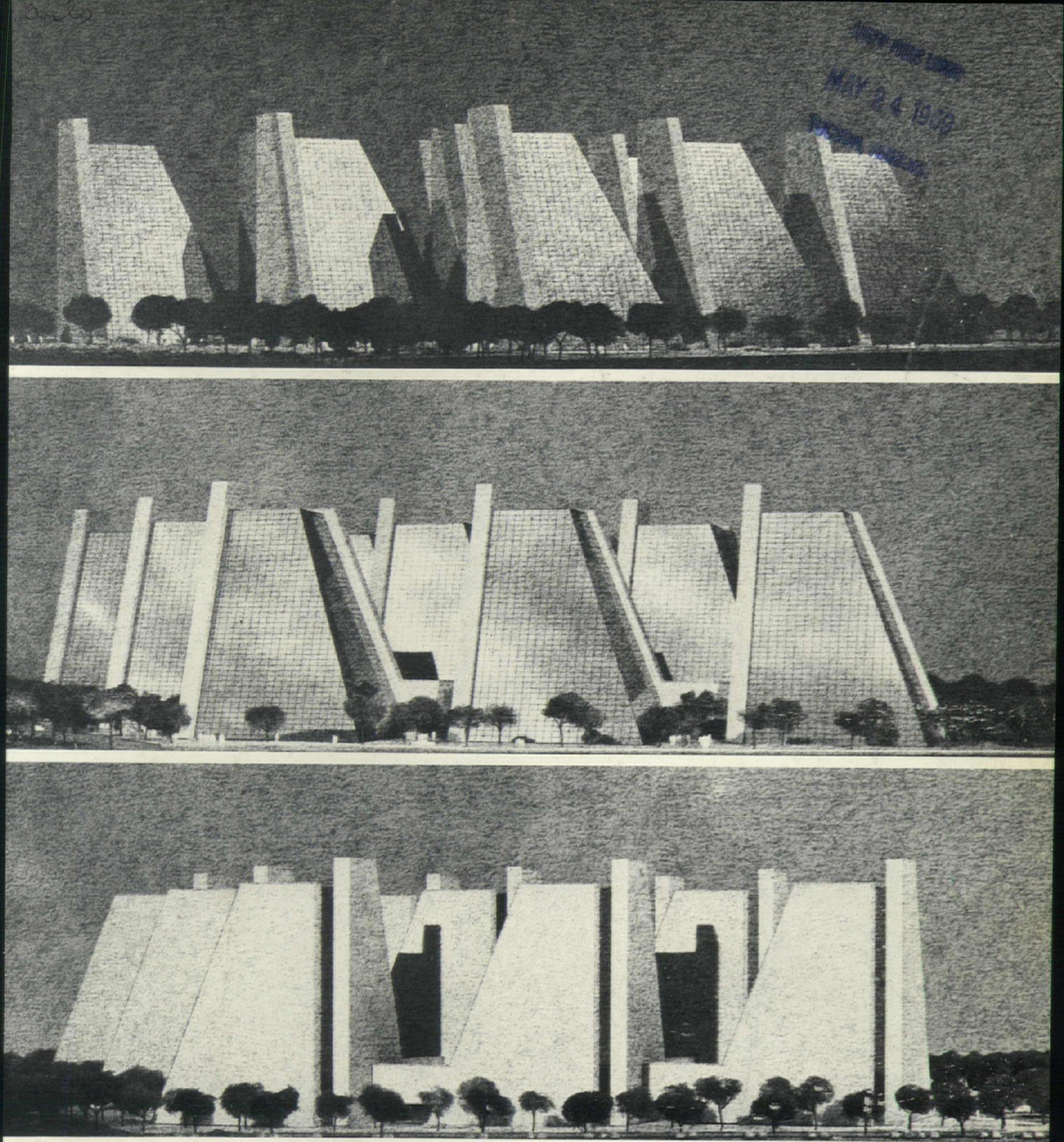

NEW DIRECTIONS: THE WORK OF KEVIN ROCHE JOHN DINKELOO AND ASSOCIATES

CITY HALL BY EDWARD DURELL STONE: NEW IMAGE FOR A CITY

FIVE RECENT HOUSES BY RICHARD NEUTRA

BUILDING TYPES STUDY: ARCHITECTURE FOR INDUSTRY

FULL CONTENTS ON PAGES 4 AND 5

ARCHITECTURAL RECORD

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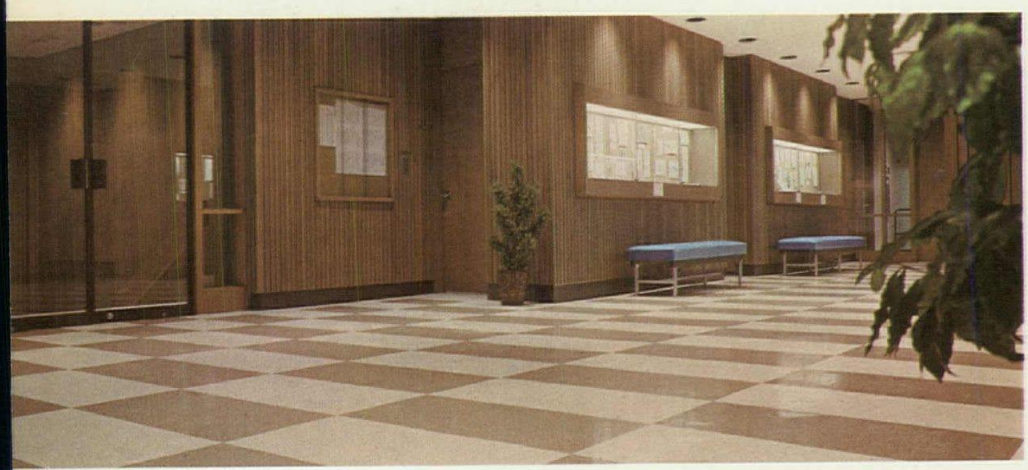
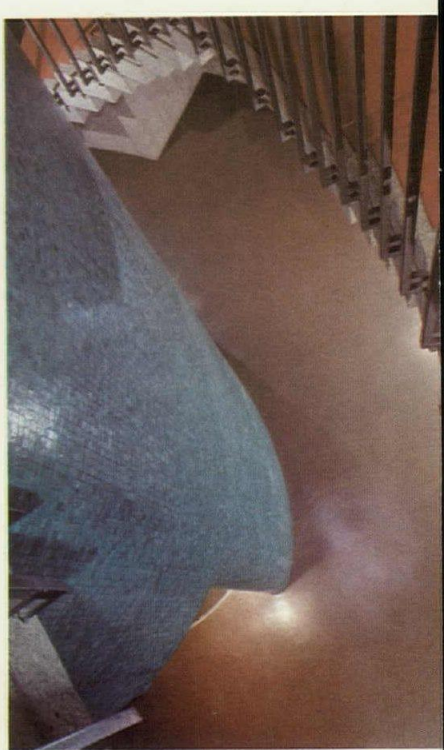
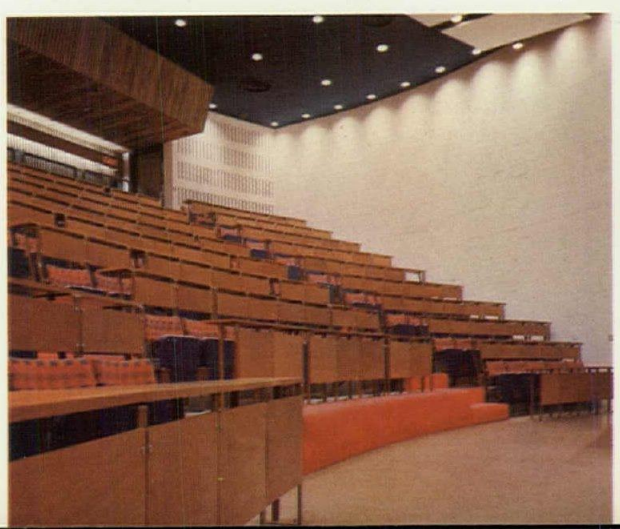
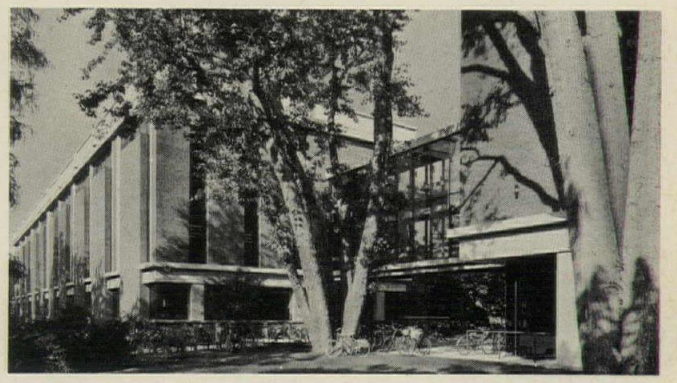






Armstrong offers the widest variety of resilient floors. The best is the one that suits your design.

Clark Science Center, Smith College, Northampton, Massachusetts. **Architect:** Shepley, Bulfinch, Richardson and Abbott, Boston Mass. **General Contractor:** Daniel O'Connell's Sons, Inc., Holyoke, Mass. **Flooring Contractor:** Kesseli and Morse, Worcester, Mass.



At the Clark Science Center, the best floor is Imperial Modern Excelon Tile.

The architects for the science complex at Smith College wanted distinctive flooring to contribute to the striking design of this 8.5 million dollar project. They wanted variety in color and design, but they wanted an overall unity. They wanted flooring that would stand up to the heavy traffic and punishment that class and research work would produce. And they wanted flooring that would fit the budget.

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e Architects Collaborative was its own client for a new six-ory headquarters building (above) in the heart of Cambridge, ass. Exacting yet budget-minded, the planners of this building st considered an electric traction elevator but switched to Dover Oildraulic Elevator at a savings in cost of the hoist-ay construction. The elevator serves six landings at a speed 150 FPM and was installed by Stanley Elevator Co., Nashua, H. General Contractor was George A. Fuller Co., Inc., Boston egional Office.

e National Center for Atmospheric Research (left) in Boulder, lo. was designed by I. M. Pei to harmonize with the mesa site and the sandstone Flatirons which mark the end of e Great Plains and the beginning of the Rockies. Three ver Geared Electric Traction Elevators were chosen for s building which has been called "entirely appropriate to site and to its purpose." Architects: I. M. Pei & Partners, w York City; General Contractor: Martin K. Eby Construc-n Company, Inc., Englewood, Colo. Dover Elevators installed Dover Elevator Co., Denver, Colo.

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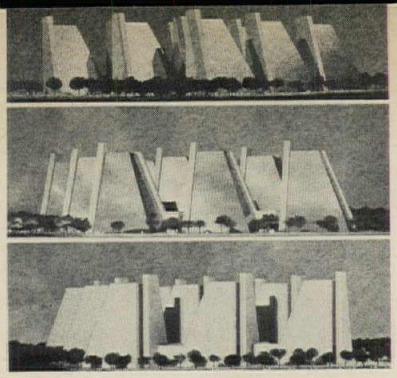
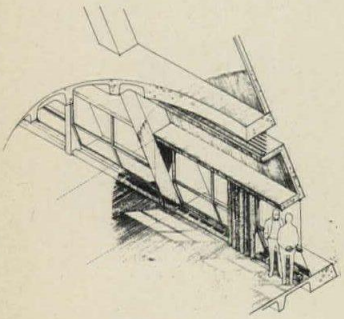


Cover: College Life Insurance Company
Indianapolis, Indiana
Architects: Kevin Roche John Dinkeloo and Associates

FEATURES

Hesse

BUILDING TYPES STUDY 383



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ARCHITECTURAL RECORD

CONTENTS: MAY 1968

COMING IN THE RECORD

BUILDING TYPES STUDY: URBAN HOUSING

Perhaps no design problem deserves more attention by architects than design for low- and middle-income housing. It is beginning to get that attention; and government officials and community advocate groups alike are beginning to respond to the new approaches that some architects are exploring. The Building Types Study for June examines some of these new approaches—new forms, new planning systems, new ideas for creating not just living space but space for living—that are being carried on within the disciplines of restrictive controls and restrictive budgets.

A DRAMATIC SPORTS AND RECREATION COMPLEX

The new Coliseum in Oakland, California, a spectacular addition to the city's skyline and a significant work of architecture by Skidmore, Owings & Merrill, is one of next month's features. The complex includes a stadium for outdoor events and a unique Arena for indoor events with one of the world's largest cable-supported roofs.

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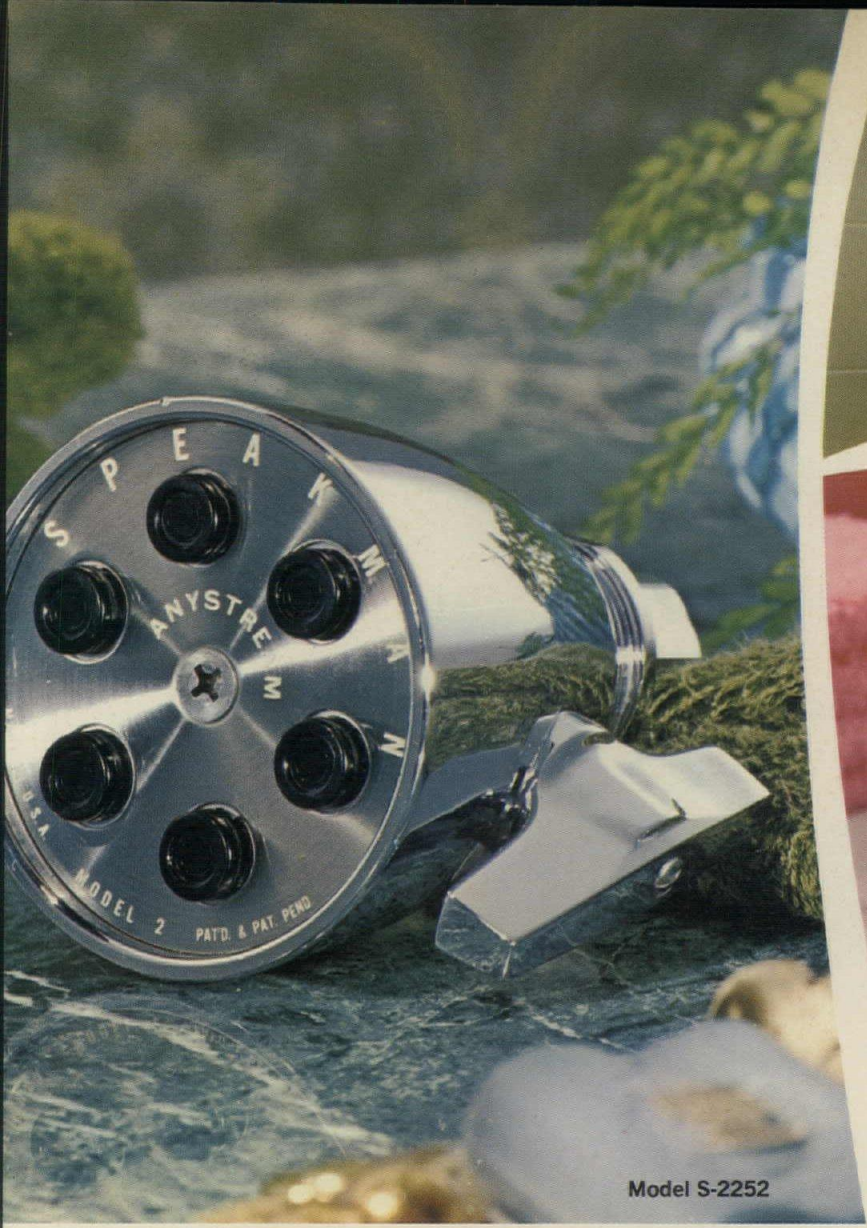

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et's work on total solutions, but eep going a community at a time

summer approaches, it seems to me at I've been reading more than ever out "total and comprehensive ap-oaches" to the problems of our cities. ecause the problems of any city reach t fingers in every direction—and espe-ally into Washington—more and more oughtful minds are thinking about not st city planning but regional planning d national planning. This raises some estions that worry me quite a lot: 1) ho is going to develop the "total and mprehensive approach"?; 2) Who is ing to decide, at any such scale as a re-onal or national one, which "total and mprehensive approach" is the right e?; and 3) Who is going to administer What role will local planning and local chitects play within that "total and mprehensive approach"?

Some of the most evocative (and orrisome) ideas I've heard lately were esented by Bill Slayton of Urban Amer-a at last month's international confer-nce on Cities in Context at Notre Dame. hile firmly, and repeatedly, arguing for liance upon "the market mechanism ther than a bureaucracy to deal with e problem," he suggested that, "We ould establish a national policy on ur-anization—a policy that addresses itself where the increasing population ould be located." The mechanism ould be new cities "of at least a quar-r of a million." He also suggested "state evelopment corporations with the ower of eminent domain to acquire raw nd and authority to issue tax-free bonds to buy the land and develop it." He called for a new "governmental mechanism—a governmental organization—that can control or guide future metropolitan development." He argued, though I don't see how, that "such a structure need not threaten existing political entities," but insists that "particular predelictions [of local political jurisdictions] should not permit them to skew or thwart the rational development of the metropolitan area." (I can understand the frustrations involved, but think it is important to remember that "particular predilictions" have for a long time been highly thought of under such labels as "home rule.") Finally, Slayton suggested that "perhaps we should take a look at the more basic questions of how large, in terms of numbers, should the United States be? . . . Would we not be better off to try to maintain a constant population level and provide that population with as much of the resources and amenities as we can rather than channeling much of our economic growth into those activities that must provide for an increased population."

Many other proposals on such a broad scale are being made. Item: The Department of Housing and Urban Development has invited proposals for nothing less than "a comprehensive plan for designing, developing, organizing, implementing, managing, reporting, and analyzing . . . the entire low-cost experimental housing research and development program together with a plan for "proper and careful selection of some Model Cities (maybe 20) to participate in this program." Proposals were due April 19th, and as this is written there is no information on how many proposals were received and from whom. But surely it is logical to interpret this as an approach by HUD to the "systems people" and I, for one, consider this another rather worrisome prospect.

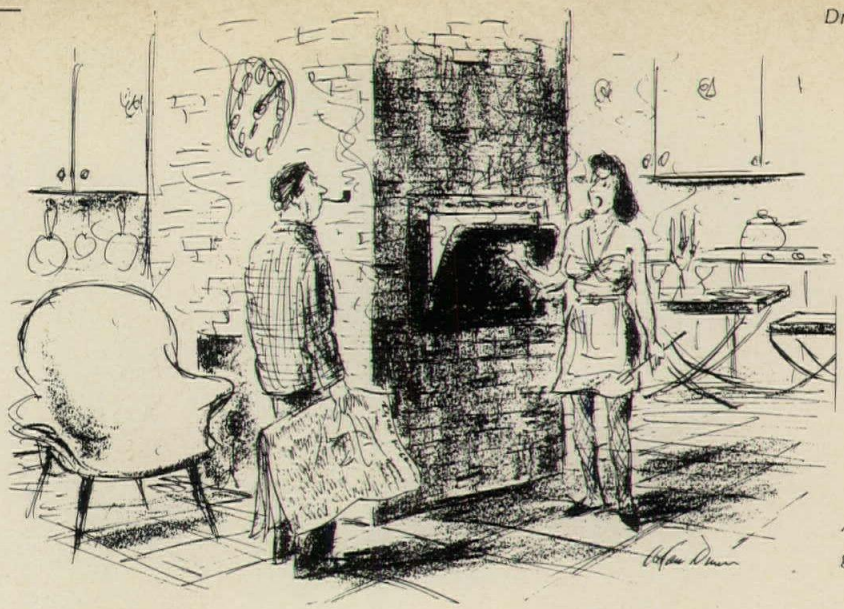
I'd like to be very clear about one thing: I'm all for making big plans and not just, I hope, because it is so much in vogue. The need for big plans is clear on every side and in every morning's newspaper. But let's go back to my list of worries: I'm worried about who is going to develop that "total and comprehensive solution," who is going to decide that it is the right one, and who is going to administer it.

Which means I'm worried about the control over local skills and talent and involvement inherent in such broad-scale approaches. The bulk of the money for "total and comprehensive" effort is going to come from the Federal government, and the power to distribute money is the power to wield great influence. The Federal record for generating quantity of building is really very good. But its record for generating quality of environment is —with some notable exceptions—certainly not all that could be hoped.

So I would hope most earnestly that any new public policy growing out of any new approach would demand a high quality of environment and provide the money to pay the best architects to create it. For it is only on the architect's drawing board that two-dimensional plans for development of cities can be translated into three-dimensional designs for truly pleasant places to live. The approach can be national, but the architecture must be created a community at a time.

—Walter F. Wagner, Jr.

Drawn for the RECORD by Alan Du



"If you can't stand the heat get out of the Open Plan!"

A new tribute to Walter Gropius

Walter Gropius, who will be 85 on May 17, was three months ago presented with the honorary degree of Doctor of Fine Arts by the University of Illinois. At the special convocation honoring Professor Gropius, the "Encomium" was delivered by his former student and later associate in both education and practice, now Dean of the College of Architecture and Art at the University's Chicago Circle campus, Leonard J. Currie. Dean Currie's words are a reminder of monumental contributions to the development of dynamic strategies of education and of practice to respond to the emerging social imperatives of an urbanizing society. And the contributions, of course, are continuing in Professor Gropius' continuing vigorous involvement in vast architectural projects on three continents. Excerpts from the address follow.

Considering this place and this occasion, it seems fitting to refer primarily to the highlights of Gropius' contribution to education, to his prescience with regard to the challenges arising from the evolutionary changes in a rapidly urbanizing society, and to his vision in identifying the institutional and formal devices required to shape human environment in response to social goals and imperatives.

The story is well known of how Walter Gropius took over the Weimar Art Academy—then arts- and crafts-oriented—secured support for a dynamic new school which he called the Bauhaus, brought together the most formidable array of talent—innovative artists such as Kandinsky from Russia, Paul Klee from Germany, Feininger from America—and before long had them joined by such great designers, architects, and teachers as Moholy-Nagy, Albers, Breuer, Herbert Beyer, Schlemmer, and Kepes—as diverse and dedicated and contentious a group of creative people as has ever been assembled. Small wonder that their interaction gave off sparks that illuminated the entire world of the creative arts. And who provided the cohesive force to hold these energies in dynamic tension but the man with the seminal idea of the Bauhaus—Walter Gropius. It was surely on this forge that he shaped and tempered and tested one of his favorite maxims—"diversity within unity."

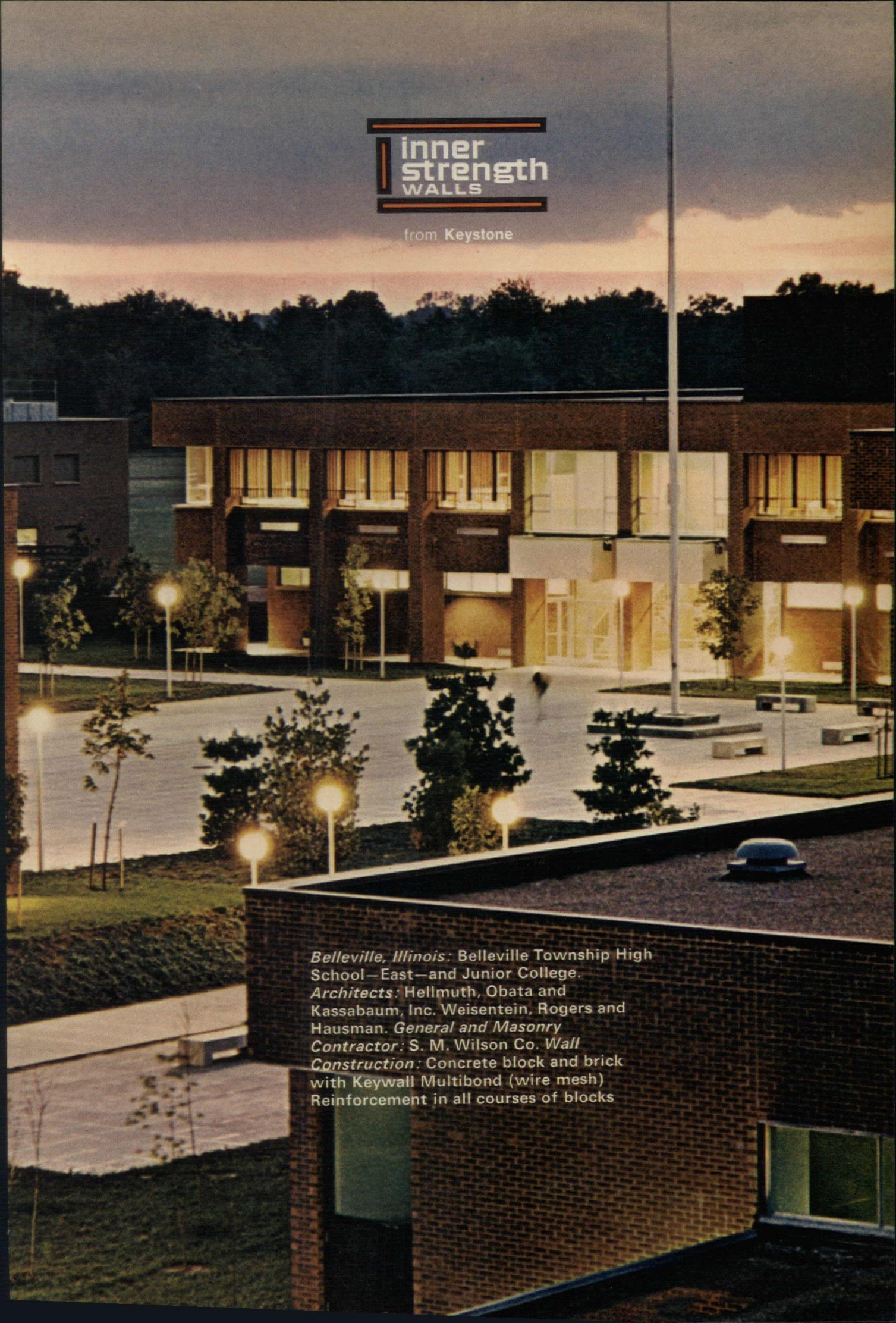
Excitement ran high in the Harvard Graduate School of Design during the winter of 1936-37, when we got the word that Gropius, then in London, had accepted the position of chairman of the Department of Architecture. He was to arrive by February of 1937 and would take over the instruction in the Master's class. The architectural profession and architectural education were at their nadir in the United States. The pause in building activity during World War I had been followed by the boom of the 1920's—a period of lavish, shoddy, imitative building of almost orgiastic bad taste—and then the depression and the virtual cessation of building after 1930. With the profession so moribund, it is small wonder that the architectural schools lacked vitality. The American Beaux Arts system—a pale carbon copy of the Paris school—was engaged in endless competitions with projects quite unrelated to the real world or to the needs of society.

At Harvard Gropius did not replicate the Bauhaus—which can never be done anywhere again—but rather he provided a new thrust within the organized system of higher education of the United States.

I know that he often found progress painfully slow, and the walls between departments exceedingly high. Yet Gropius managed in his 15 years at Harvard to set in motion the forces that changed the whole direction of architectural education in the United States—and ultimate throughout the world. Of course, he d not accomplish this all alone. As usua he attracted talented collaborators wh formed part of a team effort. But Gropi was the spearhead, the leader and th symbol of the sweeping changes th were to take place in schools of arch tecture, city planning, art and desig throughout the country. He accurate anticipated the new and evolving patter of professional practice and hence of e ucation to meet the needs of dynamical changing society.

In an interview shortly after his con ing to Harvard, Gropius was inveighin against dogma in education. He said, ". It would be an absolute horror for me my appointment would result in th multiplication of a fixed idea of 'Gropiu architecture.' What I want to do is t make young people realize how ine haustible the means of creation are if the make use of the innumerable products o our age, and to encourage these youn people in finding their own solutions.'

The lessons we have all learned fro Gropius are too numerous to cite, bu they include: bringing art and technolog into a new unity; emphasis on method—process rather than form—an open ended system—a notion applicable no only to the building of an urban enviro ment but to the creation of an educa tional ambience; teamwork, not only in tra-professional but broadly interdisc plinary as well; erasing the 19th Centur artificial division between the fine an the practical arts—bringing art out o the exclusive concern of the museum an back into a harmonious relation to th daily lives of all people; the social con cern of the architect and city builder—change from the design of elegant build ings for individual clients to an attitud of responsibility to the community an to society as a whole.



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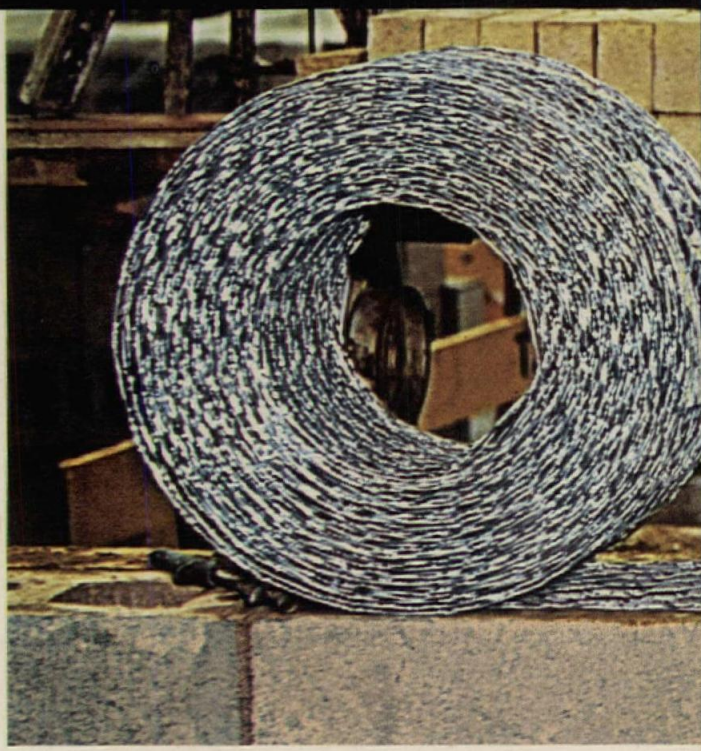

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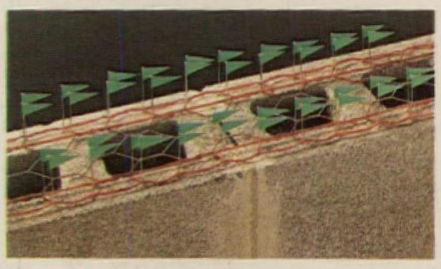

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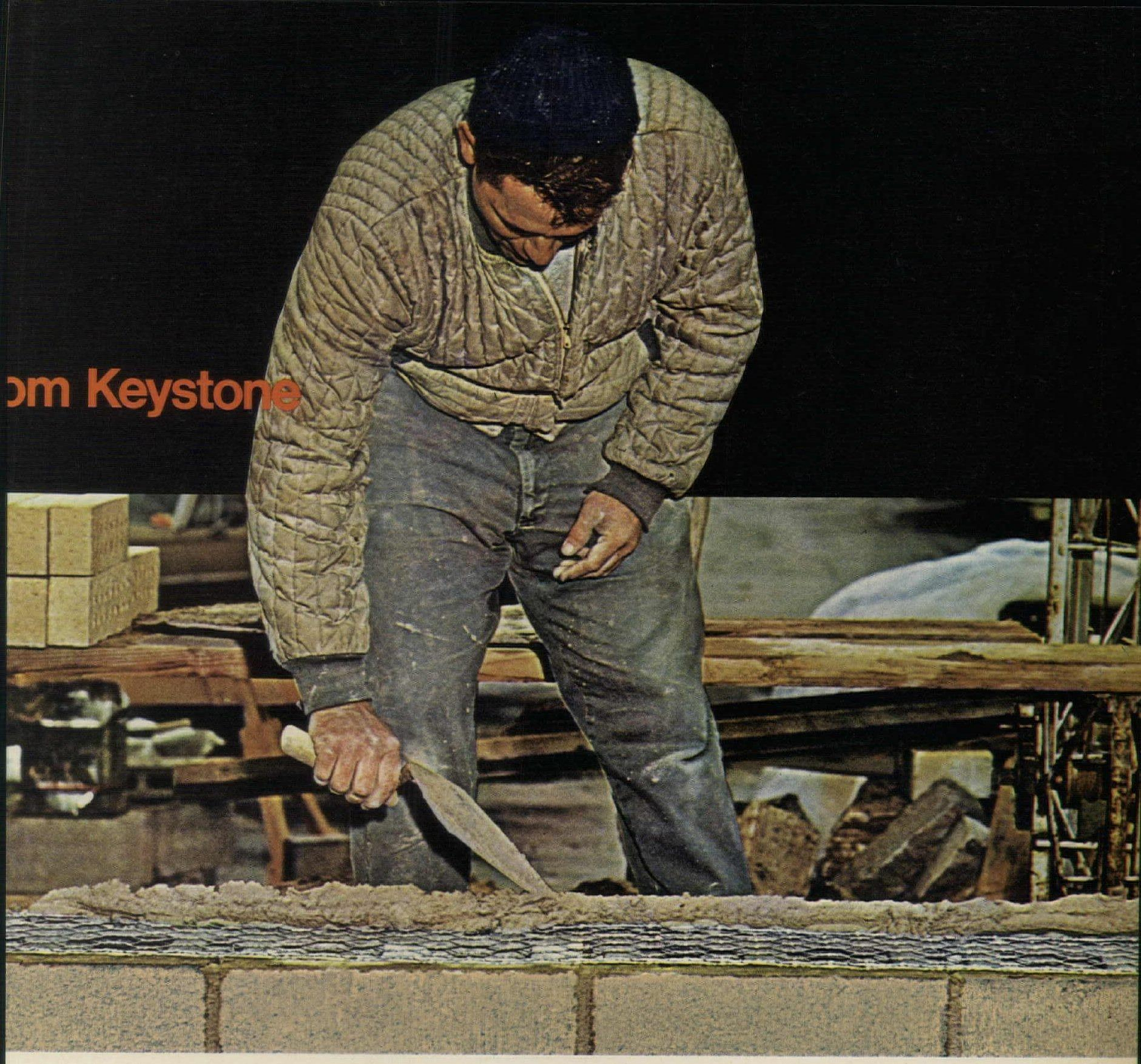

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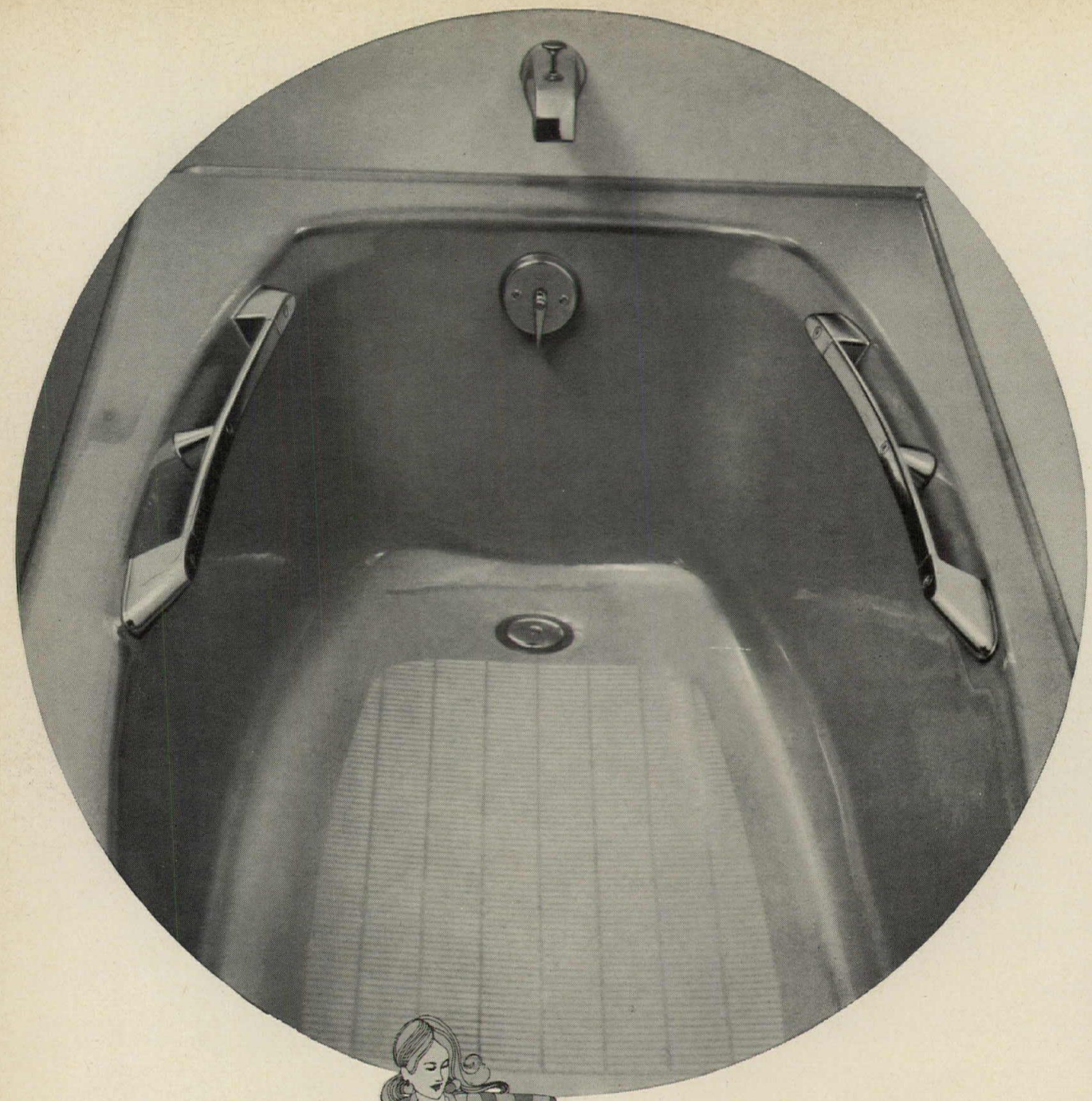

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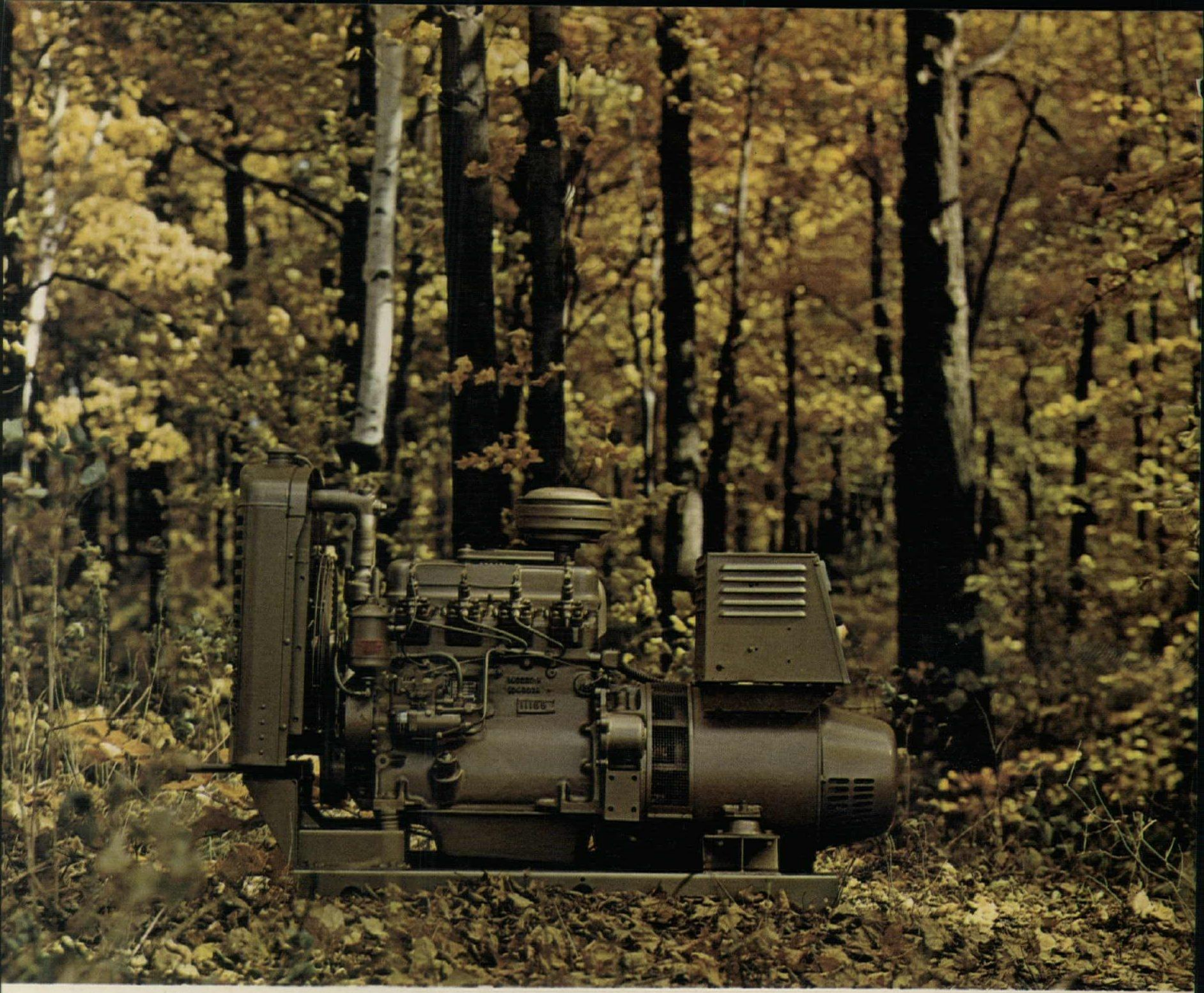

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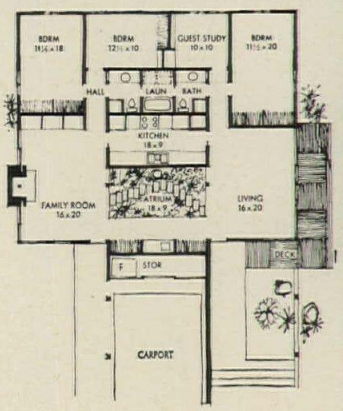

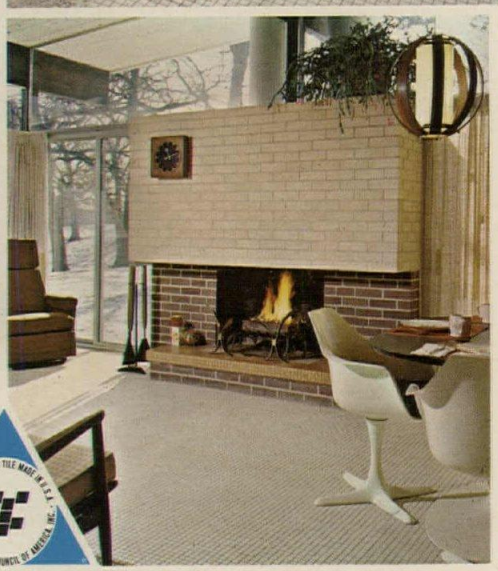

The pleasures of an indoor garden are obvious. But, an atrium is often gained at the expense of convenience, or given a self-defeating "fish bowl" treatment.

Architect Ray Heuholt, A.I.A., solved this dilemma by combining living things and a natural material – ceramic tile – in this Des Moines, Iowa home. A ceramic mosaic floor surrounds the atrium and covers the family room, entranceway, kitchen, bath and halls. The atrium can be maintained simply, without worrying about water, soil, spilled gravel or falling leaves.

Ceramic wall tile and decorator tile are also used in the house for which Des Moines Marble & Mantle Co. served as tile contractor.

The colors, shapes, sizes, textures and patterns of American ceramic tile are endless. The seal at right on every carton of Certified Quality Tile is your assurance of tile that is regularly tested by an independent laboratory to meet the most rigid government specifications. For information write: Tile Council of America Inc., 800 Second Ave., New York, N.Y. 10017.

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When safety demands your careful consideration of emergency exit doorware, specify Russwin Exiter* Fire Bolts for any building on your boards. Their performance will back up your decision. Meet every requirement for safety, style and stamina. Positive "touch and go" action inside . . . positive security outside. Thousands installed last year in schools, offices, hospitals and stores. Contact your nearest Russwin distributor or write for latest brochure. Russwin, Division of Emhart Corporation, New Britain, Conn. 06050. In Canada — Russwin Lock Division, Belleville, Ontario.

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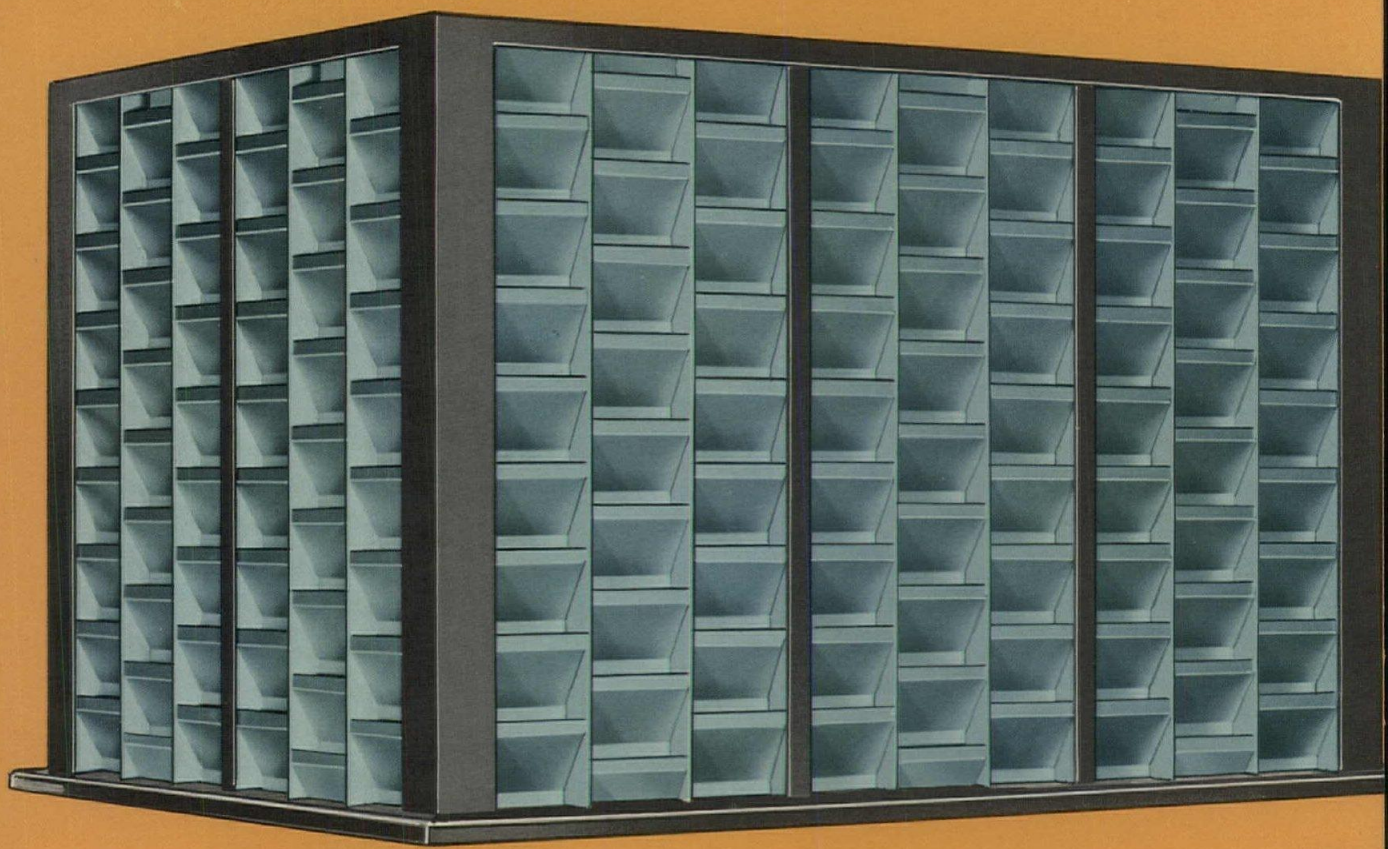


new decorative enclosure

Extruded Aluminum
Architectural
Model EXL-1

BEFORE Titus Decorative Enclosures. Equipment is prominent on roof, detracts from beauty of building.

AFTER Titus Decorative Enclosures. Equipment is cov ered, enclosure blends into color and lines of building

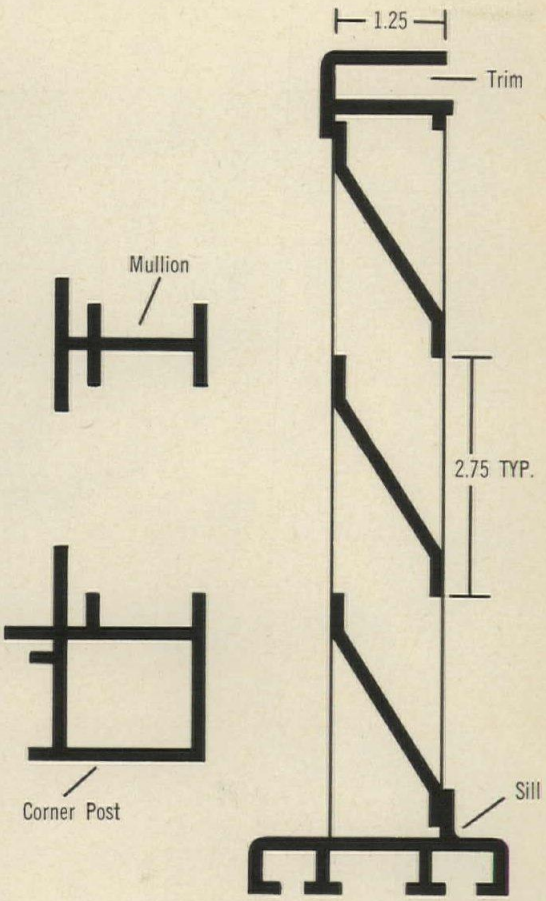
MR. ARCHITECT: DON'T GET CAUGHT WITH YOUR EQUIPMENT SHOWING!

Whether it's air conditioning equipment on the roof, or other apparatus at ground level, it usually detracts from the overall beauty and dignity of the building you have designed.

You can protect yourself from this problem by simply specifying Titus Extruded Aluminum Decorative Enclosures to enclose the equipment. They blend beautifully with the lines of any structure – actually enhance the appearance of the most modernistic building.

Each enclosure panel slides open for fast, easy servicing of equipment if needed. Constructed of extruded aluminum throughout, never require painting or maintenance.

Titus Decorative Enclosures can be furnished in a wide range of anodized colors to fit any decor. Available in sizes to meet any enclosure requirement.



Extruded design of Titus Architectural Model EXL-1 Decorative Enclosures.

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Plasteel Panels are preformed, bu

"A Sidewalk Cafe at Night" by Vincent Van Gogh represents this great artist at his creativ best. Van Gogh's skillful use of color, combined with interesting, exciting design, make this one of the world's great masterpieces. And everyone knows that complete creativ freedom is the primary requirement for a great painting.

The architect must have the same freedom of creativity as the artist. And t

A full color, 16 by 20 inch print of Van Gogh's "A Sidewalk Cafe at Night" is yours free fo the writing. Send for your print today on your Company letterhead.

never preconceived!

interpret his creative skills, he requires the building materials to match his ingenuity. Plasteel Wall Panels offer much more than just durability and protection. They offer the architect the unlimited creative freedom necessary to make his building come alive. They never dictate the shape of things to come. For the ultimate in design, specify Plasteel —the name for creative ideas in wall panels.

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LONG ISLAND LIGHTING COMPANY Northport Power Station — Units 1 and 2 — Northport, New York
Architect-Engineer: Ebasco Services, Inc., New York, New York

SEE OUR CATALOG IN SWEET'S OR WRITE FOR YOUR COPY.

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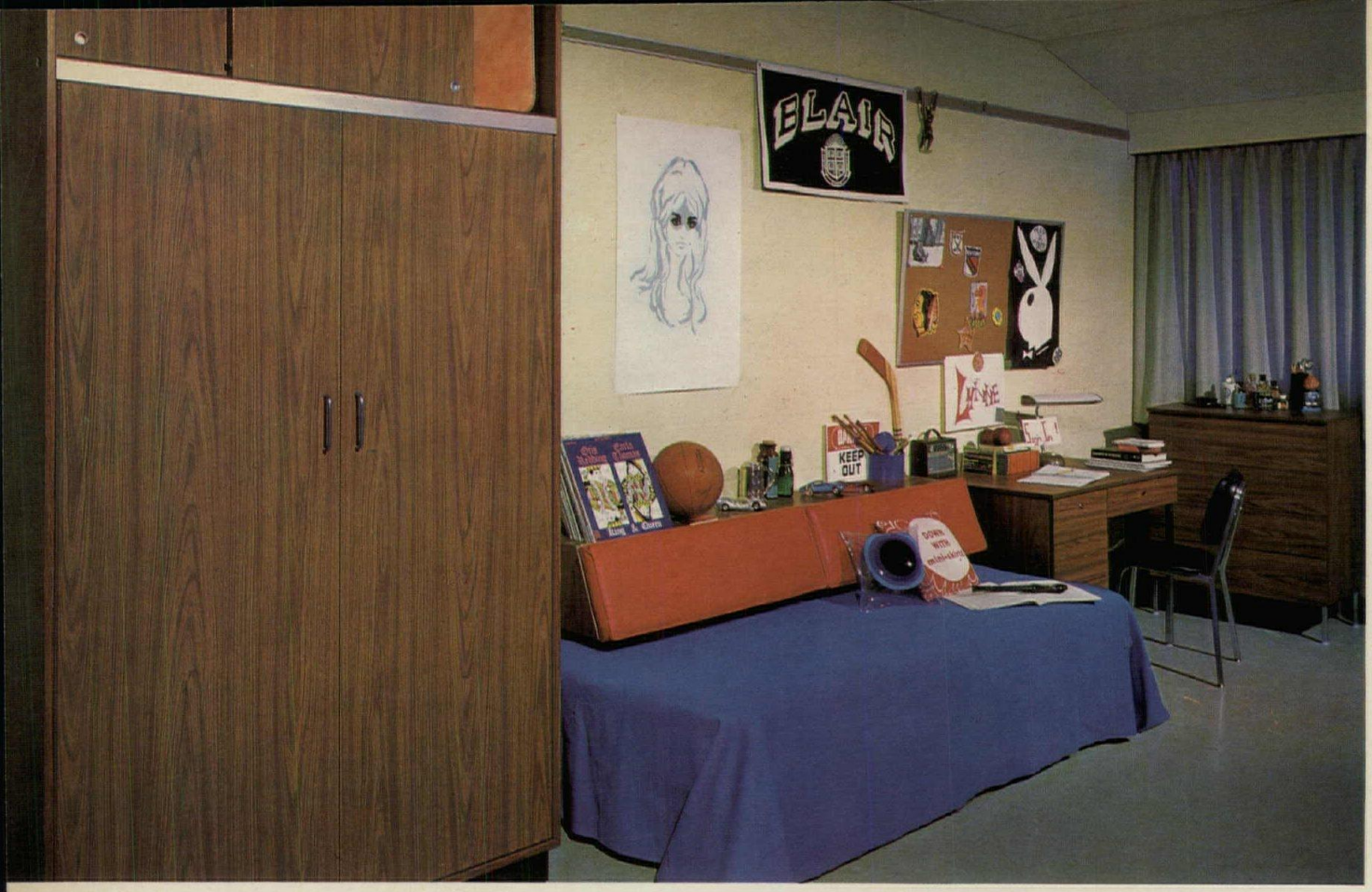
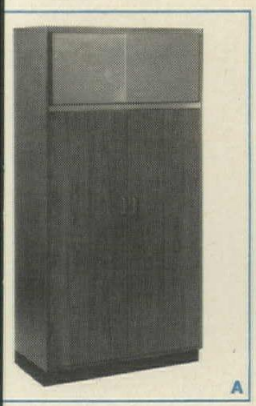


How modern schools use the student-proo

ROYAL

ir Academy, Blairstown, New Jersey
admaster: James Howard
chitects: Scrimenti, Swackhamer and Perantoni, Somerville, New Jersey

lorful and convenient. With the stamina to outlast whole generation of rambunctious teenagers.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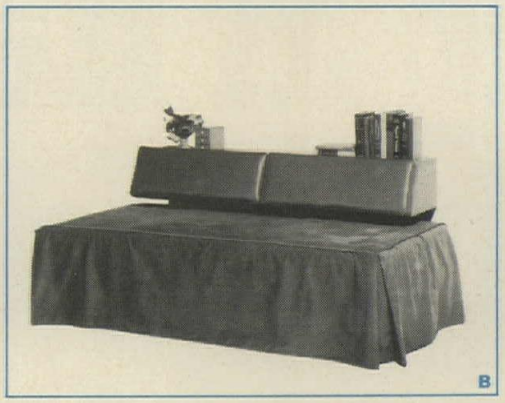
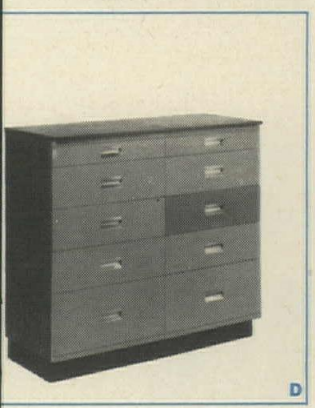

B


C

Multiversity Built-ins pay back their cost—year after year—in space saving, replacement saving performance. They're made of Fiber-X®. The fused, structurally balanced, warp free, non-delaminating, dimensionally stable, homogeneous plastic panel. Five wood grains and five solid color textured finishes. Write for our catalog. It's full of versatile options and flexible design ideas. Royalmetal Corporation, One Park Ave., New York, N.Y. 10016.

udget stretchers... Multiversity built-ins.


D


E


F

A. *H-1358 Hinged Door Wardrobe.*
B. *3390-LGP Sleep Lounge.*
C. *3306-F Four Drawer Chest. Shown with standard base. Legs optional.*
D. *3327-J Ten Drawer Double Chest.*
E. *S-1508 Sliding Door Wardrobe.*
F. *L-3332-M Student Desk. Knee-space drawer, two box drawers, one file drawer.*

oyola College, Baltimore, Maryland
esident: The Very Rev. Joseph A. Sellinger, S.J.
rchitects: Bonnett and Brandt, Baltimore, Maryland

o each his own. Room to store, room to study nd relax in comfort. The modern look for any classes to come.

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The world's most sophisticated elevatoring system, VIP, could well make a difference in the number of elevators your building needs. That's why we think it's worth your consideration—early in the game.

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ELEVATOR COMP

ver 6800 precast panels. 100 different sizes. Featuring

MEDUSA WHITE

This dramatically beautiful university building is believed to be the largest precast panel job ever designed. Over 6800 units are being precast in Manassas, Virginia, and shipped to the Connecticut site on flat bed trucks. A typical unit, of over 100 different sizes, is a concave, two-window unit 6′ wide by 13′11″ high. All are a unique salt and pepper color. Pink and gray sand, black, tan and white quartz exposed aggregates and both Medusa White and Medusa Gray Cements were used. Whether your job is large or small, Medusa Cements will help you achieve your creative goal. Write Medusa at P. O. Box 5668, Cleveland, Ohio 44101.

RESEARCH ACADEMIC WING, UNIV. OF CONNECTICUT HEALTH CENTER, Farmington, Conn. Architect: Vincent G. Kling and Associates, Philadelphia, Pa. Gen. Contractor: Lasker-Goldman-Corporal, New York, N. Y. Precast Producer: Earley Studio, Incorporated, Manassas, Va.

MEDUSA PORTLAND CEMENT COMPANY

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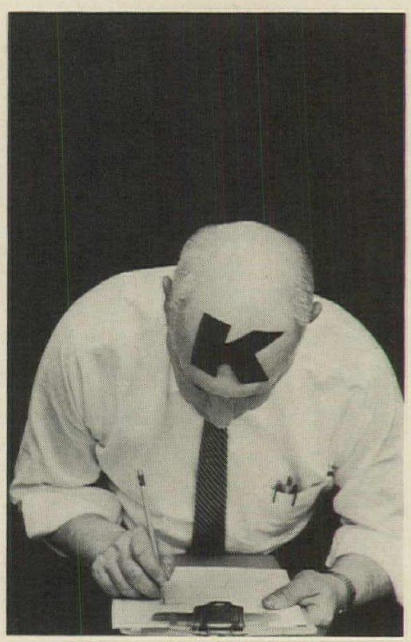
The facts of light

No. 5 in a series on plastic lighting panels.

When you spell lighting with a "K" we guarantee professional results.

(Remember that when you write specs.)



Spell it "K-Lite."

K-Lite is the brand name for "The finest and most economical lighting panels you can specify" . . . Specification Quality panels!

That statement may seem a little immodest. But it's true. So why beat around the bush. It's high time somebody spoke out on this matter of plastic lighting panel quality.

Unfortunately, there are many companies turning out panels which sell only on a price basis.* They fail to meet professional photometric requirements.

There's only one way to make sure someone won't swing in a "price panel" on your job. Write strong specifications with brand names spelled out. Spell it "K-Lite"!

Check with your fixture manufacturer. You'll find that K-Lite quality is a bargain.

*Only two firms offer a line of Specification Quality panels.

K-LITE® K-S-H, INC. / 10091 MANCHESTER / ST. LOUIS, MO. 63122

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You don't have to worry about a thing with Republic standard doors...

Because Republic gives distinctive treatments of lights and louvres to its standard doors.

You'd hardly guess Republic full flush doors are mass-produced. Except when you see the price. Beautifully finished, these standards are smooth and trim on the outside, a honeycomb of strength inside. And they have the most *unusual* light and louvre treatments.

Unusual because *you* design these treatments. We produce them at our factories and regional warehouses. You get creative treatments at a fraction of the cost of custom modifications. We also supply a snap-on glazing bead that *looks* very expensive.

Republic standard doors can be used with our new Frame-A-Lite stick system . . . or with standard Republic universal door frames. These economical frames are produced in a wide variety of sizes. Steel gives added strength to the corners.

Our salesmen have a kit that demonstrates the design versatility and quality construction of Republic standard doors, Frame-A-Lite sticks, and universal door frames. To arrange a meeting, call your nearest Manufacturing Division sales office, listed in the Yellow Pages. Or use the coupon.

REPUBLIC STEEL MANUFACTURING DIVISION

YOUNGSTOWN, OHIO 44505

( ) Please have a salesman call with a demonstration kit.
Please send literature and specifications on:
( ) Republic full flush doors
( ) Frame-A-Lite stick system
( ) Universal door frames

Steel

Name_____ Title_____

Company_____

Address_____

City_____ State_____ Zip_____

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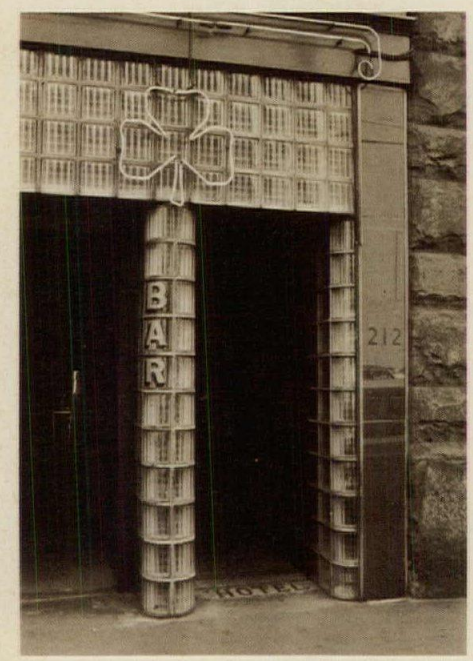
IF YOU THINK GLASS BLOCK STILL LOOKS LIKE THIS



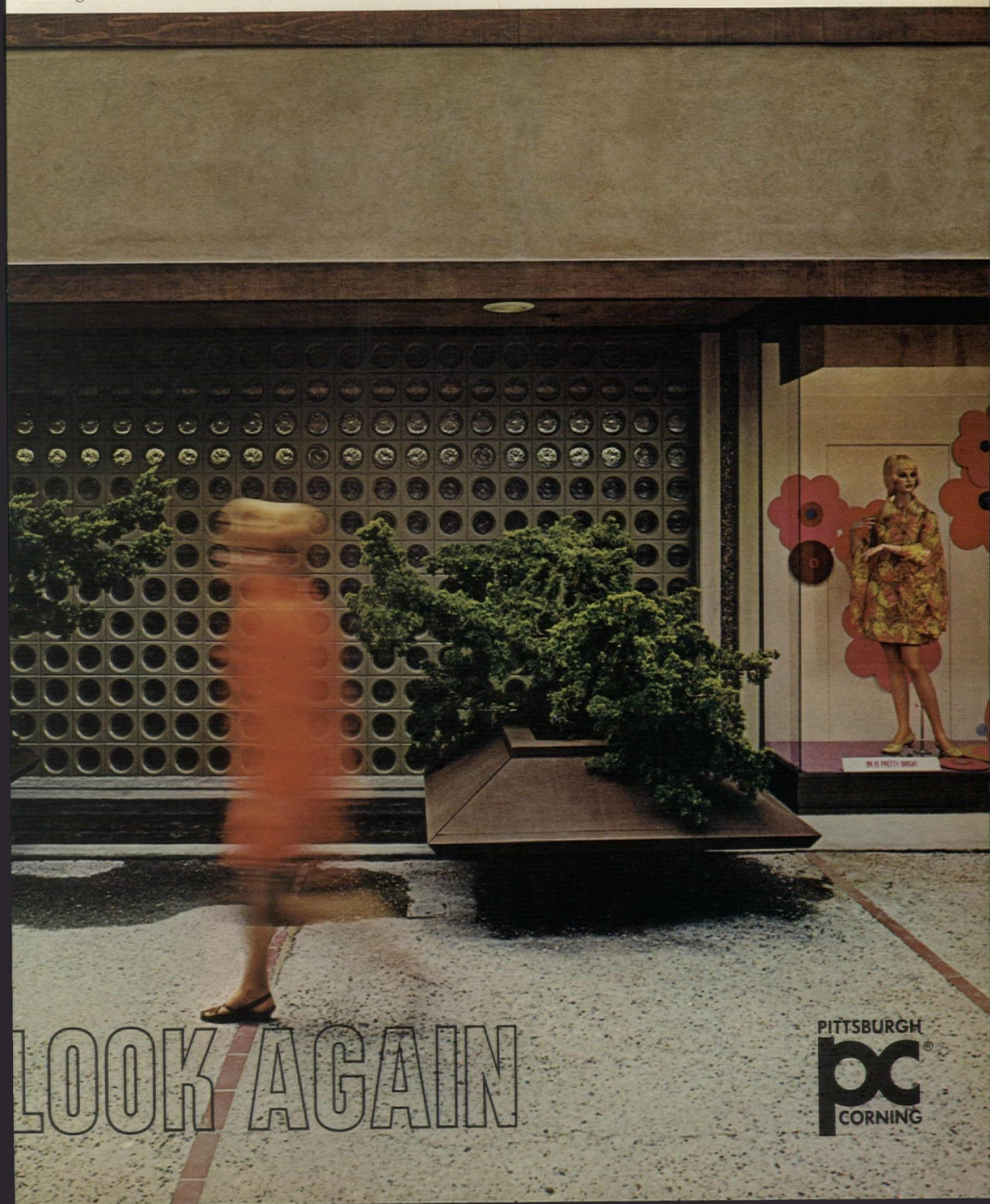
YOU'D BETTER

A lot of new things are happening with this modern, versatile building material: exciting designs, innovative uses in walls and striking sculptured effects adding new dimensions to today's buildings.

Pittsburgh Corning Intaglio III glass wall units were chosen for major portions of the perimeter wall at Bancroft Center in Berkeley, California. The architect, John H. Ostwald, created a grill-like effect with the circular patterned exterior while providing attractive natural light for the interior of the stores in this shopping center. A feeling of openness was maintained without loss of space.

PC Intaglio units are available in six unique patterns with glass and masonry textured surfaces. This offers almost limitless design possibilities in the aesthetic use of dimensional wall effects.

For a closer look at PC Intaglio and new Chiaro glass units, or Sculptured Glass Modules, write for our catalog: Pittsburgh Corning Corp., Dept. AR-58G, One Gateway Center, Pittsburgh, Pa. 15222.



These men are starting a revolution

This group of Altec "CE" Sound Contractors meeting at the Warwick Hotel, New York City, receives special training in the revolutionary *Acousta-Voice* method.

In sound. We call it Acousta-Voice.™

Acousta-Voice is the most important and revolutionary development in sound reinforcement of the last several decades. It's a unique new method that "tunes" a sound system—electronically and with amazing accuracy—to match the peculiar characteristics of the building or auditorium where it's installed. (Just as a pipe organ must be "voiced" and "regulated" to its particular area.) The *Acousta-Voice* method is exclusive with Altec Lansing, leader for more than 30 years in the development of fine sound equipment.

So what's so revolutionary about *Acousta-Voice*?

Consider first that even the finest sound system may not be able to control quality and feedback in some buildings because of their inherent structural characteristics. *Acousta-Voicing offers a practical answer to these problems.*

Most revolutionary of all, *Acousta-Voicing* imparts such stability to the sound system that the microphone may be used *in front of the loudspeakers*, as with "thrust" stages.

In a series of training clinics, Altec has now trained its "CE" Sound Contractors all over the country to use the *Acousta-Voice* method. These men form an elite corps of sound experts specially trained and equipped to perform the finest possible job of planning, installing and *Acousta-Voicing* sound systems. Each has invested approximately $7,000 in X-Y oscilloscopes, random noise generators, impedance bridges, R.C. oscillators with less than .06% distortion, 1/3 and 1/10 octave band analyzers, precision sound level meters and other special electronic equipment in order to properly *Acousta-Voice* any sound system.

Many auditoriums have already been *Acousta-Voiced* with startlingly good results. In time, every sound system of consequence will be *Acousta-Voiced*. We'd like to tell you the whole story. Use the coupon below. Or if you want to talk now to an Altec "CE" Sound Contractor, you'll find him listed in the Yellow Pages under "Sound Systems." Either way, find out about *Acousta-Voice*.

ACOUSTA-VOICE, Dept.
Altec Lansing
1515 So. Manchester Ave., Anaheim, Calif. 92803

I'd like to know more about *Acousta-Voice*.

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A Division of LTV Ling Altec, Inc.

Visit Altec Lansing at Booth #29 at the 1968 Int'l. Association of Auditorium Managers in Houston—July 22-25

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DISTINCTIVELY DIFFERENT

...that's the *La Paz!*

The first new closet design in over a century

Over 4,000 architects and builders have written us for details on this dramatically new water closet. Many leading builders have already specified it for new developments.

Model homes and apartments featuring the LA PAZ are receiving the same enthusiastic reaction from customers.

LA PAZ is revolutionary in design, with a low-pressure flush valve and a whisper quiet operation. For further information and specification detail on our #595 La Paz see your plumbing contractor or write.

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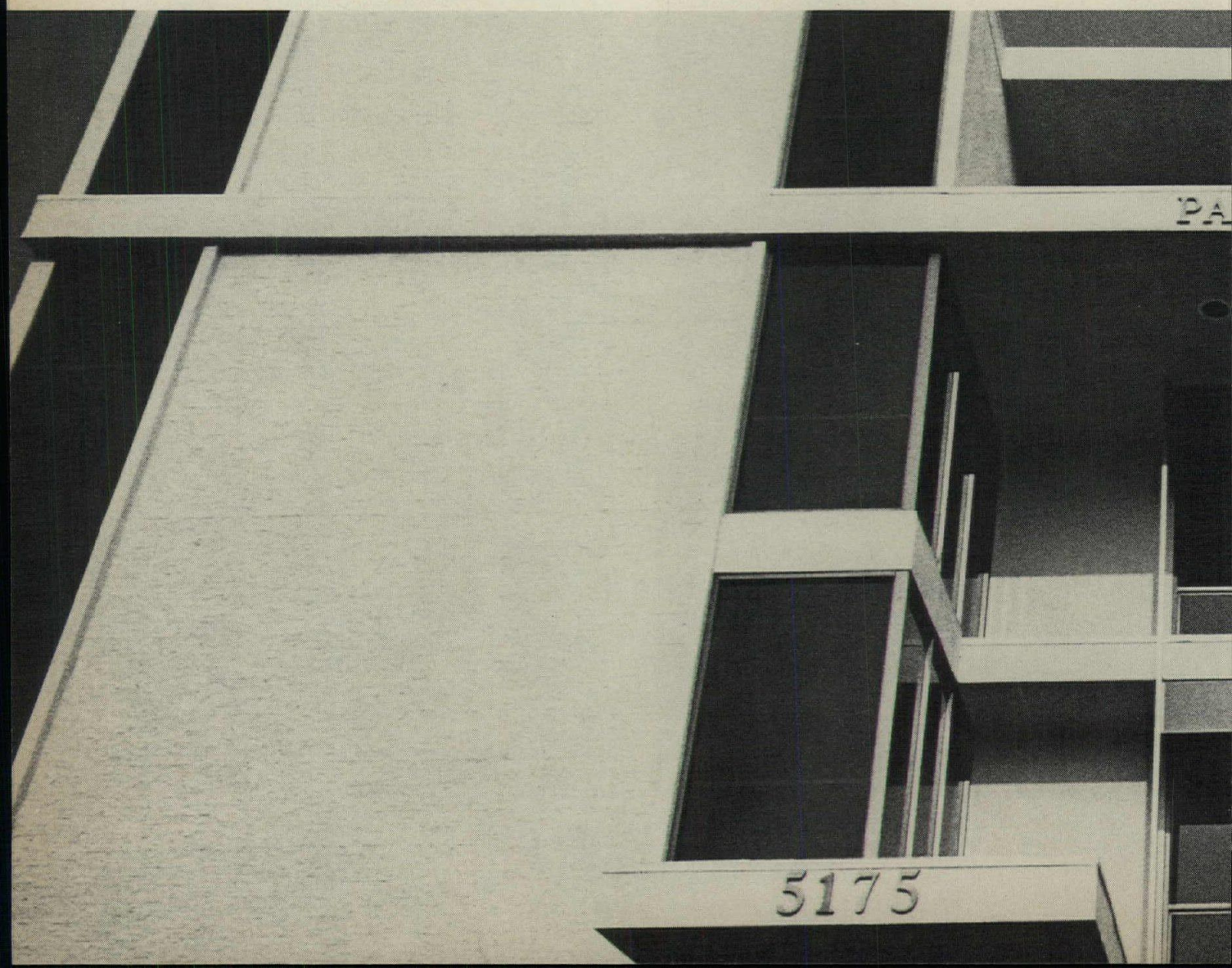
Another big one goes all-electric.

The all-electric concept proves itself again, this time in the contemporary design of the Park Central Professional Building. This modern medical center is one more important addition to the long list of all-electric projects in Edison's service area

Electric space conditioning tems can save builders 30% to in first cost installation. In most c expensive stacks, flues and vents eliminated, often saving the eq lent in space of whole floors. The more freedom of design in an electric building. Less room



equired for the main space-conitioning plant. The result is a low rst cost, low maintenance building ith very competitive per square foot perating costs. Add up all the advanages and savings. The all-electric uilding invariably has the lowest total nnual cost.

Park Central Professional Building was designed by Markling-Yamasaki and Thompson, AIA Architects and Associate. General contractor and developer was Thompson Westcoast Company. The Park Central Professional Building now goes into our files as just one of the hundreds of case histories of all-electric buildings in our Central and Southern California service area.

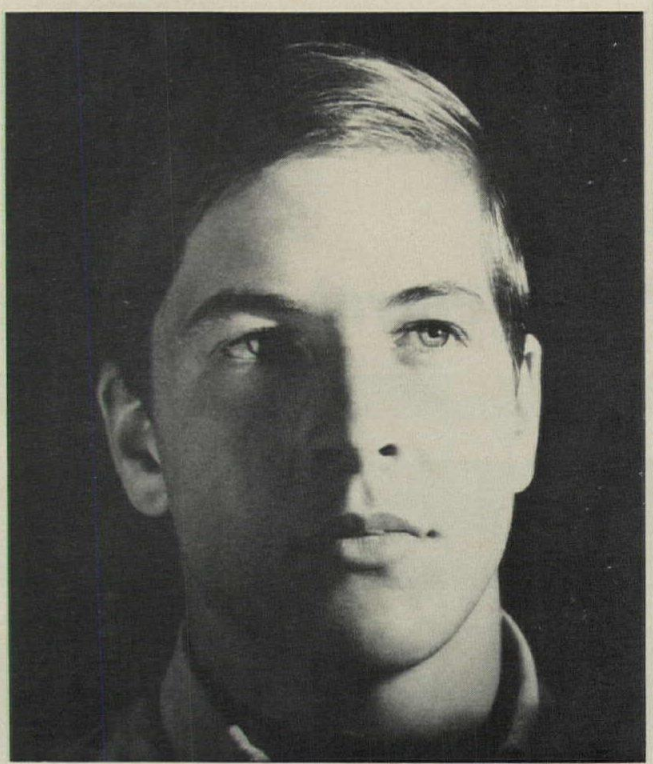
The Southern California Edison Marketing Engineering Department will be glad to show you how to apply the all-electric concept to your project for remarkable savings. Write: Marketing Engineering Department, Post Office Box 62, Terminal Annex, Los Angeles, California 90051.

SCE

Southern California Edison

Park Central Professional Building, Long Beach.

Success is something you can't leave a son



Success is coming to depend more and more on whether he gets a good college education. Because as each day passes, our world gets more complex and specialized.

But his ability to learn will carry him only part way unless the nation's colleges can answer some serious questions: How to cope with rapidly increasing student enrollments? How to keep the quality of education constantly improving with more modern laboratories, better libraries, new classrooms? How to attract able new faculty members?

Your support will help colleges answer these questions, help them make your son ready for his world.

Give to the college of your choice.

Published as a public service in cooperation with The Advertising Council and The Council for Financial Aid to Education.

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GAS ABSORPTION AIR CONDITIONING:

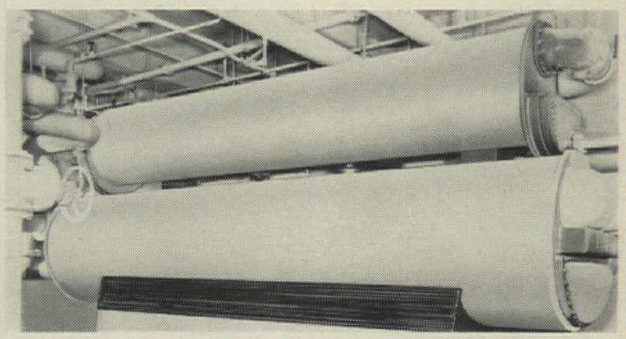
"COSTS LESS TO MAINTAIN...USES LOWEST-COST FUEL...IS MORE RELIABLE"

...says Eliseo O. Mariani, Consulting Engineer

Mt. San Antonio Gardens has no stairs, only gently sloping ramps. Its doors are all wide enough for wheel chairs. Each living unit is connected to a 24-hour medical center by a 2-way communications system. Why? It's a retirement village. And these are just some of the ways life there was made more pleasant and secure for elderly people.

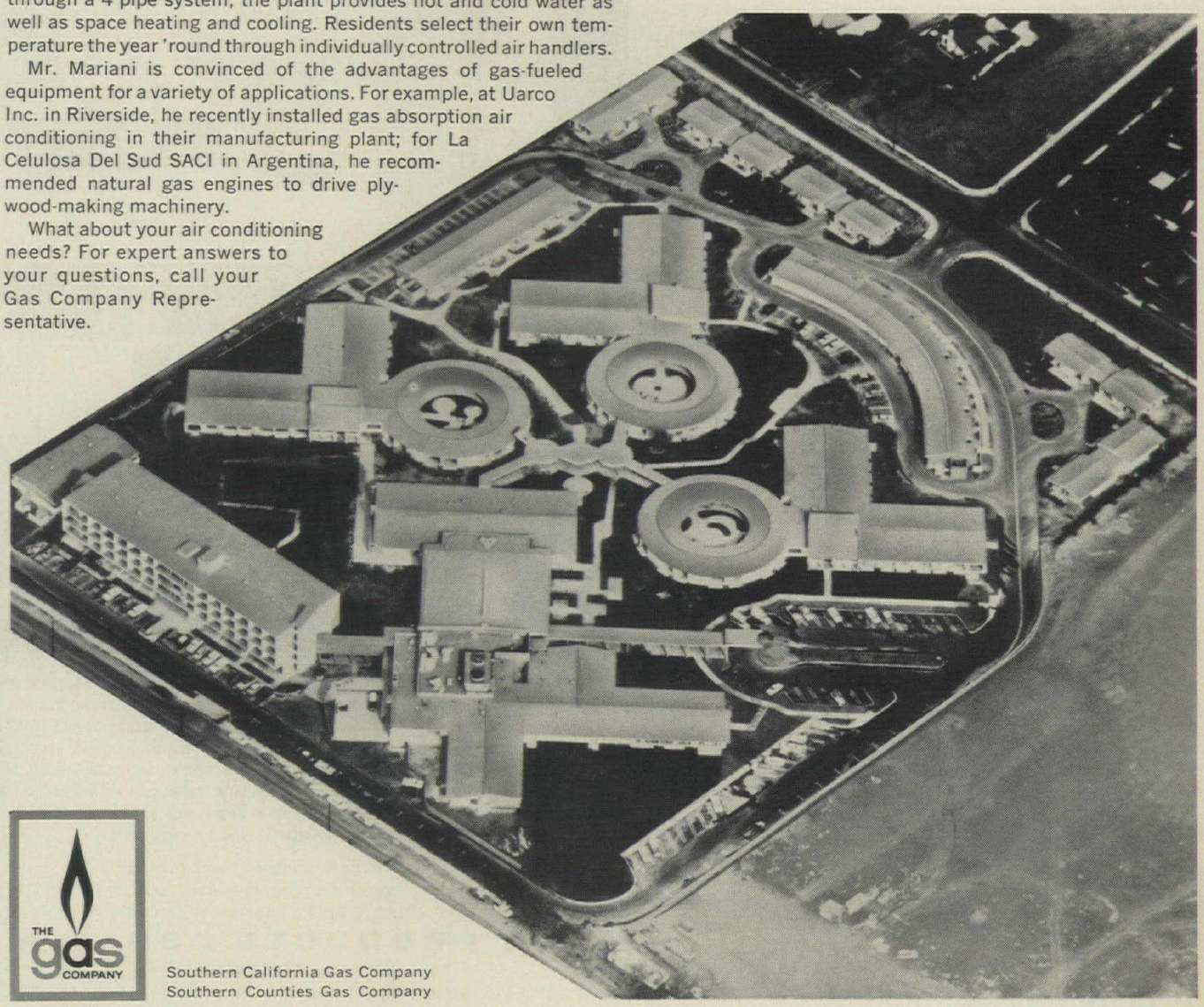
Another comfort feature was provided in the electrical and mechanical system by Eliseo O. Mariani, of Mariani and Cummings, Inc., Consulting Engineers. Mr. Mariani specified gas air conditioning for this Pomona project. His reasons were basic: "Besides the comfort it provides, we chose gas-fired equipment because it's more reliable, costs less to maintain and uses the lowest-cost fuel."

He designed a central plant system using 2 Cleaver Brooks boilers connected to a Carrier 359-ton steam absorption unit and a Pritchard cooling tower. Supplying the entire 13½-acre project through a 4 pipe system, the plant provides hot and cold water as well as space heating and cooling. Residents select their own temperature the year 'round through individually controlled air handlers.



Mr. Mariani is convinced of the advantages of gas-fueled equipment for a variety of applications. For example, at Uarco Inc. in Riverside, he recently installed gas absorption air conditioning in their manufacturing plant; for La Celulosa Del Sud SACI in Argentina, he recommended natural gas engines to drive plywood-making machinery.

What about your air conditioning needs? For expert answers to your questions, call your Gas Company Representative.



THE gas COMPANY

Southern California Gas Company
Southern Counties Gas Company

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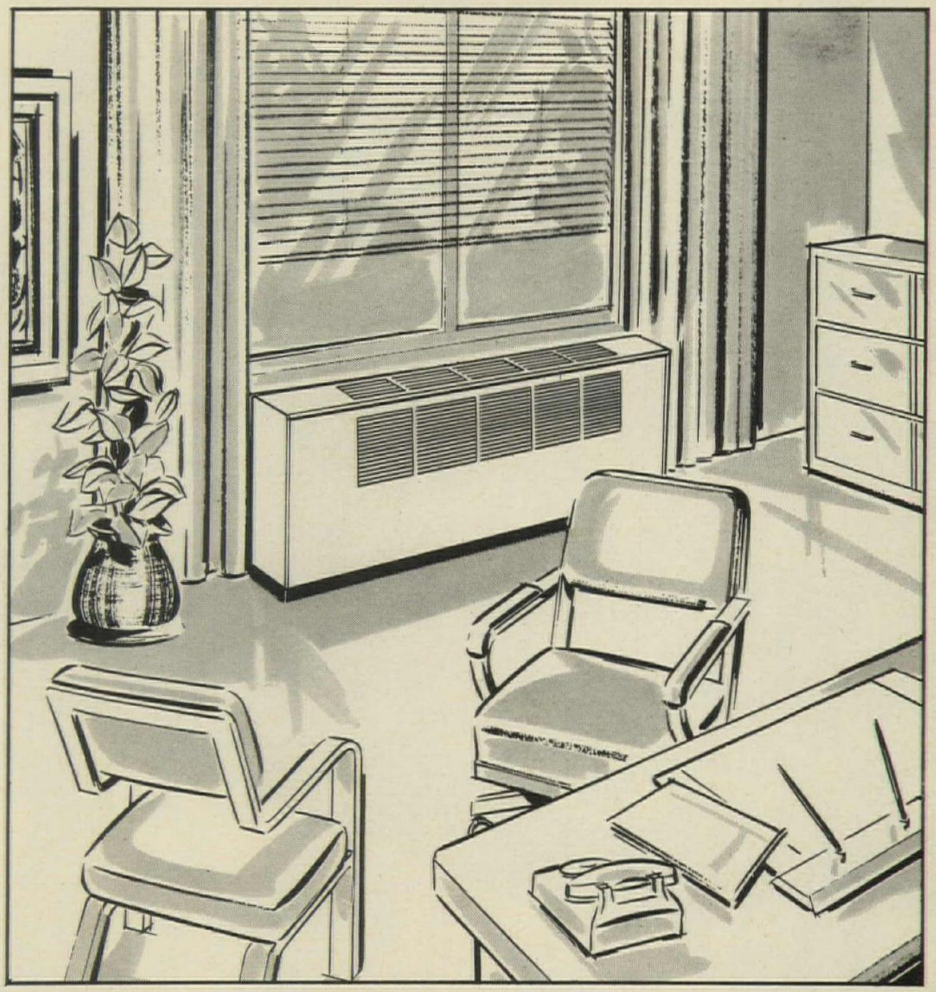
Take a fresh look at this terminal for our induction reheat system–it's new!



This sketch shows one of the new Carrier terminals used with our high quality single duct, constant volume system.

The system provides superior individual room control of heating and ventilating only or complete air conditioning.

And the new Carrier terminal, in two important ways, improves on a performance that up to now set the standard for this type of unit.

(1) It's even quieter than the previous model—
yet delivers higher capacity per unit.

(2) It has higher reheat capacity per lineal inch—
so you can save space using smaller unit sizes.

Your choice of five models—available in 7 attractive decorator colors. Choice of steam, hot water or electric heat. Plus a large line of accessories. Capacities: 75 to 800 cfm.

For complete information about our new terminal, call your nearest Carrier representative. Or write us at Syracuse, New York 13201.

Carrier Air Conditioning Company

Carrier®

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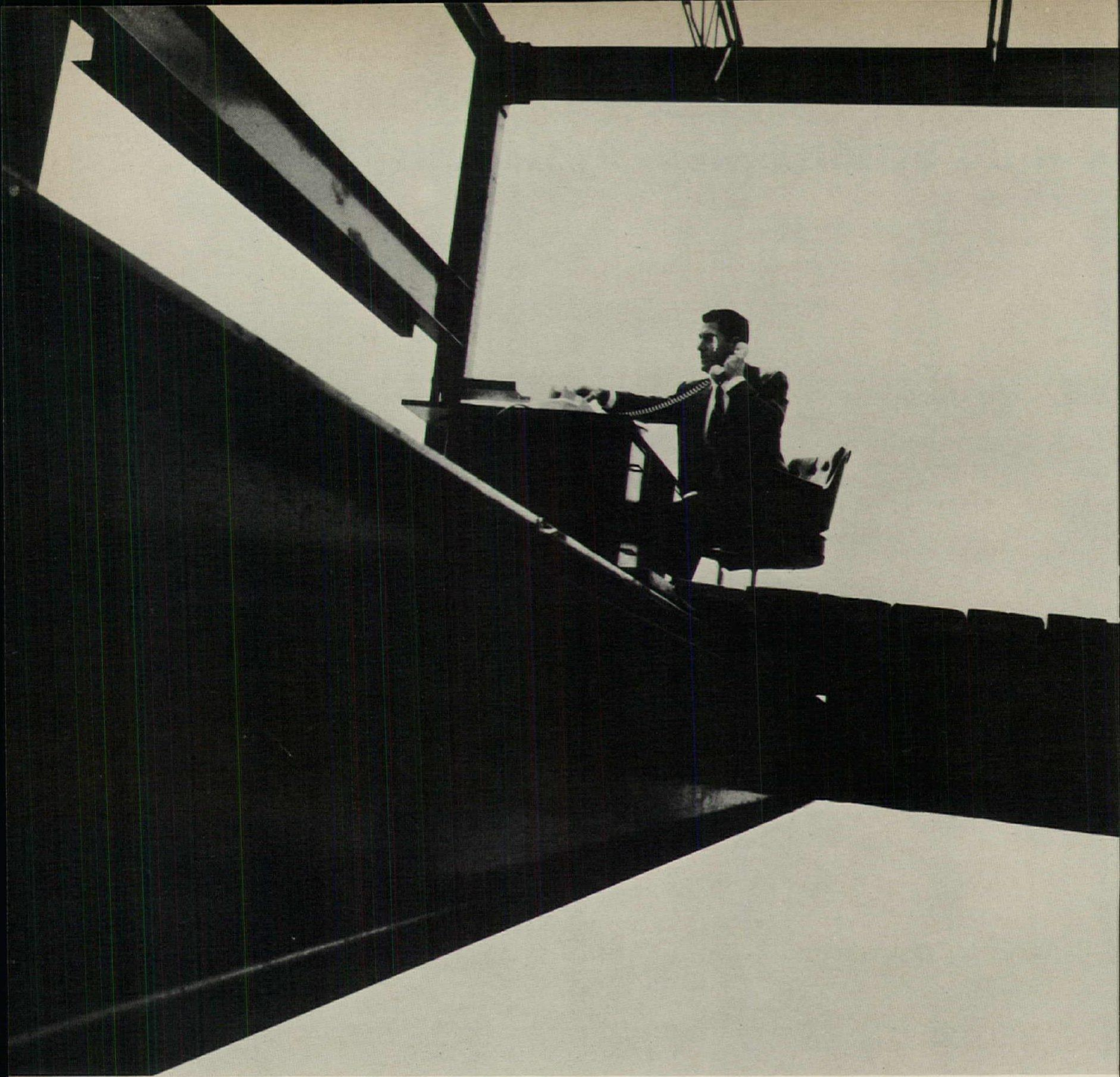


"People can work without plumbing. And they can work without air conditioning. But they just can't work without telephones."

Fairchild Hiller Corporation's facilities manager, A. S. Damiani, knows what he's talking about.

He's seen buildings outgrow their communications capacities time and time again. He's tripped over exposed wires. Cables running across floors. Seen holes being drilled for telephone wires right after a building had been finished.

And he was *determined* this wasn't going to happen to the new Sherman Fairchild Technology Center near Washington, D. C.

That's why he called in a Bell System Architect and Builder Service Representative at the very beginning.

The result: not just the most modern telephone system possible, but a system which provides for every foreseeable *communications* need.

Data-Phone* service. TWX. Even closed circuit TV using Bell Telephone System lines.

All cabling is concealed . . . yet the installation still insures the owner easy access, painless movement and quick expansion.

To make sure your next building is as modern as modern communications can make it, simply call 212-393-4537 collect. We'll send you a complete list of our Architect and Builder Service Representatives.

*Service mark

BELL SYSTEM AT&T and Associated Companies

For more data, circle 24 on inquiry card

heme speakers and more award recipients named for A.I.A. convention

ans for the 1968 convention of the merican Institute of Architects to be ld in Portland, Oregon, June 23-27 and Honolulu June 28-29, are nearing com- etion with the naming of speakers and e disclosure of more award recipients.

The theme of the convention is M.A.N.," standing for "Man, Architec- re and Nature." Speaking on "Man" ll be Whitney M. Young, Jr., executive rector of the National Urban League, d Gene C. Brewer, chairman of the ard of the National Forest Products As- ciation and president of U.S. Plywood- ampion Papers, Inc. Donald Canty, itor of Urban America's CITY maga- ne, will be discussion leader.

The "Architecture" theme will be scussed in a series of seven workshops aling with the following topics: how compete with the package deal; auto- mation in the drafting room; design for preservation; the Federal government—client and partner; how to set up a design concept team; the community's right to design quality; and planning for profit.

Mrs. Lyndon B. Johnson will be the main speaker on the theme of "Nature," presenting the first B.Y. Morrison Memorial Lecture, sponsored by the Agricultural Research Service of the Department of Agriculture in honor of the first director of the National Arboretum. Speaking with the First Lady will be a panel which will include: Orville L. Freeman, secretary of the Department of Agriculture; Dr. M. Gordon Wolman, member of the A.I.A. Potomac Planning Task Force and chairman of the Department of Geography at Johns Hopkins University; and Marvin B. Durning, a Seattle attorney, who was named "National Conservationist of the Year," in 1965 by President Johnson.

Presenting the Purves Memorial Lecture will be Miss Barbara Ward, internationally known author, editor and economic interpreter, who will speak on the topic "Hope for an Urbanizing World."

Ten foreign architects have been elected Honorary Fellows of the A.I.A. and will be invested at the convention. The 10 are: Franco Albini, Italy; Georges Candilis, France; Charles-Edouard Geisendorf, Switzerland; Eric Lyons, England; Frei Otto, West Germany; James E. Searle, Canada; Gin Djih Su, China; Sir Leslie Hugh Wilson, England; Iosya Yoshida, Japan; and Bruno Zevi, Italy.

In addition, the A.I.A. has named a sixth honorary member—Richard C. Lee, Mayor of New Haven (for the other five see March, page 35).

esign Methods Group will old first annual conference

e first annual international conference the Design Methods Group will be held the Massachusetts Institute of Tech- logy from June 2-4. The Design ethods Group was formed in June 1966, a conference in Canada for the purpose exchanging information about research design methodology.

The conference will be jointly spon- red by the Urban Systems Laboratory, e Department of Architecture, and the epartment of Civil Engineering at I.T.; the Department of Architecture d the Laboratory for Computer aphics at Harvard University, and the hool of Architecture at the Boston Ar- itectural Center.

The major portion of the program ll consist of papers which emphasize e importance of a given methodology the broad intents of environmental search and design. Registration infor- ation can be obtained by writing: nference Planning, Department of chitecture/7-304, M.I.T., Cambridge, assachusetts 02139.

Louisiana student wins first Eaton Yale & Towne fellowship

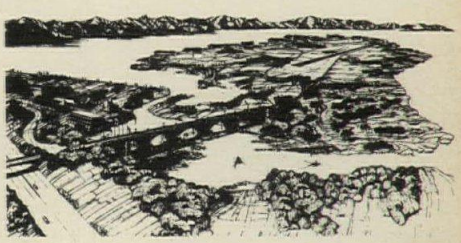
W. Barry Graham, a student in his final year in the Department of Architecture at Louisiana State University, has been named the recipient of the first annual Eaton Yale & Towne Urban Design Fellowship. The fellowship, administered by the American Institute of Architects, provides a stipend of $3500 for one year of study in an approved graduate program of urban design, with an additional award of $1200 for a minimum six-week foreign study tour of urban developments.

Bush-Brown is named design adviser to HUD

Albert Bush-Brown, president of the Rhode Island School of Design, has been named Adviser for Design to the Secretary of the Department of Housing and Urban Development, succeeding George Rockrise, who has returned to private practice (March, page 36). Mr. Bush-Brown will serve on a consultant basis, and will work closely with Ralph J. Warburton, special assistant for urban design.

Mr. Bush-Brown has resigned as president at Rhode Island effective at the end of June.

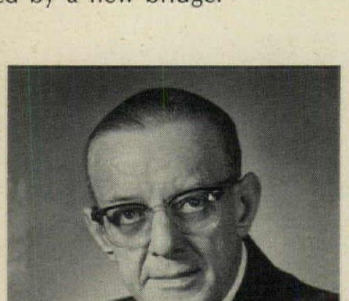
In resigning his post Mr. Bush-Brown said: "Our performance for our students and for the public of Rhode Island strains our current resources. The model our faculty and staff would like to build in the future outstrips any predictable resources. It is time to reassess that model and to shape the school's future more closely to the resources that are available here, and that task is best undertaken by new leadership."



Americans buy London Bridge; it will be erected in Arizona

London Bridge, the 1005-foot-long structure over the Thames, has been bought for $2,460,000 through competitive bid-

ding by the McCulloch Oil Corporation of California. The bridge, dedicated in 1831 and designed by John Rennie, will be dismantled and rebuilt over a scenic waterway to be developed as an international resort at Lake Havasu City, Arizona, located 232 miles east of Los Angeles on the lower Colorado River (see drawing on page 35). The London Bridge was sold by the city because it no longer accommodated mounting traffic and because it has been sinking into the river bed at a rate of one inch every eight years under its weight of 130,000 tons. It will be replaced by a new bridge.



James Hornbeck retires: 16 years a RECORD editor

James S. Hornbeck, A.I.A., a senior editor of ARCHITECTURAL RECORD, has retired for reasons of health after 16 years on the RECORD staff.

Mr. Hornbeck joined the RECORD in 1952 after 19 years of experience in architectural education and practice, including two-and-a-half years with Harrison & Abramovitz and three years with Skidmore, Owings & Merrill in New York. His professional experience also included two years with the Manhattan Engineer District, with wartime work on the design and development of industrial buildings related to the atomic bomb project at Oak Ridge, Tennessee.

After getting his B.S. in Architecture at Penn State University in 1931, Mr. Hornbeck taught for five years at Penn State before doing graduate work at the Harvard Graduate School of Design. His interest in teaching continued and after coming to the RECORD he also taught design theory for several years in the evening program at the School of Architecture of Columbia University.

As a member of the American Institute of Architects, Mr. Hornbeck has been active on such committees of the New York Chapter as Architectural School Liaison, Esthetics, Publications and the Arnold W. Brunner Scholarship. Mr. Hornbeck has also been a member of The Architectural League of New York, and has served as editor of the League's News-Bulletin and chairman of its Membership Committee.

On the RECORD, Mr. Hornbeck was responsible for many major architectural features and Building Types Studies; and he initiated and was the editor responsible for developing the RECORD's continuing series on Architectural Details.

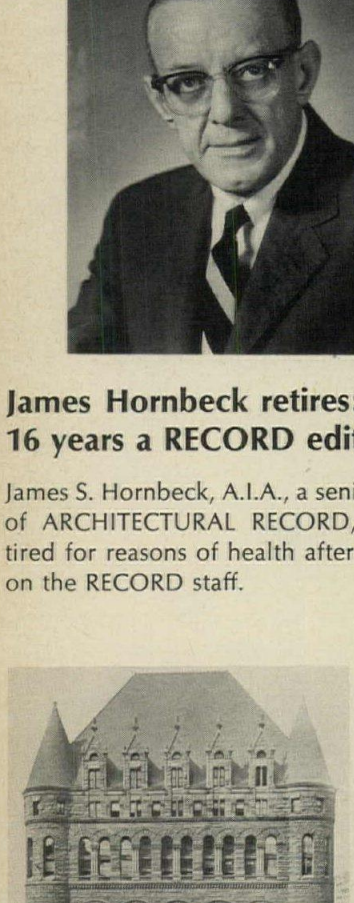
Obituaries

Winston Elting, well-known Chicago chitect, died on January 25 at the age 60. At the time of his death Mr. Elti was Professor of Architecture at the U versity of Illinois, Chicago Circle Camp and chairman of the board of the recen organized architectural firm of Mega Inc. He was a past director of the Chica Chapter of the American Institute of A chitects and was elevated to fellowsh in the A.I.A. in 1956 for design.

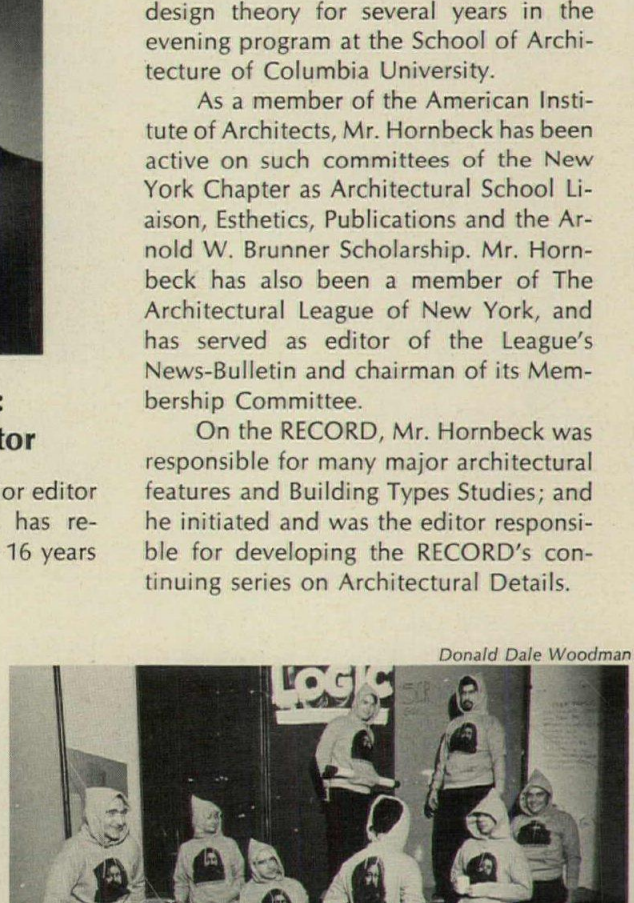
Frank Grad, founder and senior pa ner of Frank Grad & Sons, architects a engineers, Newark, New Jersey, died January 19 at the age of 85. Mr. Gr started his firm in 1907 after graduati from the Vienna Technical School. 1932 he was joined by his two so Bernard, an architect, and Howard, engineer, who will continue the practi Mr. Grad was a member of the Americ Institute of Architects, New Jersey Socie of Architects, and the Society of Ame can Military Engineers.

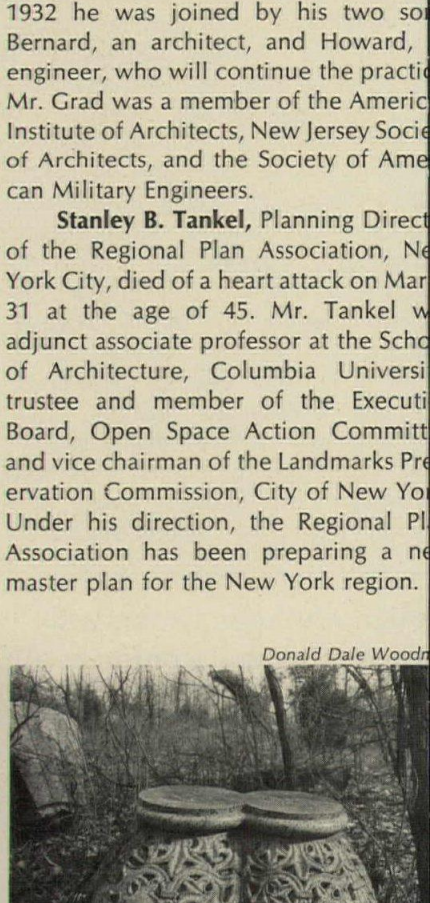
Stanley B. Tankel, Planning Direct of the Regional Plan Association, Ne York City, died of a heart attack on Mar 31 at the age of 45. Mr. Tankel w adjunct associate professor at the Scho of Architecture, Columbia Universi trustee and member of the Executi Board, Open Space Action Committ and vice chairman of the Landmarks Pre ervation Commission, City of New Yo Under his direction, the Regional Pl Association has been preparing a ne master plan for the New York region.

Donald Dale Woodman

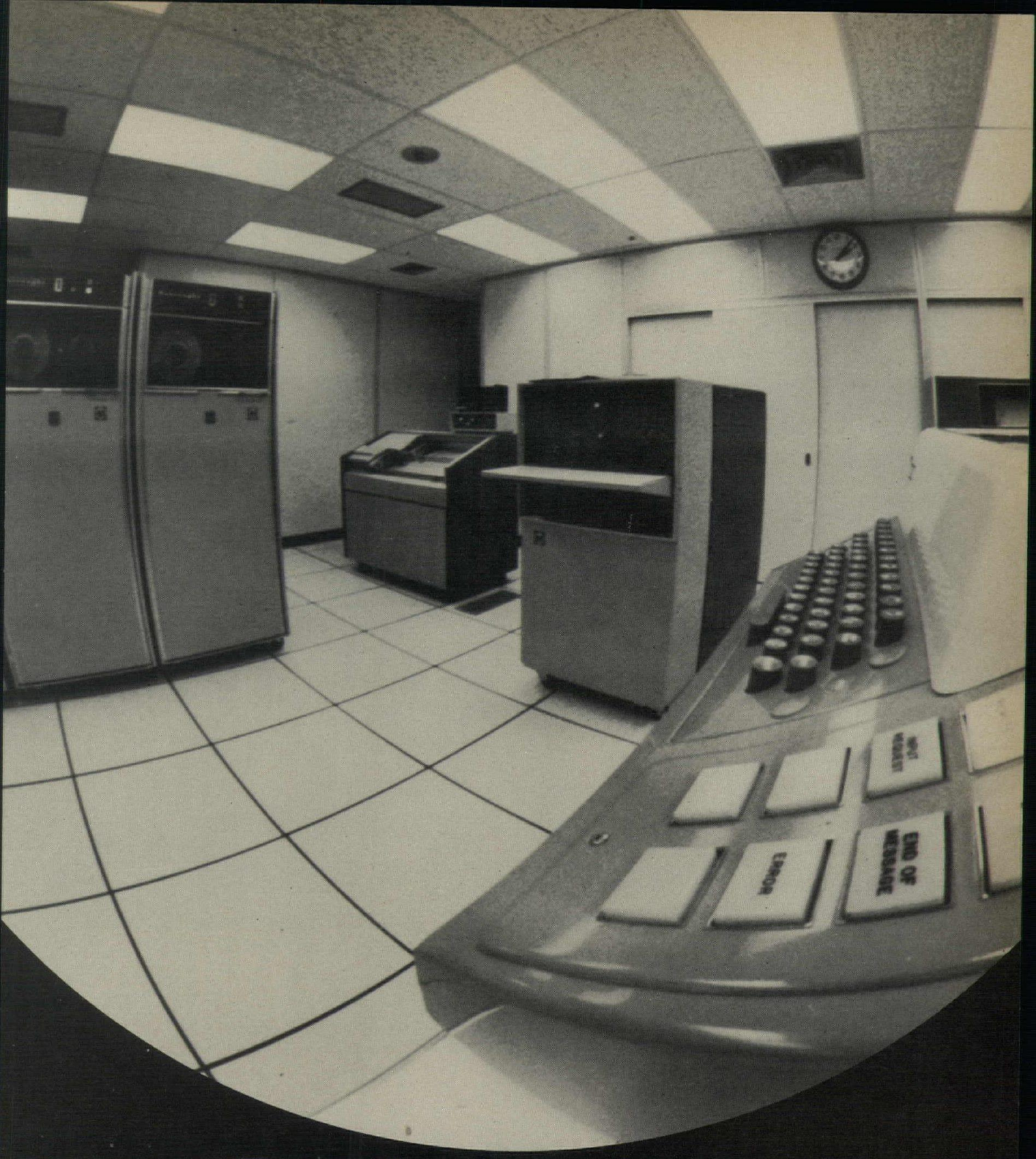


Donald Dale Woodm





H. H. Richardson lives again: When the competition-winning building for the Cincinnati Chamber of Commerce designed by H. H. Richardson was gutted by fire on January 10, 1911, the pink granite facade was dismantled and removed to a site seven miles outside of the city. In 1927 the stones were moved to another site to be used on the facade of an observatory which was never completed. And now, 40 years later, a design competition has been initiated by an interested group of architectural students and faculty from the University of Cincinnati. The purpose of the competition, called Operation Resurrection, is to use some of the stonework as design elements in a park-like setting in Burnet woods, on a small rise directly north of the College of Design, Architecture and Art. The design competition, which will close May 3, will have a first prize of $200, a second prize of $100, and a third prize of $50. The competition is being financed in part by the sale of H. H. Richardson buttons for 25 cents and sweatshirts for $4.50 (as modeled, above center, by members of the faculty of the Department of Architecture). Front row, from left, John M. Peterson, William Widdowson, Richard Wheeler, head of the Department of Architecture, Denis Mann, Donald Stevens, and Robert Williams. At rear: Clay Hickers and Harris N. Firoosz. The sweatshirts (whi have been ordered by a Pittsburgh archite tural firm for their baseball team) a buttons can be obtained by writing to: Ope tion Resurrection, Department of Archite ture, University of Cincinnati, Cincinn Ohio. Other groups which have given th active support and encouragement to t project include the Cincinnati Chapt American Institute of Architecture, Conte porary Arts Center, Miami Purchase Assoc tion, Cincinnati Historical Society, Sm Haines Lundberg Waehler—Architects, a the Besl Transfer Company.



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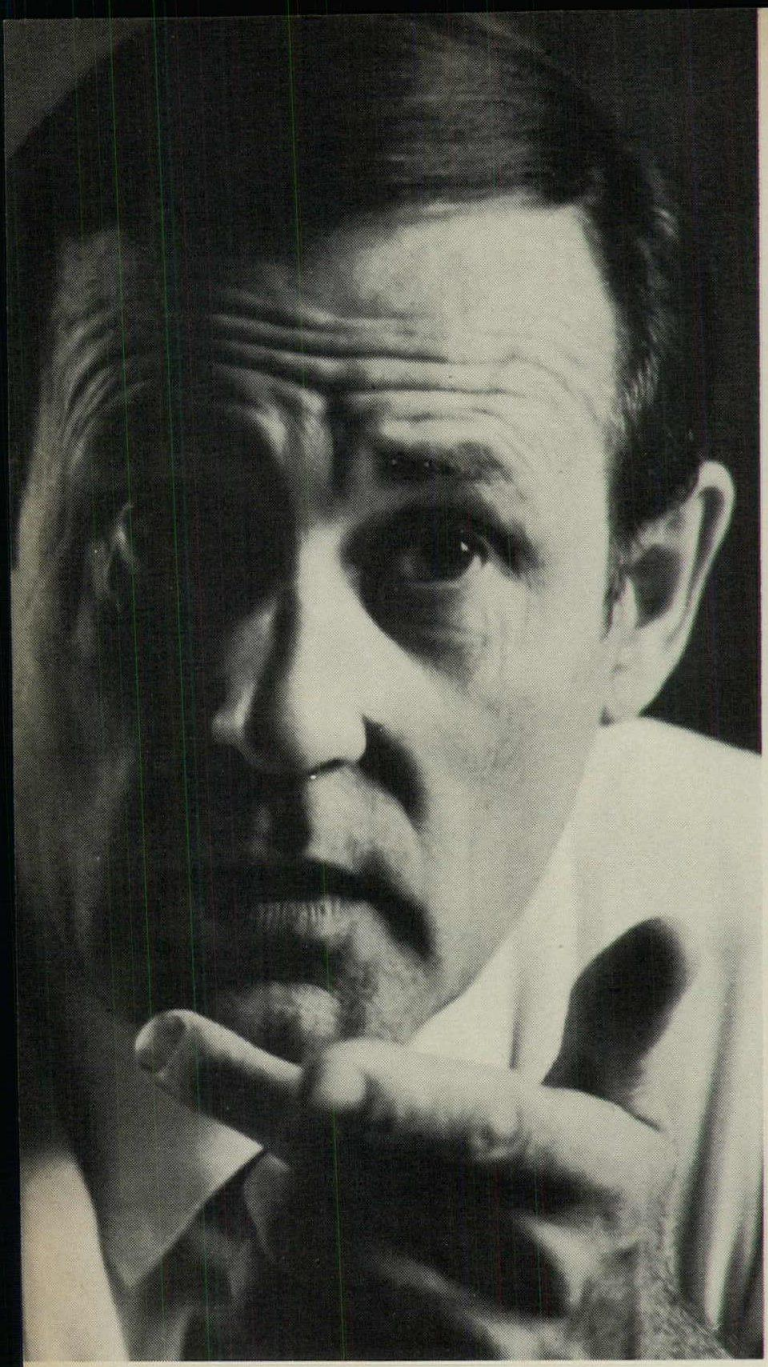
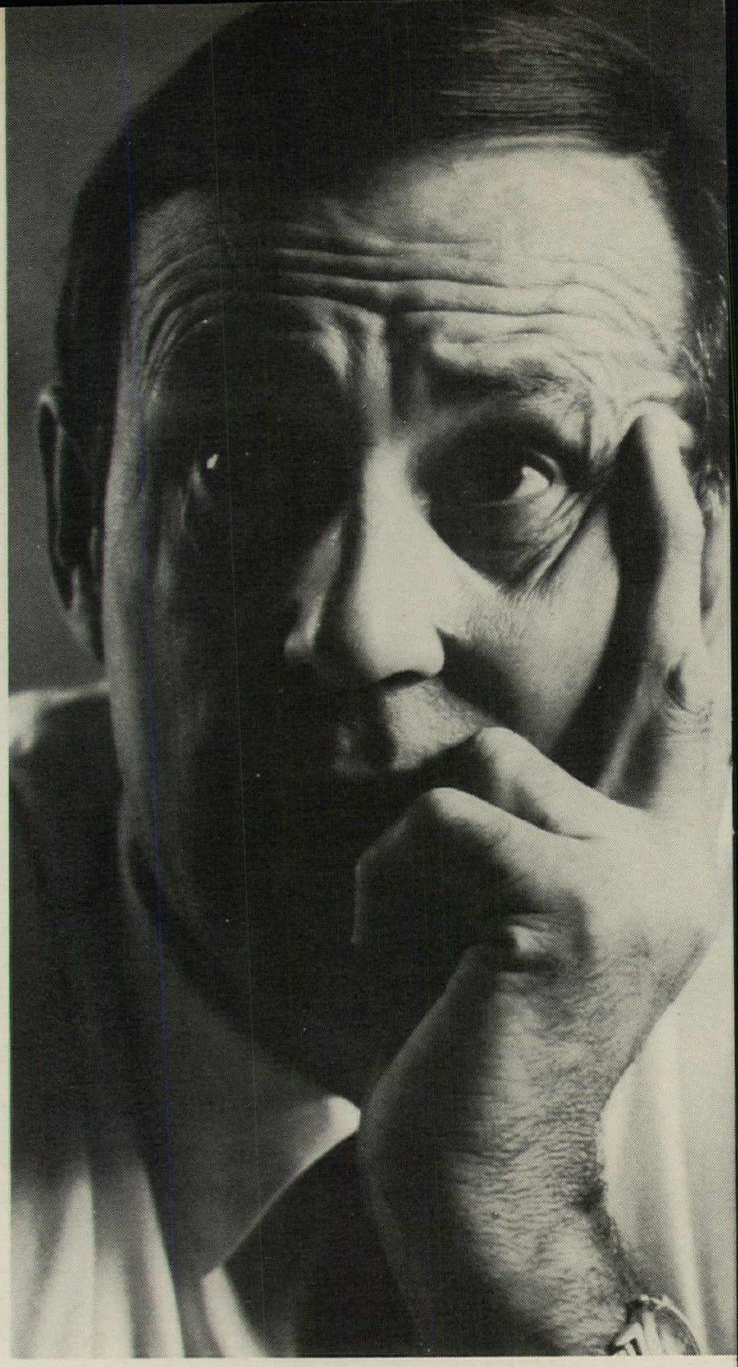


"... insulation, of course, is essential..."



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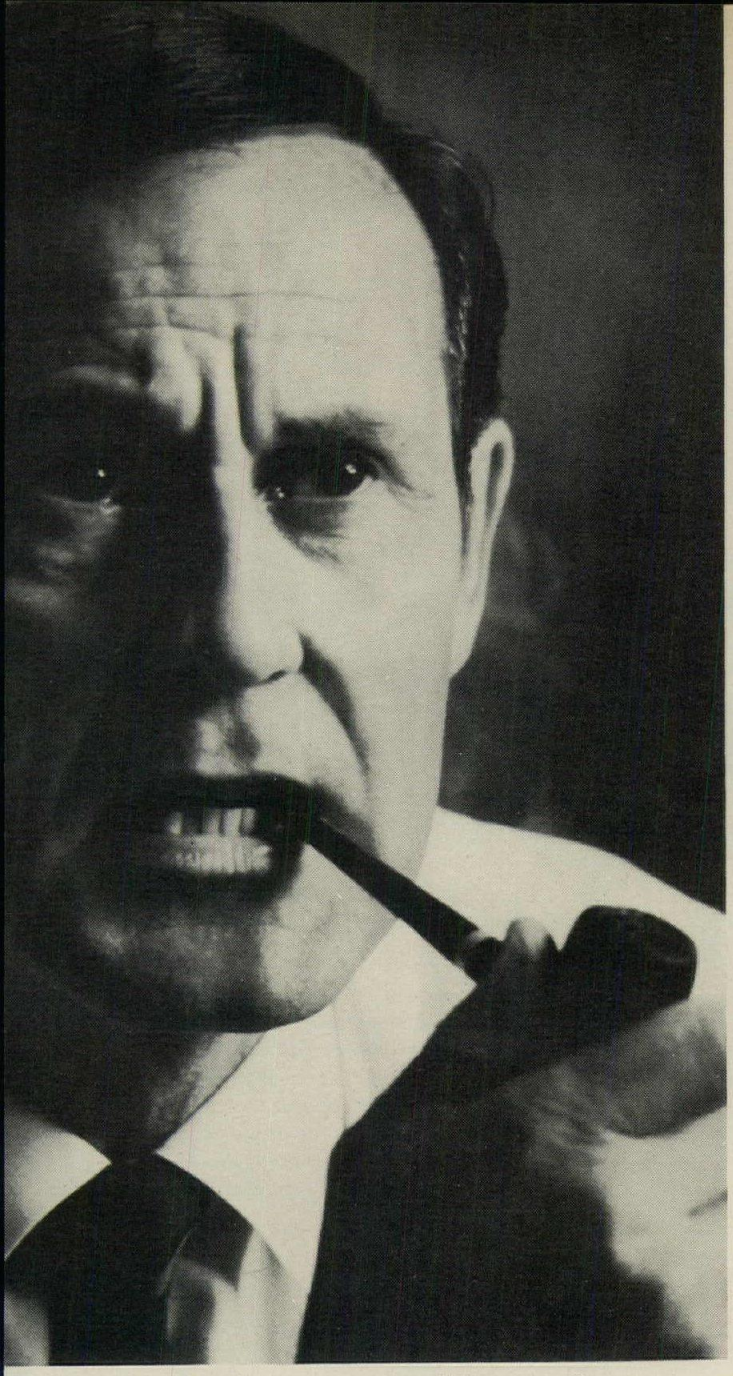

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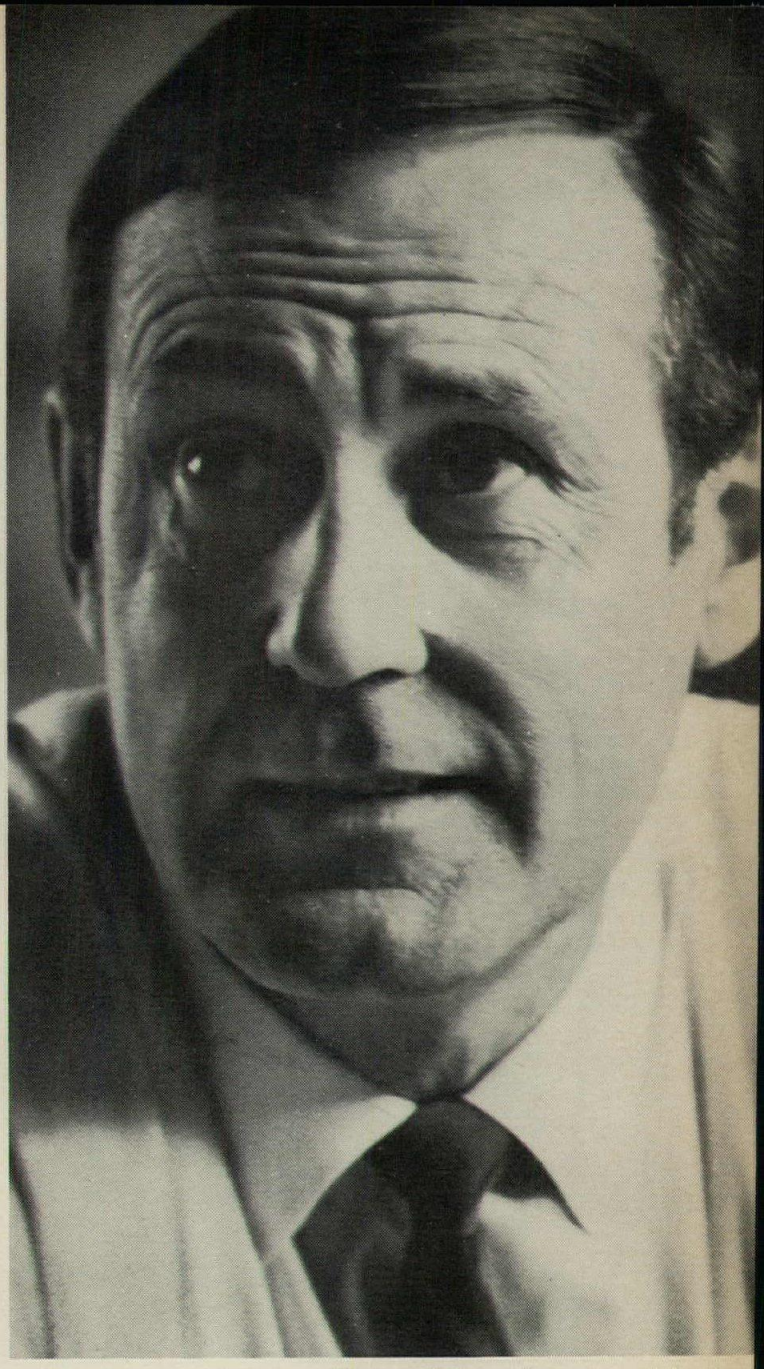

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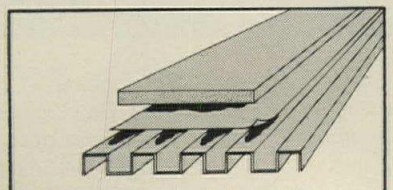

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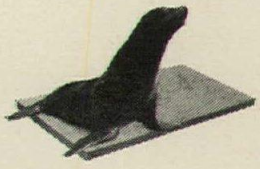

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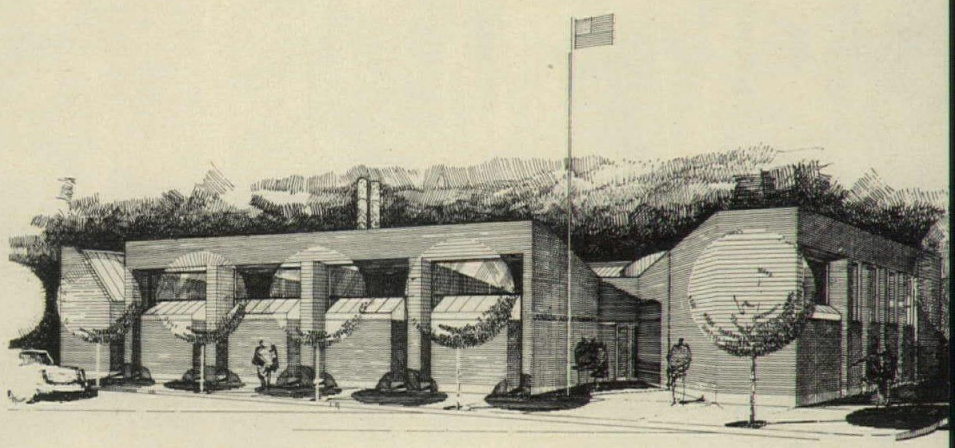
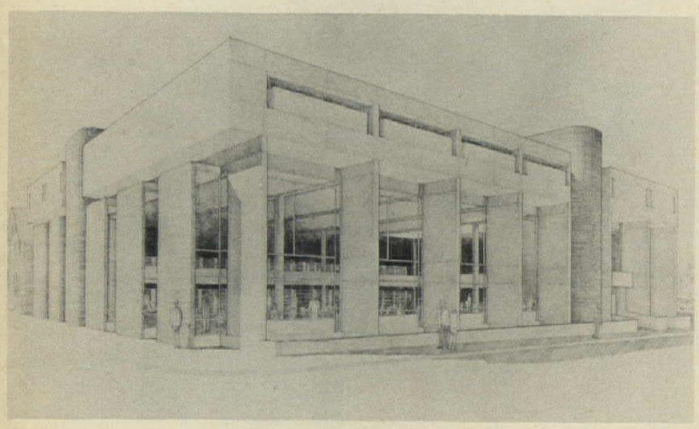
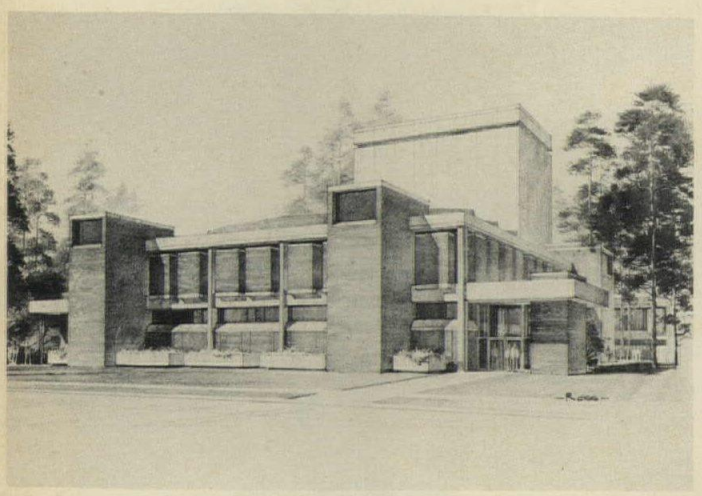


The Junior Achievement Center, Seattle, designed by Naramore, Bain, Brady & Johanson, will be a one-story building containing 9600 square feet and will cost $153,600. The project will provide space for 34 Junior Achievement companies and 640 students, with eight office and shop areas plus service and banking company facilities. Also provided will be staff offices, conference space, paint spray booth, and on-site parking for 10 cars.

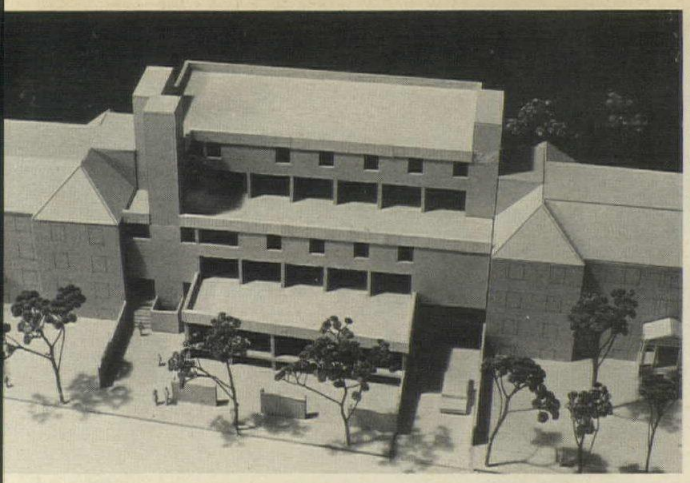


The Central Library for the Public Library of Knoxville and Kn County, Tennessee, designed by Bruce McCarty & Associates, Arch tects, will be located on a busy downtown corner and is intended be inviting to the passer-by and casual shopper. The $1.2-million brary will have a reinforced concrete structure with brick exteri walls. It will contain approximately 67,000 square feet with sta facilities for 350,000 books. Facilities provided will include readi and work rooms, staff offices, an auditorium, children's room, a a special area for the McClung collection of historical books.

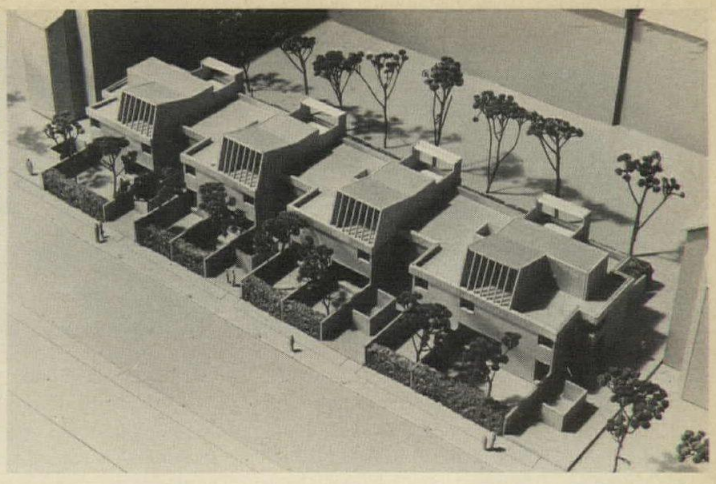


A Fine Arts Building at the University of Southern Mississippi at Hattiesburg, designed by Benham and Dawson, an affiliate of Benham—Blair and Affiliates, architects-engineers, will be a $1.5-million concrete and masonry structure with stairwells on either side prominently expressed on the facade. The building will house a 780-seat auditorium, rehearsal and individual practice rooms, classrooms, faculty teaching studios and offices and workshop and storage areas.

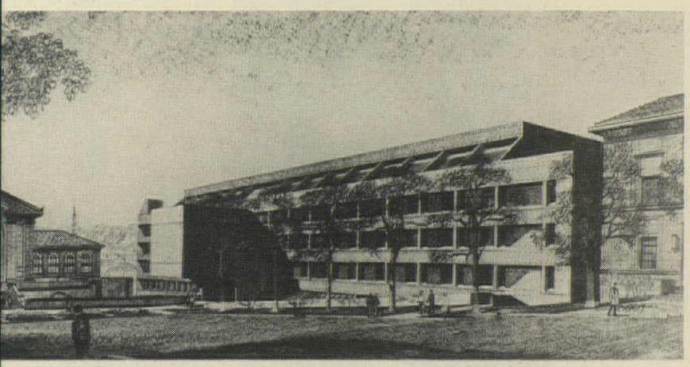
A church and community center for the New York Society of th Methodist Church, to be located in the Taft Housing Developmen New York City, will be a one-story, 10-room, multi-use structure. will contain a large meeting room/sanctuary for 200 people, smalle meeting rooms for groups of 30, and offices. The $338,000 projec will be constructed of a new giant brick with fenestration limited t clerestory and atrium to prevent vandalism. Architect is Edgar Tafe



Joshua F. Lombard photos

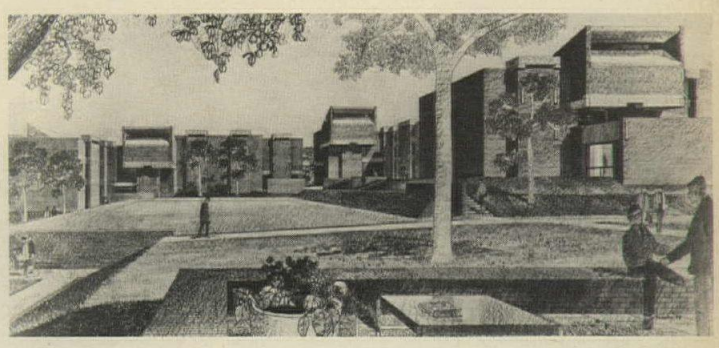


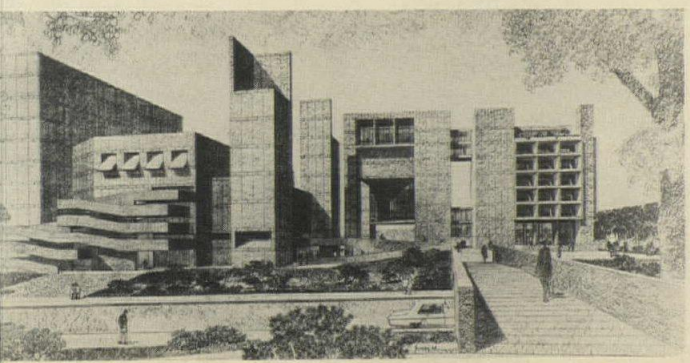
vo additions to the Radcliffe College resi-ntial quadrangle, Cambridge, Massachu-tts, designed by Integrated Design Services oup, Architects Associated Engineers, in-ude the South House Central Unit, above t, and faculty housing, above right. A third w unit in the quadrangle was designed by Max Abramovitz. I.D.S.G. was retained by the college to help convert the quadrangle from dormitories to a house system, as well as to design the new additions. The South House Central Unit will contain a dining room and kitchen, a master's apartment, tutor's offices and apartment residences for 12 girls and two visiting professors. The faculty housing will provide two four-bedroom, three three-bedroom, and two two-bedroom row houses, all with studies and/or studios. Studios on roofs of new and existing buildings as well as parking under the main green are projected.



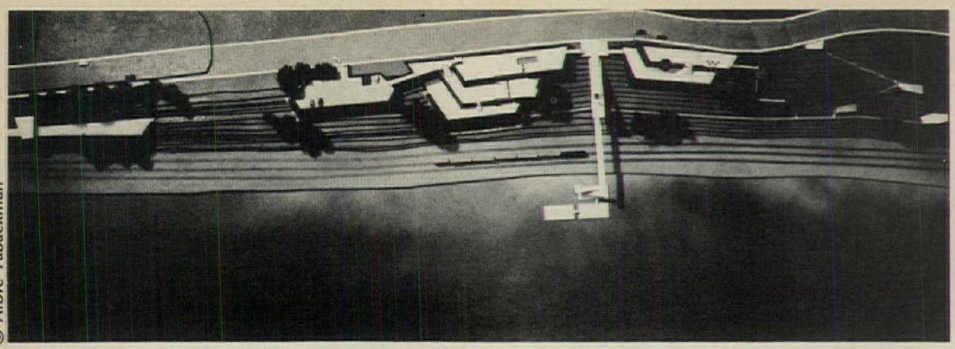
A research-computer Center at Carnegie–Mellon University, Pittsburgh, designed by architects Deeter, Ritchey, Sippel, is an eight-story building for a site on the side of a deep ravine, and will be entered at the fifth-floor level below a cantilevered, 150-seat auditorium prominently expressed on the facade. It will complete an existing quadrangle, and is intended to relate to existing structures by height, massing and scale of the facade. Below grade will be a two-story research library with balcony, which will be skylighted from plaza level. The building will have faculty offices on the perimeter and laboratories and offices for various departments on the interior. Major building materials will be buff-colored concrete with random-width board finish and smooth-finish precast concrete panels. The $13-million project will contain 305,000 square feet.

complex of four fraternity houses at Carnegie–Mellon University, esigned by architects Curry and Martin, will be organized around a adrangle-recreation space. The four three-story units will each ouse 36 students and provide dining space for 60 students. Three the units will have study areas separated from two dormitory areas ch housing 18 disposed in "L-shaped" plans, while the fourth unit ill have nine combined study-sleep units. The houses will have wall-earing masonry structures with precast concrete floors, which in is application limits the width to 24 feet (the precast span), and rying in depth from 28 to 12 feet. Budget for the four units is $1.3 illion. Master planners for the entire Carnegie–Mellon campus e Sasaki, Dawson, DeMay Associates, Inc.





A Fine Arts Complex, also at Carnegie–Mellon University, designed by Paul Schweikher, Architect, will house the departments of drama, architecture and design. The building will contain two 500-seat theaters, with a proscenium theater stacked above a thrust-stage theater, as well as a smaller experimental theater seating 200. The theaters will share an entrance lobby, workshops, dressing rooms and instructional facilities. Elsewhere in the complex will be the facilities for architecture and design, including studios, workshop laboratory, drafting rooms, classrooms, and offices. Other facilities include a library, 250-seat auditorium, and student-faculty lounge. In general, the structure of the $9-million project will be poured-in-place reinforced concrete, with punctuations of color and texture inside and out in other materials such as stone, metal and fabrics.



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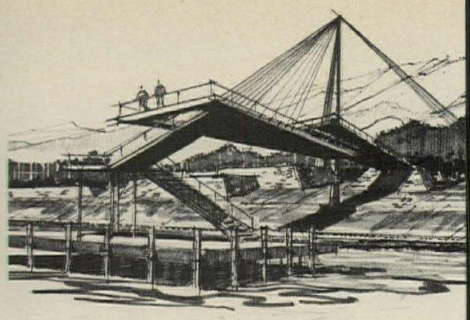
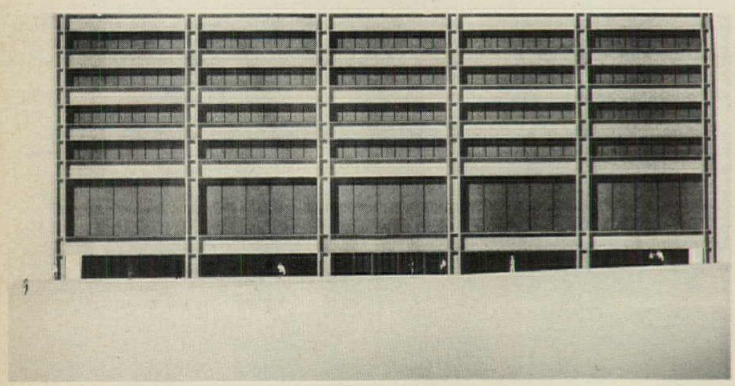
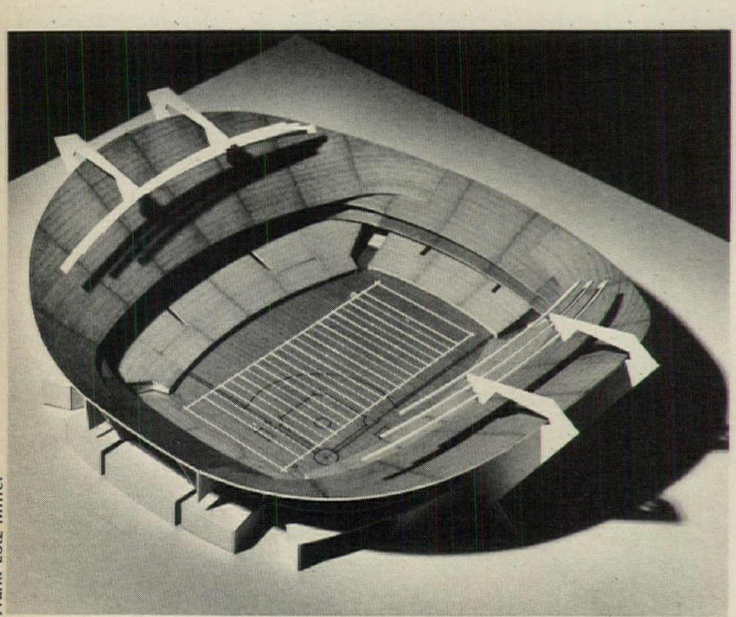


A half-mile long park on a 7.5-acre site 80 feet above the Hudson River, Yonkers, New York, will consist of three elements connected by walkways, and a dramatic two-level, 250-foot-long cantilever bridge with stairways leading down to the river itself. The site, over railroad tracks, had been used by the city as a dump for a landfill project. The Hudson River Valley Commission, a New York State agency charged with upgrading the area, disapproved the landfill project and made seven recommendations for better ways to utilize the area, one of these recommendations being a park. The main element of the design will be a cent area including a three-level sitting ar walkways, and a multi-level playgrou Flanking areas will contain a 40-car parki lot, quiet sitting areas and lookouts. The pr ect will cost upwards of $1.5 million. Jose Roth and Associates are the architects.



A 54-story office building for United States Steel Corporation in downtown Manhattan, designed by Skidmore, Owings & Merrill, architects, will rise from a two-and-one-half acre site, a full acre of which will be made into a public park. The building's frame is a modified exterior frame wall, using six-foot-high spandrel girders to connect the exterior columns with vertical trusses for support in the mechanical core. Gray tinted windows will be recessed from the cool gray of the exterior supporting members (see rendering above). It will contain more than 1,750,000 square feet of usable space. The building is the outgrowth of an extensive research project commissioned by U.S. Steel and carried out under the direction of SOM by a team of architects, engineers, the builders, and the developer.

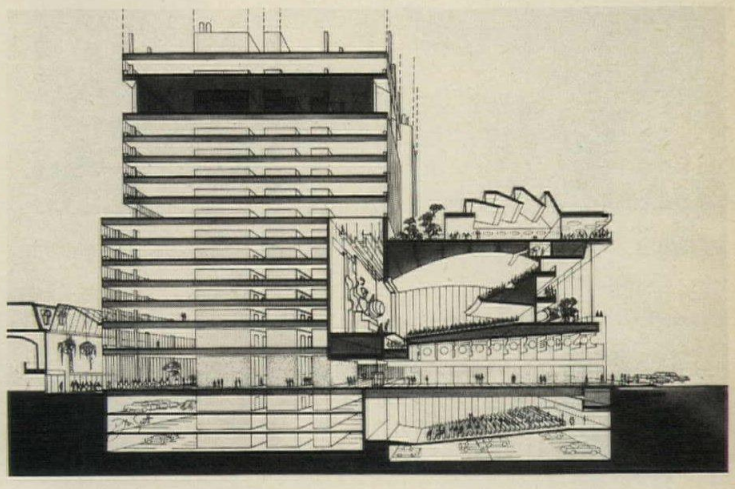


Frank Lotz Miller

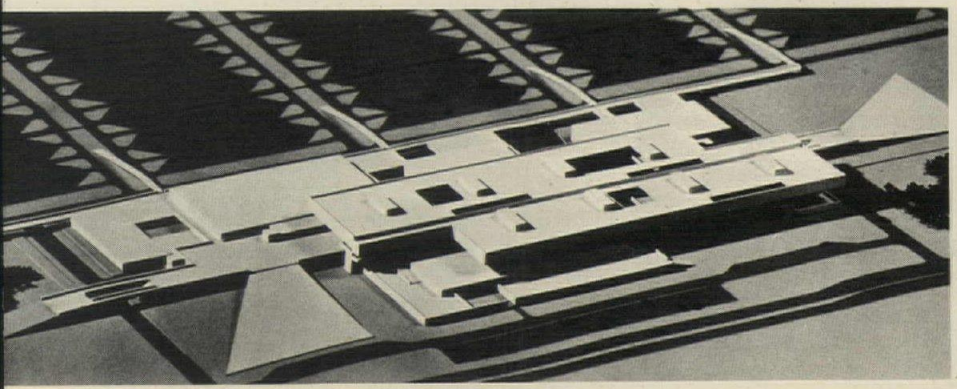
A domed multi-use stadium for New Orleans (with top of mod removed) will place the baseball home plate in the "coffin corne of the football field, so that the first base line will correspond wi the football side line, and the third base line will be close to th football goal line. Maneuverable seats will bring baseball fans clo to the action. The 70,000-seat stadium (80,000 with temporary seat will cost $46.6 million, not including a proposed three-level, 700 car garage. The project is a joint venture of architects and enginee Curtis and Davis and Sverdrup & Parcel in association with Nola Norman and Nolan, and Edward B. Silverstein and Associates.

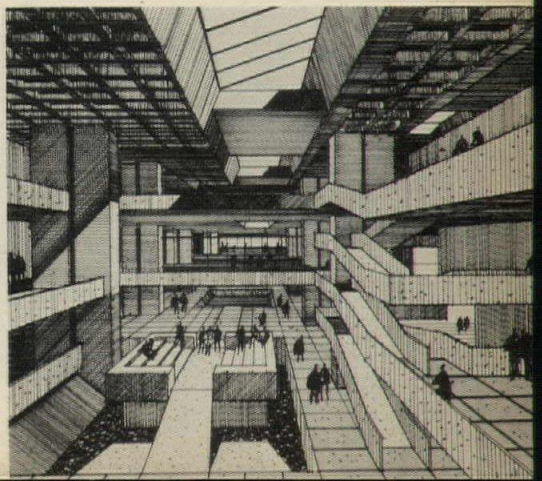
$30-million police headquarters complex, New York City, designed Gruzen & Partners, architects, will consist of a 15-story building h its three-story lobby giving access to several one- to five-story uctures. The complex, which will contain 750,000 square feet, will lude a 1200-seat auditorium, a 400-seat cafeteria, a press room ting 175, an underground parking garage for 478 cars, and a ond garage for 200 cars. It will have a reinforced concrete struc- al system and the main building material will be a medium- wn speckled brick with deeply recessed bronze-tone windows. e complex will relate to other municipal buildings by a three-acre dscaped pedestrian plaza which will bridge a street.

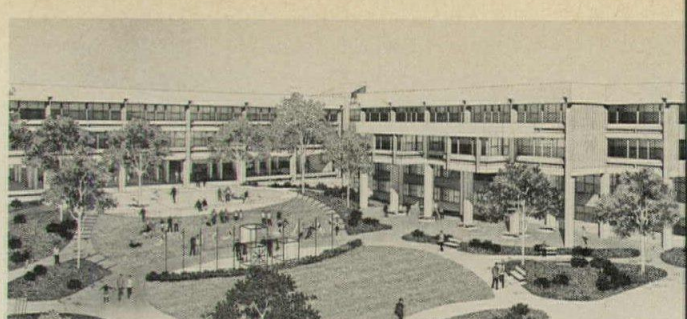
A 53-story office building for the Astor Hotel site on Times Square, in the theater district of New York City, will include two theaters in its 10-story base element—an 1800-seat legitimate theater and a 1500-seat motion picture theater. The inclusion of theaters in new office buildings in the district came about through the efforts of the Urban Design Team, a group of young architects and designers within the City Planning Commission, who recommended that a zoning amendment be enacted allowing developers to build larger structures if they included theaters. The zoning amendment now has been passed, and the City's Board of Estimate has given approval opening the way for start of construction. Architects for the project, which will contain 1.4 million square feet, are Kahn & Jacobs.



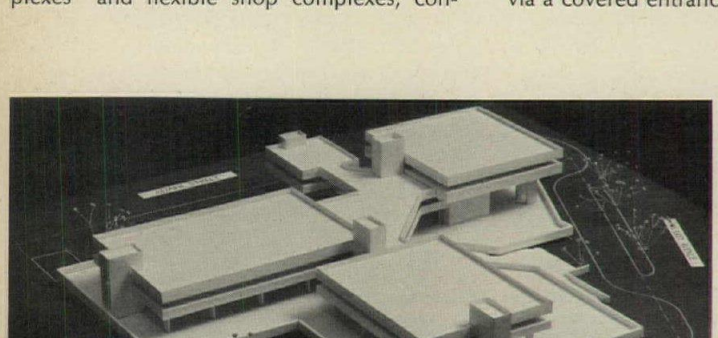
new campus for Thornton Junior College South Holland, Illinois, will be a suburban, tomobile-oriented campus consisting of a ies of modular three-level structures con- cted by ramps and bridges, with a student eet forming the spine of the project. Ar- itects for the $21-million campus are Frid- stein Fitch & Partners. On the lower level of the structure will be the music department, theaters, two-story student center, lecture halls, two-story library, dining, two-story vocational and technical departments, health and physical education. The intermediate level will house speech and drama, administration and classrooms. The upper level will contain classrooms, laboratories, art studios, multi-purpose areas and audio-visual facilities. The campus is designed for 5000 day students and 10,000 night students. A depressed parking lot for 4,000 cars, will occupy one-fourth of the site.







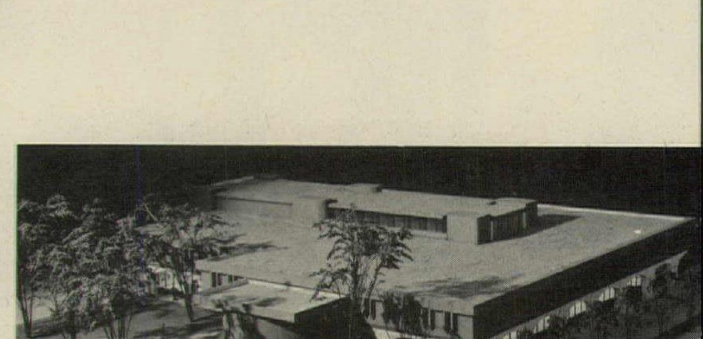
South Richmond High School, designed by Daniel Schwartzman Architect & Associates, is one of the newly programed comprehensive high schools for the City of New York. The program calls for close integration of the vocational facilities with the academic high school's elements. Enrollment is to be 4,000 students. There are provisions for flexible study complexes, including a resource center for each; team-teaching in "large group complexes" and flexible shop complexes, convertible in whole or part to study spaces. Both auditorium and library are to be made available for community use and public utilization of the athletic facilities is programed. "Within the confines of the established Board of Education standards," says Mr. Schwartzman, "the design creates a feeling of physical openness and also integrates the structure with its 20-acre site and the proposed residential environment." The main entrance is via a covered entrance terrace under the east classroom wing, leading into the landscap central court with its banked amphitheat adaptable for outdoor performing arts and c cussion meetings, descending to ground le on the west. On the north and south sides the court, cantilevered forms of lecture roo and library introduce sculptural variety a provide protected play area for the remed classrooms located at the ground level. Str ture is reinforced concrete with sandblast spandrels and exterior columns.



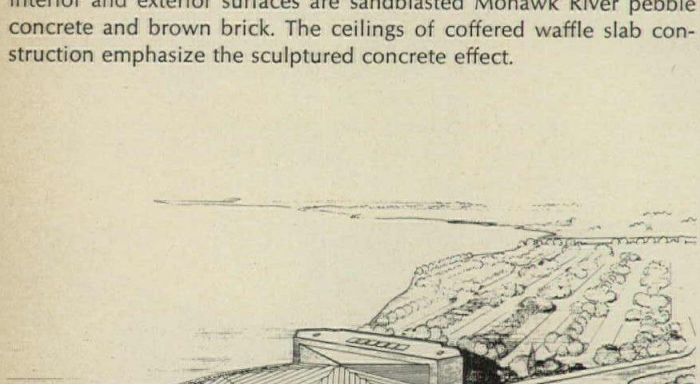
Camera Hawaii

A bank/office complex for Victoria Ward, Limited, in Honolulu, h been designed by Au, Cutting, Fairweather & Smith, Architects ar Planning Consultants. The $1.3-million project will contain 40,0 square feet of rental office space in three separate two and thr story structures, including a branch bank and TV drive-in teller f cility. The reinforced prestressed concrete structure provides parki for 160 cars on a partially excavated lower level. A landscaped pla will serve as an entry court, and a bridge covering a portion of t plaza level ties the three buildings into a complex. The complex w have an exterior of natural concrete aggregate finish.

Schenectady County (N.Y.) Public Library, designed by Feibes & Schmitt, Architects and now under construction, is organized around a three-story light well which spatially interlocks the ground floor public areas and staff work areas above. Located on urban renewal land and adjacent to McKim, Mead and White's Post Office and neo-colonial City Hall of the 1920's, the library will be important as a cultural and exhibition center. Open stacks for 100,000 volumes will house part of the 300,000 volume collection. Lively patterns of sun and shadow are achieved by using corbelled brick and sculptured concrete. Both interior and exterior surfaces are sandblasted Mohawk River pebble concrete and brown brick. The ceilings of coffered waffle slab construction emphasize the sculptured concrete effect.

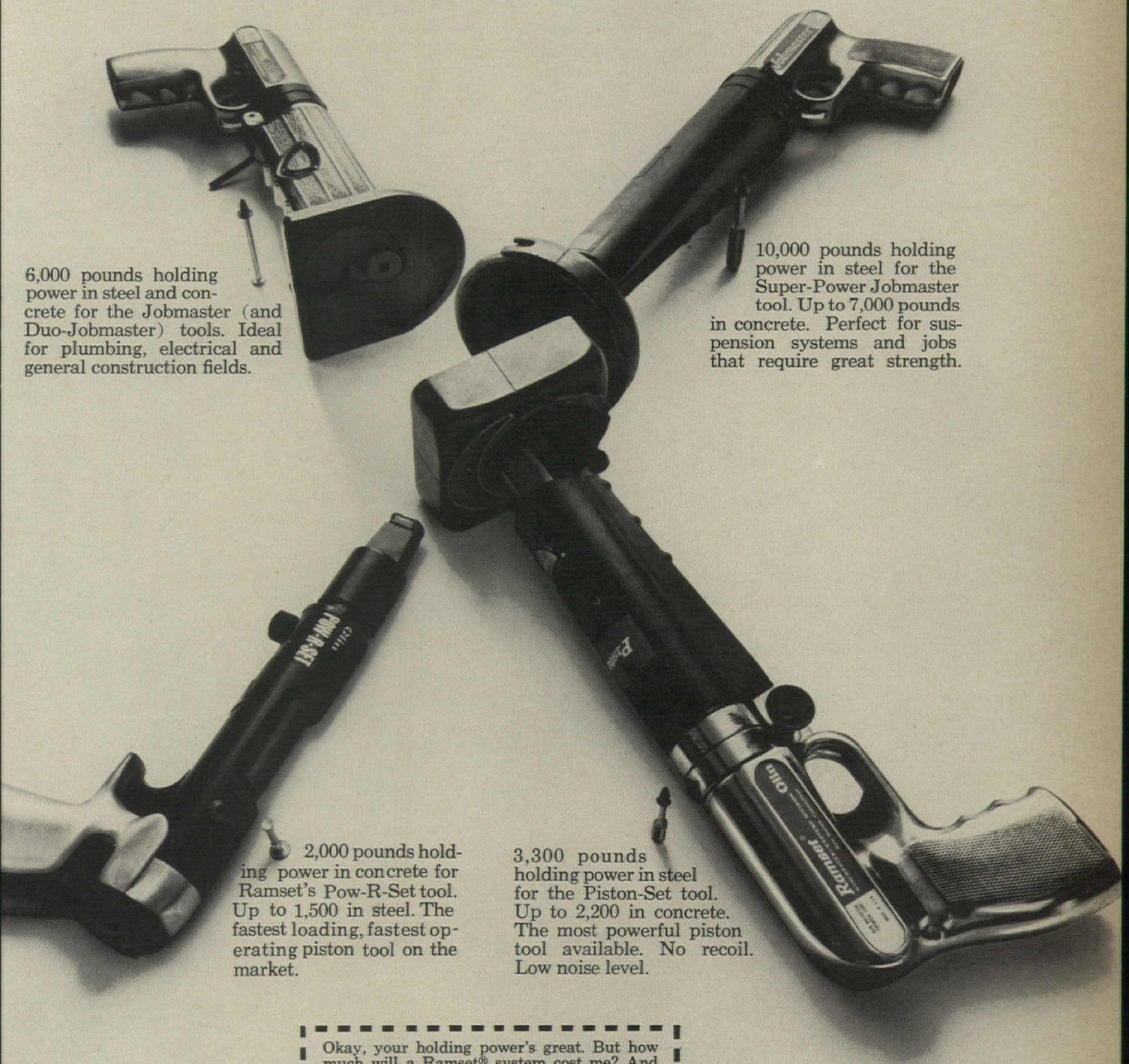


Gene Tobl



Theater-auditorium for the city of Sarasota, Florida, is designed b William Wesley Peters, Architect, member of Taliesin Associate Architects of the Frank Lloyd Wright Foundation. Of 1,794-seat max mum capacity, the theater-auditorium will be adaptable for use as concert hall, recital hall, drama theater, and opera house as well as musical comedy theater. A separating acoustic curtain can be lowere to reduce the hall to half-size for more intimate uses. It will be po sible to vary the acoustic characteristics for a given performanc through the use of transparent mesh surfaces on walls and ceilin with provision for variable degrees of sound absorption. Acoustic consultant is Vern O. Knudsen. Theater consultant is George Izenour Associates. The plan is based on a parallelogram modul The building is designed as part of a master plan developed by th architects. Structural engineers are Fraioli-Blum-Yesselman. Mechan cal and electrical engineers are E. R. Ronald & Associates.

The Powers that Be.



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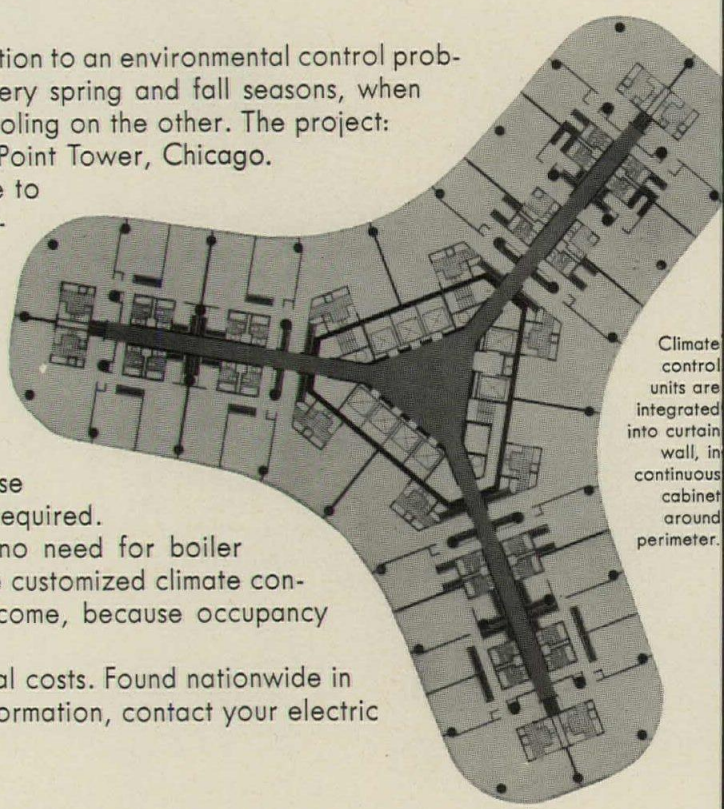
By going All-Electric, the designers were able to isolate each apartment as an environmental entity, each with its own year-round climate control system. Tenants could thereby control their own room temperatures with precision. Repeat: with precision. Possible only with All-Electric design.



Climate control units are integrated into curtain wall, in continuous cabinet around perimeter.

Other advantages to going All-Electric: Space savings, because no central boiler room was needed. Lower construction costs, because neither smokestacks nor long pipe runs were required. Lower maintenance costs, because there was no need for boiler room attendants. Higher owner income, because customized climate control helped justify higher rents. Early owner income, because occupancy could begin before completion of construction.

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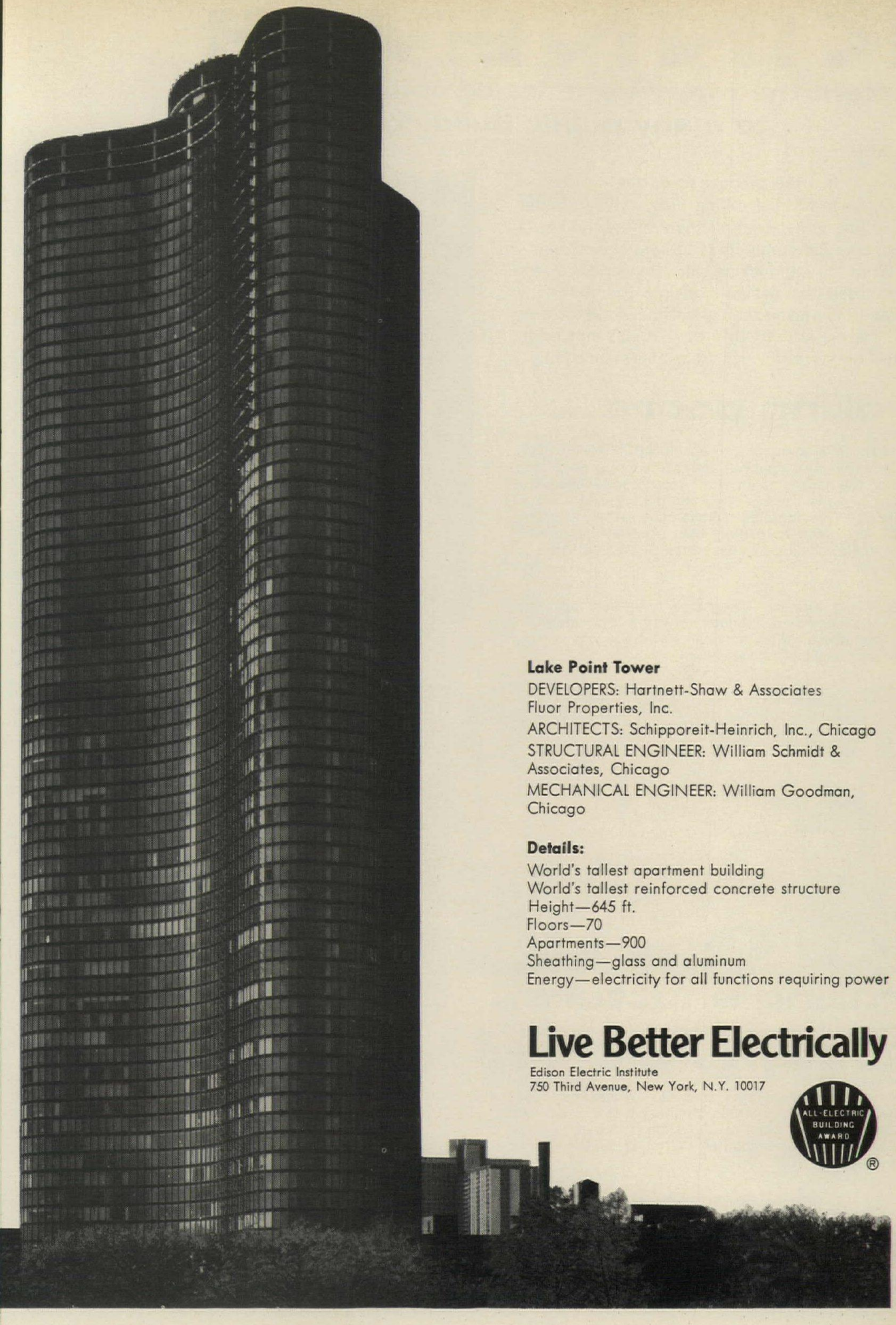

Lake Point Tower

DEVELOPERS: Hartnett-Shaw & Associates
Fluor Properties, Inc.
ARCHITECTS: Schipporeit-Heinrich, Inc., Chicago
STRUCTURAL ENGINEER: William Schmidt & Associates, Chicago
MECHANICAL ENGINEER: William Goodman, Chicago

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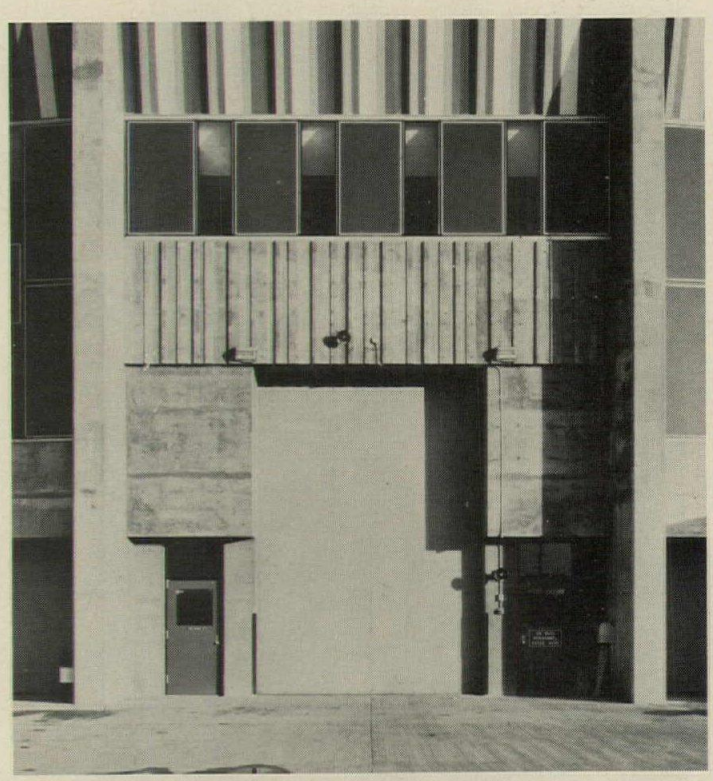
Kinnear has the product to do the job that is required — be it a rolling door, rolling shutter or rolling grille. Each of them offers the space economy and durability of upward coiling operation. In the interlocking slat, Kinnear Engineers originated the design principle that has now been time proven throughout the world for over 70 years. And to this day, it has not been excelled for efficiency from any standpoint.



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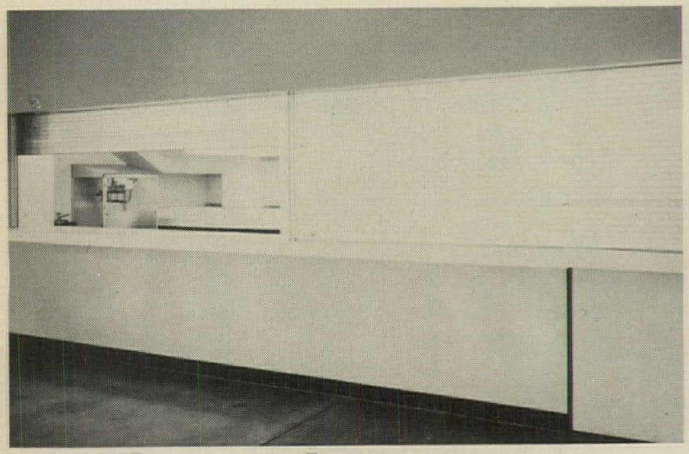

rolling shutters...

Whether it's a pass window, concession counter — or even a wall cabinet — it can be neatly and securely closed and locked with a Kinnear Counter Shutter. Developed especially with architectural appearance in mind, all mechanism is designed for maximum concealment and the curtain is composed of a small artistic steel, stainless steel or aluminum flat slat.
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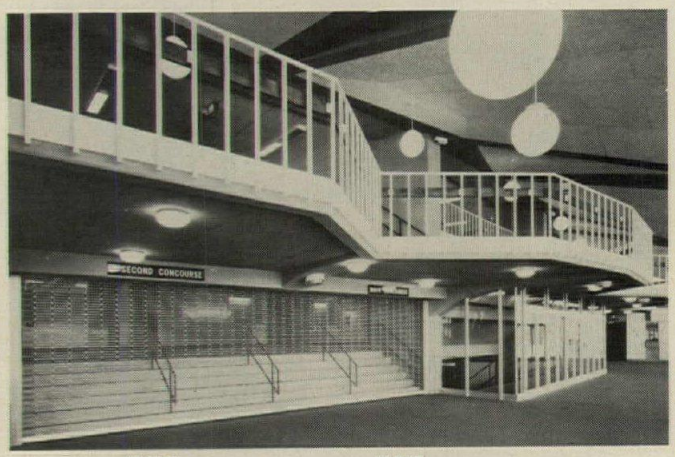

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When it's desirable to barricade an opening or corridor against trespassers, without sacrifice of air, light or vision, the Kinnear Rolling Grille is a perfect answer. The ornamental assembly of steel or aluminum bars and links is attractive in any style architecture; and flexibility and operating efficiency of the grille are similar to Kinnear Doors or Shutters. For the ultimate in convenience they can be equipped with electronically controlled motor operation.

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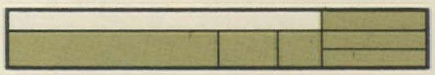

Baked enamel cabinet colors are blue, green, red haze, brown, charcoal, manilla and cool tan.

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COLUMBUS, OHIO 43221

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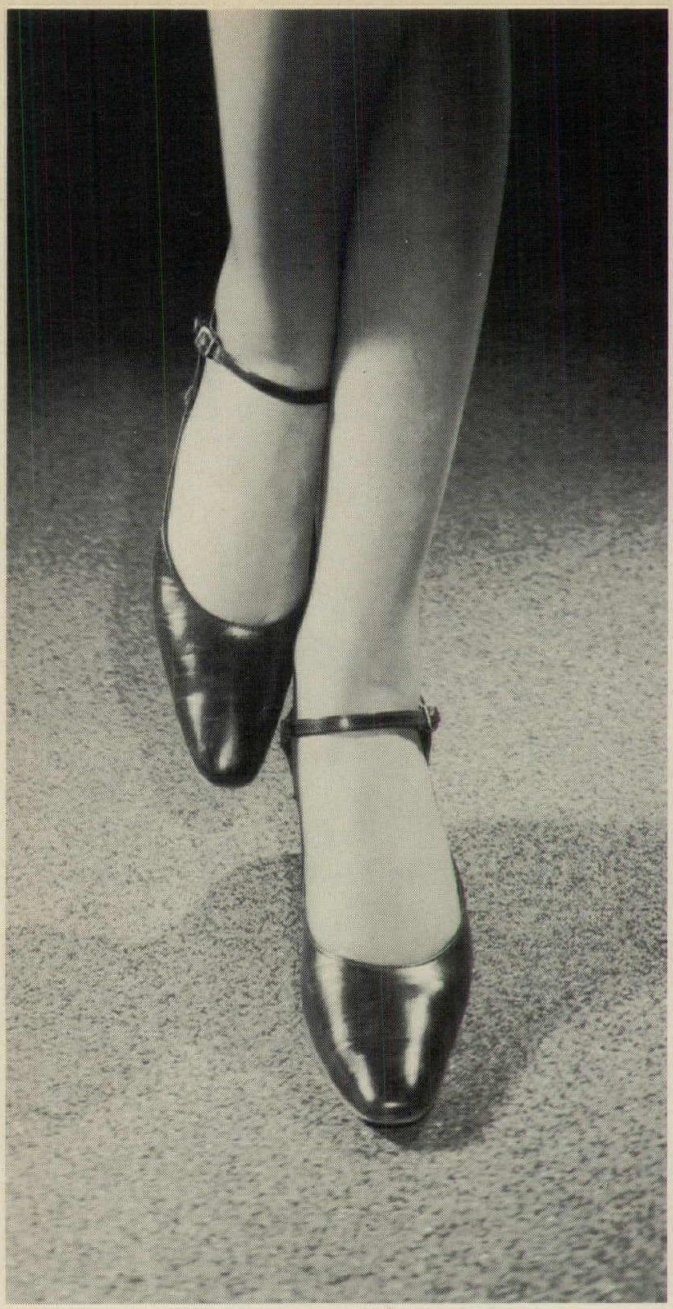

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Tweed-Tex is attractive enough to be used for floors in automobile showrooms, theaters, banks, lobbies, schools, supermarkets, churches and restaurants. Yet it is tough enough to take the rugged use common in many industrial plants.

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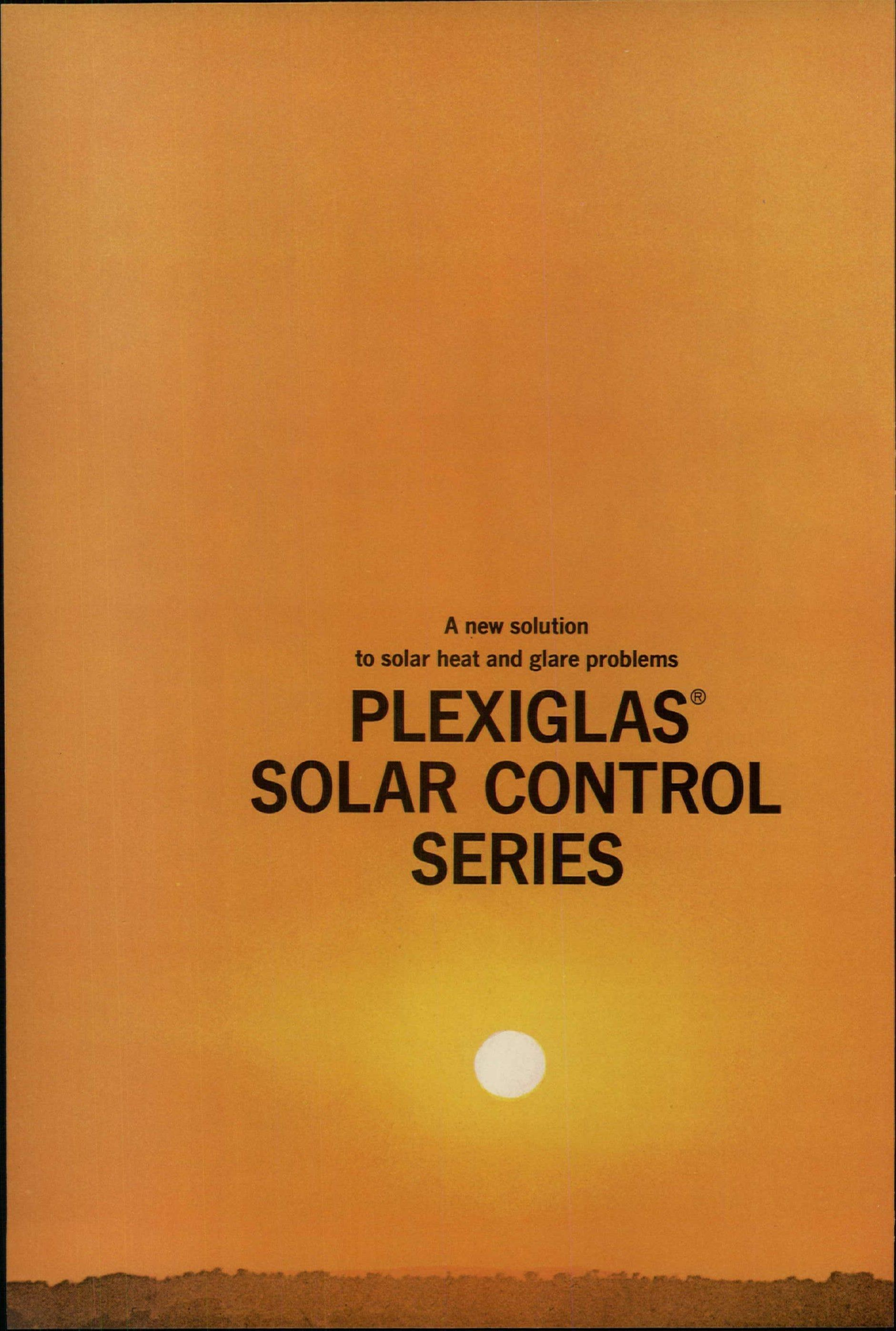
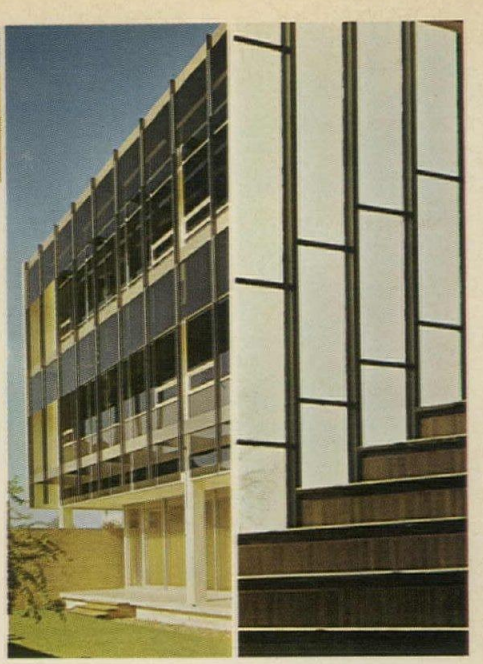
to solar heat and glare problems

PLEXIGLAS® SOLAR CONTROL SERIES



DOME ENCLOSURES
SUN SCREENS
WINDOW GLAZING



TRANSPARENT GREY SERIES

unfiltered sunshine

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Grey 2514

Grey 2094

Grey 2537

Grey 2538

TRANSPARENT BRONZE SERIES

unfiltered sunshine

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Bronze 2539

Bronze 2404

Bronze 2412

Bronze 2370

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2. Solar energy and light transmittance values are approximately constant for all sheet thicknesses in each color density. Sheets of high color density need not be of greater, more costly thickness.

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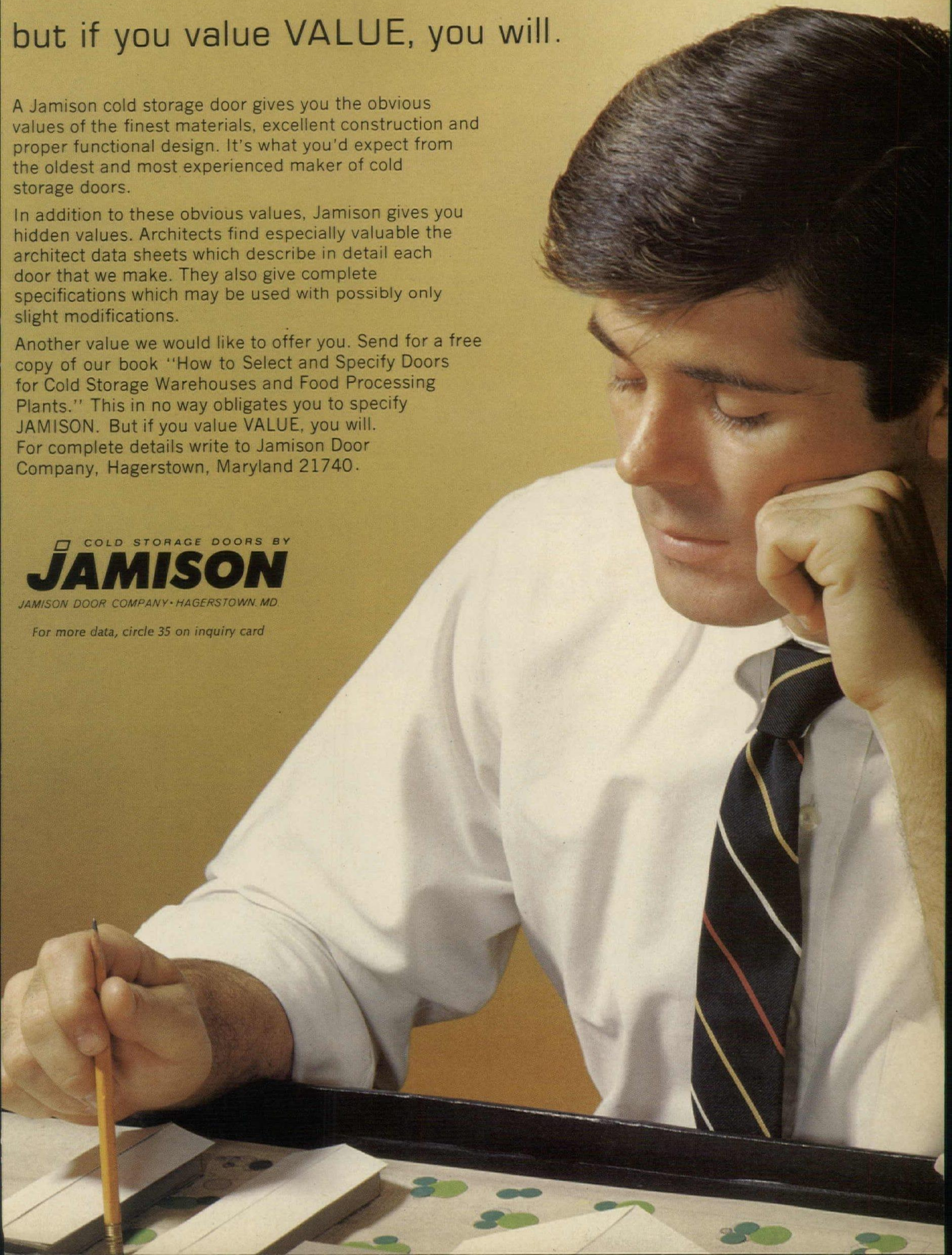

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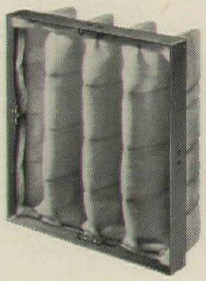

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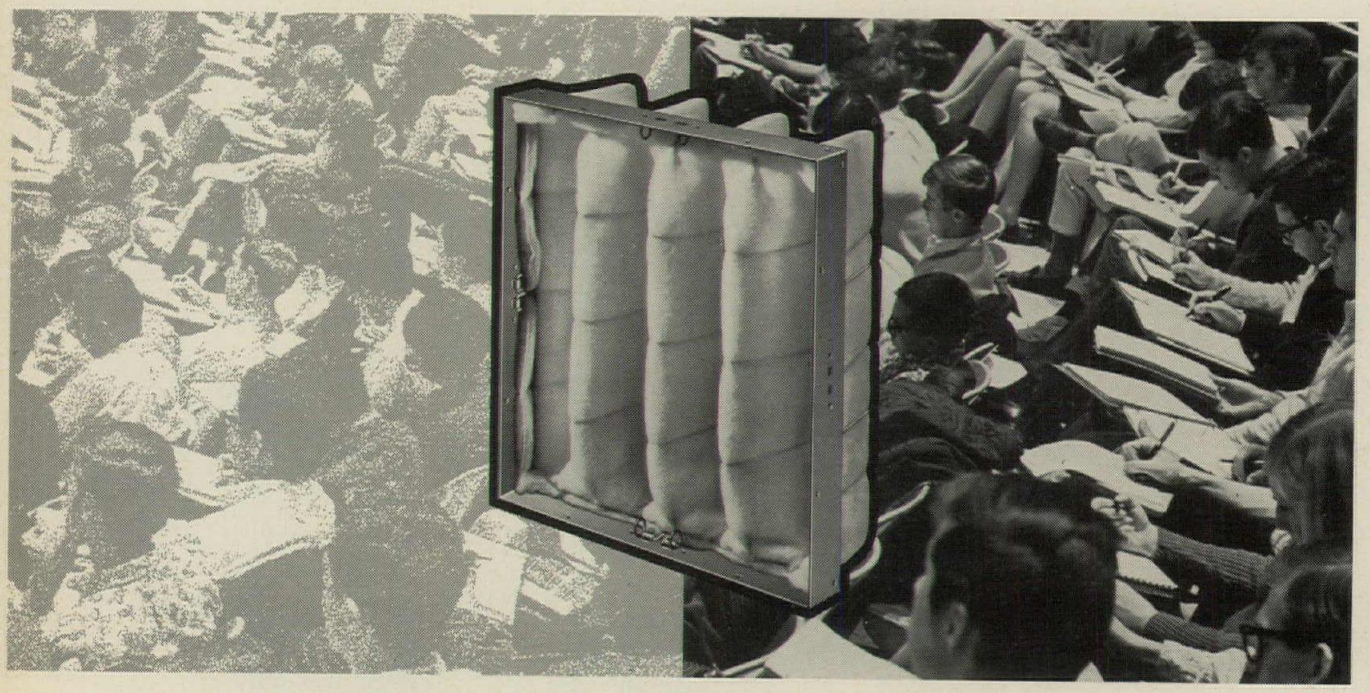
Cambridge Filters 'endow' libraries, lecture halls and labs with clean air



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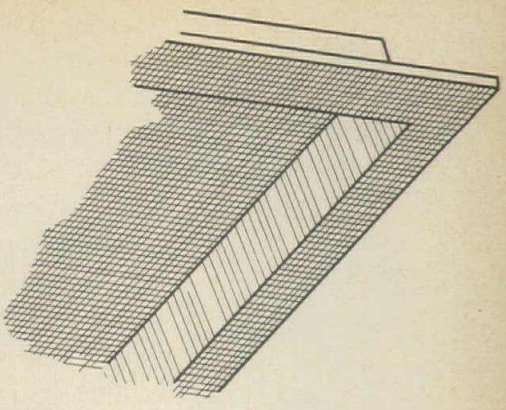
HOLOPHANE INTRODUCES

the shy lens



Holophane's new regressed Controlens® recesses itself discreetly into the ceiling. It creates a soft, luminous transition between lens surface and ceiling line.

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THE REGRESSED LENS...NEW FROM

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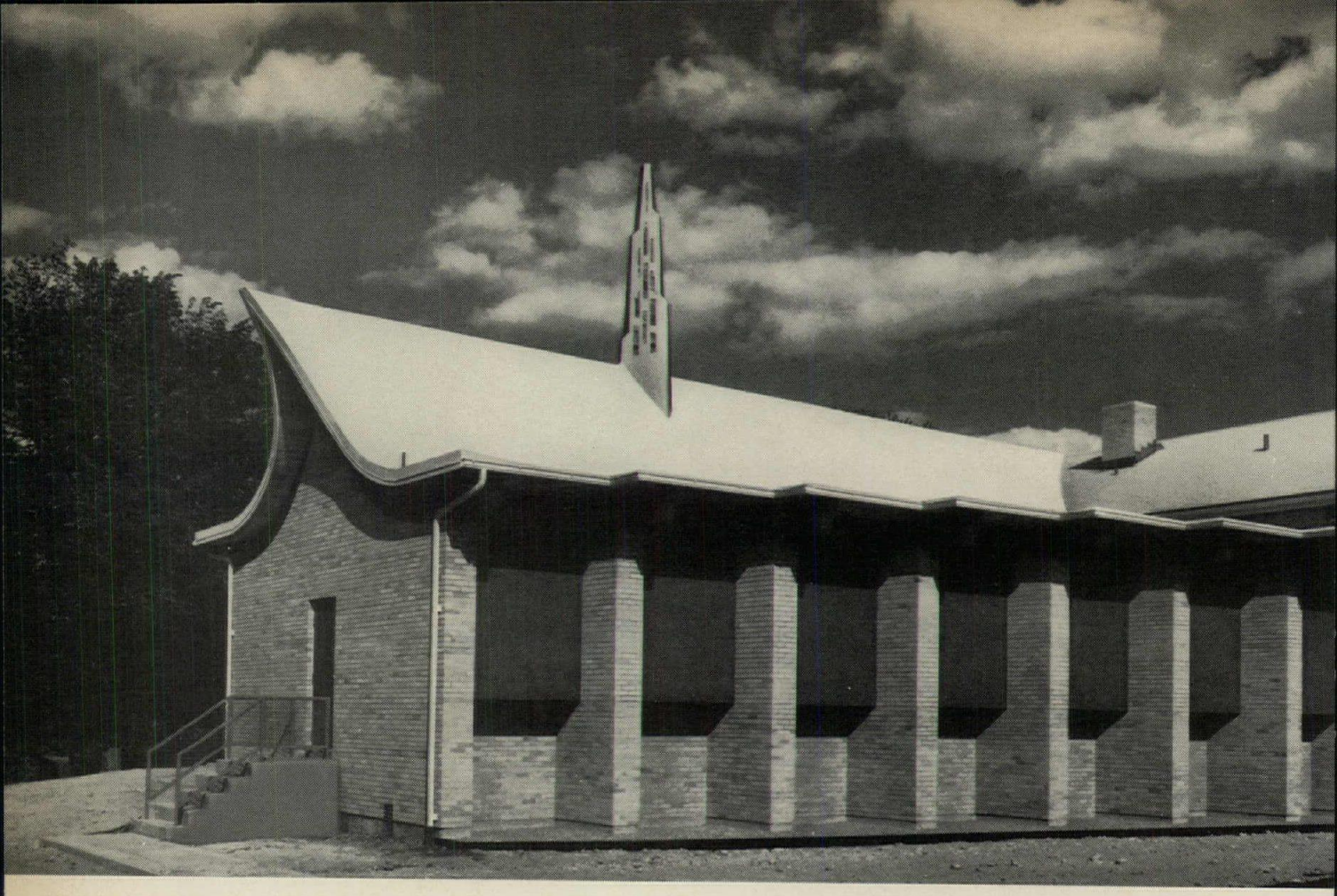

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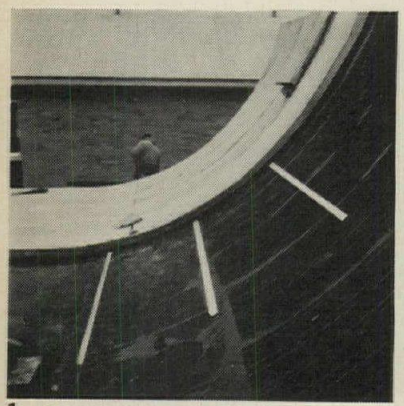

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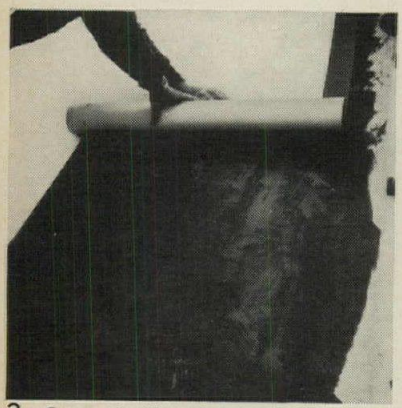

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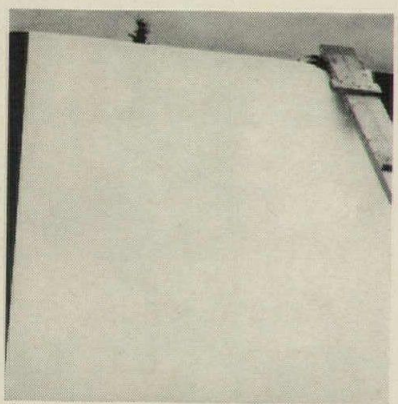

4. Forms a smooth, clean attractive surface.

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Haskell & Connor were the architects and Welliver Construction Co., Inc., both of Elmira, were the General Contractors.

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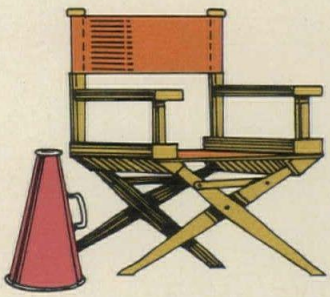

With a cast of not one, but thousands!
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Desco Exposed Aggregate wall coatings provide you with the most talented, exciting raw material available; it is then up to you to style, to shape and to have them cast in your imaginative image. The range of drama-building effects at your disposal is unlimited!

Endless variations of type and size of aggregate. Wide selection of matrix color. Desco Exposed Aggregate coatings have even been seen going around corners. Over arches. On columns. In murals. They respond beautifully to direction. And the aggregate never has a falling out with the matrix.

Desco Exposed Aggregate coatings heroically resist fading, weather and vapor transmission problems. They can be pre-cast at the studio, or applied on location. And all are applied solely by Desco's expert coatings technicians. Write today for further information and the name of your Desco applicator.

Desco Exposed Aggregate coatings are a Desco International Association production.

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These are the

They're the ones who gave Allied Chemical

PROVEN PERFORMANCE COMMANDS: This unretouched photograph of the carpet that covered the floor of a major pavilion at the N. Y. World's Fair shows how Allied Chemical nylon fiber carpeting takes a beating beautifully. If you think you have a special carpeting problem, look again. This is performance proved. 16,000,000 people walked on this carpet.

PRODUCT INNOVATiON COMMANDS: The new tri-dye fiber at Allied Chemical's Research Center is only one of the many new processes developed here that are opening up new styling and performance areas for commercial carpeting. A 1-step color bath to achieve a brilliant 3-color effect! Another example of how Allied Chemical works toward tomorrow's most contemporary applications.

Become a Commander. Specify A.C.E.® nylon on your next commercial carpet contract. Write to Allied Chemical

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Your number for elegance. And only one of many stylish Mortise Locksets. Andorra, expressing the beauty, quality and security built into the complete Corbin line of door closers, exit devices, and many types of locksets.

Your Corbin distributor can furnish you with complete data on this design, or write P. & F. Corbin Division, Emhart Corporation, New Britain, Connecticut 06050. In Canada—Corbin Lock Division, Belleville, Ontario.

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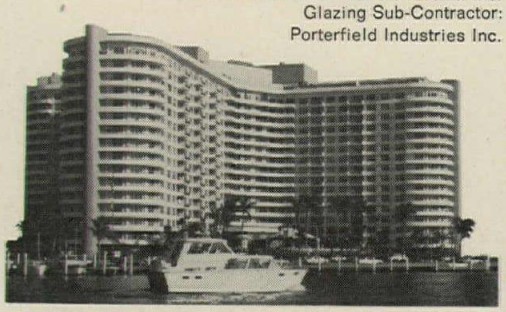

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AR-6

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A Bally Walk-In . . . meets the challenge of mass feeding's growing needs. Today's kitchens demand the most modern equipment and advanced techniques. The emphasis is on fewer kitchen personnel . . . turning out more and better food . . . for a growing number of diners.

At the heart of these modern food preparation centers Bally prefab Walk-Ins, with an entirely new design concept, fill every critical refrigeration need.

Standard modular panels can be used to assemble any size or shape Bally prefab to fit available kitchen space. Four inch thick "foamed-in-place" urethane with remarkable insulating qualities suitable for temperature as low as minus 10°F, makes it possible to convert a cooler to a freezer by a simple change of refrigeration equipment.

It's easy to enlarge a Bally Walk-In for growth requirements by adding additional sections . . . just as easy to disassemble it for relocation. Metal finishes range in choice from galvanized steel and patterned aluminum to high polish stainless steel.

Bally Walk-Ins are the accepted industry standard of high quality. Constructed with unique and advantageous features, they are designed to move forward with today's evolution in mass feeding.

Send to Bally Case and Cooler, Inc., Bally, Pennsylvania 19503 for free 32-page catalog and urethane wall sample.

There's an evolution in the kitchen

Bally®

Address all correspondence to Dept. AR-5

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This is beauty that lasts. Color that stays bright and clean with virtually no maintenance. And strength and durability.

Robertson Vitralume Panels, on the handsome building shown here, combine two of the toughest, most maintenance-free materials used in building: porcelain enamel and aluminum. Permanently fused into one material, these give you a wall surface that rain can't rust, sun can't fade, nor weather age.

With Vitralume, this building has a wall that washes clean in a rain, a wall that stands up to knocks and abrasion without marring. The co is Reynolds Aluminum, so you c expose the bare edges without fe of rust or stains.

Aluminum gives you a panel tha strong, too. It's lighter in weig easy to handle and fabricate in t field, and provides a long unbroken span.

Vitralume Panels offer dozens colors to choose from, including t new "Nature-tone" earth colors. you want a special hue, Roberts can match practically any swatch sample. You can have a glossy matte finish, and there's a wi

Sun can't fade it, rain can't rust it, weather can't age it.

Vitralume®... porcelain on Reynolds Aluminum

The new Western Electric Plant, Shreveport, La., 150,000 sq. ft. of enduring, low-maintenance Robertson Vitralume on Reynolds Aluminum, manufactured by H. H. Robertson Company. Lockwood-Greene Engineers, Inc., Consulting Engineers, George A. Fuller Co., General Contractors.

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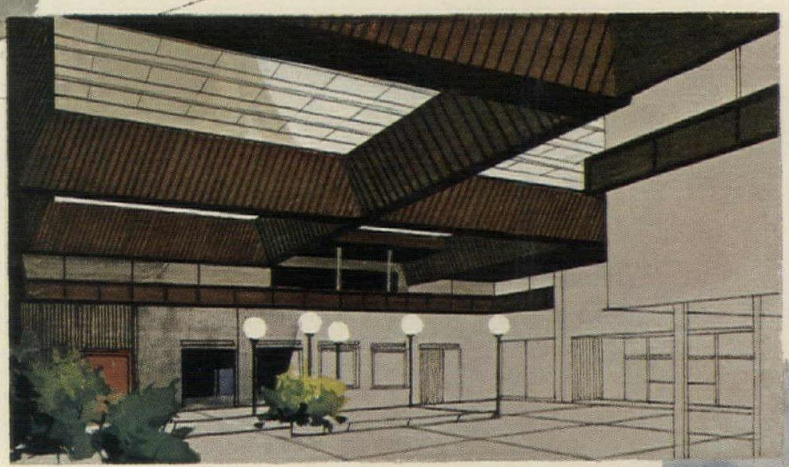
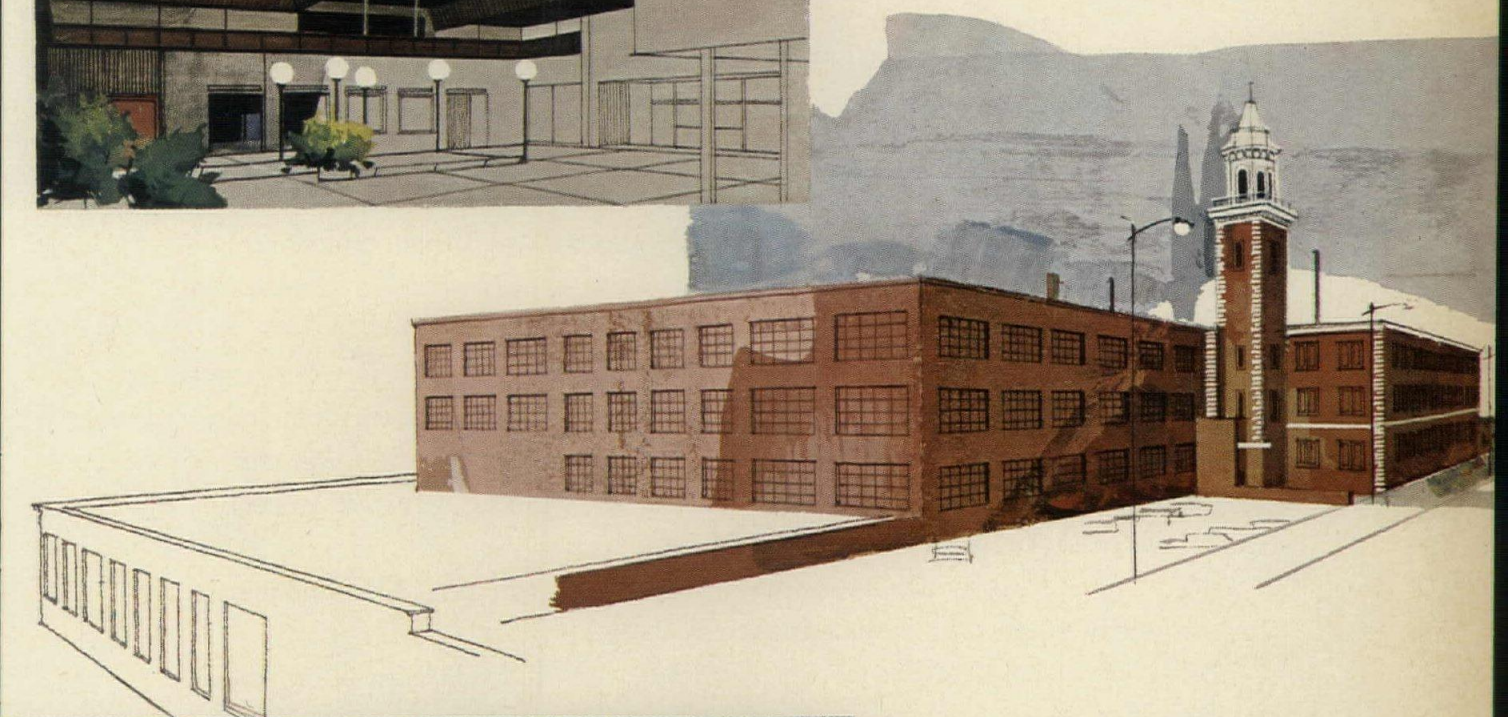
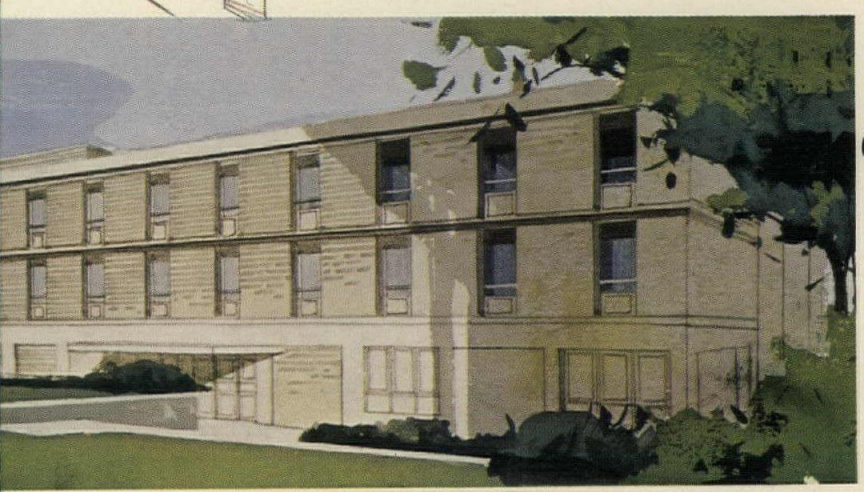


Lennox modular central systems:





the "micro-climates" concept for any building

For more data, circle 49 on inquiry card

Lennox systems' flexibility protects design freedom, boosts comfort performance, holds cost line

We air condition people in schools, offices, apartments, motels, plants, clinics, shopping centers, homes. And the people problems often can be as complex as the buildings themselves.

For instance: fat people and thin ones. Younger ones and older. Active and quiet. Emotional and calm. Crowded together or apart. Doing all manner of different things . . . at the same moment . . . in the same building. On the sunny side. Or the shady. Hot days or cold. Bright or cloudy. Windy or still.

No wonder that only the most sophisticated air conditioning systems can create the infinite variety of "micro-climates" to meet the people problems. Lennox modular central systems have that sophistication. Whatever the number and size of the "micro-climates" required for your planning, Lennox has the system—or combination of systems—to match.

Examples: the Lennox Direct Multizone System (DMS) for either rooftop or multi-story installation; DMS with dual ducts and mixing damper boxes for an infinite number of "micro-climate" comfort zones. And for single-zone areas, the Lennox GCS3 combination gas-heating/electric-cooling system; Model CHA air conditioning, with add-on heating; and Lennox condensing units combined with coil-blower units.

All Lennox multizone and single-zone systems are compatible, and may be combined easily where such requirements exist.

Lennox systems are factory-assembled, wired and tested, including controls. And they offer Lennox single-source responsibility.

Whatever the building you're planning, consider the people problems . . . and the "micro-climate" advantages provided by Lennox modular central systems.

For details, see Sweet's—or write Lennox Industries Inc., 328 South 12th Avenue, Marshalltown, Iowa 50158.

LENNOX®
AIR CONDITIONING • HEATING

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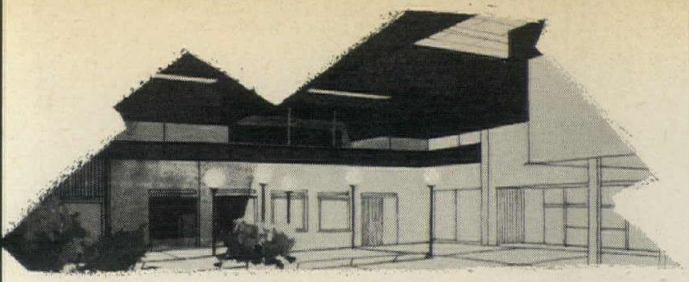
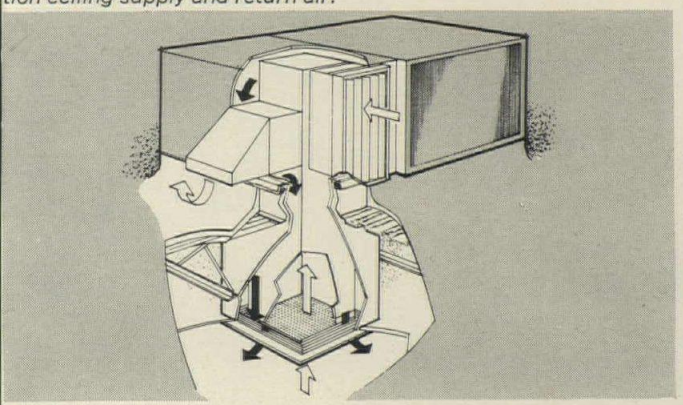
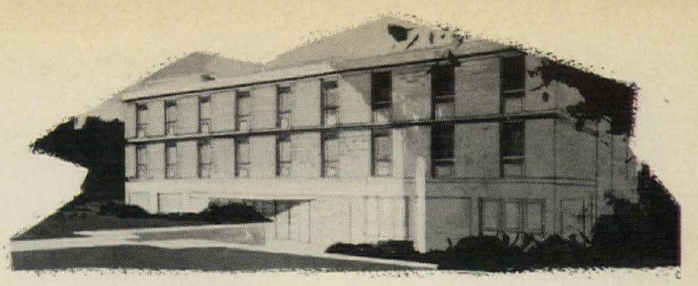


Example: This modern shopping center, where single-package Lennox Model CHA rooftop air conditioning units provide "micro-climates" required for the varied comfort control zones. Stores, bakeries, music shops, drugstores, restaurants and malls are among the relatively large, undivided areas with high-occupancy people problems. The versatile, simple-to-install CHA is available in cooling capacities ranging from 25,000 to 273,000 Btuh. Easy to add either electric or gas heating.

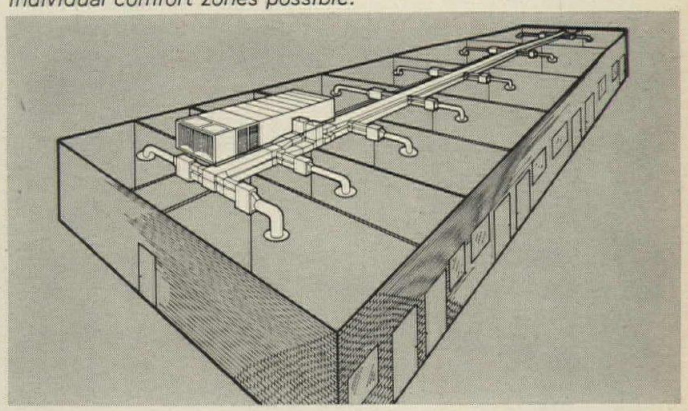
Rooftop unit with POWER SAVER™ fresh air dampers and combination ceiling supply and return air.

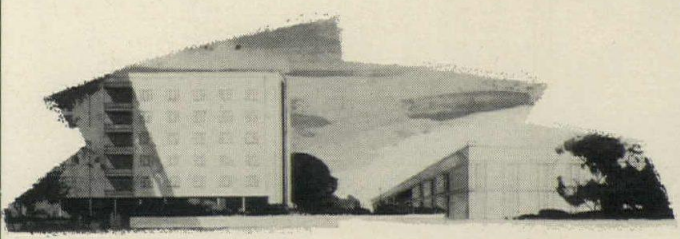




Example: Efficiency in a nurses' dormitory. This entire 3-story building is heated, cooled and ventilated by just two Lennox DMS rooftop units. Use of dual ducts and individual mixing damper boxes make possible a precise individual temperature control—hot-and-cold-running air for 57 separate "micro-climate" zones, including nurses' rooms, lounges and housemother's apartment. The DMS can ventilate with 100% outside air, cools free when that air is below 57°F. And it permits inside walls to be changed —moved, added or eliminated—as needs change.

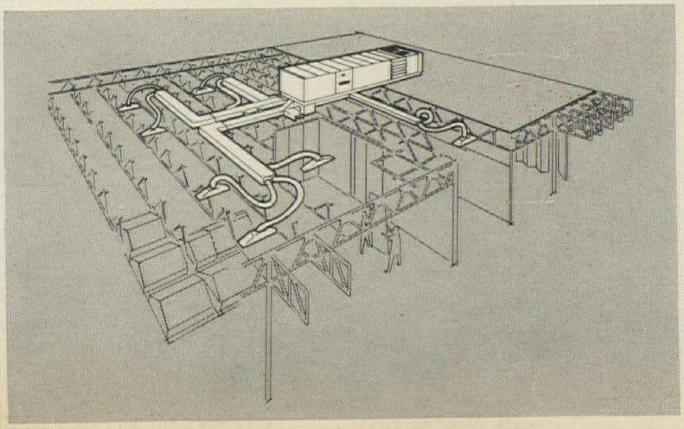
Dual-duct system with Lennox DMS rooftop unit adds to number of individual comfort zones possible.

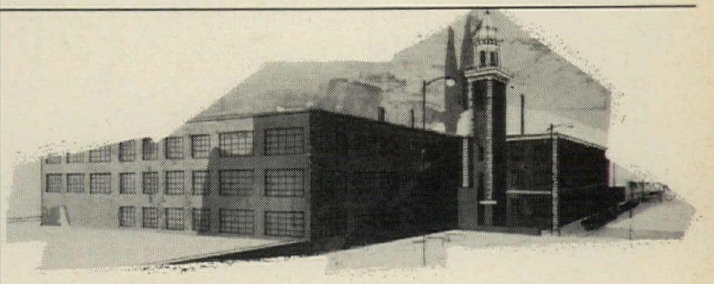




Example: This new junior college, where 20 DMS (Direct Multizone System) units provide comfort for 94 zones of individual temperature control. Here are 409 tons of cooling and 7,000,000 Btuh heating for a 135,000-sq. ft., 208-room area that includes classrooms, lecture halls, laboratories, vocational shops, library and offices. The Lennox DMS can heat some areas while cooling others, with up to 12 "micro-climate" zones per unit. Thermal response is instantaneous, compensating for changes in weather, occupancy or activity.

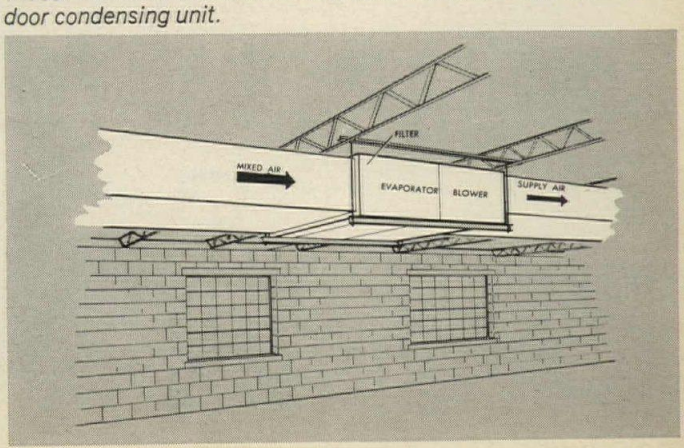
Ceiling distribution system from rooftop unit serves top floor, also can be ducted to floors below.

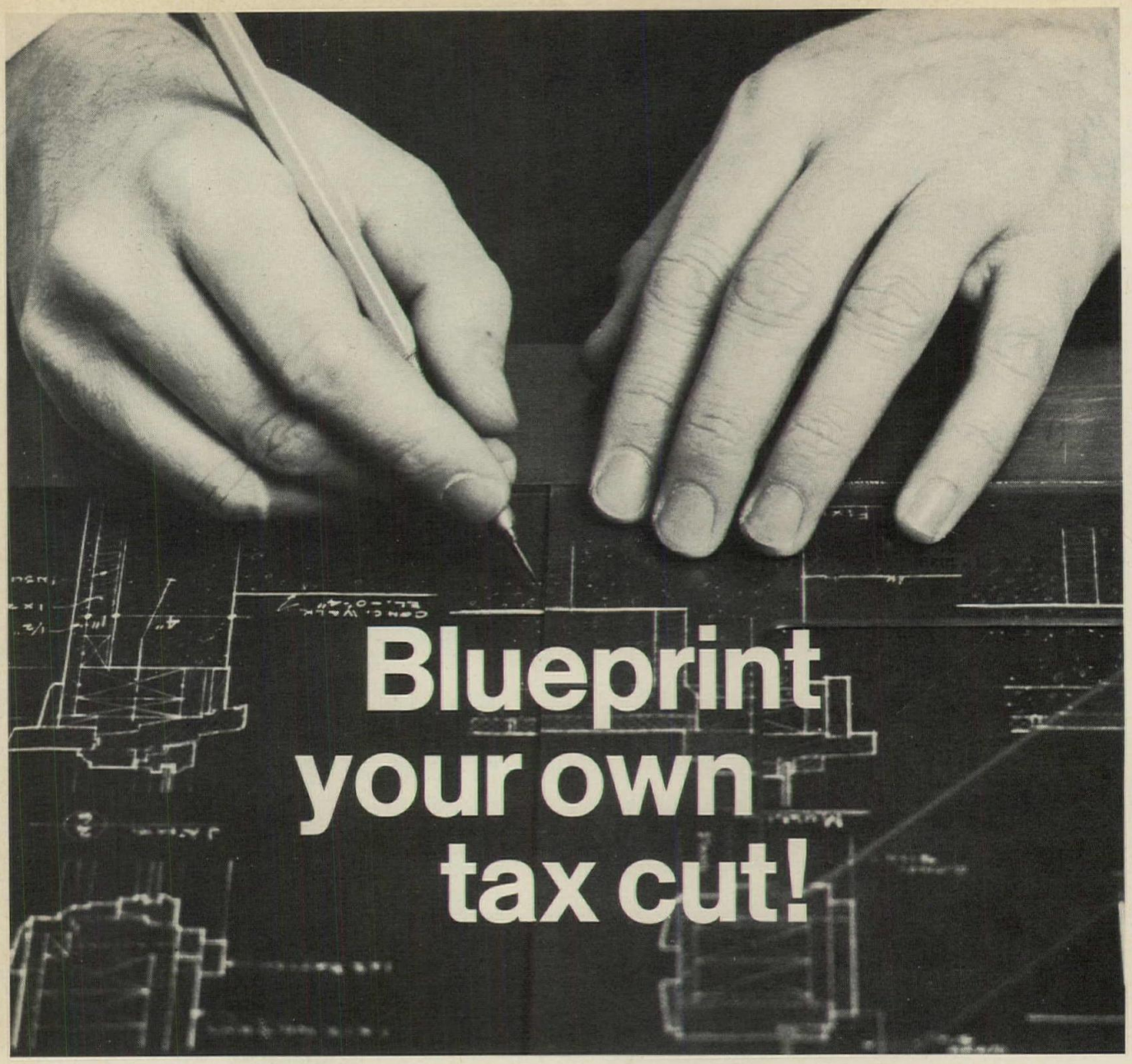




Example: Offices of a large publishing company. Lennox unitary systems—rooftop condensing units coupled with coil-blower units—were chosen as the most efficient means of installing nearly 400 tons of air conditioning for the 600-plus people in this 55-year-old building. Total comfort zones: 23—each served by a separate unitary system. Individual condenser capacities: 7½ to 25 tons. Unitary Lennox systems have definite maintenance advantages over the large central system: servicing is simpler, and affects only a single "micro-climate" zone each time.

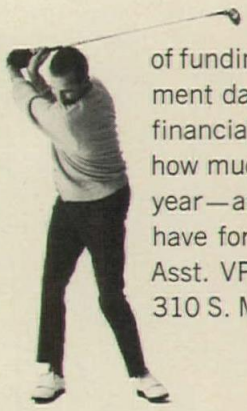
Indoor fan-coil unit is mounted in ductwork and coupled with outdoor condensing unit.





(Deduct up to $2500 extra this year—while building retirement security.)

Continental's new TARGET PROGRAM helps self-employed architects do it. Immediately reduce your current taxable income by 10% or up to $2500 each year. Also increases your spendable income, while permitting a sizable contribution to your retirement fund. Continental's TARGET PROGRAM, authorized under the amended Keogh Act, or HR-10, offers you many *different* methods of funding. You can tailor your own carefree retirement days of doing just as you please—and with financial security. For complete information on how much you can reduce your income taxes this year—and how many dollars you can expect to have for tomorrow—write Mr. Robert M. Powell, Asst. VP, Dept. 112, Continental Assurance Co., 310 S. Michigan Avenue, Chicago, Illinois 60604.



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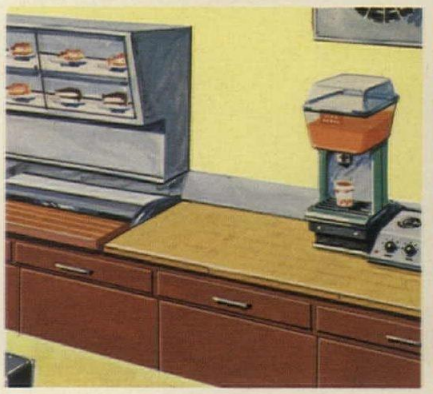

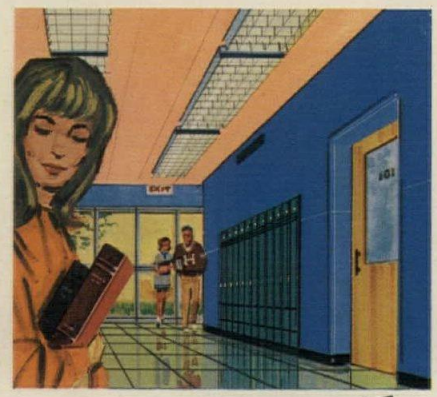

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Masonry soaks up water like a sponge. Soaks up expensive paint, too.

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And these fill-coats are the only ones to meet Federal Specification TT-F-001-098. They successfully block wind-driven spray at the equivalent of 98 mph for eight hours.

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Don't be satisfied with surface coa ings. Go all the way to full protectio

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GOODYEAR CHEMICALS

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.S. business to increase capital spending in 1968

erican business plans to spend $66.5 ion for new plants and equipment in 8, an eight per cent increase over 7, according to the 21st annual survey business' plans for new plants and uipment, conducted by the Economics partment of McGraw Hill Publications. out one quarter of the total capital lay will be for buildings.

"This planned increase is two per- ntage points higher than was indicated the survey by the U.S. Department of mmerce and the Securities and Ex- ange Commission released in mid- rch," said Douglas Greenwald, chief nomist of McGraw-Hill Publications.

"While this planned gain brightens outlook for plant and equipment ex- nditures, it is nowhere near the 16.7 cent gain that occurred in the 1966 ital spending boom," Greenwald ded.

"In 1966, plant and equipment in- tment amounted to 8.2 per cent of the ss national product. Even though in- stry has upped its plans since last fall, s year's expenditures will come to only per cent of an estimated $845.6 billion P," Greenwald said.

Preliminary planning for 1969 now dicates that American business plans to nd nearly $66.2 billion, only one per nt lower than 1968 spending plans. ns for 1970 and 1971 are down two per nt in each year from the previous year's el.

nufacturers plan to spend 3.5 billion this year

nufacturers expect to add six per cent their productive capacity this year; 47 r cent of their planned investment will for expansion, with the remaining 53 r cent for modernization and replacement. The industries are almost equally divided between those that will concentrate on expansion and those emphasizing modernization and replacement.

Eighty per cent of this year's capital spending by manufacturers go into facilities directly related to goods production. The remaining 20 per cent will be for nonproductive facilities such as warehousing, office building and distribution.

This year, expenditures for pollution control—air and water—are expected to rise 34 per cent, to about $1.6 billion, as compared to the $1.2 billion spent in 1967. Most industries expect to increase their spending in this area; the exceptions are paper, railroad equipment manufacturers and shipbuilders, and those included in miscellaneous non-durables.

Aerospace and some non-durables may reduce capital spending

Durable goods producers indicate their plans are now 10 per cent higher than 1967's spending. Sizable increases in spending are planned by the machinery, electrical machinery, and fabricated metals and instruments industries. Within the durable goods group, only the aerospace industry currently expects a decline in investment this year.

Current spending plans of the nondurables goods industries call for a gain of only four per cent this year. The chemicals, paper and pulp, and textiles industries all expect to spend less this year than they did in 1967. However, planned increases by three industries—rubber, petroleum, and food and beverage industries—are large enough to offset the declines.

Airlines to spend nearly $3 billion this year

In the nonmanufacturing area, planned changes range from an increase of 36 per cent for the airlines to a decrease of 12 per cent for railroads. Only the railroads expect a drop in investment; they now plan outlays of $1.35 billion this year compared with $1.53 billion in 1967. The electric and gas utilities plan to increase their investment to well over $11 billion, a rise of 12 per cent.

The airlines, pursuing an aggressive investment program, plan to spend nearly three billion dollars this year.

ARCHITECTURAL BUSINESS THIS MONTH

Computer graphics probed at Yale conference

"Computer Graphics and Architecture" was the subject of a three-day conference at Yale University April 18 to 20. Some 200 architects, planners, and teachers were brought up to date on the vanguard of research and application of the visual capabilities of computers. Since the so-called "hardware" phase of development (involving linkage of cathode-ray tubes and light pencils to sophisticated storage and retrieval capabilities) appears to have gone beyond the capacities of usable "software" or program material, the main thrust of the conference was to report on software developments.

To become effective as a tool for architects, the computer is now being taught to respond to architectural modes

of communication. "Architects should be able to speak to computers in the language of architects," said Nicholas Negroponte, professor of architecture at Massachusetts Institute of Technology, in a talk describing the "Urban 5" program for computerized graphic aids to design. This system uses the cathode ray tube and light pen as a means of transmitting building plans to the computer. The machine can then apply limiting parameters (such as allowable amounts of south-facing glass or requirements for structural stability) and alert the architect when limits have been exceeded. The demonstration machine was programed to warn the operator by printing out his name and telling him what error he had committed.

Once a design has been recorded and accepted by the "Urban 5" program, the machine can project the plan and have it drawn by a plotter. It can also produce a series of changing perspectives. On a larger scale, this program can be used to reproduce a whole city street and, through operation of controls, can convey the impression of walking through the street.

"While the Urban 5 system is not proposed as practical for most architectural offices today, Professor Negroponte envisions the possibility of wider use through time-sharing which would reduce its cost. He regards it even today as a valuable teaching aid for architectural students.

Another system, originally developed by NASA and General Electric to simulate moon landings, was programed for architectural design by Peter Kamnitzer, professor of architecture at UCLA. Using a mathematical-data input, the machine is able to create a building or urban space and display it on a color television tube as a three-dimensional projection. Then, by manipulating a "joy stick" device, the operator is able to maneuver around, through and over his creations. Aside from its value as a design aid, Mr. Kamnitzer envisions "color-televising systems' output to acquaint the pub with urban projects before they are bu using movies made of the output for chitectural presentations; and as a tea ing aid." Architects at the conference sponded warmly to a talk by Br Graham of Skidmore, Owings and M rill, who spoke on the computer's pres role in architecture. Mr. Graham show how SOM used it to optimize data their John Hancock Center, as well as other projects.

The conference concluded with panel discussion by Louis Kahn, Cha Moore, Stephen Coons and Warren M Culloch. Any architects worried ab being replaced as designers by techn ogy may be reassured by the over sense of the conference which was t computers—fantastic tools though th may be—will never replace nor even i tate the intuitive component of desi As Kahn put it: computers may out-p form the brain, but never the mind.

Young architect speaks out on union problems as societies take action

In the April bulletin of the California East Bay Chapter, A.I.A., James Mawson entered the following position paper that seems to echo widely held opinion—especially among younger members of the profession—regarding conditions fostering unionization of professional offices of architects and engineers.

"Recently, the architectural and engineering professions have again had to face the spectre of unionism. However, this time the threat of unionism is not just an apparition, it is a reality. This can be seen from the fact that many firms—architectural and engineering—have gone and are presently going through the throes of a union drive.

"About five months ago, at a conference held in Chicago, nearly 500 architects and engineers gathered to discuss this mutual problem and to learn of the full scope of union activity and of the countering steps that might be taken. This topic was again discussed at a Grass Roots conference held in February in San Diego, and finally again at a C.C.A.I.A. conference of presidents in March in Santa Barbara. At that last meeting, it was decided to hire Case & Co. (the same firm that recently completed a study on the cost of architectural services) to make a state-wide study on the employment practices of our profession.

"A few minutes' study of the survey that the National A.I.A. released covering technical salaries paid by architectural firms points to the crux of the problem. Draftsmen are just not being paid enough money commensurate with their education or technical experience. Nor are they being paid a wage comparable to those persons in the building trades who execute their designs. However, every time this topic is raised, architects automatically point to low fees as the principal reason for low salaries. What architects don't see is that they are the only professionals who continue with fee schedules completely and hopelessly outdated.

"Wages alone, however, are not the only problem. Most young draftsmen hope someday to be in a management position. To prepare for that day, draftsmen must learn what to do by observing the actions of the architects that they work for. During this observation period, they are faced with situations which are professional or non-professional, or ethical or non-ethical. They are, by the time they become architects, aware of what the architect's professional and ethical responsibilities are to his client and to his profession, but they are not made aware of the architect's moral responsibilities to his employes.

"The A.I.A. must begin to police itself. It must begin to take its place next to the other strong professional societies. It must seek a new method for determining its fees. It must bring its wages paid to its technicians up to the levels in other professions. Professionalism cannot be put in a paycheck, but if we don't perform these needed duties, unionism cannot be avoided."

Architects and engineers propose joint action on union problems

A joint interprofessional action committee to deal with unionization problems has been recommended by the individ employer-employee committees of C.E and N.S.P.E. The recommendation the parent bodies was made followin meeting at Chicago in February co-sp sored by six national groups concern with unionization of professional firm They are A.I.A. A.S.C.E., American Co gress on Surveying and Mapping a Legislative Council for Photogramme C.E.C. and N.S.P.E. All societies co mended the action and indicated th would consider joining and would w come other interested societies.

A.G.C. president calls national labor conference

A national conference on labor matt in the construction industry has be called by Fred W. Mast, president of Associated General Contractors of Am ica. The conference will be held in Wa ington, D.C. May 20 and 21 at the She ton Park Hotel. About 300 representati of all segments of the industry will be vited to participate.

Labor problems on urban rehabili tion will undoubtedly come up for d cussion at the Washington meeting. T A.G.C. Labor Committee has reco mended that a subcommittee be a pointed to meet with representatives other national construction employer sociations and representatives of the ternational Unions to negotiate a suita national labor agreement limited to wo performed under the provisions of t Demonstrations Cities Act with approp ate regard given to areas where e ployees are not represented by a uni

URRENT TRENDS IN CONSTRUCTION

orge A. Christie
ief Economist
cGraw-Hill Information Systems Company

Mobile homes and modular apartments gain markets

ul Rudolph's stimulating concept of e mobile home as the "20th century ick" (AR, April, 1968) suggests that th proper redesign its potential could sily and economically be expanded high density, multi-family use.

In the relatively short space of time at the mobile home has been around, has already established itself as an im-rtant force in the housing market. Up now, though, this force has been felt most solely in the very low-price end the one-family home market.

Last year, mobiles accounted for 15 r cent of all newly built housing. In 65, they represented about 12 per nt of the total—up from an average of per cent during the years 1960-65, d only 5 per cent from 1950 to 1960.

Measured against just one-family using demand, the mobile share is gger—one out of every five of the mbined 1967 total of conventionally-ilt single family and mobile units. But s in the low-cost field that the mobile really a standout. According to the obile Home Manufacturers Associa-n, mobile homes account for more an three quarters of all new homes ld for $12,500 or less.

Low cost is clearly the key to the mobile home's success to date. But it's not the *only* reason for its growing popularity. While factory mass-production methods can quickly produce a dwelling unit of reasonable comfort and utility that sells for well under $10,000, there are other advantages . . . as well as disadvantages.

One trend that has been strongly at work for the mobile market in recent years is the population mix. The primary markets for these units—young adults and retirees—have been and will continue to be the fastest growing segments of the population.

Credit markets have also favored growth of mobile home sales. Most are financed through installment credit departments of commercial banks over relatively short periods of time. This really paid off during the credit squeeze of 1966-67 when mobiles were able to continue to get financing while the traditional sources of credit for conventionally-built housing (savings and loan associations primarily) ran dry.

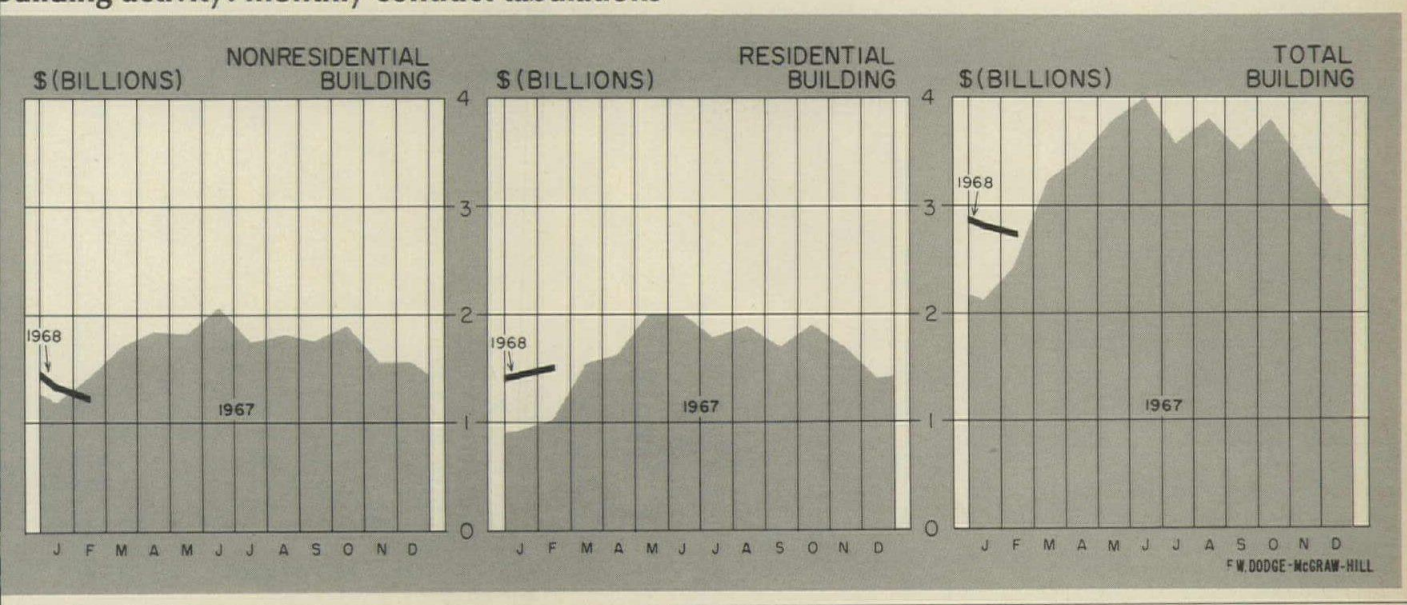
There are obvious disadvantages to mobiles as they exist today. To the architect, their design may head the list. Site limitations, (controlled by local zoning laws) and transportation of the finished unit to its site (typically the longest trip the mobile home ever takes) are others. Biggest drawback, though, is that the useful life of the average mobile is far shorter than that of a conventionally-built house.

The future of the mobile dwelling will be influenced by several conflicting trends:

- Land scarcity and stricter zoning make desirable "close-in" sites for mobile parks harder to find
- Rising income level encourages ownership of conventional single family housing
- Obsolesence of older units accelerates replacement with bigger new ones
- Use of mobile as an element of multi-family structures opens new potentials
- Multi-family application potential is likely to be encouraged by low-income housing programs.

There seems little question that the mobile home is here to stay, though its future growth may be in a use quite different from that of today.

Building activity: monthly contract tabulations



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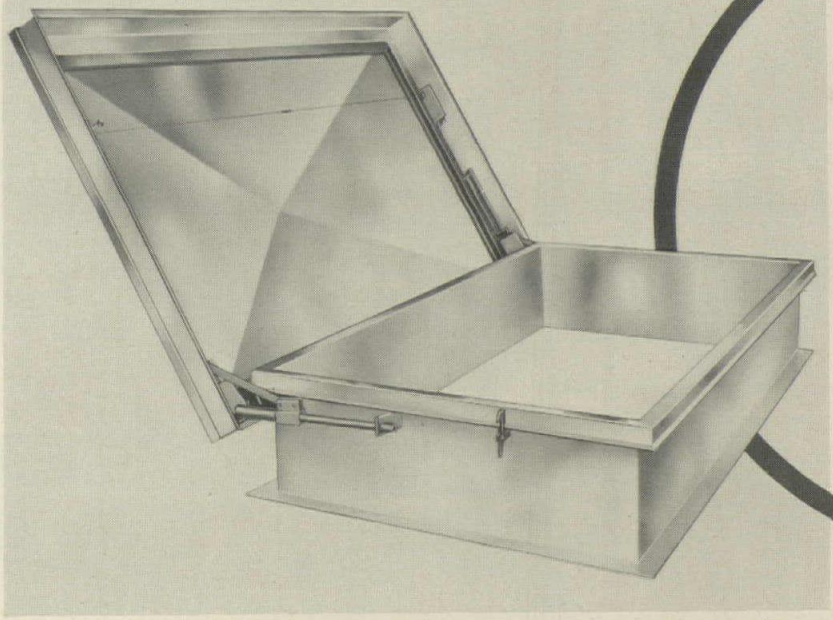

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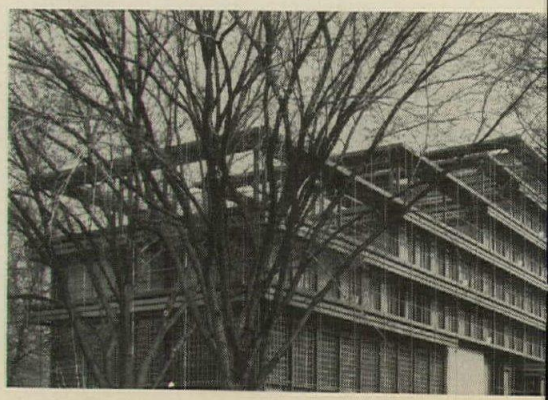

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RENDS AND ANALYSIS

vrence C. Jaquith
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ccuracy of estimates: close but never perfect

aspect of construction costs needs rification more than accuracy of es- ating—especially at it applies to ar- tect's projections. The A.I.A. book, *eative Cost Control,* although other- se a thoughtful and useful work, treats matter scarcely at all—confirming, rhaps, the difficulty of the topic.

ndards of accuracy not clearly defined

e question of how accurate a given hitect's estimate might be, presup- ses the existence of standards for gaug- accuracy. If such standards do exist, s clear that there is no general agree- nt among architects as to what they and how they apply to individual es- ating tasks. The subject might best be rsued by asking two questions:

1. What is the goal or target of an hitect's estimate?
2. What are the factors governing ainment of that goal; the possibilities achieving "bulls eye" on the target?

me use the eventual bid the bench mark of accuracy

e have all heard architects or estima- s cite their estimating records in a tistical fashion—"We hit most of our os within 3 per cent of the low bid" "Our estimates range from minus 5 r cent to plus 10 per cent, measured m the low bid" or "Our estimates aim the middle third of the bidders and al- ost always fall within that range."

Such expressions suggest that ac- racy can be measured and that the two estions above might be rephrased:

1. What, theoretically, constitutes 0 per cent accuracy?
2. What are the practical limits to realization?

e contractor then becomes e arbiter of accuracy

ith respect, first, to the definition of ac- racy, it is clear that the target or goal is established in some manner by the contractors actually bidding the job, and an architect's estimate might be considered an anticipation of bids.

However, since the architect's lexicon includes terms such as "poor bids" or "non-competitive bidding", it seems equally clear that *mere* anticipation of bids is not enough. Rejection of bids as "non-responsive", or "too high", etc. assumes a standard against which they are measured. To avoid circularity, then, a working definition of an architect's estimate might be "an estimate of the bid likely to be received from one of a slate of interested, responsible bidders". Whether low bid, median bid, or some other representative is to be taken as the target is a matter of individual preference, dictated usually by job features or owner's desire.

Another way of phrasing our working definition might be "an estimate of the fair and reasonable cost to the performing contractor, to which are added reasonable markups for overhead and margin". This may be regarded as a mode of setting benchmarks for contractors' reasonable bids.

Responsible bids and reasonable costs both affected by market conditions

Whether the two definitions are in fact compatible depends on the interpretations placed on the modifying words—"interested, responsible" in the one instance, and "fair and reasonable" in the other. If the conditions of the construction market are optimum, the interpretation is not critical. If, however, the market is not fluid, or if its capacity is taxed by too much work, one cannot rely on contractor competition to keep prices reasonable. If "responsible" contractors must pay significant premiums to attract competent tradesmen, their bids will, of course, reflect this fact. If pre-cast concrete yards are overly busy, their subcontract quotations can be expected to rise. Whether the architect's estimate should include these "extra" costs depends entirely on what the estimate is intended to express.

Let owners understand the basis of the estimate

It is of the utmost importance that the estimator's target be fully understood by both architect and owner. It is not unreasonable, surely, to clarify this matter with the owner in advance: "This building, on an optimum bid basis, will cost $1 million, but to advertise it on *this* market, *now,* will result in bid premiums of perhaps $125,000." When thus informed, the owner can consider his option to delay award or even to build in another place, although in practice, the owner seldom exercises this option, being bound, for a number of reasons, to build now. In any event, the definition of a proper target for an architect's estimate should consider the conditions under which awards will be made or not.

Functionally, then, an architect's estimate is a statement to an owner that a given sum of money should be budgeted to accomplish the desired construction, within limitations to be set forth by the owner. Since, in the experience of most architects, the funds available for the project are barely adequate for the construction under the best of market circumstances, a comfortable contingency cannot substitute for estimating accuracy in the first place.

If the accuracy of an architect's estimate is, in any of the foregoing ways, to be gauged by the resulting contractor bids, it is clear that seeking means for achieving accuracy involves some prior understanding of the factors governing preparation of contractors' bids.

Bidding methods differ on a given item of work

A persistent concept in the mythology of estimating holds that there is a "right"

price for a contract, which is a function of the "true" cost to perform the work. Much has been written recently about statistical approaches to contractor bidding, all of which assume that, armed with a knowledge of the true cost and a history of competitors' bidding habits, a contractor may calculate the probable low bid. A study of contractor bidding practices conducted by my firm over a number of years, has confirmed that contractors disagree substantially about the basic cost to accomplish a specific construction task, and differ widely in their approaches to estimating.

Responsible bids differ in spite of common bases

To illustrate the difficulty in assessing true cost, consider a typical building project which we studied. Seven general contractors presented bids; the spread from low to high was 12 per cent; from low to third was 5½ per cent. The three low bidders all fit the description of interested, responsible bidders. They have incurred considerable expense in bidding and all want to perform the work. One is inclined to conclude that 5½ per cent is a fair way of stating the limits of accuracy that can be expected in anticipating the low bid. After all, the contractors approximated one another's bids by that close a margin, and an architect's estimator might aspire to the same degree of approximation.

However, these are general contractors and their bids are comprised in large measure—say 75 per cent—of quotes to them by subcontractors. Our examination revealed that they shared virtually the same package of significant subcontractor quotes; that is, they shared the same body of information regarding the "true" cost of 75 per cent of the work; and further, that the three bidders had used very nearly the same profit markup. Thus the difference between the low and the third bidder was either

a) a disagreement as to the "true" cost validity of the subcontractor quotes received, or

b) a disagreement as to the value of the 25 per cent of work to be performed by their own forces, a discrepancy then of .055/.25 or 22 per cent, or

c) a combination of both.

Our examination went further. We made the same kind of analysis of the HVAC subcontractors who had quoted the job and discovered a similar pattern. The five subcontractor quotes varied from least to greatest by 18 per cent, and each included a shared package of quotations from suppliers or second tier subcontractors. Presumably the same would hold true for the plumber, the electrician and other bidding subs.

Two conclusions emerge from this analysis. First, we are fishing in murky waters indeed, and second, that the dollar difference between general contract bids for a single job in no way defines the limits of accuracy in evaluating the true cost of that job.

Total job bids tend to level sub-bid differences

It would appear that performing contractors differ as to the costs of accomplishing given construction tasks by a substantial margin. When these costs are summarized, the individual differences are largely offsetting and the net difference in total bid price implies a consensus which, as an approach to accuracy, is misleading at best.

Most general contractors would confirm this conclusion. They know from their dealings with subcontractors that differences between proposals for a given plumbing or electrical job differ not only in profit and overhead markups but also in the fundamental evaluation of the cost to perform the work which each reflects. This is not to say that it will necessarily cost one contractor more to perform the work than another, but rather that contractors will differ, and differ materially, in their *estimates* of the cost to perform the work.

Sometimes actual costs derive from estimated costs

Indeed contractors have discovered that what it actually costs them to complete a contract is related, frequently, in a derivative way to what they have estimated the cost to be. In other words, the estimate sets a norm which *must* be accomplished, a budget which *must* be adhered to. There are limits, of course, to this Stakhanovism, but many contractors have achieved significant results when after bidding too low, they set themselves to "save" a project by more imaginative efforts, better equipment, or closer supervision of the work.

Thus "true" cost is not a Platonic concept of which estimates are finite realizations. If the term has any meaning at all, it denotes a *range* of costs, within which a contractor, if lucky, can accomplish a given construction effort.

The architect's estimate shoots at a moving target

The contractor's estimate of the cost of the work must be seen for what it is —an estimate, truly, an approximation, an attempt to anticipate future events— with its own rather broad limits of probable accuracy. However, it is the contractor's estimate, not his actual incurred cost, which serves as the target for the architect's estimate, since the latter will be measured against bids, not p formance records.

Thus the architect's estimate is approximation of an approximation. accuracy vis-a-vis actual incurred co may never be known.

How then, one might ask, is it po sible for an architect to estimate co with any assurance that he will appro imate the bids? Clearly, many archite do experience some success in their es mating efforts, and the reason rests several factors.

Averages and experience help architects to hit the mark

First, there is the fact that while two timators may disagree substantially abo the true cost of a specific, finite item work, they will be in much closer agre ment about the aggregate cost of ma items of work. It is for this reason th bids taken for individual subcontracto vary more than bids taken for all-incl sive general contracts. Estimates pr pared by architects also will be closer the low bid for the aggregate contra than it will be for any individual tra subcontract.

This pattern has been the experien of almost every agency which awar work to several "prime" contractors f a single structure. They find no difficul in estimating the total cost within, sa 10 per cent, but find the estimates f plumbing, HVAC, electrical and gener construction work may be much farth off the mark.

The second factor which improv estimating accuracy is historical prec dent. The experienced cost of a buildi system influences the estimating effo of contractors far more than architec realize. In many cities, for exampl plumbing contractors bidding on hig rise dwellings figure their bids on a "p apartment" basis, because their recor reflect costs in this manner. General co tractors, also, will "shop" subcontrac seeking the cost-per-square-foot for th system which they believe supportab by experience. In this way, differenc in agreement about the cost of specif work items are bypassed in seeking a over-all price which seems reasonable

The moral of the foregoing is simp that the architect should be mode about his, or anyone else's, ability t estimate building costs. A good estima requires consideration of all the pert nent information that can be gathere If one comes close to target on th over-all project but misses badly on in dividual project features, this must b recognized as inherent in the proces Estimates and estimating practice ca always be improved but there is no suc thing as 100 per cent accuracy.

NDEXES AND INDICATORS

lliam H. Edgerton
nager Dodge Building Cost Services
Graw-Hill Information Systems Company

AY 1968 BUILDING COST INDEXES

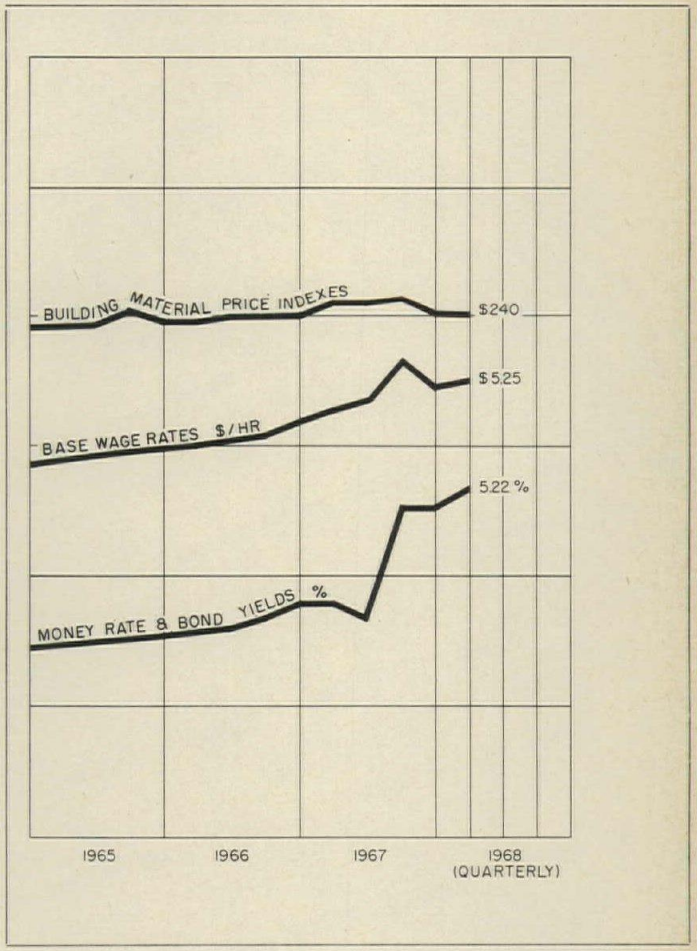
1941 averages for each city = 100.0

Metropolitan area	Cost differential	Current Dow Index residential	Current Dow Index non-res.	% change year ago res. & non-res.
U.S. Average	8.5	287.8	306.6	+3.01
Atlanta	7.2	330.4	350.5	+3.97
Baltimore	7.9	290.2	308.7	+4.30
Birmingham	7.3	262.9	282.7	+2.01
Boston	8.5	258.4	273.5	+2.43
Chicago	8.9	318.2	334.6	+2.77
Cincinnati	8.8	278.3	295.8	+4.55
Cleveland	9.6	302.6	321.6	+5.46
Dallas	7.5	266.6	275.3	+1.72
Denver	8.1	290.6	309.0	+2.48
Detroit	9.2	298.4	313.3	+3.75
Kansas City	8.2	256.5	271.5	+2.49
Los Angeles	8.3	292.1	319.6	+2.76
Miami	8.4	283.2	297.3	+3.45
Minneapolis	8.7	286.0	304.0	+2.77
New Orleans	7.8	259.3	274.8	+3.16
New York	10.0	301.1	323.9	+2.10
Philadelphia	8.5	283.1	297.2	+2.16
Pittsburgh	9.1	269.8	286.8	+4.00
St. Louis	9.1	281.5	298.3	+1.24
San Francisco	8.5	371.3	406.2	+2.21
Seattle	8.4	263.3	294.2	+3.47

ferences in costs between two cities may be compared by dividing the cost dif-ential figure of one city by that of a second; if the cost differential of one city 0) divided by that of a second (8.0) equals 125%, then costs in the first city are % higher than costs in the second. Also, costs in the second city are 80% of those the first (8.0÷10.00=80%) or they are 20% lower in the second city.

e information presented here indicates trends of building nstruction costs in 21 leading cities and their suburban areas ithin a 25-mile radius). Information is included on past and esent costs, and future costs can be projected by analysis of st trends.

ECONOMIC INDICATORS



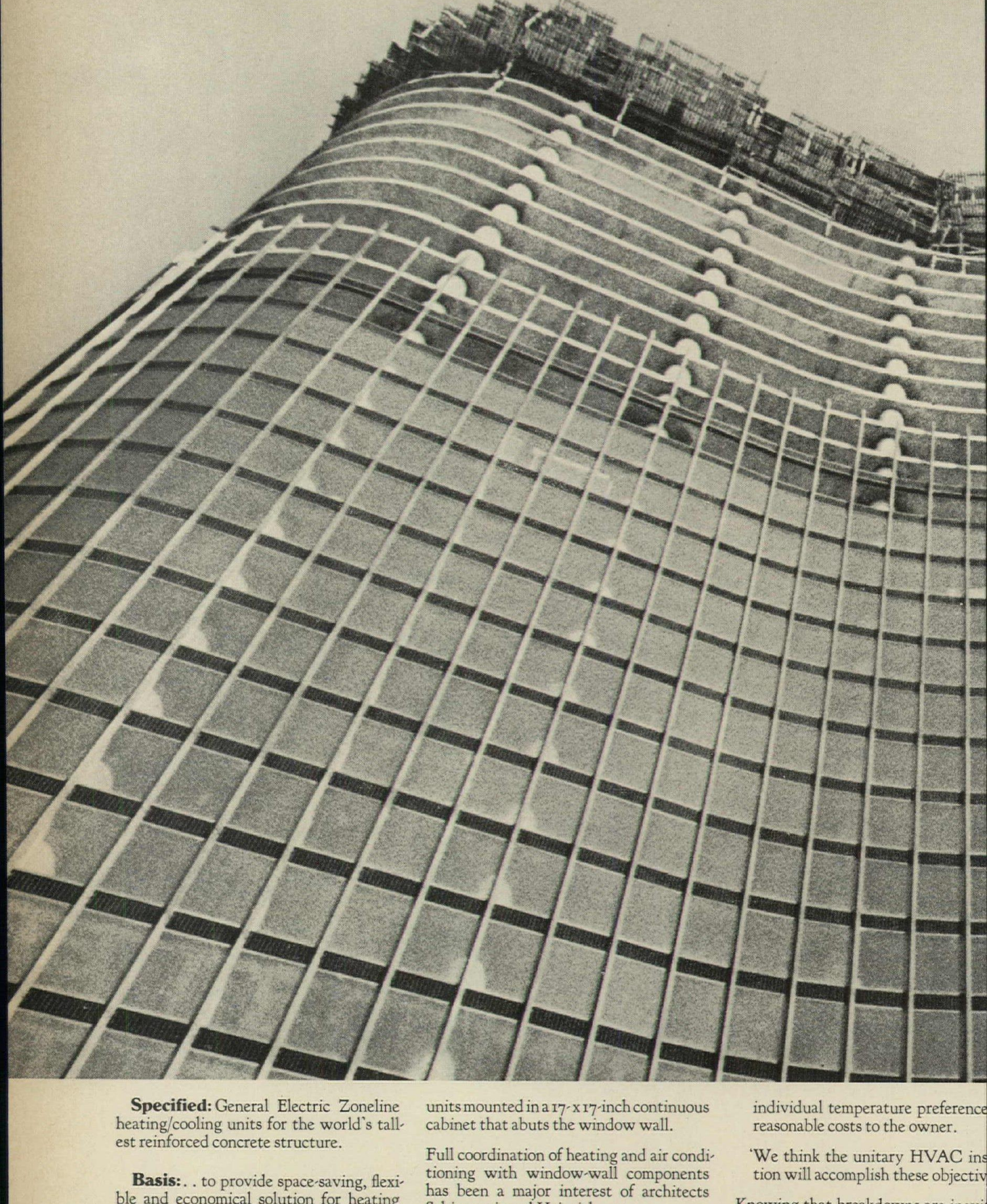
STORICAL BUILDING COST INDEXES—AVERAGE OF ALL BUILDING TYPES, 21 CITIES

1941 average for each city = 100.00

Metropolitan area	1960	1961	1962	1963	1964	1965	1966	1967 (Quarterly) 1st	1967 (Quarterly) 2nd	1967 (Quarterly) 3rd	1967 (Quarterly) 4th	1968 (Quarterly) 1st	1968 (Quarterly) 2nd	1968 (Quarterly) 3rd	1968 (Quarterly) 4th
U.S. Average	259.2	264.6	266.8	273.4	279.3	284.9	286.6	292.7	293.7	295.5	297.5	301.5	—	—	—
Atlanta	289.0	294.7	298.2	305.7	313.7	321.5	329.8	332.4	333.4	334.6	335.7	345.6	—	—	—
Baltimore	272.6	269.9	271.8	275.5	280.6	285.7	290.9	290.4	291.5	294.9	295.8	302.9	—	—	—
Birmingham	240.2	249.9	250.0	256.3	260.9	265.6	270.7	272.9	274.0	273.8	274.7	278.5	—	—	—
Boston	232.8	237.5	239.8	244.1	252.1	257.8	262.0	262.9	263.9	264.8	265.7	269.3	—	—	—
Chicago	284.2	289.9	292.0	301.0	306.6	311.7	320.4	320.4	321.3	327.3	328.4	329.4	—	—	—
Cincinnati	255.0	257.6	258.8	263.9	269.5	274.0	278.3	278.7	279.6	287.3	288.2	291.4	—	—	—
Cleveland	263.1	265.7	268.5	275.8	283.0	292.3	300.7	300.0	301.3	302.6	303.7	316.5	—	—	—
Dallas	239.9	244.7	246.9	253.0	256.4	260.8	266.9	267.6	268.5	269.5	270.4	272.3	—	—	—
Denver	257.9	270.9	274.9	282.5	287.3	294.0	297.5	297.6	298.5	304.0	305.1	304.9	—	—	—
Detroit	259.5	264.7	265.9	272.2	277.7	284.7	296.9	298.0	299.1	300.1	301.2	309.2	—	—	—
Kansas City	237.1	237.1	240.1	247.8	250.5	256.4	261.0	260.8	261.9	263.4	264.3	267.5	—	—	—
Los Angeles	263.6	274.3	276.3	282.5	288.2	297.1	302.7	303.6	304.7	309.0	310.1	312.0	—	—	—
Miami	256.5	259.1	260.3	269.3	274.4	277.5	284.0	283.4	284.2	285.2	286.1	293.1	—	—	—
Minneapolis	260.0	267.9	269.0	275.3	282.4	285.0	289.4	292.0	293.1	299.2	300.2	300.0	—	—	—
New Orleans	242.3	244.7	245.1	248.3	249.9	256.3	259.8	262.3	263.4	266.7	267.6	270.6	—	—	—
New York	265.4	270.8	276.0	282.3	289.4	297.1	304.0	309.4	310.6	312.5	313.6	315.9	—	—	—
Philadelphia	262.8	265.4	265.2	271.2	275.2	280.8	286.6	287.1	288.1	292.8	293.7	293.3	—	—	—
Pittsburgh	243.5	250.9	251.8	258.2	263.8	267.0	271.7	272.2	273.1	274.1	275.0	283.0	—	—	—
St. Louis	251.9	256.9	255.4	263.4	272.1	280.9	288.3	290.3	291.3	292.3	293.2	293.7	—	—	—
San Francisco	327.5	337.4	343.3	352.4	365.4	368.6	386.0	388.1	389.2	389.6	390.8	396.4	—	—	—
Seattle	237.4	247.0	252.5	260.6	266.6	268.9	275.0	276.5	277.5	282.6	283.5	286.2	—	—	—

sts in a given city for a certain period may be compared with costs in another riod by dividing one index into the other; if the index for a city for one period 0.0) 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.

A report from General Electric on the 70-sto



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Basis:. . . to provide space-saving, flexible and economical solution for heating and air conditioning of buildings.

Nov., 1966 issue of Building Construction magazine says: "Living and bedrooms in each apartment in the all-electric building will be fitted with modified GE Zoneline heating and air conditioning units mounted in a 17-x 17-inch continuous cabinet that abuts the window wall.

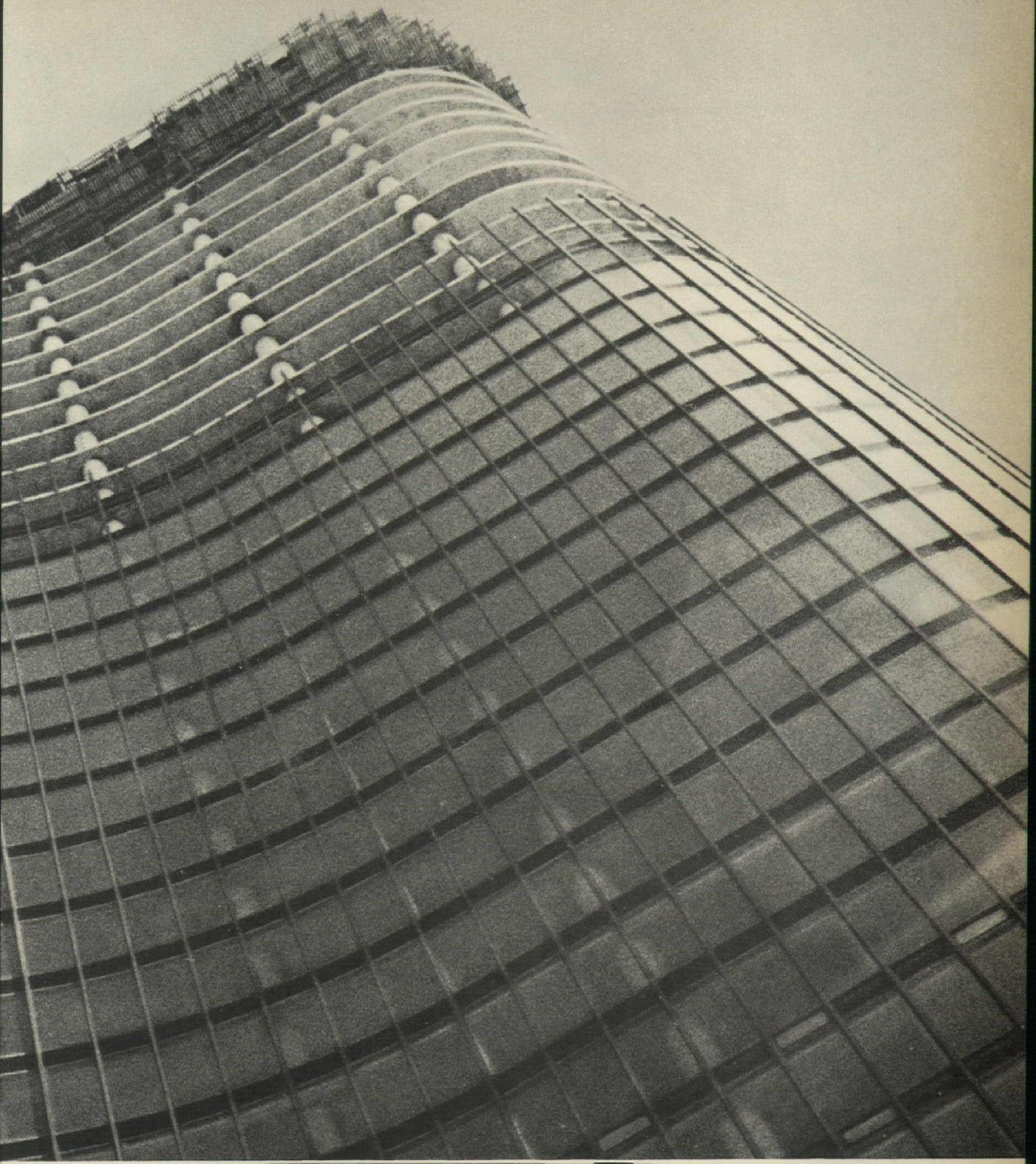
Full coordination of heating and air conditioning with window-wall components has been a major interest of architects Schipporeit and Heinrich.

'We wanted to whip the problems created by solar loads during those critical spring and fall months when air conditioning is needed on one side of the building, heating on the other. And we also wanted to provide an answer to individual temperature preference reasonable costs to the owner.

'We think the unitary HVAC ins tion will accomplish these objectiv

Knowing that breakdowns are inevi in any air conditioning system, the Point Tower architects also recogn the ease of servicing the 3350 Zon units. When one breaks down, it wi mediately be replaced with a reserve and repaired at leisure. And a breako in one apartment, of course, will i

)0-apartment Lake Point Tower in Chicago.



affect the other 899—as could hap-
with a central station system.
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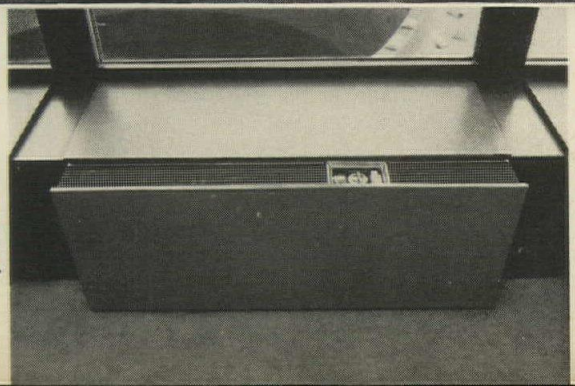
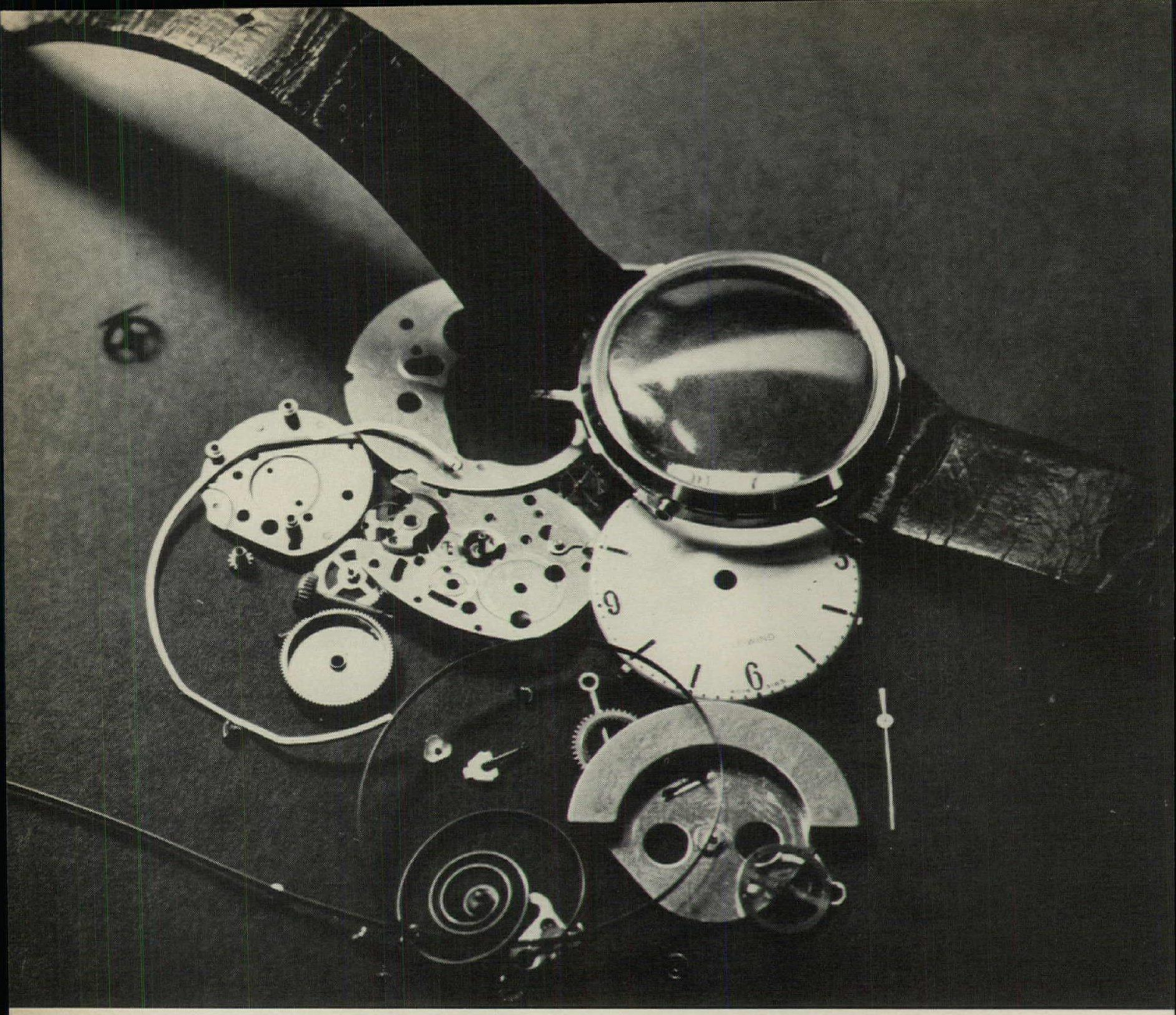
cts: Schipporeit-Heinrich, Inc., Chicago.
al Engineer: William Schmidt & Associates, Chicago.
Contractor: Crane Construction Co., Inc., Chicago.



For more data, circle 58 on inquiry card

GENERAL ELECTRIC



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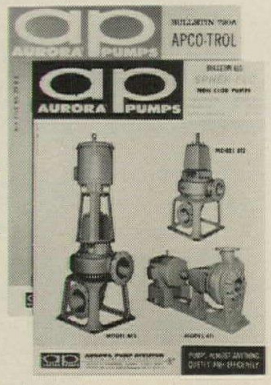

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efore cost control: a posture for public work

namic technological progress finds ex-
ession in the increasing sophistication
contemporary building systems of all
pes. Increasing in proportion is the cost
and the difficulty of predicting costs.
though cost estimating and control
ethods have developed to a high de-
ee, there is need now to examine some
the reasons and hopefully some of the
nedies for widespread frustration as
chitects confront the rigid, sometimes
dequate, budgets for public work and
e seemingly complex operating meth-
s of public construction agencies.

**dgets for investment buildings
n be rationally computed**

lowable budgets for certain building
pes, especially for industrial and com-
ercial buildings, can be computed with
asonable precision on the basis of the
urn on capital investment from rent or
erations. Budgets for projects of this
ture readily lend themselves to eco-
mic evaluation and thereby retain
me measure of flexibility.

**t public building budgets
e not logically developed**

blic, institutional and some other cate-
ries of buildings do not lend them-
ves to economic evaluation on an in-
stment basis. Budgets, therefore, are
ached to the programs of such build-
gs on the basis of many considerations
d judgments other than that of return.
nce budget magnitude cannot be deter-
ned (or adjusted) on the basis of eco-
mic return, the initial budget often
comes inviolate and unduly rigid—es-
cially so when it is locked into a public
propriation.

When bids come in over budget on
s type of building, the architect is usu-
y left with the burden of proof that his
sign is appropriate and that either the
ogram or the budget must be adjusted.
t too often he is expected to wave a
agic wand of highly sophisticated cost control methods to equalize bid cost with budget—and then maintain control.

Sophisticated cost control can't overcome excessive program

The public client is deemed by some to be a very special client. Therefore, it is implied, his projects require special cost control techniques. When the architect is confronted by an inadequate and inflexible budget for an overly ambitious program (both generally established before the design process begins), what unusual cost controls should he apply to the public client's project?

The truth is that cost control techniques used by the architect for any given scope of project must be the same regardless of the nature of the client, public or private. Professional responsibility does not vary from client to client; why then should any special conditions surround cost control for the public client? Appropriate conventional cost controls should be applied from the very first discussions of program and budget for any project, public or private.

Public clients blame the architect when bids come in too high

If we recognize that the approach to cost control is essentially the same for both private and public clients, then we have to probe more deeply into reasons underlying the special apprehensions that seem to preoccupy both architect and client regarding cost control of public work. Roots of the problem seem to lie in the inflexible, often unrealistic budgets mentioned earlier which bring architect and client to an impasse.

It is in this stand-off confrontation that some widely held misconceptions about architects assert themselves. For example, there is the notion that the architect is incapable of designing within a budget, that his estimates are concocted with a certain X-factor built into them, and further that the architect operates throughout, from design to bidding documents, with little if any regard for cost. It does little to allay such baseless notions to point out that if the architectural profession were really deficient in these important areas of responsibility, it surely would not enjoy the continuous patronage of the private corporate business community.

Public agencies are seen as unrealistic budgeteers

On the other side of the coin, the public client or government agency is looked upon in some quarters—similarly without basis—as being incapable of setting up a proper budget and program to build anything. The impression is that the budget is pasted together by obscure methods and then modified by another mysterious X-factor. Further, reports persist that the client presents, throughout the preparation of construction documents, his arbitrary directives of the design which have little relation to preestablished cost limits.

The solution lies in approaches—not methods

The point is that misconceptions are attributed too easily to both architects and public clients. An architect who has dealt extensively with public clients knows that they are as much concerned about the cost of construction as any private client. Therefore, the problem seems to be not the method of cost estimating or of working within a budget, but rather the approaches and attitudes between architect and client. Again: approaches to cost control methods, public and private, should be virtually the same; attitudes are the variable.

Public clients must guard the people's money

Each public agency will have its own format as to how and when various costs of a project are to be presented. While

this is also true of private clients, the private format is generally more familiar, more flexible and therefore, to some, seemingly more rational. Much of the frustration of architects and other professionals in dealing with public clients stems primarily from preconceptions about "how the government works" and the amount of red tape that must encumber the work; notions which have little to do with the actual professional relationship involved. Understanding is the key; understanding not only of the architectural problem but also of the characteristics which set the public client apart from the private client.

The chief difference lies in the government agency's position in our society with respect to allocations of construction money. "Public" means just that: public money. The responsibilities of the agency for that money are custodial and strongly circumscribed by law. A private corporation may, by direction of its own management, allocate more money for a project. A government agency, under similar circumstances, may have to send a special appropriation bill through Congress or pass through city council approvals for additional funds. And this is rightly so—even though the process is longer, more involved and sometimes unsuccessful. The money is not "theirs" but "the people's" money.

The architect must quickly state when budgets are inadequate

The importance of understanding this funding process is underscored in a situation, for example, in which a government agency presents an architect with an inadequate budget for an ambitious building program. This budget, set under stringent conditions, is all that is availble for the project. Now the architect, applying his cost-estimating methods, must abide by them and state from the outset that this project cannot be built to meet the program within the budget. This action creates a mutual awareness of position that must prevail throughout the duration of the project.

The client can, of course, begin the process of trying to increase the budget or reduce the program. At this point, it is important that the architect understand the difficulty of the client's situation and not allow what may appear to be inertia to pervade all subsequent decisions with the client. Neither the architect nor the client should delude himself when both know the budget is too small. If either persists, frustration begins to hamper decisions.

The fact that the architect almost always deals with his professional counterpart on the client's staff—and that both aspire to achieve the best possible design—is too often forgotten by both. Even when relationships appear congenial, an apprehensive attitude portends disappointment in the end.

Some public standards may seem unduly restrictive

Another source of irritation is the injection into public work of a great many standard restrictions and design limitations. Antagonisms rise when application of some of these standards seems to the architect to be irrelevant and expensive. But the public client, particularly the large Federal agency which is responsible for tremendous amounts of construction, has found that cost control requires much standardization—especially when the agency deals with a great many professionals of varying degrees of experience in public work.

Still another unfamiliar irritant for architects is the fact that very often public budgets, programs and sometimes even preliminary designs are set in order to establish appropriation requests before the architect becomes involved in the project. This reversal of the private approach to budgeting seems to be another disconcerting evidence of inflexibility of the public client's position.

A third-party cost consultant could help both sides

When mandatory requirements seem to the architect to be at odds with reality in his cost analysis, one device he can use is to retain an independent cost consultant for preparing estimates throughout project development. This could prove advantageous in several ways. First, architect and client are not drawn into battle directly over methods of estimating. Second, a disinterested party (the cost consultant) may be better able to convince the client that the initial budget was unrealistic. Third, the consultant's estimate can serve as a gauge of both client's and architect's accuracy.

All facets of cost estimating and control deserve the best attention at the earliest point and then continuously to completion. But apprehensive attitudes on the part of client and architect give rise to excessive preoccupation with "control of costs." The costs issue becomes a rationalization for ignoring perhaps the most basic problem itself—that of finding the means of establishing an initial realistic budget in concert with the building program.

In the offices of both architect and public client there is too much speculative reaction to the other's pre-supposed actions. Far more important is ferreting out suspect and competitive attitudes which prevent understanding and hinder cooperation.


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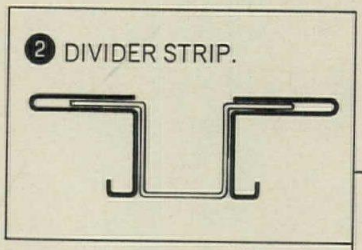

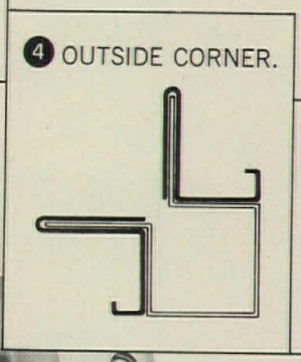

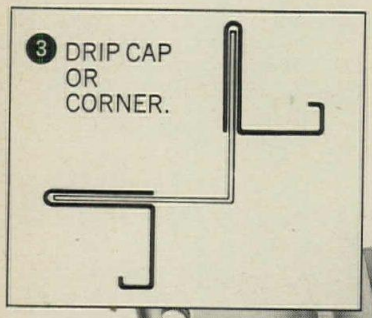

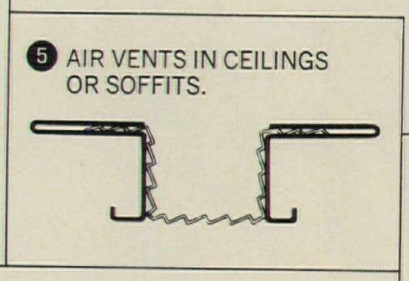

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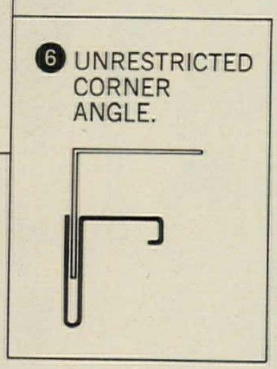

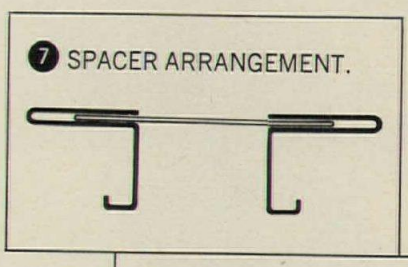

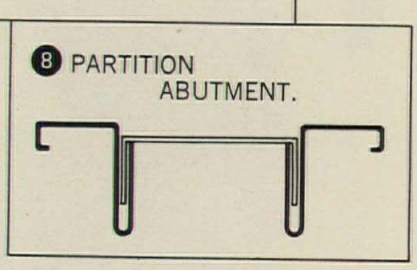

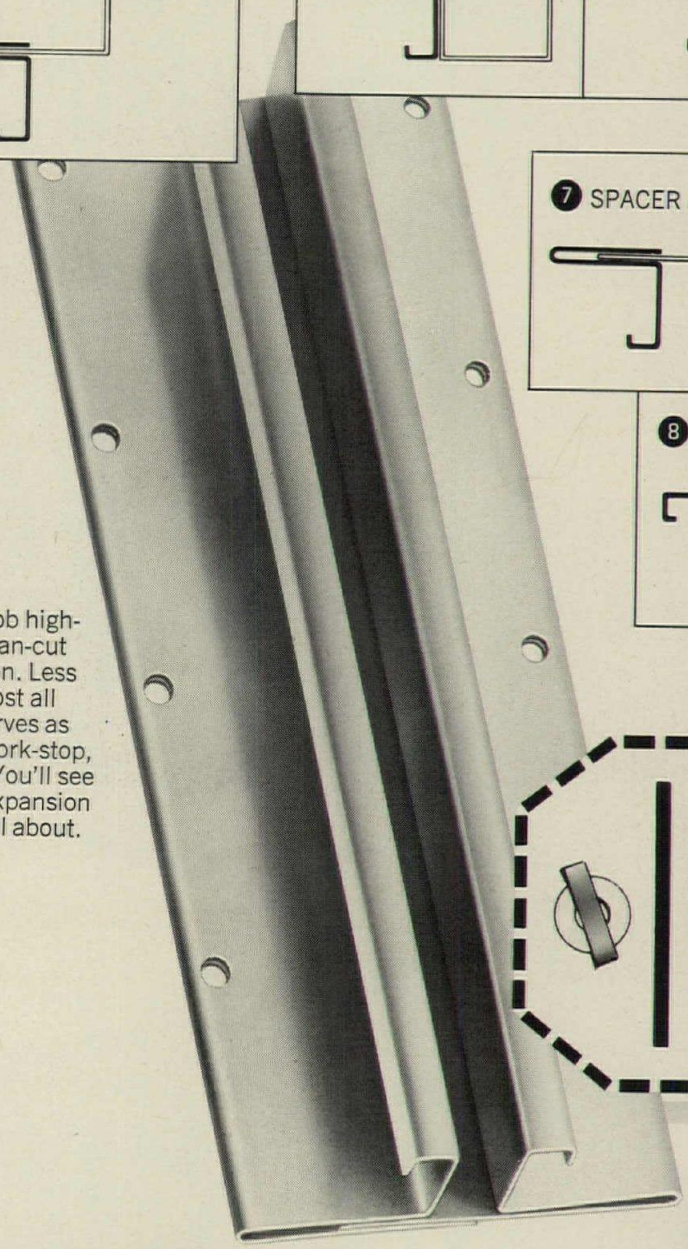

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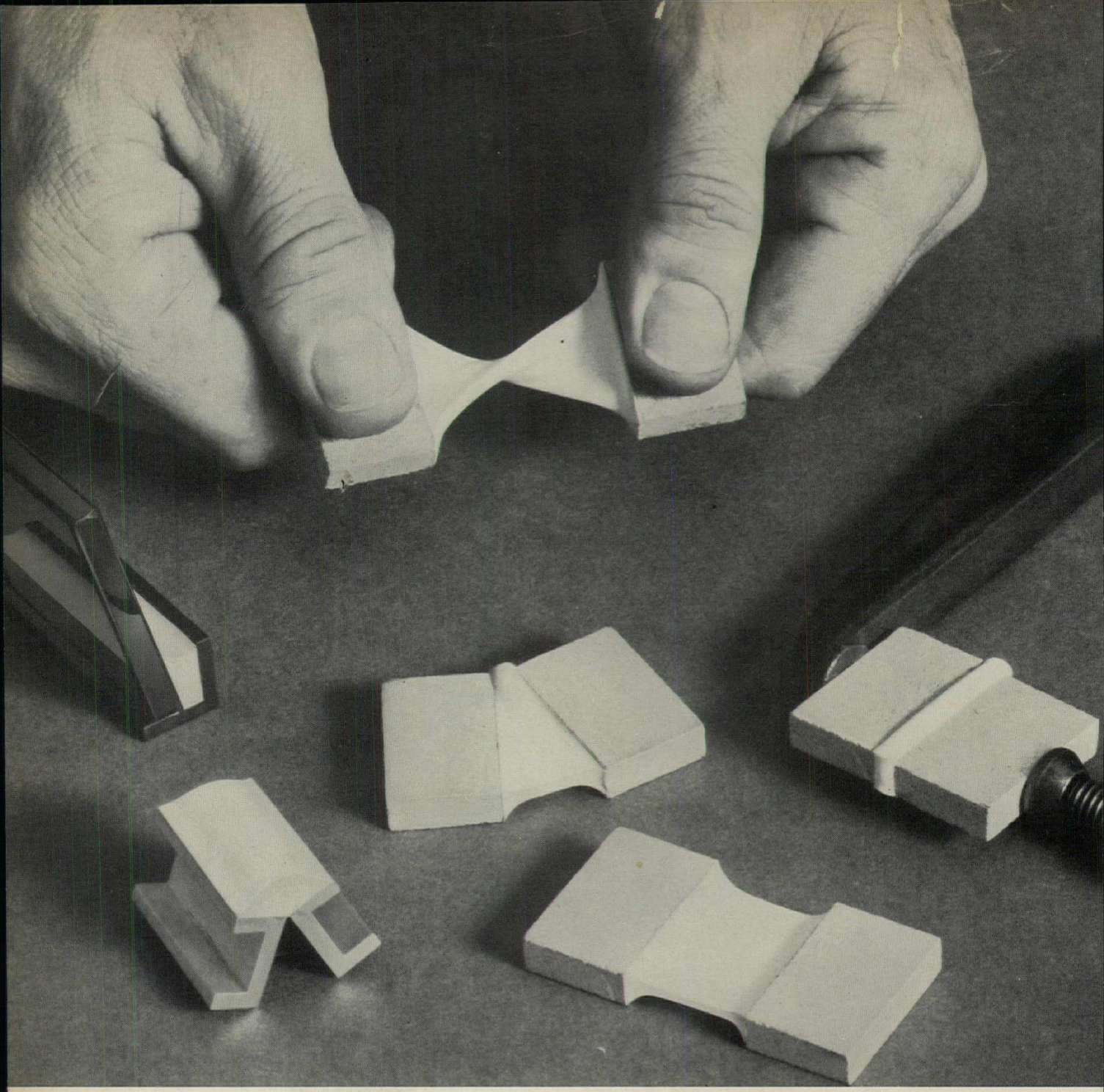

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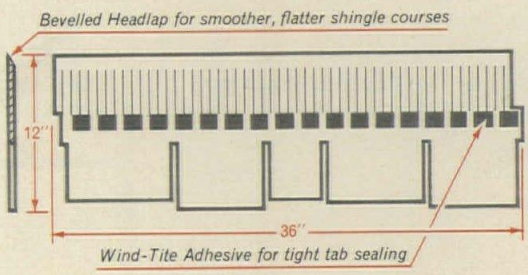

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Smallwood & Doench, Architects

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Franklin Square Hospital: a response

Your article on Franklin Square Hospital (February, page 135), while it contained imaginative ideas, presented most unfortunate cost data. It states, concerning a modern 300-bed hospital capable of being expanded to 600 beds, that "Total cost, including site work and separately-bid fixed equipment will be about $5.3 million—$17,667 per bed."

Using the cost per bed as an index is misleading since it does not indicate what space or services are provided. From data shown in our own Cost Comparison Table, the Towson, Maryland Hospital, which Mr. Wilson uses as a Hill-Burton hospital comparison, provides more than twice the cost per bed. Mr. Wilson reports a total cost figure of $17,667 whereas the cost provided by our grant applicant is $25,369—a difference of approximately 50 per cent. He may not have been aware of the data filed by the applicant listing cost which totaled $7,610,687. Mr. Wilson's figure of $5.3 million was construction cost only and did not include: Group II and III equipment; site survey and soil investigation; supervision on the site; insurance and moving; relocated fixed equipment; reused movable equipment.

We cannot refrain from commenting on the low square foot per bed, especially since this hospital expects to expand to 600 beds.

In our experience, when the square foot area per bed is low, the unit cost is high. In our Cost Comparison Table (since Mr. Wilson mentioned other Baltimore hospitals) the cost per square foot is $44.40 for Franklin Square, while the two others are considerably lower.

These comments are not meant to discourage experimentation by Franklin Square and other hospitals in cost reduction in purchased services such as laundry, food supply and power as well as the other shared sponsors to show incomplete cost data.

Wilbur R. Taylor
Department of Health, Education, and Welfare
Silver Spring, Maryland

. . . and a reply

Mr. Taylor's point that construction cost comprises only part of the total project cost is well taken. Too often many of the supplementary costs are grossly underestimated or ignored in the establishment of the initial project budget. It should be noted that the Architectural Record article was treating only the subject of construction costs and the procedures adopted for their control.

more letters on page 116

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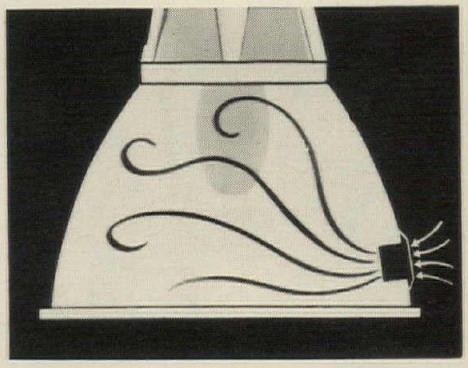

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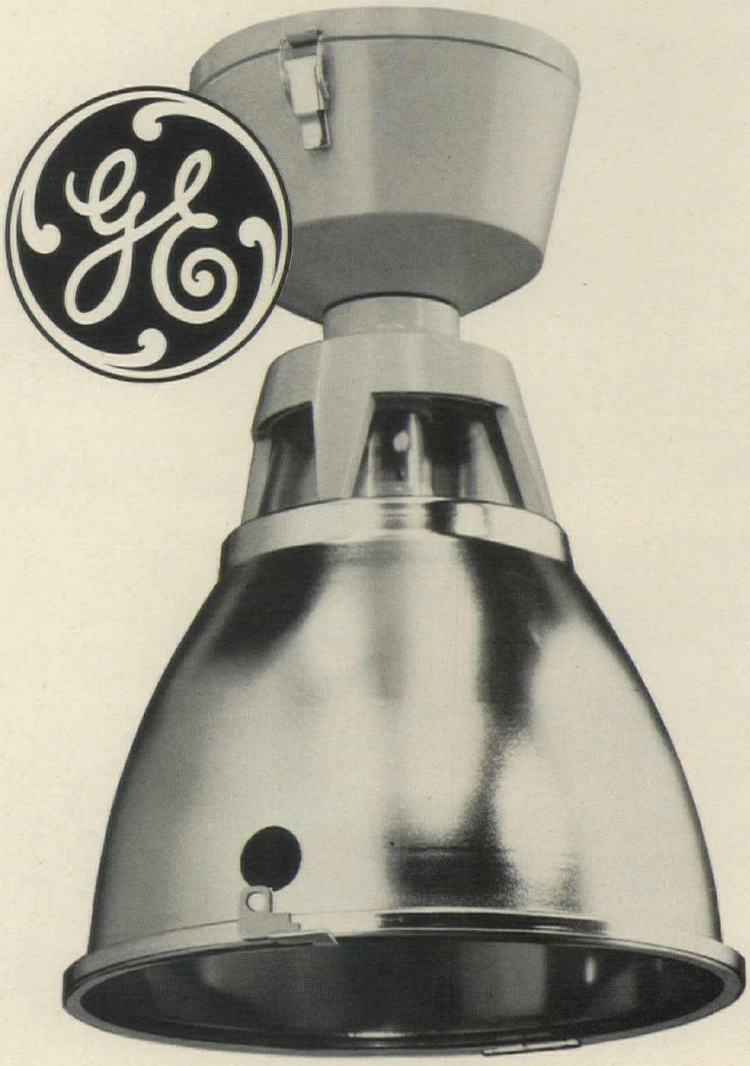

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Ask for this NEW Catalog...

This new Chicago Faucet Catalog is the most comprehensive of its kind. It covers just about everything in the way of fittings to meet the special requirements of hospital, institutional, educational and industrial applications.

In its 44 pages you will find the most complete array of faucets and special fittings ever presented . . . supplemented by readily interchangeable parts for converting them into the specials needed for these installations.

Be an expert. Use this catalog to find the one best answer in a fitting that bears the most respected name in faucets. Coupon brings your copy.

Distributed through the Plumbing Trade exclusively.

THE CHICAGO FAUCET COMPANY
2100 S. Nuclear Drive, Des Plaines, Illinois 60018
(a Suburb of Chicago)

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Company_____

Address_____

City, State, Zip_____

By_____

Mail to: The Chicago Faucet Company
2100 S. Nuclear Drive, Des Plaines, Illinois 60018

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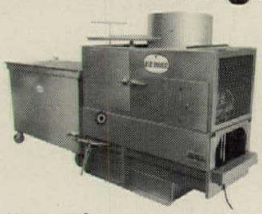
If you are concerned with good design, usable space, economy for your client, better maintenance... and air pollution

You should include an E-Z Pack Fixed Packer in your building.



By compacting refuse at a high ratio and storing it out of sight, our Fixed Packer improves the appearance of your building, cuts the costs of refuse disposal, simplifies handling, eliminates incineration and resulting air pollution.

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E-Z PACK COMPANY
Division of Hercules Galion Products, Inc.
Galion, Ohio 44833

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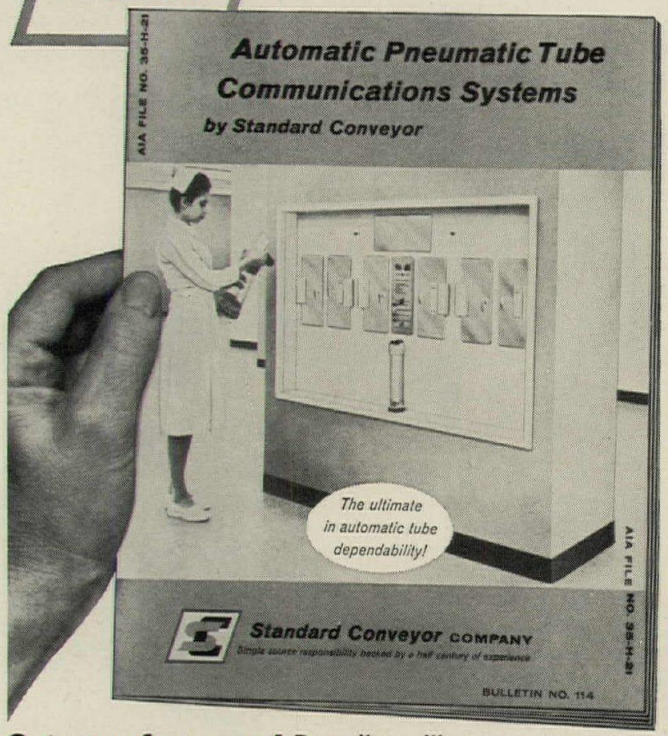
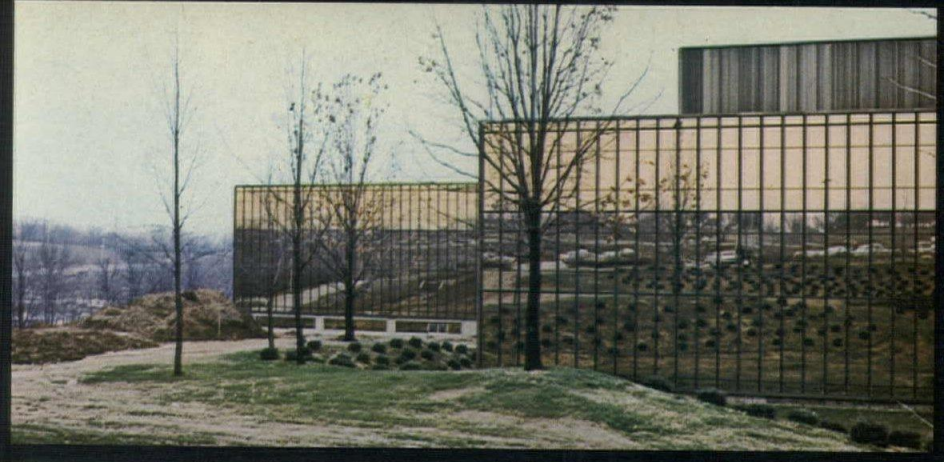
NEW ***All you need to know about***

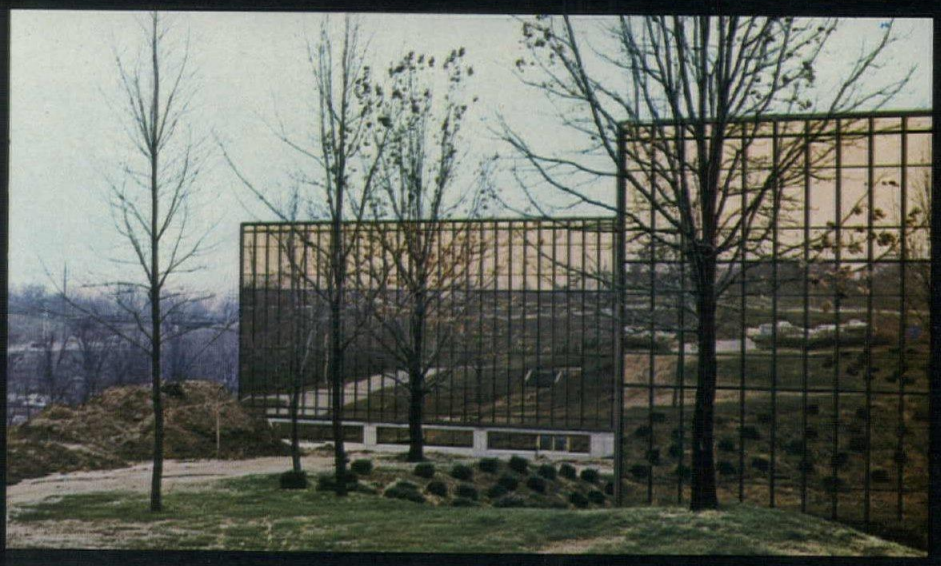


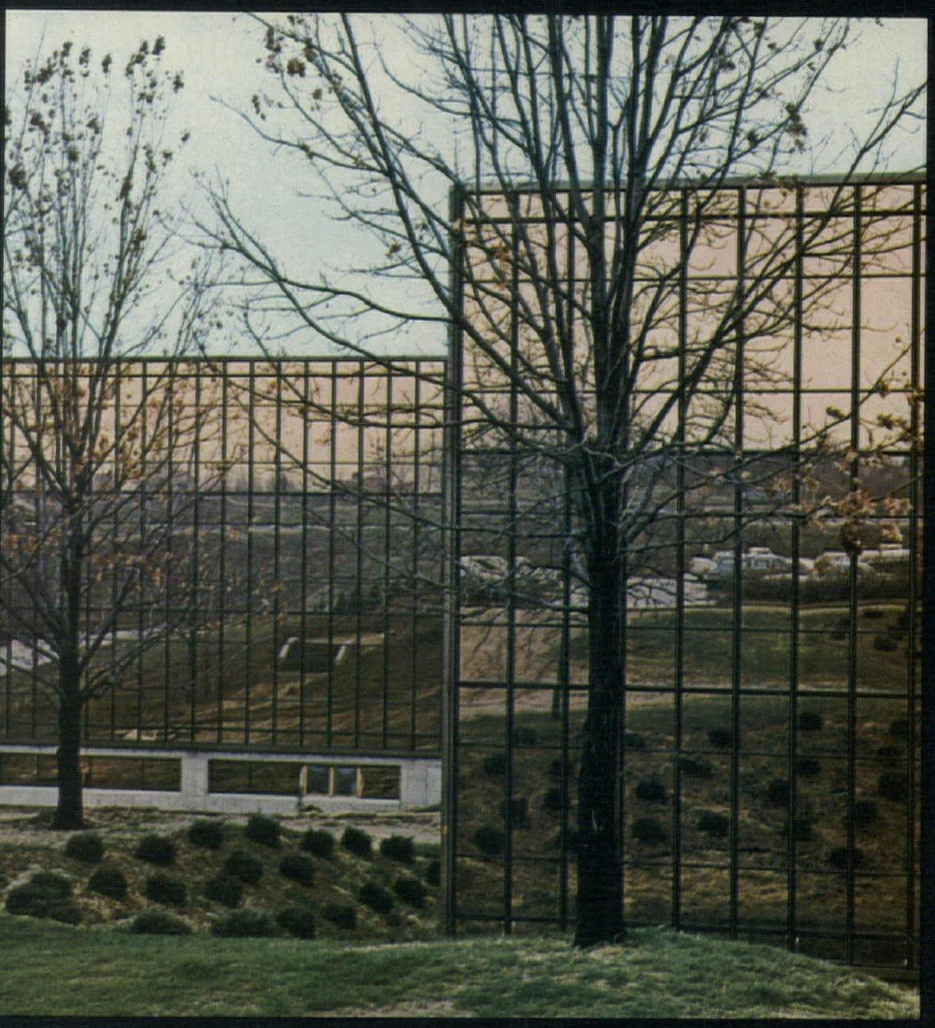
Get your free copy! Describes, illustrates new type automatic tube systems featuring greater dependability, quieter operation. 12 pages. ***Standard Conveyor Co., 312-E Second St., North St. Paul, Minn. 55109.***

For more data, circle 184 on inquiry card

For more data, circle 74 on inquiry ca







nsanto Co., St. Louis, Mo.; Architect: Vincent G. Kling & Associates, Philadelphia, Pa.

Reflectio of an Architect

Reflect a moment o clad in gold or silv which image the d and near-by trees, the clouds and sky . . . clas landscape. Integrally b

Kinney Architectural C

From without, reflectiv cealing the inner clutte working environments. internal spaces for effici Obviating awnings, scr blinds, drapes and othe artifices. Reducing air- tioning requirements.

From within, transpare mitting the undistorted, free, color-true entranc surrounding scenes.

Cool. Even to the touch summer day, because it (not absorbs) up to eigh cent of the solar heat.

Exactingly vacuum-coat deep gold, or bright alu Sizes to 60 x 96 inches, i thicknesses. Insulated or safety glass. Detailed de literature on request.

Kinney Vacuum Coating De
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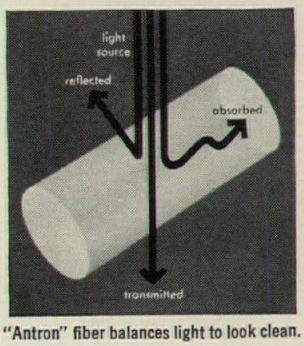
Pennsauken, New Jersey 081
Telephone: (609) 665-9364

Kinney Vacuum Division
The New York Air Brake C

Antron® picks up just as much day-to-day soil as any other carpet fiber. But your clients will never believe it.



"Antron" fiber balances light to look clean.

ntron" is the surprising new fiber from Du Pont keeps its new look longer—and keeps the appear- level of the busiest buildings at their highest.

en light colors look clean longer, because Antron* minimizes the appearance of soil. Some carpet are transparent, so you see not only the dirt on the acing you, but the dirt on the opposite side is mag- . "Antron" is different. It is specially structured opaque. It controls absorbed, reflected and trans- d light to minimize the appearance of soil.

d "Antron" is remarkably durable. It resists ing, pilling and fuzzing and is easy to clean.

earhead": Pile content, Antron®; yarn ply, 3 ply; stitch count, 8.6 ivalent to 8.6 w.p.i.); gauge, 1/8" (equivalent to 216 pitch); pile ght, 28 oz./sq. yd.; pile height, 6/32" (equivalent to .188"); primary king, 100% polypropylene; secondary backing, 8 oz. jute (avail. foam); total finished weight, 70 oz./sq. yd.

When you combine all these benefits, your clients end up with carpets that need less frequent cleaning and keep their new look longer. Carpets with pile of "Antron" deliver a long term saving. And *that's* something you *will* believe!

"Antron" is the optimal carpet fiber for high traffic areas and is available in a wide variety of contract styles from leading mills. Ask ALDON about "Spearhead" and "Invader."

For a free brochure on "Antron" (and Du Pont's other contract fibers) write: Contract Carpet Specialist, Du Pont Company, 308 East Lancaster Avenue, Wynnewood, Pa. 19096.

DU PONT ANTRON® NYLON CARPET FIBER

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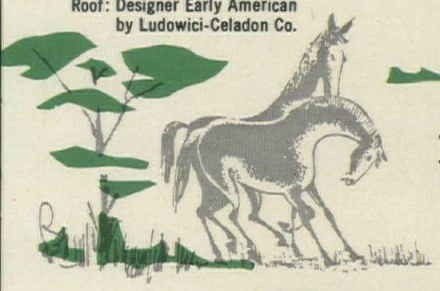
*Du Pont registered trademark. Du Pont makes fibers, not carpets.

Waverly Farms
Village of Golf, Florida

Architects: Bywaters & Duemmling
Fort Lauderdale, Florida

Roof: Designer Early American
by Ludowici-Celadon Co.

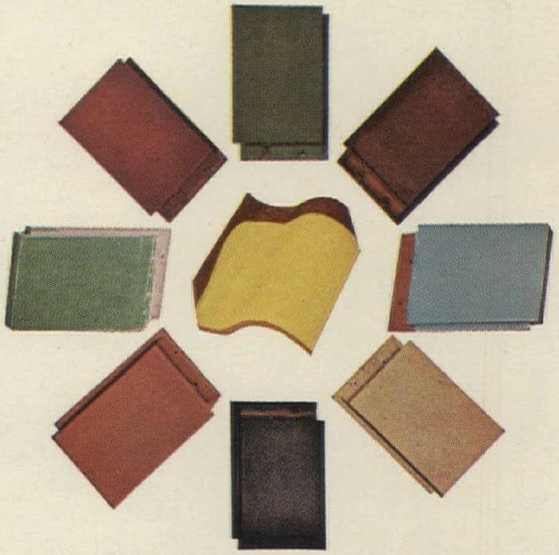


The Architects selected Ludowici's Designer Early American pattern Roofing Tile in a range of Dark Gray

for the roof of this gracious residence and several other buildings on the estate.

They chose this prestige material for its beauty—its durability—its non-fading colors.

Architects can offer their clients this superior roofing material of hard-burned clay tile in a great variety of colors, patterns and surfaces, all architecturally correct.



WIDE SELECTION OF OTHER PATTERNS, TEXTURES & COLORS

For additional information write Dept. AR

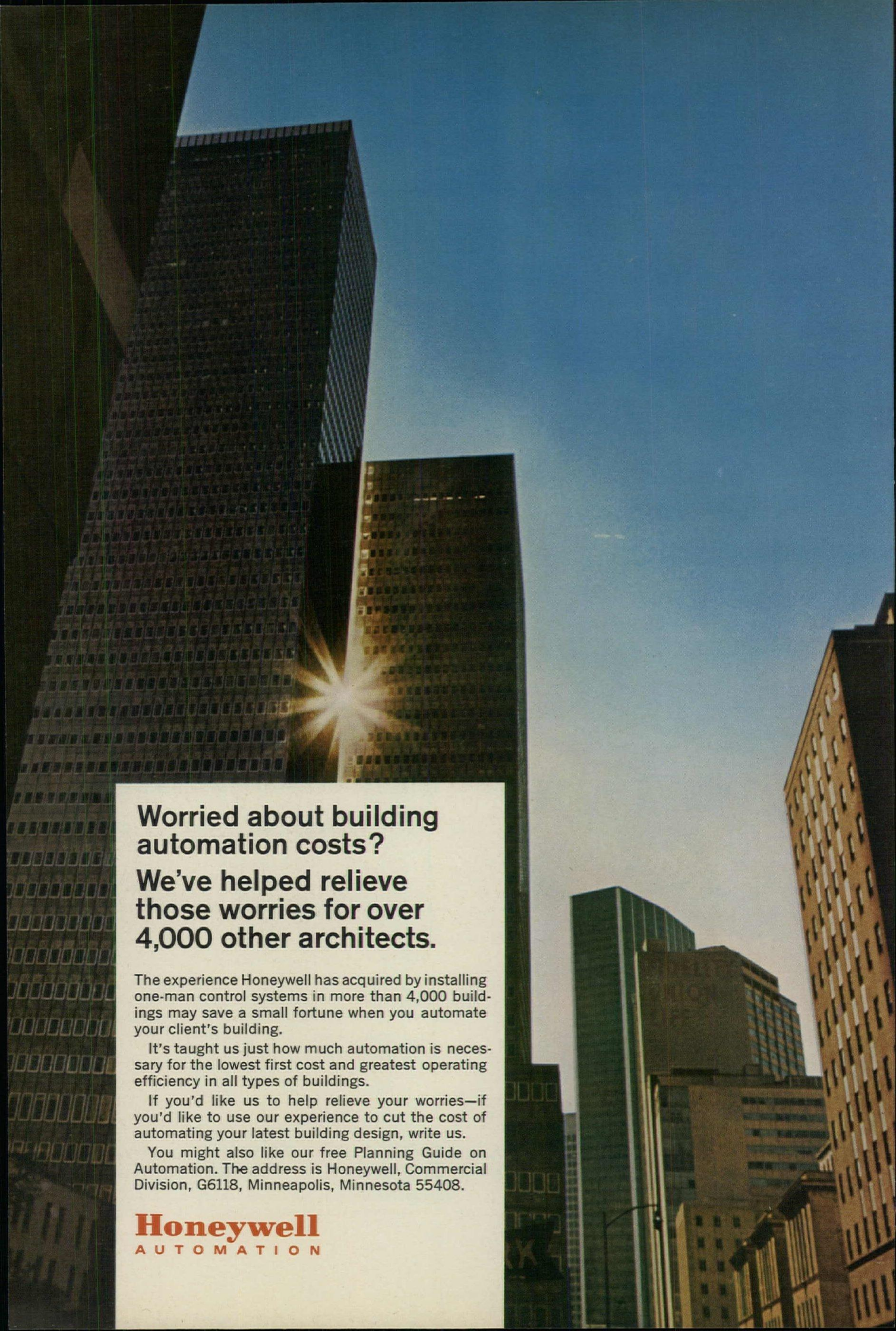
LUDOWICI-CELADON COMPANY

75 East Wacker Drive • Chicago, Illinois 60601

Manufacturers of quarry tile, the nation's largest producer of roofing tile and NAILON Facing Brick.

A.I.A. FILE 12-E

For more data, circle 76 on inquiry card



Worried about building automation costs?

We've helped relieve those worries for over 4,000 other architects.

The experience Honeywell has acquired by installing one-man control systems in more than 4,000 buildings may save a small fortune when you automate your client's building.

It's taught us just how much automation is necessary for the lowest first cost and greatest operating efficiency in all types of buildings.

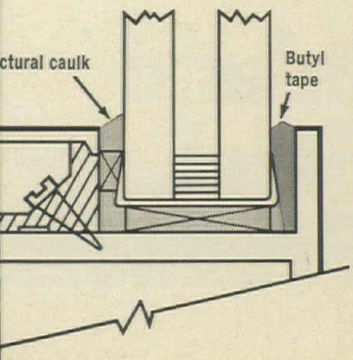
If you'd like us to help relieve your worries—if you'd like to use our experience to cut the cost of automating your latest building design, write us.

You might also like our free Planning Guide on Automation. The address is Honeywell, Commercial Division, G6118, Minneapolis, Minnesota 55408.

Honeywell
AUTOMATION

From 30° below to 100° above...

Butyl tape keeps insulated windows leak-free.



Because of the seasonal temperature extremes in Minneapolis, the tall, dual-pane insulated windows used with the marble sheath on the new Northwestern National Life Insurance Building needed a carefully designed glazing system. An effective seal was obtained with flexible, non-hardening Butyl tape.

Made of specially processed Enjay Butyl rubber and polyisobutylene, the preformed tape has 100% non-oxidizing solids. It provides a strong bond between the glass and external stop ... is resistant to shrinking, hardening, cracking, ultraviolet rays and temperature extremes between —40°F and 200°F... gives practically permanent sealing. On sashes with interior stops, all glazing with Butyl tape can be done from the inside... with no scaffolding or external clean-up. Supplied with a paper backing, the tape is easily and quickly applied.

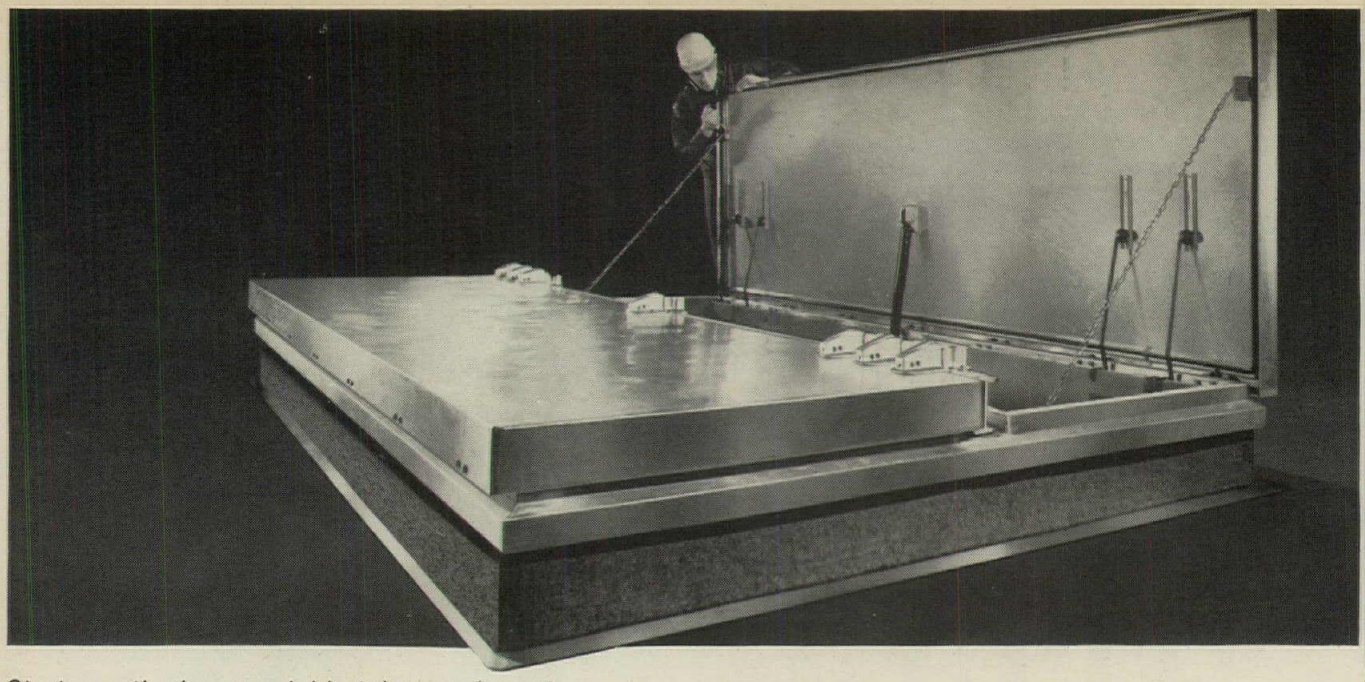
Butyl sealing tapes are also widely used for sealing mullions, exterior panels and the like. They are available in a variety of colors and shapes, usually with internal reinforcing to prevent distortion and squeeze-out.

Enjay does not make tape, but we do supply Butyl rubber and other elastomers to quality-conscious tape manufacturers.

Enjay Chemical Company,
60 West 49th Street,
New York, N. Y. 10020.

ENJAY

For more data, circle 78 on inquiry card



Start mentioning special hatches and most manufacturers don't even want to talk to you. Some won't budge an inch on their standard sizes. What to do?

Ask about Inland's two-step answer. Step one: you design the roof opening and specify the hatch's operating characteristics. Step two: We will modify a standard Milcor hatch or custom design one to match your exact needs. Typical modifications include: special height curbs, special insulation, metal outside liners for curb insulation, cylinder locks, special sizes, explosion release cover mechanisms.

We can make a Milcor hatch to match your special needs.

We have a lot to offer in standards too. Single or double leaf roof styles, sidewalk or floor doors, and smoke hatches available in a choice of metals, finishes and sizes. Standard or special, Milcor roof hatches and floor doors are strong and dependable. And all are counterbalanced for easy manual operation.

Write for the new Milcor Roof Hatch and Door catalog no. 211. Inland Steel Products Company, Dept. E, 4033 W. Burnham Street, Milwaukee, Wisconsin 53201.

From the makers of Milcor Metal Access Doors

Inland Steel Products

INLAND

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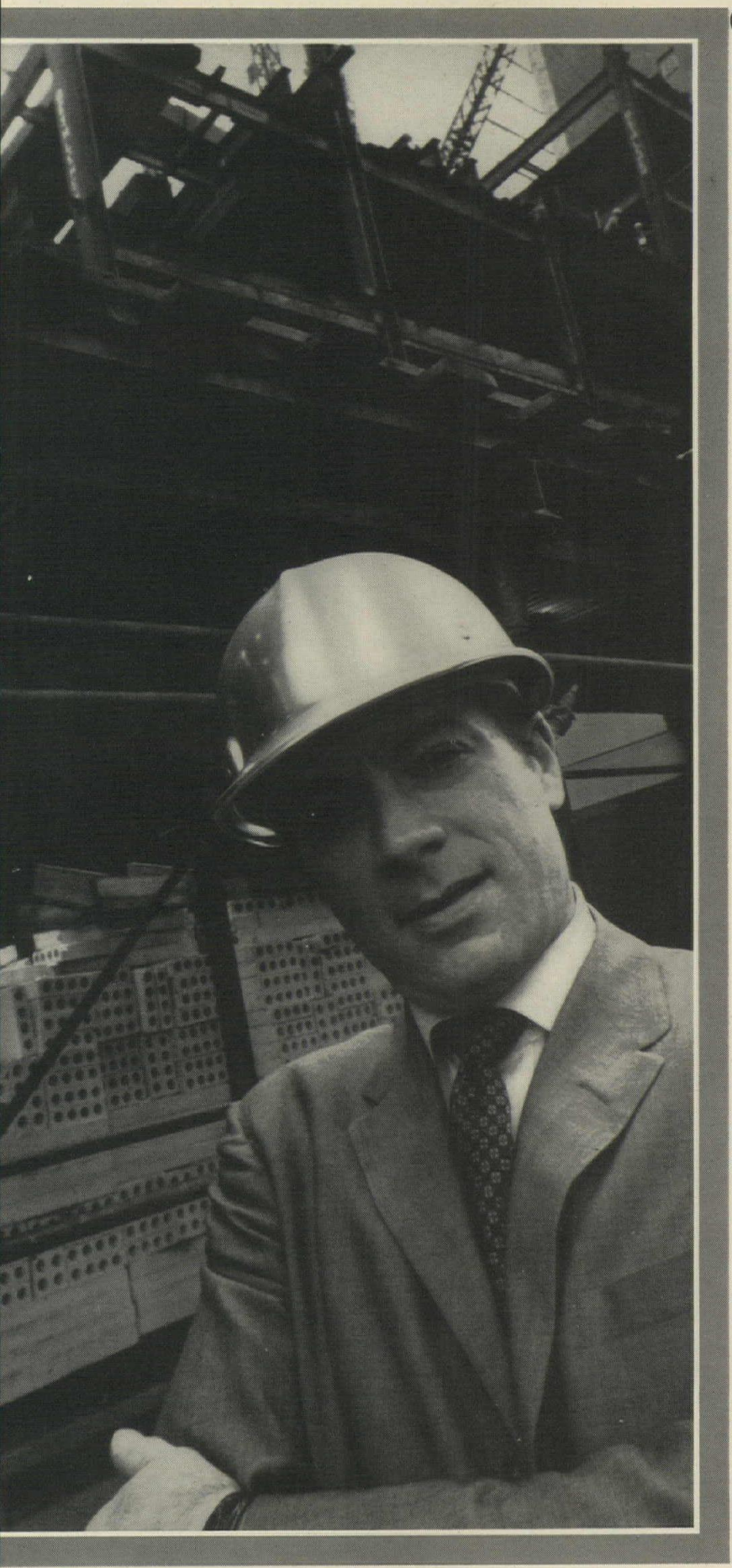


"Butyl caulks last 5 times longer ... cost just pennies more."

Ask any contractor who has used Butyl-based caulks and he'll tell you that it doesn't make much sense to specify 3- to 5-year oil-base caulks on permanent structures. Not when one-part Butyl sealants cost only a fraction more ... are just as easy to apply ... and give you a seal that's good for 20 years or more.

When made of non-oxidizing weather-resistant Enjay Butyl rubber, economical Butyl sealants resist cracking and hardening ... are non-staining and offer superior adhesion with minimum shrinking. Normal service life is 20 years or longer. Except for extreme movement joints (lap joints with more than 20% relative movement and butt joints with more than 15%), performance of these economical sealants is comparable to that of expensive, chemically cured rubber-base sealants, both the one- and two-part variety.

Enjay does not make Butyl sealing caulks, but we do supply Butyl rubber and other elastomers to quality-conscious manufacturers that do. Enjay Chemical Company, 60 West 49th Street, New York, N.Y. 10020.

ENJAY **Enjay Chemical Company**

For more data, circle 80 on inquiry card

continued from page 104

To keep the record straight, no comparison was made, nor intended, between the construction cost of Franklin Square Hospital and that of any other particular Baltimore hospital. However, since Mr. Taylor has made such a comparison, it might be well to take a closer look at his figures. Adjusting for rising prices, the total Project Cost of Project No. 104 would be approximately $36,200 per bed today while that of Project No. 100 would be $37,500 based on newspaper reports of actual expenditures. Using the latest figures submitted by the hospital to the Public Health Service, the comparable Project Cost for Franklin Square Hospital is $22,939 with a resulting square foot cost lower than that of Project No. 100. It must be emphasized that the comparison is neither fair nor valid since the three hospitals differ in their philosophies, needs, services and procedures. The above is presented only to bring Mr. Taylor's figures up-to-date.

Similarly, it is invalid to equate the cost, efficiency or quality of a hospital to square feet per bed. In the case of Franklin Square Hospital substantial reduction in circulation and dietary space, omission of a laundry plus detailed analysis of the hospital's actual needs resulted in a low gross area with no compromise of its medical care programs. Most space savings were a consequence of the understanding, cooperation and direct participation of the administrative and medical staffs in all phases of design development.

Interestingly, Mr. Taylor's examples are illustrations of the serious pitfalls which Franklin Square Hospital is hoping to avoid through full involvement of a Construction Consultant. Project No. 104 required rebidding to bring it closer to the construction budget while Project No. 100 experienced severe financing problems occasioned by unexpected costs following receipt of bids.

David H. Wilson
David H. Wilson & Associates
Towson, Maryland

Alan Dunn and architecture

I am a great admirer of Alan Dunn's cartoons on the Perspectives page every month. As soon as I have a copy of RECORD, I turn to that page and enjoy it. I was never more delighted than when I saw the November cartoon: What a wonderful way of expressing, admiring, criticizing contemporary architecture!

A. N. Suryavanshi
Consulting Engineer & Architect
Maharastra, India

ON THE CALENDAR

MAY

20-24 Inter-American Conference on Materials Technology—Convention Center, San Antonio, Texas.
26-28 Annual Theatre Television and Film Lighting Symposium, Illuminating Engineering Society — Barbizon-Plaza, New York City.
29 Construction Specifications Institute Twelfth Annual Convention—Denver Hilton Hotel, Denver.

JUNE

5-7 Annual Pacific Coast Builders Conference—Fairmont Hotel, San Francisco.
8-14 Annual conference of the Building Officials Conference of America—St. Paul Hilton, St. Paul, Minnesota.
16-21 International Federation of Landscape Architects Biennial Congress—Bonaventure Hotel, Montreal.
16-22 International Design Conference, Aspen, Colorado.
23-26 American Society of Landscape Architects Annual Meeting—Sheraton-Brock Hotel, Niagara Falls, Ontario.
23-28 Annual Meeting and Materials Testing Exhibit of the American Society for Testing and Materials—Statler-Hilton Hotel, San Francisco.
23-29 A.I.A. Annual Convention—Portland Memorial Coliseum, Portland, Oregon, and Ilikai Hotel, Honolulu (June 28-29).
24-26 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Annual Meeting—Lake Placid Club, Lake Placid, New York.

JULY

8-12 Annual Summer School Planning Institute, Stanford University. Topic: The processes of planning as they affect educational planning. For information, write: School Planning Laboratory Summer Institute, School of Education, Stanford University.

OFFICE NOTES

OFFICES OPENED

John Fowler, Registered Architect, has opened an office at 104 Audubon Street, New Haven, Connecticut 06510.

Hammel Green and Abrahamson, Architects Engineers announce the opening of a new office at 329 Park Avenue

continued on page 132

The galvanized door

Discover the rustless door. Discover Steelcraft.

Here's a door that can take it . . . Steelcraft's zinc-coated steel door. Shrugs off weather, salt air, high humidity, abnormal abuse. Retains its good looks year after year.

Scratch the zinc coating and protective action continues. The hot-dip-applied coating of 1.25 ounces of zinc per square foot of steel (in accordance with ASTM spec A-525) makes the door practically immune to rust . . . inside and out . . . even on sharp bends where thinner, less effective zinc coatings flake off.

Steelcraft zinc coated doors and frames are specially treated to take and hold their prime coat of paint. They won't peel. So maintenance is practically nil.

Available in a wide range of styles, in heights of 6′8″, 7′0″, 7′2″ and 8′0″, labeled and non-labeled construction, and in 20, 18, and 16 gage.

For more information on The Galvanized Door, write Steelcraft, 9017 Blue Ash Road, Cincinnati, Ohio 45242 U.S.A.

STEEL Craft **Steelcraft**

finest name in metal doors and frames

For more data, circle 84 on inquiry card

This new GE Mainlighter* fluorescent announces a bright new day for American business.

A new 40-watt fluorescent that combines high light output, low operating cost and long life.

General Electric has a new standard fluorescent. But there's nothing "standard" about it.

The new GE MAINLIGHTER fluorescent is taking the place of our two most popular fluorescents: the "3-PLUS" and the "/54."

The reason is this: We've married the best features of both these best-selling fluorescents into one fluorescent. We also added a new phosphor to it. And the result is dazzling.

The new GE MAINLIGHTER Cool-White fluorescent gives you a perfect light combination: A high light output of 3120 lumens (just like the "3-PLUS"). And a long, dependable life with low operating cost (just like the "/54").

With this new fluorescent you can expect a higher light output than from any competing standard 40-watt fluorescent. Plus a wattage consumption that's as low or lower than any other 40-watt brand—and a life that's as long or longer.

All this for just $1.12—for the Cool-White model. You know, that's possibly the only thing that's normal about this new fluorescent.

For full information about the new GE MAINLIGHTER fluorescent—see your GE Large Lamp Agent. Or write to us: General Electric Co., Large Lamp Dept., C-809, Nela Park, Cleveland, Ohio 44112.

We make a prediction: It's going to be a brighter year for American business.

*TRADEMARK OF THE GENERAL ELECTRIC COMPANY

GENERAL ELECTRIC

See more for your dollar with GE lamps.

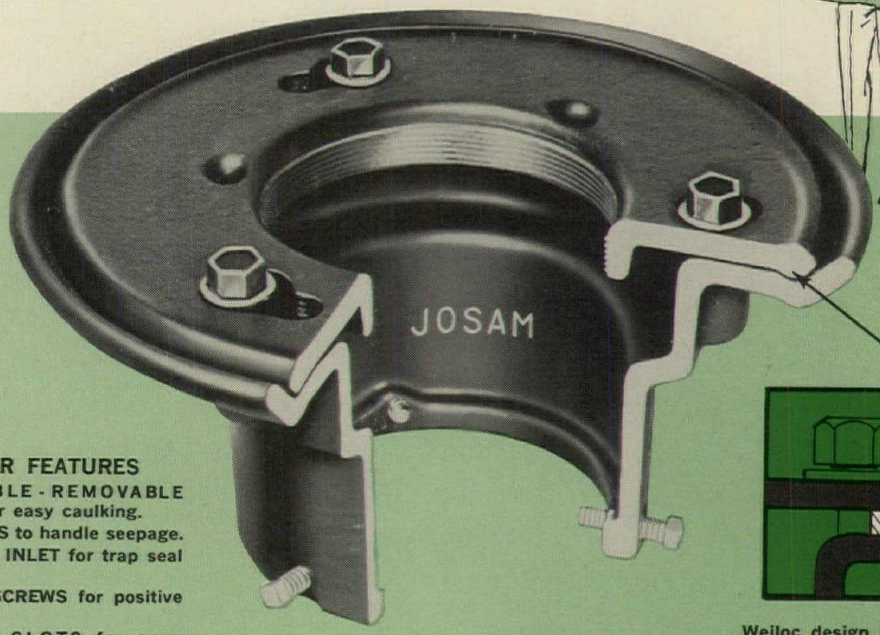
For more data, circle 85 on inquiry card

A GRIPPING PERFORMANCE

JOSAM

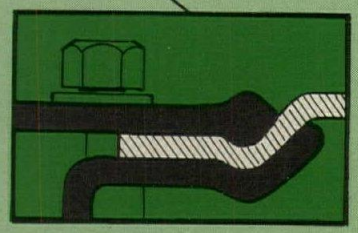
SUPER **300-**

FLOOR DRAIN



OTHER FEATURES

INVERTIBLE-REMOVABLE COLLAR for easy caulking.
WEEPHOLES to handle seepage.
AUXILIARY INLET for trap seal primer.
LEVELOC SCREWS for positive pipe grip.
KEYHOLE SLOTS for easy collar removal.



Wejloc design of collar and body grips waterproofing without puncturing to provide a solid bond with drain.

The Josam Super 300— Drain has several important features that provide a superior installation. The Wejloc design on the collar provides a positive *NON-PUNCTURING* bond of waterproofing to drain. The heavy threaded collar provides a choice of Josam adjustable strainers including the Type ASF Super-Flo strainer (more sanitary, stronger, and drains water faster.) The Super 300— drain is designed to meet the requirements of modern construction. Specify them on every job. Write for Manual TJ today.

JOSAM

JOSAM MANUFACTURING CO.

Michigan City, Indiana 46360

JOSAM PRODUCTS ARE SOLD THROUGH PLUMBING WHOLESALERS

For more data, circle 86 on inquiry card

...and this new GE Staybright* fluorescent makes it even brighter.

It starts brighter, stays brighter, stops end-blackening—gives the lowest total cost of light.

No other 40-watt fluorescent is as bright as this one. General Electric made sure of it—by adding an improved phosphor, a different gas and an insulated shield that stops end-blackening. And it all works beautifully.

The GE STAYBRIGHT fluorescent starts with 3200 lumens—the highest number yet for any 40-watt fluorescent that meets industry specifications for cool white colors.

Not only does it start brighter—it will stay brighter through improved lumen maintenance. For example: At 12000 hours you'll have received 5% more lumen hours than with any other 40-watt fluorescent.

Another advantage: Better appearance. It's the first 40-watt fluorescent to battle end-blackening. And win.

The GE STAYBRIGHT fluorescent will always give a bright, clean light during its working life. And that seems to leave other 40-watters in the shade. Doesn't it?

Total up this new fluorescent's performance — and you'll end up with the lowest total cost of light of any 40-watt fluorescents.

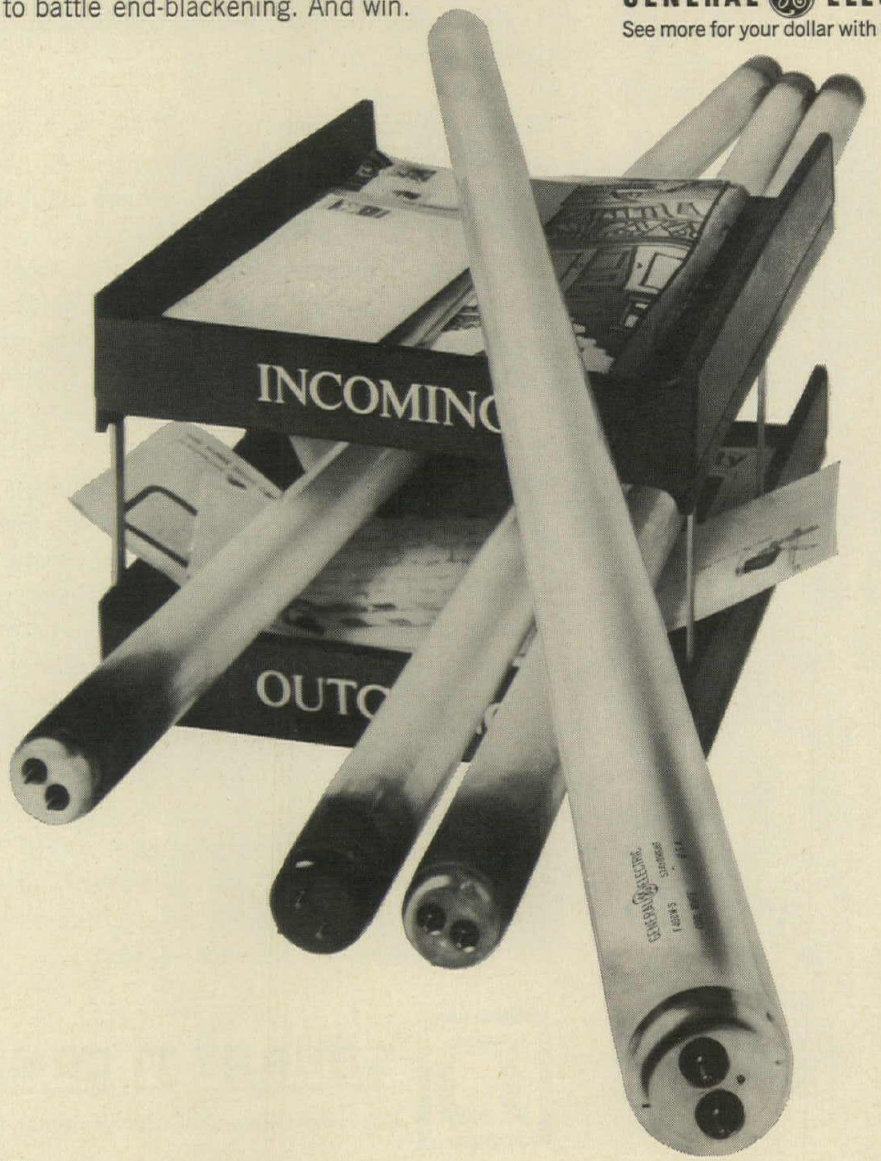
And that makes $1.29—the price of the Cool-White GE STAYBRIGHT fluorescent—seem a downright bargain. Which it is.

For full facts about the new GE STAYBRIGHT fluorescent—see your GE Large Lamp Agent. Or write to us: General Electric Co., Large Lamp Dept., C-804, Nela Park, Cleveland, Ohio 44112.

Now, doesn't everything look a little brighter today?

GENERAL ELECTRIC

See more for your dollar with GE lamps.

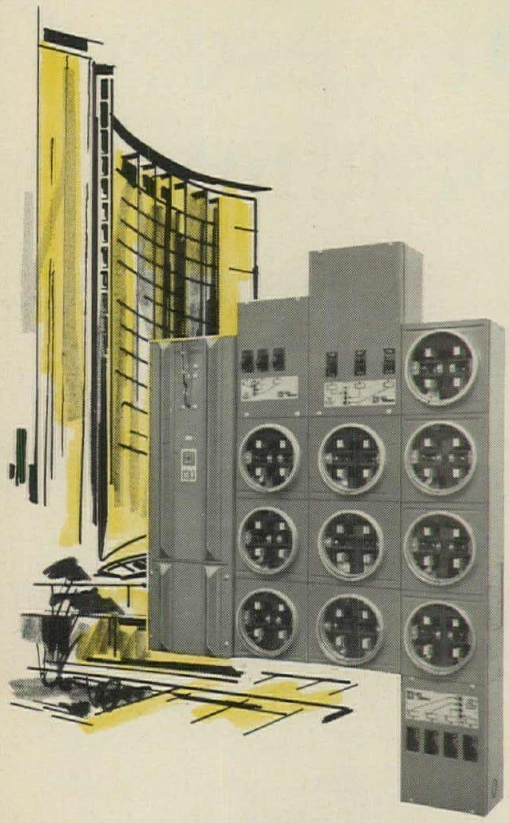


*TRADEMARK OF THE GENERAL ELECTRIC CO.

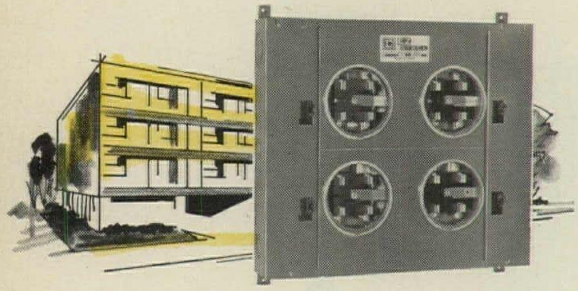
For more data, circle 87 on inquiry card

Square D
E-Z Stack devices

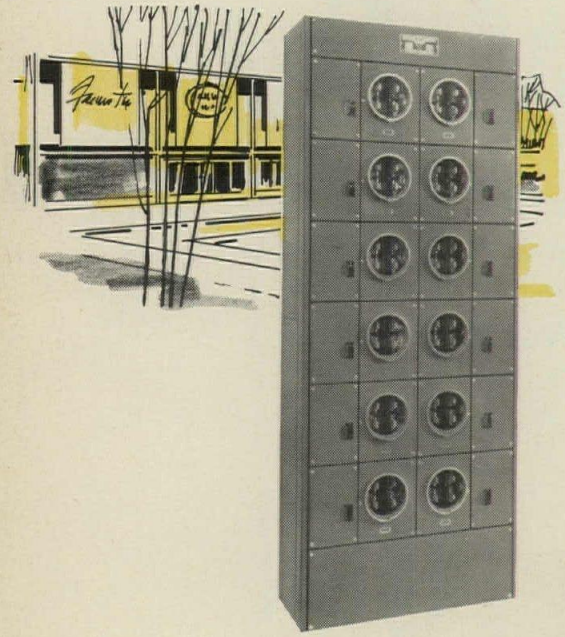
meet every multi-metering requirement



High-Rise Apartment buildings can have smaller electrical closets when you specify Vertical E-Z Stack. This indoor metering system is the most compact available. For example, a completed 24-meter assembly is only 62 inches wide. You can intermix 100, 125 and 150 ampere branch sockets to a maximum of 1,200 ampere mains rated assembly. Minimum on-site assembly reduces cost. Each device is completely internally bussed with plated copper bussing. Load conduits can be installed at the top or bottom of the main and branch breakers. For 120/208 or 120/240 volt service. UL Listed.



Garden Apartments, or other two to six dwelling apartments call for Unitized E-Z Stack. Equipment can be installed indoors or outdoors depending on preference or local codes. Installation is a one-man job since enclosures can be mounted with interior removed. This also keeps the interior safe from weather and construction damage until ready for final wiring. Meter sockets are available in 100, 125 and 150 ampere ratings with mains to 600 amperes. For 120/208 V, 3-wire or 120/240 V, 3-wire service. UL Listed.



Shopping Centers, commercial buildings and high-rise apartments with special service requirements need Customized E-Z Stack. It uses standard components in free-standing switchboards which can incorporate transformers, fusible switches and other switchboard components as well as the metering devices. Installation costs are minimized because equipment is completely factory-assembled and bussed to specifications. A variety of meter sockets for 1ϕ and 3ϕ, 100 or 200 ampere services is available to meet any requirement. UL Listed.

Your Square D Field representative or distributor can help you design and select an E-Z Stack system to meet your needs exactly. Call him. Or write us directly for full details. Square D Company, Dept. SA, Lexington, Kentucky 40505.

SQUARE D COMPANY

Wherever Electricity is Distributed and Controlled

For more data, circle 88 on inquiry card

LET A WINNER LEAD THE WAY

t to the West, Tee-M Containers are uilding owners and managers have o re-order Tee-M units, primarily abor-saving costs in trash pick-ups, of trash disposal, and pleasing ap- container. Versatile Tee-M contain- tary and prohibit animal intrusion. e of the Tee-M container is con- heavy gauge galvanized steel, with pported by steel runner. The rolling front is a Midget Slat Closure, which Wilson pioneered in 1929. This Closure coils around a shaft containing a special mandrel-wound spring. Thus fingertip ease is assured for both opening and closing. Air vents and drainage provisions are standard. The entire unit is covered with a prime coat of rust-inhibiting paint. Each unit, shipped assembled and ready for use upon delivery, carries a one-year guarantee against defective parts and workmanship.

MODEL DESCRIPTION

Standard Units for 30 Gallon Cans

Cap. (30 Gal. Cans)	D	H	L	App. Crated Shipping Wts.
2 cans	27"x55"x	49"		350 lbs.
3 cans	27"x55"x	74"		450 lbs.
4 cans	27"x55"x	97"		600 lbs.
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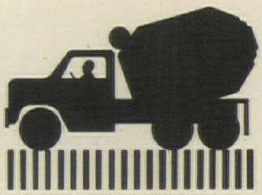

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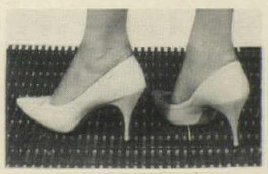

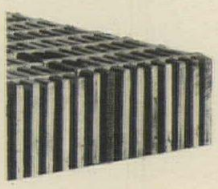

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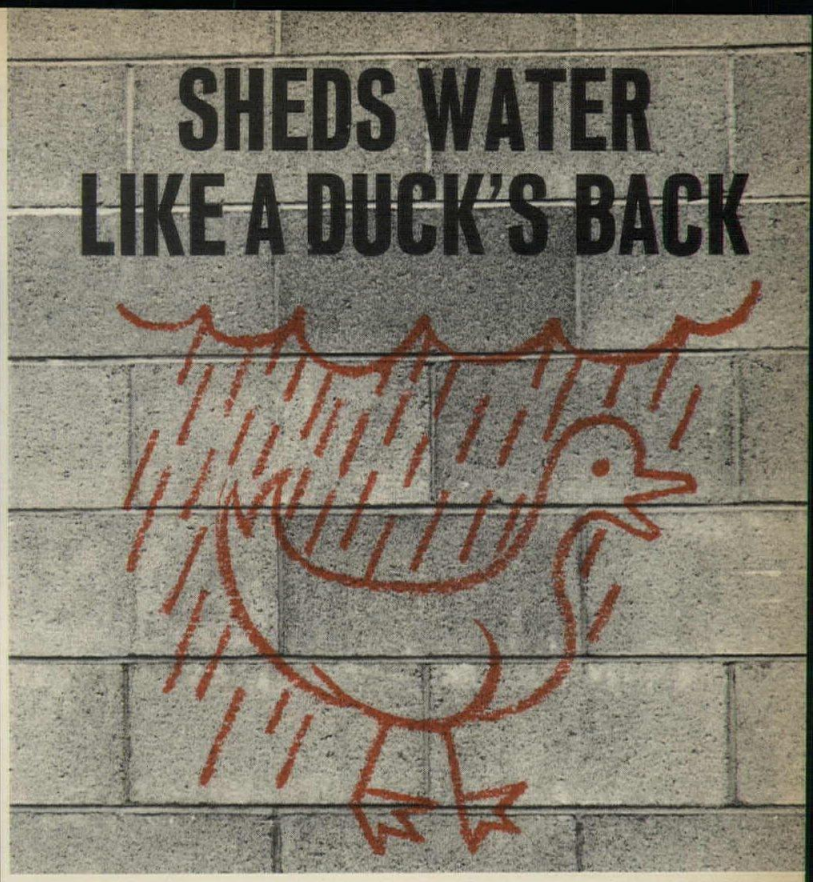

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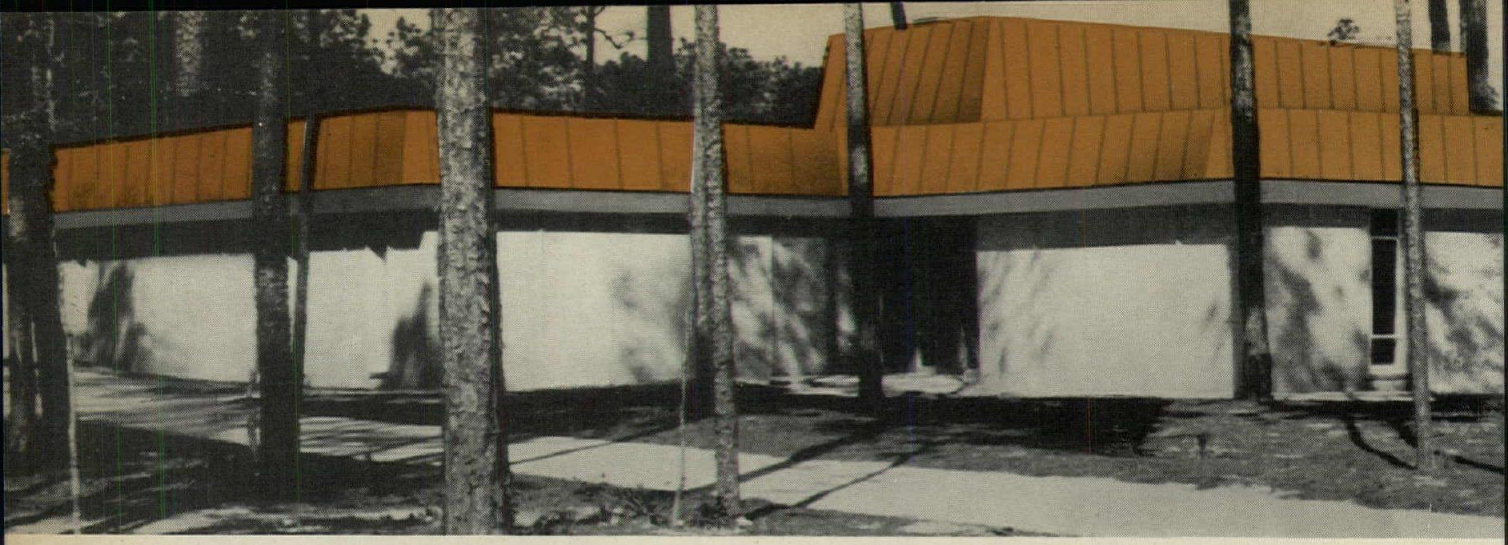

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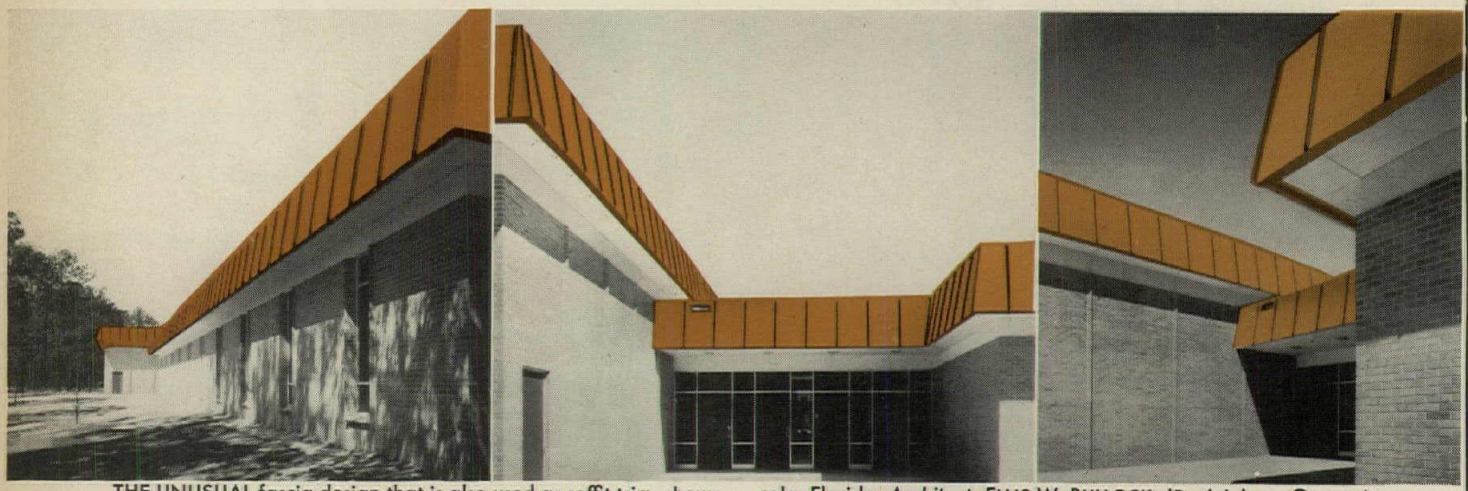

THE UNUSUAL fascia design that is also used as soffit trim, shown above from various angles, is of standing seam construction, fabricated from 25,000 lbs. of Revere 16-oz. cold rolled copper. Structure is the W. J. WOODHAM HIGH SCHOOL, Pensacola, Florida. *Architect:* ELLIS W. BULLOCK, JR., A.I.A. . . . *General Contractor:* DYSON & COMPANY . . . *Sheet Metal Contractor:* MCCORMACK ROOFING COMPANY . . . all of *Pensacola, Florida. Revere Distributor:* MOBILE STEEL COMPANY, Mobile, Alabama.

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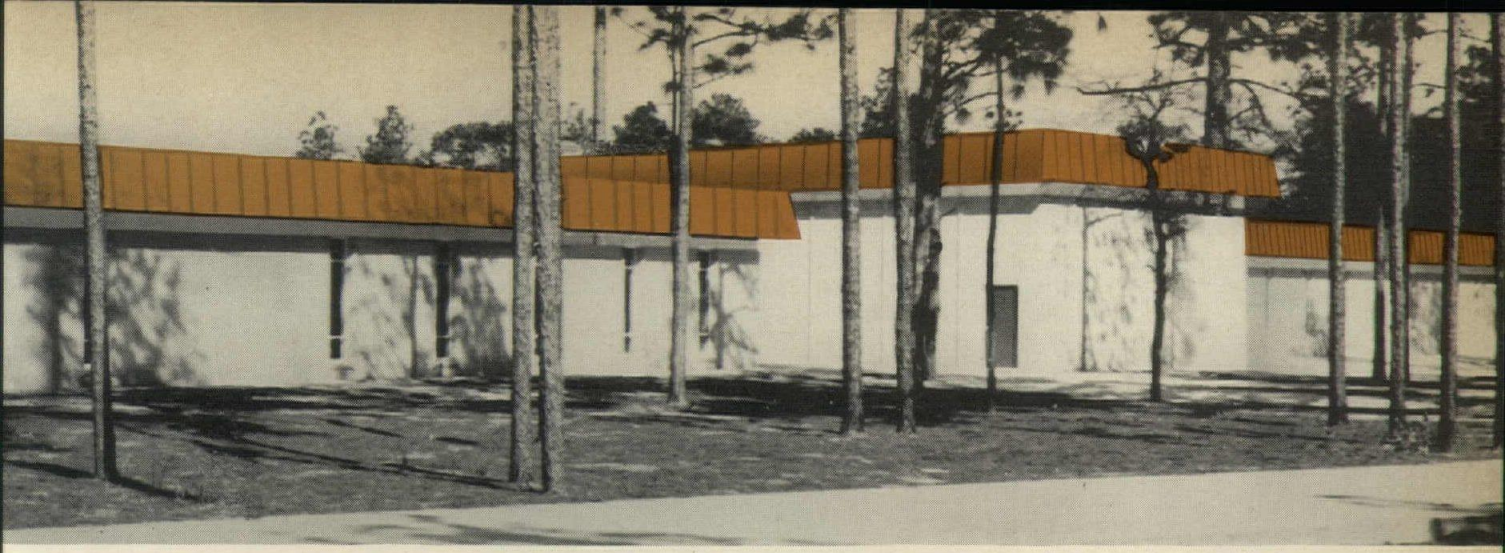
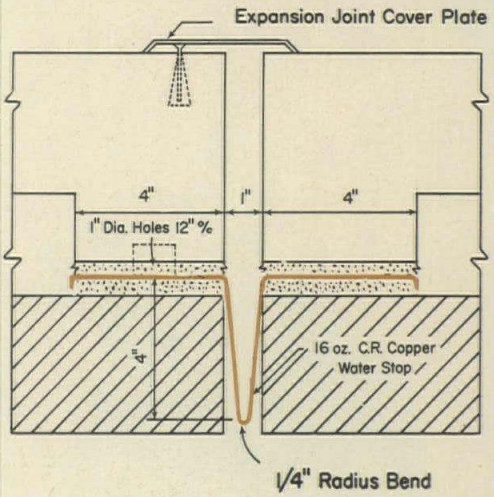
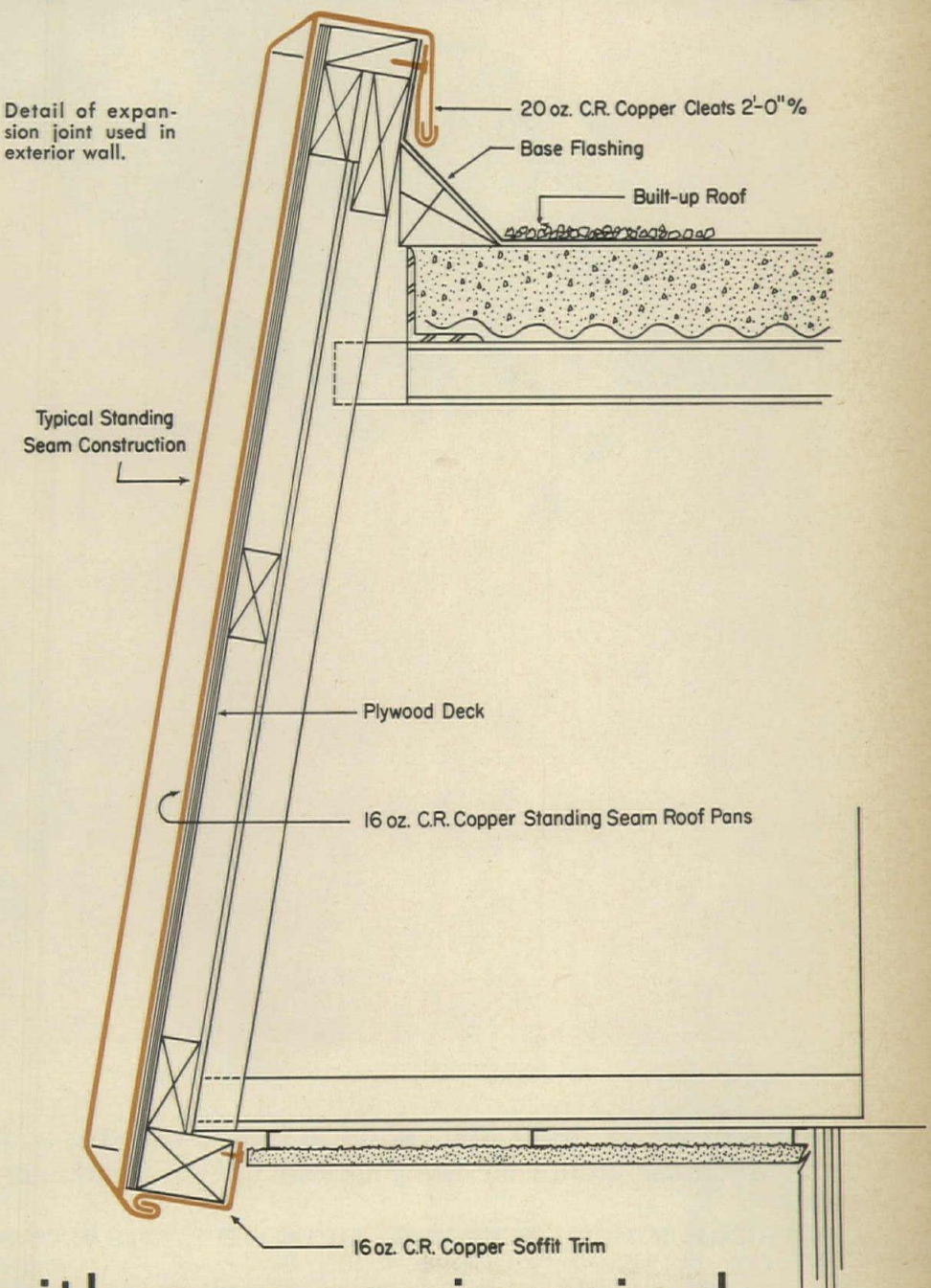
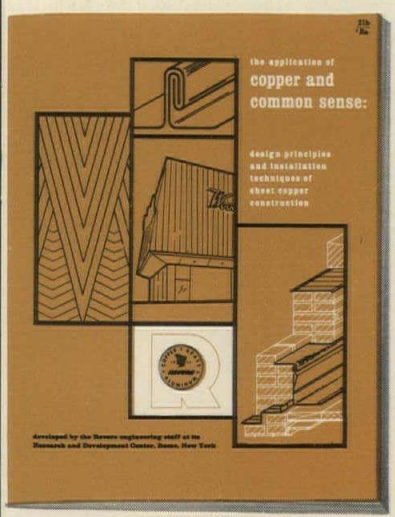


a new concept in cornice design



Detail of expansion joint used in exterior wall.





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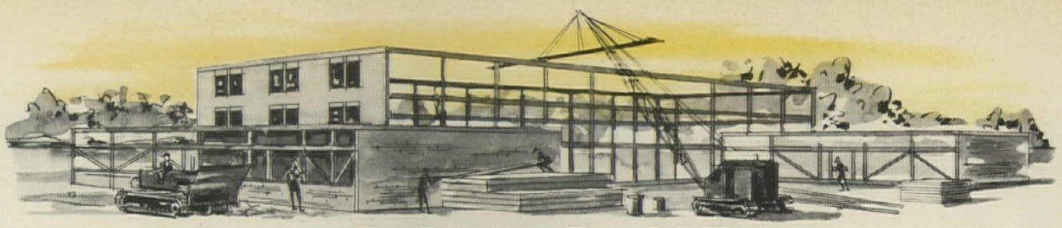

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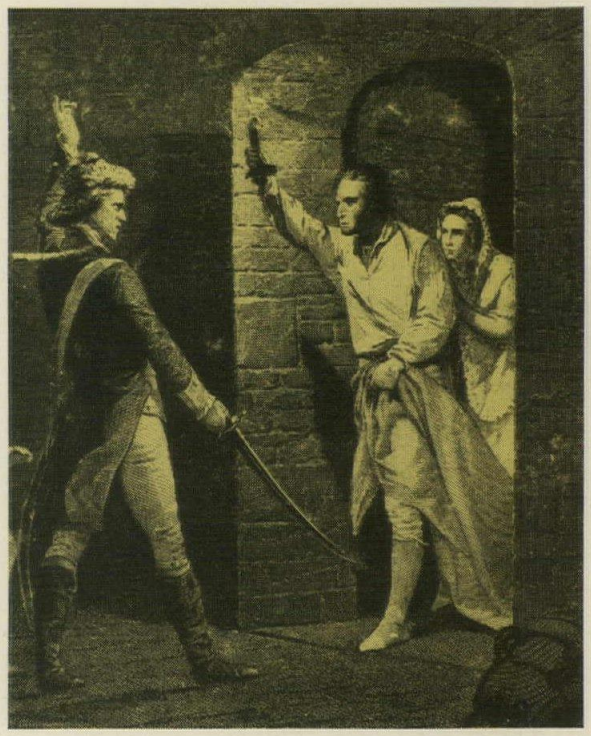

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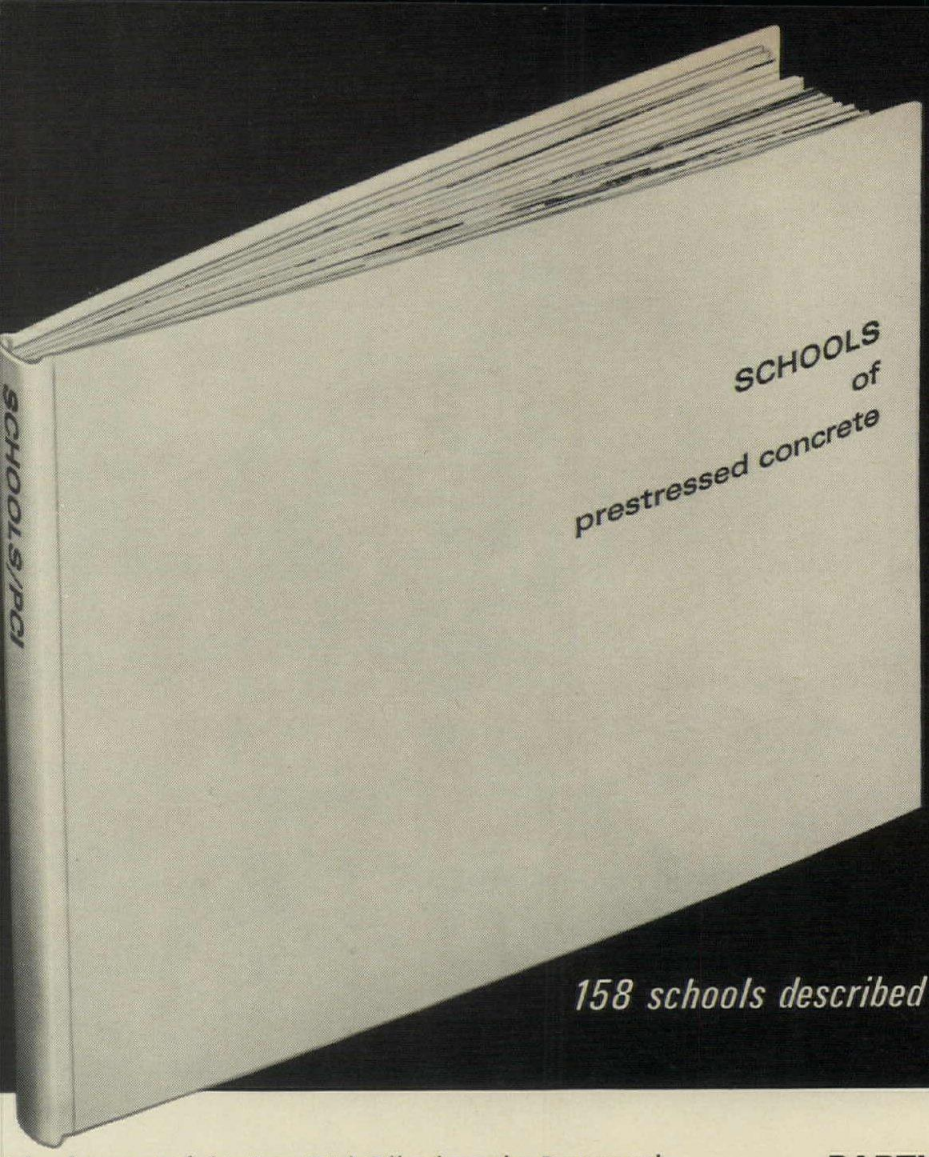

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OFFICES OPENED

continued from page 117

South, New York City 10010. The firm also has offices in St. Paul, Minnesota.

Hester & Brady, Architects, P.O. Box 4303, Magnolia Towers, Jackson, Mississippi 39216, announce the opening of an office for the practice of architecture.

Jules G. Horton, P.E., Lighting Consultant, recently opened a new office at 245 East 25th Street, New York City.

NEW FIRMS, FIRM CHANGES

Hilario Candela, A.I.A. and **Peter Spillis, A.I.A.** have been named senior partners in the Miami firm of **Pancoast/Ferendino/Grafton/Architects.**

Reynolds, Smith and Hills, Architects and Engineers have admitted **Robert F. Darby, A.I.A.** and **Dr. C. I. Harding, A.A.E.E.** as partners. The new partners are both located in Jacksonville.

The Office of Masten and Hurd, Gwathmey, Sellier, Crosby, Masten, Hurd, Architects announced the retirement of **Charles F. Masten, F.A.I.A.** The firm continues its practice from its new location under the designation: **Gwathmey, Sellier, Crosby, Architects, the Office of Masten and Hurd,** One Kearny Street, San Francisco 94108.

Schutte-Phillips-Mochon, A.I.A., Illinois architects, planners and engineers have announced the change of the firm's name to **Schutte-Mochon Inc. Ralph J. Phillips** continues with the firm as an engineering consultant.

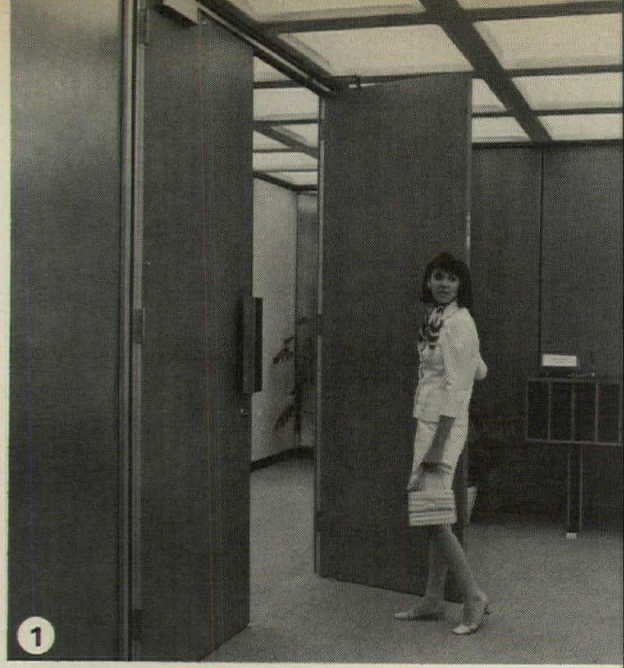
Ronald D. Schwab and **Paul M. Twitty,** Architects, have formed a partnership under the name of **Schwab and Twitty, Architects, A.I.A.** for the comprehensive practice of architecture at 400 Royal Palm Way, Palm Beach, Florida.

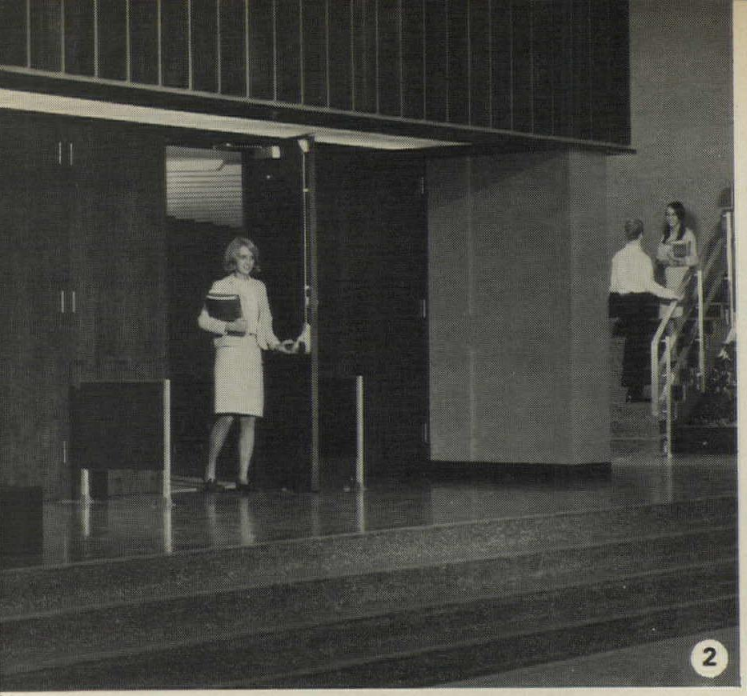
Harold Spitznagel and Associates, Architects, Engineers, Planners have announced a change in name to **The Spitznagel Partners Inc.** The firm is located in Sioux Falls, South Dakota.

ADDENDA

On page 35 of the February issue we incorrectly reported that I. M. Pei and Partners had been commissioned to develop the design of the proposed Robert R. Young Village development in New York City.

Attention is also called to the misleading statement appearing on page 35 of the March issue that Marcel Breuer's "notable works include the UNESCO World Headquarters Building in Paris". In fact, the UNESCO buildings (there are four) were not designed by Mr. Breuer alone but by Breuer with Pier Luigi Nervi of Italy and Bernard Zehrfuss of France.





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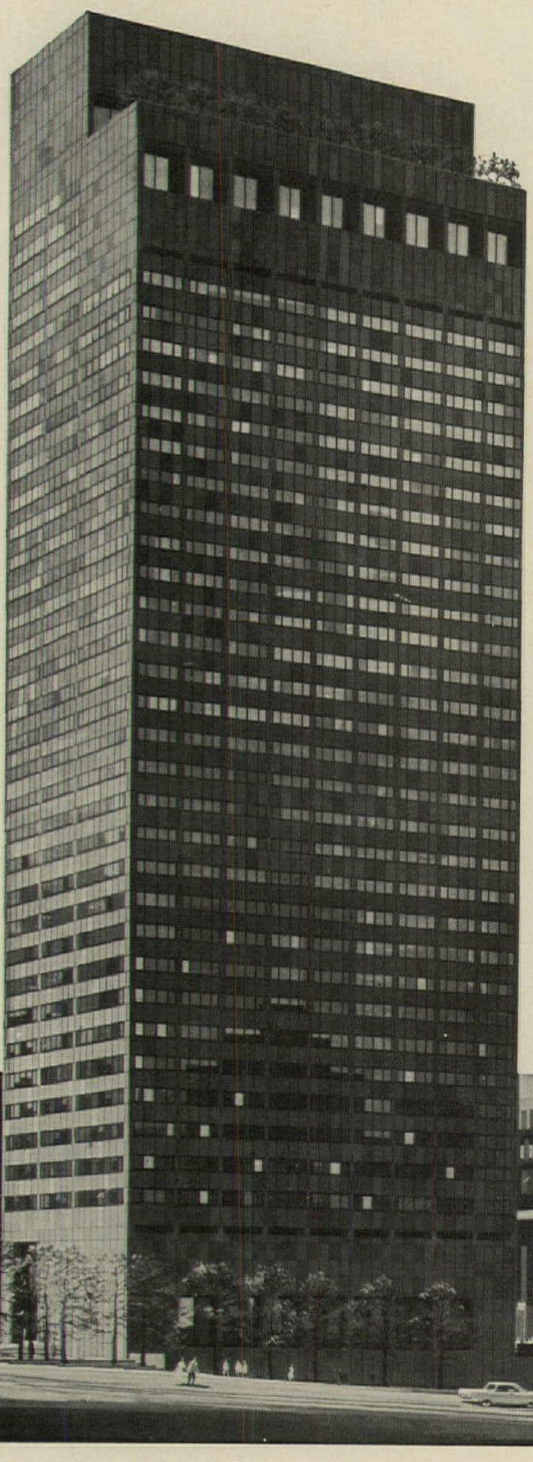

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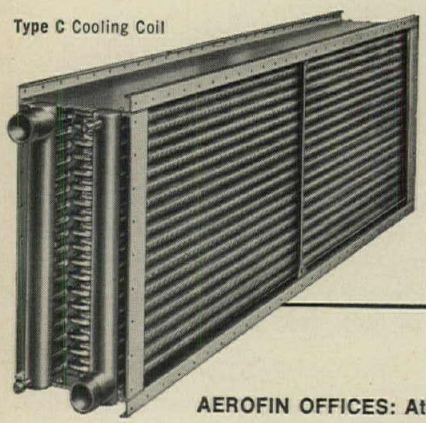

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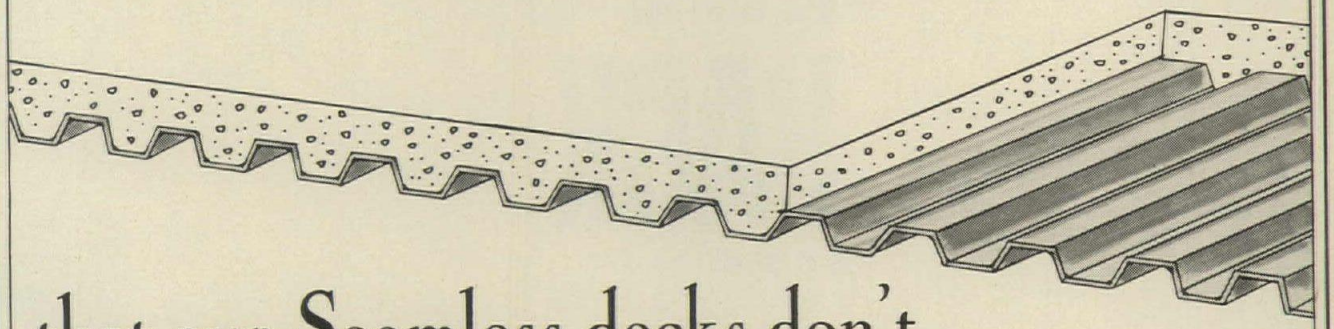

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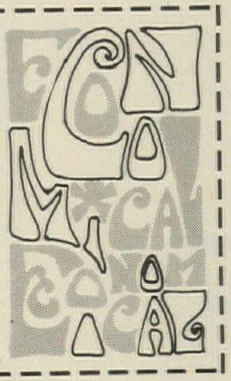

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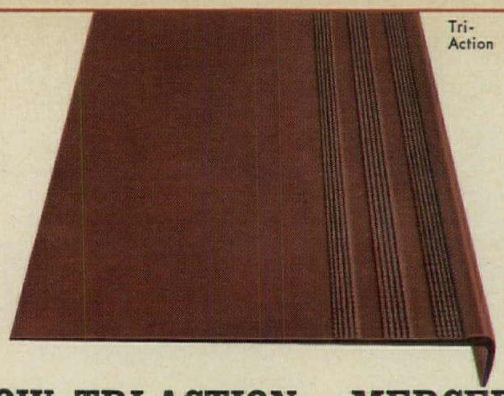

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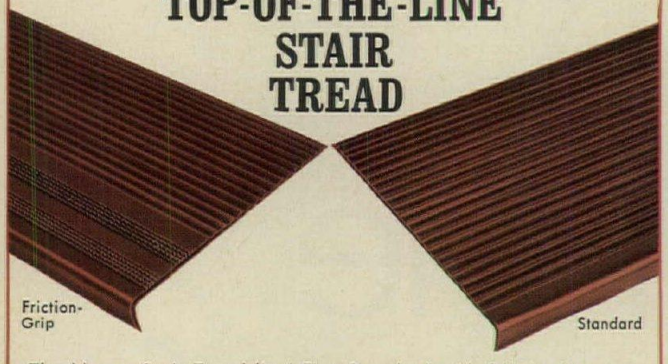

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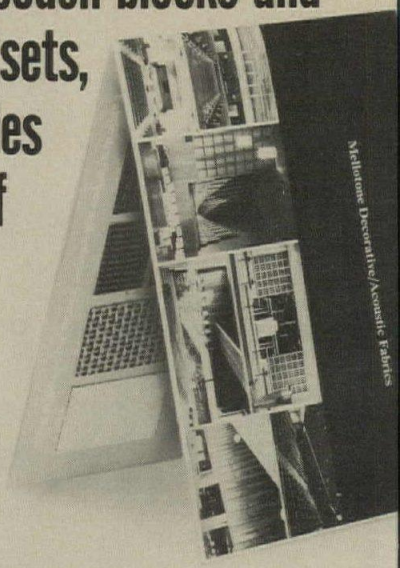

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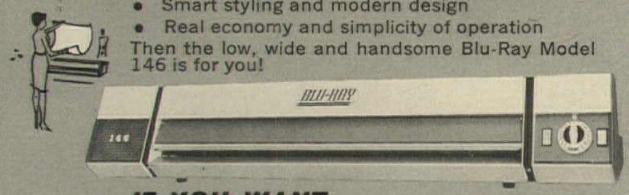

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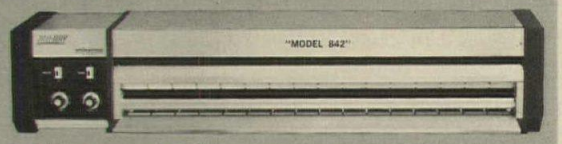

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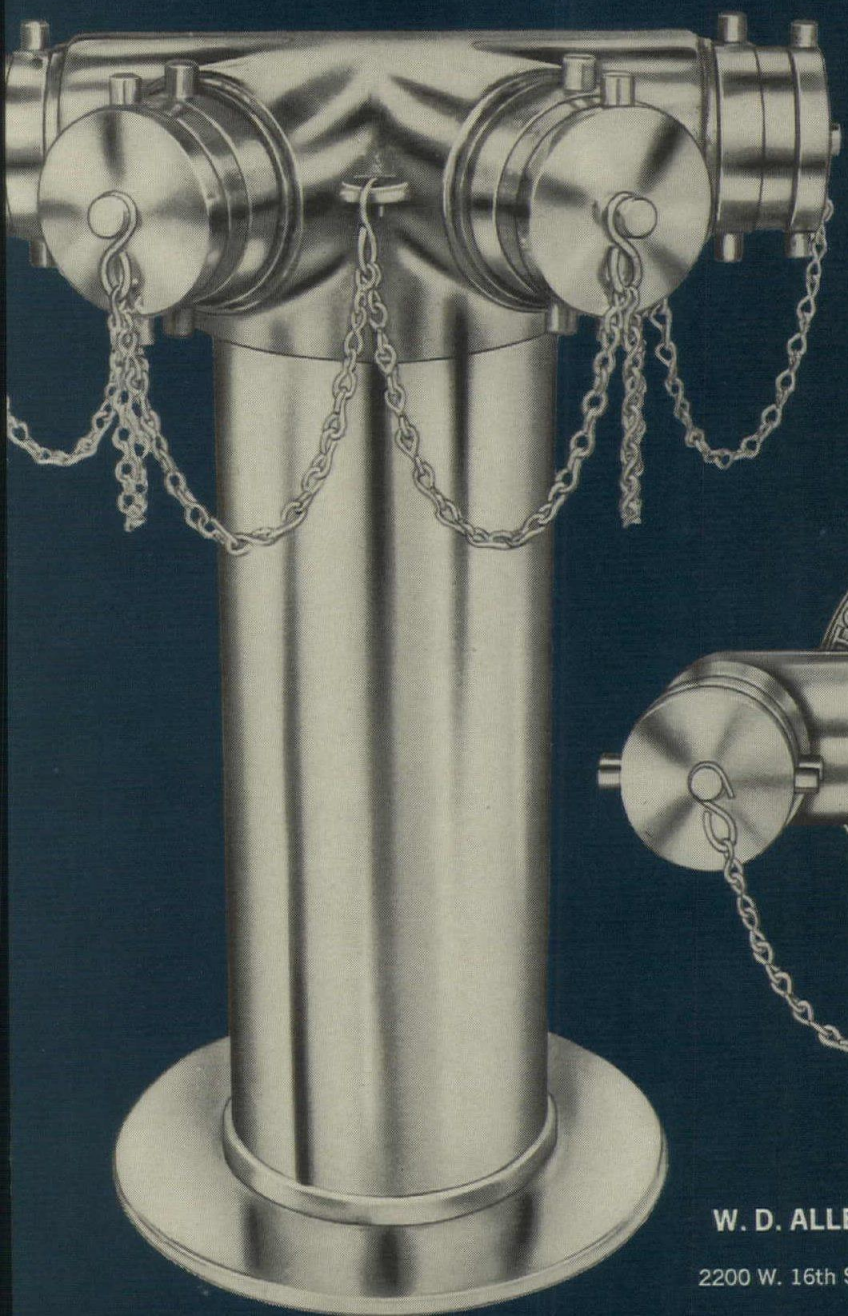

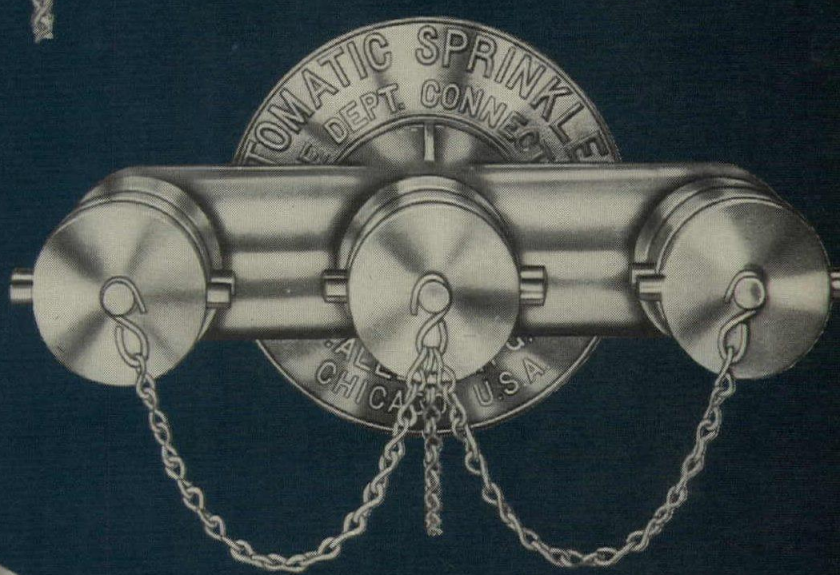

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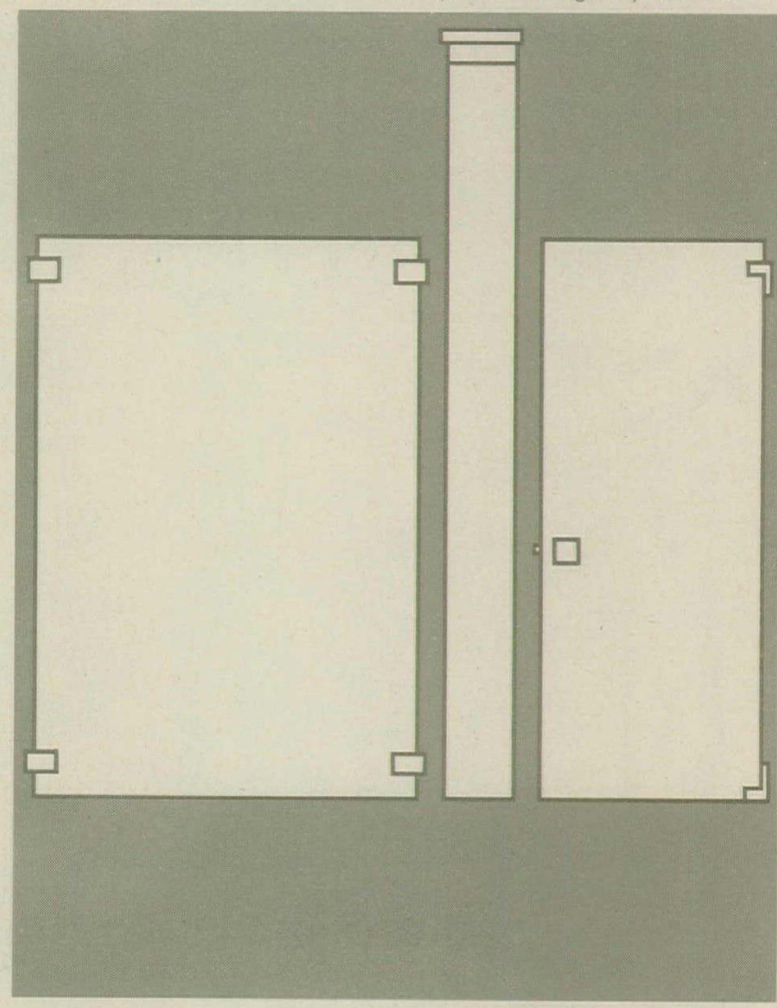

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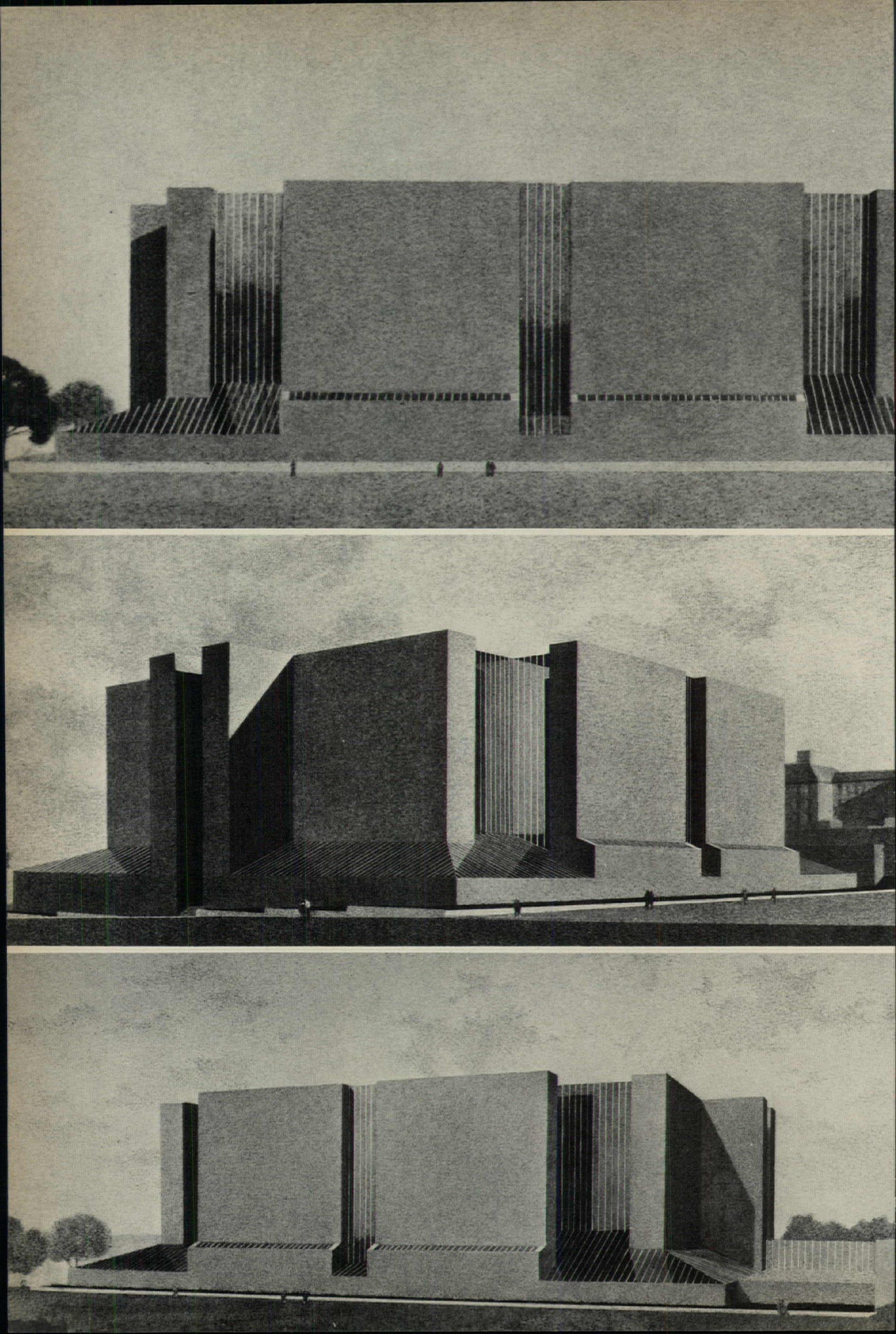
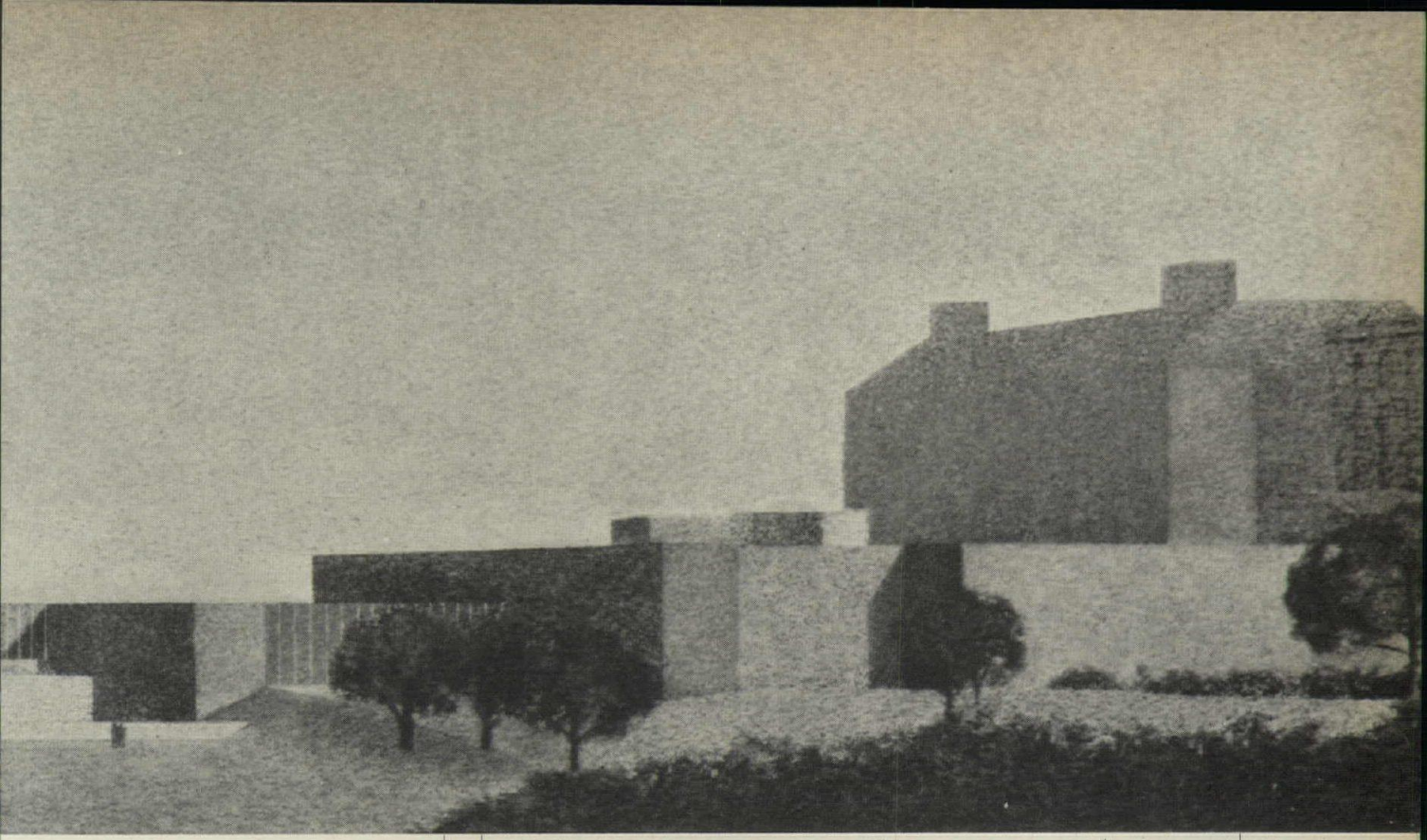
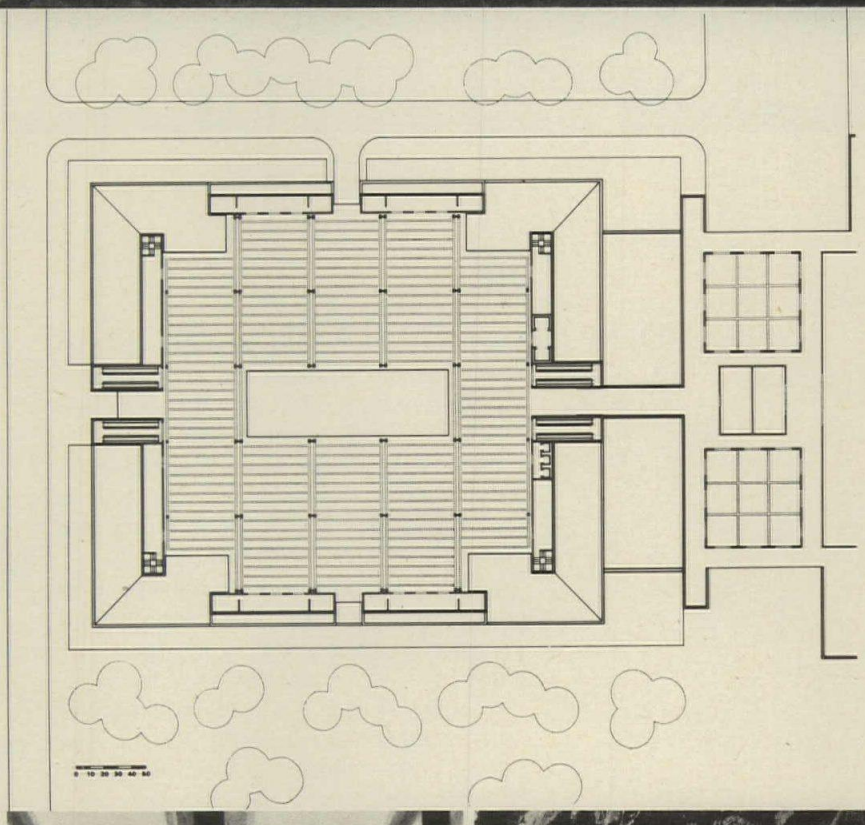
In 1961, Kevin Roche and John Dinkeloo, both long-time associates of Eero Saarinen, took over the completion of his unfinished work. In the few years since, the new firm of Kevin Roche John Dinkeloo and Associates has clearly earned its own place. Its architecture is its own, even though it may have roots in an approach to architecture that could have been learned from Saarinen. That approach is an almost uncompromising concern for solving each architectural problem for itself. If that approach once brought Saarinen criticism for "stylistic inconsistency," it is now well understood; and we can now see in Roche's work

FRESH FORMS AND NEW DIRECTIONS FROM A SPECIAL KIND OF PROBLEM SOLVING

"We think first about the purpose of the building; then about the environment—the nature of the site—and what contribution we can make to it; then about how to build it." That is not a rare and innovative process, but it is, in the hands of Kevin Roche, a process that leads to a rare degree of innovation—and to some of the best architecture being built today. There are 75 on the staff of the firm's Hamden, Connecticut office. There are no organization charts and no titles. But it is clear that all of the work that comes out of the office is the result of a very personal kind of involvement and control by Roche, who is the designer, and Dinkeloo, who is responsible for engineering and for getting the buildings built. The major work of this collaboration is shown on the pages that follow. —*Walter F. Wagner, Jr.*





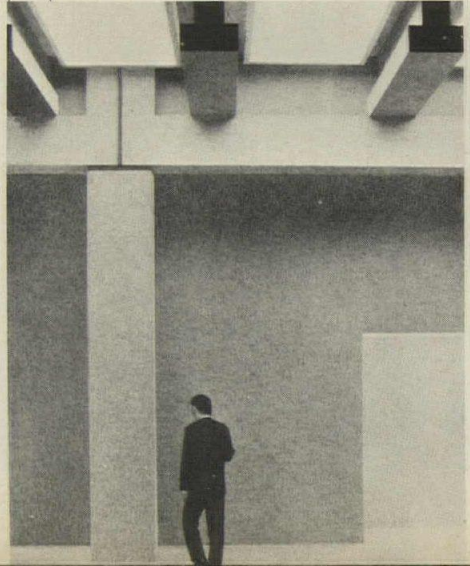


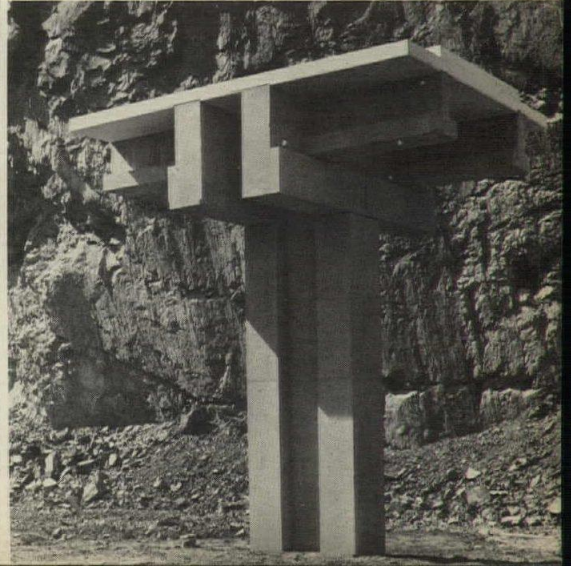
ETNA LIFE
OMPUTER CENTER
ARTFORD, CONNECTICUT

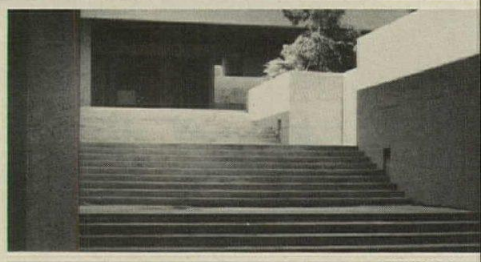
is is a very large building—it has seven ories including two below grade; its se is 364 by 307 feet; its floor area is me 747,000 square feet; and it will use over 3,000 employees. The biggest sign problem: creating a form that ould not dwarf the adjacent neo-Co-nial office building.

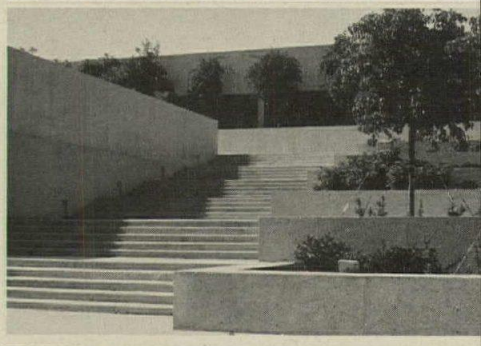
The three lower floors—below the ylighted setback—house the compu-rs and associated gear. The four upper oors are huge open office spaces, hted by an open court and by big anes of reflecting glass at the corners d in the center of each wall. Thus, the ilding, while it at a first glance appears ndowless, actually has very large win-ows—quite in scale with its mass and e size of the spaces inside.

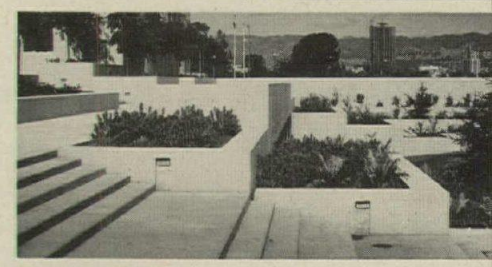
The "core" of the building is sepa-ted into shallow rooms which give ickness to the outside walls. The build-g, of concrete construction, will be mpleted next year.

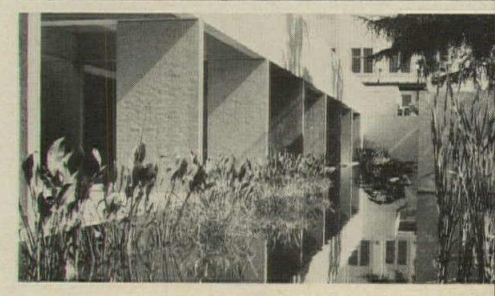












OAKLAND MUSEUM, OAKLAND, CALIFORNIA

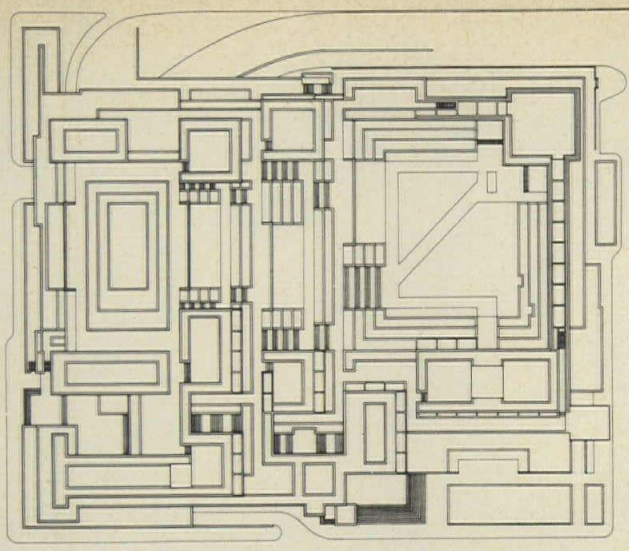
For Oakland, this four-block complex of three museums (art, cultural history, and natural history) is more than a cultural asset—it is a new core. The outside is designed as a series of gardens, and as such it serves as a central forum and major new park for the city.

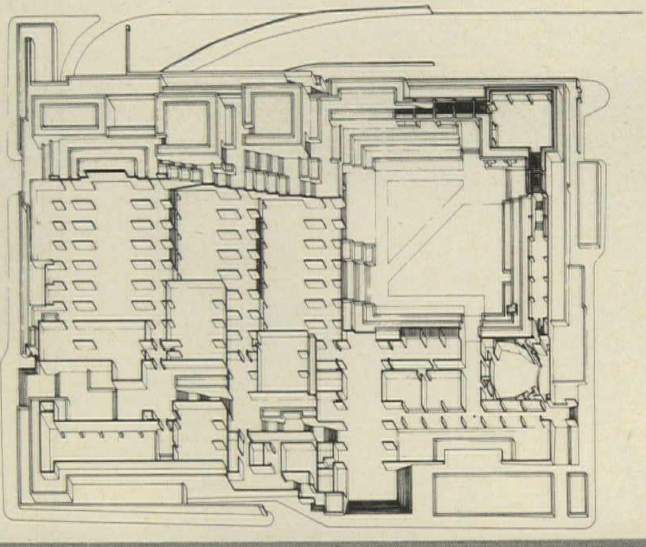
The stepped-back design creates a series of tree-lined walks and planted terraces, each the roof of the space below, and as the photos show the landscaping (by Dan Kiley) is an extraordinarily integral part of the design. The main plaza—about 200 feet square—includes a pergola, reflecting pool, small courts, and shaded pathways—settings for sculpture and exhibitions.

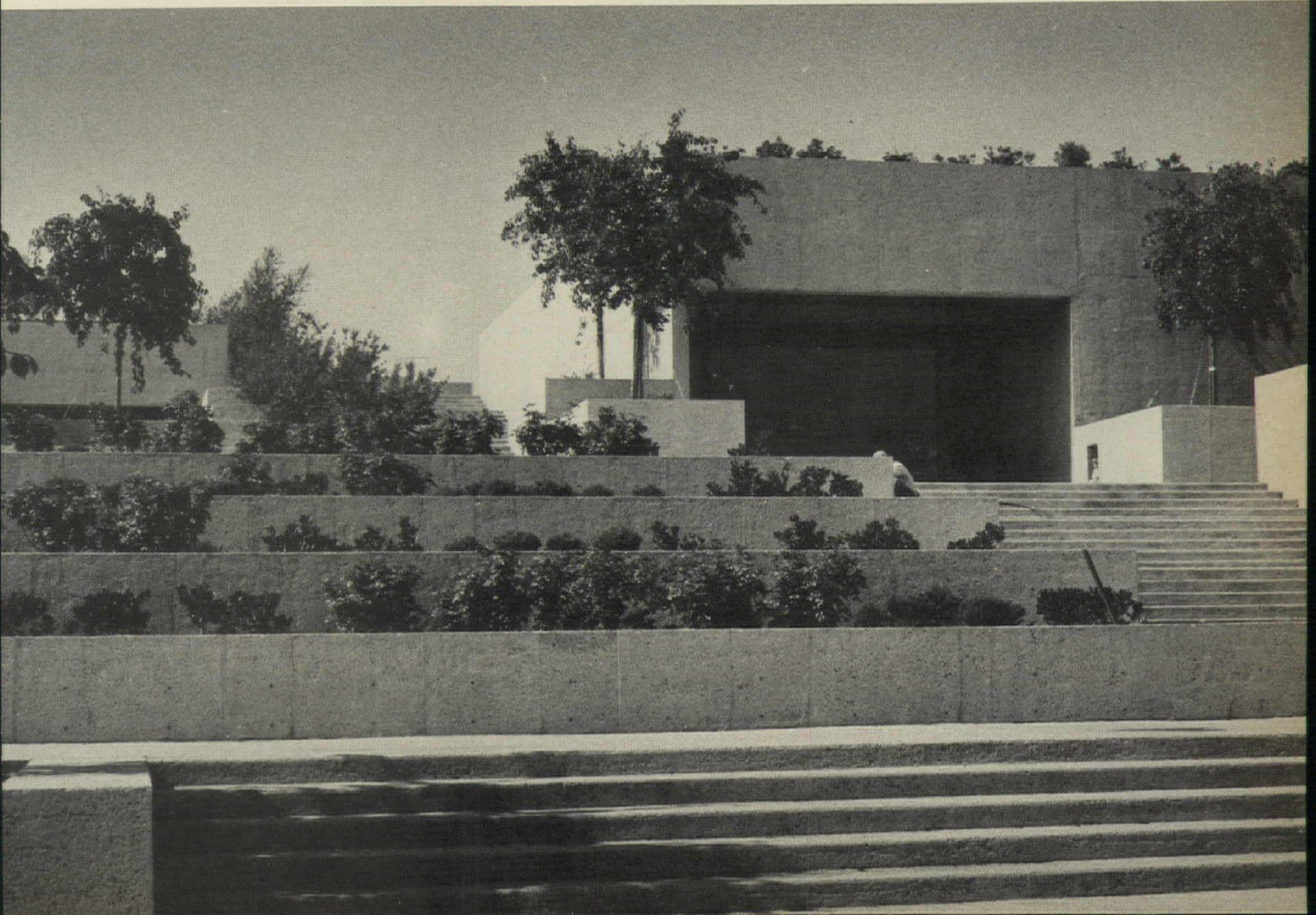
The structure is exposed reinforced concrete, partially supported on piles. In addition to 95,000 square feet of gallery space, the complex includes a 300-seat auditorium, lecture hall, classrooms, offices and restaurant. A two-story garage below the galleries holds 250 cars.

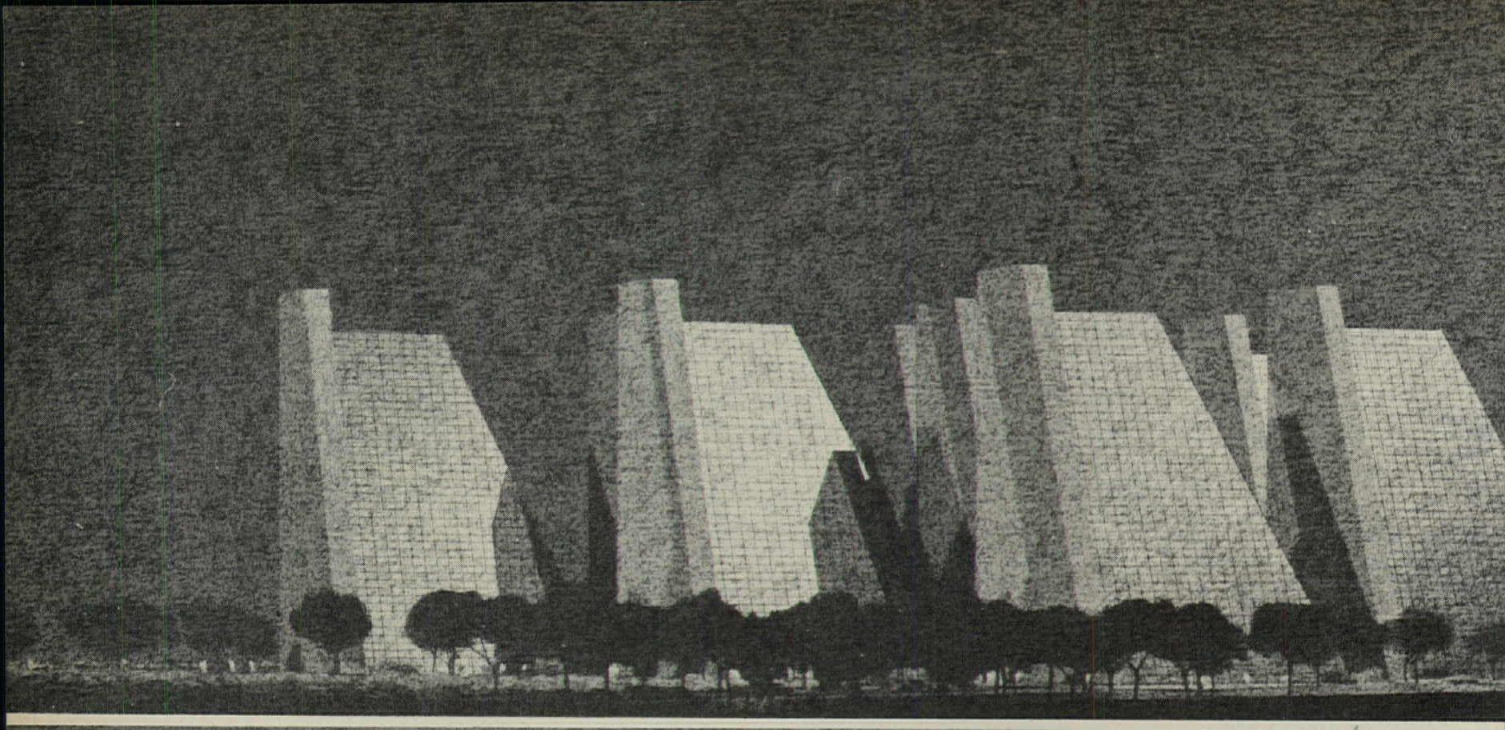
The building itself is now essentially complete, though the gallery spaces will not be opened until early next year.

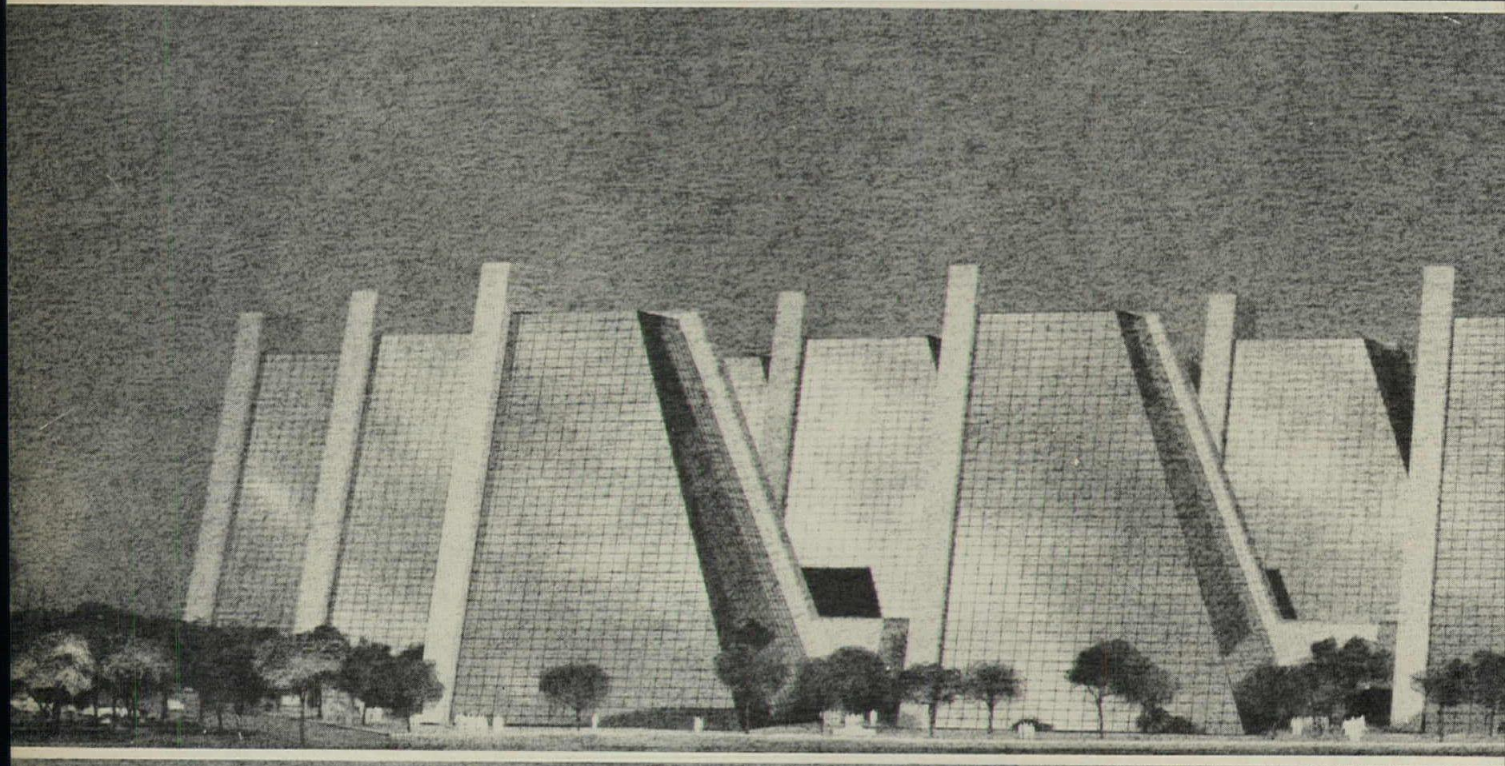
Some streets were rerouted as part of the design, and one runs under a corner of the complex.

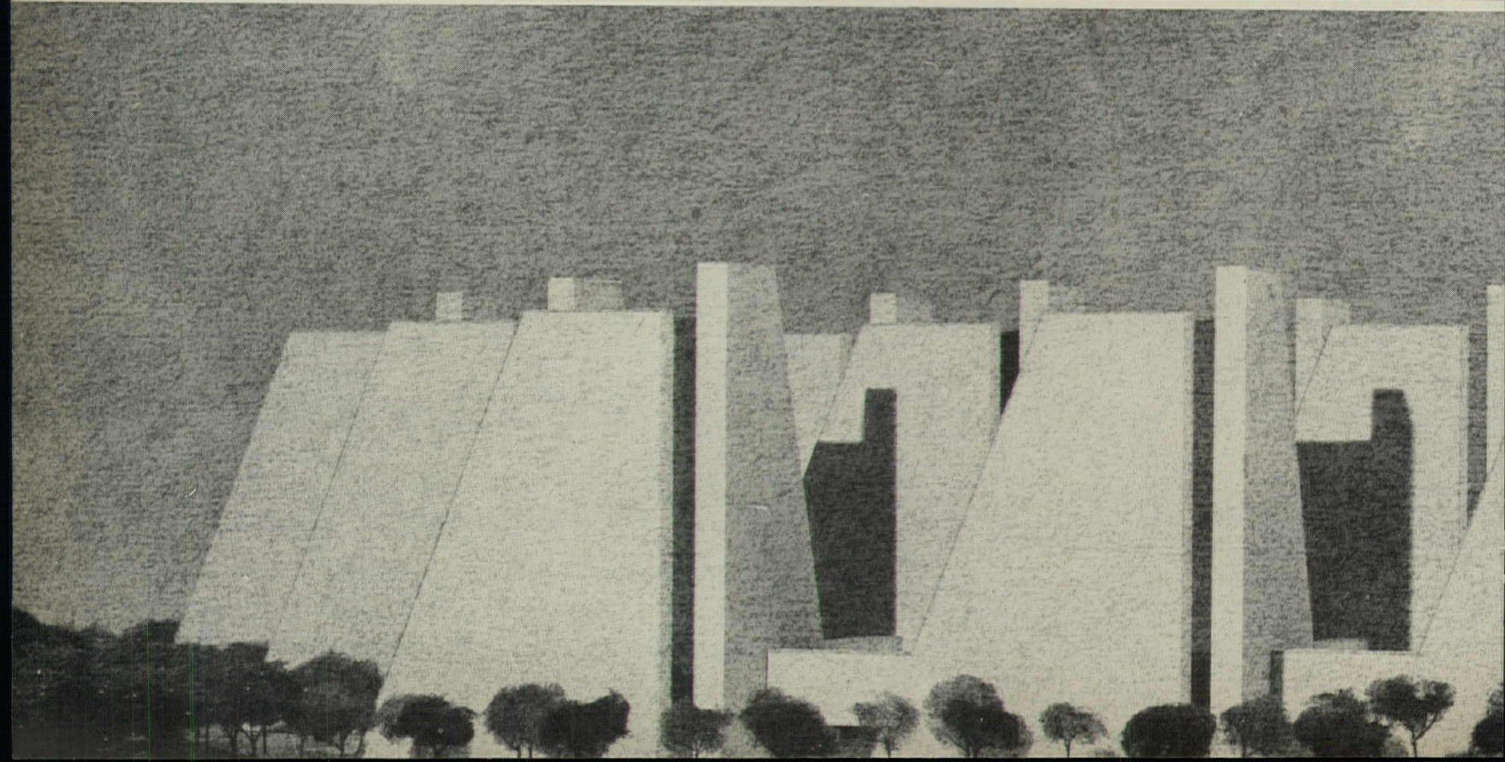


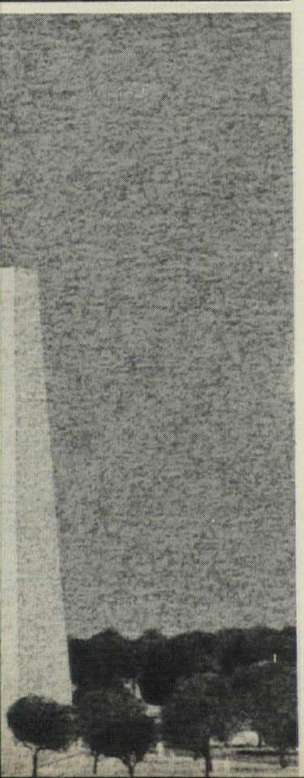


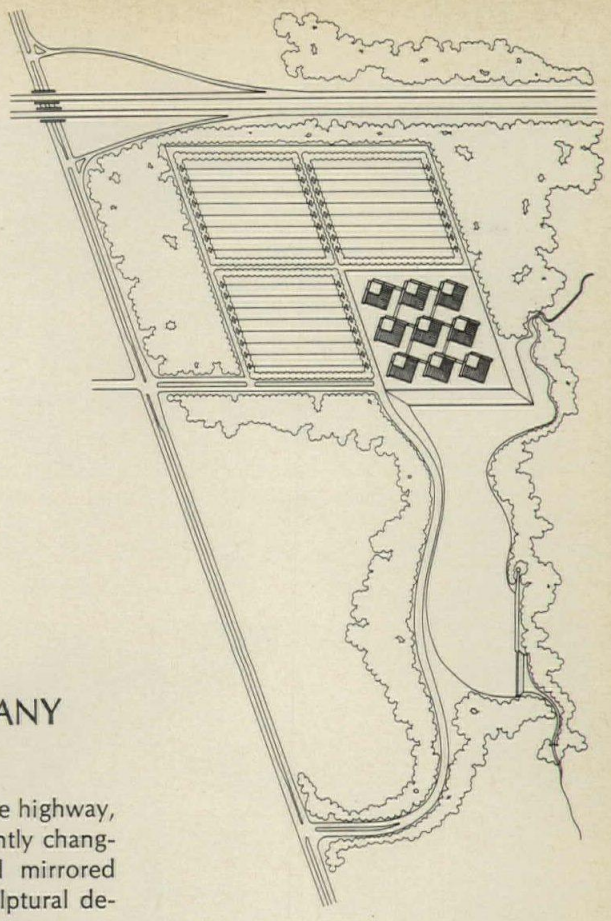






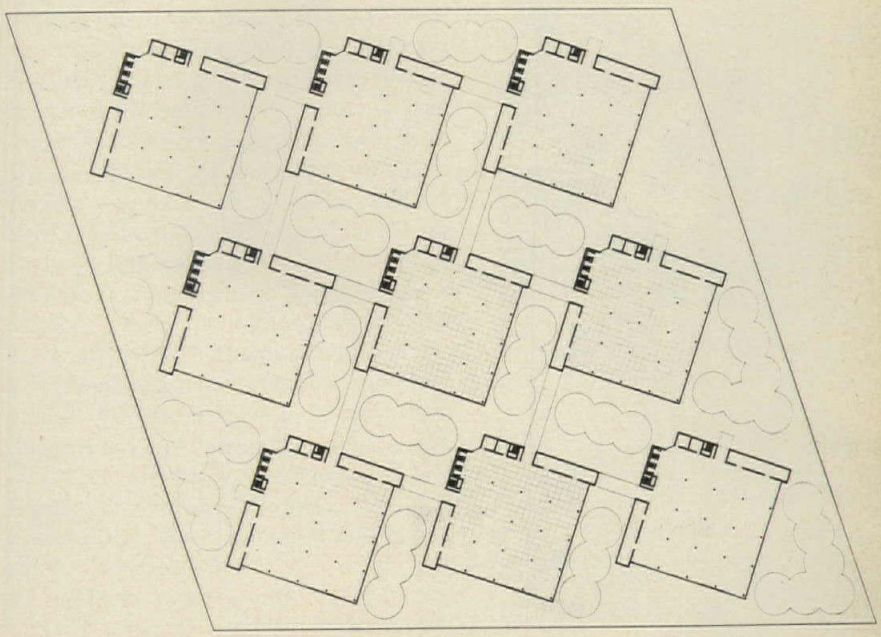


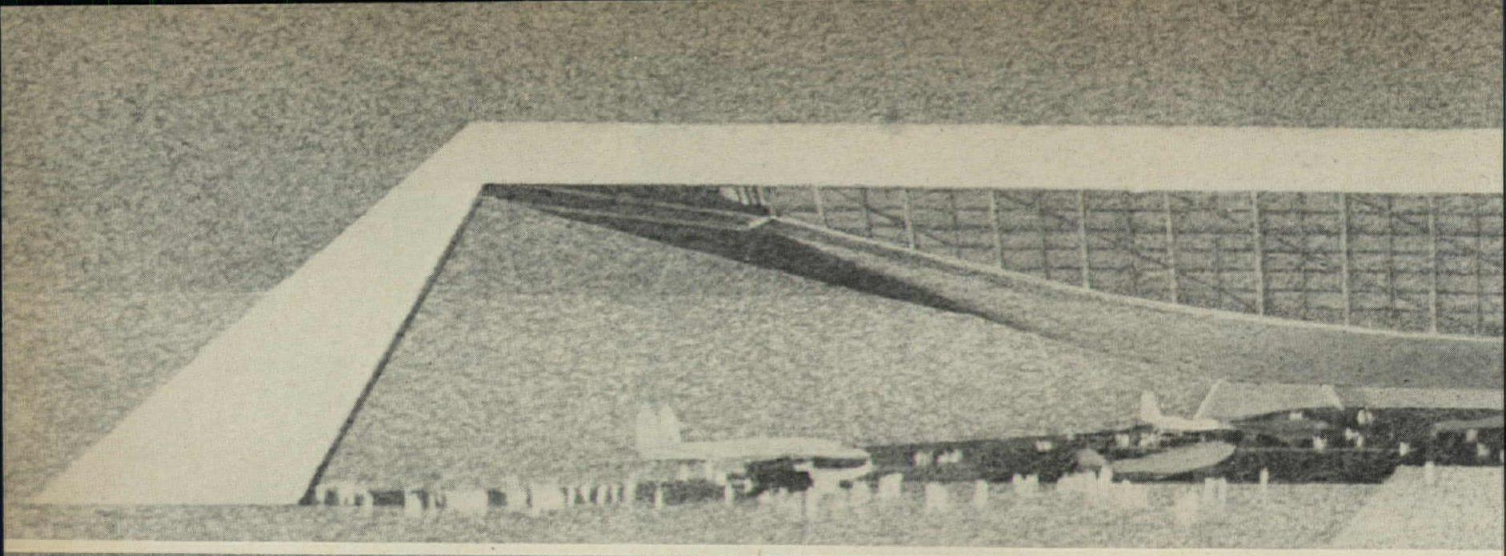


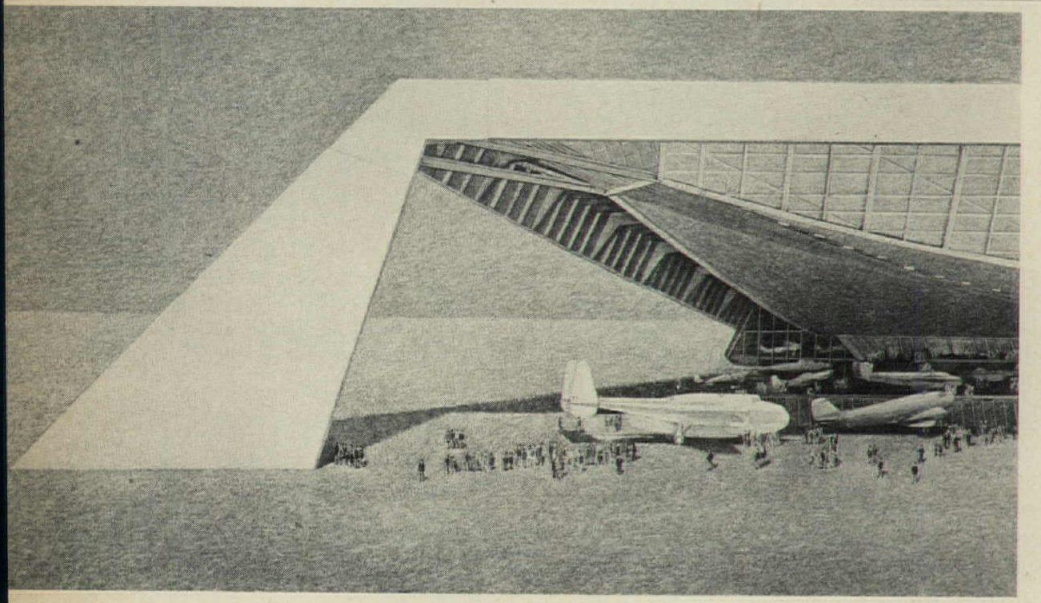


COLLEGE LIFE INSURANCE COMPANY INDIANAPOLIS

For passers-by on the Interstate highway, this complex will be a constantly changing pattern of concrete and mirrored glass shapes. The unique, sculptural design grows out of a simple program requirement: the building is for a fast-growing insurance company. This scheme permits the client to add to his space in 110,000-square-foot increments. Three towers—each 11 stories, 120 feet square at the base and 60 feet square at the top—will be built initially (construction to start this year). The shape of the units puts 40 per cent of the building population on the lower three floors, minimizing the vertical transportation problem. All core facilities are at the solid L-shaped walls, leaving open uninterrupted general office space typically needed by insurance companies.



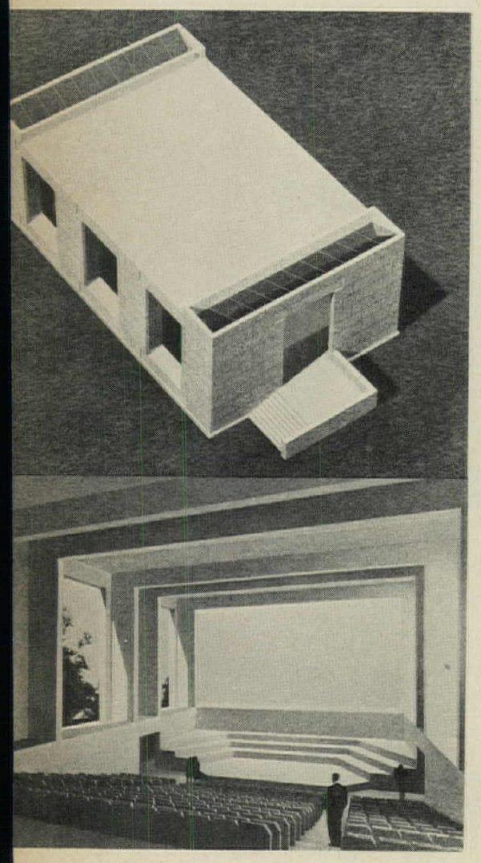




AIR FORCE MUSEUM
WRIGHT-PATTERSON BAS

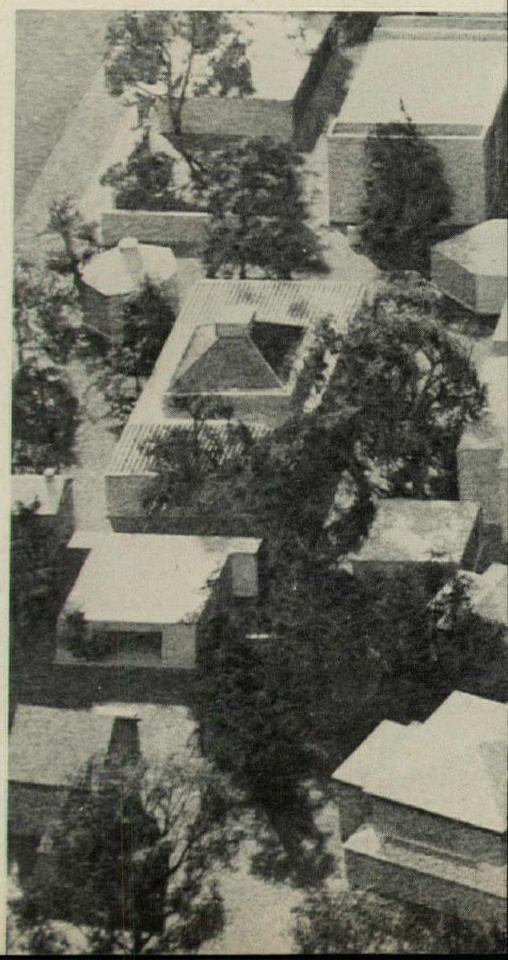
with exhibits designer Herb Rosenth

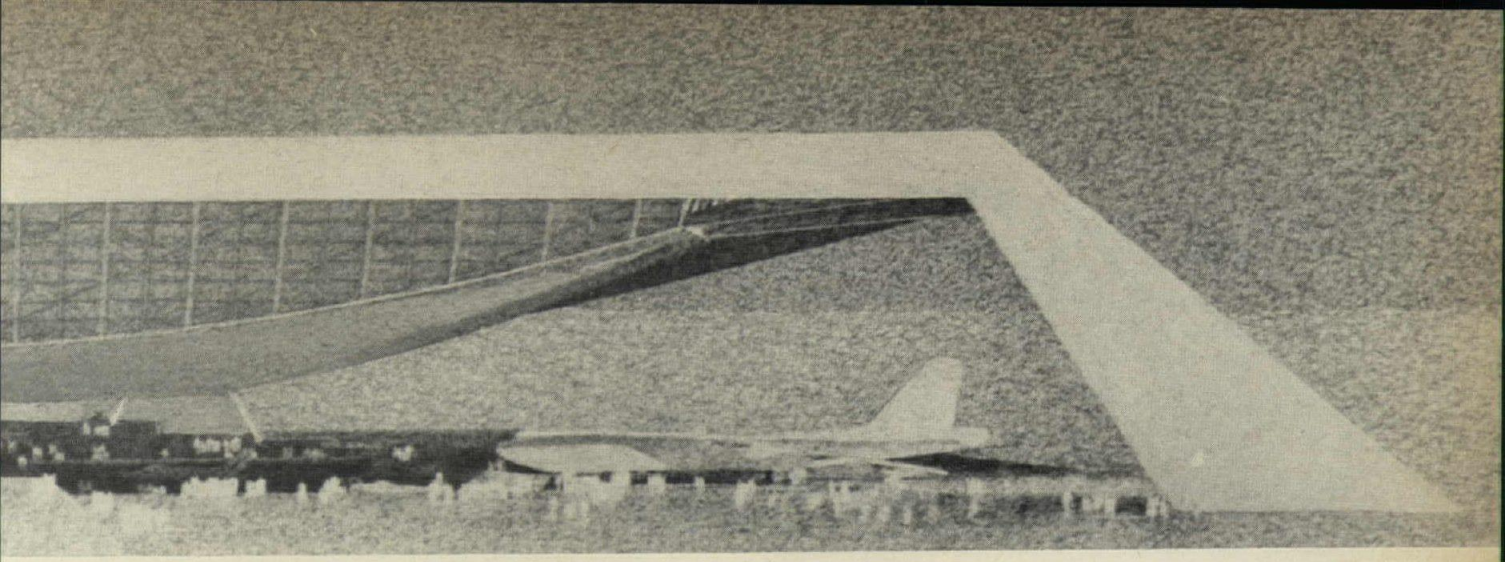
This giant project, finally expected to under construction this year, was d signed to express a technology as a vanced as the aircraft it houses. Visito will enter at the narrow edge of th wedge (and at Wright's Flyer) and pr ceed under the cable-hung roof into space that expands outwards and u wards until, standing under the 800-fo span of the main truss, they may see th very newest planes flying by. The enti structure is suspended from four pylon Structural consultant for this project Hannskarl Bandel of Severud Associate

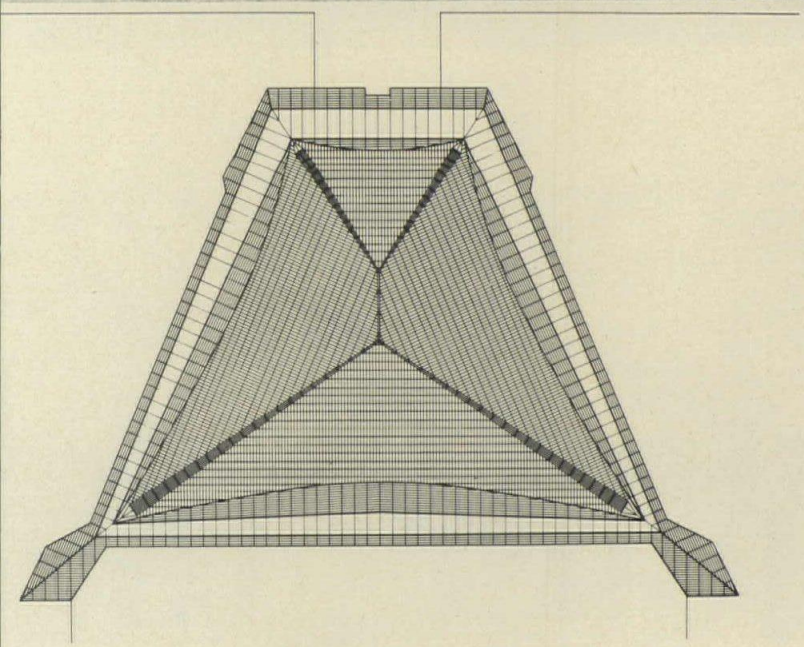


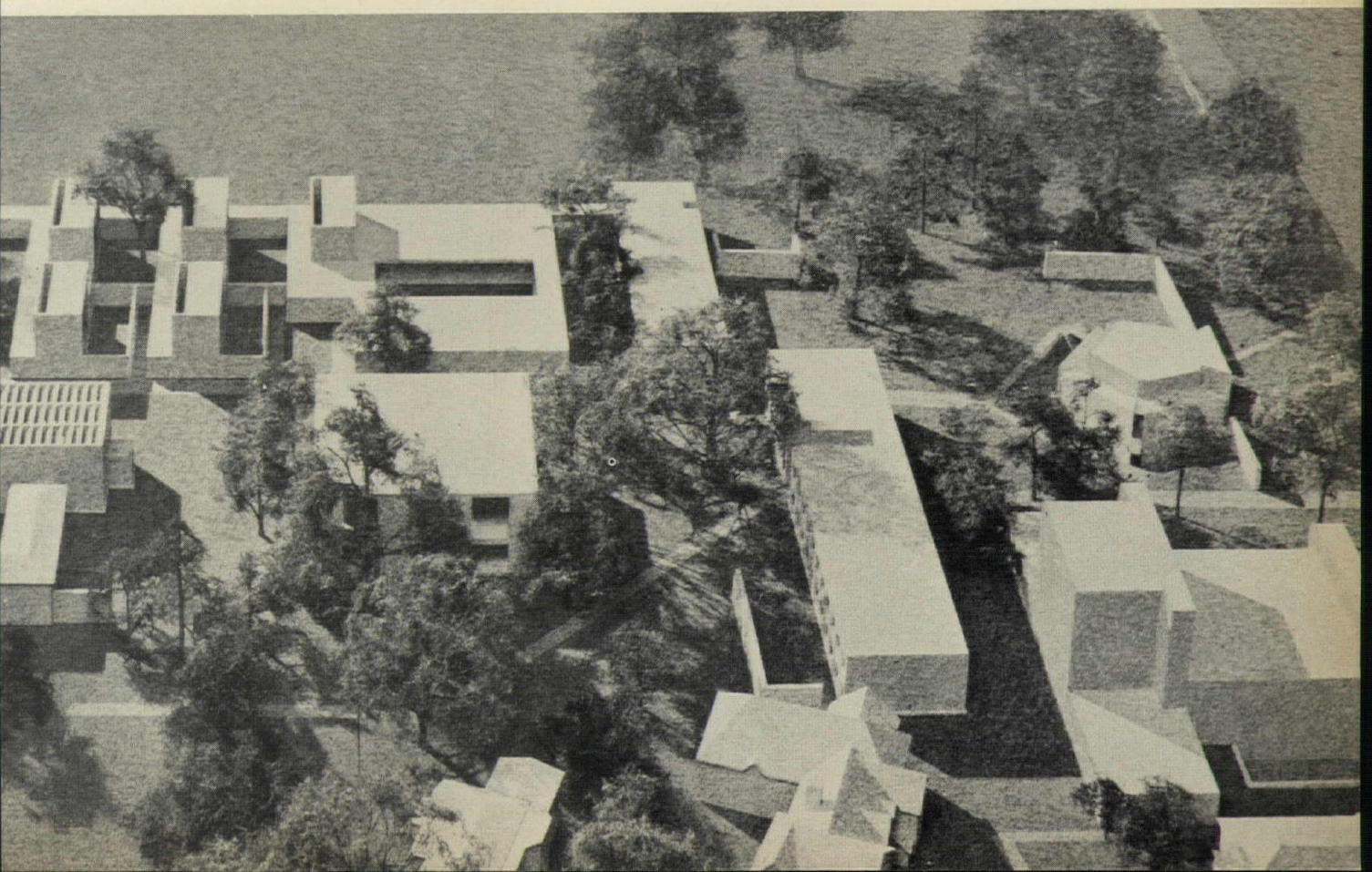
WESLEYAN UNIVERSITY
MIDDLETOWN, CONN.

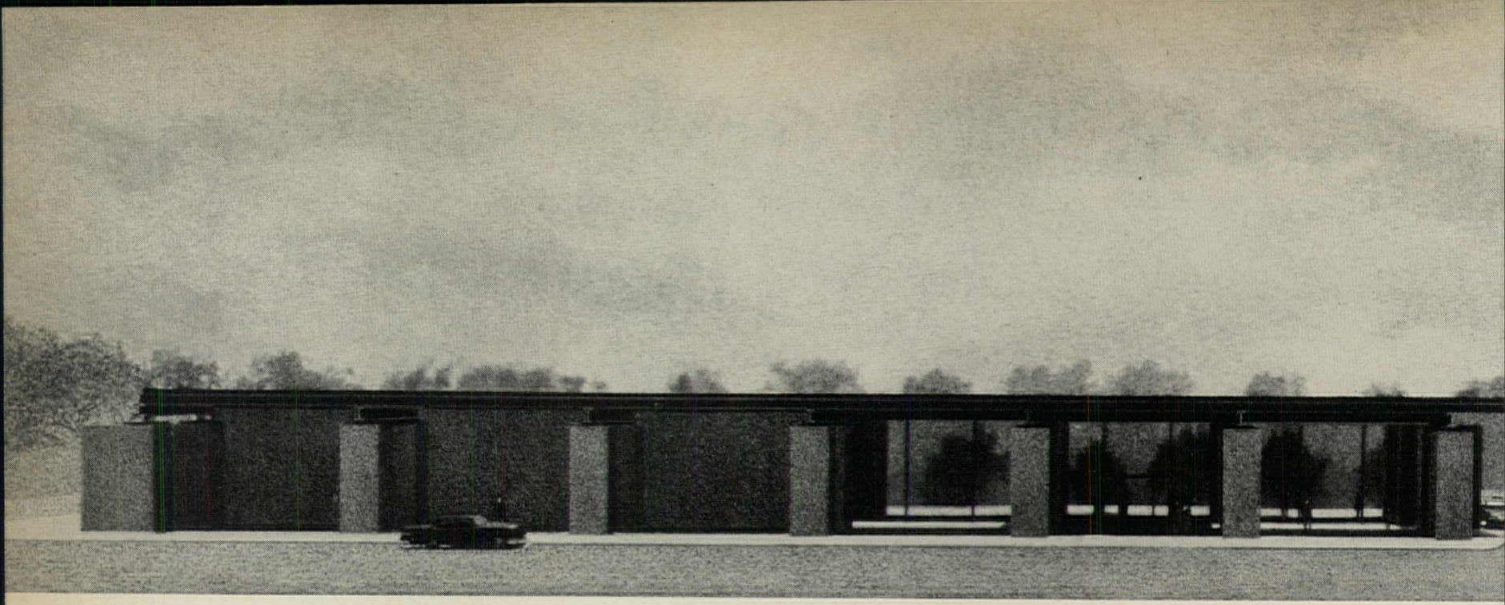
The program in this case was to design—for a site with existing buildings and many fine old trees—a fine-arts center to include two theaters, a concert hall, rehearsal halls, rooms suited for presentations of ethnic music, a cinema, a library, art studios and galleries, and classrooms. Roche's solution: this complex of very small buildings—tucked under the trees and linked with walkways and passageways—creating a sub-campus. To eliminate heavy equipment and minimize construction damage to the trees, all buildings will be constructed with a 3-foot 8-inch by 2-foot 6-inch by 14-inch lightweight (aggregate concrete) block. This construction discipline gives all the buildings within the complex the simple shapes and openings visible in the drawings at left of the concert hall. Most buildings open to controlled views of the handsome site.

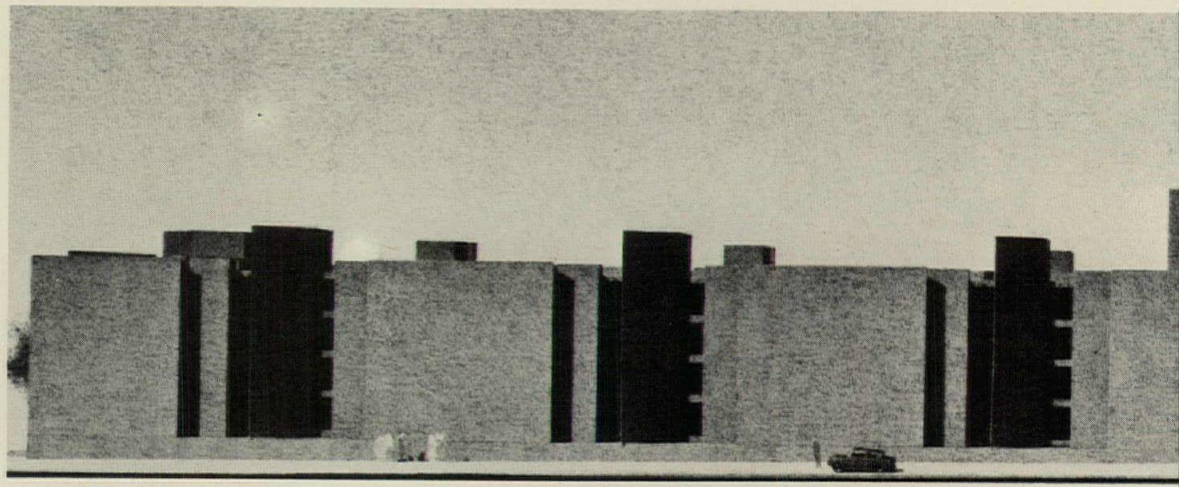


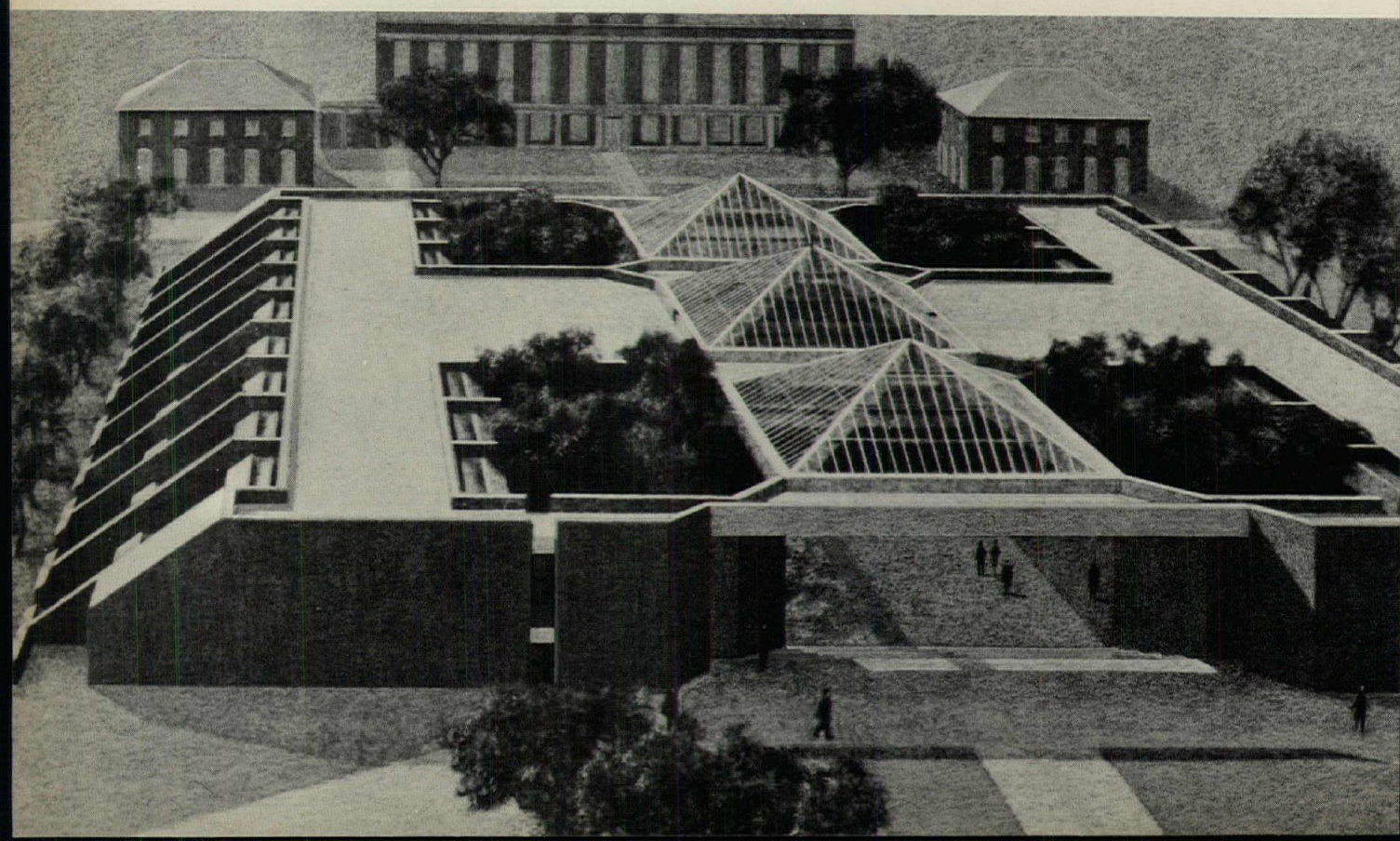


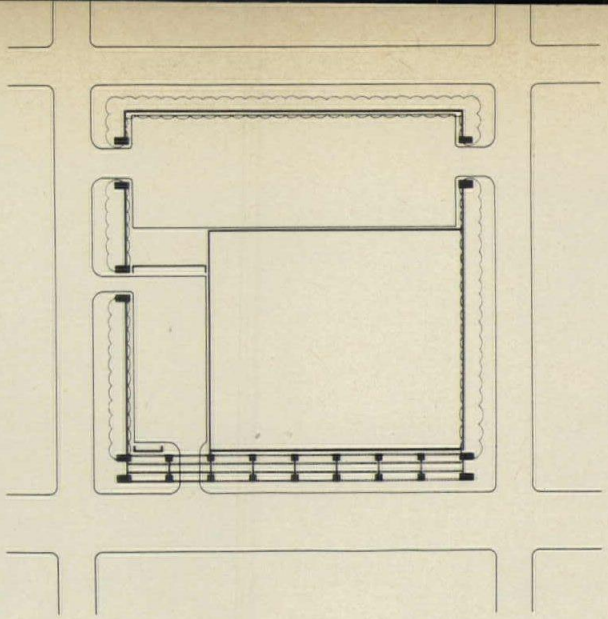






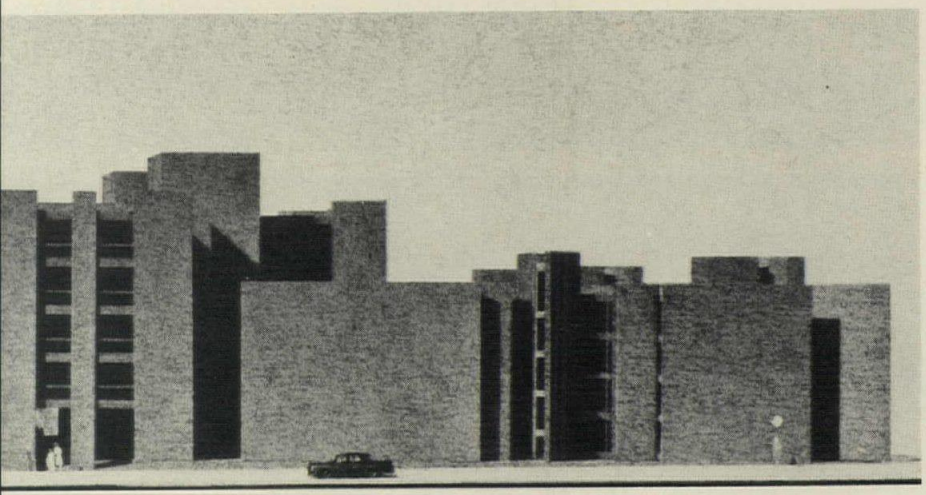






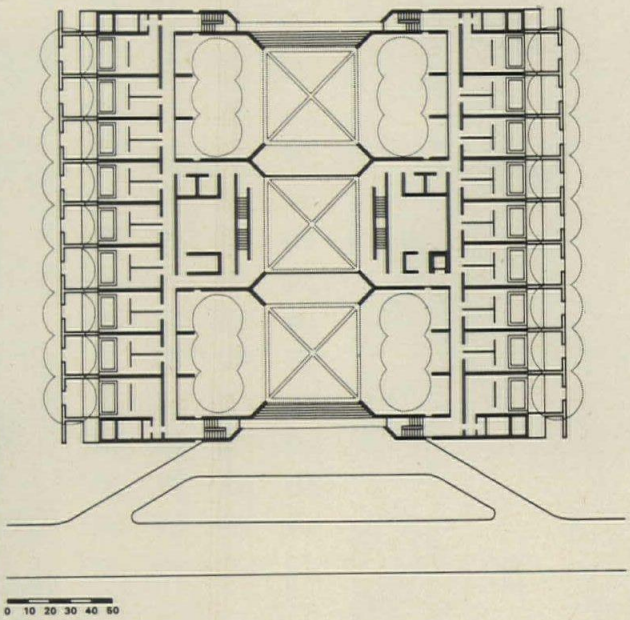
U.S. POST OFFICE COLUMBUS, INDIANA

In this design, a pilot project for regional post offices sponsored by the Cummins Foundation, the entire complex is walled in. This solution retains the traditional sense of a formal block within the town's street pattern, but screens the unsightly elements of parking lot and service yard from passers-by. On the main-entrance side, an arcade creates the same sense of dignity once achieved with broad lawns. The enclosed space will follow the standard post office plan. Construction will begin this year. Materials are local silo tile and weathering steel.



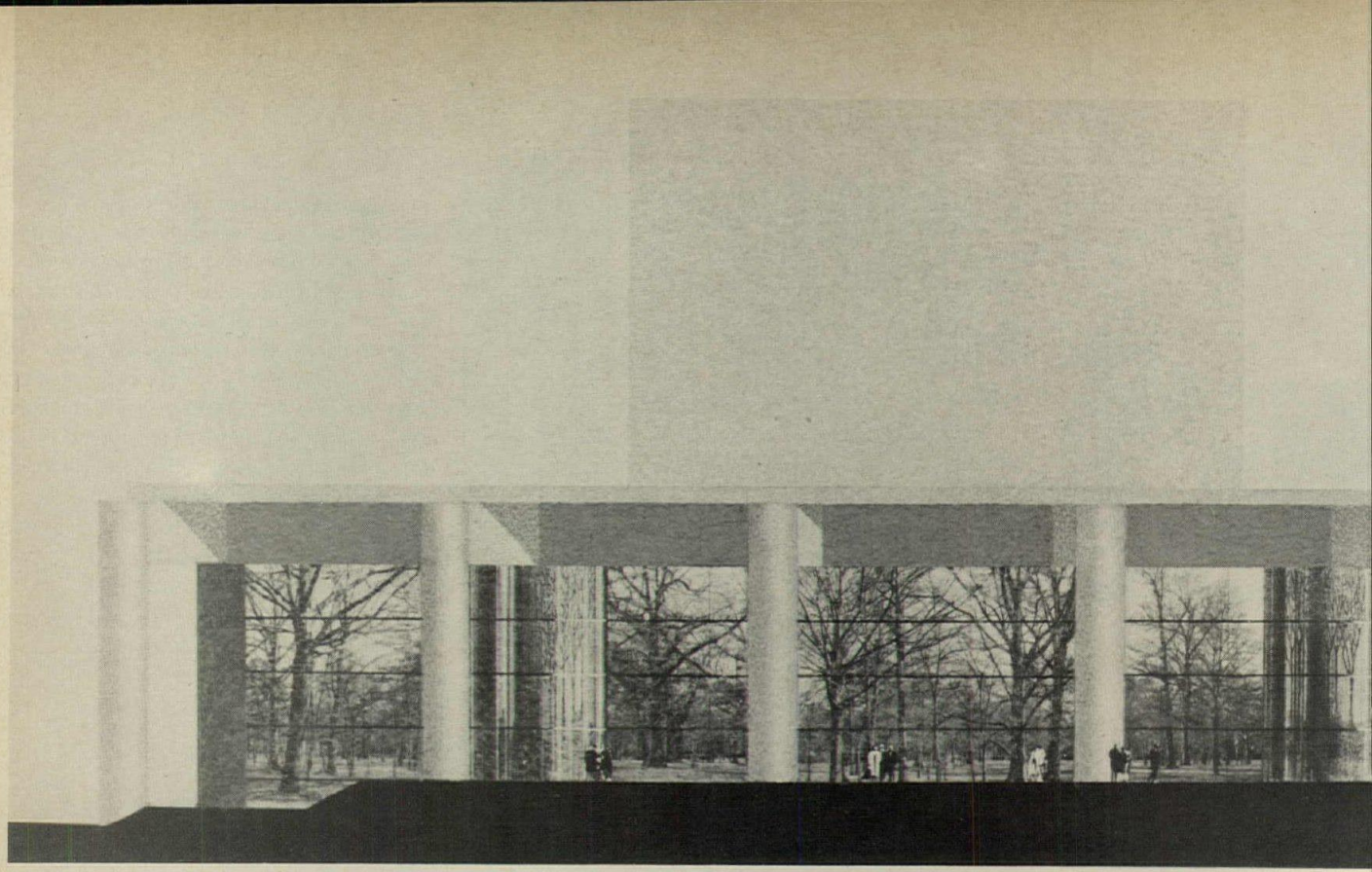
UNIVERSITY OF PENNSYLVANIA PHILADELPHIA

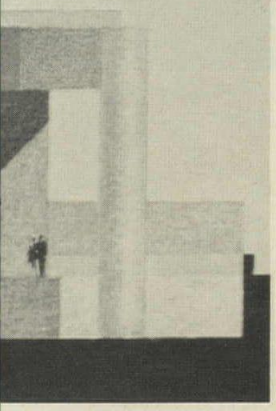
The major effort in the design of this dormitory building—one of two for 250 women each—was to break the scale to a comfortable residential feeling. Thus, the space within the four-story complex is divided into 36 rooms around a stairwell. Also included, libraries, dining facilities, apartments for masters, lounges and the like. A change in the University's housing plans has halted the development of this project.



INSTITUTE FOR ADVANCED STUDY, PRINCETON, N. J.

This building—with office, study, and conference space for professors and associates—was to be sited in front of the existing Institute building (at rear in drawing), and the most difficult design problem was to relate the addition to the older building while allowing the older to be dominant. In this two-story solution, each office area has a terrace or balcony, walled to create privacy and quiet, and opening inward to community spaces. An enclosed dining court is under the center skylight, opening in both directions to sheltered courts for seminars or conversation. This solution was not acceptable to some faculty members, and the architects have withdrawn to permit the expansion to be built in the style of the existing buildings.

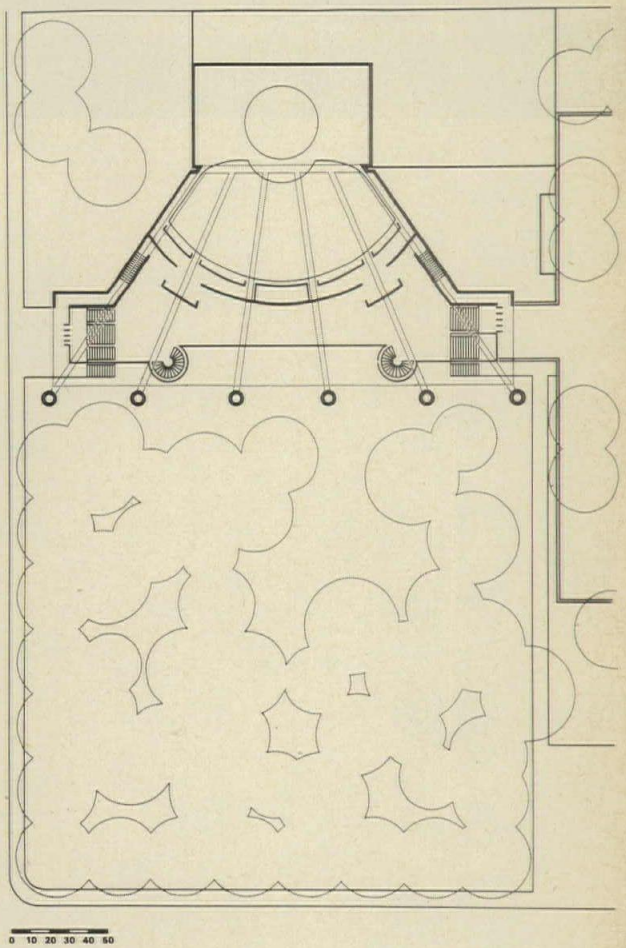


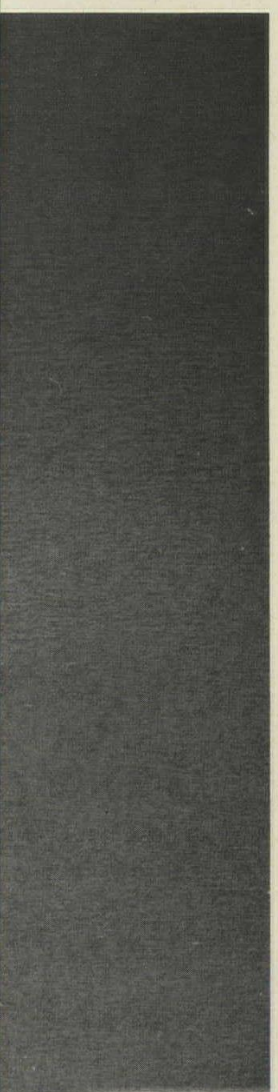


REPERTORY THEATER, UNIVERSITY OF MICHIGAN, ANN ARBOR

The site for this 1,450-seat theater, which is expected to be under construction this year, was the last remaining park space on campus. The building will be placed across the rear of the park where there are few trees and where it will screen the park from a powerhouse.

During the day, a wall of reflecting glass—set back from the columns to form an arcade—will create an image of additional park space, but at night when the theater is lighted, the glass will permit a view of the life of the theater inside. The 8-foot columns will support concrete beams as long as 145 feet.

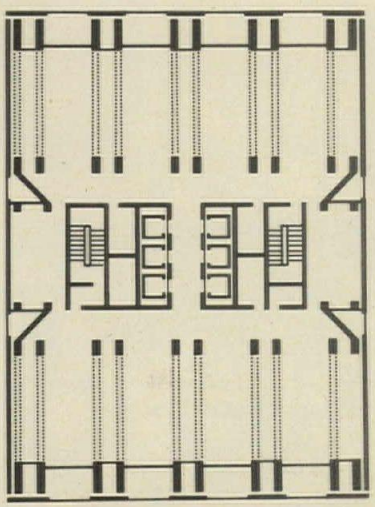


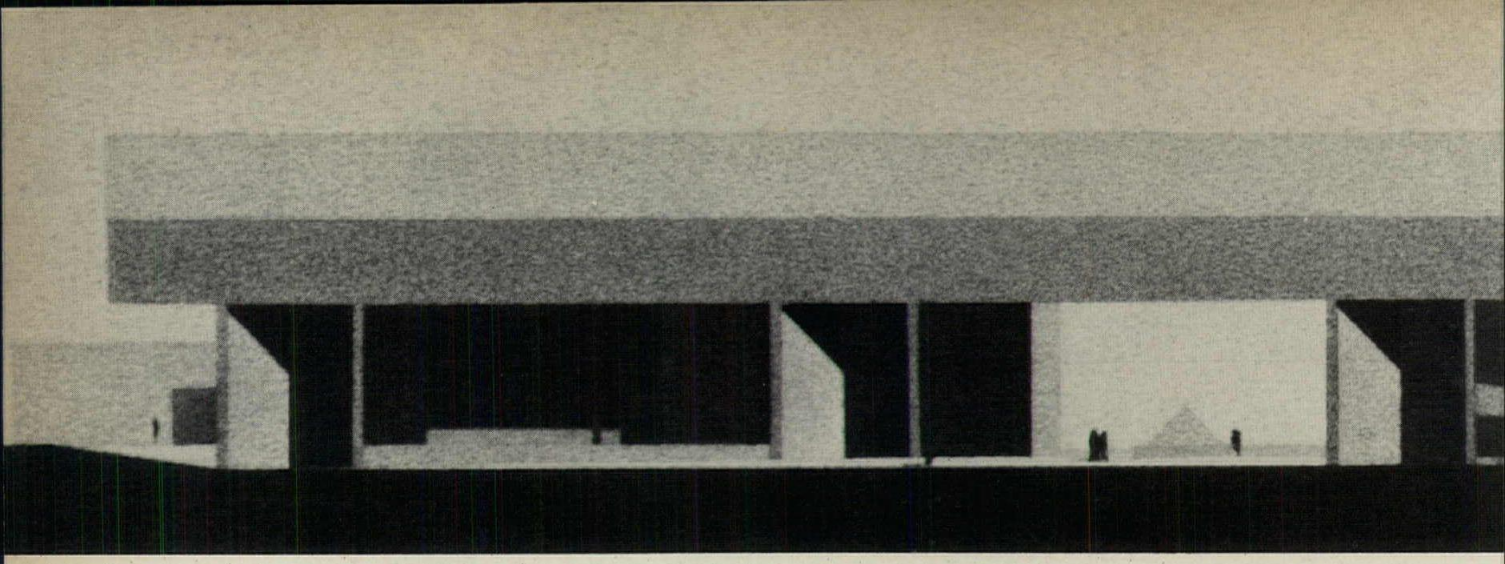


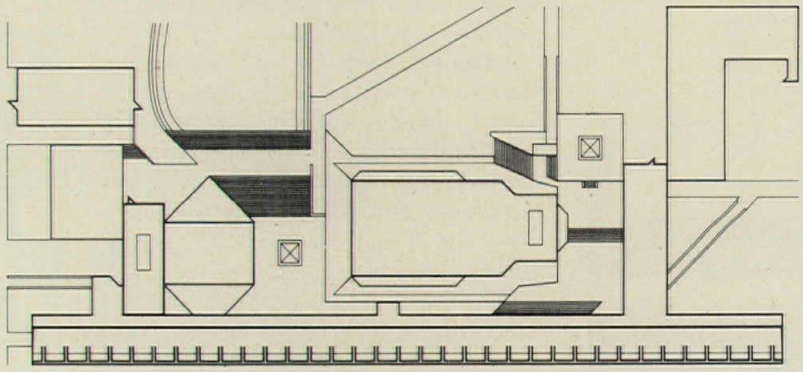
RESEARCH LABORATORY, NEW YORK CITY

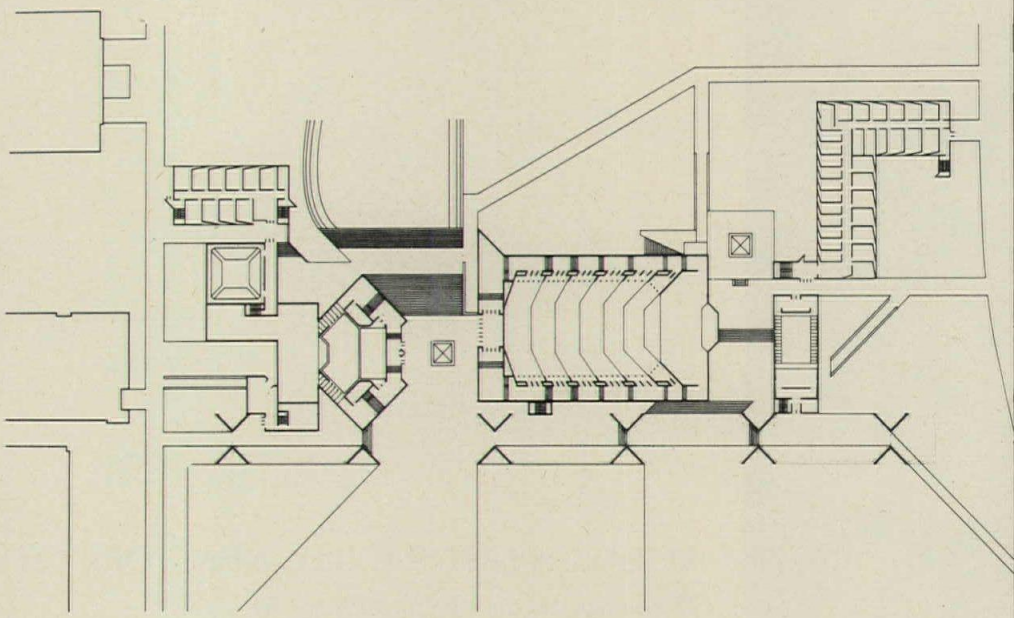
The design and the structural system for this high-rise laboratory grew out of the need for extensive mechanical and electrical services throughout the building. The outside columns are in pairs which enclose the service risers. Between the beams spanning to the inside columns are service runs and fume hoods.

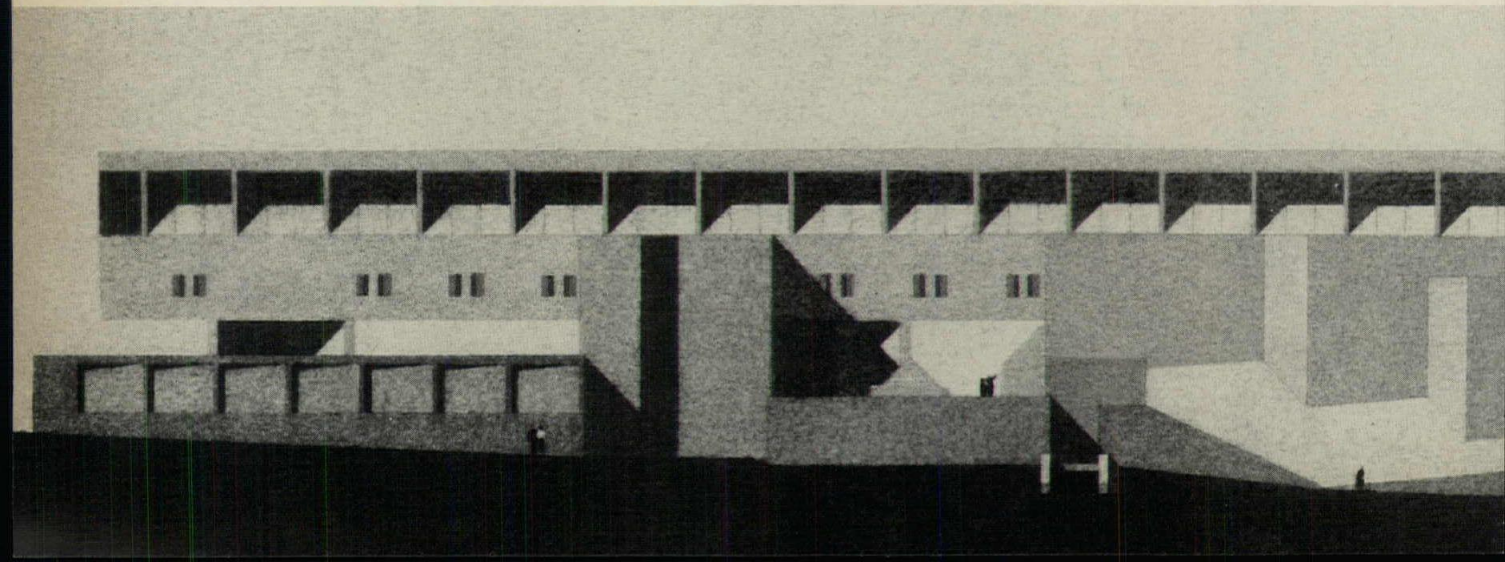
The exterior will be precast concrete in floor-high panels. The windows will be shaded by precast eyebrows or "awnings" set within the depth of the columns, which will reach down almost to eye level and eliminate the need for drapes or blinds. The windowless spaces at the base of the tower will house the extensive mechanical equipment and storage spaces.

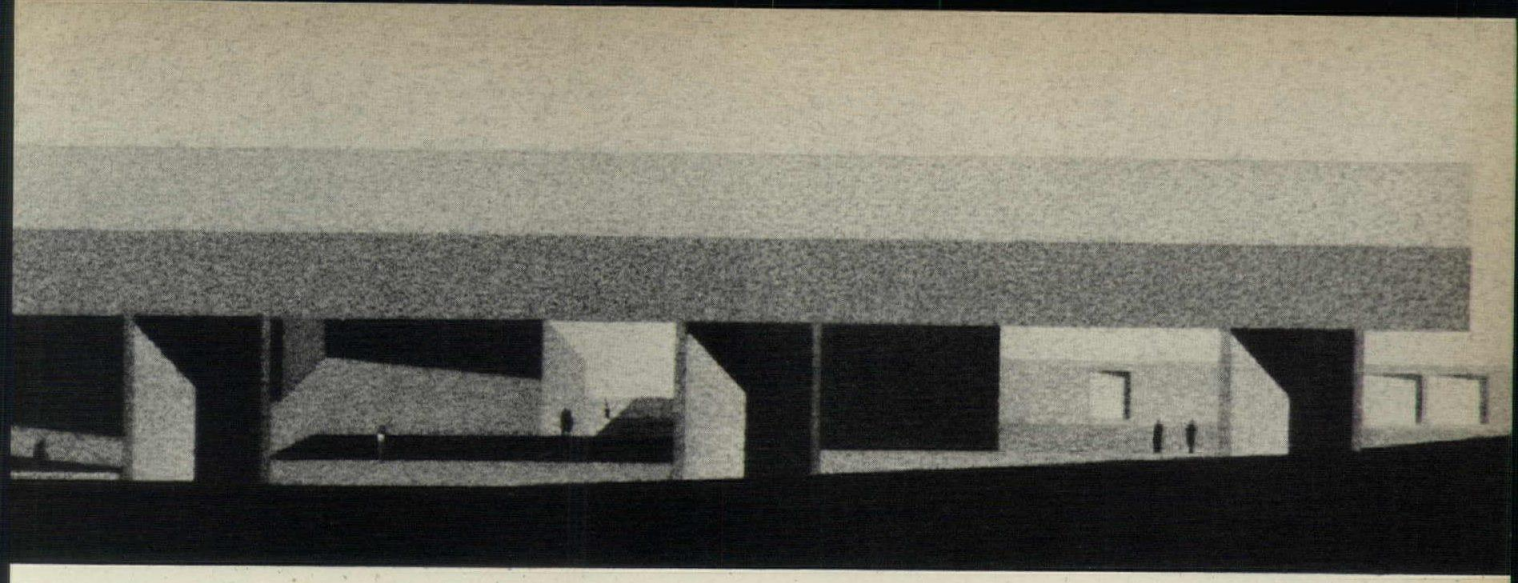












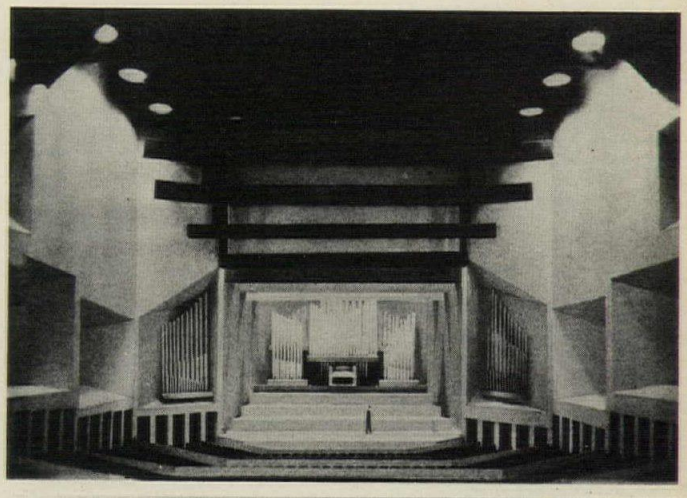
FINE ARTS CENTER
NIVERSITY OF MASSACHUSETTS, AMHERST

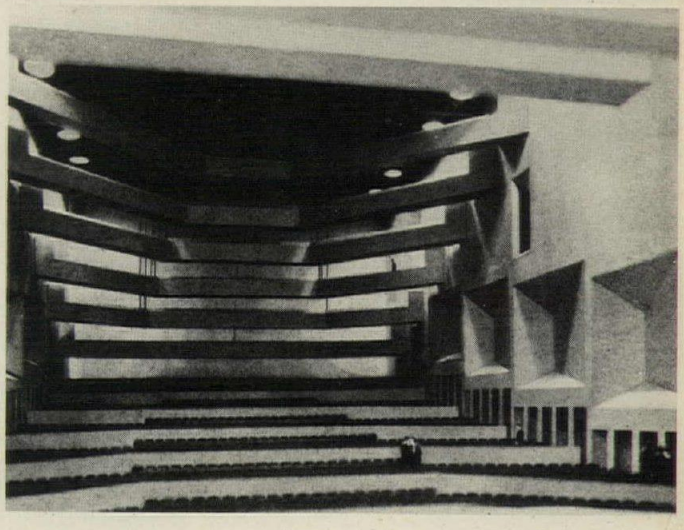
It is interesting to compare this design solution with the Creative Arts Center at Wesleyan (page 152), since many of the same kinds of varied spaces are called for but the solutions are very different.

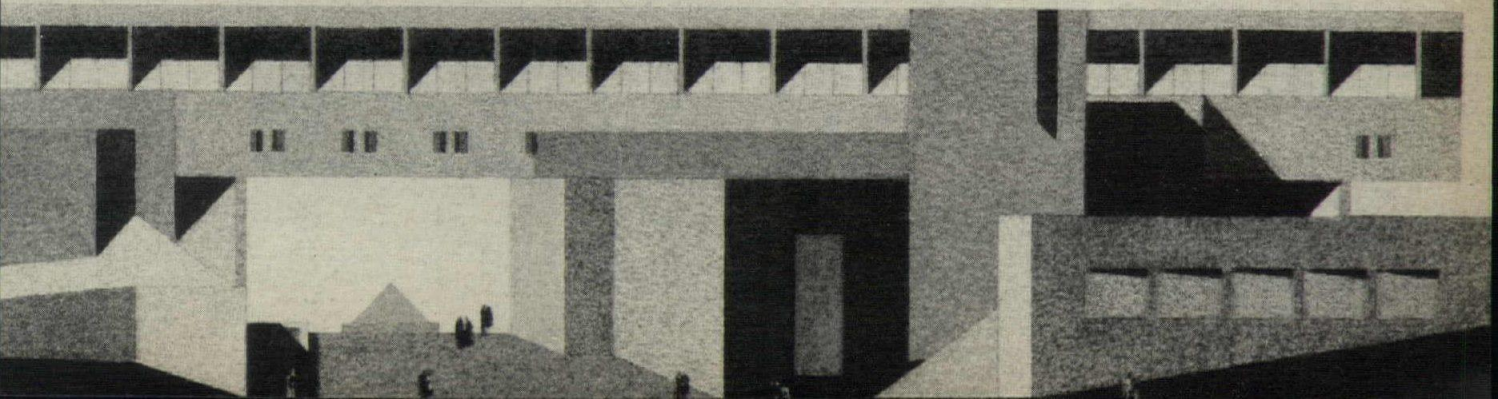
At Wesleyan, the various fine-arts facilities are scattered in a complex of small buildings (for very good design reasons) while here they are organized into a single building (also for very good design reasons).

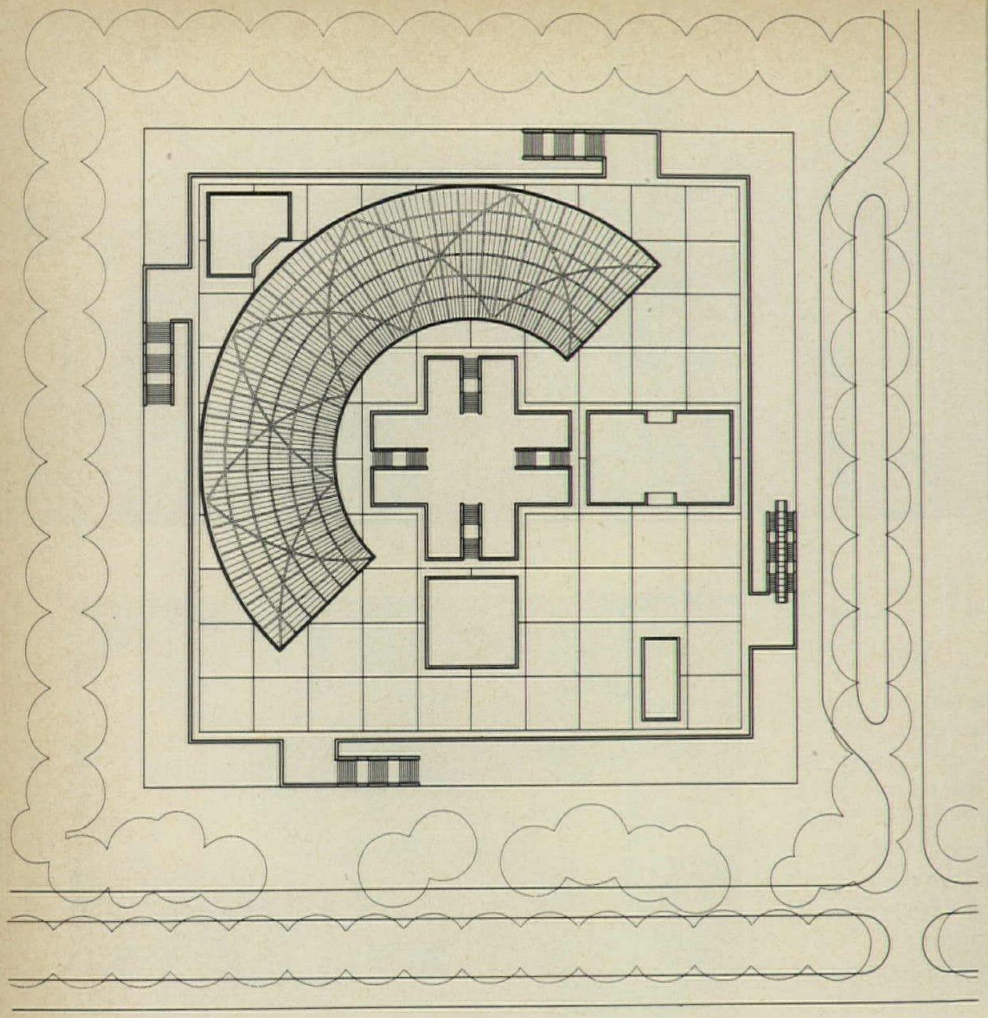
Because of its site astride the main mall, the building will form a gateway to the central campus and serve as a bridge —symbolically as well as physically—between existing humanities buildings and existing science buildings. It is sited and designed to create a constant exposure for students of all disciplines to the fine-arts facilities: a concert hall for 2,200 (drawings right), a 750-seat repertory theater, an experimental theater, a recital hall, art studios, a gallery, a library, the music school, television studios.

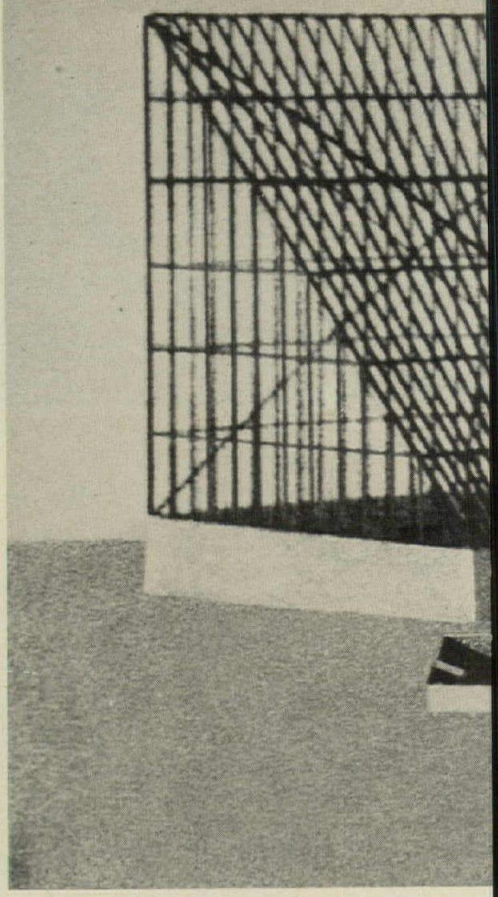
The design creates two different scales: the bolder and simpler on the gateway elevation; the smaller and more fractionated on the rear, relating to the scale of the smaller existing buildings leading off in both directions.

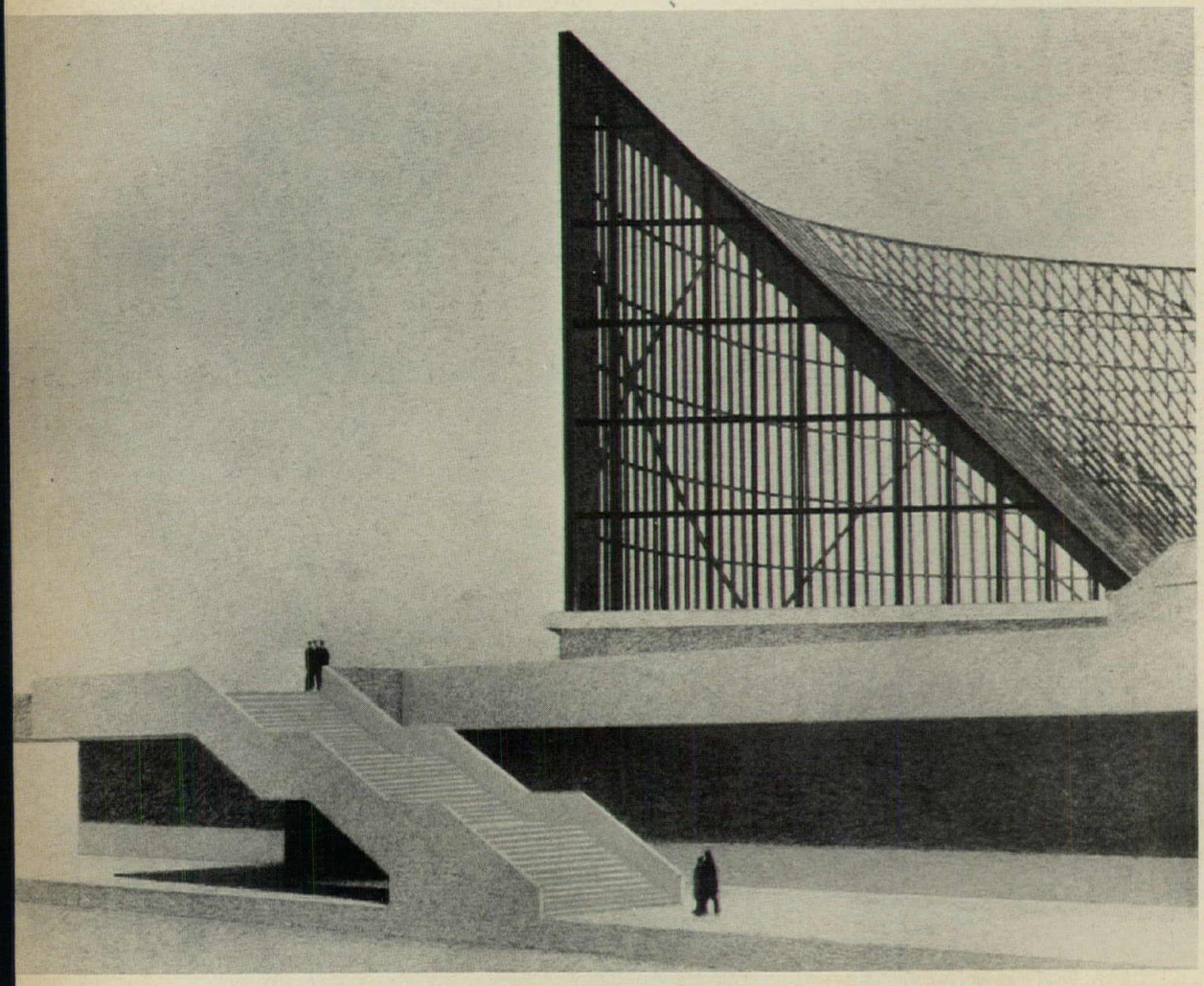








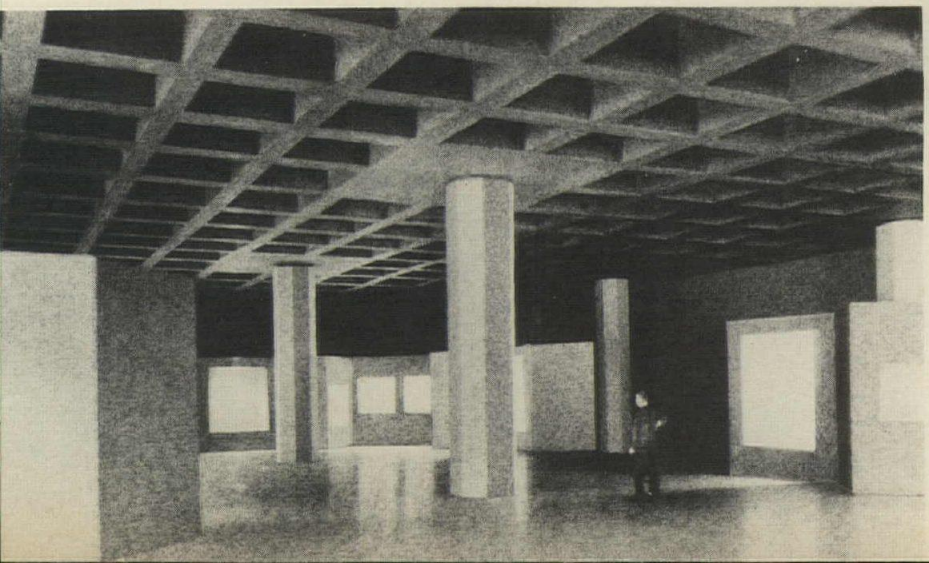


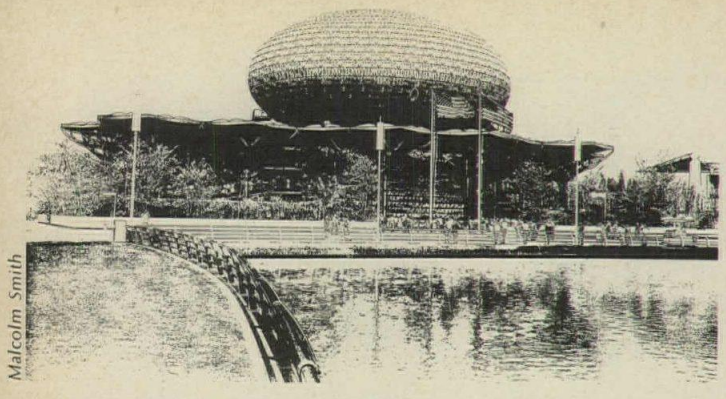


NATIONAL FISHERIES CENTER AND AQUARIUM WASHINGTON, D.C.

with Charles Eames as program designer

The 100-foot-high steel-framed greenhouse—designed to exhibit complete ecological systems and certain to be an extraordinary environmental experience—is but one section of this complex and unique building. On the same terrace level are a variety of outdoor exhibit spaces and landscaped areas. A number of broad stairwells lead down to the lower level which houses a number of marine exhibits, research facilities, a library, offices, and orientation theaters.



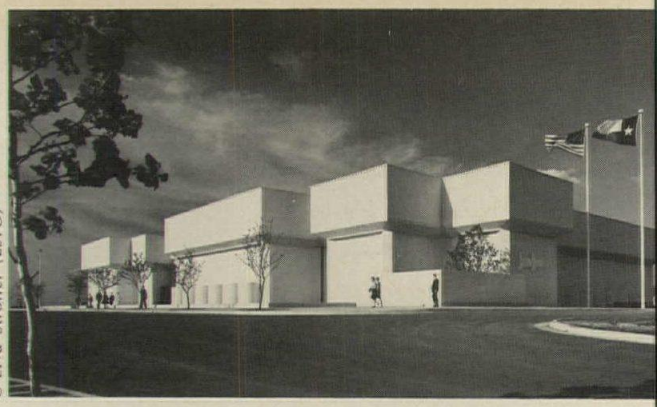


Malcolm Smith

I.B.M. PAVILION, NEW YORK WORLD'S FAIR

designed in collaboration with Charles Eames

This pavilion was designed not only to express the wonder of the computer world, but to prove that human-scale techniques are the basis. Visitors participated in a series of experiences within a grove of 32-foot-high steel trees designed to suggest that thin sheet steel could be used as an expressive as well as a structural material.

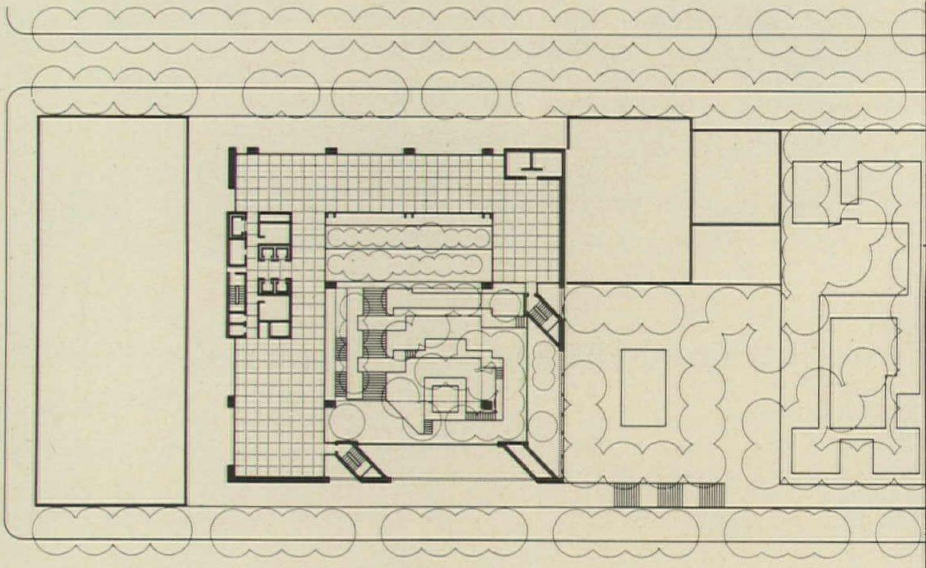


© Ezra Stroller (ESTO)

NEIMAN-MARCUS, DALLAS

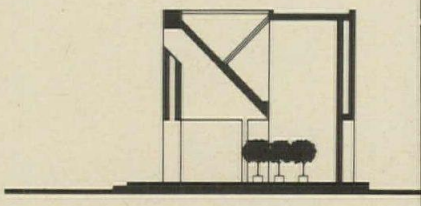
The prestigious character of this store is reflected in the d tinctive detailing in white brick—the flared corners of per eter recesses, the massive parapet, and the major exterior trances from grade at both floors. The rounded projections skylighted shields admitting daylight through the windows the fitting rooms within.

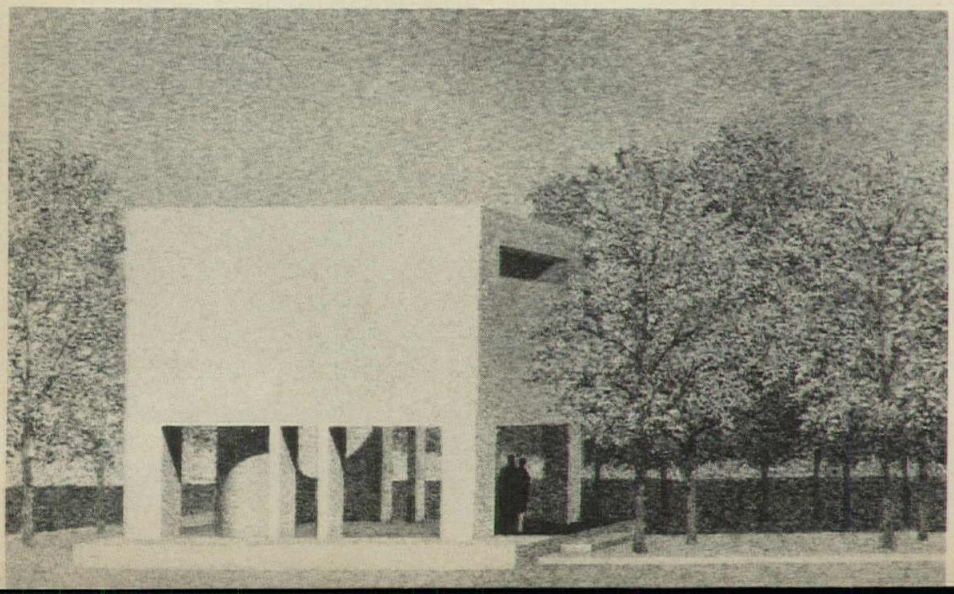
© Ezra Stroller (ESTO)



FORD FOUNDATION HEADQUARTERS, NEW YORK CITY

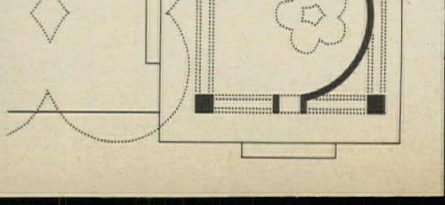
The challenge was to create an office building that would not isolate the individual in a cubicle with no sense of his working community and with no view. The large park enclosed by the C-shaped building with its 10-story-high sheer glass wall not only accomplishes the goal, but gives the passerby enjoyment In addition, the design conscientiously observes the lines and planes created by the other buildings in the area and extends the existing public parks.





ORANGERY

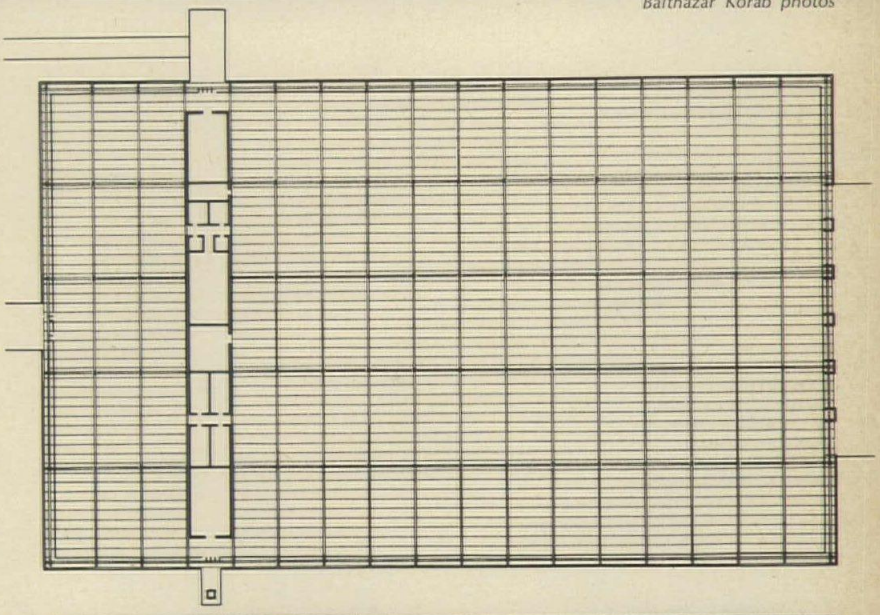
This fascinating greenhouse for oran trees is located at the end of a priv walkway lined with trees. The buildi is a 25-foot cube with retractable w dows and screens. A slatted skylight p vides changing patterns of light on t circular rear wall.

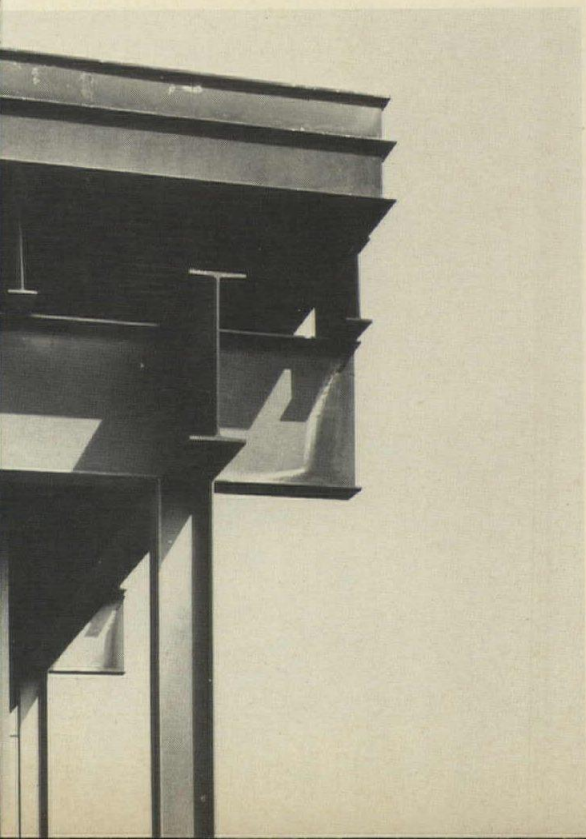


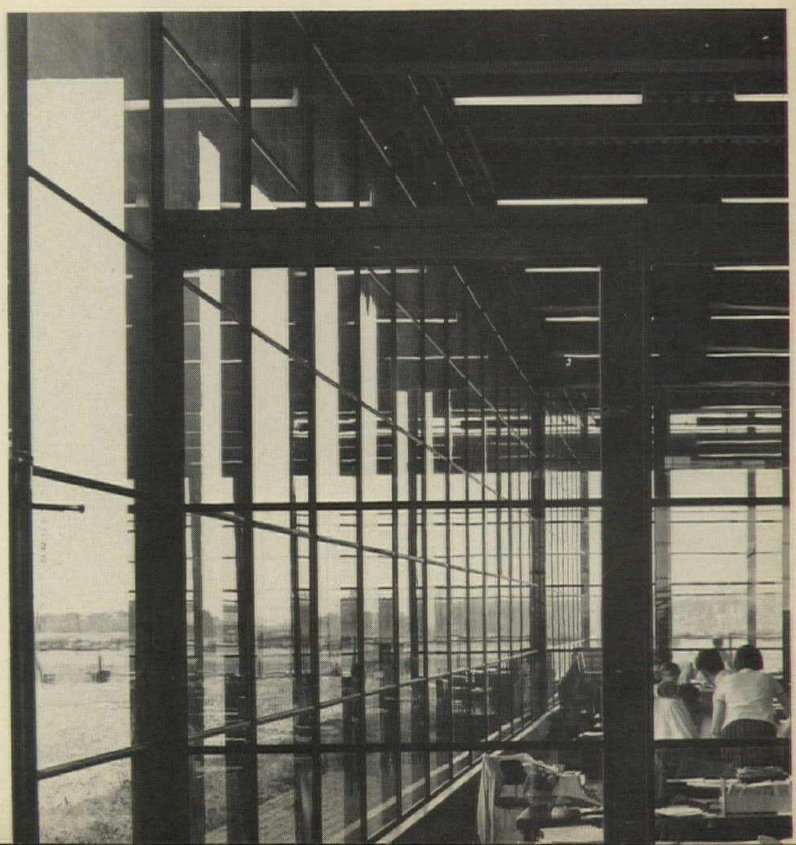
Balthazar Korab photos

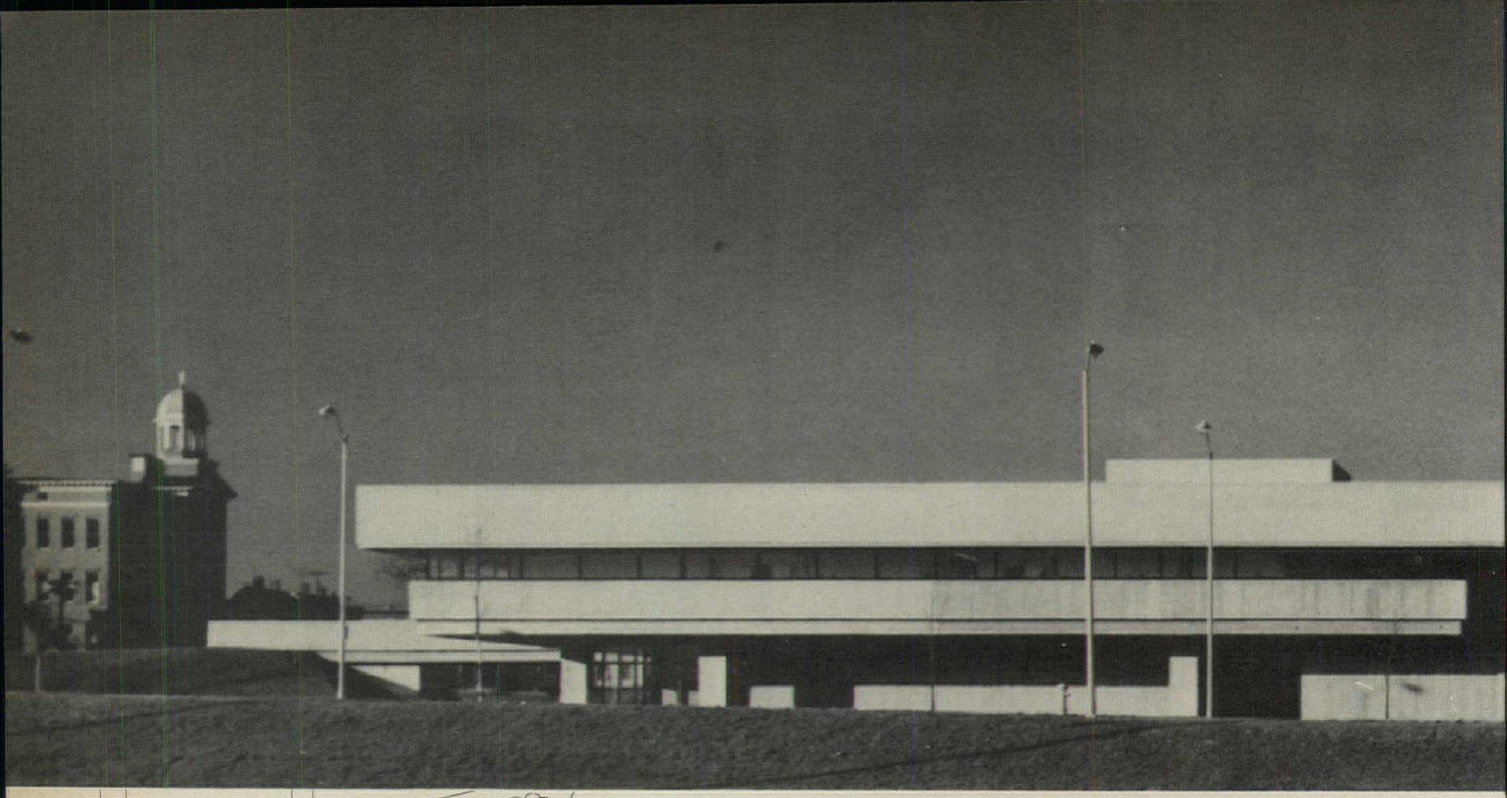
UMMINS ENGINE COMPANY
ARLINGTON, ENGLAND

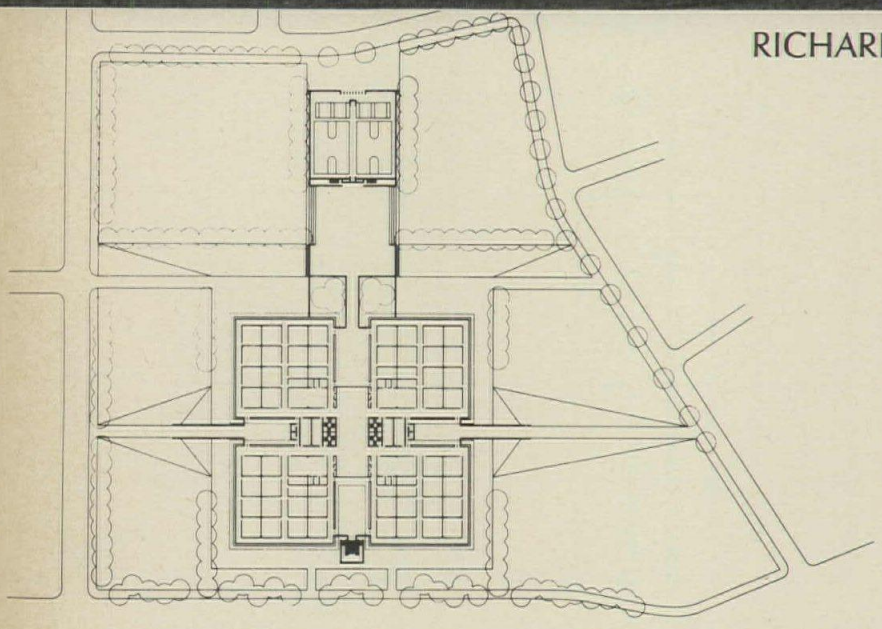
minimum of clutter and of the raw-
ss often associated with manufactur-
g plants makes this simple rectangular
x a positive contribution to its com-
unity. Factory and office space are flex-
e working areas, each capable of ex-
nsion. Where possible the interior
aces are open so that the manufactur-
g process is in one large room. Each
rlin is mounted on an 18-inch steel
F plinth that rests on the main steel
der, giving a 36-inch space between
e girder top and roof deck for all main
lity runs and 18 inches under purlins
r branch utilities.









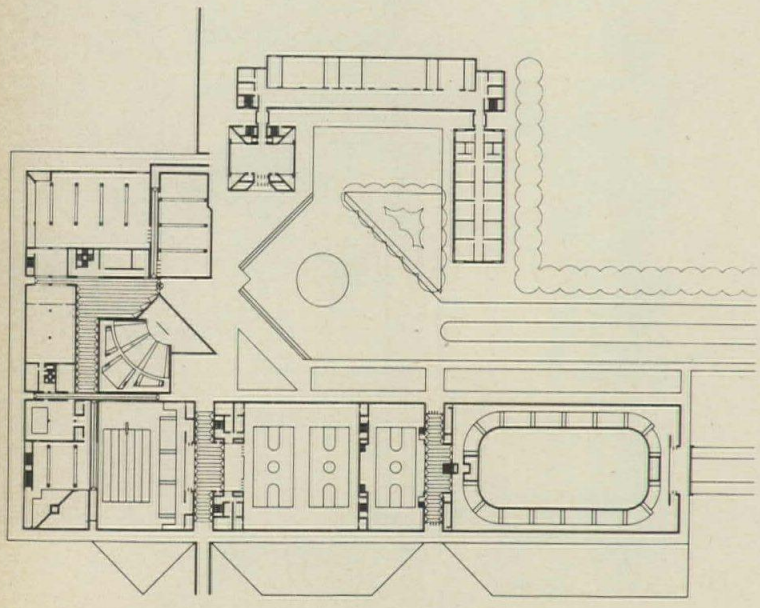


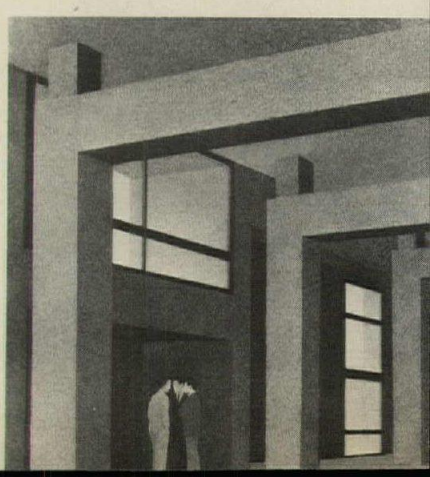
RICHARD C. LEE HIGH SCHOOL, NEW HAVE

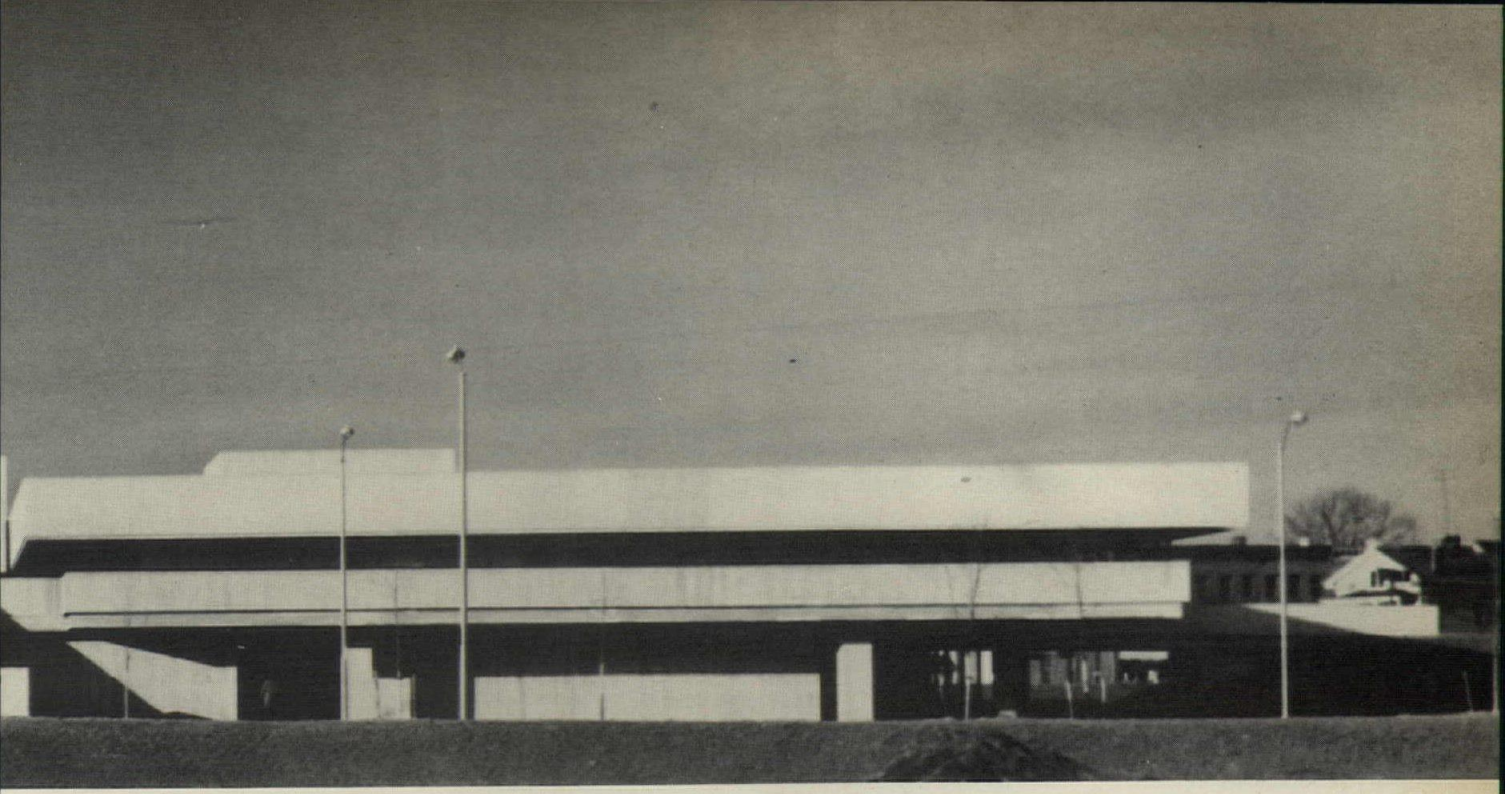
This strongly patterned concrete bui ing creates permanence and digr among dilapidated structures and re bilitation. The school houses 1,600 s dents in four separate areas, each a lor span modular building 136 foot by 1 foot with movable partitions, and ea connected to the central library. T peripheral corridors have continuc windows above a bank of lockers. T wide overhangs, supported by colc nades of square piers, shade the gla insure efficient air conditioning, and pr vide sheltered area outside. Ramps allc entrance on both levels.

ROCHESTER INSTITUTE OF TECHNOLOGY, ROCHESTER, NEW YOR

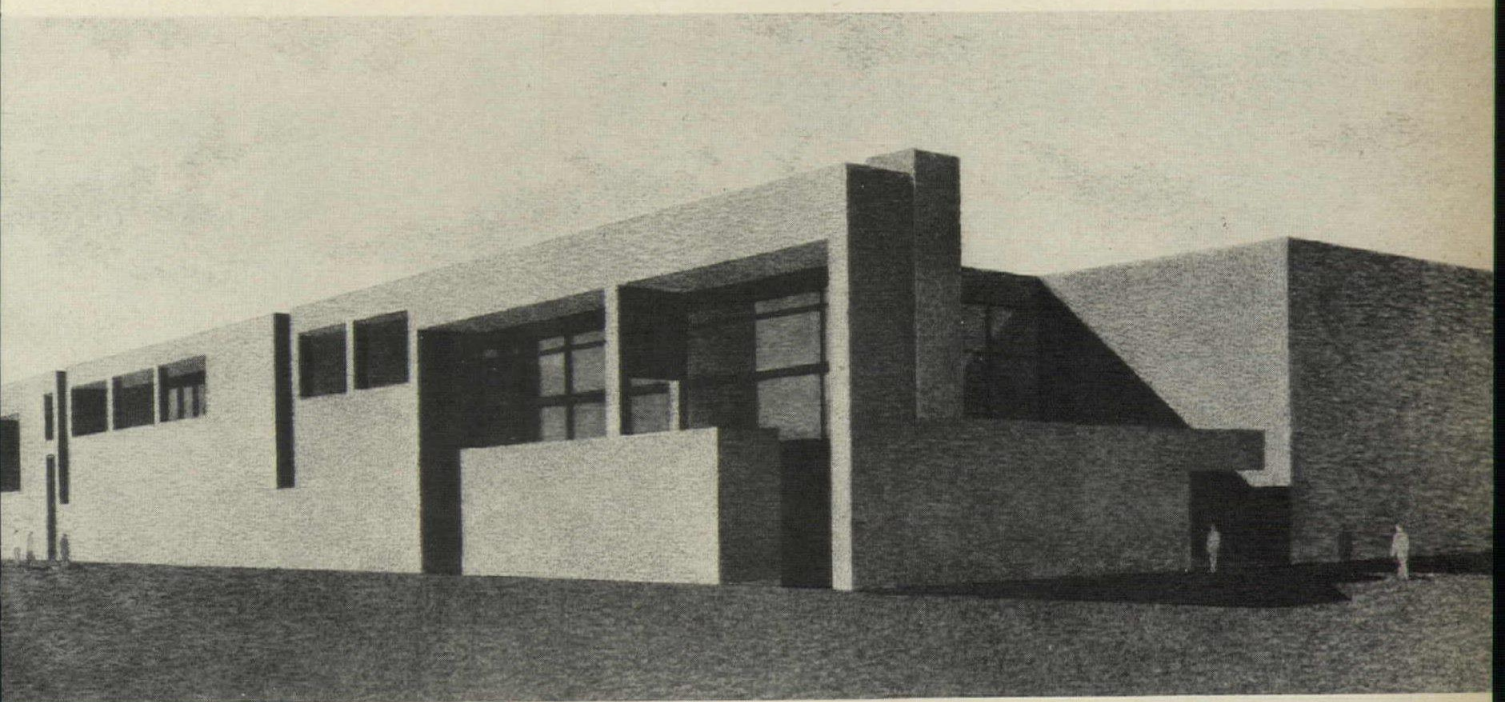
This complex of buildings presents closed face to the grey and winte Rochester climate, but is designed create instead a series of pleasant i terior views. From the student-uni lounge (lower left in plan) students c see over the swimming pool, the gy and the skating rink in one directic and enjoy a winter garden in another.

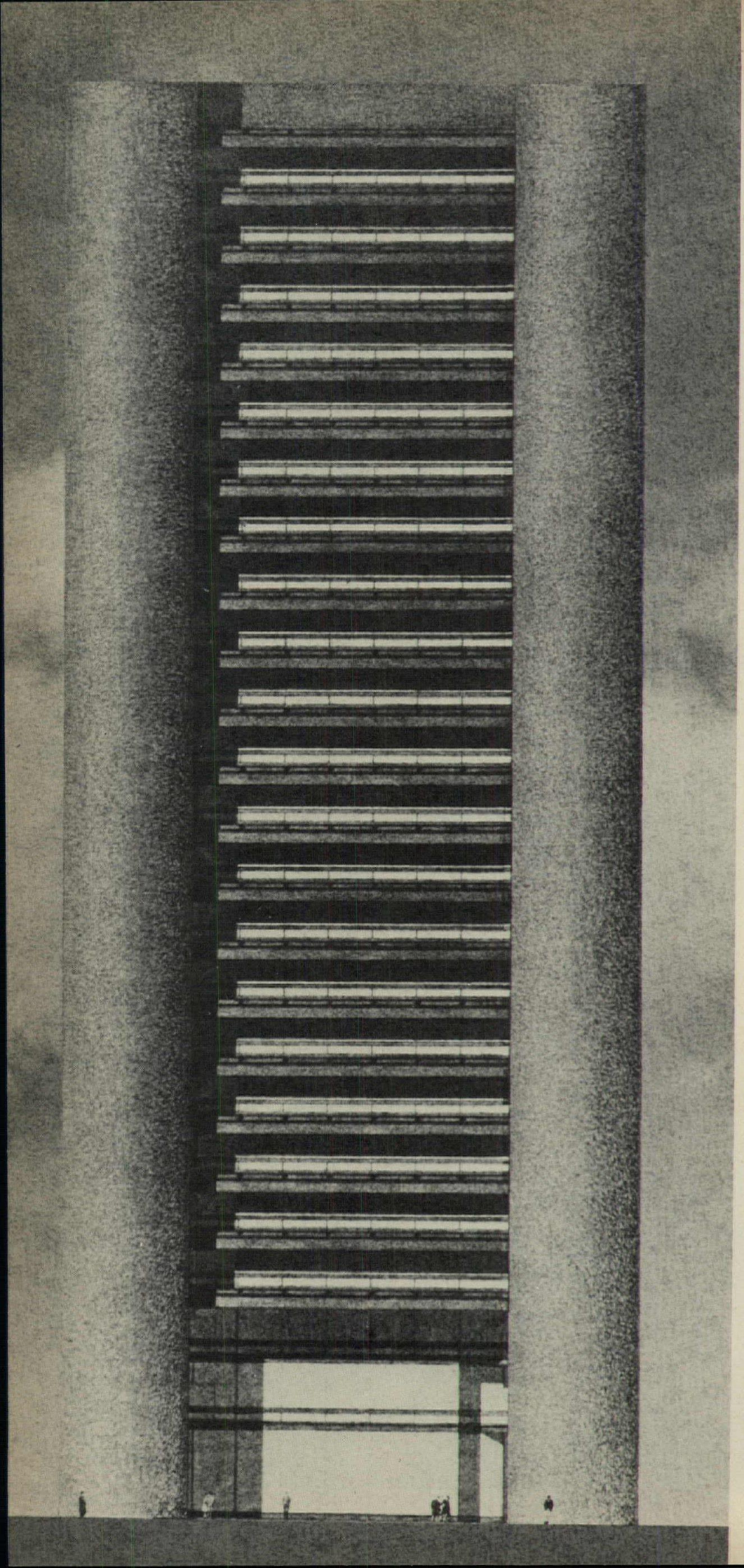






photos © Ezra Stoller (ESTO)

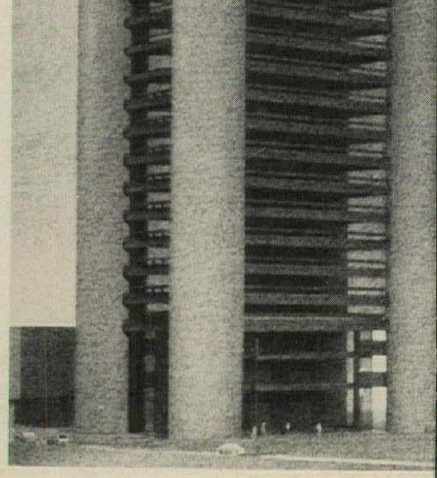


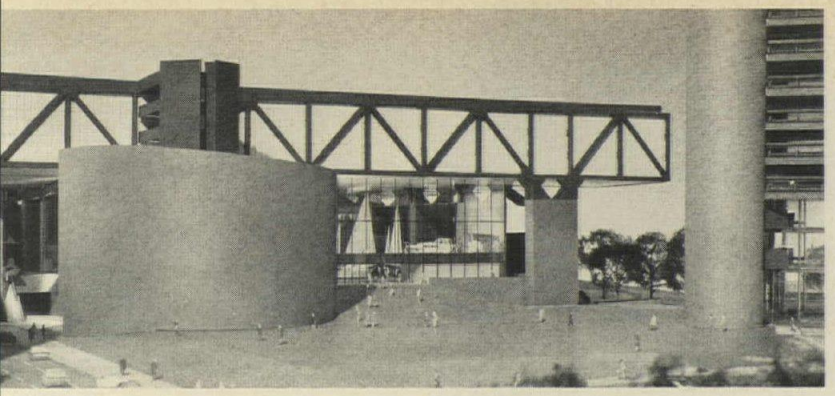


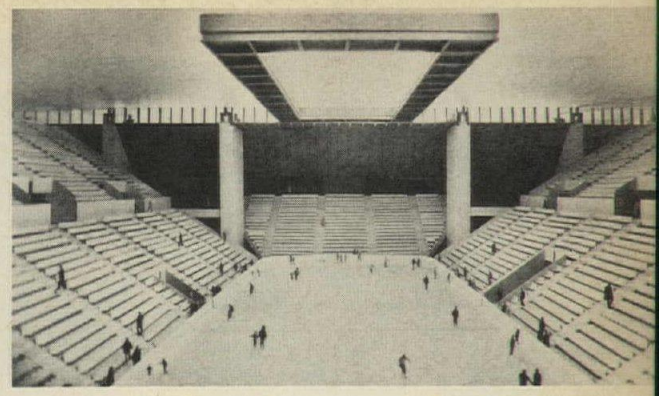
KNIGHTS OF COLUMBUS HEADQUARTERS, NEW HAVEN and NEW HAVEN COLISEUM

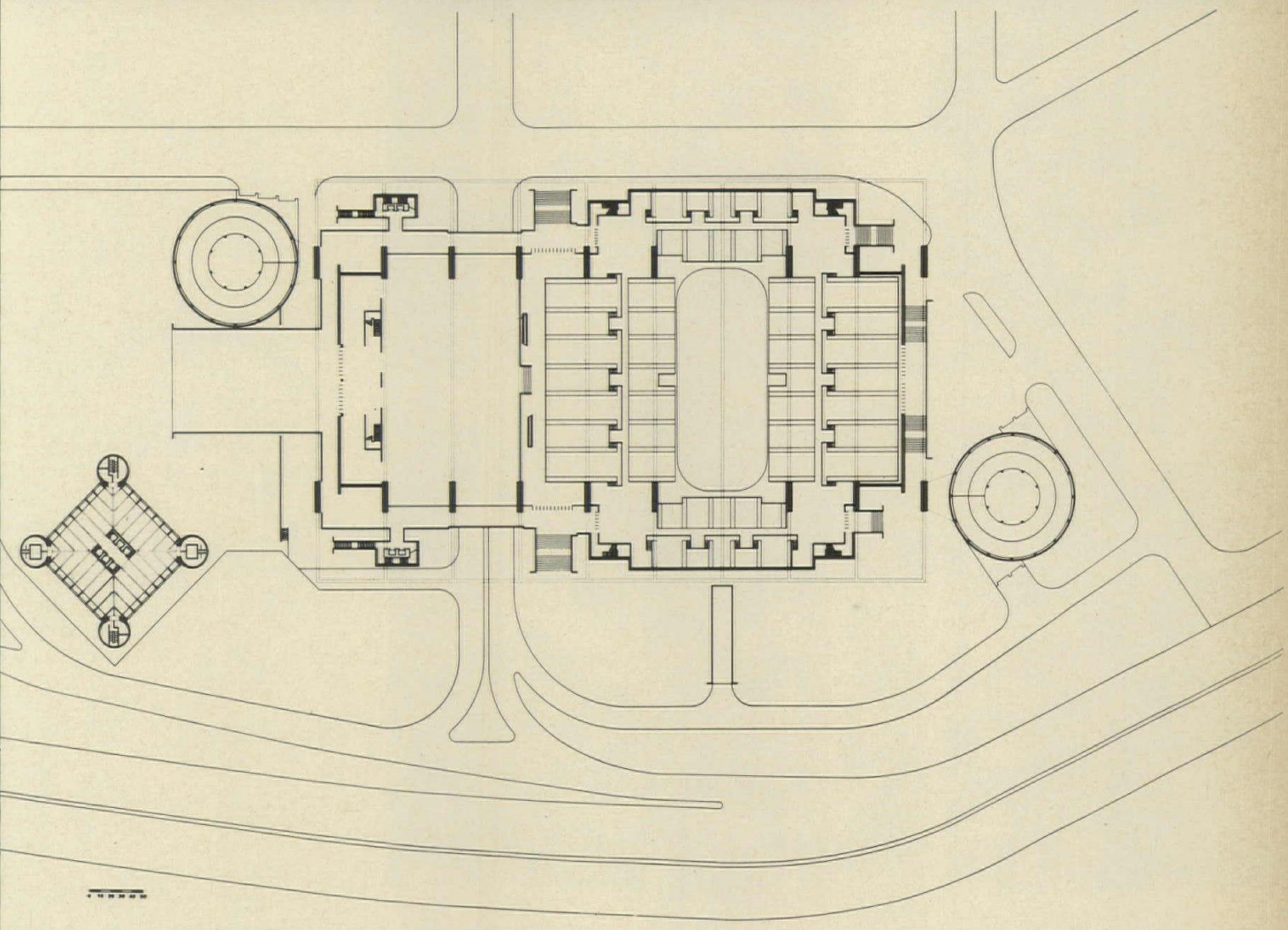
These two buildings—for separ clients—are on the same site in dov town New Haven. The form and str ture of the 26-story Knights of Columb building, now under construction, gr out of an unusual program requireme floors of 10,000 square feet each, sma than building economics normally d tate. Further, since most of the space to be used for insurance operations, op floor space was needed. The design so tion called for the unusual structural s tem: The core of the building conta only the six elevators; mechanical spac toilets, and stairs are housed in the fo tile-clad concrete towers. The towers su port 80-foot girders, which in turn su port the steel floor structure.

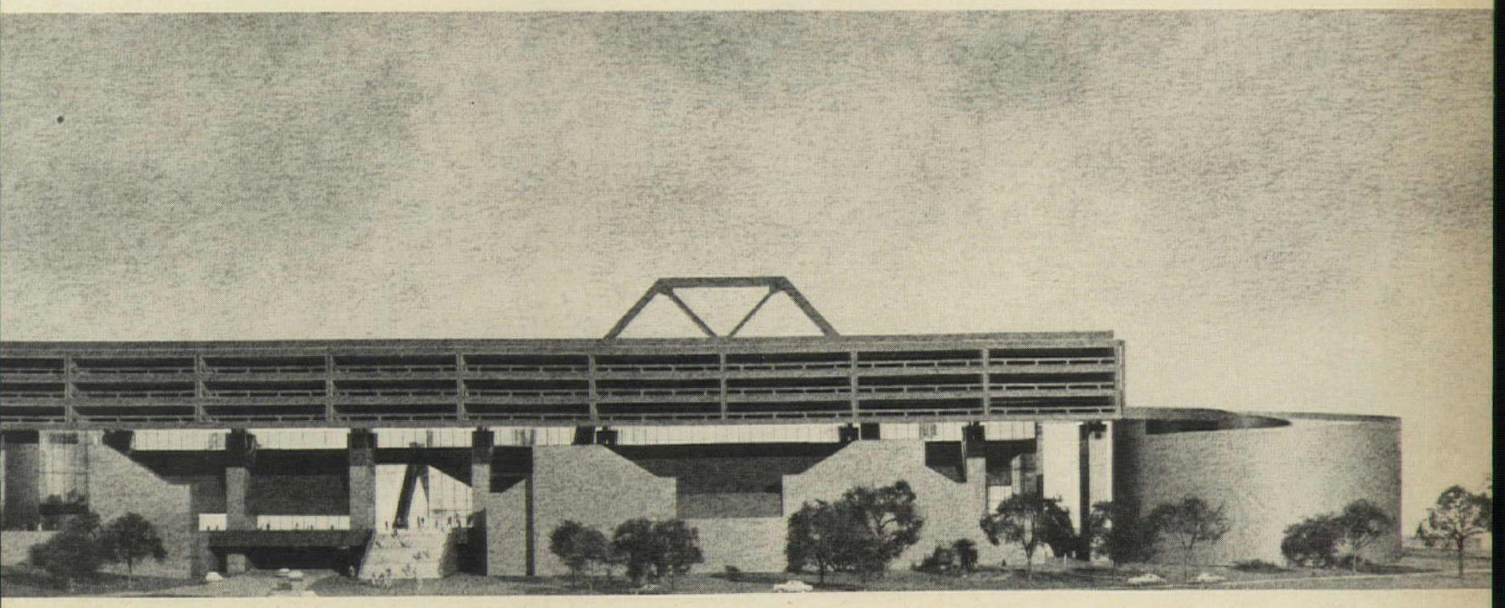
The Coliseum includes an arena, exhibition hall, and a parking garag A water condition and a street whi had to be left open suggested using t four-level, 2,400-car garage as a roof the other two units. Further, since a g rage has a regular and orderly structu (here, 62 feet o.c.) and the arena a ve special structural system, it is easier relate the two with the garage on to Over the column-free arena space– span of 184 feet—the garage/roof is su ported by the superstructure shown the elevation below. Construction w start this year.

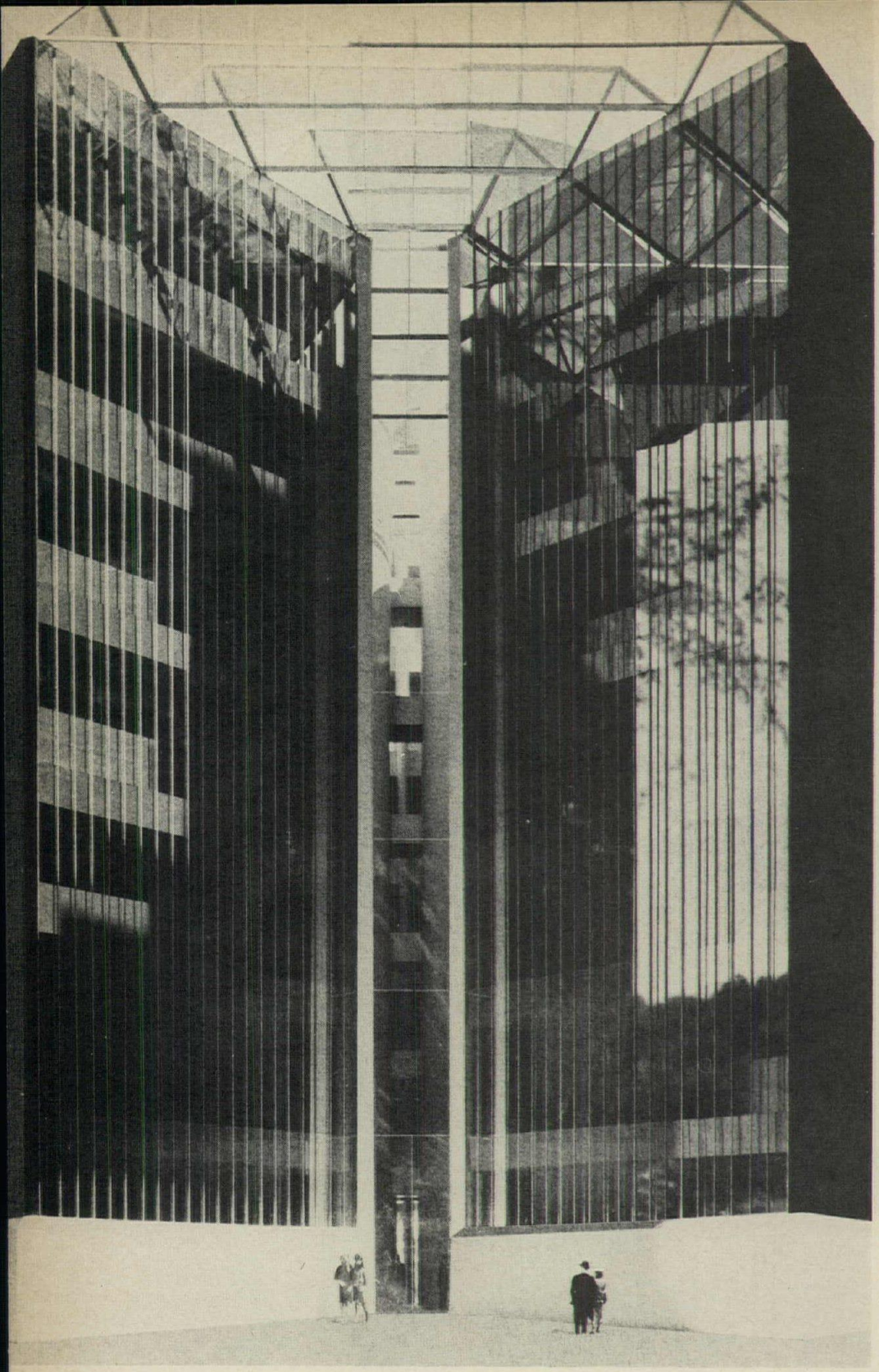


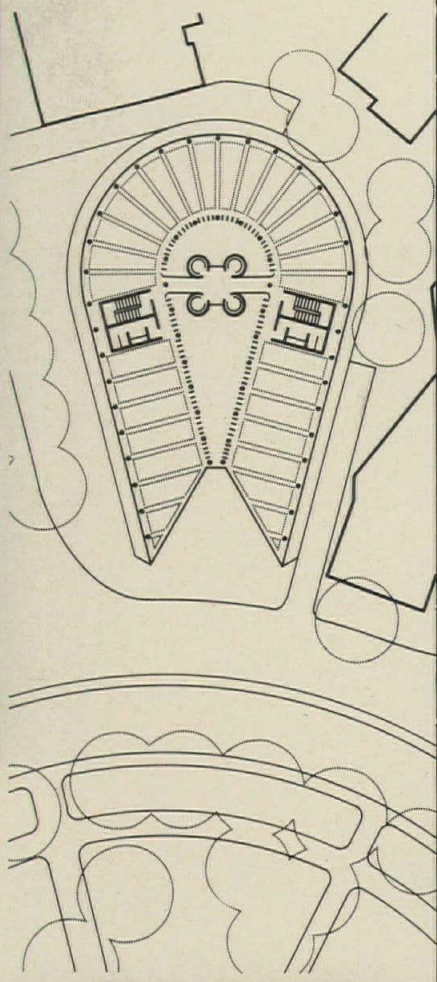












NATIONAL CENTER FOR HIGHER EDUCATION
WASHINGTON, D.C.

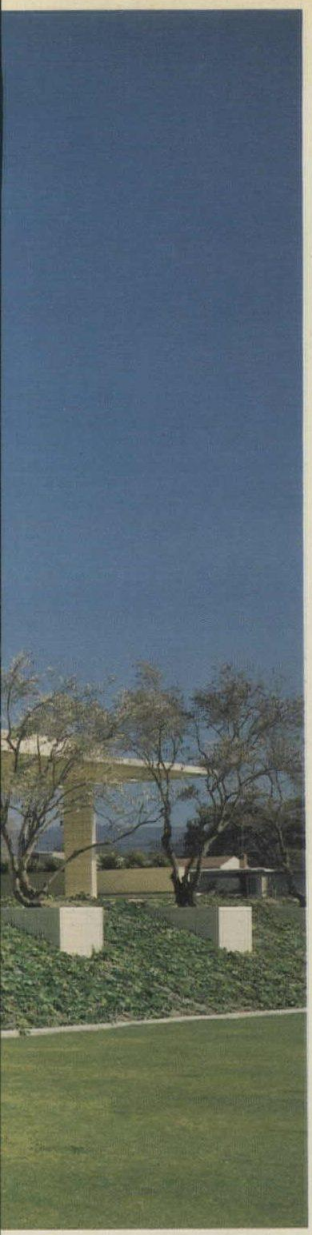
The form of this seven-story office building clearly grows from the wedge-shaped site on DuPont Circle. The design gains strength in the narrowest though most important face by the folding back of the reflecting glass walls and the deep entrance court, sheltered by a glass roof. The open office floors wrap around and overlook an interior courtyard in which the elevator core stands free.

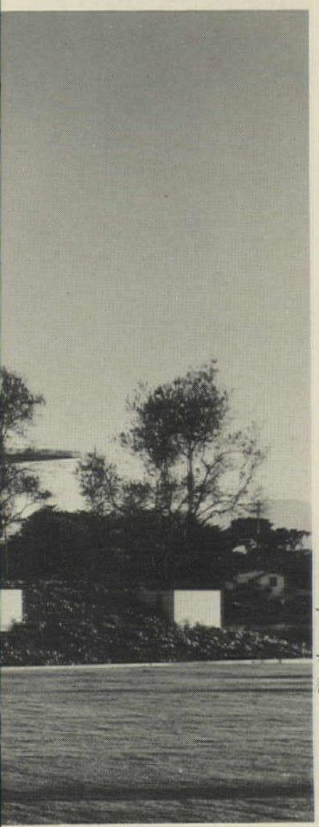
ARCHITECTURE FOR A CITY'S NEW IMAGE

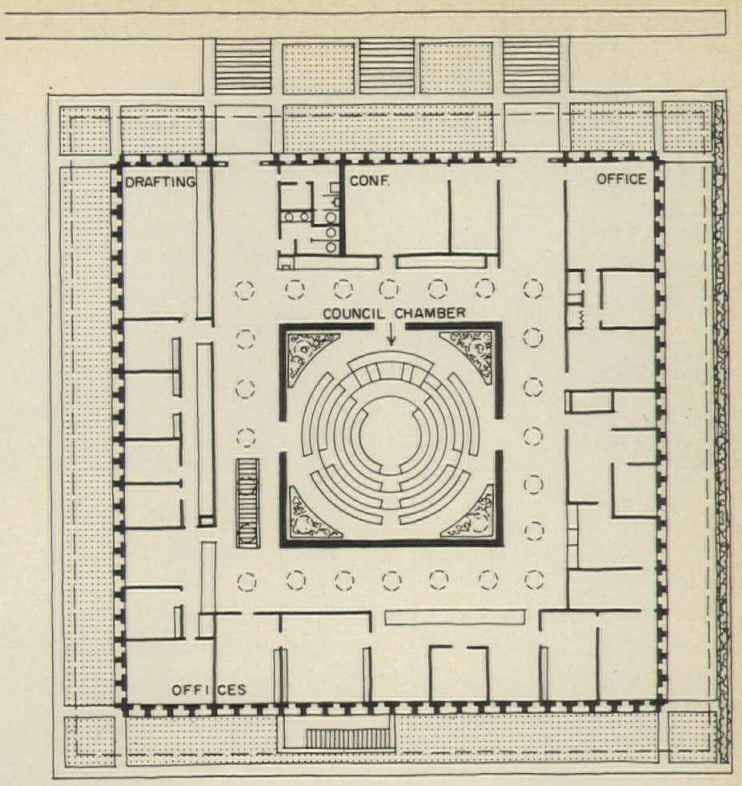
The elegance and distinction of this city hall have special significance to the residents of Seaside, California. Not only does the handsome building house the city's administrative, governmental and police offices, but its architectural solution epitomizes the new Seaside which is replacing the unplanned, ramshackle old Seaside

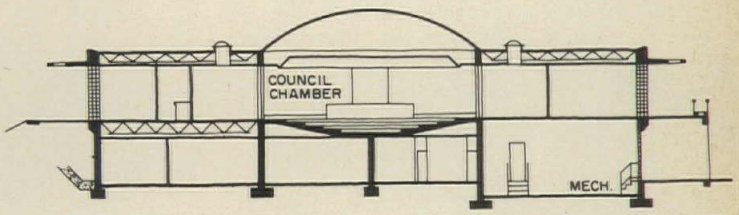
photos: Morley Baer

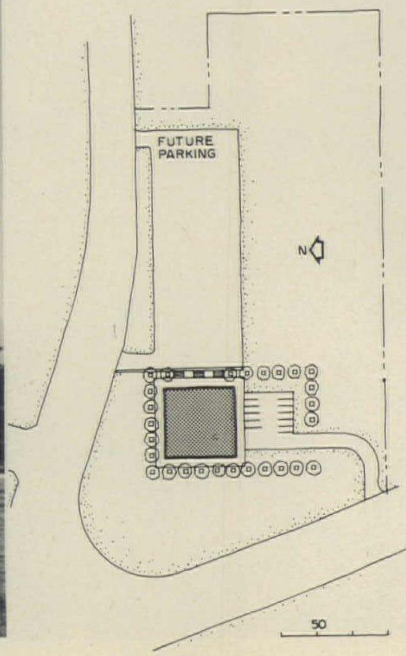

CITY OF SEASIDE
CITY HALL











The building is the first city hall that the city of Seaside—a small coastal community which became a city only 14 years ago—has had. The first settlers—mainly squatters whose tar-paper shacks blighted the dunes on which they were built—did nothing to develop a community. Even the expansion—during World War II—of nearby Fort Ord did little more than add hastily built housing and tawdry commercial establishments to the unplanned, unzoned little town. In 1954 Seaside became an incorporated city, with its own government and a population of over 15,000. Zoning and building codes were enacted, a General Plan was adopted. Seaside's determination to change its public image was real and earnest. Its population has grown to over 24,000. The new city hall evidences the dignity with which the community views itself today—and with which it wishes to be viewed. The simplicity of the building—its plan is square, its four sides similar but not identical, its lines horizontal in keeping with Seaside's low-rise character—is appropriate to the scale of the area and of the community. An ivy-covered earth berm surrounds the lower of the two floors so that the building appears to sit on a promontory. Landscaping is appropriately simple, with grassy lawns around the building site, and olive trees in planters set in the berm. The exterior walls of the building are essentially alternating T-shaped concrete block columns and fixed glass panels. A 12-foot overhang shields south and west sides from sun, east and north sides from glare.

The Council Chamber is at the center of the main floor. A shallow thin shell dome 40 feet in diameter roofs its central area. Concealed lighting at the base of the dome floods the chamber with soft light which is enhanced by skylights over the corners of the chamber. Skylights also break the ceiling in the 12-foot gallery which surrounds the chamber and provides access to offices on the building perimeter.

SEASIDE CITY HALL, Seaside, California. Architect: *Edward Durell Stone;* structural engineers: *Pregnoff & Matheu;* mechanical engineer: *George A. Greene, Jr.;* consulting engineer: *M. G. Herbert;* landscape architect: *Edward D. Stone, Jr.;* contractor: *Joseph B. Fratessa.*

VE
ECENT HOUSES
Y

RICHARD NEUTRA

Raymond Lifchez

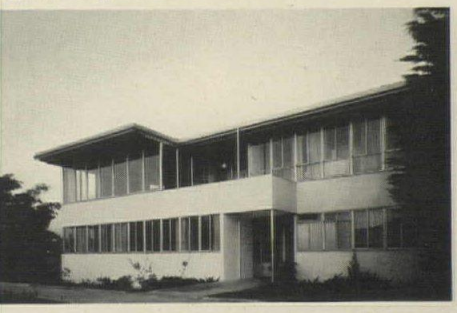
In 1923, the year Neutra arrived in New York from Europe, LeCorbusier's *Vers Une Architecture* first appeared in book form with illustrations of American grain silos, factories, bridges and city skylines. The polemical text urged revolution in architecture. In the Twenties, America with her vast industrial resources and advanced technology, promised the means by which a truly modern architecture could be realized. Avant-garde architects of that remarkable era shared LeCorbusier's idealism, and it was surely with the spirit of a revolutionary that Neutra left the Old World for the New.

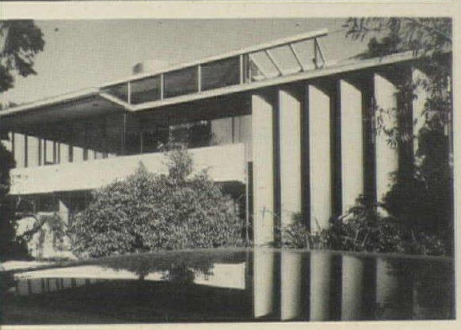
Shortly after his arrival, Neutra published a documentary on architecture in the United States. He explored in detail the new methods of construction of skyscrapers and factories: a kind of architecture then unknown abroad. At the same time he himself built radically new buildings in California by adapting similar methods of construction to his designs for houses. From this period, the Lovell House (Los Angeles, 1929) and his own residence, the VDL Research House I (Los Angeles, 1932; see below) are now fixed in the corpus of great modern buildings of the twentieth century.

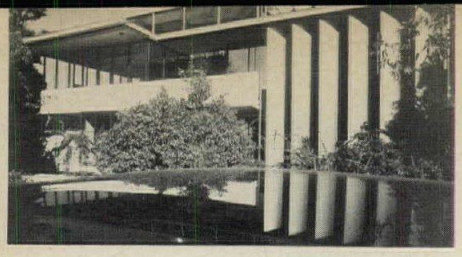
Today, Neutra has still never wavered from his position that technology is the architect's servant. He would find it prejudiced to believe that technology removes man from nature. His forms have a unique style precisely because they are derived from a comprehension of the relationship of materials and technology in making meaningful forms for human accommodation. With similar understanding, each of Neutra's buildings is also conceived in relationship to its site. There is established a sensitive unity between interior spaces and the outdoors, a relation particularly meaningful to the architect, who believes that a home must fit into the given environment. To Neutra, a home is the vantage point from which one views the world, and it is through a consciousness of the world that we realize ourselves and our desires. In this way, a house becomes our "anchor" in reality.

Neutra once wrote, "I have tried as well as I could to compose my designs housing human activities with an eye to the travel of the sun, to prevailing breezes, and to relate them more sensitively to the landscape than perhaps an ancient uninhabited temple or windowless pyramid tomb had to be. This subtle relating to the landscape combined with a by no means infinite number of measures of form giving, yields a surprising manifoldness, so to speak, all over a common denominator."

1963 a fire destroyed Neutra's n VDL Research House I of 1932 left, below). When rebuilt 1964, the house showed some nges: notably a glass penthouse lition (right) and large, tical aluminum louvres on the nt facade (bottom left). ese were added to compensate for loss of shade trees in the fire. louvers are shaped e jet-plane wings. By continuous ning they automatically npensate for the rotation of the th and the position of the sun.





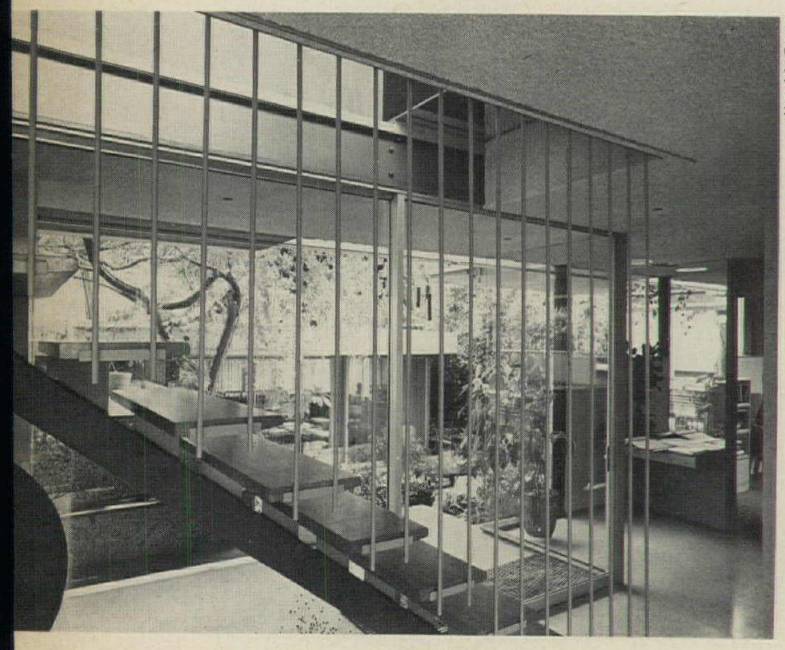


VDL RESEARCH HOUSE
LOS ANGELES, CALIFORNIA

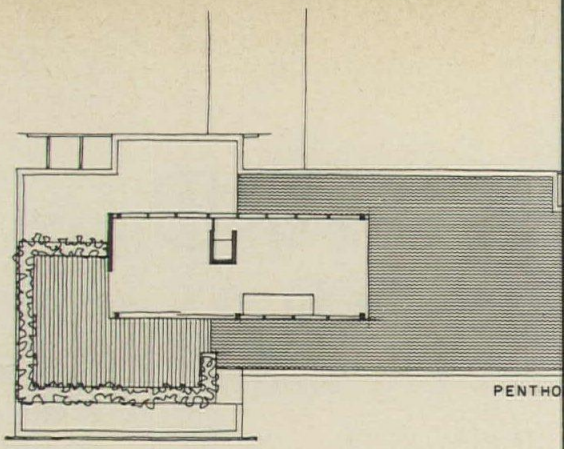
While the VDL Research House I was, in 1932, meant to be a demonstration of most progressive building methods, it showed, above all, how to build on a small urban lot of only 60 by 70 feet, and to give privacy and a feeling of spaciousness to its residents. Its design was dictated by Neutra's philosophy of an organic architecture which establishes human needs and biology as the first determinants for form. In 1932, many of the materials used were not to be found in residential architecture: pressed wood, steel sash, large amounts of glass, custom-built sliding doors, fire-enameled metal wall coverings; structural innovations included prefabricated electrically-vibrated reinforced concrete joists and a suspended arched concrete floor slab. When the house was rebuilt in 1964, certain changes were made in the interior and on the patio side of the original house design. Today, the lower floor serves as the headquarters of the Richard J. Neutra Institute; the Neutras live upstairs.

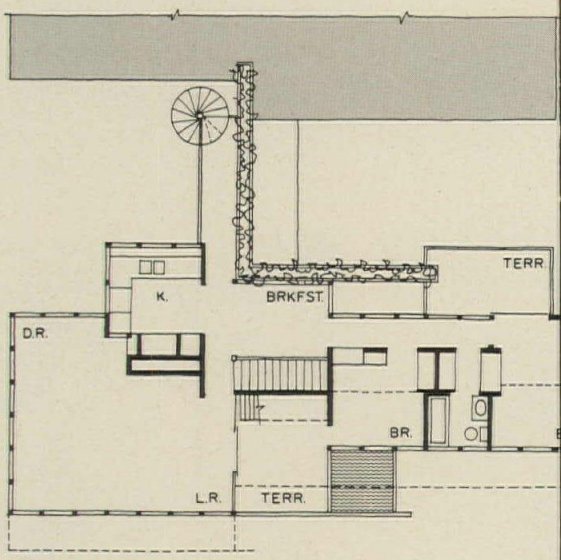
Most important, rebuilding the Research House gave Neutra an opportunity to once more explore the relationship of technology and human comfort.

VAN DER LEEUW RESEARCH HOUSE II, Los Angeles, California. Architect: Richard J. Neutra; research and project architect: Dion Neutra; structural and civil engineers: Woodward Tom and Stanley Malora; civil engineer: Arthur Levin; mechanical engineers: John Keer Associates; structural engineer: Joseph Kinoshita and Associates; contractor: Walter R. Johnson.

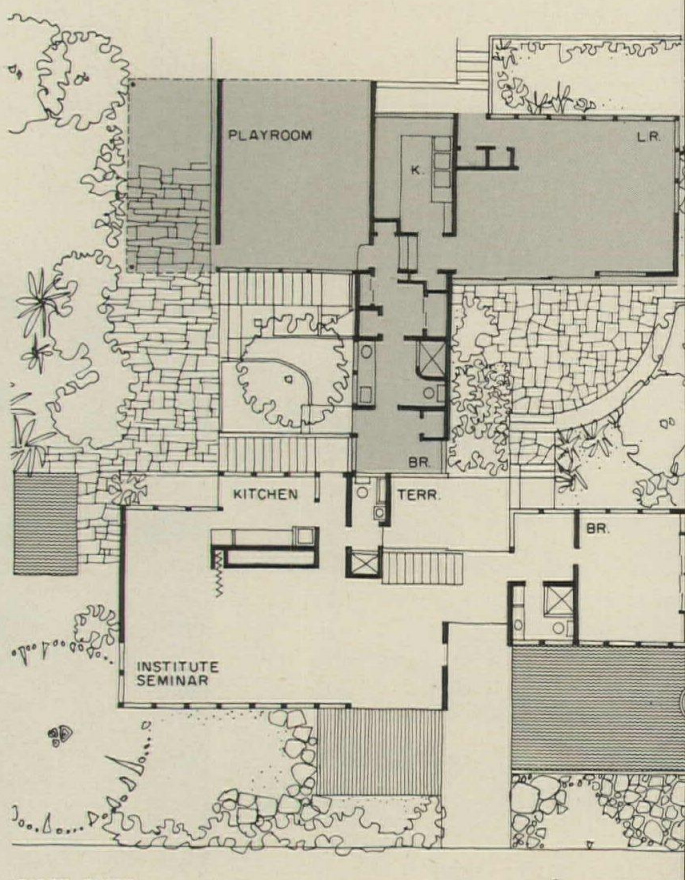


Jim McCrary





SECOND FLOOR

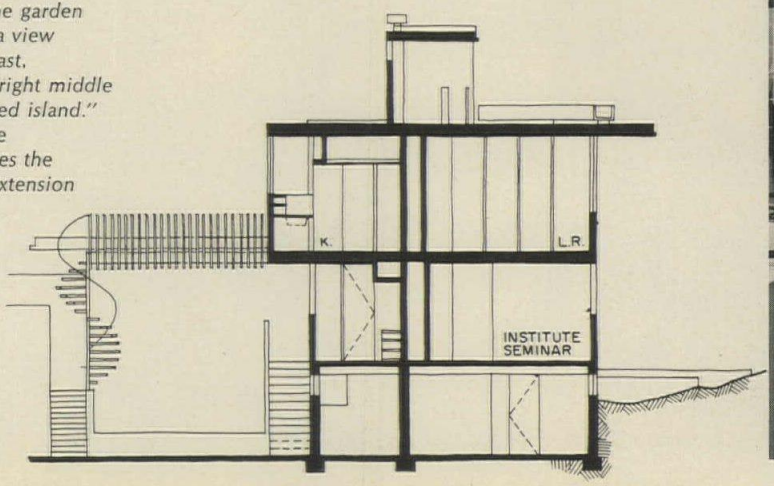


FIRST FLOOR

5

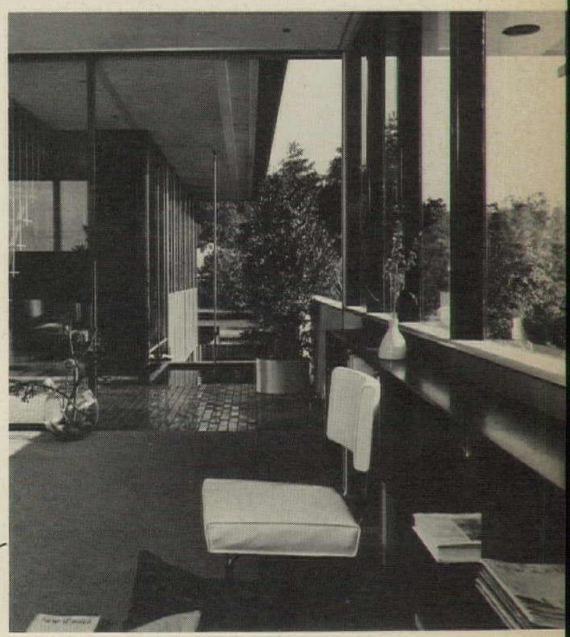
Industrial photo service

oms are compactly knit around
patios (above and below)
a spatial unity is achieved
ween inside and outdoors.
errace (right below) off of
Neutras' bedroom suite
pen to the patio below,
is raised above the garden
se so as to allow a view
ilverlake to the east.
new penthouse (right middle
above) is a "glazed island."
ter retained on the
ond-story roof gives the
sion of being an extension
he lake's surface.



5

The roof surrounding the glass-enclosed penthouse is flooded with water which insulates it from the hot California sun (below). More important, a certain ambience is created in which the penthouse becomes a sequestered pergola visually linked to Silverlake beyond. A number of new structural innovations were also made, mostly to insure that this second house would not burn. In Research House II, electricity becomes an important element. A new electrical system allows for versatile lighting effects, intercom-paging, stereo music, fire alarm signal and FM-TV antenna distribution throughout the house.



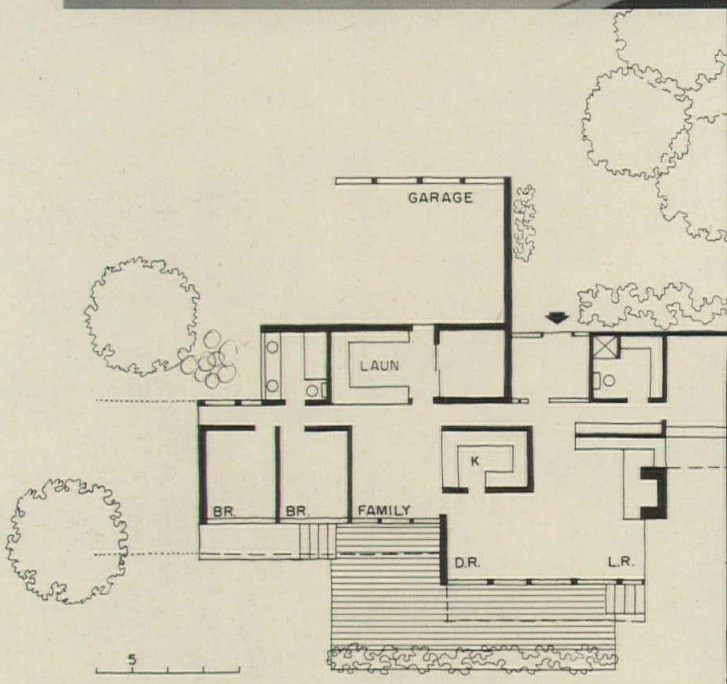
COVENEY HOUSE
GULPH MILL, PENNSYLVANIA

The theme of this small house is growth. Provision for change is allowed for by the spaciousness of the site and by the plan. No matter how the house may be extended—to accommodate more sleeping rooms to the east or west, or more service area to the north—the core of the house, composed of the family rooms and kitchen, remains the center of general activity.

The skylighted kitchen in this central location serves an adjacent formal dining area. Over a front counter Mrs. Coveney can supervise the children at play in the family room. Similarly, she has a view of the family room, from the laundry as well.

The house is approached from the north and one enters directly into this center of activity. To the left is the master bedroom suite, to the right is the children's wing, and straight ahead one reaches the formal living room with a place for dining. The three prongs of the house are separated by the family room, yet each is accessible through it.

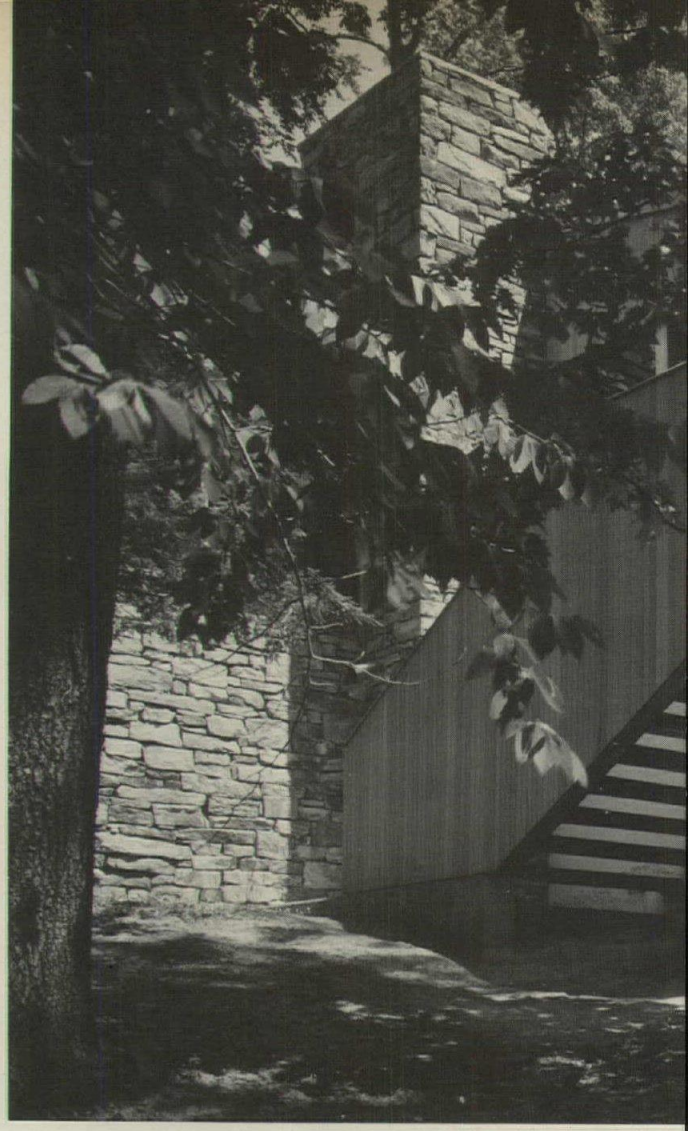
All major rooms have southern exposure. The living room has an intimate sitting corner oriented around a fireplace. Both areas share the large expanse of glass and open up onto a terrace.



RESIDENCE FOR MR. AND MRS. DAVID J. COVENEY, Gulph Mill, Pennsylvania. Architect: Richard J. Neutra; resident architect: Thaddeus Longstreth.

Lawrence S. Williams, Inc.; ph

chitect Richard Neutra
oys a quiet moment in front of
Coveney's fireplace (below right).
e family room filled with
ldren can be supervised from
e of Mrs. Coveney's two work
unters: in the kitchen and in the
ndry (right).
en the children have their meals
he kitchen counter.
the right, one catches a glimpse
the dining room.
er dark, recessed lighting in
eaves expands the spaciousness
he living room beyond
glass wall, and at night,
lighting reduces window
ections in the interior (upper
). A winter view of the house
m the southeast—the master
droom wing is at the right.

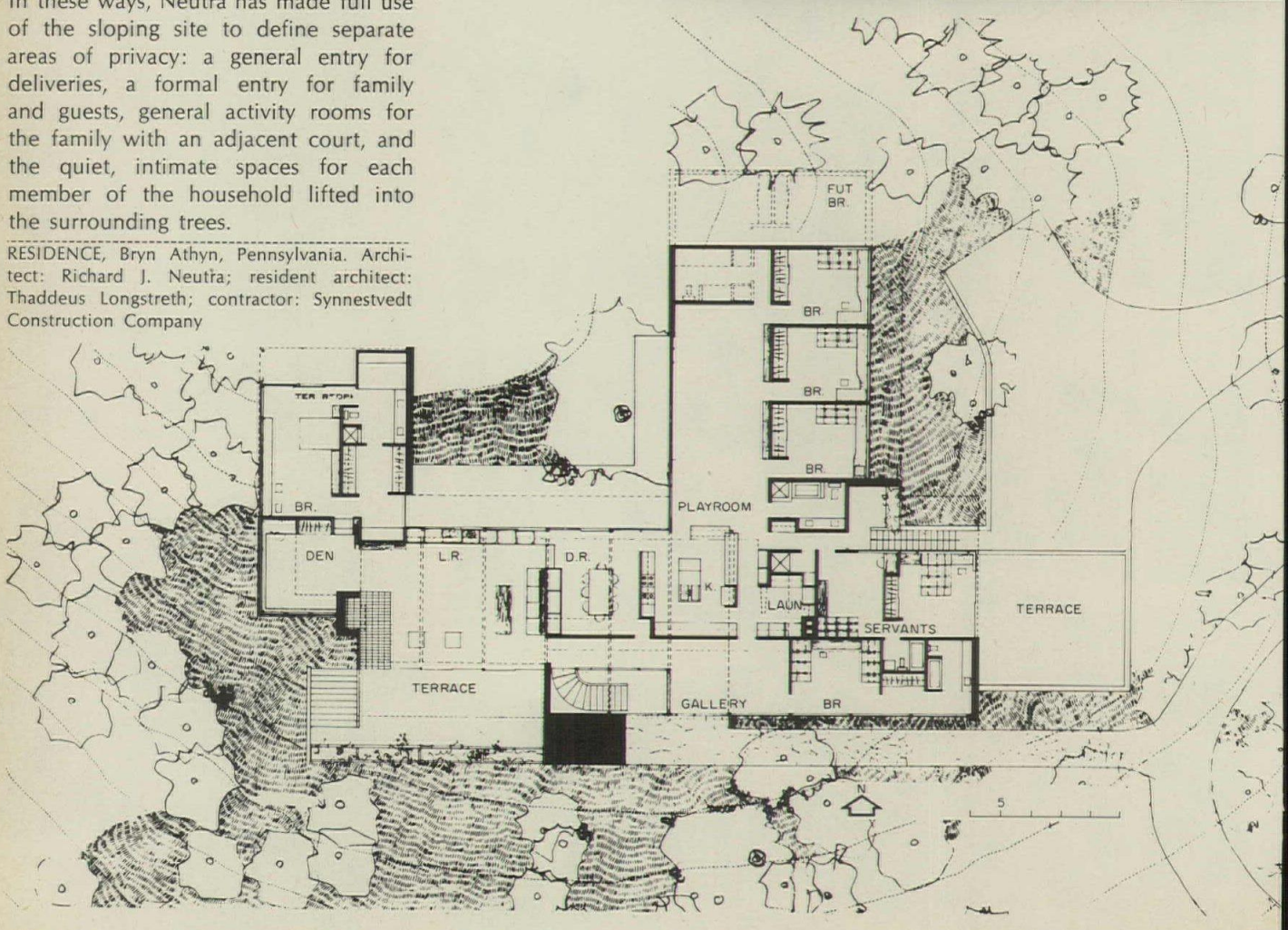


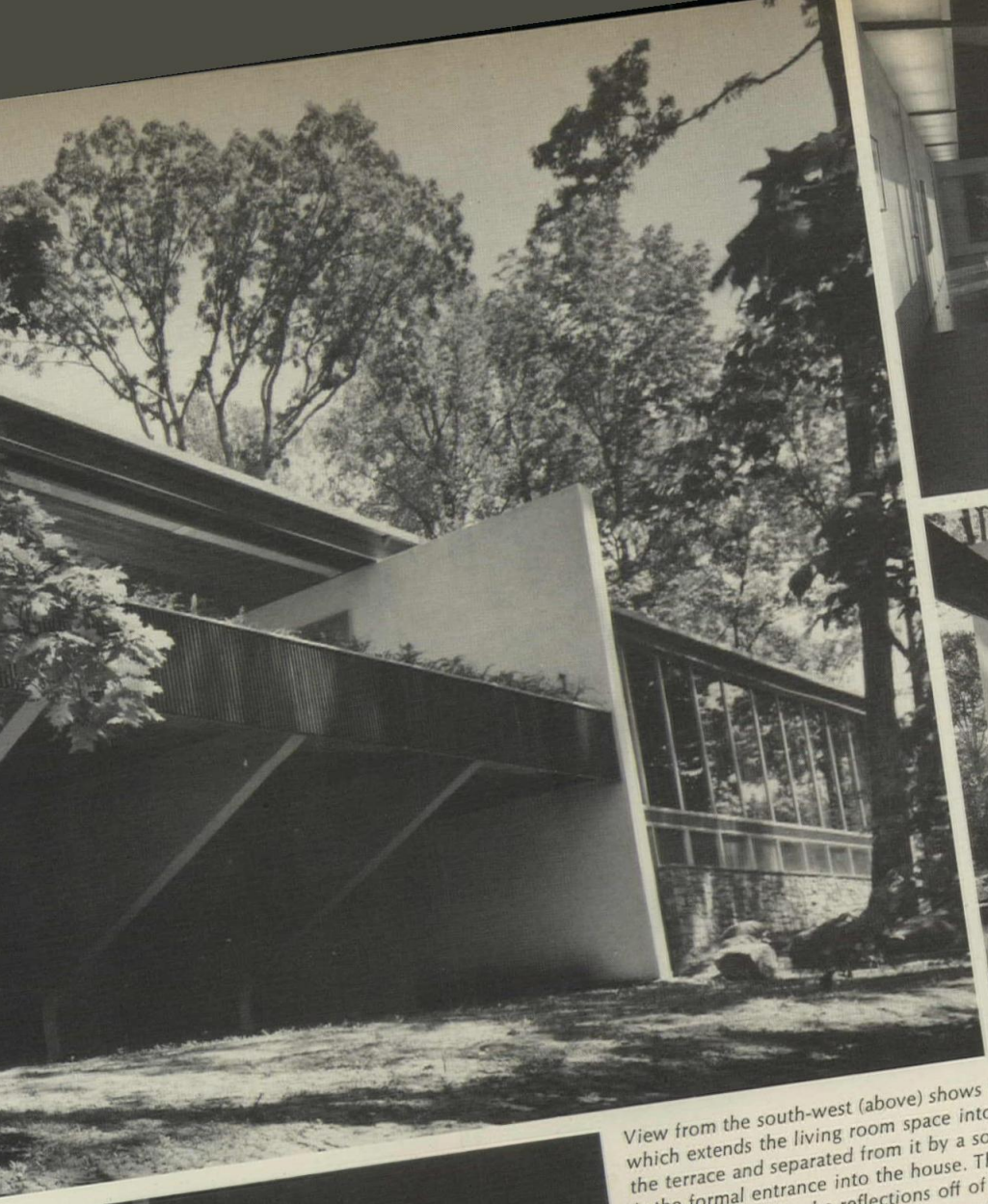
HOUSE ON A WOODED SITE
BRYN ATHYN, PENNSYLVANIA

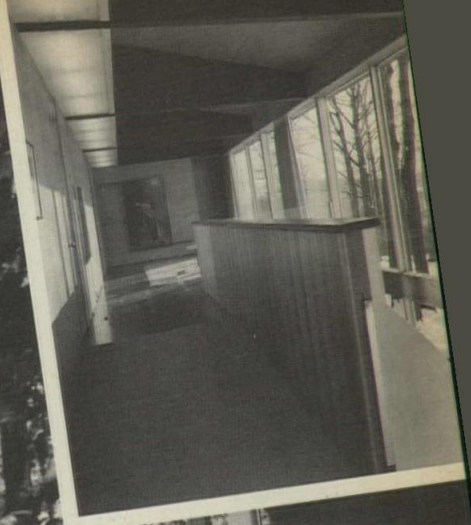
On a large, thickly wooded property, Neutra has sited this house so that it overlooks a deep valley. The house was built for a young family and had to be planned with an eye to the future, as there may be more children. The building, supported by strong boxbeams and outriggers, is adapted to a steep portion of the site in such a way that the large family rooms are adjacent to a central court at grade. The bedrooms and den, more private, quiet places, face outward toward the woods, with their windows raised substantially above the terrain.

Main entrances are reached from opposite sides of the house away from the family court. A service door is adjacent to the garage (below the terrace to the west). The formal entrance is at the south. Here, the way in is accented by a pool which reflects the southern sunlight into the hall and onto a stair leading to a circulation gallery above. In these ways, Neutra has made full use of the sloping site to define separate areas of privacy: a general entry for deliveries, a formal entry for family and guests, general activity rooms for the family with an adjacent court, and the quiet, intimate spaces for each member of the household lifted into the surrounding trees.

RESIDENCE, Bryn Athyn, Pennsylvania. Architect: Richard J. Neutra; resident architect: Thaddeus Longstreth; contractor: Synnestvedt Construction Company

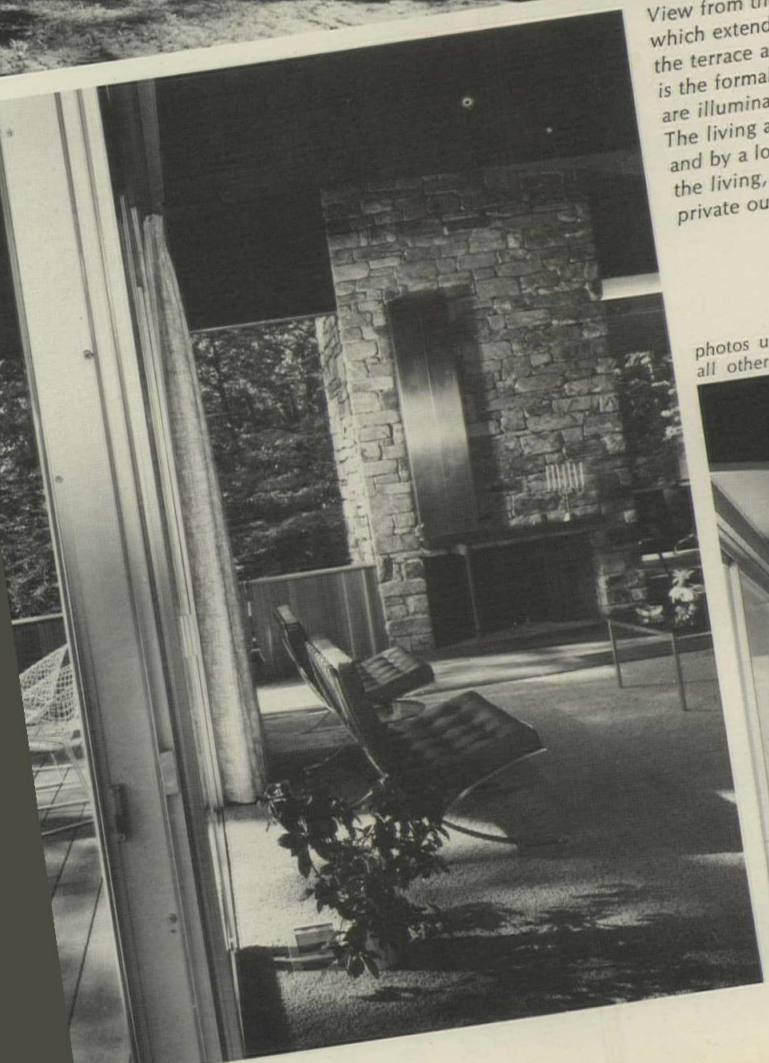


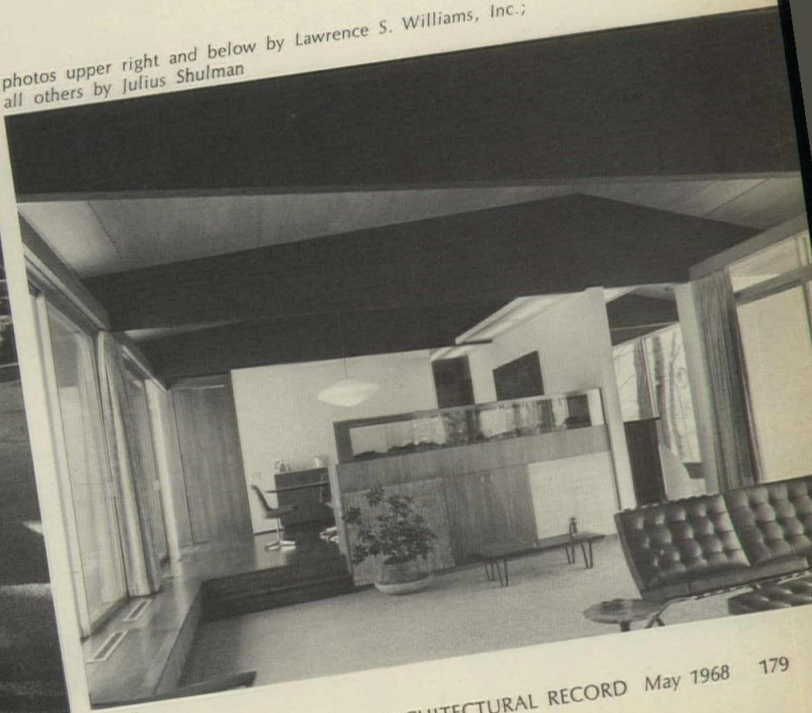


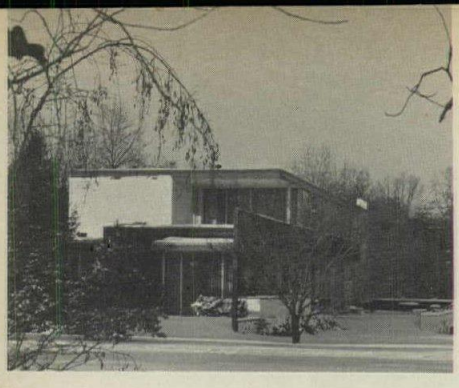


View from the south-west (above) shows the large terrace which extends the living room space into the outdoors (left). Beyond the terrace and separated from it by a solid masonry wall is the formal entrance into the house. The entrance hall and stair are illuminated by the reflections off of the pool at grade. The living and dining rooms are separated by a change of level and by a low cabinet and aquarium. A garden court adjacent to the living, dining and play rooms serves as a private outdoor area for the entire family in good weather.

photos upper right and below by Lawrence S. Williams, Inc.; all others by Julius Shulman



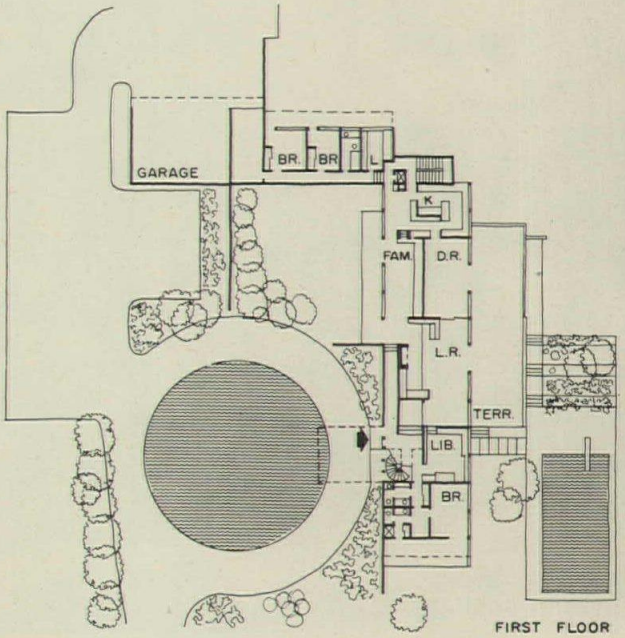


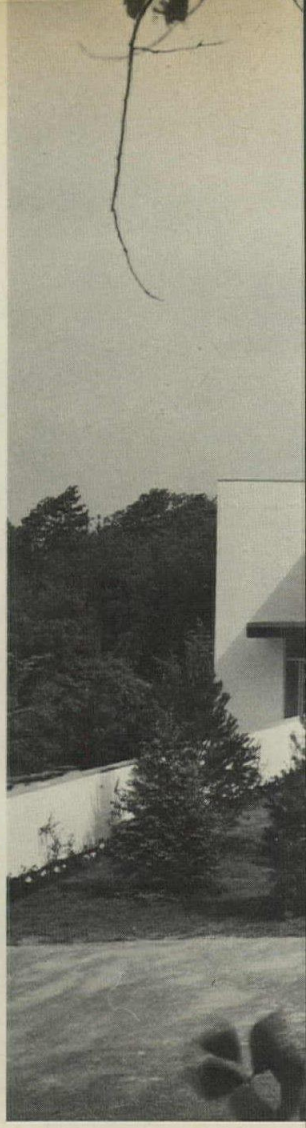


FRIEDLAND HOUSE
SUBURB OF PHILADELPHIA

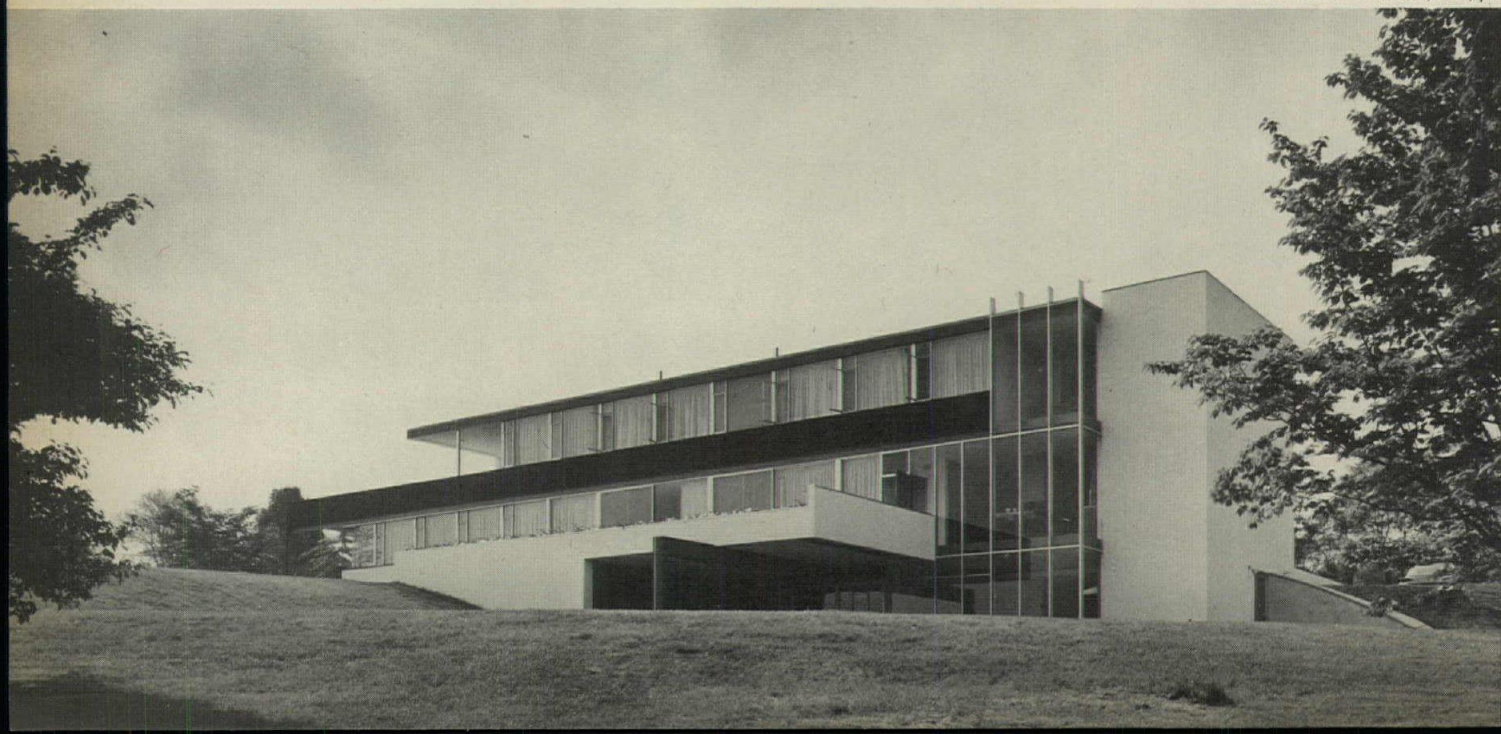
This house continues the idiom of Neutra's houses of the 20's and 30's with its taut, white masonry surfaces and long expanses of strip windows. Though there is stylistic continuity in all of the architect's work, the Friedland house clearly belongs more to the style of the VDL Research House I than any of the other houses published here. The massing of its spaces into large, simple rectangular volumes gives the building a certain serenity and monumentality which seems correct for such a large and impressive residence. Approaching from the east, the drive circles a reflecting pond and leads visitors beneath a porte-cochere. The glass entrance is the only opening in an otherwise windowless masonry wall. The two storied entrance hall, with its marble floor and elegantly spiraled stair, is in harmony with the overall impressiveness of the house. The composition of all parts of the house relies on simple, clearly defined geometric forms. In this way the house is related to the important buildings of the early Modern movement—but as in all of Neutra's work becomes a new and resourceful interpretation of his esthetic.

RESIDENCE FOR MR. AND MRS. JACK FRIEDLAND, Philadelphia, Pennsylvania. Architect: Richard J. Neutra; resident architect: Thaddeus Longstreth

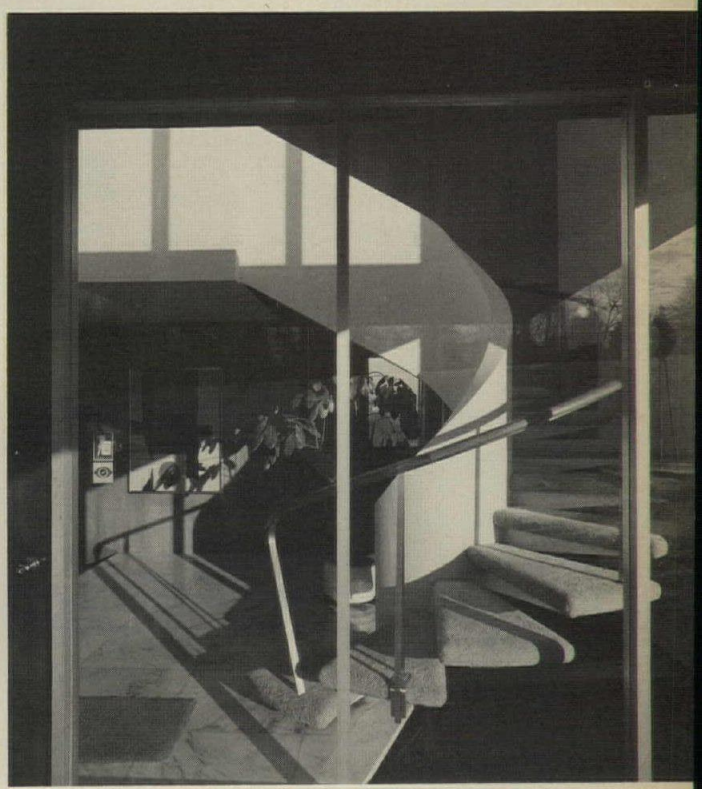




Lawrence S. Williams, Inc.; ph



The spiral stair in the entrance hall (left) is constructed with cantilevered treads extending out over a reflecting pool. The pool is made in two basins, one inside the house and the other outside, and the water appears to extend through the glass entrance wall. At night the pool is illuminated from underwater, reflecting the surface of the water on the underside of the porte-cochere and giving a unique, general illumination to the entrance way. The family room (below) has a southern exposure and the dining room has an adjacent area outdoors, which is shaded by the swimming pool terrace above.

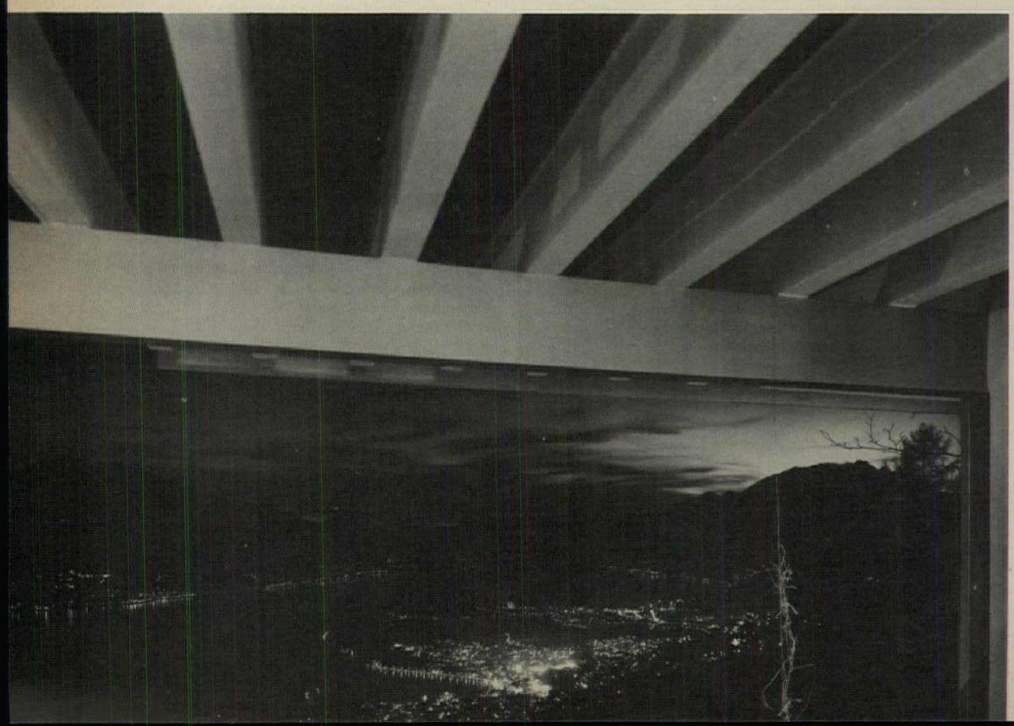


CASA EBELIN BUCERIUS NAVEGNA, SWITZERLAND

This extensive residence for one of Europe's foremost publishers is isolated almost 2,000 feet above Lago Maggiore in southern Switzerland. The magnificent lake view, however, becomes visible only after one has passed through the entrance hall and into the living rooms which have spacious balconies facing toward the south and east and the lake below. As in many of his designs, the architect protects the rim of such high, elevated balconies and terraces by wide and shallow "waterguards." As reflecting pools these "waterguards" mirror the clouds during the day and at night the moonlit mountain silhouette.

All rooms of the house are skillfully oriented to some aspect of mountain landscape. At the same time, the architect has insured a feeling of intimacy in a variety of places within each room. With intimacy in mind, he has most ingeniously created a kind of cavernous, quiet pool below the house which can be utilized in all seasons.

CASA EBELIN BUCERIUS, Sopra Navegna, Switzerland. Architect: Richard J. Neutra; job captain: Egon Winkens; resident architect: Bruno Honegger



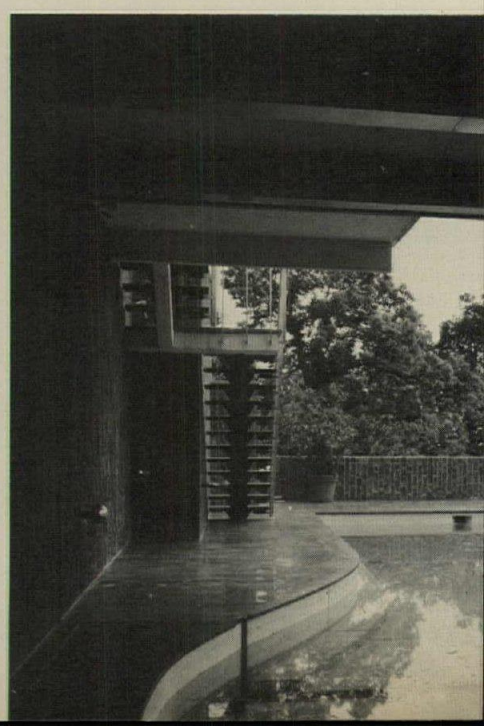
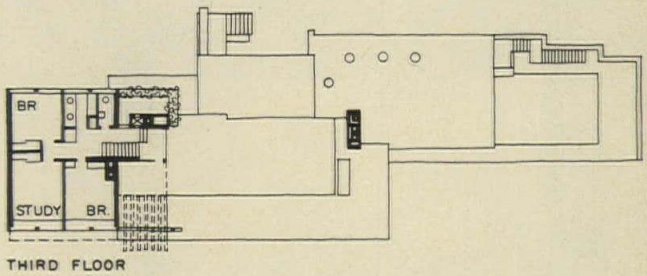
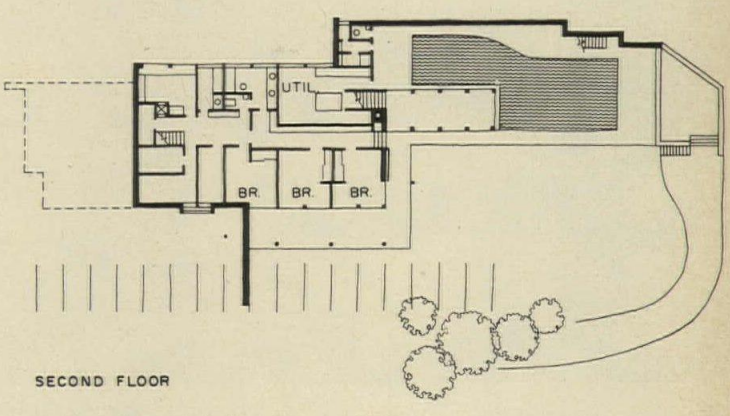


photo below by Alberto Flammer; all others by Hesse

The inner and outer portions of the pool (left) are separable by pushing a button and turning up a "sub-marine" trap door. The pool is heated according to comfort. Above the living quarters of the first two floors, there is a top story and a terrace. The surrounding roofs are flooded with water, insulating the house in summer and mirroring the changes of color in the sky and the mountain landscape. To Neutra, this effect offers a visual and psychological linkage to the waters of Lago Maggiore far below: further proof of the architect's remarkable skill in relating a house to its landscape.



THIRD FLOOR



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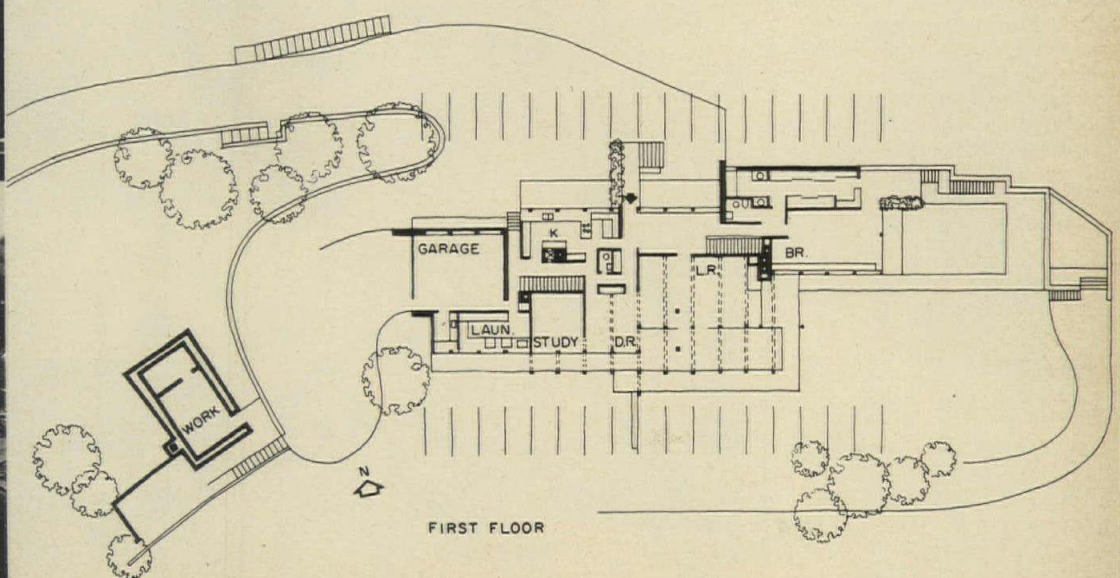


FIRST FLOOR

CASA EBELIN BUCERIUS

Hesse photos

The fireplace is composed of a raised hearth slab and a stainless steel hood (right above). Living quarters open onto a waterguarded balcony terrace (above) where the usual protective railings have disappeared and one's view is unimpeded. The same detail exists at the windows of the private suite of master bedroom, dressing room and bath (right below).

ARCHITECTURE FOR INDUSTRY

ere are many forces for change bearing upon architecture industry—ever-changing and more complex technical re-irements, industrial-union demands, construction-union de-ands, the cost squeeze, and a technical design gap through ich non-architectural professions are launching sorties.

"Rocketing changes in American business technology have, recent years, produced new demands on architecture and gineering for industry. Computers, new manufacturing meth-s and multiplication of product lines have created needs for ge new spaces. The large corporate client is a very sophis-ated client, usually with engineering and management staffs ll versed in current technology and continually pressing the ntiers of design capability." So says a recent publication of o A. Daly Company, underscoring the advent for all ar-itects of new kinds of commissions calling for nation-wide dustrial master-planning and the design of unprecedented mensions of space.

Gino Rossetti, vice president of architectural design for ffels & Rosetti, feels that the interest of industrial-union repre-ntatives in attending the U.I.A. industrial architecture seminar Detroit (May 19 through 25), reflects an encouraging aware-ss of the need for solving architectural problems implicit in anagement and labor's mutual needs. These problems in-lve not only working conditions in industrial plants (how on will all plants be air conditioned?) but also the impact labor negotiations on construction planning. For example, the automotive industry especially, management is not able make long-range plans in the midst of frequent changes in bor's requirements. Further, the negotiation period itself, w in May, occurs at a critically inconvenient time—at the ginning of the construction months. It would be helpful, r. Rossetti observes, if labor negotiations could be concluded November, thus providing time for planning of construction sed on the results.

Demands of the construction unions, observed John Andrews, director of the industrial division of Smith, Hinchman and Grylls Associates, at the Industrial Building Conference in Philadelphia, have brought the effective presence of the industrial plant owner to the collective bargaining tables of the construction contractors. Contractors insist that owners' demands for rigid schedules, together with labor shortages, have put them in a bad bargaining position. And so, for example, electricians may well succeed in this year's demand for a 59 per cent increase to $10.22 per hour—with other trades in hot pursuit. The result, Andrews points out, may well be increasing use of prefabricated systems to minimize field installation labor —and the increasing search by architects for new design solutions involving far more than the exterior shells of industrial buildings. Further, contracting patterns and services change critically, Andrews said, as general contractors become more and more brokers of subcontracts that call for increasing technological coordination on the part of the architect/engineer. The solution of this problem calls for more comprehensive planning and construction management firms capable of serving clients from the inception of ideas through final occupancy.

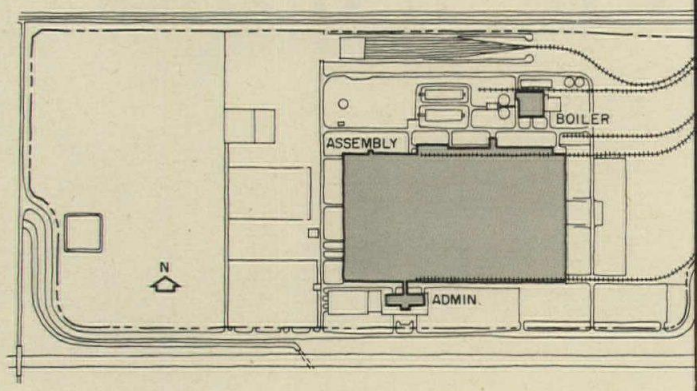
The cost squeeze, says George Heery, calls for new methods in industrial architectural design using every computerized resource to control schedules of development and construction. Using these resources, architects can perform a service well beyond the capabilities of the so-called package-dealers.

Finally, the combination of technical problems and economic forces seems to have created a gap in the available manpower of the architectural field—through which newly created organizations that have been solving similarly complex problems for the aeronautics and space industries are seeking opportunities to enter the field. While many of these organizations have much to learn in the fragmented world of the construction industry, their learning capabilities are formidable and their capacities—if honestly and professionally directed—may be welcome reinforcement for some aspects of comprehensive architectural services. —*William B. Foxhall*

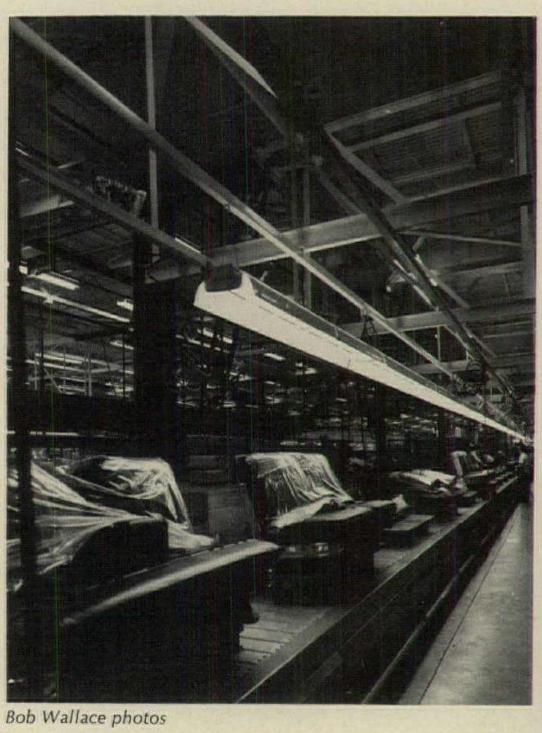
ASSEMBLY PLANT FOR CHRYSLER: A GOOD NEIGHBOR, ON TIME, IN THE BUDGET

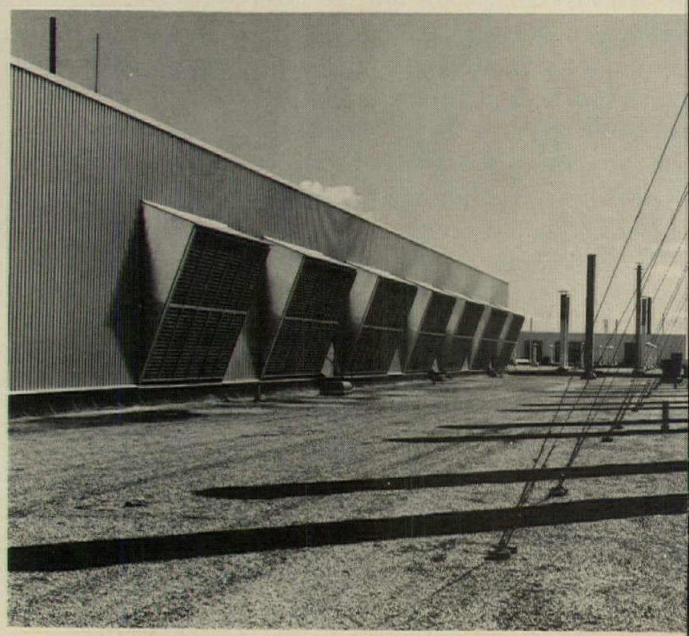
Design of an automotive assembly plant, such as this one for Chrysler in Belvidere, Illinois, underscores the seemingly opposing actions of two major disciplines bearing upon architecture for industry. First is the absolute urgency of schedule and budget (and this $40-million complex was designed and built in 17 months). Second is the increasing attention to human aspects of the working environment imposed not only by the demands of labor, but also by the economics of production and quality control as employees respond to amenities of the working space. An assembly plant will never be a pleasure palace, but in modern plants the uses of color, acoustical control, air-handling, food service areas, and the like must be given full architectural attention.

In this plant, with its appended office structure, almost 2-million square feet of manufacturing space is provided on a 300-acre rural site. Its orientation to the highway gives it high visibility so that the appearance, especially of the office section, was an important consideration. Offices are fully air conditioned.

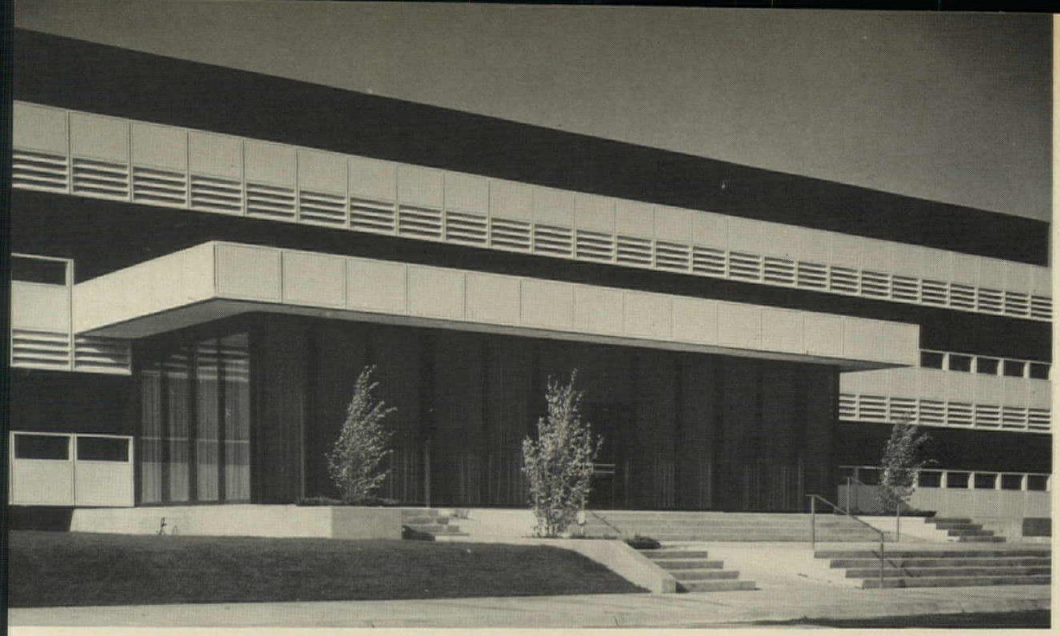


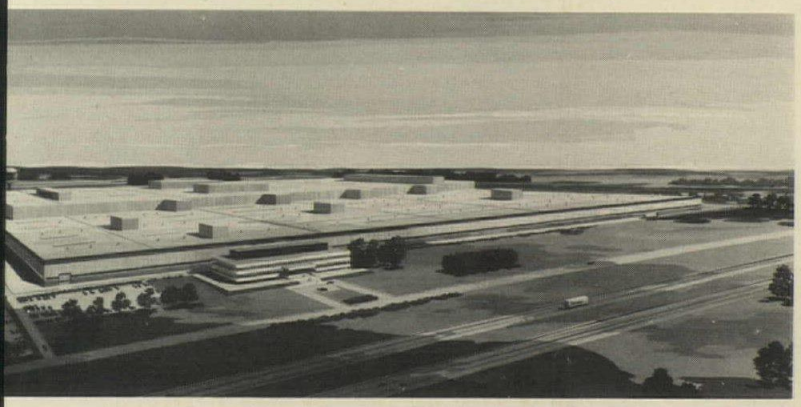
CHRYSLER CORPORATION, BELVIDERE ASSEMBLY PLANT, Belvidere, Illinois. Architect-engineer: *Smith, Hinchman and Grylls Associates, Inc.;* general contractor: *Regnar Benson, Inc.*





Bob Wallace photos





A system of white sun screens and grey glass provide a strong horizontal shape for the two-story office structure, in keeping with the extended backdrop of the plant to which it is attached. Sidewalls and sun screens in the office area are porcelain enamel aluminum.

In the shop area, welded Warren trusses were used to reduce cost and to provide open spaces for service and processing. Precast concrete sill walls are topped with aluminum siding to reduce maintenance. A second floor mezzanine area in the plant provides space for the paint shop in which a conveyer carries bodies through painting, baking and curing operations. An electronic materials transport system on the main floor of the plant consists of a signal and tracking network embedded in the floor slab so that transport carts from the loading area are keyed to a selected destination and automatically guided by the floor system without physical contact or trolleys. Other automated handling and conveyor systems are linked to a computerized scheduling and quality control system. High-intensity process lighting is used at key points and a luminous ceiling provides 150 footcandles in the final inspection area.

RESEARCH CENTER FOR UNION CARBIDE: A BRIDGE FOR MANY DISCIPLINES

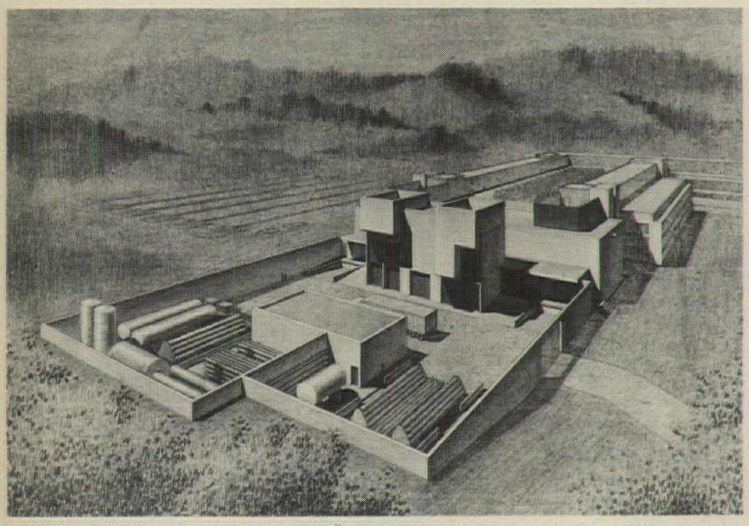
Design for industrial research deals with its own special set of disciplines: the certainty of change in processes, materials and required spaces; diversity of utilities; communication among scientists who cherish privacy for their work but demand high-grade community facilities for their families. These were some of the factors taken into account in the master plan for the Union Carbide Technical Center in Tarrytown, New York. The 300-acre site, irregularly shaped, is divided about in half by a permanent secondary highway with convenient access to the major parkway network serving its location about 15 miles north of New York City. To unify the site and to provide a central avenue of general office and utility spaces for the various divisions of Union Carbide, a long spine structure will serve as a bridge across the dividing highway and as a two-story distribution system for people and utilities. Attached to this spine, or nearby on the site, will be laboratories for the specialized divisions of Union Carbide. The first of these will bring together the now-scattered research operations of the Linde Division in a two-story laboratory building connected at the upper level to the extreme end of the spine building (far right in the air-view rendering opposite).

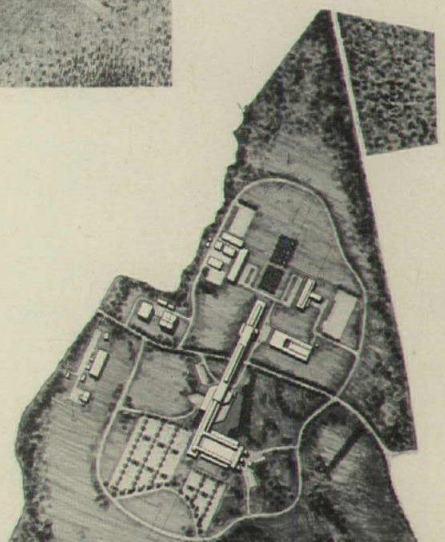
UNION CARBIDE TECHNICAL CENTER, Tarrytown, New York. Architect: *Vincent G. Kling and Associates;* consulting engineers: *Jackson & Moreland;* general contractor: *George A. Fuller Company, Inc.*

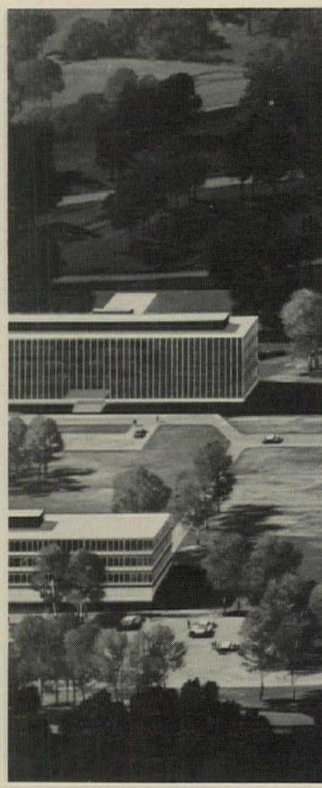
The central portion of the brid
spine building—which unites
diverse elements of Union Carbi
suburban technical center—is a t
story office building 80 feet w
containing as part of its basic str
ture two 180-foot trusses suppor
on concrete piers. Below this str
ture is hung a 20-foot wide bri
crossing 16 feet over the crown
the road.

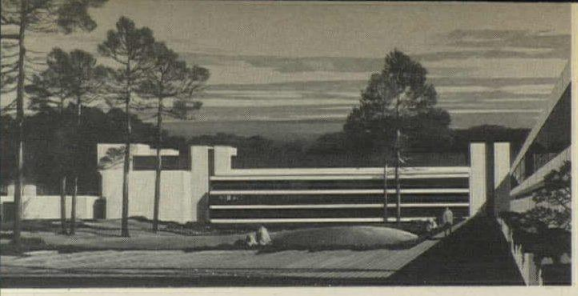
As shown in the longitudi
section at bottom right, the arran
ment of related services and tra
port systems is such that analyti
services at each end of the spine
adjacent to supporting services
cluding a computer center, din
facilities and office areas.

The Linde laboratories (left
low) are entered from the seco
level of the spine, and a stairw
proceeds into a sky-lighted galle
which both serves as a focal po
and lights the interior of the bui
ing. Service corridors branch off
spine, carrying utilities and p
services to the banks of laboratori
Offices are across corridors fr
both banks of laboratories. There
a high-bay structure for metallu
and a specialized area for test ce
and noisy operations in an enclos
area at one end of the building.

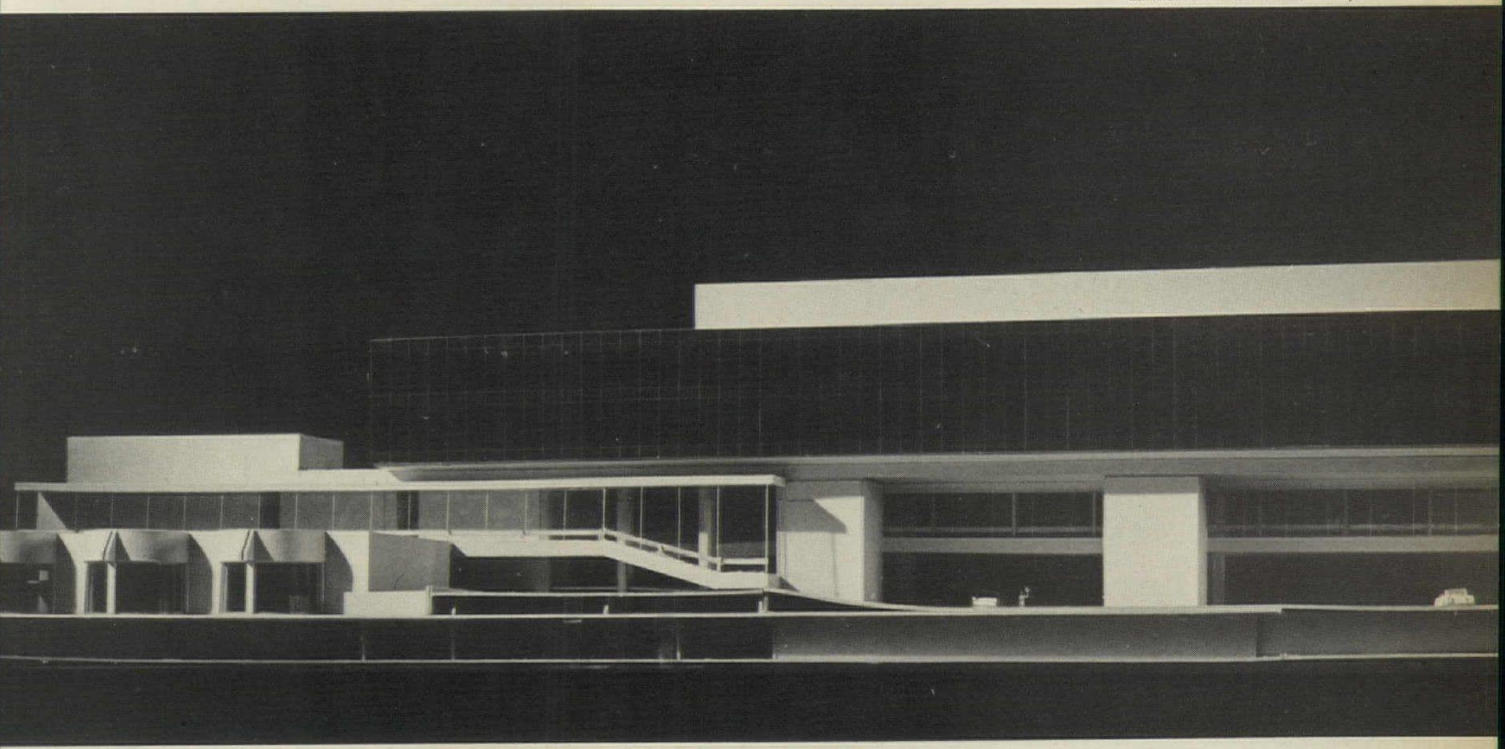


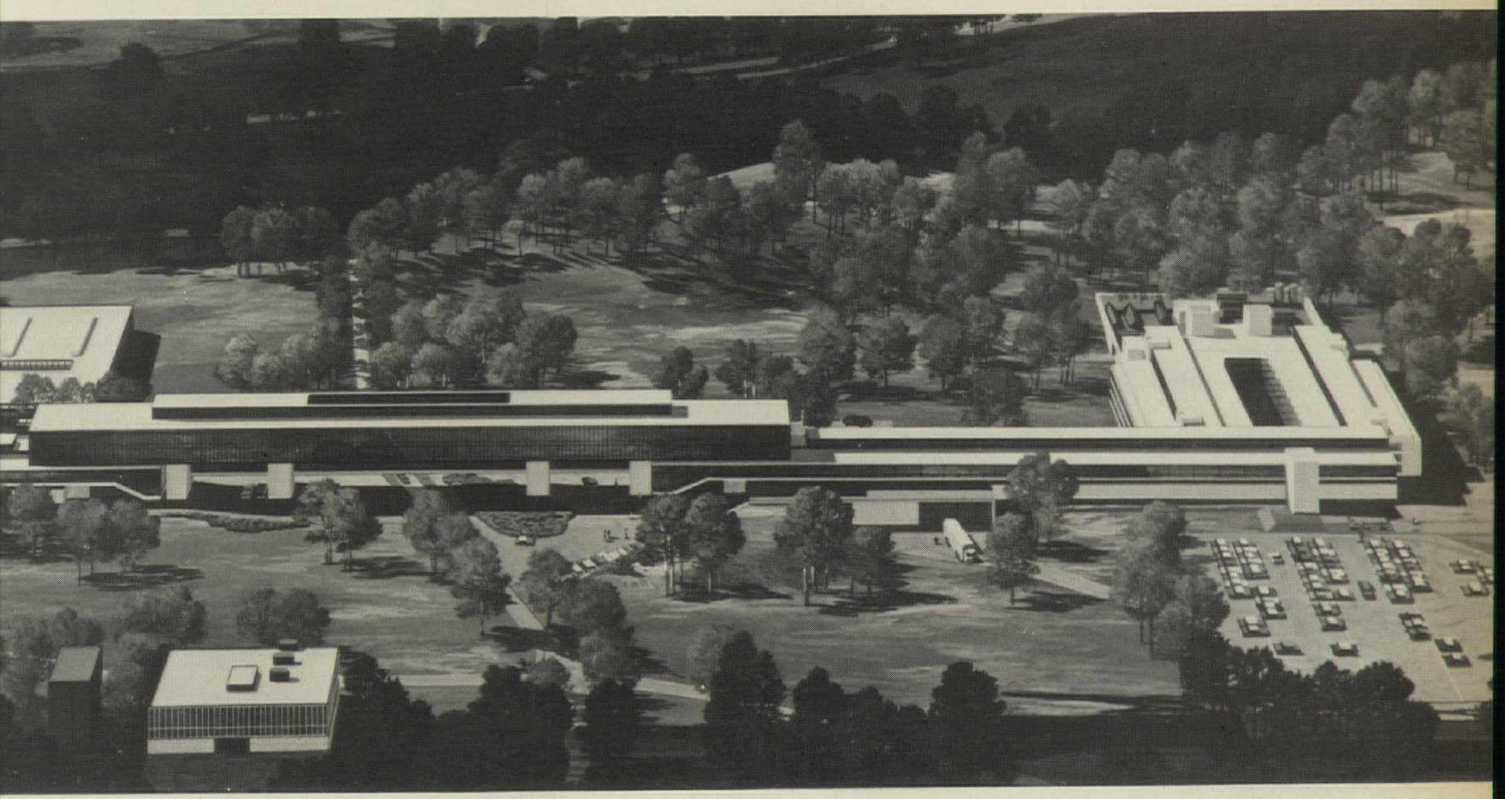


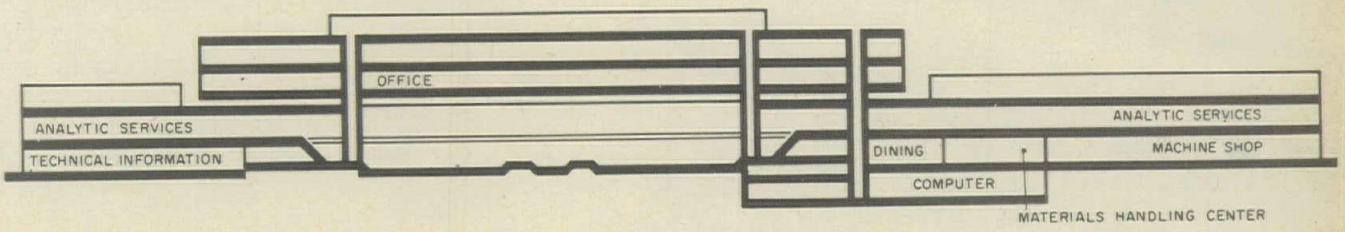




Lawrence S. Williams, Inc. photos







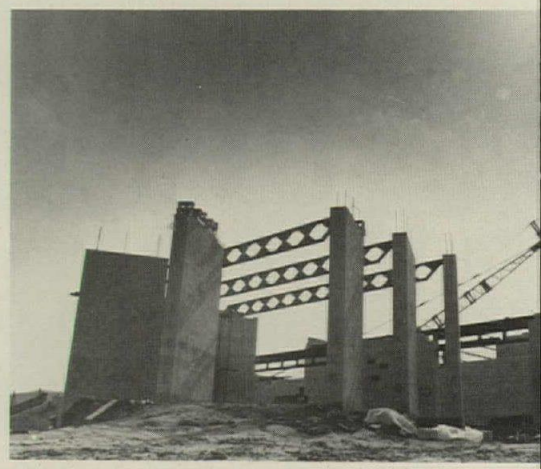
FOUR SERVICE CENTERS FOR ONE CLIENT: CONSISTENT QUALITY, COMPETITIVE COST

In these four distribution and service buildings for Air Reduction Company, architect Norman Jaffe met head-on the "guaranteed-price" competition of the package builder and delivered not only the square feet per dollar—a phrase well understood in the tough lexicon of industry—but with an architectural quality that has been respected and acknowledged with repeat commissions. He has solved the problems of an extremely conservative budget combined with requirements for attractive (without frills) sales and service areas in three of the buildings and a strongly expressed structural discipline in another which serves as a regional distribution and training center.

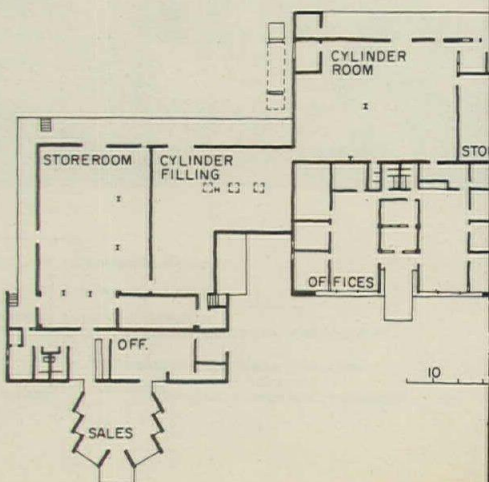
Typical of the service and sales buildings are the two shown below and at right. These buildings are used for the distribution and sale of industrial gases and welding equipment. The buildings enclose 10,000 square feet each. Fabrication of the structural beams used in the display rooms is a demonstration of the welding and cutting equipment manufactured by the owner. The webs of typical rolled sections were cut in a serrated pattern, offset and rejoined at the flat ends of the pattern.

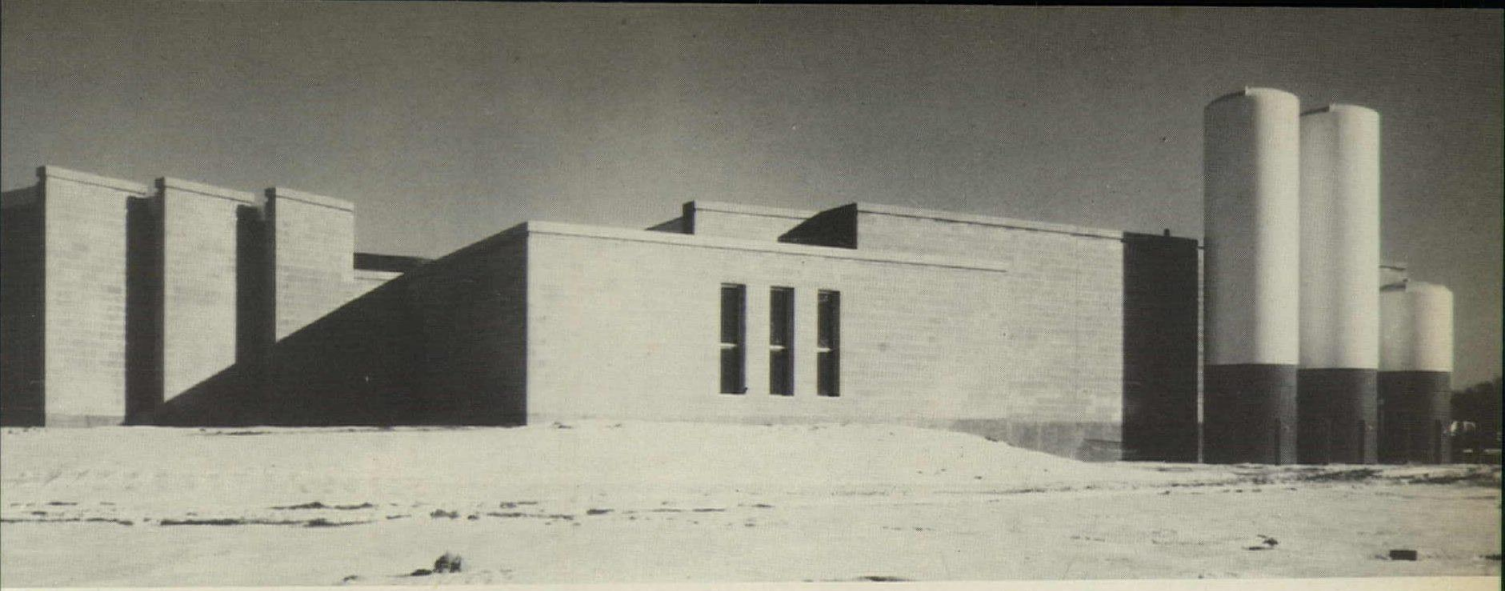
FOUR DISTRIBUTION AND SERVICE CENTERS for The Air Reduction Company, Inc. Architect: *Norman Jaffe—job captain: Costas Terzis;* mechanical engineer; *Herbert Hecht;* structural engineers: *Richard Miller (Houston) and O. C. Floyd (Atlanta).*

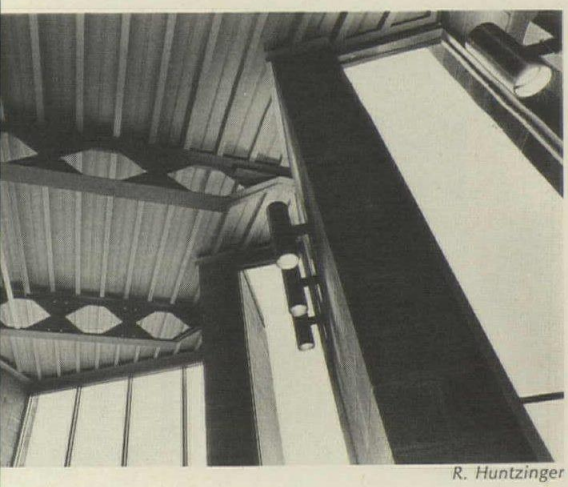
Hartford: One of the simplest the four buildings for Air Reduction, the sales and service build at Hartford, Connecticut, is straightforward, rectangular plan vided into the five categories space typical of such centers: a play area, offices, demonstrat and training space, equipment s age and a separate room for cylinder refilling and storage. exterior cylindrical forms are pur ing stations for gases stored liquid form.



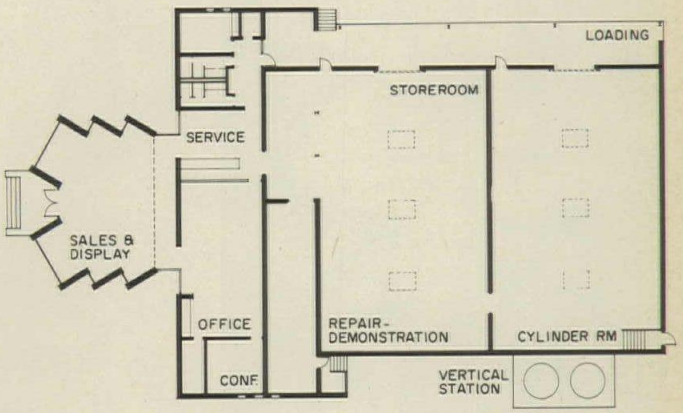
Atlanta: Similar in public image the Hartford center, this one Atlanta accommodates itself to more shallow site and includes more extensive office area to ful a wider regional function. It a has a "light manufacturing" a for equipment repair and cryoge reconstitution of oxygen, argon a welding gases.
The steel roof deck which for the ceiling of display rooms turned down to form a metal curtain over a recessed product d play.



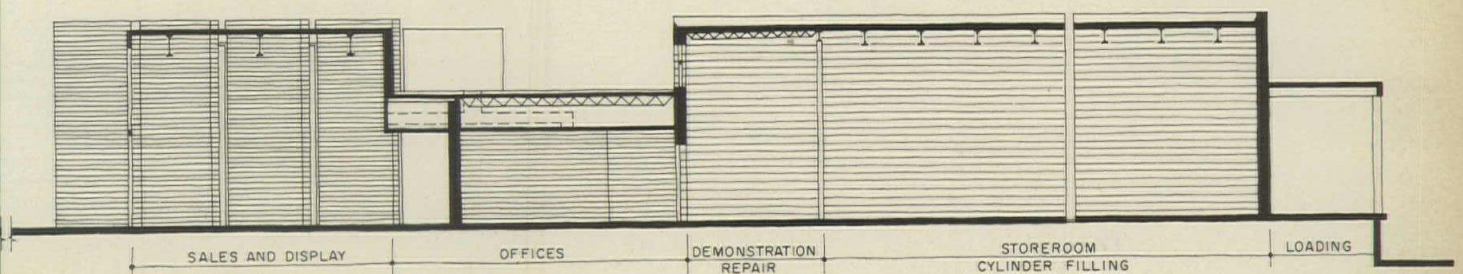


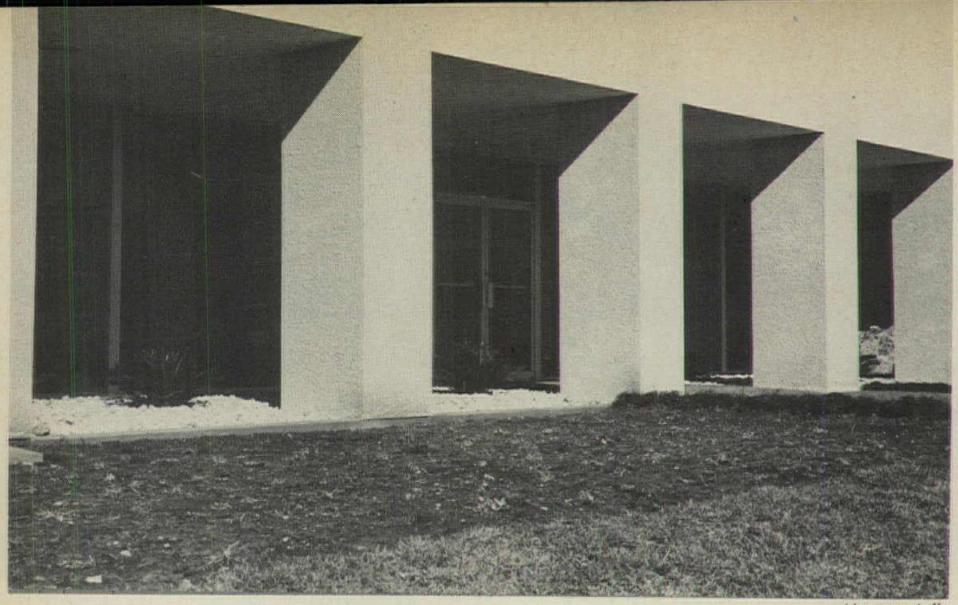


R. Huntzinger



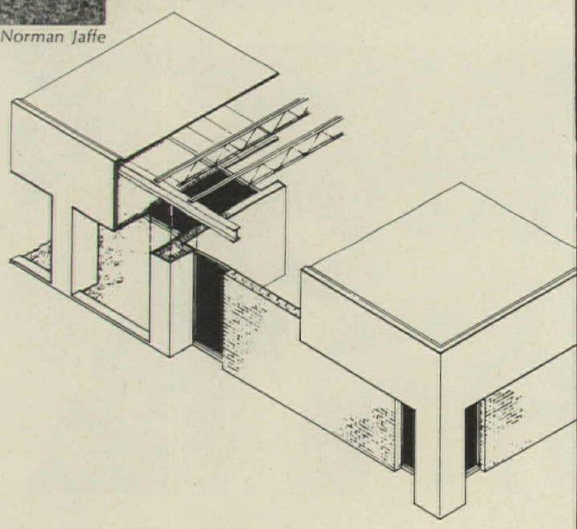
Frutchey Associates

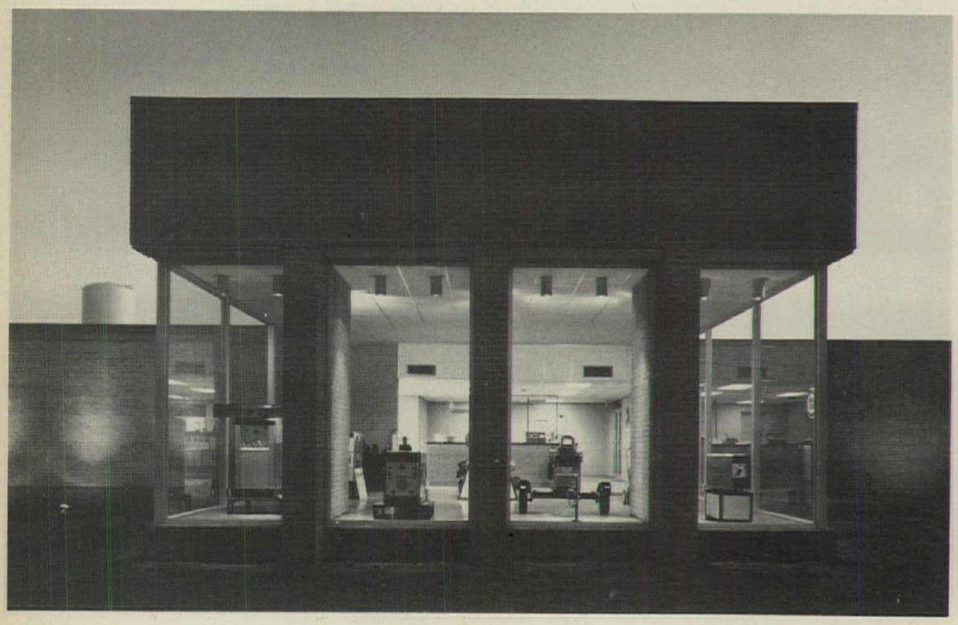




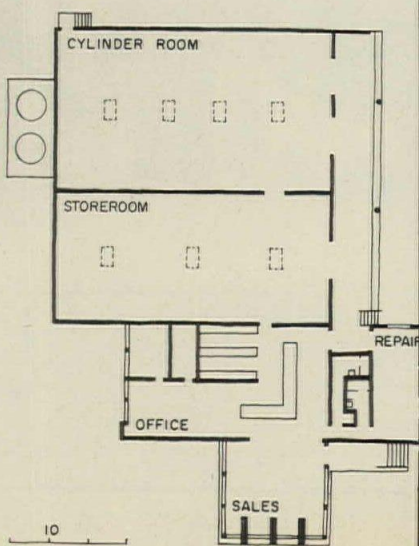
Norman Jaffe

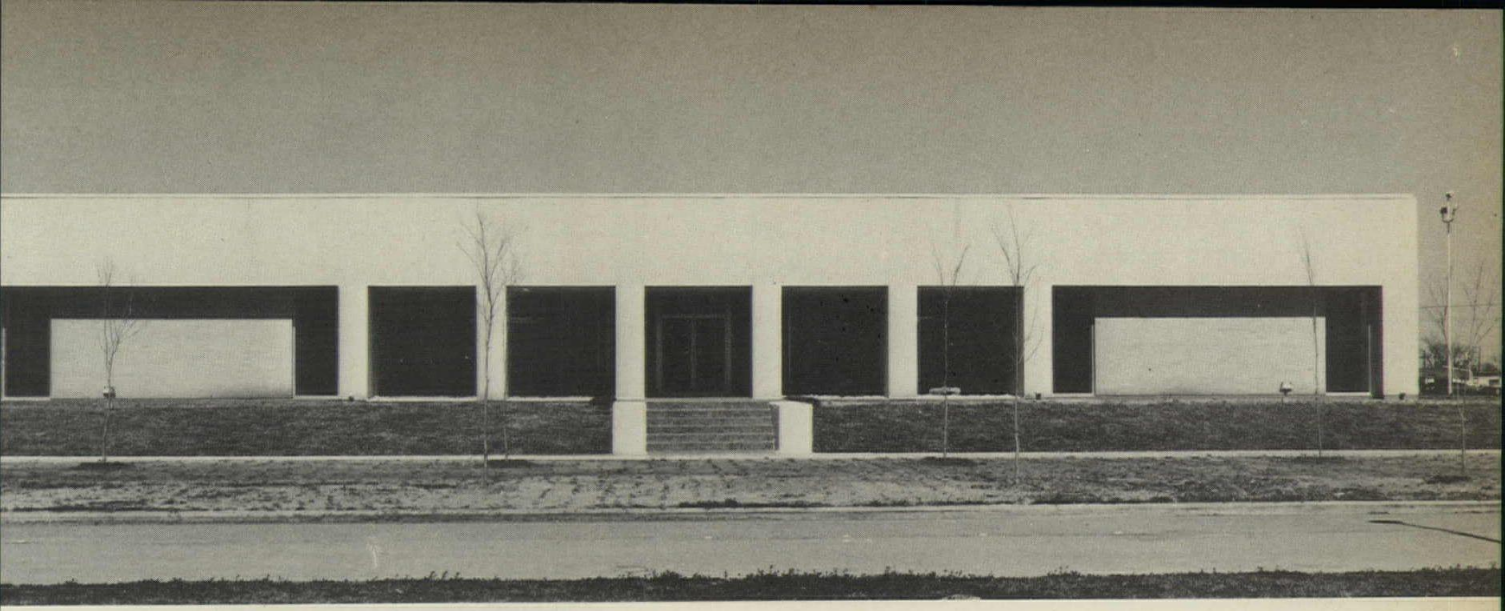
Houston: This regional distribut center (left and right) consists 32,000 square feet of air-condition warehouse space and another 18, square feet of office and serv centers. The service area is for te nical assistance to regional m agers and distributors in the use welding and cutting equipme The column bay module (sketch low) was established to accomm date pallet racks and fork-lift m neuverability. Exterior walls 20 f high are brick and block bear walls with cement plaster. Stiffen pilasters are expressed with the ment plaster carried to the interi A generous overhang provides p tection against the sun.

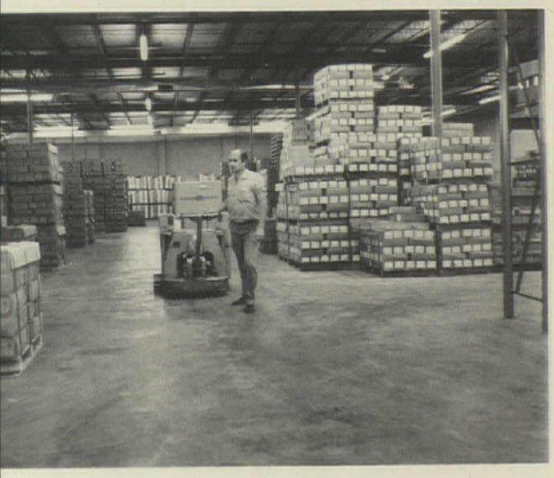


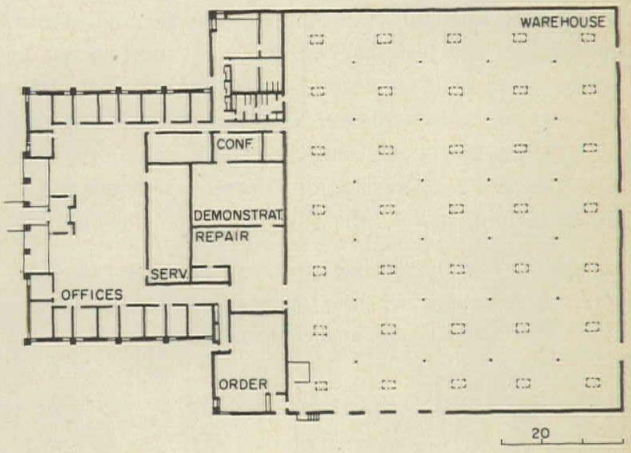


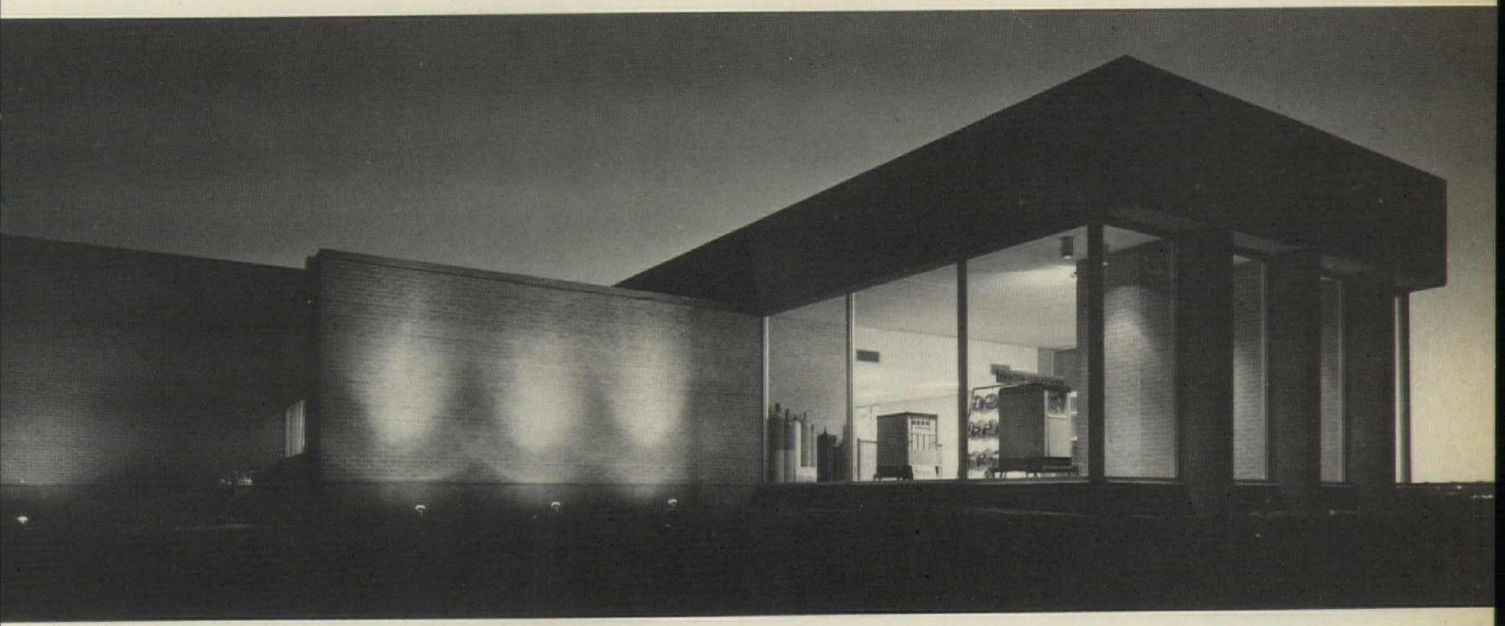
Dallas: This sales and service ce ter provides a variation on the bas solutions shown for Hartford a Atlanta. Here the display area is d signed to stand as a strong stat ment of stability and dependabilit Using similar brick and concre materials, the building establishes rectangular efficiency while mai taining similar cost and purpose.











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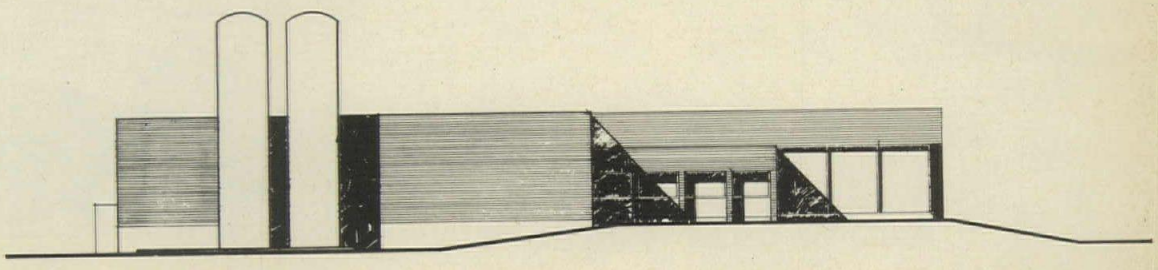
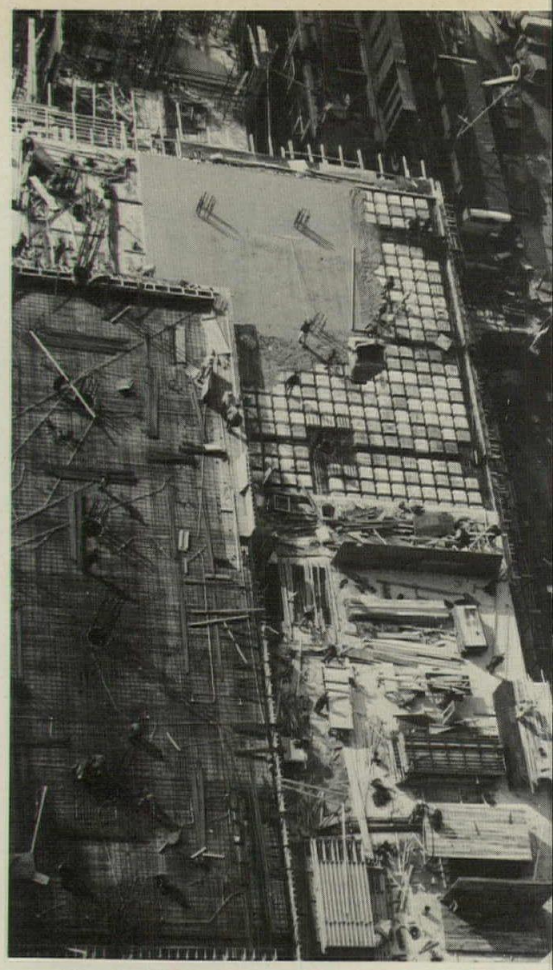


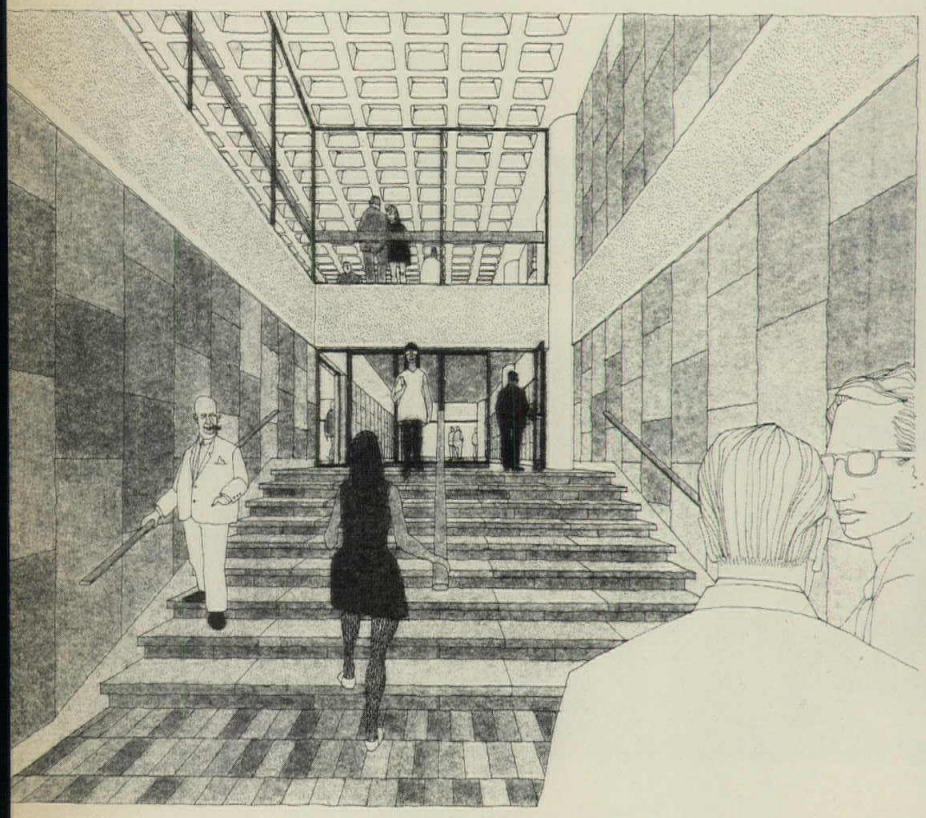
WESTYARD OFFICE-WAREHOUSE: NEW LEASE ON LIFE FOR URBAN INDUSTRY

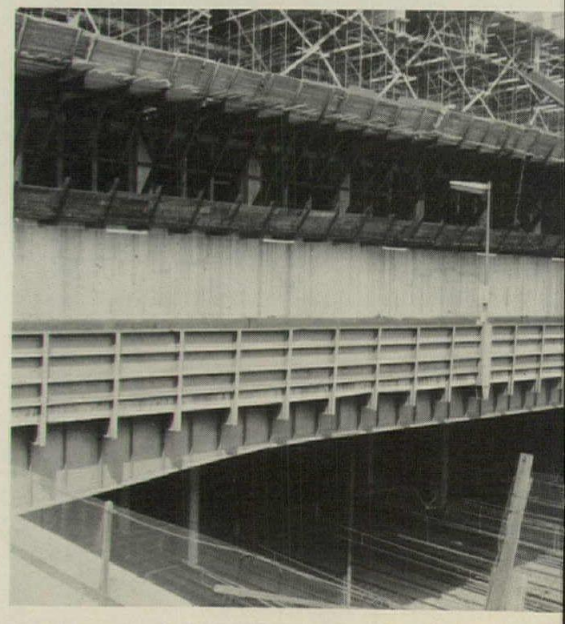
The Westyard Distribution Center, a combination warehouse, light manufacturing and office building, is under construction at 10th Avenue and 31st Street over the busy main line of the railroad approaches to New York's Pennsylvania Station. The building was designed to accommodate tenants for the various categories of space as leases were signed during preliminary phases. (Two tenants, large manufacturers and wholesalers of garments and costume jewelry who were reluctantly considering moving out of New York City, account for about half the leased space—and an ice skating club will have a year-round rink on the top floor.) The poured-in-place concrete construction, including the placement of column footings between railroad tracks, was accomplished without interruption of rail service. The problem was slightly simplified by discovery that a retaining wall and continuous bridge footing placed by the railroad in 1907 tested at over 7,000 psi strength and provided adequate support for several of the columns required to support the 12-foot-deep steel beams bridging the tracks.

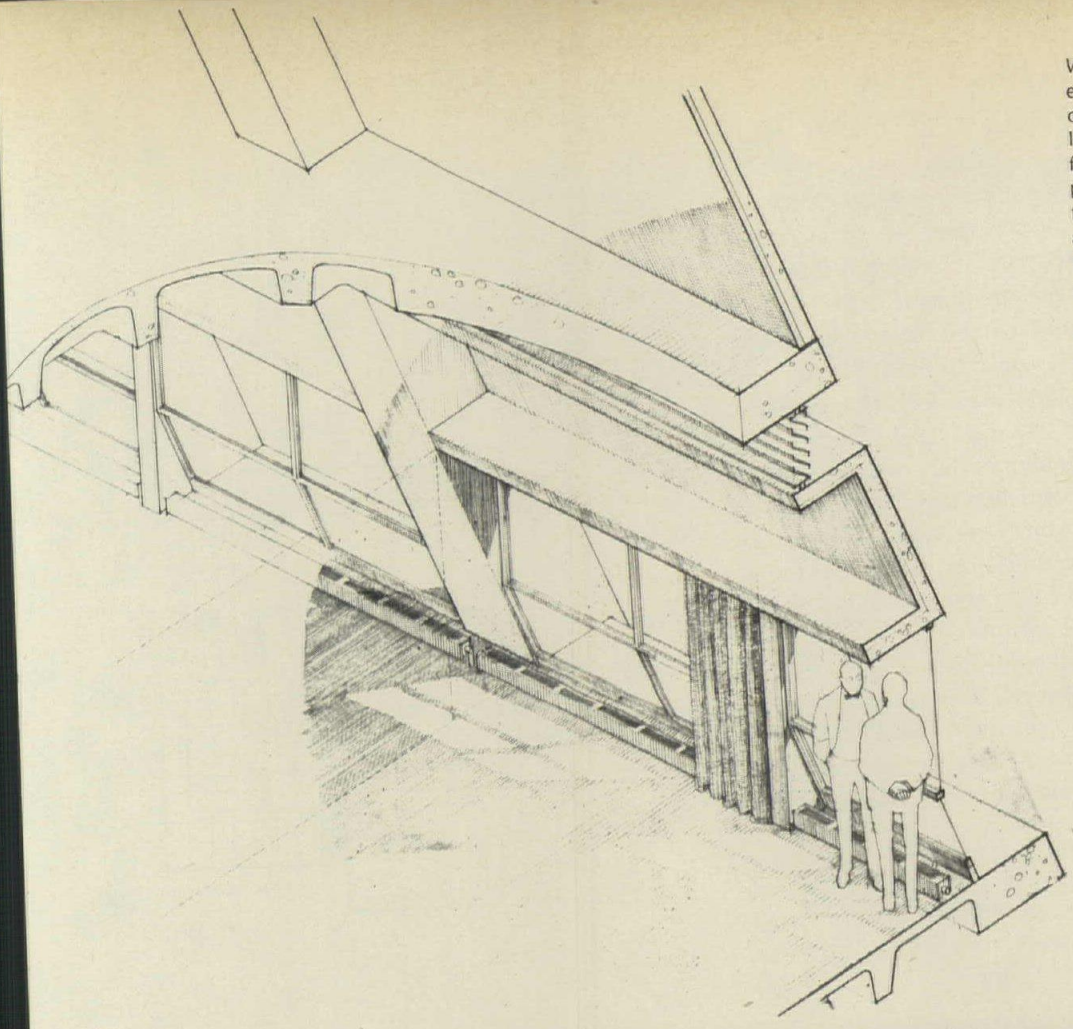
Access to the building is at both first floor and second floor levels owing to sloping of the site. There are some 38 truck docking stations distributed around the building.

WESTYARD DISTRIBUTION CENTER, New York. Architect: *Davis, Brody & Associates;* structural engineer: *Robert Rosenwasser;* construction: *H.R.H. Construction Company.*









Warehouse and office floors generally alternate. The windows of the office floors are at floor level (see left), but those for the warehouse floors are clerestory windows above precast concrete spandrels. Pan-formed reinforced concrete floors and ceilings are designed for extra-heavy duty so that the mix of tenancy remains flexible.

An unusual feature of the building is a giant watergate required to control the unlikely event of flooding along the railroad tunnel approaches from the Hudson River.

Elaborate materials handling equipment includes many passenger and freight elevators with one elevator designed for 40-ton capacity, vertical and horizontal chain conveyer systems, and spiral chutes.

The flared walls on three sides of the building provide additional floor space and increase the strength of the structure. The straight wall on the fourth side is cantilevered out from the base by concrete beams beginning at the fifth floor level to overhang Port of New York Authority approaches to the Lincoln tunnel.

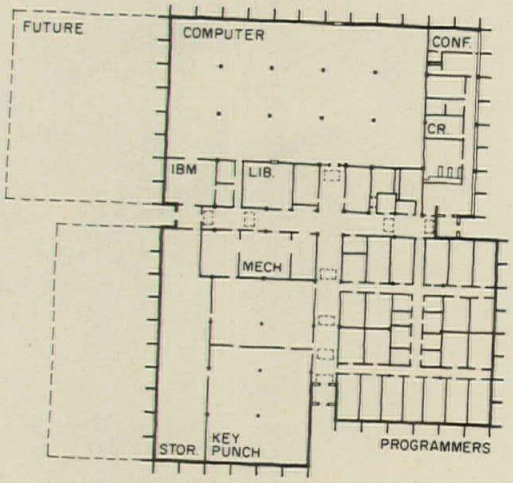
Louis Checkman

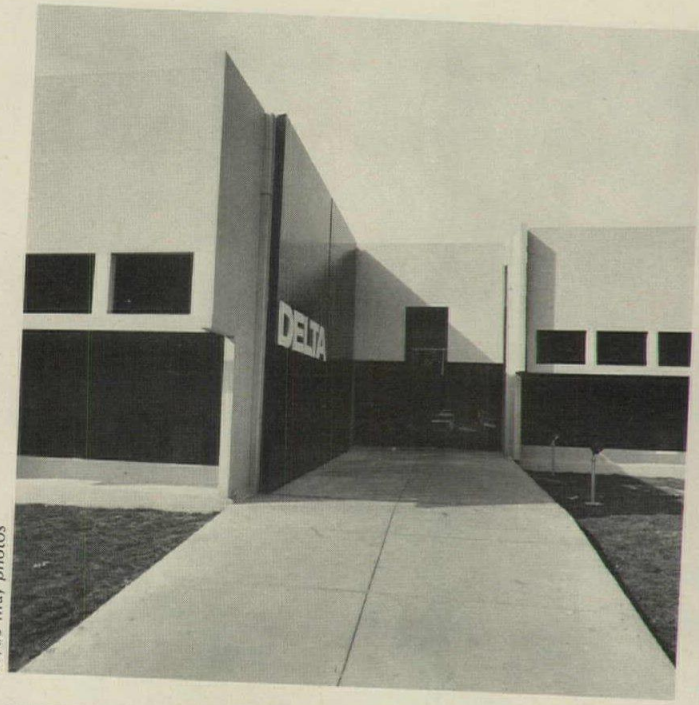
AN AIRLINES COMPUTER CENTER: SYSTEMS AND SCHEDULE KEEP CONTROL

Design and construction of this computer center for Delta Airlines demonstrate some of the principles which architects Heery and Heery increasingly apply to a varied but substantially industrial list of clients: rigid attention to schedule and cost control through computerized methods of scheduling and the use of systems in construction similar to the SCSD concept. This all-electric building of 50,000 square feet of specialized space was designed and built in 271 days. There are basically three categories of space: a computer machinery room with its special floor of raised panel construction permitting access at any part for electrical and air conditioning supply to the computers; programming area where specialists can perform their duties in quiet isolation; and an office area where key-punch and other clerical operations are performed.

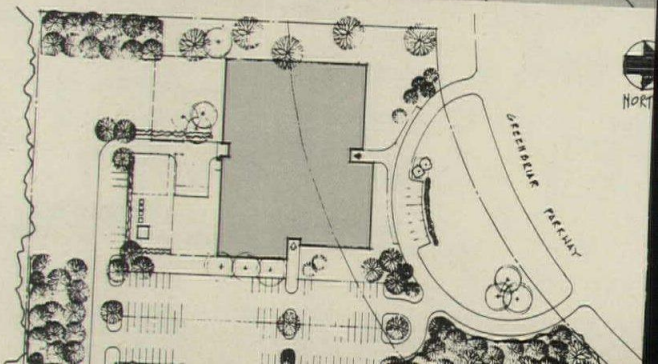
End-to-end phasing of the schedule, as shown in the diagram opposite, has been found by the Heery organization to accelerate completion of the project more rapidly and with much better control of costs than so-called "crash programs" of overlapping design and construction where both competitive bidding and whole-project coordination are forfeited.

DELTA COMPUTER CENTER, Atlanta, Georgia. Architects: *Heery and Heery;* mechanical engineer: *J.W. Austin & Associates, Inc.;* landscape architect: *John Patton;* graphics: *Hauser Associates, Inc.*



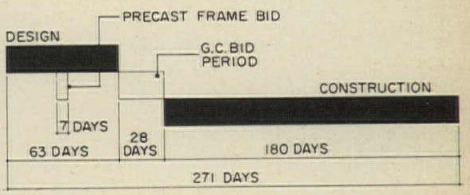


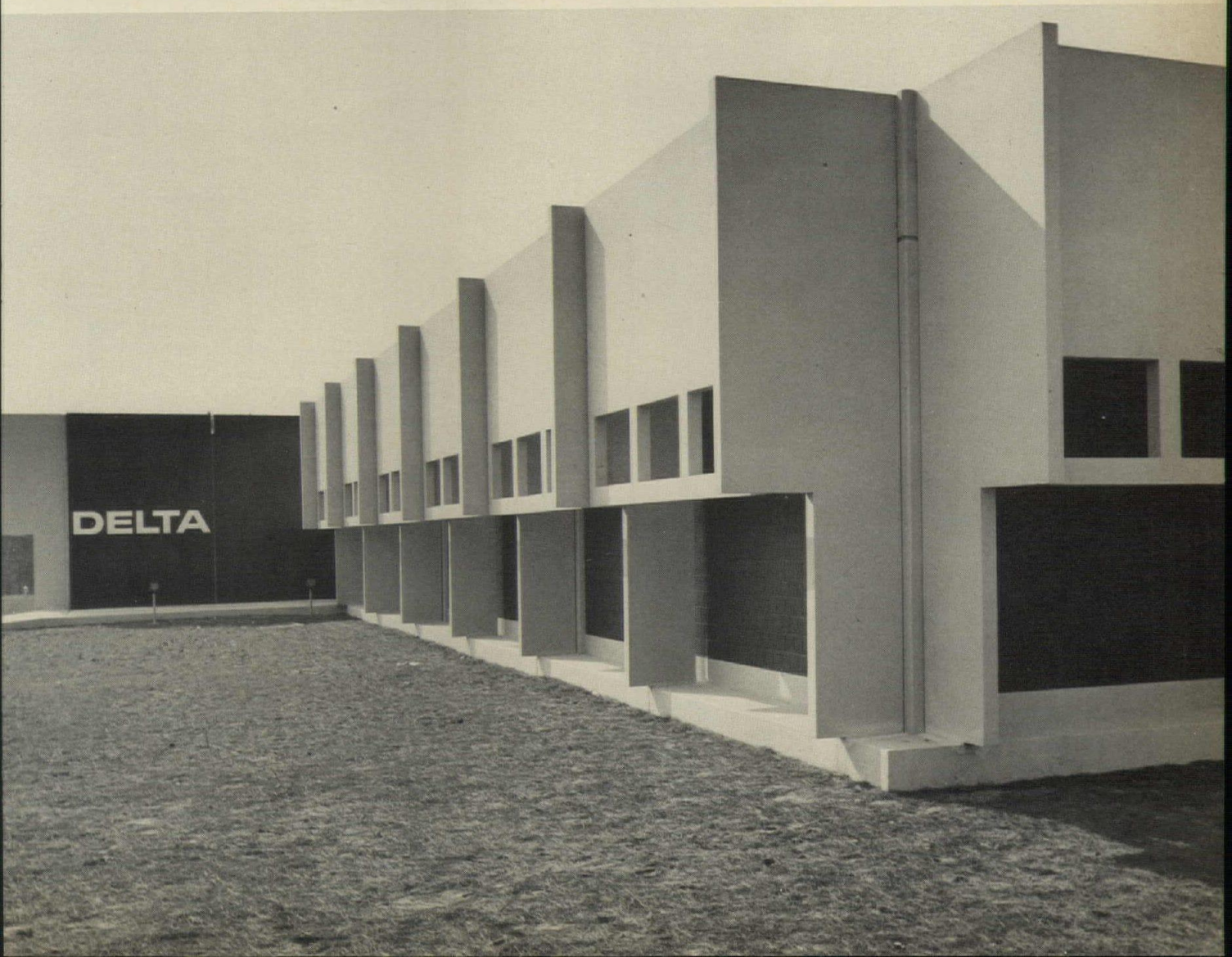
Clyde May photos



The wall structure of precast concrete panels is shaped with vertical fins to provide some solar screening to reduce air-conditioning loads. The structure is designed to carry a second story, and the first story itself can be expanded by a proposed 18,000 square foot addition.

The critical electrical supply to the computers is assured by the combination battery and generating system located in a separate building on the south side of the computer center. Interior wall systems of gypsum wall board are finished in vari-colored paint and vinyl wall covering, and a colorful symbolic mural decorates the wall of the main entrance.

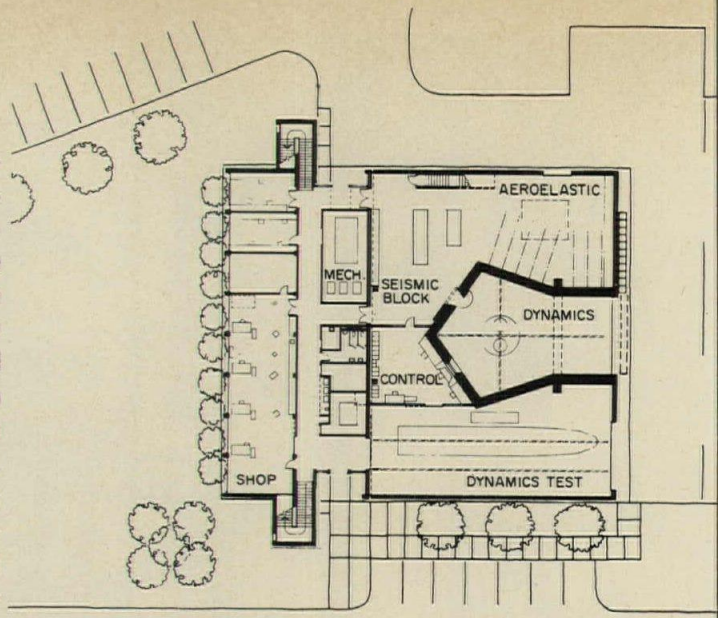




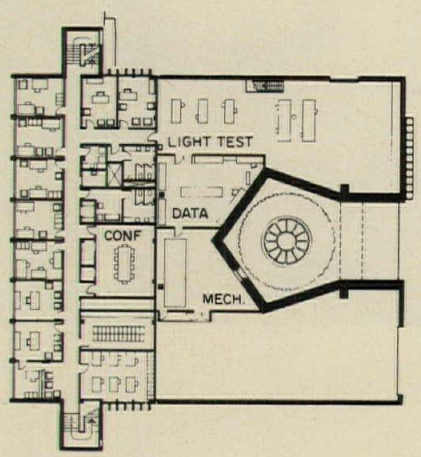
A ROCKET TESTING STATION: DESIGN FOR AN EXOTIC PROGRAM

The unusual performance program is commonplace in architecture for industry; and for the space program, unusual requirements sometimes test the limits of feasibility. Such buildings as the vertical assembly building at Cape Kennedy and the various test centers duplicating the conditions of space have extended the state of the art of construction. This laboratory for the Ames Research Center at Moffett Field evolves around a 110-foot-high vacuum test tower where space conditions can be simulated. Because of proximity requirements of support laboratories and shops to the tower, the architect points out, it became necessary to design the tower as a part of the main building mass. The tower is pentagonal in plan in order to solve requirements for sound attenuation and a pressure load of one atmosphere (2200 psf). The most efficient plan shape for these requirements would have been a circle, but the pentagonal solution was found to be the most economical design. The building also contains supporting offices, laboratories, instrument rooms and shops which are grouped around the tower in a two-story block with offices and small shops facing to the north.

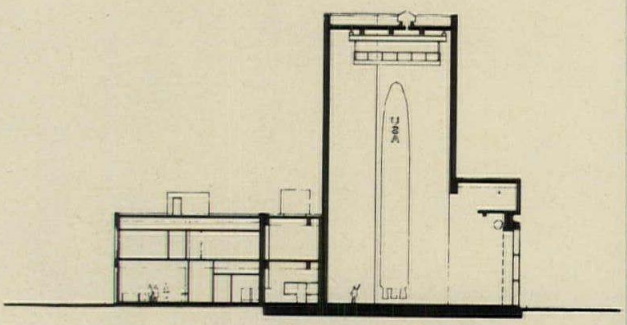
AMES RESEARCH CENTER, Moffett Field, California. Architect: *Gerald M. McCue & Associates, Inc./McCue Boone Tomsick Architects;* structural engineer: *John A. Blume & Associates;* mechanical and electrical engineers: *Buonaccorsi & Murray;* general contractor: *Carl N. Swenson Company, Inc.*

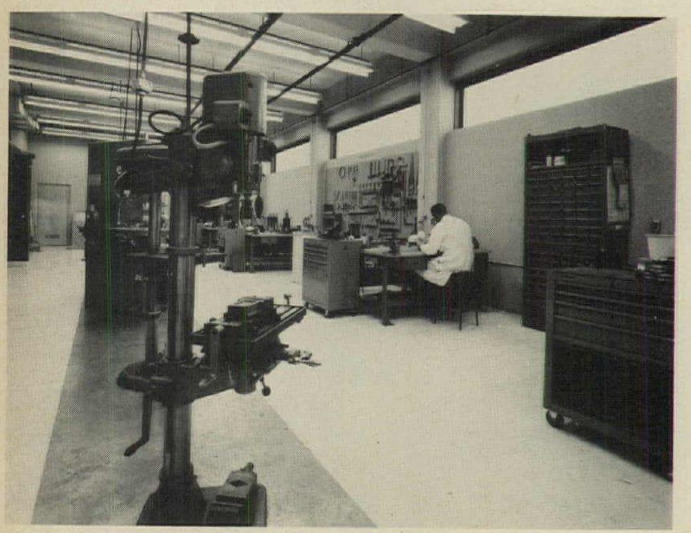


FIRST FLOOR

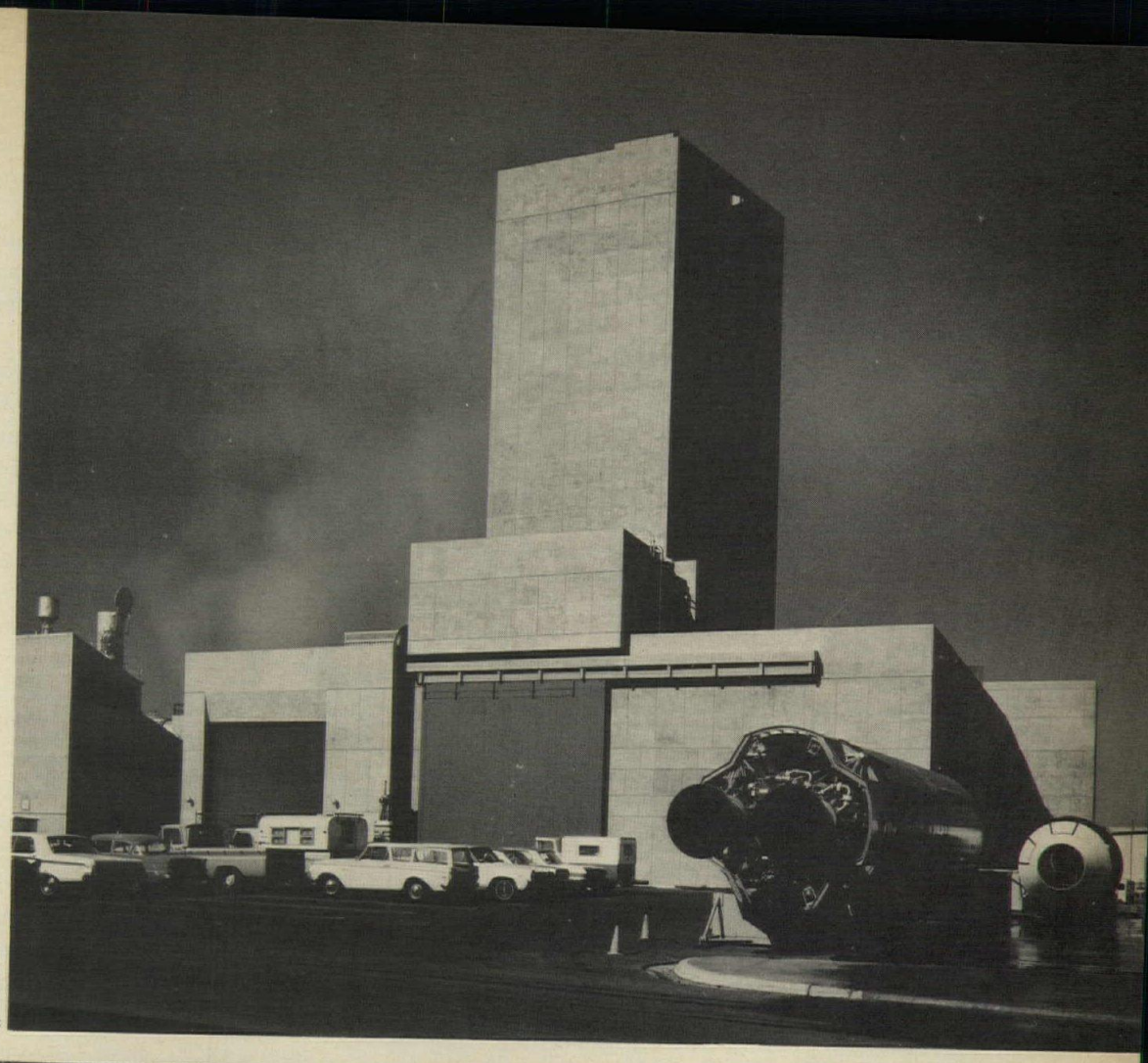


SECOND FLOOR





structure is poured-in-place
crete. The entire building is
ported by a concrete floating
ndation since soil conditions
the testing program within the
ding would not permit piles or
ventional footings. The walls of
tower are three feet thick at the
tom and 2½-feet-thick at the top,
the portion of the foundation
er the tower is six feet thick.
structure is left exposed in all
as except offices and special in-
ment rooms.



Jeremiah O. Bragstad photos

LOADING DOCKS: A KEY DESIGN AREA

The ugly, prosaic loading dock at the business end of the industrial building has increasingly gained the attention of architects and owners with the realization that every pound of raw material and finished goods must pass across that dock. Exotic and sophisticated inplant materials handling systems have failed to pay off when they do not function as an integral part of the total materials handling system which begins and ends with the loading dock.

Design approach: the mobile-room concept

At any given minute in the United States, millions of 40- by 8-foot mobile storage rooms are wending their ways through the interstate highway system to hundreds of thousands of plants and warehouses. Thinking of these millions of trucks as "mobile rooms" which must be connected to a materials handling system gives the architect an opportunity to approach the design of a truck loading dock with a concept that covers the whole spectrum of need from the time the incoming truck crosses the property boundary until it leaves.

Specifically, components of the design problem are: 1) movement of the mobile rooms from property line to dock area; 2) positioning; 3) securing; 4) attitude of the rooms with respect to the dock; 5) lighting; 6) sealing (temporarily) the mobile room to the building; 7) joining the floors of the room and dock to permit fast, safe, efficient movement of goods.

1. Provide adequate service roads. Insufficient passing clearance, random storage of materials, poor road surfaces, poor traffic control, poor traffic patterns, and inadequate curves are too often permitted. Recommended standards exist: minimum 22-foot-wide roadways for two-way traffic; 12 fe for one-way traffic. If pedestrians are involved, 26-foot widt are recommended, with pedestrian traffic separated by a cu or physical barrier. Smooth roadway surfaces should be c pable of carrying 34,000 pounds on two axles. Curves shou have a minimum 50-foot radius. Gate widths should be 20 fe for one-way traffic, 30 feet for two-way traffic and 36 feet pedestrians are involved.

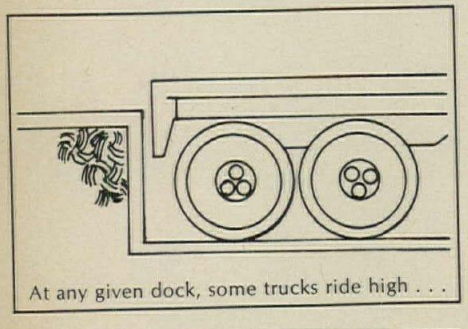
2. Design for positioning and dock approach. On the a sumption that legal tractor-trailer lengths will go from th present 55 feet to a 60-foot average in the next eight years, ar truck apron now under consideration must accommodate th 60-foot length (see table 1, page 202).

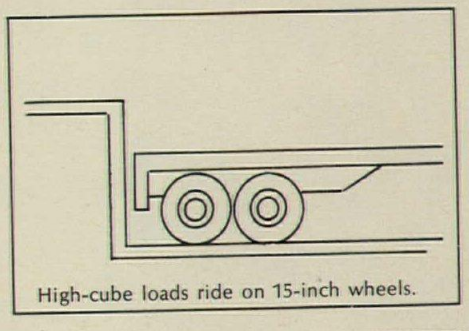
Driver skill can be counted on to put a vehicle in almo any width berth you provide—four out of five times. Prudenc however, dictates a 10-foot minimum width with 12 to 14 fe far more acceptable. Each berth should be clearly marked wi yellow lines extending 30 feet from the base of the dock ar up the face of the dock.

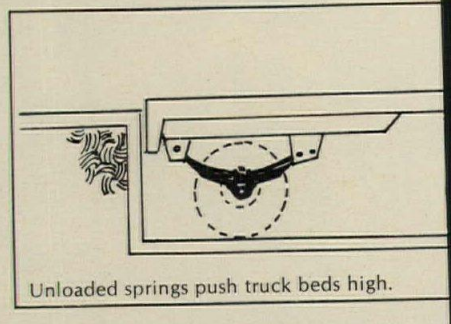
Where should berths be placed? Common practice lump both receiving and shipping on the same dock or puts shippin at one end of the plant and receiving at the other. It wou seem, with today's sophisticated communications and mobil in-plant handling equipment that truck berths could be place at several logical points around the building.

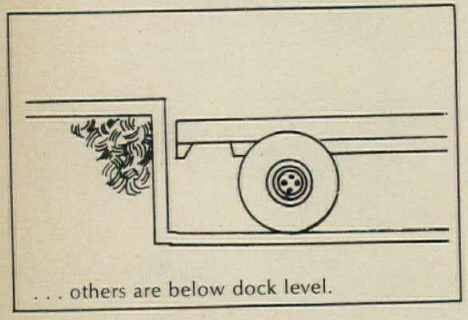
Depth of platform, as a rule of thumb, should be a min mum of 12 feet (three times vehicle width or about 24 feet f two-way traffic) measured from the rear of dockboard to nea est obstruction. If possible, the platform should be free columns except along the outer edge.

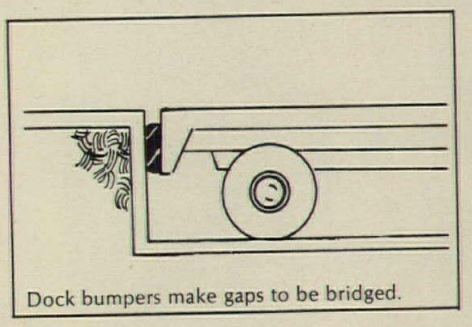
One of the best ways to determine dock length is to ca culate the tonnage which must be shipped per day, and ho much can be moved across a single truck position in an hou

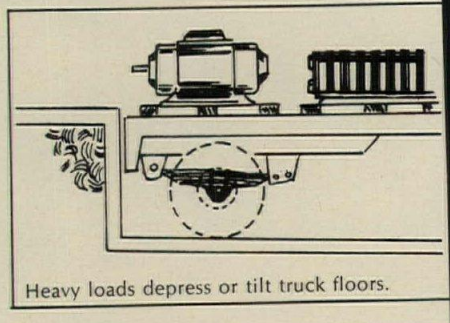

At any given dock, some trucks ride high . . .

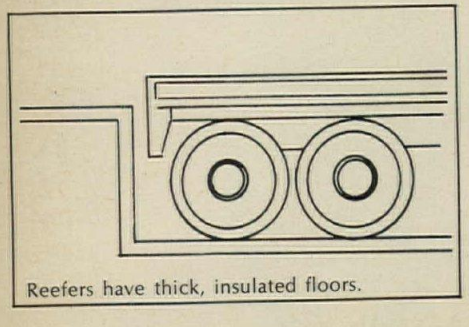

High-cube loads ride on 15-inch wheels.

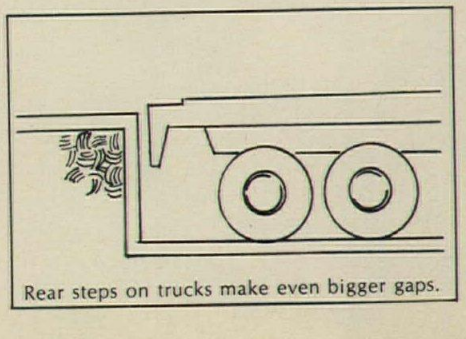

Unloaded springs push truck beds high.

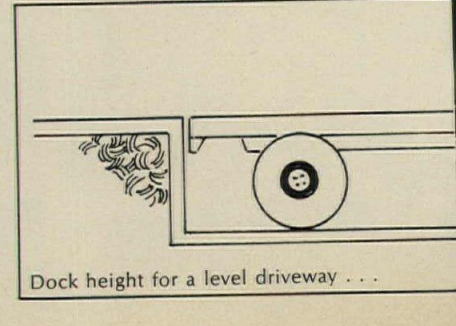

. . . others are below dock level.


Dock bumpers make gaps to be bridged.


Heavy loads depress or tilt truck floors.


Reefers have thick, insulated floors.


Rear steps on trucks make even bigger gaps.


Dock height for a level driveway . . .

hen you must decide how many effective loading hours you ave per day (many plants figure an average of three hours). om these data you can easily calculate the number of posi- ons needed.

3. Secure the vehicle against movement. When the truck connected to the dock, the wheels must be chocked and akes set. The architect should specify chocks chained to the ont of the dock at each berth.

4. Consider attitude and dock height. This is the single ost important factor in design. Depending on type of oper- ion you may have to accommodate carrier bed heights rang- g from 44 to 58 inches (in extreme cases 38 to 66 inches). bviously, the only solution is to make a survey of all trucks to e serviced and calculate the best average dock height.

5. Adequate lighting is a must. The architect should pro- de a minimum of 50-foot candle in overhead lighting on the ock. In vehicles, supplementary light is best provided by per- anently installed dock lights designed with steel housings nd shock-mounted sockets to protect the flood or spot light ulbs. They can be mounted on columns between truck posi- ons or pendant mounted above openings. They are equipped ith single- or double-arm swivel mountings so light can be rected into the truck where needed.

6. Seal against weather. Moving the roofline out to the nd of the platform improves environmental control. The prob- m of excluding cold, wind, ice, and snow from the building roper can be solved in various ways:

Closed overhead doors are reasonably weather-tight, and uring loading and unloading when the door is open the gap etween the truck and building can be effectively bridged rough the use of dock seals—canvas or rubber units which e mounted on the face of the building.

Another method of enclosing the platform area is through construction of an inner wall to create a vestibule and equipping the inner wall with traffic doors. The doors are load actuated. They open only on impact, only to load width, and close immediately. It is normal to install a traffic door for each truck position.

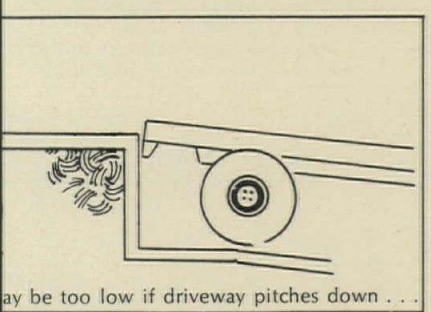
7. Join dock and truck floors in a marriage of convenience. In the final analysis, the entire problem boils down to how effectively the architect connects the wide variety of mobile rooms to the dock. In fact, all other factors being equal, the total loading and unloading effectiveness depends on the dockboard device he chooses.

Often architects must design the dock to accommodate existing in-plant material handling equipment. With his knowledge of the dock-to-truck-height differentials, he can quickly establish the length of dockboard needed, remembering that powered handling equipment will be needed if the dockboard incline exceeds about three per cent. If slight differentials exist and shipping volume is low, the use of portable plates might easily be justified. On the other hand, where fast, efficient high-volume handling is needed, the introduction of permanent adjustable dockboard equipment is indicated.

Permanent dockboard equipment, being part of the dock itself, can be any length needed (5 to 10 feet), any width (6 or 7 feet), any capacity (12,000 to 40,000 pounds) and, of course, cannot slip or slide. Proper width is becoming increasingly important as shippers are turning to palletized loads.

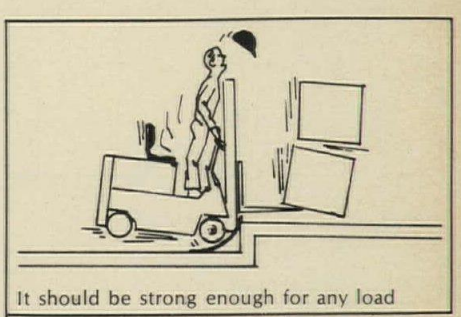
Below-dock trucks, tilt, and other problems

When trucks with low beds back into dock facilities, dock attendants face a serious problem. Truck floors are often 12 to 15 inches below dock level, and are loaded to the doors. Under this condition, all portable plates and many permanent adjustable dockboards are of no help, since the end cannot be set in-

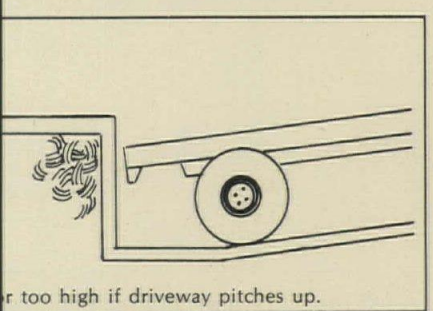


ay be too low if driveway pitches down . . .

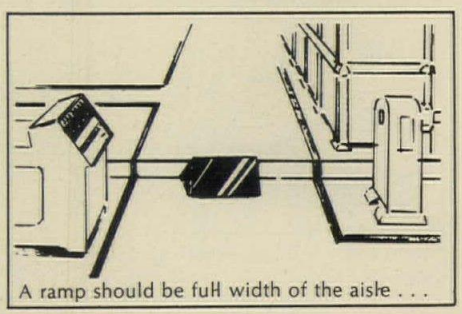
Sketches below show problems of the add-on room with change of level similar to the situation that prevails at loading docks.



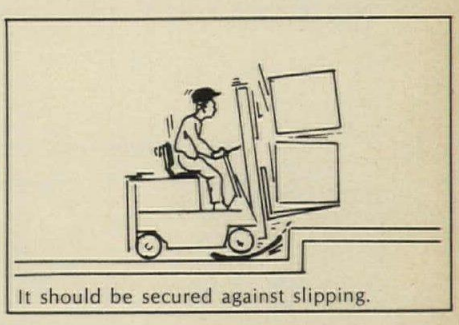
It should be strong enough for any load



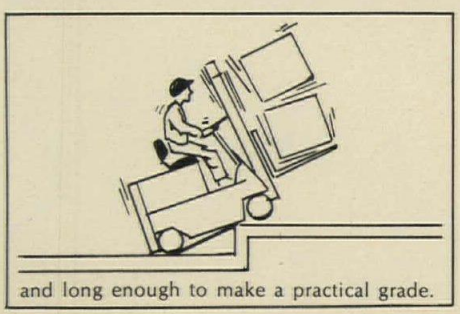
r too high if driveway pitches up.



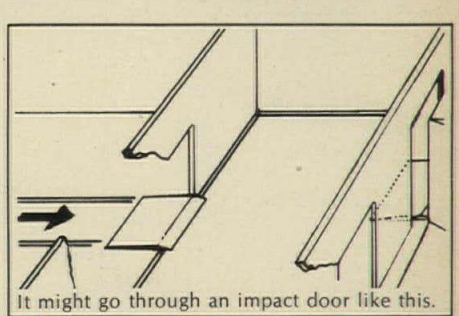
A ramp should be full width of the aisle . . .



It should be secured against slipping.



and long enough to make a practical grade.



It might go through an impact door like this.

side the truck. As a result, mechanical material handling equipment cannot be used. When this situation exists, the permanent dockboard equipment must be equipped with a below-dock-level control. This control permits the dockboard to be lowered without extending the lip . . . allowing mechanical handling equipment to pick up the load.

Weak springs, uneven loads, ice and snow on the approach, under-inflated tires, etc., are the primary reasons for out-of-level trucks. When this situation occurs dock personnel are subjected to extreme hazards. When the fork lift is going into a truck, the gangplank will suddenly conform to the truck bed causing the fork truck to lurch to the left or right. This is often enough to spill the load into the trucks. Upon backing out, attendants must force the gangplank to conform to the truck bed and push or pull the cart onto the gangplank. If using a mechanical truck it will hit the edge of the gangplank, and either stop abruptly or push the plank back with sufficient force to break off the anchoring lip.

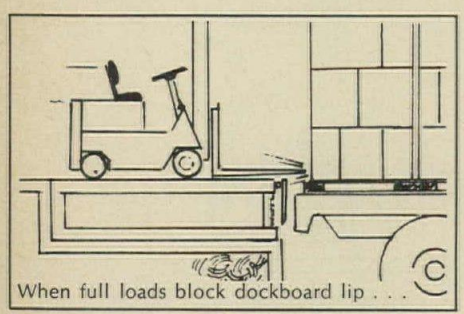
Most permanent adjustable dockboards have built-in tilt mechanisms. This tilt enables loads to move in and out smoothly and without incident. As the attendant and equipment cross the center line of the dockboard, it automatically conforms to the truck bed. Since the load, attendant and fork truck are at the center of the board they notice little change in attitude. The reverse is true as the equipment returns from the truck to the dock. Not all permanent dockboards are equipped with this feature. Some can be tilted only with extremely heavy loads. Others have tilt mechanisms which respond to pressure of less than 200 pounds.

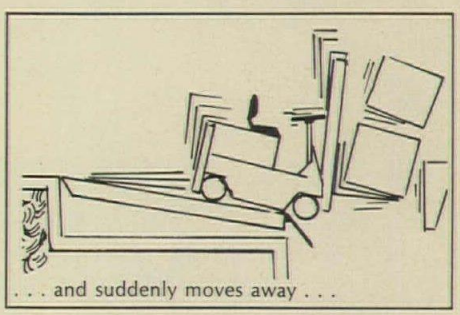
If a truck were unexpectedly to pull away from the dock, some other means must continue to support the dockboard while the attendant can remove himself and the load. This realization led to the modern front-supported dockboard.

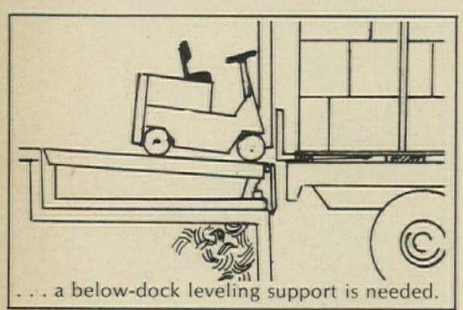
Some permanent equipment manufacturers provide front-s port by using the hinged lip itself. This is adequate only if dockboard is above or at dock level. Others use simple te scoping posts with large cotter keys. This system requires attendant to jump down into the driveway and hand-set post to match the height of the incoming truck. One manuf turer has a patented system described as automatic cross-tra legs. These hinged and notched legs work in conjunction w the hinged lip. When the lip is extended the legs retract perm ting the dockboards to be lowered to its full below-dock le When the lip drops into the pendant position the legs sw forward to provide full support. Through use of the notch this system provides for cross traffic support even if the do board is in the below-dock position.

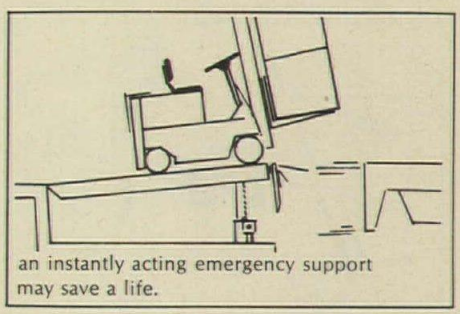
Any of the above systems will work and supply the pro support during normal operation. However, the biggest dang and one that almost inevitably results in death or serious inju occurs when a truck pulls out while an attendant and load on the board. To prevent this, one manufacturer has develop what he terms a "panic stop." This device consists of a st post with notches operating past an escapement mechani Under normal conditions the posts slide up and down with dockboard, but the moment the board is accelerated dow ward at a rate faster than one-inch per second, the escapem mechanism locks the posts and supports the board—norma limiting free fall to less than one inch.

Permanent recessed equipment, with all the features p viously mentioned, is considerably more expensive than po able gangplanks or plates. Management, aware that up to per cent of its labor force is involved in material handling, creasingly agrees that the need for faster and more effici loading have made the use of permanent dockboards an e nomic necessity.


When full loads block dockboard lip . . .


. . . and suddenly moves away . . .


. . . a below-dock leveling support is needed.


an instantly acting emergency support may save a life.

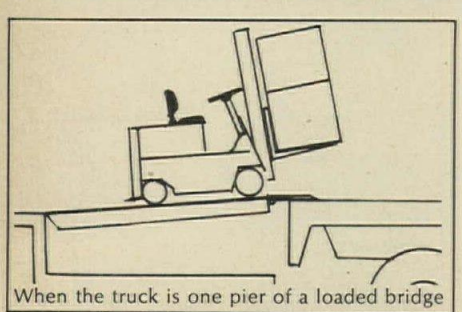

When the truck is one pier of a loaded bridge

Table 1
Apron space required for one maneuver into and out of position

Over-all length, tractor trailer, ft.	Width of berth, ft.	Apron space, fe
40	10	46
	12	43
	14	39
45	10	52
	12	49
	14	46
50	10	60
	12	57
	14	54
55	10	65
	12	62
	14	58
60	10	72
	12	69
	14	63

Apron space is defined as unobstructed sp measured perpendicular to the dock face fr 1) the unobstructed dock, 2) canopy supp posts, or 3) the front wheels of other vehi in loading position.

ECIAL REPORT NO. 6

Sealing joints: the technology and the art

ere is now a body of experience on alants and gaskets—their merits and ficiencies are now apparent. These odern elastomeric materials can be lored to the building application ed, but—if leaks are to be avoided— e joint must be properly designed the first place.
-Robert E. Fischer

If all buildings could be made seamless, architects would be saved many headaches when it rains. But as long as buildings are assembled from a number of components there will be joints, and one way or another the joints must be weatherproofed. And while the modern-day technology of sealants and gaskets is meeting some of the newer demands of buildings, this technology does not work miracles: building joints still have to be properly designed, the right material or combination of materials have to be determined, and both the building materials and joint-filling materials must be properly installed in the field.

Joint problems are hardly new, but when they occur nowadays they are generally more serious in nature. For example, the traditional glazing and caulking compounds always dry out after a time and have to be replaced. But this is expected as a matter of normal maintenance. On the other hand, if a modern sealant failure occurs, not only has a more expensive material been wasted, but the repair work is usually costly; sometimes it is nearly impossible to accomplish at all because, perhaps, of fouling of the substrate, difficulty in removing the original sealant materials, or movement that no sealant can take.

It's the reality, not the theory, that is the final test

Despite the great advances made in materials development there still is no simple, universal solution to the sealing of joints and glazing rabbets. There are just too many variations in materials combinations, climate, esthetic demands and budget requirements.

Perhaps early in the marketing of the new toxic sealants too much confidence was generated in their abilities to take large joint movements (100 per cent and more) without losing adhesion, without tearing apart, and without degrading with exposure to the weather. Laboratory conditions are not field conditions, and there is no one laboratory test that combines all of the interacting field conditions in one procedure. The sealant industry has pretty much agreed that no sealant materials should be expected to take more than a plus or minus 25 per cent joint movement, opening and closing. The point of this is that the sealant should not have to take more than 25 per cent extension or 25 per cent compression.

Elastomers compared to plastics; the difference is chemical

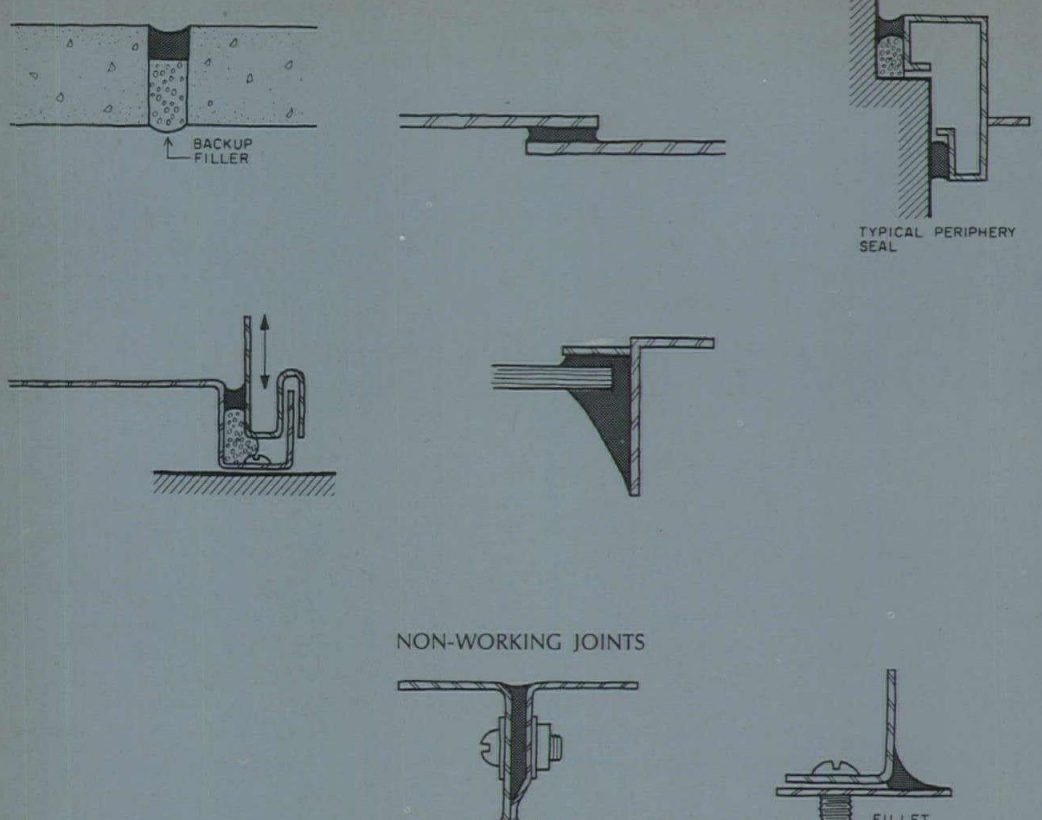
Elastomers—the basic materials used for sealants and gaskets—are defined as polymeric materials (long-chain molecules) which, at room temperature, can be stretched to at least twice their original length, and, upon immediate release, will return quickly to approximately their original length. The basic difference between plastics and elastomers is that plastics have long, regular chains of molecules that intertwine and run somewhat parallel, while elastomers have long molecular chains that are cross-connected by chemical bonds along the chains. This cross-linking is known as vulcanization and results in the rubbery characteristic of elastomers. When a single type of molecule (monomer) is polymerized with others of its type, the resulting material is known as a polymer. If two different types of molecules are polymerized the resulting material is a copolymer; if three, a terpolymer, etc.

Sealants are made by compounding the basic polymer with fillers, plasticizers, extenders and coloring pigments and sometimes tackifiers (to make them stick to surfaces). They are cured to a solid state by means of chemical vulcanization or by solvent evaporation.

The basic characteristics of the sealant are, of course, determined by the basic polymer employed, and certain desirable qualities can be built into the polymers themselves—that is, a different monomer can be chosen to impart various characteristics. Beyond this tailoring by chemistry, the compounding modifies the end product to suit certain product requirements: right consistency for ap-

e following people were helpful in the velopment of this article: Z. J. Obara of DAP .; John F. O'Brien of Diamond Shamrock Corp.; H. Barton and S. W. Schmitt of Elastomer emicals Department, Du Pont; George Grenadier The Grenadier Corp.; Arthur Hockman of the tional Bureau of Standards; Wayne Koppes, .A., Architectural Consultant; Robert W. McKinley PPG Industries; Ross W. Pursifull, A.I.A., of ith, Hinchman & Grylls Associates, Inc.; Werner mpertz and Glenn Brown of Simpson, Gumpertz Heger, Inc., Consulting Engineers; Julian R. Panek d Joseph Giordano of Thiokol Chemical Corp.; nald Esarove, F. P. Malloy and A. W. Arvidson The Tremco Manufacturing Co.

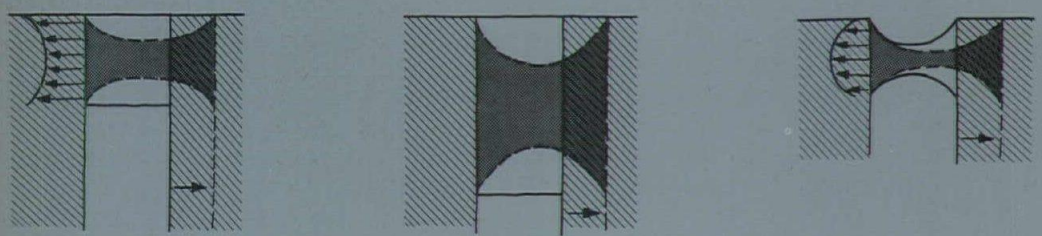
WORKING JOINTS



NON-WORKING JOINTS

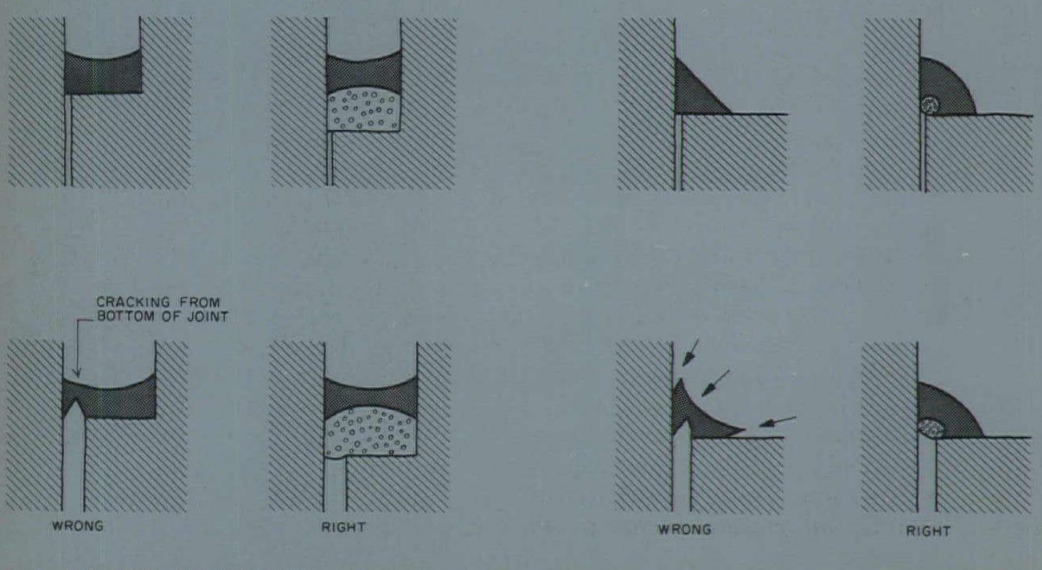
Joints may be classified as ei working or non-working. With w ing joints the sealant will be stres The basic stress in butt joints is sion and compression; with joints, shear; and with combina joints, all three types of stress. R istically, however, working jo will be subjected to the three t of stress in varying degrees. nature of the movement should anticipated in the design. For ample, take a metal window masonry wall. A sealant bead tween the sash and the masonry experience mainly shear becaus the differences in the expansion metal and masonry.

THE CORRECT SHAPE FOR A SEALANT BEAD



These diagrams show how stres the sealant is affected by the sh of the bead. A square bead, pu apart, will neck-in, and front back faces of the bead will stretched more than the center. W a deep, rectangular bead, the surfaces, obviously, stretch e more than those of the square be If the stress in the surface of bead exceeds the adhesive stren then the bead will start to peel cause failure. The correct bead sh has concave surfaces front and b obtained by tooling the bead in fr and providing a curved back-up terial behind.

THE IMPORTANCE OF BACK-UP MATERIAL



The sealant bead should never allowed to bond to the bottom joint; otherwise, stress concen tions may occur causing the sea to tear. A fillet bead in a co joint can be a source of trouble. F of all, a feathered edge is a w spot. Also, if the bead adheres both abutting wall materials it tend to tear. If such joints are avoidable, then back-up mate should be placed behind the be and the bead should have a con shape. A better approach, of cou would be to have a larger joint s that a regular bead of sealant can used.

Credits for illustrations: Top: Wayn Koppes from paper given at M.I.T. s mer session on Plastics in Architect Center: G. K. Garden from paper g at CIB symposium on Weathertight Jo for Walls. Bottom: Tore Gjelsvik, s posium on Weathertight Joints for W

cation, sufficient body to prevent sag-
ng or weeping; resistance to ultravio-
radiation; modification of hardness
d modulus; etc. Generally, there is
optimum amount of polymer that
ould be used when a sealant is being
mpounded. If this amount of polymer
lessened, the end product may not
ld up as well in service.

Most sealant manufacturers buy the
sic polymer from a chemical company
d compound the sealants themselves.
ceptions to this are the silicones and
e of the acrylic terpolymers. In order
maintain quality control over the end
oducts based on polysulfide polymer,
e Thiokol Chemical Corporation sev-
al years ago established a licensing pro-
am in which the licensees agree to
eet certain quality standards, especially
regard to the amount of polysulfide
lymer to be included so as to assure
tter weathering characteristics and
erall performance. Thiokol periodically
ecks the formulators' products, obtain-
g them through normal channels.

Currently the Adhesives and Sealants
ouncil has under discussion a "Hall-
ark" program which would perform
e same sort of quality control for other
oes of polymers.

The elastomers being used most to-
y for joint sealants include acrylics,
lysulfides, polyurthanes and silicones;
d polymercaptans are being test mar-
ted in some applications.

The three critical physical proper-
s of elastomeric sealants are: 1) ad-
sive strength, 2) cohesive strength and
modulus. The first two are self-explana-
ry, but modulus has a slightly different
eaning with elastomers than it has in
e field of structures. In the case of elas-
mers modulus is the unit stress required
produce a given strain, but the mod-
us is not constant, changing in value
the amount of elongation changes. In
y case it is a measure of the stiffness
a material—the relative amount of
rce required to pull it apart. An elas-
mer with a high modulus requires more
rce to pull it apart than an elastomer
th a low modulus. On the other hand,
elastomer with a low modulus exhibits
orer recovery characteristics. If the
odulus is too high and the adhesive
ength too low, the sealant may fail
adhesion. If both the modulus and the
hesive strength are both high either
alant or substrate may fail in cohesion.

skets and tapes: e but not foolproof

truded rubber gaskets have been used
imarily for sealing lights of glass, or
r joints between metal parts, although
casionally they have been employed
r joints between precast panels. These gaskets are of two principal types: 1) compression gaskets that are put under pressure by means of the glazing stop used with the window sash and 2) structural gaskets, which, themselves, hold the lights of glass and resist movement due to wind. These gaskets are put under pressure by means of a zipper strip that may or may not be part of the gasket itself. This zipper causes the gasket to be expanded in such a way that the edges of the gasket grab the glass.

While gaskets might seem foolproof, care must be taken in their application to assure a weathertight seal, to assure resistance to forces caused by wind and to assure proper installation without ripping of the gasket.

When structural gaskets are used, construction tolerances must be kept under good control, and all surfaces to which the gasket is to seal must be smooth. If there is too much clearance between the edge of the glass and the gasket, wind forces will rotate the gasket. When this happens, the sealing lips may lose contact with the surfaces of the glass or frame; worse, if there is insufficient "roll-out" resistance, the glass may even be blown out. On the other hand, if insufficient edge clearance is provided, the glass may crack due to differential movements. Structural gaskets sometimes have shop-molded corners, and all in one place, like a picture frame. Originally these corners had 90-degree angles, but this sharp-molded corner has given way to new designs because with the sharp corner, insertion of the zipper piece caused the corner to lift, opening the way for leaks. One type has a thin-radiused lip molded inside the square corner, a second has a completely radiused corner.

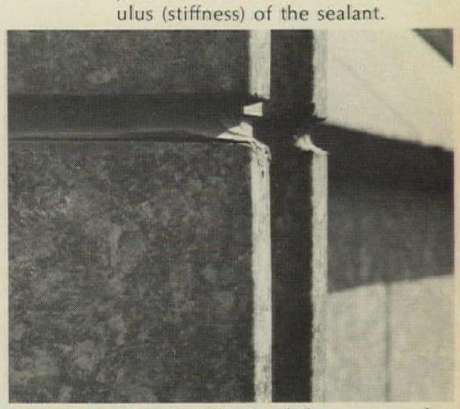
The sealing tapes are either non-vulcanized polybutylene or polyisobutylene or partially vulcanized polyisobutylene. Because the non-vulcanized tapes are not resilient, they cannot be used where much movement is expected; thus, they are generally employed in non-working joints. Partially vulcanized tapes are frequently used in glazing joints. While they are moderately resilient, these tapes should be kept under compression by a glazing stop, by the pressure of some solid elastomeric material, or by a combination of both.

Rainproofing the exterior wall: the new way uses a double barrier

Buildings have always had joints, and joints have often had leaks, at least to some degree. But traditional masonry buildings didn't place such severe demands upon the integrity of joints, as do many buildings of today—whether they be faced with lightweight metal and glass skins or with precast concrete panels.

Sealant failed cohesively and adhesively. It probably had too much resistance to stretching.

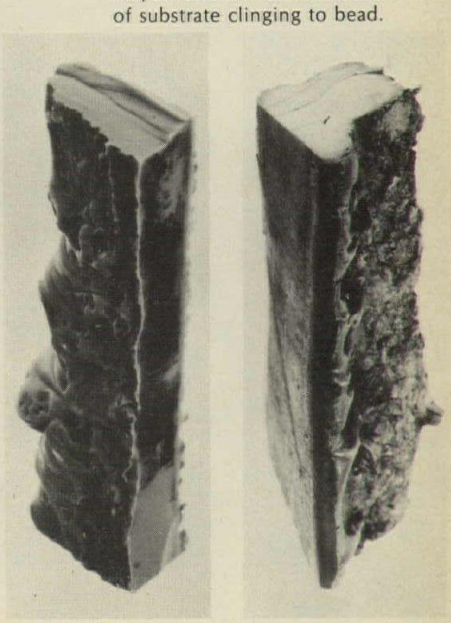
Adhesive failure of this pavement joint was caused by the high modulus (stiffness) of the sealant.



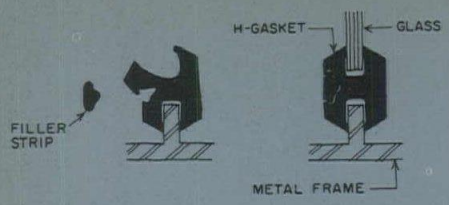
Above: Adhesive failure occurred at joints between these granite fins.

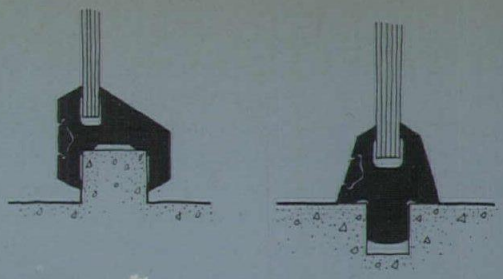
Below, left: Sealant bead removed from joint shows effect of no backup material; deep bead configuration led to adhesive failure.

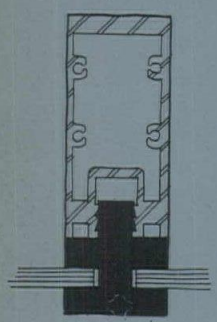
Below right: Another poor bead shape. Failure in adhesion shows bits of substrate clinging to bead.

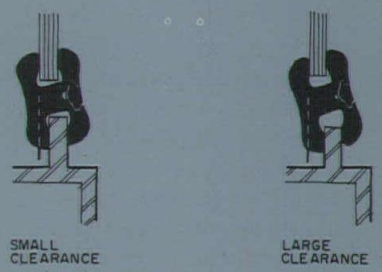


STRUCTURAL GASKETS



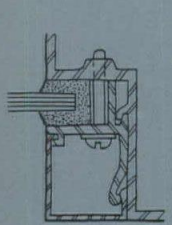


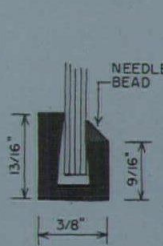


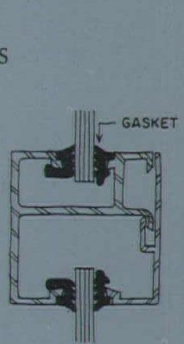


Glazing gaskets have taken o variety of configurations to su variety of functional and esth requirements. One of the most c mon types is the structural gask a spin-off from the automotive f This gasket not only has to seal the rain but must withstand v forces as well. Tolerances are im tant because too much clear between edge of glass and the tom of the gasket may resul "roll-out" of the gasket which c lead to loss of glass from v forces. One type of H-gaske made the same width as the mull head and sill members so that two-element system, the gasket pears to be the only glazing elem

COMPRESSION GASKETS

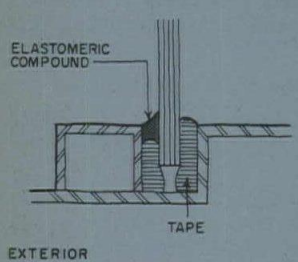


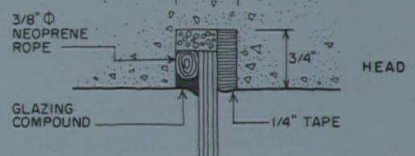


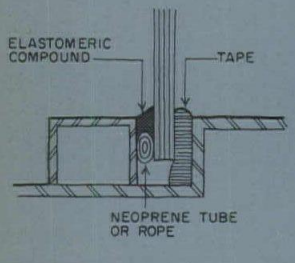


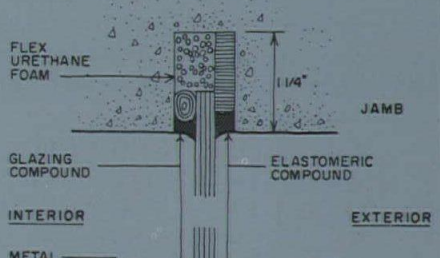
At left is an L-shaped channel ket used in the Ford Founda building. The short leg of the ga is on the exterior face of the gl a needle bead of sealant provide surance against the penetration rain. With this combined techni very little sealing material is visi

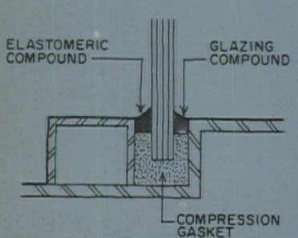
COMPOSITE SEALS

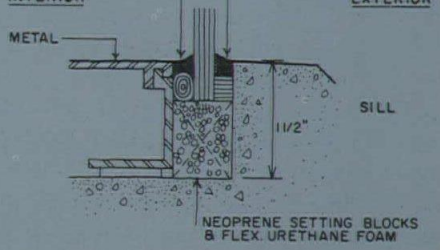












Composite seals frequently are u with glazing, i.e., several mate are employed in one joint. In so cases this means more efficient, thus less costly, use of materials other cases it may have been most logical solution, conside the nature of the window surrou For example, the details at the mediate left show the glazing de for the in-situ facade used in Earth Sciences building at M.I.T. architect I. M. Pei. The use o deep rabbet at the sill and deep s in the jamb allow some variatio field dimensions. Foam takes space; tape cushions the glass on terior face; neoprene rope squee glass against tape; sealant shuts weather. Tape, which remains ta is left exposed only at the h where dirt will not settle as re ily. Because neoprene rope tend snake around in the glazing slot d ing application, material should p ferably have shape and depth s that glazier can drive the mate "home" so it is neat, and little t is wasted.

Credits: All drawings except Ford Fo dation detail and large H-gasket f Wayne Koppes, op. cit. H-gasket sys is by Kawneer

It is the realities of building move-
nt and field tolerances that have
sed some building researchers and
he window and curtain-wall manufac-
ers to seek other methods than mak-
the outer skin of a building water-
t. They say that any slight "break"
he exterior wall spells trouble. Thus,
se people suggest that the outer cover-
of a building—the wall and even the
dow sash—serve only as a "rain
een" to divert the main portion of the
inging water; then, means are pro-
ed to weep any moisture that does
etrate the outer barrier. The inner
ity of course must be fully waterproof.
e of the physical principles employed
this technique is "pressure equaliza-
." The idea is this: When the outer
serves as the sole barrier against
penetration and something happens
he seal, rain can be forced through
joint because of a difference in air
ssure between the outdoors and the
oors or the void behind the joint. If,
vever, there is a void behind the joint
ch is open to the atmosphere, no
ssure difference exists, and the only
er that can enter will be that due to
d-driven rain, and as mentioned
ier, this is drained from the cavity.
o, various joint designs have been
eloped to reduce rain penetration into
en" joints.

rain-screen approach is not
hout its negative points

t of all, a wall designed this way may
more complicated. It does not
essarily follow that the wall must
double—in some cases a pressure
alization slot is employed at the
t. But these joints sometimes are not
ple in configuration and may present
iculties if a sealant material has to be
lied far back in the joint to act as
final water barrier. Also it may not
visible for inspection. When the rain
een consists of a cavity wall, care
st be taken that the inner wall has
apor barrier; otherwise there is the
nce that in winter, humidity from air
de the building might pass through
wall, condense on the cold outer
he, and perhaps even lead to the
mation of icicles.

nts in single-wall elements:
at makes them work—or fail?

hile the rain-screen idea has its ad-
ents, many designers will continue to
single wall elements. Since there is
y one line of defense, there can be
mistakes in joint design, sealant se-
tion, or sealant application. If the
nts are to be working joints, then the
ure and extent of movement must
determined as accurately as possible,
and the joint spacing sized accordingly.

Over 90 per cent of sealant failures, it is said, are adhesive failures. It is also said that most of the failures are caused by the lack of a primer, by poor primer application, by a joint contaminated with dirt, or by the joint being damp. Other adhesive (as well as cohesive) failures may be caused simply by too much joint movement so that no bond could be expected to hold. A different primer may be required for masonry than for metals and glass to increase adhesive bond. The only commonly used sealant that does not require a primer is the solvent-release acrylic terpolymer which "wets" the joint.

A sealant bead should have a concave shape—preferably inside and out—to help minimize chance of adhesive failure. For this reason, and also sometimes to prevent bond to the back of a joint, a back-up material is required behind the sealant (this also keeps too much sealant from being pumped into the joint and wasted).

Joint size is critical in the application of sealants because it affects the relative movement of the joint, and thus the severity of the stress imposed on the sealant. In the extreme case of a hairline crack, almost any opening represents *infinite* movement. Small butt joints between sections of aluminum are "impossible" to seal.

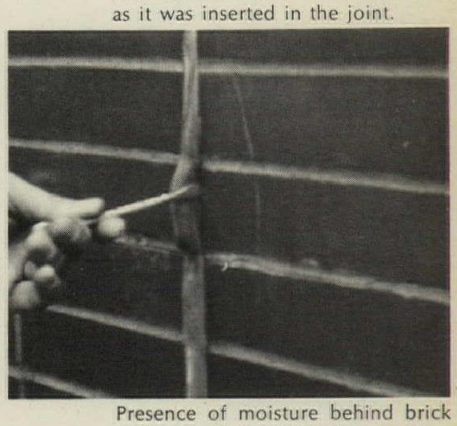
Sealant manufacturers recommend that no joint be less than ¼-in. because the caulker will not be able to get the material into the joint. The best recommendation is that joints be designed as generously as possible. The sealant bead should never be deeper than it is wide. For joints over ½-in. wide, the depth may be one-half the width. For joints over 1-in. wide, the depth may be one-third the width.

Preferably, caulking should be done when the temperature is moderate. In colder weather there may be frost or condensation on the joint which will prevent adhesion; in the hottest weather the joint will be in its closed position.

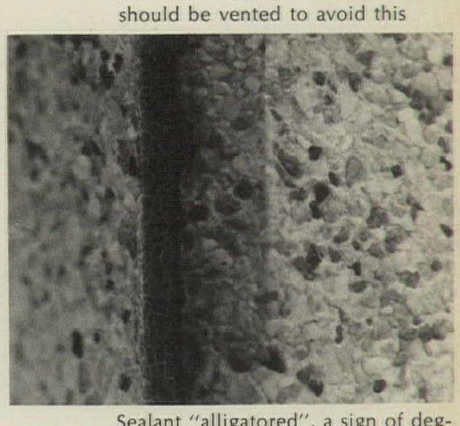
The back-up material should be a compressible material that is compatible with the sealant and that will not bond to the sealant. Some of the recommended materials include resilient, rope- or bead-type foams of expanded polyurethance or polyethylene. Butyl and neoprene cellular rubbers may bond to sealants and/or discolor them; oakum or bituminous-impregnated materials should not be used.

Compatibility with sealant compounds is an extremely important characteristic for both back-up materials and for tapes used in composite seals.

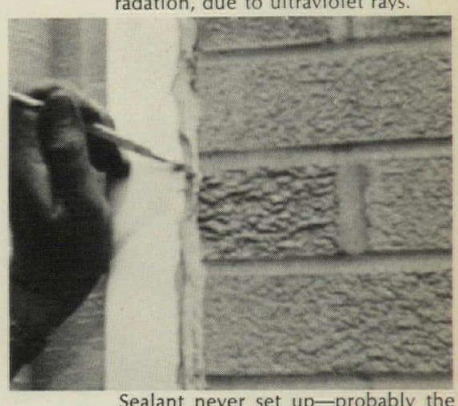
Sealant was pushed out because the back-up material had been twisted as it was inserted in the joint.



Presence of moisture behind brick wall caused "reversion" of sealant (becomes gooey again). Joints should be vented to avoid this

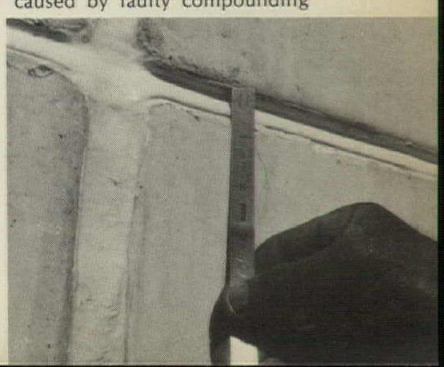


Sealant "alligatored", a sign of degradation, due to ultraviolet rays.

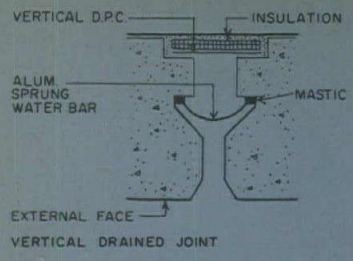


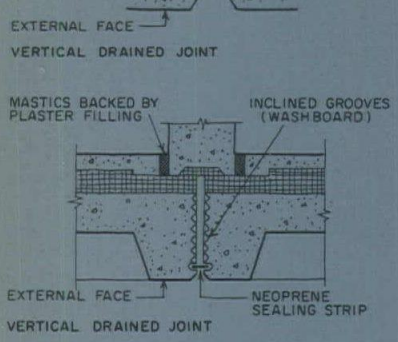
Sealant never set up—probably the result of improper formulation

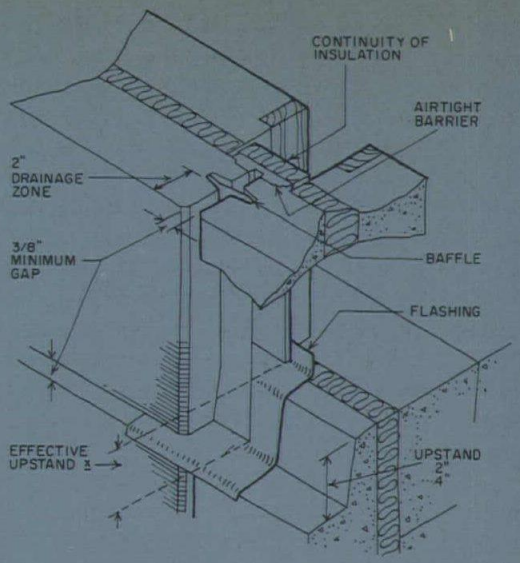
Below: Examples of sag (vertical joint) and weep (horizontal joint) caused by faulty compounding



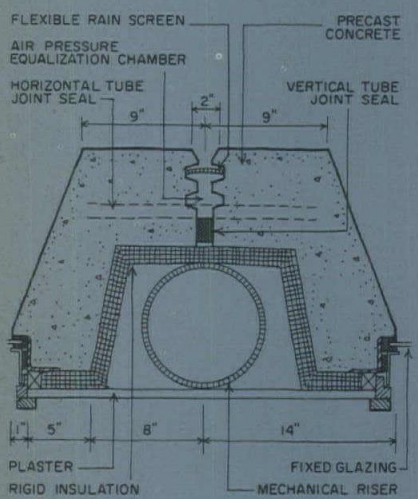
THE "RAIN-SCREEN" PRINCIPLE

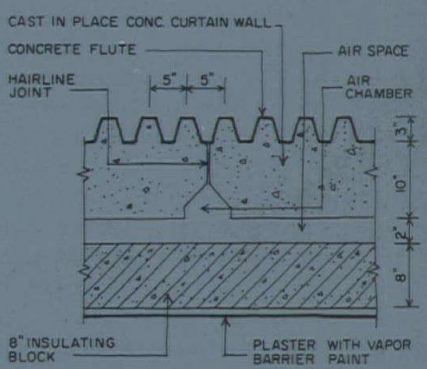




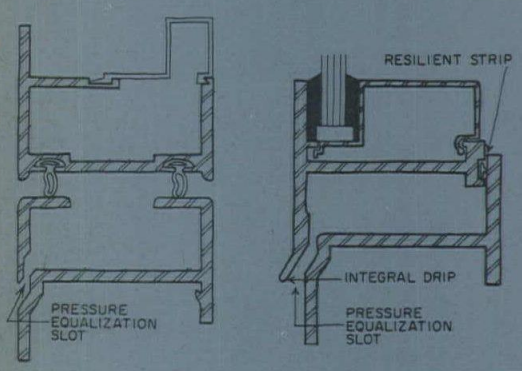


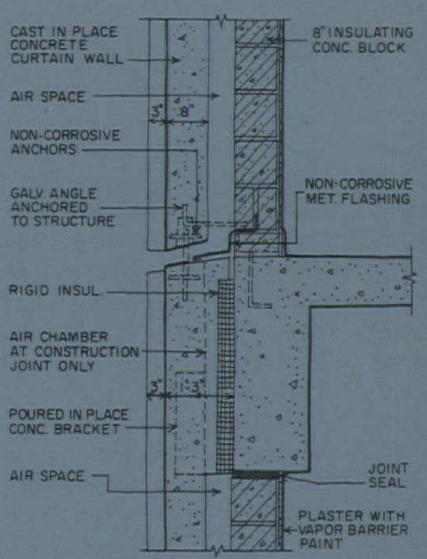
One school of thought regar joints maintains that the exterior face should not be the sole ba against rain penetration. Rather, ponents of the "rain screen" ciple state, the exterior skin sh ward off most of the rain, an inner barrier provide a final moi stop as well as an air seal. Bas the concept is an air pressure eq ization chamber which preven pressure differential between atmosphere and the interior of joint. When a sealed joint in the terior face of a wall is the only rier, it is said that a pressure di ence between outside and inside force water right into the joint slight defect occurs in the joint Sometimes the rain screen con of a baffle set in a slot formed two adjacent pieces of precast crete.



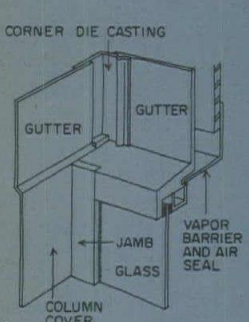


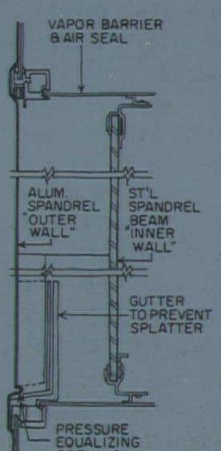
Sometimes no baffle is used at Instead, a cavity wall is emplo and only a hairline joint is left tween panels. The exterior fac the wall then keeps out the rain air chamber behind the joint eq izes pressure across the joint. rain that does get through will d down the inside face of the exte wythe.

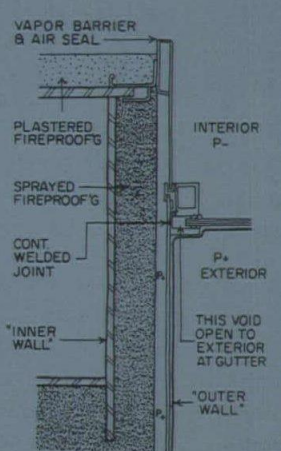




The same idea can be applied window sash and metal and curtain walls. Window sill is d to the air to eliminate air pres difference. Any water that does in can drip right out again. The screen idea is being used in the sign of the curtain wall for the W Trade Center towers by Min Yamasaki. The aluminum spandr slotted at the bottom to equa pressure; a gutter behind traps water that gets by. Window rounds are vented to the outd as are the spaces immediately hind column covers.







Credits: Top: British Research Statio gest. Center: Window details—Kaw Co., Ceco Corp.; wall details—R Affleck, paper presented at CIB posium on Weathertight Joints for (1967).

e reason is that some sealants are ad-
rsely affected by oils and plasticizers.
e sealants may lose adhesion and even
teriorate to a gooey mass; remedial
rk then is difficult and expensive.

me of the problems
field application

ealant failure may derive from: 1) poor
sign of the joint in the first place; 2)
proper material selection; 3) field
erances beyond reasonable limits; 4)
proper application. Here is a list of
me of the major problems encountered
the field:

1. Joints difficult for the caulker to
and reach.
2. With precast concrete panels, the
posed aggregate may protrude into the
nt; joint should be chamfered or
ooth.
3. Joints too small.
4. Joints larger than the caulking
ntractor bid on; he may try to make
profit by skimping on the job—no
ming, for example.
5. Improper tooling, i.e., no tool-
or use of wrong tooling compound.
6. Skinned bead, i.e., only a surface
er of sealant is applied by the caulker.
7. Improper priming—no priming,
pped priming, wrong primer.
8. Joint backing—a) no joint back-
, b) improper placement: (1) if too
se, the backing walks out, (2) too
ep, improper bead, (3) punctured, an
bubble forms in the bead, c) incom-
tible backing material.
9. Improper mixing of two-part seal-
ts.
10. Caulking beyond pot life of the
lant (poor adhesion).
11. Building walls caulked before
f is on. Wall fills with water; water in
wall forces the sealant out.
12. Incompatible waterproofing
atments.

Before building starts it would be
visable for the architect to hold infor-
l group meetings involving all partici-
nts in the wall construction to iron out
potential problems.

If the building details are in any
y unusual, the caulking contractor
uld be asked to apply sealant to a
ge-enough area to demonstrate the
thod of joint preparation, material
xing, application and final cure. Thus
there are any problems to be ironed
t these can be taken care of in the
ginning of the job.

sting sealant properties—
ndards and government specs

e characteristics of sealants that archi-
cts should be most concerned about
clude: 1) extension and compression, plus or minus 25 per cent without adhesive or cohesive failure of the sealant; 2) sealant modulus (ease of stretch), initial and aged material; 3) change in hardness with age; 4) tack-free time (the sooner the sealant is tack-free, the less dirt it will collect because of the surface stickiness; 5) materials non-staining when applied to masonry surfaces; 6) weather resistance (ultraviolet radiation).

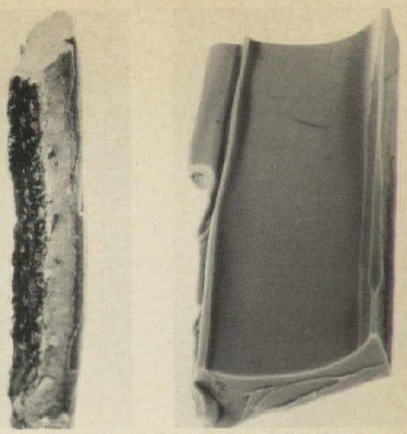
All of these characteristics are covered in existing standards and Federal specifications except the compression-extension test. Currently the only test for movement is a bond-cohesion test. The Federal specification requires that prescribed samples be oven dried for 24 hours, immersed in water for seven hours, placed in a zero-degree cold box for eight hours and then extended 150 per cent at the rate of 33 per cent per hour; this is done for three cycles.

The National Bureau of Standards, which developed the Federal specifications for one- and two-part sealing compounds for the General Services Administration (TT-S-230a and TT-S-00227c) is considering revising its cycling test to include a dynamic testing procedure in which the sealant will be extended and compressed automatically to 25 per cent of its width a number of times per hour. The heat-aging portion of the durability test would include compression of the samples to 25 per cent of the width. The cycling might be repeated as many as nine times.

The USASI Standard 116.1, covering two-part sealants, revised, approved by ASTM in January, and published in April, is now very similar to Interim Federal Specification TT-S-227b except that the cycling test involves no heating or immersion.

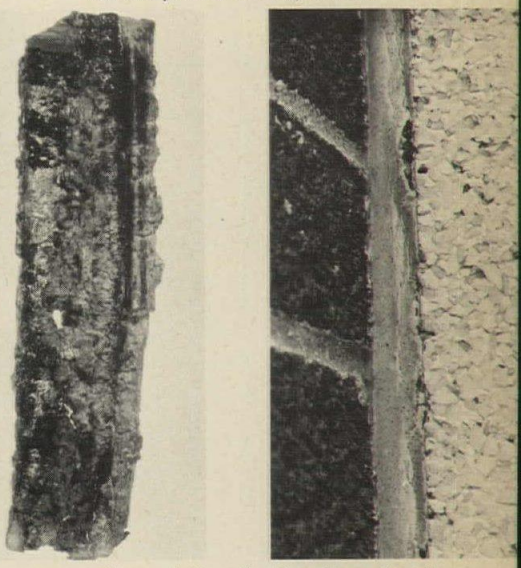
Some of those who have been close to standards preparation and testing procedures feel that existing tests may not be wholly realistic—that more meaningful tests would include test performance under shear loads, as well as more reliable means for predicting sealant durability. One polymer manufacturer has developed a computer program which he believes capable of accurately predicting sealant performance when fed the data on only a few basic tests. The idea has also been advanced that perhaps movement in testing should not be by mechanical means, but by the temperature effects on a liquid, so that movement might be more closely related to temperature change. The point to keep in mind, however, is that any test procedures that are developed must be capable of being reproduced in any of the commercial testing laboratories—the equipment can be neither too complicated, nor too expensive.

AVOID THESE SEALANT PROBLEMS:

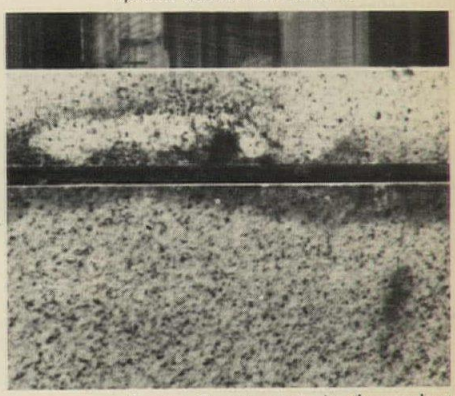


Left: Example of compression set, a failing of some materials. Note how joint closure squeezed bead

Right: Basically a good bead shape, but it failed in adhesion because of lack of primer or dirty surface



Above, left and right: Example of a "skin" bead. There was no opening at joint. Result: applicator merely spread sealant on surface



Above: Components in the sealant stained granite around joint

Below: Dirt "attracted" by sealant soiled aggregate near joint. (Note dirt wiped off by finger.)

Glossary of sealant and glazing terms

ADHESIVE FAILURE—Failure of a compound by pulling away from the surface with which it is in contact (see cohesive failure).

BACK UP—A material placed into a joint, primarily to control the depth of the sealant.

BASE—The general composition of a compound, such as vegetable oil, polysulfide, acrylic, silicone, etc. Also, in a two-part compound, the major unit of the compound to which a curing agent or accelerator is added before use.

BEAD—A sealant or compound after application in a joint, irrespective of the method of application, such as caulking bead, glazing bead, etc. Also a molding or stop used to hold glass or panels in position.

BLEEDING—The absorption of oil or vehicle from a compound into an adjacent porous surface; different from migration, which is the spreading or creeping of oil or vehicle from a compound onto an adjacent non-porous surface.

BOND BREAKER—A release type of material used to prevent adhesion of the sealant to the back-up material or back of the joint.

CHEMICAL CURE—A change in the properties of a material due to polymerization, or vulcanization, which may be affected by heat, catalysts, atmospheric pressure, or combinations of these.

COHESIVE FAILURE—Failure of a compound when placed under a strain in which, because of insufficient elasticity and elongation to absorb the strain, the compound splits and opens.

COMPOUND—A formulation of ingredients usually grouped as vehicle and pigment, to produce some form of sealant, such as a glazing compound, caulking compound, elastomeric joint sealant.

CURING TIME—The time required to complete the chemical reaction of a product to reach its final physical form as a result of the chemical reaction.

ELASTICITY—Pliability, ability to take up expansion and contraction; opposite of brittleness.

ELASTOMER—An elastic, rubber-like substance which may either occur naturally or be produced synthetically.

ELONGATION—The amount of stretch exhibited by a compound, before rupture.

FILET BEAD—Placing caulking or sealant in such a manner that it forms an angle between the materials being caulked.

GASKET—A preformed shape of rubber or rubber-like composition used to fill and seal joints or openings, either alone or in conjunction with a supplemental application of a sealant.

GUN CONSISTENCY—Compound formulated to a degree of softness suitable for application through the nozzle of a caulking gun.

HEEL BEAD—Compound applied at the base of channel, after setting light or panel, and before the removable stop is installed, its purpose being to prevent leakage past the stop.

KNIFE CONSISTENCY—Compound formulated in a degree of firmness suitable for application with a glazing knife such as used for face glazing and other sealant applications.

MASTIC—Descriptive of compounds that remain elastic and pliable with age.

MIGRATION—Spreading or creeping of oil or vehicle from a compound out onto adjacent non-porous surfaces, as contrasted to bleeding which refers to absorption into adjacent porous surfaces.

NEEDLE GLAZING—Application of a small bead of compound at the sight line by means of a gun nozzle about ¼ in. by ⅛ in. opening size.

POLYMER—A material which has been polymerized from smaller molecules into longer molecules, or chains. This can be done by addition or condensation reactions.

PRIMER—A special coating designed to enhance the adhesion of sealant systems to certain surfaces.

SAGGING—Caused by compounds not capable of supporting own weight in a joint, or by application in joints larger than the compound is designed for, or by improper application.

SEALANT—Compound used to fill and seal a joint, as contrasted to a sealer which is a liquid used to seal a porous surface.

SETTING BLOCKS—Use of small blocks made of neoprene (preferred), wood or lead to distribute weight of glass or panel to strong point of sash, aid in centering glass or panel and preventing glass to metal contact.

SHORE "A" HARDNESS—Measure of firmness of a compound by means of a Durometer hardness gauge. Range of 20-25 is about the firmness of an art-gum eraser. Range of 40-45 is about the firmness of a rubber heel.

SHRINKING—Deficiency of a compound, when it occurs excessively, in which the applied bead loses volume and contracts, by evaporation of solvent, or loss of oil or vehicle into a porous surface, etc.

SIGHT LINE—Imaginary line along the perimeter of lights or panels corresponding to the top edge of stationary or removable stops, and the line of which sealants contacting the lights or panels are sometimes finished off.

SPACER SHIMS—Devices that are U-shaped in cross-section and an inch or more in length, placed on the edges of lights or panels to serve both as shims to keep the lights or panels centered in the sash or frames, and as spaces to keep the lights or panels centered in the channels and maintain uniform width of sealant beads. Usually made of rubber.

SPACERS—Small blocks of composition, wood, rubber, etc., placed on each side of lights or panels to center them in the channel and maintain uniform width of sealant beads. It prevents distorting the sealant excessively.

TOOLING—Operation of pressing in and striking a compound in a joint in order to press compound against the sides of a joint and secure good adhesion. Also the finishing off of the surface of a compound in a joint so that it is flush with the surface.

UNITED INCHES—The addition of the dimensions of one length and one width of a light of glass.

WEEPING—Failure of a compound to support its own weight in a joint, but less pronounced than sagging.

WRINKLING—The formation of wrinkles in the skin of a compound during the formation of its surface skin by oxidation after application.

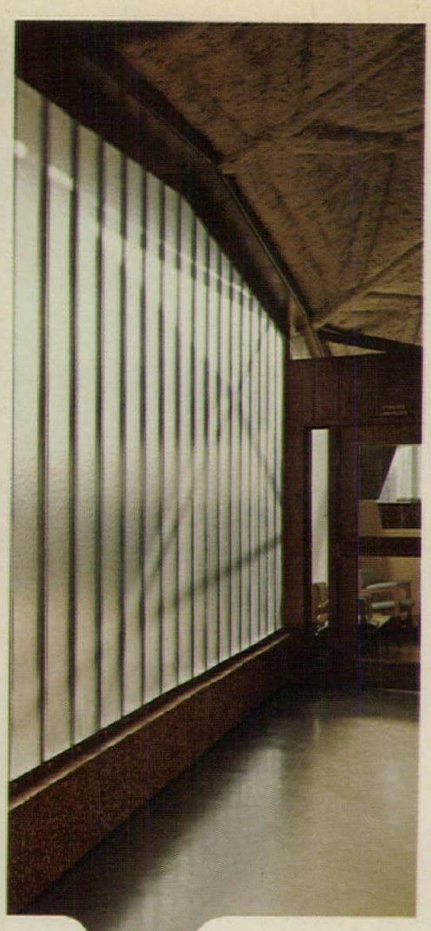
PROFILITE

LASS that could change your thinking about esign, lighting, strength, heat and sound insulation

MISSISSIPPI GLASS COMPANY

MISSISSIPPI GLASS CO.

PROFILITE



PROFILITE

the channel-shaped glass that brings a fresh new concept in daylighting practice

You need to think differently about glass to bring Profilite into your building plans. With it you have new design possibilities. It also offers new structural efficiencies. Picture the rising channels of Profilite giving their upsweep to building exteriors. Look down corridors where vast stretches of glass wall let in more light and stand strong without any framing to get in the way of the repeated vertical pattern.

BOLD VERTICAL LINES

add decorative effect

The adjoining flanges of the channel-shaped sections of Profilite eliminate the need for muntins . . . save this cost and provide attractive wall sections that are easily maintained. The vertical accent gives height emphasis to interiors and the glass helps distribute daylight for a more spacious feel in the environment. Each vertical line not only adds its heightening effect but also signifies built-in strength of Profilite.

CHANNELED SECTION

so easily handled two men can install

Profilite sections are just unde 12 inches in width (11 13/16″). Th stock lengths of 8, 10, and 1 feet are easily handled by tw men without special equipment Profilite weighs 4.34 lbs. pe linear foot, so a ten-foot sectio could be lifted and set in plac by one man if necessary an easily by a two-man team. Pro filite is set in anodized aluminu sills supplied as part of th Profilite glazing system. Slip-i vinyl inserts seal the areas be tween metal and Profilite glas channels.

CHANNEL MOVEMENT

helps compensate as building shifts or settles

Profilite sections, because of their channel linkage, can move in relation to each other without tension. And there are no rigid metal members in between. Profilite's "flange joints" are cushioned top to bottom by non-hardening sealants or vinyl insets. The seal is positive, yet the glass is free to contract, expand, or move vertically. Profilite is thus especially suited for glazing buildings that may tend to settle.

SO STRUCTURALLY STRONG

it's practically self-framing

Profilite has proved it withstands substantial wind pressures and suction forces. The structural configuration of each section forms extra strength every foot of the way. It is so resistant to lateral pressures that you do away with vertical members necessary in conventional glazing. You enclose vast stretches of wall areas, "channeling in" Profilite that builds in extra strength section after section.

GIVES PLANTS CURTAIN WALL LOOK

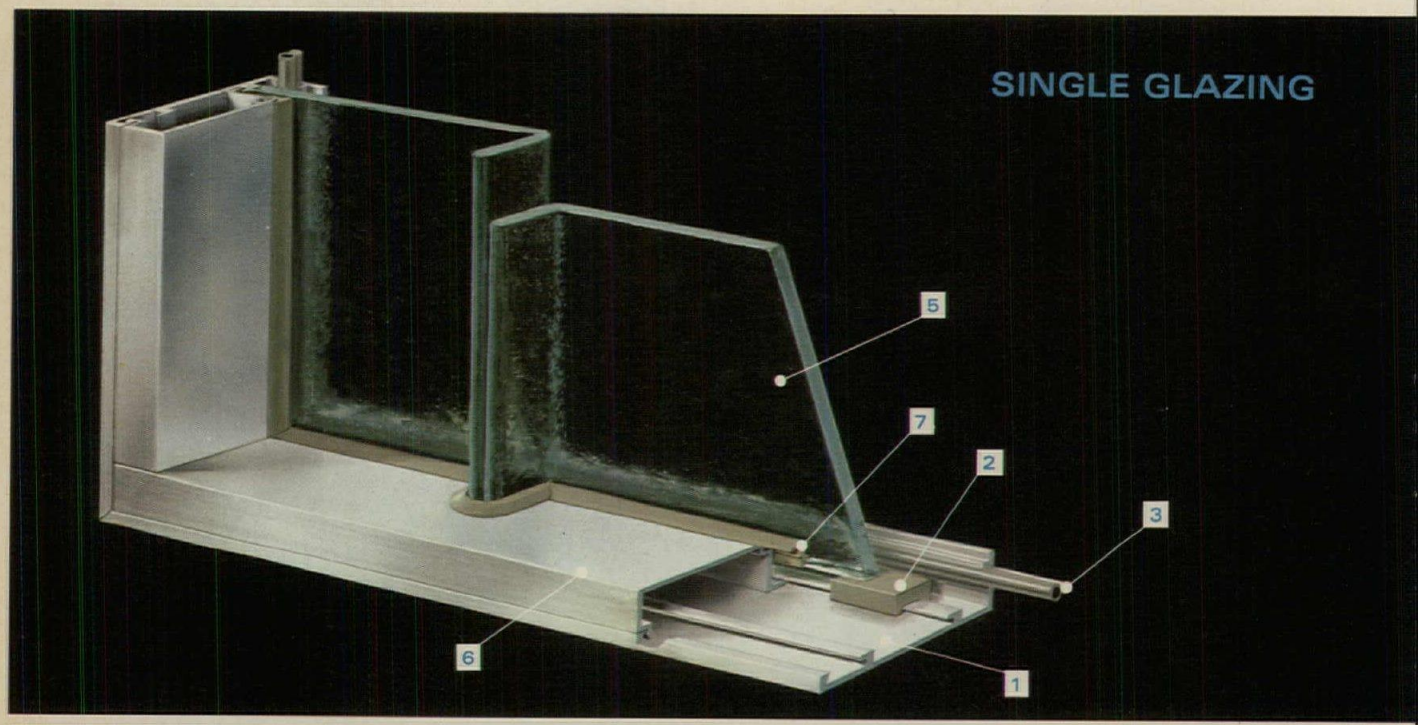
Profilite's biggest volume use at present is for exterior walls where its vertical lines give a curtain wall effect. Installed cost compares favorably with that of conventionally glazed areas. Double-glazed Profilite forms a 1½" air cushion between inner and outer channels for heat and sound insulation—U-value 0.55; visible transmittance 72%.

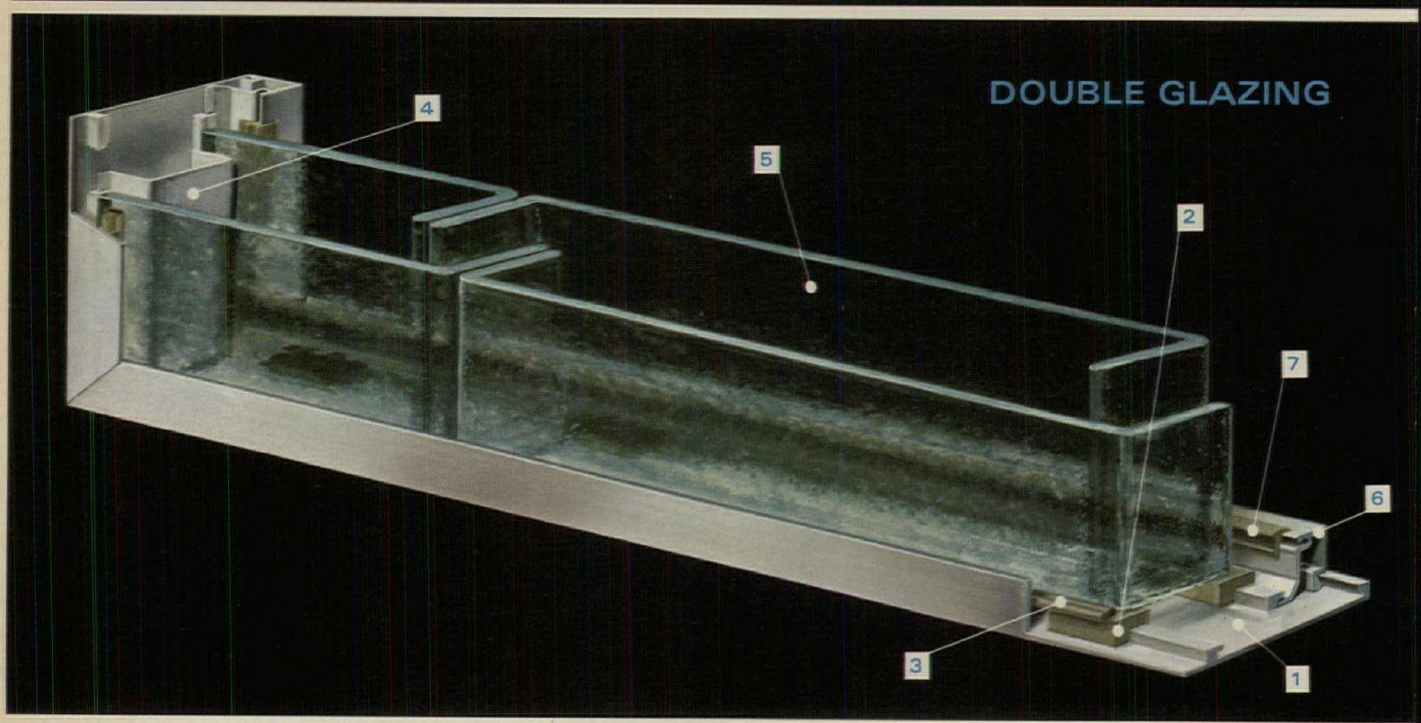
MISSISSIPPI GLASS CO.

For more data, circle 108 on inquiry card

PROFILITE EASY TO INSTALL

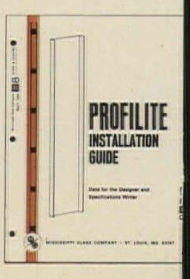
With Profilite you have a complete glazing system. Aluminium framing for periphery, jambs, heads and sill and vinyl setting blocks and slip-ins all supplied for double or single glazing.





1 Extruded aluminum periphery frame. 2 Vinyl setting block. 3 Vinyl slip-in. 4 Bent aluminum sectio
5 Profilite. 6 Extruded aluminum sill snap-on. 7 Vinyl roll-in.

Write for Profilite Installation Guide for detail glazing instructions.



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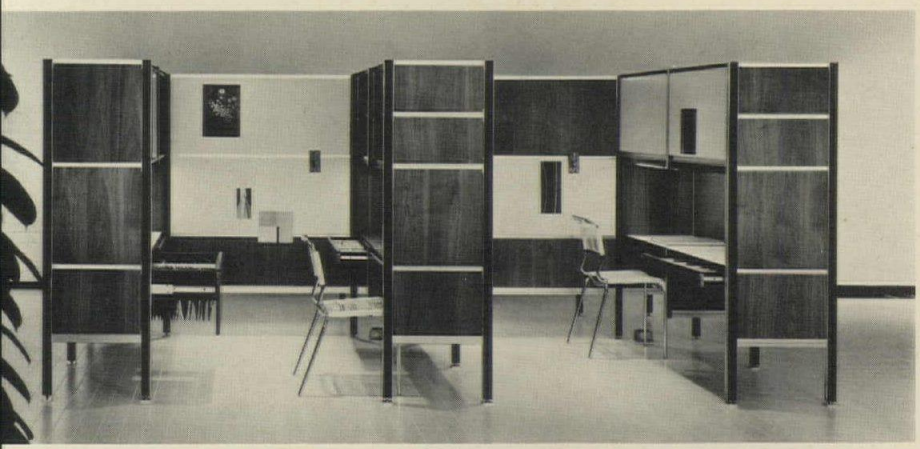
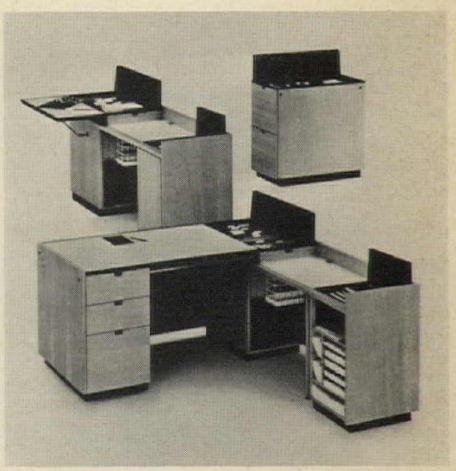
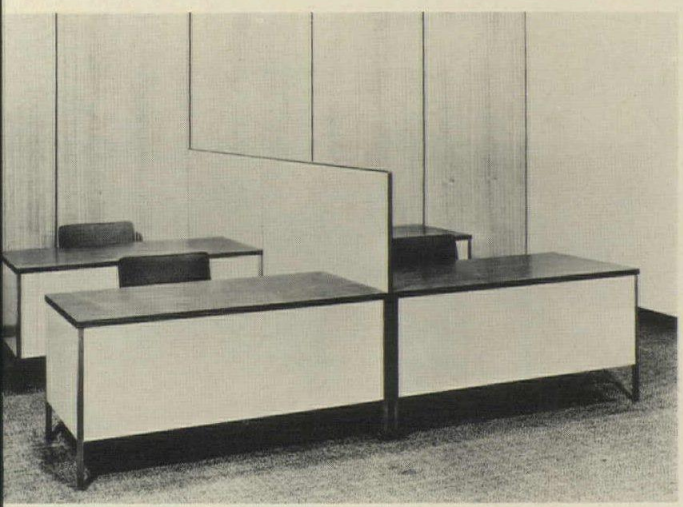
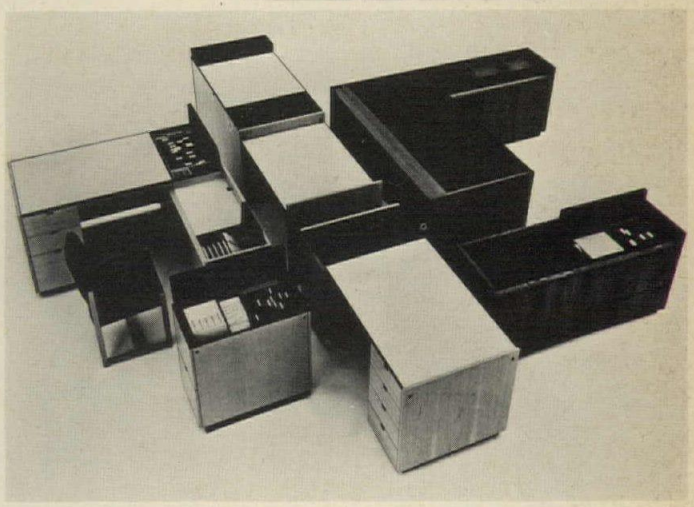
For more information circle selected item numbers on Reader Service Inquiry Card, pages 235-236









urniture and partitions for office flexibility

ore and more offices require interiors at can be readily altered to accommote changes in personnel and operans from time to time. Three manuturers offer suggestions here.

The *Omni Plus* system for custom signing (upper left) features extruded uminum rails and brackets which alw complete vertical and/or horizontal closure of space. The system can be ranged and re-arranged to form work study areas as shown. Component awers, files, panels, work surfaces and ganizers are available in a variety of aterials including fine walnut veneer, ear or bronze glass, plastics and lamites. ▪ Omni/Aluminum Extrusions, c., Charlotte, Mich.

Circle 300 on inquiry card

Fitting together matching components of the *Artwood System* (photos right) makes possible the exact amount of work surface, file area and storage space needed by each employee, instead of all having to conform to a standard desk unit. And as work requirements change, alterations and additions can be made. Included in the system are a bin file, which opens from the top, and wastebaskets contained within the desks. The result is a versatile furniture layout that can assist in the most efficient use of manpower in the minimum space. ▪ Massey-Ferguson Inc., Des Moines.

Circle 301 on inquiry card

Panel dividers (lower left) can be firmly attached to backs or sides of desks, returns, tables or file cabinets to create rows of individual cubicles or semi-private bays, which may be changed easily and quickly. In addition, the dividers can be free-standing with two, three, or four panels connected at right angles to the same post, and can be joined together end-to-end for any length. The all-metal sections have honeycomb cores for lightweight strength, and help to wall out noise without interfering with air conditioning or lighting. Panels are enameled in a choice of colors, trimmed with chrome, and come in lengths of 20, 30, 45, 60 and 66 in. ▪ Art Metal Inc., Jamestown, New York.

Circle 302 on inquiry card

more products on page 226

New! PRACTICAL GUIDE TO PERFORMANCE ENGINEERED CARDOX CARBON DIOXIDE FIRE EXTINGUISHING SYSTEMS

Cardox has compiled a complete A.I.A. File 29-E which includes fundamentals of carbon dioxide fire protection, descriptive and technical data on CARDOX Fire Protection Equipment and specifications guides. Architects and design engineers who have used this file report the savings of countless design hours in the planning of fire protection systems for all types of constructions . . . industrial, commercial, municipal and institutional. Be sure you have this valuable information on hand when preparing the plans for your next project . . . write today for your copy of A.I.A. File 29-E. Address your request to CARDOX, Division of Chemetron Corporation, Chicago 11, Illinois.

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Performance-engineered carbon dioxide fire protection systems
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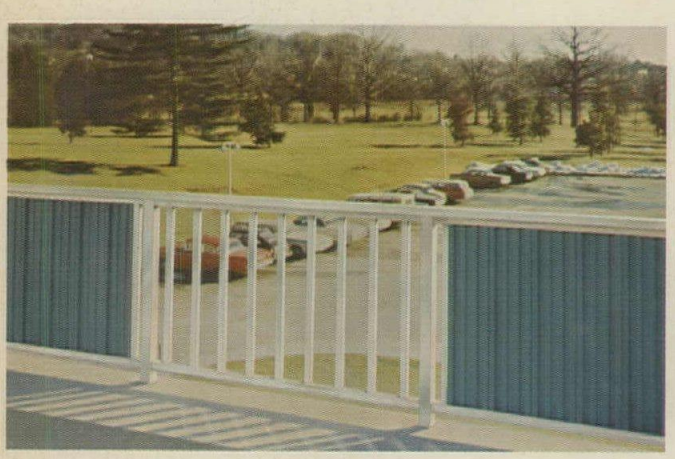
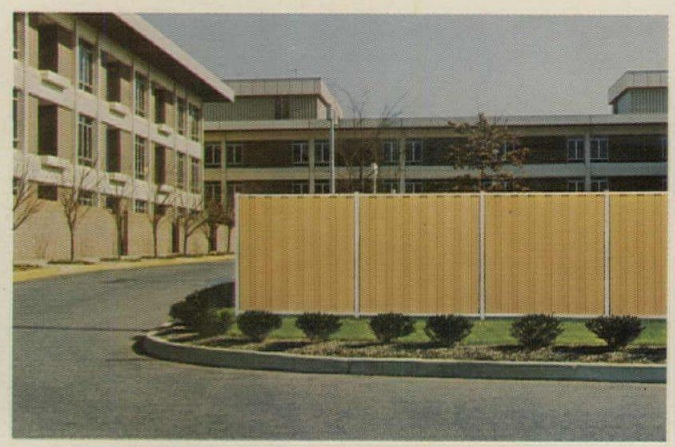


All-aluminum railing systems are high in style, low on maintenance. Ideal for balconies, stairways, entrances, even rooftops and sundecks.



All-aluminum board-on-board Privacy fence, in baked-on enamel colors, provides protection, attractive appearance, concealment. Available with barbed wire arms.

Now, Anchor® protects and beautifies...from the ground up.

Anchor all-aluminum railing systems and Privacy fencing bring you new dimensions in security and styling. Anchor railing systems, in a variety of decorator colors, extend their attractive protection from the ground up . . . railings for balconies, entrances, stairs, traffic control, indoors or out. Anchor all-aluminum Privacy fence comes in many handsome colors . . . to conceal, protect, and add beauty. For more ideas to color your thinking, see our new 12-page booklet. ANCHOR FENCE DIVISION, ANCHOR POST PRODUCTS, Inc., BALTIMORE, MARYLAND 21224. Plants in Baltimore, Houston, Los Angeles; 48 branch offices.

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Please list applications that interest you:

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Anchor Privacy for_____ Thank you.

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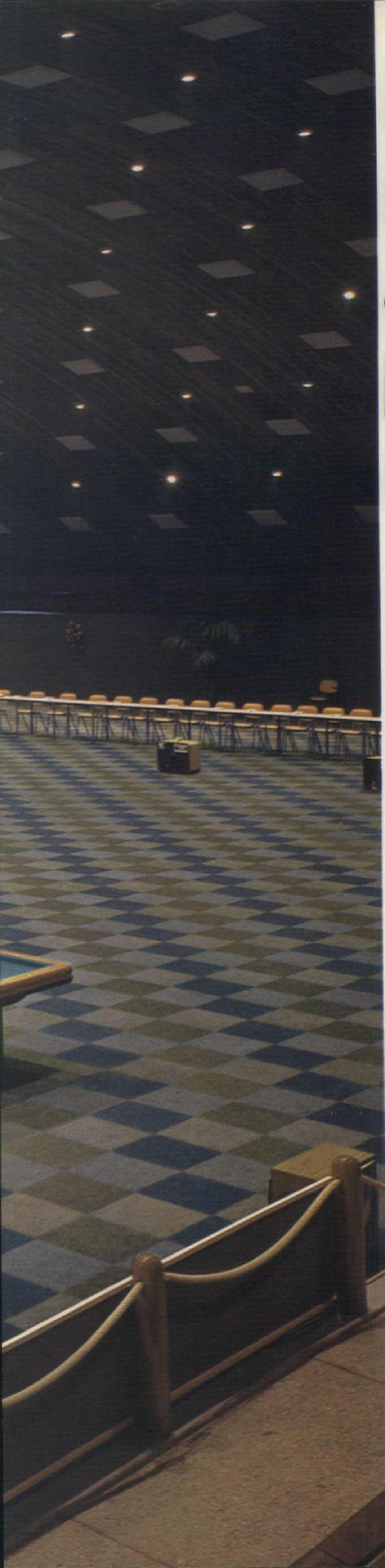
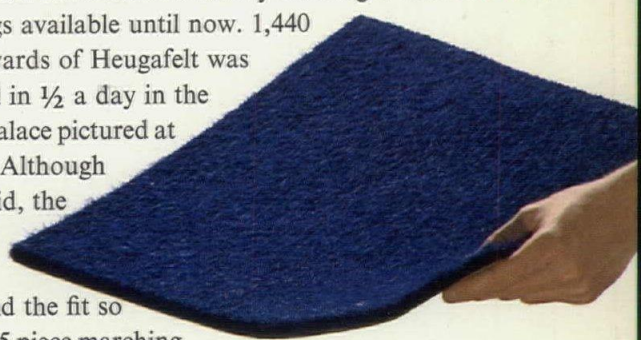
For more data, circle 111 on inquiry



Introducing luxurious deep-pile carpet squares loose-laid and totally interchangeable.

Heugatiles are a totally new concept in wall-to-wall carpeting. This dramatic new texture brings its own excitement to every application. WIRA abrasion tests prove Heugatile outwears the finest Wilton or Axminster better than 3 to 1. This combined with interchangeability that equalizes wear patterns means your Heugatile wall-to-wall installation can retain its beauty far longer than the floor coverings available until now. 1,440 square yards of Heugafelt was installed in ½ a day in the sports palace pictured at the left. Although loose-laid, the squares are so thick and the fit so snug a 75 piece marching band didn't budge a one during the opening ceremonies and the acoustical qualities enhanced the music.



Because Heugatile is loose-laid, no adhesive or tacking was necessary. Later the same 1,440 square yards were picked up and packed for storage in less than 3 hours. Cigarette burns brush away with a whisk broom. The majority of stains can be removed by gentle rubbing with a cloth dipped in lukewarm water and mild detergent. In the event of serious damage such as spilled acid, the Heugatile square can be moved to a less visible spot or simply replaced. Heugafelt is the original loose-laid carpet-tile totally interchangeable by hand. *Two Heugatile products, Heugafelt and Heugaflor, are available through 1968 within a 200 mile radius of Newark, the San Francisco Bay area and Toronto. Contract dealers needed, please write or phone.*

Please visit Booth 825 at Contract '68, New York Coliseum, June 4, 5 & 6.

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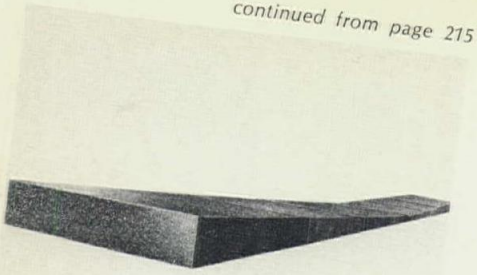
continued from page 215



ROOF INSULATION / A cellular glass insulation achieves both built-in slope and constant insulation value in one application. The system uses a flat roof deck; to achieve the slope, tapered blocks of varying thickness are placed in a predetermined pattern, sloping toward the drain. They can be placed over concrete, steel or wood decks. The application is made by laying the blocks in a mopping of hot asphalt or pitch. ■ Pittsburgh Corning Corporation, Pittsburgh.

Circle 303 on inquiry card

ELEVATOR SYSTEM / L. W.
in a Sydney, Australia con
neering firm, has designed
system that eliminates buttor
elevator. Instead, the passer
a destination button on a p
lobby and a light immediatel
which elevator will be stopp
floor. With this system, any
elevators can be placed sid
Photo is a composite showing
nation panel and buttons of a t
building. Destination panels ar
above each elevator door in
with a single set of buttons
floor. The system utilizes exist
chinery, cars and auxiliary dev
Australian Government Departn
Trade and Industry.

Circle 304 on inqu

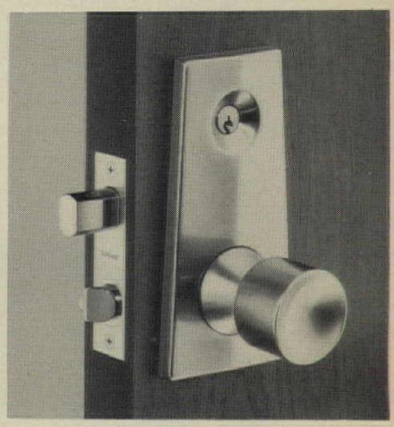
REPLACEMENT WINDOW UNITS /
double-hung aluminum window w
unit system is being installed in the stru
turally sound century-old brownsto
apartments in Brooklyn's Park Slo
North district. The system can be adapt
to any opening, even if the area
warped. ■ Season-All Industries, In
Indiana, Pa.

Circle 305 on inquiry c

more products on page

For more data, circle 116 on inquiry ca

What they definitely need today



The new SCHLAGE DOUBLE SECURITY ENTRANCE LOCK. It provides extra inside-and-out deadbolt security. It has a recessed cylinder. It has an armor-plate shield... has a free-spinning outside knob and a roller bearing in the deadbolt. It is a "panic-proof" lock that opens instantly with one twist of the inside knob. *This lock resists being jimmied, sawed, pried, punctured or drilled!*

continued from page 240

COLD STORAGE SYSTEM / A system called Glas-Gard which employs lightweight substructures with metal siding and roof, in combination with permeable insulation, prevents vapor dams, roof failures and maintenance shutdowns. Components include a steel structural frame, non-conducting studs and purlins, a free-hanging vapor barrier, wall and ceiling insulation, and interior finish materials. The system provides protection from thermal shock, allows moisture flow-through, and is light in weight. ▪ Owens-Corning Fiberglas Corporation, Toledo, Ohio.

Circle 308 on inquiry card

MICROFILM READER / A lightweight mm unit makes possible individualize data systems located at the desk. Th instant-access cartridge contains 4,4(pages of product information. The sy tem provides "all the data and the sam indexes as the 16-mm *Data Center* at much lower cost, and a section or se tions of the file applicable to a specif design speciality for as little as $348 p year. Specialized sections include "Ele trical," "Mechanical," "and Architectur & Structural." ▪ Information Handlir Services, Inc., Englewood, Col.

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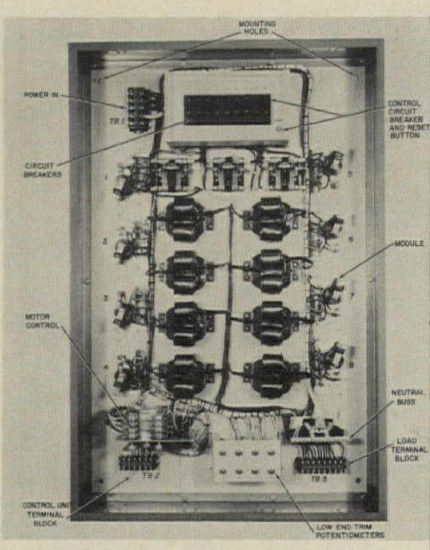
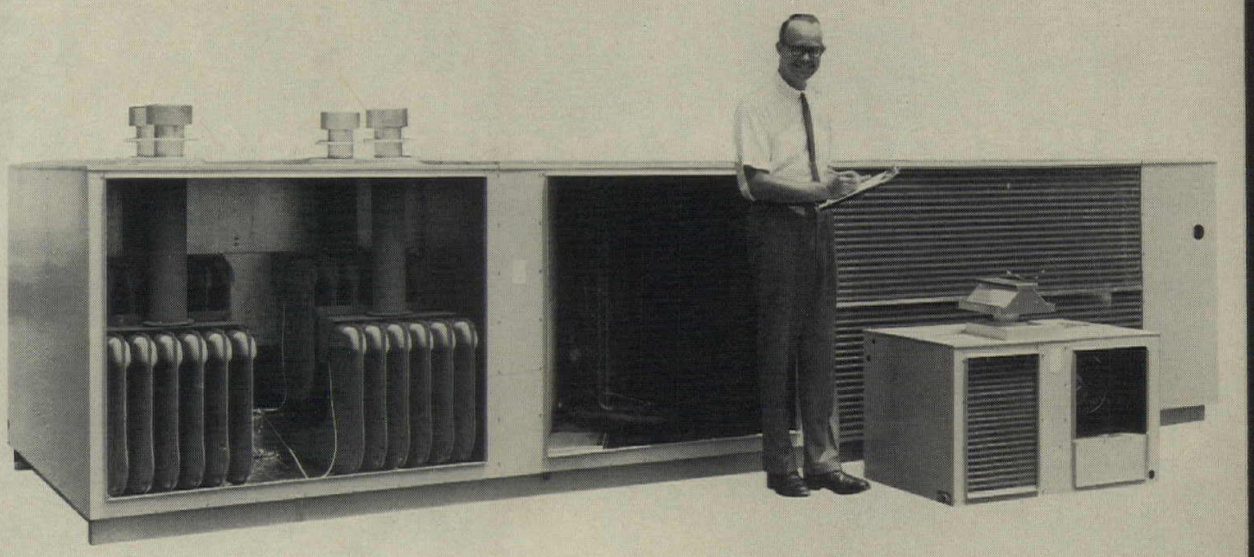


LIGHT DIMMING PANEL / *Panel Boar Incandescent* light dimming system completely self-contained, except fo control stations, which can be remote located up to 2,000 feet from the mai power modules. Units are capable o controlling loads of a maximum of 14,40 watts for 120/240 single phase or 120/20 three phase service. Load may be in candescent lamps, quartz iodine, or an resistive power load such as heatin elements. Each circuit is protected by 20-amp circuit breaker, and units ar available in up to eight 15-amp circuit as well as in units of three, four, and si ▪ Hunt Electronics, Dallas.

Circle 310 on inquiry ca

more products on page 25

For more data, circle 126 on inquiry card



Meet our 30-ton baby.

It's just one of 15 basic models of our Duopac gas heating/electric air conditioning unit. It's neat. Compact. Light. Lies unobtrusively low on ground slab or rooftop. From 1½-ton to the new 30-ton with 2-stage, separate-circuit cooling variations, *Duopac runs quietly.* Under all kinds of climatic conditions. With varying heating/cooling ratios. With 2 high-quality cast iron compressors. And multiple units give zone control, individual operation and easy service. Well over 50,000 Duopacs are delivering these benefits in every state. Mail the coupon, and see how Duopac can fit into your plans perfectly—including a very big boost on final sale.

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AR-1

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Send your brochure on the Duopac product line plus complete information on Day & Night heating and air conditioning.

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Company_____

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DAY & NIGHT MANUFACTURING CO., LA PUENTE, CALIFORNIA • COLLIERVILLE, TENNESSEE

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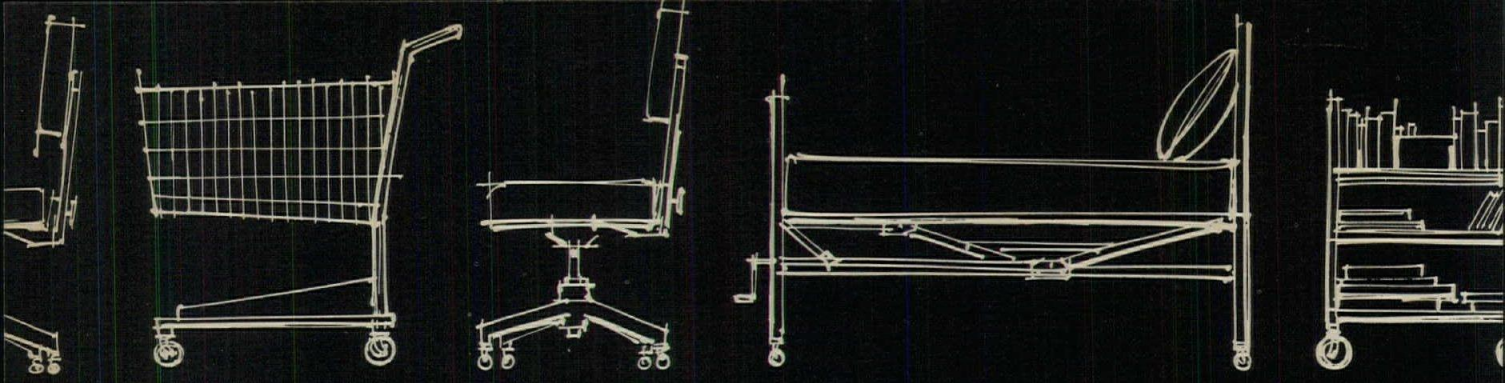

Proven perfect answer for specifiers for carpeting areas with wheel activity...

Direct glue-down installation of double Jute-backed carpets

Nothing could be simpler. Double Jute-backed carpet cemented directly to the floor . . . new or old concrete or wood. Or over previously installed resilient flooring. No cushion back on the carpet. No padding under it.

Works perfectly, as Ford Motor Co. proved in a two-year test in Dearborn. Ford is now practically standardized on this technique in new office building construction and for replacements in existing structures.

Benefits

The acoustical qualities, esthetics, luxury and thermal advantages of carpet . . . *plus* easy wheel and caster movement. Conventional wheels and casters can be used. Pads are unnecessary under chair casters if carpet pile is of good commercial grade.

Savings

Double Jute-backed carpets cost substantially less than cushion-backed carpets with equal pile specifications . . . or equivalent carpets plus separate underlayment. Installation is greatly simplified.

Jute's function

Jute secondary backing is vital because it provides maximum floor bond. This quality also guards against delamination of the secondary backing from the basic carpet. Jute's greater stability prevents carpets from shifting, which can misalign floor outlets with cut-outs in carpets.

Applications

Use in any location where free movement of conventional wheels and casters is desired. General offices, hospitals, libraries, supermarkets, computer areas, restaurants, etc.

Taking up

When replacement is necessary, Jute backing comes off easily with solvents or fast-operating scrapers. None of the removal problems common with cushion backing, such as crumbling and sticking.

Write for complete copies of editorial features shown, plus outline of glue-down installation technique and additional material.

Left, from Installation Specialist
Below, from Floor Covering Weekly

JUTE CARPET BACKING COUNCIL, INC.

JUTE

25 Broadway, New York, N.Y. 10004 • American Industries, Inc. • Bemis Co., Inc. • C. G. Trading Corp. • Delca International Corp. • A. De Swaan, Inc. • Robert F. Fitzpatrick & Co. • Gillespie & Co. of New York, Inc. • Hanson & Orth, Inc. • O. G. Innes Corp. • Iselin-Jefferson Co., Inc. • Jute Industries, Ltd. • Lou Meltzer Co. • Pak-Am Inc. • William E. Peck & Co. of N. Y. Inc. • R. L. Pritchard & Co. • Revonah Spinning Mills • Stein, Hall & Co., Inc. • White Lamb Finlay Inc. • Willcox Enterprises, Inc.

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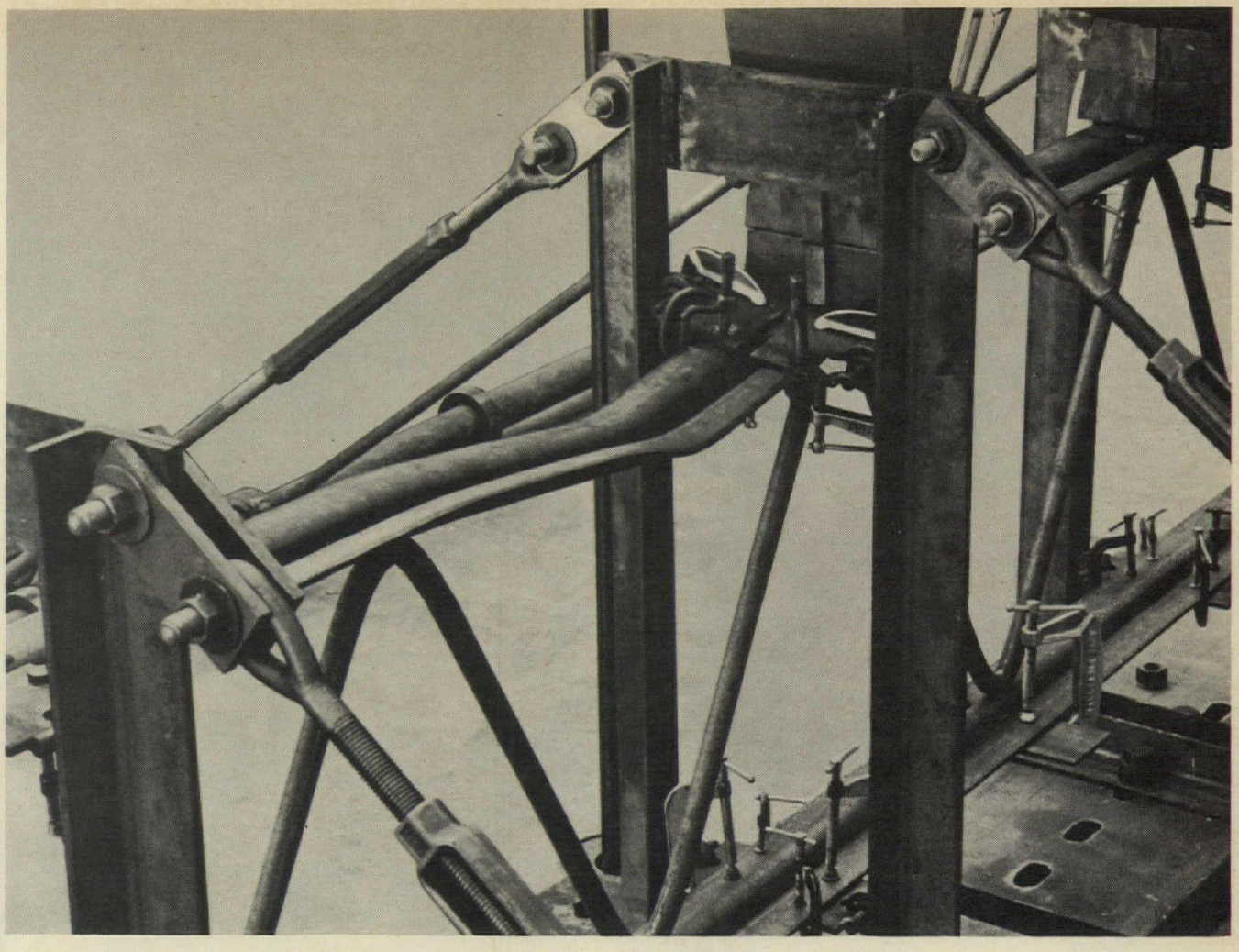


The Cold Hard Facts of Lab Research: Starting Point for Steel Joist Improvement

An aggressive program of research and development by the Steel Joist Institute has played a big role in the continuing improvement of open web steel joist designs and their acceptance by the building industry. For many years the Institute has sponsored R & D projects on steel joists at leading university engineering laboratories.

The photo above is a case in point. In this project, performed at the University of Kansas, tests were conducted to determine the ultimate strength and load-bearing capacity of compression chords in variously designed joists under concentrated and uniform loads. Manufacturers can also have investigations conducted on their J- and H-Series joist designs to determine conformance with SJI standards and specifications. New ideas in joist materials and design are also carefully checked out before standards are established.

The Steel Joist Institute has just published a new edition of the SJI standard specifications and load tables. It's a practical working handbook for anyone specifying or using open web steel joists. Write today for your complimentary copy.

STEEL JOIST INSTITUTE

DuPont Circle Bldg., Washington, D. C. 20036

6712

For more data, circle 128 on inquiry card

Our new cross beam lamp is so complex, it makes everything simple.

Our new Hide-a-Lite has an elliptical reflector built in.

So you can install it in a plain socket. No more external reflectors to get dusty and start absorbing either the light or the maintenance money. The Hide-a-Lite reflects the heat out of the fixture so the lamp lasts its rated life of 2,000 hours. No more early burn-outs. Which is nice for you, if you happen to own the building.

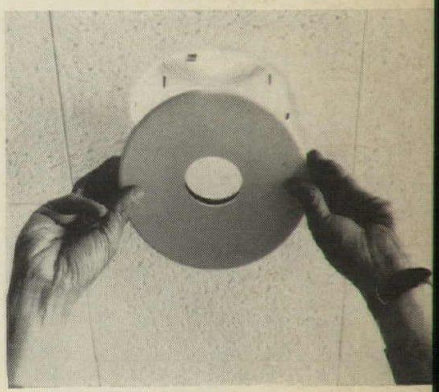
And if you're a fixture manufacturer, you can start making fixtures without reflectors. There's going to be a whole new market for them.

If you're an architect, all you need for the Hide-a-Lite is a shallow recessed fixture. No more wide-open wasted spaces in the ceiling. Because the ellipse causes our beam to focus through a two-inch opening in the bezel.

The lamp is so complex, it has a long formal name. The Sylvania Elliptical Aluminized Reflector Hard Glass 150-Watt 125-Volt Medium-Skirted-Base Lamp.

But we've nicknamed it Hide-a-Lite, because that sounds as simple as the way the lamp works.

Sylvania Lighting Center
Danvers, Massachusetts.



SYLVANIA
A SUBSIDIARY OF
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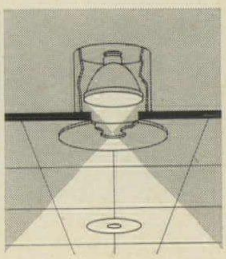

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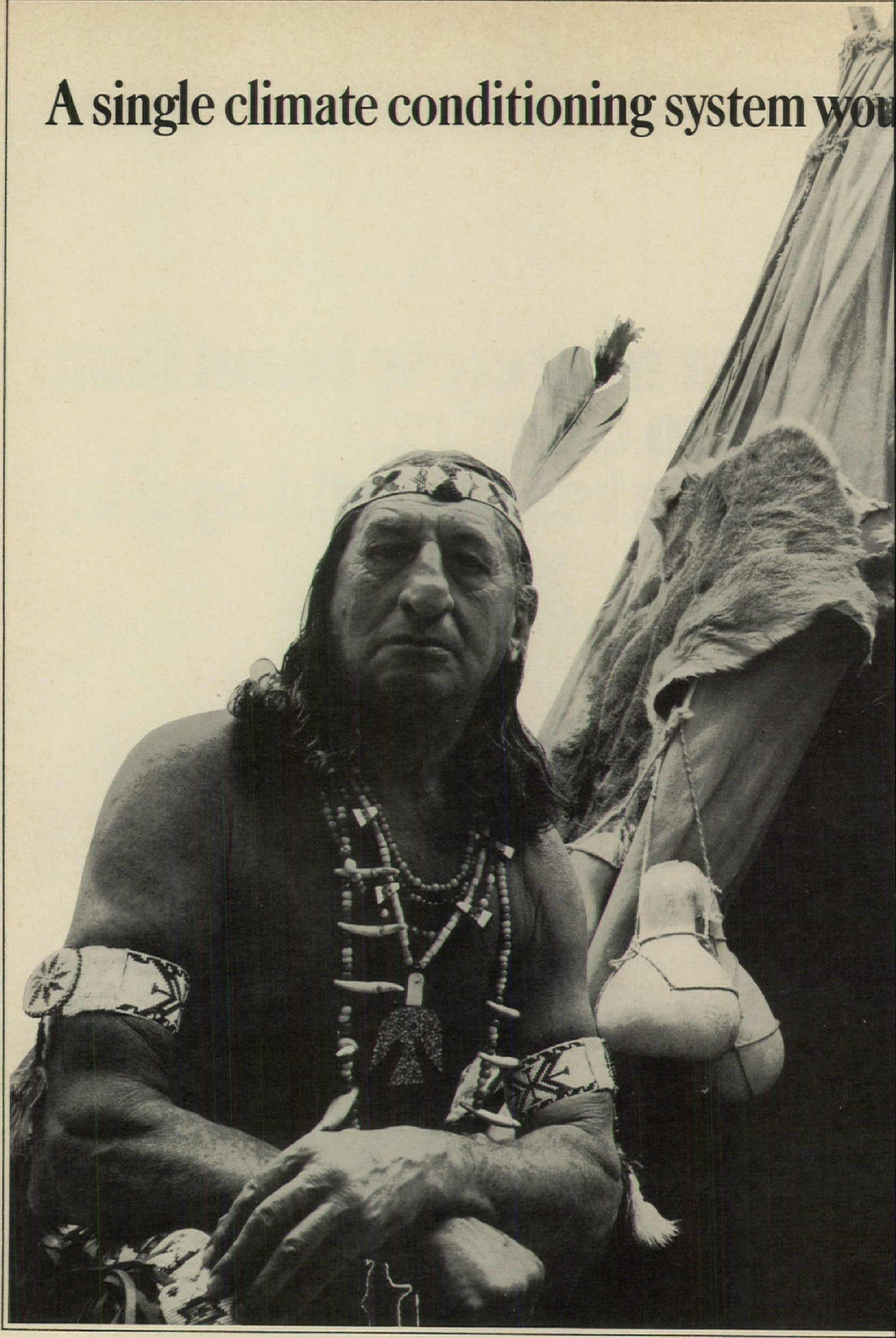
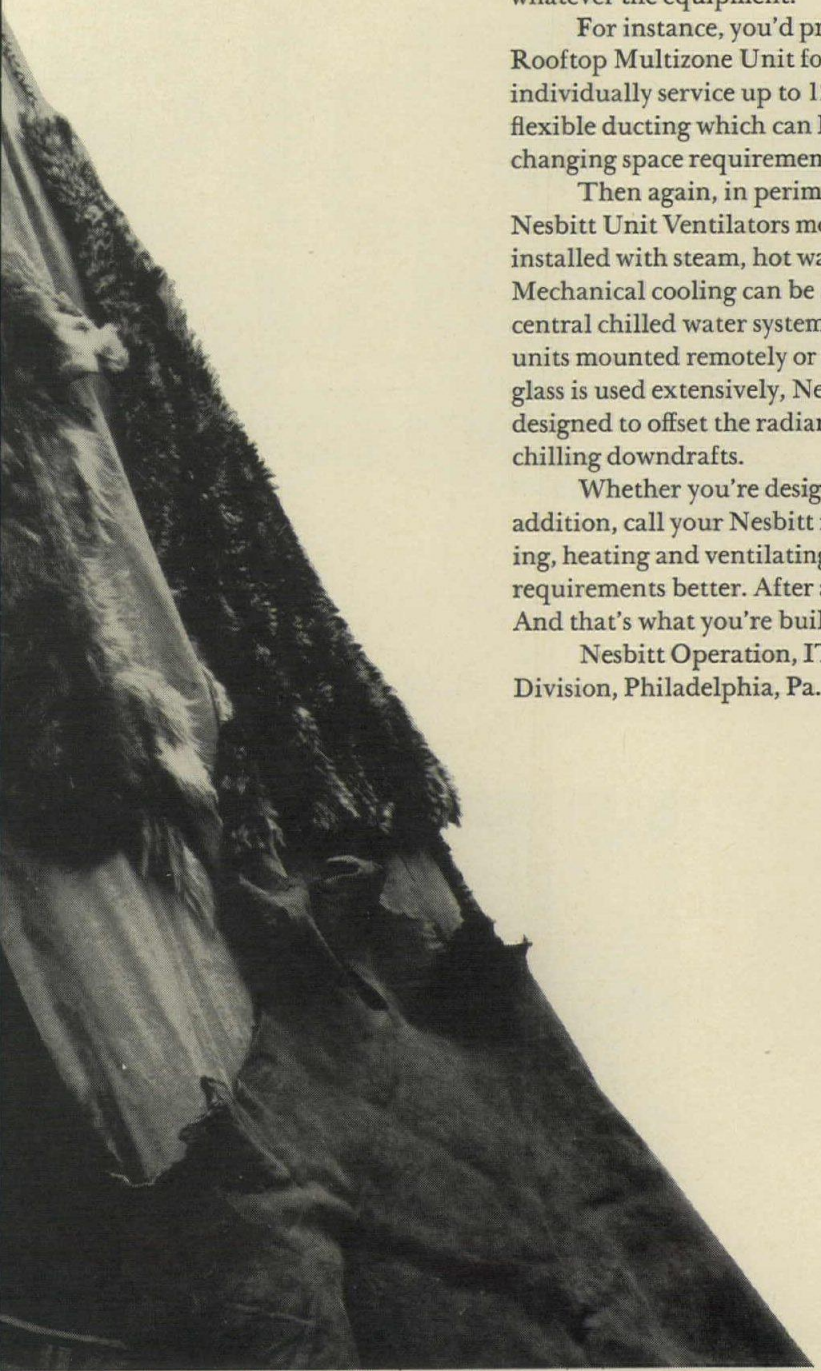
A single climate conditioning system wou



e fine if a building had only a single space.



Most Indians have grown out of tepees. And most schools have grown out of single spaces using single climate conditioning systems. Today's schools have both core and perimeter learning spaces. And if you choose one type of system—unit or central—to handle both types of situations, you're compromising.

That's why we make the range of equipment we do today. Without compromising anything, you can select the matched equipment that best fits your needs. And you can use the most economical fuel available in your area whatever the equipment.

For instance, you'd probably select our Nesbitt Rooftop Multizone Unit for flexible learning areas. It can individually service up to 12 separate zones through flexible ducting which can later be altered easily to meet changing space requirements.

Then again, in perimeter classrooms, you may find Nesbitt Unit Ventilators most economical. They can be installed with steam, hot water, electric or gas heating. Mechanical cooling can be added now or later using a central chilled water system or individual condensing units mounted remotely or adjacent to the unit. Where glass is used extensively, Nesbitt Wind-o-line Radiation is designed to offset the radiant heat loss and prevent chilling downdrafts.

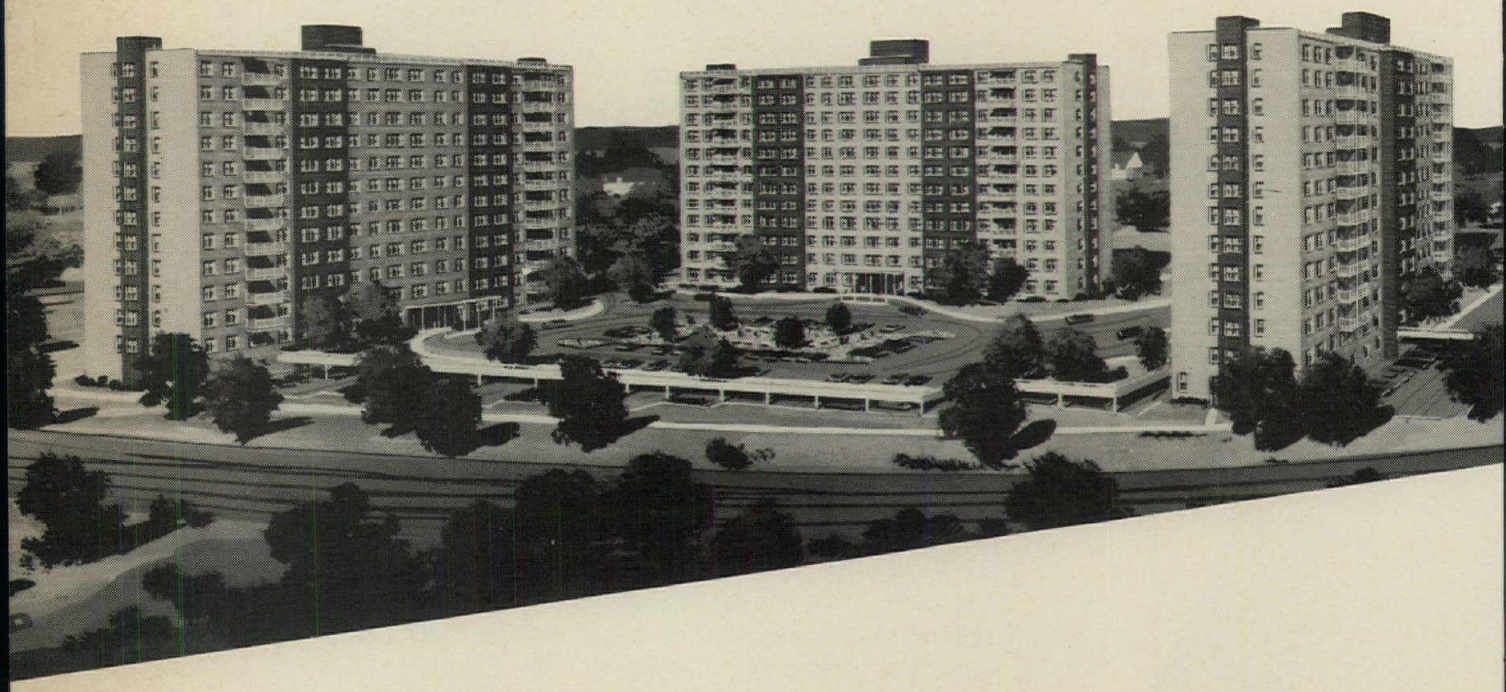
Whether you're designing a new school or an addition, call your Nesbitt man. He has the air conditioning, heating and ventilating equipment to meet your requirements better. After all, he's a specialist in schools. And that's what you're building, isn't it?

Nesbitt Operation, ITT Environmental Products Division, Philadelphia, Pa. 19136.

NESBITT ITT

For more data, circle 130 on inquiry card

FHA 221D (3) gave
Wheeling gave 'em a



"We put down Tensilform and had an instant working platform for other trades.

Now speaks Project Manager Dave Lesky: "We used over 10 acres of Tensilform. Delivery was on time. Every piece laid flat and matched perfectly. Spot welding to joists was a snap.

Architect: John Storrs; Interiors: Henry Janders, Dirrmann Company; General Contractor: A. J Bennett.

This is a typical room in the newly completed Chieftan House. Cabin Crafts carpeting of Acrilan acrylic fiber lends beauty, warmth and practicality to all 26 new guest rooms. And it was re-specified after a two-year "test" in the original 100 rooms!

"We were fortunate to have been able to observe the wearing qualities of the Cabin Crafts carpet in our first one hundred units for over two years before we specified Cabin Crafts again." These are the words of Mr. Alex Murphy, General Manager of the magnificent Salishan Lodge at Gleneden Beach, Oregon.

Salishan boasts 126 of the most luxurious rooms you'll find anywhere. Just recently completed is the new Chieftan House with 26 more deluxe suites—complete with Cabin Crafts carpet of Acrilan® acrylic fiber. "The fact that dirt gets *on* the carpet rather than *in* it should be reason enough for installing it," Mr. Murphy adds, referring to the density of the pile. "We are definitely pleased with our Cabin Crafts installation."

Salishan Lodge is a perfect example of how Cabin Crafts becomes an integral part of the architect's and designer's scheme of things. Cabin Crafts styling, coloring and manufacturing leadership gives them the ability to fit your exact specifications. For more information, send the coupon below.

Salishan Lodge, part of a 600-acre ocean front development on the central Oregon coast, consists of 14 buildings—the spacious surroundings reflect a casual, relaxed atmosphere.

ACRILAN® acrylic fiber by Monsanto

CABIN CRAFTS®

West Point Pepperell®

Carpet and Rug Division/Dalton, Georgia 30720

Mr. Campbell J. Petty
Contract Advertising Department
WestPoint Pepperell
P. O. Box 1208
Dalton, Georgia 30720

Please send me information on your complete contract/commercial carpet line☐.
Please have a contract specialist call to make an appointment ☐.

Name_____ Title_____

Firm_____

Street Address_____

City_____ State_____ Zip Code_____

continued from page 2

SCHOOL WARDROBES / Semi-conce ed wardrobes make double use space: Behind panels of chalkboard tackboard are students' wardrobes. Vogel-Peterson, Elmhurst, Ill.

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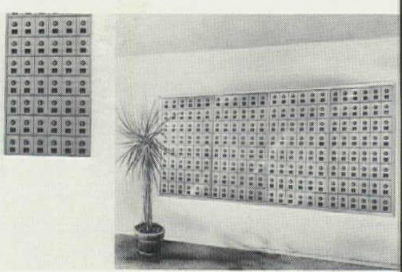

SCHOOL MAIL BOXES / Horizont style mail boxes are specifically design for use where building employees c tribute the mail. Front construction is tirely extruded aluminum. Interior co partments are bonderized electroly zinc-plated steel, reinforced with alu num extrusion and of double-wall co struction. ▪ Auth Electric Compa Long Island City, N.Y.

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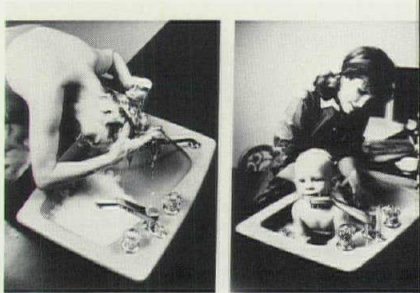

MULTI-PURPOSE LAV / *The Lady Fai* designed primarily as a shampoo lavato and/or a baby bath. It is recommend for homes, hotels, motels, and girls' d mitories. It measures 28 by 19 in. w 23 by 14-in. basin and is made of vitreo china. It requires no metal rim or fran ▪ Kohler Co., Kohler, Wisc.

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New Krueger action furniture" for '68

The DIPLOMAT

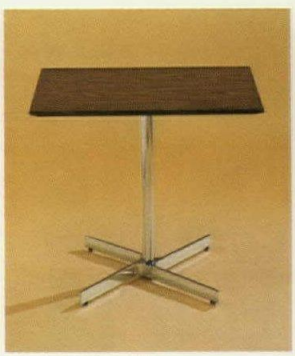
New 2′ wide DIRECTOR

6000 upholstered Modular Seating

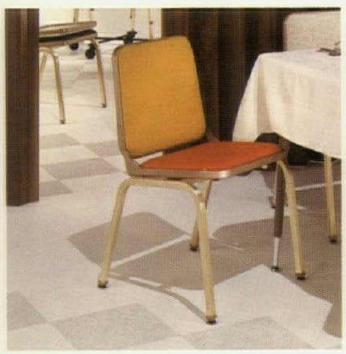
3200 Modular Seating

5200 upholstered Modular Seating

HS-504 Stack Chair

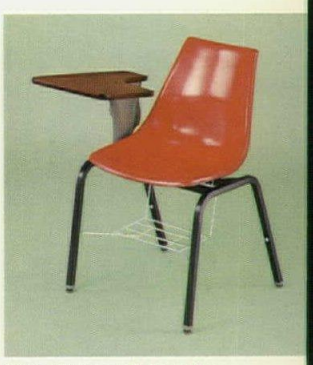


New 160-R Table



Folding Back/Stack Chair

3205 upholstered Chair



6001 Folding Tablet Arm

Take a look at Krueger and you'll see big things are happening to institutional furniture. With designs as new as tomorrow, Krueger affords a practical, accommodating convenience needed by a "generation on the move". New '68 innovations include contemporary styled, plain and upholstered Modular Seating especially adaptable to airports, hotels, banks, hospitals and other lobbies; new classroom Sequence Seating; new Pedestal Base Tables and Stack Chairs; extensive selections of Hat and Coat Racks with new space-saving floor models — plus a Single Pedestal rack. Include Krueger '68 in your planning and *stand by for action!*

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THESE MEN HAVE—WITH OUTSTANDING RESULTS!

"As the years passed your firm developed 'soft' stainless named MicroFlex. This product has taken our staff by storm. It is presently being used in all areas of flashing, coping, planting liners, fountain basins, etc. We have yet to experience any failure of any project on which MicroFlex has been incorporated."

Joseph S. Drachnik
Research Director
Bank Building & Equipment
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"Having just completed a very large MicroFlex installation, we are pleased to report that, in addition to the tremendous material cost saving involved in the use of MicroFlex rather than copper, our mechanics reported a singular ease of handling this dead-soft stainless steel when compared to the normal handling of other alloys."

Joseph C. Herdina
Manager
Reserve Sheet Metal and
Roofing Company
Akron, Ohio

"MicroFlex can definitely fill a need in the Sheet Metal Industry where extreme workability and flexibility are desirable qualities in addition to the regular qualities of stainless steel."

Wayne R. Lansdowne
Superintendent
The Bodwell-Lemmon Company
Cleveland, Ohio

"During recent months we have completed several jobs using large quantities of MicroFlex stainless steel and are pleased to find it functions in every manner true to your claims. To date we have had complete success and acceptance of this soft stainless."

Lloyd Hitchins
President
Hitchins Roofing Company
Urbana, Illinois

"The re-roofing of the Commonwealth pier in Boston for the Massachusetts Port Authority presented a problem in the selection of material. In replacing the old copper roof, the continuous exposure to a marine environment required a high degree of corrosion resistance. However, economy and ease of fabrication and installation were important factors. MicroFlex type 304 stainless steel sheet met all these qualifications and assured long and trouble-free service. The attractive installation also includes stainless steel ventilators, copings and flashing."

D. L. Adler
Assistant Manager
Columbia Cornice Company
Cambridge, Massachusetts

"You will be pleased to know that true to your claim the alternate (MicroFlex) reflected an appreciable saving compared with the cost of copper."

H. M. Garriott
Architect
Garriott, Bogart & Associates
Cincinnati, Ohio

Get the full particulars . . . and you'll specify MICROFLEX — Write to —

WASHINGTON STEEL CORPORATION
WASHINGTON, PENNSYLVANIA 15301
Plants: Houston and Washington, Pennsylvania; Detroit, Michigan
Subsidiary: Calstrip Steel Corporation, Los Angeles, California

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Hexagonal. Square. Rectangular. Mosaic Tile has the shapes to shape up *any* setting. You get a flexibility of design for any level or any space. Mosaic is the material with a message for today.

Colorwise, Mosaic shapes up, too. Our built-in color compatibility gives you even more design possibilities. And you'll find Mosaic tile harmonizes with other materials, landscaping and decorator objects. Of course, you can't overlook Mosaic *economy* with its low-cost maintenance and unbeatable durability.

Mosaic tile. *Today's* tile. It's never been in better form for what you want to create.

Consult Sweet's Catalog, A.I.A. File No. 23-A, 11d/Mos.

Mosaic tiles shown in photo are: *Walls* — Byzantile II, 3220 Light Golden Olive, 6" elongated hexagonal. *Fireplace* — Byzantile II, 3820 Parchment, 6" elongated hex. *Floor* — Carlyle Quarry Tile, 270 Colonial Buff (245 Mojave in western states).

MOSAIC®

Mosaic makes the scene no matter what shape it's in.

Trouble with contaminated air and improper thermal environment?

The Mammoth Nu-Aire prevents air loss, back drafts and negative pressures... decreases heat loss and improves temperature control... reduces maintenance and operating costs... and keeps air clean in industrial and commercial buildings.

Problems with contaminated air and improper thermal environment can be eliminated in industrial and commercial buildings. The Mammoth Nu-Aire direct gas-fired make-up air unit is designed to maintain favorable environmental conditions . . . and keep air clean in plants where manufacturing and processing operations create a noxious atmosphere.

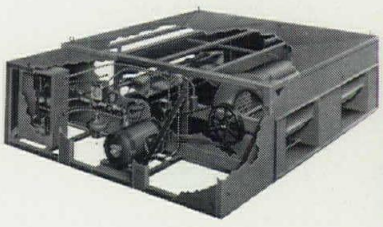
Nu-Aire maintains proper thermal environment by providing better forced exhaust to remove contaminants, at the same time sustaining normal inside pressure. The unit also maintains desired temperatures and eliminates undesirable air infiltration through exposed building walls, doors and windows, thereby effecting greater heating economy. In addition, Nu-Aire prevents back drafts, reduces air moisture content to prevent corrosion, improves processing operations and lowers maintenance and housekeeping costs.

Flexibly designed for year-around operation, Nu-Aire provides ventilation in summer, heating and ventilating in winter. For winter operation, Nu-Aire heats filtered air with an extremely efficient combustion system, delivering the heated air in an optimum pure condition.

The completely packaged Nu-Aire units are available in eight sizes and 44 models supplying from 140,000 Btu at 1,400 cfm to over 11,000,000 Btu at 100,000 cfm. Nu-Aire is available fully weatherproofed for space-saving rooftop installation or non-weatherproofed for location indoors.

There are 350 Mammoth representatives in 85 offices in the United States and Canada. One of them can tell you more about how Nu-Aire provides clean air plus proper environment for either new or existing buildings. Or write, wire or phone Mammoth (612-544-2711) for the full Nu-Aire story.

Nu-Aire is fully documented in Mammoth Bulletins NA-964 and PNA-1266. Write for your copies.



MAMMOTH

ENVIRONMENTAL AIR CONTROL FOR INDUSTRY

Industries, Inc.

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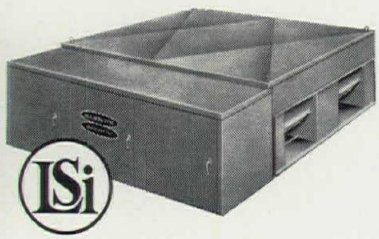

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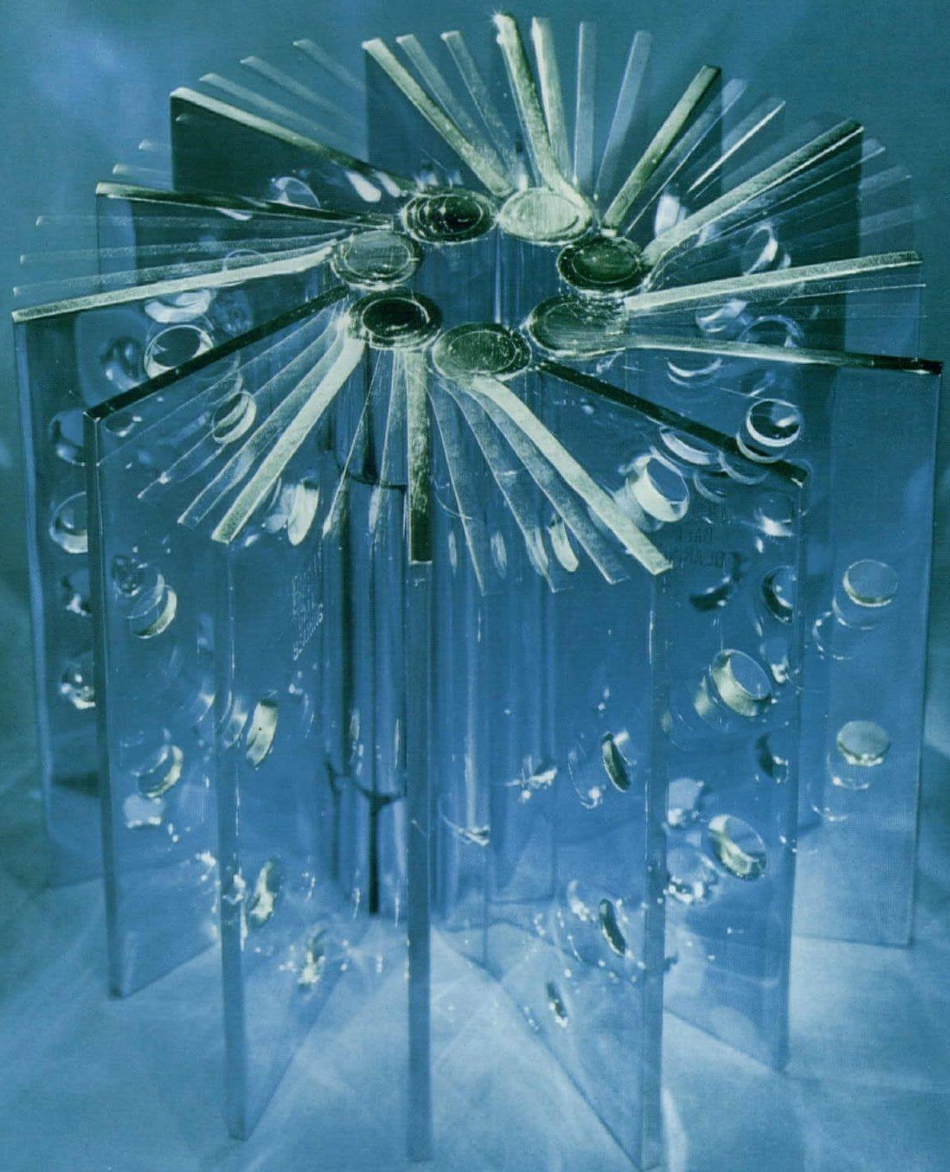
New
Beauty Treatment
for Doors . . .



TRI-CON*

The world's slimmest concealed ball-bearing hinge!

The makeup of any door deserves Tri-Con's touch of beauty. You see only two, thin horizontal lines. Even the pin tips and plugs are hidden. And inside the trim, uncluttered barrel are functional elements fitted with watchmaker precision. Ball bearings roll in nested raceways. Delrin sleeves lubricate every move and cushion the pin so it never touches the barrel. Specify this slimmest of all ball-bearing hinges. *Write for the Tri-Con catalog.*

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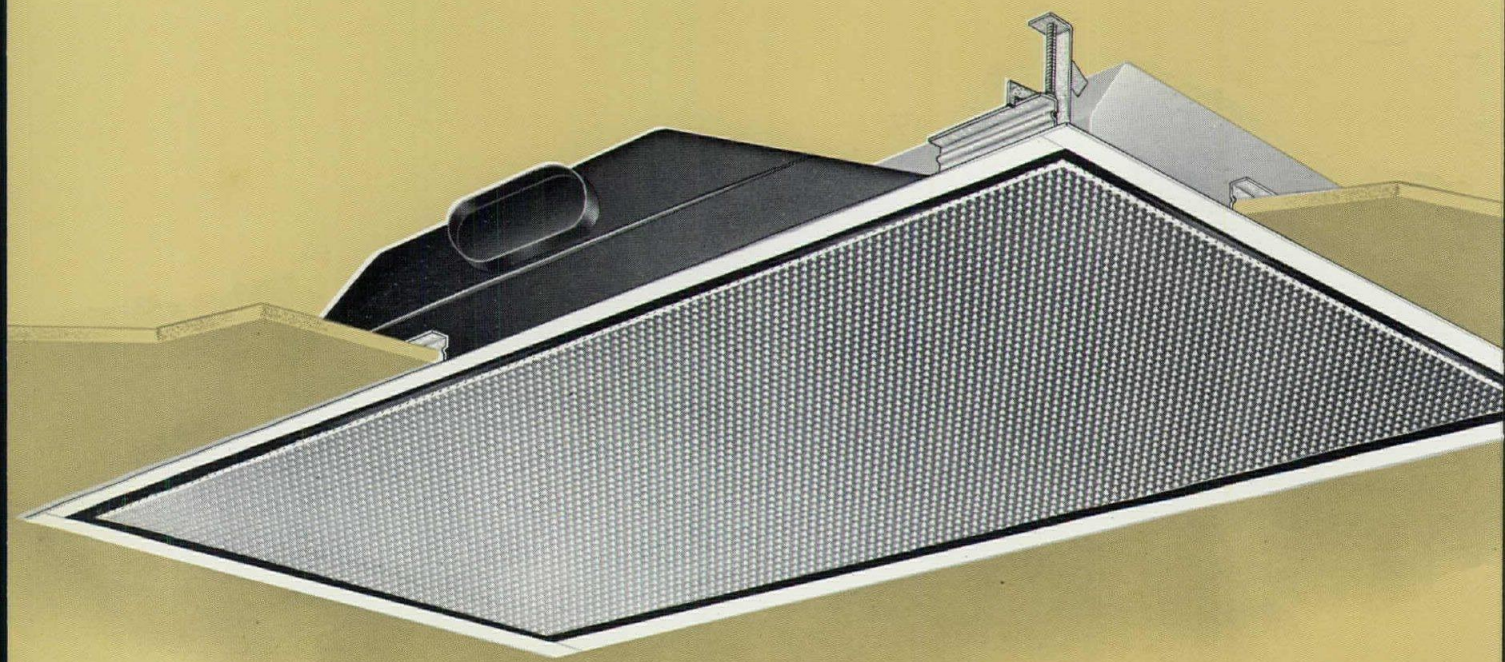
Hager

Everything Hinges on Hager

*Patent Pending

Printed in U.S.A.

*the frameless appearance they said couldn't be done!



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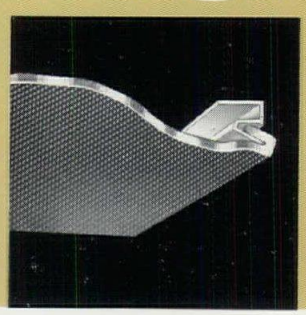

* hidden door Air Lite Series 300...NEW from Sechrist!

Looking for that "impossible" lighted lens, the one that floats in the surrounding void creating the illusion of an absolutely frameless lens? Sechrist has it. The new Air Lite Series 300. This handsome fixture offers new dimensions of aesthetic beauty for clean, crisp modern architectural design. The secret? Sechrist's special "hidden door" in a regressed air slot troffer which is compatible with most all air diffusers. Before *your* next job, check with Sechrist, where new things are happening in the most advanced concepts of air handling and lighting.

Write for your all new catalog and specification data on the Hidden Door. Request: Air Lite Series 300 Troffers.

SECHRIST

the Air-Lite Specialists

SECHRIST MANUFACTURING COMPANY

P. O. BOX 16775, DEPT. 83 / DENVER, COLORADO 80216 / (303) 534-0141

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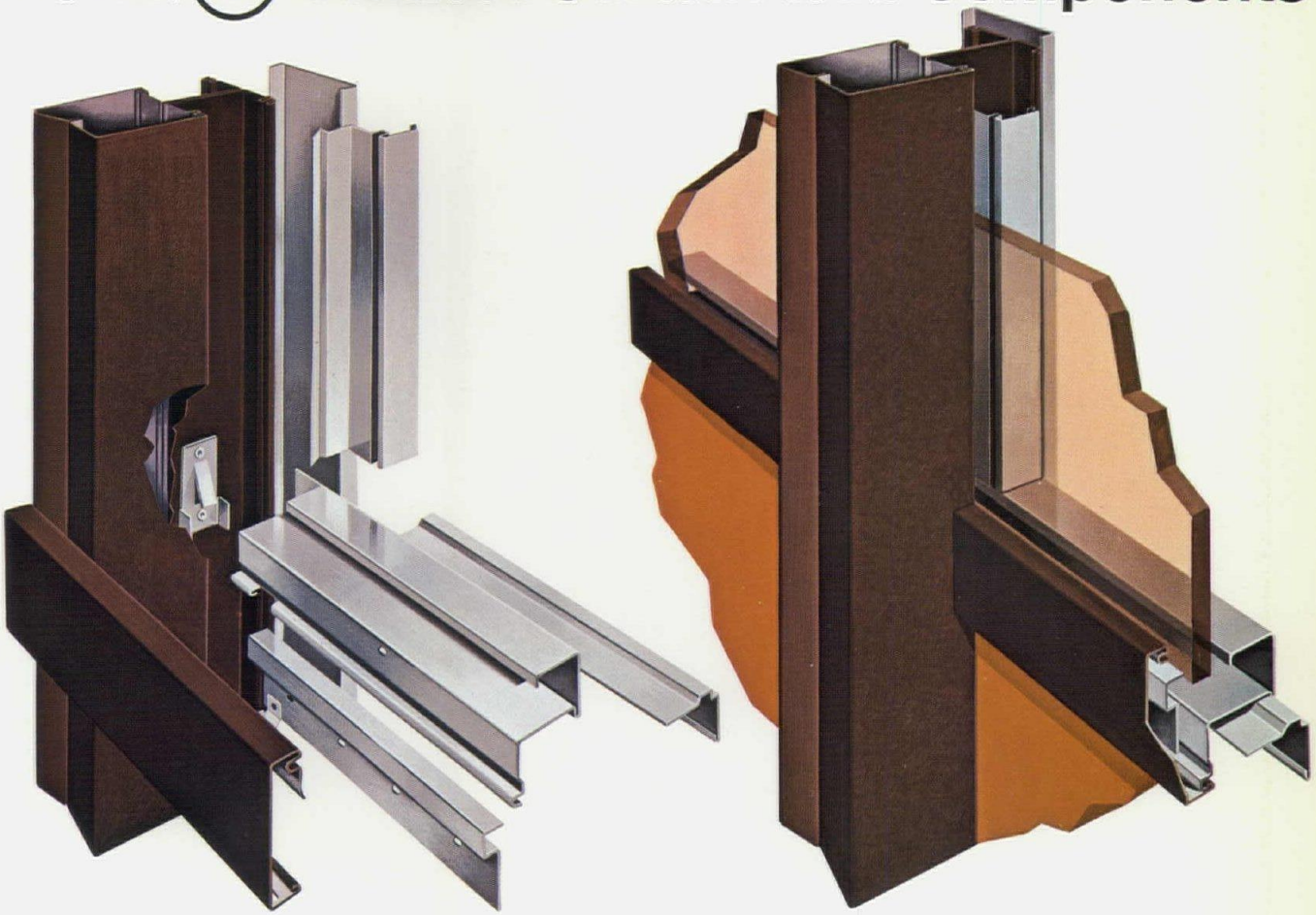
Now... USS Ultimet Curtain Wall Components



...available in USS Cor-Ten Steel

ULTIMET curtain wall framing members in COR-TEN steel include the mullion (in 3½", 4½" or 5½" depths) and the outside horizontal retainer cover or muntin. All other components and the snap-on section on the back of the mullion are of stainless steel.

USS ULTIMET, the latest idea in competitive cost curtain wall components, now comes in USS COR-TEN Steel as well as stainless steel. COR-TEN steel, which "paints" itself, actually coats itself with a dense, oxide skin that virtually stops corrosion. It weathers to a rich russet color and does not require maintenance painting.

COR-TEN high-strength low-alloy steel is the *natural* material for building exteriors that will give you a *distinctive*, attractive finish that will last a lifetime.

USS ULTIMET Roll-Formed Curtain Wall Components go up fast, easy, and fit precisely. Most members snap-lock into place. There's no on-site cutting, no welding, no exposed fasteners, no clutter. USS ULTIMET Curtain Walls are clean and uncomplicated. But perhaps the best part is the economical cost. USS ULTIMET is priced to compete with other materials which possess less strength, beauty and permanence.

Take a good look at good-looking, cost-saving USS ULTIMET Curtain Wall Components in COR-TEN steel—before you build or remodel. Write for a free copy of our folder, ADUSS 88-2932, to United States Steel, P.O. Box 86 (USS 5297), Pittsburgh, Pennsylvania 15230 . . . or contact a USS Architectural Products Representative through the nearest USS Construction Marketing or Sales Office. USS, ULTIMET and COR-TEN are registered trademarks.

USS Ultimet Wall Framing Components

OFFICE LITERATURE

For more information circle selected item numbers on Reader Service Inquiry Card, pages 319-320

GLAZED ENCLOSURES / Custom and standard systems are pictured in a 16-page booklet. Such installations as the sky dome in the Student-Faculty building at the State University of New York in Albany by Edward Durrell Stone and the custom front and roof skylights of the Bird and Reptile Habitat building by George E. Christensen at the Marsalis Park Zoo in Dallas are included. ▪ Ickes-Braun Glasshouses, Deerfield, Ill.*

Circle 400 on inquiry card

LIBRARY SYSTEMS / An 8-page folder explains Danish contemporary systems in three series. ▪ Reska Inc., Buffalo, N.Y.

Circle 401 on inquiry card

CHURCH SPIRES / A 4-page brochure describes prefabricated metal church spires, steeples, domes and campaniles. ▪ Overly Manufacturing Company, Greensburg, Pa.*

Circle 402 on inquiry card

SOUND COLUMNS / The theory o sound columns for churches, school restaurants, auditoriums and recrea tional areas is explained in a 12-pag booklet. ▪ Argos Products Company Genos, Ill.

Circle 403 on inquiry car

METALWORK / A 68-page book pre sents "Stock Components for the Fabr cation of Architectural Metalwork." Th book includes screening and railing sys tems, treillage patterns, railings and pip railing systems. There is also a compre hensive selection of architectural bar shapes, tubing, saddles, and nosings. Julius Blum & Co., Inc., Carlstadt, N.J

Circle 404 on inquiry car

WATER COOLERS / A 32-page catalo illustrates the 1968 line of electric coo ers and drinking fountains. ▪ The Halse W. Taylor Company, Warren, Ohio.*

Circle 405 on inquiry car

WASHROOM ACCESSORIES / A 32 page catalog illustrates washroom acces sories and hospital specialties. Intro duced is the *UNILAV*, a packaged modu lar lavatory and storage unit for area where space is limited. ▪ Watrous In corporated, Bensenville, Ill.*

Circle 406 on inquiry car

PLASTIC FITTINGS / A broad line o ABS plastic DWV fittings is described i a fully indexed and illustrated 24-pag catalog. The catalog includes enginee ing data, chemical resistance test result acceptances and installation information ▪ NIBCO Inc., Elkhart, Ind.*

Circle 407 on inquiry car

CERTIFICATION PROGRAM / A bro chure explains the Cooling Tower Insti tute certification program for factory-as sembled cooling towers. The purpose o the program is to set up standards whic can assure good cooling tower perform ance. ▪ Havens Cooling Towers, Kan sas City, Mo.

Circle 408 on inquiry car

PRE-ENGINEERED SYSTEMS / Dimen sional data and construction details ar contained in a 12-page color bookle Drawings on eight basic systems and in formation on accessories are included There is also a section on the availabilit of literature and special informatio services. ▪ Star Manufacturing Company Oklahoma City, Okla.

Circle 409 on inquiry car

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

more literature on page 27

Crucible Steel Company, Hunter Research Laboratory, Pittsburgh, Pa. Engineers and Designers: Hunting, Larsen and Dunnels, Pittsburgh, Pa. General Contractor: Landau Brothers Building Co., Pittsburgh, Pa.

These Smith Walls are a stainless steel showcase

They make a beautiful building! But, better than that, they are an outstanding product display of Crucible Steel Company's own stainless steel. The Shadowall fluting of the panels demonstrates the formability of the material. And, years from now, the gleaming finish of the metal will reflect its maintenance-free durability.

What you can't see when you look at this typical Smith installation is the single responsibility that made it possible . . . and typical. The walls were designed, custom-fabricated, delivered and erected by Smith personnel . . . to the architect's specifications . . . to the customer's satisfaction. With the complete responsibility on our shoulders, we make sure the job is right . . . and completed on schedule.

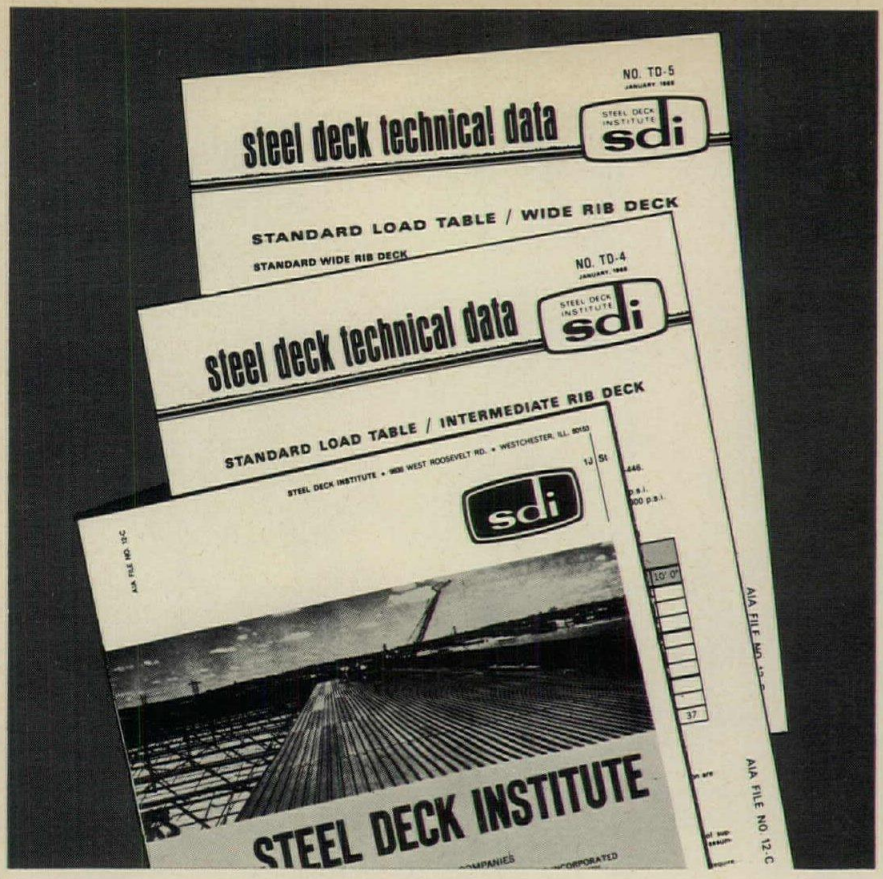
Would additional views of this interesting installation be helpful to you? We've made a limited number of color photos available for the asking.

Specify Smith Walls . . . the single responsibility . . . for your next project. You'll find details in Sweets' Catalog File 3b/Sm and 8b/Sm. Or write.

ELWIN G. SMITH & COMPANY, INC. Pittsburgh, Pa. 15202/Atlanta • Boston
Chicago • Cleveland • Cincinnati • Detroit • Philadelphia • Toledo • New York

SMITH

For more data, circle 150 on inquiry card



NEW LOAD TABLES FOR STEEL DECK

The Steel Deck Institute has approved Standard Load Tables for Intermediate and Wide rib steel roof deck.

The standard load tables provide a fast convenient design reference . . . no need to check all manufacturers' catalogs. The Institute has now approved standard load tables for Wide, Intermediate and Narrow (approved 1967) rib decks.

Steel roof deck with rigid insulation and built-up roof is one of the most economical, fire rated deck assemblies available today.

For a copy of the load tables, fill out coupon below and clip to your letterhead.

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Please send me a copy of the SDI Standard Load Tables.

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TITLE_____

For more data, circle 151 on inquiry card

continued from page

ACOUSTICAL UNITS / A 12-page bu tin describes *GEOCOUSTIC* units signed to be mounted on ceilings walls. With the "patch technique," acoustical correction method desig to improve acoustics in existing ro and buildings, the units project from wall so that all six sides are exposed sound. ▪ Pittsburgh Corning Corp tion, Pittsburgh.*

Circle 410 on inquiry

ARCHITECTURAL GLASSES / Th technical catalogs include selec tables, suggested glazing methods specifications, strength data and tra mittance values for various flat glas One of the catalogs, "Glass For C struction," gives details on all of company's glasses, including *Vari-T* coated glass and *VigilPane* safety p for show windows. The other two bo lets describe *Vitrolux* spandrel glass *Tuf-flex* tempered glass doors. ▪ Libb Owens-Ford Glass Company, Tole Ohio.

Circle 411 on inquiry

MASONRY / A 2-page report prese *Tex 4512*, a structural clay facing v unit with a 12-in. by 12-in. face size 4-in. thickness. The wire-cut velour tured finish is combined with the la square face proportions and ranges fr red to buff and a new smoky brown-r hogany color. ▪ Natco Corporati Pittsburgh.*

Circle 412 on inquiry

ARCHITECTURAL HINGE / Illustra 12-page brochure features informat tables and full specification informat on new product lines. ▪ Stanley Ha ware, New Britain, Conn.*

Circle 413 on inquiry

SUSPENDED CEILINGS / An 8-pa brochure presents a wood-grained g with a "beamed" look and a bevel-ed ceiling panel. The grid is made of g vanized steel with a baked-on vi wood graining finished with a clear p tective coating. The beveled edges of panel create a tile-like effect. ▪ Le Products, Inc., Coopersville, Mich.*

Circle 414 on inquiry

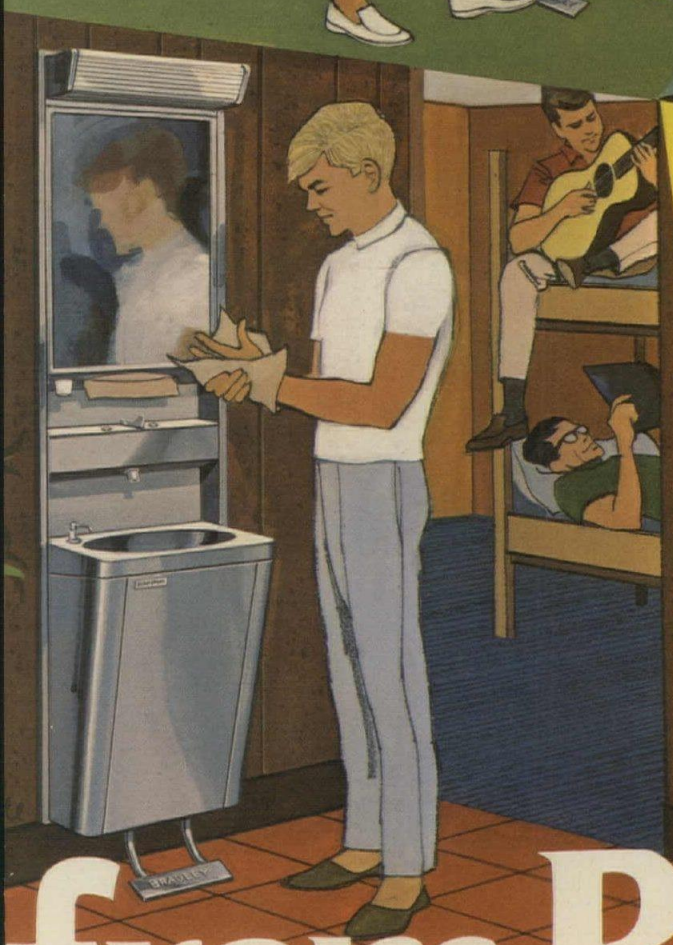
PRESTRESSING CONCRETE / Techni Manual SS7 gives information on po tensioning bar and strand systems. Spe fic design and detailing information tabulated. ▪ Stressteel Corporati Wilkes-Barre, Pa.

Circle 415 on inquiry

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

more literature on page

Bright ideas from Bradley!



A better way to specify and install lavatories and accessories: Bradpack! Bradpack pre-assembled wash centers have everything you want or need built in: lav, foot control, operating mechanism, temperature selector, dispensers—everything. Installation? They're all factory pre-assembled and ready for hook-up. And foot-operated Bradpacks are sanitary. Choice of three models, all in stainless steel: foot-controlled lavs with and without storage cabinet; or cabinet and lav with wrist blades. For all installations—from hospitals to college dorms—write in Bradpack. It's Bradley's idea to make things easier for you! See your Bradley representative. And write for literature. Bradley Washfountain Co., 9109 Fountain Boulevard, Menomonee Falls, Wisconsin 53051.

For more data, circle 152 on inquiry card

BRADLEY

SPECIFY THE TY-SEAL TEAM... the winning combination that makes better joints in seconds.

Add 'em up. It's the most complete, efficient joining system in the industry . . . AND it's been job-proved by more than 20,000,000 in-service Ty-Seal applications. For faster joining and better joints, put the profit winner on your side. Go all the way with the Ty-Seal Team!

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PENN PLANT, MACUNGIE, PA.
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TPI makes Tyler cast iron soil pipe and fittings • Wade plumbing-drainage products • Tyler water main fittings and municipal castings.

For more data, circle 153 on inquiry card

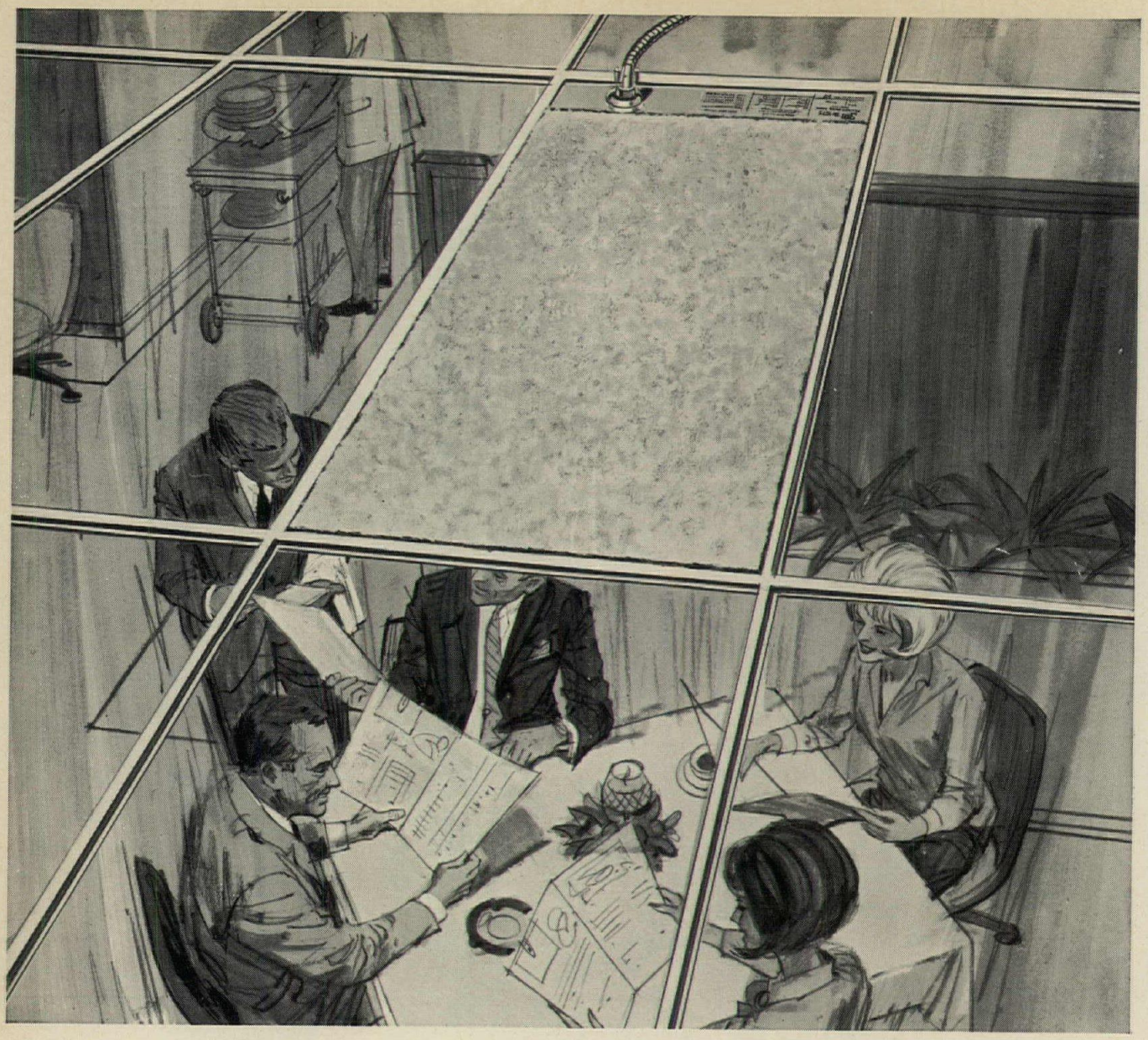
great looking... and movable

What's more, our KW-330 Movable Partition System involves practically no waste when moved from one location to another. And, it is just as easy to install as it is to move, has a one hour fire rating, possesses excellent sound transmission ratings, and can be installed for a reasonable in-place price. Panels can be field painted or prefinished in a wide variety of colors and textures. In fact, the KW-330 incorporates the best features of all the wall systems we've ever made. And that makes it the best there is. For full technical details and specifications, write: Kaiser Gypsum Company, Inc., 300 Lakeside Drive, Oakland, California 94612.

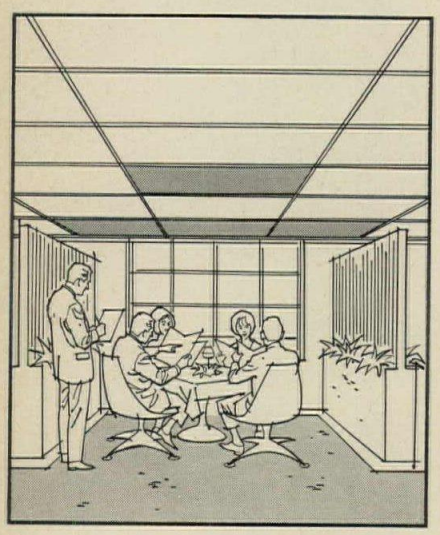
KAISER GYPSUM

SEE OUR CATALOG IN 1968 SWEET'S S

For more data, circle 154 on inquiry card



If your clients cater to comfort, why not drop in a heating system like this?



T-bar Ceiling Heat, using new 3M Brand Radiant Electric Heating Panels.

Even a gourmet dinner is more enjoyable if the diners are comfortable. And they will be. Everyone is, with a heating system incorporating new 3M heating panels.

They radiate gentle sun-like warmth. There are no drafts. The floor stays warm. Each room is thermostatically controlled. They are ideal for maximum comfort total heat, or for supplementing a central system in high heat loss areas.

This ceiling-mounted system does not interfere with ductwork, utilities, or structural members. You enjoy complete freedom of design.

3M Heating Panels have no moving parts to whir, rattle or wear out. They cycle on and off without a sound.

Designed specifically for drop ceilings, the panels are one-inch thin, and fit into the standard 2′ x 4′ T-Bar module. To install simply drop them in and wire up.

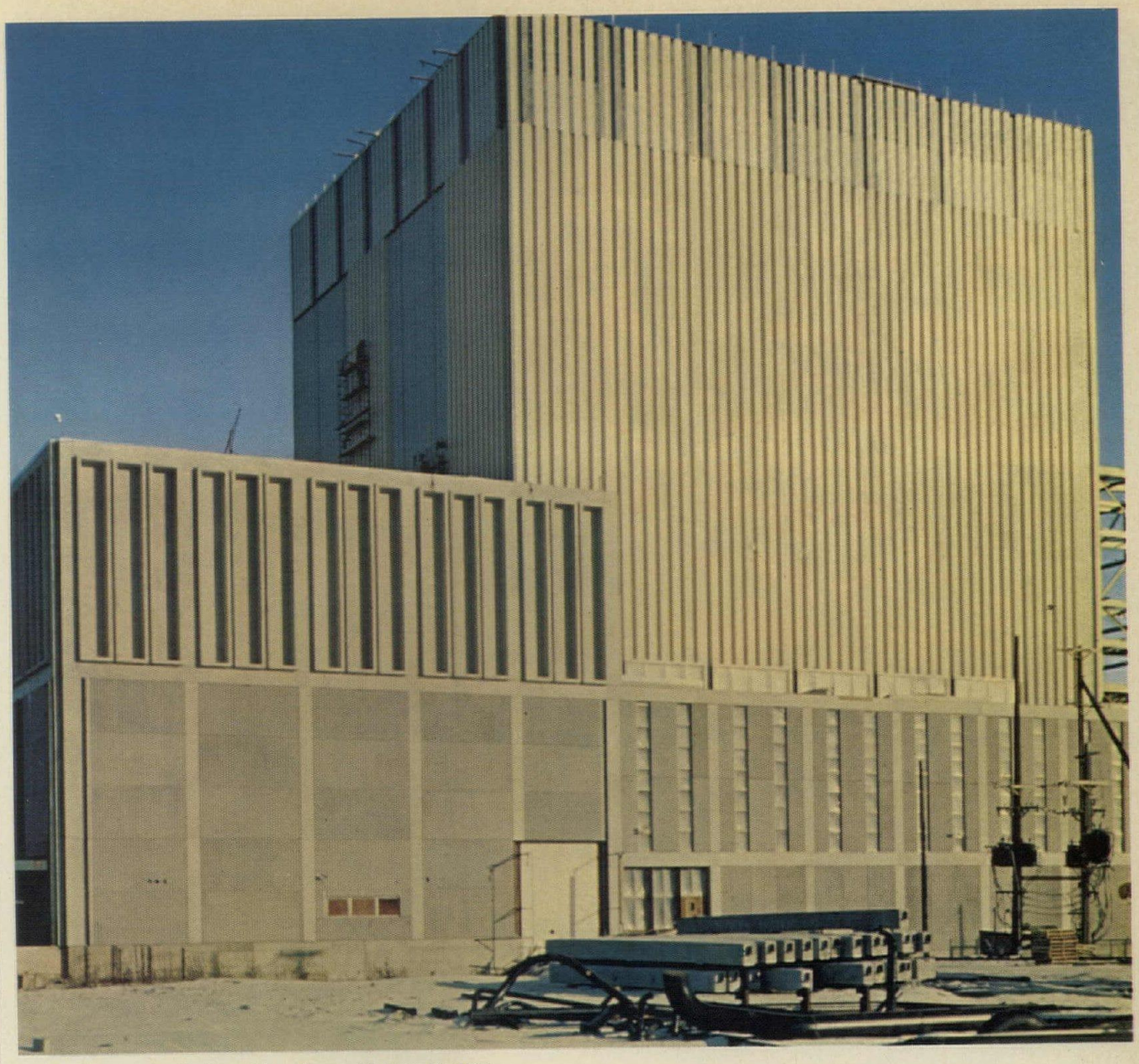
Supplied in flat off-white; they can also be painted to blend or contrast with surrounding panels of acoustical material or translucent lighting panels.

More information? Write Electric Products Division, 3M Company, Building 220-5W, St. Paul, Minn. 55119

"3M" BRAND IS A REGISTERED TRADEMARK OF 3M CO.

Electro-Products Division 3M COMPANY

For more data, circle 155 on inquiry card



Building owner: Northern States Power, Minneapolis, Minn.
Architects: Pioneer Service & Engineering Co.
Finish: Metal walls finished with Fluropon* made with Kynar 500®.

Metal walls provide lasting beauty with finishes containing Kynar 500®

By using metal walls, you can now get a wide range of colors . . . colors that harmonize with existing structures or community . . . and get long-lasting metal protection at the same time!

How? With finishes containing Kynar 500, a fluorocarbon base made by Pennsalt Chemicals Corporation. Accelerated tests by Pennsalt plus years of outdoor exposure on more than 150 major buildings, project 30 years of maintenance free life.

Equally important, with metal walls, you can save up to ⅓-½ over brick or masonry; save time and money by faster erection; save time and money in future expansion.

For your next industrial building, consider metal walls highlighted by a colorful finish containing Kynar 500. For more information, contact Plastics Department, Pennsalt Chemicals Corporation, 3 Penn Center, Philadelphia, Pa. 19102, LO 4-4700.

Make your base specification Kynar 500!

PENNSALT®

*Fluropon is a trademark of De Soto, Inc.

For more data, circle 156 on inquiry card

continued from page 276

CONCRETE COLOR / A 20-page booklet, "Color in Architecture," describes synthetic inorganic pigments in concrete and mortar. Areas covered include properties of colored concrete, possible defects, and typical applications in architecture. ▪ Naftone, Inc., New York City.

Circle 416 on inquiry card

THERMOPLASTICS / *Boltaron Corrosion Resistant Materials* designed especially for industries concerned with corrosion, air and water pollution and fume handling are the subject of a 1968 catalog. A materials usage chart and typical application photos are included. ▪ The General Tire & Rubber Co., Lawrence, Mass.

Circle 417 on inquiry card

GLASS / The winter edition of "Creative Ideas in Glass," an architectural review quarterly, contains, among others, architect Thomas E. Stanley's production research center for Atlantic Richfield, Stanley L. Horowitz's Stonehenge Tower in North Bergen, N.J., and a residence in Detroit by Donald Paul Young. ▪ American Saint Gobain Corporation, Kingsport, Tenn.*

Circle 418 on inquiry card

STAINLESS STEEL FRAMING / A 16-page booklet details the use of *COR-TEN* and stainless steel in *ULTIMET* wall framing. The booklet explains why only seven basic roll-formed shapes are needed to achieve a variety of architectural treatments. The booklet also discusses the first use of *ULTIMET* in the 841-ft.-high Pittsburgh headquarters for U.S. Steel. ▪ United States Steel Corporation, Pittsburgh.*

Circle 419 on inquiry card

SUBSTATIONS / Compact secondary unit substations for industrial, commercial, and utility installations are described in a revised bulletin. Indoor and outdoor installations with a choice of system designs are covered in the 54-page publication. ▪ I-T-E Circuit Breaker Company, Philadelphia.*

Circle 420 on inquiry card

SEAMLESS FLOORING / A 12-page color brochure covers resilient flooring and wall covering products. Included are a thickness guide and a comparative data chart. ▪ Torginol of America, Inc., Montebello, Calif.*

Circle 421 on inquiry card

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

more literature on page 288

Lyon doesn't Stop with the most Versatile Design

The freedom to select and join components to fit your needs is a big advantage in itself. But wait'll you've pounded on our desk top and discovered it has *two* layers of steel, with a ribbed underside for extra strength. Wait'll you've thumped the back and end panels and felt the vault-like solidity of double-wall welded construction. Found sound deadeners *everywhere*—in the back panels, pedestals, and even the drawers. Tried the exclusive Lyon "lock-in-top" that controls *all* drawers. Learned that the *100% acrylic* finish will last with the furniture. *Then* you'll agree that Lyon is a better buy in *many* ways.
See your Lyon Dealer. Or, write: Lyon Metal Products, Inc., 551 Monroe Ave., Aurora, Illinois for our free color brochure.

LYON OFFICE FURNITURE

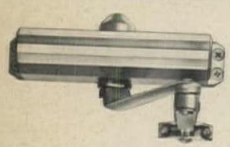
Showrooms: New York, Aurora, Los Angeles

For more data, circle 157 on inquiry card

NORTON CLOSERS

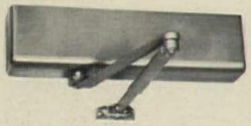
CONTROL DOORS • NOT DESIGN

Even where heavy traffic indicates the use of a door holder, there's no need to compromise the appearance of your entranceway. The unique Norton® combination of door closer and door holder, the Unitrol® control, provides the answer. All the functions of a closer and a holder in a single styled package. Mounted on the door-jamb to eliminate the cluttered look and improve the door silhouette.



SERIES J1600

Top-jamb mounted closers featuring narrow styling to blend with the slim styling of modern aluminum door frames.

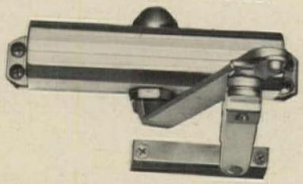


SERIES J7030

Top-jamb narrow-projection closers with covers in anodized or painted finishes to match hardware or door finish.

SERIES J6120

Top-jamb mounted Unitrol controls. A combined door closer and door holder with shock absorber to protect door, frame, and closer.



CONTACT YOUR NORTON REPRESENTATIVE FOR COMPLETE DETAILS.

EATON YALE & TOWNE INC.

NORTON DOOR CLOSER DIVISION

372 Meyer Road, Bensenville, Illinois, 60106

Etobicoke, Ontario, Canada

1159

For more data, circle 158 on inquiry card

For more data, circle 159 on inquiry car

A solid foundation in sandy soil at a fraction of the cost of piling

How? Vibroflotation®. This unique method presettles and compacts sandy soils by simultaneous saturation and vibration. Result? Uniformly densified columns of granular material that provide greater bearing capacity and differential settlement protection—*at a fraction of the cost of piling!*

Vibroflot®-compacted foundations effectively withstand the rigors of Saturn Rocket blastoffs, yet are economical enough to be used for drive-in hamburger stands. The Vibroflot machines shown here are compacting foundations for two new high-rise residence halls at the University of Miami. Residence halls in the background are on similar foundations.

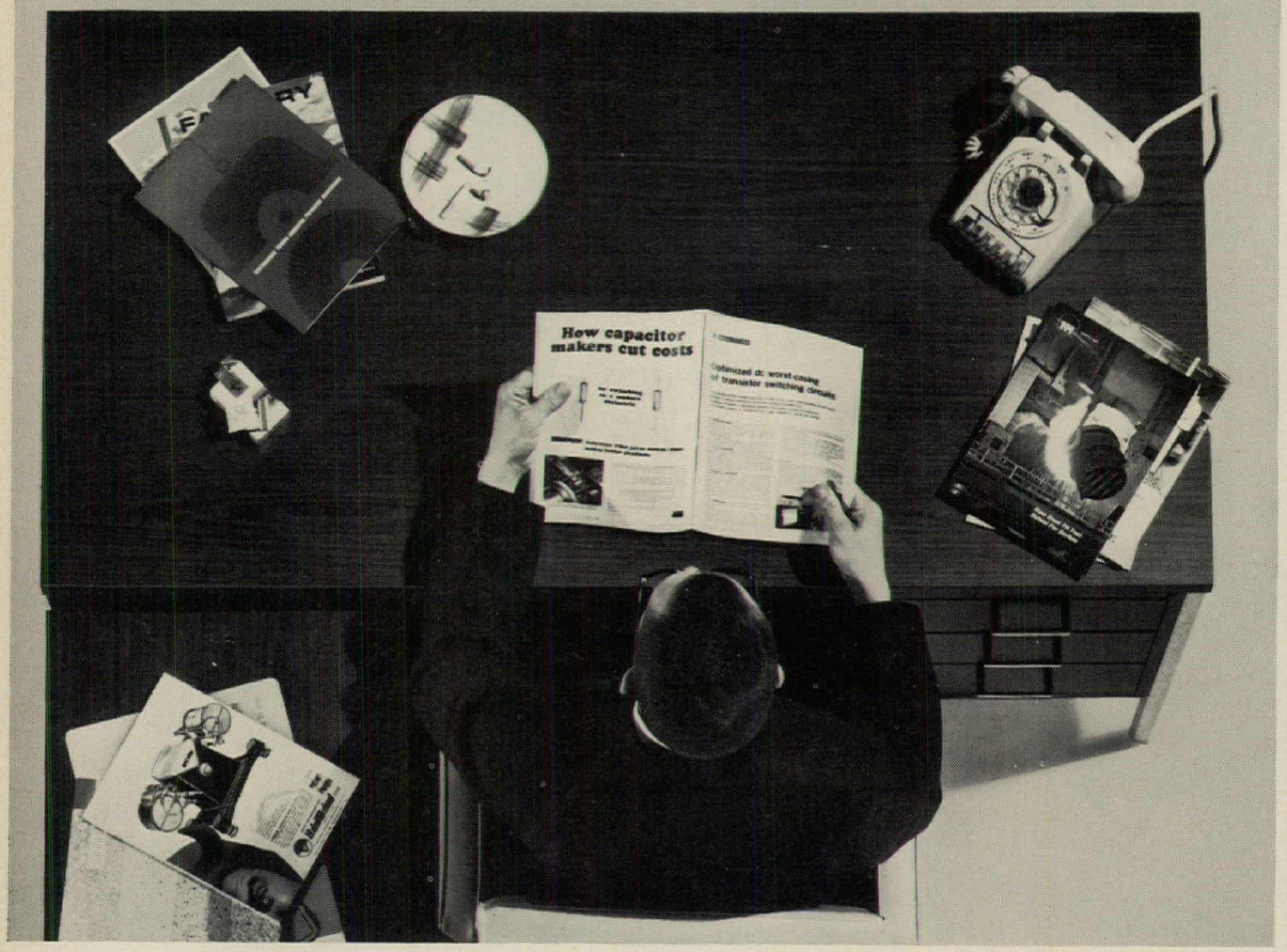
If you are planning a building of any size that is to rest on sandy soil, a phone call to us could mean real savings. Call collect, or write for Bulletin B-42. 930 Ft. Duquesne Blvd., Pittsburgh, Pa. 15222, Phone (412) 391-6424.

VIBROFLOTATION FOUNDATION CO.

A DIVISION OF LITTON INDUSTRIES

Connell, Pierce, Garland & Friedman, Architects and Engineers/ Constructed by Burk Builders, Inc.

Don't you read before you buy ?



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Businessmen do.
Because when they buy, they put more than their money on the line.
They put their reputations; perhaps their jobs. So they want the facts.
The full facts. In print. And they want to refer to the facts. Pass them along
to their associates. Keep them on file. If you sell to businessmen, it will
pay you to sell to them the way they like to be sold—the way they *have* to be sold.
With the facts. The full facts. In print. Print makes sense. Business sense.
Because print makes sales. Business sales.

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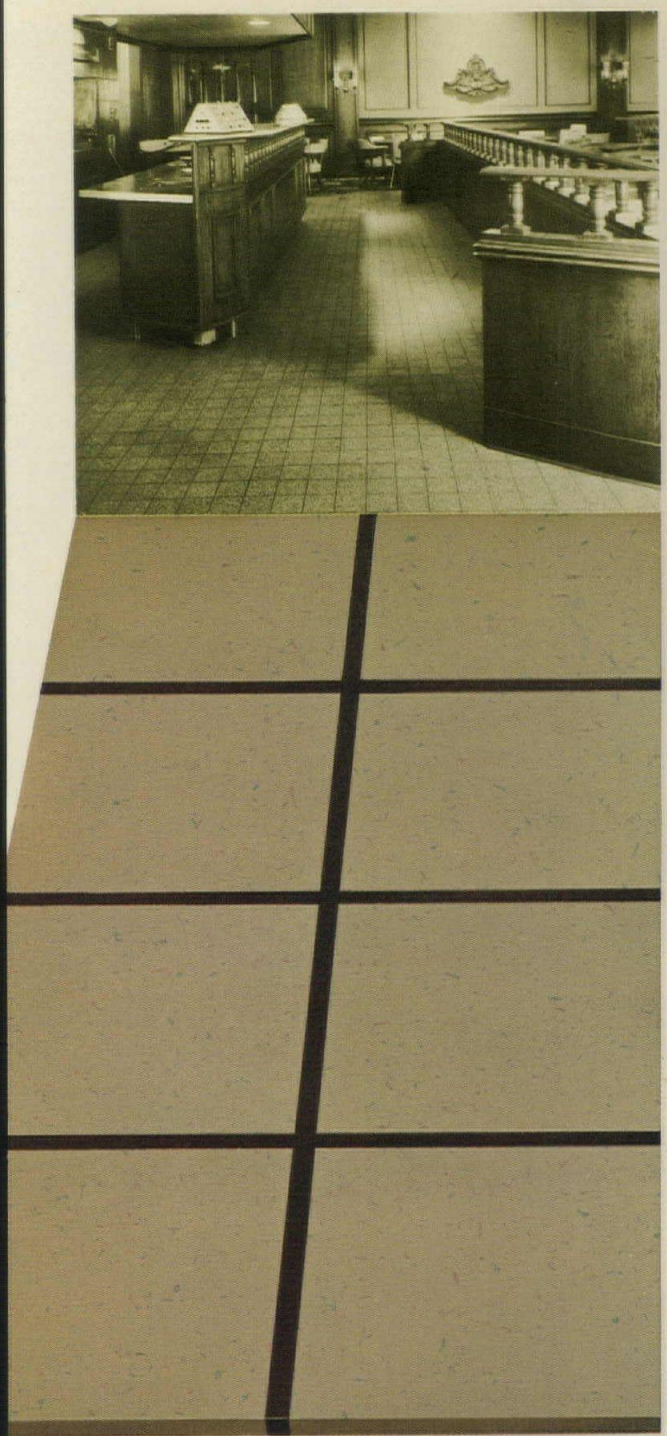
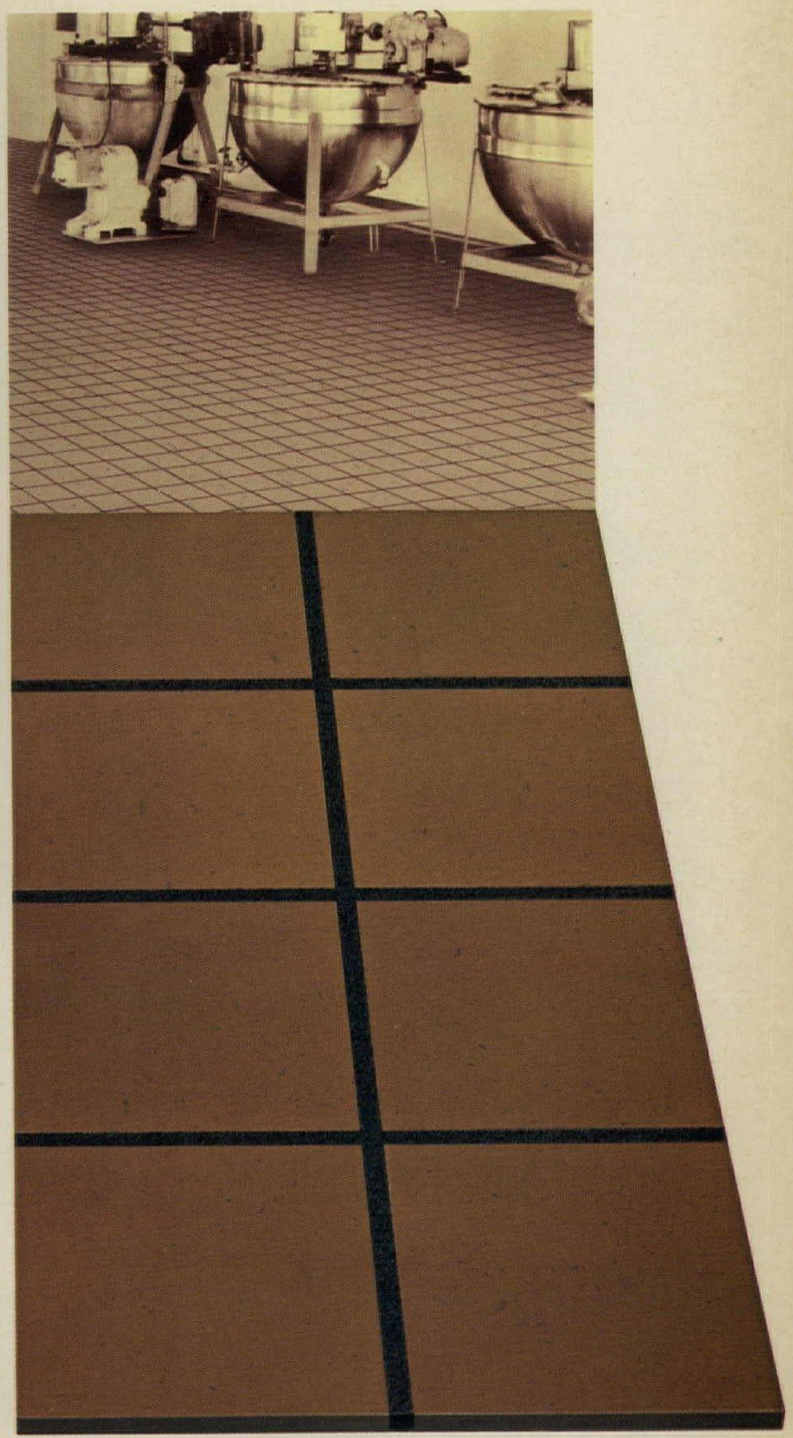
Two trouble-free grouts for all quarry tile and brick pavers



ydroment Joint Filler for: restaurants, kitchens, schools, hospitals, lobbies, etc.



U-poxy for all processing industries: canneries, metalworking, bakeries, dairies, breweries, etc.

n you specify a quarry tile or brick paver floor, it's more omical to rely on a "trouble-free" grout instead of taking ces. **Hydroment Joint Filler** has over 25 years of proved ormance, comes pre-packaged for dependable uniformity. clients will appreciate the dense, non-shrinking, easy-to- joints — comes in 10 non-fading colors.

, there's **U-poxy** for the processing industries — for the s that take a beating from acids, alkalis and chemicals. ine joints actually stronger than the tile units themselves!

U-poxy is also unusually resistant to oils, greases, fats, solvents — you name it! Meets Dept. of Navy Specification TS-T21.

Remember, brick and tile floors are no better than their joints — so specify either Hydroment Joint Filler or U-poxy. Write for technical data! (We're in Sweet's!)

USM

The Upco Company
A SUBSIDIARY OF UNITED SHOE MACHINERY
4805 LEXINGTON AVE., CLEVELAND, OHIO 44103

For more data, circle 161 on inquiry card

continued from page 282

CONCRETE BIBLIOGRAPHY / Publications on all aspects of concrete design and construction are listed in a 40-page catalog. ▪ Cement and Concrete Association, London.

Circle 422 on inquiry card

FLOORING / A 6-page color brochure describes monolithic flooring systems, coatings, and aggregate compounds. ▪ General Polymers Corporation, Cincinnati.

Circle 423 on inquiry card

COOLING TOWERS / A 24-page brochure presents factory-assembled units. Photos show typical installations and charts give tower capacities, performance and dimensional data. ▪ Havens Cooling Towers, Kansas City, Mo.

Circle 424 on inquiry card

PANELING / A 24-page color booklet shows woodgrain finishes, vinyl overlay panels, and natural hardwood panels. ▪ Evans Products Company, Riverside, Calif.*

Circle 425 on inquiry card

STEEL DOORS AND FRAMES / "U Standard Nomenclature for Steel Do and Steel Door Frames, USAS A12 1967" is a revision of the original 1 standard. New information inclu nomenclature for door types and no enclature of swing for steel door fram ▪ The Steel Door Institute, Clevelan

Circle 426 on inquiry

CEILINGS / "Total Environment C ings" is a 32-page booklet that conta photographs, sketches, exploded v drawings and environmental factor/p formance data tables. ▪ Luminous C ings Inc., Chicago.*

Circle 427 on inquiry

COOLING AND HEATING / A 12-p bulletin covers the complete line "CH" Series, all-season cooling heating systems that range in size fr 3 to 50 tons of cooling, and 75,000 1,600,000 Btu per hour heating, in combination of sizes. ▪ Hastings Inc tries, Inc., Omaha, Neb.

Circle 428 on inquiry

TEMPERATURE CONTROLS / A c densed specification guide covers most common pneumatic controls commercial heating and air condition ▪ Honeywell's Commercial Divisi Minneapolis.*

Circle 429 on inquiry

FAUCETS / Just about everything in way of fittings to meet the special quirements of hospitals, institutio educational and industrial installation covered in a 40-page book. ▪ The C cago Faucet Company, Des Plaines,

Circle 430 on inquiry

PLASTIC PANELS / Structural pla panels that offer both corrosion a built-in fire resistance are covered in tail in a 12-page bulletin. A cross-sect of commercial and industrial installati is pictured. Bulletin explains that par may be translucent or opaque, w smooth, crinkle or pebble surface, a either flat or corrugated in config ation. ▪ Durez Div., Hooker Chem Corporation, North Tonawanda, N.Y.*

Circle 431 on inquiry

CONTRACT CARPETING / A 24-p color booklet shows thirty contract stallations in such public areas as sto offices, banks, apartment hous churches, and schools. ▪ Downs Car Company, Inc., Philadelphia.

Circle 432 on inquiry

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

ne in wood and "the history of early nish towns is a history of disastrous s." But Richards has managed to find, d take, photographs of many fine dieval churches and fortresses which re built of stone.

Readers who are familiar with the hor's other books will find this one tten in the same thoughtful and in-med manner. —*Don Raney*

OKS RECEIVED

TALOGUE OF THE LIBRARY OF THE GRADUATE OOL OF DESIGN, HARVARD UNIVERSITY. *K. Hall & Co., 70 Lincoln Street, Boston, Mass. 1. 44 volumes. $2100.00.*

DIRECTORY OF ANTIQUE FRENCH FURNITURE. *F. Lewis Hinckley. Crown Publishers, Inc., 419 Avenue South, New York, N.Y. 10016. 214 pp., . $10.00.*

CITTA A IMMAGINE E SOMIGLIANZA DELL OMO. *By Vittorio Mazzucconi. Ulrico Hoepli, Via pli 5, Milano. 511 pp., illus. L.7000.*

LDING WITH WOOD *and other aspects of nine-nth-century building in Ontario. By John I. Rem-287 pp., illus. $17.50. University of Toronto s, Toronto 5, Ontario, Canada.*

HNIQUES OF LANDSCAPE ARCHITECTURE. *Ameri-Elsevier Publishing Company, Inc., 52 Vanderbilt nue, New York, N.Y. 10017. 226 pp., illus. $16.75.*

TLES FROM THE HEART OF SPAIN. *By Alberto A. ssmuller. Clarkson N. Potter, Inc., Publisher, 23 67 Street, New York, N.Y. 10021. 232 pp., illus. 50.*

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If you're moving, please let us know five weeks before changing your address. Use form below for new address and attach present mailing label in space provided.

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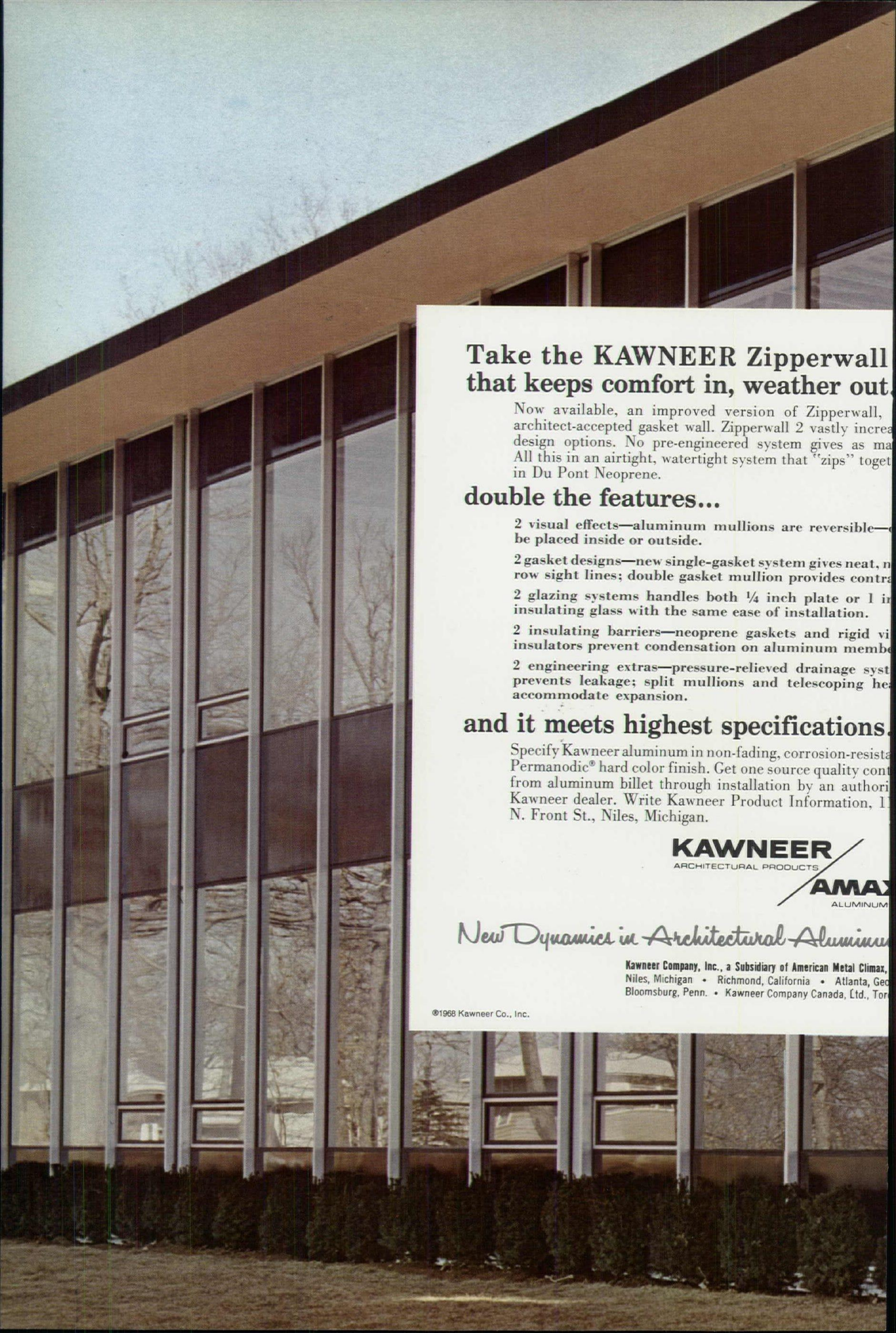
P.O. Box 430
Hightstown, N. J. 08520



Take the KAWNEER Zipperwall that keeps comfort in, weather out.

Now available, an improved version of Zipperwall, architect-accepted gasket wall. Zipperwall 2 vastly increa design options. No pre-engineered system gives as ma All this in an airtight, watertight system that "zips" toget in Du Pont Neoprene.

double the features...

2 visual effects—aluminum mullions are reversible—c be placed inside or outside.

2 gasket designs—new single-gasket system gives neat, n row sight lines; double gasket mullion provides contra

2 glazing systems handles both ¼ inch plate or 1 in insulating glass with the same ease of installation.

2 insulating barriers—neoprene gaskets and rigid vi insulators prevent condensation on aluminum membe

2 engineering extras—pressure-relieved drainage syst prevents leakage; split mullions and telescoping he accommodate expansion.

and it meets highest specifications.

Specify Kawneer aluminum in non-fading, corrosion-resista Permanodic® hard color finish. Get one source quality cont from aluminum billet through installation by an authori Kawneer dealer. Write Kawneer Product Information, 1 N. Front St., Niles, Michigan.

KAWNEER
ARCHITECTURAL PRODUCTS

AMAX
ALUMINUM

New Dynamics in Architectural Aluminu

Kawneer Company, Inc., a Subsidiary of American Metal Climax,
Niles, Michigan • Richmond, California • Atlanta, Geo
Bloomsburg, Penn. • Kawneer Company Canada, Ltd., Tor

Engineer a "zipper" gasket that locks out air and water...

Kawneer did. They custom-designed a self-sealing structural gasket to make Zipperwall 2 install quickly. A gasket that keeps a tight grip between mullions and glazing . . . that locks comfort in and weather out.

make it of Du Pont Neoprene...

Kawneer did. They chose Neoprene because of its history of dependability in curtain wall systems. Because of its proven resistance to sun, rain, heat, cold and corrosives. Because of its flame resistance.

and get long-term performance reliability...

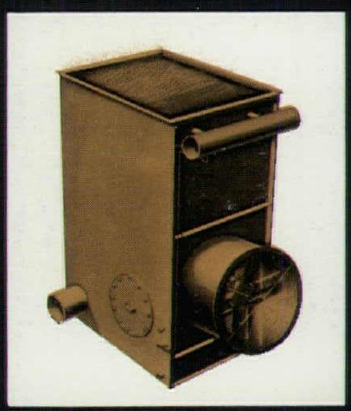
Kawneer did. They wanted a gasket that would stay resilient in any climate . . . keep its sealing pressure . . . maintain a weathertight wall year after year. They wanted long-term reliability . . . and they got it with Du Pont Neoprene.

Du Pont makes Neoprene, not gaskets. Du Pont Company, Room 6250, Wilmington, DE 19898.

Zipperwall 2: double Neoprene design for ¼" plate glass.

DU PONT
REG. U.S. PAT. OFF.
NEOPRENE

Good lookin'



and beautifully functional cooling tower.

This is the new Moduflex by Air Preheater; the first cooling tower available in dimensionally identical modular units with casings that develop their own weather-tight, oxide coating. The longer the coating is exposed to the weather, the tougher it gets.

Moduflex features a remarkable low-alloy steel that has gained wide architectural acclaim. It forms an ever stronger, ever better-looking oxide coating that inhibits corrosion and obsoletes painting. What's more, the new Moduflex's resin-impregnated asbestos fill is fireproof and fungus-resistant.

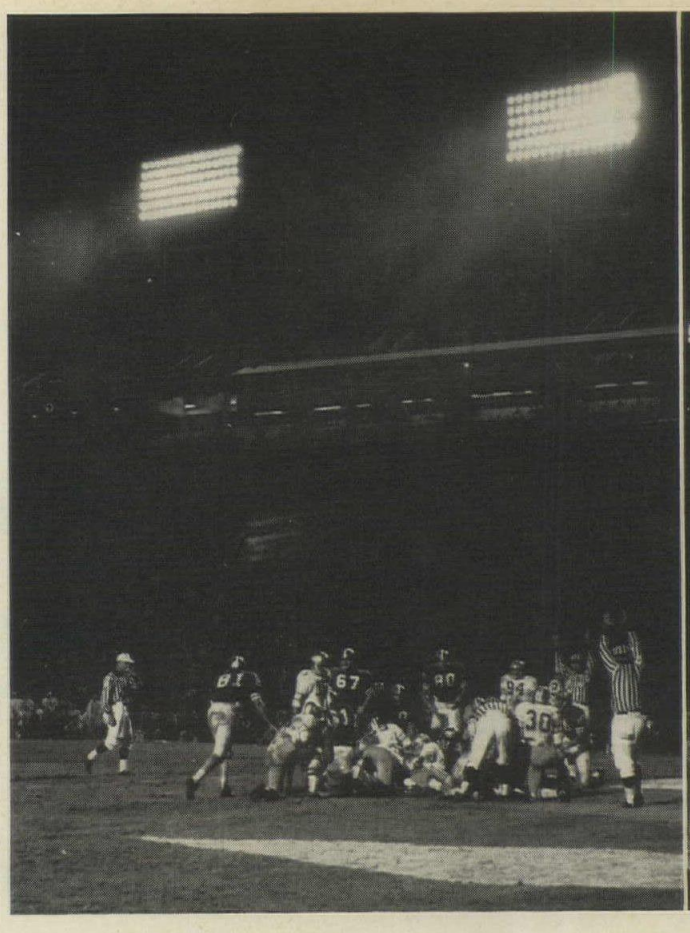
But good looks and long life are only the beginning. Moduflex is truly modular. Fully preassembled, a single common-basin Moduflex tower is composed of a bank of from one to ten identical 50-ton-capacity modules. Here's unlimited layout flexibility, plus the capability of adding on individual modules if and when cooling requirements increase.

And economy. Moduflex not only delivers full rated capacity, but each module has its own axial or centrifugal fan and heavy-duty motor for independent operation. This allows you to conserve power when weather permits.

Oh, and let's not forget the low, unbroken silhouette that makes Moduflex perfectly compatible with modern building design. Moduflex blends beautifully with building lines, and presents a clean, uniform appearance that's really good looking. But that's where we came in. For your catalog write Dept. MOD.

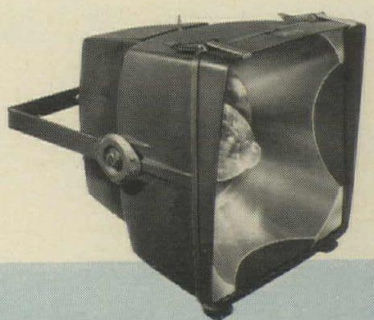
THE AIR PREHEATER COMPANY, INC.,
Wellsville, New York 14895
A Subsidiary of Combustion Engineering

For High-light, Spot-light or "Punch"...



LIGHTING VERSATILITY

Calls for Steber Super-Sportsliter



Available in NEMA 2, 3, 4 and 5 beam spreads. Internal ballast for 120 V through 480 V primary. Features: Rugged, cast aluminum reflector housing with integral, vented ballast housing; degree aiming sectors. Ballasts are class H, U.L. listed. Lens is shock, thermal and impact resistant.

Need the *punch* to floodlight large parking, loading, terminal or industrial areas? Or, the precise beam control to meet a "TV Vertical" level of illumination for a sports field? Maybe you need a powerful beam to illuminate a high-rise?

Steber Super-Sportsliter combines a unique new reflector design with precise beam control—to usher in a welcome new era in outdoor floodlighting efficiency. Narrow, medium, medium-wide and wide beam spread types let you select the pattern that is, esthetically or functionally, best suited for the job.

Super-Sportsliter is specifically designed to make the brilliant most of modern metallic and incandescent sources. It will provide more light output than any fixture in its class—yet save you money in power consumption and reduced maintenance on relighting jobs.

Ask your Steber representative for more details on Super-Sportsliter. Better yet—arrange for a *Show and Sell* lighting demonstration.

Steber Division, Pyle-National Company
1334 North Kostner Avenue, Chicago, Illinois 60651

Steber Lighting by Pyle-National

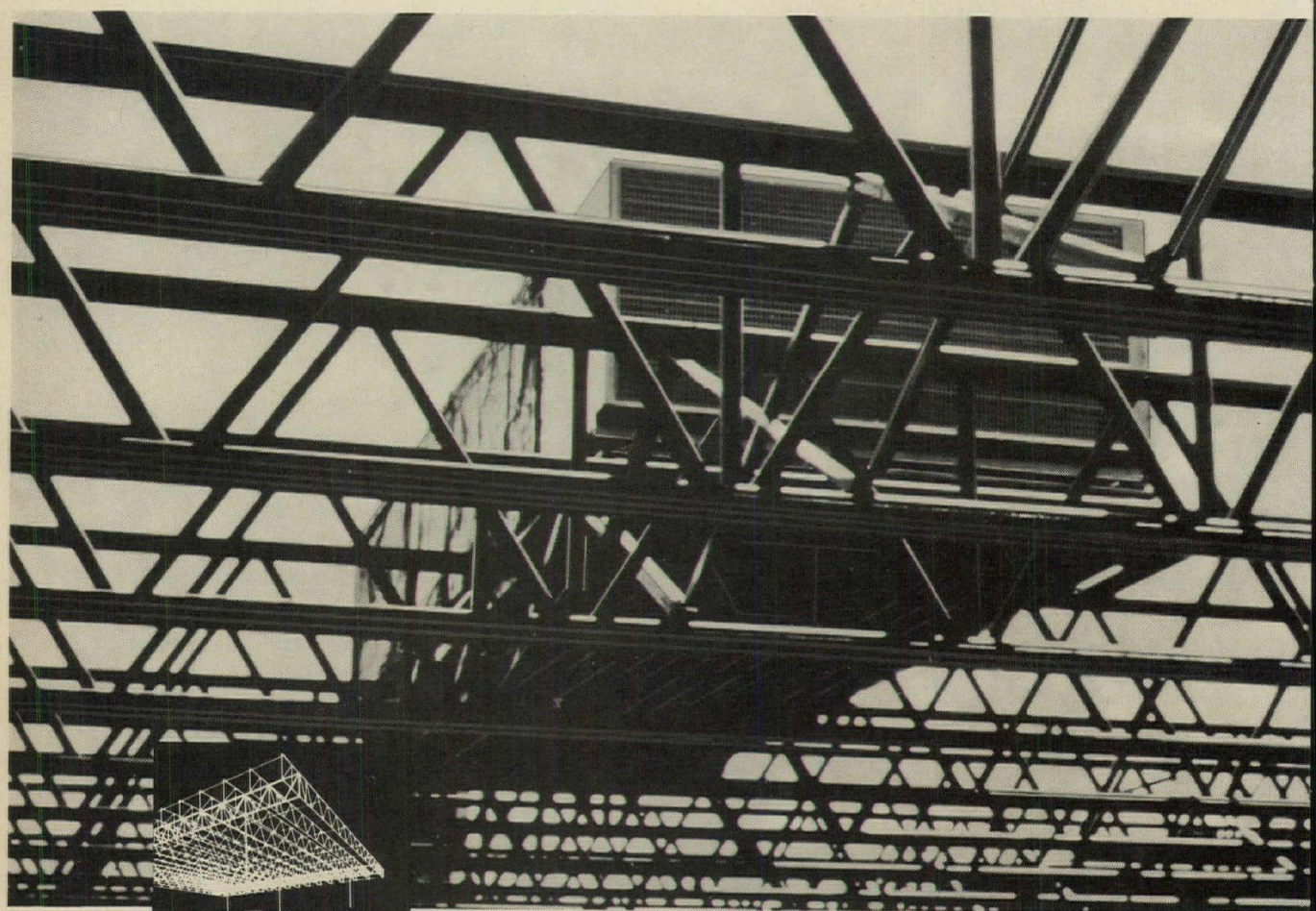
S-168

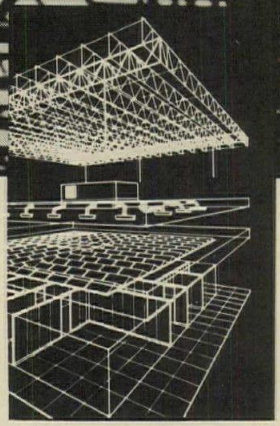
For more data, circle 171 on inquiry card

more data, circle 170 on inquiry card

THE MACOMBER V-LOK® MODULAR COMPONENT SYSTEM:

Mechanical energy





Success of Macomber's V-LOK Modular Component System is due, in large part, to the wide choice of components it offers, and to the built-in flexibility of all components.

At present, there are four components in the system: the steel structure; mechanical energy system; lighting-ceiling; and interior partitions. Macomber Incorporated supplies the V-LOK steel structure, including floor and roof decking. There are at least two major suppliers for each of the other components, providing several possible combinations of components, all compatible with the basic 5-foot module.

All of the components are engineered to permit quick and easy changes in the floor plan of the building throughout its life. This complete flexibility of interior space allows the owner to accommodate the structure to the changing needs of the tenants. VLMC buildings need never become obsolete.

MECHANICAL ENERGY SYSTEMS

Compatible mechanical energy systems, like the other VLMC components, contribute to the flexibility of the structure. Basically, they are roof-mounted, multizone units designed to handle areas of from 4,000 to 10,000 square feet per unit. Each unit can serve four to 15 zones, and each zone is served independently of adjoining zones for maximum comfort in each.

The air supply distribution network is individually designed by the architect's engineer. In one- and two-story structures, it consists of fixed

systems contribute to building flexibility

ductwork to the intended zones, and flexible ducting from there to the air diffusers in the individual rooms. In structures of more than two stories, a remote unit is recommended, but the interior distribution network remains the same.

The 36-inch depth of the Macomber open-web girders and purlins allows passage of a duct up to 14 inches by 20 inches, so that a single duct can furnish air to an entire zone.

The flexible ducts and their air diffusers can be relocated to create a new arrangement of air supply to accommodate changes in the floor plan.

METHOD OF ROOF MOUNTING

The VLMC mechanical energy unit rests on special purlins that form an integral part of the steel structure. After installation of the unit, deck is laid up to and around the unit. This method of installation allows roof mounting of the heavy units that may be required in cold, northern climates. Absence of deck under the unit provides easier access to the mechanical component.

LENNOX DIRECT MULTIZONE SYSTEM

The Lennox Direct Multizone System uses direct-fired gas or oil heat exchangers or electric resistance heating in parallel with air-cooled refrigeration to provide precise individual zone control simultaneously in as many zones as needed. Absence of water eliminates completely the danger of costly freeze-ups. A special roof-mounting frame which exactly fits the perimeter of the DMS unit simplifies mounting and results in a neat, weatherproof installation.

Standard Lennox control systems utilize fresh outdoor air to do all the cooling when the temperature drops below 58° Fahrenheit, and to carry part of the cooling load between 58° and 65°. Above 65°, direct expansion refrigeration equipment does all the cooling.

The Lennox DMS unit is a complete factory assembly of highly integrated components in a weatherproof, sound-deadened, low-silhouette package. It includes all necessary controls factory installed, factory tested, and approved by the necessary authorized agencies.

NESBITT ROOFTOP MULTIZONE

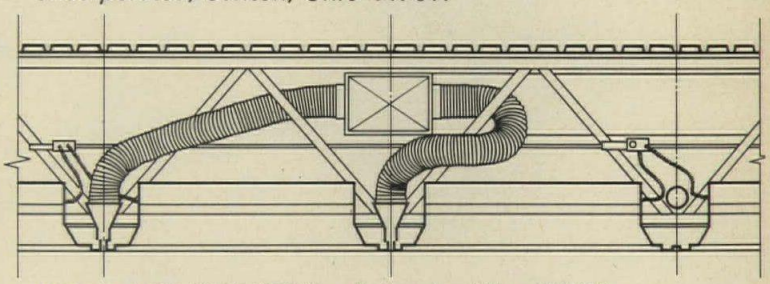
This "second generation" Nesbitt unit incorporates a new air conditioning concept that dehumidifies all air supplied to conditioned spaces during the mechanical cooling cycle. The unit permits automatic control of heating, mechanical or natural cooling, dehumidification, filtration and ventilation in as many as 12 individual spaces.

Nesbitt Rooftop Multizone design provides peak efficiency in those hours when some spaces require cooling while others must be heated. When mechanical cooling is operating, a coil in the hot deck utilizes high temperature refrigerant to reheat air flowing to spaces calling for heating. It is not necessary to operate the heat source at these times.

Placement of the cold deck over the hot deck prevents stratification of supply air. Modulation of outside-air and return-air damper banks is accomplished by a single electric or pneumatic damper motor.

All units are shipped fully assembled, precharged and factory tested, reducing on-site labor costs.

For more information on the Macomber V-LOK Modular Component System, contact your local Macomber representative, or write to *Macomber Incorporated, Canton, Ohio 44701.*



*FIXED AIR-HANDLING DUCTS fit easily through webbing of V-LOK girders and purlins. Flexible ducts carry air to diffusers, which can be "unplugged" and moved to other locations whenever changes are made in the floor plan.

Licensee in Canada: Anthes Steel Products Limited, 3430 Dundas Street West, Toronto 9, Ontario.

MEMBER AISC

MACOMBER INCORPORATED

CANTON, OHIO 44701

SUBSIDIARY OF SHARON STEEL CORPORATION

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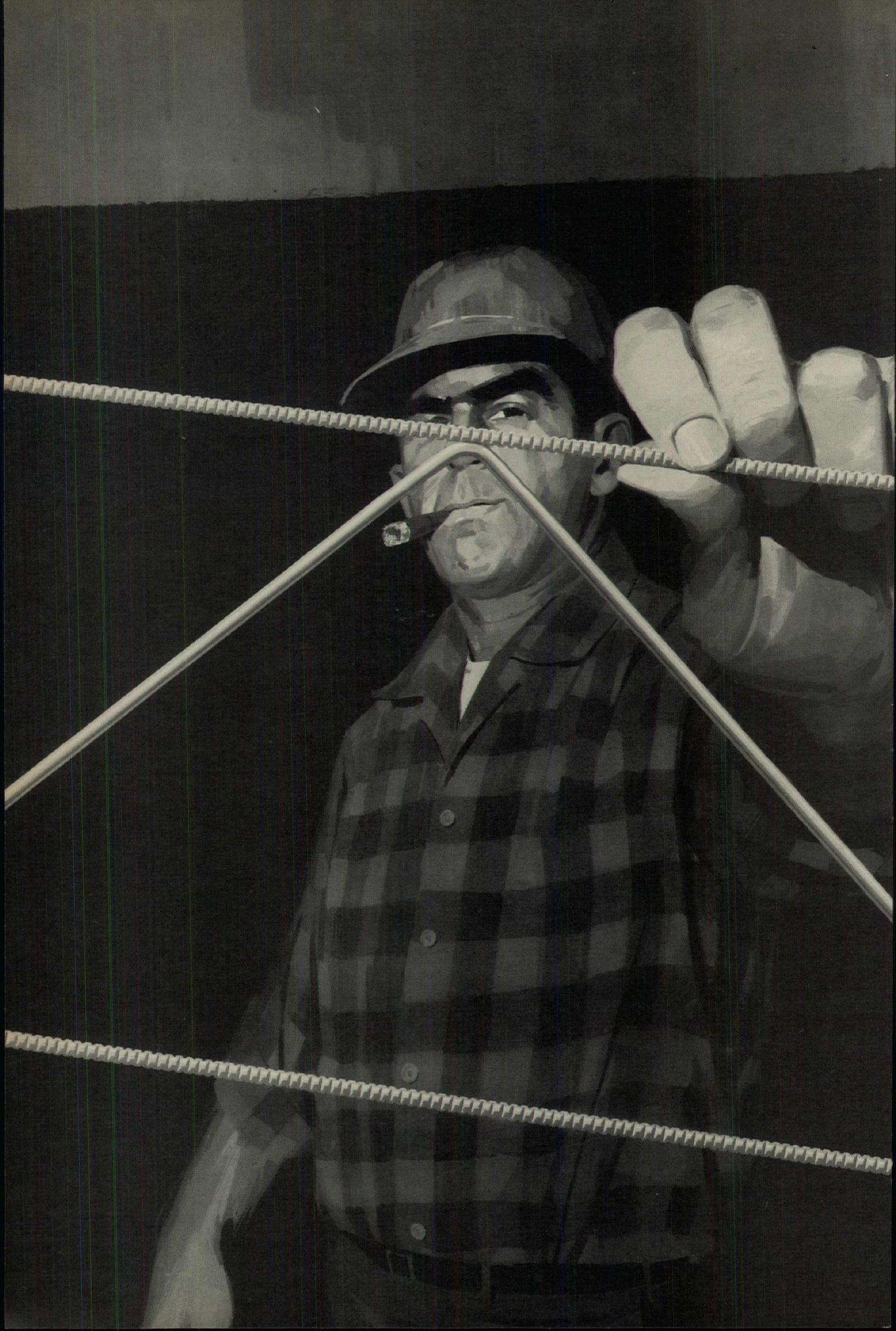

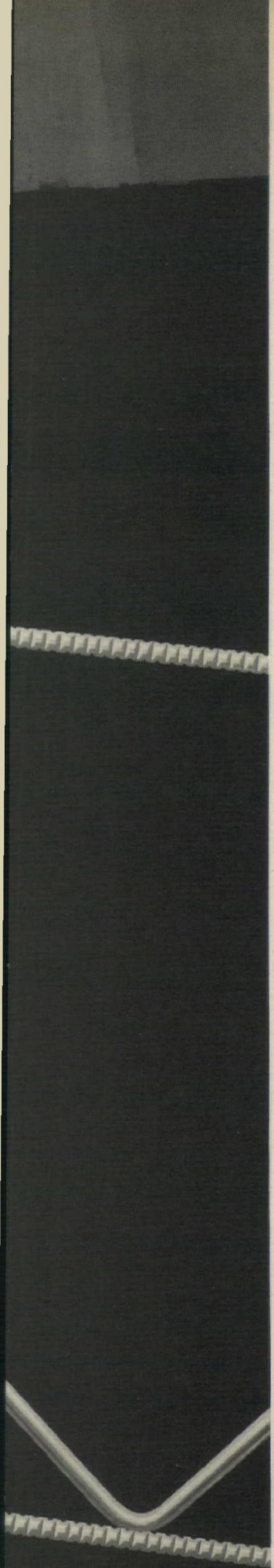

Knurling, Smurling who needs it?

You do, sir, it's one of ten good reasons to use Dur-O-waL® Truss masonry wall reinforcement.

You're looking at the most efficient masonry wall reinforcement ever devised, Dur-O-waL Truss Design.

1. Special knurling deformation in side rods means maximum bond with mortar—nearly double that of smooth side rods.

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4. Dur-O-waL Truss is available in a wide selection of shapes, sizes and finishes. You can reinforce almost any masonry wall—single wythe, cavity or composite.

5. Dur-O-waL research is the most extensive in the business. We back up every claim for our product with independent research.

6. When you need Dur-O-waL Truss you can get it. Over eight thousand dealers stock and sell our product.

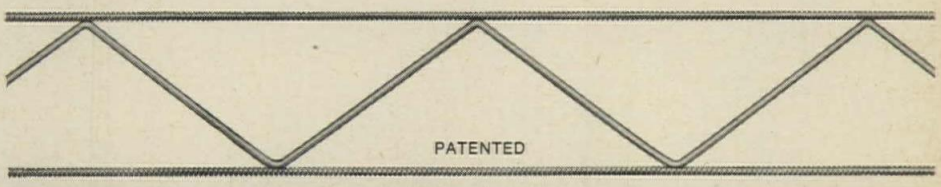
7. Dur-O-waL Truss is nationally distributed.

8. Dur-O-waL has trained factory representatives who can help you with reinforcing problems.

9. A constant supply of technical literature based on current research is available to you.

10. Dur-O-waL offers additional products exclusively for masonry construction, all backed by the same reputation for quality.

Questions on masonry wall reinforcing applications? Just write to Dur-O-waL, P.O. Box 368, Cedar Rapids, Iowa 52406.



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THE ORIGINAL MASONRY WALL REINFORCEMENT WITH THE TRUSS DESIGN

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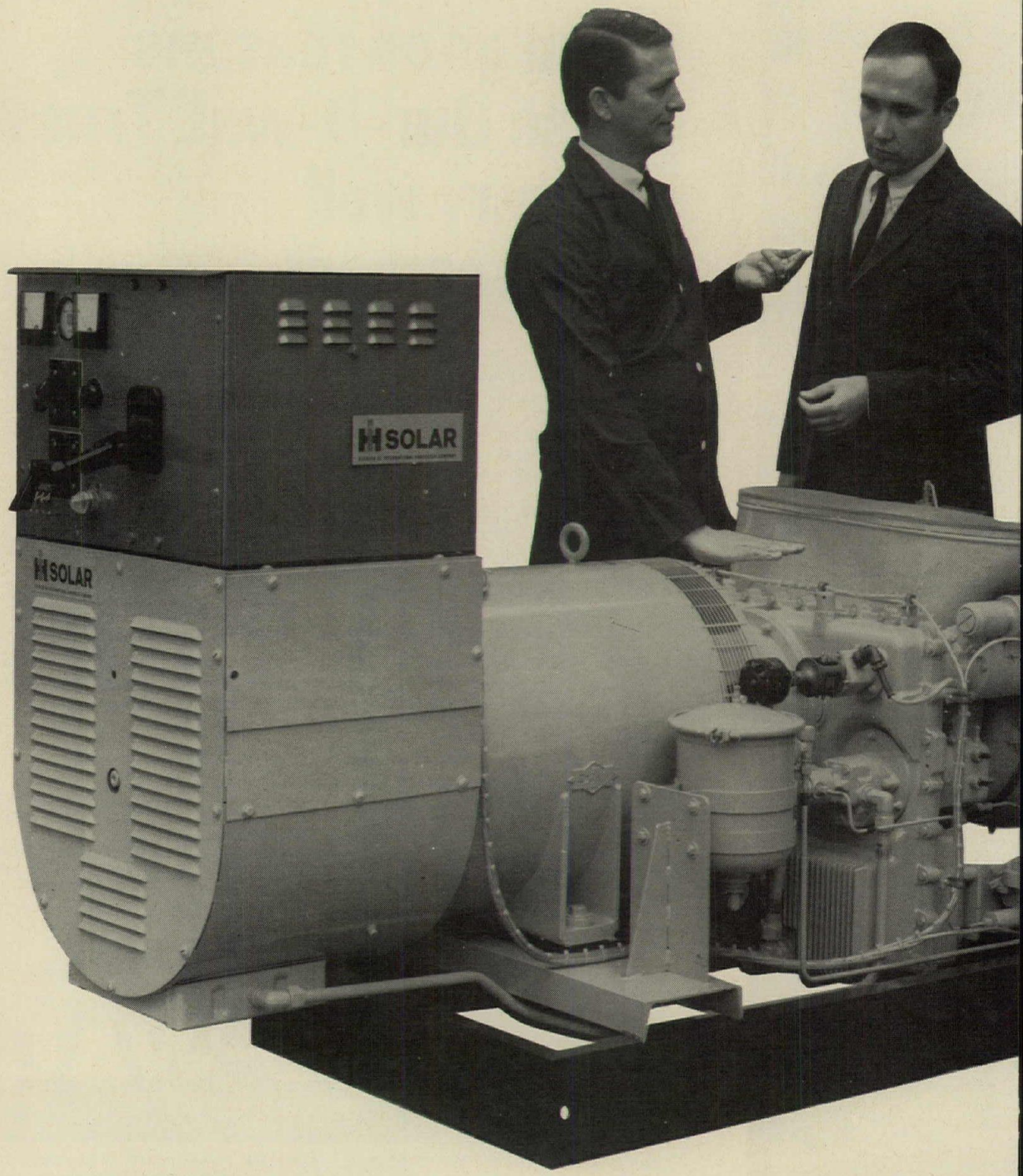
New low cost 22
emergency powe



w gas turbine enerator set!

For the first time—all the advantages of a gas turbine generator set priced competitively with standard emergency generators

Solar's new 225 kw *Spartan* gas turbine gen- set. And it is priced well within the range of arable reciprocating engine generators.

any measurement, there's no more reliable or enance-free kind of emergency electrical power. ince the very reason for an emergency generator furnish power in case of commercial power fail- ou must have equipment you can *count* on. at are the advantages of a gas turbine emer- ncy generator set compared with a reciprocating engine generator set?

Proven reliability. The new Solar 225 kw *Spartan* gas turbine generator set starts in sec- onds and has full power capability immediately. No elaborate heating systems needed as in the case of reciprocating units. In fact, the 225 kw turbine set actually *thrives* in freezing tem- peratures. And the set embodies the same principles proven so reliable in hundreds of Solar generator sets already installed, includ- ing those chosen by American Telephone and Telegraph Company to provide emergency power t its disaster-proof, hard-site communications enters from coast to coast.

Compact size. Light weight. The Solar 5 kw set weighs only 2650 lbs, and occupies only ft – about ⅓ the weight and ½ the size of a parable reciprocating set.

tually vibration free. None of the annoying ration inherent in a reciprocating engine.

installation & maintenance costs. The set uickly and easily installed anywhere from roof- top to basement! No special foundations or cooling water needed, and it operates on diesel fuel. Low heat rejection from this set considerably reduces room ven- tilating requirements. Result: *lower installed costs per kilowatt than any other kind of emergency power!* And the simplicity of the Solar gas turbine set with its few moving parts minimizes maintenance. Since it will operate at no load without detrimental effects, no expensive load banks are required during exer- cising periods. Components are designed for years of trouble-free service in normal emergency duty.

More complete information. For details on how the new Solar 225 kw *Spartan* gas turbine generator set supplies low-cost, reliable emergency power, con- tact the Solar office in the city nearest you, or write: Solar, Dept. Q-233, San Diego, California 92112.

Field sales offices.
Atlanta, Georgia • Calgary, Canada • Chicago, Illinois • Columbus, Ohio • Dallas, Texas • Dayton, Ohio • Denver, Colorado • Detroit, Michigan • Houston, Texas • Kansas City, Kansas • Los Angeles, California • Montreal, Canada • New York, New York • New Orleans, Louisiana • Pittsburgh, Pennsylvania • San Francisco, California • St. Louis, Missouri • Tulsa, Oklahoma • Washington, D. C.

IH SOLAR®
DIVISION OF INTERNATIONAL HARVESTER COMPANY

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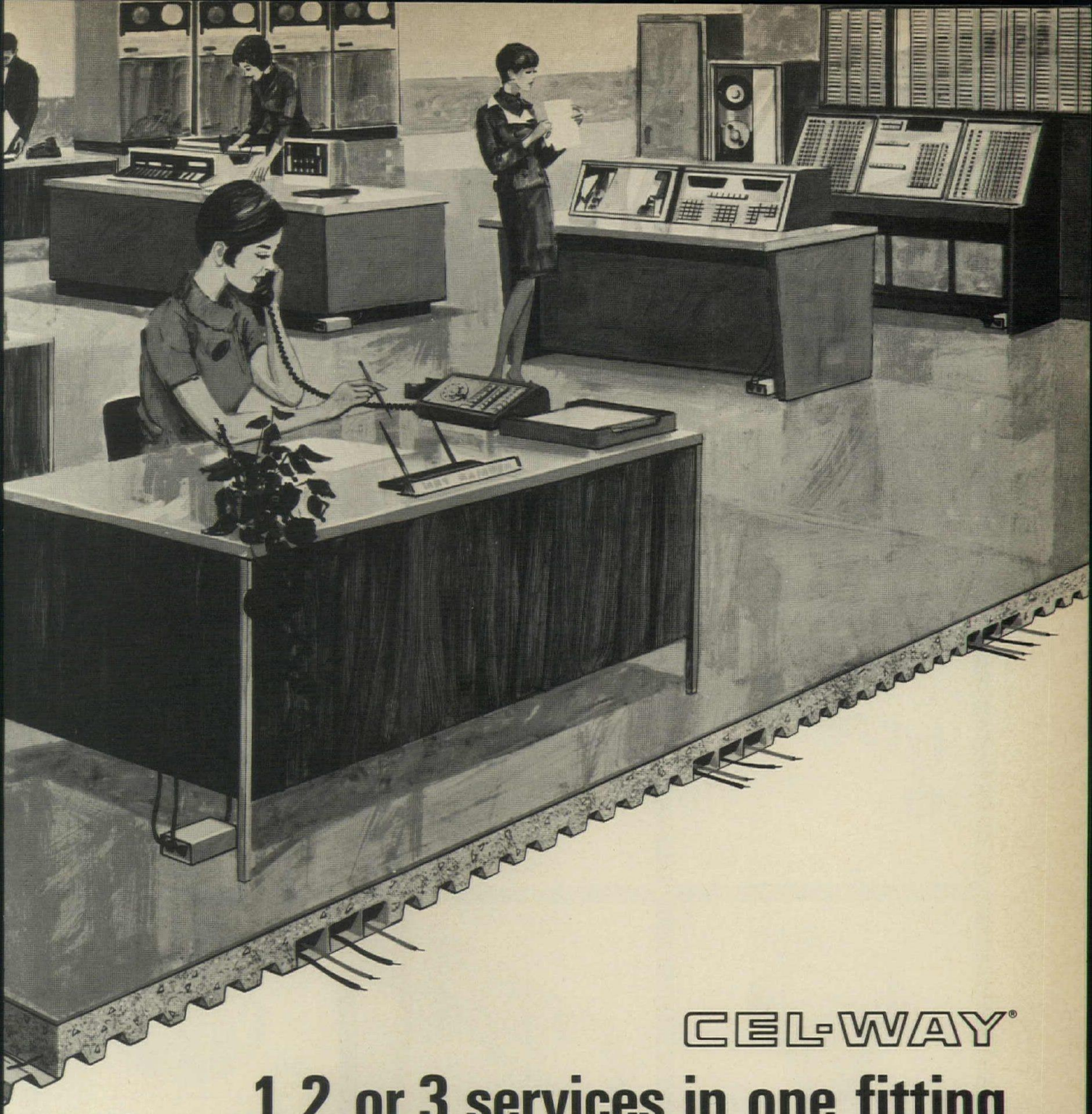
Single, double or triple cells, and
pre-set inserts . . . accommodate services
for telephone, electric, intercom, data processing,
closed circuit TV, etc.

Single, double, or triple s
in one fitting with space
1 to 5 amphenol jacks.



CEL-WAY®

1, 2, or 3 services in one fitting

where and when you want it

Cel-Way: the underfloor electrification system that prevents building obsolescence! Its roomy steel cells and factory-installed inserts can be spaced to fit any building module for widest flexibility of desk or equipment placement . . . for now and for the future. Cel-Way's architecturally-styled fitting supplies all services to any desired location. This fitting pleases owners, decorators . . . fits unobtrusively under a desk pedestal. Cel-Way's pre-set inserts make it easy to relocate services; eliminate messy core drilling in concrete — a process that can cost up to $100 for each change. All things considered, Cel-Way is the most economical and practical in-floor electrification system, for either concrete or steel frame construction.

Check Sweet's 1J/Gr, or write for Cel-Way product manual. Granco Steel Products Company, 6506 North Broadway, St. Louis, Mo. 63147. A subsidiary of Granite City Steel Co.

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CSI Convention, Denver

IMAGINATION IN STEEL

GRANCO®

Steel

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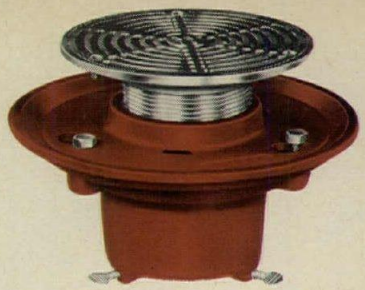
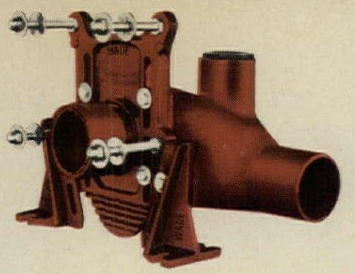
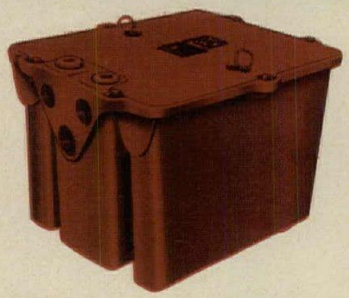
Wade Shokstops



Wade Floor Drains



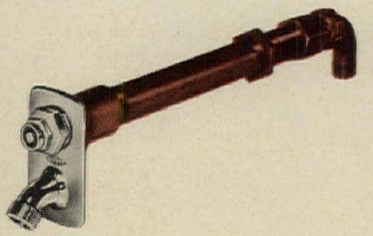
Wade Carriers



Wade Grease & Oil Interceptors

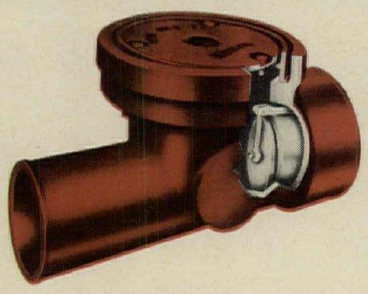
Wade Packing House Drains

Wade Roof Drains



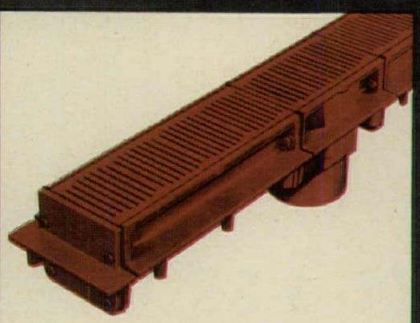
Wade Hydrants

Wade Cleanouts



Wade Back Water Valves

Wade Floor Sinks



Wade Trench Drains

Wade
SINCE 1867

Member, Plumbing and Drainage Institute

The complete line. What you need... when you need it! SPECIFY WADE.

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- ☐ Floor Drains
- ☐ Carriers
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- ☐ Roof Drains
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WADE DIVISION/TYLER PIPE INDUSTRIES, TYLER, TEXAS
BOX 2027-A TYLER, TEXAS 75701

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TPI makes Tyler cast iron soil pipe and fittings • Wade plumbing drainage products • Tyler water main fittings and municipal castings.

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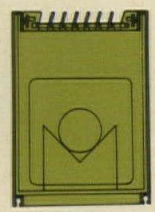
Décor

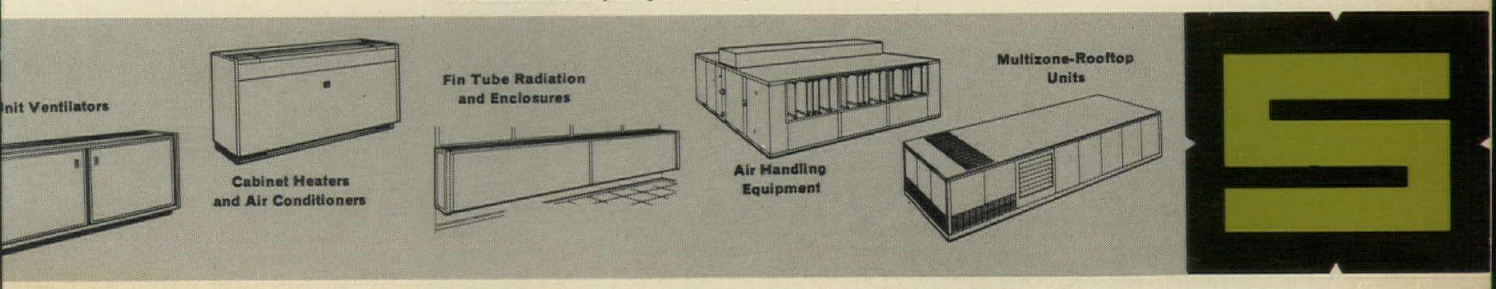
AN EXCITING NEW CONCEPT IN RADIATION ENCLOSURES

Finally it's SCHEMENAUER



Extruded aluminum has made stamped metal radiation enclosures something architects no longer have to put up with. And Décor is the reason. Décor is Schemenauer's totally new concept in enclosures for electric, hot water or steam heating elements. Standard models are anodized aluminum while custom models, in various heights, are available in aluminum, vinyl clad steel, stainless steel and enameled steel—all with extruded aluminum grilles. Here, for the first time, is a unit that enhances any architectural motif while providing unparalleled strength. In addition to ease of installation, its unique design incorporates easy-to-open hidden dampers. Available in five separate models with a full range of sizes, air flow arrangements, dampers and inlet grilles, Décor has just made other enclosures old fashioned. Write for catalog 970 or see your local Schemenauer representative.
Schemenauer Manufacturing Company, Holland, Ohio 43528

For assurance of quality in heating, air conditioning and ventilating equipment, insist on this Schemenauer benchmark



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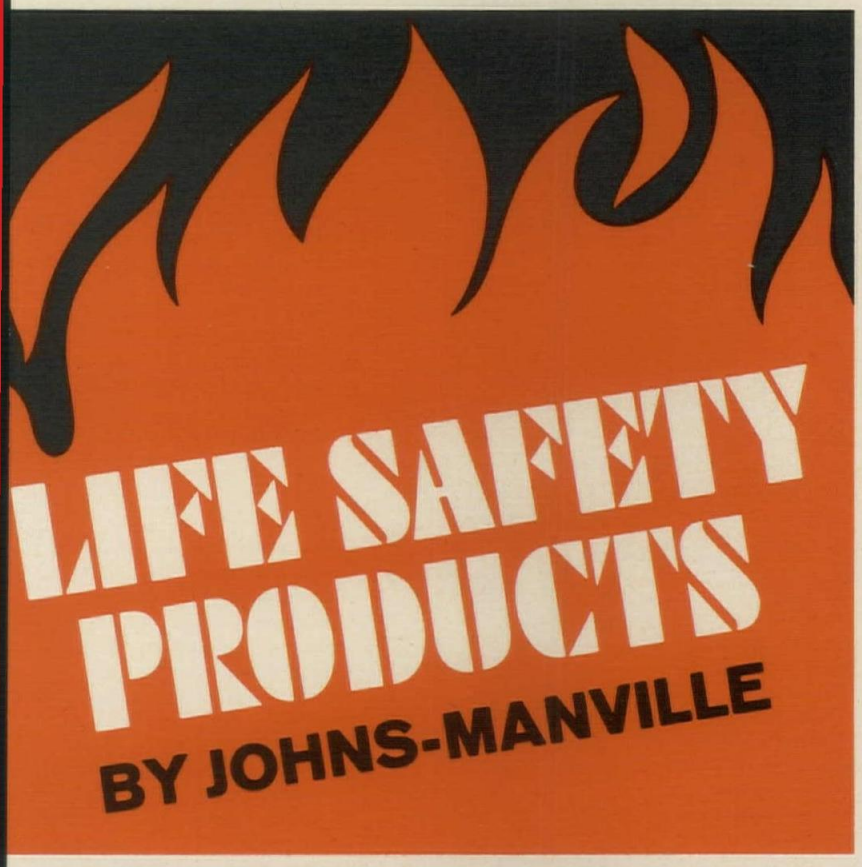
Introducing

New J-M pipe and duc insulation that help save lives

Be safe Look for this label

*A Johns-Manville trademark.

Life Safety*



Last year fire and smoke claimed more than 12,000 lives. And damage ran to over $2 billion.

Now J-M has a family of products that actually helps save lives.

We call them Life Safety products. They're the safest insulations you can get for pipe and duct systems.

Newest additions to our line are J-M Flame-Safe® fiber glass pipe insulations. The first and only to merit *composite* fire- and smoke-safety ratings established for insulations in NFPA 90A.

With Flame-Safe for pipe systems, and many other J-M insulations for ducts, you get more than Life Safety.

Their high thermal performance makes temperatures easy to control, offering continuous fuel and power savings.

They're easy to install. Lightweight. Resistant to damage and deterioration.

For complete information on our new Life Safety products, call or write your nearest Johns-Manville Industrial sales office.

REDUCE HAZARDS OF FIRE & SMOKE

Johns-Manville

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ADVERTISING INDEX

Pre-filed catalogs of the manufacturers listed below are available in the 1967 Sweet's Catalog File as follows.

A Architectural File (green)
I Industrial Construction File (blue)
L Light Construction File (yellow)

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as 75201 — Marcus Loy, 1800 Republic National Bank Tower, (214) 747-9721
ver 80202 — Edward C. Weil, 1700 Broadway, (303) 255-5483
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