, again, a program for thinking rather than doing.

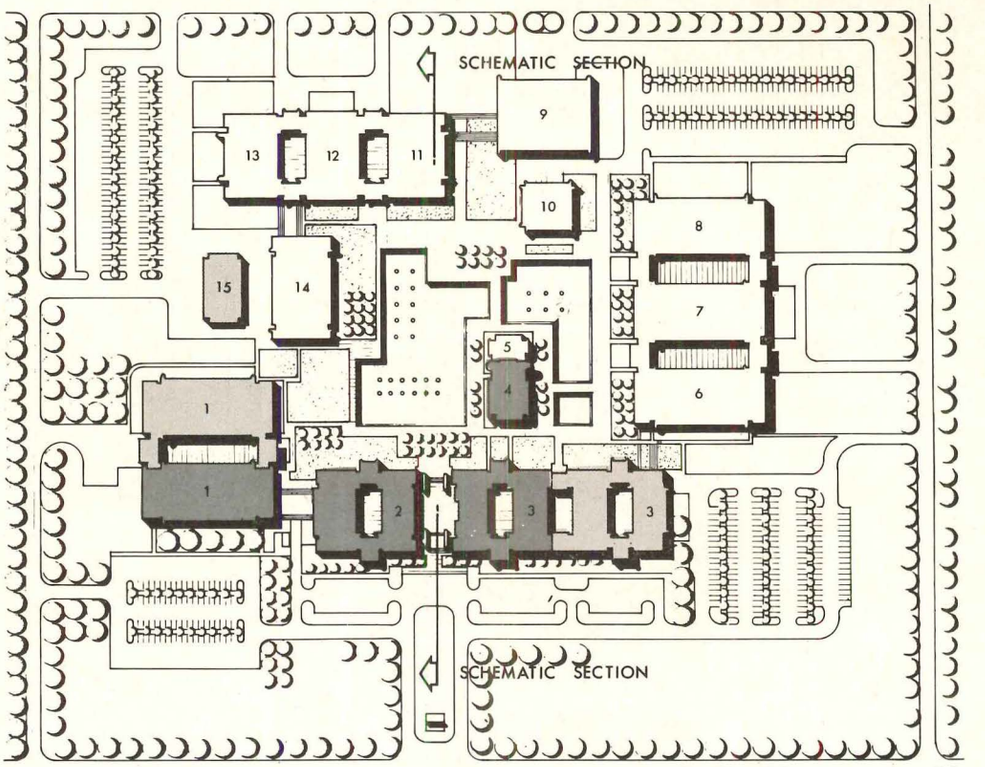
FACTORS AFFECTING DESIGN

As the normal work of the laboratories requires privacy, it was felt from the beginning that the architecture should somehow encourage interdisciplinary discussions and the casual meeting of diverse groups, things which do not necessarily occur during the course of work.

Along with this major internal need, the architects list three significant external effects upon the design:

- The large-scale natural elements of the site; that is, the flat, vast range land on which the buildings are placed, and the rugged mountains in the distance.
- The severe climate: strong sun, little precipitation, extreme temperature variations, and a strong, dust-carrying wind. It is principally a desert ecology.
- The man-made facilities surrounding the site, which were considered a detrimental element in the environment.

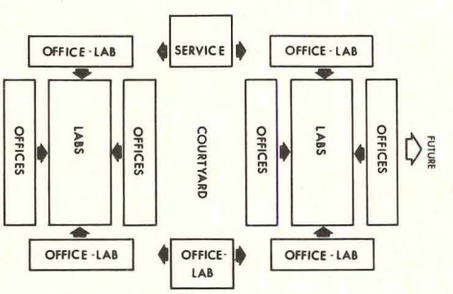
The architects' response to these pressures of the site and the nature of the work performed was to turn the project inward. A rather formal line of trees has been planted completely surrounding the site, along its periphery road, strongly identifying those elements included in the project, and those excluded from it. Their function



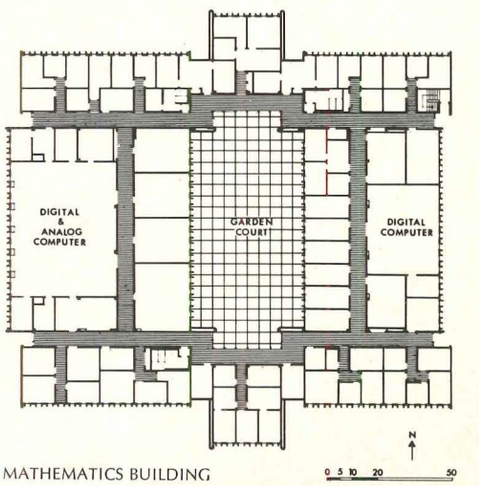
SITE PLAN OF BUILDING COMPLEX

1 Physical Sciences
2 Mathematics
3 Research Operations
4 Auditorium
5 Library
6 Plastics
7 Metallurgy
8 Chemistry
9 Maintenance
10 Cafeteria
11 Pollution Control
12 Food
13 Wood
14 Electronics
15 Engineering

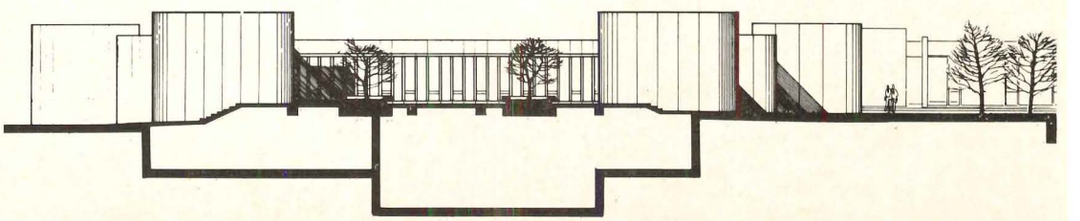
Completed
Under Design or Under Construction
Future

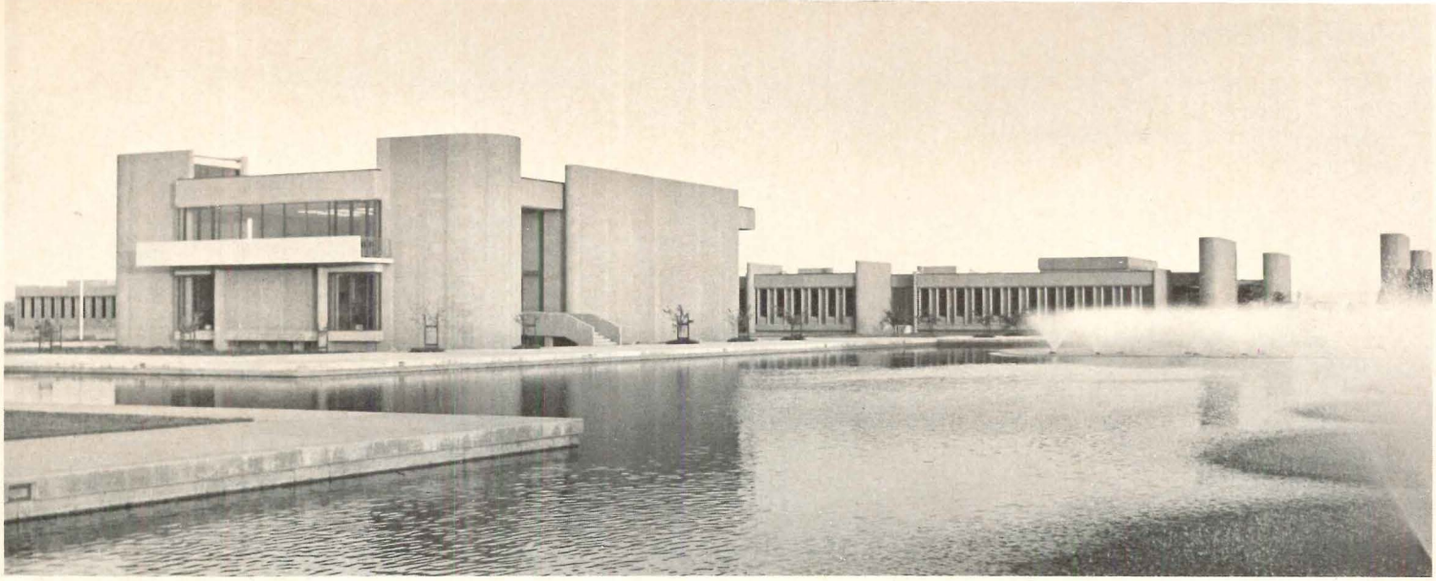


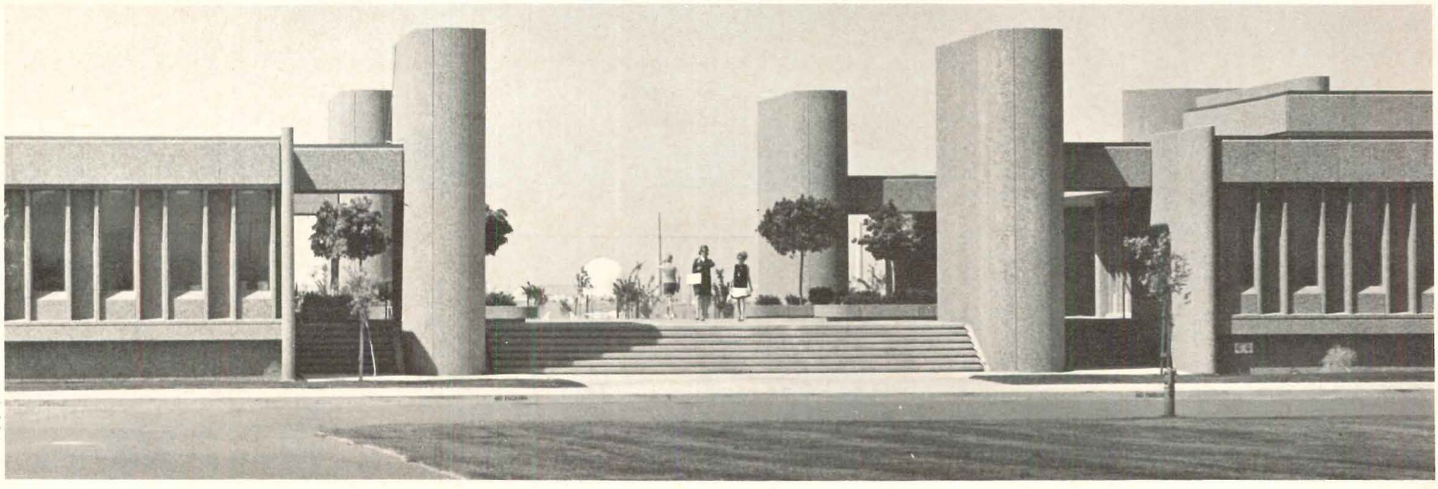
CIRCULATION AND ACCESS DIAGRAM



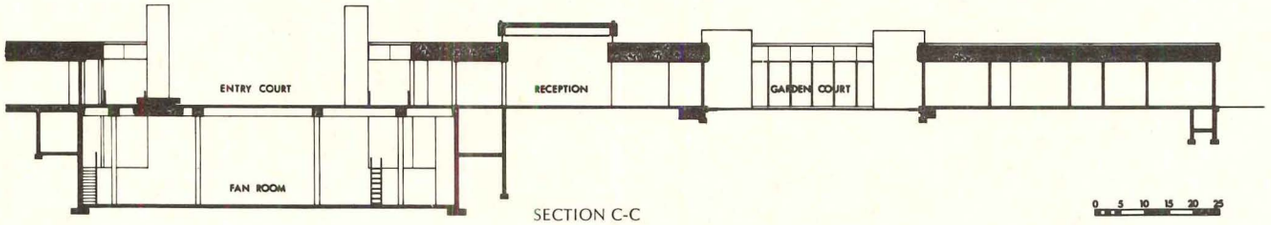
MATHEMATICS BUILDING



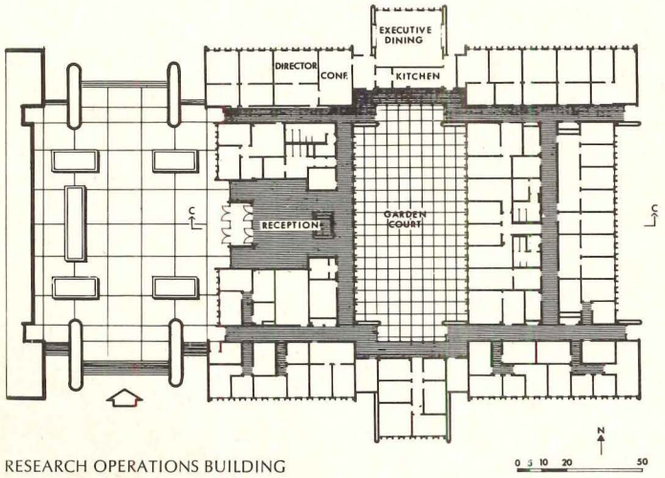




Art Hupy photos

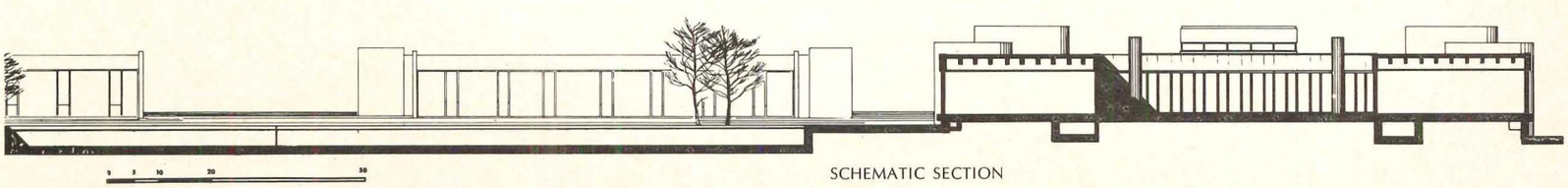


SECTION C-C



RESEARCH OPERATIONS BUILDING

The four buildings now existing accommodate about 400 people, one-half of them the scientists and Ph.D.'s who form the nucleus of the Battelle research capability, and one-half of them technicians, clerical help and administrative staff. The Research Operations Building (left) houses the administration, including a small executive dining room and the public reception area. The Mathematics Building (far left) houses the two large computers on the site, a major support facility for all research. The schematic section (below) is cut through the entire site, showing the shallow pool at the center, and the main mechanical equipment room below the entrance court.



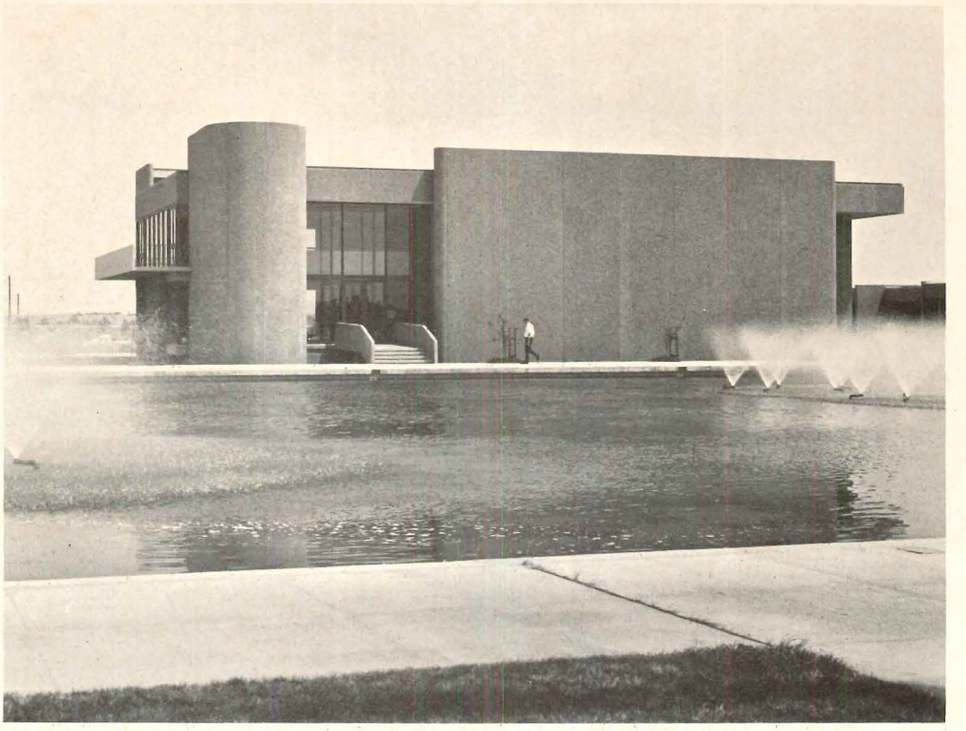
SCHEMATIC SECTION

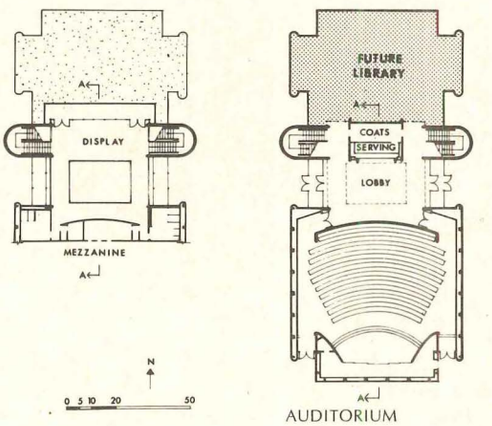
is symbolic now, because the trees are not yet grown, but eventually they will act also as a visual screen and as a windbreak. The ten-year plan for the total campus, and the individual buildings themselves, continue the focus inward. The center of the project is its man-made pool, around which all of the buildings will eventually be placed. Visually, the pool is a surprising, textured, and dynamic feature, with rippling, shallow water and formally arranged sprayers. As a part of the mechanism of the site, the pool performs as the heat sink for the air-conditioning system, with some of the heat diffusing through the spray itself. The individual buildings are further turned inward toward their garden courts, so that the whole is a progression of inward focuses from trees surrounding the site at the largest scale, to the courts of the individual buildings at the smallest.

The campus, as it seems proper to call it, has an oasis-like quality about it; it seems special, slightly austere, a controlled and contemplative world. The buildings, the ground between them, and the pond are raised a full four feet above the surrounding site, so that one must walk up a broad flight of stairs to enter a building or pass between them to the pool. The pool and walk surrounding it have then been lowered two feet to an intermediate level (see schematic section, preceding page). The buildings and walks on the podium form a strong horizontal element, rhythmically strengthened by the vertical panels of the window walls, but interrupted by the vertical pylon forms, which occur as parapet end walls and, at the entry, as announcements and direction-givers to the public. These entrance pylons double as supply and exhaust shafts for the mechanical room below them. The varied exterior forms are held together visually by the use of one exterior material, precast concrete. It carries a strongly textured, pebbled finish throughout, with the aggregate color from a light tan to dark brown.

One of the prime architectural purposes at Battelle, then, has been to aid in the mixing and social exchange between people, and this has been complementary to the physical need for enclosure, caused by the climate and the immediately adjacent environment. The inward focus, its exclusive as opposed to inclusive arrangement, tends to create in its users a sense of belonging together, of being members of a larger unit than their individual projects define or are able to include. In this sense, the values of the architecture, the issues to which the design presents itself, are not technical—solving any complicated functional need—but psychological, in the range of visual imagery and symbol.

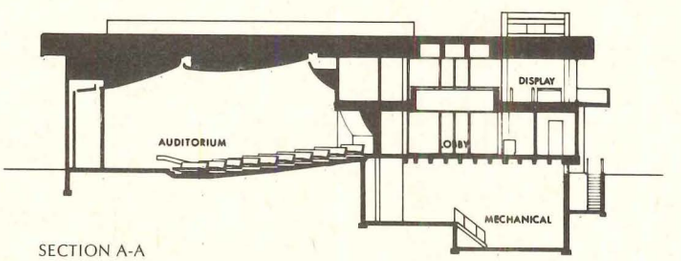
BATTELLE-NORTHWEST TECHNICAL CENTER, Richland, Washington. Architects: *Naramore, Bain, Brady & Johanson—William Bain, Jr., partner-in-charge; Michael Ossewaarde, project architect; James Jonassen, job captain;* structural engineers: *Skilling, Helle, Christiansen, Robertson;* mechanical and electrical engineers: *Bouillon, Christofferson & Schairer.*





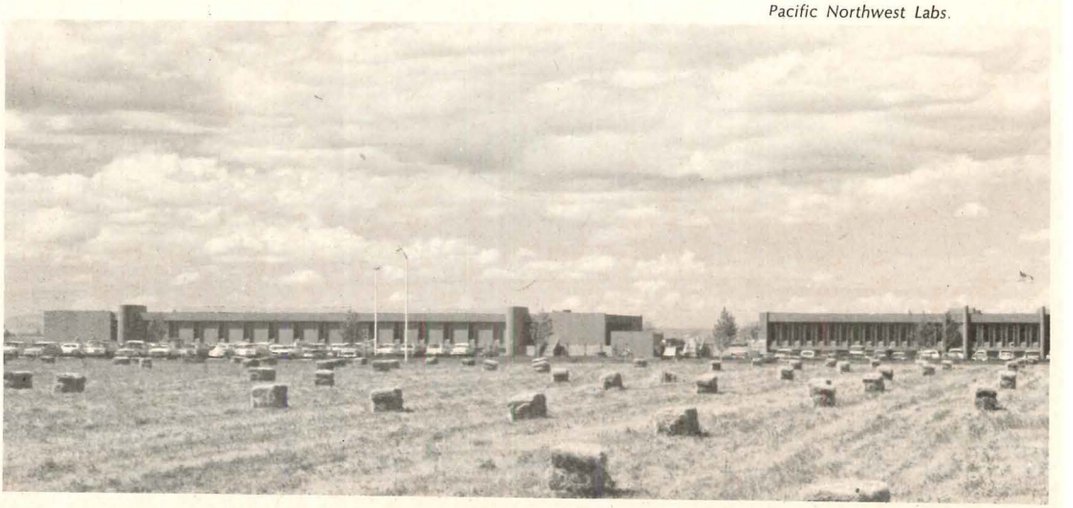
AUDITORIUM

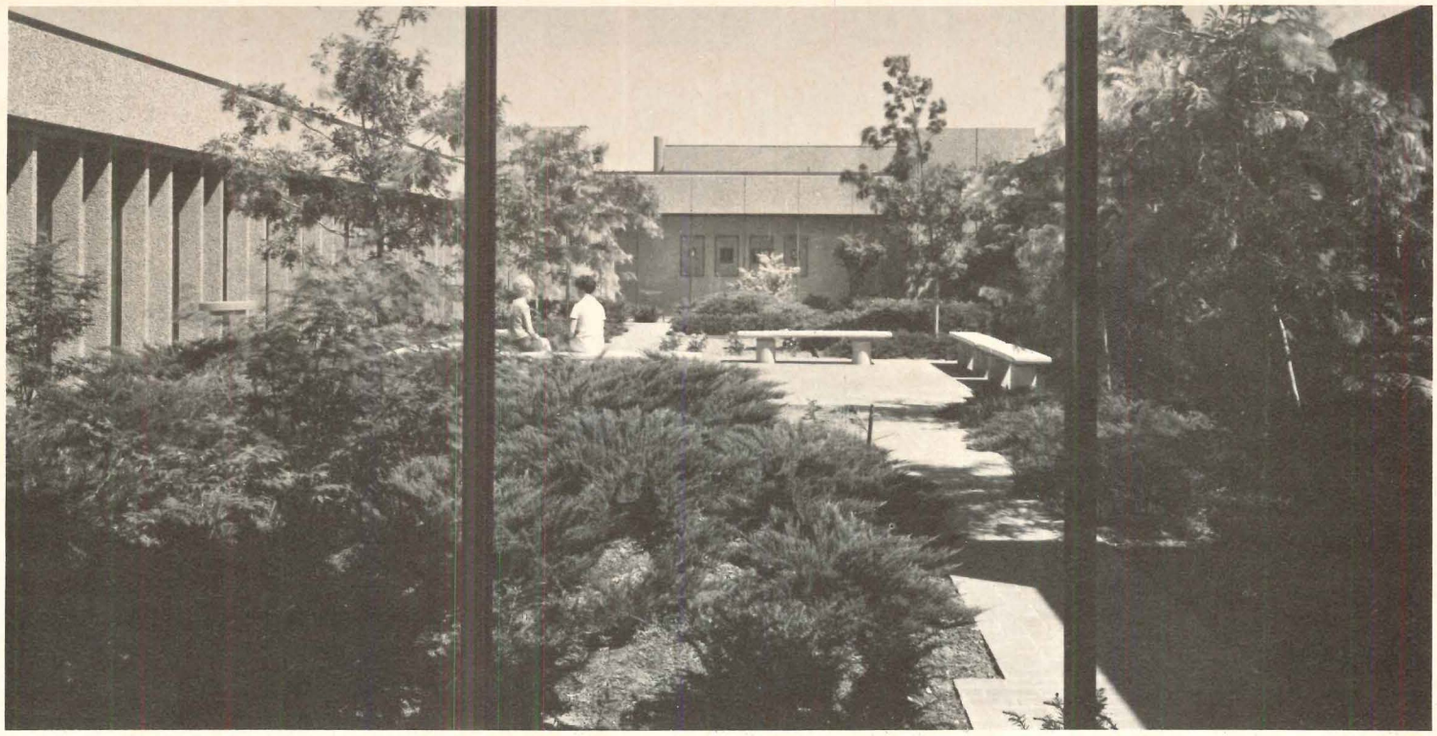
Above is a view of the auditorium and the pool which surrounds it on three sides. At right is the interior of the two-story auditorium lobby, shown also in the section, below. The future library, to be added to the present auditorium, will contain 4,000 square feet of floor space and is scheduled for completion in 1970. Battelle owns a large tract of land surrounding the development site, which is now planted in alfalfa (below). This field will eventually be supplanted by pilot manufacturing facilities.

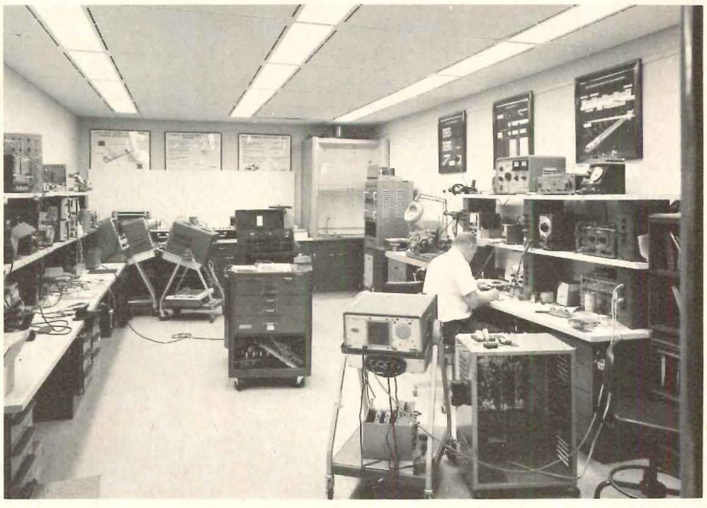


SECTION A-A

Pacific Northwest Labs.

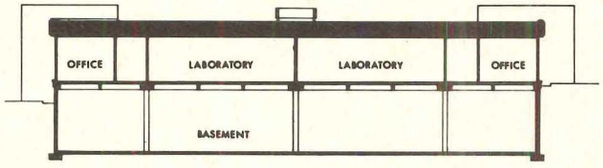




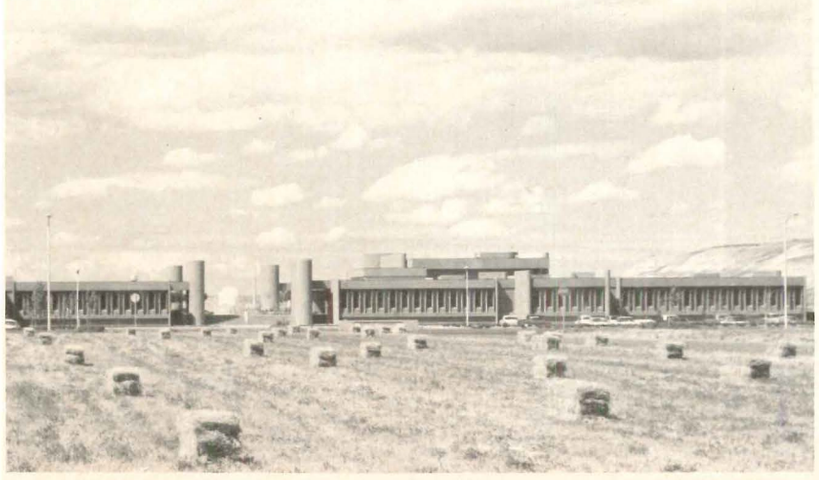


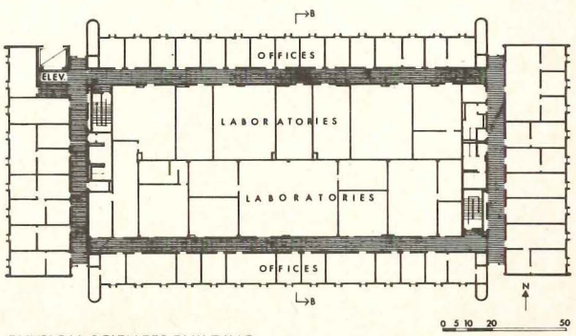
Pacific Northwest Labs.

The Physical Sciences Building (below) has its offices arranged along the exterior, with its larger laboratory spaces (one of which is shown above) placed on the windowless interior of the building. The partitions within this structure and the Mathematics Building are organized on a grid system, and have proved very flexible as space requirements change. About 95 per cent of the partitions in these two buildings do not extend to the ceiling, making the interiors more spacious in reality than they might seem in plan.



SECTION B-B





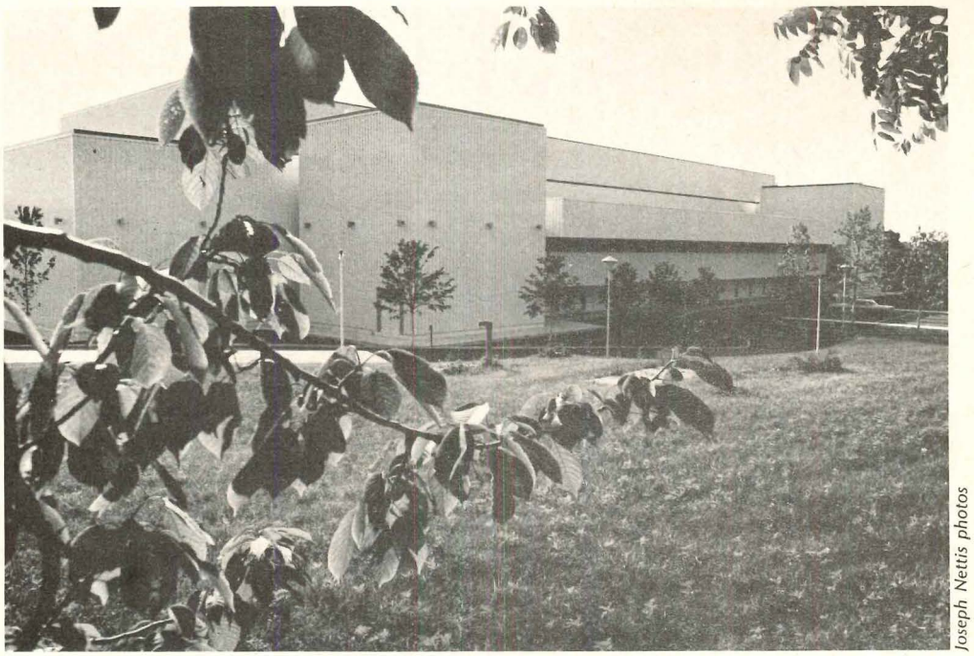
PHYSICAL SCIENCES BUILDING

A LABORATORY FOR SPACE RESEARCH:

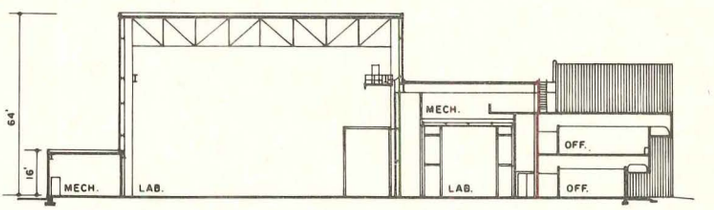
To be told what is needed, but not what goes on

A special problem is likely to occur in the design of facilities for the space program. What will be done in a client's building may be a secret, and the architect will not, cannot be told what goes in it. Yet he must design the project.

Vincent Kling and Associates confronted this problem in their design for General Electric's M.O.L. Facilities in King of Prussia, Pennsylvania. G.E. was under commission from the Air Force for research and development of some portion of the Manned Orbital Laboratory facilities, the same program which recently was cut completely from the Air Force budget by the Nixon administration. Few people knew then and few people know now exactly what R & D was to be carried out there; certainly the architects could be given very little, if any, information about it. Yet G.E. needed rather large new spaces to carry out its government contract. At this point the problem becomes a logistical one for the client as well as the architect. The client must determine how to communicate what is needed without telling what goes on; the architect, at least in this instance, must design a workable exterior envelope without knowing what will go in it.



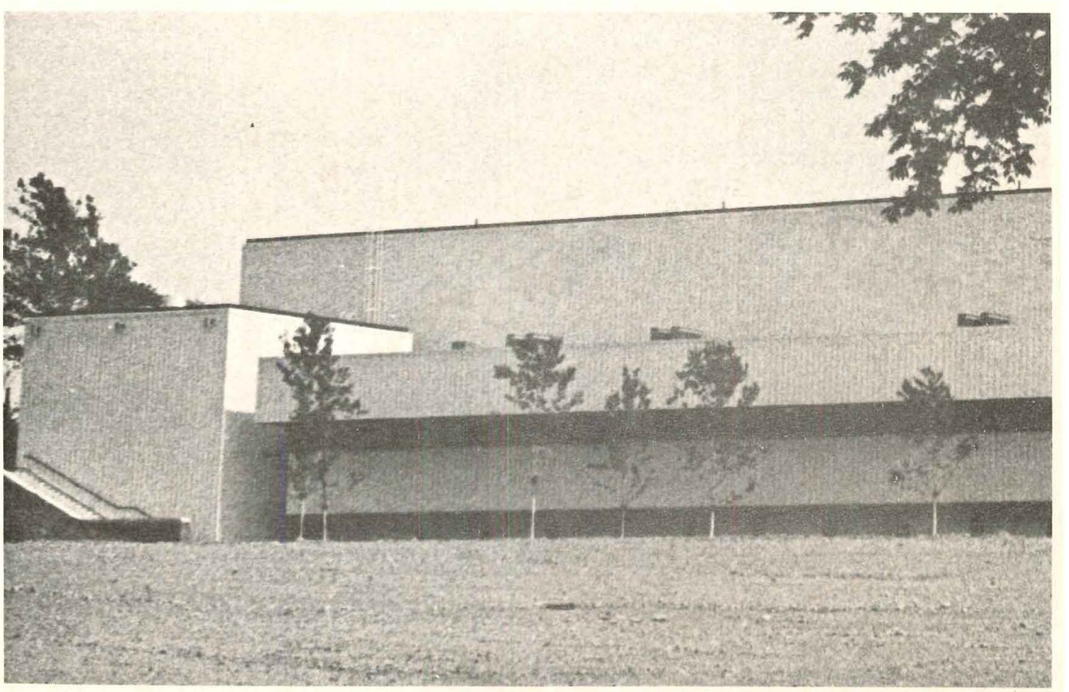
Joseph Nettis photos

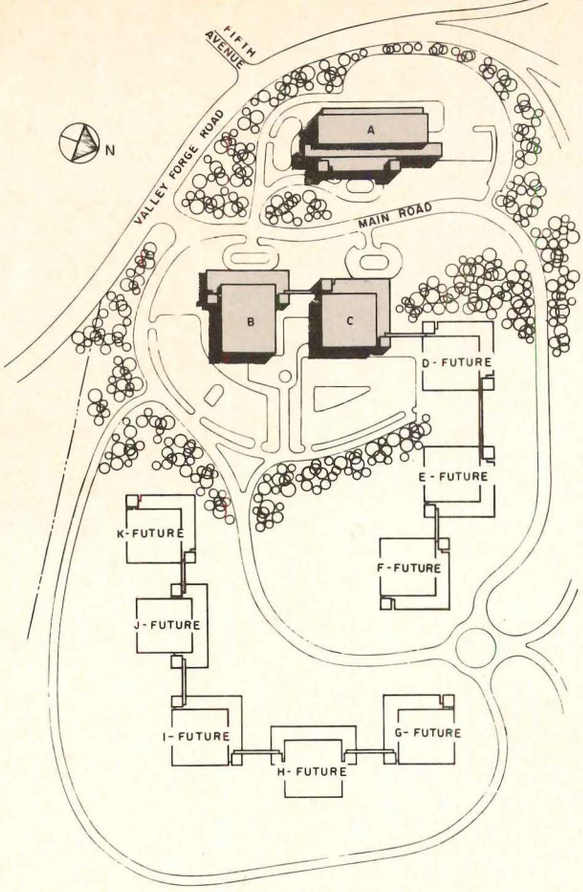


SECTION A-A

THE DESIGN METHOD: MULTIPLE SCHEMES REFINED BY DISCUSSION

Kling's office was given the specific site on which the facilities were to be placed, and told that they were to be concerned only with designing and producing working drawings for structural work and the shell; there would be a separate contract for the design and installation of interior partitions and all furnishings and equipment. G.E. told Kling they needed a scheme that would provide 1-million square feet of laboratory and office space in ten separate buildings, only two or three of which would be built initially. Each 100,000 square-foot building would be half laboratory and half offices, the labs to have a clear ceiling height of 40 feet and the office space to have a ceiling height of 15 feet. Separate entrances and parking facilities had to be provided for each building, as it might suddenly be changed to a different R & D project, and the laboratory area of each building had to be capable of at least 50 per cent expansion on its site. That is substantially all the architects were told. There was no written document or program, certainly no long list of design criteria, opera-



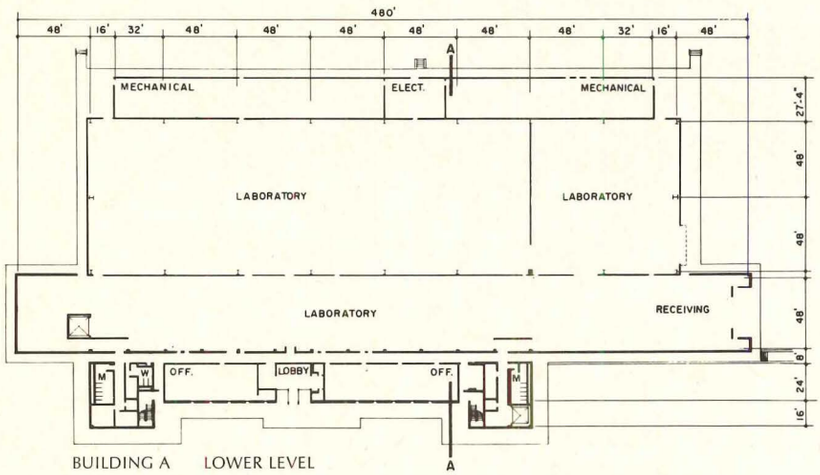


EXISTING LABS

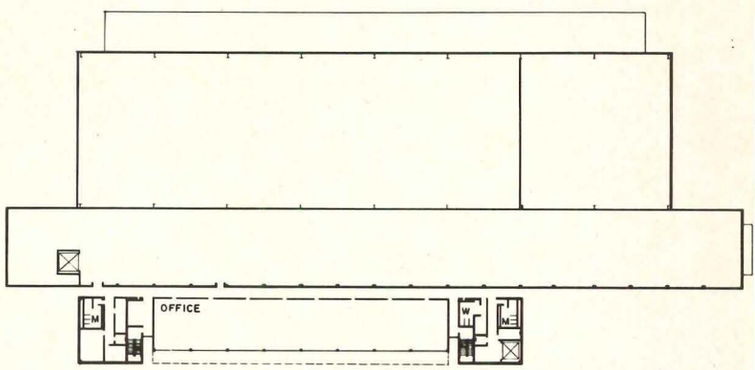
FUTURE LABS

The site plan at left shows the ultimate development of the 130-acre tract and the locations of buildings A, B and C, the only structures built so far. There are only two basic shapes to buildings B through K. One has the linear office envelope wrapping around two adjacent sides of the laboratory space, and terminated by the vertical cores at opposite corners of the lab. The other has exactly the same length of office space along one face of its laboratory, wrapping partially around two adjacent sides, and again terminated by the vertical cores. These two basic buildings are placed on the site to conform to the contours of the land, and oriented to give the offices the best possible views of the wooded setting.

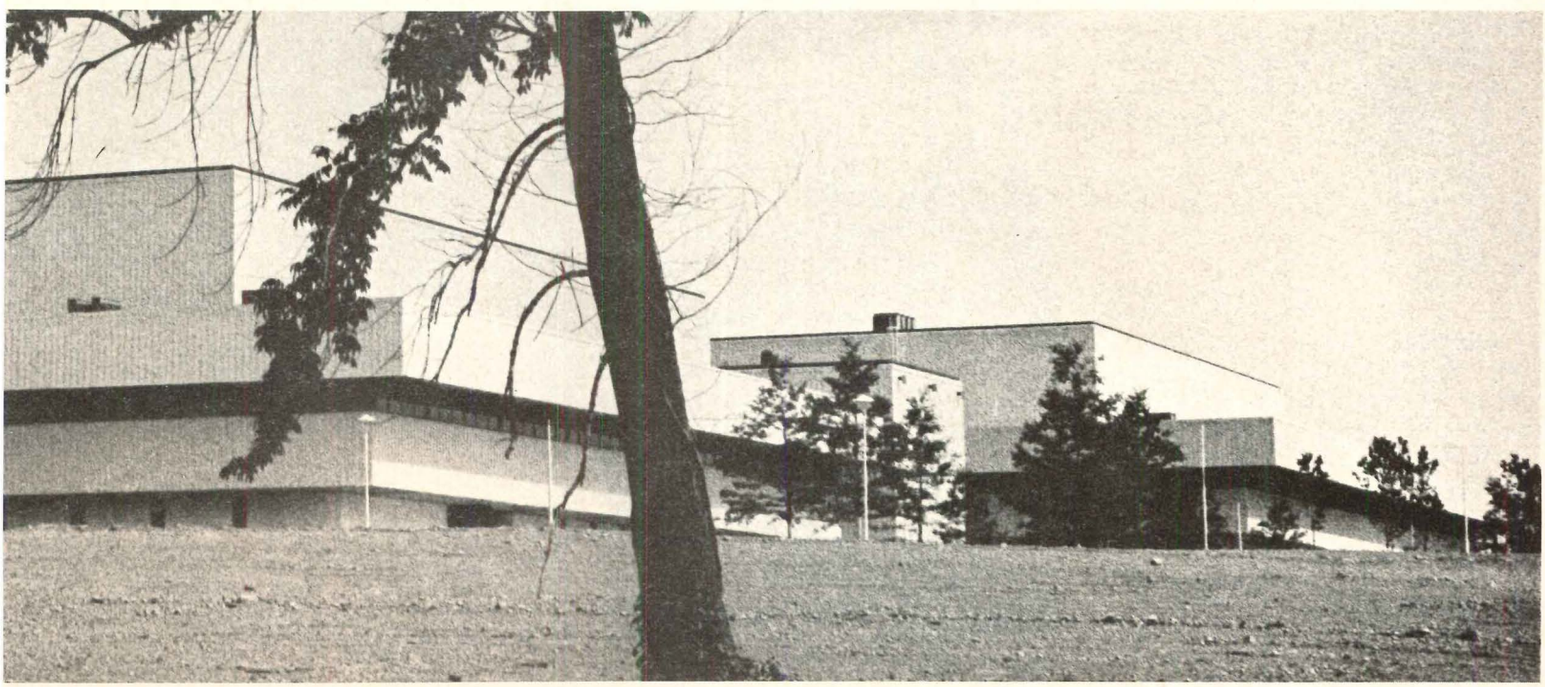
Below are the floor plans and section of building A. All its laboratory spaces are "clean" rooms, which means its air is constantly being filtered to remove dust, all surfaces are smooth and washable, a vestibule occurs before all entrances to the laboratories, and there is an "air shower" arrangement before the door to each vestibule.



BUILDING A LOWER LEVEL



BUILDING A UPPER LEVEL



tions, functions or equipment to be housed.

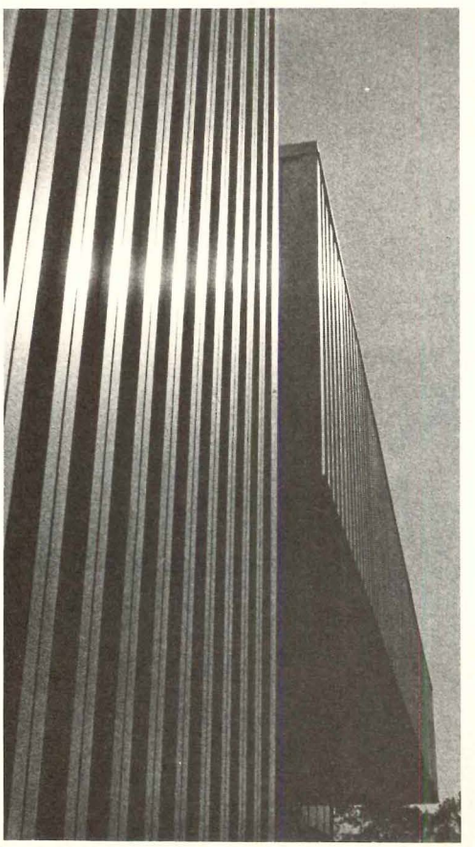
Kling's office worked with several schemes for fulfilling these requirements, and refinements were carried out through discussions with G.E. At one point the client said ". . . now try those same ceiling heights and the 1,000,000 square feet in three buildings," and Kling, at the client's request, eventually did a one-building solution on the same site. Given the need for secrecy, this system of designing multiple schemes, then rejecting, selecting and refining by discussion would seem to be the best, perhaps the only, procedure possible. The need for security wasn't the only reason for the client's not stating specific needs, of course; G.E. could not know what would be required for research on a heretofore impossible platform in space. Eventually a scheme based on the ten-building format was selected, and refined into the design of the finished laboratories we see here.

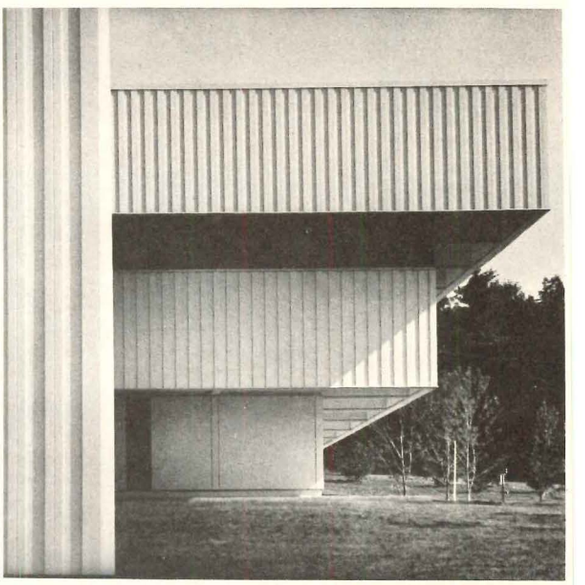
Buildings B and C (see site plan) are the only two of ten structures B through K which were proposed based upon the design format just presented. Building A, which completes the group of three structures now built, was always separate from the others, and formed to meet more precisely known functions. It has 90,000 square feet of floor space, including two linear labs with ceiling heights of 65 feet and 45 feet, respectively.

The site is a 130-acre tract, rolling and partially wooded. The three buildings are designed and sited to allow free growth of the lab space in at least one direction, and two weeks before completion of working drawings G.E. wanted building B expanded one column bay, or 48 feet. This was quickly accomplished, and is indicative of the growth possibilities in these buildings. Buildings B and C have identical amounts of office space, and two identical core units per building; they differ only in the placement of their cores and offices in relation to the laboratory space (see floor plans). The two-story office spaces are designed as continuous linear elements, to be cut off or lengthened as needed, simplifying construction and detailing. The vertical cores, which terminate the office lengths, are identical to each other on all three buildings, and contain stairs, elevators, lavatories and storage.

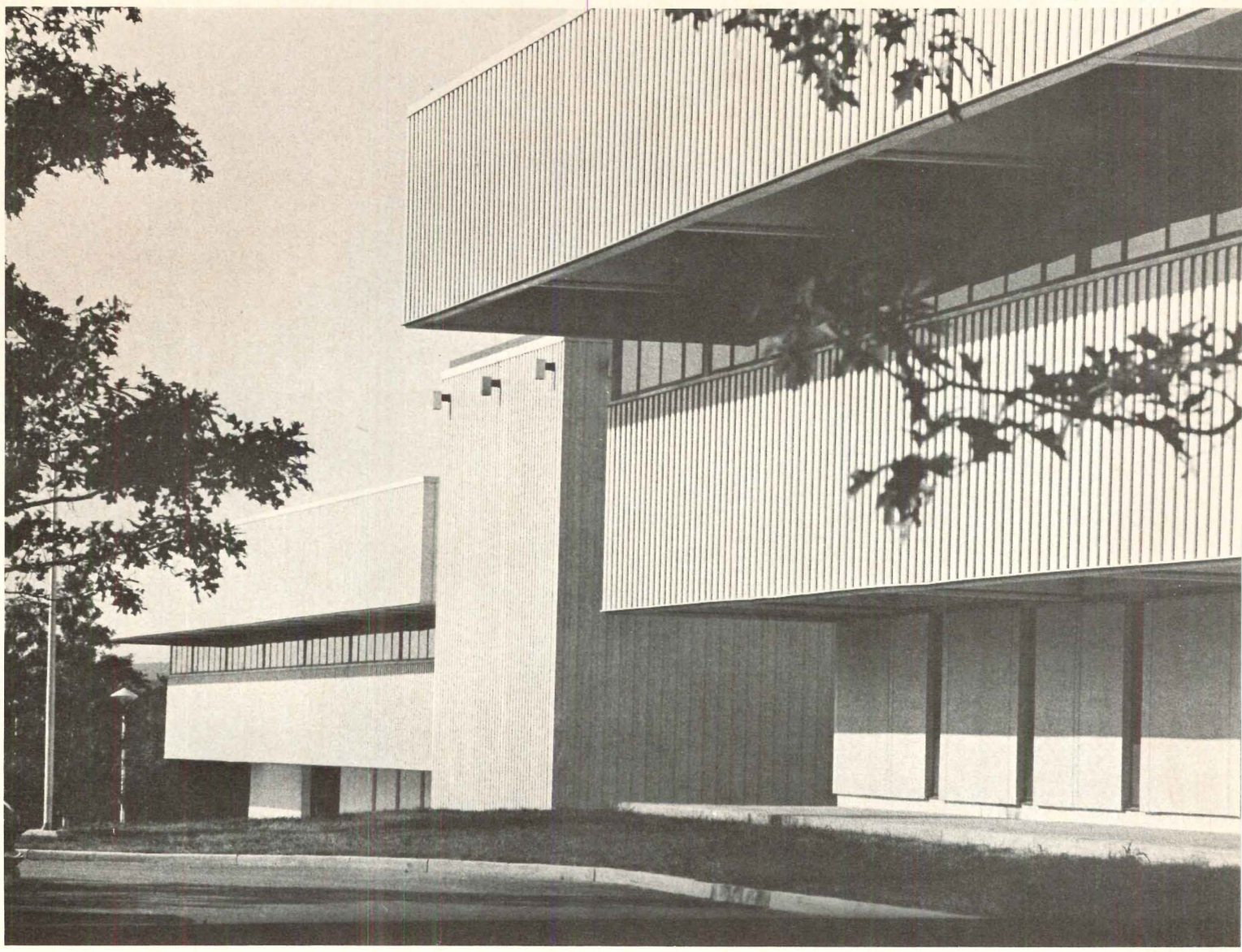
The M.O.L. facilities will receive a severe test in the coming months, as apparently G.E. must convert them to other purposes or abandon the spaces. This is the kind of problem for which the buildings were designed; so far they have proved to be the most flexible and easily altered facilities that General Electric operates at its vast King of Prussia installations.

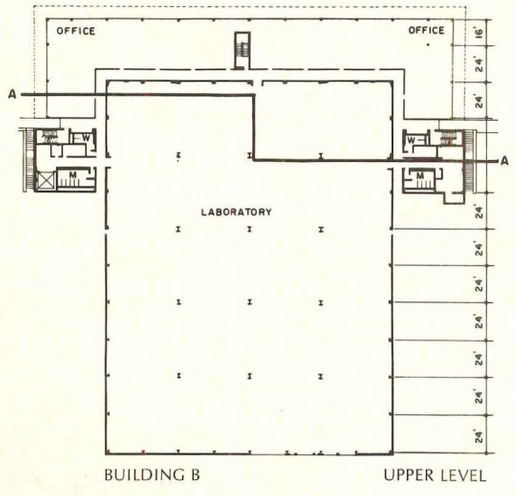
BUILDINGS A, B & C, GENERAL ELECTRIC MISSILE AND SPACE DIVISION, Valley Forge Space Center, King of Prussia, Pennsylvania. Architects: *Vincent G. Kling and Associates;* engineers: *The Kuljian Corporation;* contractors: *Turner Construction Company and McCloskey and Company.*



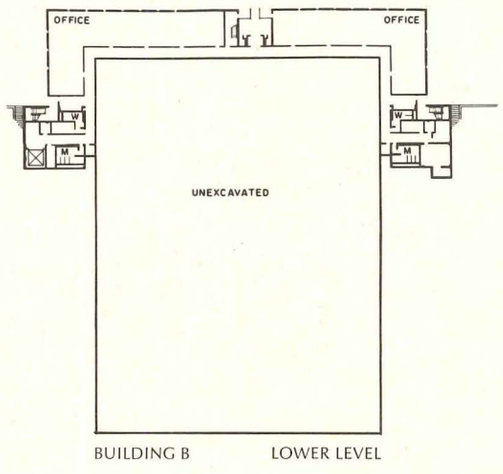


The overhanging offices and roof are dramatic forms in the composition, and their detailing in metal siding seems particularly well handled. All siding is painted a subdued eggshell white, which contrasts with the dark continuous glazing at the upper floors and allows strong contrasts in the shadows cast upon it.



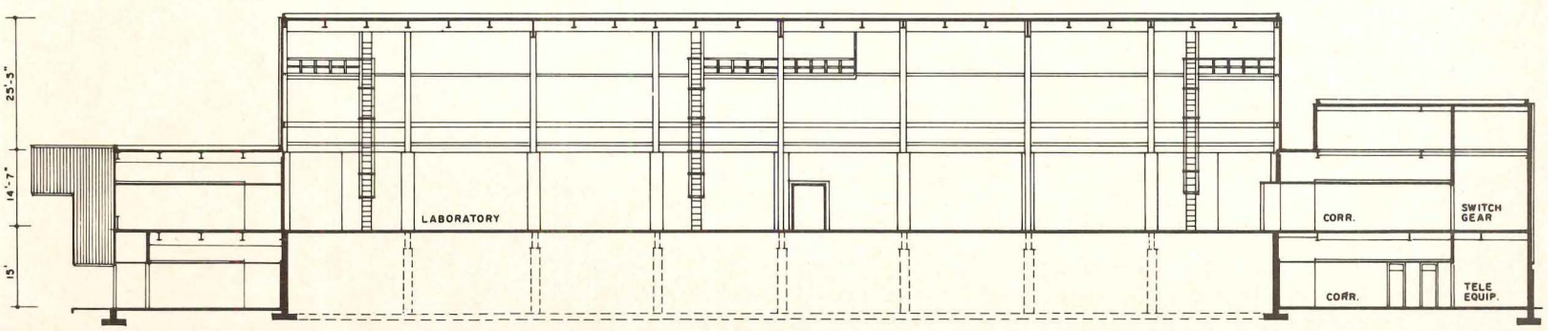


BUILDING B UPPER LEVEL

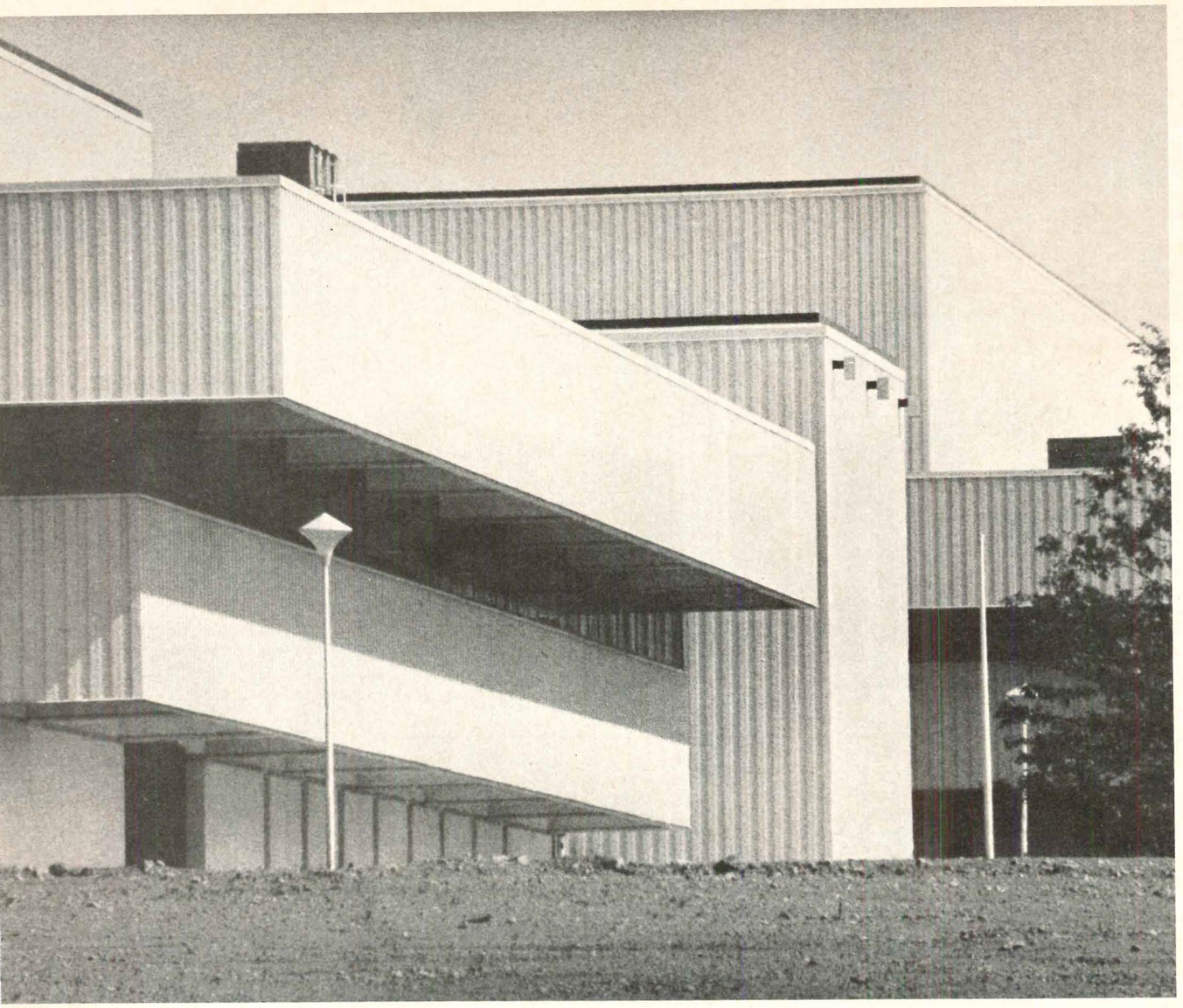


BUILDING B LOWER LEVEL

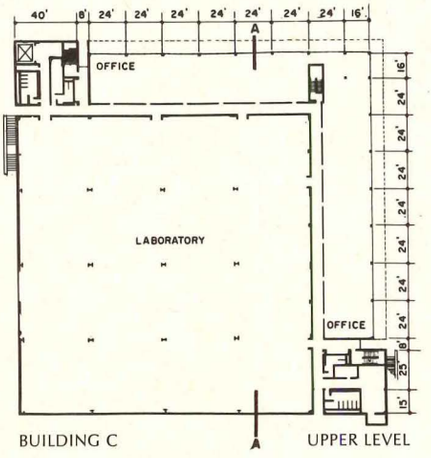
At left are the floor plans and sections for building B. The upper floor of the offices is on the same level as the laboratory floor, as can be seen in the section. Note the overhang of the second floor offices and the overhanging roof above that. A "typical" office corner appears in the telephoto lens shots, above and left. Windows on the lower office floors are small (for security) and glazed with unpolished, tinted glass. Bronze solar glass windows with anodized aluminum frames are used on the upper levels and become a continuous band of glazing.



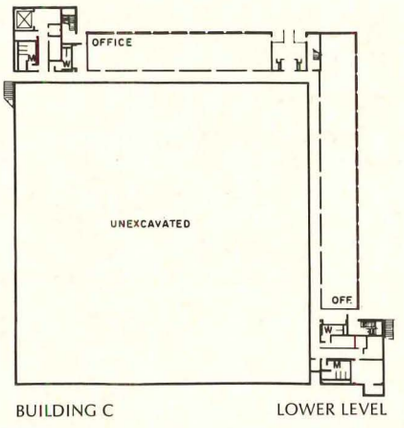
BUILDING B SECTION A-A



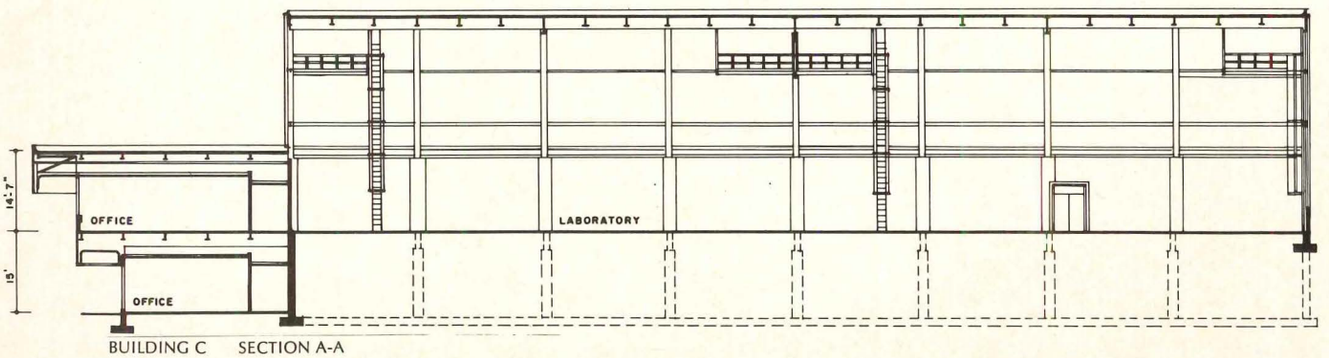
At right are floor plans and sections of building C. The photo above shows how the varied but logical forms of the three structures can be seen together on the rolling site, and form a rather dynamic composition. All three buildings are steel framed on concrete foundations, with vertically ribbed aluminum insulated panels used as sheathing. Metal paneling was chosen as the only material capable of being dismantled for expansion, and all walls that may eventually have to be removed use special screw fastenings, rather than rivets, for quicker dismantling.



BUILDING C UPPER LEVEL



BUILDING C LOWER LEVEL



BUILDING C SECTION A-A

What the systems approach means to air conditioning Part 2

by Robert E. Fischer, senior editor, and F. J. Walsh, consulting engineer

Better and less-expensive air-conditioning systems can be designed, bought and installed today—they need not await technological breakthroughs. The fact is that the product technology exists, and the design expertise exists. Most problems in engineering and economics, and with labor, are amenable to practical solution. There are, however, constraints to better air-conditioning systems, and these lie mainly with the owner. The results he gets depend largely upon how carefully he selects, and how well he utilizes professionals, and upon how well they draw on the knowledge and experience of manufacturers and installing contractors. Architects and consulting engineers need to make it clear to owners what the realities of the building industry are, and how these relate to the selection of the most effective system for each owner's purpose. They must define levels of quality and performance for various kinds of owners so they do not turn to simplistic, purchasing-oriented solutions that fail to meet their real needs.

Any systems approach to air conditioning has as its objectives—just as it does with other elements of buildings—the control of costs, the control of construction time, and the control of performance.

Success of any systems approach to air conditioning—in the largest sense—depends upon who is involved, what they know, what they do; what level of quality and performance they want; who designs the equipment and what causes them to change; who makes the decisions on the pieces that are specified and on the total system; how evaluations of results are made.

In the final analysis, success of the systems approach to air conditioning today rests not upon innovation nor upon technology, but upon how knowledgeable the owner-buyer is. The reason is that the client's attitude toward what he is willing to pay for professional services, whether or not he spells out the qualifications of professionals in detail, and how he goes about "buying" buildings will determine how much time, effort and technical know-how his consultants can bring to bear, and what quality installation the contractor can put in. The more staff people the owner has at the same level of understanding as the consultant's staff, the more intelligent job he can do as far as "buying" results and evaluating them.

Practically all the technical information and manufacturer engineering back-up that is needed for mechanical system design is available today, but it is not being effectively utilized. Of course the increase in size and complexity of systems has increased problems.

How changes in buying practices and new buyers affect air conditioning

New product design trends and purchasing practices that have developed in response to economics include: centralization using larger equipment; broader product lines; single-source responsibility; and decentralized approach with modularized packages. As a result some manufacturers are getting a larger share of the market. For example, rooftop chillers are increasing tremendously, but total chillers are not, except resulting from the larger volume of building.

Costs sometimes got out of hand in the past with the larger prestige projects because it was fairly common for owners to make many changes in requirements before and after contract, working with the "better" general contractors and mechanical subcontractors. This, of course, resulted in problems in establishing original budget, and also resulted in extras and mark-up upon mark-up.

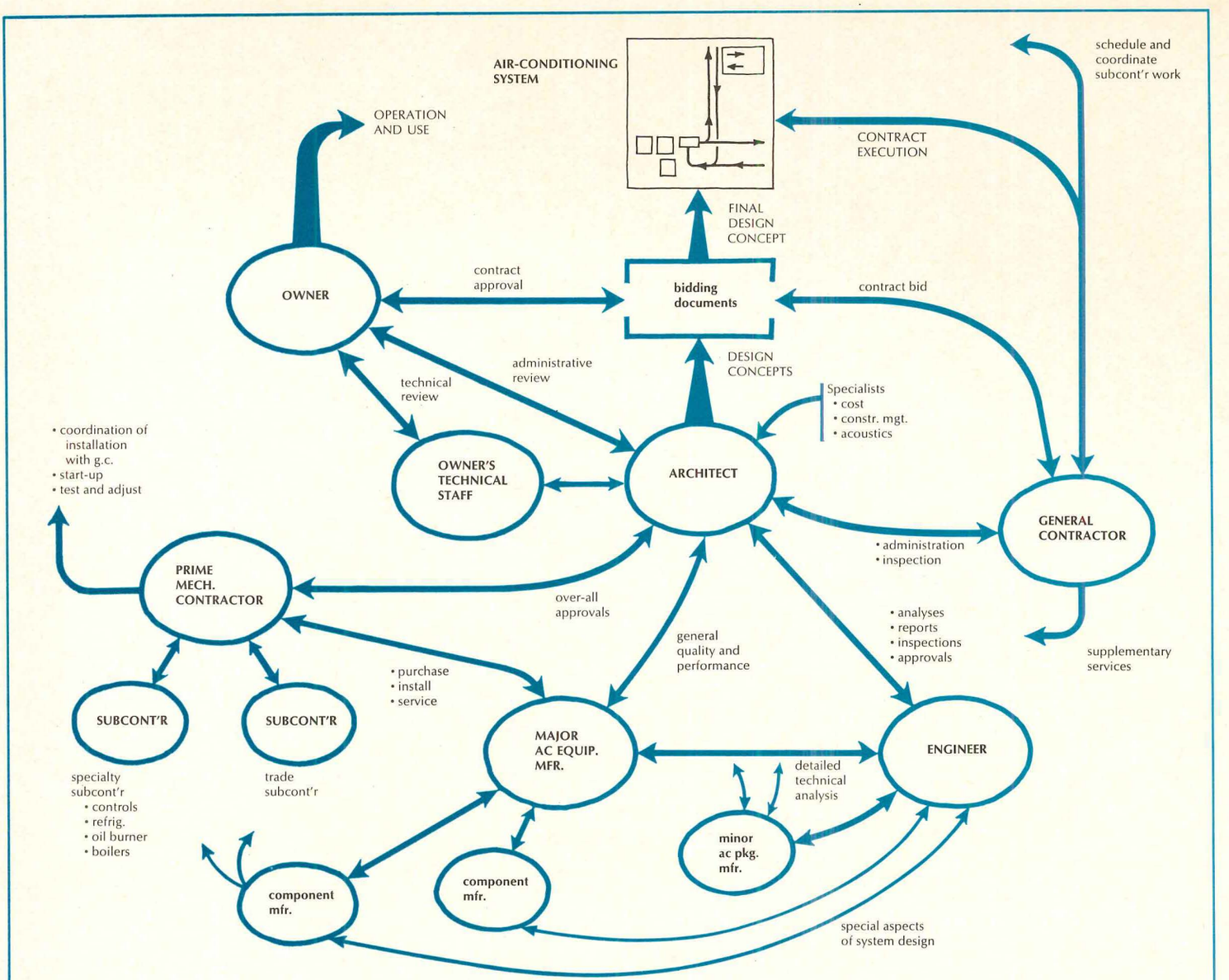
Some of the more cost-consultant-oriented contractors, realizing the absurdity of this situation, and knowing that few of these owners really understood quality, sold the idea of emphasis on a strong—almost guaranteed—cost. This, of course, required these consultant-contractors to be associated with projects from their inception, and gave them a stronger voice than the consulting engineer. In this way they were in a position to advise the owner in a positive fashion of the cost implications of any changes. But the real implication of this approach is that any change which weakens the relative position of the necessarily independent professionals can seriously weaken quality control and performance potentials.

Another trend related to costs is that of volume purchasing, such as by large builders, developers and franchisors. What are the implications of the manufacturer selling at a low-low price to such buyers who will guarantee them a certain volume of business?

While the manufacturer reasonably can give quantity discounts impartially for volume purchases because of inherent savings, there are certain items of cost that cannot justifiably be cut. The manufacturer is always under pressure to sell as large a volume of product as possible—thus the temptation to sell at a special price. Even though cost accounting might justify this, the practice is unfair to numerous other customers, principally smaller. But the special-price buyer is not pulling his own weight in regard to profit necessary to improve the product through research and development. A sales representative can, of his own choosing, make less profit at his own peril, and thus favor certain customers. But the manufacturer really cannot.

If other customers, too, are less par-

F. J. Walsh is a consulting mechanical and electrical engineer as well as a consulting management engineer.



Changing face of building industry inter-relationships

Changes taking place in the *real* relative influences of various functional groups within the building industry are subtle and gradual—despite what the unsophisticated observer might be tempted to conclude from the crisis mentality developing lately that assumes major shake-ups are imminent. Changes occurring vary, depending upon building type and size, and upon criteria set by owners and buyers.

Major concerns at the moment include inordinate jumps in the cost of field labor, the inflationary effects of union restrictions, and the lessening competence of field labor. The response to these has been an acceleration in the trend toward more inclusive packages, prefabrication, and the use of systems requiring less coordination between trades.

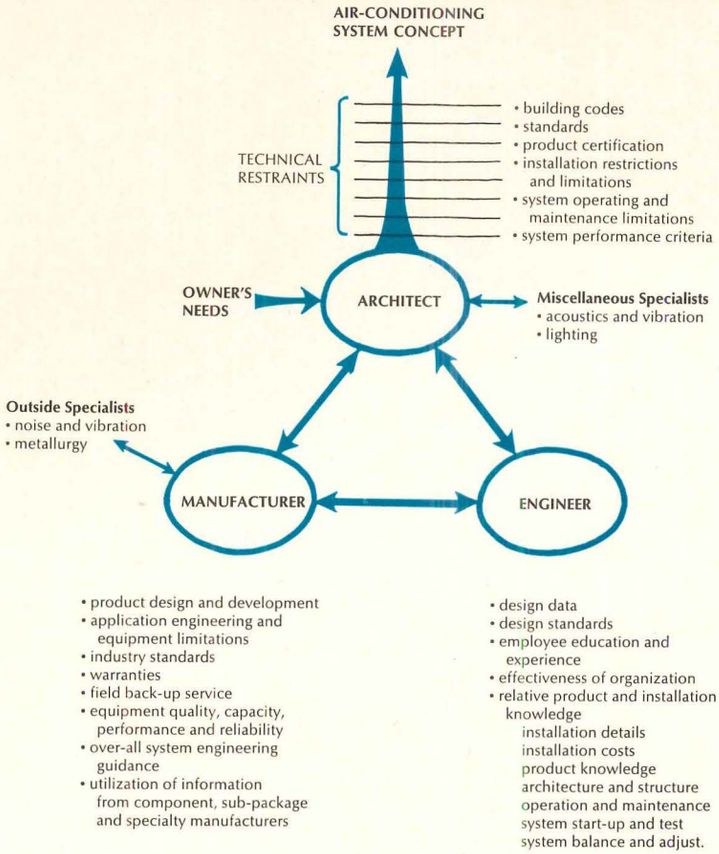
The constraints under which each functional group works are determined by the marketplace, and depending upon the building type and buyer category, one group or another works under relatively "protected" circumstances. That is, the buyer's confidence is such that judgments or evaluation criteria are seldom questioned or criticized by others. Of course, the large systems purchasing projects would be an example of a "protected" situation.

A systems approach to air conditioning should seek optimum application of existing technology in terms of desired system quality and system performance (including reliability), rather than merely minimum construction time and system cost. No balanced industrywide or professionwide effort has yet been made in this direction. A true systems approach to air conditioning would invc've a piece-by-piece evaluation of technology and of how existing manpower could best be used.

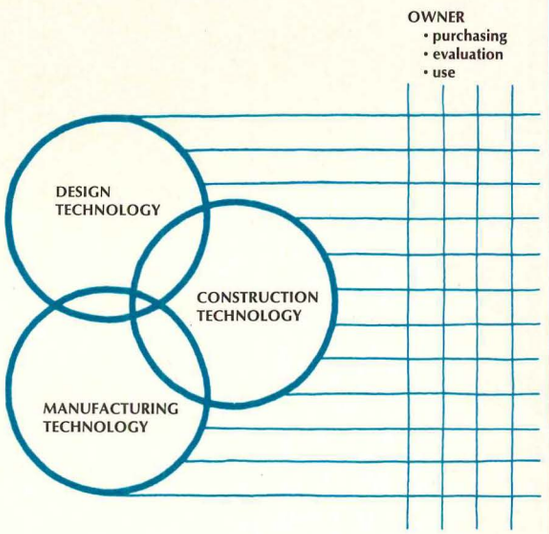
For example, if the expertise of component manufacturers (fans, compressors, pumps, burners, flow regulators, controls, etc.) were more effectively utilized, a more realistic picture could be formed of what changes are practicably possible in size reduction, reliability, noise and improved performance. Reason is that all major packages and systems start with components and accessory packages.

Certainly not much can come from thinking done in simplistic "systems" terms—terms tied to vaguely understood performance criteria. Neither can magic new ideas be expected from the air-conditioning industry. The state of the art and the structure of the industry favor evolutionary rather than revolutionary change in basic technology.

Management has been led to think that today all results can somehow be quantified. While this may be valid up to a point, the numbers may be laboratory, not field, values; the tests used may have little relevance to actual conditions; the numbers may not be put in context. This has happened in the areas of thermal comfort criteria, acoustics, construction cost figures, etc. The situation worsens because simplistic figures sell the unsophisticated buyer and make him feel safe.

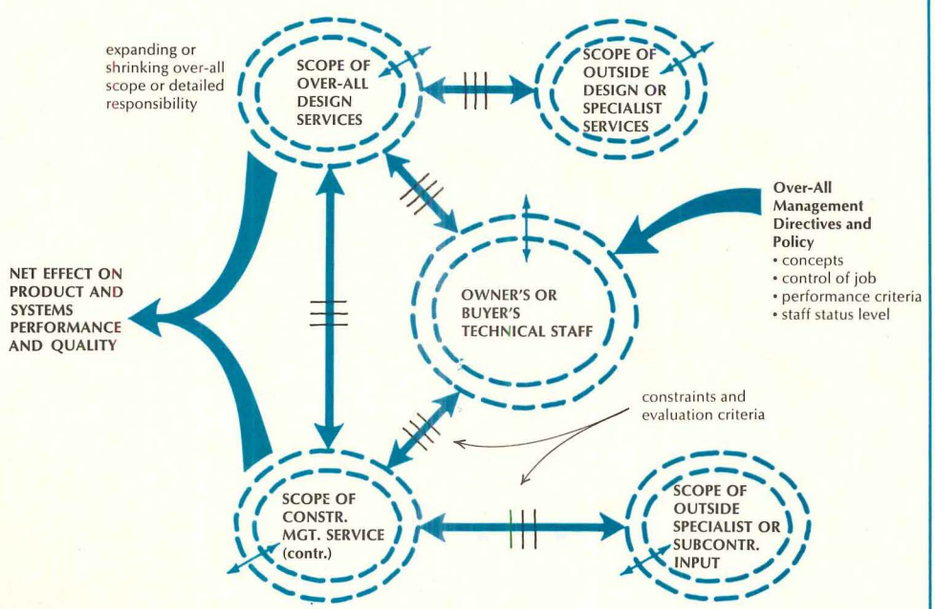


Factors determining air-conditioning system concept



- How much should one group know of the technological areas of the others?
- Within each group, how much interchange of knowledge is needed? How much exists?
- Does exaggeration of quality, performance or professional mystique lead to wishful thinking by the buyer?
- Is purchasing overtaking engineering in the technological areas of purchasing?

Problems raised by overlapping technologies



Basic conflicts in design and construction relationships

By delegating or assuming certain responsibilities, and by accepting commonly-held buying criteria, owners influence how architects and engineers can market their services, the constraints under which buildings will be designed, and, ultimately, what products manufacturers can market profitably. Most owners in the general building field do not have the knowledge to permit their own technical evaluations. They expect any evaluation as to system or equipment cost, life and quality of performance to be made by the engineer, regardless of how much control he has of results. The design professionals must want to assume maximum responsibility in their areas of competence, and convince owners that prime authority and control should reside with professionals.

The ideal owner would be the one whose staff concerned with building construction has the same level of competence (or at least a comprehension and appreciation of it) as counterparts in architectural, engineering and contracting firms in order to facilitate communications and understanding of objectives. However, few owners outside heavy manufacturing industries have staff competence levels equivalent to those of professionals and specialty contractors. Result is that lines of authority frequently are unclear, and professionals and contractors may find themselves jockeying for authority with the owner's staff or the owner's outside advisers—more so than in the past.

The competence which the owner is able to secure for his technical advisory staff is determined largely—just as it is in any field—by status and recognition given staff within and/or outside the organization, and by financial remuneration.

ticular as regards quality, then the manufacturer cannot put in as much as he did before in application engineering back-up and field service. Unfortunately more and more of them are less particular. Total effect is for the market to be depressed.

The approaches and know-how of volume purchasers cover a wide spectrum

Various buyer categories are highly interested in standardization. These include various franchise operators, large apartment developers, school buying projects such as SCSD, SEF, URBS, etc. These groups form a new or changed market in addition to the old-style competitive market; thus, manufacturers have more of a problem today knowing who they can sell to, and how they can sell.

How department store chains buy. National quality chains all have large engineering or construction engineering staffs. They have standardized their requirements in terms of types of equipment and systems; also in terms of the reliability they expect, and how design is to be worked out to achieve this. While some major chains may not get into volume purchasing, they indicate which manufacturers they prefer, and inasmuch as they are prime tenants in shopping centers, the developers will give them special consideration. Further, some store chains even standardize on space layout for equipment rooms, with a particular view to maintenance and reliability. Based upon their experience, they may show actual physical layout of equipment and provisions for access and maintenance.

With the quality department store chains, contracting for installation is usually by the center developer, but the stores' engineers make a very close check of shop drawings and do their own field inspection. Maintenance is subcontracted locally, but all the criteria have been set by the chain's staff. They search out the best people for maintenance and tell them exactly what they want. In contrast, office building owners and managers often do not spell out their requirements in a very precise fashion. They want to do as much as they can with relatively low-paid building-service-employe help; and because their operation and maintenance costs are overgeneralized, they are not subject to close and detailed analysis.

The discount department stores operate somewhat similarly to the high-quality chains, except for the fact that quality of performance of the air-conditioning system need not be nearly as good. There is a certain amount of standardization, but price is of more concern. Further, since most of their buildings are one- or two-story structures, equipment criteria are not very critical. Smaller unitary equipment is suitable for the job.

How motel-hotel owners buy air conditioning. Motel chains would appear not to have made as thorough an appraisal of air conditioning as store chains. What is strange with motel-hotel chains is that even when the design and furnishings are of a high quality, the air conditioning is not much better than that of lower-quality motels. Maybe it is a little quieter, perhaps a little better room terminal enclosure, but the basic system is not noticeably improved.

Because most motels are busy no matter what, all the air-conditioning system has to do, from a merchandising standpoint, is make the space cool. Other features such as dining room and bars, swimming pool, etc., overshadow the air conditioning. In other words, the public's attitudes and desires have not forced motel owners to do better. The chain franchisers seem always to be groping for something better, but want it for no more cost than before. Perhaps this is because the people with the most influence are in merchandising, not engineering.

Hotel-motel chains for larger (high-rise) buildings have not really standardized on equipment rooms and the like. These equipment rooms are designed by various consulting engineers; thus, many details (machine rooms, flow networks, controls) will vary depending upon the individual engineer's judgment.

With franchised motel operations, where local money is involved, local contractors will be doing the installation. However, the investor wants to know what his costs will be, so some franchisers will guarantee, or indicate in some way, what costs will be. If costs come in too high, the franchisers may call in a contractor he knows from the area who will guarantee costs.

All of the motel chains do not get involved in volume purchasing, nor standardize as much as others on systems, nor give cost guarantees to franchisees. Often, standardization pertains mainly to management organization, procedures for housekeeping, and interior design features. With air-conditioning systems, there is more trial-and-error involved.

How office building trends affect air conditioning. The trend seems to be away from corporate-owned facilities, and toward lease-back arrangements. How are the high-rise office buildings contracted for? While they represent a large market for products, they are all in the big cities, and there are always architects, consulting engineers and conventional contractors in the picture. Time of construction is of considerable importance, requiring fairly sophisticated construction management and hard-nosed purchasing. Guarantee of budget and guarantee of construction time seemingly are what counts, but not necessarily real guarantee of performance for the air-conditioning system—rather, adequate performance. The hvac system usually is the one that can get the most out of line in regard to costs—or at least is the most susceptible to cost cutting.

Speculative office building owner-builders do not have the expertise within their own staffs for hvac, even in regard to costs; nonetheless, they have access to this information. Building for their own investment, they use the same mechanical con-

TECHNOLOGY: What it is and how it relates to engineering in general, and air conditioning in particular

The director of the Harvard Program on Technology and Society sees technology as much more than hardware alone: "We understand it as tools in a general sense, including machines, but also including intellectual and linguistic tools and the latest analytic and mathematical techniques. In short, we define technology as the organization of knowledge for practical purposes." *

Basic and applied research is the foundation of all new technology. But if we employ the above definition of technology, it is obvious that all new advances do not originate at the abstract theoretical level of the scientist. As scientific research moves from the theoretical to the practical, it begins to overlap with technology.

It is no wonder that the layman finds it difficult to distinguish between the scientist and the engineer, for even in engineering circles confusion has occurred, particularly as the number of science-oriented engineers has increased.

The major categories of engineers are as follows †:

Engineering scientist. His objective is to reduce the level of empiricism in engineering by extending the understanding of basic phenomena, and the development of generic solutions so that practical implications can be fully exploited.

Engineering practitioner. Employs creative application of existing knowledge to the solution of a specific problem. Thus, he is not too interested in the development of new theories. Has proficiency with enough mathematics and science in a general area so that he can handle problems not given in the handbooks. He takes a systems engineering approach, coupled with a consideration of economics, and analyzed in the light of judgment and experience.

Engineering technician. Uses well established technology in production and in servicing, as well as in some of the supporting aspects of research and development. Is capable of using handbooks and other forms of codified information with skill and discrimination.

The important areas of technology that apply to air-conditioning systems are:

Product design and production technologies. Necessarily include considerations of installation in a "plant" or system, and also of operation and maintenance factors.

System design technology. The group responsible for this function—the consulting engineers—is in the best position to be the over-all evaluator and coordinator of all air-conditioning technologies.

Construction technology. The concern here is with installation of plant and system, and with start-up and costs.

The necessary technology for the operation and maintenance functions must be derived from the above. Reliability must be designed into and built into systems and equipment.

* Remarks by Emmanuel G. Mesthene in his foreword to the book, *Run, Computer, Run,* by Anthony G. Oettinger with Selma Marks, Harvard University Press, Cambridge, Massachusetts, 1969.

† Adapted from, "A Statement on Goals of Engineering Education," a position paper of Harvard faculty of Engineering and Applied Physics.

tractors time and time again, so they rely upon them to cut cost to meet budget. The contractors' engineers, steam-fitter foremen, and the like, are pretty competent, hard-nosed people, and have to be well-qualified in terms of field coordination. The mechanical contractor has to be correct on costs and with field coordination, otherwise he loses out in the market place. Mechanical contractors *do not design;* they start with a system that already has been designed and then see where they can cut costs in piping, ductwork, controls, types of materials, etc.

In the smaller metropolitan centers, there seems to be much more competition in terms of types of builders and subcontractors than in major cities. And with the low-rise to medium-rise buildings—say, up to 12 stories—there is much less standardization. Architects and engineers for these buildings have a much freer hand—there is less pressure to do hvac in a certain way. Probably this practice will not change much.

Builder profits have a big effect on quality of apartment building air conditioning. In the apartment building market, owner-builders may hold onto the buildings for as little as three years—thus neither equipment longevity nor performance are prime factors. Costs and volume purchasing are, and bargaining can be fierce on every item down the line. Much of the construction is in large projects where bargaining is likely to be the sharpest. The smaller developer-builder does not have much impact on air-conditioning products. Because he is small, he is not able to get anything special from manufacturers.

Unfortunately because of the way money is lent and the way tax laws are written, apartment developers want to get by with the minimum initial costs. This picture may change, however, if some recent court findings in California are repeated elsewhere. In two different tract developments where there was a building failure—cracked floor slabs in one case, defective floor radiant heating in another—the lending organization was held to be responsible for not assuring itself that these elements of the buildings would last for the presumed lives of the structures. In the first instance the California Supreme Court backed the lower court's decision that the lender had "substantial moral blame" for construction problems, and that the lender had been negligent in its supervision of the project, so had violated its duty to its shareholders to prevent construction of defective houses. In the second case a developer-builder was held liable for the repair (costing $5000) of a slab radiant heating system in a house.

Snack-food chains are an interesting, special case. Some of the mechanical contractors who provide the refrigeration for frozen foods, etc., also provide a turn-key operation for the air conditioning. Such contractors may do business as high as $100 million a year. Obviously such firms have very knowledgeable engineers in the refrigeration area. For this reason, they can knowledgeably contract for custom-designed unitary equipment—e.g., with multiple compressors, special refrigerant cycles, special electrical controls, special fan drives and special equipment configurations. This is done to get improved reliability and to allow fitting the equipment into the building design. No compromises are made with regard to provisions for access and ease of service and maintenance.

Most schools are still designed and built on an individual basis. With schools, basically it is the over-all top administrators who have to be satisfied with the hvac system because of their responsibility for physical plant. Since they are really laymen with regard to air conditioning, they depend upon the architect and his consulting mechanical engineer to assure thermal comfort and economical operation. There is a fair amount of standardization of air-conditioning systems for elementary schools. But with secondary schools and colleges and universities, where work is more custom, the consulting engineer can draw on his judgment as to what type of systems should be used. With colleges and universities, the consulting engineer must be prepared to offer options and design alternates to meet budgetary requirements.

Codes and standards do not guarantee quality of products and systems

Codes and standards have evolved over a long period of time. They are helpful insofar as minimum indication of levels of quality and performance are concerned. But primarily they are criteria for safety, health and welfare. Though a code is followed strictly, this does not assure a successful installation, nor necessarily guarantee a safe one in all aspects.

Generally speaking, consulting engineers do not differentiate enough as to quality or performance levels of systems, and this is very difficult to do; for one thing, the client's requirements are usually not very precise. The tendency is for consulting engineers to overdesign somewhat, to put in safety factors and relatively higher specification factors than he expects to get. Reason is he wants the owner to get the best installation the owner can afford.

It is difficult for the engineer to interpret codes and gather from them what he should. It is mandatory that he follow regulatory codes and standards. He also should follow good design practice, but not necessarily "best" design practice, depending upon the client involved.

Industry standards for capacity and performance ratings of heating coils, unitary air conditioners, terminal units, fans, etc., give only limited criteria related to over-all system capability. While they are adequate and helpful for design, they obviously do not cover every design contingency, and they never relate to reliability, longevity or details of construction, all of which have a bearing on cost.

Different manufacturers produce equipment in different ways, so who decides whether one type of fabrication is better than another? Long-term testing would serve as proof, but what basis does the engineer have for writing a specification? Industry cannot be forced to come up with a standard that is wholly adequate for the engineer. Of course he can rewrite standards for his specifications to assure a higher level of quality. But if the engineer cannot enforce his specification, the manufacturer cannot afford to make equipment that meets a level of quality above that of the minimum industry standard. Unfortunately, engineers sometimes cannot defend their specifications because they are not sure of all the relevant details on what they are specifying—to put it another way they are system design engineers, not product engineers.

Status of technology; what are some of the problems; some of the advances?

Because of the trend toward higher-speed equipment and higher-velocity systems, problems have arisen in the areas of noise and vibration, fan installation, the stability and control of fluid-flow networks (air and water), and the proper application of control sub-systems.

Example: problems with high-velocity, high-pressure air distribution. In response to problems occurring in supplying the right amount of air to occupied spaces, manufacturers brought out constant-volume terminal devices, rather than expecting engineers to solve the problems of the air-flow network. So the simpler, remaining problem was only pressure regulation at critical points within the system.

There have been considerable advances in the refrigeration cycle, but this knowledge resides mostly with the manufacturers. Improvements gained include greater flexibility in the operating ranges of equipment—some equipment had not been designed to work under the full range of conditions for which it was to operate, as installed (e.g., package chillers, air-cooled chillers).

The engineer's status and competence affect what the owner can get

The consulting engineer in the building services field is less independent and has less status than consulting engineers doing work for heavy industry.

In the process-industries field, the systems have to work because it means the difference between whether companies make money or not. But in the building field where systems have to work only reasonably well—i.e., well enough to avoid complaints—the level of engineering is often just not the same.

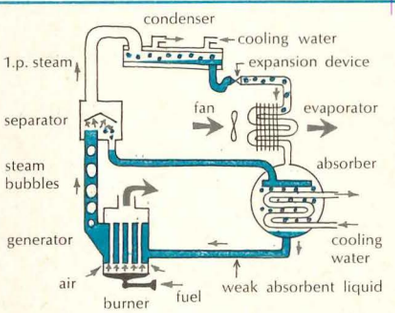
Engineers going into process, chemical plant and power plant fields find that qualifications are generally higher than for those going into the building services field. Further, their counterparts in the manufacturer's organization generally are at the same level, so communication is good.

The basic air-conditioning components and packages

Packages. A package consists of various components and minor packages (flow regulating devices, controls, etc.) assembled in an over-all enclosure, housing, frame, etc. The interrelated design for functional performance and quality is determined by major package manufacturers who assume over-all responsibility.

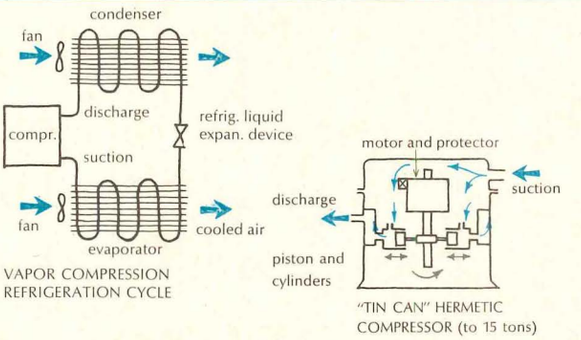
The extent to which major package manufacturers buy or build components or sub-system packages is determined by economic and quality-control considerations. The exact mix of bought and made items, and the sources of supply, do not necessarily remain the same. "Systems" thinking sometimes emphasizes only over-all system performance in terms of end results—i.e., space thermal comfort criteria, noise criteria, over-all maintenance and reliability criteria, etc. Such approach tends to obscure any appraisal that identifies and evaluates the small, but yet critical, components and packages in which product engineering and research and development are expensive, capital costs are high, and satisfactory product performance is critical. Two such items are 1) fan wheels and 2) reciprocating hermetic compressors. Other important, but less critical components are those related to fluid-flow control. With these components, production must be large-scale to be economical—generally larger than most individual package or broad-line manufacturers are willing to undertake. Often there are significant differences in quality or performance of over-all packages—not so much because of basic components such as compressors or fan wheels, but because of how they are put together along with other necessary components of varying quality and performance.

Packages are assumed to include the necessary controls. The control sub-system, because of its importance and complexity, will be covered later.



SIMPLE ABSORPTION SYSTEM

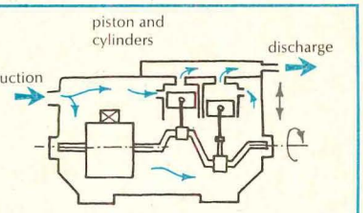
Absorption cooling. System shown provides direct cooling of air for a ducted residential system. All machines are hermetic, and, except for the one shown, produce chilled water (up to 1000 tons). Each manufacturer's design is custom and complex.



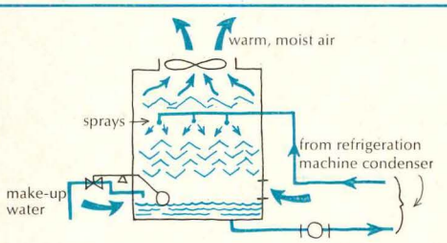
VAPOR COMPRESSION REFRIGERATION CYCLE

"TIN CAN" HERMETIC COMPRESSOR (to 15 tons)

Vapor compression refrigeration. The largest portion of air-conditioning installations use reciprocating hermetic compressors (electric motor is sealed in with the compressor and vapor-cooled by the refrigerant). Only a few manufacturers make centrifugal compressors. Research and development leading to new technology requires major redesigns every three to seven years. Development costs for either type can run into millions of dollars. Most air-conditioning manufacturers do not make their own compressors below 5 tons in size.

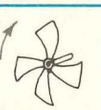


ACCESSIBLE HERMETIC COMPRESSOR (to 50 tons)

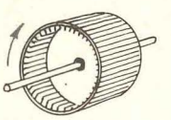


COOLING TOWER PACKAGE

Cooling tower/evaporative cooling packages. The cooling tower rejects heat to the atmosphere from a circulating water system by evaporation of water. Evaporative cooling packages cool ducted air supply or indirectly cool a circulating fluid by use of a surface heat exchanger.

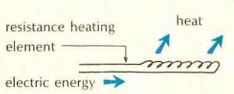

propeller fan


fluid impeller

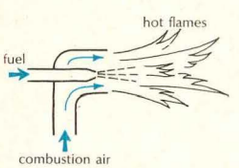

fan wheel for centrifugal fan

Flow movers. Those such as fan wheels and fluid impellers are designed around an optimum wheel-enclosing scroll or housing, or an impeller casing. Entrance and discharge flow conditions into and out of the housing have a considerable effect on flow-moving performance (mechanical efficiency, noise, flow pulsation, etc.). Much of the basic new data on fluid dynamics relates to air flow, and some of the more sophisticated data comes from NASA research.

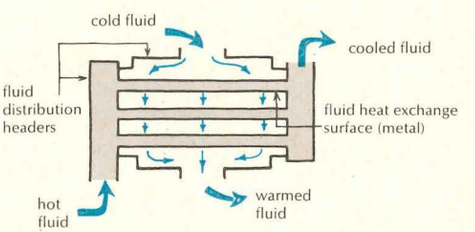
Smaller fan wheels generally are produced in large volume by a few manufacturers for inclusion in larger packages by other manufacturers. Impellers are usually the custom design of single manufacturers.



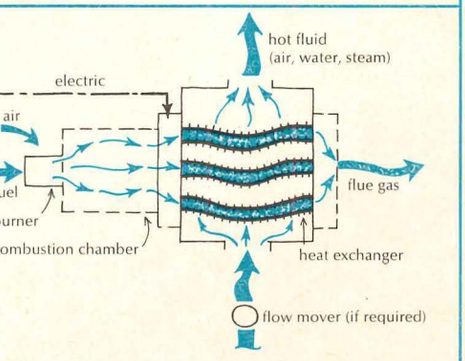
SIMPLE ELECTRIC HEATER



SIMPLE BURNER

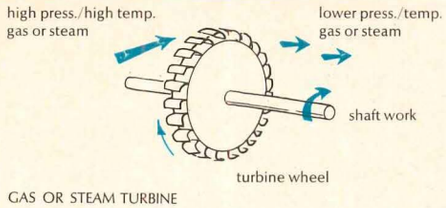


SURFACE HEAT EXCHANGER

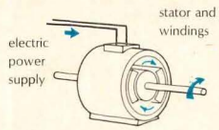


HOT FLUID GENERATOR (BOILER)

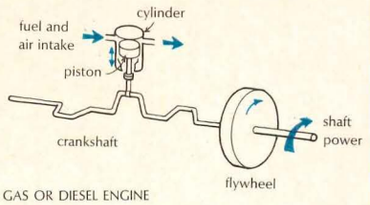
Heat-generating and transfer equipment and packages. Basic heat generation involves complex problems in combustion and its control; or, in the case of electric-resistance heat, various limitations on materials and temperature control. With liquid-to-liquid, or liquid-to-vapor surface heat transfer, fabrication may be simple, but close design for performance is complex, and knowledge not wholly complete.



GAS OR STEAM TURBINE

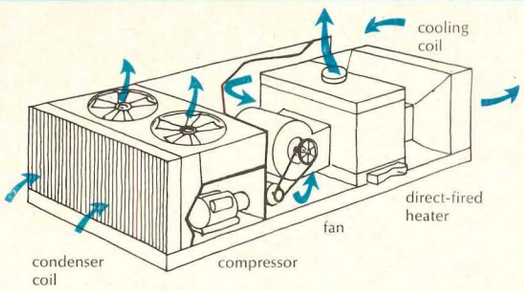


ELECTRIC MOTOR

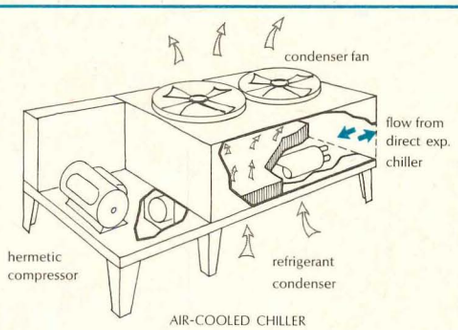


GAS OR DIESEL ENGINE

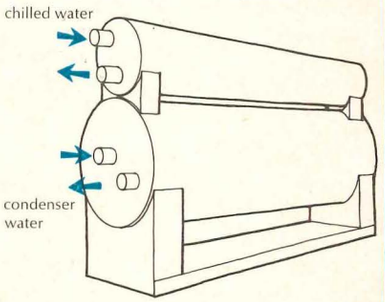
Motive power. Shaft power to drive compressors and flow movers is, for the most part, provided by a-c electric-motor drive, especially in the smaller power ranges. Electric motors lend themselves to various standard designs to meet different drive requirement. Turbines (steam- or gas-driven) lend themselves best to high-speed operation above, say, 500 hp minimum. Reciprocating engines, principally gas and diesel, find increasing application in lighter-duty, higher-speed applications, 50 hp up to 500 hp, and in slower-speed applications, 1000 hp and up.



SINGLE-PACKAGE HEATING-COOLING AIR CONDITIONER



AIR-COOLED CHILLER

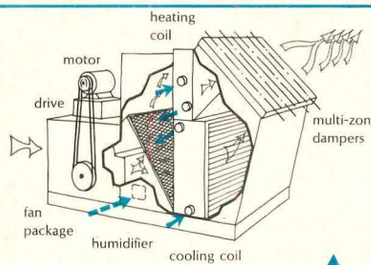


ABSORPTION CHILLER

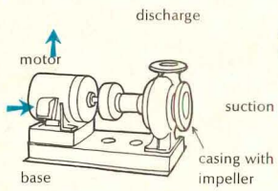
Unitary direct heating-cooling air conditioner package. Single roof-top unit represents the maximum combination of components and sub-packages. Sizes range from about 5 tons for residential application up to over 100 tons for split-system packages. Smaller packages (10 tons and less) are industry certified for cooling.

Compressor-chiller packages. The air-cooled package chiller shown represents the maximum combination of components and sub-packages for a cold-fluid generator. Package chillers with centrifugal compressors use a water-cooled condenser and a remote cooling tower. Such chillers use serviceable-type compressors.

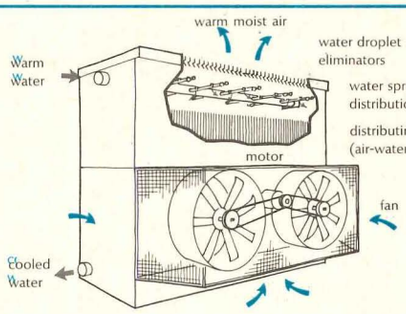
Absorption chiller packages. Commercial-size chillers range in size from 25 to 1000 tons, and are either direct fired or motivated by steam or hot water. All require remote cooling-tower packages. Designs are proprietary, and determining the significance of design differences requires much study by the consulting engineer.



CENTRAL STATION
MULTI-ZONE FAN-COIL UNIT

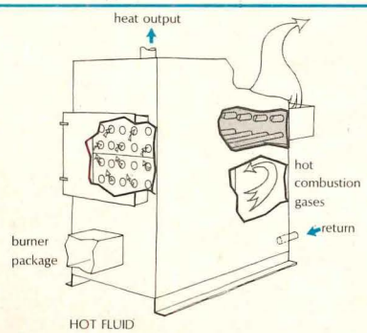


CENTRIFUGAL PUMP

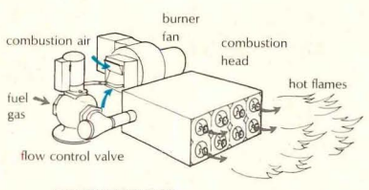


COOLING TOWER

Fluid-flow moving and atmospheric-evaporative cooling packages. Central-station air and liquid (water and water plus anti-freeze) packages are basic to the thermal fluid networks of the air-conditioning system. Other configurations and combinations from those shown are possible. Either the conditioned air supply or one of the circulating water systems can be cooled "free" by evaporative cooling, using a cooling tower package such as shown, or a similar remote or ducted in-stream arrangement.



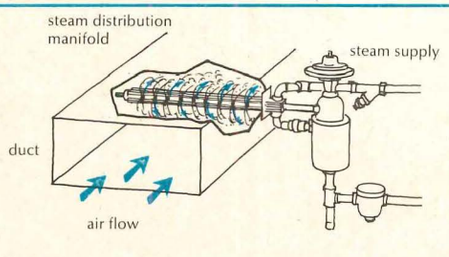
HOT FLUID
GENERATOR (BOILER)



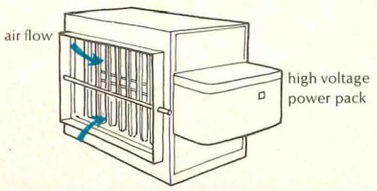
GAS POWER BURNER

Heat-generating packages. The medium-size commercial hot-fluid generator shown is commonly termed a steel "boiler" (steam or hot water). To protect safety, details of design are well covered under criteria of insurance and national technical standards groups.

Basic heat generation package is the burner which must be properly matched to the combustion chamber (electric immersion heaters also may be used). Safety criteria originate from insurance, code and standard groups.



HUMIDIFIER



ELECTRONIC AIR FILTER

Air-treatment packages. Adequate moisture removal is generally incidental to, and accompanies, the air-cooling function. Air filtering is a necessary air-conditioning function; higher standards and better recognized uniform criteria are needed. Control of humidity is often most simple and effective when steam is absorbed directly by the air, because this does not raise the temperature of the air stream.

What the profession doing building services design really needs is an upgrading in proficiency and in status, and these engineers need more backing by architects and owners. One solution might be to set up practical and theoretical qualifying examinations for various specialties. Individuals passing these exams would have demonstrated competence, and this certification would help engineers to acquire status.

Architects' licensing procedures are much more specific and meaningful than those of professional engineers. Further, the architects are a more cohesive profession devoted solely to building. They have comprehensive training intended to make them coordinators of the total building design. Their exams call for them to be able to analyze a client's requirements and come up with an analysis and visual presentation of a building reflecting the client's needs.

In contrast, the engineer's exams cover basic areas only. Of course there may be splits into four to six fields such as structural, mechanical, electrical, etc. But there are no exams covering proficiency in the building field, aside from structural. The result is that engineers now do not have to prove their competence in design and construction for the myriad hvac areas in which they may practice.

Originally in the building field engineering aspects were handled by architects in collaboration with contractors and manufacturers specializing in heating and ventilating. Eventually, some engineers in industry saw opportunities in private practice. Then after World War II, some of the more complicated air-conditioning systems developed by manufacturers were designed and installed by them. Later as consulting engineers gained political strength, manufacturers gradually withdrew and turned over design and construction activities to consulting engineers and contractors.

The architect needs to become more familiar with the practical aspects of air conditioning so that he gets a better feel for systems in terms of physical space requirements, thermal comfort effects, power required for the system—for example, in terms of pushing air. The architect needs better rules of thumb from his engineers.

How does the consulting mechanical engineer educate himself? At the semi-professional level there are a number of technical schools and drafting schools covering the rudiments of heating and air conditioning. At a higher technical level, some university courses are given in air conditioning and refrigeration, but these are fairly minimal. The range is broad and no one is required to take them to prequalify for practice or to prove expertise. This is one reason why so few technically-trained people come into the field. Another big reason, of course, is the attraction of more exotic areas of engineering in aerospace and similar fields.

In the small- to medium-size consulting engineering firms, it is the partners, themselves, who are most competent in engineering design. And it needs to be said that there is a large number of competent and conscientious engineers in the profession. These engineers are self-educated in all or most areas of practice (in the post-graduate sense), subsidizing the time involved from their own resources. The larger firms make a point of seeing that their engineers become involved in technical society activities, and in preparing technical papers and job write-ups, which add to the firm's prestige. Engineers in the smaller firms are hard pressed to find time for these activities. They generally educate themselves in response to jobs they become involved with, and to trends that they feel may become significant.

The very considerable body of knowledge on hvac system design has been accumulating since the beginning of the century, but the task of properly organizing information for easy and convenient use still remains. In all fields, there has been a trend toward specialization. As the fund of knowledge in each branch has grown, particularly in technical areas, it has been increasingly difficult for any one person to master the whole subject.

The larger consulting engineering firms, while they have highly competent people, have a concern for project cost-keeping and being known for certain specialty areas. Their greater use of engineering standards may help quality, but is more an aid to production.

In smaller consulting engineer firms, the principals and project managers oversee and control more aspects of a project. In the larger firms, work is delegated to many more people and departments, and the work becomes necessarily more fragmented. It has to be this way to keep production schedules. Bigness is necessary for handling big jobs. It follows, though, that individuals get less exposure and their breadth of experience is narrower. There are some tasks they may never do—shop drawings, field supervision, etc. The tendency with larger firms is to develop specialists; otherwise they cannot control costs. They also do this so that they can shift manpower. Even project engineers may be shifted off one job to another.

How can competence of a consulting engineering firm be evaluated? The client has to look beyond the reputation of the firm itself to that of individuals who will be involved with the project, particularly at design and managerial levels.

All engineering designs involve compromises which can only be resolved by judgment. The phrase, "standard engineering methods," is frequently heard, but no such uniform standards exist. Viewpoints and evaluations for various aspects of mechanical systems mean different solutions. Again, a designer is often not acquainted with many types of construction which are common but not good engineering practice, and which may depart considerably from that recommended by quality manufacturers of equipment and materials.

Some areas of practice that bother the engineer

The consulting engineer's biggest problem today is how to get more work done with fewer and less competent people, both at engineer and technician level. Thus one of the main reasons for use of the computer is to take the place of personnel, rather than to get more precise results, although this can be a concommitant result. In other areas such as duct sizing, the computer can be helpful in reducing the chance for error. It should be remembered, however, that design concepts and analysis and interpretation of data are engineering-level, not technician-level functions.

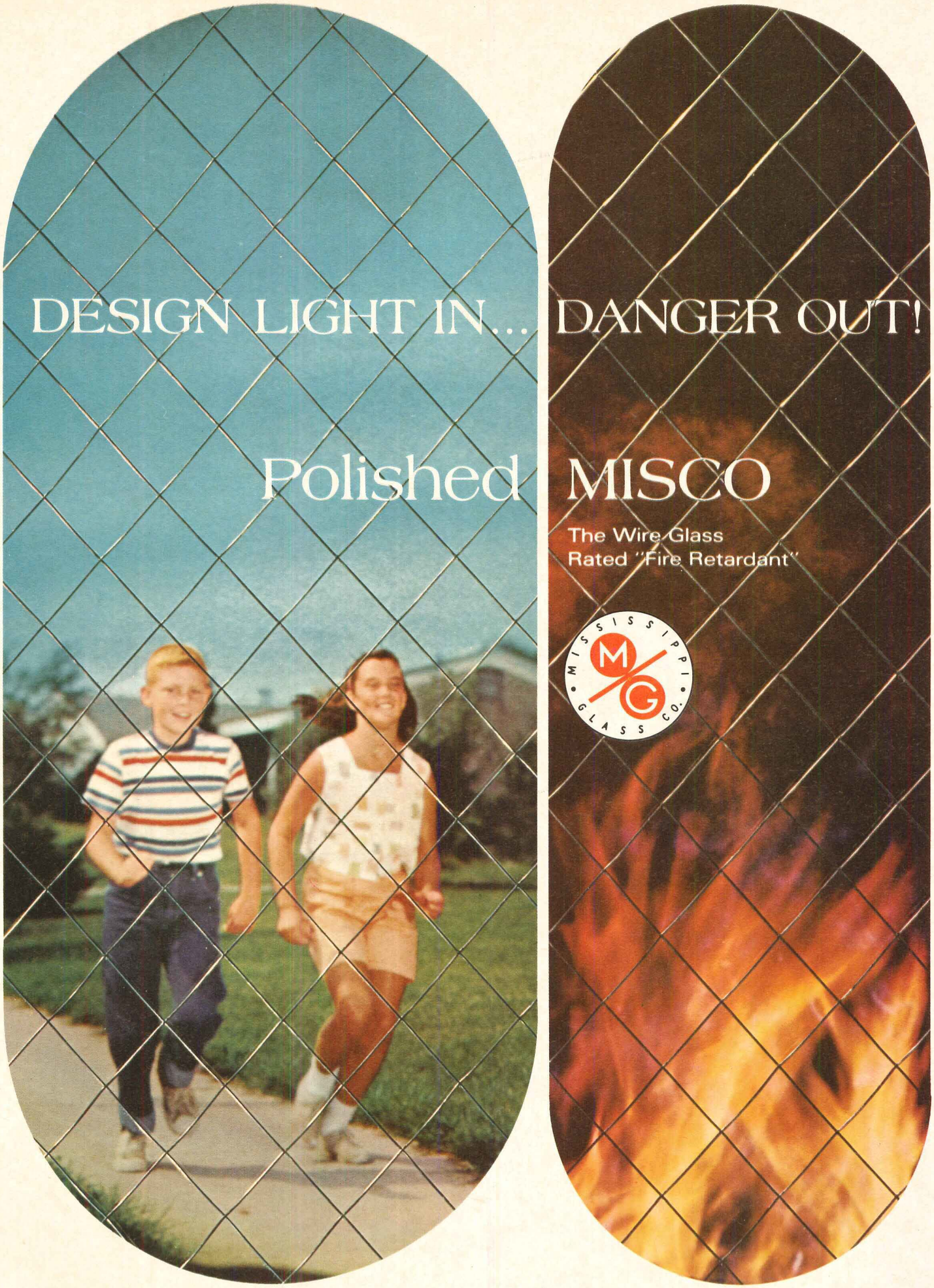
Some engineers resist the idea of standardization. But perhaps they have not understood the implications, or perhaps the word has not been defined broadly enough. Unitizing or modularizing is simplifying, and really standardizing. Instead of trying to design optimum custom solutions, perhaps the engineer should try to simplify his designs and rely on fewer types of systems.

Recently the consultant has been faced with the prospect of doing more "comparison studies" for alternate systems and fuel sources. Reason is that owners want figures to prove that they will get optimum results. The consulting engineer can get involved in such studies only to the extent that his fee will allow. If he gets no additional fee, the studies, necessarily, will have to be more superficial than otherwise.

Engineers say that the owner's typical attitude is that he has "bought" a complete design and installation to give him the end result he wants (purchasing-type thinking). If something goes wrong, then he feels it is up to the professionals and the contractors to decide among themselves who is responsible for making it right. In other words, "the customer is always right." But few owners can distinguish between technology of design and technology of construction. This is complicated by problems of communication.

Engineers in industry complain that management frequently takes the attitude that: "The professional specialist over-elaborates the obvious," or, "You can hire technical brains a dime a dozen."

Also bothering the consulting engineer is the situation in which a construction consultant by-passes him and goes directly to the owner. Construction consultants are not asked to produce design, but rather to comment on what the designers have done, and to suggest alternates and substitutions. By tossing in alternates and challenging the engineer to justify why he fails to approve, construction consultants can put the engineer on the defensive. The engineer finds it difficult to argue with the construction consultant if the owner is looking to him to bring the building within a budget with which the engineer has had little or no involvement. The construction consultant in this case does not really have to defend his position because he is presumed to be the "expert" when hired.



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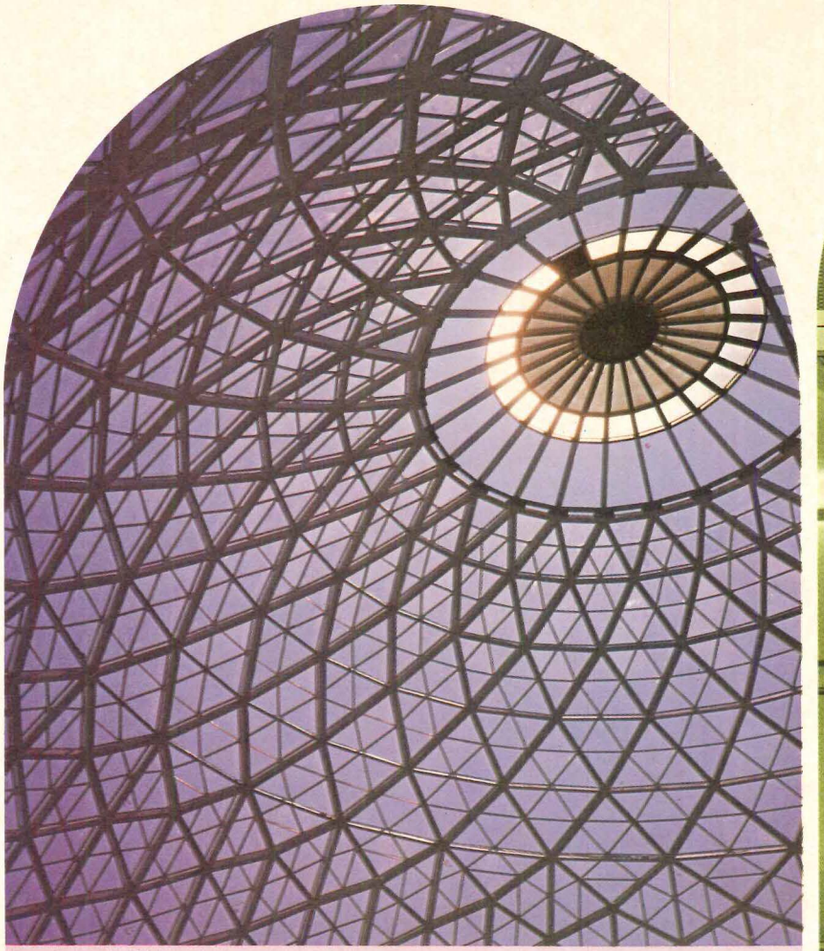


POLISHED MISCO

for clear vision with fire protection

Wherever fire control is part of built-in safety . . . in windows, doorways, walls, skylights . . . wire glass finds growing use in regular specifications. Yet, not all wire glass is listed by Underwriters' Laboratories, Inc. as fire retardant*. Mississippi Glass is one of only two sources for wire glass so listed.

When you design with fire control in mind, specify with confidence in the proved protection of Polished MISCO Wire Glass. It permits full vision and maximum light transmittance. The diamond-shaped netting is inconspicuous, yet protectively visible to alert floor traffic and avert danger from human impact.

*To qualify for this "Fire Retardant" listing, Mississippi Wire Glass had to withstand the furnace test given by Underwriters' Laboratories, Inc., Wire glass windows in a removable wall are placed in a gas-fired furnace. Temperature is raised to 1600° F. in 45 minutes and held at this point for 15 minutes. The wall is then removed and the glass is subjected to a 1⅛" stream from a fire hose at 35 to 40 lbs. of pressure. The glass must remain in the sash, substantially unchanged except for any cracking due to thermal shock. Actual test scenes are shown in our 30 minute film "Rolled Glass by Mississippi."

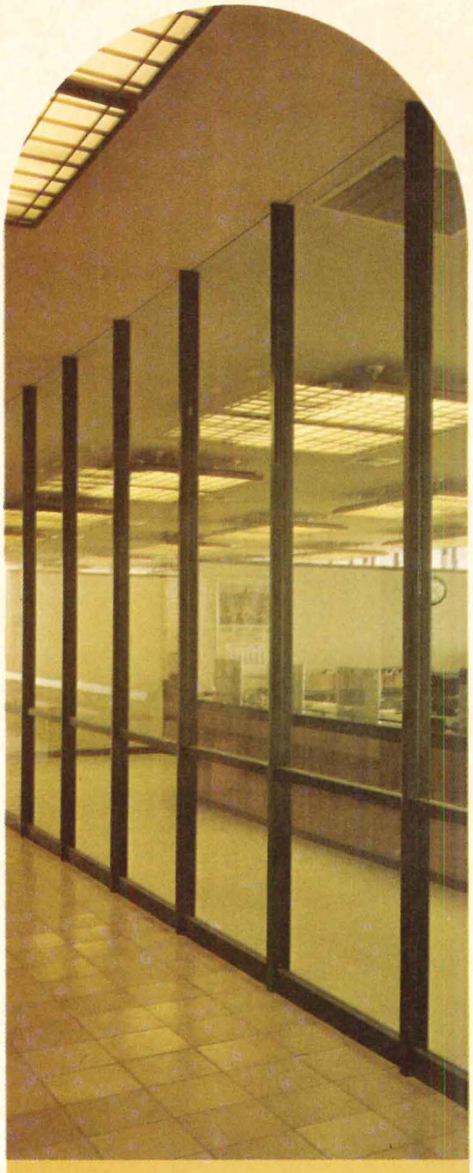
Underwriters' Laboratories, Inc.®
INSPECTED
GLAZING FOR
FIRE WINDOWS AND DOORS
ISSUE NO. 101
MISSISSIPPI GLASS CO.
MADE IN U.S.A.

MISSISSIPPI GLASS CO.

FULL-VIEW DOORS

with fire retardant glass

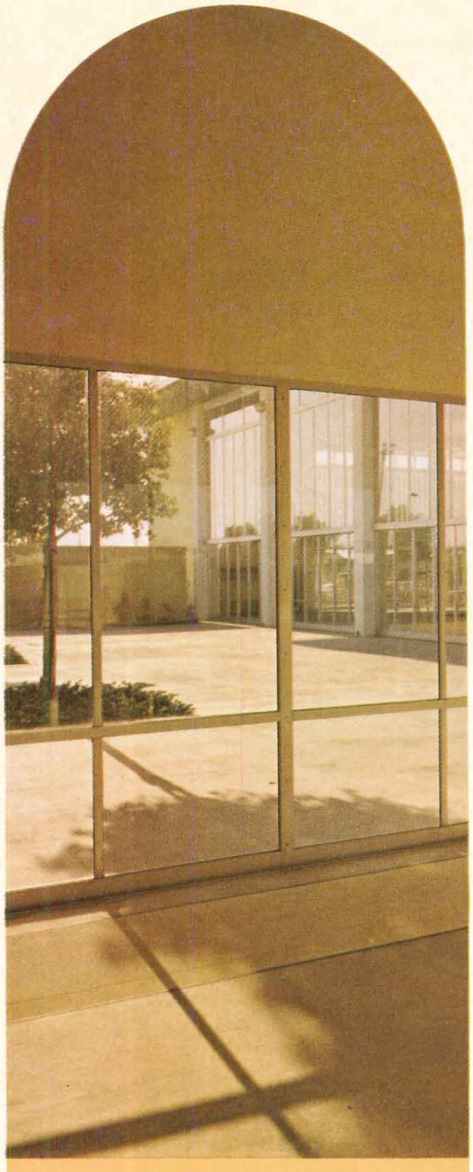
Polished MISCO gives clear vision, so important to safety at busy doorways. It can take abuse and still stand by, ready to fulfill its complete fire retardant function. The way it holds against intense heat seals the doorway against drafts that speed through any openings and spread the smoke and flame. The wire webbing is unobtrusive yet it subtly blends with entrance areas so the glazing adds an interesting design feature as well as a safety function.



ATTRACTIVE WALL SECTIONS

with full-vision range

Give the "open" feel to interiors through walls that make full use of natural light. The smooth surface of Polished MISCO makes attractive wall sections that are easy to keep that way. The diamond-shaped mesh is inconspicuous . . . just visible enough to ward off floor traffic accidents from unawareness of glazed openings. Its basic fire retardant ability checks smoke and flame. The sturdy steel webbing holds glazing fast in its frame under prolonged heat exposure.



PROTECTIVE WINDOWS

that give clear view

Transmit natural daylight through windows that are glazed sentinels against fire, breakage, vandalism, and forced entry. Polished MISCO provides window areas with fire retardant protection, while maintaining clear vision and the sense of spaciousness that comes from greater light transmittance. Mississippi Wire Glass has been looked to by architects and engineers as the approved fire retardant glazing through more than 60 years.

SKYLIGHT GLAZING

dramatic and functional

No need for protective screening above and below. MISCO's strong steel diamond-shaped webbing is already fused in where it not only protects against impact from above or below but also prevents shattering that releases ordinary glass for dangerous fall out. Listed "Fire Retardant" by Underwriters' Laboratories, Inc., Polished MISCO holds fast against fire spread under intense heat. Bring more light in from above safely, with fire retardant Polished MISCO.

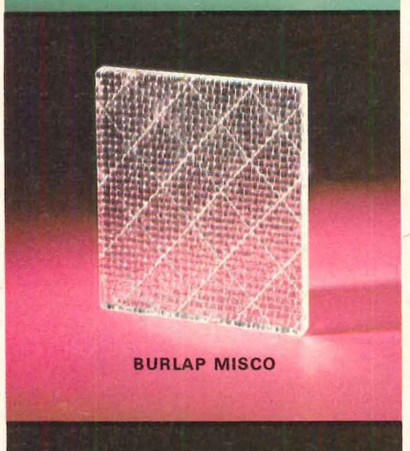
For more data, circle 68 on inquiry card

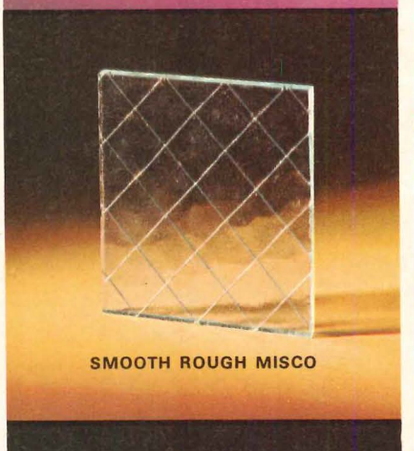
Patterned MISCO

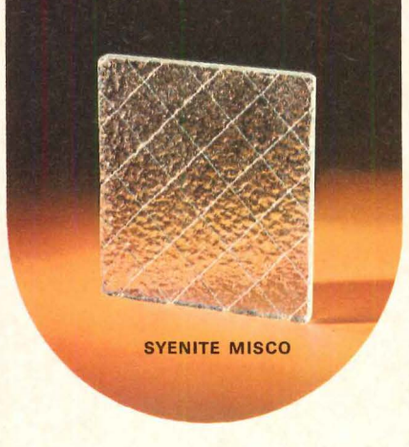
Protection plus diffusion for controlled light direction and obscurity for varying degrees of privacy and heat absorption where required.


FACTROLITE MISCO

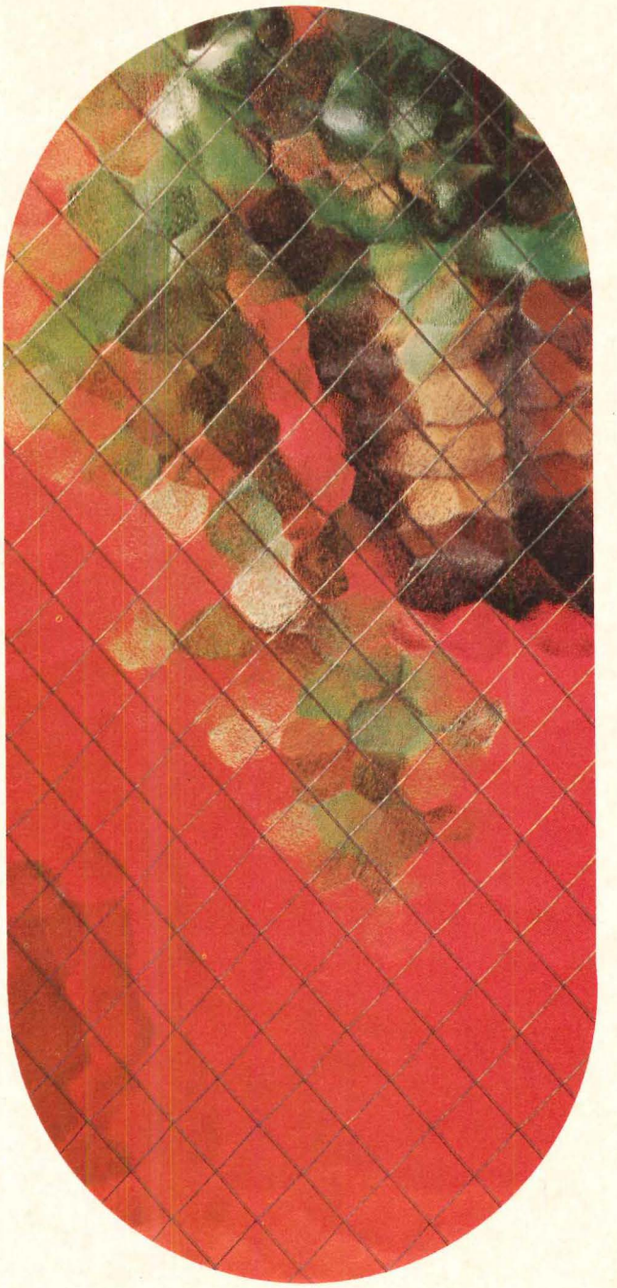

HAMMERED MISCO


BURLAP MISCO


SMOOTH ROUGH MISCO


SYENITE MISCO


COOLITE MISCO



All ¼" MISCO Patterned Wire Glass is listed by Underwriters' Laboratories, Inc.

Underwriters' Laboratories, Inc.®
INSPECTED
GLAZING FOR
FIRE WINDOWS AND DOORS
ISSUE NO. 101
MISSISSIPPI GLASS CO.
MADE IN U.S.A.

Because of its long history in the manufacture of wire glass that has always met Underwriters' requirements, Mississippi Glass is a natural source for technical information on various requirements in glazing applications. Architects and engineers are urged to consult with our specialists for possibilities in dramatic use of glass and particularly on safety requirements. Mississippi Glass is available from most leading distributors of quality glass in the principal cities of the United States and in Canada from Canadian Pittsburgh Industries, Ltd., Glass Division.

See our catalog in Sweet's (S)

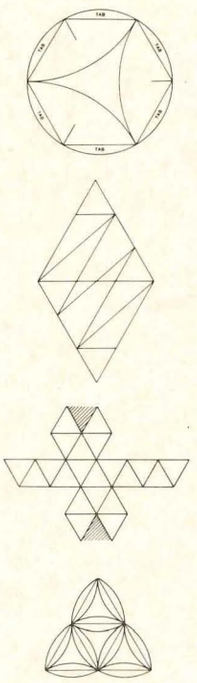
MISSISSIPPI GLASS COMPANY
88 Angelica Street • St. Louis, Missouri 63147
NEW YORK • CHICAGO • ATLANTA • DALLAS • SAN FRANCISCO • FULLERTON, CALIF.
Largest Domestic Manufacturer of Rolled, Figured and Wired Glass

For more data, circle 68 on inquiry card

For more information circle selected item numbers on Reader Service Inquiry Card, pages 237-238

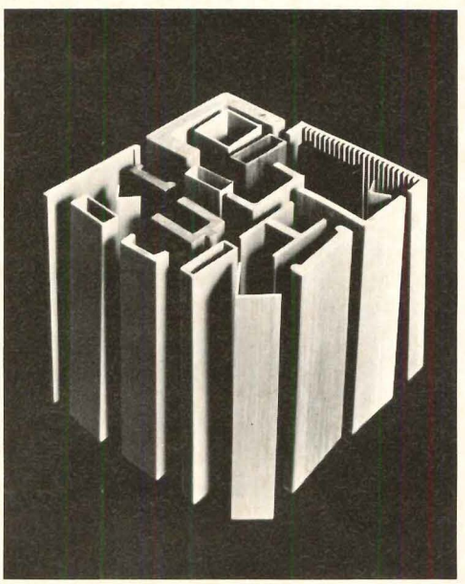
The Mondrian ceiling system, influenced by the Dutch artist for whom it is named, emphasizes the suspension grid by making it an integral part of the overall design. The system—which comes from the factory 60 per cent preassembled—consists of three basic components: large (4-ft by 4-ft and 4-ft by 8-ft) preframed glass-cloth-faced acoustical panels, integral lighting modules and the suspension system. Each panel is framed with brushed aluminum on the exposed face and has an offset reveal painted flat black to match the black face of the inverted tee into which it fits. The frame incorporates a continuous flange which hangs onto the main tee. ▪ Owens-Corning Fiberglas Corporation, Toledo, Ohio.

Circle 300 on inquiry card



Scorasculpture, a technique based on the use of a cellulosic material, makes possible three-dimensional shapes similar to metal sculptures and wood carvings. The material, *Forbon,* is durable and can be die-cut or scored and folded without delaminating or peeling. Interior designers may use *Scorasculpture* to create unique lightweight decorations, and architects are using it to make architectural models. ▪ NVF Company, Wilmington, Del.

Circle 301 on inquiry card



A new continuous molding process makes possible these fiberglass-reinforced plastic shapes capable of meeting the most exacting specifications. The *Polyglas* shapes are non-conducting, non-magnetic, thermally insulating, flame-retardant and dimensionally stable. ▪ Westinghouse Electric Corporation, West Mifflin, Pa.

Circle 302 on inquiry card

more products on page 170

OFFICE LITERATURE

For more information circle selected item numbers on Reader Service Inquiry Card, pages 237-238

LIGHT DIFFUSING LOUVERS / Three brochures offer information on three different light diffusing louvers in acrylic plastic. ▪ MSL Plastics, Inc., Franklin Park, Ill.

Circle 400 on inquiry card

SOUND REDUCTION / A 16-page catalog introduces a new line of units for air distribution. The units are aimed primarily at reducing duct noise from fans and pressure reducing valves. They can also be used to eliminate cross-talk through air ducts connecting rooms, to control excessive noise generated by cooling towers, and to muffle ventilation openings in diesel generators and engine enclosures. ▪ Anemostat Products Division, Scranton, Pa.*

Circle 401 on inquiry card

DECORATIVE PANELING / A 28-page color-illustrated catalog presents a line of prefinished hardboards in a variety of colors, woodgrains and textures. ▪ Masonite Corporation, Chicago.*

Circle 402 on inquiry card

STEEL DECKS / "Steel Decks for Floors and Roofs" is a 20-page catalog that contains useful information on many products as well as practical guides for selection, application and erection. ▪ Bowman Building Products Division, Cyclops Corporation, Pittsburgh.*

Circle 403 on inquiry card

MAIL BOXES / An eight-page brochure illustrates vertical-style apartment house mail boxes "produced in accordance with the latest revised requirement of the U.S. Post Office Department." ▪ Auth Electric Company, Inc., Long Island City, N.Y.*

Circle 404 on inquiry card

LIGHTING / A supplement to the last regular catalog presents some exciting new designs in lamps and lighting fixtures. ▪ Koch & Lowy Inc., New York City.

Circle 405 on inquiry card

CONCRETE ADMIXTURE / A 16-page booklet gives data on a number of admixtures. Charts and graphs include the effect on strength, durability, volume change, water-tightness, uniformity and appearance. ▪ Master Builders, Cleveland.

Circle 406 on inquiry card

HOT WATER SYSTEMS / A 14-page color bulletin shows details of advanced boiler design and construction covering five types of installations for hotels, schools, apartment houses, hospitals and others. ▪ Raypak Company, El Monte, Calif.

Circle 407 on inquiry card

VINYL WALLCOVERINGS / An eight-page guide features 24 of the more than 60 original *Vicrtex* wallcovering patterns and their extensive color ranges. Some swatches are included. ▪ L. E. Carpenter & Company, New York City.*

Circle 408 on inquiry card

LAB FIXTURES / An illustrated two-color, 26-page booklet introduces an extended line of faucets, fixtures, apparatus, electrical and drainage units. ▪ Wolverine Brass Works, Grand Rapids, Mich.*

Circle 409 on inquiry card

EMERGENCY LIGHTING / A ten-brochure library covers battery-powered fluorescent lights for schools, hospitals, stores, offices, industrial plants and jails. ▪ Woodbro Corporation, Van Nuys, Calif.

Circle 410 on inquiry card

WASTE DISPOSAL / "From Trash to Ash" is a 10-page booklet on the *Mark VI Radicator* incinerator, a disposal system for a

variety of industrial, commercial and institutional enterprises. ▪ Midland-Ross Corporation, Roxboro, N.C.

Circle 411 on inquiry card

ACOUSTICAL LOUVERS / A new series of high-efficiency sound-curbing *Noishield* louvers is described in an eight-page booklet. "Attractive architectural appearance and variety of purpose are the functional-design keynotes . . . these louvers have been designed to increase the esthetic appeal of a structure by adorning it rather than detracting from the finished appearance." ▪ Industrial Acoustics Company, Inc., Bronx, N.Y.*

Circle 412 on inquiry card

MOVABLE WALLS / *Custom Line* design movable walls and partitioning for general business offices are described in an eight-page illustrated brochure. Features of the system include glazing, extruded vinyl baseboards, sound control and anodized aluminum posts that can house power, communications and control circuitry. ▪ Westinghouse Electric Corporation, Pittsburgh.*

Circle 413 on inquiry card

DUCTS / *Micro-Aire* duct systems are described in a 16-page booklet that covers duct board and preformed fiber glass ducts, including the new flexible and aluminum-jacketed units. ▪ Johns-Manville, Industrial Insulations Division, New York City.*

Circle 414 on inquiry card

CONCRETE / The versatility of concrete is the subject of another issue of "Concrete Today." Shown in the 14-page color booklet are a museum, a high-rise office building, a railroad tunnel and a home in Iceland. ▪ Master Builders, Cleveland.*

Circle 415 on inquiry card

ARCHITECTURAL COURSES / A 40-page catalog describes 28 architecture and building trades courses available. Also discussed are careers in the field. ▪ International Correspondence Schools, Scranton, Pa.

Circle 416 on inquiry card

STEEL DOOR FRAMES / A definitive 16-page A.I.A. catalog on *"Roberts Rediframe* Prefinished Steel Door Frames" illustrates 50 wall systems and spells out 16 jobsite economies. ▪ Roberts Consolidated Industries Inc., City of Industry, Calif.

Circle 417 on inquiry card

OFFICE FURNITURE / A 60-page, color catalog shows contemporary and traditional office furniture and accessories in settings that include desks, tables, chairs, credenzas, etc. ▪ Lyon Metal Products, Incorporated, Aurora, Ill.*

Circle 418 on inquiry card

AIR CONDITIONERS / A 48-page catalog features the fan-coil air conditioner line, which includes five basic models, eight unit sizes, and some 50 options and accessories. ▪ Modine Manufacturing Co., Racine, Wis.

Circle 419 on inquiry card

TINTED GLASS / A 26-page technical service report describes recommended installation practices for tinted glass. Included in an architectural section is a glazing recommendation chart ▪ Glass Division, PPG Industries, Inc., Pittsburgh.*

Circle 420 on inquiry card

CONTROLS - THERMOMETERS / "Catalog K2" includes complete technical data, applications, photos, drawings and pricing on a wide selection of temperature and pressure controls, thermometers and recorders. "Several unique new designs are featured." ▪ United Electric Controls Company, Watertown, Mass.

Circle 421 on inquiry card

** Additional product information in Sweet's Architectural File*

more literature on page 210

WALL-TO-WALL HALL

Clear the way with OASIS Fully-Recessed water coolers—an "in" design that never stands out.

Stop the cluttered hallway before it gets off your board. Design now, to take full advantage of OASIS Fully-Recessed water coolers 5- or 10-gph capacities.

Put refreshing cool water wherever it's needed, without transgressing one sneaky little inch into the primary *traffic* function of any hall or passageway.

Always aesthetic and practical, OASIS Fully-Recessed models now take on new significance when your plans must comply with the new "Hill-Burton" bill for corridor safety in hospitals.

Design the 100% hall, wall-to-wall. See Sweets or write for full description of features and specifications.

NEW COMPACT ON-A-WALL. The off-the-floor and out-of-the-way OASIS economy cooler. Only 15" high, 17" wide, 13" deep. For offices, shops, service stations, classrooms. Three- or five-gph capacities. For complete data write for specifications.

OASIS® WATER COOLERS • HUMIDIFIERS • DEHUMIDIFIERS

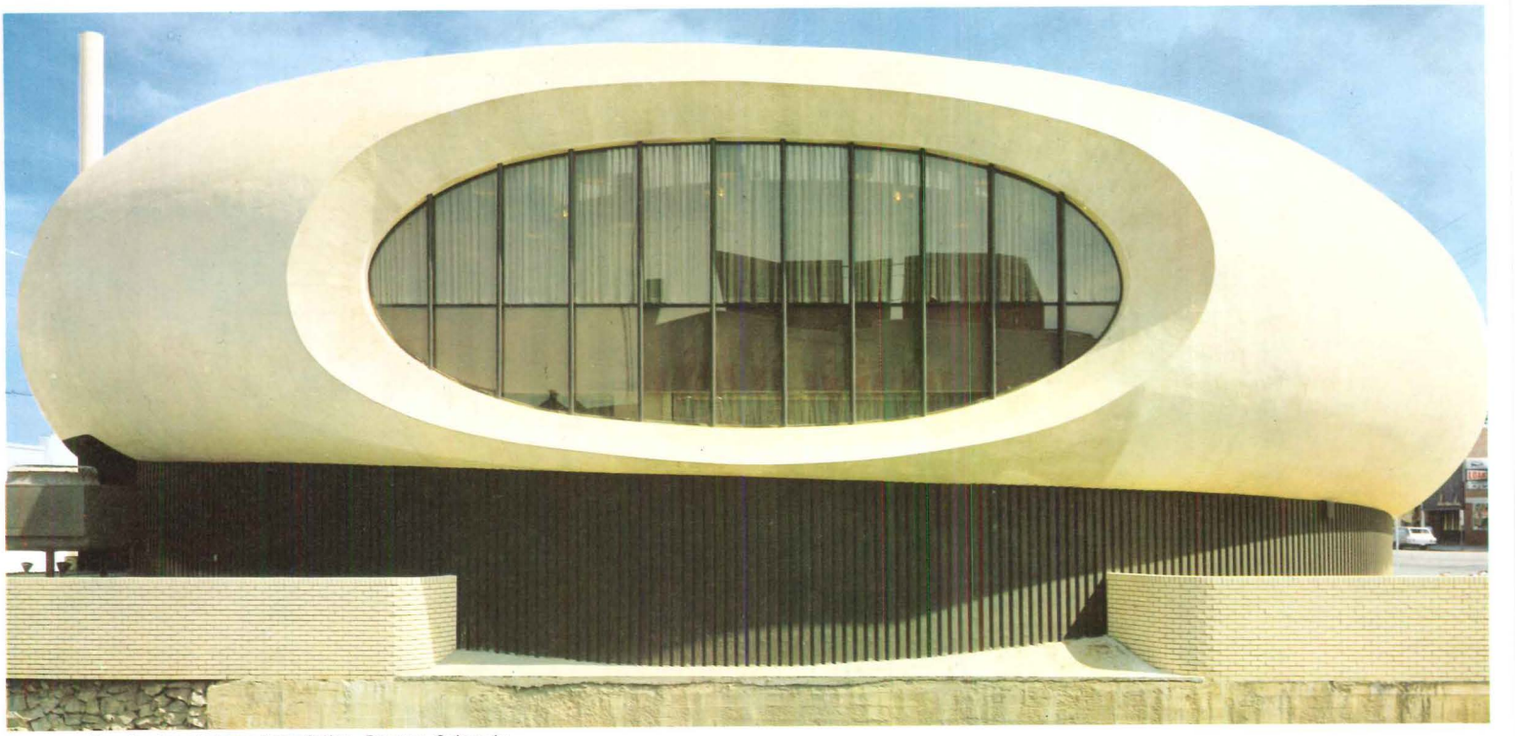
Quality you take for granted.

See Sweet's or write Dept. AR-20, 265 North Hamilton Road, Columbus, Ohio 43213

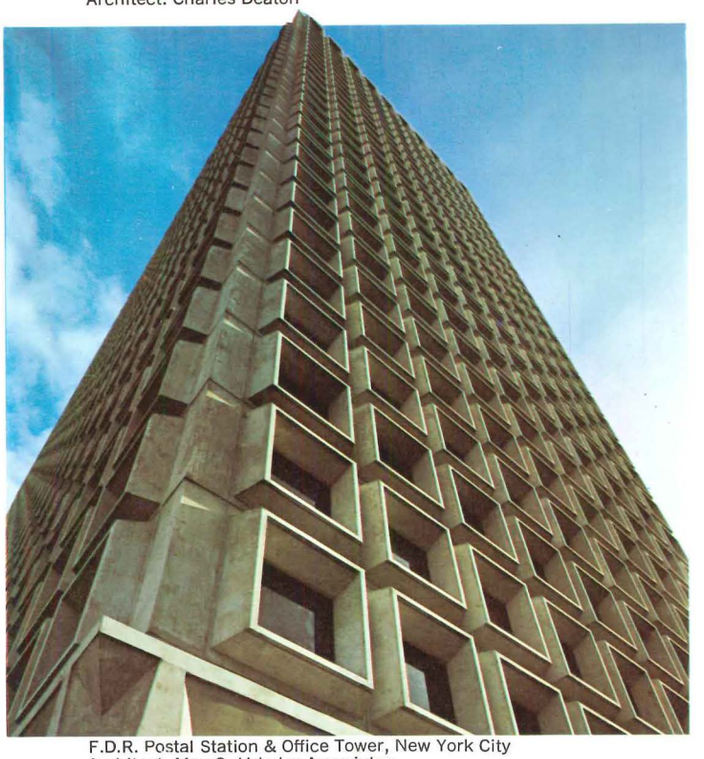
For more data, circle 71 on inquiry card

THE SUNFIGHTERS

A PORTFOLIO OF CURRENT ARCHITECTURE ▶
USING ASG BRONZE AND
GRAY PLATE GLASS.

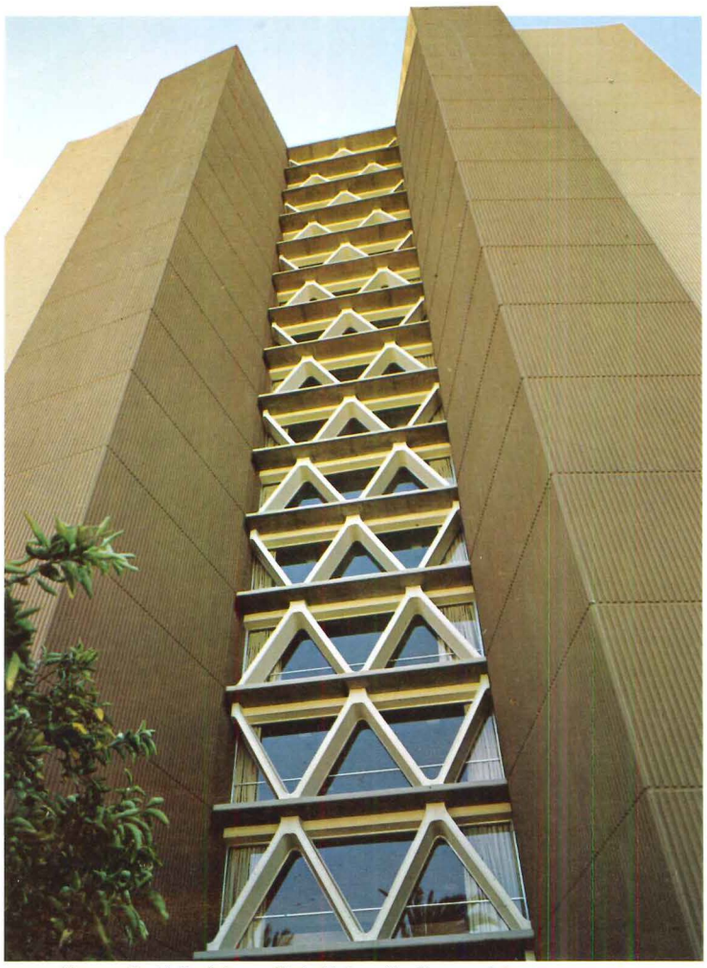


Key Savings & Loan Association, Denver, Colorado
Architect: Charles Deaton



F.D.R. Postal Station & Office Tower, New York City
Architect: Max O. Urbahn Associates

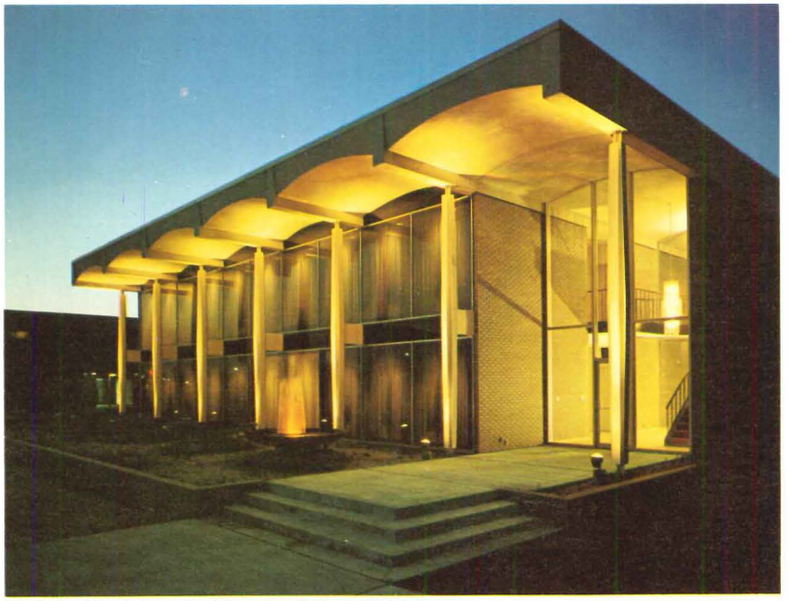
Singer Office Plaza, Southfield, Michigan
Architect: Sanford Rossen



Manzanita Hall—Arizona State University, Tempe, Arizona
Architect: Cartmell and Rossman

Claflin University, Fine Arts Building, Orangeburg, South Carolina
Architect: Godwin & Beckett

Public Library, Chapel Hill, North Carolina
Architect City Planning & Architectural Assoc.



Stark food brokerage building, Southfield, Michigan
Architect: Volk & London Architects Inc.

continued from page 163

PLAYGROUND SCULPTURE / This 18-ft tower, which may be used as a display area for art, has won the first $2000 commission in Alcoa's "Ventures in Design" program. On a quarterly basis a program committee will select and commission international designers to develop original concepts using aluminum. The "Aluminum Forest," designed by David Day, is made of aluminum tubing force fitted and secured by fasteners with all parts interchangeable. The structure is anchored in concrete. ■ Aluminum Company of America, Pittsburgh.

Circle 303 on inquiry card

AWARD-WINNING CHAIR / An American-manufactured chair has received the Austrian Gold Medal for the top design award at the Third International Furniture Exhibition in Vienna. The *GF 40/4* chair, designed by David Rowland, is engineered so that 40 chairs can be stacked within a height of only four feet. ■ The General Fireproofing Company, Youngstown, Ohio.

Circle 304 on inquiry card

more products on page 181

Conwed

Conwed

Here today
CHANGED
TOMORROW

Conwed®

MOVABLE
WALLS

Conwed CORPORATION

Movable Systems Beauty today... MOVABLE for tomorrow's SPACE CHANGE DEMANDS

Now you can create beautiful, functional interiors with complete flexibility for minor or major space modifications. Three Conwed systems build "permanent look" walls from "bank screen" to cornice or full height. Door, glass and panel units readily interchange for efficient planning and low cost installation or change.

Conwed movable partitions come in a wide variety of colors, textures, and panel surface materials. Some are specially designed for maximum acoustical control.

The Conwed movable systems were developed by the same design-engineering team who made Conwed "office landscape" dividers, the choice of interior designers for beauty and versatility.

3 BASIC TYPES

Conwed 1,000 Partition System

Especially adaptable to modern offices, or wherever space demands are subject to change on short notice. Panel, window and door modules can be changed or added without disturbing adjoining units. Framing members are anodized aluminum. Panels are full or cornice height.

Conwed 3,000 Partition System

Ideal for the budget-conscious buyer desiring economy without sacrificing beauty or versatility. This flush post style system provides easy installation and complete movability Framing members are anodized aluminum. Panels are available in full or cornice height.

The Conwed 5,000 Divider Wall System

A low wall "bank screen" style, designed to subdivide large spaces into semi-private work areas. Vinyl track across divider top accepts glass units for ticket counters, offices, lunchrooms, etc. Framing members are anodized aluminum or prefinished painted steel. Long panels span up to ten feet, minimizing the number of floor anchors. Various heights are available in low rail or glazed rail versions.

Unitized Door and Glass Modules

Conwed modular door and glass units come in a variety of colors and finishes matching 1,000 and 3,000 systems. Modules install as one unit to sharply cut jobsite assembly time. Future remodeling or relocation can be done quickly, too. These unique modular units make Conwed partitions *truly movable* walls.

Variety of Color and Surface Treatments

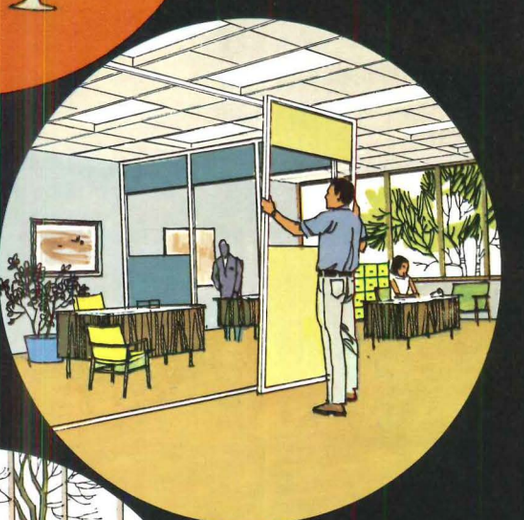
Each partition series is available in a variety of colors, textures and panel materials to harmonize with any decor.

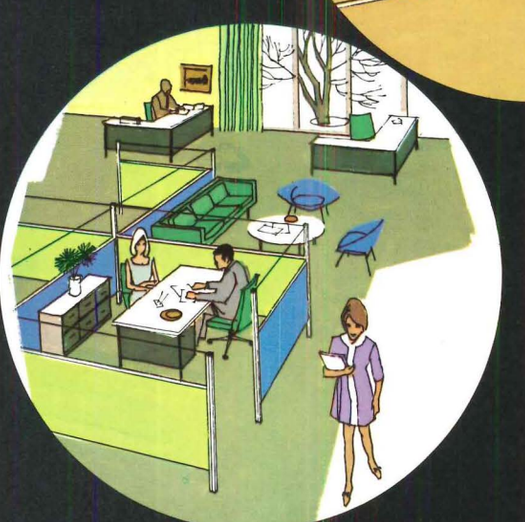
For more details about the Conwed Movable Partition Systems including specifications and installation ideas, write:

Conwed Corporation, Dept. C-4
332 Minnesota Street
St. Paul, Minnesota 55101

Conwed
CORPORATION

The versatile Conwed 3,000 Partition System offers beauty, privacy and economy. Cornice height units, illustrated, create acoustically comfortable study and work areas.





Conwed modular door and glass units install as one unit in the same track as standard panels. Hours of disassembly and re-installation time are saved because doors never need re-hanging or windows re-fitting.

Conwed 5,000 Partition System can be used for secretary or receptionist work areas and other low wall privacy applications. The system is designed for quick change, and easy maintenance.

FRONT PAGE PHOTO
Project: St. Paul Terminal Warehouse, St. Paul, Minn.
General Contractor, Lovering Construction Co.
Acoustical Contractor, Hauenstein Burmeister

Your building. More than a building. A vital, life-supporting environment, shaped by the design, energized by electricity—an Electro-environment.

Your design. More sophisticated than the last one because that's the nature of technology. Particularly electrical technology.

Your challenge. To profit from the benefits of the Electro-environment—and to make your design statement with the confidence that the industry is ready to support you.

The Qualified Electrical Contractor is ready. Ready to translate your ideas, your designs into a working, functioning reality.

Supplying, installing and maintaining the Electro-environment is his business. The Qualified Electrical Contractor advances with the state of the art.

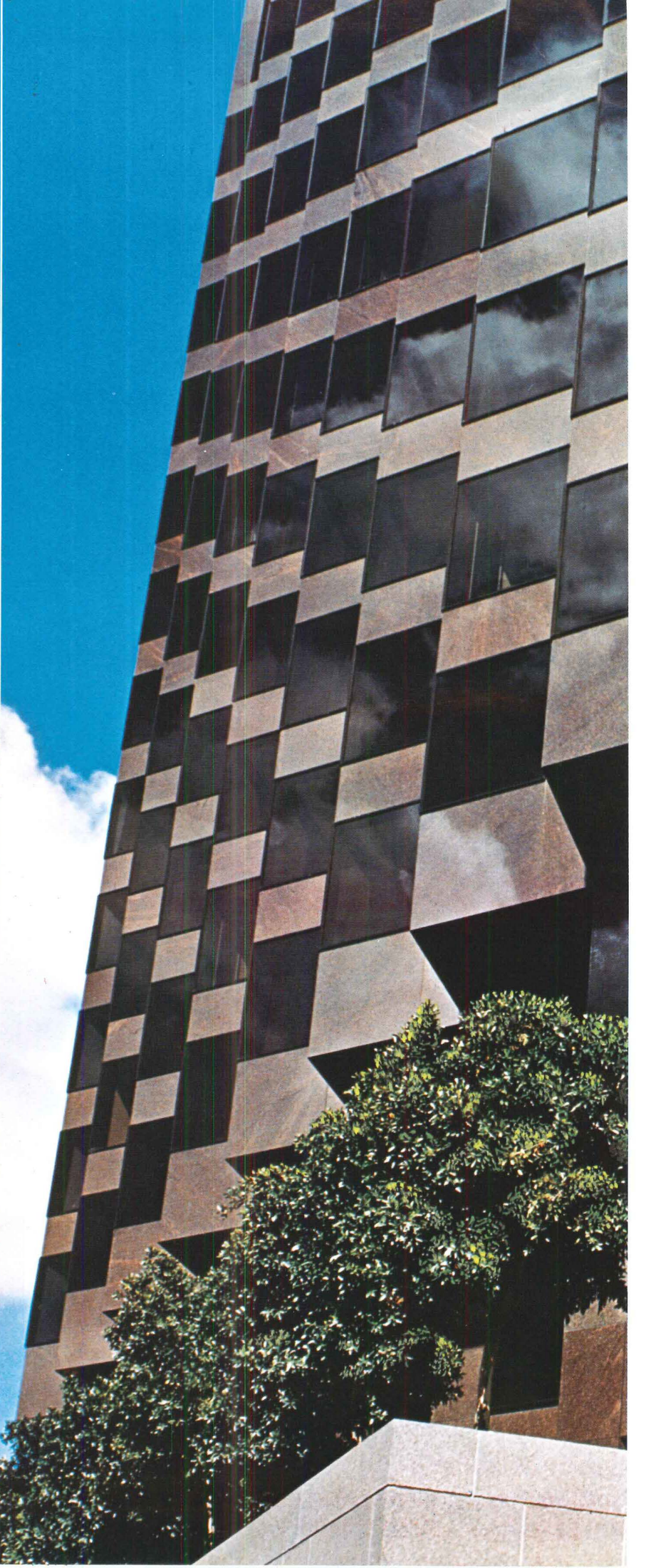
Your challenge is his challenge.

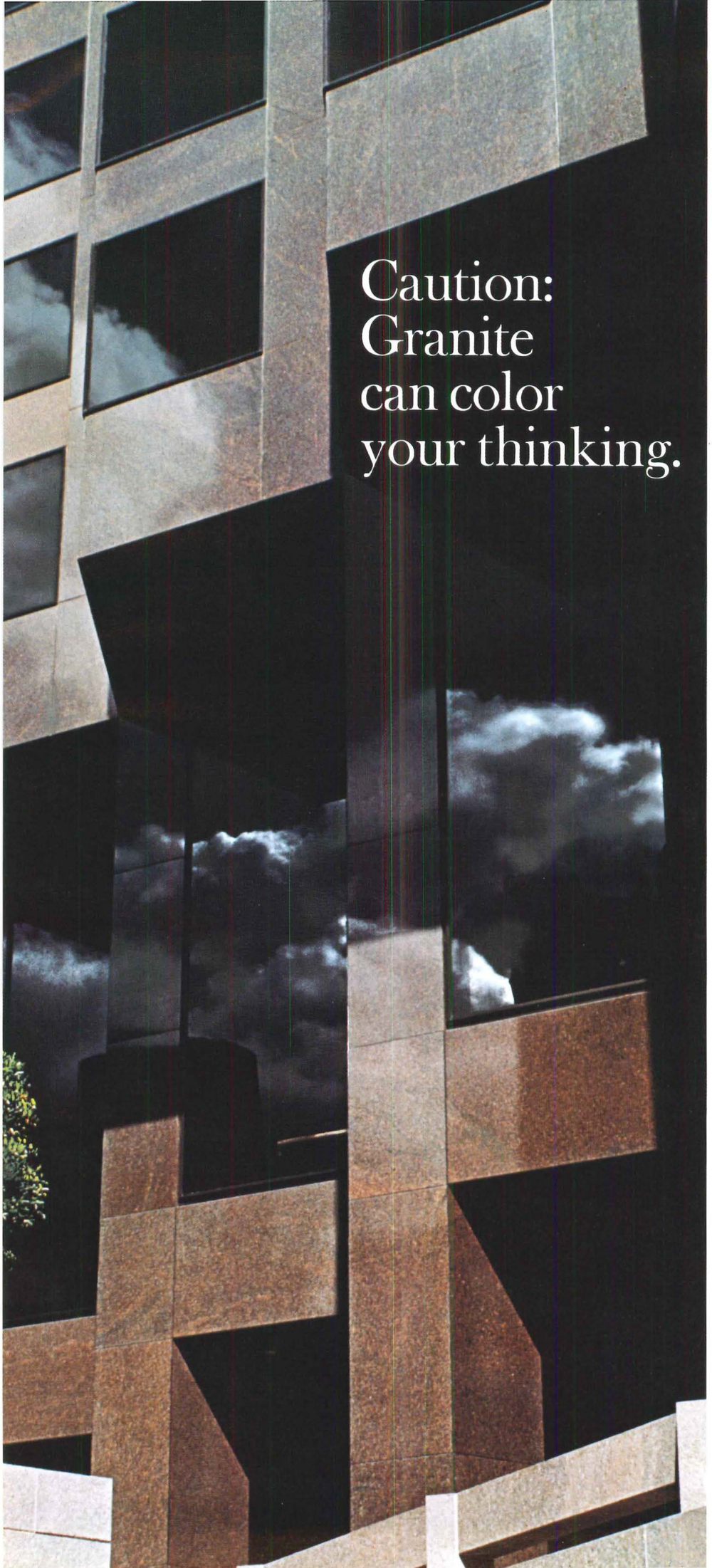
The challenge of the Electro-environment

The Qualified Electrical Contractor makes the Electro-environment work.

NECA. National Electrical Contractors Association.
1730 Rhode Island Avenue, N.W., Washington, D. C. 20036


ROLLS
GARAGE
PARKING
Van Ness Ave. California
49
& Market Streets





Caution: Granite can color your thinking.

The Bank of America World Headquarters Building, San Francisco, California
Architects: Wurster, Bernardi & Emmons, Inc./ Skidmore, Owings & Merrill
Consulting Architect: Pietro Belluschi
Contractor: Dinwiddie-Fuller-Cahill
Granite: Carnelian, polished and natural cleavage

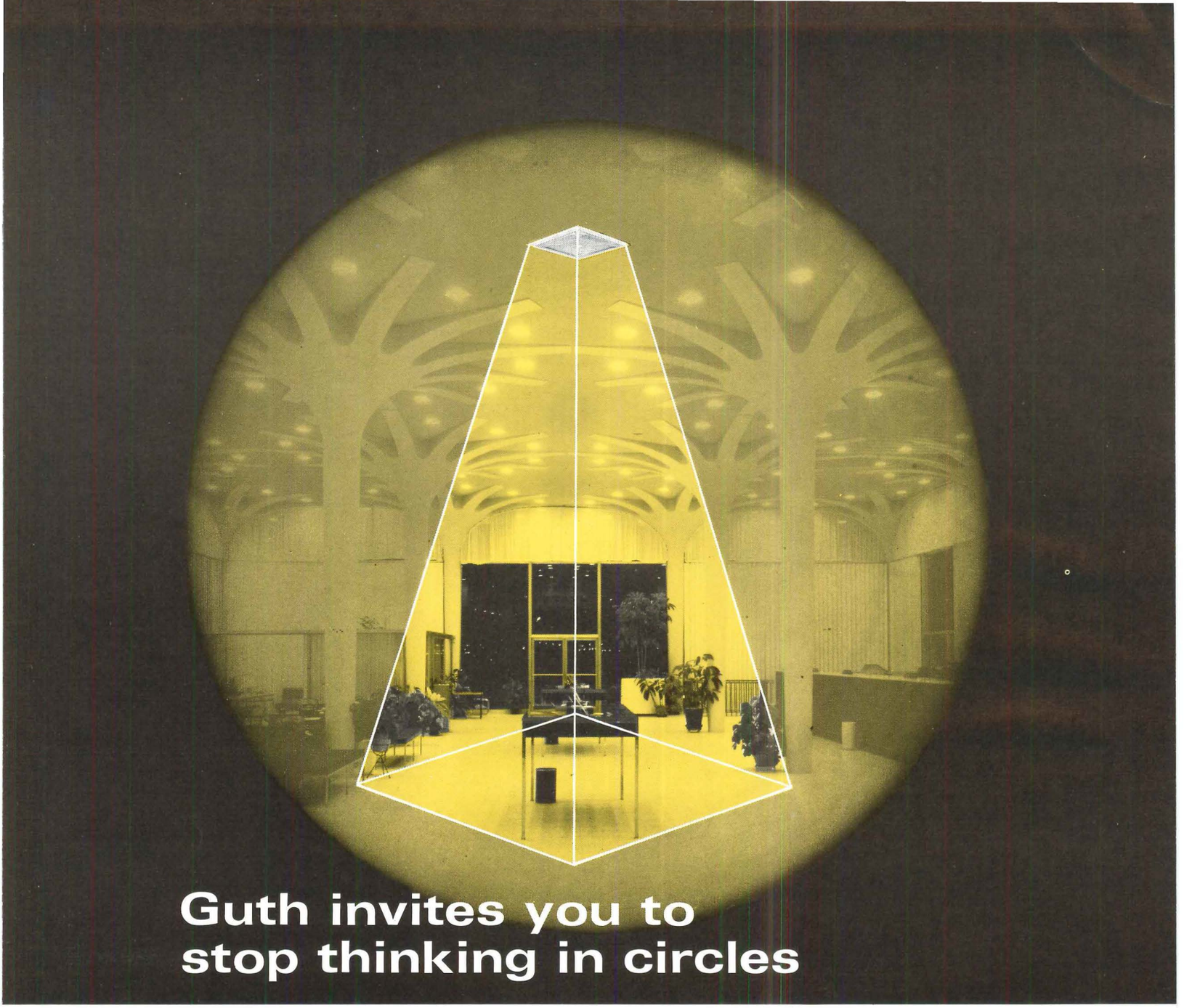
Cold Spring Granite Company

Cold Spring, Minnesota

subsidiaries:
Lake Placid Granite Company
Jay, New York
Texas Granite Corporation
Marble Falls, Texas
Raymond Granite Company
Raymond, California
Cold Spring Granite (Canada) Ltd.
Lac Du Bonnet, Manitoba

over 20 producing quarries

See us in Sweets, File No. $\frac{6a}{Co}$, or write.



Guth invites you to stop thinking in circles

New Guth Square Light Distribution delivers up to 50% greater efficiency.

From beautifully engineered Guth square prismatic lenses come near-perfect squares of light . . . eliminating shadowy corners and bright overlaps. Now you can meet today's high footcandle demands with far greater efficiency. Fill every area with uniform light superior to anything you've ever known (we'll send photometric data to prove it). Select recessed fixtures in a choice of styles and sizes for incandescent, mercury vapor, lucalox* or metalarc** lamps—with more than a dozen optional features.

Send today for our complete designer's catalog.
You'll never "think in circles" again.

*G.E. Trademark **Sylvania Trademark

THE EDWIN F. GUTH COMPANY • 2615 Washington Blvd. • Box 7079 • St. Louis, Mo. 63177

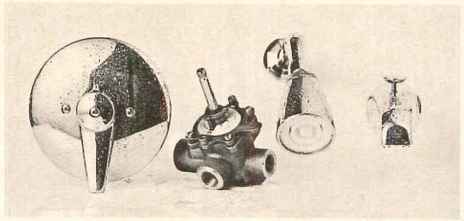
Guth

For more data, circle 75 on inquiry card

For more data, circle 15 on inquiry card

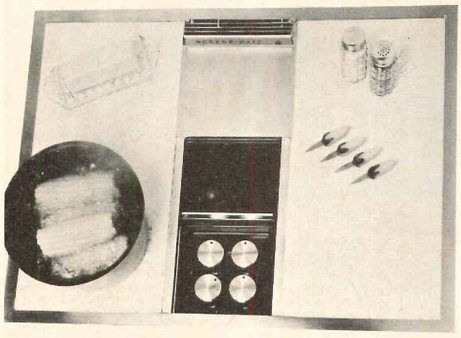
For more data, circle 76 on inquiry card

continued from page 170



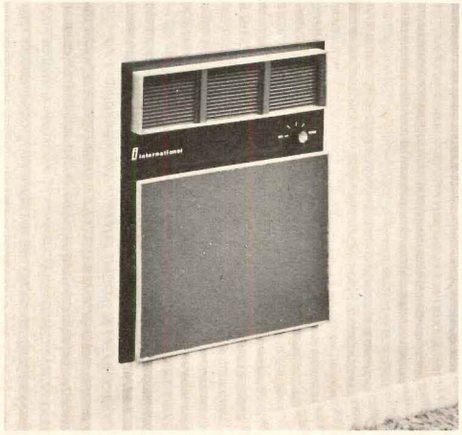
SHOWER-BATH FIXTURES / *Hydroguard 400* fixtures include an automatic shower/bath control with full equalizing capabilities. The control is designed to sell at a price competitive with standard single-handle valves. A fixture set consists of an adjustable, self-cleaning shower head, a tub spout with built-in diverter latch, and a control handle and dial, all in polished chrome-plated brass. ▪ Powers Regulator Company, Skokie, Ill.

Circle 305 on inquiry card



COOKTOP / A glass ceramic electric cooktop, *Perma-Clean,* requires no special cookware. The unit is only 3¼ in. deep and can be installed over a drawer, slide-in oven or built-in dishwasher. The controls are hidden by a sliding black glass panel, and the two large and two standard elements are beneath starburst designs on the flush top. There is reported little heat transfer to non-cooking areas. ▪ Modern Maid, Inc., Chattanooga.

Circle 306 on inquiry card



HEATER / A quiet and safe in-the-wall heater, recommended for baths and other areas where baseboard heaters are undesirable, is the newest in a "hot-water-heat-without-plumbing" line. The fan used to draw cold air into the heater is lifetime lubricated. The electric element is sealed within the piping, assuring safety of operation. ▪ International Oil Burner Company, St. Louis.

Circle 307 on inquiry card

BATH LINE / A new line of bathroom fixtures, the *Designer Line,* will offer products of fiber glass-reinforced plastics. Included in the line will be two 60-in. tub and surrounds, two 36-in. three-wall shower compartments, and a 48-in. and a 60-in. shower with seat. First to be available is the integral tub and surround pictured. Its features include a built-in lumbar back support and an oversized soap dish that also accommodates shampoo bottles. ▪ Architectural Products Department, American Standard, New York City.

Circle 308 on inquiry card

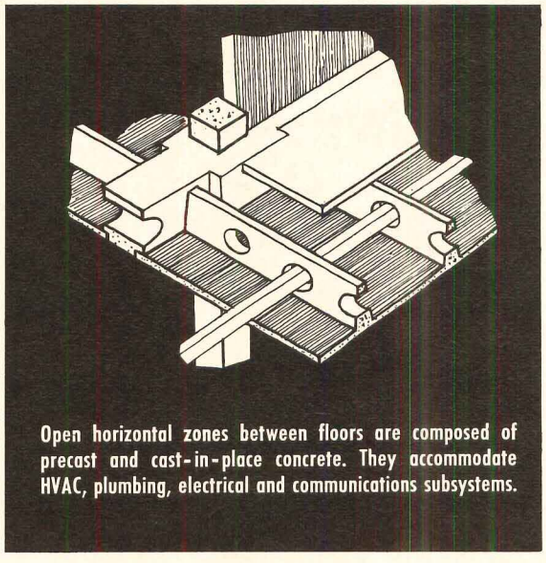
more products on page 188

For more data, circle 77 on inquiry card

For more data, circle 76 on inquiry card

Concrete is good for you

Building systems for student housing... fast, flexible, economical.



Open horizontal zones between floors are composed of precast and cast-in-place concrete. They accommodate HVAC, plumbing, electrical and communications subsystems.

There are two remarkable things that are inherent in concrete building systems.

One is design freedom. Concrete building systems allow any exterior configuration. And they provide complete freedom in choosing exterior materials.

Second, they are as economical and accommodating as other, more rigid systems. Open horizontal zones between floors are the key to much of the economy. They accommodate HVAC and other subsystems such as plumbing, electrical and communications.

Concrete building systems are good for you.

We'll help you make them better by providing the information and technical assistance you need. Just write us.
Dept. A8-8, Old Orchard Rd., Skokie, Ill. 60076.

PORTLAND CEMENT PCA ASSOCIATION

IMPROVING AND EXTENDING THE USES OF CONCRETE

For more data, circle 78 on inquiry card

Rule: All walls must be vertical.

Why look for trouble? Walls have been straight up and down for years and nobody ever complained.

So why experiment? Why not just stay with the commonplace? For one thing, it's easier. And for another, you'll save yourself the time it takes to read the rest of this ad. Because what we have to say will be of interest only to men of imagination.

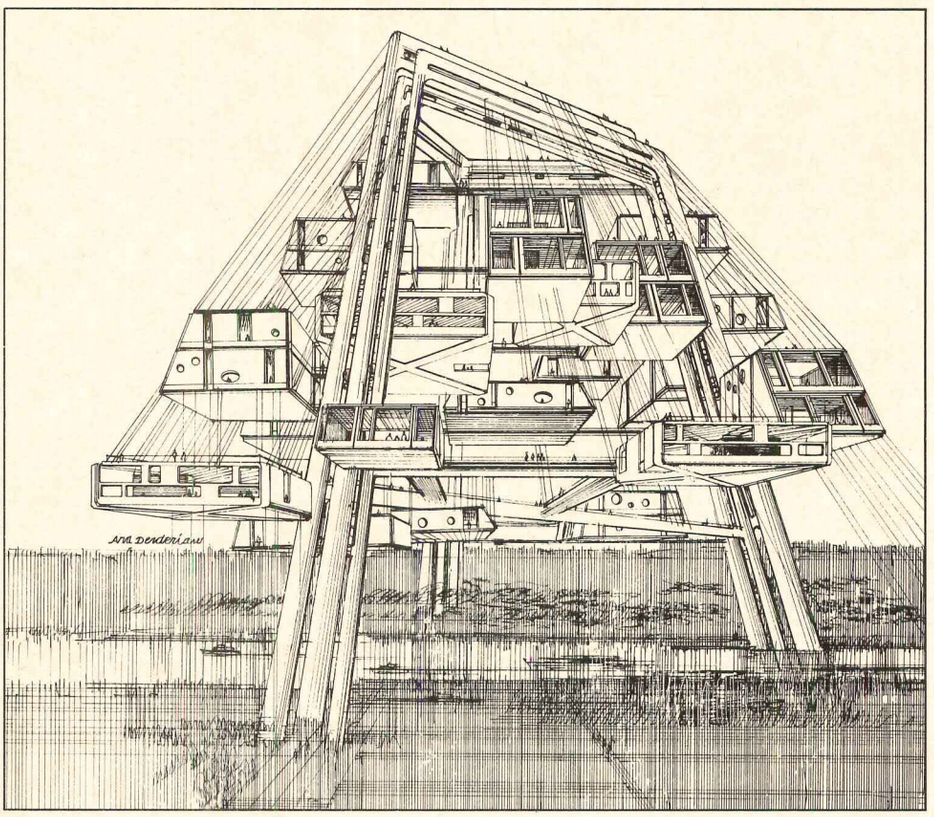
Men like Architect Ara Derderian, who parlayed vertical wall and sloped wall cable-hung units into this visionary exhibition center.

And, to accompany his unconventional sloped windows, we've developed an unconventional method of hanging the only window covering he could use to combine light-and-air control with privacy: blinds.

Looking ahead with Ara Derderian, we've determined that thin wires, threaded through the blinds' tips, would

enable them to parallel the sloped windows, yet still leave them free to tilt, raise and lower.

In this way, we repeal the law of gravity. And indicate to you that our imagination can keep up with yours. If only you'll let it.



Levolor Blinds. For architects who break the rules.

ARCHITECT ARA DERDERIAN'S VISIONARY EXHIBITION CENTER MAY NEVER BECOME A REALITY. YOUR "VISION" MAY. □ DISCUSS IT WITH US NOW, BEFORE YOU HAVE TO START COMPROMISING. □ LEVOLOR LORENTZEN, INC., 720 MONROE STREET, HOBOKEN, NEW JERSEY 07030

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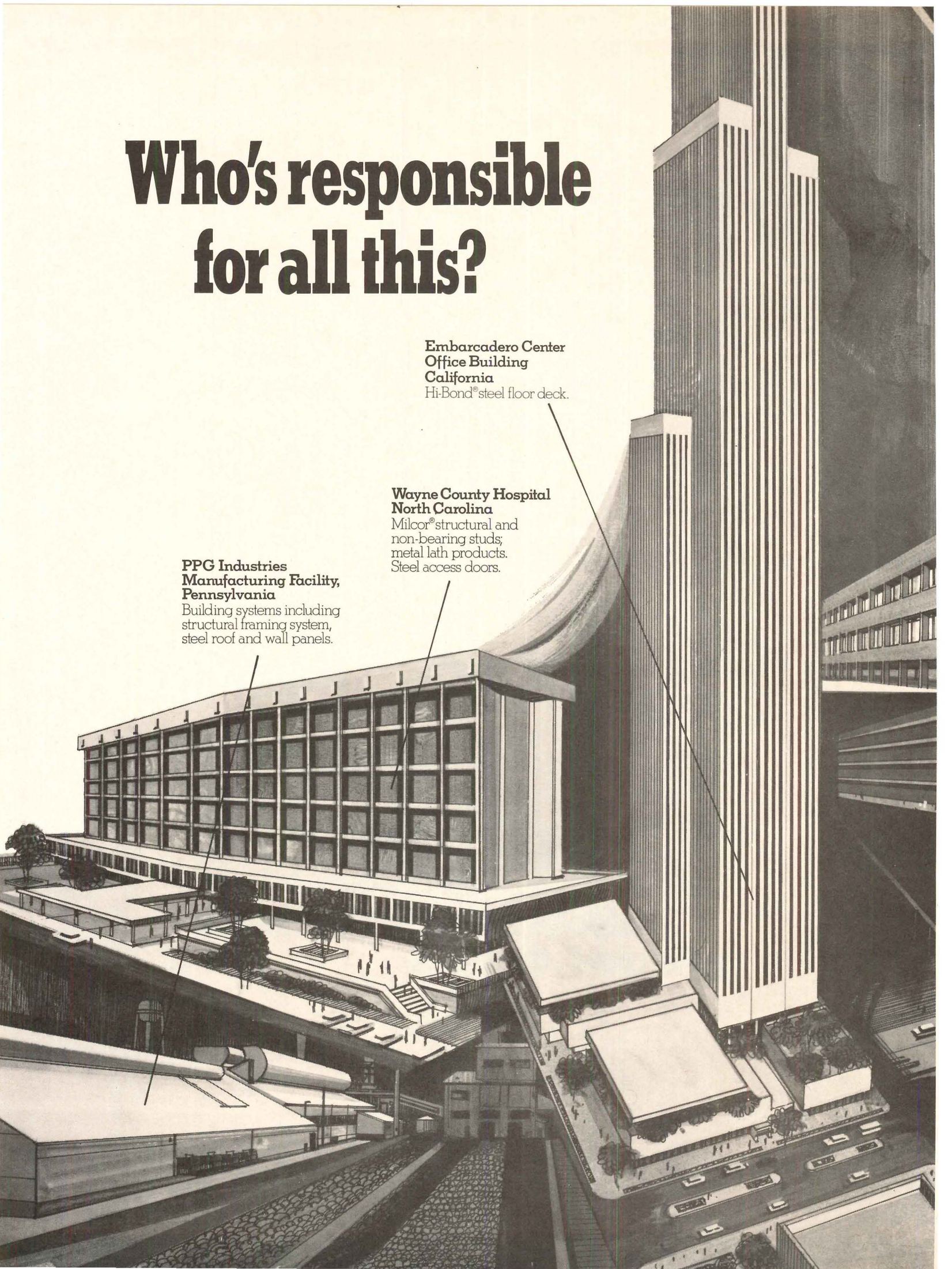
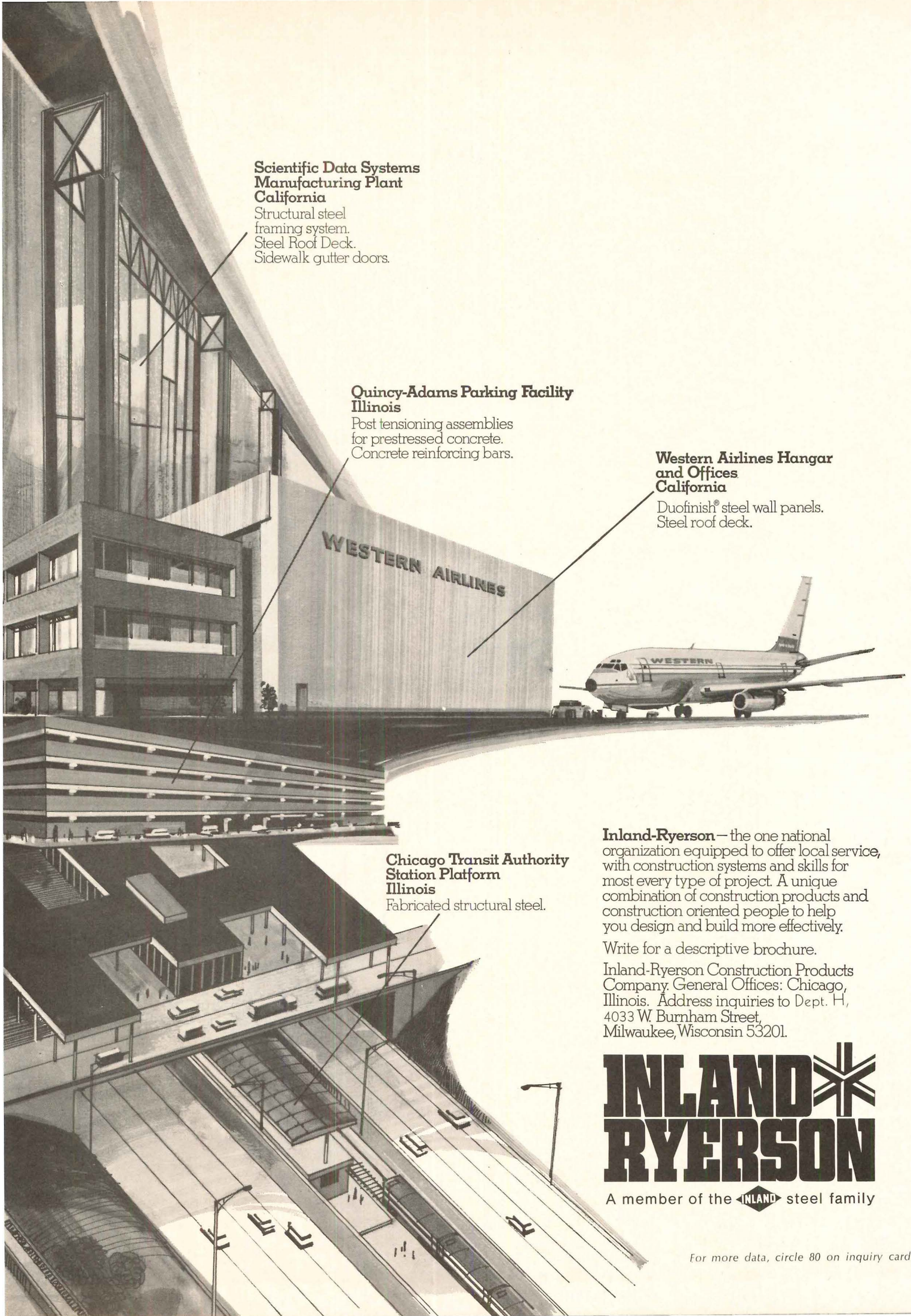
Who's responsible for all this?

Embarcadero Center Office Building California
Hi-Bond® steel floor deck.

Wayne County Hospital North Carolina
Milcor® structural and non-bearing studs; metal lath products. Steel access doors.

PPG Industries Manufacturing Facility, Pennsylvania
Building systems including structural framing system, steel roof and wall panels.





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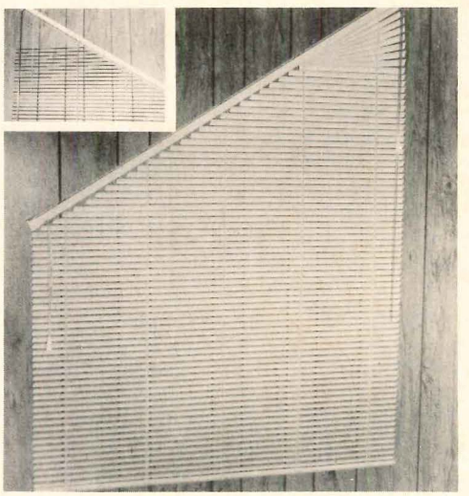
continued from page 181



A-FRAME BLINDS / A slat blind for trapezoidal-shaped windows—usually in summer or second homes and split-level homes with cathedral ceilings—has narrow slats of less than one in. Almost invisible polyester ladders support the slats and the "Magic Wand" twists to tilt them. Blinds come in a full range of colors. ▪ Levolor Lorentzen, Hoboken, N.J.

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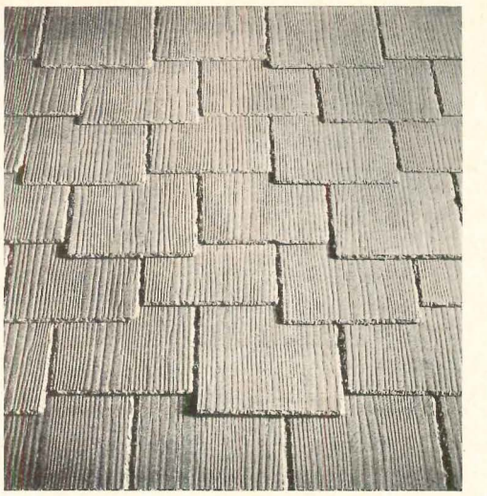
MINERAL FIBER SHINGLE / A fire-safe, mineral fiber roof shingle has been designed specifically to complement western architecture. Shingles have a wood grain look and sloping edges. They will not rot, rust, shrink, warp or crack; they resist the extremes of weather and need no preservative treatment. ▪ Johns-Manville, New York City.



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TILT WINDOW / A premium-quality double-hung wood window unit has sash that tilt into the room or are easily removed. Storm panels are mounted on the sash, so they, as well as the full screen, can also be removed from inside. ▪ Rimco, Rock Island, Ill.

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LONG ALUMINUM SHINGLE / A five-ft-long aluminum shingle in one-foot widths is guaranteed for 20 years not to split, chip, blister, peel, rust, rot or warp. A four-way interlock forms a tight weather seal between shakes. The reflective qualities of the aluminum shingles are said to control temperature extremes. ▪ Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

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more products on page 201

This ceiling makes it easy to uncover what you've covered up.

Its unique tile suspension system provides complete accessibility at any point in the ceiling. The system is called ATS... the Accessible Tile System... by Armstrong. Among other things, it eliminates the need for costly access panels. Panels that spoil the look of a tight, tile ceiling. With ATS, a simple tool is all that's needed to gain access or to change tiles or to rearrange light fixtures. And routine maintenance is done with little bother to people working under it. ATS and other ceiling innovations are described in our folio. Please write for a copy. Armstrong, 4207 Rock Street, Lancaster, Pa. 17604.

Armstrong
Ceiling Systems that work

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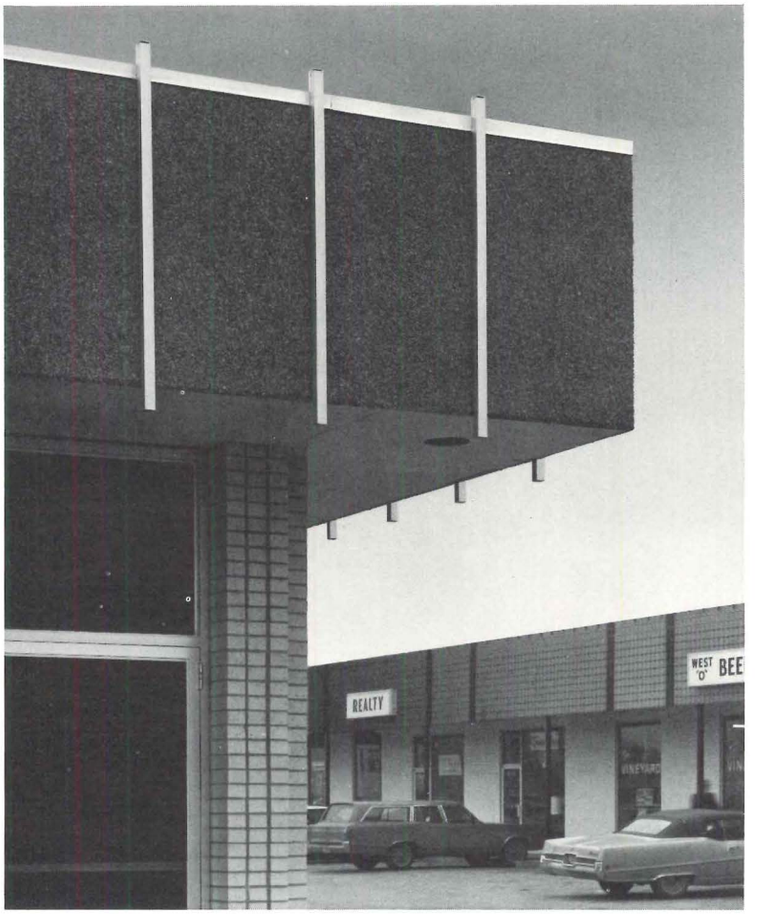

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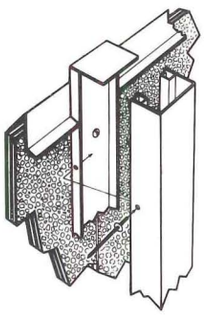

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For complete information, phone or write **mapes industries, inc.**
Box 2067 Lincoln, Nebraska 68501

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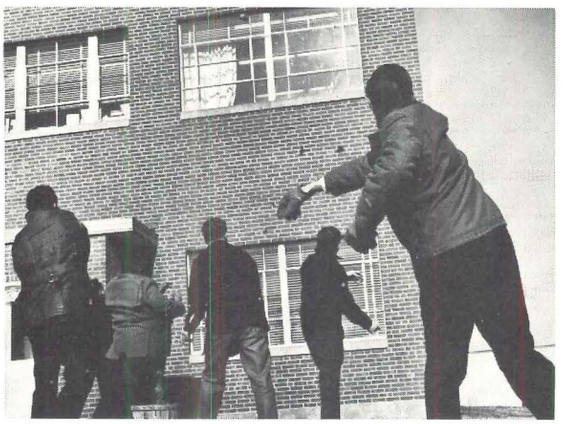

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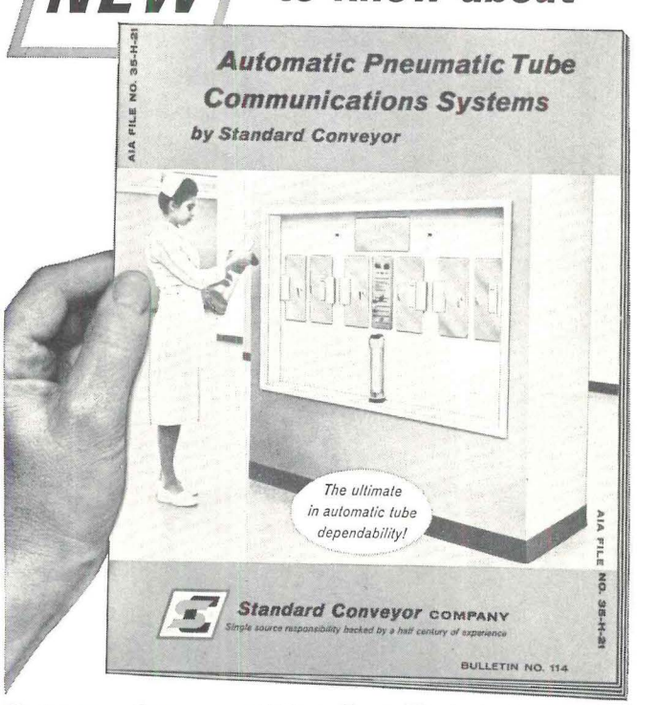

Get your free copy! Describes, illustrates new type automatic tube systems featuring greater dependability, quieter operation. 12 pages. ***Standard Conveyor Co., 312-H Second St., North St. Paul, Minn. 55109.***

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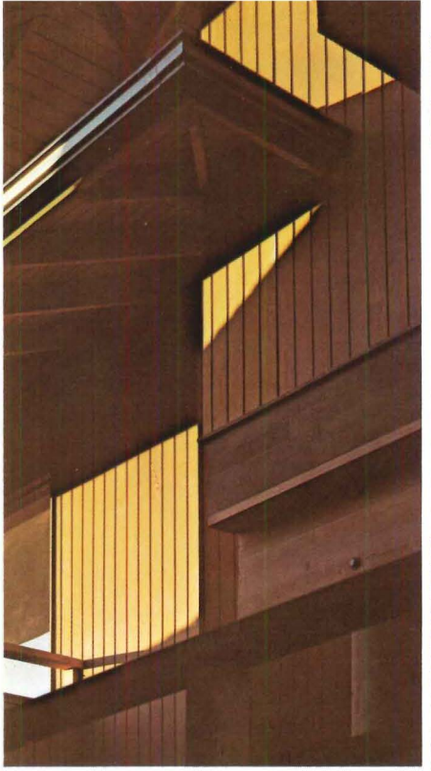
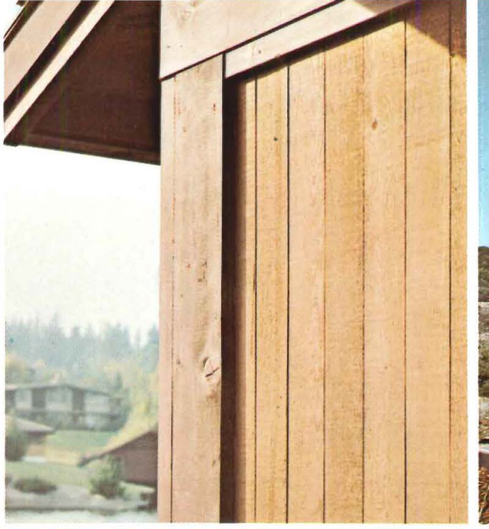





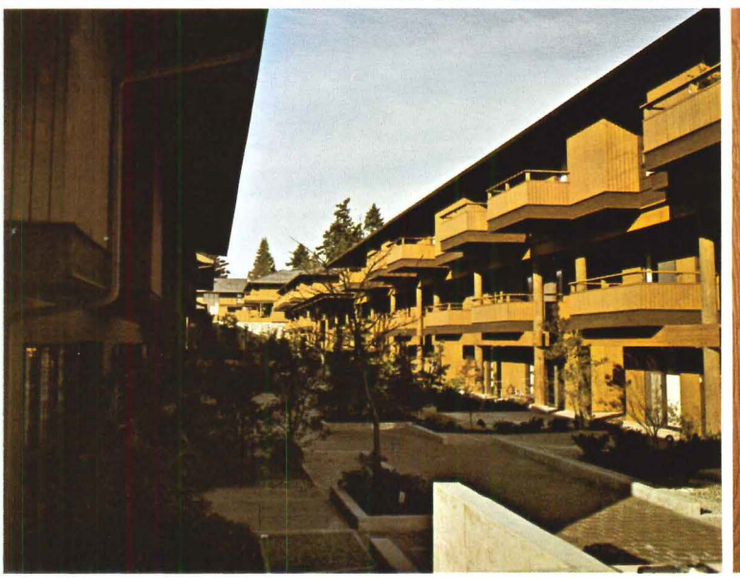

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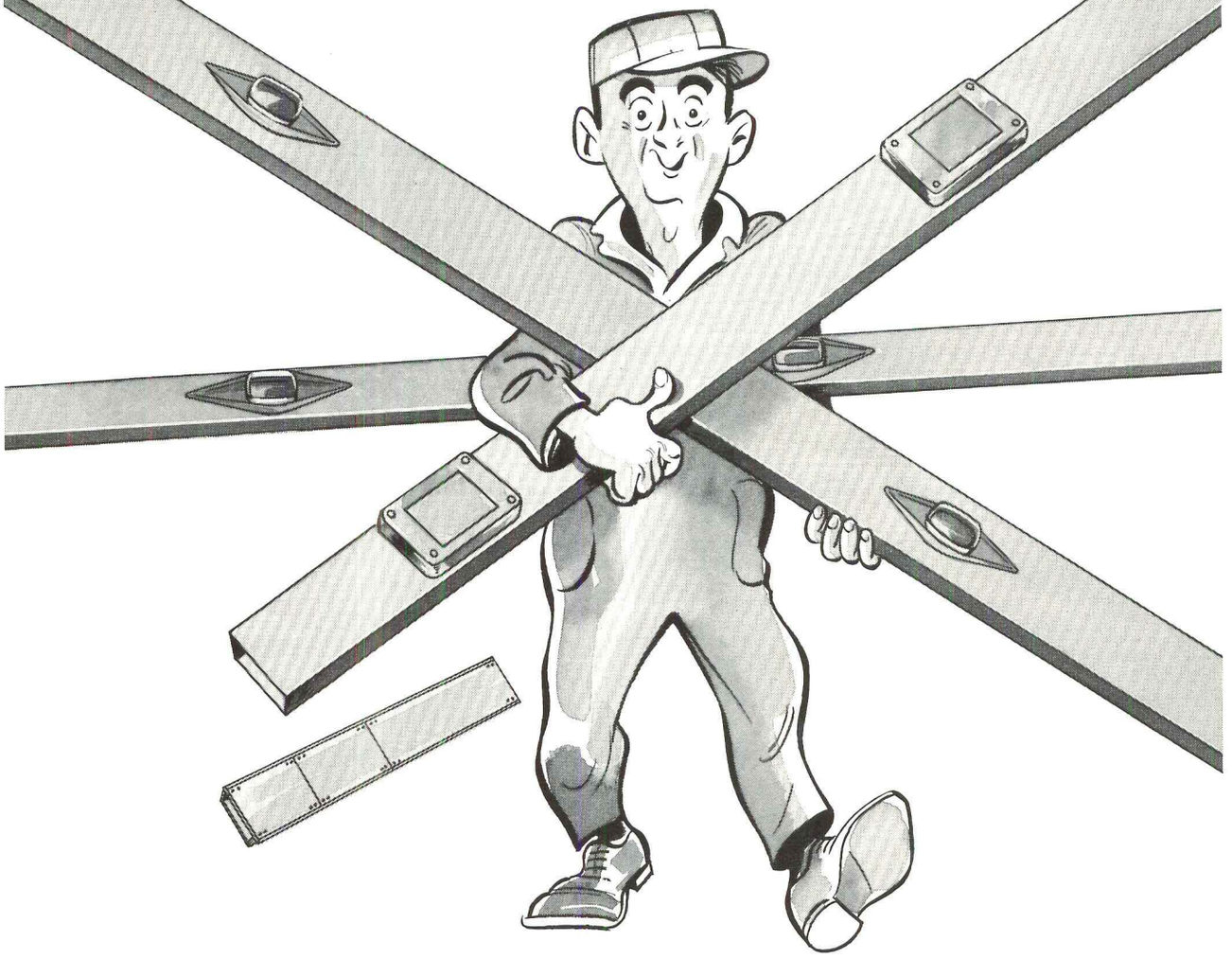

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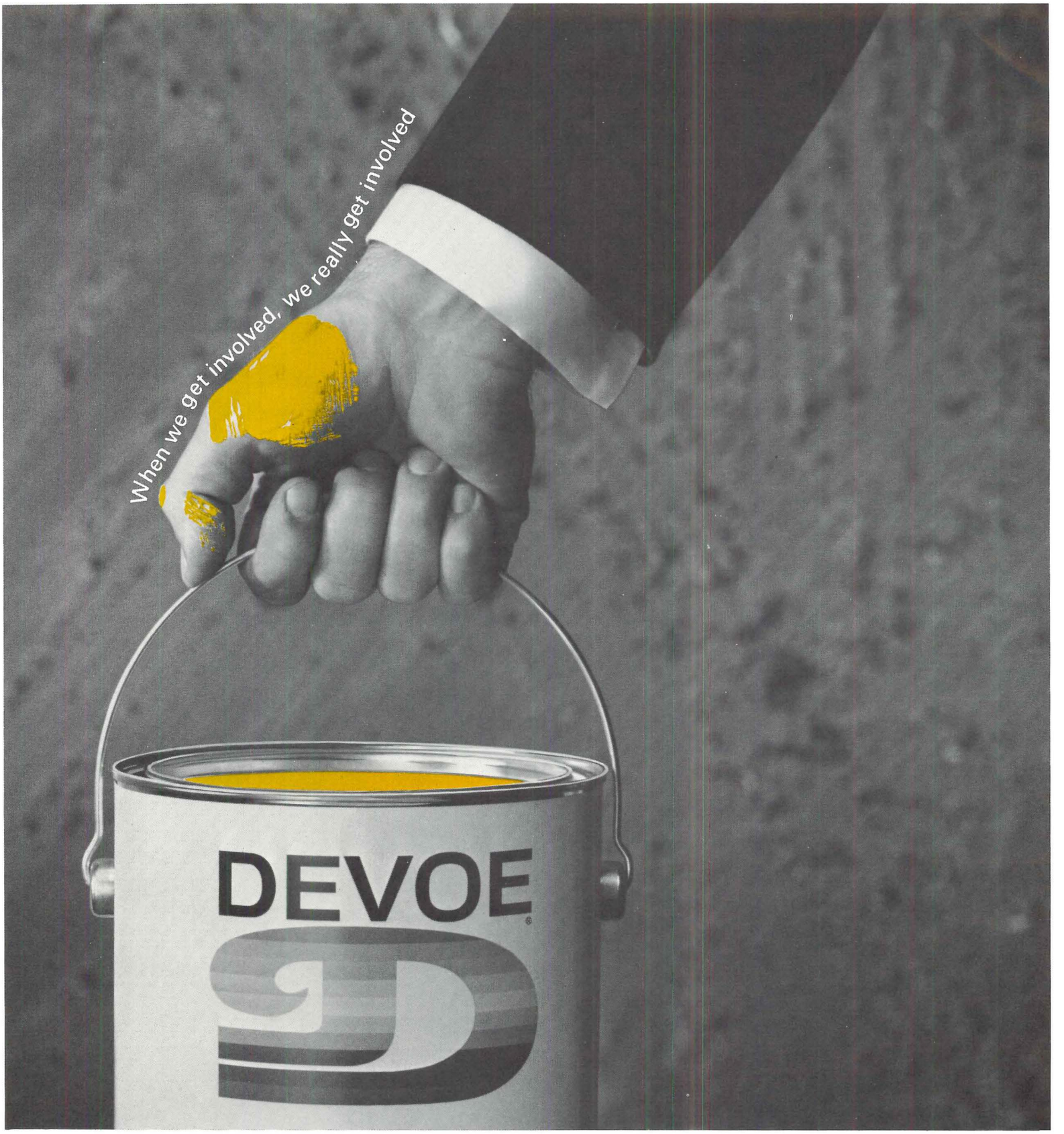

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continued from page 188

WATERPROOFING / *X-Pandoseal,* a clear liquid that is spray or brush applied to brick, stone, masonry and concrete, provides a complete seal against water seepage, efflorescence and winter cracking—even hairline cracks become impervious to moisture. One proper application of the sealer is said to provide complete protection for at least 10 years. ▪ X-Pando Corporation, Long Island City, N.Y.

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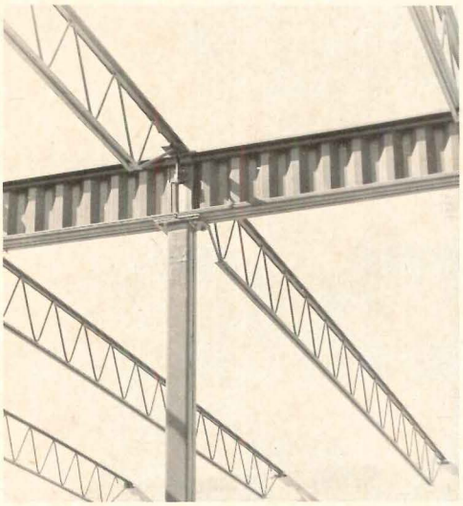

GIRDERS / The *Panlweb* girder is reported to speed assembly, provide superior construction and reduce material, engineering and labor costs. Also, for a given load, a lighter *Panlweb* girder can be used instead of its solid structural counterpart. The girder, suited to light-to-medium construction, consists basically of top and bottom flanges joined by a ribbed steel web. ▪ Macomber Incorporated, Canton, Ohio.

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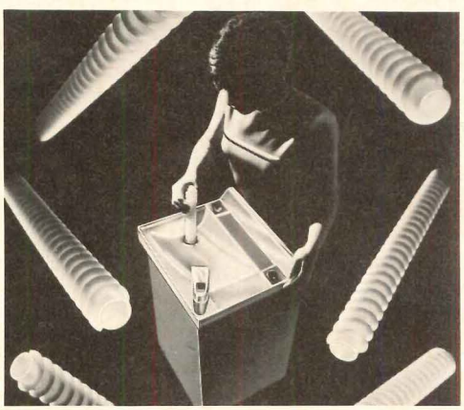

COOLER CLEANER / For easy cleaning, plastic spirals, now offered on many of the company's units, may be readily removed from drains of pressure-type water coolers, without lifting the basin top. Tissue, tobacco and other sediment that often clog water cooler drains are wiped from the spiral cores. ▪ Commercial Equipment Department, General Electric, Chicago Heights, Ill.

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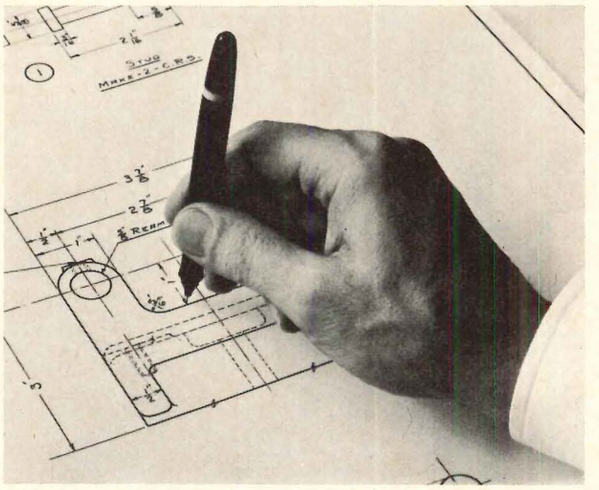
Class Mates



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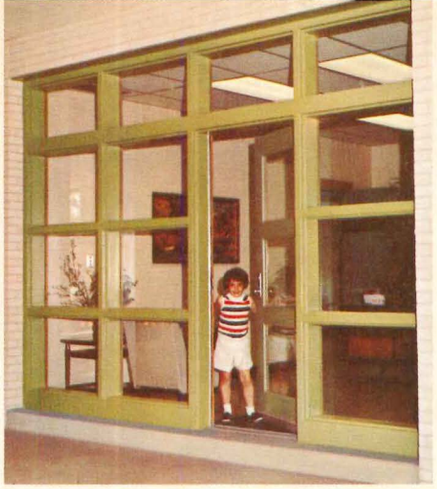

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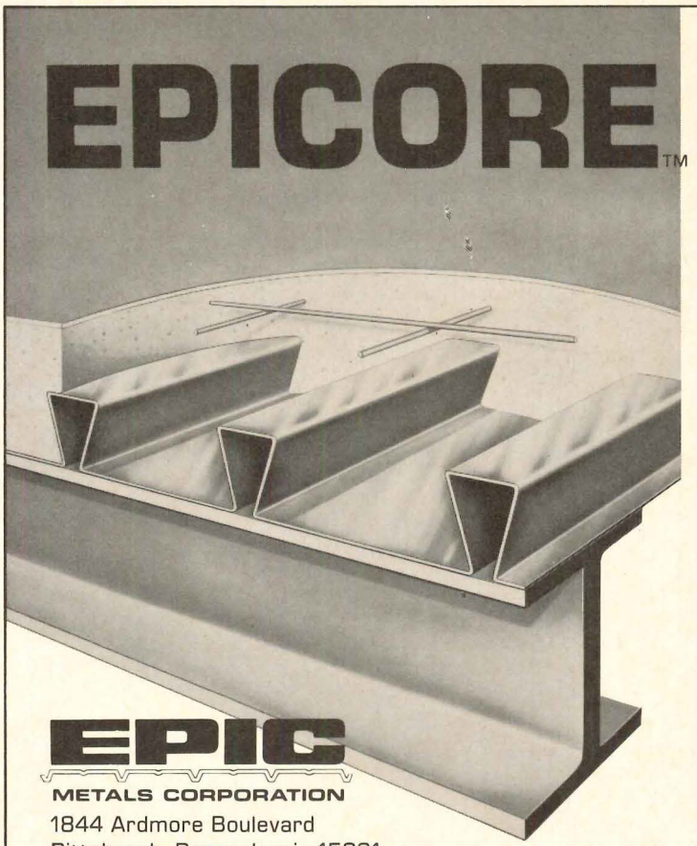

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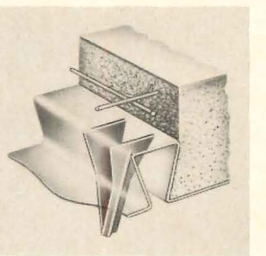

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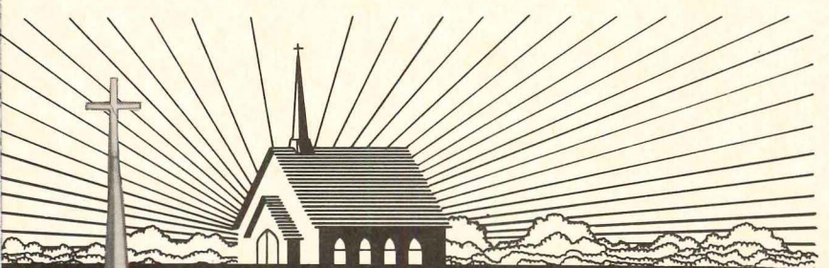

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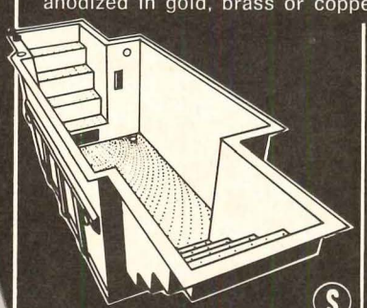

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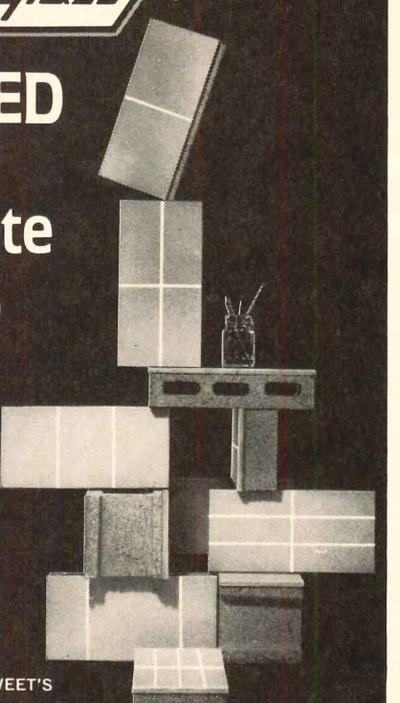

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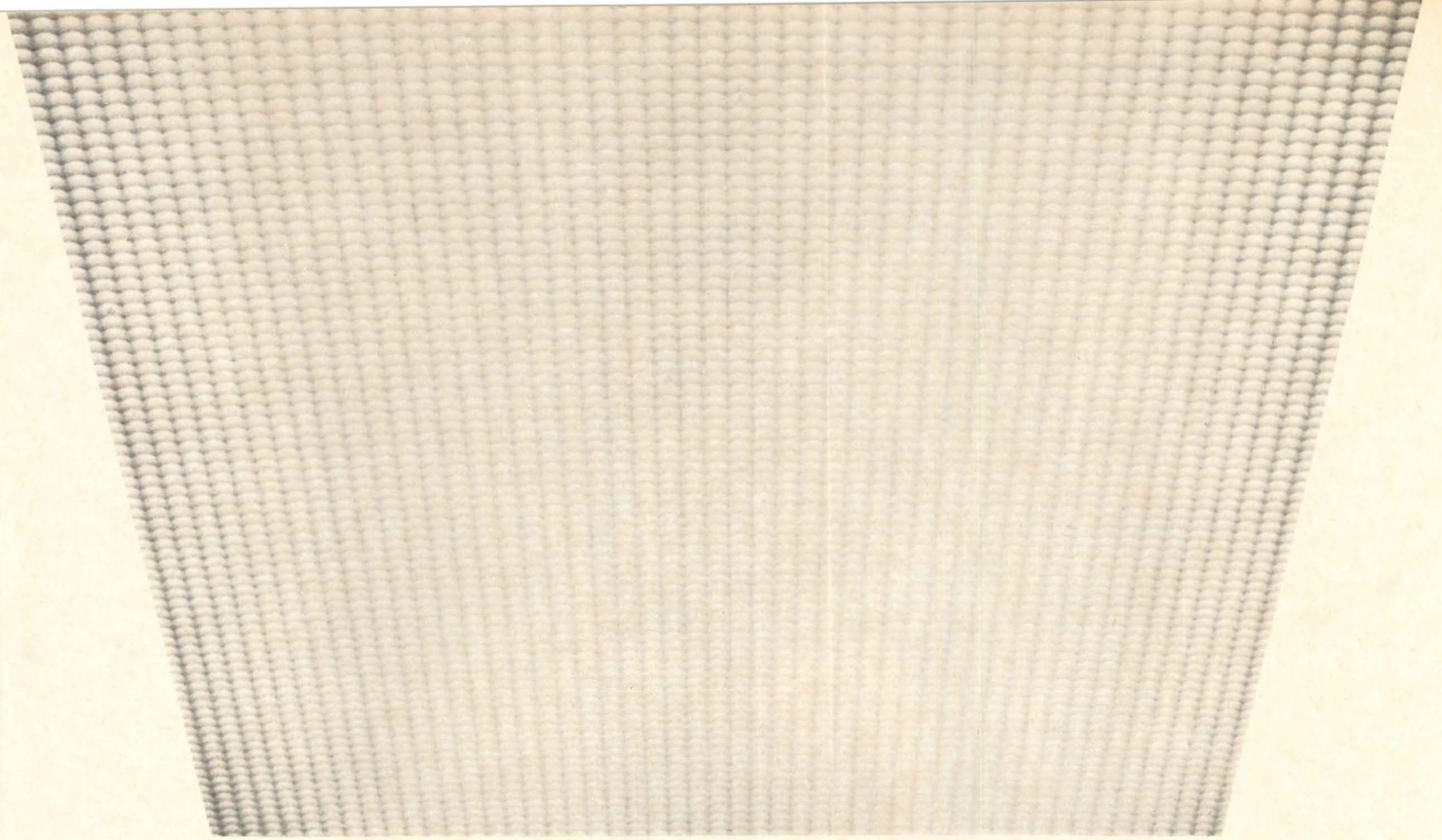

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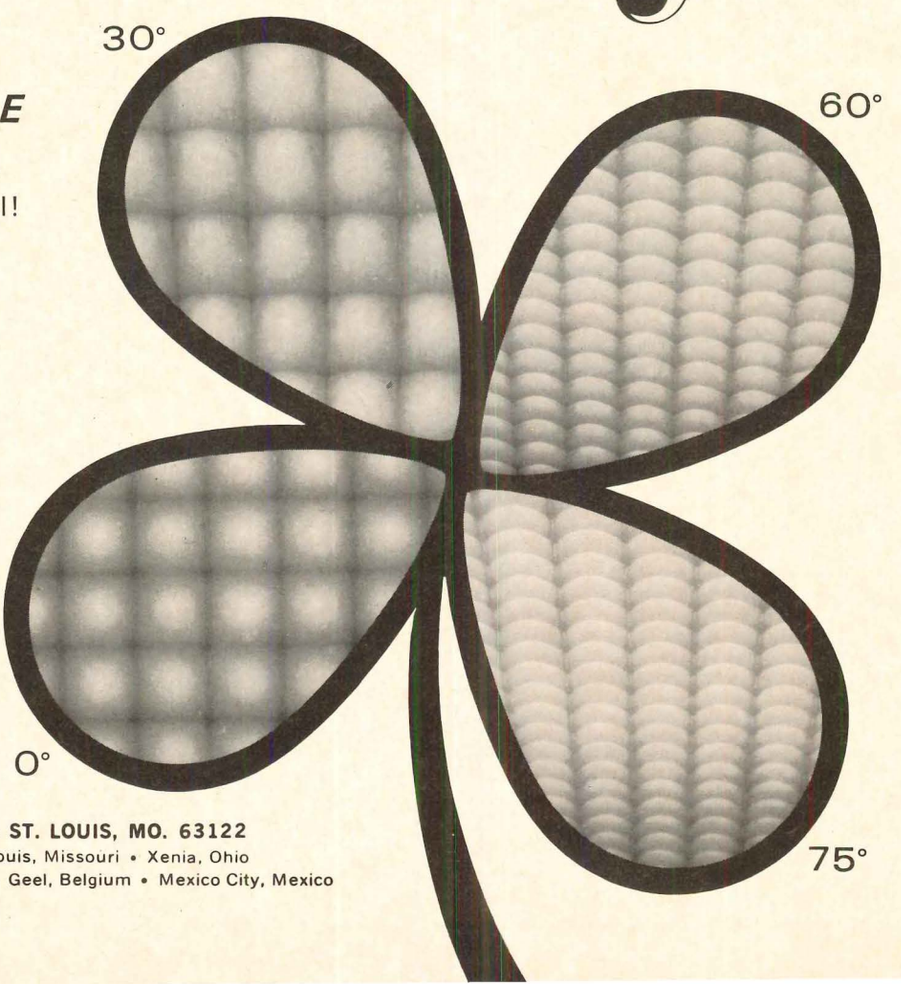

FROM EVERY ANGLE

K-S-H scores again with the new KSH-15 white opal lighting panel! Big ⅜″ square design in .200″ thickness! The look of a lattice-like louver. The lighting quality and maintenance advantages only a panel can bring you. And KSH-15 comes in the big sizes–3 x 3 and 4 x 4. So you can use it in place of the pans you've been using for big area lighting. From every angle . . . here's a great one. Specify KSH-15 soon!

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Plant locations: Santa Ana, California • St. Louis, Missouri • Xenia, Ohio
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Here forest green and feltwhite 118 chalkboards are extended to ceiling to bring extra color and brightness to classroom. Magnetized chalkrails can be raised or lowered and removed for projection of films.

mix and match porcelain-on-steel AllianceWall® chalkboard colors for beauty and versatility

AllianceWall porcelain-on-steel chalkboards are the ultimate in functional design. The popular feltwhite 118 boards double as a movie screen and can be used for projection of any type visual aid. AllianceWall porcelain-on-steel chalkboards can also be used with magnetic symbols, letters, characters and diagrams for more effective instruction. Also, the feltwhite 118 boards can be written on with watercolor markers to add emphasis to written presentations.

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AllianceWall porcelain-on-steel chalkboards are guaranteed in writing for 50 years or for the lifetime of the building in which they are installed. For complete information, including specifications, see Sweets' File or mail coupon today.

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Alliance, Ohio 44601

For more data, circle 102 on inquiry card

continued from page 165

MULTIPLE SHOWERS / *Acme Series* systems are said to offer savings in space and installed costs. A brochure presents information and photos on the stainless steel modular sections that are factory preassembled to include shower heads, valves, soap system and installed copper tubing and fittings. ▪ Acorn Engineering Company, City of Industry, Calif.

Circle 422 on inquiry card

DOORS AND FRAMES / A 16-page color brochure, "The New Concept in Standard Doors and Frames," contains complete information and detail drawings on the *Custom-Redi* line. Architects can select whatever jamb depth is best to accommodate more than 95 wall conditions and get immediate delivery from local distributors. ▪ Pioneer Industries, Carlstadt, N.J.*

Circle 423 on inquiry card

STORAGE AREA PLANNING / A programed training workbook "serves as an introduction to steel shelving for the beginner and is a good method of review for others." It is "Lesson One" in the series "Fundamentals of Storage and Work Area Management." Send $1. ▪ Penco Products Inc., 200 Brower Ave., Oaks, Pa. 19456.*

WALK-IN COOLERS / A 12-page illustrated brochure contains full construction details and sizes for many units, together with engineering and architectural data. A detailed remote cooling chart helps specify BTU requirements for four temperature ranges. ▪ Harford Metal Products, Inc., Aberdeen, Md.

Circle 424 on inquiry card

POWER DRIVEN FASTENERS / A 44-page comprehensive "Fastening Handbook for Architects and Engineers" explains how to cut costs and time in construction work. Included are charts and graphs, Federal, municipal and military code approvals, field and laboratory testings, and the holding strength values for fasteners in concrete and steel. Send $2.50. ▪ Ramset Fastening Systems, 289 Winchester Ave., New Haven 06504.*

WOOD PRODUCTS / Some 250 plants are listed in a 50-page products directory along with their various lumber products, facilities and capacities, species processed and shipping services. The manual also contains information on freight rates and weights, terms and conditions of sales, lumber sizes, grades and grading, and abbreviations of lumber terminology. ▪ Western Wood Products Association, Portland, Ore.*

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* *Additional product information in Sweet's Architectural File*

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Pouring Zonolite® Masonry Fill Insulation into masonry walls reduces sound transmission to a murmur.

Increases fire ratings of two-hour rated block to four—count them—four hours.

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W. R. Grace & Co., Dept. AR-08
Cambridge, Mass. 02140

Gentlemen: Please send me complete information on your comforting, quieting, saving, fire-resisting Zonolite Masonry Fill Insulation, with complete technical data and specifications.

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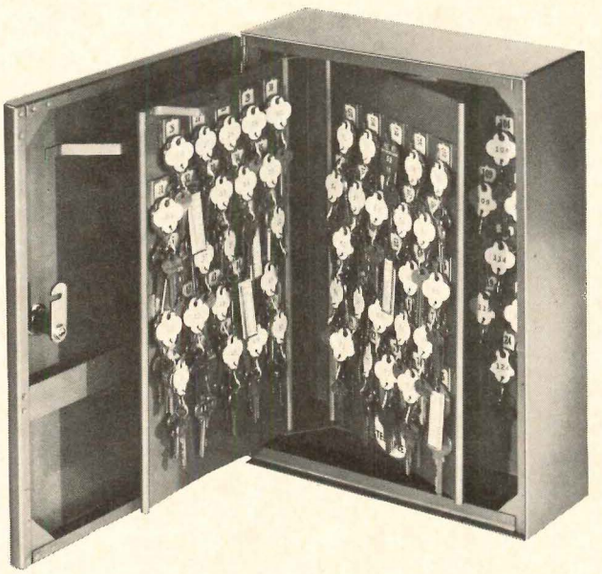

We hope you specified TelKee Key Control systems to your client—or else he'll be picking locks.

If he must account for 25 keys or more, it will pay him to use TelKee. So it will pay you to specify it.

The reasons are as important as those he has for keeping some people *out* . . . and letting other people *in.*

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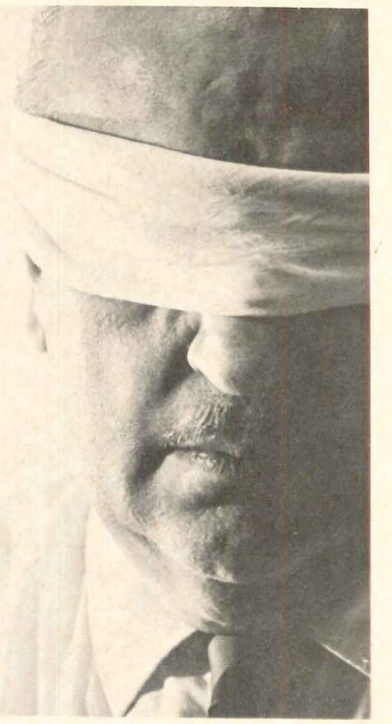
There's just one thing worse than finding out about cancer.



Not finding out.

Sure, finding out is a shock. But finding out gives you a fighting chance. And the earlier cancer is found, the better the chances of beating it.

There's one certain way to lose to cancer. And that's not to find out. Until it's too late.

The thing to do is to have your physician give you a good going over now, when you feel great. And then when your doctor tells you that you *are* great, you'll feel even better.

american cancer society

This Space Contributed by the Publisher

You don't have to specify JAMISON

but if you value VALUE, you will

Value in a Jamison cold storage door is something more than the degree of excellence of the door itself. Materials, design and workmanship are, of course, just what you'd expect from the oldest and most experienced maker of these doors.

But you have at your command other values. For example, if you are commissioned to design a restaurant or cafeteria, you will find our food service layout sheets can save you a great deal of valuable time and effort. They are typical, based on our experience in providing cooler and freezer doors for thousands of food service installations.

These food service layout sheets are available free. Also free, our book "How to Select and Specify Doors for Cold Storage Warehouses and Food Processing Plants." Send for these free values.

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For complete details write to Jamison Door Company, Hagerstown, Maryland 21740

COLD STORAGE DOORS BY
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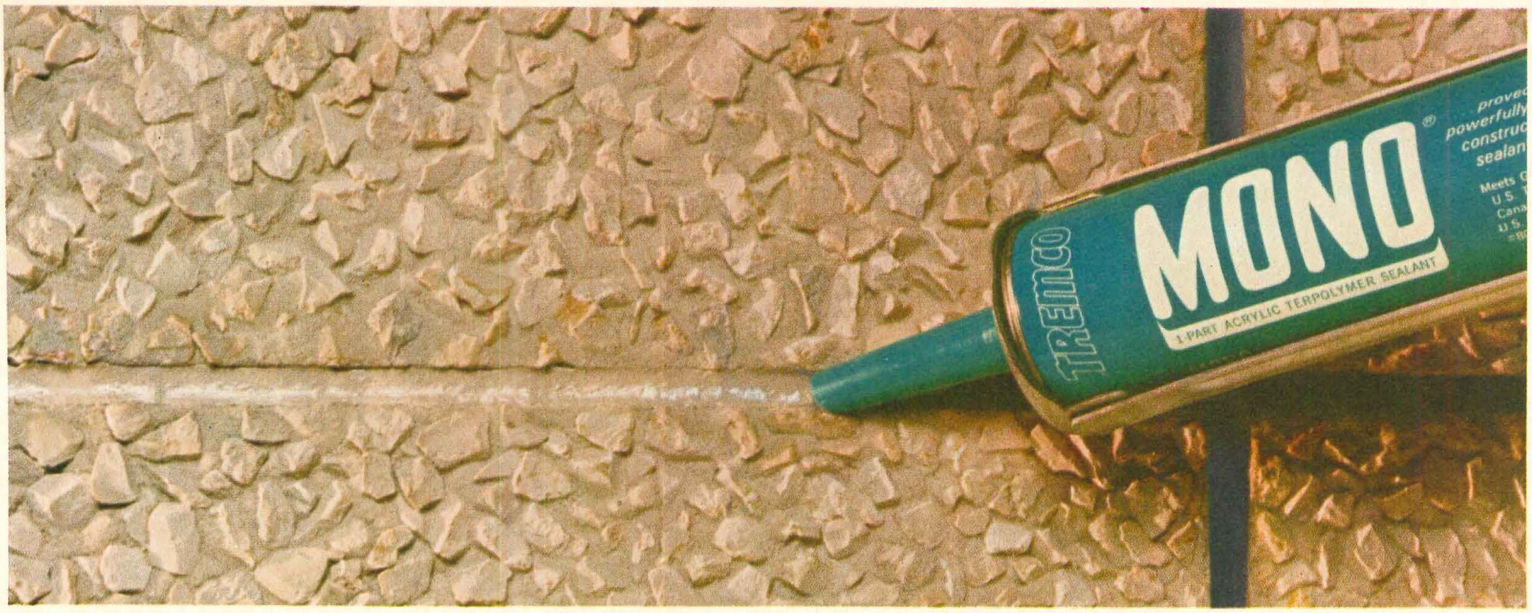

Nine times out of ten, MONO fills the sealant gap.

When it can't, he can.

We know you'd like an all-purpose trouble-free construction joint sealant. □ So would we. But right now, MONO's as close as we can come . . . and it won't do everything, any more than any other types and brands we've tested. □ Sure, MONO's good and works so well under the kind of adverse conditions (dust and moisture) that are common to the job site, that we suspect many construction people actually look on it as an all-purpose sealant. □ But actually Tremco's business isn't based on selling *any* all-purpose sealant. Instead we're a single-purpose company. We're The Water Stoppers and we want to give you leakproof security in every joint on the job. □ So we make not one, but fourteen other sealants besides MONO, like a very good polysulfide (Lasto-Meric), a highly-regarded preformed tape (440) as well as a dozen others with special purposes. □ The only all-purpose item in our catalog is the Tremco Representative. He has been thoroughly trained to provide you the proper sealant for each application and is ready to give job-site assistance before, during and after each project. □ Why not give him a call next time you run into the sealant gap? He'll get you across every time. □ The Tremco Manufacturing Company, Cleveland, Ohio 44104; Toronto 17, Ont.

TREMCO
The water stoppers

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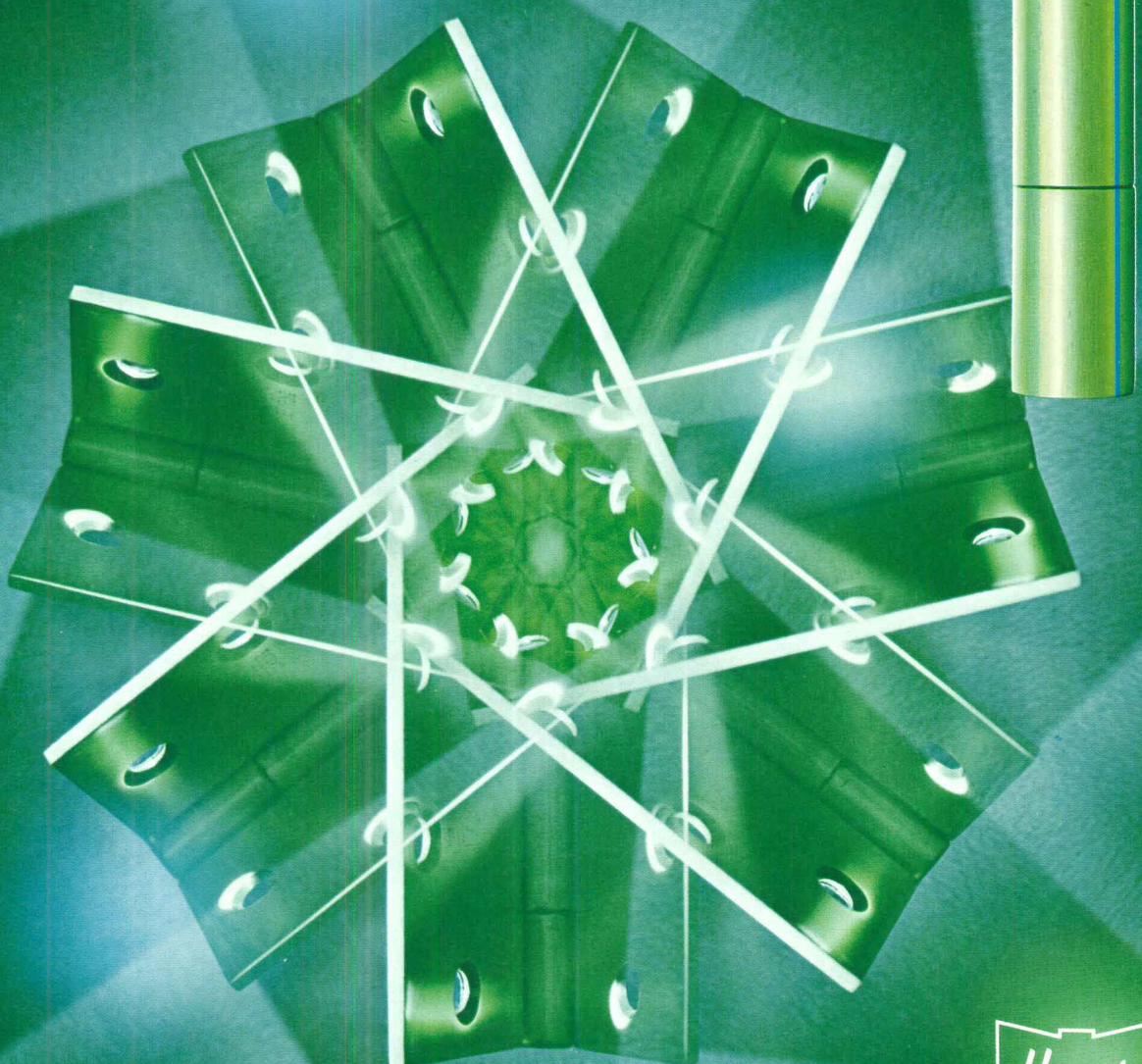
TRI-CON

The world's slimmest concealed ball bearing hinge!

Practically friction-free with its Delrin-lined barrel and exclusive new Teflon-coated pin. Inner movement as fascinating as the outer appearance of this exciting new slimline by Hager.



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Hager

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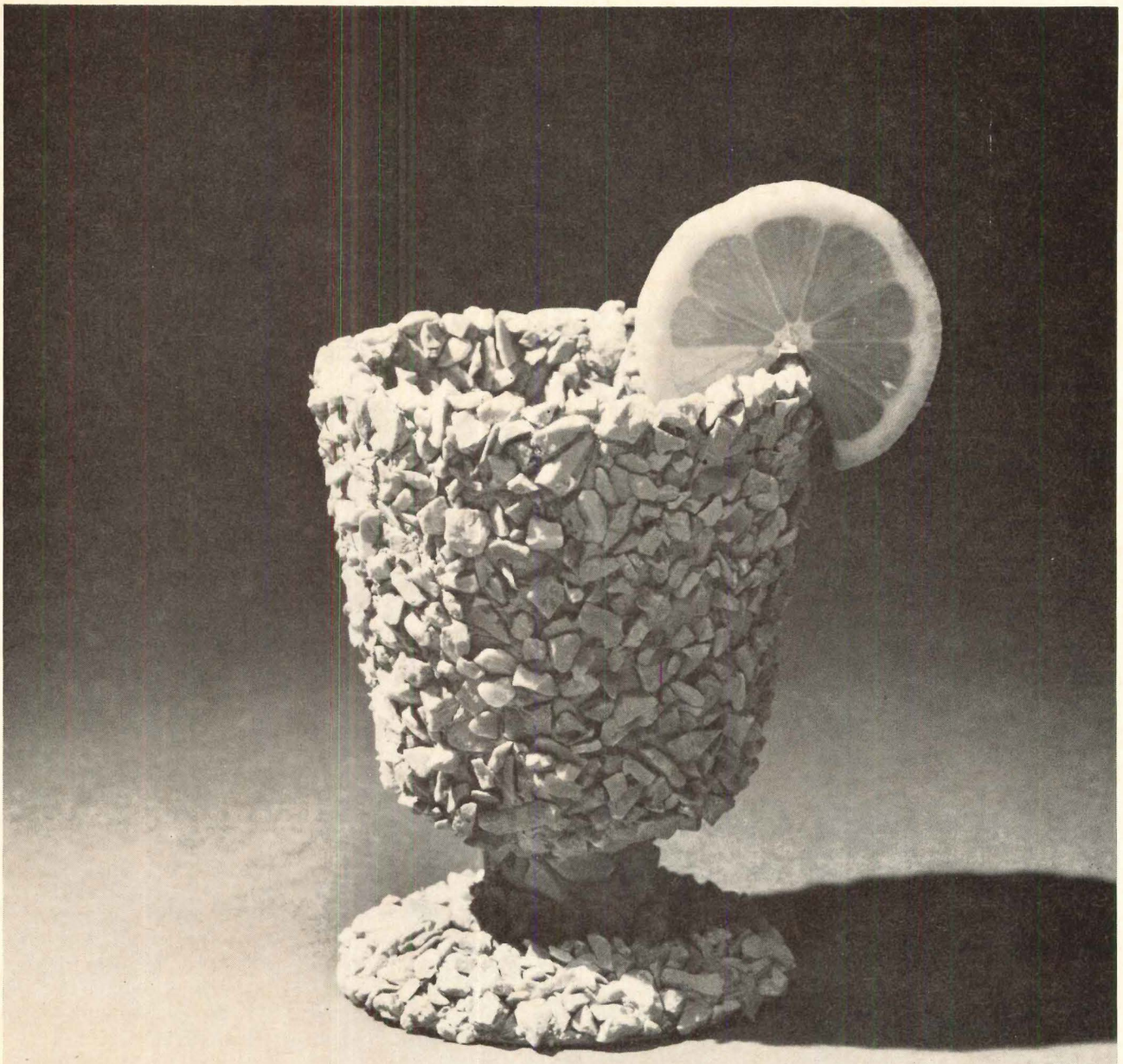

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Which is pretty high proof of Tuff-Lite's dependable performance and remarkable quality.

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HB FULLER COMPANY
CONSTRUCTION DIVISION
2400 Kasota Avenue, St. Paul, Minnesota 55108 Dept. 34142

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For more data, circle 111 on inquiry card

LETTERS

Architecture is a business

I was appalled, as a consulting engineer who does a measurable amount of work for architects, to note the tone of the article referred to on page 83 of your April issue. The problem of "delayed fees" will not be cured by editorial moans and groans such as this. The root of this problem is that too many architects are running their business far too casually and not paying close attention to whether or not the clients they work for are in a position properly to meet their obligations on time on a reasonable basis.

Until architects across the country and the technical press that supports them recognize that architecture is a business to be engaged in for profit, you will have conditions like the architect you describe basically unable to collect his fees on time. I have found that it is a necessary, but basically simple, matter to ensure that the client recognizes the payment schedule and is committed to meeting it when one embarks on a job. Similarly, if a client is unable to fund his current bills and the matter is known ahead of time, it is possible that the architect's credit will carry the job and that he can recover the costs of interests and carrying the job.

Clearly, none of us will ever be 100 per cent successful in dealing only with clients who have funds in hand reserved for their work with us. It will remain a fact, however, that unless we operate our businesses on the basis that this should be the approach, just as it is if you go to the grocery story or the automobile store, we will have to expect the smarter businessmen to take advantage of us in every way they can. I trust that your editorial policy will, in the future, tend to encourage architects to take a harder line with their clients on money problems.

J. Peter Gratiot, P.E.
The Gratiot Engineering Company
Woodstock, Vermont

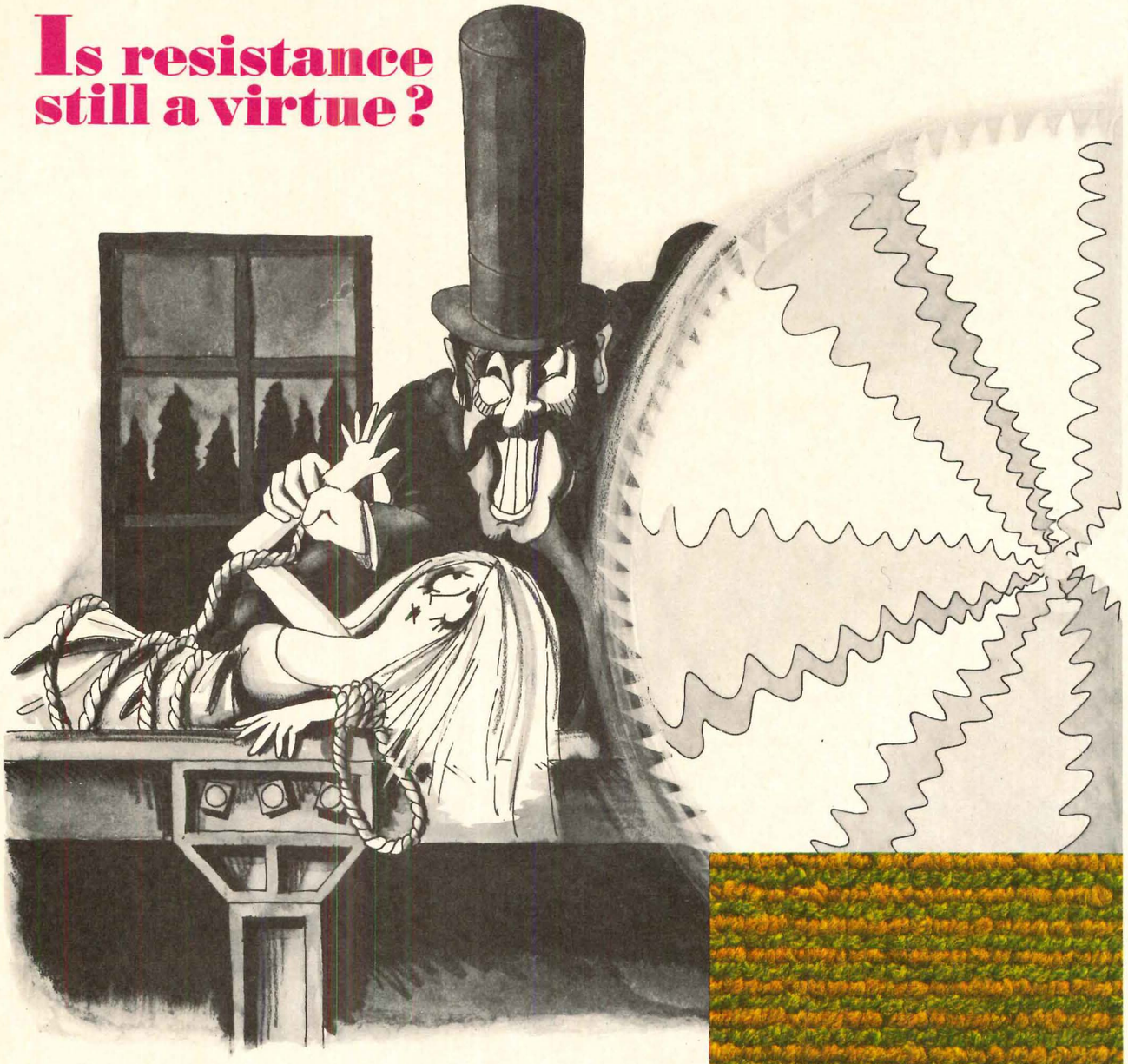
We couldn't agree more that architects are in business and must act accordingly. They are not endowed by foundations, nor do they have limitless credit with which to finance the developers of publicly funded work. It is the funding process by which fee payments are withheld beyond the normal intervals of private work that puts an undue burden on those architects who are committed to publicly funded work. We thought that was the point of the story.
—WF

New Boston City Hall

Having met Gerhard Kallmann in England (and listened to some of his architectural theory) in 1939, and having admired his City Hall when it was nearing completion in Boston last September—as sculpture, that is—I was particularly interested in, and impressed by, your recent coverage

more letters on page 230

Is resistance still a virtue?



Wellco says yes, with Vectra fiber.

New Wellco "Miracon"—the first 2 color striped, tufted indoor-outdoor carpet of Vectra® fiber—resists stains, fading and wear, but can't resist being beautiful.

The "durable but dull" days of commercial indoor-outdoor carpet are over. It's all because of Miracon! Exciting colors. Fun stripes. All in one elegant, fine gauge tufted carpet. Miracon not only opens countless, colorful new opportunities for indoor-outdoor carpet... it also performs like a trouper in the worst disaster areas. Wellco Miracon is made with spun yarns of 100% Vectra olefin fiber. You know what that means when it comes to resisting stains, fading and abrasion. Behind these colorful stripes is a true indoor-outdoor carpet...with all its rugged advantages. But once you see how great it looks indoors... you may not have the heart to put it outside.

SPECIFICATIONS
Pile of 100% solution dyed Vectra olefin fiber
1/10 Gauge (270 pitch)
Pile Wt.—30 oz. per yd.
Pile Ht.—⅛" or .125
Stitches per inch—8¾
Yarn Count—3.00cc (3 ply)
Primary Backing—4 oz. moisture barrier 100% polypropylene
Secondary Backings—Total wt. per yd.:
Permabonded jute—69 oz.
Compression tested high density rubber—92 oz.
Special All-Weather Back—80 oz.

For additional information and samples of Miracon and Decathlon carpets, write to: Wellco Carpet Corporation, Department V, P.O. Box 281, Calhoun, Georgia 30701

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Vectra® olefin fiber is manufactured by Enjay Fibers and Laminates Company, Odenton, Maryland, a division of Enjay Chemical Company. Odenton: (301) WO 9-9000. New York: 350 Fifth Avenue, (212) LO 3-0720. Charlotte: One Charlottetown Center, (704) 333-0761. Enjay makes fiber, not carpets.

Vectra . . . the fiber that believes resistance is still a virtue.

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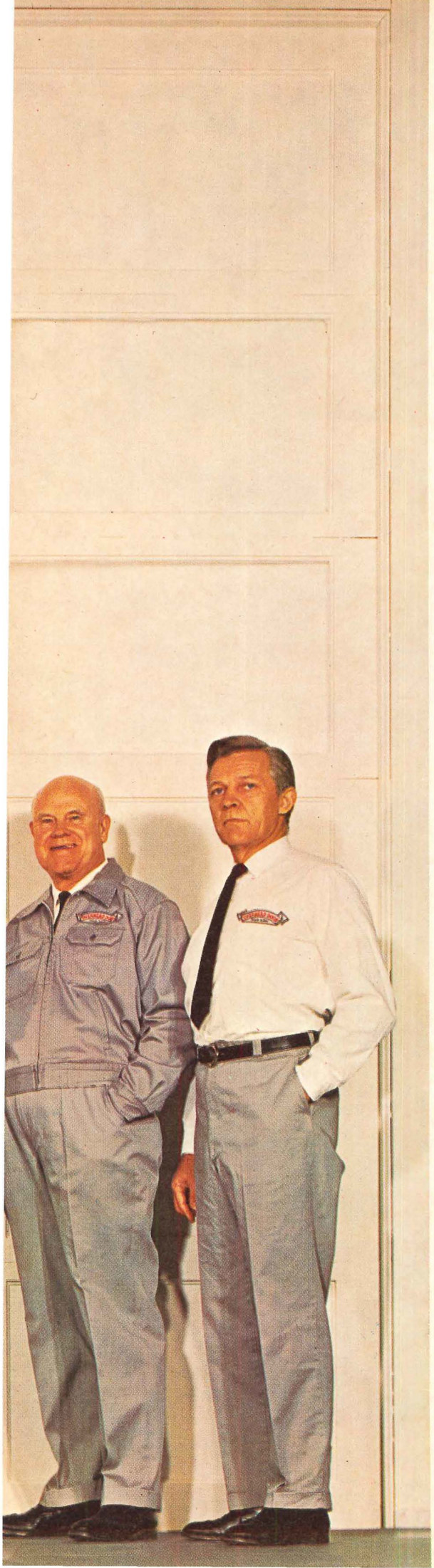

It takes our kind of experience to build our kind of doors.

And your kind of imagination to utilize them to their optimum potential.

More and more creative architects are discovering more and more ways to use The "OVERHEAD DOOR" to improve their designs—improve them functionally, economically, and esthetically.

You can do the same.

The "OVERHEAD DOOR" is available to you in just about every material, size, and style. You name the kind of door you need, and if we don't have it in stock, we'll build it for you. And build it *right*. (We've built over eight million doors since 1921, so we're pretty much in practice.)

If your design calls for an electrically operated door—or doors—we have architectural consultants and engineers at the ready to help you determine the right electric operator to do the best job.

You can always specify The "OVERHEAD DOOR" with total confidence. Our nationwide network of factory-trained distributors install and service every door they sell. They also issue a full one-year warranty on all parts and workmanship.

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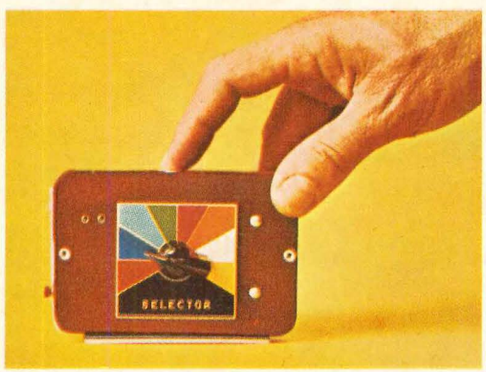

Fully transistorized, portable transmitter with color-coded selector, controls up to 8 doors individually by radio control.

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Sales • Installation • Service

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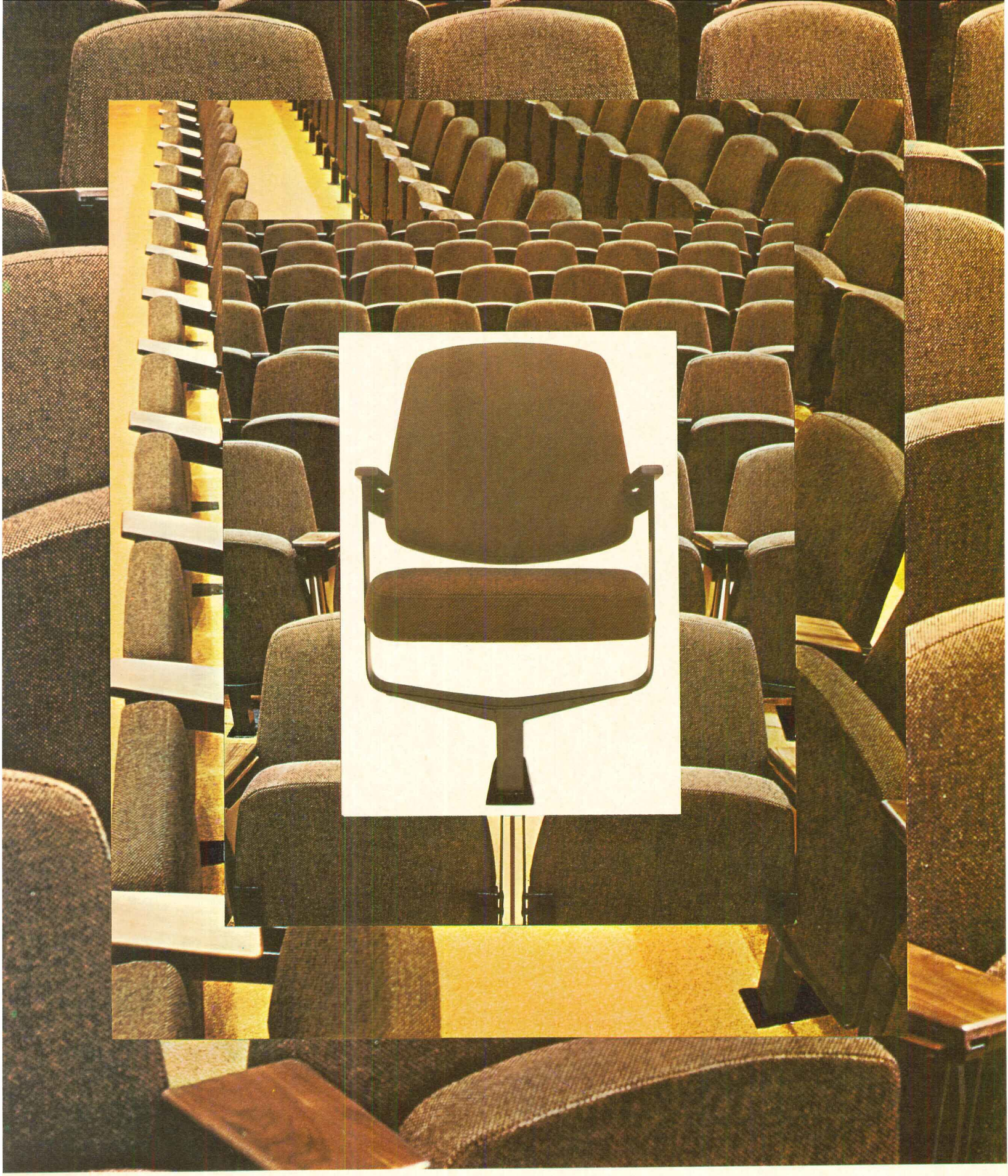

RACE SPACE.

The Everson Museum is only one of the distinguished new buildings throughout America and Europe in which you will find The Race/JG Theatre Seat, designed by Peter Dickinson. For a complete list of installations and brochure, write J G Furniture Company, Inc., Quakertown, Penna. 18951.

JG

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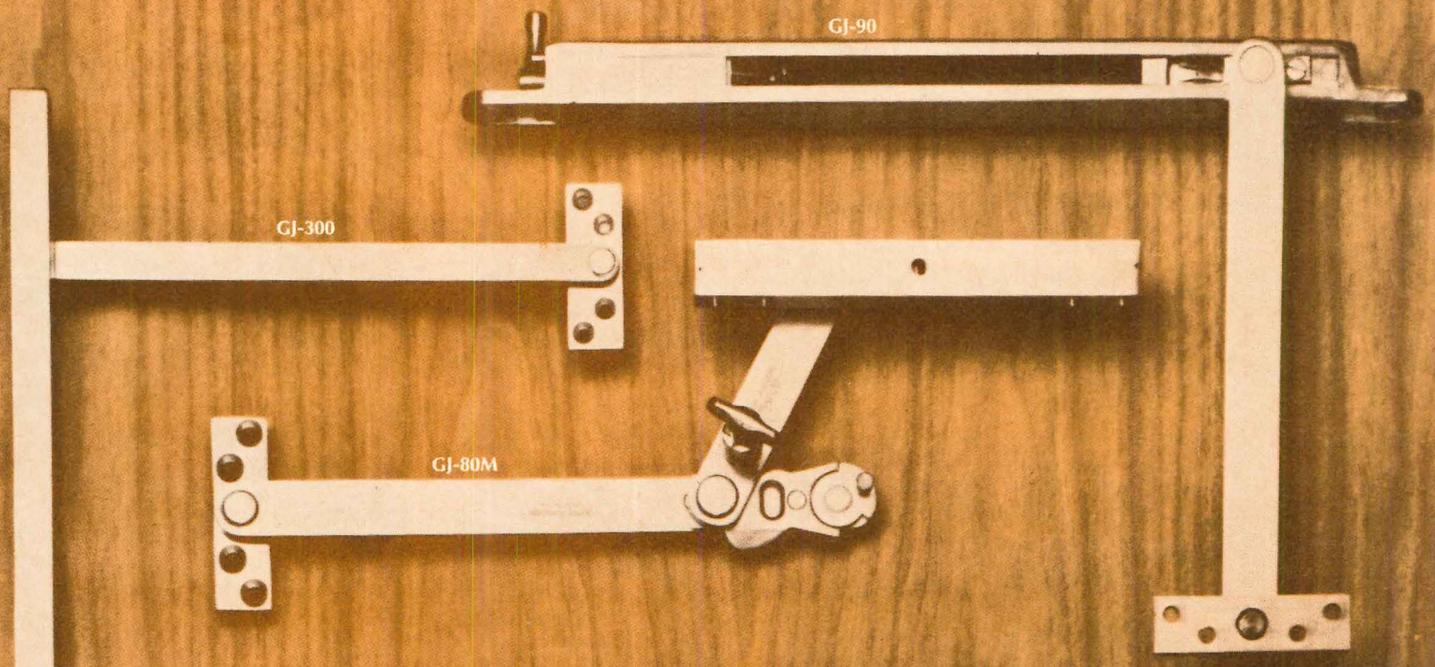
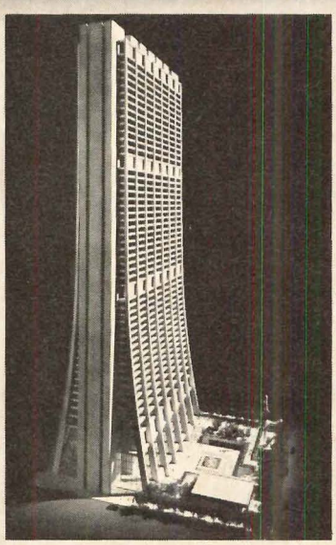




There's a new dimension in design on the horizon... and "new dimension" door hardware to meld perfectly. From Glynn-Johnson.

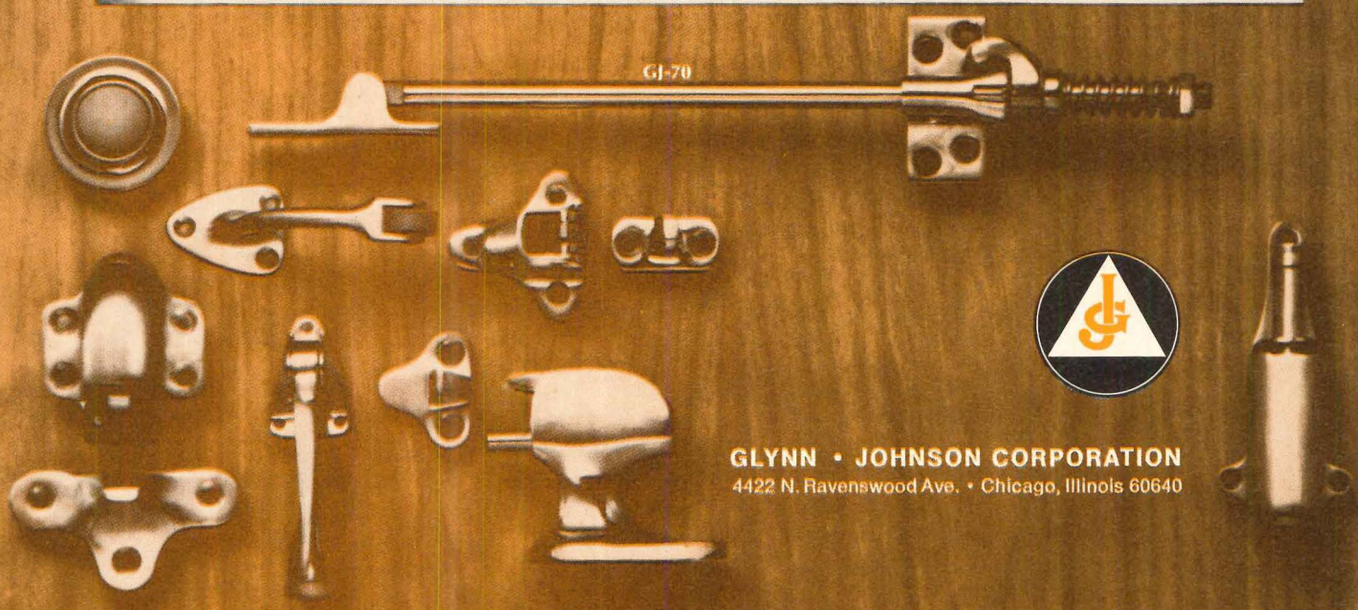
Bold, new plans, new building materials, new techniques, and new architectural concepts have produced marvels of construction beauty and function. And new and exciting challenges to suppliers' design and engineering facilities.

Thus came our "new dimensions" in door hardware. Functional, of course, and beautiful, versatile, superbly engineered.

Those factors, plus a reputation for service and dependability, led to the selection of Glynn-Johnson hardware for Chicago's magnificent new First National Bank Building. A special oxydized bronze finish (US 10B) was specified; hardware including heavy duty overhead holders, wall and door bumpers and door stops were installed.

Architect, specification writer and contractor agreed on "new dimensions" hardware. Ours.

ARCHITECTS: *C. F. Murphy Associates & The Perkins & Will Partnership*
GENERAL CONTRACTOR: *Gust K. Newberg Construction Company*
CONTRACT HARDWARE DEALER: *Midwest Hardware Company*



GLYNN • JOHNSON CORPORATION
4422 N. Ravenswood Ave. • Chicago, Illinois 60640

continued from page 222

(February). However, there are two matters of a most basic nature which puzzle me about the building, and on which I would be grateful to have your and/or his views and further explanations.

Firstly, as everybody knows, one of the most fundamental items in any city hall program in our time is (or certainly should be!) provision for future expansion, particularly of the office space for the various executive departments. The building would not appear to make any such provision whatsoever.

Secondly, what actual purpose do the vast, triple-height, open public spaces (those shown in white on your plans, and occupying three-quarters of the fourth floor and nearly half the fifth) really serve? Although "open to the sky and to all four exposures," this is a vast amount of very expensive space indeed, and I would not like to think that it was all just for "glory." And is it an advantage, in Boston in winter, for the citizen to be able to "walk through and be part of his City Hall without once opening (or being able to close) a door"? No doubt 5,000 persons will do business there each day: but all at once? (If so, the vertical circulation would surely be totally inadequate.)

I would have thought that the climatic resemblance of Boston to, say, Chandigahr would not be very great; such spaces are surely for the tropics?

The building has great poetic beauty, and it has already set a trend: see pages 42 and 43 of that same issue, for instance. I am not sure whether this is good or bad.

K. H. Gardner, architect
Bridgetown, Barbados

RECORD HOUSES

I think that RECORD HOUSES has become the definitive annual publication on contemporary house design. It seems that the recent publication of my house in this year's issue has resulted in many inquiries to me from other publications, such as the various house publications, as well as inquiries from product suppliers whose equipment has been specified. The issue also serves as a strong design influence in the profession and the bookstore sale of it disseminates design quality to the general public. I hope this short letter accurately expresses my interest in your continued good work.

Alfred De Vido, A.I.A.
New York City

ADDENDUM

The June 1969 article, "Battery Park City" (pages 145-150) should have credited the Battery Park City Authority as the developing agency for the project, rather than as a controlling agency. The Office of Lower Manhattan Development is the city's supervising representative for the project.

Before you specify partitions-consider the man who keeps changing his mind!

It's bound to happen with almost every new building, no matter how well planned it is.

Six months from now, or a year, or a couple of years, somebody will change his mind. He'll want the conference room moved from one end of the hall to the other.

Or he'll want a bigger office for someone who was just made vice president. Or more room in the steno pool.

Or something.

That's why our Quick Change movable partitions make so much sense. They allow for changes just about as easily as the mind changes.

The whole idea of our Quick Change partitions is—they're changeable. When they're in place, they're just as sturdy and rigid as an ordinary fixed wall.

But when change is needed they can be quickly disassembled, rearranged and locked in a new place. With a minimum of trouble.

Naturally, we're not the only ones who make movable partitions. But we think we make the best.

For one thing, only Masonite Quick Change partitions give an architect virtually unlimited design flexibility.

There's a staggering variety of painted, unpainted and Royalcote woodgrain surface finishes. In addition, there are many Quick Change styles and shapes to use separately or together.

What's more, Quick Change partitions go in easily and economically. That's because we have professional Partition Representatives to do the installation. Their training, equipment, and experience are nearby no matter where your construction site is.

Finally, Quick Change can change quickly! And that's important!

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Box 777, Chicago, Illinois 60690

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Company_____

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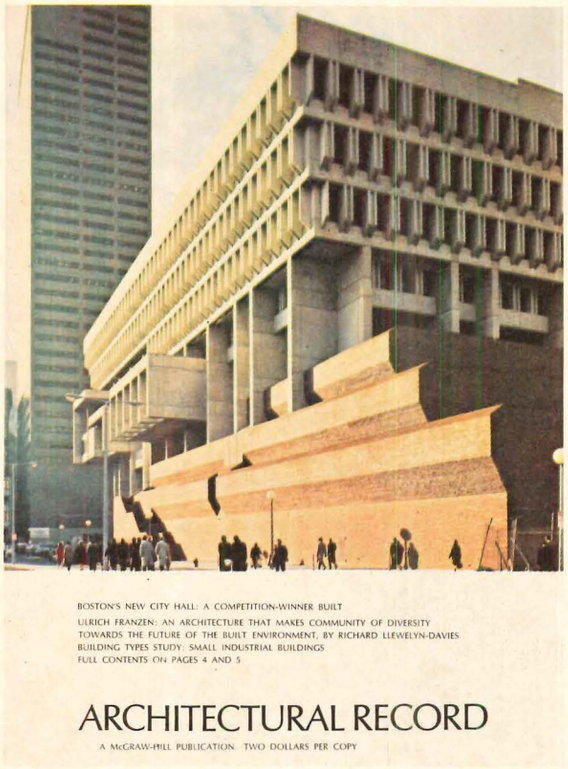

happen. It's the direct result of a superior editorial product...uniquely timed and balanced with the aid of Dodge Reports to be of maximum value to architects and engineers in terms of the work on their boards.

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I Industrial Construction File (blue)
L Light Construction File (yellow)
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ARCHITECTURAL RECORD

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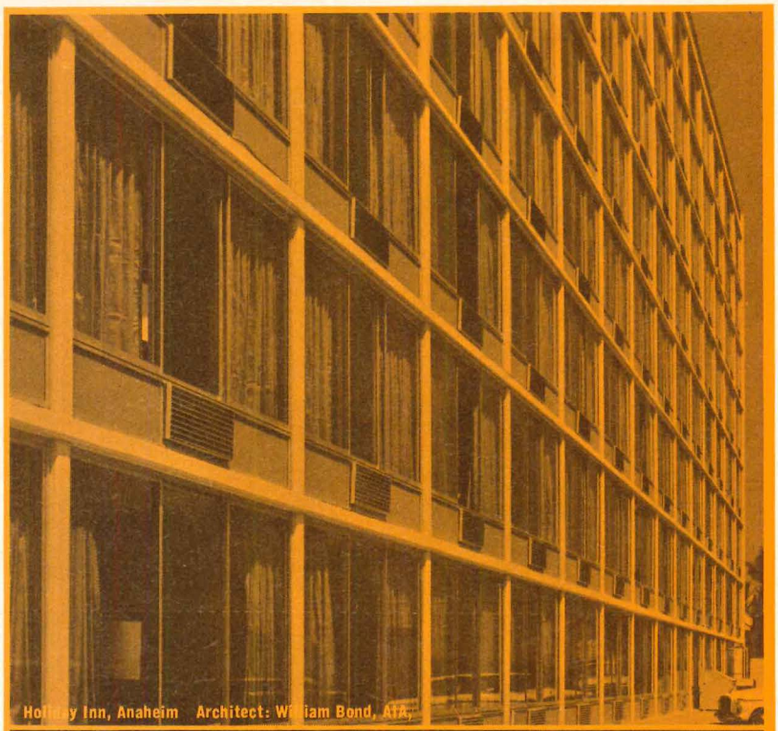
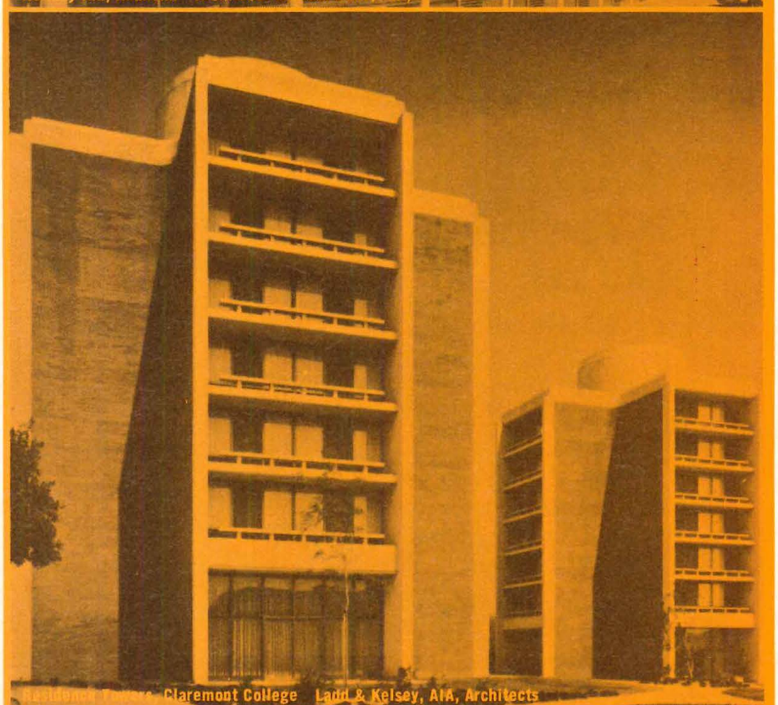
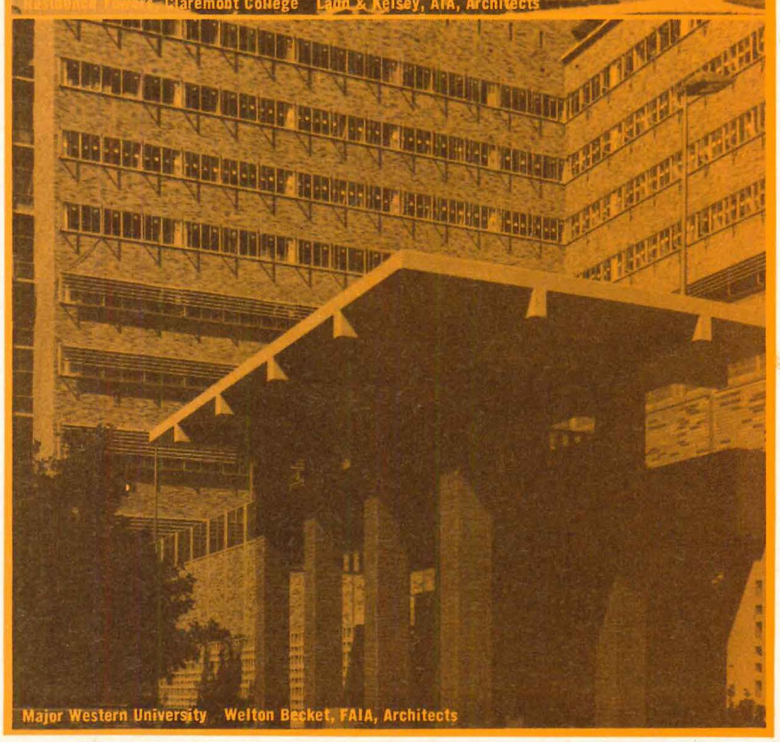


Holiday Inn, Anaheim Architect: William Bond, AIA



Claremont College Ladd & Kelsey, AIA, Architects



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inside and out, for easy stacking or joining. Adjustable mullion for continuous runs before columns of varying widths.
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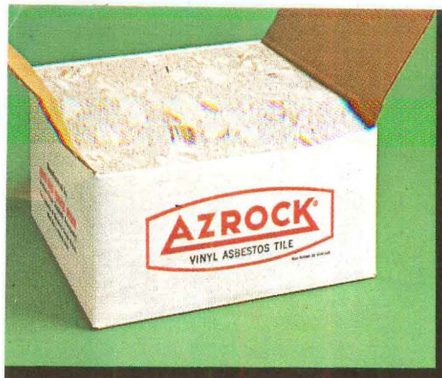
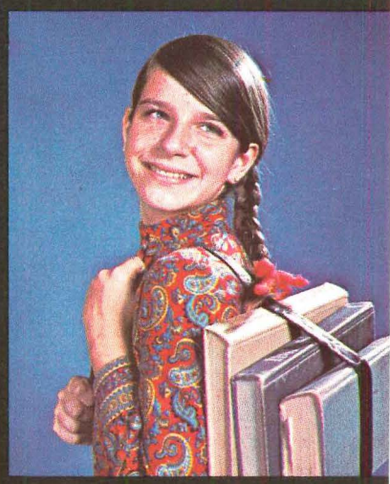
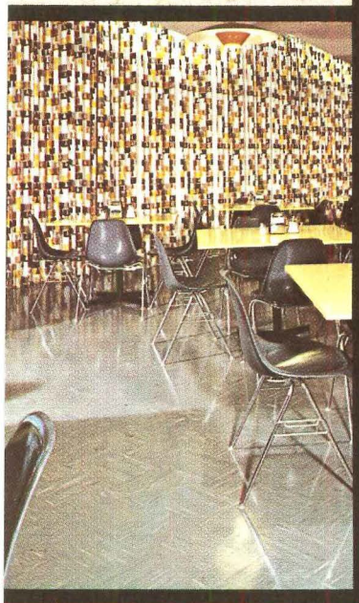
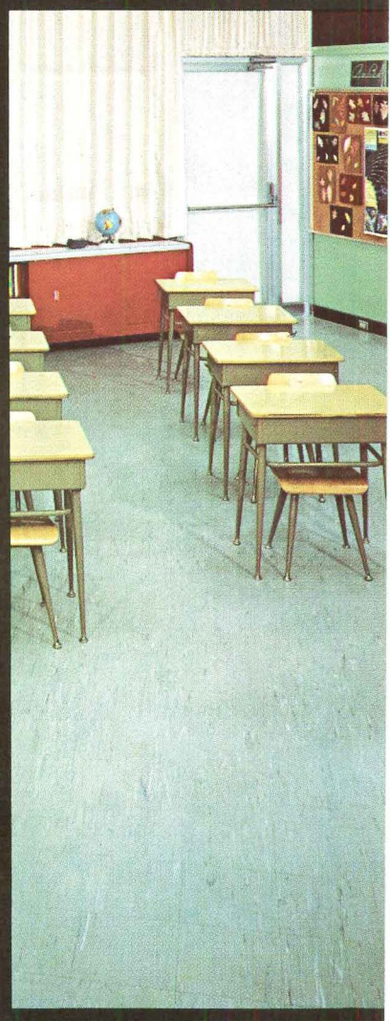


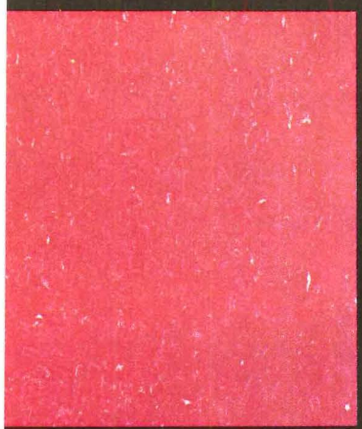
Carton Full of Miracles

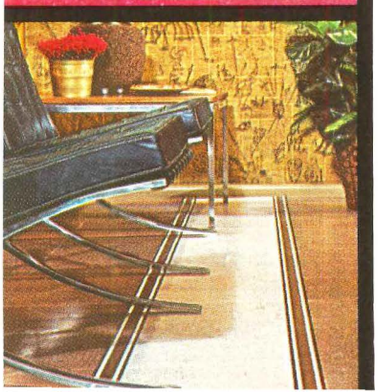
Azrock Vinyl Asbestos Tile. It's what's happening in school flooring.











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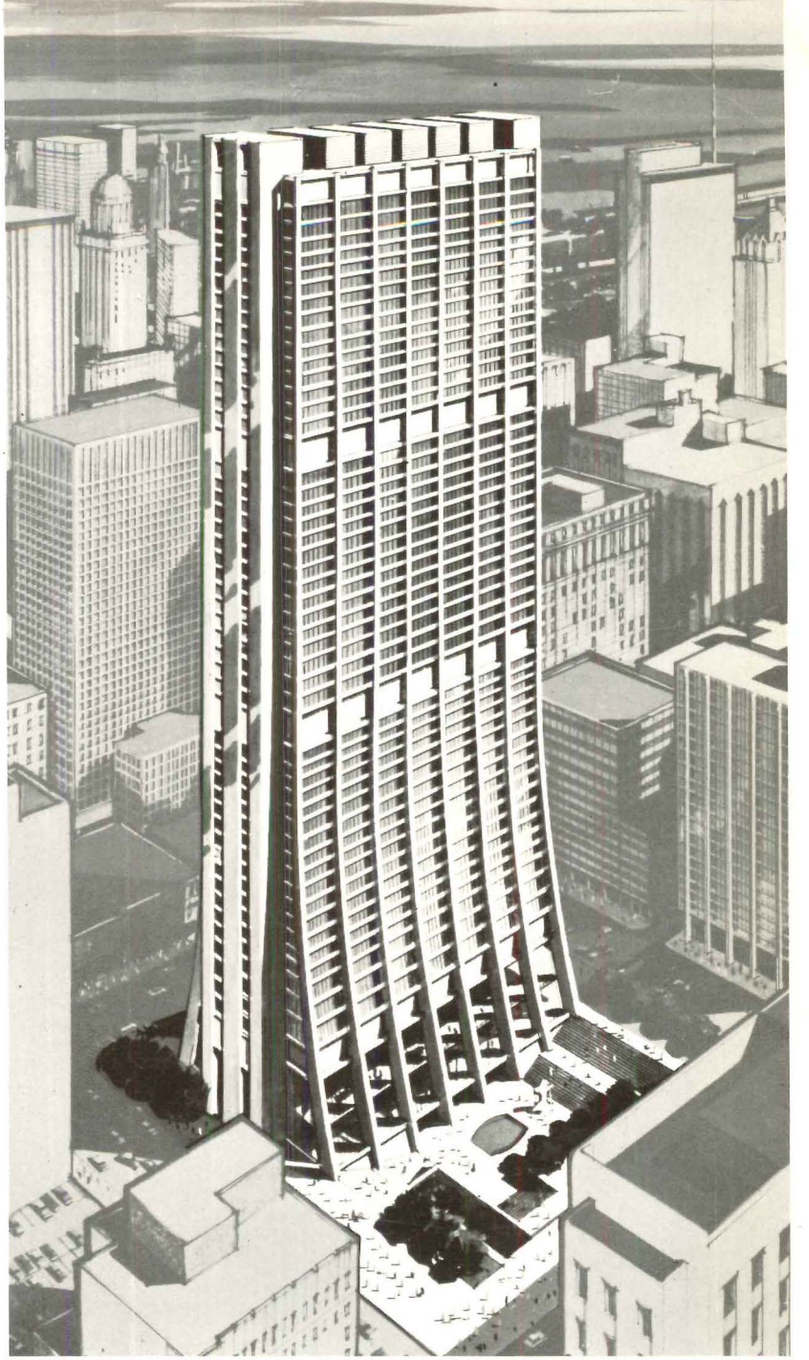

Graceful new home of The First National Bank of Chicago

■ From its graceful tapering facade to its elegant interior appointments, One First National Plaza is in every respect, an archetype. In more ways than one, it is the world's tallest bank building. There's a feeling of permanence and solidity about its distinctive and towering "pearl gray" granite exterior which is reflected inside in the granite counters and marble walls. Adding to this grandeur is a ceiling of vertically suspended planes of copper and stainless steel which diffuse the light source from above. Unique coin returns operate from below the teller counters. The Bank's security TV console monitors more than 1000 locations and is the largest and most complex security system of any public building in the world. Over $15 million in computer equipment serves thousands of depositors, with more than one billion in deposits.

A real understanding of the most intimate human engineering factors is much in evidence throughout the building's mammoth 2,200,000 square feet of floor space. The flush valves, for example, are Sloan Quiet-Flush II, famous for their quietness, dependability and long life with minimal maintenance. Such high standards of quality contribute to the feeling of refinement and permanence experienced by tenant and visitor alike.

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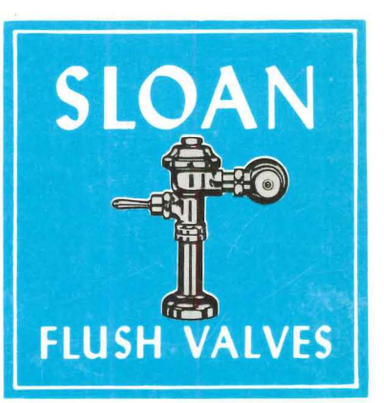

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