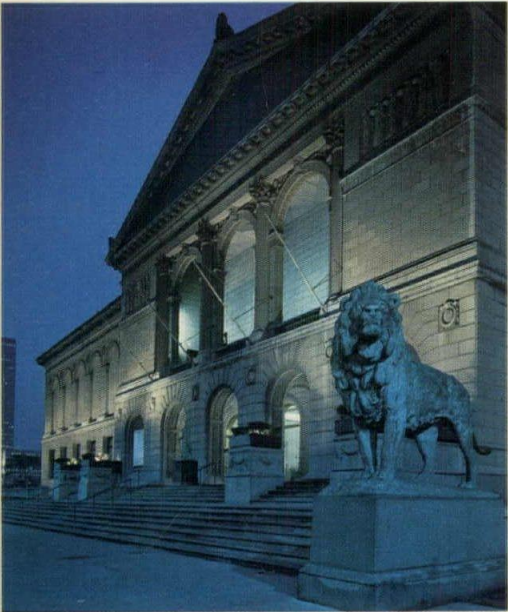




HOFFMANN-LA ROCHE ADMINISTRATION BUILDING BY LUNDQUIST & STONEHILL
APARTMENT TOWER BY HARRY WEESE & ASSOCIATES
SPECIAL REPORT: DESIGNED PARAMETERS FOR AUDIO-VISUAL SPACES
BUILDING TYPES STUDY: HOTELS / MOTOR HOTELS / RESORT HOTELS
FULL CONTENTS ON PAGES 4 AND 5

ARCHITECTURAL RECORD

JULY 1968 **7** A MCGRAW-HILL PUBLICATION TWO DOLLARS PER COPY



T.P.L.

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

For the Chicago Art Institute, the best floor is Tesserera Vinyl Corlon.

As one of the country's leading art museums, the Chicago Art Institute draws over two million visitors a year.

Because that's a lot of shuffling and scuffing for a floor to take, the Institute chose Tesserera Vinyl Corlon for the latest remodeling of gallery areas.

Tesserera is made of heavy-gauge vinyl for heavy-traffic needs. On top of that, the nubby texture of its surface masks marks until the after-hours maintenance crew takes over. No resilient flooring is easier to maintain than Tesserera. It cleans up quickly and easily.

Because Tesserera comes in long 6'-wide rolls, seams are kept at a minimum—and practically unnoticed, thanks to the new Armstrong Seam Master. This electrically operated instrument mechanically cuts smooth and perfectly matched seams right on the job.

Tesserera on the floor never distracts from the artwork on display. Its smart contemporary, cube-like design adds up to quiet good looks—providing a complementary background for



anything from Rembrandt to Warhol, from ancient relics to modern graphics, from marble statues to metal sculpture.

Tesserera is the most widely used and proven sheet vinyl flooring available, but it is only one of over 17 different kinds of Armstrong floors for contract interiors. So, it may or may not be the right floor for your next project. It all depends on your specific needs. Talk to an Armstrong Representative. With the world's largest line of resilient flooring behind him, you'll get an objective recommendation. And for more information, write Armstrong, 307 Rock Street, Lancaster, Pa. 17604.

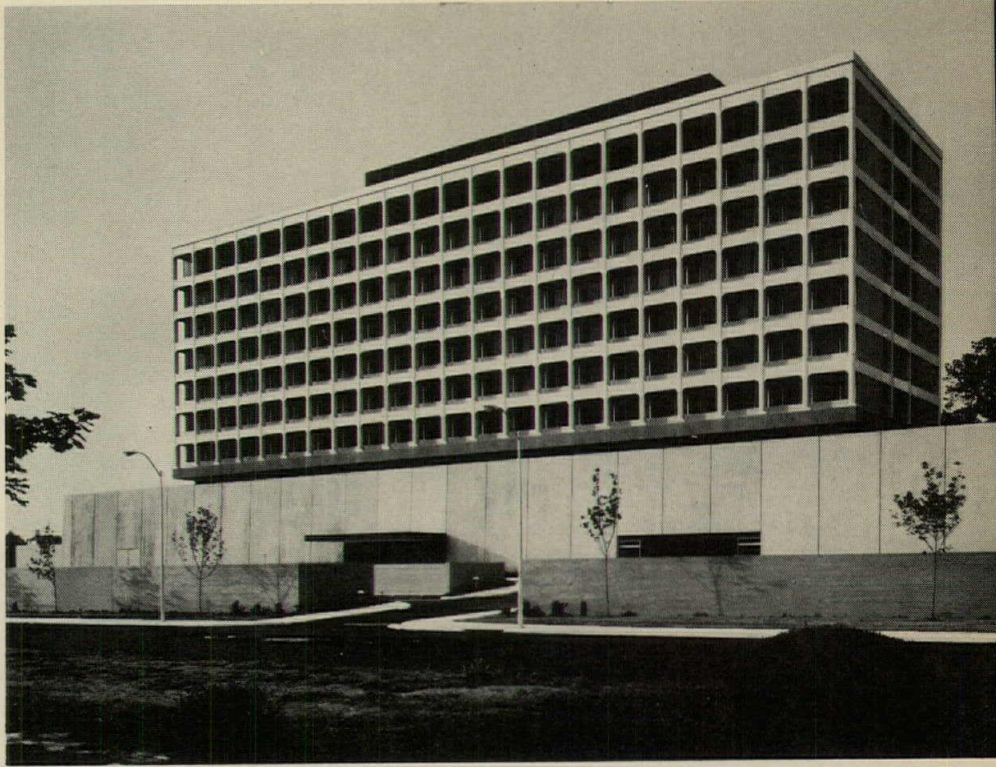
SPECDATA, TESSERA VINYL CORLON Colored vinyl chips inlaid in translucent vinyl all the way to the backing. Moisture-resistant Hydrocord backing. Sheet material 6 feet wide up to 90 feet long. Overall gauge .090". Excellent durability, ease of maintenance, resistance to heel damage; superior grease, stain, and chemical resistance. Can be installed above, on, or below grade or directly over existing resilient floors, using the Armstrong Perimiflor Installation System. Tesserera®, Corlon®, Hydrocord®, Seam Master, and Perimiflor® are trademarks of Armstrong Cork Company.

VINYL FLOORS BY

Armstrong

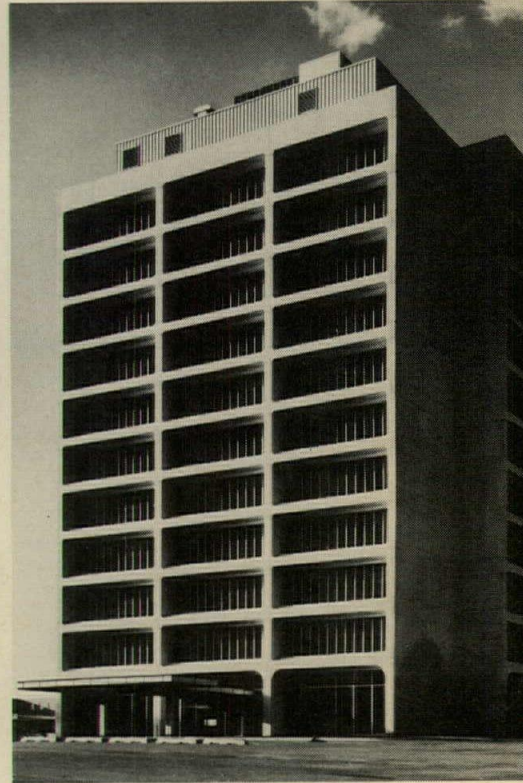
For more data, circle 2 on inquiry card

ROANOKE COMMUNITY HOSPITAL,
 Roanoke, Virginia.
 Architects and Engineers:
 Hayes, Seay, Mattern & Mattern,
 Roanoke, associated with Skidmore,
 Owings & Merrill, New York. General
 Contractor: Basic Construction Co.
 Six Dover Electric Traction Elevators
 with Computamatic control; one
 Dover Oildraulic Elevator, installed
 by Dover Elevator Co.



ALLEN & O'HARA BUILDING,
 Memphis, Tennessee.
 Architects: Robert Lee Hall Associates, Inc.
 General Contractor: Allen & O'Hara, Inc.
 Three Dover Oildraulic Elevators
 installed by Dover Elevator Co.

PHYSICIANS & SURGEONS BUILDING,
 Oklahoma City, Oklahoma.
 Architects: Coston, Frankfurt &
 Short. General Contractor:
 Manhattan Construction Co.
 Three Dover gearless elevators
 with Computamatic control and
 one Dover Oildraulic Elevator
 installed by Dover Elevator Co.



Dover Elevators... engineered for busy buildings

and the busy architects who design them

It makes a difference whom you work with when the time comes to fit an elevator system to your building plans. Dover moves fast to serve you best, and save your time. Since we manufacture a full range of electric traction and Oildraulic® elevators we can offer you the optimum combination for any building requirement.

DOVER

And Dover dependability saves troublesome client complaints after the job is finished. Call in Dover elevator engineers on your next project. See Sweet's Files or write for catalogs. Dover Corporation, Elevator Division, Dept. D-4, P. O. Box 2177, Memphis, Tenn.—38102. In Canada, Dover/Turnbull.

For more data, circle 3 on inquiry card



Cover: Hoffmann-La Roche Administration Building
Nutley, New Jersey
Architects: Lundquist & Stonehill
Photographer: Joseph W. Molitor

FEATURES

- 109 **JOHN FEWKES TOWER, CHICAGO**
In the spirit of the "Chicago School"—an apartment building designed for light, air and views. Architects: Harry Weese & Associates.
- 113 **BUILDINGS DESIGNED AS "STREET"**
Dutch architect Herman Hertzberger is concerned with making un-self-conscious buildings that make people feel at home, with approaches that are intended to make them seem like friendly extensions of the street.
- 121 **HEADQUARTERS BUILDING FOR HOFFMANN-La ROCHE**
A sophisticated response to the client's need for a building that would have great flexibility, provide amenities for all levels of employees, and which could be designed and built quickly and reasonably. Architects: Lundquist & Stonehill.
- 127 **ARCHITECTURAL DESIGN METHODOLOGY: NEW TRENDS**
Jonathan Barnett reports on the first international conference of the Design Methods Group, held at the Massachusetts Institute of Technology in June.
- 129 **KREIZEL HOUSE, LONG ISLAND, NEW YORK**
An extensive alteration by architect Herbert Beckhard of this house originally built in the early 1950's gives it a new character and new capabilities to meet new needs.



BUILDING TYPES STUDY 386

- 133 **HOTELS/MOTOR HOTELS/RESORT HOTELS**
- 134 **TOMORROW'S IN-CITY HOTEL**
Noted hotel architect William B. Tabler outlines the problems affecting large urban hotels—labor costs and profit squeeze—and suggests some possible solutions in future urban hotels.
- 138 **MOTOR HOTEL DESIGNED TO INVITE LONGER STAYS**
Fenway North Motor Hotel, Revere, Massachusetts
Architects: Salsberg & LeBlanc
- 140 **MOTOR LODGE IN DENSE URBAN AREA**
Howard Johnson Motor Hotel, Anaheim, California
Architects: William L. Pereira & Associates
- 141 **MOTOR INN ON CITY EDGE**
Village Inn Motor Hotel, Birmingham, Michigan
Architects: Luckenbach/Durkee & Associates, Inc.



Louis Reems

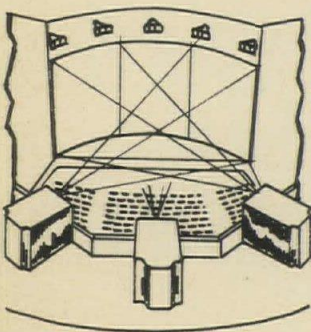
ARCHITECTURAL RECORD, July 1968, Vol. 144, No. 1. Published monthly, except May, when semi-monthly, by McGraw-Hill, Inc., 330 West 42nd Street, New York, New York 10036. CORPORATE OFFICERS: Shelton Fisher, President and Chief Executive Officer; John L. McGraw, Chairman; John J. Cooke, Vice President and Secretary; Gordon W. McKinley, Vice President and Treasurer. SUBSCRIPTION RATE: for individuals in the fields served \$6.00 per year in U.S., U.S. possessions and Canada; single copies \$2.00; further details on page 6. THIS ISSUE is published in national and separate editions. Additional pages of separate edition numbered or allowed for as follows: Western Section 32-1, through 32-6. PUBLICATION OFFICE: 1500 Eckington Place, N.E., Washington, D.C. 20002. Second-class postage paid at Washington, D.C. POSTMASTER: Please send form 3579 to Fulfillment Manager, ARCHITECTURAL RECORD, P.O. Box 430, Hightstown, N.J. 08520.

ARCHITECTURAL RECORD

CONTENTS: JULY 1968

- 142 PLANNED FOR GROUP TOURS
Terrace Wing—The Motor House, Williamsburg, Virginia
Architects: David Warren Hardwicke and Partners
- 143 PLANNING A SUCCESSFUL RESORT HOTEL
Alan H. Lapidus stresses the "back of the house" in resort hotel design with two paramount objectives: control and efficiency.
- 146 THE ARCHITECT AWAY FROM HOME
Hotel Siam Inter-Continental
Architects and engineers: Joseph Salerno-Tippetts-Abbott-McCarthy-Stratton-Walther Prokosch
- 148 A RESORT HOTEL ON A HAWAIIAN ISLAND
Kona Hilton Hotel, Kona, Hawaii
Architects: Wimberly, Whisenand, Allison and Tong

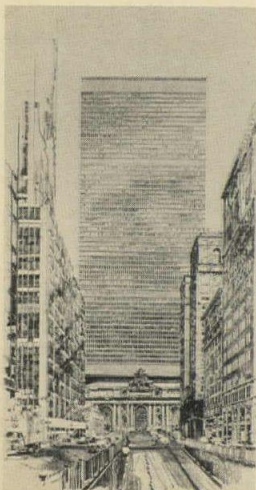
ARCHITECTURAL ENGINEERING



- 149 THE PRACTICAL CONSIDERATIONS IN DESIGNING AUDIO-VISUAL SPACE
Engineer Ray H. Wadsworth investigates audio-visual systems—their technical aspects and design parameters—and discusses their application for education, commerce and entertainment fields. Design data for determining space requirements of audio-visual facilities are given.

- 165 PRODUCT REPORTS
- 210 OFFICE LITERATURE
- 243 READER SERVICE INQUIRY CARD

THE RECORD REPORTS



- 9 BEHIND THE RECORD
"Vest-pocket excellence: Can it be contagious?"
- 10 PERSPECTIVES
- 35 THE RECORD REPORTS
- 36 BUILDINGS IN THE NEWS
- 72 CALENDAR AND OFFICE NOTES
- 81 ARCHITECTURAL BUSINESS
Building activity 83
Cost trends and analysis 87
Cost indexes and indicators 89
- 240 ADVERTISING INDEX

ARCHITECTURAL RECORD STAFF

EDITOR

WALTER F. WAGNER, JR., A.I.A.

MANAGING EDITOR

JEANNE M. DAVERN

SENIOR EDITORS

ROBERT E. FISCHER
WILLIAM B. FOXHALL
MILDRED F. SCHMERTZ, A.I.A.
HERBERT L. SMITH, JR., A.I.A.
ELISABETH KENDALL THOMPSON, F.A.I.A.

ASSISTANT EDITORS

SIDNEY A. ABBOTT
MARY E. ARENDAS
JOHN SAMUEL MARGOLIES
DON RANEY

EDITORIAL ASSISTANTS

JOAN F. BLATTERMAN
NANCY LOU MOORE
ANNETTE K. NETBURN

DESIGN

ALEX H. STILLANO, Director
RUSSELL F. ETTER, Associate
SIGMAN-WARD, Drafting
JAN WHITE, Consultant

EDITORIAL CONSULTANTS

EDWARD LARRABEE BARNES, F.A.I.A.
WALTER GROPIUS, F.A.I.A.
ROBERT F. HASTINGS, F.A.I.A.
PAUL RUDOLPH, A.I.A.

INDUSTRY CONSULTANTS

GEORGE A. CHRISTIE, JR., Economics
ERNEST MICKEL, Washington
WILLIAM H. EDGERTON, Building Costs

McGraw-Hill WORLD NEWS

ARTHUR MOORE, Director
DOMESTIC NEWS BUREAUS—Atlanta,
Chicago, Cleveland, Dallas, Detroit,
Los Angeles, Pittsburgh, San Francisco,
Seattle, Washington, D. C.
INTERNATIONAL NEWS BUREAU—Bonn,
Brussels, Hong Kong, London, Mexico City,
Milan, Moscow, Paris, Rio de Janeiro, Tokyo

PUBLISHER

BLAKE HUGHES

CIRCULATION MANAGER

HENRY G. HARDWICK

COMING IN THE RECORD

BUILDING TYPES STUDY: AIRPORTS

The next decade will see more expansion in air traffic, both passenger and cargo, than in all the years since Kittyhawk, according to responsible projections. Architects and engineers are already deeply committed in master planning and ground facilities design to cope with the advent of giant transports and increasing short-haul requirements. The August study will show examples of current work and will outline the scope of commissions, large and small, associated with this multi-billion-dollar expansion.



McGraw-Hill



ARCHITECTURAL RECORD (combined with AMERICAN ARCHITECT, ARCHITECTURE and WESTERN ARCHITECT AND ENGINEER), July 1968, Vol. 144, No. 1. Title ® reg. in U.S. Patent Office © copyright 1968 by McGraw-Hill, Inc. All rights reserved including the right to reproduce the contents of this publication either in whole or in part. Quotations on bulk reprints of articles available on request. Indexed in Reader's Guide to Periodical Literature, Art Index, Applied Science & Technology Index, Engineering Index, and the Architectural Index. Architectural Record is a McGraw-Hill publication, published monthly, except May, when semi-monthly, by McGraw-Hill Publications, a division of McGraw-Hill, Inc., 330 West 42nd Street, New York, New York 10036. James H. McGraw (1860-1948), Founder.

EXECUTIVE, EDITORIAL, CIRCULATION AND ADVERTISING OFFICES: 330 West 42nd Street, New York, New York 10036. Western Editorial Office: 255 California Street, San Francisco, California 94111. PUBLICATION OFFICE: 1500 Eckington Place, N.E., Washington, D.C. 20002; second-class postage paid at Washington, D.C.

OFFICERS OF McGRAW-HILL PUBLICATIONS: Joseph H. Allen, president; J. Elton Tuohig, executive vice president; Robert F. Marshall, senior vice president—operations; vice presidents: John R. Callahan, editorial; John R. Emery, administration; John M. Holden, marketing; Paul F. Cowie, circulation; Jerome D. Luntz, planning & development; Robert M. Wilhelmy, controller.

CORPORATION OFFICERS: Shelton Fisher, president and chief executive officer; John L. McGraw, chairman; Robert E. Slaughter, executive vice president; Daniel F. Crowley, Donald C. McGraw, Jr., Bayard E. Sawyer, senior vice presidents; John J. Cooke, vice president and secretary; Gordon W. McKinley, vice president and treasurer.

Every effort will be made to return material submitted for possible publication (if accompanied by stamped, addressed envelope), but the editors and the corporation will not be responsible for loss or damage.

SUBSCRIPTIONS: Available only by paid subscription. Publisher reserves the right to refuse non-qualified subscriptions. Subscriptions solicited only from architects and engineers. Position, firm connection, and type of firm must be indicated on subscription orders forwarded to Fulfillment Manager, Architectural Record, P.O. Box 430, Hightstown, New Jersey 08520. Subscription prices: U.S., Possessions and Canada: \$6.00 per year; other Western Hemisphere countries, to those who by title are architects and engineers, \$15.00 per year. Single copy price, \$2.00. Beyond Western Hemisphere, to those who by title are architects and engineers, \$15.00 per year for 12 monthly issues not including Mid-May issue. Subscription from all others outside U.S., U.S. Possessions and Canada for 12 monthly issues, not including Mid-May issue, \$24 per year.

SUBSCRIBERS: Address change of address notice, correspondence regarding subscription service or subscription orders to Fulfillment Manager, Architectural Record, P.O. Box 430, Hightstown, New Jersey 08520. Change of address notices should be sent promptly; provide old as well as new address; include zip code or postal zone number if any. If possible, attach address label from recent issue. Please allow one month for change of address to become effective.

UNCONDITIONAL GUARANTEE: The publisher, upon written request, agrees to refund the part of the subscription price applying to the remaining unfilled portion of the subscription if service is unsatisfactory.

OTHER McGRAW-HILL SERVICES TO THE BUILDING AND CONSTRUCTION INDUSTRY: Chicago Construction News—College and University Business—Construction Methods and Equipment—Daily Construction Reports (Los Angeles)—The Daily Journal (Denver)—Daily Pacific Builder (San Francisco)—Dodge Construction Statistics—Dodge Mailing Service—Dodge Reports—Dow Building Cost Calculator—Engineering News-Record—Home Planners' Digest—Hospital Purchasing File—House & Home—The Modern Hospital—Modern Nursing Home—The Nation's Schools—Real Estate Record & Builder's Guide—Sweet's Catalog Services—Sweet's Canadian Construction Catalogue Services.

A Great New Solution to the Building Facade Problem Kydex[®] 5000



- TOUGH ● FLAME RESISTANT ● WEATHER RESISTANT
- SHARPLY DETAILED, DEEP FORMABILITY ● LOW COST

Now Rohm and Haas offers a choice of two building facing materials—famed Plexiglas[®] acrylic plastic, and Kydex 5000 for large opaque facades such as that shown in the above illustration. Kydex 5000 combines Kydex, an acrylic-polyvinyl chloride sheet as the substrate, with an acrylic film permanently fused to its surface.

Kydex 5000 offers this outstanding combination of properties:

Toughness—Its toughness and resilience are demonstrated by an elongation in excess of 100% under 6500 psi load in the standard tensile test. Yet it is as stiff as Plexiglas, with a modulus in flexure of 400,000 psi.

Flame Resistance—The flame spread rating of the Kydex substrate is in the range of 25 which should facilitate approvals under building codes for large area facing panel installations of Kydex 5000.

Weather Resistance—Its durability in sunlight exposure is provided by the 100% acrylic film surface, combined with the inherent resistance of the substrate to oxidation and other degrading effects of outdoor environment.

Formability—It forms deeply and in sharp detail with the same low cost tooling that forms Plexiglas panels so economically.

Low Cost—Sculptured facades of Kydex 5000 typified by the illustration are lower in material and installation cost than heavier masonry materials currently used to create similar exterior designs.

Write for our brochure containing specification data and installation details. Names of fabricators of Kydex 5000 formed panels will also be supplied on request.

**ROHM
AND
HAAS** 
PHILADELPHIA, PENNSYLVANIA 19105

For more data, circle 4 on inquiry card



precast white concrete screen that fools the sun

The solar screen on this new office building in Mobile, Alabama illustrates the highly imaginative results that can be developed with precast white concrete. The screen, made up of 21,000 8" x 16" units, is set the width of a narrow balcony out from the windows. This provides good visibility to the surrounding area yet maintains full protection from the sun in all seasons.

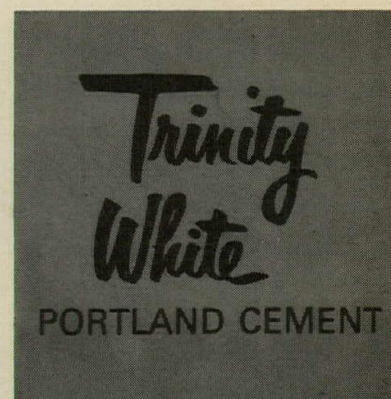
Precast white concrete solar screens, window walls, and curtain walls of out-

standing beauty are available in all parts of the country today—thanks to TRINITY WHITE portland cements and the capable products' plants who can translate your design into practical, economical building materials.

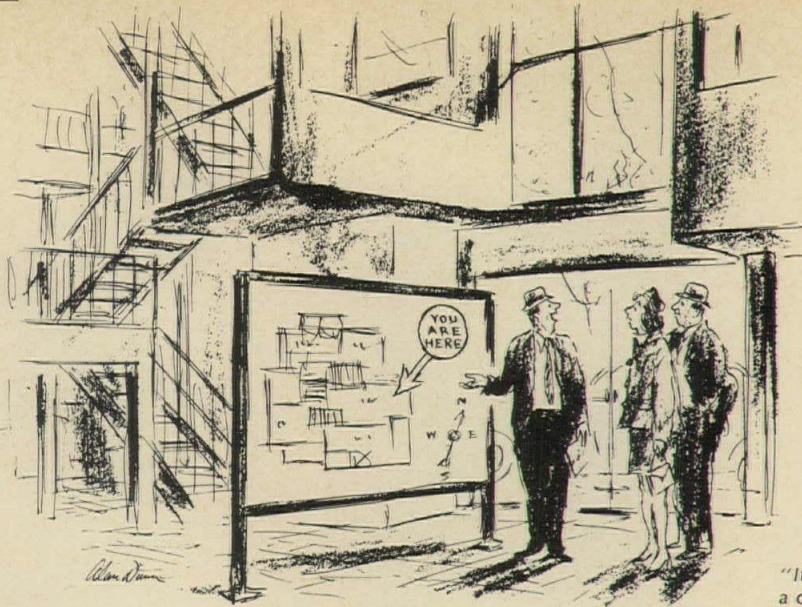
CREDITS: #1 Office Park, Mobile, Alabama. Architects: Woods & Steber & Assoc. General Contractor: Martin Builders. Solar Screen by: Underwood Concrete Products Co. Masonry: W. J. Van Arsdale.



A product of GENERAL PORTLAND CEMENT COMPANY, P.O. Box 324, Dallas, Texas 75221
Offices: Houston • Tampa • Miami • Chattanooga • Chicago • Fort Wayne • Kansas City, Kan. • Fredonia, Kan. • Los Angeles



For more data, circle 6 on inquiry card



"It goes with each of our homes, Madam, a complete plan on every level."

Industrial architecture: big problems push in

In Detroit last month, I was privileged to attend the fifth Industrial Architecture Seminar of the UIA—only the second UIA event to be held in this country. Its theme was "The Effect of Industrial Architecture on People and Environment," but as at all gatherings of architects I've attended lately, the discussion quickly broadened to cover the whole range of architectural problems and the pace at which new ideas and techniques and needs are developing. The example I enjoyed most: Architect E. F. Groosman of Rotterdam, speaking of new building techniques proliferating in Europe. He suggested that "if there would have been the same amount of regulation for the aircraft industry [as there is for building] they would have produced beautiful planes never flying higher than one inch. . . . All over the world, we have building regulations . . . which allow the building and the architects to build, to construct, but which are not sufficiently elastic to allow the building industry to develop." In support of his argument that the building industry must develop, and quickly, he argued that "In other fields of activity, the speed of development cannot be adequately expressed as 'acceleration', but rather as 'multiplication and mutation.' Mankind has existed for about 20 million years, but only during the last 100 years did our transport speed accelerate from seven miles an hour in a horse-drawn cart to 25,000 miles per hour in a rocket. Acceleration or mutation? Printing has existed for 300 years, TV for 30 years. Now, pictures from Mars are here in less than 300 seconds. This is mutation. In the building industry," says Groosman, "we must with our hands, and with every particle of

our brains, search for new possibilities, and exercise and develop those to perfection."

Some reflections on the moon

"Our problem is really a problem of what the computer people call 'software'. It is the way in which the hardware systems are strung together to make them work effectively. Perhaps the best example I can give of this is the example of the dweller in Harlem who sits drinking beer, looking at his modern television, and perhaps a NASA program was coming in from the moon showing a little shovel scooping a trench. As he sits and looks at this, we have to reflect that we do not know how to put a public school system in New York City and take his kids through high school so they can participate in and contribute to and gain the benefits of our modern industrial society."—from a speech by Dr. Thomas O. Paine to the Architects and Engineers Forum sponsored by Southern California Edison Company and the Los Angeles Department of Water and Power.

Public planning for private building

At the same forum in Los Angeles, Dr. William L. C. Wheaton, elaborating on his point that Sixth Avenue "has produced a huge investment in excellent buildings on a site and in a manner reflecting the worst of pre-World War I planning", asked: "How many mistakes and how many bad investments of this sort can our society afford to make? It is not a failure of architects nor is it a failure of building sponsors. In consider-

able degree, it is a failure of local governments: The inability of local governments to become involved in planning and building the infra-structure for private effort. And yet you say in what government? In what city in the United States would the mayor say to Time Inc. and CBS and the Hilton chain: No boys, hold up your buildings for two or three years. I know it will cost you a quarter of a million a year, but ride with me and we will put a platform there and connect it to the subway system and connect it to the highway system and connect it to a parking system and put in a moving walkway so this thing can be a vital piece of the future.

"It would take a very tough mayor to lay down such a line and stick to it. And it would take very courageous business leaders to ride with it and get behind the effort so that there could be that new and better scale of planning. But if we continue to miss opportunities, we will never get around that corner toward the future that we all search for."

Bad news of the month, automotive division

The efforts of architects and others to save at least a small portion of the earth's surface from the highway engineers will be hampered by the news (via McGraw-Hill's far-flung World News) that a "record 198,996,479 motor vehicles were registered throughout the free world last year," and that "The United States continues to lead all other areas in registrations, with 51 per cent of the world's total." Those who have given up all hope may flee to Burma, "the only country in the free world where automobile registrations are going down." —W.W.

Vest-pocket excellence: Can it be contagious?

A few weeks ago, I noted in the local paper that the new offices of the County Federal Savings & Loan in Westport, Conn. (incorporated circa 1787 and big on clapboards and copper-roofed cupolas) had been opened with due ceremony. The item was of some interest because the new building was a replacement for a building which had rather spectacularly burned to the ground a year ago, and because the new design had been done by Lew Davis (of Davis, Brody and Associates whose work I almost always admire highly). Well, I did stop off to see it on the way to the hardware store last Saturday morning. People on their shopping trips were stopping to look at the building, which fits quietly between two very ordinary neo-Colonial retail establishments though it is almost starkly contemporary—done in bold planes of white stucco and glass. Others crowded inside to look at the handsome contemporary furniture and admire the paintings set off against the white plaster walls. The point is that “the people” were responding to the concern that the owner had exhibited in commissioning a first-rate architect and were responding to the concern the architect had exhibited in every phase of the design from basic concept to choice of the clock and calendar on the wall. The people were responding to a vest-pocket of excellence tucked into their main street.

It is a long way from this perhaps absurdly small-scale recognition of excellence to a national demand for excellence, but I continue to believe in the idea that “the people”—if they are given

the opportunity to see and experience good architecture and good environment, if only one person at a time, one building at a time, one experience at a time—will grow to want it and then perhaps to demand it. First on an individual basis—in their housing. Then on a broader scale, as in their local schools; then as part of the massive government efforts that are building up now to house and serve our growing population in our growing cities. And if that demand for quality of design can be superimposed on the enormous (indeed frightening) need for quantity of construction, our total environment will come much closer to what we sometimes dream it might be.

Can we really hope for changes in what sometimes still seems like a hopeless apathy on the part of so many government officials and private citizens about quality of architecture? Yes, I think, because so much change is required in the systems and organizations and attitudes involved in the building job that there is fresh opportunity for change in systems and organization and attitudes towards the design job. Because while we are making the changes in the system to create quantity we can also make the changes to assure quality.

In a recent speech, Marie McGuire, who long headed the Public Housing Authority and is now HUD's Assistant for Problems of the Elderly and Handicapped, said that whenever public funds are used in building, “the result should reflect our best, not our least. It should be a contribution to the high level of basic and esthetic goals of the city. . . .

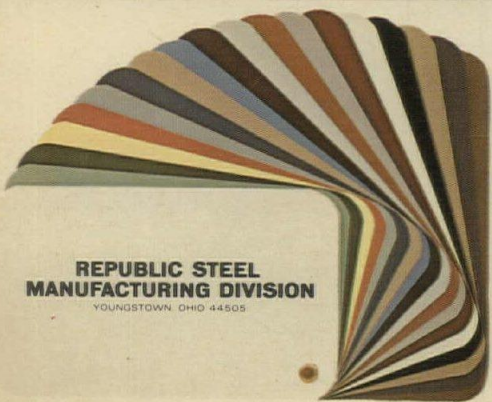
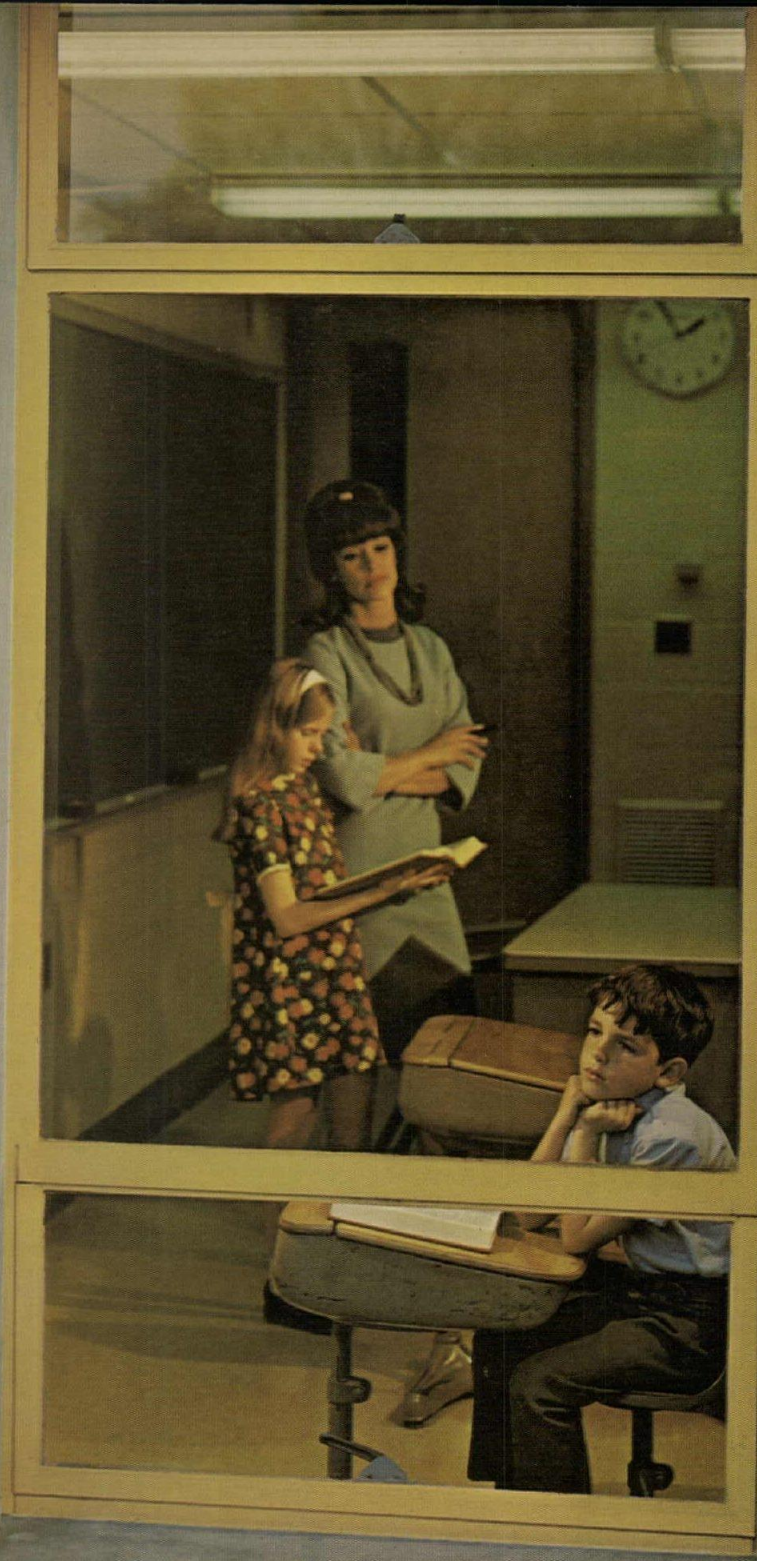
Above all, housing for low-income people, through its design, should inculcate a love of one's home by having a home worthy of love. If we build barracks, we will get barracks reactions. I suggest this is the normal human response, and has little relationship to the individual's economic status.”

Some of the housing shown in last month's Building Types Study (“Urban Housing: New Approaches and New Standards”)—commissioned by private clients with a belief in the importance of excellence, designed by architects willing to work and fight for something above the norm, and financed by lenders willing to try something new (and how rare they are)—is exploring new ideas in the hopes of new human responses.

Excellence in design of buildings is, of course, not enough by itself. Dr. William L. C. Wheaton recently pointed out to the American Society of Planning Officials that “most of the programs of public or private development have utterly failed to take advantage of major opportunities for urban development. The substantial rebuilding of Sixth Avenue in New York City without any public intervention has produced a huge investment in excellent buildings on a site and in a manner reflecting the worst of pre-World War I planning. It could have been a major fragment of the city of the future.”

The hope is, of course, that quality is catching; that vest-pocket examples can stimulate a broader and broader demand for over-all excellence of design. If that is true, each new house or garden apartment or public school or post-office or corporate headquarters or speculative office building is an opportunity to set a new and higher standard of excellence for at least its area. Which is, it seems to me, a challenging and helpful way to approach every new commission.

—Walter F. Wagner, Jr.



**REPUBLIC STEEL
MANUFACTURING DIVISION**
YOUNGSTOWN, OHIO 44505

Dream in color with Republic CRYLCOAT* windows.

Economical way to let your imagination roam.
Choose from 18 colors to blend or contrast Republic
standard windows with your building walls.

*A trademark of Republic Steel Corporation

For more data, circle 7 on inquiry card





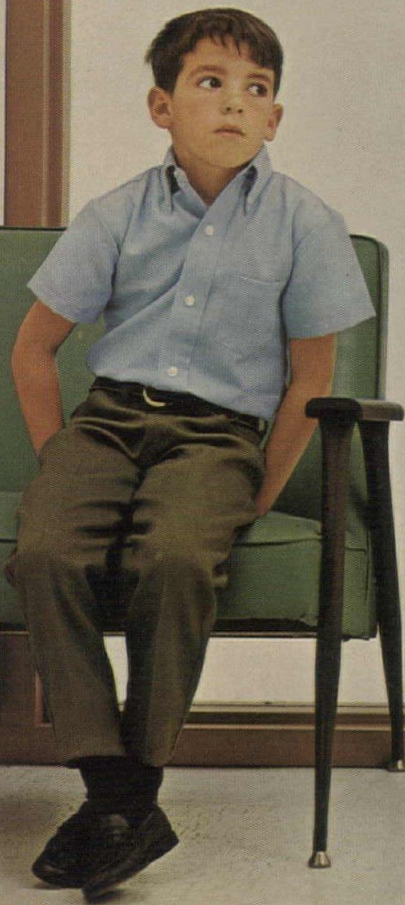
Create with standard Republic sticks and doors.

Republic Full-Flush Standard Doors offer the same creative versatility at standard cost. These doors are modified at our factories and regional warehouses for distinctive light and louvre treatments. You get beautiful doors that are exceptionally well finished, durable, and

quiet. At a fraction of the cost of custom work.

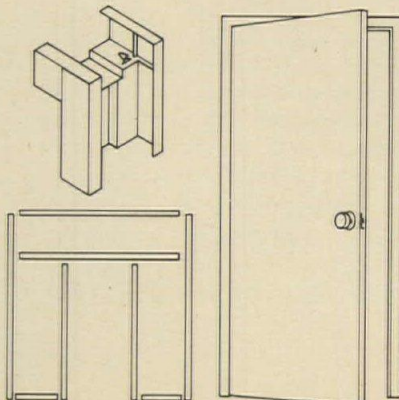
Combine these with Republic CRYLCOAT windows, and your building's beauty is much more than skin deep. From inside or outside you've created a splendid building — and at much lower cost.

PRINCIPAL



Frame-A-Lite Sticks offer unlimited design flexibility for entrances, halls, or entire walls. The system is very inexpensive. Trim, steel sticks won't warp, sag, rot, or shrink. The need for costly planing and mortising is eliminated. And our snap-on glazing bead *looks* very expensive.

**REPUBLIC STEEL
MANUFACTURING DIVISION**
YOUNGSTOWN, OHIO 44505



**REPUBLIC STEEL CORPORATION
MANUFACTURING DIVISION
Youngstown, Ohio 44505**

Please have a salesman call with a demonstration kit.

Please send literature and specifications on:

- CRYLCOAT Standard Windows
- Frame-A-Lite Stick System
- Republic Full-Flush Doors
- Universal Door Frames

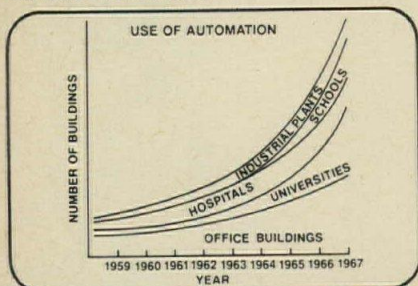


Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

For more data, circle 7 on inquiry card

A Honeywell summary of recent developments in building automation

Building automation—the automatic collection and use of data to operate mechanical systems with least attention and highest efficiency—is governed by trends in building construction itself. In recent years, two major trends have emerged. These are, the increasing number of large buildings constructed each year, and the steadily growing cost of operating commercial buildings of all kinds and sizes.



Installations doubled between 1965 and 1967.

Both these trends give rise to a need for the application of more and more automation, designed to achieve greater efficiency at lower cost. In terms of automation hardware, we consider that the significant trends are:

- the standardization of systems, with modular construction.
- the increased use of monitoring systems for automatically spotting trouble.
- greater use of logging systems, to aid in efficient operation and costing.
- a trend to larger capacity, high-speed systems, able to accommodate major building additions.
- the use of new technologies.

Standardization and Modularity

Standardized automation systems bring a number of advantages. They have lower initial cost—a result of mass production. They are well-defined, with readily available technical information on their performance. They incorporate tested designs. Start-up is virtually trouble-free and servicing is simplified.

Modular construction means flexibility. A system can be easily adapted to fit the needs of a particular building. Add-on modules mean a system can grow with building additions.

Standardized, modular systems cost less, making automation practical for more buildings. For the consulting engineer, standardized systems are easy to specify—information is readily available.

Monitors catch trouble early. There is an increasing use of monitoring systems to spot equipment trouble. Monitoring means malfunctions are located before they become significant—damage to expensive equipment is avoided and tenant complaints averted. The manpower required for inspection is substantially reduced, and automatic inspections are made even during unoccupied hours.

Correctly applied automation systems mean lower operating costs. But experience shows it is possible to over-automate. A careful survey of needs should be made before writing the specification. For example, don't over-achieve by installing a 3,000 point system in a 1000 point application. Careful planning is necessary to assure maximum return on your automation investment.

New technologies

For the efficient operation of very large buildings and building complexes, more sophisticated technologies are needed. Because of its activities in the computer field, Honeywell is particularly well equipped to do this, and from computer technology we have borrowed "core memory." From space technology we have taken micro-electronic techniques, and combined the two in a new family of standardized systems called Special Purpose Digital Data Processors.

The number of logging systems installed in the past two years is more than equal to all those pre-

viously installed. Further, a wider variety of data is being logged. For example:

- logs of values when trouble occurs.
- logs of flow and BTU's for determining costs.
- logs of energy input vs. output to indicate efficiency of operation.

On a typical Honeywell console, a series of selection switches allows an operator to demand a variety of logged information.



Standardized System 7 Selectographic Supervisory Data Center, with system analyzer and alarm printer module.

Another major trend is toward systems designed to facilitate future expansion. To provide this flexibility, systems incorporate core memories. With this device, a system can be completely reprogrammed without changes in electrical wiring. The memory also allows an operator to add a new input or inputs in minutes.

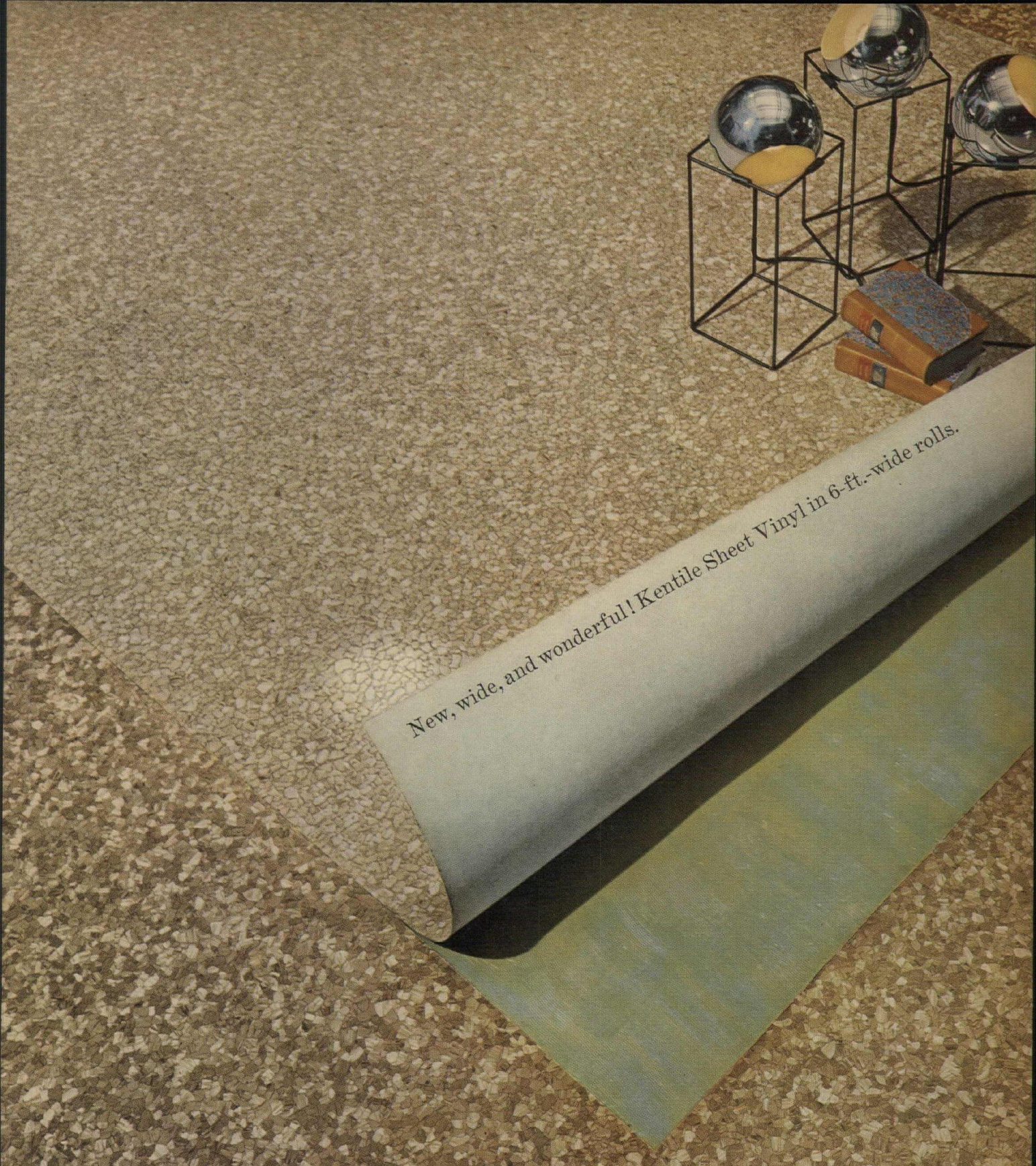
Now, the computer. Finally, there is a trend towards doing more building automation functions automatically: the next generation of systems will be based on computers, working in closed loops with the mechanical systems.

A computer's speed allows for simultaneous scanning, alarm printing, plus status and trend logging. Computer programs, aimed at more efficient operation can be written.

For the full story on building automation, ask the Commercial Division at your local Honeywell office.

Honeywell
AUTOMATION

For more data, circle 8 on inquiry card



New, wide, and wonderful! Kentile Sheet Vinyl in 6-ft.-wide rolls.

New Kentile Malibar—a textured sheet vinyl floor in heavy .090" gauge. Colors: 10. Complies with Fed. Spec. # L-F-475a—Type II.

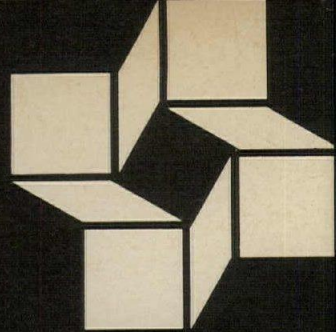
New Malibar. Stonelike chips set deep in translucent vinyl.

An excitingly realistic sheet vinyl floor because each set-in chip extends clear through to the backing. 6-foot-wide rolls ensure a virtually seamless look. Textured surface helps hide underfloor imperfections. Malibar is long wearing, greaseproof, easy to maintain. Hydrite backing permits use anywhere, even below grade. Ideal for commercial use. Samples? Ask your Kentile® Representative.

KENTILE FLOORS

Brooklyn, N.Y. 11215

OMNI PLUS



An Architectural Furniture System for Custom Designing Active Storage and Work Areas

The wall and front supported application of OMNI PLUS expresses structural order and organizational function while achieving more efficient utilization of space. The cantilevered effect of the wall supported application accentuates its classic architectural form which is compatible with any style or fashion. OMNI PLUS' system concept is the most complete and significant new product available to the interior designer interested in environmental design. Its vertical and horizontal flexibility has synthesized function with form, and when necessary can be front supported to combine the ruggedness needed in contract furniture with its architectural simplicity.

Wall supported offices can be equally well designed for the action directed, the reference (or storage) oriented, or both. Enclosures may be ganged or stacked as high as one can reach.

OMNI PLUS offices may or may not be designed to include a desk extended from one of its modules. In a typical application, OMNI PLUS uses as little as one third the floor space of traditional furniture. The many possible applications are an appealing solution to floor maintenance problems, and offer the designer freedom of vertically separated and/or varying depths of custom cabinetry. Rather than being object furniture, OMNI PLUS becomes the background element in any given interior.

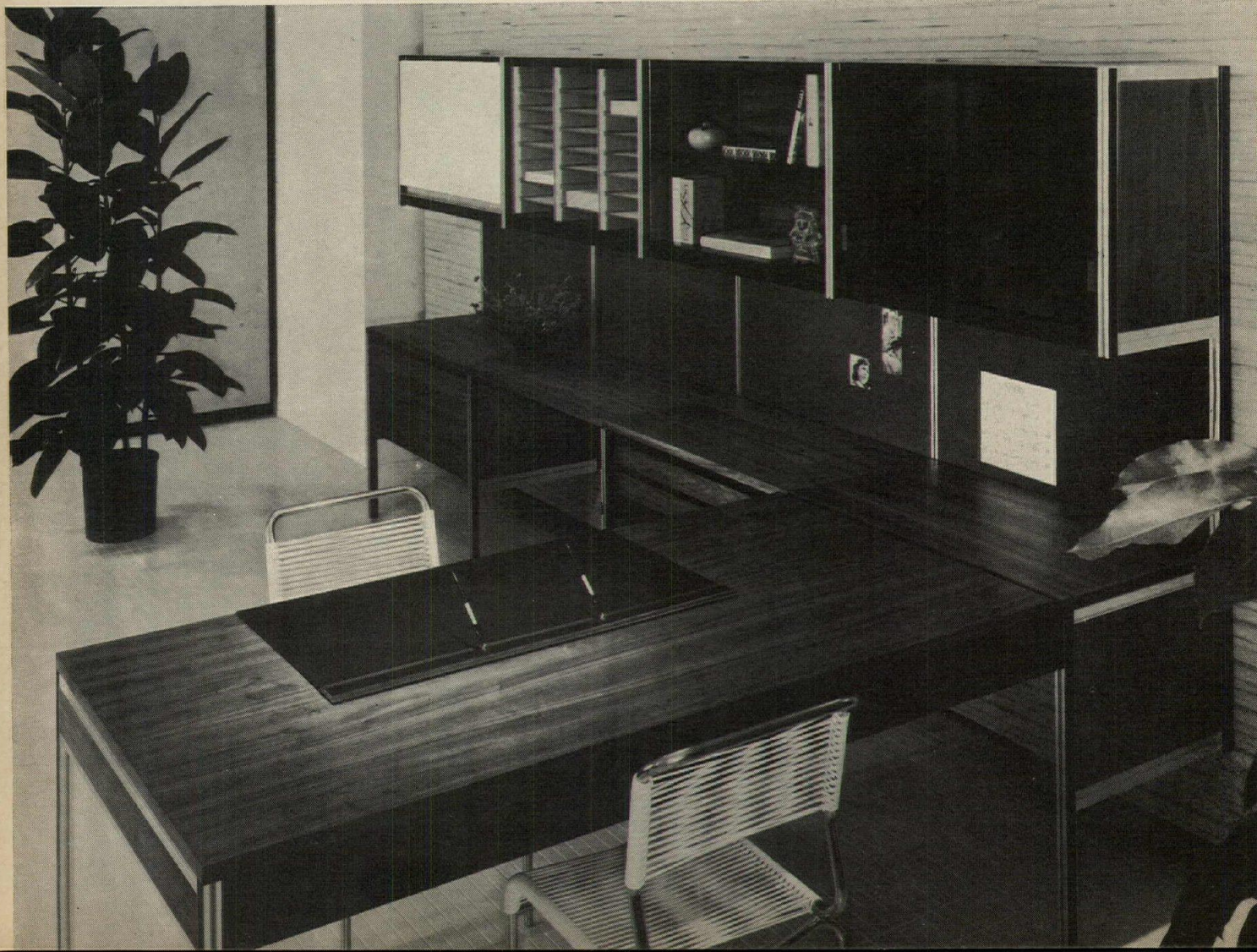
OMNI PLUS is a complete component system which can be designed into wall supported or wall and front supported applications. It can be disassembled and reassembled in a new location, or be redesigned for a new function. The designer of a system has the freedom and flexibility of unlimited combinations of open areas, enclosures, semi-closures with variable organizer systems, work surfaces and accessories.

Write for the location of the showroom or dealer nearest you, and an OMNI PLUS brochure which shows a variety of applications and details about accessories. OMNI/Aluminum Extrusions, Inc., Subsidiary of Hoover Ball and Bearing Company, 1378 Shepherd St., Charlotte, Michigan 48813.



Front rails may be extended to the floor for support when the requirement is more rugged. The library/periodical rack shown above has a drop front work surface, and is ideal for professional waiting rooms and foyers. Strip lamps are available for horizontal panels.

For more data, circle 9 on inquiry card





The number is Menlo 921L

Your number for efficiency. Functional, contemporary beauty. Menlo captures the style, quality and security typical of each Corbin UNIT® Lockset. You'll also find these features in the complete line of Corbin exit devices, door closers and other types of locksets.

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



For more data, circle 10 on inquiry card

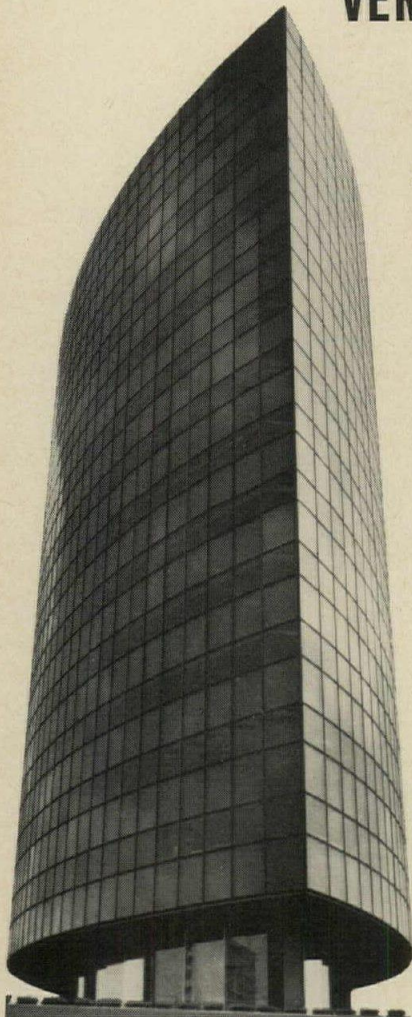
Planning an on-the-go office building? Specify a

Recordlift

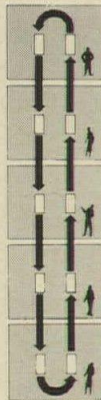
VERTICAL MAIL CONVEYOR BY



**Standard
Conveyor**



Phoenix Mutual Life Insurance Co., Hartford, Conn. *Architect:* Harrison & Abramovitz. *Contractor:* George A. Fuller Co.



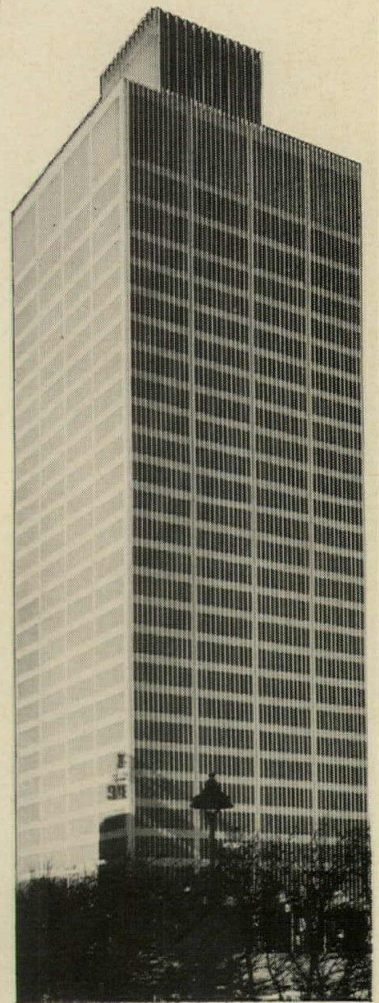
The ultra-modern office buildings seen here differ greatly in architectural style—yet they do have one thing in common to give them remarkable functional efficiency.

It's a STANDARD CONVEYOR *Recordlift* Vertical Mail Conveyor System, schematically illustrated at the left.

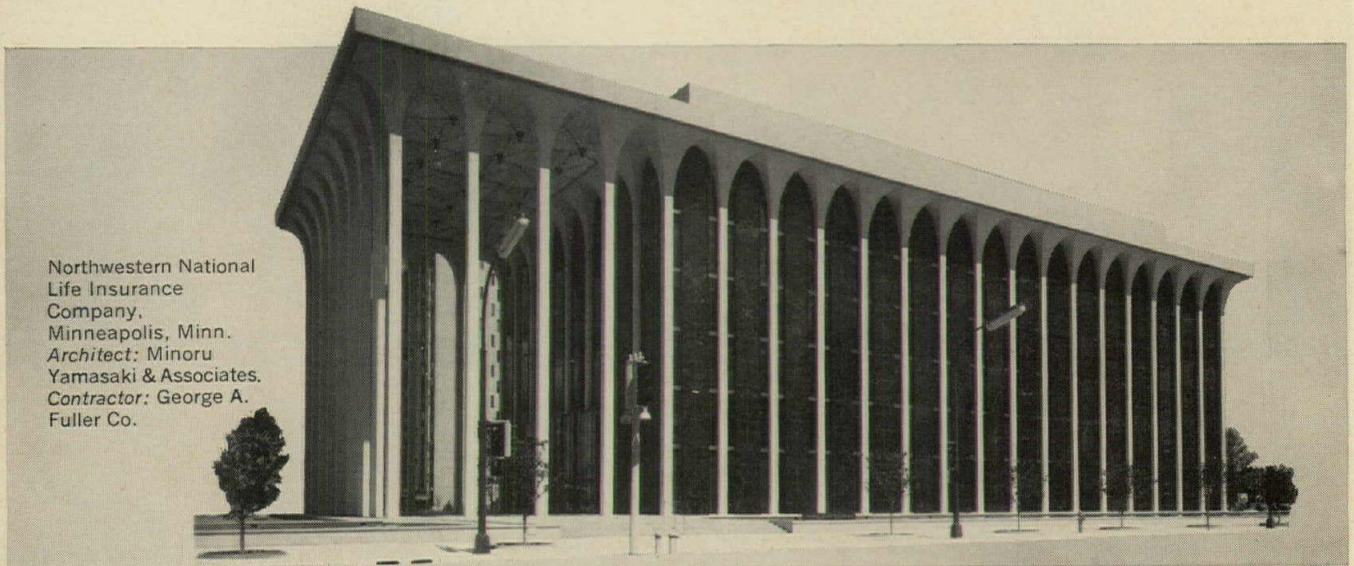
By providing fast, selective distribution of inter-floor mail and supplies, a *Recordlift* cuts operating costs by saving 100's of mailboy and messenger man-hours daily. Operation is completely automatic . . . all you do is load the container, set the address and *Recordlift* delivers. *Automatically.*

It's the *proven* way to solve office building distribution problems! Ideal for hospital use, too!

Get details. Write for new illustrated *Recordlift* Bulletin 153. Describes operation, shows various addressing systems, gives dimensional requirements. Standard Conveyor Company, 312-G Second St., North St. Paul, Minn. 55109.



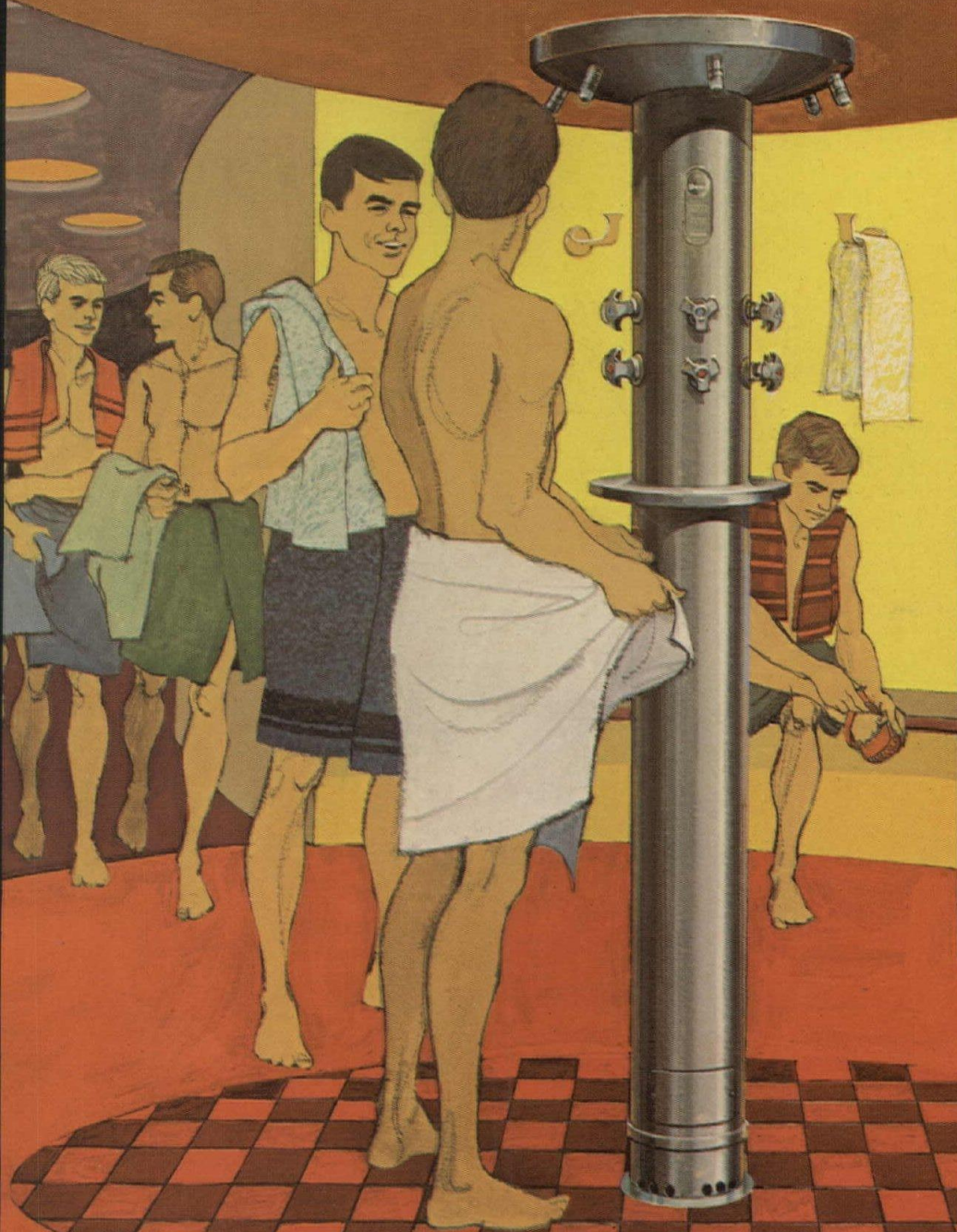
Michigan Consolidated Gas, Detroit, Mich. *Architect:* Minoru Yamasaki — Smith, Hinchman & Grylls. *Contractor:* Bryant & Detwiler Co.



Northwestern National Life Insurance Company, Minneapolis, Minn. *Architect:* Minoru Yamasaki & Associates. *Contractor:* George A. Fuller Co.

For more data, circle 11 on inquiry card

Bright idea



This column shower serves 6 people with one set of plumbing connections! So it cuts installation costs up to 80%. Like all Bradley Group Showers, it saves space, too—serving more people in far less space than ordinary showers. It eliminates double-wall construction and piping in outside walls. And it has its own drain, saving the cost of drains along the perimeter. Made in 2 to 6 person units. Other Bradley Group Showers include Modesty Module®, Multi-Stall, Wall-Saver®, and Panelon types. Bright ideas—space and money-saving ideas from Bradley! See your Bradley representative. And write for latest literature. Bradley Washfountain Co., 9109 Fountain Dr., Menomonee Falls, Wis. 53055.

from Bradley!

For more data, circle 12 on inquiry card



Anacondability pulls the plug on plumbing bottlenecks, saves space, speeds construction on every type of building.

Adds value

to single family dwellings. Copper plumbing in a home says "quality" as no other material does . . . adds significantly to its worth and marketability. And the Anaconda name on the copper tube and pipe enhances the builder's reputation for using only the best.

Added advantage: Anaconda provides a broad range of tube and fittings to meet every blueprint requirement.

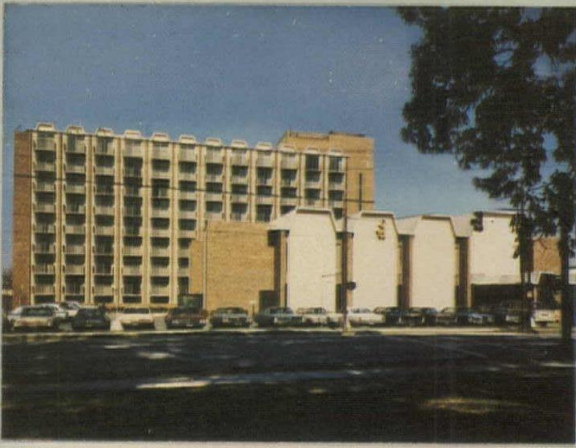


Coordinates delivery

in housing developments. Anacondability makes planning easier by providing you with one dependable source for all ACR tube, copper tube, DWV, wrought copper and cast brass fittings, plus low pressure cast brass valves with both solder and threaded joints.

It works to coordinate deliveries when you want them, where you want them. Got a tight schedule to meet? Talk it over with your Anaconda representative. You'll find him eager to help.





Courtesy Statler Hilton Inn, Greensboro, N. C.

Saves space

in hotels, hospitals, institutional buildings. Anacondability offers copper runouts that can save space and costs by installing easily in 12-inch chases. This represents a savings of 6-inches in chase width ordinarily required by galvanized pipe and fittings . . . that's 48 cubic feet in an average size room! You can credit Anaconda's slim fittings and superior corrosion resistance in copper metals for making this savings possible as well as practicable.

Speeds installations

in high-rise buildings. Anaconda's broad range of copper tube sizes permits on-the-job preassembly of complete water supply trees without delay or wasted man-hours. In a typical back-to-back installation, for example, trees with 146 pre-assembled joints installed with just 4 solder joints! Added advantages: Copper's easy bending clears obstructions without costly modifications or space-consuming partitions.

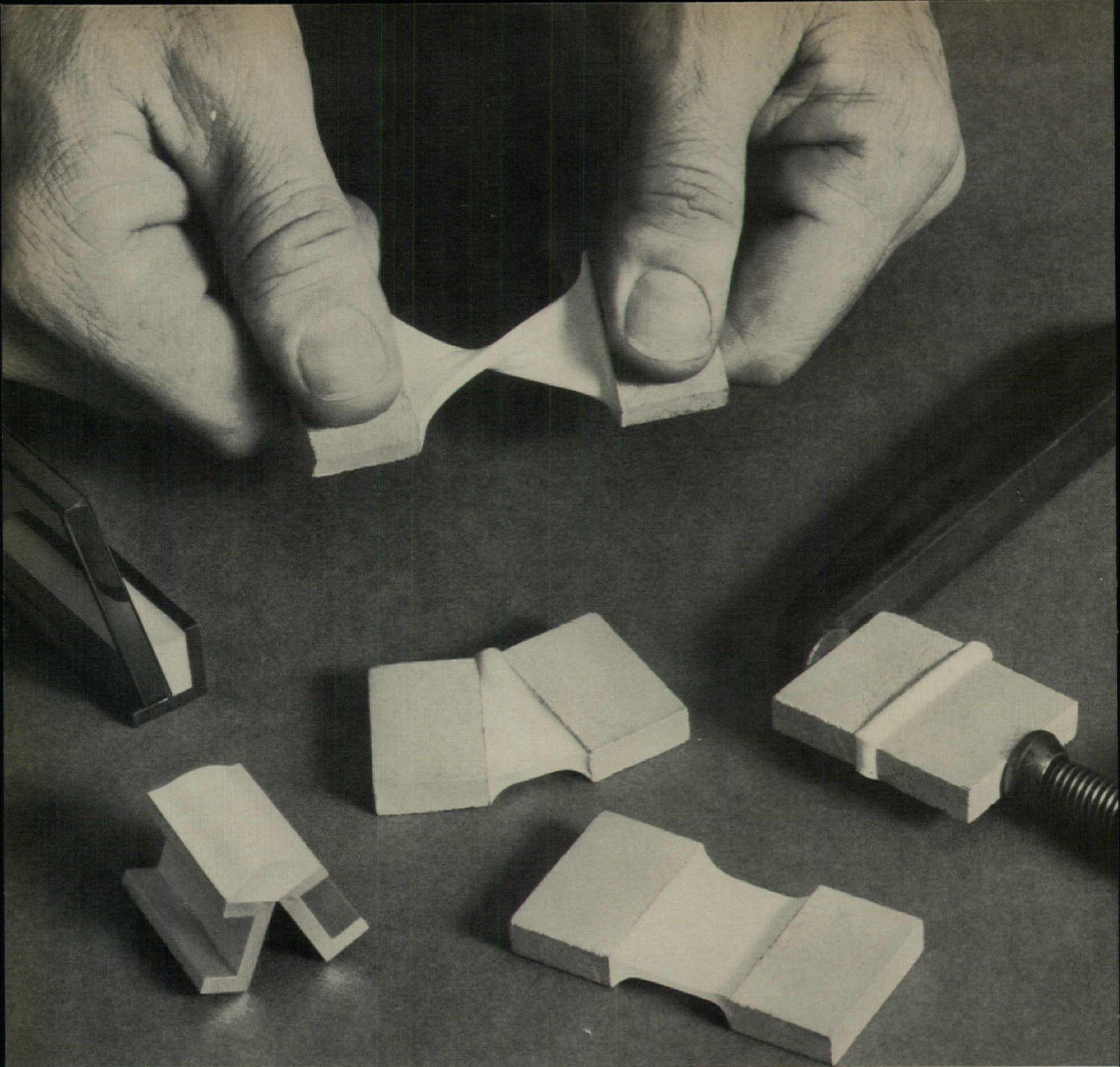
Considering copper's many inherent properties and characteristics, *installed* cost of copper plumbing including DWV can often compete in price with ordinary ferrous types. For further information concerning Anaconda pipe, tube and fittings, for the building construction industry, write for Publication B-1. Anaconda American Brass Company, 414 Meadow Street, Waterbury, Connecticut 06720.

ANACONDA[®]
AMERICAN BRASS COMPANY

2.8.46

For more data, circle 13 on inquiry card





MONO stays where the action is

. . . that gives it a long, weathertight life as a construction joint sealant.

Construction joints move. Mono can follow that movement day in, day out for 20 years or more, because the body of the bead stays pliable. This eliminates stress where the Mono meets stone, glass, metal, wood, concrete or plastic.

Since 92% of sealant failures occur because the sealant pulls away from the joint sides, you can see why we build this special quality of stress-relaxation into Mono.

Mono also gives you an extra margin of safety during installation. Even where construction dust or moisture is present, Mono's extreme adhesion seals the joint. No priming required.



While we make many kinds of sealants, we think Mono will serve you best in 9 out of 10 cases. In the 10th case, your Tremco man will recommend one of the other fourteen Tremco sealants. You can be sure he's right, because he'll be on your job site, checking.

If you'd like to know more about Mono and the other Tremco sealants, please see Sweet's or write us for additional information.

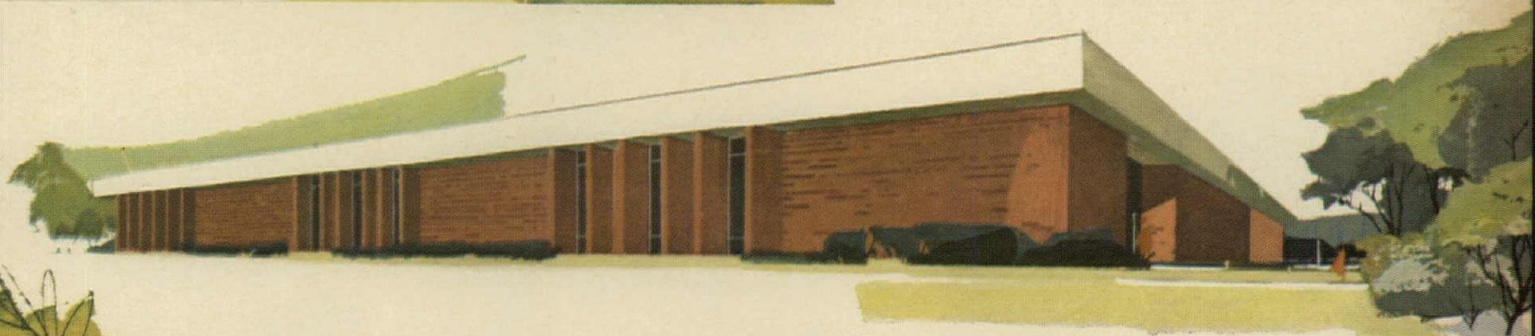


**THE TREMCO
MANUFACTURING COMPANY**

Cleveland, Ohio 44104
Toronto 17, Ontario

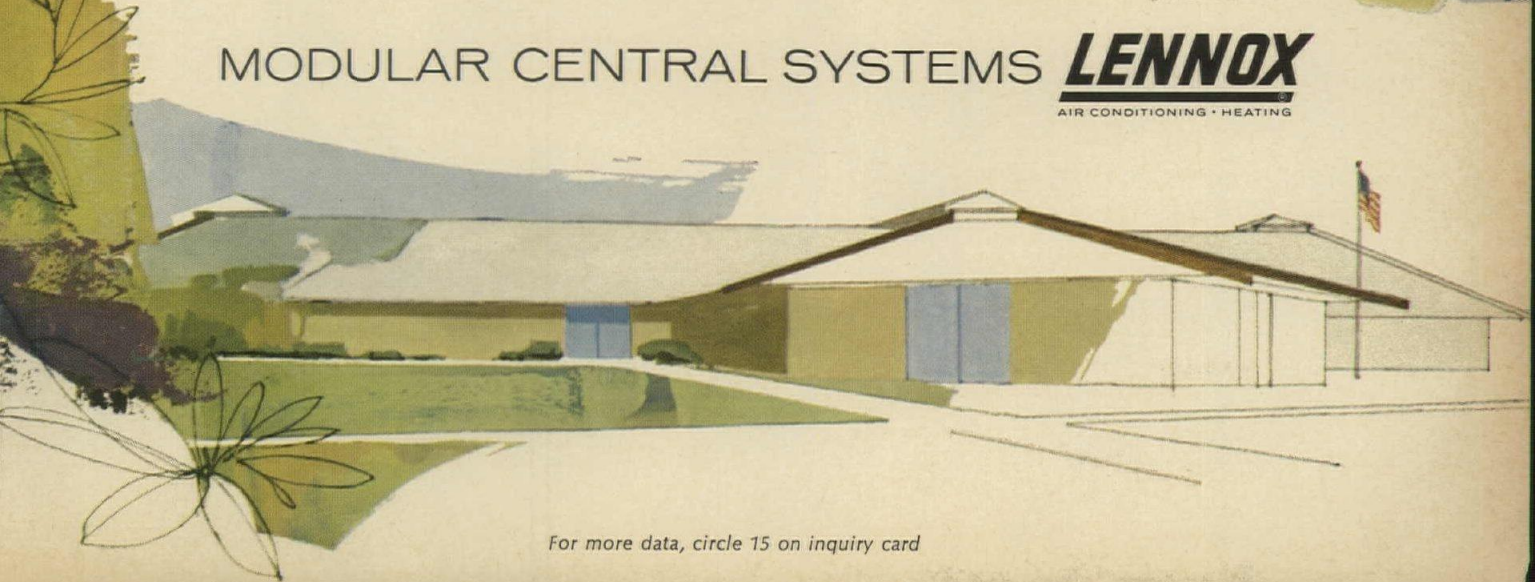
For more data, circle 14 on inquiry card

Solving the
“people problems”
in all types of
buildings...



MODULAR CENTRAL SYSTEMS

LENNOX
AIR CONDITIONING • HEATING



For more data, circle 15 on inquiry card

People comfort? Economy? Or Design freedom?

(Why choose? Lennox flexibility guards all three.)

When you plan to air condition a building — single-story or multistory — consider all the people problems as well as the building problems . . . and the Lennox solutions.

We create people comfort . . . to match the different problems of different people. In all types of buildings. For all types of people. Doing all manner of things. At the same time. In the same building. Whatever the weather.

Tough problems? Sure. But Lennox modular central systems can handle them. They have the flexibility, the sophistication of control for an almost infinite variety of “micro-climates” — individual comfort zones.

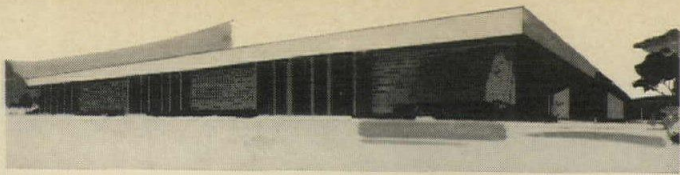
Whatever the building type, there's a Lennox system—or systems combination—to match its demand for “micro-climates.”

Take the Lennox Direct Multizone System (DMS), for rooftop or multistory installations . . . up to a dozen comfort zones; or DMS with dual ducts and mixing dampers. Or take the single-zone Lennox combination system for gas, oil, or electric heating with electric cooling; or air conditioning with add-on heating; or unitary systems with a wide variety of coil-blower units.

When you plan for people comfort in any building—school, office, apartment, motel, plant, clinic, shopping center, home—plan with the “micro-climate” advantages of Lennox modular central systems.

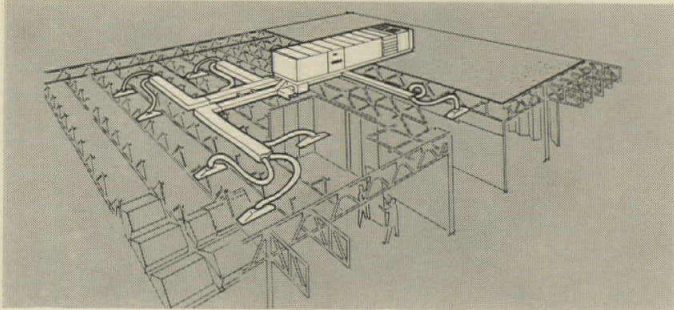
*For details, see Sweet's—or write Lennox Industries Inc.,
330 S. 12th Avenue, Marshalltown, Iowa 50158.*





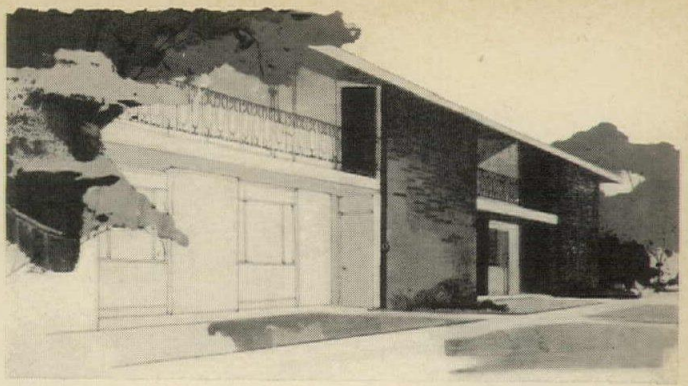
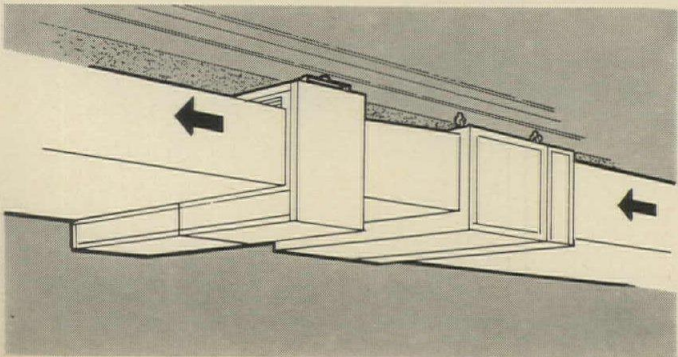
Functional new offices of midwest manufacturer, where four Lennox DMS rooftop units provide the "micro-climates" necessary to meet a variety of individual comfort requirements spread through its 24,000 sq. ft. area. Each DMS combines up to 22 tons of cooling capacity with up to 700,000 Btuh of heating (can be gas, oil, electric or hot water). Each unit can provide comfort in up to 12 of these "micro-climate" areas, and can heat some while cooling others.

Direct Multizone units on roof serve many comfort zones through flexible duct which can be moved as zones are changed.



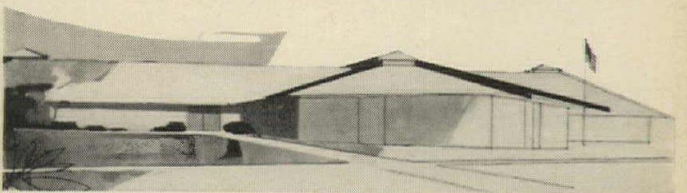
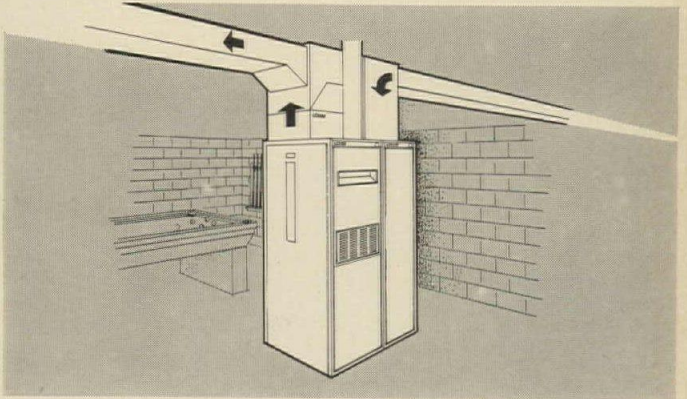
Seven story professional building has shops on lower level, offices on middle floors, restaurant on top. Lennox "micro-climates" meet the varying comfort needs. Thermostatically-controlled dampers select cool or warm air for each comfort zone. An air handler gives constant circulation in each zone. Heating/cooling source is gas duct furnaces coupled with blower-coil-filter units. Air-cooled condensing units are outdoors at grade level. Restaurant is served by two gas heat/electric cooling units on roof. POWER SAVER™ supplies fresh air and cools "free" when outdoor temperature is below 57°F.

Fan-coil units coupled with duct furnaces supply heating or cooling to first six floors. Rooftop units handle cafe on top floor.



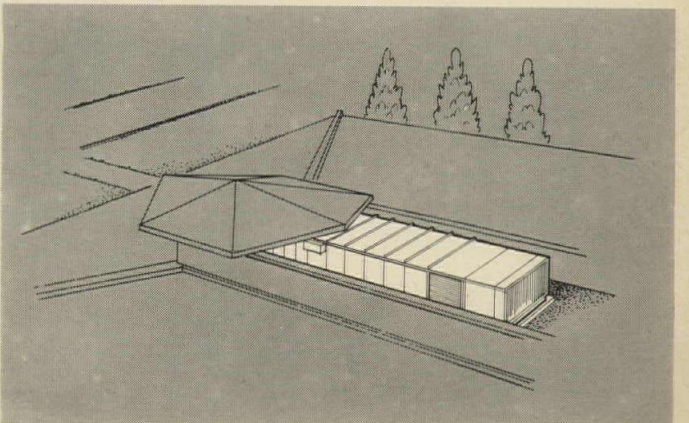
This striking, modern condominium provides individual comfort control for occupants of its apartments with Lennox remote air conditioning systems. Each apartment is cooled and heated by a gas furnace-cooling coil combination located in the basement. Condensing units are concealed on the roof. Cooling capacity for each apartment is 2½ tons; heating is 110,000 Btuh.

Each apartment has its own heating/cooling system for complete flexibility and tenant control.



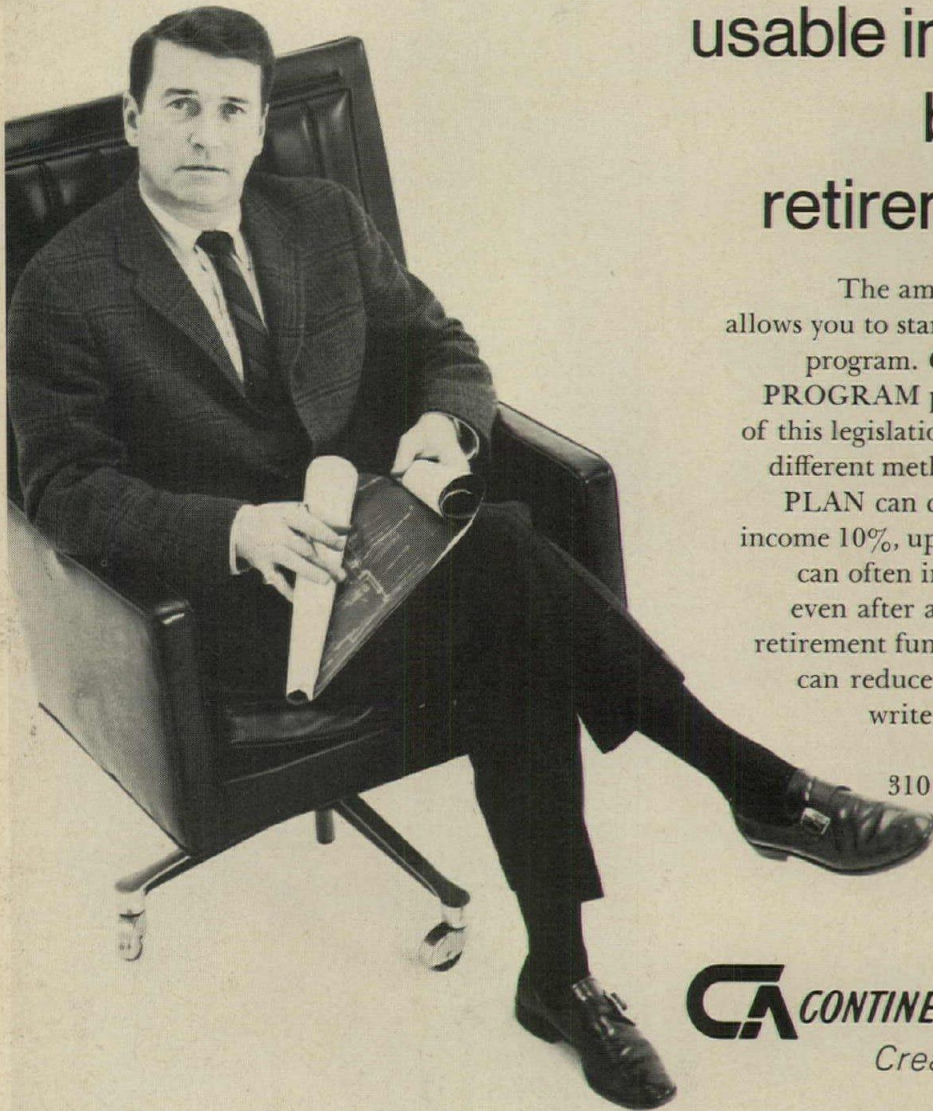
This progressive elementary school utilizes the flexibility afforded by Lennox DMS rooftop units to help promote the advanced concept of team teaching. More than 30 teaching/study areas, offices, and other rooms are heated and ventilated by the four DMS units. Individual thermostatic control in the large class areas permits varying occupancy and activity, while maintaining comfort levels. The DMS units are completely hidden from sight, do not intrude on the school's design esthetics.

Architecturally-designed enclosure conceals the DMS equipment and contributes to esthetics of the building.



If you are a self-employed architect—

**you owe it to yourself
to learn about
Continental's new
Target Program
Reduces current
income taxes, increases
usable income, while
building your
retirement dollars!**



The amended Keogh Bill, or HR-10, allows you to start a tax-deductible retirement program. Continental's new TARGET PROGRAM permits you to take advantage of this legislation through one of up to eight different methods of funding. A TARGET PLAN can currently reduce your taxable income 10%, up to \$2,500 each year. And this can often increase your usable income — even after a sizable contribution to your retirement fund. To find out how much you can reduce your income taxes this year, write Robert M. Powell, Asst. V.P., Continental Assurance Co., 310 So. Michigan Ave., Chicago 60604, Dept. 112.



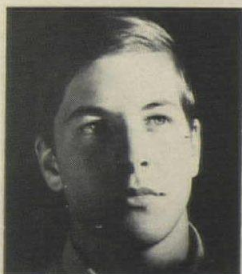
CA CONTINENTAL ^{Life} ASSURANCE CO.
Creative Financial Planning

©CA, 1968

For more data, circle 16 on inquiry card

For more data, circle 17 on inquiry card

**Success
is
something
you
can't leave
a
son**



In today's complex and specialized world, success depends more and more on whether he gets a college education.

But he may not be able to get one 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?

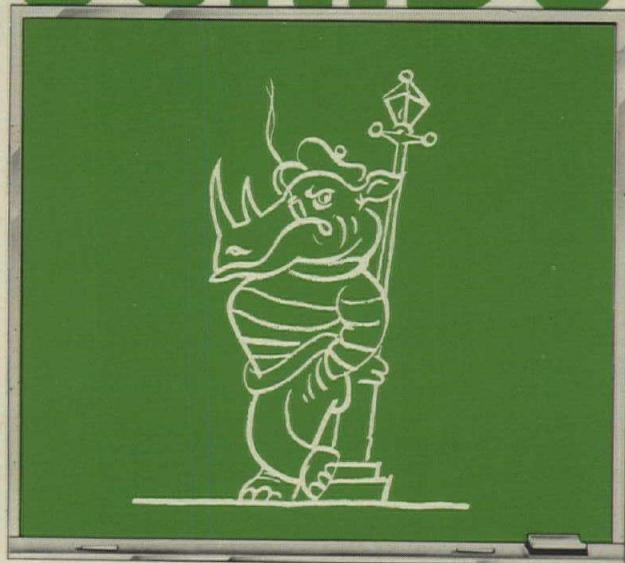
Your support will help colleges answer these questions . . . help them make your son ready for his world.

Give to the college of your choice.



advertising contributed
for the public good

SCRIBO CHALKBOARDS

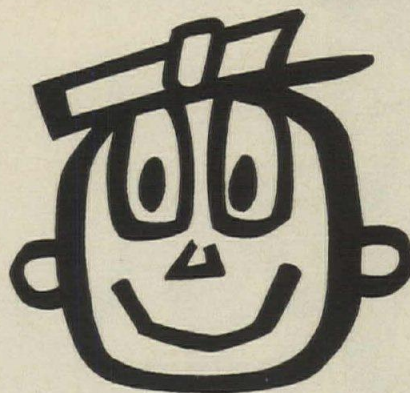


TOUGH to take years of wear. Scribo Chalkboards have a baked alkyd amine enamel surface for clear writing, ghost-free erasing and damp cloth cleaning. Your choice of three types — ¼" Hardboard — ½" Particleboard — 24 ga. Steel — in five standard colors. Write for samples and specifications.

Bestile MANUFACTURING COMPANY
P.O. BOX 71, ONTARIO, CALIFORNIA 91764

For more data, circle 24 on inquiry card

**I WANT
YOU**



**TO USE
ZIP CODE**

So that you can have faster,
more efficient mail service.

Another big one goes all-electric.

The advantages of the all-electric concept for commercial buildings

are demonstrated once again. This time, in Montgomery Ward's com-

bined Metropolitan District Office West Coast Buying Offices and retail facilities in Rosemead, California.

Montgomery Ward, Rosemead, is one more important name on the long list of all-electric buildings owned and operated by major corporations.

Electric space conditioning systems can save builders 30% to 50%



in first cost installation. In most cases, expensive stacks, and boiler rooms are eliminated, often saving the equivalent in space of whole floors. There's more freedom of design in all-electric buildings. Less room is required for the main space-conditioning plant. The result is a low cost, low maintenance building with very

competitive per square foot operating costs. Add up all the advantages and savings. The all-electric building invariably has the lowest total annual cost.

Montgomery Ward, Rosemead, was designed by architects Mazzetti, Leach, Cleveland & Associates, Ron Cleveland, A. I. A. It goes into our files

as one of the hundreds of case histories of all-electric buildings in Central and Southern California.

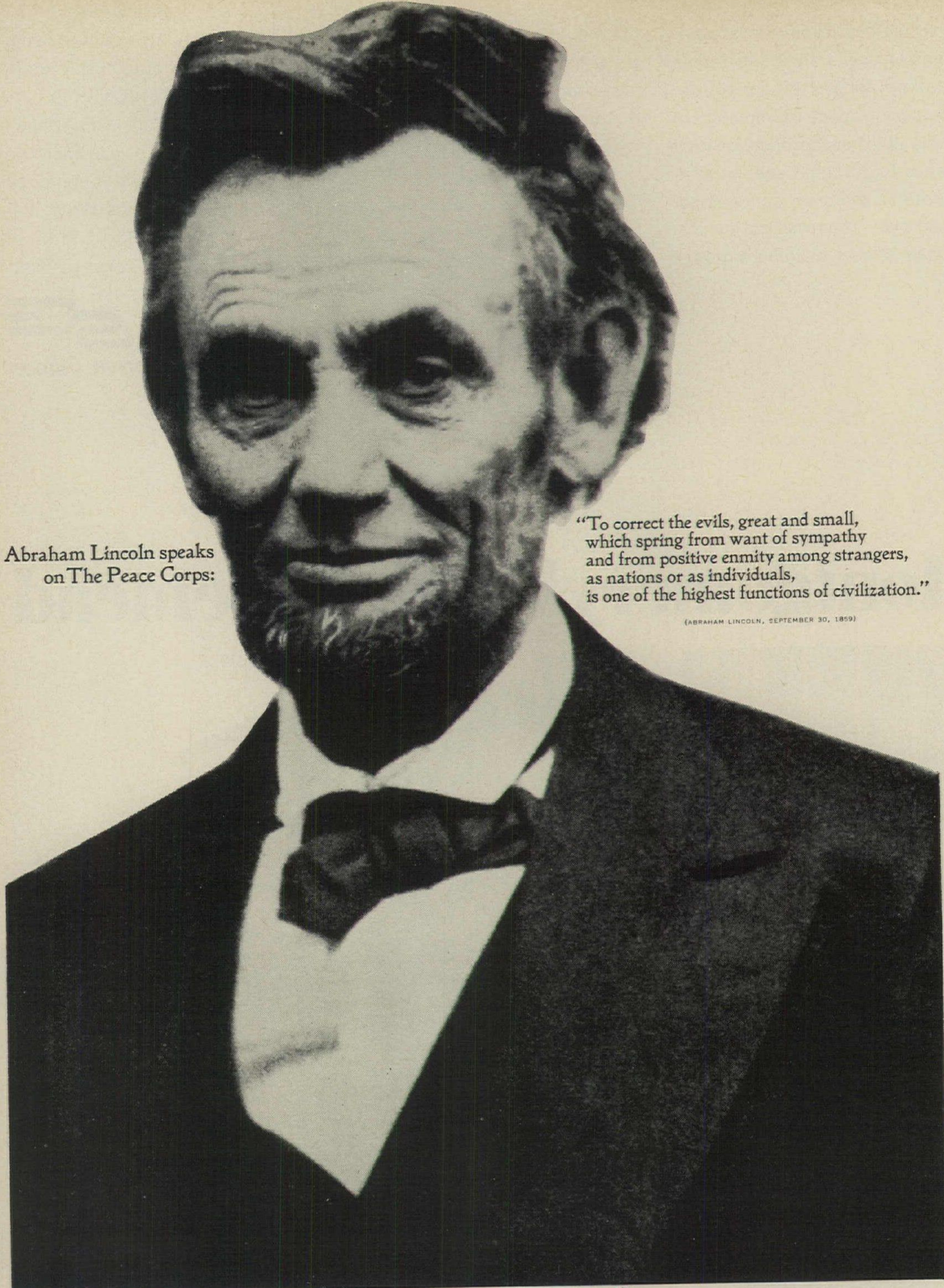
Our Marketing Engineering Department will show you how to apply the all-electric concept to your project for remarkable savings. Write: Marketing Engineering, Box 62, Terminal Annex, Los Angeles, California 90051.

SCE

Southern California Edison

Montgomery Ward, Rosemead





Abraham Lincoln speaks
on The Peace Corps:

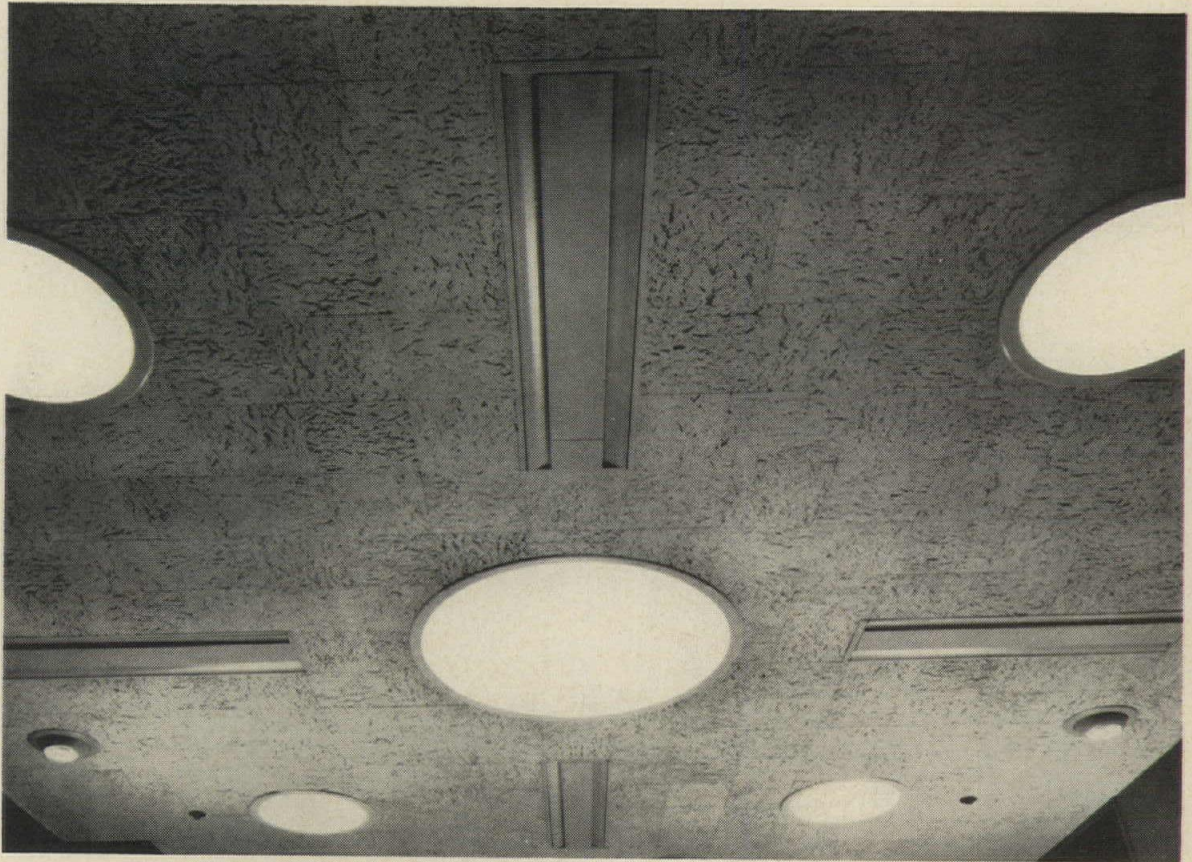
"To correct the evils, great and small,
which spring from want of sympathy
and from positive enmity among strangers,
as nations or as individuals,
is one of the highest functions of civilization."

(ABRAHAM LINCOLN, SEPTEMBER 30, 1859)

PUBLISHED AS A PUBLIC SERVICE IN COOPERATION WITH THE



Zero in on the Carrier Moduline® System for architecturally-designed air conditioning!



This close-up of our Moduline air terminals, integral parts of the system, shows one use with circular light fixtures to attain an attractive ceiling pattern.

They integrate with lights dozens of different ways. May be installed as random singles, linked in pairs or coupled in lines of any length.

The system provides variable volume temperature control room-by-room in buildings of any size. Maintains an ideal temperature level in each room at all times. Delivers air quietly and smoothly at any volume. And does it automatically with utmost simplicity.

Controls are unit contained. There are no pumps, valves, electrical connections, or wall thermostats. As a result, you have unlimited design flexibility—not only in initial planning, but also for future changes.

For complete details, contact your nearest Carrier office or distributor. Or write us at Syracuse, New York 13201. Represented in Canada by Carrier Air Conditioning (Canada) Ltd.

Carrier Air Conditioning Company



For more data, circle 25 on inquiry card



Architect: Walton & Madden, Riverdale, Md.
Screen erected by: Acme Iron Works, Inc., Washington, D.C.

BORDEN DECOR PANEL AS BUILDING FACADES

Shown above is Deca-Grid style Borden Decor Panel used as a facade for the Pargas, Inc. building in Waldorf, Maryland. Set off by piers of white precast stone, the sturdy aluminum Deca-Grid panels are finished in blue HINAC, Pennsalt's new finish for metals.

This Deca-Grid installation has tilted spacers, a feature called the Slant-Tab variation wherein spacers may be mounted at angles of 30°, 45°, 60° or 90° as desired.

The Slant-Tabs may be further altered by use of non-standard angles, or lengthened tabs.

All the Borden Decor Panel styles, including Deca-Grid, Deca-Grid, Deca-Ring and Decor-Plank, are highly versatile in design specification and in application as facades, dividers, grilles, fencing and the refacing of existing buildings. In standard or custom designs, Borden Decor Panels provide a handsome, flexible, maintenance-free building component.

Write for latest full-color catalog on Borden Decor Panel

BORDEN METAL PRODUCTS CO.

MAIN OFFICE: 822 GREEN LANE, ELIZABETH, NEW JERSEY 07207 • ELIZABETH 2-6410

PLANTS AT: LEEDS, ALABAMA; UNION, NEW JERSEY; CONROE, TEXAS

When in New York City, see our exhibit at Architects Samples, 101 Park Avenue

For more data, circle 26 on inquiry card



Blake Hughes is publisher to succeed Eugene Weyeneth

Blake Hughes, formerly associate publisher of ARCHITECTURAL RECORD, succeeds Eugene E. Weyeneth as publisher. Mr. Weyeneth has been named publisher of Engineering News-Record and Construction Methods & Equipment.

Mr. Hughes joined the RECORD in 1951 as promotion manager and became director of marketing services in 1959. He was named assistant to the publisher in 1963 and associate publisher in 1967. Earlier, he was promotion manager of Engineering News-Record and Construction Methods & Equipment. He is a graduate of Dartmouth.

Building Research Institute names new officers

Benjamin H. Evans, A.I.A., has been named executive vice president of the Building Research Institute to succeed Robert P. Darlington, A.I.A., who has become manager of market development for building construction, Copper Development Association, New York City. Leander Economides of Economides and Goldberg, Consulting Engineers, New York City, replaces Mr. Evans as B.R.I. vice president.

In addition, two new Board members have been appointed: J. Anthony Vilar, a former B.R.I. executive vice president and at present managing editor of Building Construction magazine, Chicago; and Robert W. McKinley, manager, Technical Services, Glass Division, Pittsburgh Plate Glass Company, Pittsburgh.

Mr. Evans, who also will be secretary to the B.R.I. Board of Directors, has served as Director of Education and Research of the American Institute of Archi-

tecs since 1963. He is a member of the Building Research Advisory Board of the National Academy of Sciences and the Association of Collegiate Schools of Architecture and of its Committee on Graduate Studies and Research.

Academy-Institute honor Mies, Aalto, Fuller and Johansen

The American Academy of Arts and Letters announced Ludwig Mies van der Rohe a newly elected member at their joint annual ceremonial with The National Institute of Arts and Letters May 28 in New York City. George F. Kennan, the historian and diplomat, read a citation naming Alvar Aalto, Finnish architect, an honorary member.

In addition, R. Buckminster Fuller was awarded the architecture medal, and John M. Johansen, the Arnold W. Brunner Memorial Prize in architecture.

Academic notes: new schools, deans, chairmen

- A School of Architecture will be established at The City College of The City University of New York, effective July 1. Dr. Buell G. Gallagher, president of the college, announced that the new school, an outgrowth of a program in architecture established in 1961 with the engineering school, will offer a six-year program leading to a Master of Science in Architecture and Environmental Studies.

- John W. Wade, head of the architecture division at Tuskegee Institute, has been appointed the first dean of the new University of Wisconsin-Milwaukee School of Architecture. Mr. Wade has been on the faculty of Tuskegee since 1963, while maintaining an independent practice. The school, the first architecture school in Wisconsin, will begin accepting students this fall.

- Professor Robert C. Metcalf has been appointed chairman of the University of Michigan Department of Architecture. He succeeds Professor Jacques Brownson, who has resigned to return to architectural practice in Chicago.

Professor Metcalf, an alumnus of the College of Architecture and Design, established his own practice in 1953, and joined the University in 1955.

- Dr. Harvey S. Perloff has become dean of the U.C.L.A. School of Architecture and Urban Planning, succeeding Dr.

George A. Dudley, who will be chairman of both the New York State Pure Waters Authority and the State Council on Architecture. Dr. Perloff has been director of a Washington, D. C. planning foundation, Resources of the Future, Inc., since 1955, and is the author of several books on planning and economics.

- Howard Sayre Weaver, associate secretary of Yale University and assistant to the president for external relations, has been appointed dean of the Yale School of Art and Architecture. He has been serving as acting dean of the school during the current academic year.

- O. M. Ungers, Berlin architect and educator, has been appointed chairman of the Department of Architecture at Cornell University's College of Architecture, Art, and Planning. Mr. Ungers has been professor and ordinarius at Technical University of Berlin and prodean of that University's Faculty of Architecture and Urban Design. He has been visiting critic at Cornell, as well as Trebizond, Turkey, Rome and Moscow.

Architectural firm offers tours of Chicago's famous buildings

Fridstein Fitch & Partners is offering the first organized architectural tours of Chicago's famous buildings—landmarks and notable new structures.

A specially trained architectural student will conduct the two-hour, Loop-centered tour aboard a glass-topped sightseeing bus. Price is \$3.50 per person, which includes a paperback edition of "Chicago's Famous Buildings" by Siegel. Groups must guarantee a minimum of 35 persons. Address: 351 E. Ohio, Chicago.

Architect on committee to advise Open Space Program

William Turnbull, Jr., A.I.A., has been appointed the only representative architect/planner on the 25-member Technical Advisory Committee authorized by the California Legislature's Joint Committee on Open Space Lands.

The Committee is to work closely with the eight-man Joint Legislature Committee to define open space lands and to provide for their assessment for tax purposes as open space, provided they are subject to legally enforceable restriction to use as agriculture, recreation, natural resources or enjoyment of scenic beauty.

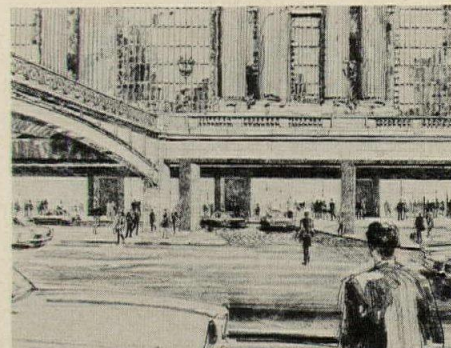
55-story office building will float over Grand Central



A \$100-million, 55-story office building that will "float" above Grand Central Terminal in New York City has been designed by Marcel Breuer and Associates for UGP Properties, Inc. When finished, the cast-stone-and-granite building will provide some 1.9-million square feet of office space for an estimated population of 12,000.

The rectangular tower, designated 175 Park Avenue, will be 221 feet south of the Pan Am Building. It will be supported solely by a central "spine" which also will serve as the core for its 52 elevators. Outside weight of the office floors will be transferred to the spine at the base of the building by four trusses, cantilevered to points just below the first office floor, 160 feet above ground level. Windows will be deeply recessed.

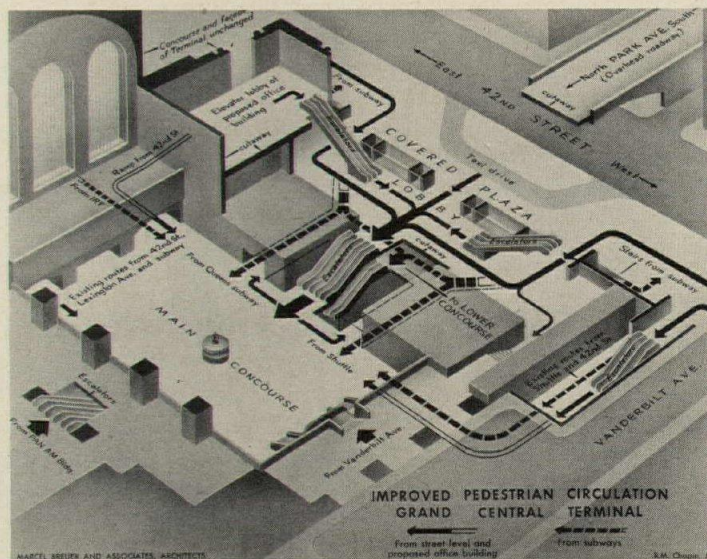
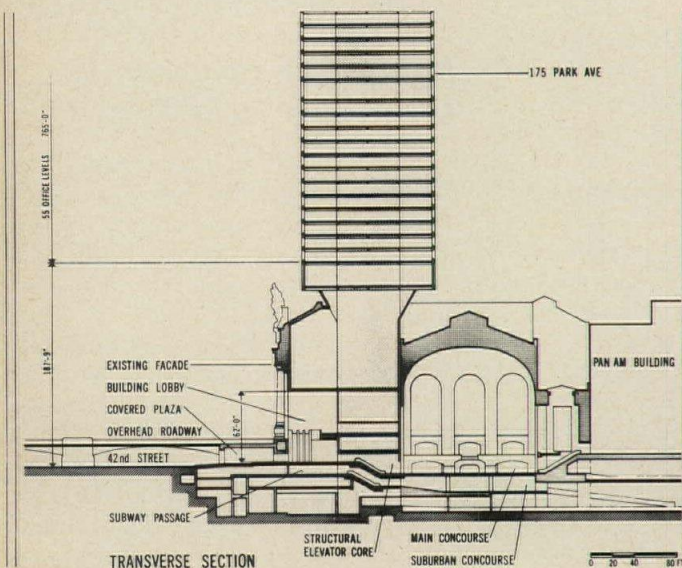
Inherent in the planning is much needed improvement and simplification of pedestrian circulation in and around Grand Central, for both train and subway passengers: There will be two new direct corridor connections to subways through the new floor at the main concourse level; there will be two new weather-protected subway entrances on 42d Street; escalator transportation will connect all levels; the 42d Street sidewalk



will be widened by 50 feet and there will be off-street taxi loading; and there will be a broad range of interior shops and services to relieve street congestion. The main concourse will not be affected by the new construction.

Other statistics: The typical floor size will be 37,370 square feet gross area. Dimensions are 122 feet by 306 feet. Rentable office space per floor varies from 31,320 square feet to 35,480 square feet. Gross area of the tower is 2.2-million square feet and commercial space is 113,400 square feet. Terminal roof height is 150 feet.

Construction is to take two and a half years, during which time normal functions in the station will not be disturbed.



Our catalog cost us a fortune!

...but there's a wealth of institutional furniture ideas in it for you.

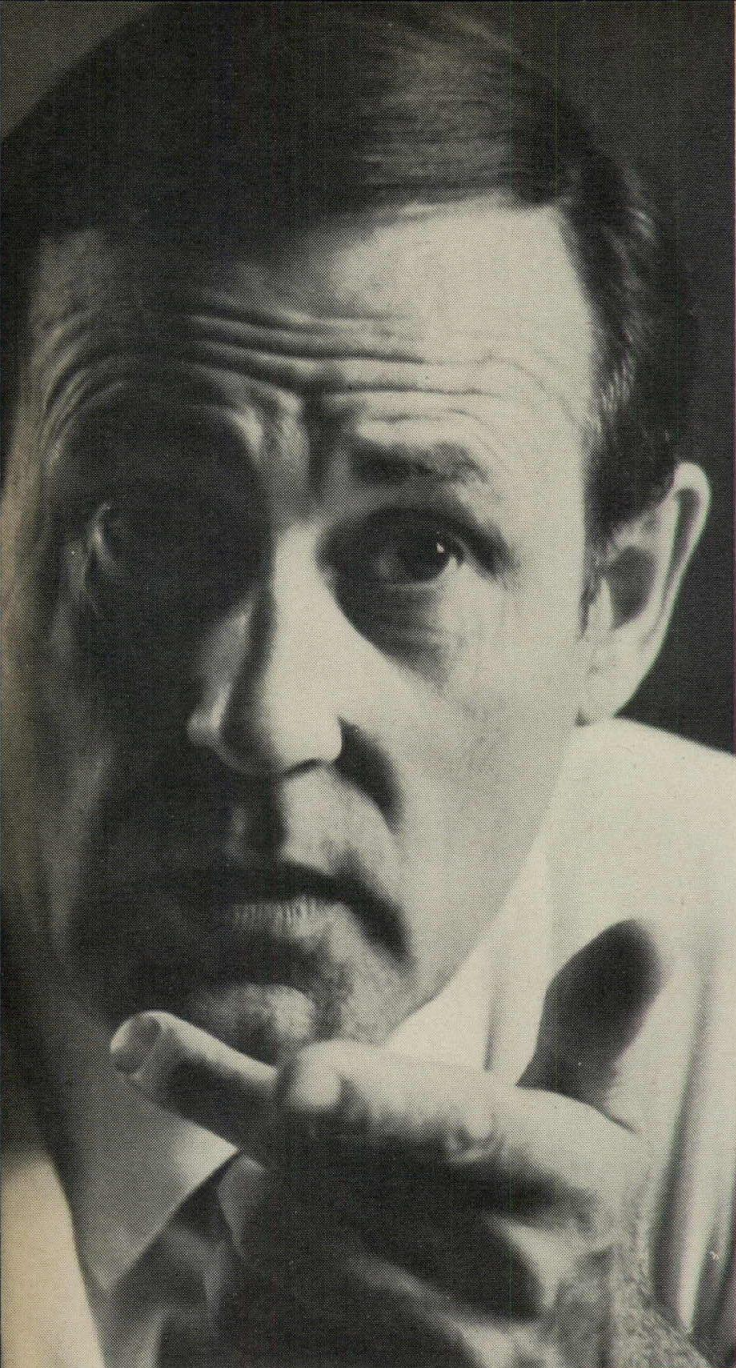


It's yours for the asking if you're an architect, designer, decorator or dealer.

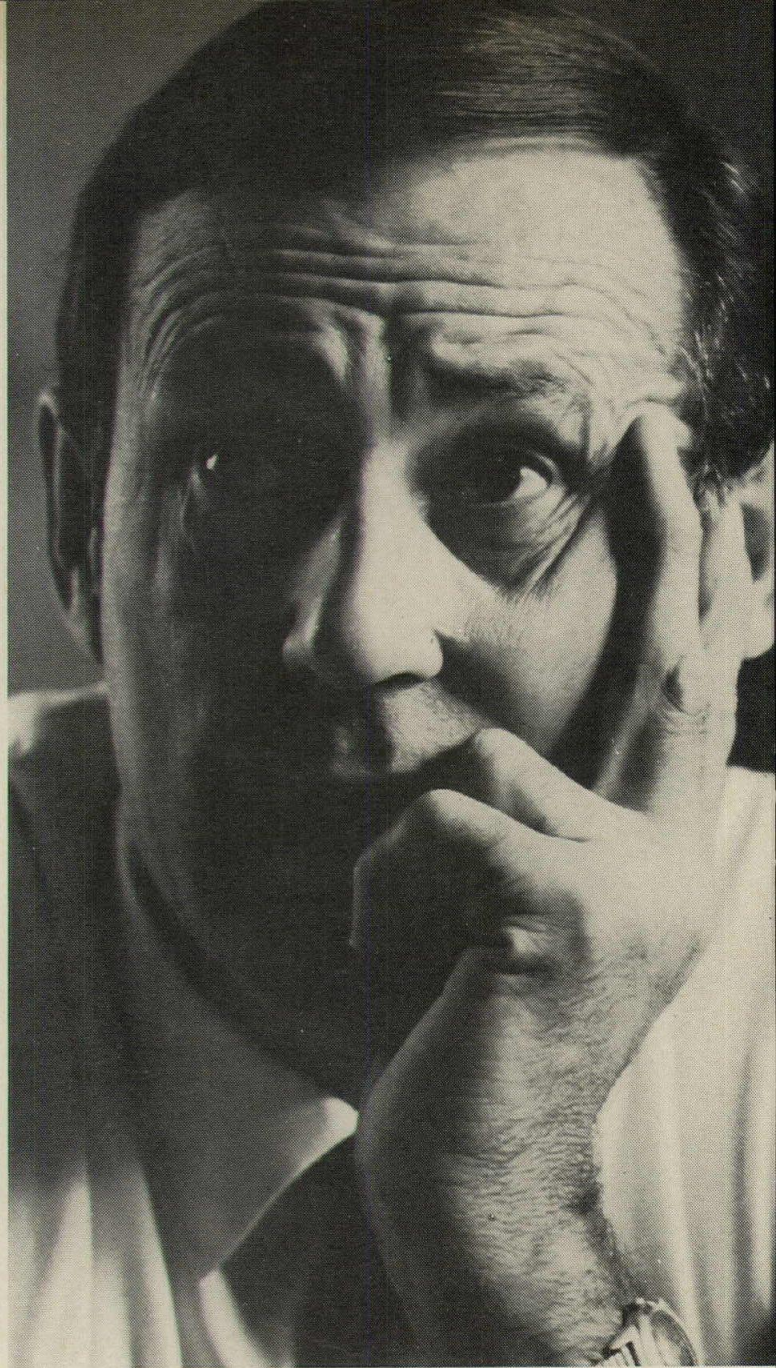
Visit our Showrooms . . .
 NEW YORK—20 E. 46th Street
 CHICAGO—1184 Merchandise Mart
 LOS ANGELES—8815 Beverly Boulevard

KRUEGER
 METAL PRODUCTS COMPANY • GREEN BAY, WIS • 54306

For more data, circle 27 on inquiry card



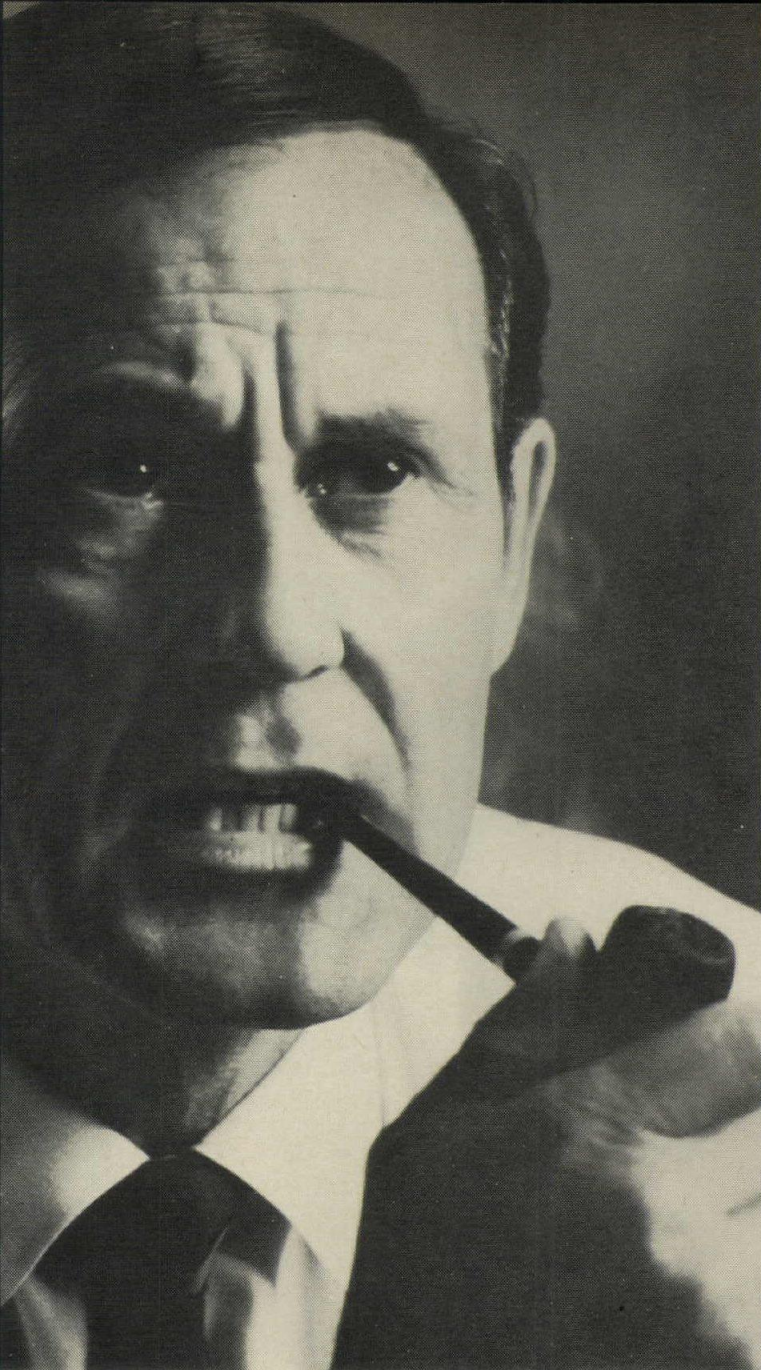
"... insulation, of course, is essential ..."



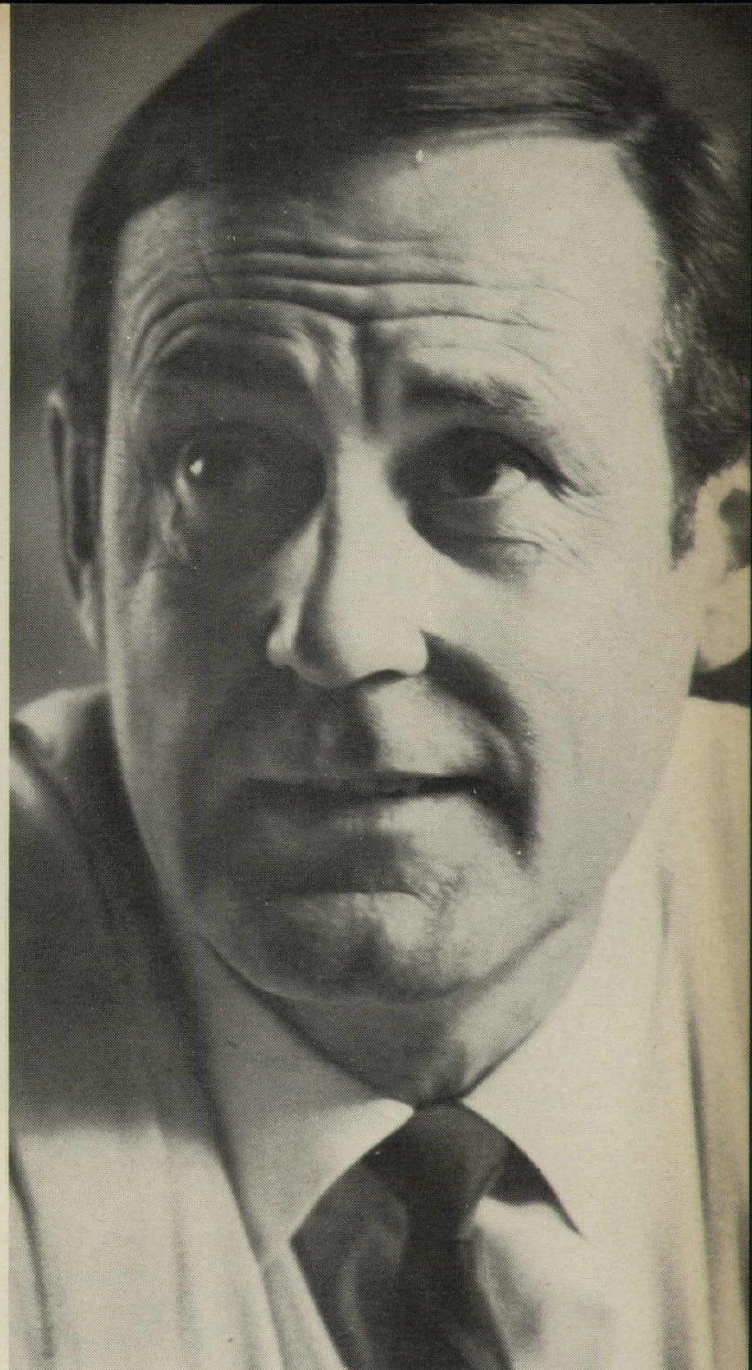
"... good bond between board and roofing ..."

What are you going to do about the roof?

For more data, circle 28 on inquiry card



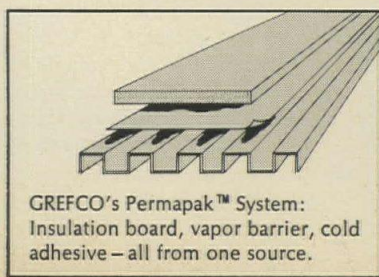
"... can't afford any water problems ..."



"... a long efficient life without trouble."

Class I rated Permalite Sealskin® insulation board gives you everything you need in rigid roof insulation.

And, the perfect package for optimum thermal and vapor control—Permapak™—includes three UL and FM listed materials: Permalite Sealskin® rigid roof insulation board, Permalite's cold adhesive, and Permalite's reflective vapor barrier. All shipped together from a single source. The system is approved for FM Engineering Division insulated steel decks acceptable class I construction, and UL listed metal deck assemblies construction 1 and 2, and UL Design RC-16, two-hour rating over prestressed concrete units.



See your Permalite representative, consult Sweet's or write for literature and samples.

GREFCO Inc. / Building Products Div.
333 North Michigan Avenue
Chicago, Illinois 60601



A subsidiary of General Refractories Company

Permalite®



Sealskin®

RIGID ROOF INSULATION



Der Scott

An apartment building, The White Tower, designed by Javier Saenz de Oiza, situated on the main avenue leading from central Madrid to the airport, is composed of circular trays and vertical planes. Deep narrow spaces between the planes and trays afford cool shade in the hot climate, while providing privacy for each apartment. The pinwheel plan generated from the center core provides four apartments of eight rooms each for every floor. Studio apartments, also a part of the design, give variety to the external design. In addition to the 160 apartments, there are plans for a restaurant, cafeteria, pool, kindergarten, chapel and commercial space at the top of the building. Materials are concrete with board-marked finish, with shutters and window frames of wood, colored glass in kitchens, and clear glass on terraces.



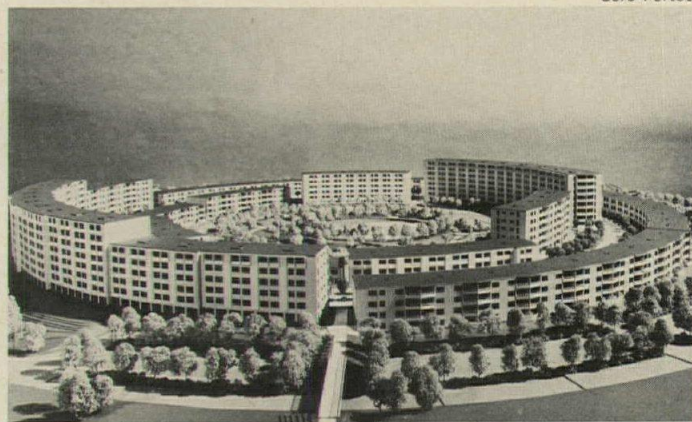
A circular office building seven stories high and 1,000 feet in diameter will occupy only 6.4 per cent of a proposed \$40-million office park in Jericho, New York. Uris Buildings Corporation has contracted to purchase the 125-acre Underhill estate for the project, and architects are Skidmore, Owings & Merrill, New York City. The building will be set back more than 700 feet from adjoining roads on the natural rolling terrain with tree cover. It will contain approximately 2 million square feet of office space and is expected to provide space for 7,000 employees. The inner walls will face on a broad landscaped plaza and park area, and parking facilities for 5,000 cars are planned for the underground area beneath the central plaza.

Dwain Faubion

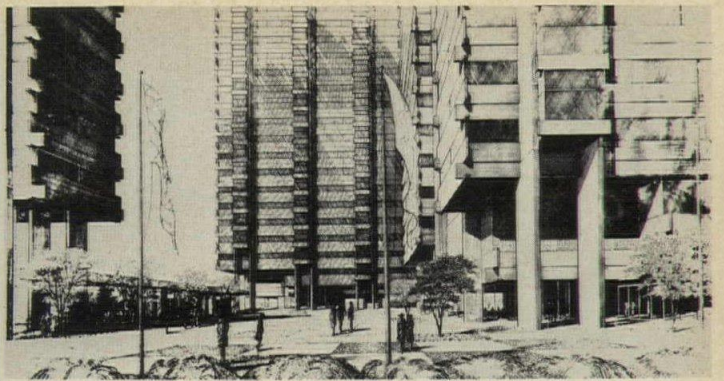
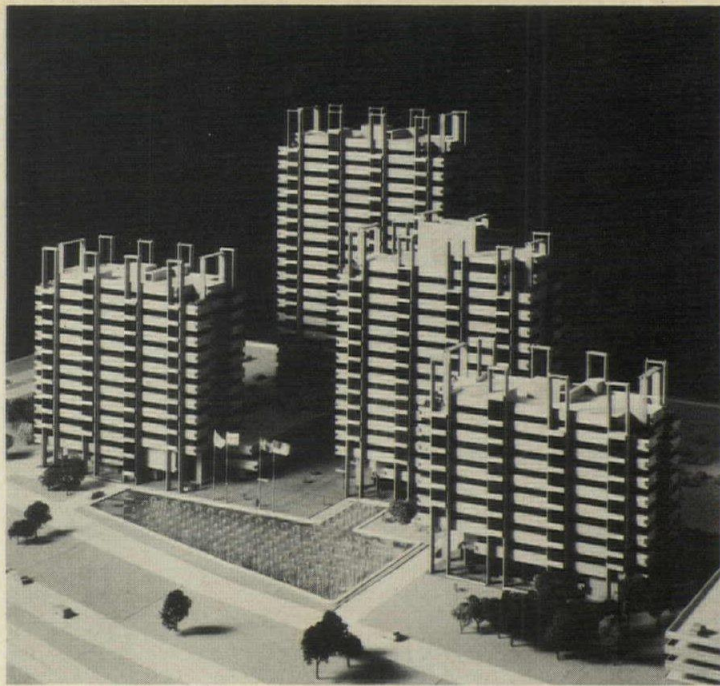


Out-patient Clinics Building and parking structure at the University of California, San Francisco, will house 22 major clinics and 700 cars. Architect John Lyon Reid has designed the Clinics Building to rest on six floors of the parking structure, which is joined at each floor to an adjacent parking structure. The building is designed for nine floors with a capacity for two future floors. A central core houses all elevators, stairs and utilities; peripheral columns provide column-free space. A floor-to-ceiling glass curtain wall provides a view of the city. For the parking structure, a concrete-sheathed steel column and one-way pan slab construction are used with peripheral spandrel beams to resist seismic forces. Its roof is the plaza level designed to connect to a future plaza at the Student Union.

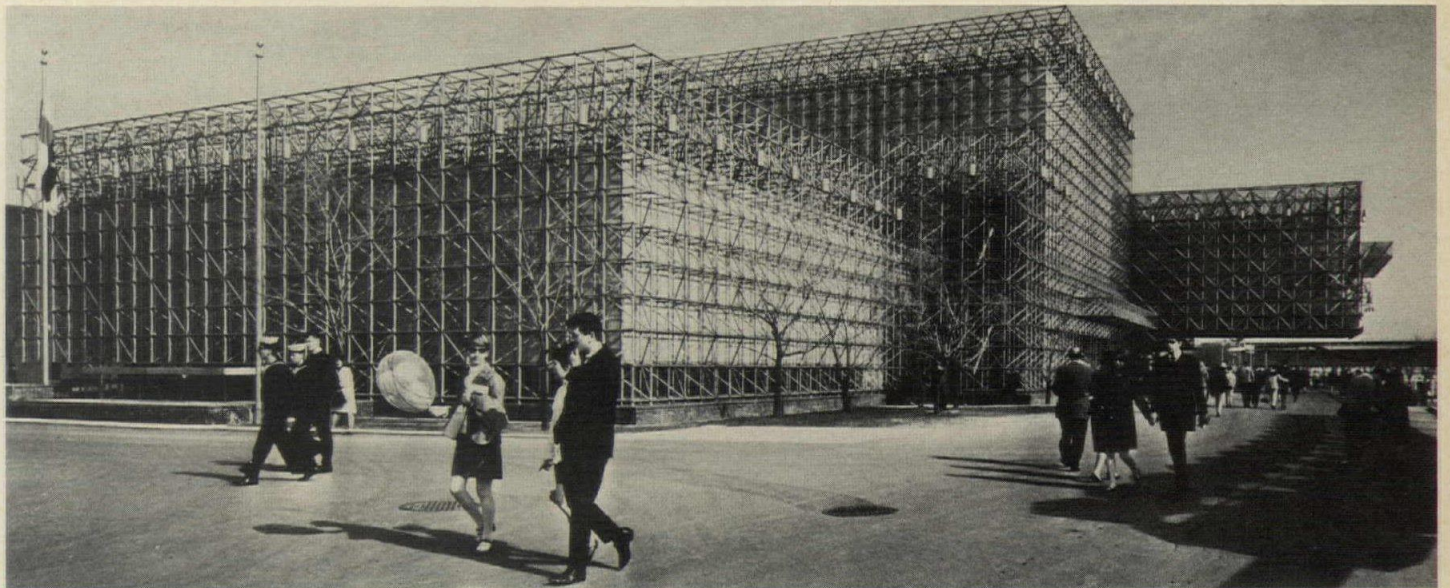
Celo Pertot



This prefabricated housing, in Sweden southwest of Stockholm, consists of two circles, one inside the other, with a 60-foot pedestrian street between. The diameter of the outer circle is 900 feet. There will be 891 apartments, a school, a religious meeting room, and a swimming pool in the \$9.5-million project. In addition, a garage beneath the street will park 450 automobiles. Height of the houses—from three to eight floors—has been varied according to patterns of sunlight and shadow. The houses will be built entirely of prefabricated elements and the apartments are expected to be built at a rate of two and a half units per two four-man teams per day. The architect is Eric Ahlin, Arkitektkontor AB. Construction is expected to begin in August.



Brookhollow Plaza, a \$20-million office complex in Dallas, designed by Paul Rudolph, contains four high-rise towers ranging from nine to 22 floors in height. The four towers will enclose a central plaza lined with restaurants and shops, providing some 700,000 square feet of office and commercial space. A three-quarter-acre reflecting pool with more than 80 fountains will extend forward from the plaza. In addition, a four-level covered parking structure accommodating 3,000 cars will serve the entire complex from three sides. The first building, to be completed by 1969, will offer 16 corner offices per floor, and will be supported by precast exterior columns leaving the interior areas column-free.

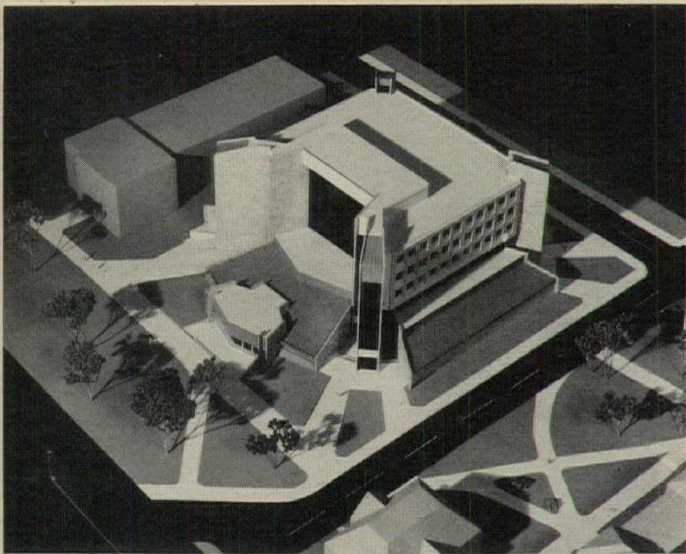


The Netherlands Pavilion at Expo 67 has won the 1968 R. S. Reynolds Memorial Award for "significant architecture in which aluminum has been an important contributing factor." The exposition building is suspended within a cage of 57,000 individual pieces of aluminum tubing that weighs only 100 tons, but supports the roof, floor, and walls. There are 23,000 square feet of floor space. Walter Eijkelenboom and Abraham Middelhoek, partners in a Rotterdam, Holland, firm are the architects, and George F. Eber of Montreal, the associate architect.

The Bryant and Stratton School building complex in Boston's Back Bay area has been designed by architects Solomita & Palermo. The ground level of the 15-story tower combines with adjoining open spaces to create a plaza containing shops. The next floor will be classrooms, the upper 11 floors will be a dormitory, and the penthouse will contain offices and a library. A 5-story classroom building is to the rear of the tower. A total of 53 classrooms will accommodate 1800 students; there will be 442 dormitory students.



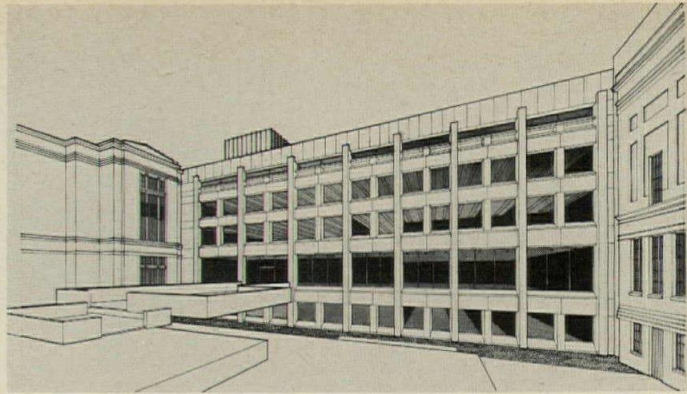
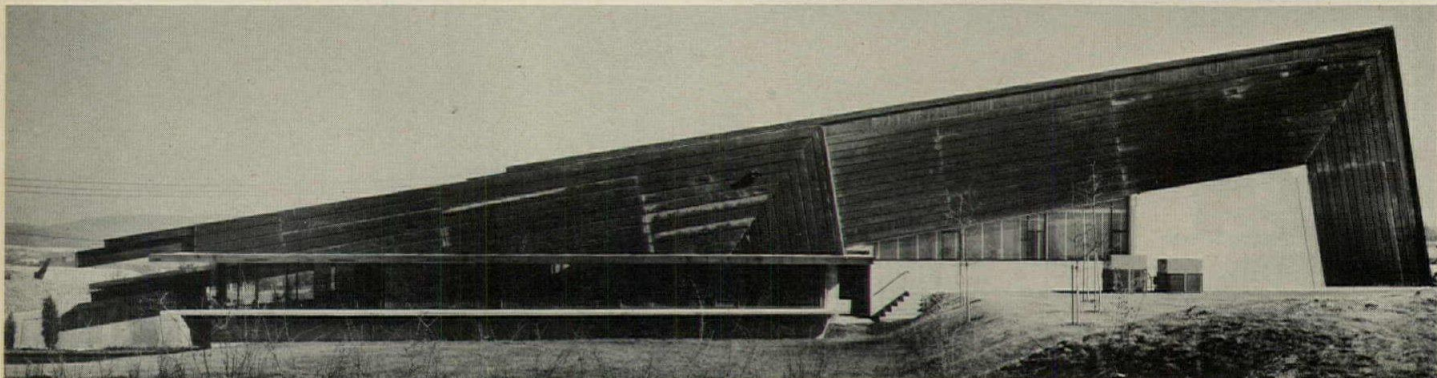
Allen Photos



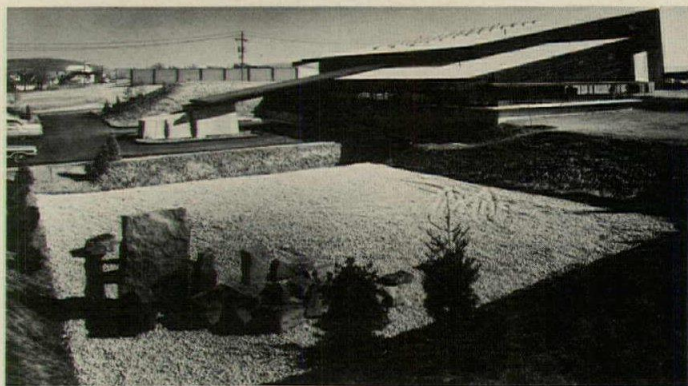
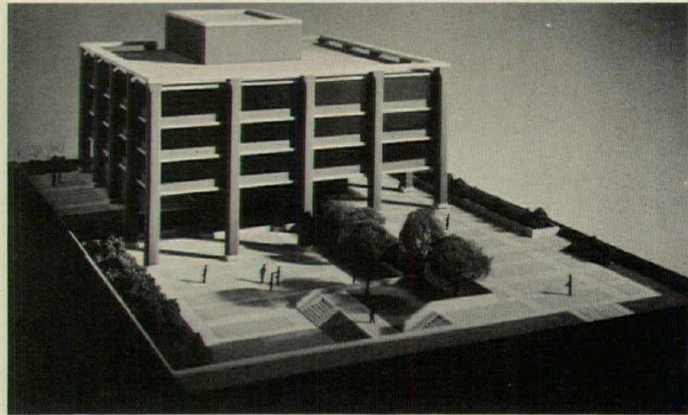
A proposed Arts and Sciences Building at Virginia Polytechnic Institute in Blacksburg has been designed by the collaborating architectural and engineering firms of Lyles, Bisset, Carlisle & Wolff of Alexandria and Carneal & Johnston of Richmond. The vertical stair towers at the four corners of the 125,000-square-foot, \$3-million building reduce horizontal travel within and provide ready access from the quadrant approaches. The lower three floors contain an auditorium and classrooms, with the first floor depressed half a level to reduce vertical travel of the major traffic. The top three floors contain offices, space for administrative functions, lounges and small seminar rooms.

University of Illinois office building at the Medical Center Campus, encompassing 62,646 square feet, will provide office space for administrative personnel and work area for campus-wide services. The structure, designed by Loeb, Schlossman, Bennett & Dart, will consist of a lower level and four floors above grade. Exterior materials will be face brick with windows glazed with bronze glass set in dark bronze duronodic aluminum frames. The expected cost is \$3,666,000. Construction is to begin this fall and the building is due to be completed in 1970.

A warehouse for Construction Fasteners, Inc., west of Reading, Pa., is described by architect/conservationist Malcolm B. Wells as "conservation architecture." The easily-expandable 20,448-square-foot, steel-framed shed, clad in weathering steel, was built on an "eroded patch of worn-out farmland. . . . Now, the rain water from the roofs and paved areas drains into a huge pebble pond," before seeping out of sight. "Ground cover on the site is blacktop, and 1½ acres of crown vetch, a leguminous vine that puts nitrogen into the earth, needs no cutting, and flowers gloriously each spring." Berms screen out nearby factories, yet allow a view of surrounding hills. Cost: \$340,000.

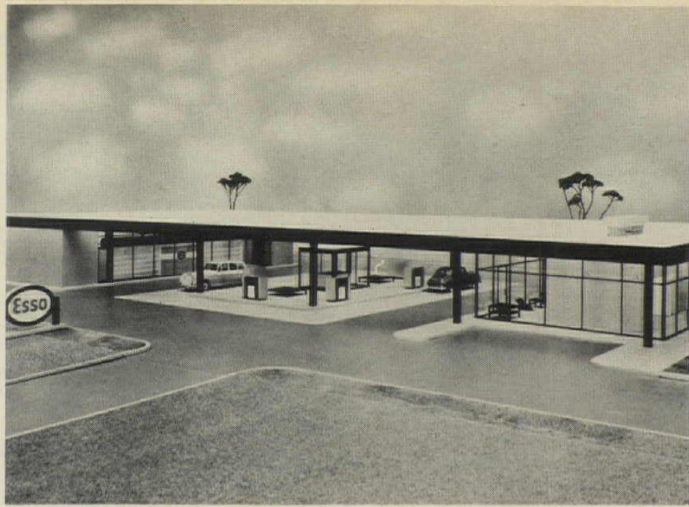


A Museum of Fine Arts addition, Boston, adds 14,000 square feet of exhibition and work space on two levels, increasing the museum's present exhibition space of 175,000 square feet by 8 per cent. The new building, designed by Hugh Stubbins Associates, will be faced with pre-stressed concrete slabs with five 15-foot-high hooded windows, cantilevered from the second floor. The hooded windows, with side panes of glass, will minimize direct exposure of art objects to sunlight in the second-floor gallery. The first-floor gallery, which will serve as a permanent exhibition for the textile collection, is windowless "to create large, unencumbered yet intimate space where finely detailed textiles can be viewed at close range."



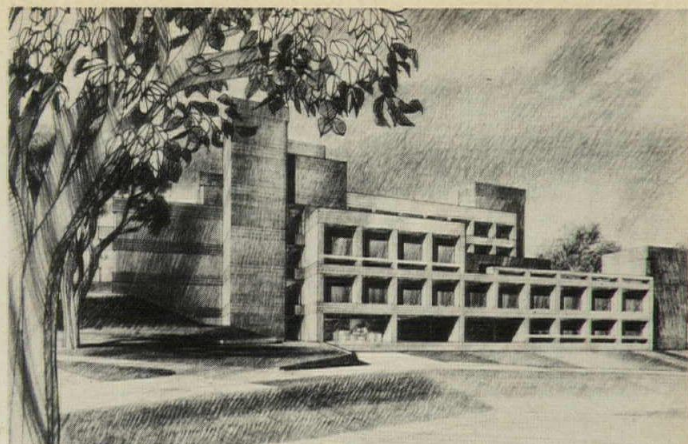
Bill Engdahl, Hedrich Blessing

Skomark Associates



A service station being built for Imperial Oil, Ltd. is under construction at Nuns' Island, the "new town" which will house some 50,000 people six minutes from downtown Montreal. Mies van der Rohe served as design consultant for the 167-foot by 74-foot building, and the architect is Paul H. Lapointe. The station will be predominantly of steel and glass construction; colors are black and white. There will be no advertising on or around the station, except for one Esso oval at ground level, and the middle-of-the-island kiosk will keep all products such as oils, anti-freeze, and cleaning cloths out of sight. On one side of the station there will be a rest area, washrooms, telephones, a travel center and display stands. Four service bays—with polished concrete floors, two walls of brick and two of glass—will be located on the other side of the building.

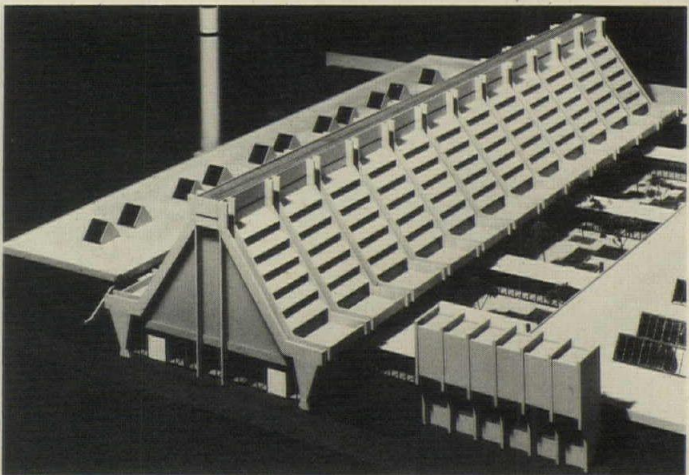
A Science Tower for The Rockefeller University in New York City is an 18-story, 245,000-square-foot limestone-faced building. Four corner supporting towers house ducts for exhaust and supply equipment. The supporting facade columns carry plumbing services. Additional support is provided by horizontal post-tensioned concrete beams. The interior is column-free, providing flexibility in the design of laboratories and in the placement of partition walls. In addition to the 13 floors for laboratory research, there will be a lobby, kitchen and dining facilities, two lecture halls seating 75 each with special devices for visual and oral presentations, four conference rooms seating 40 each, and faculty lounge library. The architects are Nelson W. Aldrich, Campbell, Aldrich & Nulty, with Jan K. Sterling, Chief Designer. Approximate cost: \$10,250,000.




Amherst Science Center, Amherst College, Amherst, Massachusetts, relates easily to the existing 19th-century campus. Architects Campbell, Aldrich & Nulty have designed the building to fit a sloping site, making only two stories apparent from the campus side, while all five relate to the surrounding space and mountains of the other side. The \$5.8-million building consists of classrooms for physics, chemistry and astronomy departments, three lecture rooms, a joint library, a faculty lounge and dining hall. Materials are brick with masonry block units as back up and steel sash.



The Rosenthal Glass factory, Amberg, Germany, designed by The Architects Collaborative, has been shaped to achieve the most effective natural ventilation. Continuous ventilators along the roof of the 100-foot-span main hall act as exhaust openings, and at ground level the two sides open onto courtyards for air intake. The building will be visible only above the top of the low structures, and the design of the roof area—the major elevation—has been handled with particular care. The four side walls have been treated with earth berms, above which a clerestory lights manufacturing space. Approximate cost will be \$3 million.



The easy-to-install cooler

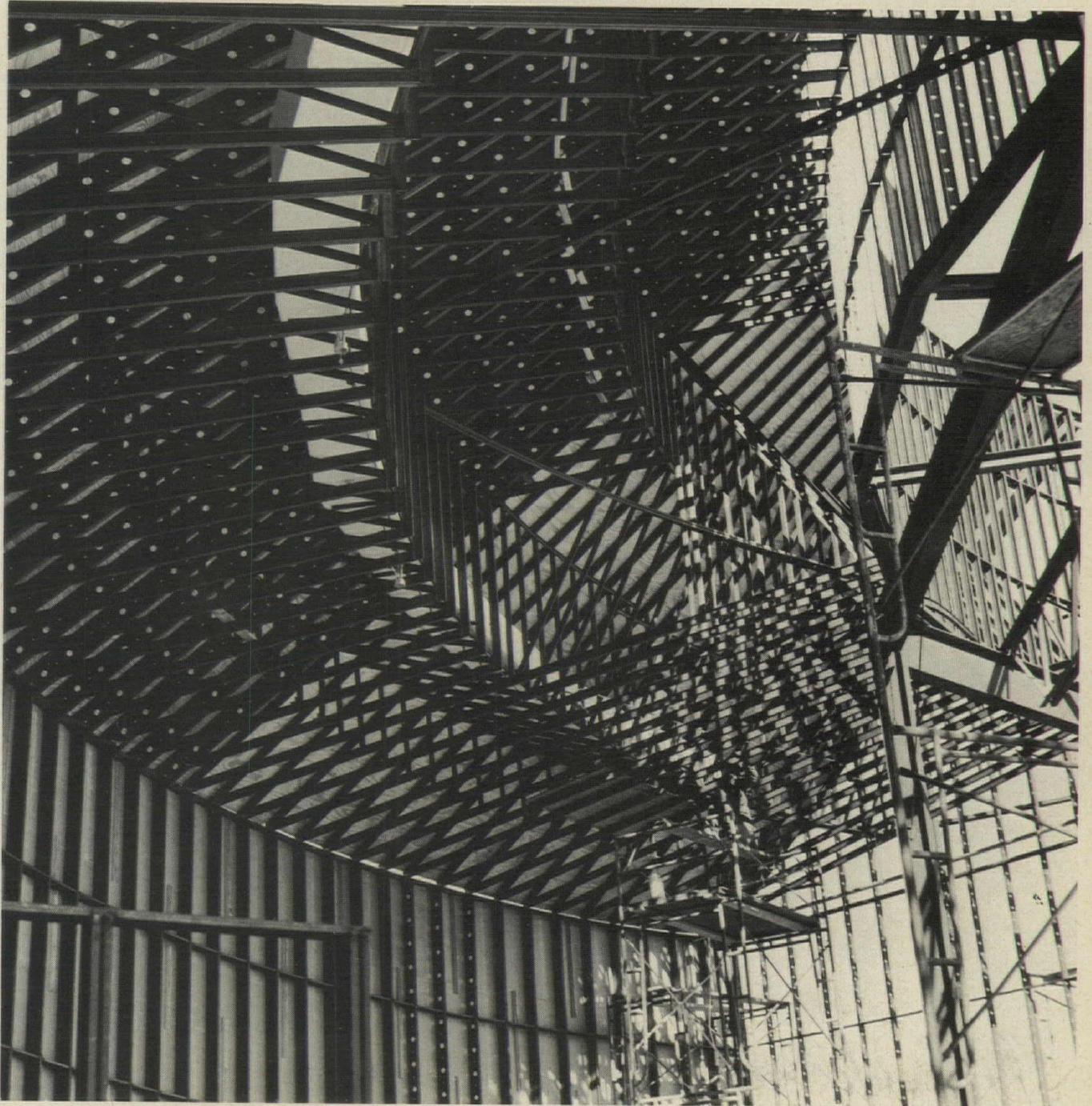


This Westinghouse Heavy Duty Wall Mount water cooler saves you installation time, so it doesn't drain off your profits. It uses a slip-fit trap, a standard hand-valve and a short pipe and tube. A time-saving installation template comes with each good-looking Wall Mount. It comes complete with stainless steel basin, vandal-proof push-button bubbler and built-in glass-filler plumbing. And the complete cooler is backed by a five-year guarantee plan that covers the hermetically sealed refrigerator system and all functional parts (excluding labor). For product details, see Sweet's, Mechanical Products Catalog or contact our local Manufacturer's Sales Representative. Westinghouse Water Cooler Department, Columbus, Ohio 43228

**You can be sure...
if it's Westinghouse**



OUR TEXAS ERECTOR SET:

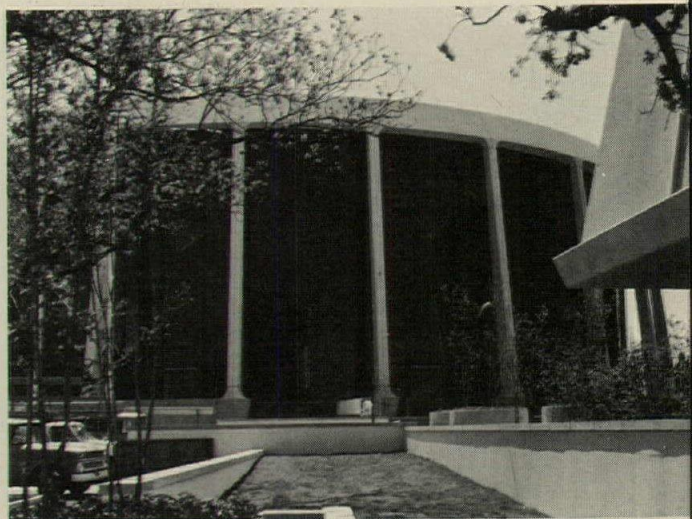


For more data, circle 30 on inquiry card

For more data, circle 29 on inquiry card

HOW KEENE SPEED-STEEL AND ARCHITECTS

Marmon-Mok Associa
Archit



The Confluence Theater of the Federal Pavilion measures 195 feet in diameter and 70 feet in height. Speed-Steel's light weight made handling much easier for those high walls, hence speeding erection time.

Speed-Steel really showed its stuff in the U.S. Exhibit Pavilion. Over 50,000 pounds went into the wall-framing system of this 20,000 square foot building. Light weight, ease of handling, and easy adaptability to the curved wall made Speed-Steel a natural here.

Roberts-Allen-Helmke
Architects

Photograph on preceding page.

Coca-Cola Building
Phillip Carrington, Architect
Jean Edens, Jr., Engineer



HELPED THE BUILDERS AT HEMISFAIR '68.®

There's plenty of interesting design at Hemisfair. Speed-Steel's versatility undoubtedly helped make this possible.



*Foreign Government
Exhibit Buildings
Roberts-Allen-Helmke, Architects*

Speed-Steel has a nailing groove with approximately three times the holding power of wood. So what goes up is really up to stay.

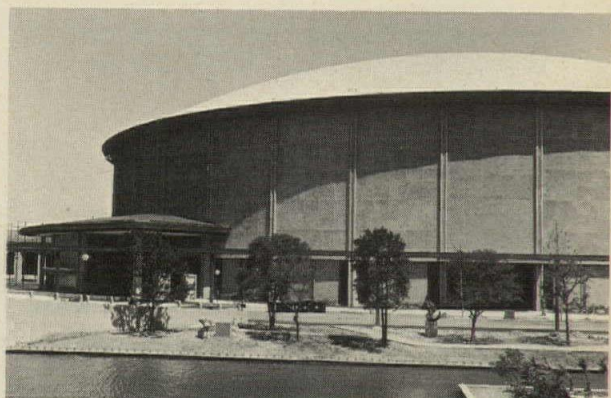
Calling Speed-Steel the Texas Erector Set isn't all tall tale. After all, it was used to build 19 principal Hemisfair buildings. That gives it some claim to the name.

Speed-Steel was used because it has one of the highest work-to-weight ratios of any building product. Yet it is light-weight and easy to handle. So erection is fast and economical. Incombustible, Speed-Steel's versatility also gives great freedom to architectural design.

Find out more about our framing system. Ask some of the other Hemisfair architects: Elliot Noyes & Associates; William D. Jones & Associates. Or write to our Structural Framing Division for our brochure that tells you all.



The Civic Center, a permanent three-building complex, used Speed-Steel to advantage. 70,000 pounds went into this Arena alone. It went up fast, and will be there for a long time.

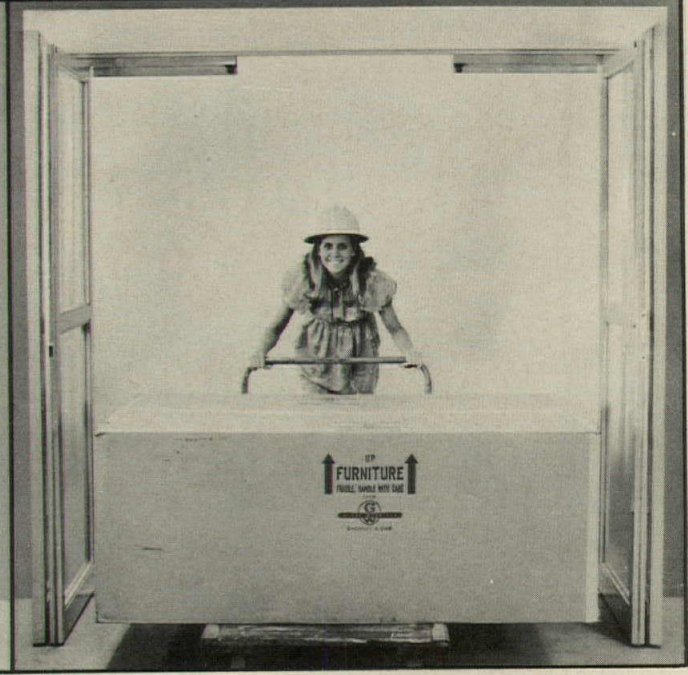
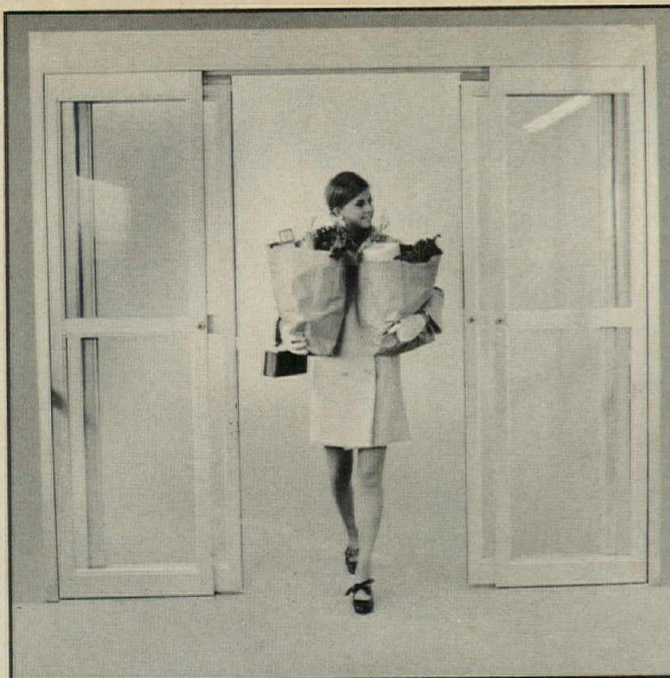


*Noonan & Krockner & Phelps & Simmons Associates
Architects-Engineers*

KEENE PENN METAL
CORPORATION DIVISION

PARKERSBURG, WEST VIRGINIA

For more data, circle 30 on inquiry card



Great big wide entrances to be exact.


Stanley's new Auto-Slide® 6000 series is, you might say, a breakthrough in automatic sliding entrances. In addition to opening and closing automatically, it has an exclusive wide-open feature that gives you maximum use of your doorway. Emergency breakaway at any point meets exit codes. No other automatic entrance opens up such opportunities.

So write or give your Stanley D. O. E. Distributor a call. You'll find him in the yellow pages under "Door Operating Equipment".

STANLEY®

Stanley Door Operating Equipment
Farmington, Connecticut 06032

For more data, circle 31 on inquiry card

An aerial photograph of a city skyline, likely New York City, featuring several prominent skyscrapers and a river with bridges. The image is in a sepia or brownish tone, giving it a classic, historical feel. The buildings are densely packed, and the river winds through the city, with several bridges crossing it. The sky is a hazy, light brown color, suggesting a clear day or a slightly overcast sky.

**Something to help
ease your mind
when you automate
your clients' buildings.
We've been through
it 4000 times.**

Every building is different. In size, design and function. But the experience Honeywell has acquired by installing one-man control systems in more than 4000 buildings can save your clients a small fortune when you automate theirs.

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 to know more about how Honeywell's experience can save your clients money on a complete building automation system, send for our free Planning Guides on Automation and Security.

Write Honeywell, Commercial Division, G6118, Minneapolis, Minnesota 55408.

Honeywell
AUTOMATION

For more data, circle 32 on inquiry card



MODERNIZE WITH MARBLE

The Zibell Anchoring System Makes the Job Fast and Economical



JOHN SMITH CO., Atlanta



WILLIAM BREEN, Architect
WILLIAMS TILE & TERRAZZO CO., Setting Contractor

The Zibell System of installing $\frac{7}{8}$ " marble veneer has been the answer to many a design problem and the way out of many a budget squeeze. Widely used in new construction, it is finding increasing favor for remodeling work. The unique metal grid system which supports the marble can be anchored to old facades with a minimum of remedial work and the light weight of the installation is easy on old footings. Erection is fast and the cost is frequently lower than that of less desirable materials. Let us send you the whole story. It's worth having.

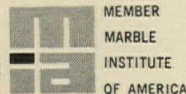
Write for the brochure "The Zibell Anchoring System"

the Georgia Marble Company

The Innovators in Stone

11 Pryor Street, S. W., Atlanta, Georgia 30303

COAST-TO-COAST CONSULTING SERVICE Our engineers stand ready to assist you any time any where on any project involving marble or limestone. A phone call will put one of our men across the desk from you in a matter of hours. No obligation, of course.



MEMBER
MARBLE
INSTITUTE
OF AMERICA

For more data, circle 33 on inquiry card

You don't have to specify **JAMISON**

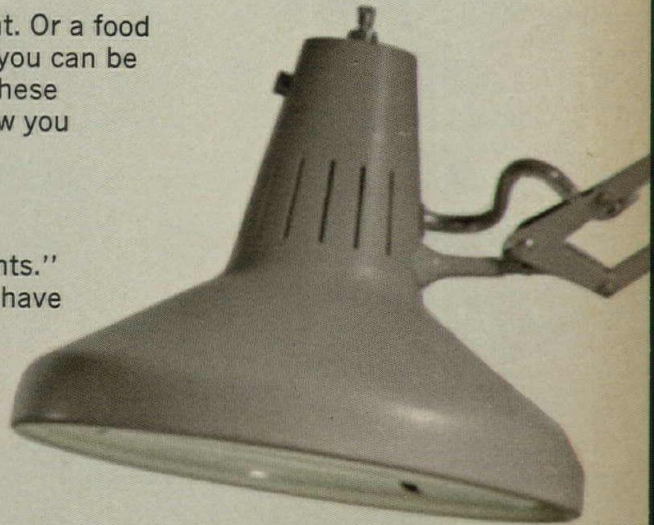
but if you value VALUE, you will

There is a subtle value about Jamison cold storage doors that goes beyond quality materials, superior design and expert workmanship. Naturally, you expect these—the best from the oldest and most experienced company in the business.

But this subtle value we're talking about—it's the invaluable technical assistance and engineering help we are able to give you.

For example. Suppose you are designing a meat packing plant. Or a food distribution center. Or a bakery. Think of the time and effort you can be spared by using our layout sheets for typical installations of these kinds. Typical examples clearly marked out and coded to show you exactly the right cooler and freezer doors for the given circumstances.

We have for you a valuable book "How to Select and Specify Doors for Cold Storage Warehouses and Food Processing Plants." After you send for, and receive your free copy, you still don't have to specify JAMISON. But if you value VALUE, you will.



COLD STORAGE DOORS BY
JAMISON

JAMISON DOOR COMPANY • HAGERSTOWN, MD.

For more data, circle 34 on inquiry card



A suspended acoustical ceiling with a 1-hour fire rating under an insulated steel deck.

You can have it with 2' x 4' x $\frac{5}{8}$ " Gold Bond Fire-Shield Solitude grid panels. And for maximum economy, use the roof/ceiling system illustrated. A 22-gage fluted metal deck over bar joists with 1" Gold Bond® roof insulation board or equivalent.

It offers the lowest possible cost for quality roof/ceiling construction for one-storied structures such as warehouses — the roof of any multi-storied light commercial or industrial building.

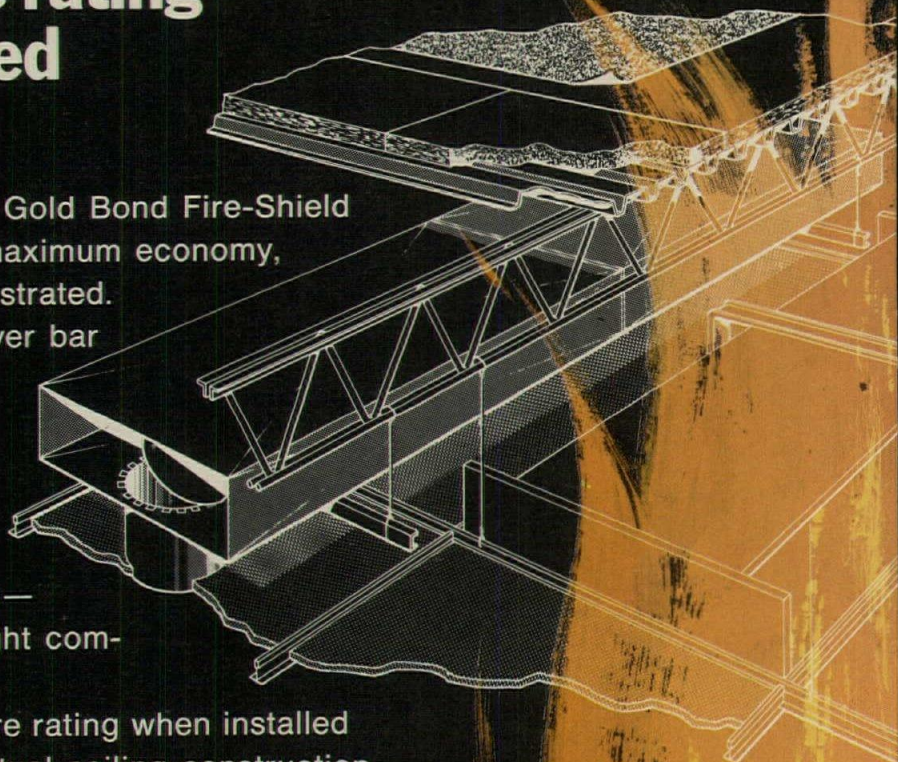
This system earns a 1-hour fire rating when installed in compliance with Factory Mutual ceiling construction designs. And it offers a lot more, too.

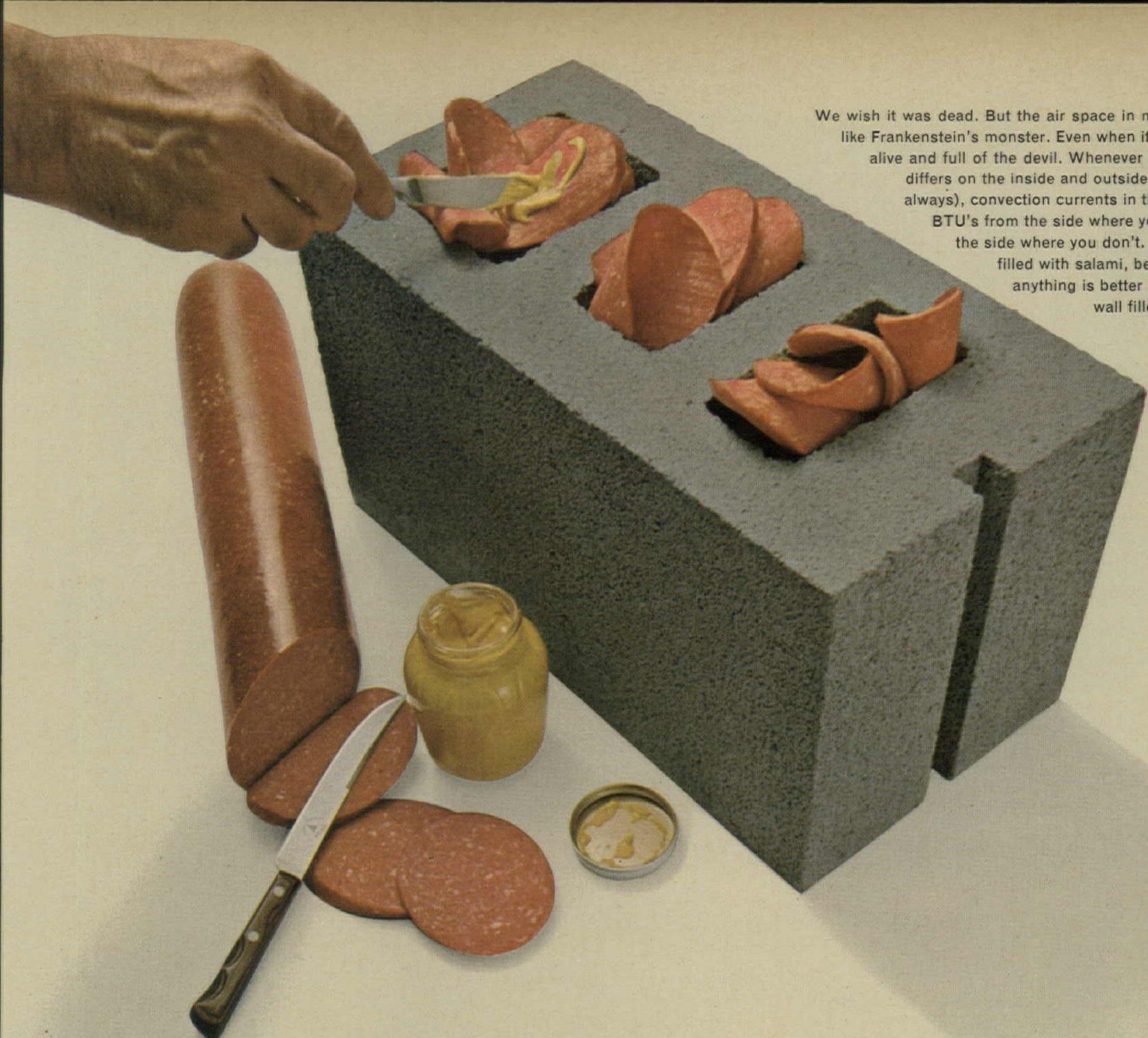
Good acoustical absorption and sound attenuation values.

A choice of attractive Fire-Shield Solitude patterns — fissured, needle-point, textured.

Low maintenance. Standard finish on all panels is a washable, factory-applied vinyl acrylic coating.

A scrubbable coating is also available for areas where cleansing maintenance and resistance to staining are factors.





We wish it was dead. But the air space in masonry walls is like Frankenstein's monster. Even when it's sealed up it's alive and full of the devil. Whenever the temperature differs on the inside and outside of a wall (that's always), convection currents in the cavities carry BTU's from the side where you want them to the side where you don't. A masonry wall filled with salami, beef stroganoff or anything is better insulated than a wall filled with nothing.

Anything in the wall is better than nothing at all.

Here's news about a special insulation that doubles insulating values, increases masonry fire ratings, too.

The name is Zonolite® Masonry Fill Insulation.

Perhaps you already know that it doubles the insulating values of concrete block, brick cavity and brick-and-block walls. Which keeps the occupants more comfortable, cuts the heating and air conditioning bills as well.

But the big news is that it can double the fire ratings of an 8-inch lightweight block wall.

A 2-hour rated block wall gets a 4-hour rating when insulated with Zonolite Masonry Fill. Particularly important in perimeter, party and stairwell walls and elevator shafts.

For extras, we throw in the fact that Zonolite Masonry Fill cuts sound transmission, too.

All for as little as 10c per square foot, installed.

There simply is no other way to combine high insulating value, sound reduction and fire safety in a masonry wall at such low cost.

For complete information, mail the coupon.

GRACE

Zonolite Div., W. R. Grace & Co., Dept. AR-07
Merchandise Mart Plaza, Chicago, Ill. 60654

Gentlemen: I like salami (especially with a little mustard) but I think it's a little rich for masonry walls. Please send me latest Zonolite Masonry Fill Insulation publication with complete technical data and specifications.

NAME _____

TITLE _____

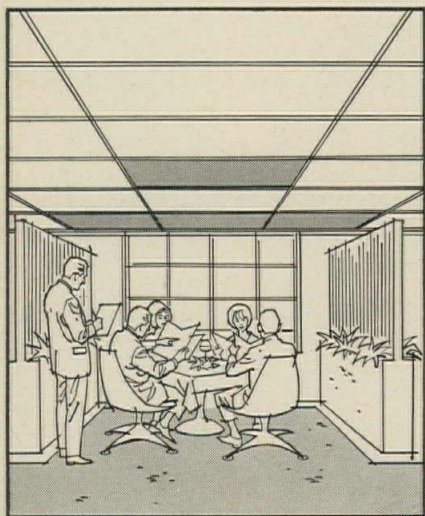
FIRM _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____



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 Electro-Products Division, 3M Co., 3M Center, Building 220-5W, St. Paul, Minnesota 55101.

3M BRAND IS A REGISTERED TRADEMARK OF 3M CO.

Electro-Products Division 

For more data, circle 38 on inquiry card



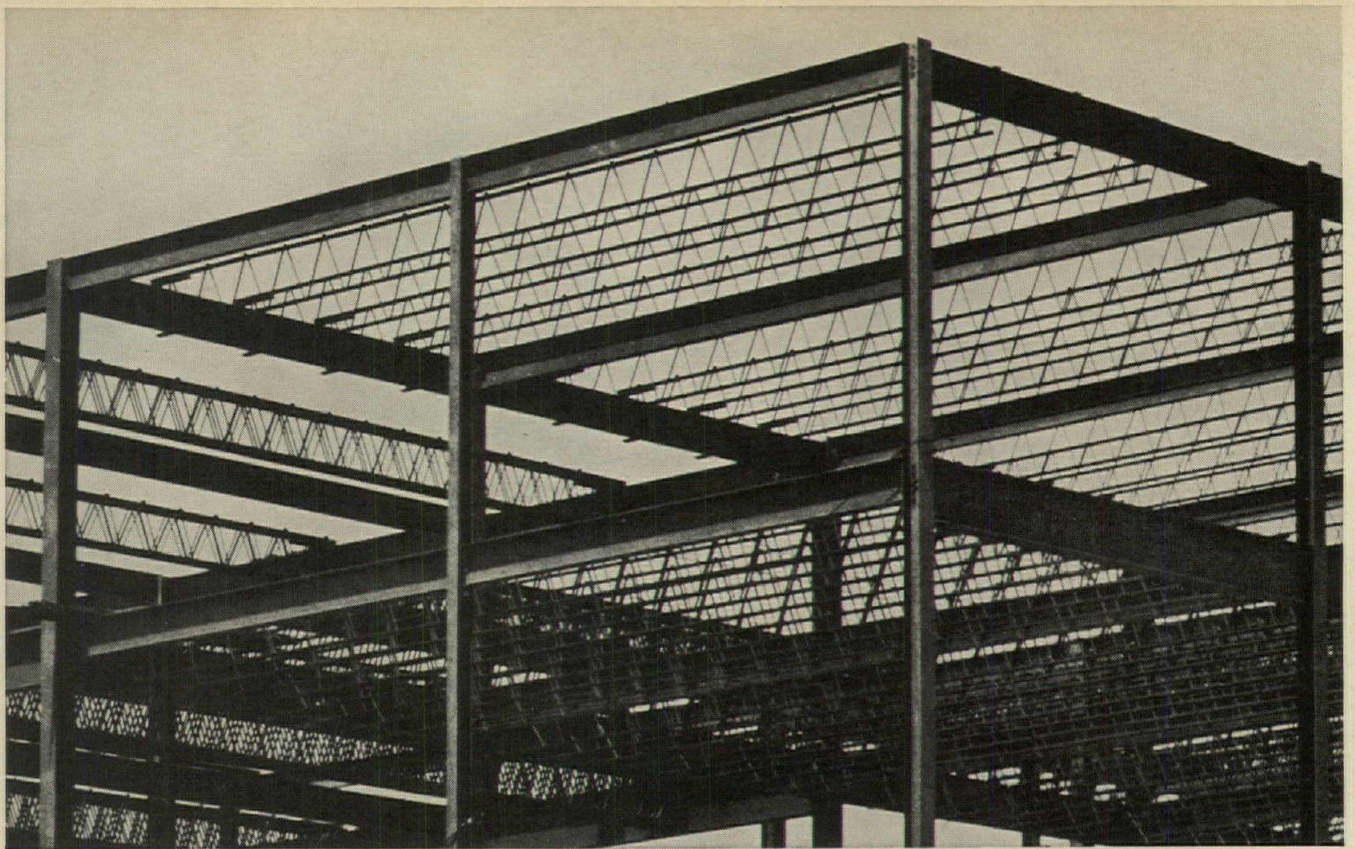
Designs by Ving Smith, A. I. D.

Have a wild idea in canvas!

Design with canvas and your imagination takes wing, while the cost stays happily down to earth. That's because standard hardware or welded pipe framing supplies all the structural support needed. The fabric is a sturdy weave of 100% cotton (8 to 15 ounces per yd. of 31" width) treated for mildew and water resistance to weather any outdoor job. No wonder there's so much happening in canvas. Canvas solves so many problems. Ask your local canvas products manufacturer.

CANVAS AWNING INSTITUTE
(in cooperation with National Cotton Council and Cotton Producers Institute)
P. O. Box 12287-X, Memphis, Tennessee 38112

For more data, circle 39 on inquiry card



Another Building Goes Composite with Laclede's Unique C-Joists

Composite construction is showing up in more and more buildings across the country. Here's one of the more recent: Adlai E. Stevenson Hall for Humanities at Illinois State University, Normal.

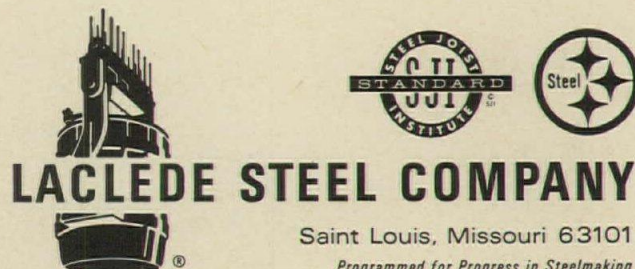
Almost 400 tons of Laclede Composite C-Joists were used in the floor system of this new educational facility, with an additional 52 tons of Laclede standard joists in the roof.

C-Joists offer distinct advantages for composite construction. They eliminate the time and cost of welding on shear connectors. The web panel points project several inches above the top chord, acting as built-in shear connectors. Inverted top chord provides a convenient shelf for fast, one-man placement of prefabricated deck.

Laclede composite and standard joists are available in a wide range of lengths, depths and load bearing capacities. Write for new technical brochure with complete information.



*Adlai E. Stevenson Hall for Humanities
Architect and Engineer: Middleton & Assoc., Normal, Ill.
Contractor: J. L. Wroan & Sons, Inc., Normal, Ill.*



For more data, circle 40 on inquiry card

6754

There's a lot of Ohio deep in the heart of Texas.

And particularly in the U. S. Confluence Theater at HemisFair in San Antonio.

Those giant 7' x 19' glass panels which form the semicircular front of the handsome structure are Toledo-made, heavy-duty Parallel-O-Bronze® plate glass. Extra thick for added strength, each panel weighs 900 pounds.

The bronze tint gives the 14,000-square-foot glass area a rich, warm

cast. It also reduces sky brightness and sun heat build-up within the building.

L-O-F makes a particular kind of glass for every purpose in building design. Consult Sweet's Architectural File. Or call your L-O-F Glass Distributor or Dealer listed under "Glass" in the Yellow Pages. Libbey-Owens-Ford Glass Company, 811 Madison Avenue, Toledo, Ohio 43624.

Libbey-Owens-Ford



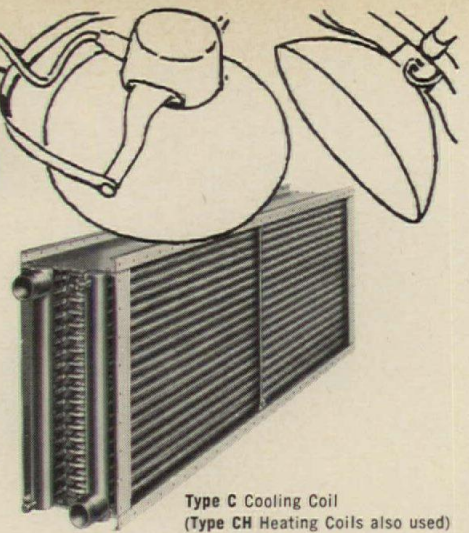
OPERATION AEROFIN

for complete Heating and Cooling Comfort of
staff/students/patients . . .

Environmental control of this massive Center calls for exacting performance—the kind delivered by Aerofin. Modern smooth-fin design of Aerofin Coils permits optimum heat-exchange capacity in compact space—allows the use of high air velocities without excessive resistance.

Aerofin performance data are laboratory and on-the-job proved. Specify dependable, true-rated Aerofin Coils for *your* next heat transfer "operation."

AEROFIN Heat Transfer Coils INSTALLED

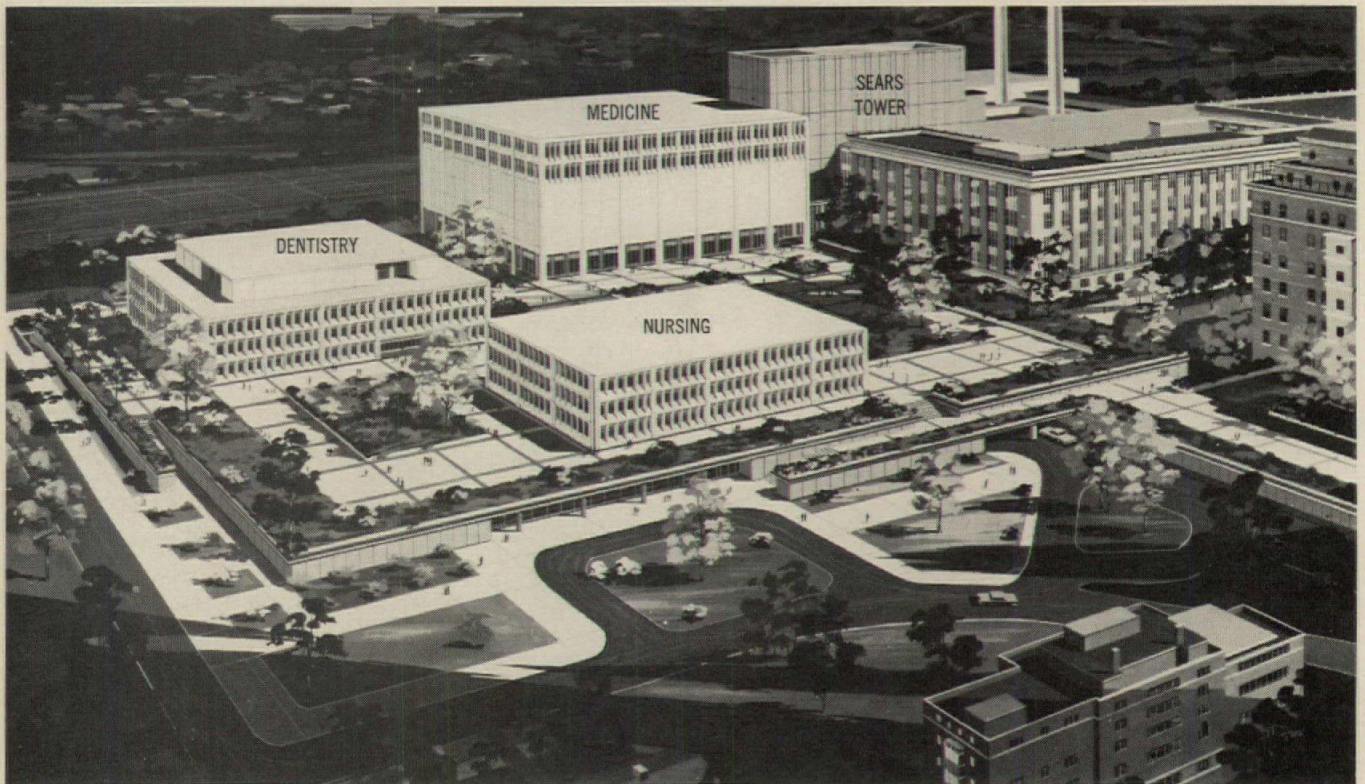


Type C Cooling Coil
(Type CH Heating Coils also used)

Case Western Reserve University Health Science Center — largest project of its kind in the country.

Cleveland's health care and health education facilities get a significant shot-in-the-arm with this \$38,000,000 project — consisting of new buildings for the Schools of Dentistry, Nursing, plus a new Wing and Administration Tower for the Medical School.

Three buildings rise from a unique architectural concept—a 5 acre, story-high "podium." Beneath the podium, at street level, are shared classroom facilities, the Dental Clinic and 600 parking spaces.



John Williams & Associates, Barnes Neiswander & Associates, Architects Byers, Urban, Klug & Pittenger, Engineers Turner Construction Co., General Contractor Smith & Oby Company, The Spohn Corp., Mechanical Contractors

AEROFIN CORPORATION

Lynchburg, Virginia 24505

Aerofin is sold only by manufacturers of fan system apparatus. List on request.

AEROFIN OFFICES: Atlanta • Boston • Chicago • Cleveland • Dallas • New York • Philadelphia • San Francisco



Quick Change Partition System offers FLOOR-PLAN FLEXIBILITY with economy!

Quick Change* Movable Partitions let you direct traffic, remodel with ease. Simple to install with a minimum of disturbance. Beautiful, economical Masonite Royalcote prefinished hardboard panels come in many colors or simulated wood panel surfaces. Factory finished with built-in hardener for long wear, low maintenance, lasting beauty. Choose low rail, cornice or ceiling height partitions, with or without glass inserts.

You'll meet your completion promises, too. Our nationwide network of 90 installers—local people, working from local inventory—assures fast installation. For details, see Sweet's Architectural File 13A. Or write to us. MASONITE CORPORATION, Dept. AR-7, Box 777, Chicago, Illinois 60690.

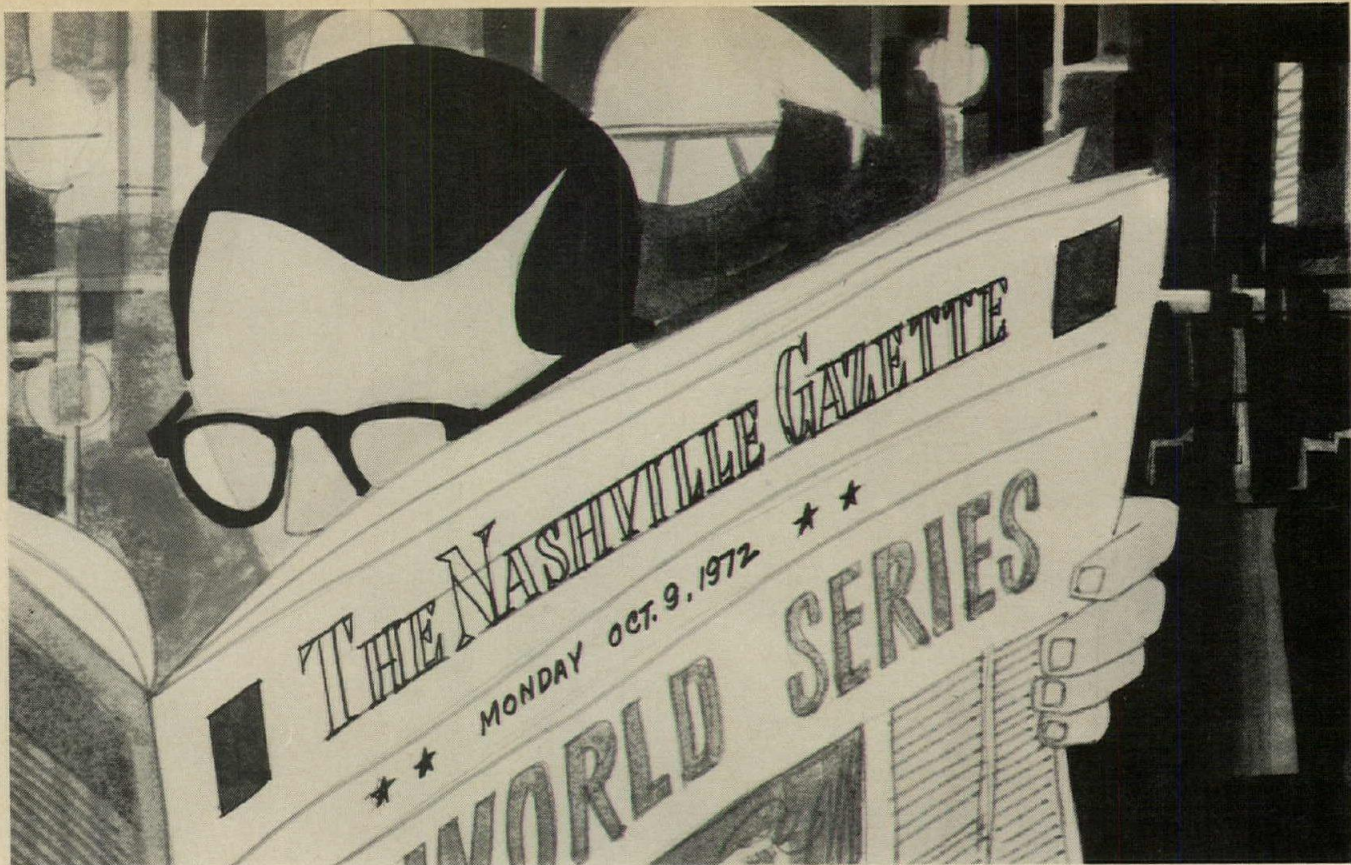
*Quick Change is a registered trademark of Glen O'Brien Movable Partition Company, Inc.

Masonite and Royalcote are registered trademarks of Masonite Corporation

 **MASONITE CORPORATION**



For more data, circle 43 on inquiry card



FOR YEARS-AHEAD IDEAS IN ADVANCED WATER FILTERS . . .

come to Bowser-Briggs where it's 1972

What does filtration really offer you — an investment in future product efficiency, right? Then the more you think “future”, the more you deserve Bowser-Briggs water filtration equipment, years ahead in design and performance for years-ahead efficiency.

You see, to the men at Bowser-Briggs it's 1972 — and this attitude in thinking five years ahead gives you developments like the Model 610-E with patented Star-Cor® elements or the fiberglass vacuum diatomite swimming pool filters with new rectangular star-leaf construction. Leaves are individually removable

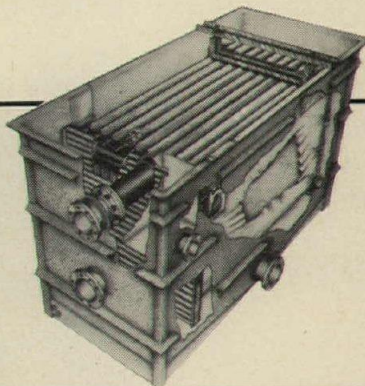
for greatest ease of maintenance, and offer uniform pre-coating-filtering and the most unrestricted water flow. These are just two examples of Bowser-Briggs' 1972-thinking. You'll also see it in many other areas . . . anywhere there's a need for dehydration, oily waste treatment, filtration, absorption or coalescence. We've been specializing in looking ahead since 1885 (1890 to us), so if you'd like a view of 1972 — in filtration — call your man from Bowser-Briggs. Or send us your requirements, without obligation.

Your future is our business . . . today.



BOWSER-BRIGGS FILTRATION DIVISION
COOKEVILLE, TENNESSEE 38501

IN CANADA: S. F. BOWSER CO., LTD., HAMILTON, ONTARIO



BOWSER-BRIGGS MODEL 618A-FG, FIBERGLASS VACUUM DIATOMITE SWIMMING POOL FILTER

Preferred by leading municipalities.
For swimming pools of 134,000 to
806,400 gallon capacity. Approved
by National Sanitation Foundation.
Complete data available. Write Dept. AR-5

For more data, circle 44 on inquiry card

For more data, circle 45 on inquiry card

 **new**
space-saver
WATER COOLER

Choice of 5 Colors

New appearance. New size. GE's new wall mounted Space-Saver combines both to bring you the latest in water cooler appeal.

Take appearance: There are no louvers on the front to detract from the clean, modern lines. It's sleek, it's smart, it's stylish. Five beautiful cabinet finishes to choose from: Mocha Linen or Pebble Charcoal textured vinyl side panels with Ironstone vinyl front panel; Desert Mist or Regal Silver baked enamel side panels with Ironstone enamel front panel; or all stainless steel. A handsome combination for any decor.

Take size: It's 26 inches high, 15 inches wide and extends a mere 12½ inches from the wall . . . less than any other wall mounted cooler in the industry.

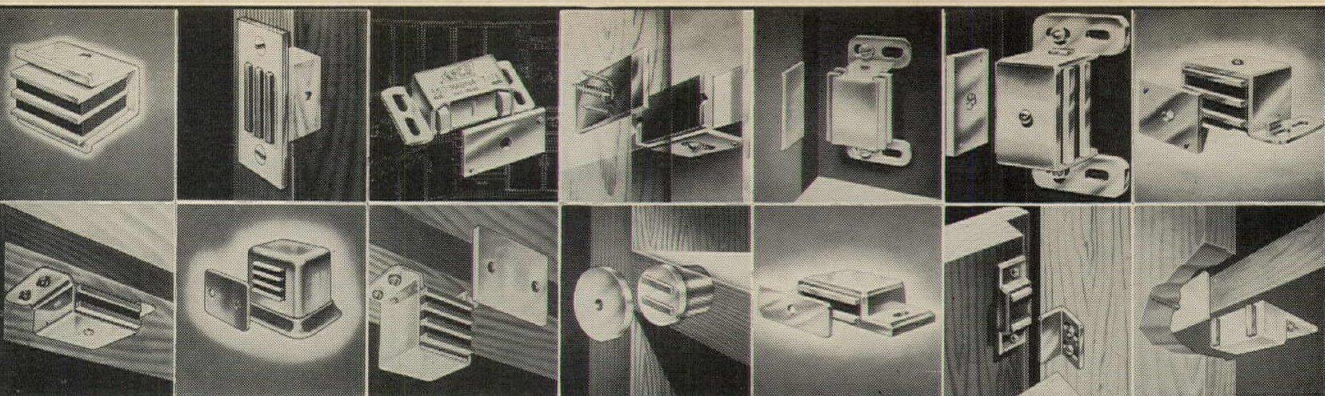
Available in 6, 8, 12 and 15 gallon capacities or as fountain only. Refrigeration system can be added later.

For more specifics on the sleek new Space-Saver, check the Yellow Pages for your local GE water cooler representative. Or write GE, Dept. 761-41, 14th and Arnold Streets, Chicago Heights, Illinois 60411.

GENERAL  **ELECTRIC**

new
space-saver



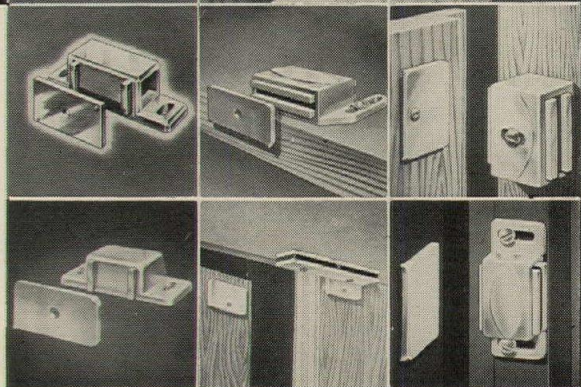


MAGNETIC CATCHES



designs to meet every need for commercial and residential doors and cabinets

Here are catches for every conceivable application. Each is engineered for an attractive appearance, to mount easily in a variety of ways and to last a lifetime. Full-power magnets are self-aligning to enlarged strikes. The floating action helps control door warpage.



Free 38-page catalog on all EPCO magnetic catches, sliding door hardware and knobs and pulls available on request.

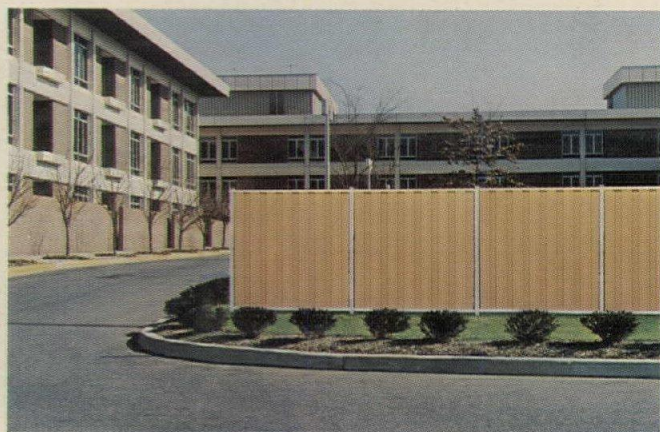
See Sweet's Catalog under Arch. File 19g-En and Light Const. File 7b-En.

THE ENGINEERED PRODUCTS CO.
P.O. BOX 108 FLINT, MICHIGAN 48501

For more data, circle 46 on inquiry card



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 Baltimore, Houston, Los Angeles; 48 branch offices.

Anchor Fence, Dept. C-07
6500 Eastern Ave.
Baltimore, Md. 21224



Please send 1968 "New Dimensions" color booklet.

Name _____ Title _____

Firm _____

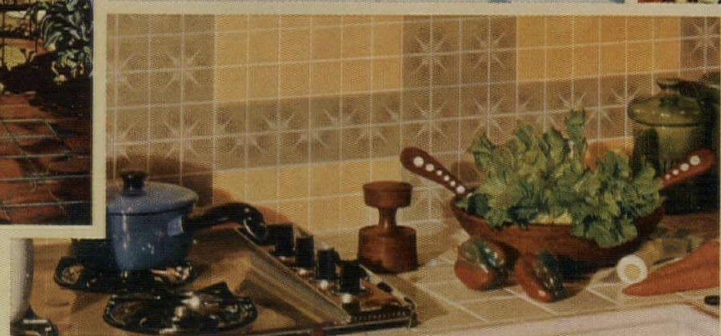
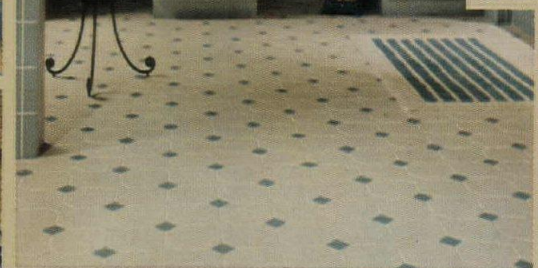
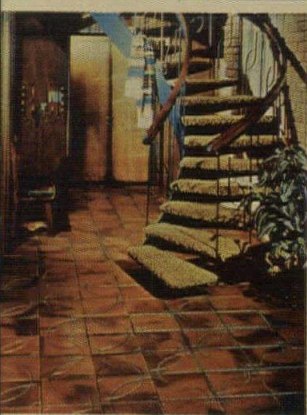
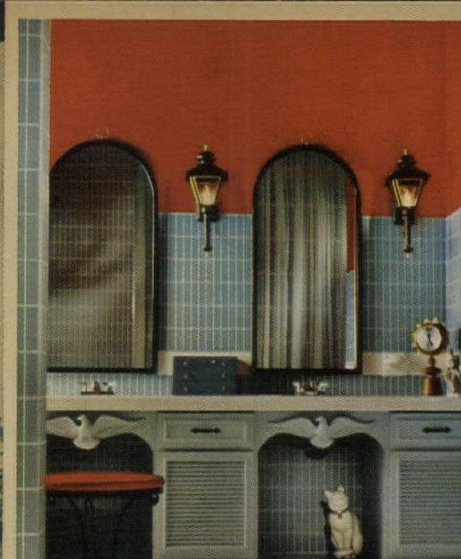
Street _____

City _____ State _____ Zip _____

Please list applications that interest you:

Anchor Railing Systems for _____

Anchor Privacy for _____ Thank you.



Should a house be just a house when it can be a villa, a chalet, or a chateau?

The cool elegance of a moorish floor. The echo of nature in a finely detailed kitchen. The sweep of a dressing room refined to an individual personality. The artistry of a sculptured entrance.

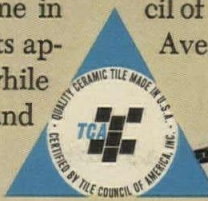
The timeless beauty of ceramic tile makes all these possible—in homes that give the pleasure of

dreams turned real.

Ceramic tile continues to lend its unique qualities to more and more areas of the modern home. For good reasons. A seemingly endless choice of colors and textures. More investment than expense, it will last as long as any home in which it's used, enhancing its appearance and value. All the while eliminating the drudgery and expense of constant care.

Some of what's new in

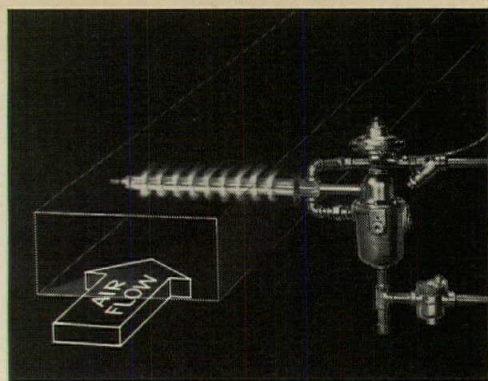
ceramic tile is contained in "Designs For Gracious Living." Sixteen pages of information plus illustrations of actual designs. For what's best in ceramic tile, ask for "Certified Quality Tile" bearing the mark shown here. Tile Council of America, Inc., 800 Second Ave., New York, N.Y. 10017.



TILE COUNCIL MEMBER COMPANIES: American Olean Tile Co., Inc. • Cambridge Tile Manufacturing Co. • Continental Ceramic Corporation • Florida Tile Industries, Inc. • Gulf States Ceramic Tile Co. • Keystone Ridgeway Company, Inc. • Lone Star Ceramics Co. • Ludowici-Celadon Company • Marshall Tiles, Inc. • Mid-State Tile Company • Monarch Tile Manufacturing Inc. • Pomona Tile Manufacturing Co. • Sparta Ceramic Co. • Summitville Tiles, Inc. • Texeramics Inc. • United States Ceramic Tile Co. • Wenzel Tile Company

For more data, circle 48 on inquiry card

7 reasons why architects should be concerned with humidification



Armstrong "Dry Steam" Humidifiers introduce water vapor into the air flow to provide accurately controlled relative humidity.

- 1.** *Human Comfort*—When air is dry, normal moisture evaporates from the skin more rapidly and produces a feeling of chilliness, even with the temperature at 75°F or more. Nose and throat membranes tend to feel uncomfortably dry without adequate humidity.
- 2.** *Personal Health*—Research indicates that some disease-causing bacteria that thrive in very dry or very moist air die quickly at relative humidities of 45% to 55%.
- 3.** *"Shock" Reduction*—Irritating and uncomfortable shocks from static electricity discharge are reduced as relative humidity approaches 50% or more.
- 4.** *Preservation of Furnishings*—Moisture loss from wood panelling, furniture and fixtures in dry air can lead to material deterioration in the form of glued joint failure, checking, shrinking and cracking.
- 5.** *Dust Control*—Maintenance of adequate relative humidity reduces the formation of dust and helps reduce its settling out.
- 6.** *Safety*—Adequate relative humidity helps prevent the accumulation of static electricity which, in a potentially explosive atmosphere, could be hazardous.
- 7.** *Production Efficiency*—In operations where machines generate static electricity or where "static-prone" materials such as paper, films, plastics, etc., are handled, controlled humidification can substantially reduce or eliminate the static problem.

Good reasons all why controlled humidification is a very important (if not essential) consideration in the development of any building. You can find out more about it in *The Armstrong Humidification Book*, a comprehensive handbook on humidity control for industry, institutions and commercial buildings. Write for your copy today to . . .

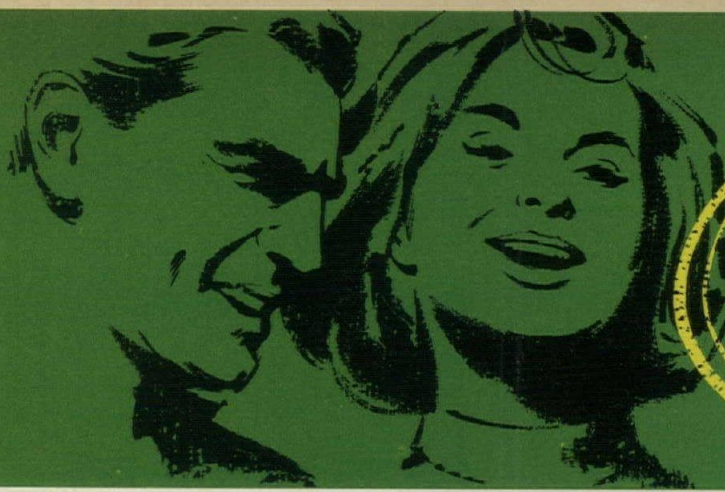


ARMSTRONG MACHINE WORKS

8573 Maple Street, Three Rivers, Michigan 49093

812 MH

For more data, circle 49 on inquiry card



**FOR CUSTOMER
SATISFACTION**



The "Concord": Pembroke Greens, Naperville, Ill.; as built by Harris Home Builders (land developers and home builders in Chicago area); Mr. William F. Harris, Pres.

NICHOLS ALUMINUM BUILDING PRODUCTS

Long-Lasting • MAINTENANCE-FREE • ATTRACTIVE

Whether you are architect, contractor or home-developer, always specify or use top-quality Nichols Aluminum Building Products on your construction projects. Nichols offers a complete line of care-free Building Products that add beauty to any home or commercial building . . . with the added feature of virtually no maintenance costs.

Rustproof aluminum will not stain, warp, rot or otherwise deteriorate. Many Nichols' Building Products are pre-painted with baked-on enamel. Others never require painting because of the beauty of natural aluminum. Precision-engineered for quality, dependable installation.

INCLUDE THE COMPLETE LINE OF NICHOLS PRODUCTS

Begin with the basics—Hy-Tensil Aluminum Alloy Nails, with

greater strength, prevent rust-spotting or staining on siding . . . and eliminate the need for repainting due to rusty nails.

Continue with Aluminum Building Trim, Valley & Flashing to assure weather-tight, long-lasting finish. Add Gutter Spikes, Ferrules and Gutter Cover for Rain-Carrying Systems.

Complete the attractive homesite appearance with Aluminum Privacy Panels (with installation flexibility), Aluminum Chain Link Fence and modernistic Contempra Gate. Hy-Tensil Roofing & Siding Sheet is ideal for carports and patio covers . . . or for roofing or siding on commercial buildings.

Also available are aluminum Building Corners, Rain-Carrying Equipment, Soffit System.

Be sure to specify the complete line of Nichols Aluminum Building Products. It will pay off in customer satisfaction!

Write today for this **FREE** "Building Blocks" Brochure

For more data, circle 50 on inquiry card

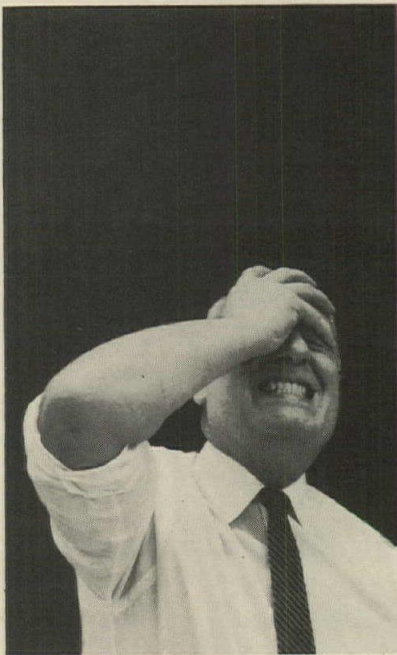


NICHOLS ALUMINUM COMPANY
15 Spinning Wheel Road, Hinsdale, Illinois 60521

The facts of light

No. 1 in a series
on plastic
lighting panels.

What happens if you don't tie down specs on lighting panels?



Somebody gets into a price-cutting competition. They ring in a cheap lighting panel to bring their cost down. Your client winds up with a second-rate job. After all, the lighting can't be any better than the panels . . . because they control results.

There's only one way you can make sure this won't happen. Write tight specs. Specify lighting panels by brand names.

And remember this: Only two manufacturers now make a line of plastic lighting lenses of Specification Quality (their brand name is on every panel).

One is KSH, Inc. Our brand is K-Lite. Specify K-Lite and you won't have to worry about the quality of your lighting.

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

KLITE[®]

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

For more data, circle 51 on inquiry card



Bally Walk-Ins help handle the change in American eating habits

More and more affluent society eats away from home. Teenagers have more money to spend. Schools have better and more diverse menus. Industrial cafeterias attract and satisfy more diners. Hospitals, nursing homes and institutions are upgrading their feeding programs.

Inspired operators of mass feeding places everywhere are rising to the challenge of this new American way of life with imaginative profit making ideas and menus. A good example is the wide spread use of foods pre-prepared during low peak hours to make more effective use of kitchen personnel and help offset higher food costs.

The most important advancement within the kitchen is the increased use of refrigeration. Today Walk-In Freezers are a must . . . and along with companion Walk-In

Coolers provide high "profit-earning" space for perishable food storage. Bally prefab design permits assembly of Walk-Ins in any size and shape to fit existing space and traffic patterns . . . with walk-in doors and glass service doors located where they improve workability.

Patented Bally "Speed-Lok" construction makes it easy to add sections to increase size . . . equally easy to disassemble for relocation. Four inch urethane insulation "foamed-in-place" (equal to 8½" of fiberglass) shrugs off high temperatures and Bally Walk-Ins operate efficiently located adjacent to kitchen ranges . . . or outdoors exposed to hot summer sun. 76 models and sizes of self-contained refrigeration systems are made to fit every individual need. Send to Bally Case and Cooler, Inc., Bally, Pa. 19503, for 32-page catalog and urethane wall sample.

There's an evolution in the kitchen



© 1968, ALL RIGHTS RESERVED.

Address all correspondence to Dept. AR-7

For more data, circle 52 on inquiry card

**"It's just a
3-story building
so we don't need
the world's most
sophisticated
elevator."**

Get the new Otis HP-1500, specially designed (and priced) for low-rise buildings. Pre-engineered to simplify elevator planning and installation. It's completely automatic and has a memory. That's what you really need.

Otis
ELEVATOR COMPANY

For more data, circle 54 on inquiry card



 **SARGENT**[®]

*A complete line of advanced architectural hardware, including the Sargent Maximum Security System
New Haven, Connecticut • Peterborough, Ontario*

AUGUST

19-24 Icoграда Third General Assembly and International Congress on Graphic Design. Program theme: Design Destinations—graphic design for communication in a changing world—Technological University of Eindhoven, the Netherlands. For information write: Will van Sambeek, Congress Organization Committee, GKf, Joop van Weezelstraat 8iv, Amsterdam 16.

SEPTEMBER

4-6 North Central States Region and Minnesota Society of Architects A.I.A. conference—Radisson Hotel, Minneapolis.

18-21 Western Mountain Region A.I.A. conference—Hotel Utah, Salt Lake City.

21-29 American Home and Better Living Exposition—New York Coliseum.

26-28 New Jersey Society of Architects annual convention—Chalfonte-Haddon Hall Hotel, Atlantic City.

OFFICE NOTES

NEW FIRMS, FIRM CHANGES

George H. Aull, Jr. has become an associate of **Wilbur Smith and Associates, Consulting Engineers**, of Columbia, South Carolina.

John N. Bratichak has become a partner of the architectural and engineering firm of **Brodsky, Hopf & Adler**.

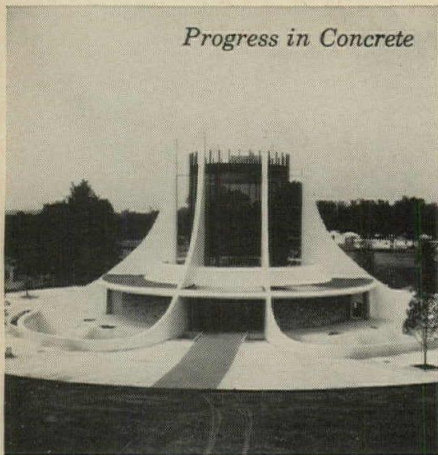
Two Southwestern architectural firms, **Cain, Nelson and Wares, PC Architects**, and **Cook and Swaim**, recently announced the merger of their practices. **William H. Cook** and **Robert J. Swaim** have joined **Gerald I. Cain, Edward H. Nelson** and **James A. Wares** as principals of the company, now known as **Cain, Nelson, Wares, Cook and Swaim, PC, Architects**, and located at 151 South Tucson Boulevard, Tucson, Arizona.

Caudill Rowlett Scott announces the election of **James B. Gatton, A.I.A.** and **Philip C. Williams, A.I.A.** as partners, and **G. Norman Hoover, A.I.A., Paul Kennon, A.I.A., Bob H. Reed, A.S.L.A.** and **Dan R. Stewart, A.I.A.** as associate partners. The Houston-based firm also announces the appointment of **William T. Cannady, A.I.A.** Mr. Cannady was formerly associate professor at Rice University School of Architecture.

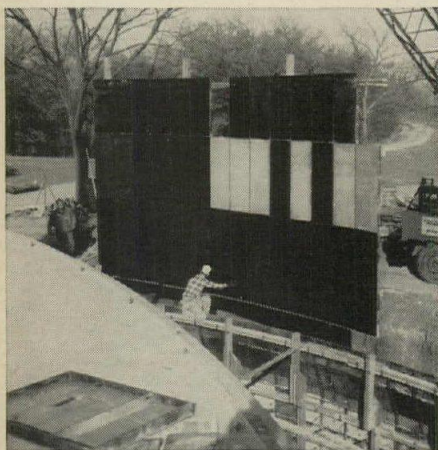
Quido H. Ciardi is now with the Los Angeles architectural and engineering firm of **Daniel, Mann, Johnson, & Mendenhall** as project director.

Donald J. McKinley, A.I.A. is now a partner of **Moritz Kundig Associates, Architects, A.I.A.**, of Spokane, Washington.

Progress in Concrete



LABOR COSTS CUT 20% WITH SYMONS GANG FORMS



Kansas City's newest attraction . . . The Great Ape House at Swope Park Zoo. The circular ape house features six concrete pylons that extend 56' 8" above ground level.

Callegari-Kahn Construction Company, the contractor, working with Symons engineers in Kansas City worked out plans where gang forming could be used on the pylons, and moat walls.

Pylons were poured in three lifts, and for the first 20', gangs 20' x 30' were erected. The top gang sections were also formed on the ground with the reinforcing steel tied in. Formwork, re-bars and scaffolding were then lifted into position as one unit.

On one of the pylons, a steel rung ladder was specified to be set in the concrete. The steel rungs were fastened to the gang sections by placing them right through the panel faces. In stripping, the rivets which hold the plywood face to the form's steel frame were taken off, allowing the gangs to be broken back. This type of "gang" forming cut costs considerably.

William M. Linscott, of Linscott, Kiene, & Haylett, was impressed with the economy of gang forming, and will approve it again on other jobs.

Complete illustrated story sent on request. *Just ask for the Ape House Story.*

Symons forms can be rented, purchased or rented with purchase option.



CONCRETE FORMING EQUIPMENT
SYMONS MFG. COMPANY
122 EAST TOWHY AVE., DES PLAINES, ILL. 60018

MORE SAVINGS WITH SYMONS

For more data, circle 55 on inquiry card

New! Just issued and just the catalog you need for...

- Weatherstripping
- Soundproofing
- Lightproofing



shows 54 basic types
and 194 different sizes —

from **ACCURATE**
metal weatherstrip

- Hinged door weather strip saddles including exclusive sectionals
- Door bottoms, automatic and manual
- Hinged door weather strip
- Sliding door weather strip
- Meeting rail weather strip
- Window weather strip, casement and double-hung

Excellence and economy—that's why America's leading architects have been specifying Accurate Metal weather strip for 67 years. This brand-new, 24-page catalog shows it all—with large-scale, blueprint installation drawings and complete specifications. All styles for all applications, including the most difficult. Advanced design, finest materials and manufacture. Fabricated from purest quality zinc, architectural bronze, aluminum, brass.



Write or Phone for
Your Copy Today

accurate metal weatherstrip co., inc.

Our 67th year of precision manufacturing

729 South Fulton Ave., Mount Vernon, N.Y. 10550
(914) MOUNT VERNON 8-6042

For more data, circle 56 on inquiry card



Christian Science Organization Building, Urbana, Illinois

Architect: Paul Rudolph, New York City
 Painting Contractors: Felmley-Dickerson
 Company, Urbana, Illinois

**...mastery of space,
 scale and materials**

The exterior of the building is formed from rough, massive-looking claw hammered concrete, while the interior represents skillful manipulation of vertical space. Tower ceilings are painted with Pratt & Lambert Lyt-all Flowing Flat in a variety of bright colors reflected in softer hues on the textured concrete walls.

PRATT & LAMBERT, INC.



For personal assistance on any aspect of painting or finishing, contact your P & L representative or write one of these P & L Architectural Service Departments:

LONG ISLAND CITY, N.Y. 11101
 BUFFALO, N.Y. 14240
 CHICAGO, IL. 60632
 ORANGE, CA. 92667
 FORT ERIE, ONT.

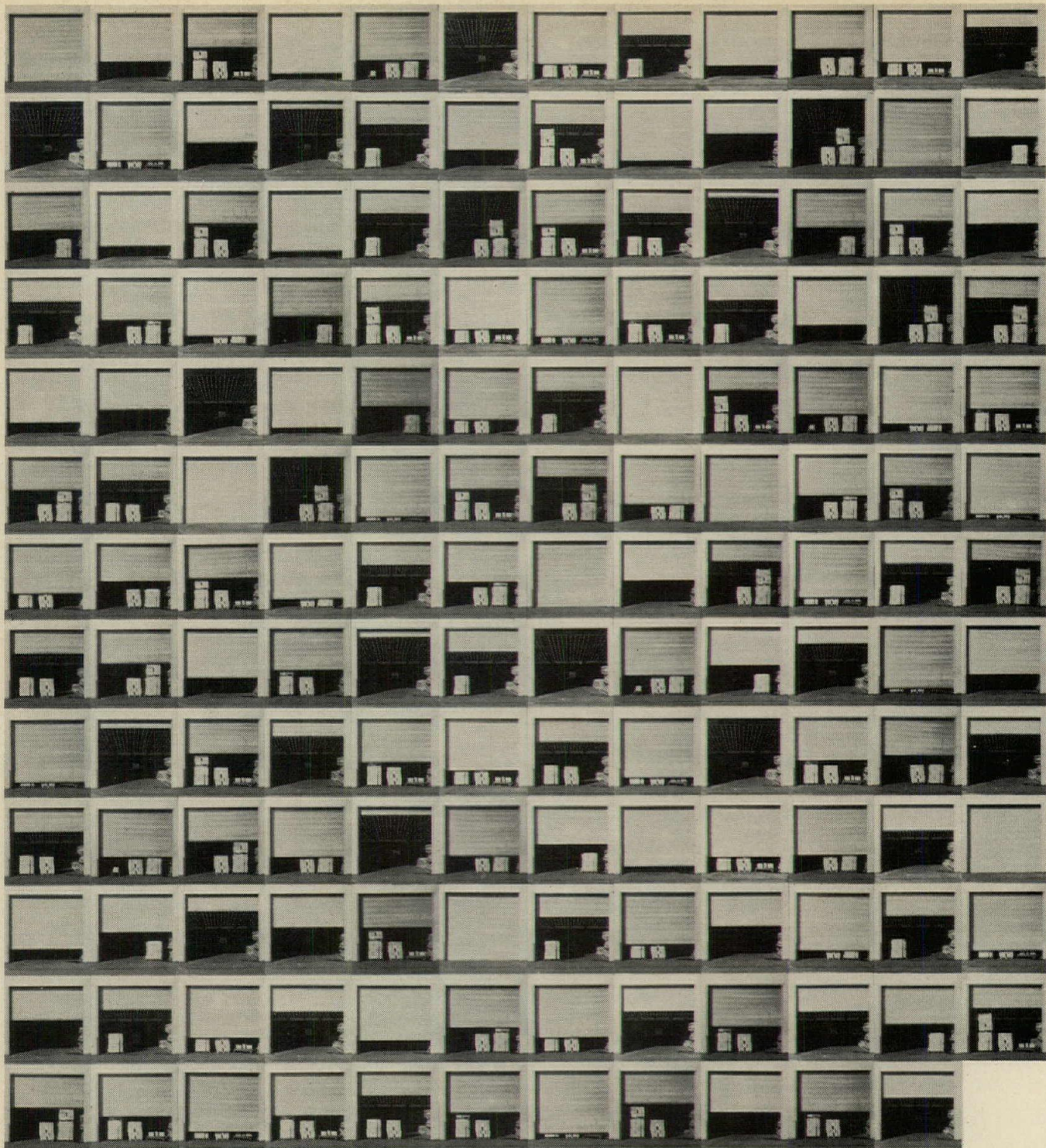
3301 38th Ave.
 Box 22
 4900 South Kilbourn Ave.
 1405 North Batavia St.
 254 Courtwright St.



Foyer and reception area.

Meeting hall, showing treatment of tower ceiling.

For more data, circle 57 on inquiry card



155 NEW WAYS IN AND OUT OF SAN FRANCISCO

When the Port of San Francisco opens its new Army Street Terminal for business every morning, Cookson opens the doors. And closes them again at night.

155 Cookson power-operated steel rolling doors provide easy access to, and complete security for, the \$25 million installation's 820,000 square feet of enclosed cargo handling and storage facilities.

And every one secured by a Cookson steel rolling door

On the basis of quality, operating ease, reliability and cost, the Port of San Francisco's choice of Cookson power-operated rolling steel doors was an open and shut case.



"Best Way to Close an Opening"

THE COOKSON COMPANY

700 Pennsylvania Ave., San Francisco, Cal. 94107

For more data, circle 58 on inquiry card

This highway oasis is "painting" itself



OWNER: Illinois State Toll Highway Commission, Donald R. Bonniwell, Chairman; Orville Taylor; Austin L. Wyman; Otto Kerner, Governor; Francis S. Lorenz. ARCHITECT: David Haid, Chicago, Illinois.

The external steel members of the Abraham Lincoln Oasis Highway Restaurant on the Illinois Toll Road near Chicago are made of a bare steel that "paints" itself. The steel is USS COR-TEN High-Strength Low-Alloy Steel. As it weathers, COR-TEN steel forms a dense, tight, attractive oxide coating that retards further atmospheric corrosion. If the coating is scratched or marred, it heals itself.

Chicago architect David Haid selected bare COR-TEN steel because it blends beautifully with the landscape, and because maintenance is reduced to negligible proportions. The rigid-weld structure spans a six-lane divided highway. It is a plate girder and truss system supported by four massive columns that extend to the roof and carry

the main floor and roof girders. All of the exposed steel is bare COR-TEN steel, including the specially extruded window frames.

Bare USS COR-TEN Steel is a natural for economical good looks, and for structural use. It is about 40% stronger than structural carbon steel; so members can be lighter and more graceful. It is available in a full range of structural shapes, plates, bars, and sheets. For full details on COR-TEN steel for architectural use, contact a USS Construction Marketing Representative through our nearest sales office. Or write U. S. Steel, P.O. Box 86 (USS 5469), Pittsburgh, Pa. 15230 for our booklet.

USS and COR-TEN are registered trademarks.

 **Cor-Ten Steel**

Lyon doesn't Stop with the Best Soundproofing

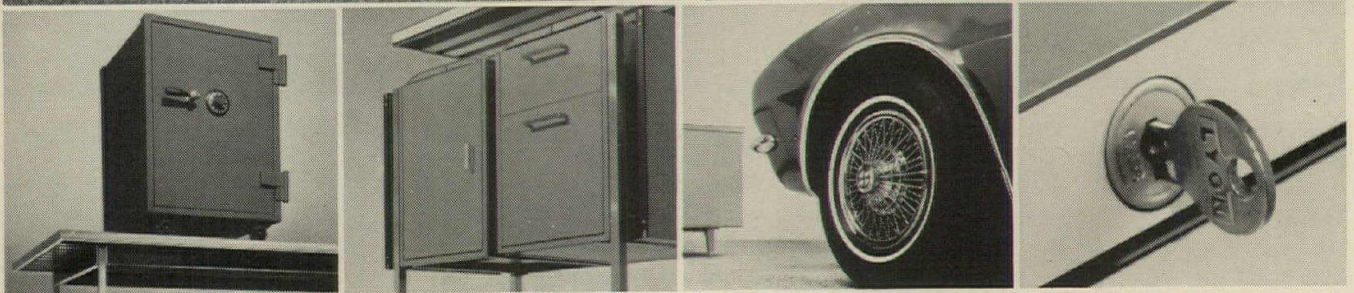
MAKE US PROVE IT!

LYON METAL PRODUCTS, INC.
751 Monroe Avenue, Aurora, Illinois 60507
 Please send me more complete information
 I'd like the name of my nearest dealer

Name _____

Address _____

City _____ State _____ Zip _____



For that hushed sound of elegance, we insulate every flat part with honeycomb fillers. For extra strength we use *two* layers of steel for the desk top—make it the main structural member from which all other parts stem. We give the back panels double walls. Make the pedestal frames continuously welded structures which gird the front opening. So you see, Lyon quality is *many* things. It's planned versatility; you join basic components as you see fit. It's careful sculpturing that looks less massive, adds leg room. It's a choice of nine lustrous *100% acrylic* (automobile-type) finishes. It's the exclusive Lyon "lock-in-top" that controls *all* drawers. See your *Lyon dealer*! Or, write: Lyon Metal Products, Inc., 751 Monroe Ave., Aurora, Ill., for our free color brochure.

LYON OFFICE FURNITURE

Showrooms: New York, Aurora, Los Angeles

For more data, circle 59 on inquiry card

Make lighting a design tool with GE SPACE-LITE* luminaires

The flexibility of today's daring architecture has been captured with the dramatic styling of General Electric SPACE-LITE luminaires. Circles and squares become your tools to make every lighting installation unique.

SPACE-LITE luminaires combine flexible modular mounting arrangements and bold geometric shapes to give you exciting design possibilities. Six decorator colors, a variety of mounting hubs and arms, and today's most efficient light sources are available to further increase application flexibility and efficiency.

High-quality GE features make SPACE-LITE luminaires your best lighting buy. New application flexibility makes them your best design choice.

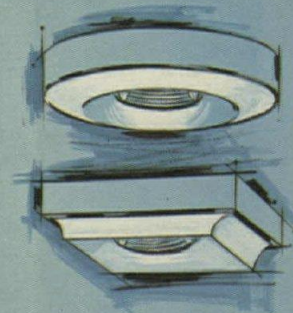
For additional information and a "Build an Installation Designers Kit" see your General Electric Sales Engineer or write to: Section 460-27, General Electric Co., Schenectady, N. Y. 12305.

*Trademark of General Electric Co.

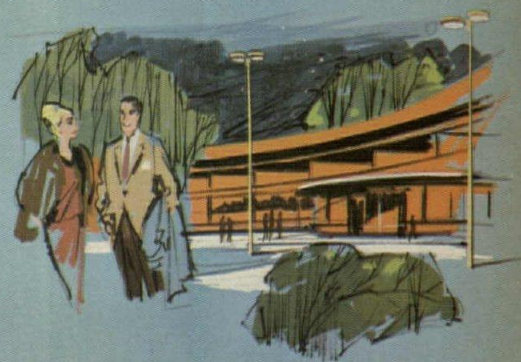
Outdoor Lighting Dept., Hendersonville, N. C.

GENERAL  ELECTRIC

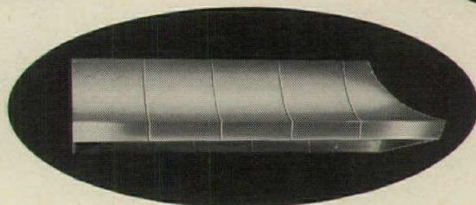
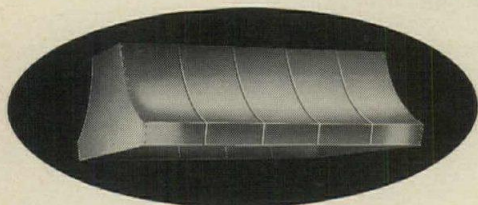
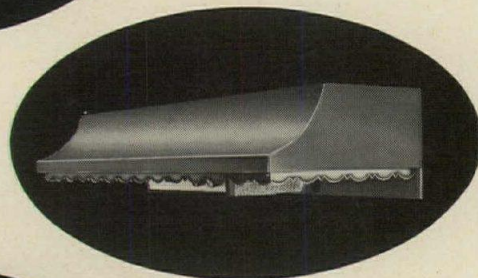
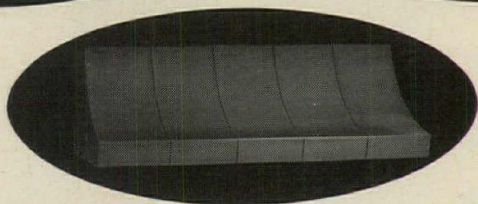
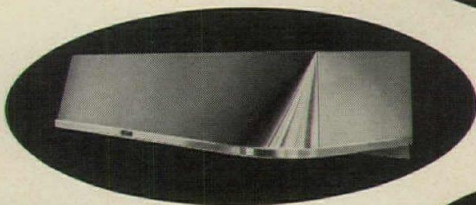
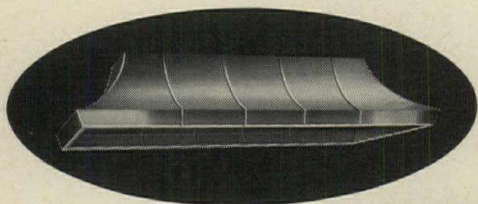
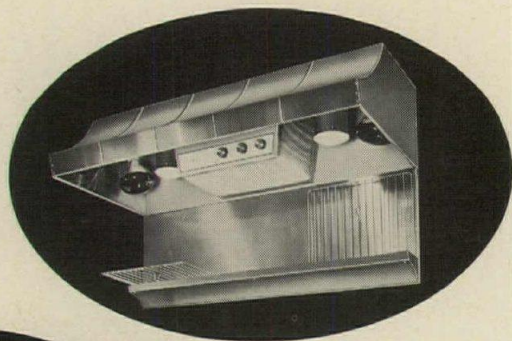
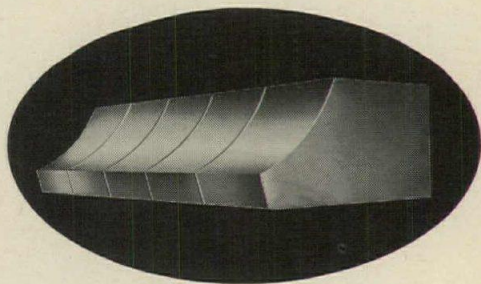
For more data, circle 60 on inquiry card



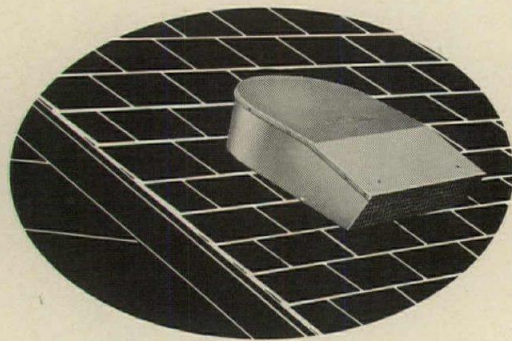
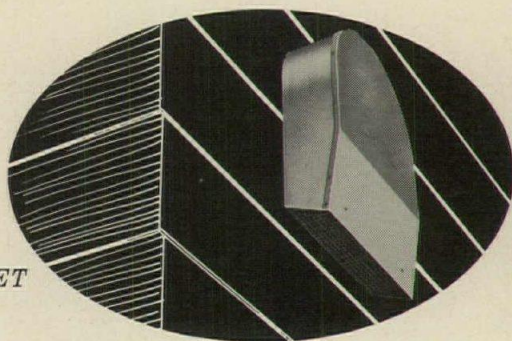
West Hills Mall



Put **Quiet** Where The Kitchen Is



Insist on the NEW Trade-Wind Remote Ventilator. VR-1000 is powerful enough for indoor barbecues — yet is “whisper quiet” for routine cooking. ● VR-1000 has a reliable three-speed ball bearing motor, and is designed to deliver 900, 700, or 400 CFM. ● A remarkably inconspicuous low profile ventilator — extends less than 6” above roof (or beyond exterior wall). ● What’s more — VR-1000 will operate with any of EIGHT different hood styles. Further, VR-1000 is only one of FOUR new ventilators designed to be used with these hoods.



Write for complete information on “The QUIET revolution in residential ventilation.”

THERMADOR



America’s Finest Bilt-In Appliances Come from Thermador
Often Copied . . . Never Equalled

5119 District Blvd., Los Angeles, California 90022. Department AR

Division of Norris Industries

For more data, circle 61 on inquiry card

For more data, circle 62 on inquiry card



The Executive...

THE PERFECT STANDARD STEEL DOOR

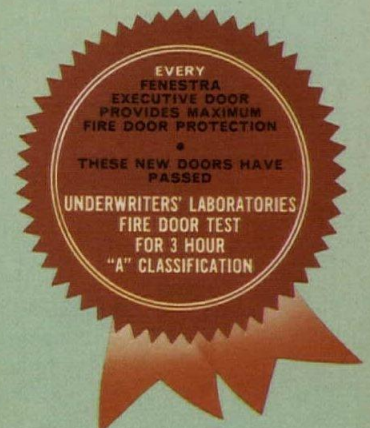
- SMOOTH – SEAMLESS
- 3-HOUR FIRE PROTECTION
- SOLID, QUIET PERFORMANCE

ONE precision-made door . . . Fenestra's flush seamless Executive, offers all the advantages you look for in a quality door . . . attractiveness, maximum fire protection, unmatched performance . . . plus the economy and availability advantages of a standard steel door.

There is only *one* Executive Door . . . 3-hour fire protection is built into every door regardless of label requirements. It is the only standard door that offers this *premium* value.

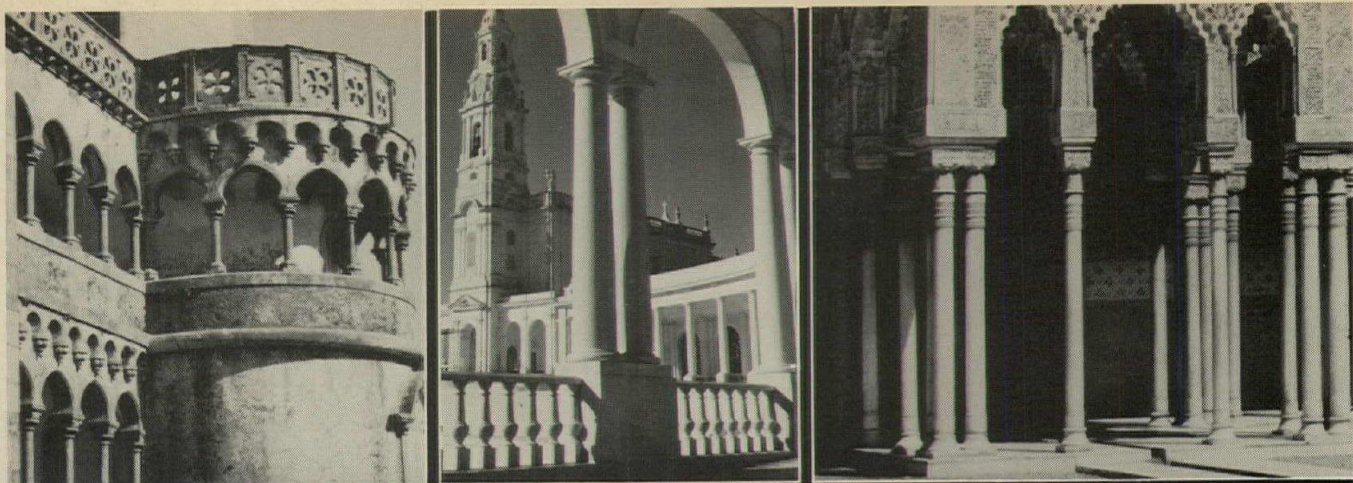
Specify Fenestra steel frames and Executive Doors on your next job. Available with complete door and frame service from your local Fenestra distributor.

Write for new full color brochure . . .
"The Executive Door."



FENESTRA

DIVISION OF THE MARMON GROUP, INC. (MICHIGAN)
ERIE, PENNSYLVANIA 16505



The rebirth of round columns.

Years ago, just about every column was a round column. Then, architects began coming up with new and different designs. And round took a back seat.

Now it's coming back. And one of the reasons for the rebirth of round columns is the SONOTUBE® Fibre Form.

It's the fastest, most economical way to form concrete columns. It can save up to \$1.50 per linear foot in cost and labor.

It's available in a wide variety of sizes, too. Diameters from 6" to 48". Standard lengths are 18', with shorter or longer

lengths (up to 48') available on request.

This variety of sizes makes the SONOTUBE form so versatile it can be used in almost any project requiring columns.

Most important, the SONOTUBE form achieves the simple beauty of round.

Much of this beauty is shown in our new booklet: *A Portfolio of Round Columns*. Earlier round column design is also featured.

For a free copy, write: Sonoco Products Company, Hartsville, South Carolina.



SONOCO PRODUCTS COMPANY, HARTSVILLE, S. C. • Akron, Ind. • Atlanta, Ga. • City of Industry, Calif. Holyoke, Mass. • Hayward, Calif. • Longview Texas • Louisiana, Mo. • Lowell, Mass. • Montclair, N. J. • Munroe Falls, Ohio • Mystic, Conn. • Newport, Tenn. • Richmond, Va. • Tacoma, Wash. • MEXICO: Mexico City Also in CANADA

SO 246

For more data, circle 63 on inquiry card

Congress gets in-depth urban transport study

President Johnson on June 12 sent to Congress a summary report of a major study which recommends a program of transportation research and development to ease the problems of Americans who live in or commute to work in cities.

New systems for meeting urban travel needs ranging from those of the pedestrian to those of the air traveler and improvements in existing service and facilities, new and improved system components, and new and improved methods of planning and operating urban transportation systems are reviewed in the 100-page indexed and illustrated report. Sources for the report include researches and analyses by more than a dozen of the nation's largest corporate, architectural, engineering and consulting firms.

Developed by the U.S. Department of Housing and Urban Development, it is the first major Federal effort to formulate a comprehensive urban transportation research, development and demonstration program.

As a part of the Housing and Urban Development Act of 1968, the President requested a research and development program for urban mass transportation of \$25 million to maintain the momentum of this study. In addition, he requested increased funds for the Urban Mass Transportation Program at a level of \$230-million for fiscal 1970 to help local governments implement many of the ideas reviewed in the study.

The Senate has approved these requests, and a bill is now under consideration in the House of Representatives.

For the future, the new systems study found many promising technologies which should be explored, such as:

- automatic controls for vehicles and entire movement systems
- new kinds of propulsion, energy and power transmission
- new guideway and suspension components
- innovations in tunneling
- the application of these potentials for movement of goods as well as people.

Promising new systems discussed in the summary report are:

- *Dial-a-bus*: A bus type of system activated on demand of the potential passengers, perhaps by telephone, after which a computer logs the calls, origins, destinations, location of vehicles and number of passengers, and then selects the vehicle and dispatches it.
- *Personal rapid transit*: Small vehicles, traveling over exclusive rights-of-way, automatically routed from origin to destination over a network guideway system, primarily to serve low-to-medium population density areas of the metropolis.
- *Dual mode vehicle systems*: Small vehicles which can be individually driven and converted from street travel to travel on automatic guideway networks.
- *Automated dual mode bus*: A large vehicle system which would combine the high-speed capacity of a rail system operating on its private right-of-way with the flexibility and adaptability of a city bus.

- *Pallet or ferry systems*: An alternative to dual mode vehicle systems is the use of pallets to carry (or ferry) conventional automobiles, minibuses, or freight automatically on high-speed guideways.
- *Fast intraurban transit links*: Automatically controlled vehicles, capable of operation either independently or coupling into trains, service metropolitan travel needs between major urban nodes.
- *New systems for major activity centers*: Continuously moving belts; capsule transit systems, some on guideways, perhaps suspended above city streets.

Other proposals of more general application were considered to improve fare collection methods, security of passengers and operators, methods for communicating station and passenger information, and, of particular significance, management and operation of urban transit systems.

In transmitting the summary report, entitled *Tomorrow's Transportation: New Systems for the Urban Future*, to the Congress, President Johnson commended it for study "by the Congress and the concerned Federal, state and local agencies." It is distributed by HUD's Office of Metropolitan Development, Urban Transportation Administration, Washington, D.C.

For the handicapped, a bill (HR 6589) to require Federally aided buildings to include ramps, street level entrances, and other features to make them accessible was approved by the House Public Works Committee late in May. A similar measure had been approved by the Senate. When small differences are resolved, it is fairly certain that an acceptable joint measure will come to the floors of both houses.

ARCHITECTURAL BUSINESS THIS MONTH

Building activity	83
Cost trends and analysis	87
Cost indexes and indicators	89

C.E.C. backs joint meeting on mergers

The how, why, when and where of selling or buying architectural and engineering firms is the subject for a national conference on "The Trend Toward Merger" to be held July 22, at the Flying Carpet Motor Inn, near O'Hare International Airport in Chicago. Stimulating the national session is the increasing incidence of manufacturer and holding company purchase of private A/E firms as investments or for diversification.

In recent weeks, consulting and architectural firms in Boston, Los Angeles, New York, Seattle, and other U.S. cities have become affiliates of conglomerates, construction companies and/or other consultants. Consulting Engineers Council, sponsor of the meeting, has ap-

pointed a special committee to study the attraction to consultants of such mergers and what effect affiliation with manufacturers and suppliers may have on an individual firm's membership.

Speakers at the Chicago meeting will include principals of merged firms who will discuss both the objectives and the results of their new affiliations. Legal experts will explain the liability and registration problems involved in selling or purchasing A/E firms. Industry leaders will answer the question "must we merge to grow?" Other speakers will cover anti-trust implications of merger and procedures for selling firms to employees, other consultants, contractors and to holding companies. All engineers and ar-

chitects are invited to attend.

A.I.A. task force studying future of small office

Recently the executive committee of the Northern California Chapter, A.I.A., set up a task force committee to study the problem of survival of the small architectural office. Members of the committee are William Watson, Robert Marquis, George Agron and Max Garcia. The committee will seek the names of offices that had to go out of business since 1963, and those who feel in danger of having to go out of business. An attempt will be made to determine the underlying reasons for distress in small practices and to help find solutions to these problems.

HUD awards contract to new Urban Institute

Secretary Robert C. Weaver announced last month that the U.S. Department of Housing and Urban Development has awarded a \$3-million contract to the new Urban Institute to carry out research related to the Department's programs.

According to Secretary Weaver, the Institute will take a comprehensive view of urban life and will be oriented to problem solving in cities. The Institute will develop new knowledge and obtain information useful to the Department.

HUD's contract is the first to be

made with the new Institute. It is expected that others will follow with several Federal departments having important urban-related responsibilities.

The Urban Institute, a private non-profit organization, was officially launched April 26. At that time President Johnson said: "As a nation we must mobilize our best intellectual resources to attack the problems of the city, to evaluate the effectiveness of alternative courses of action and to develop workable solutions. The Urban Institute is

being created to focus that effort on our priority social problem—the cities."

The institute's Board of Trustees includes 15 prominent national figures from the public and private sectors. Arjay Miller, vice chairman of the Ford Motor Co., is chairman of the Institute. William Gorham, former assistant secretary of the Department of Health, Education and Welfare and a former deputy assistant secretary of Defense, has been named president and chief executive officer of the Institute.

FTC calls for new law to bar deceptive lumber grading

Mandatory grademarking of all common yard softwood lumber was recommended in a report issued last month on 1967 hearings of the FTC.

The report said the proposed new trade regulation should "require that all graded lumber be grademarked; all lumber graded within the American Lumber Standards Committee system be grademarked pursuant to the American Lumber Standard; and all ungraded lumber be marked 'ungraded'."

The report said the FTC also advocates broad new legislation to prohibit deliberate misgrading. It called for laws: 1) prohibiting the simulation, counterfeiting or unauthorized use of existing grade-

marks; 2) prohibiting the knowing misrepresentation of specie, size, strength or grade of lumber, and 3) requiring Federal inspection of grading and grademarking practices in the softwood industry.

Home builders think present laws are adequate

N.A.H.B. was represented among more than 30 witnesses who testified at the hearings in March, 1967. Eugene A. Gullledge, then vice president-treasurer, now first vice president, was the official spokesman for N.A.H.B. Technical services director Milton W. Smithman testified as a member of the American Lumber Standards Committee.

They told the FTC that, rather than new laws, prosecution is needed under existing laws when evidence is obtained of misgrading violations. They said fraudulent grademarking can be minimized through stricter enforcement of existing statutes, which were termed adequate.

They declared that increased cooperation and exchange of information between the FTC and the A.L.S. Committee would have far greater value in minimizing the incidence of fraud "than the mere addition of new prohibitions."

N.A.H.B. also has taken opposition to the proposal for Federal inspection on the grounds that the A.L.S. Committee system of inspection would be adequate.

Briefs

The Committee on Federal Procurement of Architect-Engineer Services is an interdisciplinary body with representation from A.I.A., A.I.C.E., Engineering Division of A.R.B.A., A.S.C.E., C.E.C. and N.S.P.E. Having reviewed recent developments in the procurement of professional services, the committee issued, June 5, a recom-

mendation that its member societies adopt the following policy: RESOLVED, in the interest of the public and the taxpayer, an architect or engineer should not submit a price proposal nor enter into competitive price negotiations for any services prior to final selection as being best qualified for the particular project.

A study of industrial freight handling facilities, made possible by a \$25,000 grant awarded by the Operations Council of American Trucking Associations, may prove useful to industrial architects. The study should provide design criteria for determining the number of docks and freight yard size needed.

CURRENT TRENDS IN CONSTRUCTION

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

The midyear outlook for construction

Architects and builders are facing a departure from the pattern of construction forecast earlier for the current year. Last fall, when a tax surcharge and a moderate, if not easy, monetary policy appeared certain, a year of solid gains for almost every type of building activity seemed to be in the bag. In most cases, the first half of 1968 bore out this prediction. Sharply increased flows of funds into savings institutions fed the credit-starved housing market. Public works construction benefitted from increased appropriations and the "unfreezing" of a billion dollars in highway trust fund money. Industrial and commercial contracting lagged a bit, but was expected to rebound as production recovered from its sluggish 1967 performance.

The second half of the year promises to deviate a good bit from these trends. The tax increase that was needed at the beginning of the year didn't materialize until 1968 was half over, and then it was combined with a \$6 billion cut in Federal spending programs. Meanwhile, credit has tightened again and probably won't loosen up until the end of the year. These factors alone have reduced much of 1968's potential for construction growth.

Residential building

Housing is one construction market that will be feeling a rather sharp change. The seeds of a second-half decline were sown earlier in the year, when the postponement of the surtax revived tight money. Passage of the tax program at mid-year will prevent another 1966-type disaster, but it's too late to avoid some loss.

A high rate of housing activity in the first half of 1968—starts averaged over a 1.5-million annual rate—was sustained by the combination of unusually strong demand and a backlog of mortgage commitments made several months ago when deposits were flowing into savings institutions. The demand is no doubt still there, with a potential of well over 1.6-million units. The supply of credit is an-

other question. By the second quarter, the rate of deposit inflows to Savings and Loan Associations had slowed to half the 1967 rate. Once the surtax takes effect, savings will drop even further.

By July, housing starts will be in a decline that won't turn around until monetary policy is reversed. If the effects of the surtax match expectations, that will happen by year's end. Meanwhile, starts may temporarily fall to as low as a 1.25-million rate. This would still yield a total for the year between 1.40- and 1.45-million housing units—an 8 per cent rise over the 1967 level, but far short of the potential. Most of the gain will be in apartments, which should account for about 37 per cent of all units and 25 per cent of the value of new housing.

DODGE CONSTRUCTION OUTLOOK 1968 MIDYEAR REVIEW

non-residential building	Per Cent Change in Contract Values
Commercial	+ 5 per cent
Manufacturing	—
Educational	- 4
Hospitals	+ 4
Public Buildings	- 9
Religious	+ 4
Recreational	- 1
Miscellaneous	- 1
Total	+ 1
residential building	
One-and-Two Family	+ 8
Apartment	+25
Nonhousekeeping	- 3
Total	+11
nonbuilding construction	- 2
total construction	+ 4 per cent

Non-residential building

Business capital spending was inhibited through most of 1967 by unused capacity and sagging profits. Recent improvements in both these areas was reflected by a spurt in contracts for office buildings and stores and a sharp rise in the value of

utilities projects. On the other hand, contracting for manufacturing plants, which rose toward the end of 1967, is currently suffering from the lack of large projects that inflated the totals in recent years.

McGraw-Hill's spring survey of business' plans for plant and equipment outlays in 1968 shows that industry as a whole intends to spend about 6 per cent more than it did last year. This includes equipment, machinery and transportation facilities, as well as offices, stores, factories and warehouses. Matching these expectations with current trends, it looks like outlays for factories will just about equal the 1967 total, while office building will remain strong and utilities will exceed the year-ago contract value by as much as ten per cent.

Unexpected declines in contracting for schools and hospitals in the opening months of 1968 have been reversed, and both of these institutional building types are expected to return to recent growth trends during the remainder of the year. The early lapse in college dormitory and classroom projects will probably pull total outlays for educational building below the 1967 total. An expected shift toward general hospital construction, on the other hand, should lift the value of medical facilities contracting four per cent above last year's total.

Other types of nonresidential building, some heavily influenced by government spending programs, are expected to show declines ranging from 1 per cent (recreational) to 9 per cent (public buildings). In total, the largely architect-designed class of non-residential building will advance only about 1 per cent in contract value for the full year.

Total construction (including non-building projects) will increase by 4 per cent during 1968, with contract value reaching \$56.7 billion.

(A fuller analysis of construction markets at midyear is available from McGraw-Hill Information Systems Company upon request.)



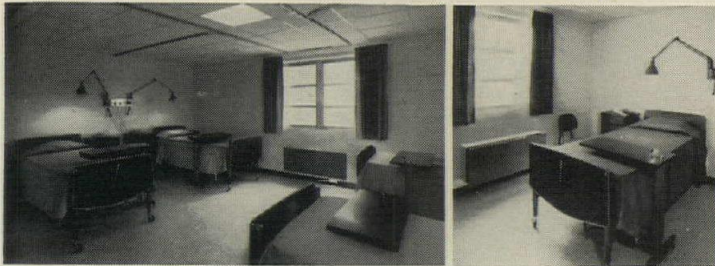
Just what the doctors ordered:

**General Electric Zoneline units
provide individual room temperature control
in Daytona Beach General Hospital.**

When Drs. J.B. Bragg and John E. Kaye planned the hospital's 1.5-million-dollar new building program, they included the most advanced equipment and services.

An absolute requirement among these, Dr. Bragg felt, was individual room temperature control. And that was one reason why he chose GE Zoneline units for heating and cooling.

With rooms of 2-, 4- and 6-bed capacity, the heating/cooling requirement can vary widely, and Zoneline's precise temperature controls make immediate adjustment possible. The same is true in compensating for a climate where heating



may be needed in early morning and cooling may be needed by noon, or when temperatures vary widely on different sides of the building.

Yet another reason for choosing Zoneline, according to the doctor, was its "add on" capability. While two of the three floors are already occupied, the third will not be



used until some future date. But sleeves and grilles are fitted in the vacant floor, and units can be readily installed when needed.

From nursing homes to high-rise construction, GE Zoneline units offer you unparalleled flexibility in design and application and significant savings on installation and maintenance expense. For full information, call your General Electric representative.

Or write Manager of National Sales, AP6-208, General Electric Company, Louisville, Ky. 40225.

Architect: Chester E. Wolley. General Contractor: Gordon Anderson. Administrative Director: Homer R. Bently.



**GENERAL
ELECTRIC**

For more data, circle 64 on inquiry card

...and the first tenant hasn't even moved in.

Modern design, engineering and construction—with outdated communications planning—add up to obsolescence. Chances are your tenants will need

more than just telephones. They'll probably use Data-Phone® service, teletypewriter, Tele-Lecture, even closed-circuit TV. Make your building truly modern by allowing for these services in the blueprints. Avoid expensive

alterations and unsightly wiring later.

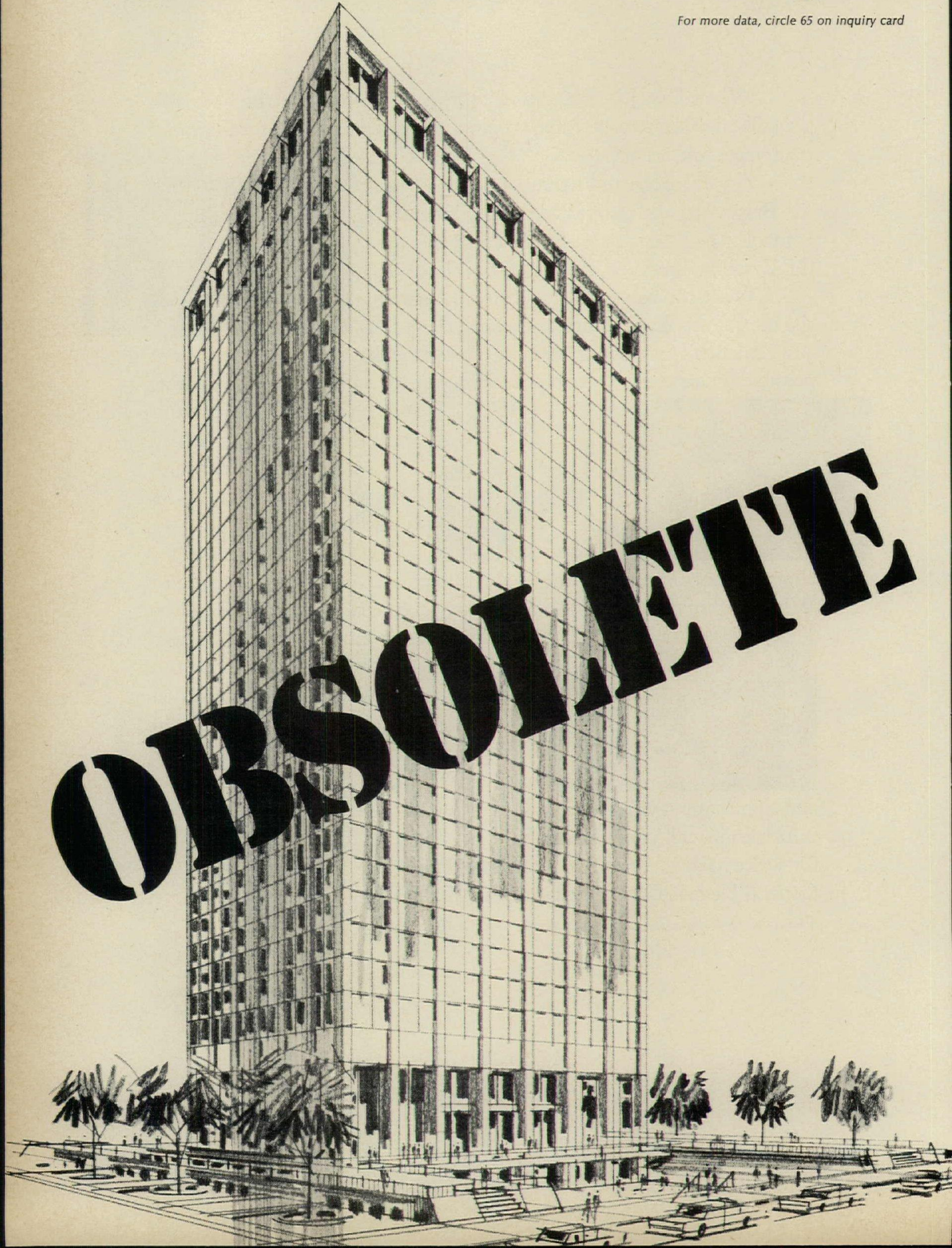
Just call 212-393-4537, collect, and we'll send you a complete list of our Architect and Builder Service representatives.



AT&T
and Associated Companies

For more data, circle 65 on inquiry card

OBSOLETE



TRENDS AND ANALYSIS

Gerald McKee, Jr.
McKee-Berger-Mansueto, Inc.
Construction Consultants

Management controls keep estimates on target

Economic projections in the construction industry vary widely in reliability. Yet large risks based solely on these projections are taken daily. The pattern has become quite confusing recently, and owners are coming to realize, indeed even to become reconciled to, the fact that they often cannot contract for the construction they want—on time and within the budget.

In the construction industry perfect competition is a myth

We cannot rely on economic law to order the confusion. In Chicago, about a year ago, a conference of owners, architects and engineers was convened to discuss runaway inflation in the local construction market. The consensus of those attending was that the only solution to the problem lay in *cutting back the demand*, that is, delaying needed construction.

This was not so much an acknowledgement that the growth of industry capacity had lagged behind demand and that demand should be stayed until supply catches up; as it was their contention that capacity is essentially *static*, and that construction requirements should strive to contain themselves within these fixed limits. The hope implicit in this recommendation was that the observed construction boom was temporary, and that construction planning should be leveled over the long haul to match the flat curve of capacity.

In fact, the increase in the demand for new construction starts in the Chicago area has proved to be a constant one, and erratic, inflated bidding continues. The conference did, of course, suggest measures which it was hoped would stimulate an increased construction capacity in the area (accelerated enlargement of labor ranks, attraction of new contractor interests to the area, etc.). But these suggestions were, I think, understood to be without real hope of accomplishment (in the light of constraints upon growth of union and contractor industries), and the results have justified the cynicism.

In an attempt to understand—however partially—the reasons behind today's often erratic bidding and perhaps

discover the means whereby architect and owner can bring building cost projections into line with market conditions, let us look at changes that have taken place within the industry in recent years.

Two trends: stronger subcontractors and a need for management

To begin with, the pattern of construction has changed with increasing swiftness since World War II. During the decade 1947-1957 two major trends were established. First, the role played by subcontractors increased as modern building technology demanded more work of a specialty nature. Second, a more critical need for construction management in the role of owner's agent emerged as bidding, pricing and scheduling problems became more and more diffuse.

This change in construction technology produced a corresponding change in the role and character of the general contractor. Historically, the industry had been dominated by strong, prosperous general contractor organizations, favoring extensive use of concrete, carpentry, and the traditional G.C. trades. With the surge to prominence of mechanical systems and prefabricated building elements, this pattern faded and emphasis—with attendant power—passed to the subcontractor.

The general contractor found himself: 1) performing less work with his own forces and thus sharing in less of the construction dollar; 2) facing reduced profits due to a smaller base of construction force activity and to more vigorous competition; and 3) supervising, and bearing responsibility for a project operation which, for the most part, was an activity of others.

As the general contractor, his was still the responsibility to perform the work, but he was performing it through the agency of subcontractors. From 60 per cent to 85 per cent of the labor on a typical building project was not in his employ or under his direct supervision.

New management procedures were called for. New communication and coordination techniques were needed to shape the complex network of subcontract relationships into an effective whole. Unfortunately, the industry did

not everywhere respond successfully to the challenge. The construction broker, rather than the construction manager, was the industry's frequent answer.

Understandably, the subcontractors rebelled. Drawing on their new power and from the tight organization of their trade societies, they lobbied successfully in many states for public bidding laws which required public owners to solicit bids directly from major subcontractors without the intervening agency of the general contractor.

With multiple contracts lines of authority are mixed

Subcontractors, then, achieved a status in public construction equal, contractually, to that of the general contractor. Who then was in charge of the operation? Many efforts were made to establish a clear pattern of authority. It was still felt that if a single over-all managing agent were required, he should be the contractor for the general trades, and not one of the more dominant subcontractors (though this latter approach was tried from time to time with little success). The technique of assigning the subcontractors to the general contractor for administration and coordination was, and is now, widely employed.

But administration is not supervision; and coordination is not control. As in *Animal Farm*, all the animals are equal, but the general contractor is more equal than the others. But unlike that barnyard community, the general contractor has no real power to enforce his special status. Under the assigned subcontract system the instruments by which a manager persuades and compels are not available to the general contractor.

There are, of course, many excellent contractors among the 500,000 odd contractors and subcontractors actively operating in the United States. The more than 65,000 who go out of business each year attest to the difficulties of the business; the 65,000 new ones who replace them speak for its continuing promise.

Traditional fee structures limit the role of the architect

The role of the architect and the consulting engineer have, of course, been

affected by the disruption of the contractor's management processes. Many owners encourage the architect to step in and fill the management vacuum. Generally the architects have declined under the constraints of traditional fee structures, and their responsibility during the actual construction of a project has thereupon been limited to a traditional role of administration, inspection and the rendering of opinions in contractor-owner disputes.

Time and conditions blur anticipation of construction costs

Since function, purpose and capacity are generally established by owner and architect early in the planning stage, they may be treated as constants in this discussion. The critical questions then become: what will the facility cost to build, and when will it be ready for occupancy? Neither question can be answered with assurance at the time when both are critical, before the detailed design commences. Reasonable attempts can be made at that time, however, and when made by reasonable men—fully aware of the potential dangers of the process—they may prove to be accurate a surprisingly large part of the time. Facilities are completed on time and within the budget. To determine how the frequency of such successes can be maximized requires a closer look at the question of what the building will cost.

It is difficult to budget accurately the cost of a proposed facility for several reasons:

1. From the initiation of planning to the award of the construction contract is a period usually of at least two years, and thus projections must attempt to anticipate cost trends.

2. The construction cost (if we mean by this the awarded contract amount), is itself an estimate. We must never forget that cost to the owner, in this context, is not necessarily cost to the contractor plus a profit. The contractor only hopes that his bid will fairly reflect his costs. In one sense, then, project budgeting is one man's early guess at what another man will later guess.

3. Early planning has not defined the project in the kind of detail that contractors require in the preparation of their bids, and the early plan is likely to undergo many changes in scope and character before it becomes brick-and-mortar reality. We frequently build something more—scarcely ever less—than we set out to build.

4. Since one is not buying a packaged facility at stated price, one cannot shop about to bring cost, scope and quality into line, as one can for example with a custom-made suit.

Implicit in these reasons is an important characteristic of the construction industry—namely that short-range trends frequently influence construction costs decisively. Overtaxed or inadequate labor forces, higher profit goals for contractors, or relaxation of competitive activity can drive costs up. But largely because local industry interests discourage intrusion by alien contractors and labor forces, capability never catches up to demand. Thus, while local inflation in other industries is checked at the level at which distant competitors can reasonably compete, inflation in the construction industry continues to spiral costs higher and higher.

A cost control program can keep a project on target

The difficulties in budgeting construction can be mitigated if not overcome by a serious cost control program, generally including these elements:

1. A statement of budget-scope relationship formulated before the architect has even determined the design scheme (often accomplished by assignment of a unit price to the gross program square footage).

2. A carefully thought out, detailed preliminary estimate to represent the earliest firm preliminary design. It is no longer a cost evaluation of the owner's desires or program requirements, but is now an estimate of the cost of the architect's interpretation of the owner's program.

3. An appropriate program of cost review carried out during the working-drawing stage. Somehow changes do creep in here even though owner and architect have both sworn to abide by the preliminary document "freeze." If a necessary change is introduced, it is important that its effect on the project cost be understood at once by all concerned. The arguments put forth for additions to the scope of a project during working drawings often fade when their value has been assessed.

The problem of such a cost control program when operating in the arena of an often unpredictable economy can best be studied, I think, by examining the estimating technique most familiar to owner and architect—the square foot unit cost.

The trick, of course, is to select an appropriate unit cost. This is done, usually, by reference to some historic data, either personal experience or published sources. These data are then corrected, first for the differences in scope or character between the historic control and the proposed building. A further correction is required to reflect the cost transition from the construction market in which the control was contracted for to

the projected market conditions for the proposed facility.

Thus there are three steps to the determining of an appropriate gross square-foot unit price: 1) selection of a historic control, 2) evaluation of the control vs. the present project differences, and 3), projection to the time of bid.

The second of these steps is admittedly a subjective enterprise, but the other two, because of the great number of published aids available, are often thought to be more objective and reliable than they in fact are, and a word of warning is advisable.

Many published averages of square foot costs are, in my opinion, virtually useless; and their use is more often than not misleading and thus harmful. Clearly statistics which average Alabama with New York, or rich with poor, urban with rural, are bound to reflect costs that exist in no real environment.

Let us look then to the art of projection, the adjustments to the unit price necessary to put it in the right time and market frame. Such construction cost indexes can be misleading when used to project future cost, and they seldom do—or even purport to do—what everyone thinks they do—i.e. relate *in place* building costs for identical structures in different frames of time and locale.

For example, the construction program of a major mid-west university suffered a severe blow a few years ago, when bids for a group of buildings, at an urban campus, came in 20 per cent to 40 per cent higher than their almost identical counterparts had cost three years earlier. Other bids in the area at that time came in similarly high, and yet the major published indexes for the period show a 5 to 7 per cent increase during the three year lapse.

Care and experience needed in projecting cost data

To combat these difficulties, make sure that historical unit cost data are accurate, neutral and responsive to your needs. Each historical unit price must be researched carefully, and then stripped of the peculiarities of the time and place of its construction by careful reference to a control construction market environment. Most usually this control is the *present time at this place*.

Then make an exhaustive study of the probable construction market at the proposed construction site for the time of projected bidding. Hire someone, if necessary, to make this study. The results will more than pay for the cost of research.

Finally, establish and maintain contacts with the major forces in the local industry, and adjust the market model from time to time as new factors arise.

INDEXES AND INDICATORS

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

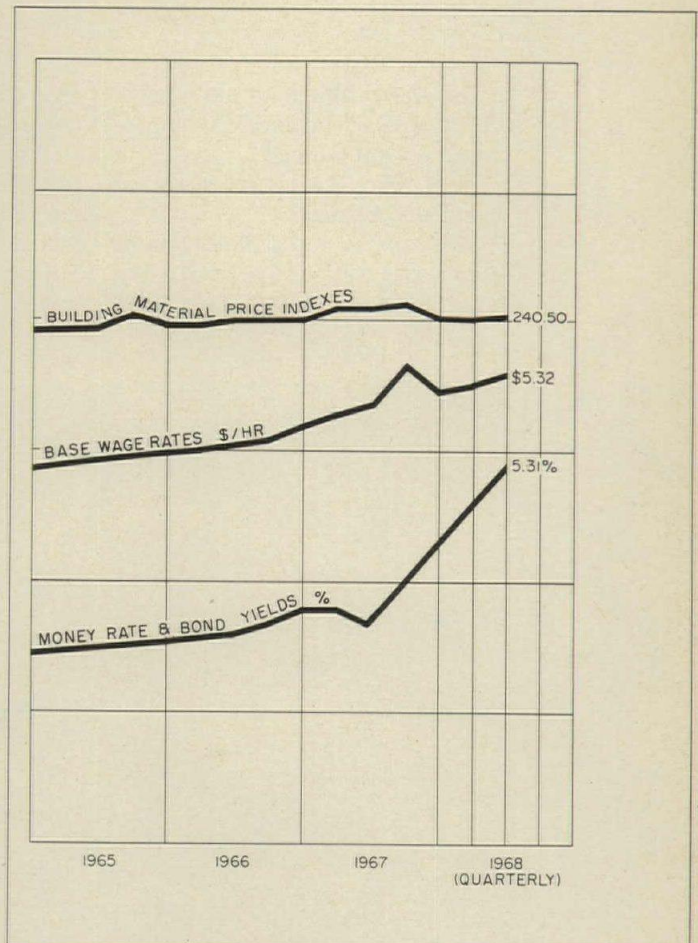
JULY 1968 BUILDING COST INDEXES

Metropolitan area	Cost differential	1941 averages for each city = 100.0		% change year ago
		Current Dow Index residential	non-res. res. & non-res.	
U.S. Average	8.5	288.5	307.3	+3.03
Atlanta	7.2	331.1	351.2	+3.99
Baltimore	7.9	291.0	309.6	+4.32
Birmingham	7.3	263.6	283.4	+2.01
Boston	8.5	258.9	274.1	+2.42
Chicago	8.9	318.7	335.2	+2.80
Cincinnati	8.8	279.0	296.6	+4.61
Cleveland	9.6	304.0	323.1	+5.64
Dallas	7.5	267.4	276.1	+1.82
Denver	8.1	291.3	309.7	+2.51
Detroit	9.2	299.2	314.1	+3.78
Kansas City	8.2	257.2	272.2	+2.52
Los Angeles	8.3	292.7	320.3	+2.76
Miami	8.4	284.0	298.1	+3.55
Minneapolis	8.7	286.5	304.6	+2.69
New Orleans	7.8	259.9	275.4	+3.11
New York	10.0	301.8	324.6	+2.06
Philadelphia	8.5	283.6	297.7	+2.12
Pittsburgh	9.1	270.5	287.6	+4.06
St. Louis	9.1	282.0	298.8	+1.17
San Francisco	8.5	372.1	407.1	+2.26
Seattle	8.4	263.9	294.9	+3.49

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

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

ECONOMIC INDICATORS



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

Metropolitan area	1941 average for each city = 100.00							1967 (Quarterly)				1968 (Quarterly)			
	1960	1961	1962	1963	1964	1965	1966	1st	2nd	3rd	4th	1st	2nd	3rd	4th
U.S. Average	213.5	264.6	266.8	273.4	279.3	284.9	286.6	292.7	293.7	295.5	297.5	301.5	302.6	—	—
Atlanta	223.5	294.7	298.2	305.7	313.7	321.5	329.8	332.4	333.4	334.6	335.7	345.6	346.7	—	—
Baltimore	213.3	269.9	271.8	275.5	280.6	285.7	290.9	290.4	291.5	294.9	295.8	302.9	304.1	—	—
Birmingham	208.1	249.9	250.0	256.3	260.9	265.6	270.7	272.9	274.0	273.8	274.7	278.5	279.5	—	—
Boston	199.0	237.5	239.8	244.1	252.1	257.8	262.0	262.9	263.9	264.8	265.7	269.3	270.3	—	—
Chicago	231.2	289.9	292.0	301.0	306.6	311.7	320.4	320.4	321.3	327.3	328.4	329.4	330.0	—	—
Cincinnati	207.7	257.6	258.8	263.9	269.5	274.0	278.3	278.7	279.6	287.3	288.2	291.4	292.5	—	—
Cleveland	220.7	265.7	268.5	275.8	283.0	292.3	300.7	300.0	301.3	302.6	303.7	316.5	318.3	—	—
Dallas	221.9	244.7	246.9	253.0	256.4	260.8	266.9	267.6	268.5	269.5	270.4	272.3	273.4	—	—
Denver	211.8	270.9	274.9	282.5	287.3	294.0	297.5	297.6	298.5	304.0	305.1	304.9	306.0	—	—
Detroit	197.8	264.7	265.9	272.2	277.7	284.7	296.9	298.0	299.1	300.1	301.2	309.2	310.4	—	—
Kansas City	213.3	237.1	240.1	247.8	250.5	256.4	261.0	260.8	261.9	263.4	264.3	267.5	268.5	—	—
Los Angeles	210.3	274.3	276.3	282.5	288.2	297.1	302.7	303.6	304.7	309.0	310.1	312.0	313.1	—	—
Miami	199.4	259.1	260.3	269.3	274.4	277.5	284.0	283.4	284.2	285.2	286.1	293.1	294.3	—	—
Minneapolis	213.5	267.9	269.0	275.3	282.4	285.0	289.4	292.0	293.1	299.2	300.2	300.0	301.0	—	—
New Orleans	207.1	244.7	245.1	248.3	249.9	256.3	259.8	262.3	263.4	266.7	267.6	270.6	271.6	—	—
New York	207.4	270.8	276.0	282.3	289.4	297.1	304.0	309.4	310.6	312.5	313.6	315.9	317.0	—	—
Philadelphia	228.3	265.4	265.2	271.2	275.2	280.8	286.6	287.1	288.1	292.8	293.7	293.3	294.2	—	—
Pittsburgh	204.0	250.9	251.8	258.2	263.8	267.0	271.7	272.2	273.1	274.1	275.0	283.0	284.2	—	—
St. Louis	213.1	256.9	255.4	263.4	272.1	280.9	288.3	290.3	291.3	292.3	293.2	293.7	294.7	—	—
San Francisco	266.4	337.4	343.3	352.4	365.4	368.6	386.0	388.1	389.2	389.6	390.8	396.4	398.0	—	—
Seattle	191.8	247.0	252.5	260.6	266.6	268.9	275.0	276.5	277.5	282.6	283.5	286.2	287.2	—	—

Costs in a given city for a certain period may be compared with costs in another period by dividing one index into the other; if the index for a city for one period (200.0) divided by the index for a second period (150.0) equals 133%, the costs in

the one period are 33% higher than the costs in the other. Also, second period costs are 75% of those in the first period (150.0 ÷ 200.0 = 75%) or they are 25% lower in the second period.

Face your

Is your problem an old eyesore that needs a new look? A renovation? A tight budget?

O.K. Face it with Wheeling expanded steel mesh.

We can give you a choice among four configurations. In the sizes and modules you specify. They'll all

give you a clean, elegant light look. (And they'll probably save money.)

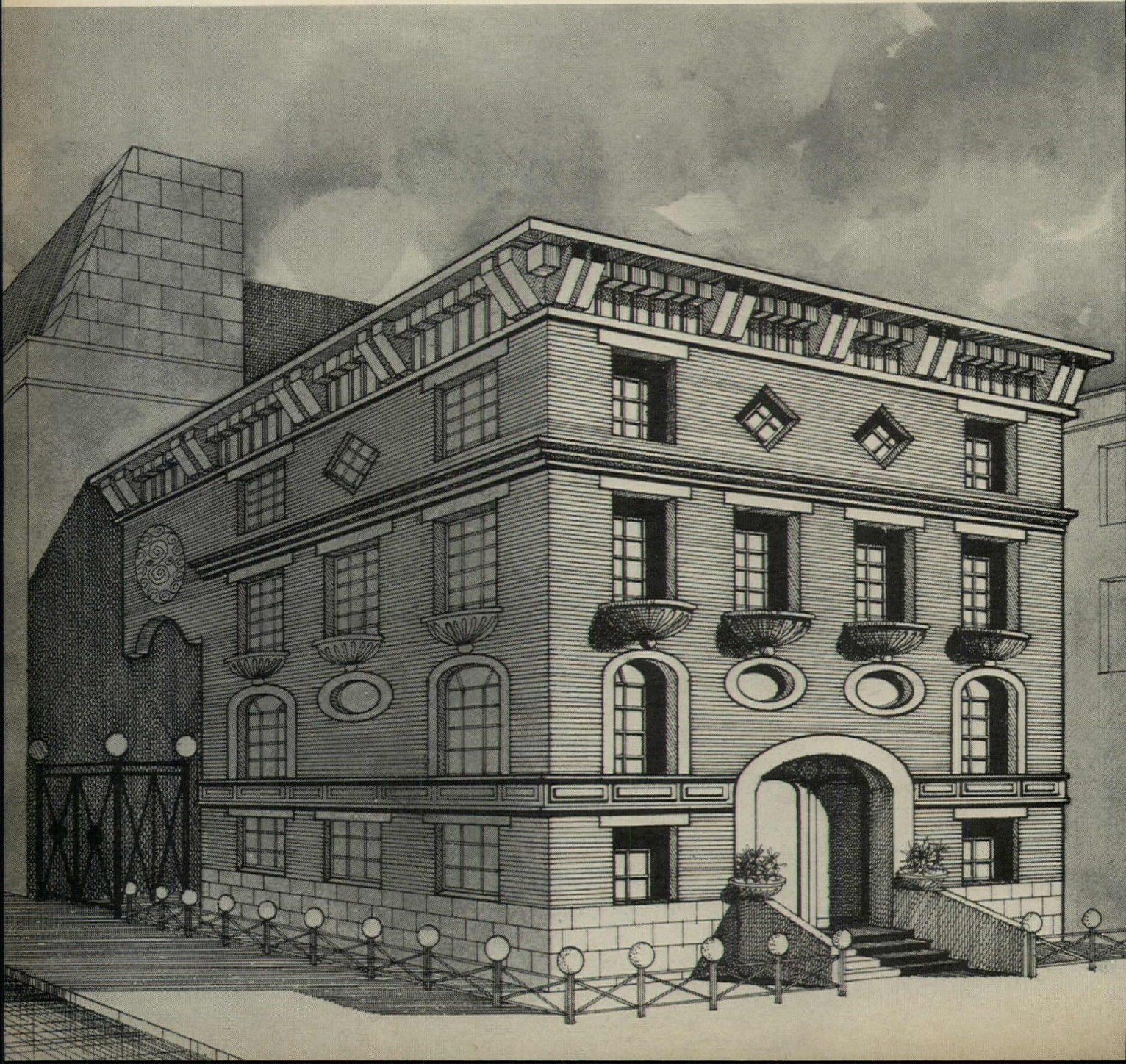
What's more, Wheeling expanded metal can be painted, lacquered, bronzed or galvanized. And it will look great.

One thing that doesn't meet the eye: Wheeling expanded steel mesh

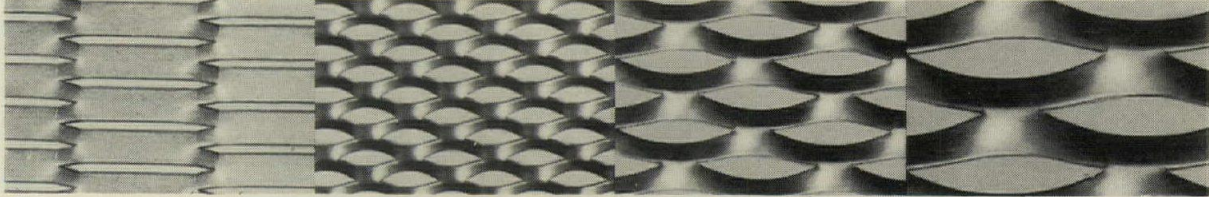
is stronger per foot and lighter per pound than the sheet of steel it's made from. Interesting?

Mind you, we aren't in favor of obscuring beautiful old buildings. Just the ones that aren't beautiful.

Write us about it. (Maybe beauty *is* only skin deep.)



problems.

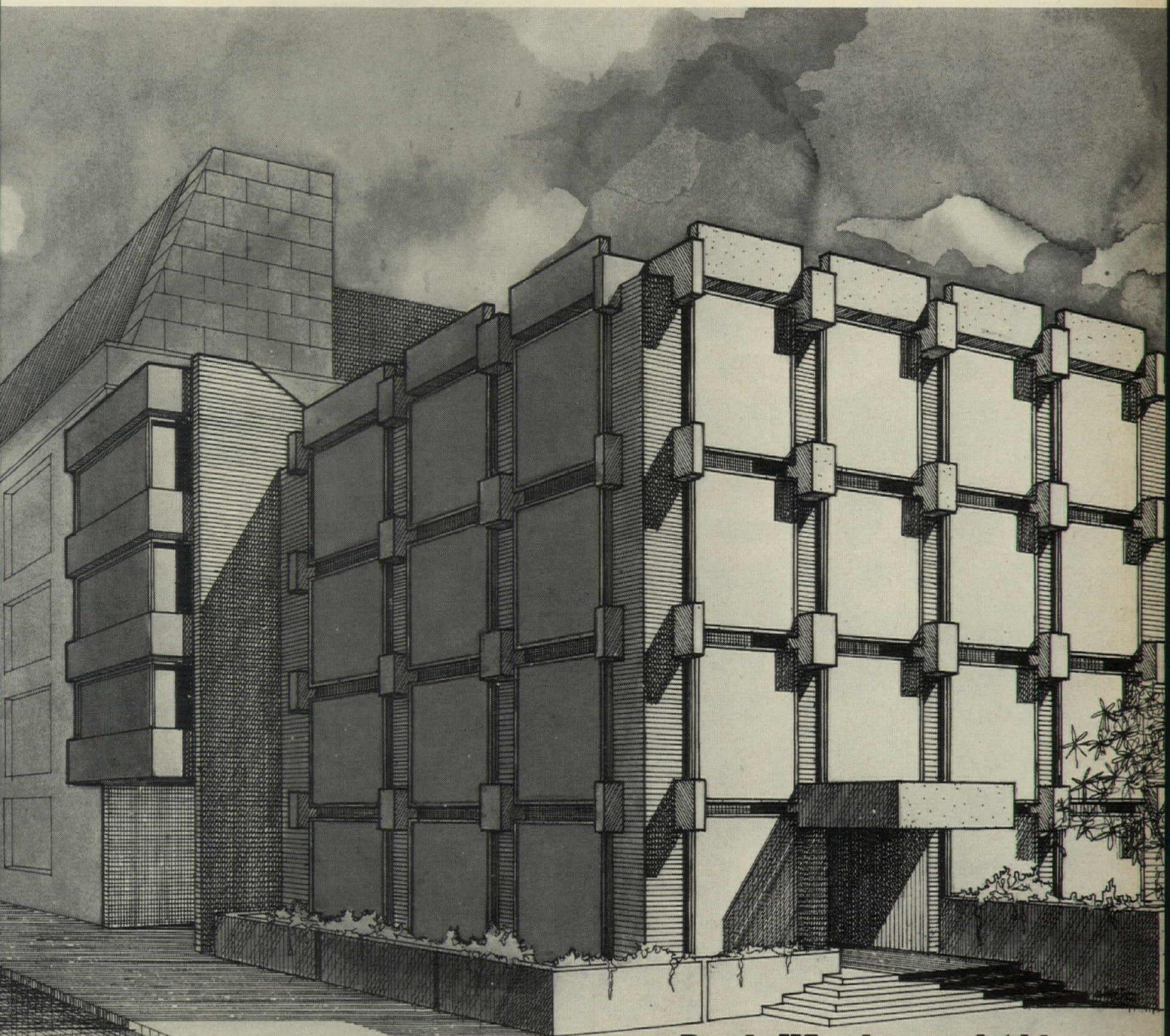


Louver mesh

1/2" facade

1 1/2" facade

No. 4 facade



Ready, Wheeling and Able

Wheeling Corrugating Co., Div. Wheeling Steel Corp., Wheeling, West Virginia

**We'd like
to tell you
about our
operation.**

The operation is called Executone HCP.

HCP means Hospital Communications Programming. It's a modern technology developed by Executone for analyzing the present and future communications needs of the modern hospital.

Executone HCP goes far beyond Nurse Call systems. It puts the newest advances in electronics to work in every nursing area and all hospital service departments. (Communications systems can be fully integrated with sound systems, doctors' register and pocket paging.)

Better use of hospital personnel

Through this Executone approach, hospitals can make more efficient use of their personnel. For example, one nurse may monitor the activities of many patients remotely. And a single watchman may guard against pilferage in many hospital areas at once.

And no one is as well qualified as Executone to perform the HCP operation.

For with Executone, you have:

- one manufacturer assuming full responsibility for all hospital communications.
- all systems and equipment produced, installed and maintained by one source.
- expert local service provided round-the-clock and on-the-premises by factory-trained technicians.
- training and re-training of hospital personnel by communications experts.

Fight rising costs

The only practical answer to rising costs is to multiply the effectiveness of personnel. This is the immediate result of Hospital Communications Programming — whether applied by Executone in modernization, expansion or new construction.

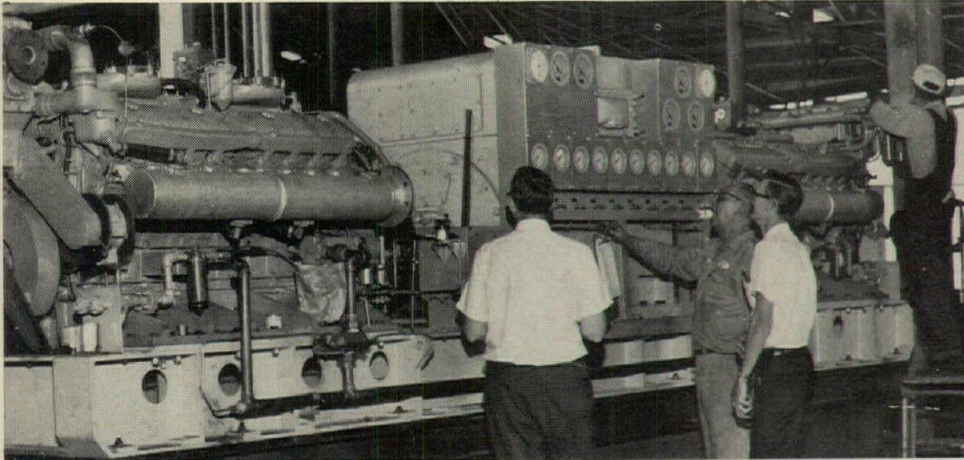
Call your Executone man for the story of Hospital Communications Programming. Or write Executone, Inc., Dept. U-6, Austell Place, Long Island City, N. Y.

In Canada: 331 Bartlett Avenue, Toronto.

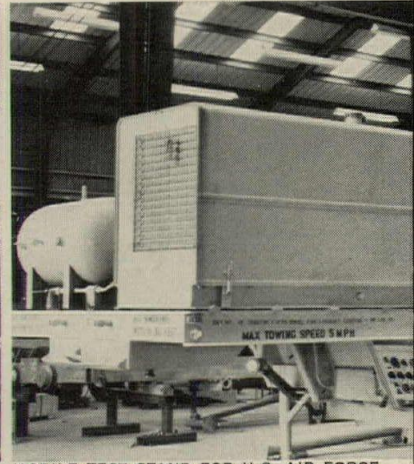
Executone

For more data, circle 67 on inquiry card

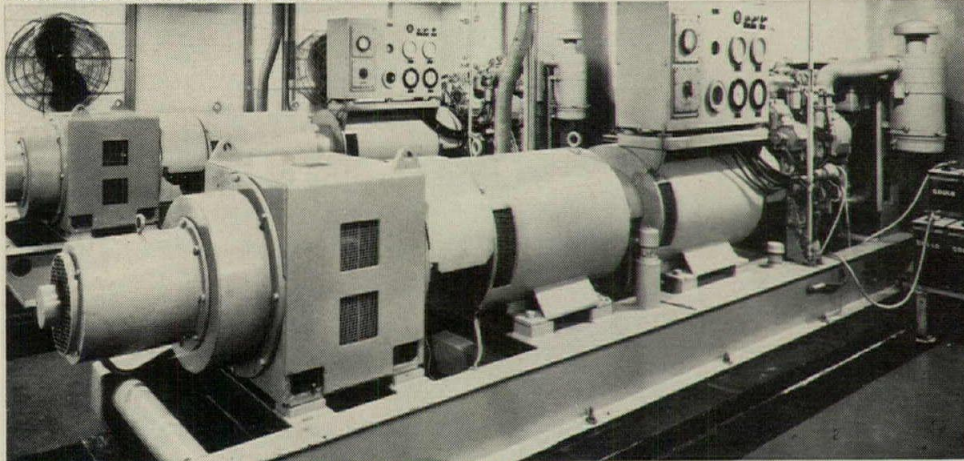
If you require eng



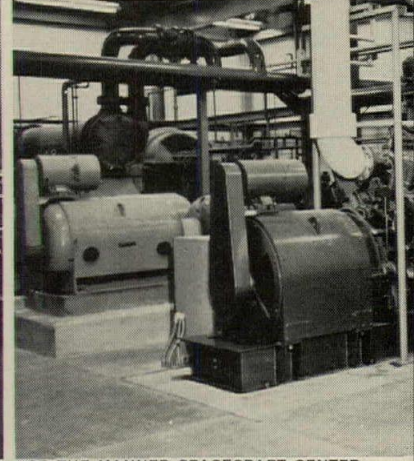
HIGH-SHOCK EMERGENCY POWER UNIT FOR THE NAVY



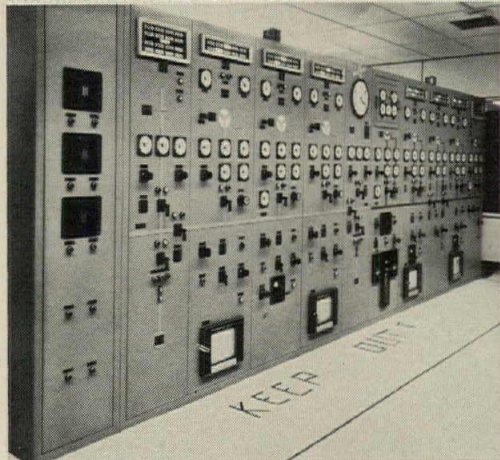
MOBILE TEST STAND FOR U.S. AIR FORCE



NON-INTERRUPTABLE POWER SOURCE FOR CRITICAL COMPUTER

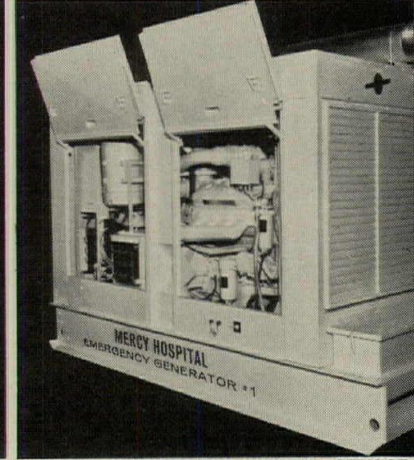


FOR THE MANNED SPACECRAFT CENTER



SOPHISTICATED POWER CONTROL PANEL FOR NASA

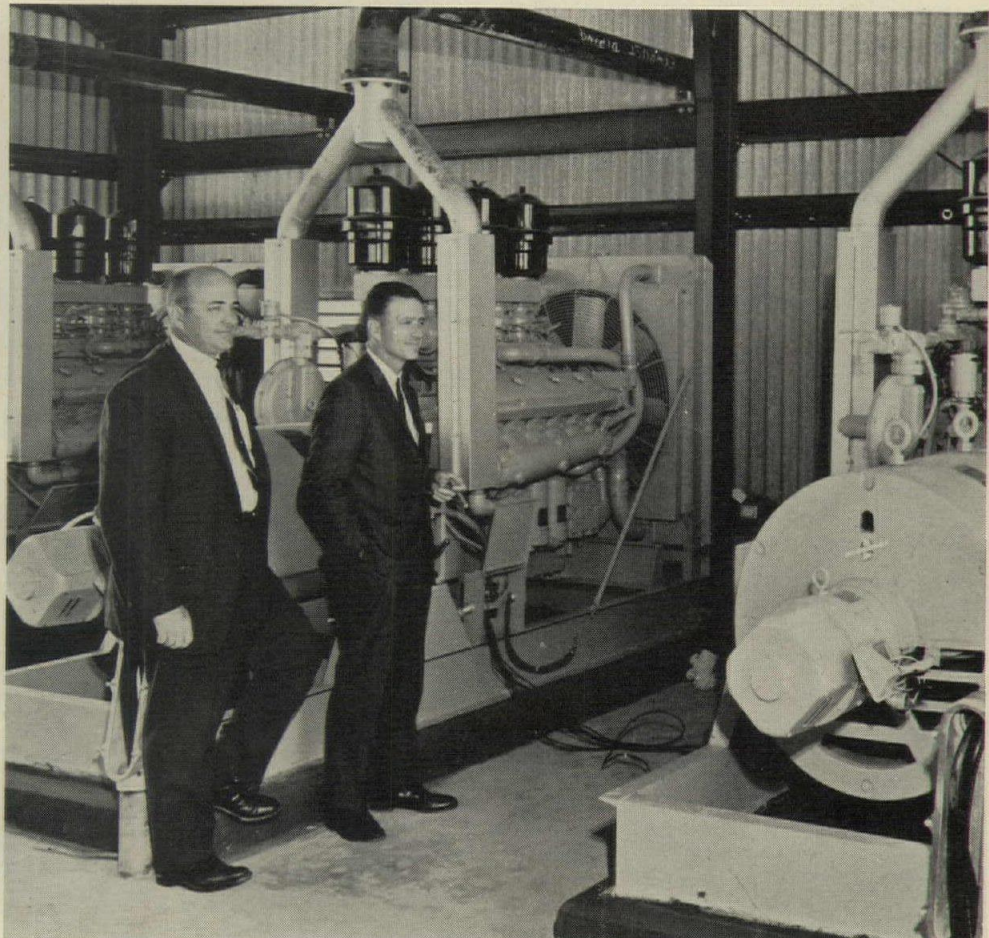
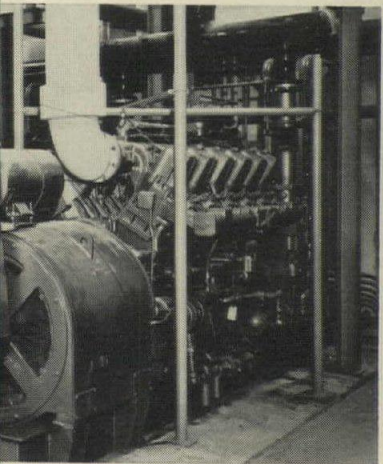
FOR ANY PURPOSE
**DIESEL
OR GAS**



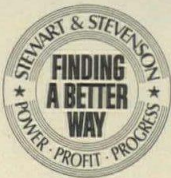
EMERGENCY POWER FOR HOSPITAL SERVICE

me driven power...

You can be sure of *guaranteed performance*
on the job if it bears this trademark



ON-SITE POWER GENERATION FOR GULF COAST INDUSTRY



Some firms offer certificates by Independent Testing Laboratories. Other suppliers offer guarantees against defective parts, workmanship and materials.

Yet, it is not what the unit did at the factory that really counts . . . but what happens *if* it does not perform as specified *after* installation!

When it is a Stewart & Stevenson Unit, both Engineer and Client have the protection of Stewart & Stevenson's **GUARANTEE OF DUTY** which states in plain and simple language that " . . . *if the equipment should fail for any reason and we cannot make it perform as specified, we will remove the equipment at our expense and refund all money paid.*"

We would like to tell you all the other advantages. Write or call. A free booklet and catalog are available.

STEWART & STEVENSON SERVICES, INC. MAIN OFFICE AND PLANT: 4516 HARRISBURG BLVD., HOUSTON, TEXAS 77011, PHONE: CA 5-5341/BRANCHES: BEAUMONT, CORPUS CHRISTI, DALLAS, LUBBOCK, ODESSA, SAN ANTONIO, SAN JUAN/REPRESENTATIVES AND SERVICE DEALERS: ABILENE, AMARILLO, ARANSAS PASS, AUSTIN, BROWNSVILLE, FORT WORTH, FREEPORT, GALVESTON, LAREDO, LONGVIEW, PORT ARTHUR, PORT ISABEL, PORT LAVACA, SAN ANTONIO, SEMINOLE, SAN JUAN, WACO, WICHITA FALLS; HOBBS, NEW MEXICO/EXPORT-OILFIELD ONLY: P. O. BOX 360, FLORAL PARK, NEW YORK 11002, PHONE: 212-846-5500/EXPORT-AIRLINES EQUIPMENT: 52 UPPER MONTCLAIR PLAZA, UPPER MONTCLAIR, NEW JERSEY 07043 USA, PHONE: 201-744-8220.

THE WORLD'S LARGEST DISTRIBUTOR OF DIESEL ENGINES

For more data, circle 68 on inquiry card



PHOTOGRAPH BY JULIUS S
ARCHITECT: DAVID JAY FLO

See Dollar Mountain or Baldy at 40° below through insulating glass by Thermoproof.

On a clear day, you can see forever.

And each resident of the Sun Valley Condominium Apartments will get a view of Dollar Mountain or Bald Pt.

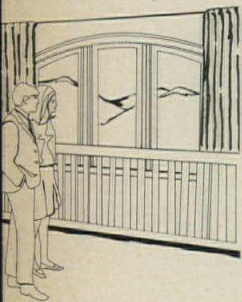
Large glass areas to meet this design criterion required the use of insulating glass units by Thermoproof to minimize heat loss and allow visibility at temperatures up to 40° below zero.

Thermoproof took the extra care to equalize the atmospheric pressure between Detroit (14.3 lbs. per sq. inch), and Sun Valley (11 lbs. per sq. inch) by inserting a special breather tube into each unit.

Specially fabricated insulating glass units to meet unique design criteria are another way Thermoproof does more to meet your ideas.

For more data, circle 73 on inquiry card

See full color 4a
Sweet's insert Th
Insulating glass by
Thermoproof Glass Cor
subsidiary of Shatterpro
Glass Corporation
4815 Cabot Avenue
Detroit, Michigan 48210



A

AMERICAN
CHAIR
COMPANY

SINCE 1887

Wide selection of contract seating with complementary tables. See your dealer or write for our distributor's name.

MANUFACTURERS OF CONTRACT FURNITURE, SHEBOYGAN, WISCONSIN
PERMANENT DISPLAYS: Atlanta • Chicago • Dallas • Miami • New York • San Francisco • Sheboygan

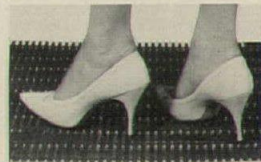
For more data, circle 69 on inquiry card

ATTRACTIVE LIGHT WEIGHT GRATINGS LONG SPAN HEAVY DUTY GRATINGS



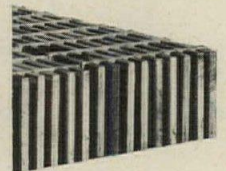
Reliance I-Lok Aluminum Grating is not only structurally strong but also has aesthetic appeal. The grating has a finished look and is ideally suited for use where a pleasing appearance is required.

This grating, with openings as small as 1/4" x 2", is the best choice for use in locations where women will be walking, such as sidewalk vault covers, kitchen floor drains and utility trenches. Request our Catalog RSL-12AAR for more detailed information.



This bar grating is recommended for locations where material handling equipment, as well as people, must travel over the installation. Where it is necessary to temporarily remove a grating panel, fastening devices and lifting lugs are easily designed to fulfill your requirements.

For more detailed information, request our design manual RSL-11AR.



RELIANCE Steel Products Company

3700 WALNUT STREET • McKEESPORT, PA. 15134 • 412/461-3616

see our catalog in Sweet's

For more data, circle 53 on inquiry card

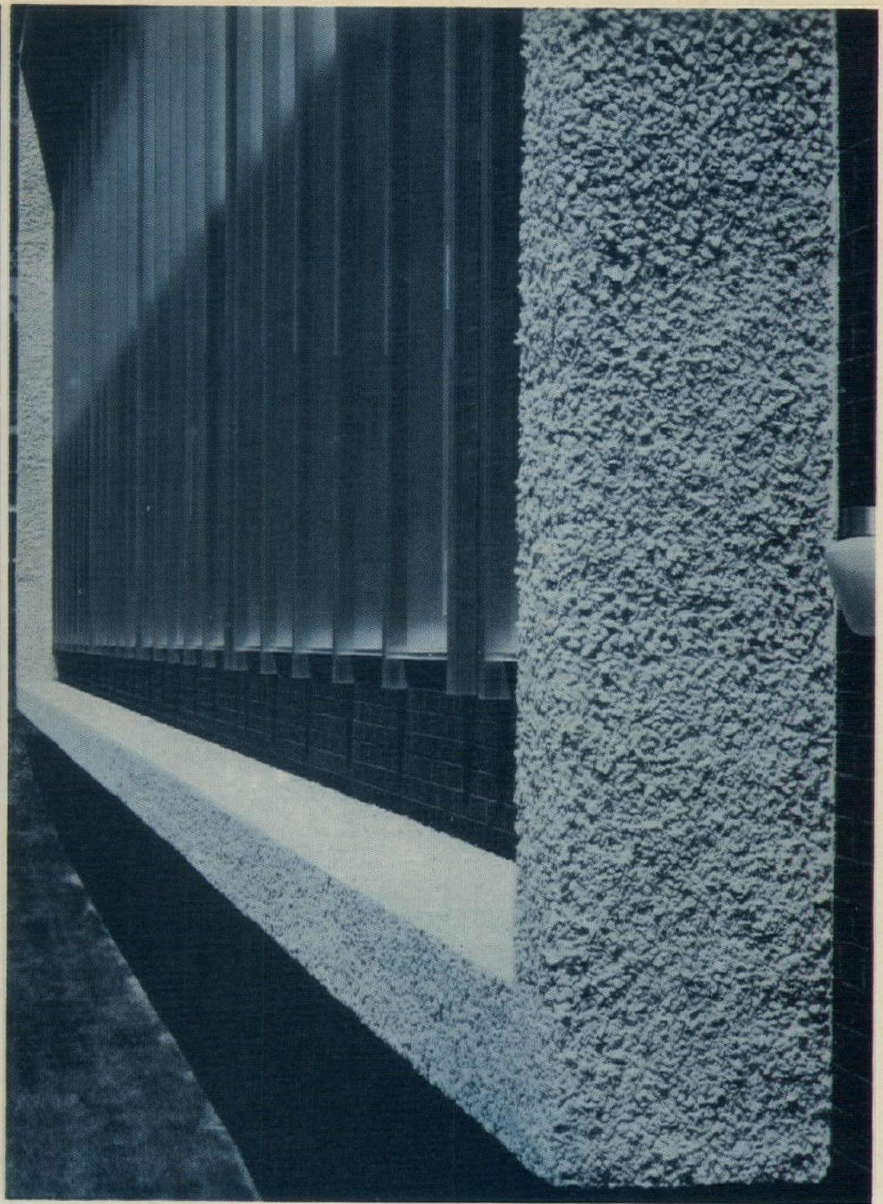
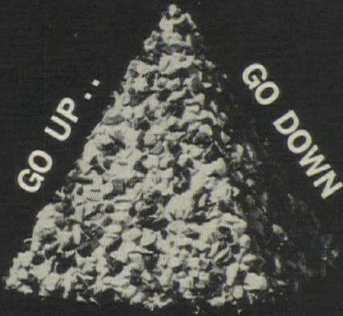
GO STRAIGHT ...



GO ROUND ...



GO UP ... GO DOWN



...with Fuller Tuff-Lite® Matrix the design direction is entirely up to you.

Choose Fuller Tuff-Lite®, the epoxy-based Wall Matrix specifically formulated for exposed aggregate construction. It's your key to complete freedom of design creativity in new construction or remodeling.

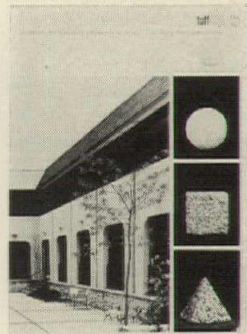
It is the one matrix that can be used for interiors or exteriors, on flat surfaces (vertical or horizontal), around corners, on concrete, brick, wood or any dry clean substrate.

Fuller Tuff-Lite® is an unusually strong, exceptionally lightweight material designed to be used as a base in exposed aggregate construction . . . for walls, columns, dimensional design areas. Allows greater exposure of aggregate. Eliminates costly erection. Tuff-

Lite® is available in any color. And the color you specify remains uniform for the complete job. Will blend or contrast with any aggregate used. Tuff-Lite® retains its color—and superior bonding strength—through wind, snow, frost and all temperature changes. Will not pit, spall or peel. Will not shrink, chip, crack or craze.

Just a $\frac{3}{8}$ " layer is all that's necessary. Can be applied and seeded immediately. Or can be used in making pre-formed, lightweight sections off the job. Cures in less than 24 hours.

Choose Fuller—a complete line of adhesives for the Construction Industry.



Refer to Sweet's Architectural Catalog File 110/Fu or Write for FREE Brochure.

LEADER IN ADHESIVE TECHNOLOGY

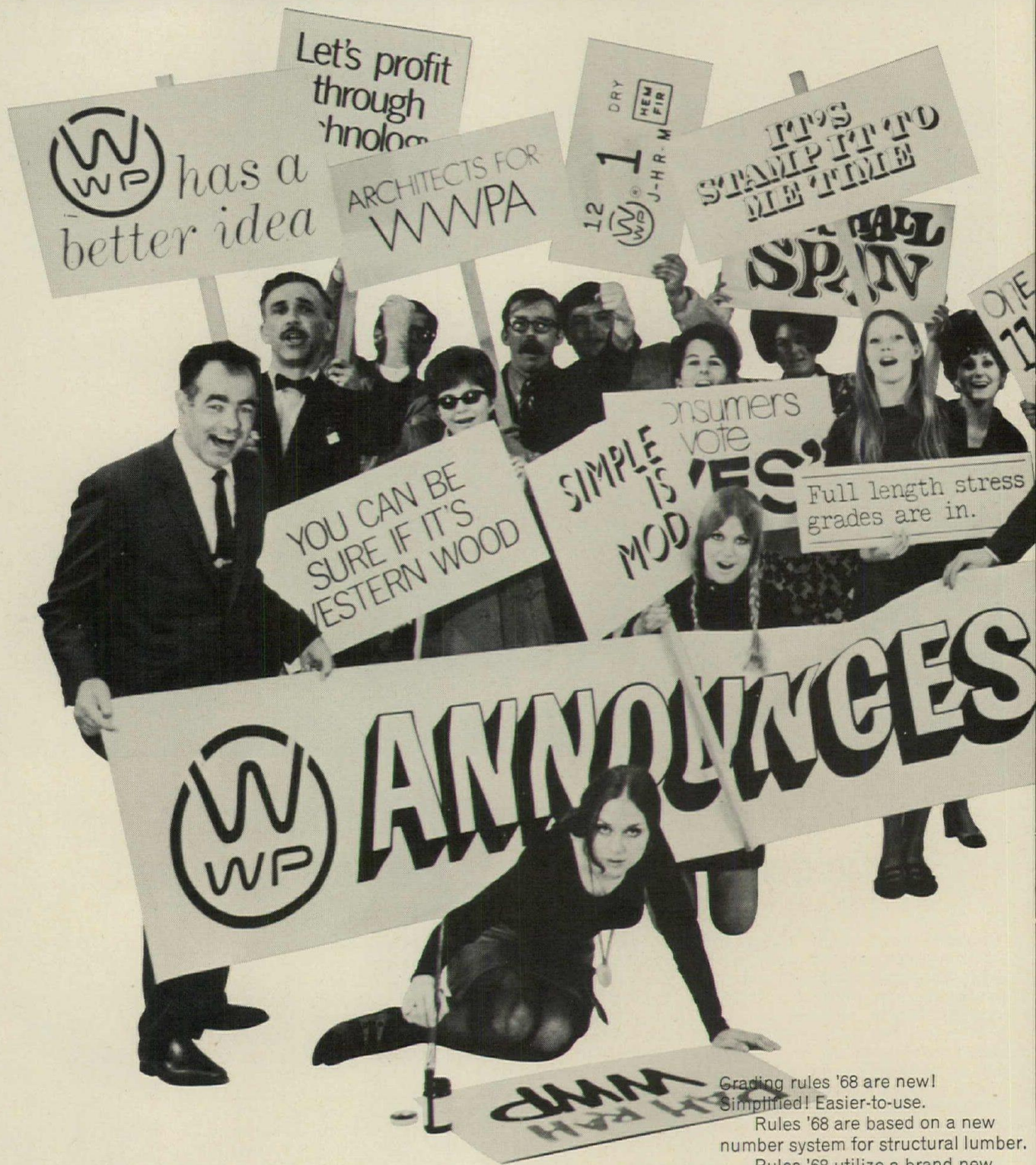


HB FULLER COMPANY

1150 Eustis St., St. Paul, Minn. 55108, Dept. 258R42

For more data, circle 70 on inquiry card

The greatest happening in lumber Swan Alverdson invented them in



Grading rules '68 are new!
Simplified! Easier-to-use.

Rules '68 are based on a new
number system for structural lumber.

Rules '68 utilize a brand new
"SPAN-CODE" system. This code,
appearing on the grade stamp, permits
rapid selection of joist and
rafter spans.

Rules '68 utilize FULL-LENGTH
GRADING for stress grades of 2" and
thinner. (Posts, timbers, beams and

grades since 1754!



stringers are still graded on middle 1/3).

Rules '68 utilize the latest data on working stresses. All species are assigned design values.

Rules '68 are extremely condensed. 70 pages of board grades have been cut down to 8 pages. Grade descriptions are much easier to understand and evaluate.

What does this mean to you?

For Architects: These new grading

rules make the job easier because they are the most efficient body of lumber grade specifications yet devised.

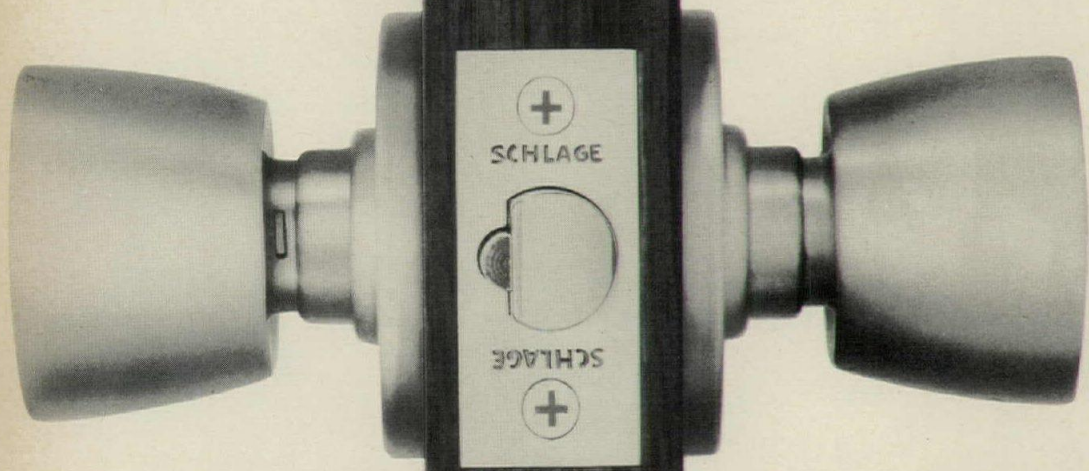
For Retailers: Rules '68 are customer oriented. So your buying and selling are much easier and much more profitable.

For Builders and Contractors: Rules '68 are easier to apply, so you'll save time. Related sizes assure uniformity and span symbols prevent "over-engineering."

All these advantages and technological advances are built in the new Western Wood Products' Association book "Grading Rules '68." For your copy, send \$1.00, along with your name and address to Rules '68 — Dept. AR-768, Western Wood Products Association, Yeon Building, Portland, Oregon 97204.



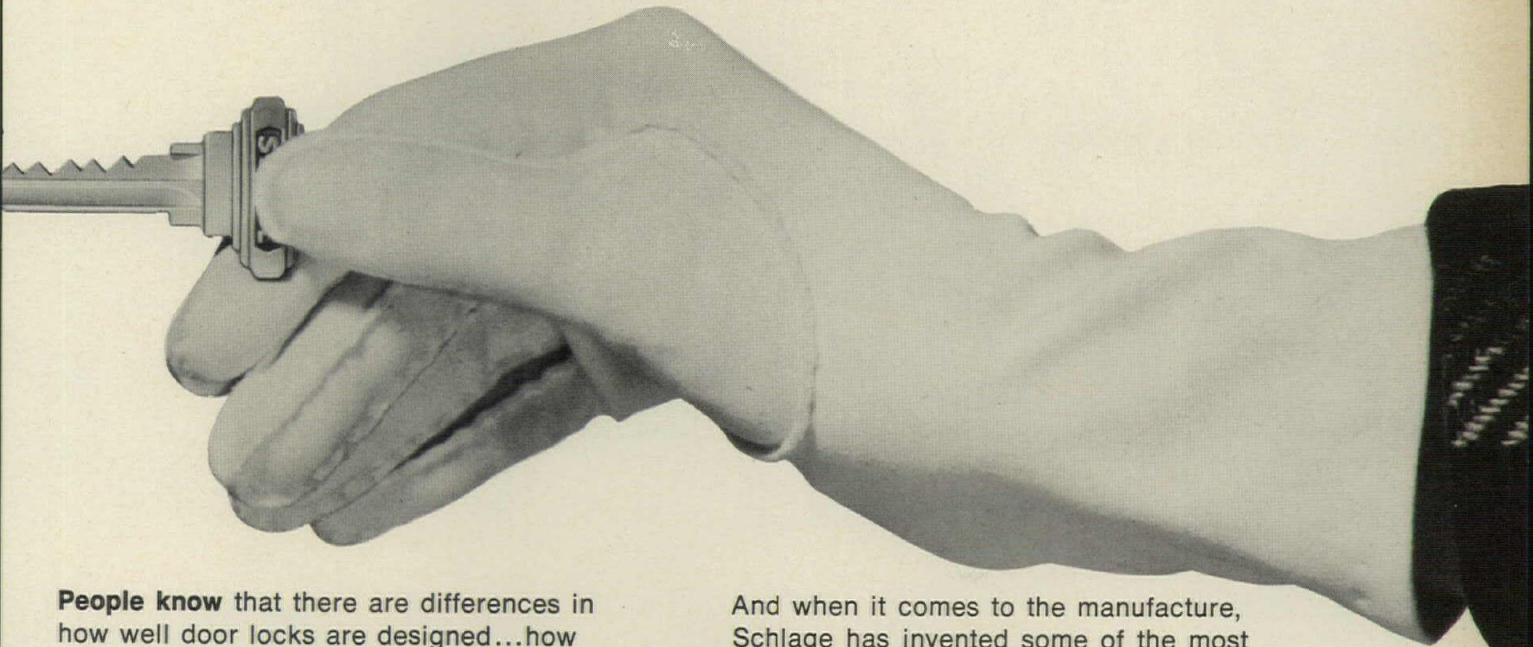
For more data, circle 71 on inquiry card



**Door locks,
to most people,
mean security**

Will people pay a little more for something much better?

Obviously they will. But just as obviously, they want to be certain that what they *get* is much better. Door locks for instance. They are something we really know about.



People know that there are differences in how well door locks are designed...how well they are made and how well they operate. They know that those differences make a difference in *security*.

What about Schlage Door Locks? They generally cost a little more. Yet they outsell all other door locks. So they must offer a "difference" in security.

Is the design much better? Schlage invented the cylindrical lock...made it so good that others have tried to imitate the design for years. But Schlage has kept improving and perfecting it. Still does—as the latest models reveal.

Is the quality much better? There is better quality in the design, of course. But Schlage goes further. For example, Schlage expends more for raw materials. How else would it be possible to make a better lock? Schlage picks out and spends more for special strip steels rolled to rigid specifications...spends more for assuring the most precise tolerances in the industry...spends more for constant and rigid inspection.

And when it comes to the manufacture, Schlage has invented some of the most modern and unique instruments—high-precision key milling equipment, for example. Most important, the Schlage craftsmen are men of talent as well as pride. Naturally, Schlage pays them more, too.

Do Schlage Locks work much better?

That is the result of better quality—better workmanship. It has made Schlage the largest selling door lock in the world. Over the years, Schlage has proven itself the one lock that apparently never wears out. And it is virtually free of maintenance cost.

Aren't they WORTH a little more? More than a little more. So much more goes into Schlage Locks that they actually *do more* for people—provide a feeling of dependability and reliance. The Schlage sense of security.

SCHLAGE
LOCK COMPANY[®]
San Francisco • Vancouver, B.C.



BARRETT BOND PLY

BARRETT BOND PLY

BARRETT BOND PLY

PLY

BOND PLY

BARRETT BON

OND

BARRETT BOND PLY

BARRETT

BARRETT

BARRETT takes half the build-up out of built-up roofing.

It's the most significant advance in built-up roofing in many years—the BARRETT®BOND PLY* System. It uses only **two** plies to do the job of ordinary **four**-ply systems.

But those two plies aren't the same felts used in ordinary systems. The BOND PLY roofing sheet is **factory-coated** on both sides with a heavy, uniform layer of high grade roofing asphalt—reducing on-the-job moppings by half. The **factory coatings** assure positive, complete coverage and more uniform distribution of weather-proofing asphalt than the "job applied" moppings they replace.

The BOND PLY System cuts down on installation steps—but not on roof performance. Or the way we stand behind it. And just to be sure your client gets genuine Bond Ply, every roll has the name printed along its entire length. Write for Bond Ply specifications today.

*Trademark

The name BARRETT stands for 114 years of leadership in roofing products, systems and services. And you can rely on it.



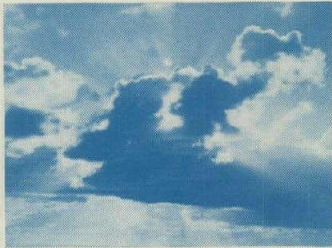
CONTRIBUTING
TO THE PROGRESS OF
MAN THE BUILDER

THE CELOTEX CORPORATION

Tampa, Florida 33607

Subsidiary of Jim Walter Corporation

For more data, circle 74 on inquiry card



Pioneering is a lonely business. *Only when you go it alone.*

■ When pioneers join forces, have a good idea where they're headed and have the heart to hang in there, pioneering is usually a gratifying group adventure.

So it has been for the ever-widening circle of membership in the Prestressed Concrete Institute in the decade since its inception. While lacking the almost-lost-in-obscurity beginning of ancient building materials, prestressed concrete is no patiently plodding frontiersman. Rather, like the jet, it has spread its swept-back wings and soared. Evidence of that is everywhere for all to see. In

terms of what has already been accomplished, prestressed concrete has long since passed the point of no return.

PCI represents all facets of precast and prestressed concrete, whether pre-tensioned, post-tensioned, or architectural precast. Its members include producers, architects, engineers, industry suppliers, educators, students, and technicians.

■ The Institute serves principally in three areas: (1) To gather and disseminate knowledge of whatever nature will advance the industry's cause; (2) Through

continuous research and development, to increase the use of prestressed and precast concrete; (3) To establish and maintain industry-wide design and production standards.

■ The entire construction industry has benefitted significantly from many Institute-sponsored activities. Among them were original PCI specifications, the first published in the U.S. The PCI Building Code was the first national code on prestressed concrete. An Institute committee developed and recently released new guide specifications for the industry. A PCI-AASHO joint committee is continuing to prepare design standards that assure economy in bridge structures.

As a result of PCI fire tests, two, three and four-hour U.L. label service is now available on most prestressed concrete building elements.

■ Each year, an internationally prominent Awards Jury selects and suitably recognizes excellence in design originality. This competition does more than merely herald those so recognized. It spotlights design creativity to benefit the entire construction industry.

Annually, PCI convenes to offer stimulating technical forums on design, research, production, and new developments. Formal presentations, panel discussions, and shirt-sleeve sessions combine to form balanced, rewarding meeting programs. State and regional conferences throughout the year augment this annual event.

■ Numerous publications regularly keep PCI members aware of industry advances as they occur. Among the most recent are a long-span bridge study, one on fire resistance, and a 156-page book containing 341 illustrations, *Schools of Prestressed Concrete*, which covers planning, design, and construction in all areas of educational building.

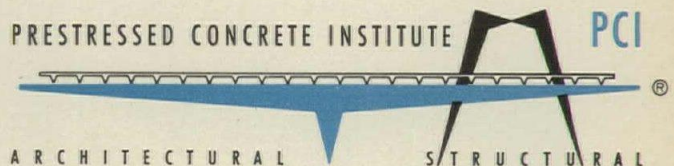
Several high-priority PCI programs of promise are currently in various stages of development. They include preparation of a prestressed concrete

handbook, industry-wide product standardization, intensive fire research, further implementation of quality-control techniques, safety practices, coordination of research by agencies throughout the U.S. and Canada, and cooperation with foreign countries in exchanging design concepts and manufacturing procedures. (*PCI is the sole U.S. representative to the world prestressed concrete organization, Federation Internationale de la Precontrainte.*)

■ It is perhaps no accident that design and management people of pioneering mind should have become attracted to prestressed concrete. Although modern as tomorrow, the credentials of prestressed concrete as a trustworthy construction material are beyond question, providing as it does the strengths of both concrete and steel. No mere building *ingredient*, this. No commodity. But a unique structural and design medium with inimitable, innate characteristics.

The use of prestressed concrete faces ever more far-flung horizons, as broad as the true professional's endless quest for the new, the better, the lower-cost way to improve mankind's lot. And, in the process, his own.

■ In the belief that those of like mind get further, faster, when banded together, we invite you to consider joining PCI. If, of course, you are not already a member. Simply call or write us.



205 W. Wacker Drive / Chicago, Illinois 60606 / Telephone: (312) 346-4071

A single climate conditioning system would



be 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 76 on inquiry card



STAND ON END

80

**CERTAIN TEED
DUAL 80
PLY SHEET**

Dual in the sun

Certain-teed Dual 80, for built-up roofing, goes down before the moon comes up.

We do more work in our plant. Less work is required on the job. Fewer steps and less handling, on the job, means a higher quality finished product. Dual 80 is "the half finished roof".

We impregnate our high quality organic fibered felt with satu-

rating asphalt and enclose the impregnated felt with mineral stabilized asphalt, giving you a roof that's half finished before it leaves our plant.

Rugged Dual 80, eliminates felt curling and fish mouthing. Requires less handling and fewer operations. Reduces the chance of membrane damage being caused by workmen.

For more data, circle 77 on inquiry card

Specify Dual 80 for a "half finished roof". It goes down before the moon comes up. Certain-teed Products Company, Ardmore, Penn.



In the spirit of the "Chicago School"— an apartment building designed for light, air and views

This tower by Harry Weese strongly recalls the 80-year-old beginnings of modern skyscraper design in Chicago. The apartments within, filled with daylight and a heightened sense of space, demonstrate the continuing relevance of this tradition for the city in which it was begun.



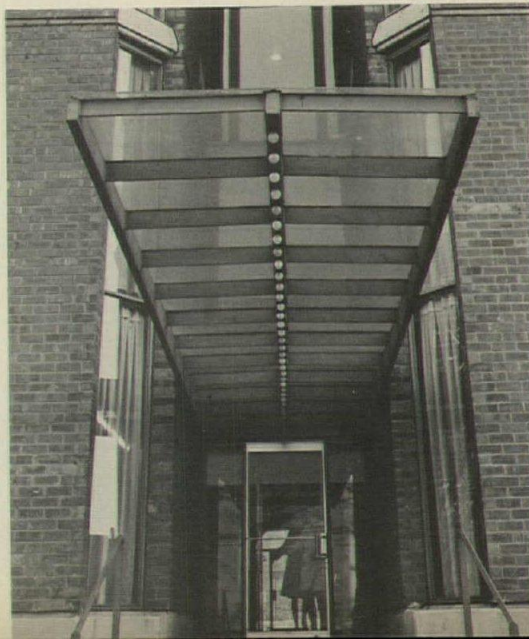
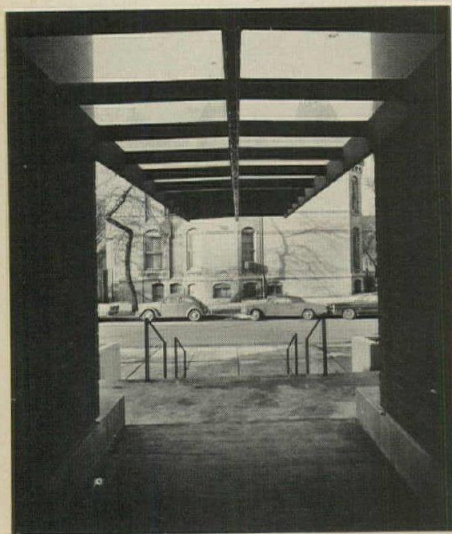
Orlando R. Cabanban photos

Great vertical tiers of broad bay windows—borrowed from Chicago's brilliant late-nineteenth-century architectural past—dominate the four facades of this 30-story apartment tower by Harry Weese. "Chicago School" buffs will be reminded of Holabird and Roche's Tacoma Building begun in 1887; Burnham and Root's Monadnock Building and William Le Baron Jenney's Manhattan Building, both finished in 1891; Burnham and Company's Reliance Building of 1894; and several other Chicago skyscrapers of that great decade for which, as in Weese's building, fenestration was everything.

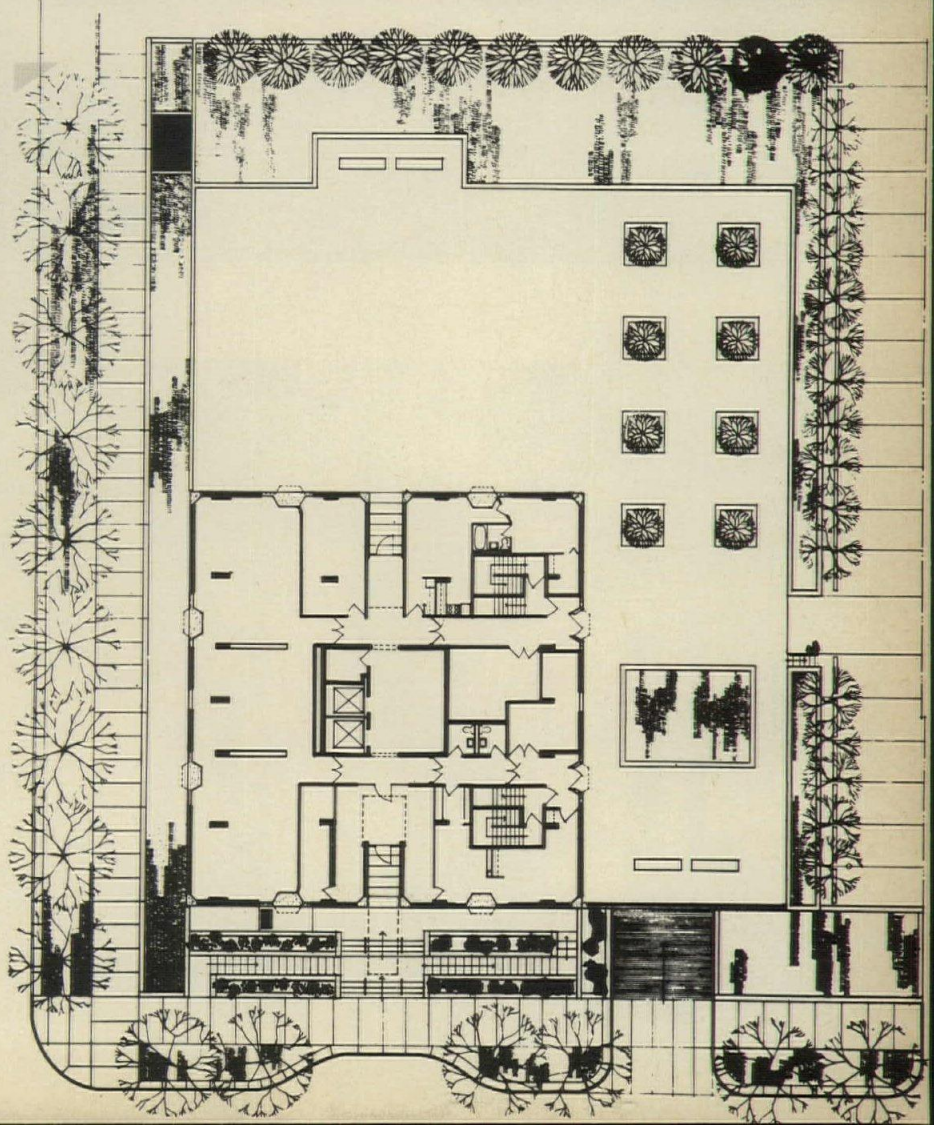
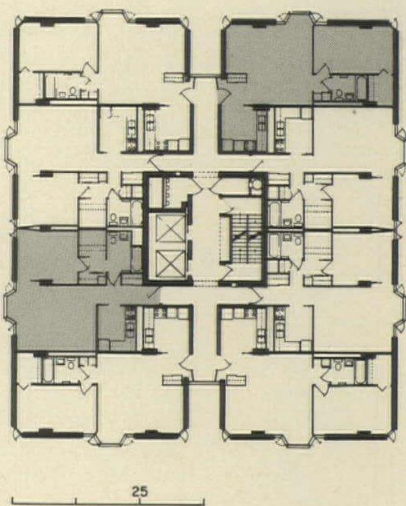
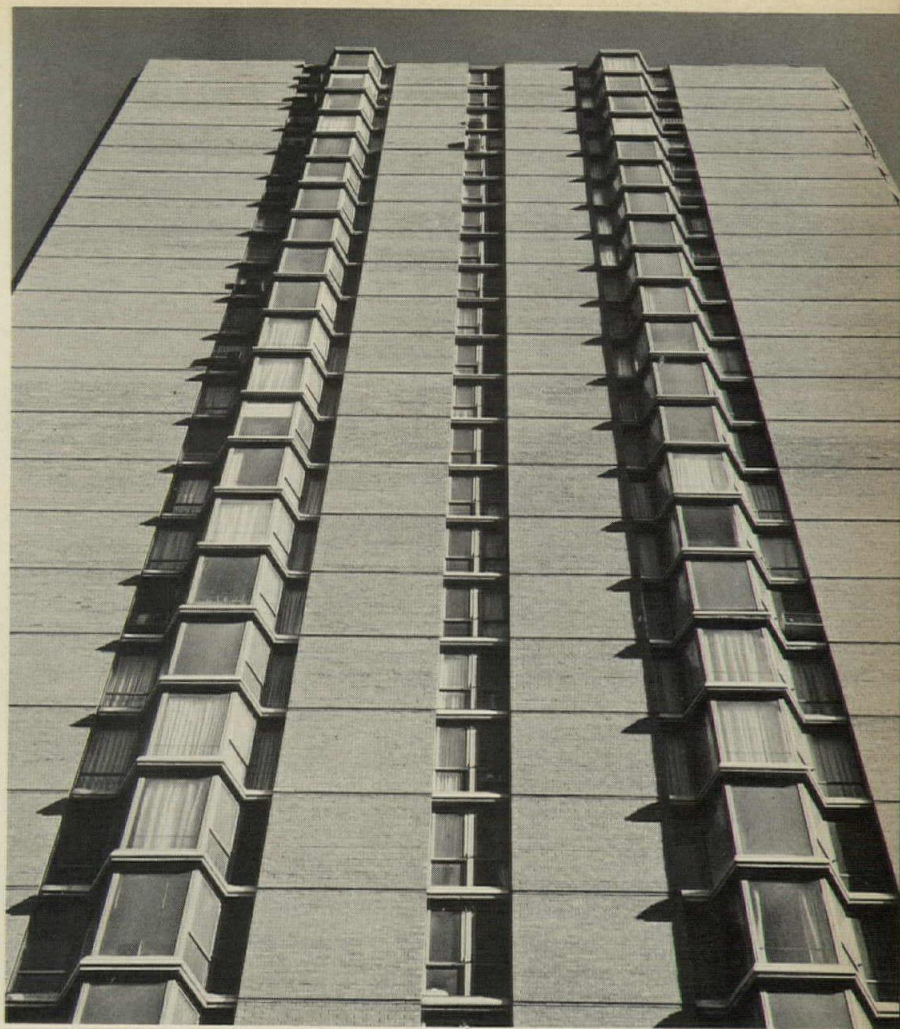
Weese decided upon a square tower with a capacity limited to eight units per floor to allow multiple orientation and cross ventilation for each apartment, and for as many individual rooms as possible. The building corridors on each floor have windows at opposite ends, the extensions of which light the apartment kitchens as shown in the typical floor plan on the opposite page.

In addition to the foregoing advantages, the tower scheme also provides short corridors (extending only 29 feet on either side of the elevators), conserves the site and as a slender vertical mass, does not overwhelm its neighboring townhouses as a lower, bulkier structure might. The tower, which contains 224 apartments in all, is perched on top of a two-level 88-car garage and parking area shielded behind a grass berm.

Costs were tightly controlled to keep rents within the reach of retired teachers, for whom the building was constructed by its owners, the Chicago Teachers Union. The entire building is of typical concrete flat slab construction with 8-inch non-bearing masonry walls faced with a light-colored brick. Total cost of construction was \$2,607,800, a little over \$12 per square foot.



Deep vertical recesses in each principal facade (shown above), add counter-emphasis to the projecting bay windows, provide daylight for corridors and kitchens, and define the entrances (shown at left). In deliberate contrast, each secondary facade (above opposite) has been made flatter. In the typical floor plan (at right) two basic units are repeated. As shown on the plot plan (far right) the roof of the garage serves as a landscaped plaza.





A typical living room interior (above) shows three of the five segments of the window unit. One segment brings light to the adjoining bedroom on the opposite side of the wall. The other is concealed by the curtain just visible to the right. Weese repeats the bay window silhouette in the corridor partitions (below).

JOHN FEWKES TOWER, Chicago, Illinois. Architects: *Harry Weese & Associates*; structural engineers: *The Engineers Collaborative*; mechanical and electrical engineers: *S. R. Lewis & Associates*; landscape architects: *Office of Dan Kiley*; interior designers: *Dolores Miller & Associates*; acoustical engineers: *Kodaras & Associates*; general contractor: *Morris Handler Company*.

BUILDINGS DESIGNED AS "STREET"

By Raymond Lifchez

Since the mid-1950's there have appeared in Europe a number of young architects who are determined that their buildings should be relevant to those accommodated, both "at home" and when in the street. Basically these architects subscribe to the thought that architecture has no higher aim than to assist man in achieving a sense of personal well-being: a building should be judged not in terms of the usual esthetic considerations but in terms of how people react to it and use it.

When Dutch architect Herman Hertzberger talks about his solutions for the student house in Amsterdam and the Montessori school in Delft, one is immediately drawn into his concern for making people feel at home, with approaches to the buildings that are intended to make them seem like friendly extensions of the street and public spaces designed to be community gathering places. When I visited them, Hertzberger's buildings proved to be succinctly designed counterforms of work and leisure. But couched in these forms, that appear only to be good solutions to recognizable problems, is a potential for unique uses.

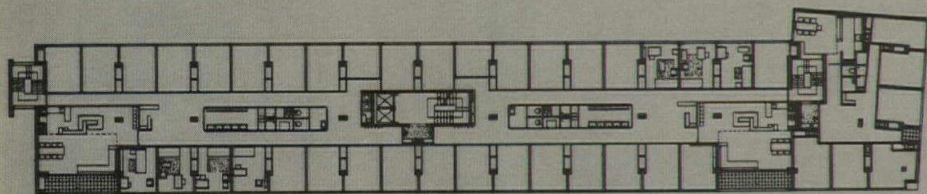
Hertzberger's Amsterdam Student House (right) takes its place within a town structure of the 17th century. His building is obviously the most recent addition to the surrounding fabric. The massing of the building's forms was partially dictated by the form of the earlier structures. At the same time, the student house poses a new scale of architecture that in time will possibly replace that of its predecessors.

According to Hertzberger "to survive the change-process everything that is built must be so formed that it can be plurally interpreted, that is to say, able to take on other implications and throw them off again without its identity being affected.

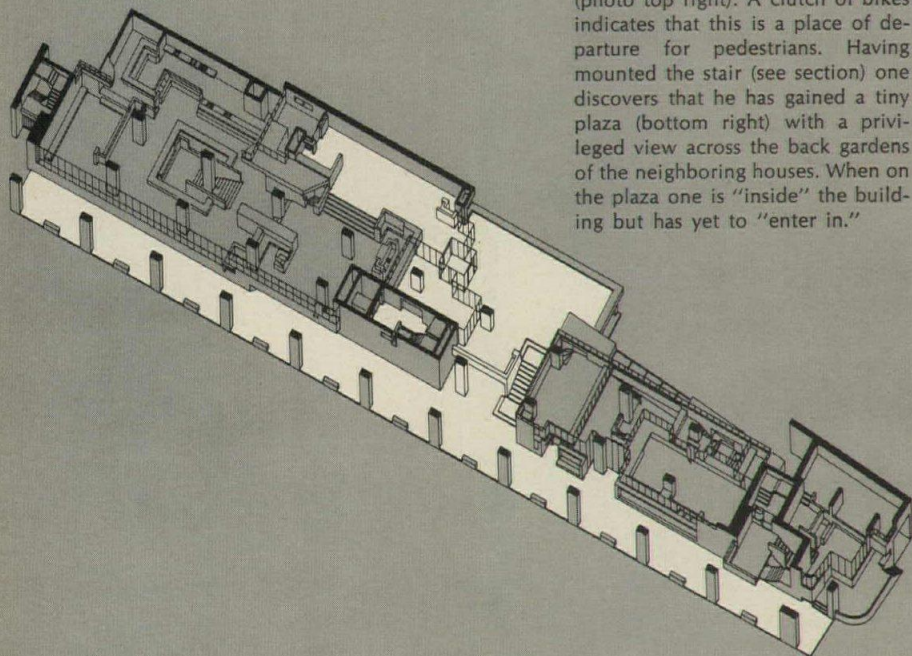
To take old Amsterdam as illustration: canals—which were once sewage conduits, defense ramps and transport channels—have all lost their original implication. They have none the less managed to vindicate themselves as a linear skeleton of the town, that is to say, as form they are still accepted and respected. We see them now as special routes—to show the town to tourists in summer, traditionally to skate on in winter, and, simply because the trees have gone on growing, as the predominate greenbelts. They have the incidental temporary function of providing space for houseboats; and the future may see them as parking areas. This process of plural interpretation takes place in time."



Johan Van Der Keuken



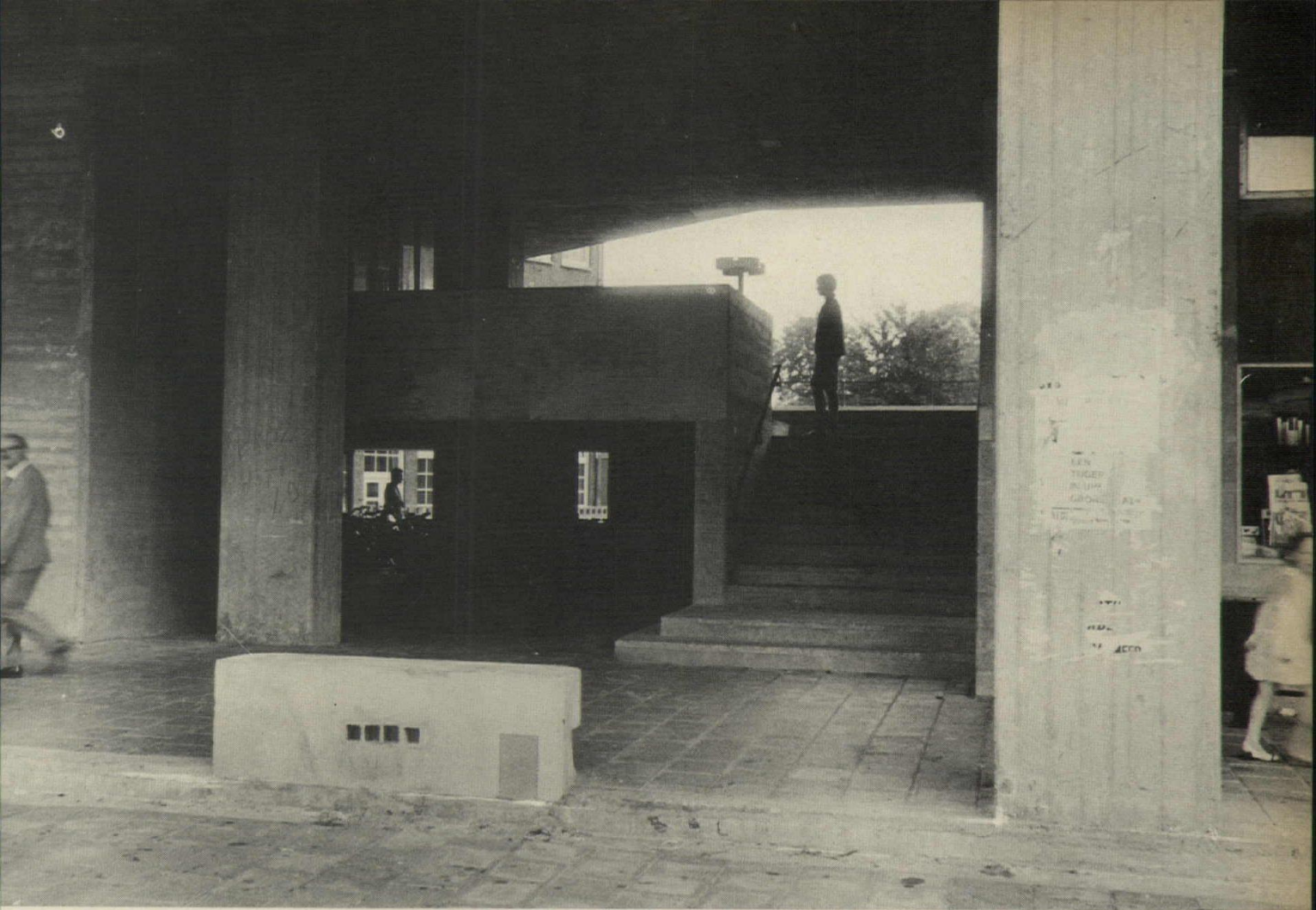
Halfway along the street gallery there is an opening and a stair up (photo top right). A clutch of bikes indicates that this is a place of departure for pedestrians. Having mounted the stair (see section) one discovers that he has gained a tiny plaza (bottom right) with a privileged view across the back gardens of the neighboring houses. When on the plaza one is "inside" the building but has yet to "enter in."



This potential for various uses gives the forms heightened meaning as experience reveals their true worth. Hertzberger's aim is to create forms that lend themselves to multifarious interpretation by those they serve; to allow a form's meaning to change momentarily vis-a-vis the one accommodated. Therefore a building's response to changing needs is the test of the building's relevance.

Hertzberger's architecture is built practically. In spite of the obvious economy imposed upon his means, he ingeniously creates good forms, though he insists that the formal result is not his objective. Hertzberger, however, emphatically maintains that "form makes itself, and that is less a question of invention than of listening well to what person and thing want to be."

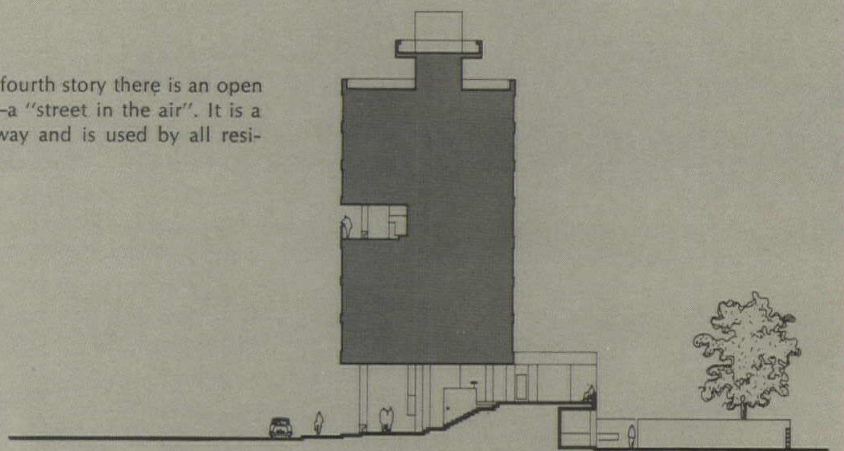
His preoccupation with an open-ended interpretation of form is extended to the problems of a building's growth and the changes that accompany it. Change is inevitable if a building is to maintain vitality and must therefore, Hertzberger says, be assumed from the beginning of the design process as a prime generator of the architectural form of the building.



Johan Van Der Keuken

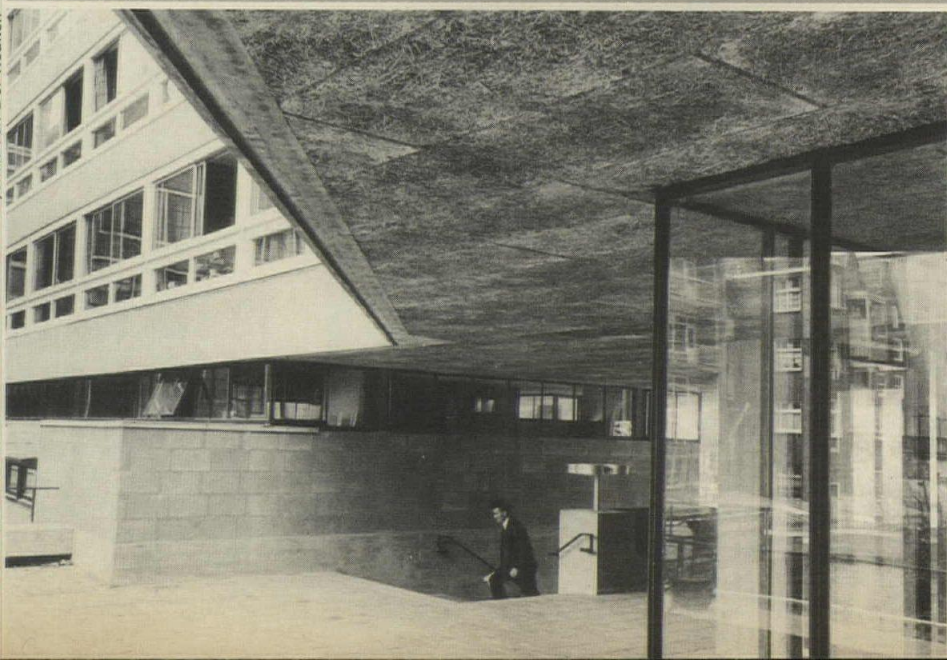
The student house in Amsterdam is unique in that it accommodates male and female students as well as students with families. Its numerous facilities serve the entire neighborhood.

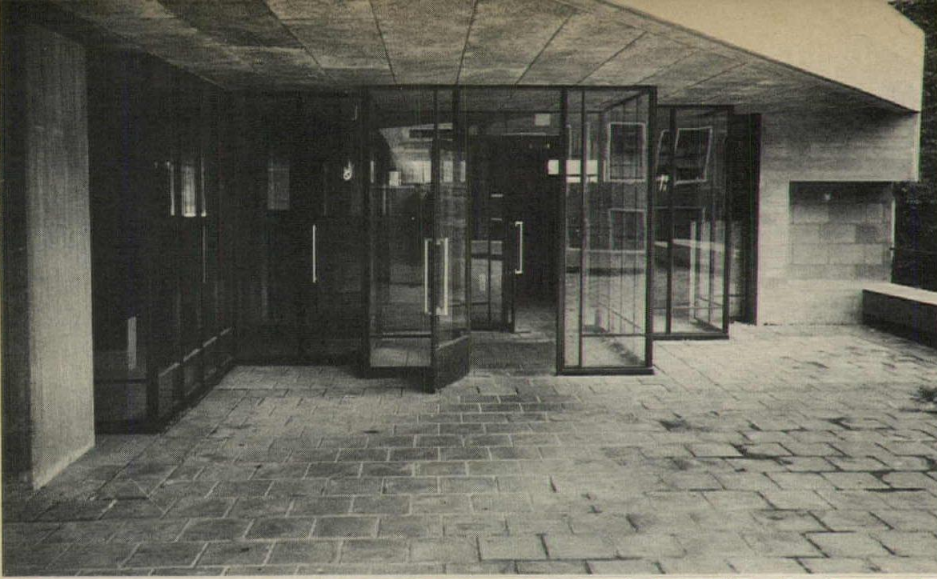
On the fourth story there is an open gallery—a “street in the air”. It is a public way and is used by all residents.



The building houses 250 students in living units of either 6 or 18 single rooms or in family apartments. Each unit has a large kitchen and dining area and may be thought of as self-contained dwellings, which, like separate houses, are serviced independently of the rest of the building.

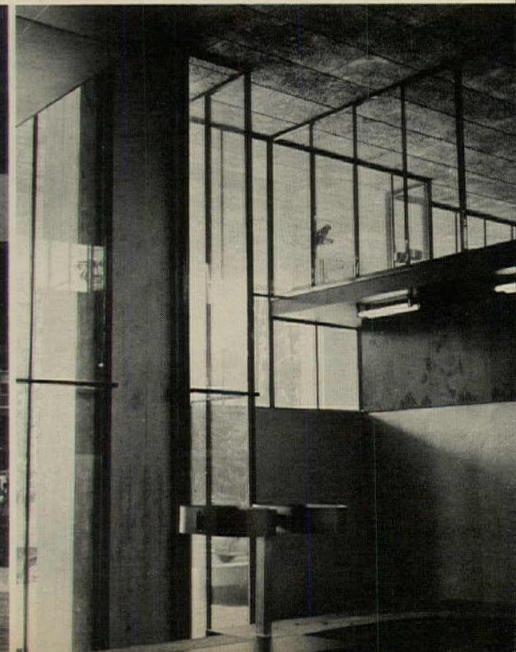
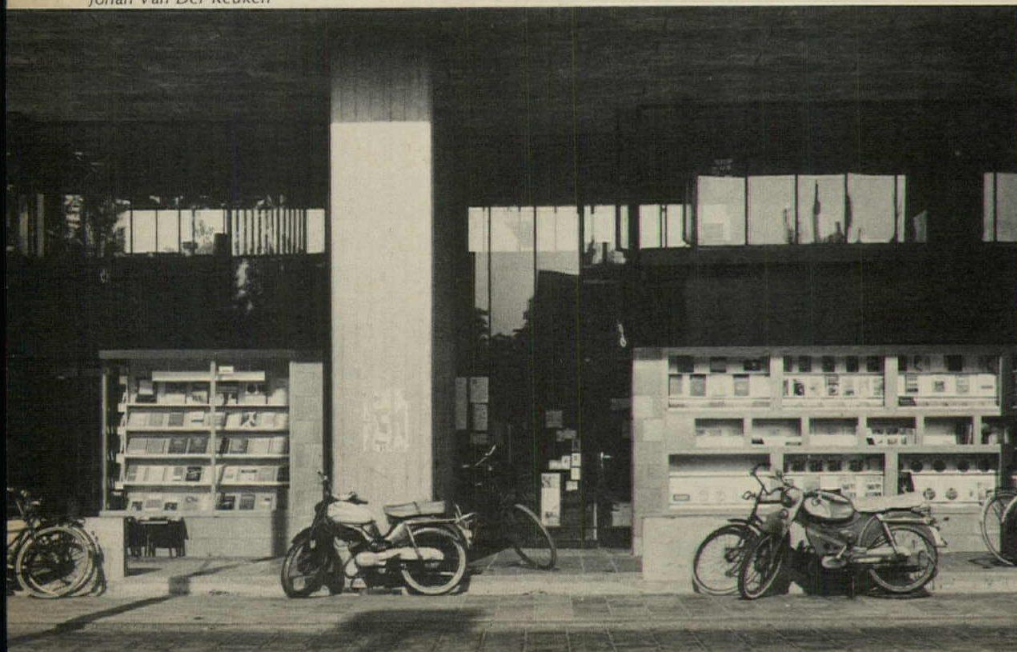
Hertzberger lays emphasis on the importance of public spaces; the passage from the street into the building was conceived as a continuation of the street and no clear delineation between “outside” and “inside” was intended. To Hertzberger, “where one enters in the literal sense, that is to say, the point at which the weather is shut-out, is of only secondary importance in a succession of places, each of which, like street corners, directs one on toward his destination.” Passage through the building is promoted without signposts as the succession of spaces is clearly articulated. “The





The typical Dutch paving block is used throughout the building, extending the street's texture into all public areas. The plaza (top) appears to be a familiar place and it continues inside.

Hertzberger is delighted by the treatment the building receives (below). Windows and walls are continually plastered with notices: the building's outer surfaces have become billboards announcing the interests of residents and neighbors.



significance of this articulation is that it removes any hard edge between the public and private zones: the street penetrates the building and conveys the *color* of the town to the inside."

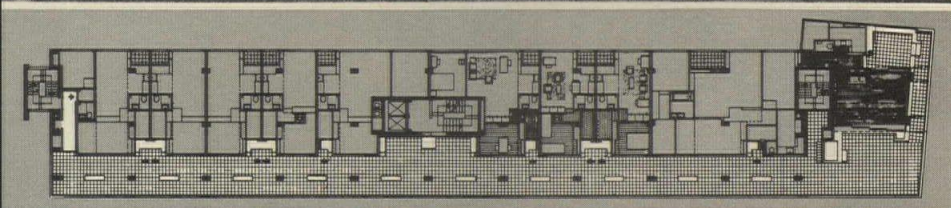
Ground floor of the building is for services which are directly or indirectly relevant to students. Apart from a restaurant there is the office of the Union of Amsterdam students, meeting rooms, bookshop, cafe-terrace and a central rooming agency for the whole town. These services, quite apart from the living areas, are accessible to the public and form a link, as it were, between the student house—in the narrow sense—and the town. The covered gallery on the fourth story is halfway between all residents. Its ostensible value is to give access into the apartments of the married students and the administrator. Need for the passageway was taken as an opportunity to make a prototype of a residential street without traffic: a street surrounded by the rooftops of Amsterdam; a street where children could play in safety; a street that could serve not just for circulation for those dwelling along it, but also as a realistic outdoor extension of everyone's living area; a street on which all could sit as in front of one's own house anywhere.

Streets today, occupied by cars, have become circulation canals. "For the people," says Hertzberger, "they have lost their original significance of being the large playground and living room for everyone as they always were and should become once again. The street is the place for action and communication: as a place, the street has tremendous potential for individual expression and together



ness—for everyone to be himself.”

Lighting for the gallery is provided by fixtures in the form of concrete blocks. These give a low, indirect light which doesn't hinder the view of the city at night. Nor as objects do they interfere with the view from the apartments along the gallery. The blocks have been “conditioned” in their form and placement for a diversity of uses. And in fact, they are used in diverse ways: as seats and worktables, and in good weather, even for outdoor dining. The blocks become a place of “adhesion” by which the specific character of the residential street is initiated. Design of the lighting blocks is an excellent example of Hertzberger's preoccupation with an “open-ended” interpretation of form. “The chance has to be taken wherever possible,” he says, “to increase the number of available uses of each thing. A form's yield can be increased without the need to do less than justice to its primary function. Therefore, a form must be capable of interpretation in the sense of being conditioned to play a changing role. It must be made in such a way, that the implications are posed beforehand as hidden



“Since such residential streets were first realized by architect Johannes Brinkmann in the Spangen Gallery (Rotterdam, 1921), many people have continued to work on this idea,” Hertzberger notes. “What I have built is no more than an experimental 65 meters of what should and could be commonplace in a modern town.”

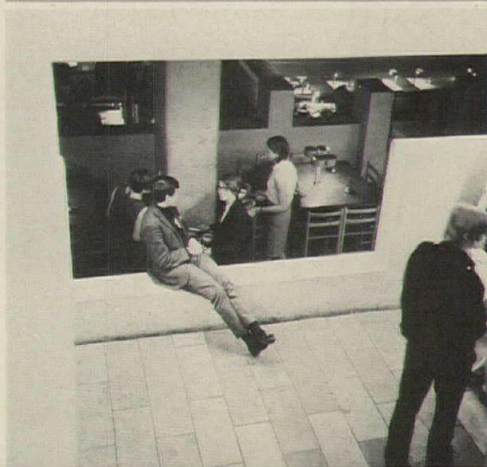
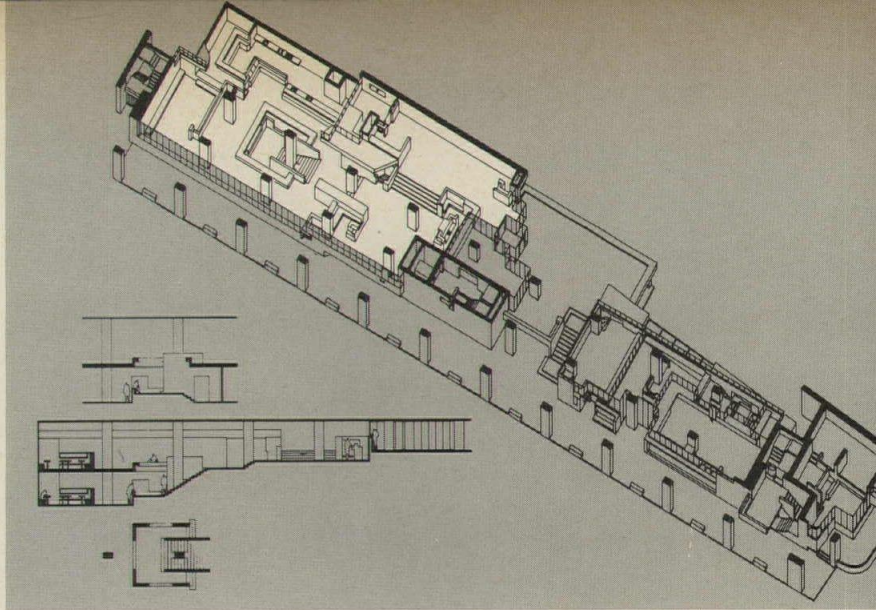
STUDENT QUARTERS, Weesperstraat, Amsterdam, Holland. Architect: *Herman Hertzberger*. Collaborating architects: *Ir. T. Hazenwinkel* and *Ir. H. A. Dicke*.



possibilities, evoked without being openly stated. Everything must be so formed that one can make it relevant to himself according to his own interests, and in this way it may contain separate, adequate implications for everyone."

"A student cafe implies not only eating, but also meeting people: an opportunity for communication. The dining areas have been arranged with an eye for a large degree of differentiation. The aim was to allow for a great variety of social intercourse on a free and informal basis. There are corners where one can eat alone or in groups of two, three, four, or eight. If one wishes solitude, there is a counter along the street wall where newspapers can be spread open or the street traffic may be observed while one dines.

The separation between the people upstairs and those downstairs is most pronounced at the point where the stairway links the two levels of the restaurant. To relieve this separation of abruptness, a landing has been introduced at such a height that in this mid-zone, people may converse with those on either level."

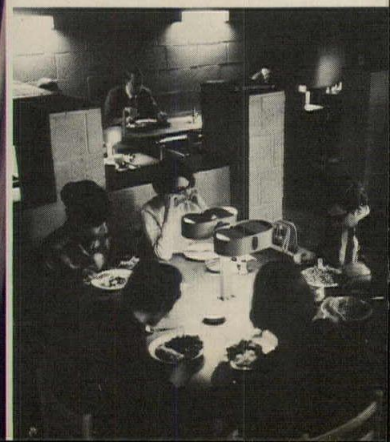


Hertzberger has made a kind of stage of the landing. "Here each person can appear in a variety of poses. Depending upon his own attitude he can freely decide the nature of his relation to others. In this process the architecture acts as a catalyst."

"Everything we make must be the catalyst to stimulate the individual to play the roles through which his identity will be enlarged. The aim of architecture is then to reach the situation where everyone's identity is optimal, and because user and thing affirm each other, make each other more itself, the problem is to find the right conditioning for



each thing. It is a question of the right dimensions, placing, heat, interval, the right articulation, that things and people offer each other. Form makes itself, and that is less a question of invention than of listening well to what person and thing want to be."



A small primary school in Delft allows for multiple interpretation of its spaces and forms, enhancing the vitality of the pupil's daily routine.

Johan Van Der Keuken

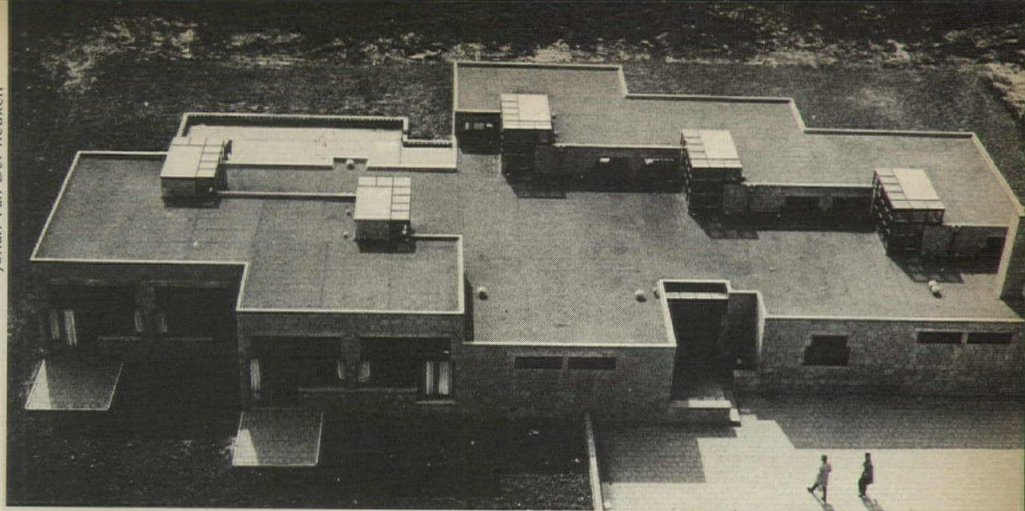
This school was designed to answer the specific demands of the Montessori teaching system in so far as was possible within the framework of the strict building regulations for primary schools in Holland. Each classroom is equipped as a complete unit and was considered as "a house in itself."

The working method of a Montessori school is not dominated as in traditional teaching methods by a fixed relationship between teacher and children, but exploits in principle a great variety of relationships of child to child, child to work, and child to teacher.

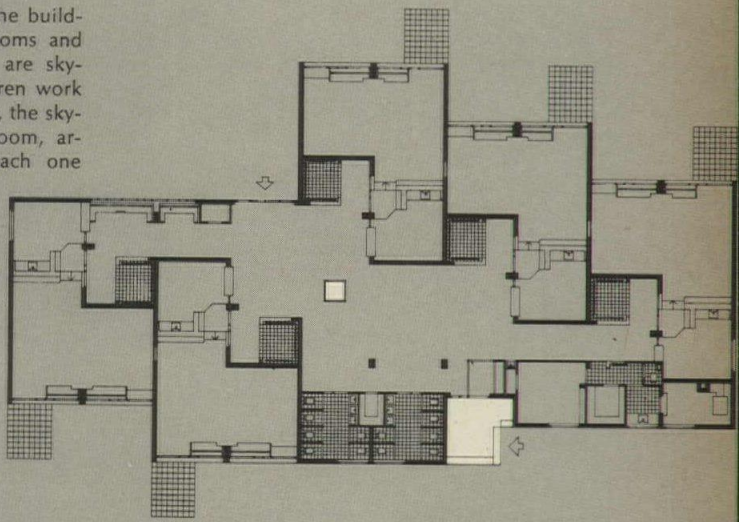
Essential to the system is the possibility for many different activities to take place simultaneously. In the traditional rectangular classroom this generally tends to create a somewhat chaotic situation in which one child is moving about while another is concentrated in work, so that to a certain extent every child is a potential disturbance to every other child. It is especially those children who have difficulty in concentrating, or those doing demanding work, who are at a disadvantage in the typical classroom.

In this plan, the form of the classroom has been modified into an L-shape and several floor levels have been introduced. By suiting the parts of the classroom to the various categories of activity—like the rooms of a house—one achieves a situation where the children disturb each other as little as possible. Those who have the most difficulty in concentrating can be given their place in the quietest corner; those doing arithmetic, that requires concentration, will not be distracted by children painting, modeling and sketching, who at that moment are free to talk.

In its most limited sense the school entrance is a doorway that is used only for a few short moments at the beginning and end of the school day. A sort of entrance porch has been made to accommodate the children before school begins to provide a place for them to wait for one another, or just to hang around after school hours. Hertzberger conceived of the porch



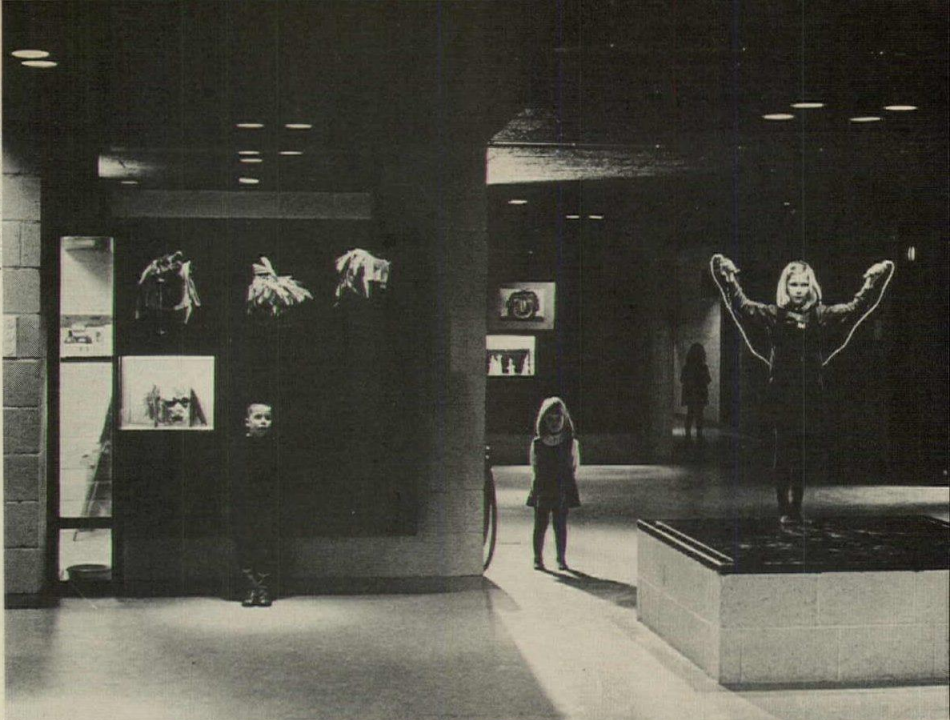
The most active plans in the building are where the classrooms and hall merge. These places are skylighted, for here the children work in the hall. On the exterior, the skylights identify each classroom, articulating the place of each one within the building.



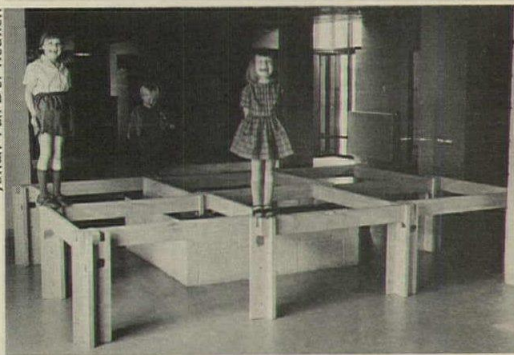
just as much as an outward extension of the hall inside as an "inward" extension of the playground. He says, "It is the in-between-area where one feels not yet within, but not entirely outside the building." The playground is a public area, part of the street. "Out of school hours, when the school is not open, neighborhood children are attracted to this place where they seem to feel at ease. It has become a meeting place quite out of context of being the doorstep of the school. At these times it appears to have a meaning of place unrelated to being a doorway. Formed by the walls that enclose it, it has an adhesive quality with the capacity to contain people."

The hall space is the "street" around which all classrooms and other units are grouped. Here the most important part of school life is centered. The hall is the big communal classroom; the complementary form and the extension of the classroom element. The stepped arrangement of the classrooms creates many corners where the children can work near their own homeroom.

Johan Van Der Keuken



Johan Van Der Keuken



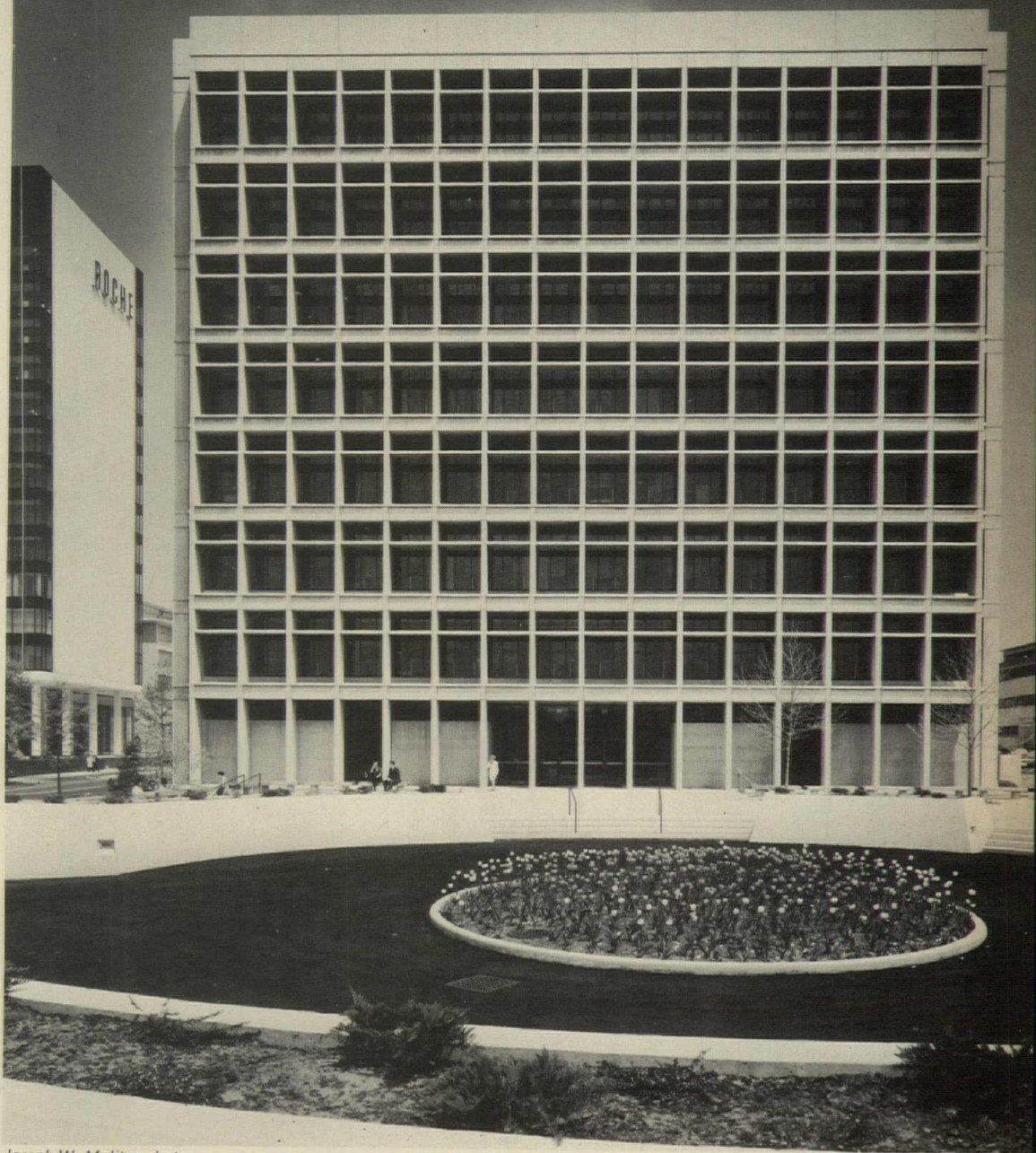
With its strongly articulated form, the hall can suitably contain the most diverse activities. Places are provided in the middle of the hall by a podium or in one of the many dark corners. In the hall specialized lessons in handwork, crafts, traffic instruction, music, etcetera take place, while at the same time other classes can continue to function normally.

The central point in the hall is the brick podium used for formal gatherings as well as for spontaneous expression. Upon inspection, the podium is revealed to contain wooden elements which the children can fit together to make a real stage. Curtains are rigged to an overhead track so that the stage and hall can be interpreted in numerous ways as a setting for theater.

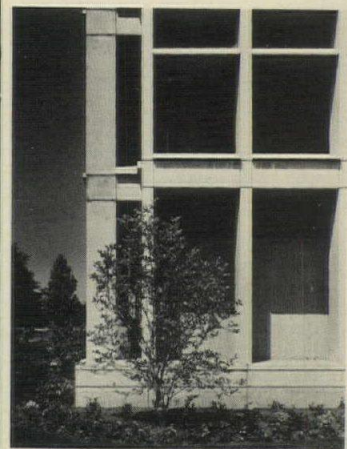
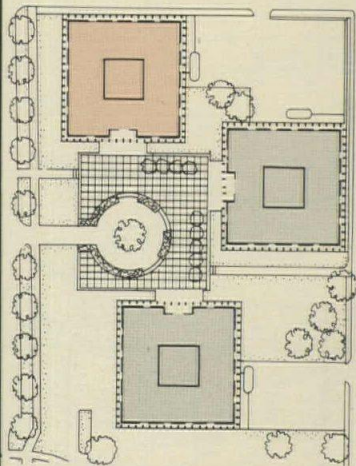
Says Hertzberger, "the children take the podium for granted. They use it to sit on, as a table, to stand on to make announcements, or just to become taller people. They play games around and on it. To them it is an island of which the floor is the sea. In every circumstance, this fixed point acts as a magnet towards which they are unintentionally drawn. It is a 'touchstone,' articulating the space, enlarging the scope of the hall's habitability."

MONTESSORI PRIMARY SCHOOL,
Delft. Architect: Herman Hertzberger





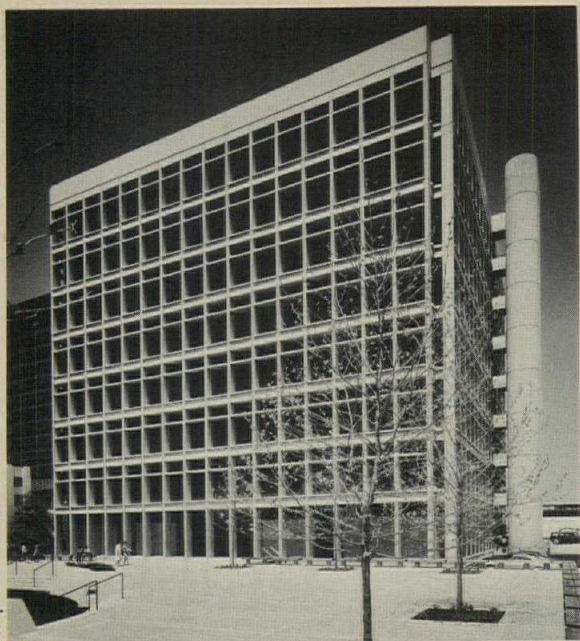
Joseph W. Molitor photos



Skillful planning and detailing gives real flexibility to an office building

The new Hoffmann-La Roche headquarters building, designed by architects Lundquist & Stonehill, is a response to the client's need for a building that would have great flexibility, provide amenities for all levels of employees, and which could be designed and built quickly and reasonably. The building is the first of three to be located around a central plaza. The solution meets the client's needs with great skill and sophistication, and is a very effective example of common building type too often handled without such meticulous attention to detailing.

Joseph W. Molitor

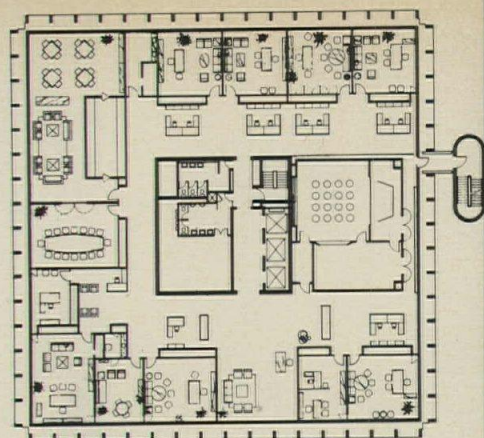


Robert Galbraith

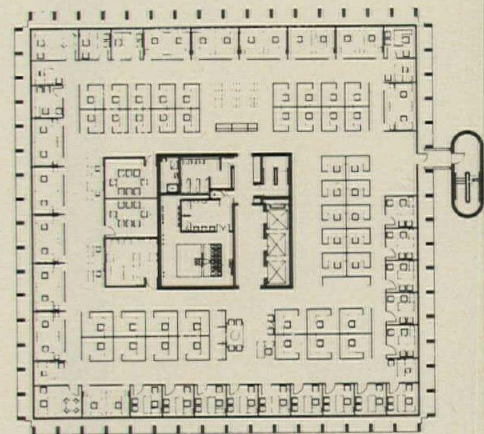


The structure of the building is strongly expressed by the 5-foot set-back of the bronze-tinted glass wall. Columns, spandrels and sunshades are poured-in-place, reinforced smooth-finish concrete, contrasting with the vertical board finish of the ground-level walls and the exposed stair tower. The spandrels form a walkway around the building. The concrete columns are set every 7½ feet reflecting the interior module of 2½ feet. The sunshades provide good protection, with the west wall being in total shade until 4 o'clock and the south wall receiving less than 40 per cent of sun at 2 p.m. on October 21.

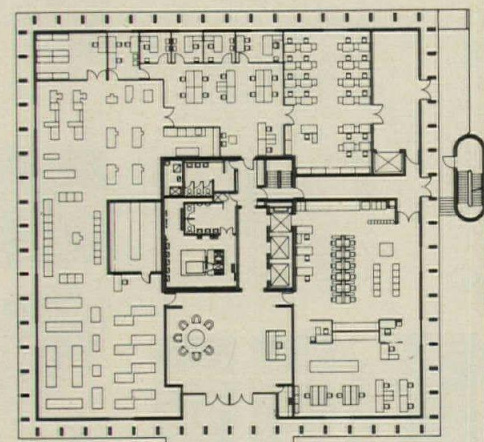
The stair tower was placed on the exterior not just for esthetic reasons, but for many functional reasons. Under local building code regulations, the second means of emergency exit also needs an adjoining air tower of 10- by 20-feet. If the second stair and its air tower were placed within the core, it would have disturbed the very low core/floor ratio of one to nine, as well as the efficiency of the core as a circulation point. The bold interior of the stair tower is shown in the construction photograph at left.



EXECUTIVE FLOOR



TYPICAL FLOOR



LOBBY

The painstakingly detailed design of this office building grew out of the client's need for complete flexibility. This need was interpreted by the architects and engineers by integrating the mechanical and electrical systems within the structural system. And flexibility in mechanical and electrical services has been achieved by development of a plug-in combination light and air supply or exhaust box which can be placed at random within a coffered ceiling, permitting concentration of light and air wherever it is needed. The coffered ceiling also serves as the anchor for a unique, custom-made clip-in partition system (see page 126). The result is a facility that can be easily adapted to the changing needs of the client.

Commensurate with the building's great flexibility is its provision of human amenities, as reflected in choice of materials and in meeting esthetic as well as functional requirements. The eight-story, square-plan building seems very warm in feeling for an all-concrete structure. The warm beige exterior concrete in two finishes—smooth by use of plastic-coated plywood forms for the columns and sunshades, and a rough, vertical board finish on the walls at ground level and on the exterior stair tower—relates in color to existing buildings on the site. The warmth of the exterior is enhanced by the use of bronze-tinted glass.

The architects took a more-than-functional approach to development of

the interior areas, with special consideration to choice of materials. The core-to-floor ratio is very low—one to nine—and this contributes to a sense of openness. This feeling is enhanced by ready proximity of any work place to the sheer glass wall behind the structural facade. The 10-foot clear ceiling height also contributes, with height added by the coffers.

Interior materials are simple and muted, being given added warmth by the use of incandescent light within the coffer-box system. The coffers cut off the light from 150-watt bulbs at an angle of 45 degrees. Interior finishes include exposed vertical board form concrete finish on the core, the oak wood, the matte black plastic accent and glass of the par-



Robert Galbraith

The interiors are spacious, comfortable, and carefully detailed. The executive office floor, above, has special features, but within the basic system. Special plaster partitions with white sand paint finish contrast with the rough concrete finish of the core wall. Photo of a typical office floor, right, shows the column-free space, the glass wall set within the structural framework, and one arrangement of the flexible air/light plug-in ceiling units. Below is the waiting area in lobby.

Robert Galbraith



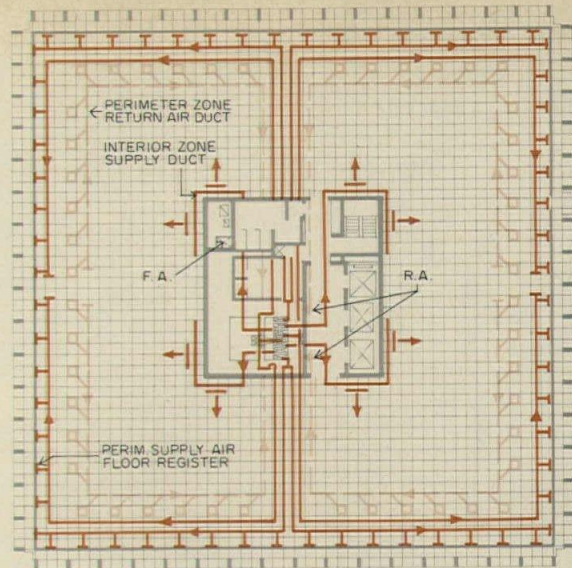
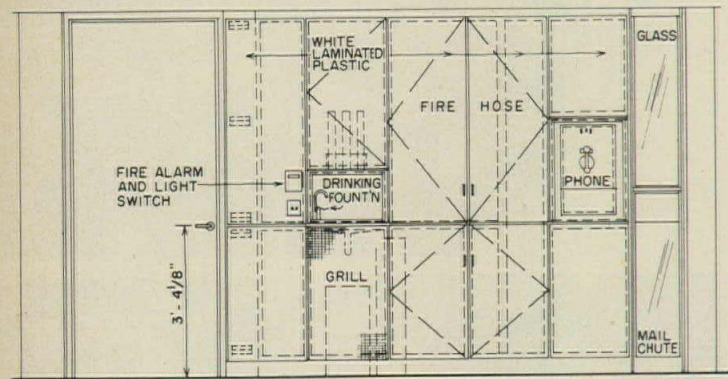
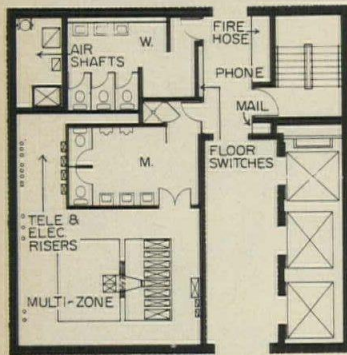
Joseph W. Molitor



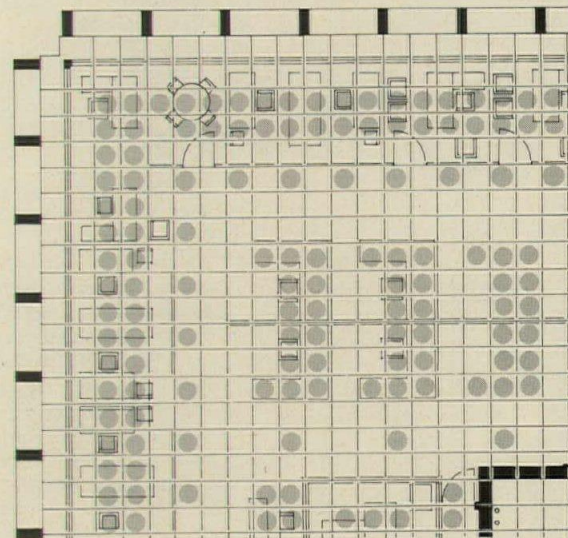
Robert Galbraith



The compact core occupies only 1,600 square feet (40- by 40-feet) of the usable 10,500 square feet per floor. With its 1-foot-thick concrete walls, it serves as a shear wall to provide lateral bracing for the structure. The thick walls also serve as a shield from the noise of the mechanical equipment located on each floor. The sub-lobby contains all required service components. The initial population of the building is 520, with an increase to 680 projected by 1975. Core facilities and elevators are adequate to serve 1,000 workers. The core was designed with two penetrations, a major and a minor one, for efficiency of movement within the building. The 3/4-inch rough board vertical texture with tie holes exposed on the surface of the core walls, serves as a textural foil to other interior materials. The east elevation of the stair lobby, below, shows handling of phone, mail chute, emergency equipment and water fountain.



The air distribution diagram, above, shows the horizontal arrangement of supply and exhaust sources within the plenum created by the raised floor. Each floor operates independently, with great flexibility of arrangement possible. Below is a possible lighting arrangement with lighted coffers creating bright pools (approximately 90 footcandles) over work areas, with lower level illumination for circulation areas.



tion system, and carpeting throughout.

Structurally, the building has a 40-by 40-foot core with 1-foot thick shear walls that give lateral bracing to the structure. The exterior wall, set 5 feet out from a floor-to-ceiling glass wall, is a grid of 10- by 30-inch columns interconnected by sunshades and spandrels. The columns are set every 7 1/2 feet to reinforce the interior planning module of 2 1/2 feet. The spandrels form a walk around each floor, preventing any sense of acrophobia from the glass walls and allowing easy maintenance. Between core and exterior are 40-foot clear spans of waffle-slab concrete, creating the coffered ceiling.

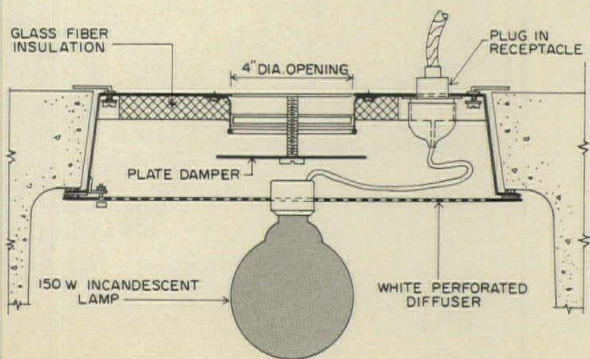
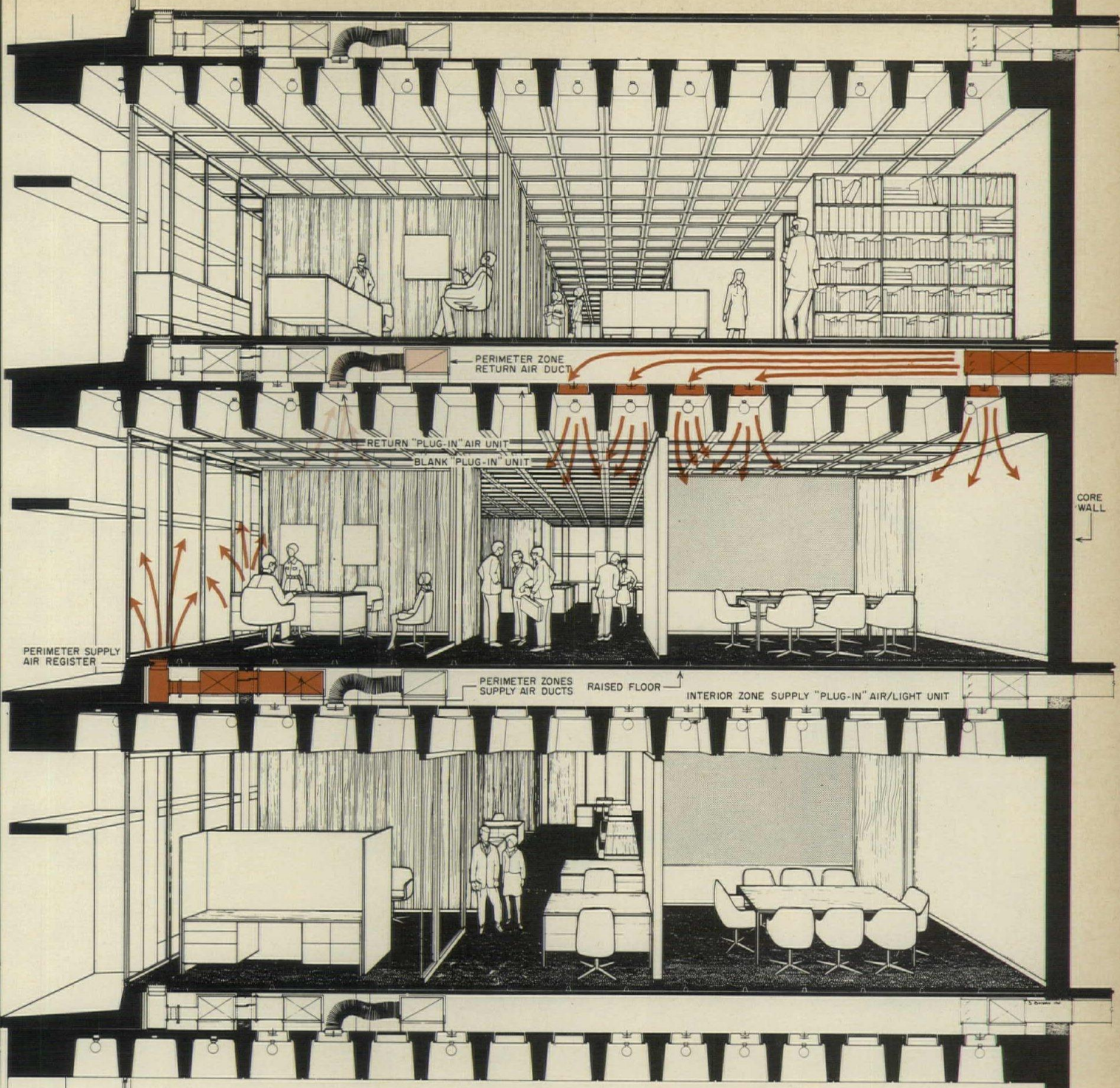
The mechanical and electrical systems operate independently on each

floor, permitting separate floors to be open in off hours and infinite flexibility on each floor. These systems are supplied and controlled from mechanical and electrical equipment shielded from noise within the thick core walls.

For interior areas there are metal air/light boxes which can be plugged into any coffer, serving as supply units for the interior and supply or exhaust on the perimeters. Each floor is raised above the coffered ceiling, forming an air plenum for electrical and communications wiring and ducts. Floor air outlets, set every 7 1/2 feet between the structural bays, provide conditioned air for perimeter zones.

Speed of construction and budget were also factors in planning the building.

The building contains a total of 150,000 square feet and cost \$4.8 million, making the cost per square foot \$32 including lighting and basic air-distribution system, but not including the following: special air-conditioning requirements and tenant work on the executive floor, special installations in the computer area, full television studio in the basement, and underground energy center. The project was completed from design concept to finish in 26 months. Contributing to the fast construction were the hiring of a contractor on a cost-plus basis, separation of mechanical and electrical components from the structural system, and use of rapid construction systems such as the partitions and light/air boxes.

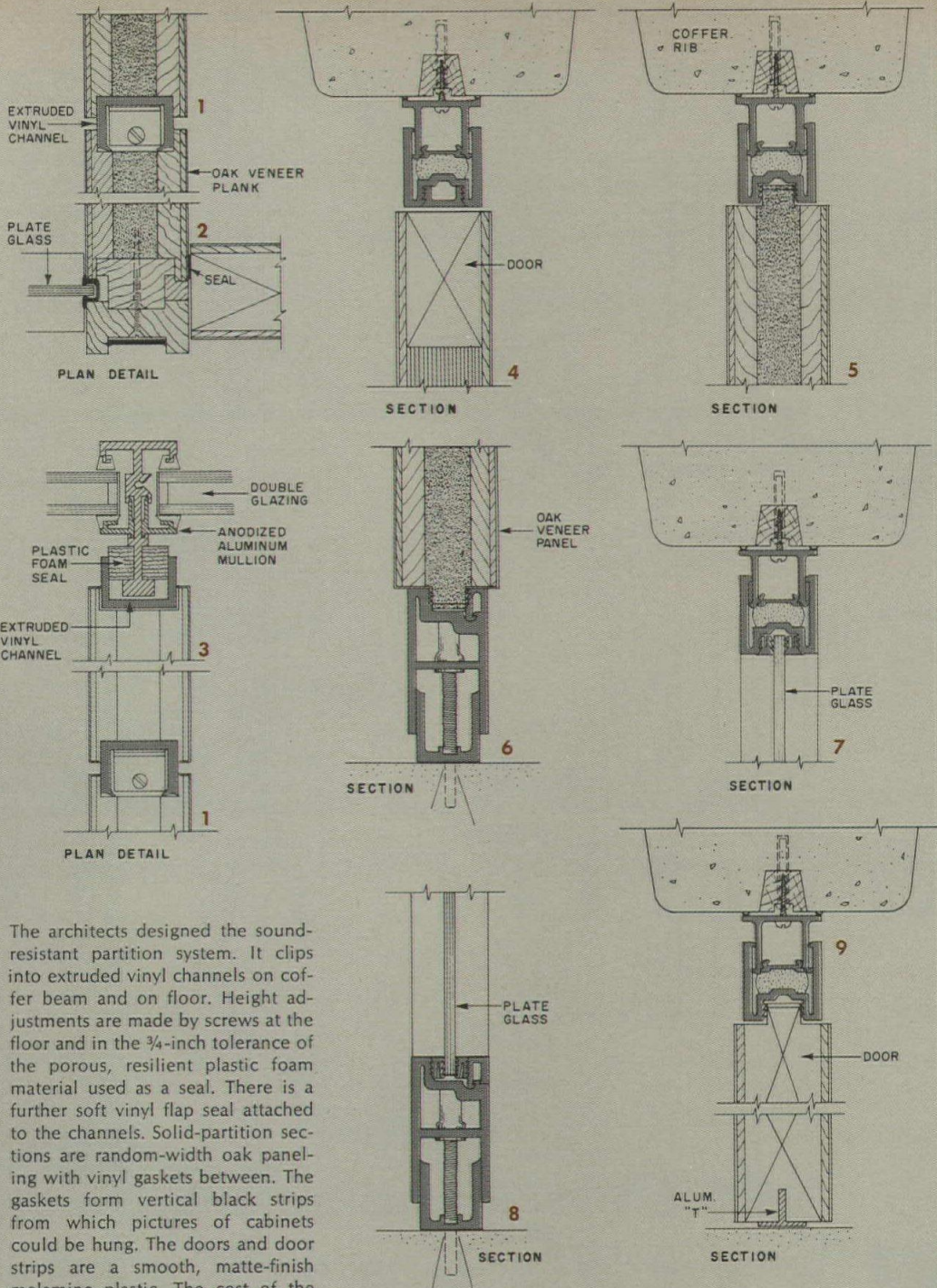
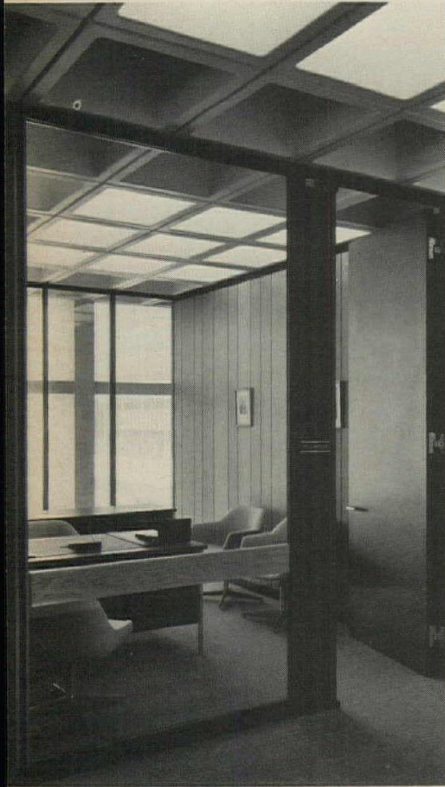


The air/light plug-in units are the key to flexibility in lighting and mechanical systems. The lighting fixtures are, in most areas incandescent; with a finely perforated plate to diffuse the air. The plate hinges to a metal air box with its simple adjustable supply valve, and can be inserted in every coffer. The 18-inch-deep coffers provide a 45-degree cut-off for the 150-watt bulbs. Incandescent lighting was chosen because of its warm color.

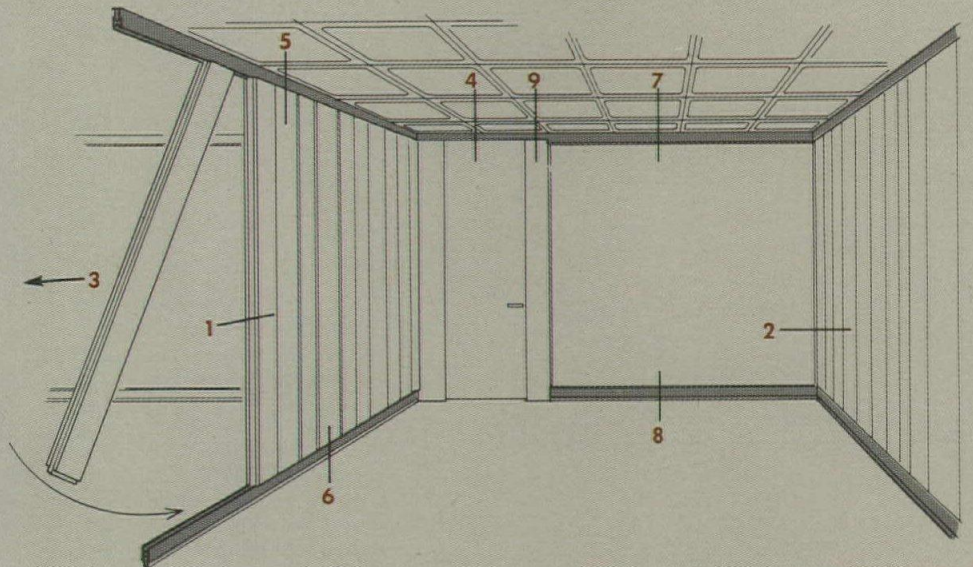
Joseph W. Molitor



Joseph W. Molitor



The architects designed the sound-resistant partition system. It clips into extruded vinyl channels on coffer beam and on floor. Height adjustments are made by screws at the floor and in the 3/4-inch tolerance of the porous, resilient plastic foam material used as a seal. There is a further soft vinyl flap seal attached to the channels. Solid-partition sections are random-width oak paneling with vinyl gaskets between. The gaskets form vertical black strips from which pictures of cabinets could be hung. The doors and door strips are a smooth, matte-finish melamine plastic. The cost of the system was \$50 per lineal foot.



ADMINISTRATION BUILDING, Nutley, New Jersey. Owner: Hoffman-LaRoche. Architects: Lundquist & Stonehill—Oliver Lundquist, partner, John Jay Stonehill, partner, Bryant Conant, project associate; structural engineer: Goldreich, Page & Thropp; mechanical engineer: Abrams & Moses; electrical engineer: Gustave P. Weiser; acoustical consultant: Ranger Farrell; furnishings consultant to owner: Joseph Whited; mechanical contractor: F. W. McBride; electrical contractor: Eastern States Electrical Contractors; general contractor: W. J. Barney Company.

GLASS BOX AND BLACK BOX

OR

Can artificial intelligence help solve design problems?

by Jonathan Barnett

Architects are known to be rather superstitious about their ability to design. They have learned how to make successful design decisions through experience; and they seem to prefer not to analyze exactly how they go about their work.

In other fields that make use of intuitive judgment, however, such as military strategy, or marketing analysis, or structural engineering, there has been a constant effort to make the decision-making process as rational and explicit as possible.

About five or six years ago it began to be apparent that some of the research done in these other areas could be applied to architectural problems, although few of the existing techniques were transferable as they stood, and the practice of architecture would have to change if these new methods were to be accepted and put to use.

Researchers interested in architectural design methodology began meeting around the fringes of conferences devoted to engineering research and computer technology. Now, at last, this subject has attained the status of a conference of its own. It was held at M.I.T. in early June, under the auspices of the Design Methods Group, a low-key organization that seems to include a high proportion of the researchers doing this kind of work. The conference, sponsored by such eminent organizations as the Boston Architectural Center and the departments of architecture at Harvard and M.I.T., maintained an impressively high level throughout and provided encouraging evidence that design methodology is becoming both more sophisticated and more practical.

Before describing the conference further, however, it might be worthwhile to summarize some of the earlier work that forms the context for investigations taking place at the present time.

It is possible to divide the research being done on design methods into two basic approaches. The first makes the assumption that the design process needs to be given an entirely new structure, based on highly refined analytic techniques and elaborate evaluation procedures. The other takes a completely opposite direction and assumes that the mental processes behind design are not really susceptible to rational analysis. In-

stead, these researchers propose to leave the designer to follow the same processes he uses now, but to place at his disposal a whole array of highly sophisticated techniques which will allow him to refine and rationalize his work as he goes along.

J. Christopher Jones of the University of Manchester one of the speakers at the Design Methods Group Conference, characterized these two views of the same problem as the "glass box" and "black box" approaches. Jones's glass box includes all of those who assume that design is exclusively a problem-solving process and consider that design problems today are too complex to be solved by traditional intuitive methods. Such people are highly critical of the design of established building types and components, because they feel that significant architectural problems are remaining unsolved.

Glass box techniques, more conventionally referred to as problem structuring, tend to make use of some relatively complex mathematics; but past results have often proved quite simple-minded, because systems analysts and operations researchers had seriously underestimated the complexity of the problems which the architect was trying to solve.

A pioneering work that recognized the true difficulty of rationalizing architectural design was Christopher Alexander's "Notes on the Synthesis of Form," which he summarized in an article for ARCHITECTURAL RECORD, April 1965. Alexander's research, which continues to be very influential, turned out to be not so much a workable design method as a formulation which set down the need for a whole series of procedures that had not yet been invented.

Much of the subject matter of this first Design Methods Group conference seemed to be concerned with making corrections to Alexander's theories, or filling in areas that he had left blank.

The "black box" approach, while it accepts the design process in its present form, also implies that designers are failing to solve today's problems. The proposed remedy is to provide the designer with new resources, making it possible for him to ask and answer difficult questions while he is thinking through a problem. Most of the advances in com-

puter graphics have been directed to this end. In computer graphics systems the vast calculating ability of the computer is harnessed to a method of drawing, typically with a "light pen" on the face of a cathode ray tube. By this means, the hand holding the light pen can—without any understanding of computer programming—receive answers to all kinds of complex questions that only a computer could answer in such a short space of time. In addition, the computer can make complicated drawings, capable of infinite variation, which would be well beyond anyone's capacity to do by hand.

Some of the most articulate descriptions of the potential effect of computer graphics on environmental design have been given by Professor Stephen Coons of M.I.T., and much of the basic research for computer graphics—notably by Ivan Sutherland and Timothy Johnson—has been done at M.I.T. Some of this basic research was described in ARCHITECTURAL RECORD, January and October 1965.

The most spectacular example of blackboxmanship shown at the Design Methods Group conference was demonstrated by Nicholas Negroponte, a member of M.I.T.'s architecture faculty. His computer graphic program, called URBAN 5, provides a sophisticated and flexible format which actually adjusts to the idiosyncracies of an individual designer. Films, shown with three projectors, documented a novice's first encounter with URBAN 5, which is programmed to make kindly comments like: "I'm afraid you have a conflict here, Ted," (the user types in his name when he sits down at the console) or "Ted, how long are you going to postpone resolving this conflict?"

The aim of the program is to permit the designer to sketch as freely with his "light pen" as he would with a soft pencil, to pursue trains of thought as they occur to him, back-track, change his mind, or start all over again. At the same time, the computer's capabilities are constantly at work, providing sections at different points, perspectives at various angles, numerical information, and so on.

URBAN 5's major defect at this point is that it requires the full attention of a very expensive computer. The next

step will be the production of a smaller, prototype computer that is designed to offer only the capabilities required for this kind of program.

Another presentation described a program of a somewhat analogous type, called DISCOURSE, which does not attempt to be as elaborate or as all-inclusive as URBAN 5 ultimately aims to be, but seeks to provide a convenient means for presenting data in graphic form to an urban designer working on a city planning problem.

The Conference workshops also heard reports on the progress of a group of computer programs called ICES (for Integrated Civil Engineering Systems) which allows a wide range of engineering problems to be solved using a consistent programming language and methodology, and also a report on improved methods of describing three-dimensional spaces to the computer. This ICES research has the potential of being related to computer graphic techniques, although this has actually been done only in a few experimental cases.

The great majority of papers presented, however, belonged to the "glass box" category, and represented research growing out of Christopher Alexander's formulations although Alexander himself was not present.

Alexander's approach makes the designer begin by drawing up a comprehensive list of the requirements that must be solved by a design, and the relationships that exist between them. As it is clearly not possible to make a truly exhaustive list each time an architect designs an individual building, Alexander suggested that this research be done for whole categories of building uses. Each of the requirements would be given equal weight, and the lists of requirements and relationships would then be broken down by a computer program—devised by Christopher Alexander and Marvin Manheim—into individual subgroups of requirements that would be as closely related to each other as possible, and as separate as possible from other subgroups. The various subgroups would also be arranged by the computer into a hierarchy of importance. The designer is then supposed to start at the bottom of the hierarchy, solving each cluster as a separate design problem, until he has built up a design that responds to all the original requirements.

By this comprehensive approach Alexander sought to insure that significant parts of the problem would not be overlooked, or be overridden by stereotyped design concepts. His ideas have evolved substantially in the last few years, however, and he is now devoting most of his attention to analyzing rela-

tionships between various kinds of requirements, and the patterns that result from them (see RECORD, September 1966). Alexander's absence from the Design Methods Group conference seemed to indicate his dissatisfaction with some aspects of his earlier work. At the same time, these early ideas cannot be put aside simply because they may be criticized and modified.

One such modification was offered by Marvin Manheim of M.I.T., who pointed out in a paper at this conference that it has not proved possible to make a definitive list of requirements in advance of a design analysis, because some of the requirements were inevitably going to be uncovered while the design was in progress. He concluded that it is therefore necessary to be able to reformulate the problem continuously. This point was made by several other conference participants, including Christopher Jones, who put it rather more flippantly when he said it was wrong to try to turn a vicious circle into a straight line.

Another type of modification to Alexander's hypotheses was suggested by Charles Davis of the University of Kentucky, who pointed out that the requirements for buildings were seldom of equal importance. Alexander was more concerned not to leave anything out, and felt that decisions about relative significance could be made during the design process, when the designer came to solve the individual clusters of requirements that had been separated and defined by the computer program. He therefore did not propose a method of weighting the importance of individual requirements during the computer analysis.

Davis suggested that significant requirements could be identified by their degree of inter-connection with other requirements: the greater the intensity of relationships, the more significant the requirement must be. It was not possible to tell from the presentation whether Davis's computer program would accomplish this kind of discrimination, but it certainly represented an important line of inquiry.

In another workshop, Murray Milne of Yale's architecture faculty described an improved computer program for accomplishing Alexander's hierarchical sorting process, which apparently eliminates some of the persistent problems found in earlier computer programs of this type, where results had to be laboriously touched up by hand.

Yet another type of research that is related to Alexander's work is design evaluation. Two closely reasoned, and closely related, papers by L. Bruce Archer

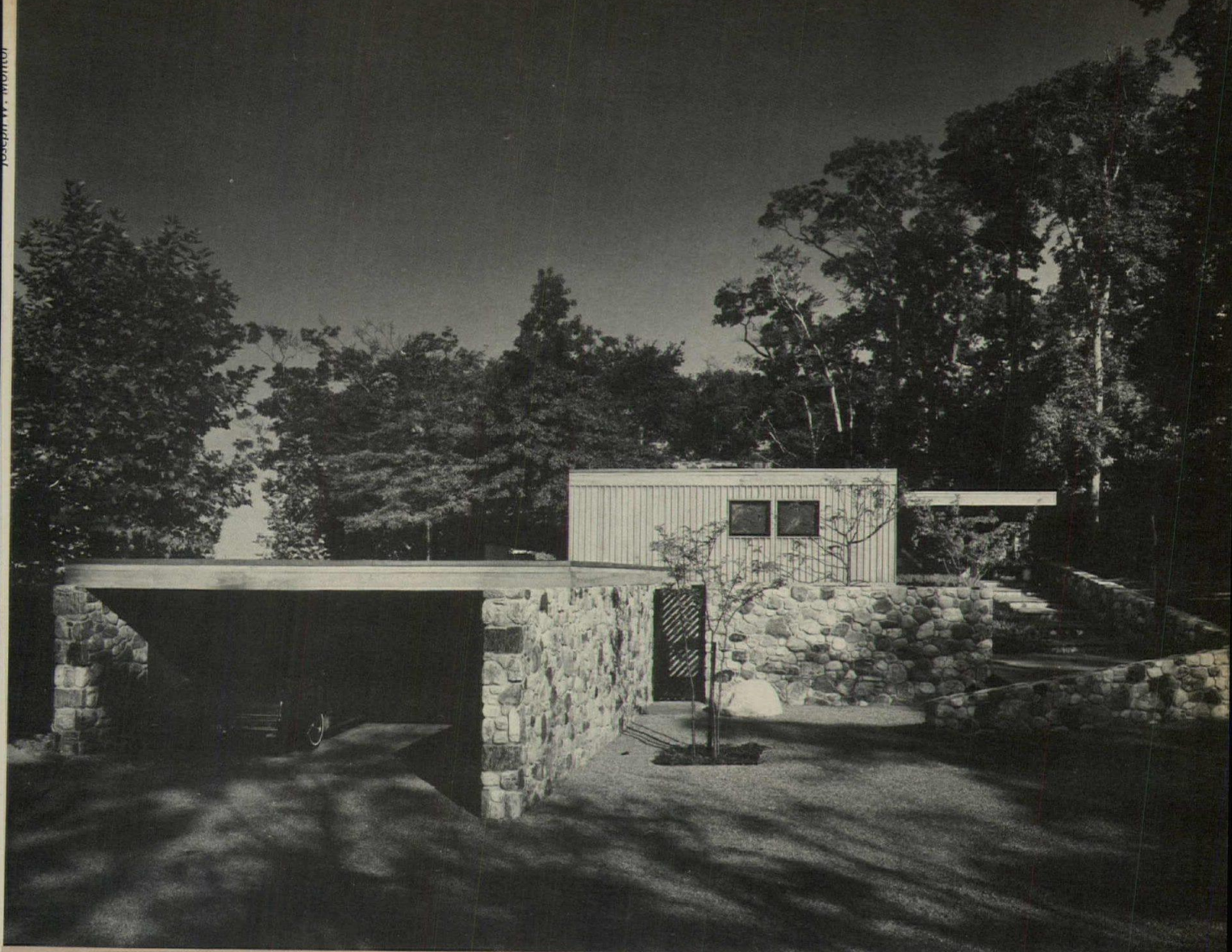
of London's Royal College of Art and Horst Rittel of the University of California defined methods of deciding which of several design decisions was the best, and, in a group of inter-connected design variables, which combination of relative successes and failures provided the best over-all solution. Alexander dealt with this question by assuming that either a design met a requirement or it did not; but, to an outside observer who is able to discount the technical problems involved, this kind of more elaborate design evaluation does not seem fundamentally incompatible with Alexander's original approach.

Of course, not all papers at the Design Methods Group conference fell neatly into a category. There were a few papers (of the kind that used to be so annoyingly common at conferences on computer technology) that assumed that a program which could solve floor plan layout problems represented a design methodology. In general, however, the conference revealed that there is now a significant group of people, many of them still in their 20's, who possess a sufficient knowledge of both architecture and of the mathematics needed to work with computers that they can deal intelligently with either one. When the proceedings of the conference are published, the reader will discover much interesting material that could not be covered in an article of this kind.

The one area in which sophisticated understanding seemed to be somewhat deficient was in the field of psychology. Quite a bit of research seems to be going on that involves observing the design process in action, and to do this successfully would seem to require a greater knowledge of the pitfalls and vexed questions of psychology than the average Design Methods Group member has at present. Observing the design process is important because it is clear that the incomprehensible black box of man's own intelligence is still much more efficient in dealing with complex inter-relationships than the rationalized version of mental processes that can be programmed on a computer—no matter how impressively the computer can perform individual calculations. So far, many of the new design methods do not meet Christopher Jones's simple test: "the cost of not knowing should exceed the cost of finding out."

Nevertheless, computer technology applied to design problems in a subtle way, plus more rigorous methods of using the intricate design abilities of the human mind, seem to this observer to be a formidable combination. Architects would be well advised to keep an eye on the Design Methods Group.

PHOTOGRAPH BY MICHAEL



NEW HOUSE FROM OLD



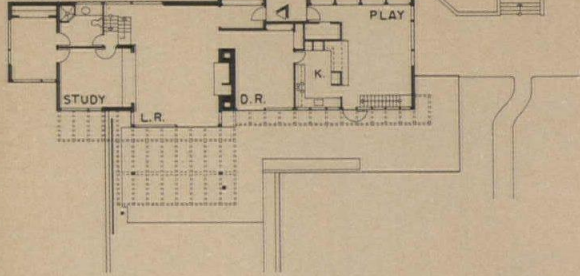
A problem perhaps more difficult than designing a new house is altering an existing one extensively enough to give it a new character. Here, the house that was (photos in sepia on this and following page) bears little resemblance to Herbert Beckhard's handsome altered version (photo above).

By adding a new garage and a walled courtyard, the architect increased the house's horizontal attitude and left the old garage space free for conversion to a playroom. The warm colors of the stone in the garage and courtyard walls complement the rough-cut cypress siding which was applied over the previous concrete block exterior. Richness of materials and texture, coupled with the general crispness of the design—achieved by removing the roof overhang, changing the fenestration, redefining the entrance, and reducing the size of the pergola at the rear of the house (see next page)—has resulted in an elegant updated house.

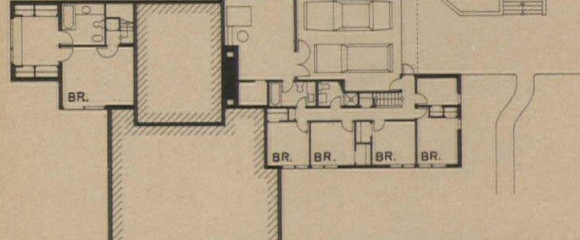
Inside, some shifting of walls has created larger bedrooms, and a new entrance hall and dining area. More efficient use of space was obtained by moving the staircase. Most interior surfacing materials were replaced, giving the house a totally new look both inside and out.

The terraced landscaping at the rear of the house was lowered to the level of the first floor, which gives indoor-outdoor access to the bedrooms facing out onto Long Island Sound and the New York skyline.

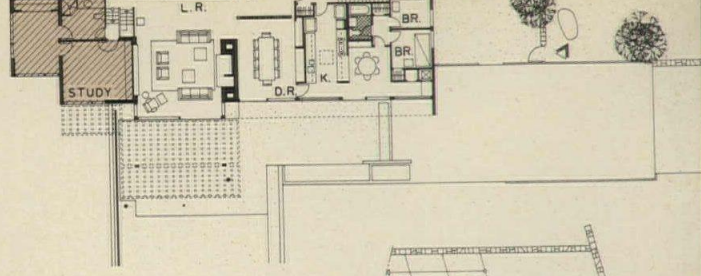
UPPER LEVEL (BEFORE)



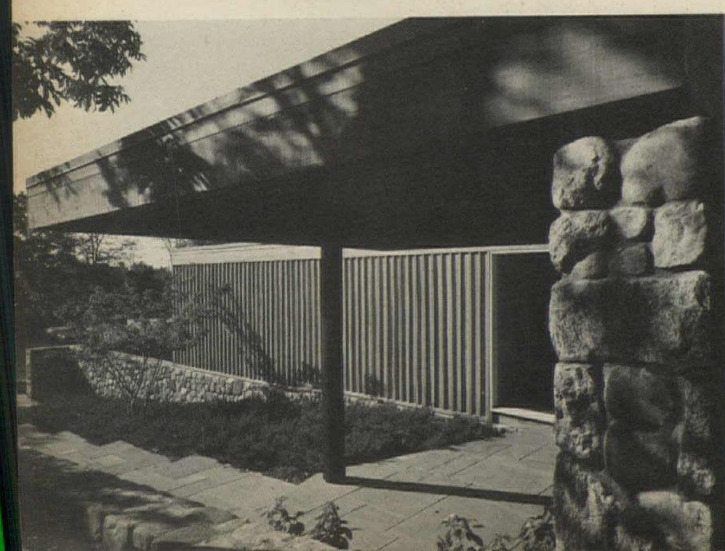
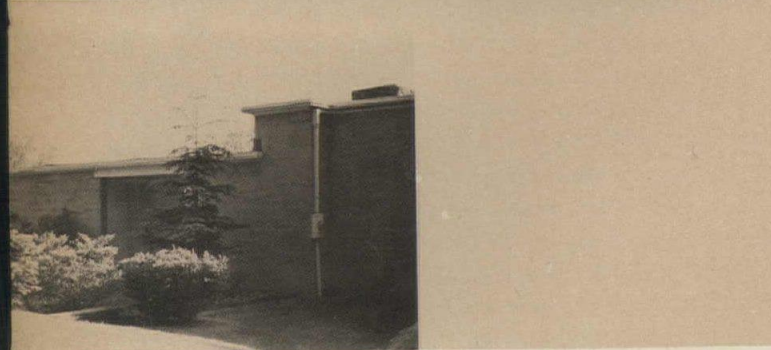
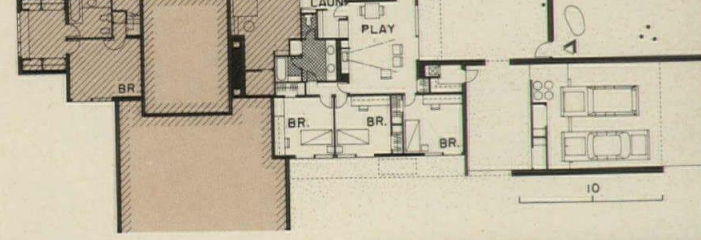
LOWER LEVEL (BEFORE)



UPPER LEVEL



LOWER LEVEL



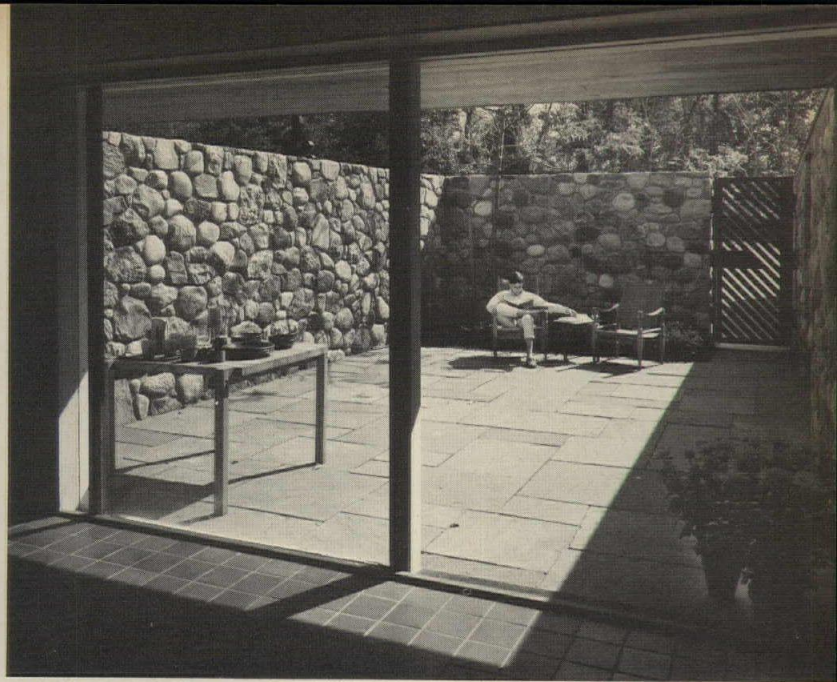
A comparison of the old and the new plans shows how much more open the Beckhard design is. By moving the staircase out of the center of the house, three large bedrooms were made out of what were previously a maid's room, three small bedrooms and the staircase and hall. The shaded area on the new plan represents the unaltered portion of the house.

What had been a rather undefined entrance is now an attractive covered area approached by a long rise of stairs bordered by a low stone wall (see photos lower left). Facing onto the swimming pool, the bedrooms can also be used as changing rooms for swimmers.

The new walled courtyard (photo upper right) is a pleasant space which can be reached either through the children's playroom or the passageway—the shadowed area in photos top center and far right.



KREIZEL HOUSE, LONG ISLAND, NEW YORK
ARCHITECTS: HERBERT BECKHARD with
STANLEY ABERCROMBIE and DONALD CROMLEY
CONTRACTOR: EILART FRERICHS



Joseph W. Molitor photos

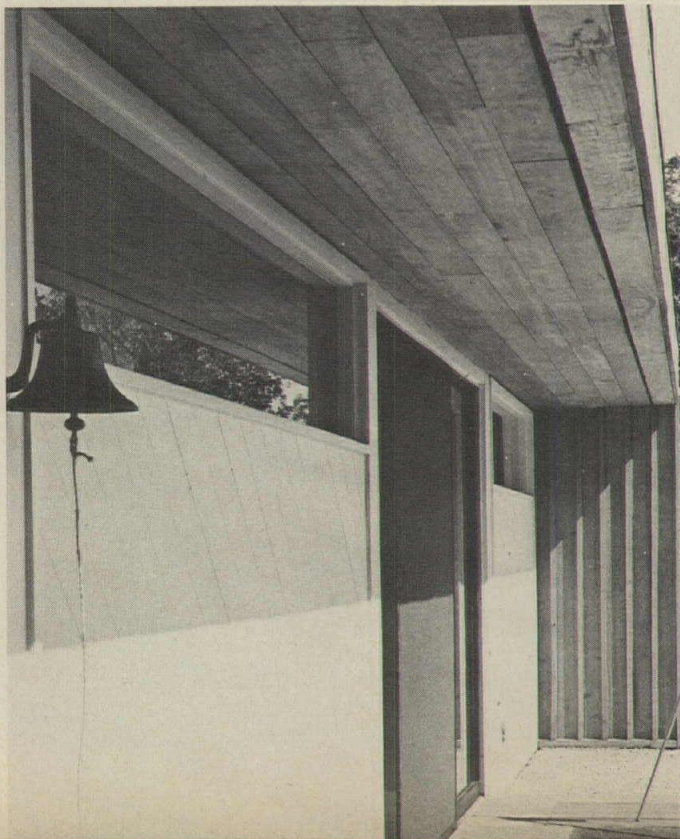
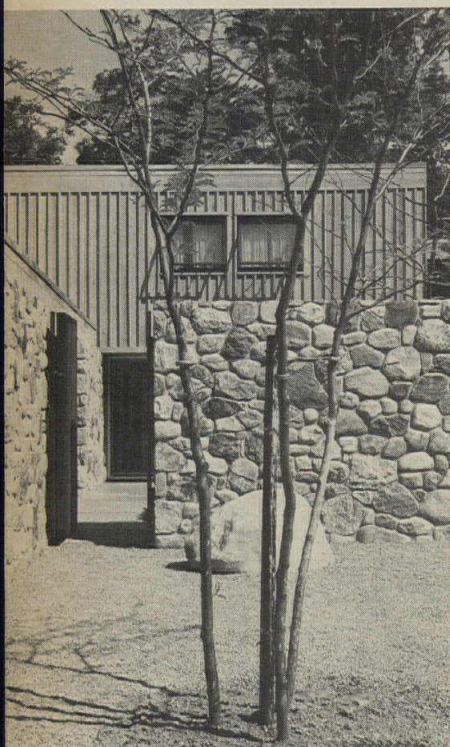
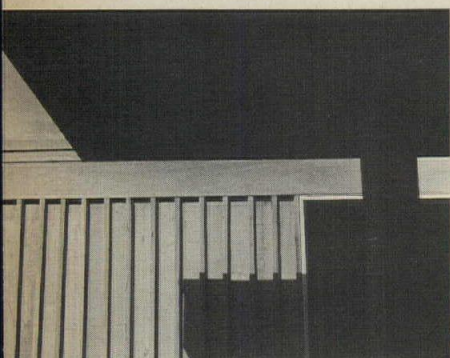




Joseph W. Molitor

Texture and detailing are important aspects of this design. Battens used over the cypress siding create a three-dimensional shadow-texture which is repeated inside onto the wall separating entrance.

The random patterns on the stone walls contrast with the more rigid linear forms of the battens, the nicely detailed windows, and the house itself. The photo at left shows the hooded entrance. Below is a detail of the west facade.



Herbert Beckhard photos

HOTELS

MOTOR HOTELS

RESORT HOTELS

The basic function of the hotel has always been to provide the traveler with a place to rest his head and with food to maintain his strength. There seems little doubt that this will continue to be a primary function of the hotel. But not its only function. For the provision of lodging must also include the automobile, an indication of how travel methods have changed. The traveler can go further in less time—and he does, to remote places by air as well as by car. As transportation has changed, so has the hotel, but much more slowly, almost reluctantly, despite the urgency of its economic situation. But economics, the labor market, and the patterns of travel today are making such simultaneous impact on the hotel business that its operation and its physical planning are of necessity effecting changes. The automobile, the rise of convention business and the increasing degree of self-service are the three most important influences on in-city hotel planning and design today. The automobile generated the motel, the motel's popularity generated the more sophisticated motor hotel, and the convenience of the motor hotel for the increasingly numerous travelers-by-car pushed it further and further toward the heart of the city, where it now can—and sometimes does—rival the older hotel in dignity. Accessory to the convention business is the development of the jet plane, since it has opened up to this business many smaller and medium-sized cities previously by-passed because of their transportation condition. To attract conventions, older hotels are being remodeled and added onto, and new hotels are being built with large public facilities for meetings, banquets and exhibitions. The jet has spurred development of another type of business also, and its super versions will further extend this business: the resort hotel, thanks to the jet, has moved from near centers of population to remote locations, and even to other continents. Perhaps most revolutionary of all, however, is the trend toward self-service in all kinds of hotels, a trend which challenges the architect as much as the hotel manager. It is clear that this time of change for the hotel world is a time of opportunity for the architect. On the following pages, some of today's outstanding hotel architects discuss the changes, the potentials, the problems and the requirements of designing for today's—and tomorrow's hotel.

—Elizabeth Kendall Thompson

NEW FORCES AT WORK ON THE IN-CITY HOTEL

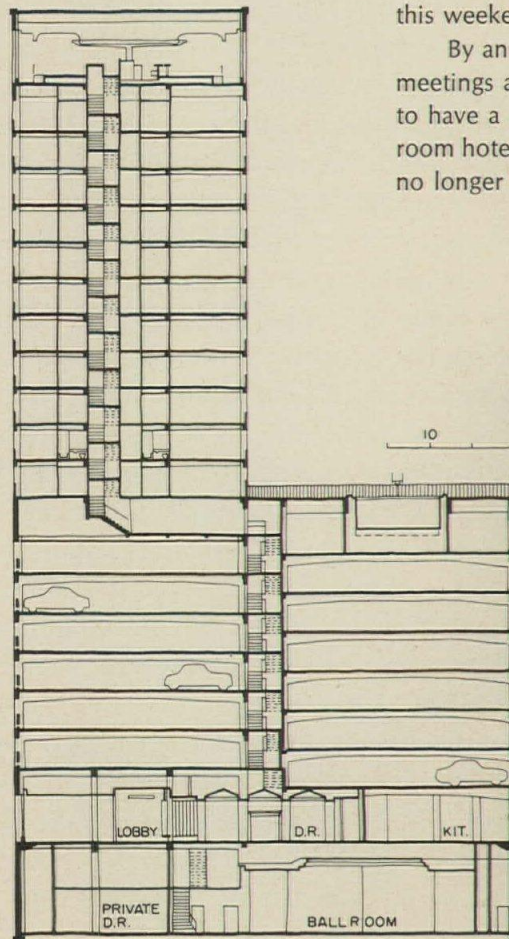
By William B. Tabler, F.A.I.A.

A hotel is a single-structure city, where thousands of people are housed, fed and entertained, whose space must be rented every night (not once every five years, as is office space), and whose structure must turn a profit for its owners. The overnight guests in a hotel may be as numerous at any one time as the entire population of many a small town: the New York Hilton and Conrad Hilton hotels, for instance, can have as many as 20,000 people each in their various types of spaces—rooms, restaurants, shops, service. The ballroom alone of the New York Hilton has room for 5,000 people at one time, the Washington Hilton, for 3,500.

A hotel's departmental profit ratios are as follows: 70 per cent, rooms; 50 per cent, liquor; 15 per cent, rentals; and 0 per cent, food. Its costs run 65 per cent for public rooms, 35 per cent for guest rooms. The in-city hotel is an expensive operation, especially in contrast to the more casual motor hotel, with its lower initial and operating costs and—usually—on-ground parking.

The first hotel (right) to be built in downtown Indianapolis in 40 years is under construction, the result of action by local businessmen. Hilton Hotels will operate it. The 440-room hotel locates all its parking on the second through sixth floors of the hotel, with elevator service direct from parking to guest room floors. Hotel rooms begin on the seventh floor, where a central terrace is landscaped and has a swimming pool. The hotel's extensive convention facilities—meeting rooms and banquet hall will seat 1,000 persons—are designed to keep it busy with meetings of various sizes. Ground floor and lower levels contain lobby, airline reservations offices, coffee shop, cocktail lounge and a formal dining room. On the twentieth floor is a restaurant and cocktail lounge. Architect: William B. Tabler.

A 150-car garage will be built into the tower of the Othon Copacabana Hotel (far right) in Rio de Janeiro, making parking accessible on each floor to the rooms on that level. In the experimental stage for this hotel is proposed use of a mechanical parking system, often suggested but as yet unused. Note location of ballroom one floor above ground level; shops, night club and service are below grade. Architect: Artur Licio Pontual; consulting architect: William B. Tabler.



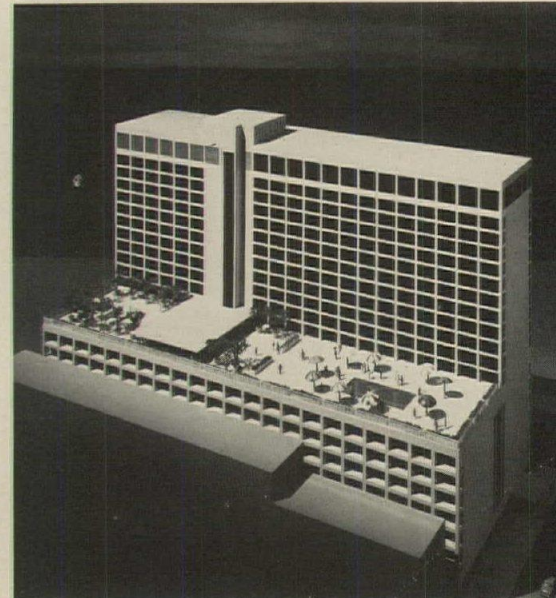
Yet every urban development proposal by a Central Business District calls for a hotel and every new suburban office building development also calls for a hotel. The visiting businessman must be housed. The Hotel Bonaventure on top of Place Bonaventure in Montreal is an in-city hotel that directly responds to this need.

But even 100 per cent five-day-a-week occupancy is not enough to keep a hotel operation profitable; it needs weekend business as well: convention, recreation and social. These are vital for successful operation of a hotel, whether it is in the heart of a city or in a resort area. Motor hotels, too, are finding it expedient to make provision for meetings and conferences, and sometimes for social functions as well.

The new opportunities in the hotel field, however, are not so much in the large metropolitan areas as in the "secondary" cities, smaller cities which are not and will probably not be ports of call for the superjets and supersonic planes. Secondary cities such as St. Paul, St. Louis, Indianapolis and Hartford, Connecticut, are interested in hotels not only to stabilize their downtown business areas but also as attractions to the traveler's pocketbook: for every dollar he spends at the hotel, he spends six elsewhere in the community. For this reason civic groups now realize as well as the urban planners that to revitalize the downtown area a hotel is the first order of business and as a civic venture are raising the money and building the hotel. This was true in St. Paul and Indianapolis and is under discussion in many other cities across the country. These secondary cities are good locations for conventions, if their hotels have the facilities to accommodate such groups. In these particular instances, St. Paul, St. Louis and Indianapolis have new hotels, and the Hotel America in Hartford (none too successful as a weekday bedroom hotel) is adding large convention facilities (i.e., ballroom for banquets, conference and meeting rooms) to attract this weekend business.

By an old rule of thumb the ballroom—necessity for large meetings as well as for banquets of convention groups—used to have a capacity based on 10 square feet per room: a 500-room hotel would have a 5,000-square-foot ballroom. The rule no longer holds. The St. Paul Hilton has a 12,500-square-foot

© Louis Checkman



ballroom plus a 10,000-square-foot exhibition hall; Stouffer's River Inn in St. Louis has an 18,500-square-foot ballroom and a 10,000-square-foot exhibition hall. Each of these hotels has only 500 rooms. Each is, however, in a prime location for convention business—it is in a city accessible by various means of transportation but without the potential of becoming a supersonic jetport.

The automobile has brought a great change to hotel operation, and parking has become a primary problem. Nothing on the horizon at this time indicates that it will become less of a problem. The alternative is to provide for it. Our firm has done this in several unorthodox ways. In the San Francisco Hilton (ARCHITECTURAL RECORD, July 1965, pages 143-147) we provided what is in essence a motel-type of accommodation on certain floors, where the guest can drive his car to a parking stall adjacent to the corridor on which his room is located. In the St. Paul Hilton, we used something of the same kind as a solution, and in Indianapolis, where the Hilton is now under construction, we provide 650 parking spaces in a garage immediately under the 440-bedroom floors, with vertical (elevator) transportation direct from garage to room floor. Even more unusual is the Othon Copacabana Hotel in Rio de Janeiro where a 150-car garage is built into the hotel tower. Although this hotel is still in the planning stage and final decisions have not yet been made, we are experimenting with the idea of using a mechanical parking system. The idea is not wholly new, but its actual use would be. For another city, we have explored a spiral hotel with a continuous ramp for parking cars right outside each of the 500 rooms. Except for fire escapes, such a hotel will require no stairs.

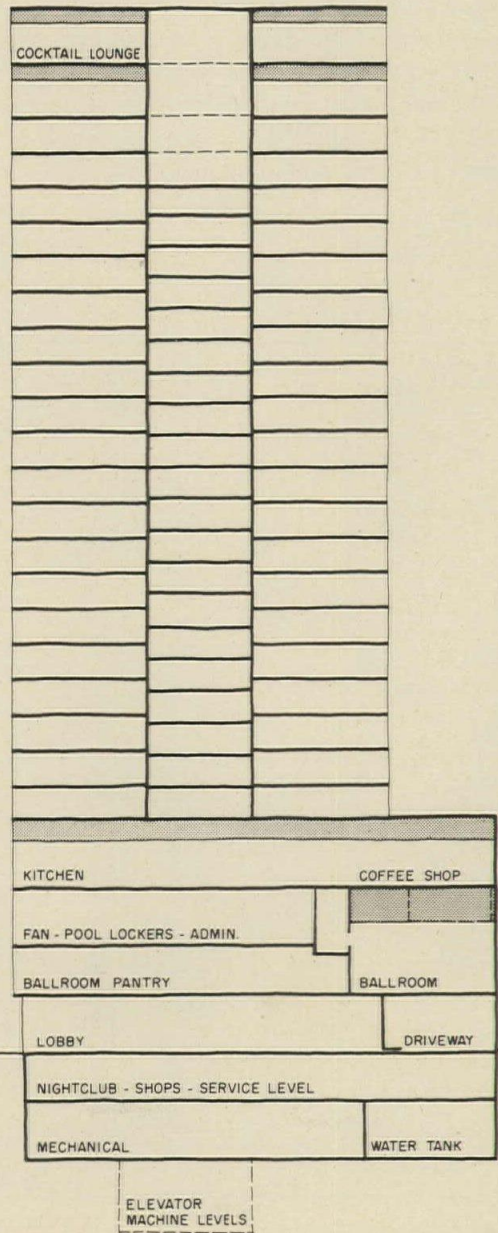
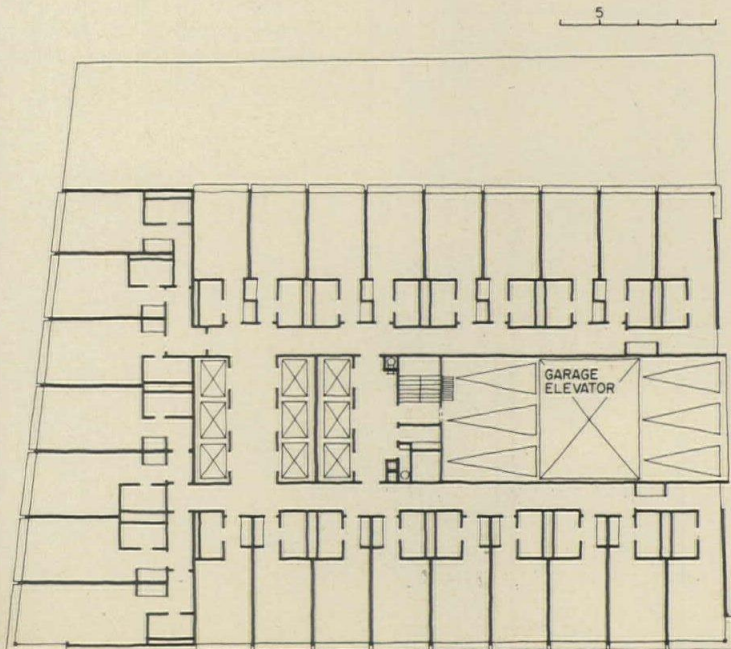
But these are fairly radical answers to today's problems. Hotel construction traditionally lags behind the transportation on which hotel operation depends. While we are still struggling with the automobile age, we are beginning to build for the jet age.

Basically there are three types of hotels to suit three types of travelers: commercial hotels, for the commercial traveler who comes by air, or perhaps by rail, and who, once settled in his

hotel, needs local public transportation; the motor hotel, for the traveler who arrives in his own car (or rents one to achieve mobility); and the resort hotel to which people at leisure come for recreation and entertainment. Although there is a boom in hotel construction in far-away places, due to increased travel for business and for pleasure, and to greatly increased and improved air transportation to the places appropriate to resort development, I leave discussion of this type of hotel to the article which appears on page 143 of this magazine, and will consider only the first two types.

Commercial hotels can exist only in cities with adequate transportation systems. New York is a good—perhaps the best—example of this sort of city. The commercial hotel is caught, however, in a life-and-death struggle right now, due in part to the labor and profit squeeze in which it finds itself and to the decline of great free-spending wealth and in part to the stiff competition it is getting from the motor hotel.

The motor hotel is assuming the place of the hotel in the "secondary" cities whose transportation (into the city and



within the city) is below adequate standards (i.e., there is general dependency on the private car). The motor hotel enjoys certain advantages over the traditional in-city hotel, with a reputation as a formal and elegant place where service is a by-word, and these make for strong competition to the hotel. The motor hotel location has been on the fringes of the city, where sites were cheaper and more land was available. However, it is more and more true that as the location of the motor hotel approaches the center of the city, its occupancy rate goes up. At the same time, its costs increase: center-of-the-city sites cost more, and are smaller. The old notion of a one-story, spread-out motel has to go by the board. Instead, the multi-story building, cheaper to build and to operate, becomes an economic necessity, and an answer to a contemporary need. As the motor hotel becomes more formal, as the hotel absorbs the automobile into its walls, the hotel and the motel become less unlike each other than seemed possible a few years ago. There is no question in my mind that the hotel of the future—except in those relatively few cities where adequate transportation exists—must be a motor hotel.

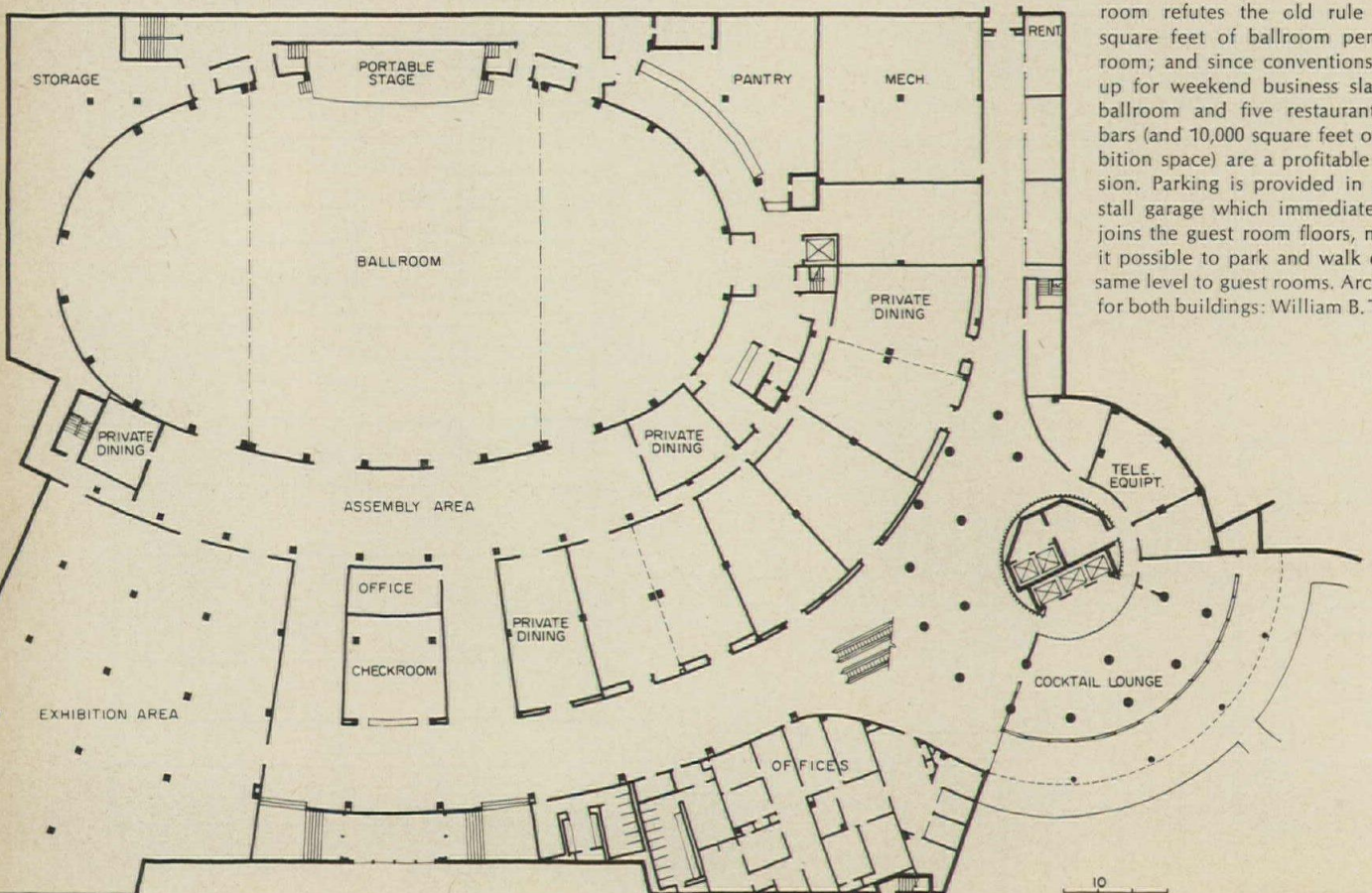
One of the major influences on hotel operation is the increase in self-service, and this is bound to have repercussions on the design of hotel buildings. The motor hotel, in its early version as motel, depended on self-service for its very life, economically speaking. The traveler drove up to the door of his room, carried in his luggage, did all the things a bell-boy usually does. It turned out that he did not mind doing these things for himself as long as provision was made for doing them without too great inconvenience. As a matter of fact, great numbers of people showed signs of actually preferring the independence that this

represented, and they patronized the motel increasingly as proof. Now hotels, hard-pressed to maintain their profits, are adopting many self-service features: the automatic message indicator on the telephone, direct dialing for outside calls, floor ice machines and canteens for beverages and sandwiches, even hand carts for baggage and room. coffee makers (well-established in motels and motor hotels) are familiar manifestations of this trend.

Disposable items—towels, sheets, pillowcases, dishes and glasses—will further reduce the service of the traditional hotel. They must all be of acceptable quality (the airlines have shown the way here), of course, but they can help considerably in the relief of labor pressures.

Yesterday's hotel had maids, porters, floor clerks, waiters and watchmen on each floor to handle a variety of services for guests. Today the guest does—or can do—most of these services himself. Television cameras in the corridors have replaced the night watchman as a means to continuous protection. The other servitors have simply been absorbed elsewhere.

The importance of ballroom and other large-gathering facilities is clear in the plan for the ballroom area of Stouffer's Riverfront Inn, St. Louis, Missouri (left). This 500-room hotel has an 18,500 square foot ballroom and 10,000 square feet of exhibition area plus private dining areas. Conventions and parking are two important influences on type and design of hotel. The 500-room St. Paul Hilton (opposite), a downtown hotel in a "secondary" city, makes provision for both of these demands: its 12,500 square foot ballroom refutes the old rule of 10 square feet of ballroom per hotel room; and since conventions make up for weekend business slack, its ballroom and five restaurants and bars (and 10,000 square feet of exhibition space) are a profitable inclusion. Parking is provided in a 300-stall garage which immediately adjoins the guest room floors, making it possible to park and walk on the same level to guest rooms. Architect, for both buildings: William B. Tabler.



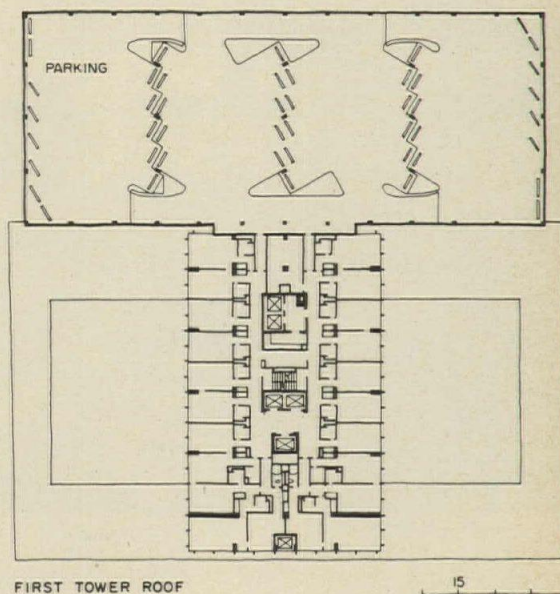
Each item of self-service is designed to accomplish one thing: to continue a favorable profit/cost ratio in the room-rental end of hotel operation. Unfortunately, in food service the ratio of profits to costs is as small as can be imagined. Costs far outrun profits, principally because of the high costs entailed in providing the level of service which the public expects—or which the hotel restaurant believes it expects. A waiter is expected to walk the length of the dining room to sell a half-penny pat of butter, or to keep a glass filled with free water. No wonder the food business is unprofitable. I go to a country club dinner dance and pay \$15 to wait on myself at a buffet, yet when I enter a hotel coffee shop, I expect the amount and kind of service that prevailed in the Gay Nineties, a vastly different era of labor and economics.

A revolution has to come in the food department. I am certain that before long packaged meals, ordered electronically, will be served as beautifully as the bedroom fruit basket that never fails to thrill the arriving guest. Single-purpose dining rooms will give way to private dining rooms and function rooms, and more people will eat in their rooms. Today's ultrasonic silver cleaning will be replaced by non-returnable tableware and dishes. The really penny-wise hotel operator may even encourage his guests to take his cups and saucers away as souvenirs, saving himself the trouble of disposing of them.

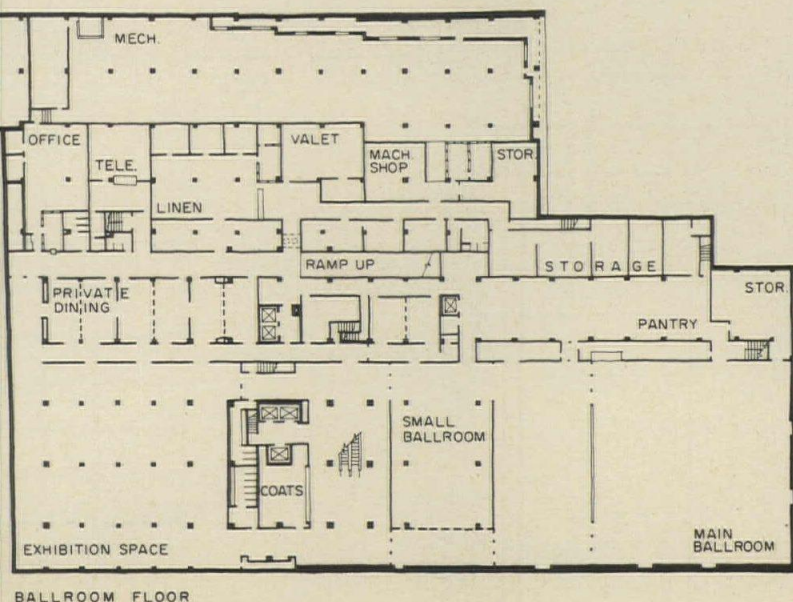
Other changes are also to be expected. Electronic equipment already in use in larger hotels will be incorporated in the smaller operation, making possible smaller service and lobby areas. Microfilming of records, no longer a novelty, has already reduced the amount of storage space required. Telephone equipment for a group of hotels will be located in a remote building where telephone operators will be pooled for better service and the equipment, centralized, will be serviced better and more easily.

It goes without saying that new materials and products will make for improved—and less expensive—construction, once the obstacles of obsolete codes and ordinances are cleared away.

The hotel of tomorrow—and of day after tomorrow—will still provide the traveler with the basic needs of his sojourn, food and lodging, even entertainment. But the potential is real that the in-city hotel in the "secondary" city will be less distinguishable from the motor hotel in many of its aspects than it has been. And the motor hotel, as it gets closer to the heart of the city will be more sophisticated even while it retains some of the casual informality which has always been its charm. It is doubtful that the automobile will be any less of an influence on hotel design, or that labor and economics will, in their ways, force changes on hotel operation and, inevitably, on hotel planning. But new ideas will also come in design, as direct responses to these changes.



FIRST TOWER ROOF



BALLROOM FLOOR



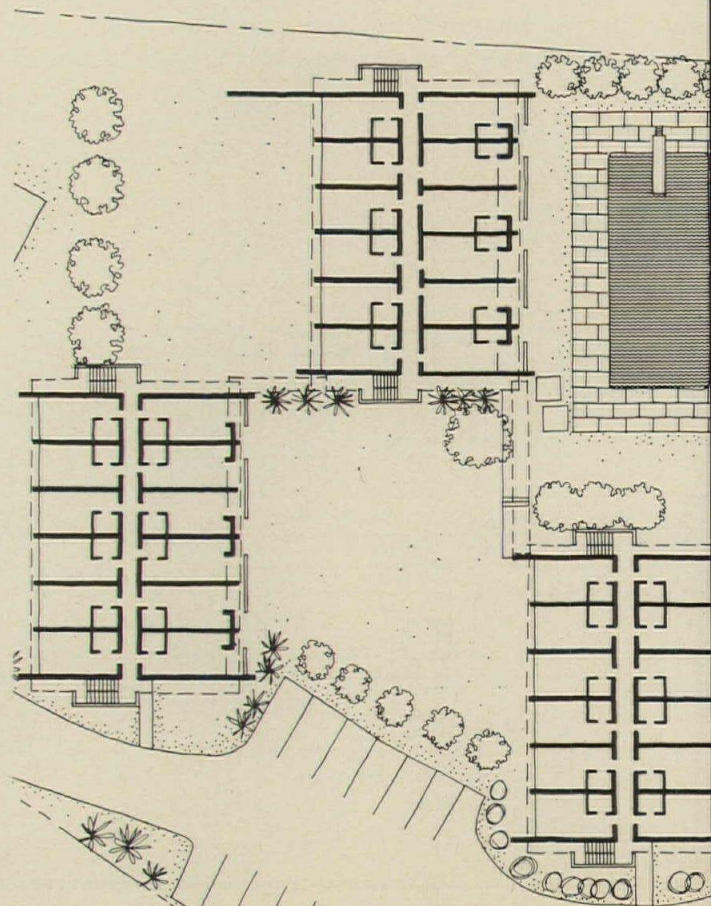


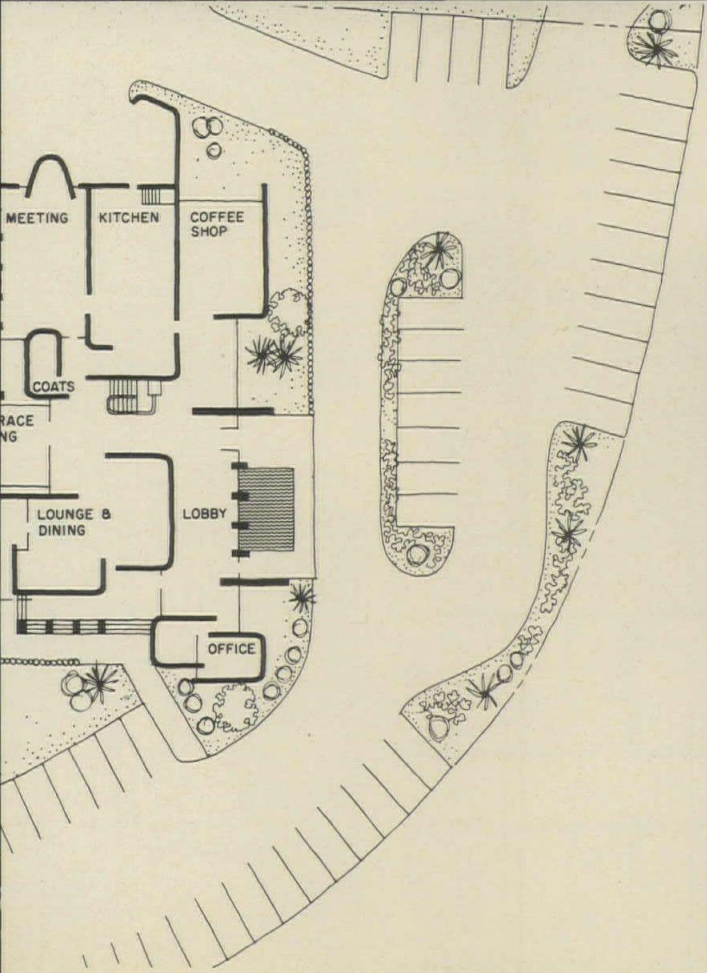
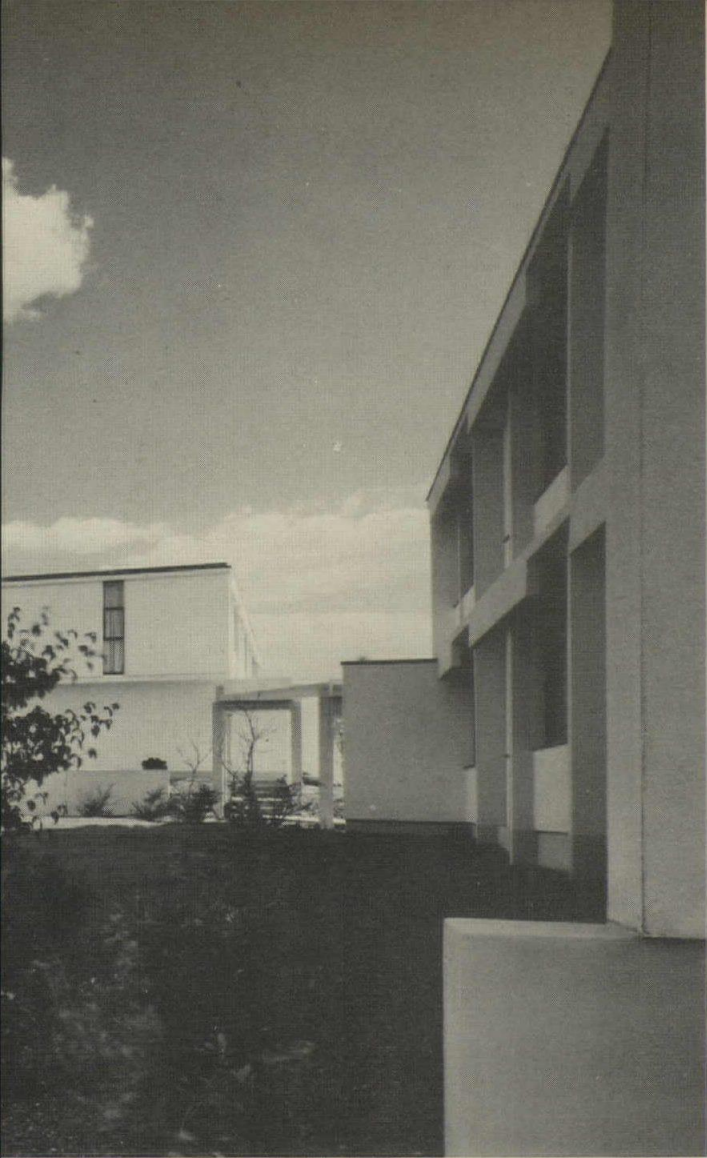
Louis Reens photos

MOTOR HOTEL DESIGNED TO INVITE LONGER STAYS

Situated at the intersection of two main highways near Boston, this motor hotel includes, besides its 78 guest room units, facilities for meetings, entertaining and for dining. The site slopes gently away from the main entrance which is at street level. Three guest room units of 12 rooms each, are placed around landscaped courts on the terraces. The site plan separated vehicle and pedestrian traffic by means of a system of covered footpaths which connect the living units with the main building. Automobile traffic and parking is permitted only on the perimeter of the site. Direct access from parking to guest units is through entrances at the end of each building. The main building contains registration lobby, meeting and lounge rooms, and restaurant. The primary requirement for the motor hotel was that it provide an "inviting environment which would encourage guests to extend their stays", in strong contrast with nearby motels.

FENWAY NORTH MOTOR HOTEL, Revere, Massachusetts. Architects: *Salsberg & LeBlanc*; structural engineer: *Benjamin Abrams*; mechanical engineer: *Poley Abrams Corp.*; contractor: *Joseph Schneider*.





Buildings are reinforced concrete with concrete bearing walls. On the south side all rooms have balconies, extending their size and providing sun protection to ground floor units. Public rooms are all located in main building, the activities they serve interrelated and supporting each other. Curved partitions are designed to reinforce the continuity of spaces.

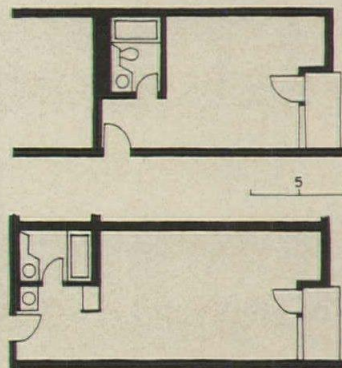
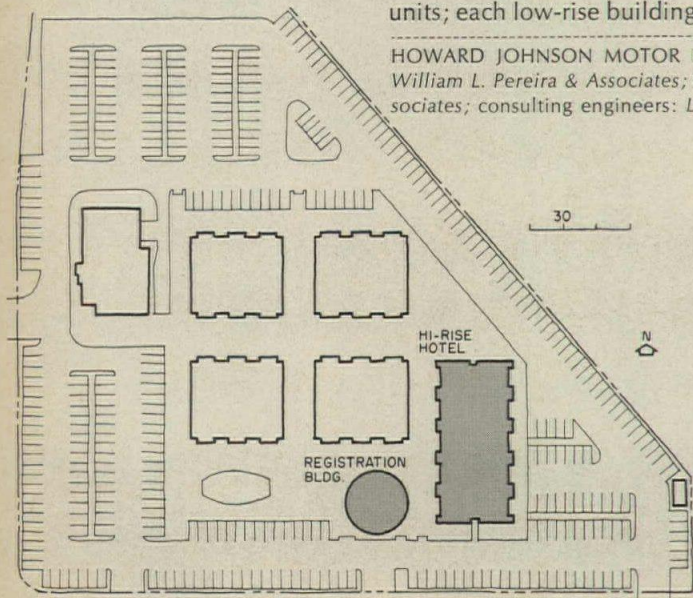




MOTOR LODGE IN DENSE URBAN AREA

This motor lodge—a unique building among the various designs used by the national chain which operates the lodge—is strategically located to serve a number of tourist attractions, one of which is Disneyland; another, a new stadium. Its site, in a densely populated part of the Los Angeles metropolitan area, would seem to preclude the serenity which the program called for. Yet not only is there a pleasant repose in the design of the buildings, but a pleasant, quiet outdoor area with a reflecting pool is provided by placement of the buildings. The activity center near the administration-registration building includes the swimming pool. The high-rise building contains 100 guest units; each low-rise building has 24 units.

HOWARD JOHNSON MOTOR HOTEL, Anaheim, California. Architects: William L. Pereira & Associates; structural engineers: S. B. Barnes and Associates; consulting engineers: Levine & McCann; contractor: C. L. Peck.



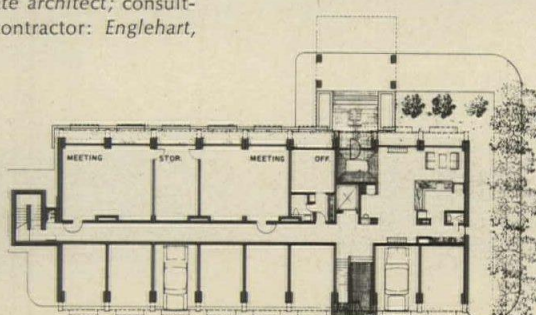
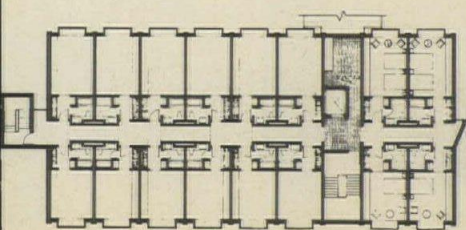
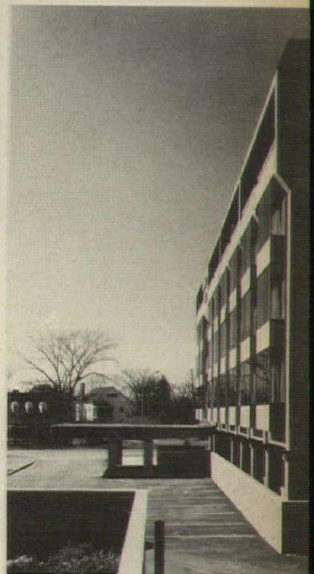


Daniel Bartush photos

MOTOR INN ON CITY EDGE

This luxury motor hotel is located on the immediate outskirts of Birmingham, Michigan, along a busy and garish section of an eight-lane highway. The owner wanted acoustical privacy between guest rooms and public rooms because much of the hotel's business consists of meeting of various sizes. Accordingly, the guest rooms are on the upper floors, with meeting rooms on the ground floor, easily accessible from the lobby and from the parking area outside. An existing restaurant next door serves the hotel, and for snacks, vending machines are located on each floor. The simple building design, with its straightforward use of materials (brick veneer cavity walls for insulation, concrete for the projecting bays which enclose heating and cooling units) is welcome on the cluttered street.

VILLAGE INN MOTOR HOTEL, Birmingham, Michigan. Architects: Luckenbach/Durkee & Associates, Inc., Basil Nemer, associate architect; consulting engineers: McWilliam & Keckonen; general contractor: Englehart, Buettner & Holt, Inc.



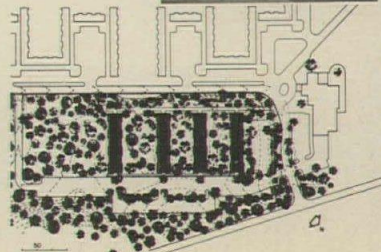
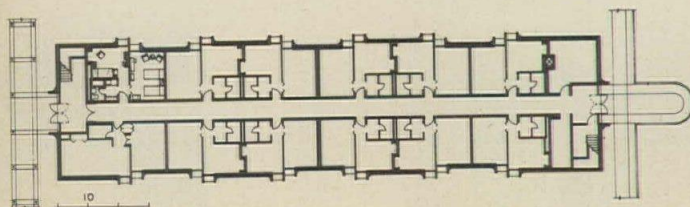
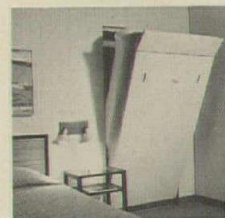
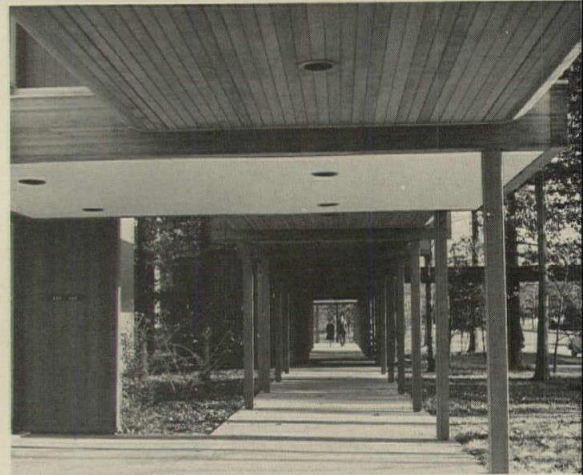


Haycox Photoraminc, Inc., photos

PLANNED FOR GROUP TOURS

The novel unit plans in the Terrace Wing annex of the Williamsburg Motor House in Williamsburg, Virginia, are designed to meet the special needs of three kinds of visitors to the historic town: summer tourists, winter conferees, and fall and spring school groups. The two-story building makes maximum use of a small site, and also provides good control for the school groups. The new wing, quite different in architectural expression from the original building, is joined to the older building by a covered walk. Typical guest units are, in effect, one-and-a-half rooms, and function as two rooms, an economical solution to providing inexpensive semi-private space. A wall bed in the smaller room doubles occupancy at night and frees floor space for daytime uses.

TERRACE WING—THE MOTOR HOUSE, Williamsburg, Virginia. Architects: *David Warren Hardwicke and Partners*; structural engineer: *William J. Blanton*; mechanical and electrical engineers: *Hankins, Anderson and Moncrieff*; civil engineers: *Austin Brockenbrough and Associates*; interiors: *Miller and Rhoads*; general contractor: *Taylor and Parrish, Inc.*



PLANNING THE SUCCESSFUL RESORT HOTEL

By Alan H. Lapidus, architect
Morris Lapidus Associates, Architects

The resort hotel, like Janus, wears two faces. The paying customer sees only the "front of the house", and this must be all that he desires—a wish fulfillment, an ego builder, a status symbol, and the promise (and perhaps fulfillment) of great delight. The "front of the house" comprises every area that he will see: lobbies, dining spaces, rest rooms, bathers' passages, passenger elevators, hotel rooms, etc. These spaces must be handled and laid out with one thought in mind, the convenience and continued approbation of the guest.

But the "back of the house" is where all that makes this happen takes place. These are the areas of burnishing, butchering, baking; of boilers and many other functions. The guest never sees this but these unseen spaces will precisely determine his degree of contentment. These are the areas that will ultimately dictate whether the hotel will run at a profit or a loss.

Let us presuppose a hotel located in a thriving but not overdeveloped resort area, an architecture suitably superb—or suitably ghastly—to attract the clientele (either extreme will generally succeed; it is mediocrity that founders) and a competent top echelon management.

The "back of the house" must be laid out with two paramount objectives: control and efficiency. Control is crucial because pilfering is a real problem and improper design resulting in incomplete control can cripple or kill the operation. Take the case of a large chain that opened the first sizable hotel on a little Caribbean island several years ago. The building was finished, the employees had had several weeks of pre-opening training, but the hotel could not open on schedule: there simply was not enough of the new silverware left. Several changes in service area layout were made, the local constabulary called on employees at their homes and requested return of the "borrowed" flatware—and the situation was corrected. Liquor, meats, dry goods, linens and housekeeping supplies are all items that most people have need of in their homes; and maids, dishwashers, busboys, laundresses etc. are not the best compensated people in the labor market. The pilferage problem in hotel operation should never be underestimated.

The second objective is efficiency. Inefficiency results in two people doing a job that could be done by one person, thereby increasing the operating overhead of the hotel by the yearly salary of that person. It also results in the delay of or detriment to service to a guest. An employee that has to travel a maze of passages to accomplish his job is being paid for spending a lot of time walking. A poor layout results in lost time, effort, tempers and customers.

What is the flow diagram for a typical "back of the house"? First, the service entrance is located out of the view of the main entrance to the hotel but with direct access onto a road capable of handling truck traffic. It should have a loading dock—covered, to protect it from the weather. (Food, laundry and sup-

plies will be off-loaded and stored on this dock and should not get rain-soaked while waiting to be checked in.)

All personnel will enter the hotel at this point. At least two small offices should be located here, for the steward (or receiving) and the timekeeper. Outside the steward's office is a floor scale to check the weights of the produce as it enters. If the food storage and preparation kitchens are located on a different level, a sidewalk lift or conveyor belts should be provided here. The timekeeper checks the employees in and out and makes certain that everyone stays honest. Immediately past the timekeeper, the employees should be separated into two different traffic flows: one for food service personnel, the other for everyone else. (It is advisable to provide separate locker facilities for these two types of personnel.) Once food service personnel enter their traffic flow they have no contact (with the obvious exception of waiters) with either guests or other house personnel. The reason is simply security. If there is any deep dark secret of successful hotel service design, it is a built-in security system. Uniform issue is related to the housekeeper, the housekeeper to the laundry room (and the laundry room to the soiled linen room; the soiled linen room, connected by vertical linen chute, to a service room on every typical floor; and every typical floor connected by service elevator(s) that open to the aforementioned service rooms and also to the service entrance, convenient to the scrutinizing gaze of the steward and the timekeeper).

For convenience, the trash chute from the typical floor service area is located next to the linen chute. The trash room must therefore be located next to the soiled linen room and, for ease of pick-up, near the service entrance. Depending on the size of the hotel and the frequency of trash pick-up, this room may be equipped with a trash compactor or some other such implement of destruction. The garbage room should be located somewhere near the trash room (ideally, opening directly onto the loading dock). It should be refrigerated and either have space for, or be in immediate proximity to, a can wash area with floor drain and hose bib.

The boiler room usually has a direct escape to the outside and, for ease of maintenance and repair, should be located near the service entrance. The boiler flue, extending to the top of the hotel tower, is usually located in the main vertical circulation core and its location, therefore, is important at the earliest stages of design. If there is enough height in the service floor to breach the flue horizontally, the problem is somewhat mitigated, but usually not without objections from the structural and mechanical engineers.

Telephone equipment, electrical and air-conditioning equipment rooms can be handled more flexibly than the other service areas, but their size and locations vary according to the size and location of the hotel.

The employees' cafeteria, generally a steam table-grill operation, should be located near the kitchen and as close to the employees' locker room as possible. Access should preclude passing through the food service area.

Before delving into the intricacies of the workings of the food service and laundry, let me comment on the services of the specialists who will actually lay out and design the equipment in these areas. They don't *really* need that much space. They will swear a mighty oath that they do, and will conjure up visions of irate chefs stalking off the premises and laundresses working overtime shifts, but they can really do with less. Believe me. However, before one can hope to cope with

the specialist, it is necessary to understand how these spaces operate.

After comestibles have been weighed in, checked, and signed for, they are sent to either dry storage or liquor storage (a room with a big lock on it) or to one of the various cold holding rooms or boxes. If the hotel does its own butchering it is necessary to know what size cuts it buys (halves, quarters, etc.) and it may be necessary to provide ceiling rails to transport them. Meats, fish, dairy, bakery products, frozen foods etc. all require different cold facilities. Since these boxes require heavy insulation, slab sinkages will be required in these areas. If these are not provided, the floor of the box will have to be ramped—but the person who has to push a heavy cart up this ramp will curse the architect for all the days of his life. An alternate method, if the exact sizes will not be known until later, is to depress the entire slab and build up the rest of the floor with lightweight fill.

Any resort worthy of its credit cards will have one main restaurant, at least one specialty restaurant, a night club with a dinner show, and a bar where sandwiches and/or snacks will be available. It will also have that service—beloved of guest and hated by manager—room service. Most resort hotels these days also have convention facilities which entail feeding large numbers of people the same meal at the same time. If that meal turns out to be semi-congealed chicken-a-la-king the hotel has lost that convention group forever.

From kitchen storage, food goes to the prep kitchen to be prepared for final cooking in the main kitchen. The main kitchen actually consists of several kitchens (and must have a flue extending to the top of the building lest the guest get an odoriferous foretaste of his next meal). The specialty restaurant(s) and the main restaurant will have their own kitchens and their own chefs but these should all be located within the same general area. ("Kitchen" refers to a cooking line with its back storage tables, reach-in boxes, work areas etc.) The "common" areas that all of the kitchens can use are the dishwash, pot wash, salad set-ups and dessert set-up (waiters usually set up desserts such as ice cream, cakes, etc.). The dishwashing area should be located near the door of the kitchen so that the waiter or busboy can enter, drop off the dirty dishes, and get out again without walking through the cooking area. This is, however, a noisy area and it should be sound-baffled.

Cooking for banquets is usually done in the main kitchen and then brought to a banquet or "holding kitchen", equipped with banks of ovens where food is kept hot until served. Depending on the size of the operation, this kitchen may also have its own dishwashing equipment. Other facilities include reach-in boxes, set-up areas, and storage areas. Hot and cold carts are another means of servicing a smaller banquet facility. Both methods require direct access between main kitchen and banquet area.

There is usually a service bar for alcoholic beverages in the general area of the kitchen. As the waiter leaves the kitchen he must pass a checker who verifies that what has been billed is being served and that only food that has been billed is walking out of the kitchen. The checker's station is always located immediately inside the door between kitchen and dining area. The head chef should have his office in the main kitchen area, in an office with enough glass to permit visual control over the kitchen operation. In addition, silver storage and burnishing room must be under his visual control.

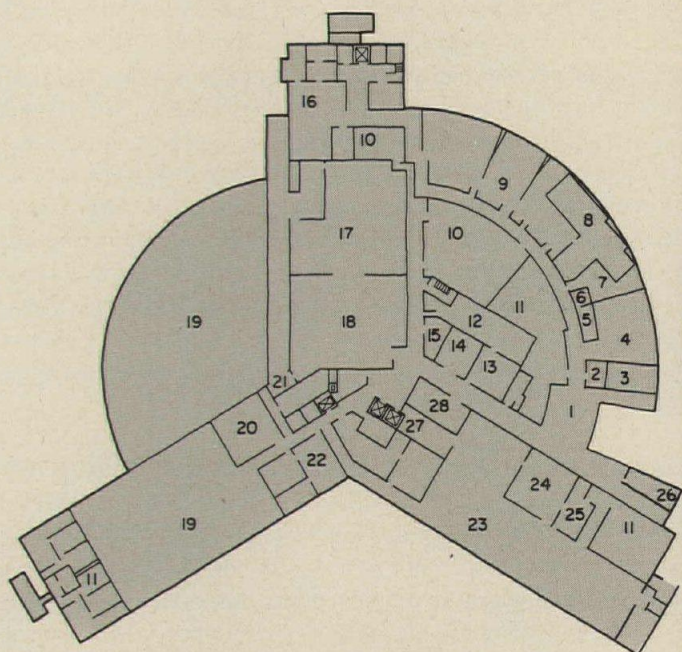
Room service should work from the main kitchen area, with direct access to the service elevator. It has its own checker and it may have its own "kitchen" usually consisting of a generous amount of grill. (Breakfast is the most popular room service meal.) Storage and setting up room service carts—these take up considerable space—must be provided.

It is evident from this cursory survey that all the food facilities of the hotel, from the coffee shop to Old Watashi's Polynesian Luau Room, must feed directly from the main kitchen without going through tortuous service corridors or across public areas. With this flow line, food can be requisitioned from storage to the kitchen and go through just one control.

The laundry size will depend upon such diverse factors as the number of people who will use the pool or water facilities (beach towels); whether tablecloths are used for lunch and breakfast; whether there is a health club (towels again); and how many employees there are (uniforms). The main concerns in allocating space for this facility are the enormous amount of ventilation required, the large headroom required over items such as a ten roll ironer, and the fact that circulation within the laundry is by means of large heavy carts. (No ramps here; avoid columns in the aisles.)

The principal items in a laundry are the washers, extractors, dryers, ironers, sorting rooms and the folding areas. There must also be linen and uniform storage, a sewing area, a dry cleaning area and a spot cleaning area. The housekeeper's office is always located in this area and, like the head chef, she should be situated so as to maintain visual control.

There are other areas in the back of the house, repair shops, locksmith, administration, miscellaneous storage and so forth but the items set forth above are the prime space determinants. They must be set up in a certain pattern and that pattern will set the plan for the front of the house.



Service area for a large resort hotel—Paradise Island Hotel on Paradise Island, Bahamas (Morris Lapidus Associates, architects). 1. Loading dock 2. Receiving steward. 3. Garbage, refrigerator and can wash. 4. Trash. 5. Purchasing agent. 6. Steward. 7. Liquor storage. 8. Cold boxes. 9. Prep kitchens. 10. Employees' cafeteria. 11. Toilets. 12. Lockers. 13. Locker (upper echelon). 14. Transformer room. 15. Switch gear. 16. Bakery. 17. Mechanical equipment. 18. Boiler. 19. Storage. 20. Maintenance shop. 21. Locksmith. 22. Switch gear. 23. Laundry. 24. Housekeeper. 25. Uniform issue. 26. Timekeeper. 27. Soiled linen. 28. Trash collection.

When a guest enters the hotel lobby (and there should never be confusion as to where the entrance is) he should be overwhelmed by a feeling of serenity—or enchantment, or revulsion—but never confusion. The registration desk and the elevators should be immediately apparent. The registration area should consist of the front desk, behind which is a clerk, behind whom is the key and mail rack, behind which are various administrative spaces. At one end of the desk (and partitioned off from the rest of it) is the cashier and next to this is the valuables room, a separate room where the guest is given a safe deposit box. After filling his box with jewelry, cash or other valuables, the guest hands the box to the cashier who locks it away.

The main administrative area usually backs up to the desk but the type and amount of space for this depends solely on the management. The telephone board is located here. The restaurants, bars and other *divertissements* should be either visible from or well indicated in the lobby area.

If the hotel has a casino, local regulations will determine how visible or accessible it may be. In Las Vegas the idea is to force *all* circulation through the casino whereas in Puerto Rico the casino is only open during certain hours and there are strict regulations as to how obvious the gaming may be. Nonetheless, the ironclad relationship here is that the casino entrance should be immediately opposite the night club entrance. The psychology is simple. After being entertained by the stars of stage and screen, the patron walks out of the night club and practically falls into the casino. He thereupon sees the glitter of the wheel, hears the click of the dice, remembers how Bond did it in Casino Royale and immediately blows the egg money. Casino operation is highly variable and the actual planning depends upon the individual operator.

A bathers' passage should be provided from the elevators to the pool or beach. This is so that clothed dry guests do not have to associate with half-naked, wet and oily guests. In designing the pool deck do not forget the little nicety of making sure that a large shadow does not fall across it. Most pool decks containing the shadow of the hotel at 2:00 P.M. have pools with the architects at the bottom. Since the main occupation at any pool deck is sunning rather than swimming, a generous area must be allocated for chaises. These are large and it is a good idea to overestimate space for them. If at all possible the pool should be oriented so that the diving board does not face the afternoon sun. A bar and snack bar for the pool deck should be provided and access to the coffee shop should be from the pool deck as well as from the public spaces of the hotel.

The typical floors of a hotel are strictly a matter of budget and esthetics. The module for the floor set up (and thus for the building) is based on the fact that a maid can make up 12 to 14 rooms per day. (It is inadvisable operationally to have a maid make up six rooms on one floor and five on another.) A normal double-loaded hotel tower is at least 60 feet wide (minimums are 17 feet clear living space from outside window to bathroom wall, 10 feet for bathroom and closets, 6 feet for a hall). A typical floor should have a number of interconnecting rooms (soundproof connecting doors) and some rooms that by size, configuration and furniture can be combined into suites of various sizes. However, for the most efficient hotel design every room should have a fully equipped bathroom so it may be rented as a separate room. A room furnished as a living room should have convertible beds instead of couches. Thus every

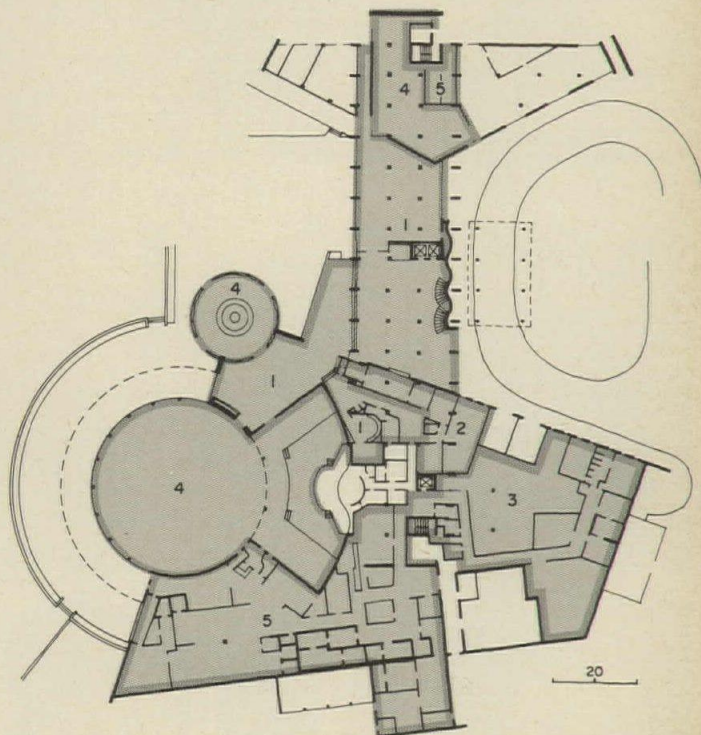
room is a "key." (In hotel parlance rentable rooms are called "keys" and a two-room suite where the rooms cannot be rented separately is only one "key".)

The service area on the typical floor is located near the vertical circulation core (service elevator, dirty linen and trash chutes). The service area also contains space for storage of the service carts (one per maid), a slop sink and storage for clean linens, towels and supplies. Walls of rooms that adjoin the elevator core should be sound proofed.

Now that I have lovingly laid out the principles of practical hotel layout let me stress that all generalizations, including this one, are false. Depending upon the terrain, the view, the solar orientation and the size of the property many of these guidelines may have to be stretched.

At the Conquistador Hotel on the eastern tip of Puerto Rico, the program was to enlarge an existing 90-room hotel with minimal facilities by adding 300 more rooms and full public facilities, including convention ball rooms and a casino. The site was a steep mountain with no available flat areas but an incredible view. A high rise building was deemed inappropriate and the operation of the existing hotel could not be interrupted during construction. The solution was to break most of the rules. A large portion of the hotel, including the pool and pool deck, 70 hotel rooms, a bar, kitchen and outdoor dining, was located in a fold of the terrain halfway down the mountain. The only way to reach this complex is by an aerial tram and a cable railway. This means that all foods, linens and supplies have to be brought down this way and garbage, trash, etc. have to be removed this way. The total number of employees per guest is high and operational problems are legion. However, these considerations are secondary because of the unique layout which attracts guests at premium rates, thus insuring a successful operation. Which is, after all, what it is all about.

Rules are for the ideal. If you can take advantage of a special situation or create spatial excitement by bending or breaking these rules, do so. Just be aware of the consequences, and be sure the owner concurs the result will be worth it.



Main floor of the Jamaica Hilton Hotel (Morris Lapidus Associates, architects), Jamaica, B.W.I. 1. Public area. 2. Administration. 3. Support personnel. 4. Restaurant (or cocktail bar). 5. Kitchen.

DESIGNING HOTELS FOR FOREIGN SITES

By Joseph Salerno, architect

The architect abroad is a foreigner. He is there because someone wants his talents and knowledge. But his expertise may be a trap, and he will find that his most difficult problem may be diplomatic: local sensitivities may appear in very strange and unexpected forms. The exact placement and design of the "spirit house" or shrine, required in all Thai buildings, may interest him very much, but he will find that it is definitely none of his business.

Just about everyone, in whatever country, wants to join the 20th century. It takes great diplomacy to convince entrepreneurs that there ought to be as many 20th centuries as there are places, that their new hotel with its own identity of place, inside and out, can be efficient, comfortable and profitable, and that they ought to be able to have *their* 20th century.

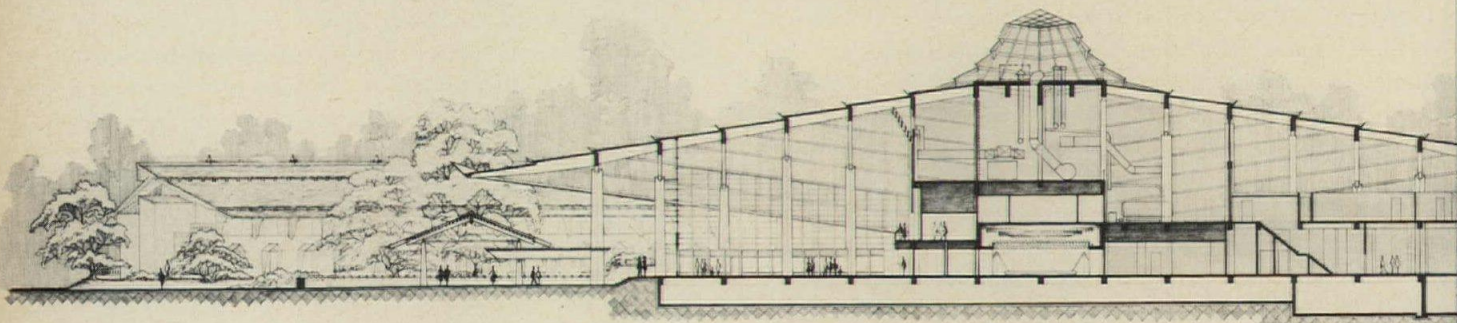
To turn a profit, a hotel must be designed efficiently for what local hotel labor can do, plus what it can be trained to do. This is true for maids and floor boys (how many rooms can they clean in a day?) but more critically true for house engineers. Since mechanical, electrical and plumbing systems will absorb 35 to 40 per cent or more of the total cost of a hotel, their proper maintenance is vital. Most engineers seem to think the building exists for the sole purpose of stuffing it with equipment. To a degree, they are right. A hotel has to stay open 24 hours a day. A good consulting engineer is terrifyingly necessary. It is a sad fact that if the design is bad no one complains much. But let the air conditioning quit on a

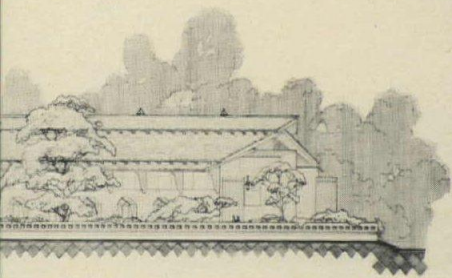
hot day and you may be *persona non grata*. The nearest help may be 10,000 miles away. How much does stand-by cost?

What is true for mechanical systems is no less true for structure and enclosure. Should you spread out on the ground or go up in the air? What kind of crane is available? In either case, the number of rooms on a floor is critical because of those maids. Arrivals and departures may be tied to an airline schedule, in which case great numbers of guests must be able to check in and out with some ease all at once. What kind of concrete is produced locally, and can it be improved? And the roof: in certain areas of the tropics the roof is rained on (heavily) once in six months, baked mercilessly the rest of the time. When should you insist on introducing a new method or material and when should you go along with what they have been doing for hundreds of years? Local construction labor may be cheap by the hour, but how efficient is it?

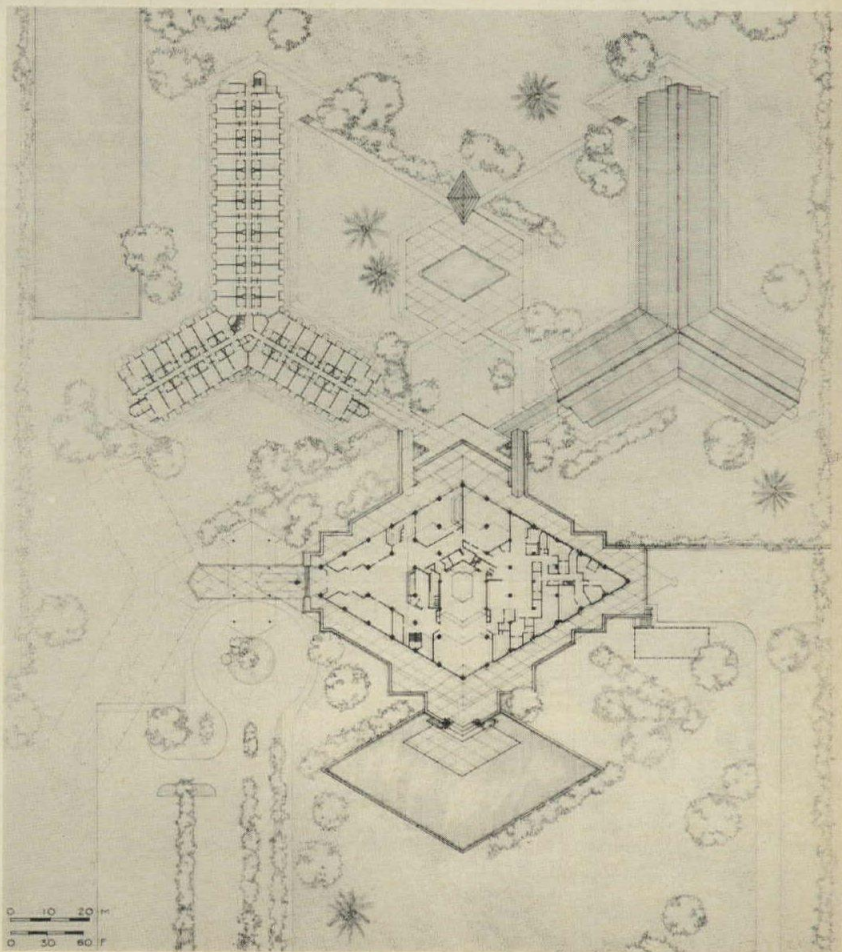
Finally, and most important of all, the real object of all this exercise, the building itself. What we must have is a building in which people can live and move with comfort, pleasure, some joy, some surprise and, with luck, some dignity. A beautiful building may be the most practical advantage the venture has. In stiff competition it will win. How can this 20th century object still be itself? What do you know of the place, its climate, its people? How and where do they live, how do they amuse themselves, how many people have you talked to, or rather listened to? What do you know of their history? Have you seen them dance, listened to their music? How are they governed? Crime? Any snakes? And what about the light, its intensity, its color? You had better know.

HOTELSIAM INTER-CONTINENTAL, Bangkok, Thailand. Architects and engineers: Joseph Salerno-Tippetts-Abbett-McCarthy-Stratton-Walter Prokosch; construction management: Bechtel Corporation, E. M. Kell, field superintendent; general contractor: Southeast Asia Construction Company, Ltd.





The Hotel Siam Inter-continental at Bangkok balances modern conveniences without compromising local tradition and custom. "Modern architecture is brutally uncomfortable there," says the hotel's architect, Joseph Salerno. "The culture of Thailand is pretty much its own. How much obeisance should the hotel make to its cultural tradition? I tried to avoid the superficial reminders, to make as direct a response to an exigent climate as I could. The symmetry of arrangement and the 30-deg-60 deg angles are pure Thai, however." The reflecting pool is a familiar Thai device, but here it is a flood control measure as well. Shade is the great luxury in this climate. The main building roof overhangs the glass all around. Guest building roofs are umbrellas over the structural roof. Core mechanical systems are under the service side of the main building. Materials are local tile in several colors (purple, red, orange) on roofs; plaster on local block for walls; teak for millwork, sun baffles and guest building roof structure.



A RESORT HOTEL ON A HAWAIIAN ISLAND

By George J. Wimberly, F.A.I.A.
Wimberly, Whisenand, Allison & Tong, Architects

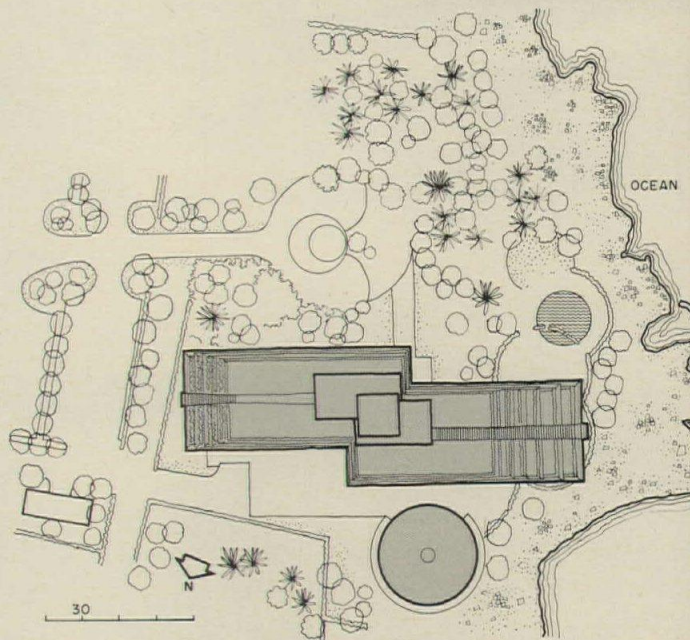
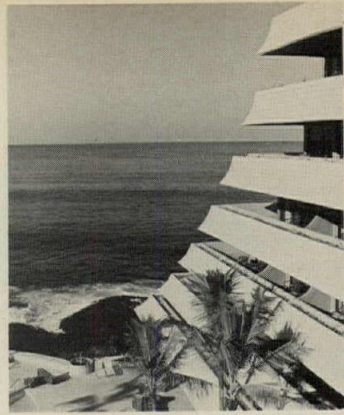
The main problem in designing overseas resort hotels has been, in my experience, to convince the owners and operators that their hotels should fit the country in which they are built and that they should not simply reproduce (often badly) some stateside hotel. There are already too many of these—phenomenally successful, unfortunately, due partly to the tourism explosion, partly to the operators' international booking capability, and partly to the lack of other accommodations nearby.

But our experience in Hawaii and the Pacific countries has convinced us that hotels which are built of local materials, which fit into the landscape, and which identify with the country in which they are located, can be built for less money, and will command higher rates and greater occupancy.

The hotel in a foreign country must, of course, offer the same conveniences and modern amenities that these stateside hotels do, but the buildings do not need to look like stacks of gigantic shoe boxes. To convince the local owners of this is usually difficult and sometimes impossible. It is *sometimes*—but not always—possible to persuade international operators that this is also cheaper, but decisions are usually made at U.S. head offices and are based on unfamiliarity.

Relevance and prudence should favor the use of local materials and products. It does not seem logical, in a country

The Kona Hilton on the Kona coast of the "big island", Hawaii, is in the center of a resort area. Its 190 rooms are located on seven floors, and all have dramatic views along the coast, to the mountains or over the village of Kailua. The curving towers at each end enclose stairs, and derive their shape from local tradition. The hotel lobby is open, thanks to the warm, dry climate; a curving promenade leads from it to a group of shops.



where a farmer's house of brick and stone with plastered walls and tile roof costs three dollars a square foot, to build tourist hotels at \$25 a square foot. Modern plumbing, electricity and air conditioning do not make that much difference in cost.

As hotels which combine modern conveniences, proper operation and local building practices become more common, increasing numbers of knowledgeable travelers will patronize them at luxury rates, leaving the expediently built stacked boxes to low-cost tour operators—and hotel buildings on foreign soil will again become architecture.

KONA HILTON HOTEL, Kona, Hawaii. Architects: Wimberly, Whisenand, Allison and Tong; architectural consultant: Joseph Rosenthal; structural engineers: John E. Mackel and Associates; mechanical engineer: United Air Conditioning Corp.; plumbing engineers: H.D.H. Mechanical Designers, Inc.; electrical engineer: Michael J. Garris and Associates; landscape consultants: Makihi Nursery; builders: Munro, Burns and Jackson Brothers.



The practical considerations in designing audio-visual facilities

By Raymond H. Wadsworth

The author, a professional engineer, is associate and senior engineer with the firm of Hubert Wilke, Communications Facilities Consultant. His experience with this firm and previously has involved the design of over 200 audio-visual systems. Among some of the more recent that he has been involved with for the Wilke firm are installations for Standard Oil of New Jersey, Eastman Kodak, NASA, Cornell University Medical Center, Pace College, the advertising agency Doyle Dane Bernbach, and the Philadelphia school system.

In the ferment now going on in audio-visual communications, much of the attention has centered on the new and untapped potentials of the various media in relation to various needs—whether they be education, commerce or entertainment. It is not surprising, therefore, that occasionally some of the technical aspects of audio-visual systems get neglected. This is unfortunate, because many of the technical considerations are actually design parameters. To cite one example, the type and size of screen has a considerable effect on how many people can view it under optimum conditions. Another is the spatial arrangement of equipment for rear-screen projection. If provisions are minimal, performance will suffer. If they are less, then some equipment may not be able to be used at all. The area of technical considerations is the metier of the author, who has had many years of experience in electro-mechanical-optical design and as an audio-visual specialist. In this article he discusses these technical considerations and relates them to actual application. He also gives convenient-to-use design data for determining space requirements of audio-visual facilities.

Audio-visual systems today cover a tremendous gamut. Components include everything from the simple, inexpensive slide projector to the complex and expensive projection equipment used for projecting video images. Projection systems, the main area of concern in this article, probably pose the most problems for the architect—because every situation is different. The matter of carrels for self-instruction with various audio-visual devices such as TV, cathode ray tube, tape recorders, dial-access retrieval and the like is still another subject. In these cases many of the technical considerations have already been resolved by the manufacturer of the equipment.

A very important problem for the architect is to know exactly what the audio-visual facility wants to be in the first place. These facilities should be complete enough for the client's real needs, but not so elaborate that equipment goes unused, or cannot be used because personnel are not available to operate it. But

most importantly, the systems the facility does have should be capable of operating at topmost performance. The design parameters that govern this performance are the real subject of this article.

Front projection: where it started and where it is used today

Front projection has traditionally "belonged" in theaters and auditoriums. There are no tasks to be performed by the viewer, such as verbal participation or notetaking. Most of the time he is a passive observer, free to relax and be entertained or become emotionally involved.

Large screen techniques attempting to involve an audience in a sight and sound experience are natural front projection situations. The advantage of the resulting long-throw light beam over the heads of large audiences allows wide pictures to reach the screen without distortion. Curved screens create scene wrap-around, and here again the pro-

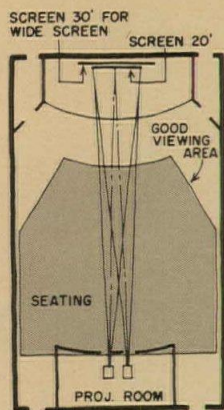


Figure 1: Standard and wide screen conventional seating theater

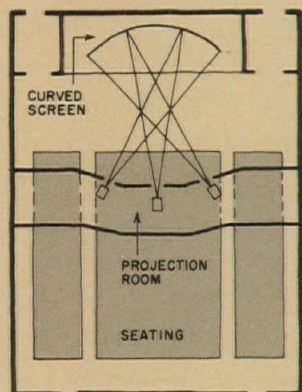


Figure 2: "Cinerama" 3-projector composite image, with deep curved screen

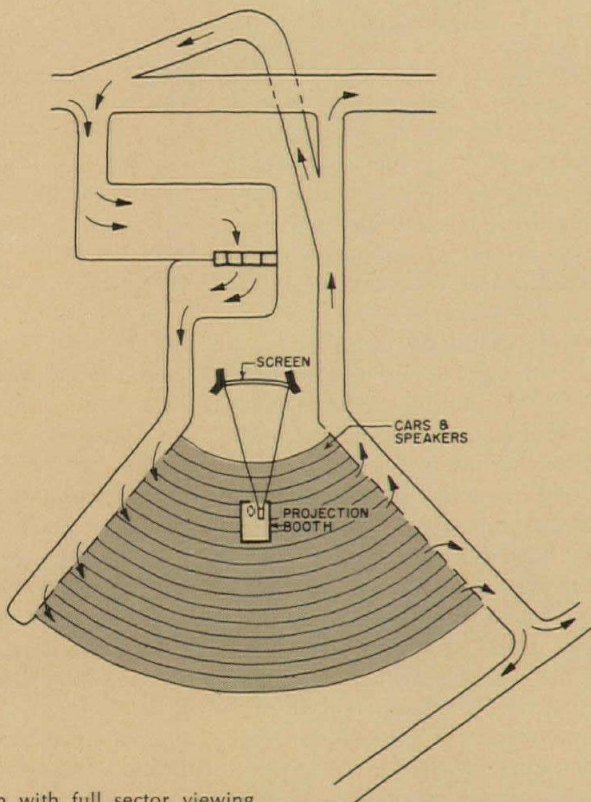


Figure 3: Outdoor drive-in with full sector viewing

jection devices must be placed on the audience side of the screen.

The Cinerama process typifies this technique. Here a curved screen, measuring some 50 ft across, curves in a circular arc with a chord-to-arc distance of 17 ft. Three front screen projectors are used to show simultaneous edge-matched images through specially designed optical systems (figure 2).

Most theaters today are equipped with front projection screens 50 per cent wider than the standard movie screen of 15 years ago (figure 1).

Both optical and architectural considerations make the front screen projection necessary where continuous wide or curved screens are used. If a rear-screen projection system were being considered for such an installation, the space needed behind the screen to accommodate long beams of light would be prohibitive. Further, curved screens with rear projection would not produce good image quality at the extreme sides of wide pictures and good audience viewing angles could not exist.

For certain special effects, such as the projection of images onto a horizontal screen at floor level, as was done at Labyrinth during Expo 67, a rear-projection system would obviously not be practical, and front screen projection becomes an absolute necessity.

Front projection gives the "best" images for judging film quality

The increasing production of television commercials and newsprint media advertising has created need for expanded agency screening capabilities. Advertising agencies use their screening facilities for viewing work prints, judging image and sound quality, and for client presentations. It is interesting to note that most agency screenings take place in rather small rooms, viewed by a group of from 4 to 12 persons and invariably use front projection.

Front projection systems for theaters and screening rooms imply, of course, the use of noise-isolated booths or projection rooms for housing the operator and the equipment.

Advertising screening rooms probably have the highest equipment cost per sq ft of projection screen—perhaps \$100,000 worth of projection equipment—pouring its output light beams onto a front screen only 52 in. wide. The system is costly, not because it is front-screen, but because the quality is the highest obtainable, and the accessories (such as color television transmission, videotape machine and TV monitors) are extremely costly. It is not expensive merely because of front-screen projection (figure 4).

Schools had "instant" audio-visual with front screen

With the early introduction of the portable 16mm motion picture projector to the school market, and with the increasing availability of education films, front projection of 16mm movies became extremely popular in schools.

The same situation held true for slide projectors and filmstrip devices. An expenditure of \$100 to \$300 resulted in an extremely flexible and portable front projection capability. The fact that front projection became so predominant in educational use does not imply that this projection method is necessarily ideal, but that it is simple and inexpensive.

The use of front screen projection in the classroom will, of course, continue as an extremely useful and expedient method of screening 16mm as well as super-8mm films. The newer techniques, however, demand a more comprehensive audio-visual environment, where the media more appropriately suit new educational processes. New teaching approaches have encouraged the use of rear screen projection.

Rear screen projection: where it started, and where it is used today

Rear screen projection did not get its start in this country until the early 1940s, but had been used in Europe some 20 years earlier. Although its use was short lived in the newsreel theaters that promoted it, its advantages began to find recognition throughout the various government agencies, and by 1960 there were some 200 rear-screen installations in military posts across the country.

The rear-screen technique was ideally suited to the military's needs to display all kinds of information, using random access slide projectors, 16mm movie projectors, overhead projectors, and television projectors. The briefing rooms contained elaborate rear screen systems with all projection devices wired for remote control from a command position within the viewing area. Multiple image techniques were first used in these rooms: a large key image was projected along with several adjacent smaller images to supplement the large one.

In other instances, one projector might project an overlay or grid pattern, while one or more data projectors superimposed data from computerized generators (figure 5).

Briefings could be conducted in properly lighted interiors and the viewers were able to take notes, operate equipment, move about, and do other tasks requiring more light than is available in a darkened room using front projection.

As the concept of total group com-

munications caught on, it was natural that it should spread to schools, universities, and commercial and industrial organizations, for in each of these uses the underlying needs are the same—to communicate.

Rear-screen projection has advantages for the modern corporate meeting room

Such rooms are today's industrial counterpart to the military briefing room. Seldom longer than 40 ft, they are ideally suited to rear screen systems to handle the projection of all visual materials (figure 6).

Brilliant images can be shown in normal room light; the only restriction is that light patterns should be directed down, and shielded from illuminating the screen.

With projectors located behind the screen, no light beams cross the room, no shadows are cast by hand-held pointers or people, and windows need not be light-tight.

The overhead projector, however, does not lend itself to rear projection because it is purposely designed to permit the lecturer to face his audience, to project over his head to a screen located behind him, and to let him write on an acetate overlay.

All of today's advanced display devices, including such newcomers as the electric blackboards, cathode ray tube displays, projected graphics, etc., will probably not displace the time-honored overhead projector, neither will a rear screen system replace a roll down or portable front screen.

Rear screen ties in with new teaching methods in schools

There is a growing trend toward equipping several areas in a school complex with permanent audio-visual systems. For example, it is not uncommon to find new schools with as many as a dozen areas equipped for rear screen systems. These systems provide for the rear screen projection of all popular media, as well as front screen use of the overhead projector and television projector. The spaces are designed for good viewing and listening, and usually include tiered seating so that table-top demonstrations can be seen clearly. Seating arrangements vary, but most all are arranged to provide for student discussion and participation (figure 7).

The use of television camera pickup, or provision for its early future use, is a necessary feature of every new system. Easy-to-see blowups of microscope slides, documents, experiments and such are viewed on TV monitors located throughout the room, or on the large front screen via the television projector.

Rear screen projection of television signals, using the same television projector, is also practical, and several schools employ this method where the space exists behind the screen. The image is reversed electronically and no mirror is required.

Chalkboards are still in demand as a visual aid, and are usually arranged to slide in front of the rear screen aperture, or to occupy the space below a high-mounted screen.

Behind the screen are usually several projectors, some on fixed tables or shelves, others on sliding table tops, allowing the "multi-plexing" of two or three different projection devices on screen center. Dual screen images are a commonly used format, with equal size adjacent images.

Although there is no rule that says rear screen cannot be used when there are more than a certain number of viewers, it must be remembered that rear screen systems excel when used in teaching situations, and the capacity of the typical lecture hall is limited by the size of student body engaged in learning at one time, and not by inability of a rear screen to serve a large audience.

An interesting parallel to the portable front screen operation is the use of what is best described as a mobile rear screen system. It consists of a rather large box on wheels, the front of which contains a rear screen, about 48 in. wide by 36 in. high (figure 18), and a space behind the screen for projector mirrors for using "folded optics" to save space, and necessary audio equipment. Although the advantages of lights-out use, mobility, flexibility, are all pluses, there still remains the initial cost of the cabinet, which may be as high as \$1,500.

Screens: How the front screen works to achieve optimum reflectance

The ability of a screen to reflect light depends upon several factors, such as color, texture, pattern, material and angle of mounting. If an observer views an image reflected from the central portion of the screen, he will see it with a brightness dependent upon his angular position relative to the screen.

Figure 8 shows a plot of the way three different kinds of front screens reflect light from the projector. The vertical line scale shows the amount of light reflected relative to a standard matte white surface which has the property of reflecting almost 100 per cent of the light it received from the projector in a perfectly diffused pattern, so that any observer may see the image with equal brightness no matter where he sits.

Commercial white matte screens do

not quite achieve such perfection; however, their characteristic curve is remarkably flat. Figure 8(b) shows that, at angles of view of 50 degrees off center, the screen is still reflecting almost as much light as it did on center. Such a screen performance may seem ideal, and it is in situations where the audience fans out in a wide arc and where the projector has no difficulty illuminating the total screen.

In theater projection, especially since the advent of the wide screen, image brightness requirements have increased, and available projector light outputs need an assist from the projection screen.

The pearl lenticular screen, whose characteristic reflectance curve is shown in Figure 8(a), is today's answer to the ideal screen problem. At angles of view of 50 degrees off center it still reflects all the light it receives from the projector; and, at lesser angles, it actually increases the reflected light by a factor of up to 1.6 at center position. The light "gain" for any other angle may be read from the chart.

At first it would appear that the screen is able to manufacture light, but this is not so. High central light gains are offset by extremely low gains of the wider angles of view.

The criteria of an ideal screen are that it be able to confine its low gain reflectance to those areas that are outside of the usable angle of observation and that within the useful area the gain is not too high at screen center.

Figure 8(c) indicates the highly specular nature of the common beaded screen. An observer on center sees an image that reflects over *four times as much light* as it receives from the projector. Such a screen is needed for living room showing of 8mm movies where a small group may sit practically on screen-center. The pronounced light fall-off at viewing angles above 20 degrees from center render this screen unusable for theater projection.

The light reflectances shown in figures 8(a) and 8(b) are for perforated screens. Theater screens are usually perforated with small holes a little larger than 3/64 in., spaced on 1/4 in. centers in staggered rows. This permits sound to be projected through the screen from behind, so that the illusion of "screensound" is preserved.

Seating plan affected by viewing angle as well as screen-brightness

Once the characteristics of a screen are known, the viewing geometry may be established. The viewing geometry is defined simply as the horizontal and vertical envelopes of good audience

sightlines. In the case of the matte screen, figure 8(b) indicates that the screen could be viewed from a position 60 deg off center and still reflect an image almost as bright as the normal on center image. Another factor, however, is perspective. When scenery is viewed, for example, the observer is not disturbed by the foreshortening of true length distances caused by angular viewing of the screen since the original scene appeared in perspective to the eye. But, if the subject is a person, or a circle, such as might occur in an educational film or slide, then it is disturbing to see the image distorted. Thus a person would appear taller and thinner, and a circle becomes an ellipse.

The maximum amount of horizontal distortion that normally can be tolerated is about 40 per cent, and this would be equivalent to viewing a circle at 50 deg off normal axis (figure 11).

The maximum useful angle of view for front screens may now be taken as 50 deg either side of the center normal. The pearl lenticular screen characteristic of fig 8(a) shows that this screen has unity gain at the extremes of the useful viewing angle, with a uniform buildup of gain to about 1.6 at center. The absence of a bright peak at center, such as occurs with the beaded screen of fig 8(c), insures that the viewer will see a fairly uniform image brightness. The screen actually reflects approximately one-third more light at the center than it does from a 50 deg observer position, but since the eye sees logarithmically, the apparent screen brightness difference is scarcely noticeable. If the brightness difference between center screen and edge of screen were actually three to one, the eye would interpret this as only a difference of 20 per cent.

A good picture calls for a strong enough projector

Although both the matte and pearl lenticular screens can cover a 100 deg viewing sector, it is obvious that the lenticular screen produces a brighter image, and thus makes a larger screen possible with a given projector light source. The part played by the projector in being able to illuminate the screen is now apparent.

Figure 12 explains that a bundle of light, say 400 lumens, shaped by an aperture to a rectangular beam, will just cover a 4 ft by 5 ft screen 30 ft in front of the lens. The intensity of this illumination on the screen, or the illumination per square foot, is averaged at $400 \div 20 = 20$ lumens per sq ft or 20 footcandles.

Screen "B" is twice as far away. It has four times the area, and conse-

quently one-fourth the light intensity, or 5 fc. Reflected light is measured in foot-lamberts—that is light reflected to the eye. If the screen is matte white, figure 8(b), then at a viewing angle of, say, 30 deg, it reflects .98 footlamberts for each footcandle it receives. Only with materials that have the property of producing a light gain can the footlambert value of reflected brightness be higher than the footcandle value at initial illumination.

The lenticular pattern (small cuplike depressions or lenses embossed in the vinyl screen material) are responsible for the light gain in lenticulated screen, each depression acting like a tiny automobile headlight.

To help the reader to visualize commonly encountered light values, a normal light source in a theater projector emits enough lumens to produce 15 footlamberts from a pearl lenticular screen, averaged over the entire area. If the screen is 20 ft wide and 8 ft 6 in. high, and has an average gain of 1.3, then the projector must emit $20 \times 8.5 \times 15 \div 1.3 = 1950$ lumens, or say 2,000 lm.

The projector shown in figure 12, while able to illuminate the 4 ft by 5 ft screen with 20 fc, which is excellent, is unable to illuminate the larger screen to a satisfactory footcandle level. Good practice requires 16 ± 2 footlamberts of reflected light for satisfactory viewing. Based on unity gain for a matte screen, screen B of figure 12 would require a lumen output from the projector of 8 ft by 10 ft $\times 16 = 1,280$ lm.

Standard light sources in 2 in. by 2 in. slide projectors have a lumen output of some 550 lm, and consequently require higher intensity light sources such as xenon, quartz halogen, or high wattage incandescent lamps, if large images are required.

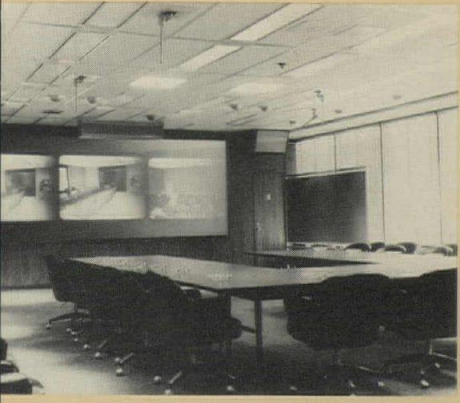
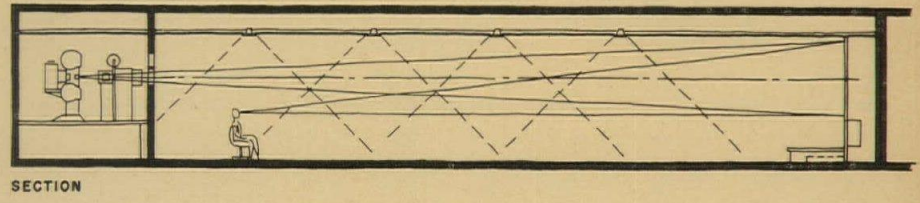
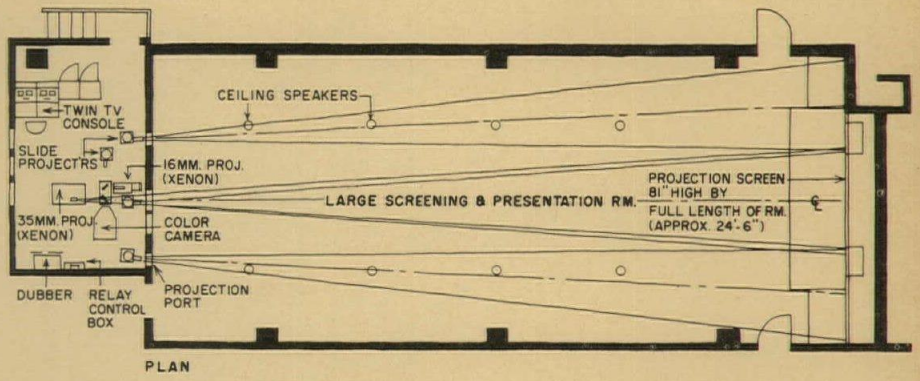
The rear screen has a different brightness pattern

There are two main differences between front-screen projection systems and rear-screen systems. First, the screen must transmit rather than reflect the projected light, and secondly, short focal length lenses are usually required to keep projector throw distances to a minimum, and thus conserve valuable space behind the screen. Both of these considerations work against optimum results.

It is difficult to produce a translucent screen material that can transmit light in a wide pattern similar to the pearl lenticular front screen, with good uniformity. Further, the projector light beam strikes the screen at a fairly large

**TWO SPECIAL TYPES OF FACILITIES: 1. A SCREENING AND PRESENTATION ROOM,
2. A MILITARY BRIEFING ROOM**

Figure 4: Screening and presentation room for an advertising agency: one of the most elaborate installations using front screen projection. Flexible equipment combines 35mm and 16mm film and slide projectors with color TV camera and controls.



Sophisticated rear screen projection equipment for NASA conference room's multiple screen is mounted in "stories" on three vertical elevator tables. Remote control raises and lowers stories to centerline. The structures on floor tracks can be positioned for one, two or three image projection.

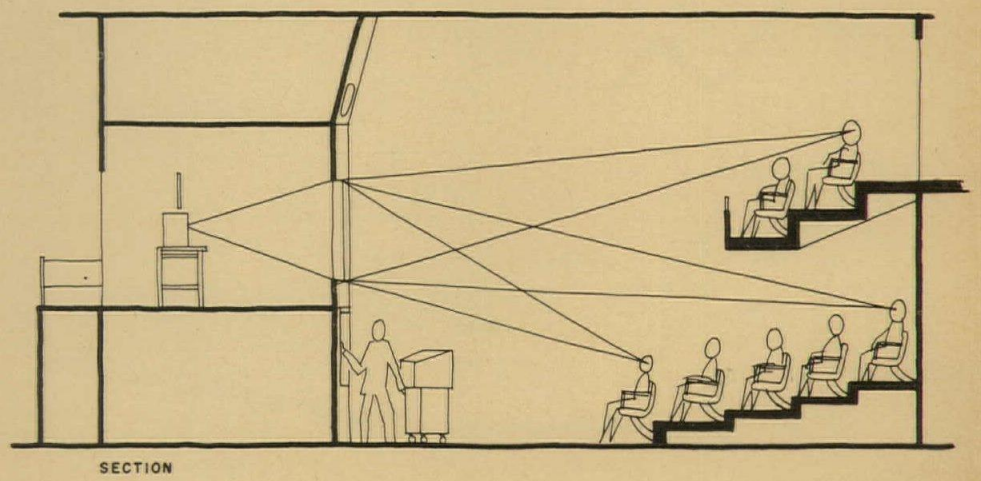
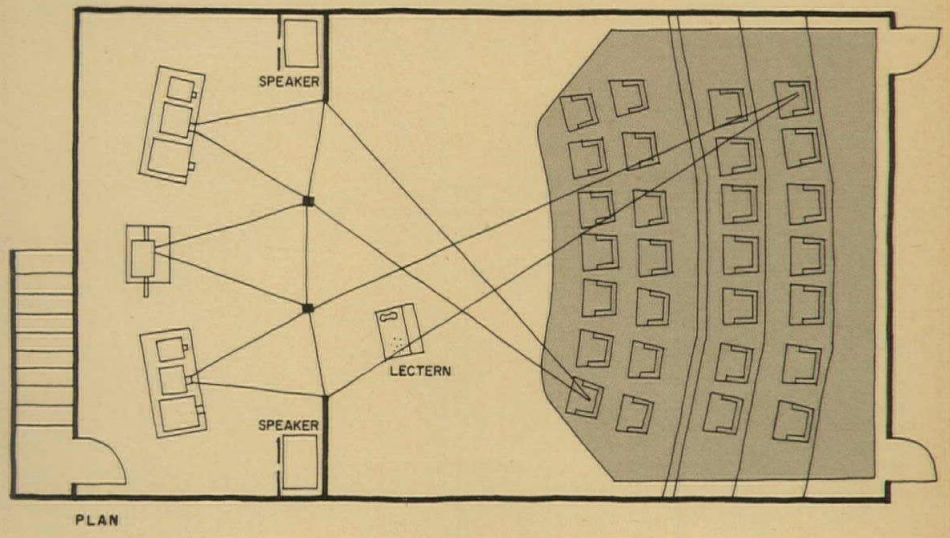
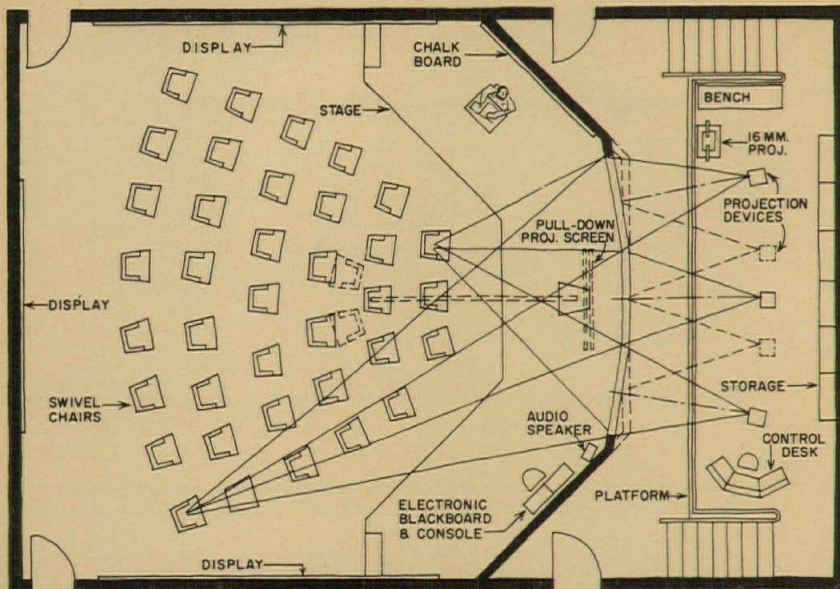
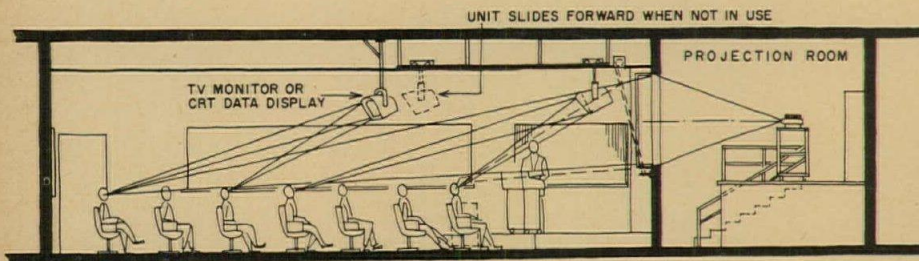


Figure 5: Military briefing room: one of the first major applications of the rear screen technique. Complex rear screen devices for the projection of multiple images are remotely controlled from the lectern. Provision for computer call-up from a vast store of visual data differentiates this briefing room from NASA installation in photos above.

TWO COMMON TYPES OF FACILITIES: 1. A COMPANY CONFERENCE ROOM, 2. SCHOOL LECTURE ROOM



PLAN - SHOWING 3-PART SCREEN, WITH ALTERNATE 2-PART SCREEN (DOTTED)



SECTION

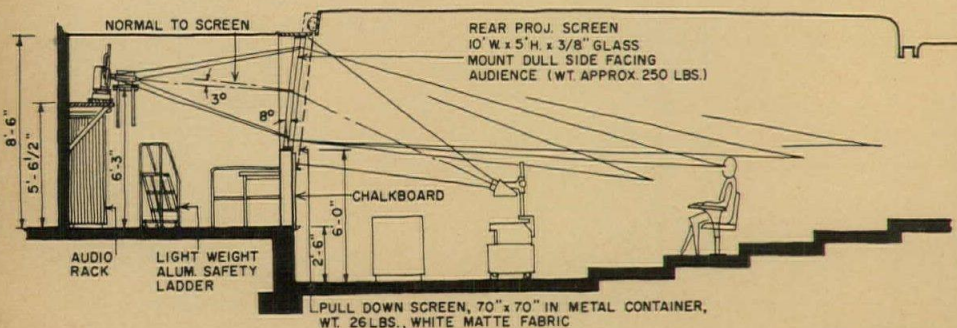
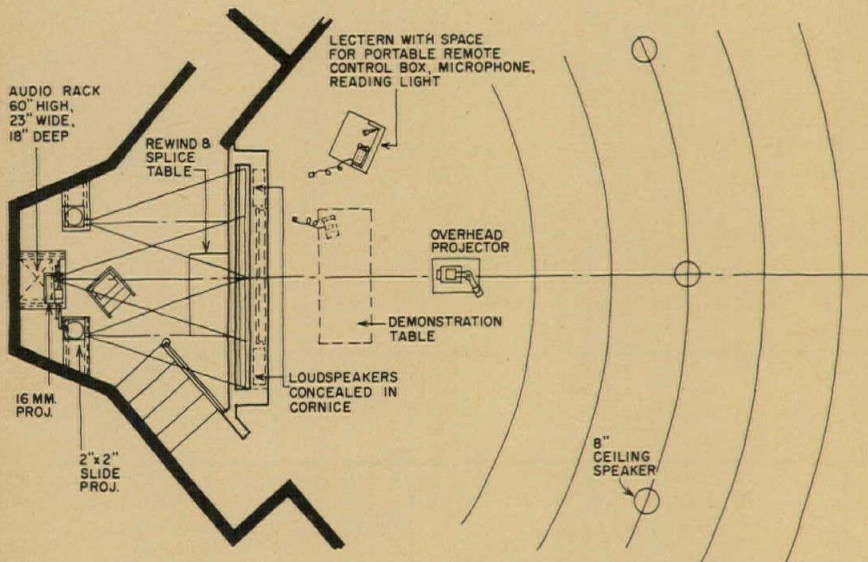
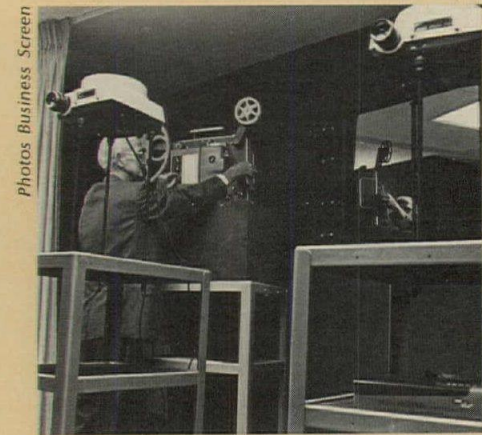


Figure 6: Typical company conference room includes three-part screen with alternate two-part screen (dotted), TV pickup, and flexible seating.



Rear screen equipment for a typical conference room, top photo, includes 16mm movie and slide projector. Mirror inverts movie image for transmission through screen. Participant in a seminar, bottom photo, uses chalkboard, with slides projected on dual-image screen. Rear projection both permits full room lighting and eliminates screen shadows. Equipment can be operated from remote control panel, lower right.

Figure 7: Typical small school lecture room is equipped with rear screen and overhead projection systems. A dual image screen is used.

angle at screen edges, due to the close proximity of lens and screen.

Figure 13 shows the problem and compares front and rear-screen projection. Note that in (a), the 50-degree limiting viewing angle has been taken from the far side of screen, instead of from screen center. This assures that perspective distortion does not exceed 40 deg anywhere across the screen, not just in the center.

An observer seated at A requires the screen to reflect the extreme edge ray through an angle of about 42 deg into his eye.

In (b), it is seen that the seating pattern cannot accommodate viewers up to the limiting distortion angle because the screen is not able to bend the transmitted edge ray through an angle of more than 60 deg without losing excessive light.

Figure 9 shows the results of a rear-screen characteristic light-gain pattern test.

How rear screen compares with front screen

To show how the two systems compare, the brightness curve for a pearl lenticular screen is drawn on the same graph as that for a rear screen (Figure 10). The curves show that:

1. The front screen is definitely superior for a wide-spread audience up to the limit of perspective distortion.
2. The front screen gives more uniform light distribution over the maximum usable viewing angle.
3. The rear screen (in both high and medium formulations) is capable of higher gains over narrow audience viewing angles of 25 deg each side of center than are the medium- and high-gain front screens.

While this would seem to favor the front screen, this is not always the case. If the extreme viewing angles do not exceed 35 deg from the normal at the far third of the screen, and all the advantages of lights-on use, no screen shadows, etc., are desired, then the rear screen is unexcelled.

Efficient room shapes consider characteristics of projection systems

A review of many recent designs for university and school lecture halls and auditoriums shows that some of the basic technical aspects are frequently overlooked. Rear screen is used predominantly, because it is so well suited to the instructional environment, but there is a tendency to overestimate the ability of the rear screen to serve a wide angle audience, and to disregard perspective distortion.

Particularly, when the popular clus-

ters of adjacent hexagon-shaped lecture halls are used, seating arrangements favor group discussion and live demonstration, but do not allow for the reduction in seating capacity when the room is to be used for screen viewing. With hexagonal rooms, 40 per cent of the area will be unusable for viewing a single image, and this is increased to 45 per cent when dual images are used side by side (figure 14).

Designing spaces for proper viewing of projected images, whether front screen or rear, is best done by fitting the room around the system rather than by fitting the system into a given space.

There are simple rules about screen size and shape

In discussing screen sizes, it is important to know what kinds of media will be projected. Each medium has its shape standard, or aspect ratio, and the screen must be wide enough and high enough to accommodate all the media that will be used. It is obvious that if the common 35mm slides are to be used, the screen will have to be a perfect square. If it is not, the tops and bottoms of vertical slides will be chopped off. Again, if a 16mm film image just fills a screen, then a 35mm slide projected to just fill the screen left-to-right will expose bare screen top and bottom. Table 1 lists sizes and aspect ratios of all commonly used film media.

Key dimensions describing seating area can be related to the width of the screen. Good practice calls for a screen width equal to 1/6 the distance from screen to farthest viewer. Back row viewing is referred to as 6W viewing.

The distance from the screen to the first row of seats should be approximately 2W. The 2W and 6W distances are based upon a single image at screen center, even though wide screen Cinemascope, dual or triple images are used.

How to get the maximum number of seats

Full sector seating refers to the seating arrangement in which the audience occupies the full sector bounded by the 2W distance in front, the 6W distance at the rear, and by the side lines based on permissible distortion. Figure 15 uses a single front screen W ft wide and a 50 deg off-normal side angle, measured at the screen extremes. If a wide screen is used for multiple images, or a Cinemascope screen, the side viewing lines move inward, resulting in fewer seats.

The 50 deg side angle, while satisfactory for lecture hall and auditoriums, is usually reduced to 40 deg in theaters, where patrons pay for a "good" seat, and where the showing may require two

TABLE 1. STANDARD APERTURE DIMENSIONS AND ASPECT RATIOS

Kind of film	Height, Inches	Width, Inches	Aspect Ratio
8 mm motion picture	.129	.172	1.33:1
Super-8 mm m.p.	.158	.211	1.33
16 mm motion picture	.284	.380	1.33
35 mm motion picture	.600	.825	1.37
2 x 2 single frame	.688	.906	1.32
2 x 2 double frame	.906	1.344	1.48
2 x 2 super slide	1.500	1.500	1.00
3 1/4 x 4 lantern slide	2.75	3.00	1.09
3 1/4 x 4 Polaroid slide	2.40	3.26	1.36
4 x 5 slide	3.50	4.50	1.28

Note: Aspect ratios of wide screen formats vary from type to type, but the most popular are:
 16 mm Cinemascope.....A.R. = 2.65:1
 35 mm Cinemascope.....A.R. = 2.34:1

or more hours of observation from the same seat.

Full sector seating is obviously only economically sound when the building envelope has a sector-shaped floor plan. Consequently lecture hall complexes are often grouped in pie-shaped wedges around a central rear screen projection area to take advantage of the maximum seating capacity offered by this kind of arrangement. Figure 16 gives two examples of the kind of shapes that can be used to surround full sector seating.

Rectangular rooms, such as the usual boardroom, conference room and training room, cannot use full sector seating because of the waste of space along the side angles. The width of the partial sector is determined by a trade-off between seating capacity and space economy. Seating capacity may require a room so long that the proper size screen cannot fit between floor and ceiling with enough space below the screen to assure good viewing over the heads of the audience (figure 19).

Partial sector seating areas need careful consideration, since they are usually required where there are restrictions on available ceiling height. Ceiling height is one of the most important dimensions in any such room. It can be the one limiting factor which governs the height of the screen, and consequently its width. Six times the screen width then establishes the farthest viewer, and thus the length of the room.

Other factors that enter the picture are building module lines, use of single or multiple images, types of seating such as conference table, informal, seminar and auditorium. So variable are all of these conditions that it is impossible to lay down fixed rules for a given space.

THE LUMINOUS CHARACTERISTICS OF FRONT AND REAR SCREENS

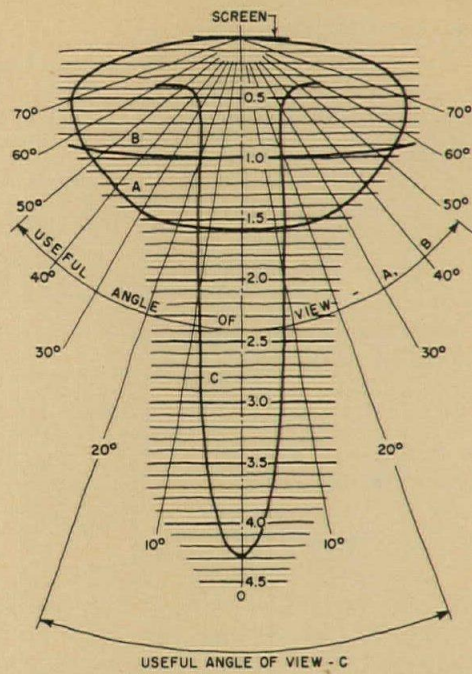


Figure 8: Reflecting characteristics of three different front screens.
 A: pearl lenticular (perforated)
 B: white matte (perforated)
 C: Beaded

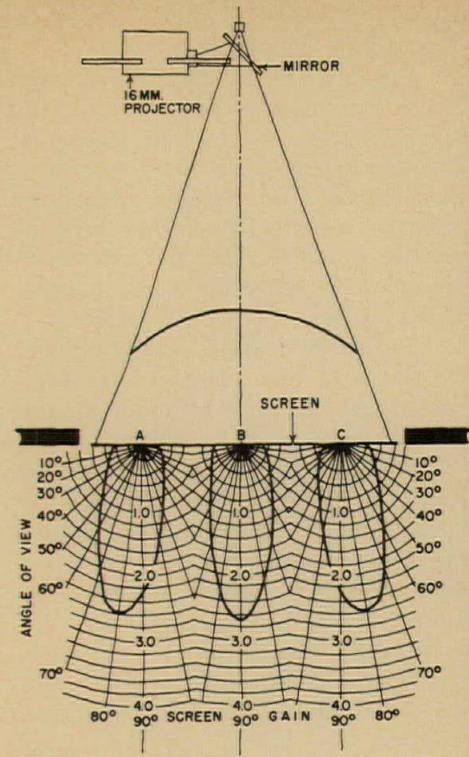


Figure 9: Transmitting characteristics of a rear screen.

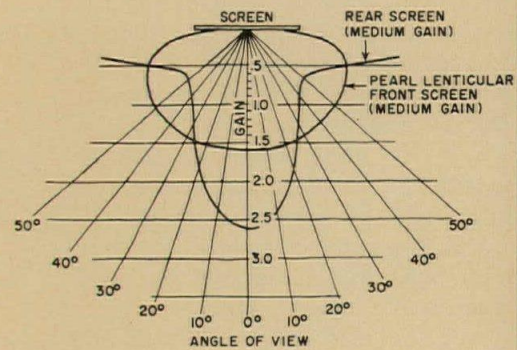


Figure 10: Comparison between front and rear screen characteristics.
 (Note: The rear screen characteristic appears different from fig. 9 as it has been plotted with rectangular ordinates rather than polar.)

GUIDELINE DIMENSIONAL AND AUDIENCE CAPACITY DATA FOR CONFERENCE-ROOM TYPE SPACES

TABLE 2. DESIGN GUIDELINE FOR TYPICAL OFFICE BUILDING CONFERENCE/BOARD ROOM AUDIOVISUAL SYSTEMS

ROOM DIMENSIONS				PROJECTION ROOM			SCREEN DETAILS					SEATING ARRANGEMENTS								
Width of Room	Ceiling Height	Slab-to-Slab Height (Min.)	Length of Room	Depth Behind Screen (Min.)	Platform Height (A.F.F.)	Platform Depth	Screen Height (Clear)	Single Screen Width (Clear)	Double Screen Width (Clear)	Triple Screen Width (Clear)	Bottom of Screen A.F.F.	Distance Screen to Nearest Viewer	Number of Viewers (Auditorium Seating)			Number of Viewers (Swivel Chairs)			Conference Table Size	No. of Chairs
A	B	C	D	E	F	G	H	W ₁	W ₂	W ₃	J	K	One Screen	Two Screens	Three Screens	One Screen	Two Screens	Three Screens		
18'-0"	8'-6"	9'-6"	32'-0"	9'-0"	2'-4 1/2"	6'-0"	3'-3"	4'-10"	9'-8"	14'-6"	4'-9"	9'-8"	42	40	36	18	18	16	18' x 4'	16
	9'-0"	10'-0"	35'-0"	11'-9"	2'-9"	8'-9"	3'-6"	5'-2"	10'-4"	15'-6"	5'-0"	10'-4"	42	42	39	20	20	18	18' x 4'	16
	10'-0"	11'-0"	40'-0"	12'-0"	3'-0"	9'-0"	4'-0"	6'-0"	12'-0"	18'-0"	5'-0"	12'-0"	48	48	46	23	22	20	20' x 4'	16
20'-0"	8'-6"	9'-6"	32'-0"	9'-0"	2'-4 1/2"	6'-0"	3'-3"	4'-10"	9'-8"	14'-6"	4'-9"	9'-8"	48	46	42	20	20	18	18' x 5'	18
	9'-0"	10'-0"	35'-0"	11'-9"	2'-9"	8'-9"	3'-6"	5'-2"	10'-4"	15'-6"	5'-0"	10'-4"	56	54	50	21	21	19	20' x 5'	20
	10'-0"	11'-0"	40'-0"	12'-0"	3'-0"	9'-0"	4'-0"	6'-0"	12'-0"	18'-0"	5'-0"	12'-0"	64	62	58	24	23	22	22' x 5'	20
24'-0"	8'-6"	9'-6"	32'-0"	9'-0"	2'-4 1/2"	6'-0"	3'-3"	4'-10"	9'-8"	14'-6"	4'-9"	9'-8"	60	56	50	22	20	18	18' x 6'	20
	9'-0"	10'-0"	35'-0"	11'-9"	2'-9"	8'-9"	3'-6"	5'-2"	10'-4"	15'-6"	5'-0"	10'-4"	68	64	58	23	22	20	20' x 6'	20
	10'-0"	11'-0"	40'-0"	12'-0"	3'-0"	9'-0"	4'-0"	6'-0"	12'-0"	18'-0"	5'-0"	12'-0"	72	69	63	26	25	23	22' x 6'	22
30'-0"	8'-6"	9'-6"	32'-0"	9'-0"	2'-4 1/2"	6'-0"	3'-3"	4'-10"	9'-8"	14'-6"	4'-9"	9'-8"	81	71	61	28	26	24	18' x 18'	28
	9'-0"	10'-0"	35'-0"	11'-9"	2'-9"	8'-9"	3'-6"	5'-2"	10'-4"	15'-6"	5'-0"	10'-4"	83	77	69	31	27	25	20' x 18'	30
	10'-0"	11'-0"	40'-0"	12'-0"	3'-0"	9'-0"	4'-0"	6'-0"	12'-0"	18'-0"	5'-0"	12'-0"	96	90	82	35	29	27	22' x 18'	32
38'-0"	8'-6"	9'-6"	32'-0"	9'-0"	2'-4 1/2"	6'-0"	3'-3"	4'-10"	9'-8"	14'-6"	4'-9"	9'-8"	92	78	64	32	30	28	18' x 18'	28
	9'-0"	10'-0"	35'-0"	11'-9"	2'-9"	8'-9"	3'-6"	5'-2"	10'-4"	15'-6"	5'-0"	10'-4"	99	89	79	36	32	30	20' x 18'	30
	10'-0"	11'-0"	40'-0"	12'-0"	3'-0"	9'-0"	4'-0"	6'-0"	12'-0"	18'-0"	5'-0"	12'-0"	119	104	88	39	35	32	22' x 18'	32

HOW SCREEN CHARACTERISTICS AFFECT AUDIENCE SEATING AREAS

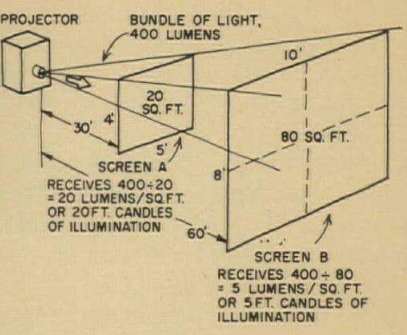


Figure 12: Quantity of light (lumens) remains constant regardless of distance, but intensity of illumination (lumens per sq ft) decreases as the distance increases. Thus a screen twice as far away from the lens as a given screen receives 1/4 of the light per square foot.

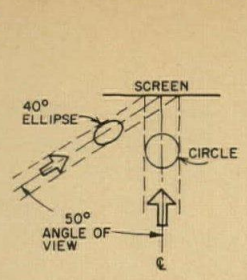


Figure 11: Distortion due to angular viewing

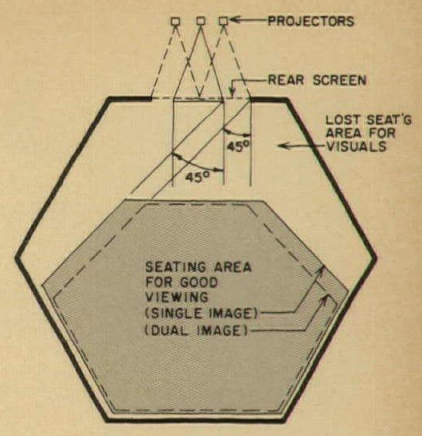


Figure 14: The popular hexagon-shaped lecture hall loses valuable seating area when maintaining good sight lines.

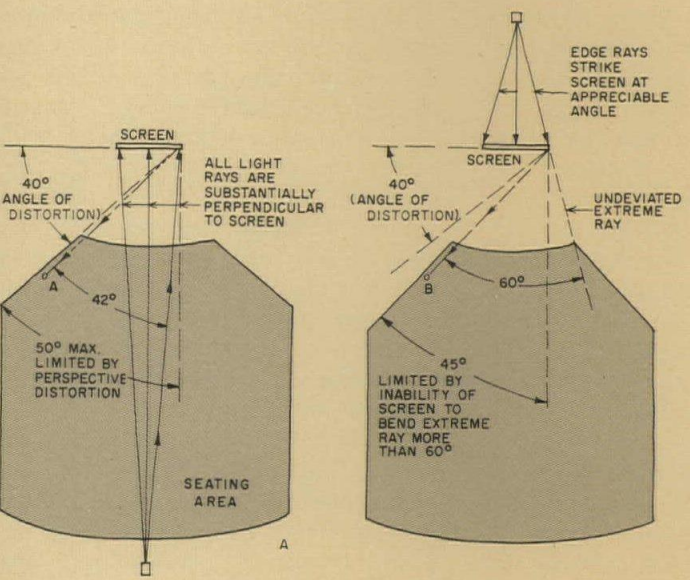


Figure 13: Seating area in front screen system is limited by perspective distortion, in rear screen by screen characteristics.

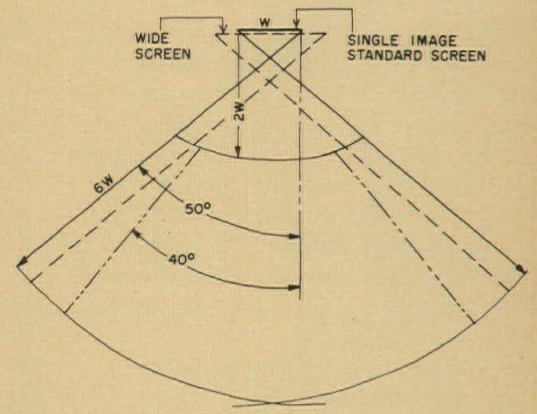


Figure 15: Full sector seating for a front screen installation

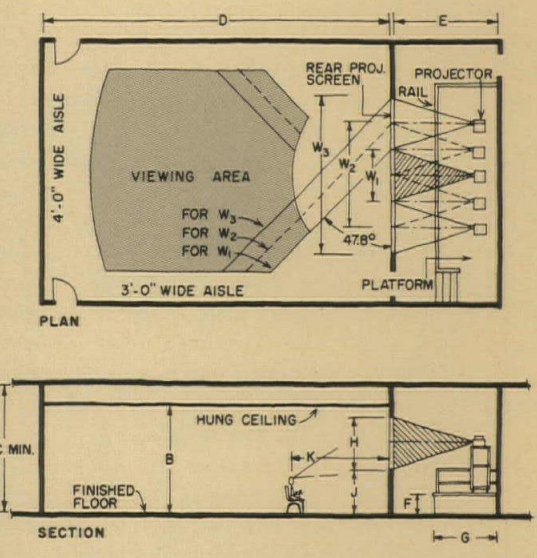


Figure 17: Partial sector seating. Symbols refer to Table 2. (Note: When ceiling heights are in excess of 10 ft, screens may be higher and rooms longer. Usually a speaker's dais is provided to give satisfactory sight lines. These cases must be given careful consideration, as there may be acoustical, audio, lighting and air conditioning problems.)

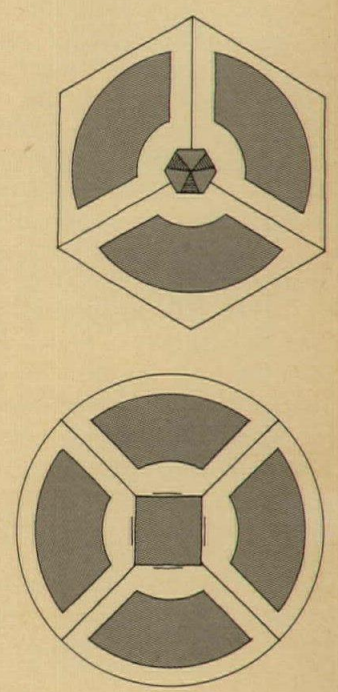


Figure 16: Building shapes which accommodate full sector seating

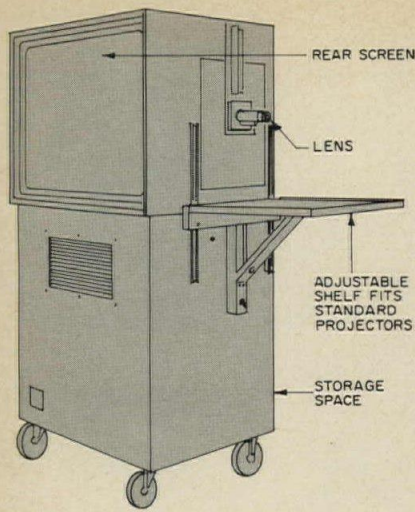


Figure 18: Mobile rear screen system

Table 2, however, serves as a guide. The space shown (figure 17) is a typical conference board room with partial sector seating for one, two or three adjacent images on a rear screen. The data have been aimed at the typical ceiling heights found in most office buildings. Slab-to-slab heights shown are minimum, and allow for high hats in the ceiling for housing ceiling loudspeakers. Air-conditioning ducts must also be provided for.

Some rooms require sloping floors for better sightlines

Sloping the floor of the audience area upward toward the rear of the room in many cases improves viewing, but it is not always possible. Theaters and large auditoriums and lecture halls require it. In theaters it is desirable so that large audiences can have unobstructed sightlines. In lecture halls it permits all observers to see down on the top of demonstration tables and displays.

Sloping floors are, of course, usually out of the question in meeting rooms in office buildings, especially where the room is multipurpose. Although flat floors and shallow ceilings are not conducive to optimum viewing arrangements in the larger rooms, this condition will have to be lived with in most commercial buildings.

Theater floors are usually sloped so that theoretically a person in any row can see over the head of the person seated two rows ahead. Seats are staggered to allow him to see over the person in the next row.

A rise sufficient to attain the idea of no interference from the row immediately in front of the viewer leads to slopes too steep for theater orchestra seating, but is more nearly achieved in the balcony, where there are fewer rows of seats.

It is common practice to slope main floors 6 in. in rise to 3 ft 6 in. of run.

This allows good sight lines under the balcony, and limits the last row of the balcony to a height which permits light beams from the projectors to clear the heads of standers, and cover the screen without too much down tilt.

Figure 20 depicts the usual theater geometry, showing projector light beam and audience line of sight.

Too much projector tilt produces a "keystone" image

Note that the downtilt of the projector in figure 20 is appreciable. This is, of course, necessary if the theater contains balconies, but it causes what is known as "keystone" on the screen. This means that the image spreads wider at the bottom than at the top.

The distortion is never noticed in movies, but could be disturbing in slides depicting rectangular objects, or charts with ruled grids. Any so-called "keystone correction" which squares up the projected trapezoid only corrects the edges, but does not correct the image itself. It is achieved by re-shaping the aperture mask in the projector gate, actually shaping it to a trapezoid.

There are theater installations with 20 deg or more downtilt (and also uptilt in the case of drive-in theaters) with their consequent 20 deg of keystone. The image border is corrected to rectangular, but the actual image objects cannot be. In still picture projection (slides, transparencies), 8 deg keystone can be tolerated, but a maximum of 3 deg is more desirable. These angles are valid for vertical as well as horizontal keystone. The latter takes place when projectors are angled sideways, as happens when the projectors are aimed to superimpose their images on a single screen. If projector is tilted vertically and horizontally at the same time, the resulting image will be a combination of the two keystone patterns.

The true correction for any keystone situation is to slope or tilt the screen so that the optical center line of the projected beam is perpendicular to the screen. This is more necessary with rear screen projection than with front screen, because of the shorter distance used behind the screen. This explains why platforms are always used with rear screen systems to elevate the projector (and the operator) to optical centerline.

A glance at figure 20 shows why theater screens aren't tilted—if they were tilted up to correct keystone they would favor balcony viewing and the orchestra seats would view a tilted screen with less light reflectance. A vertical screen is preferred in theaters, favoring neither balcony nor orchestra.

Some general rules for laying out projection rooms

Rear projection systems

1. The center of the lens of all projectors (optical center line) should be located 48 in. above the surface on which the operator stands. (See figure 21.) This assures that the average person can operate, thread, change slides, etc. in perfect comfort and safety. If this cannot be done, then a casted safety step platform should be used to provide the same working height.

2. For a 16mm film projector, L = approx. 1.65 W . For a 2 in. by 2 in. 35mm slide projector, L = 1.5 W . These factors are based on using a $\frac{5}{8}$ in. EFL lens for the 16mm, and a 2 in. EFL lens for the 2-in. by 2-in. slide projector.

3. When 16mm movie projector is used rear screen, the image must be inverted left-to-right, necessitating a small mirror attachment to the projector. This means the projector must be turned sideways. The distance L used in figure 21 is measured along the centerline of the "folded" light beam of figure 22.

4. If the space behind the screen is shallow, the beam can be folded further downstream, and a larger mirror used, shown in figure 23. All mirrors should be front surface reflectors to avoid parallax. Slide projectors do not require image inversion mirrors as the slide itself can be inverted.

5. Movie projectors are threaded and operated from the side nearest their lens. Figure 24 explains right and wrong ways to mount 16 mm projectors.

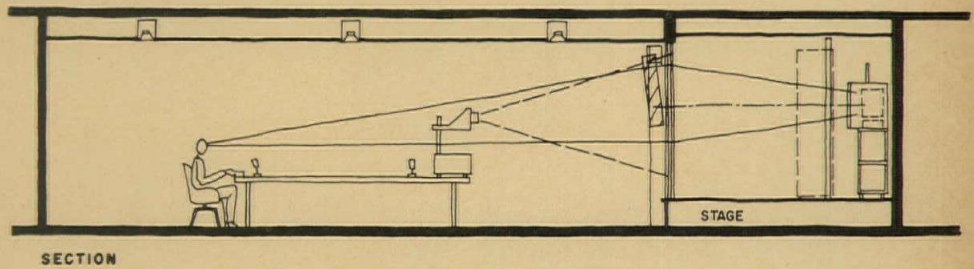
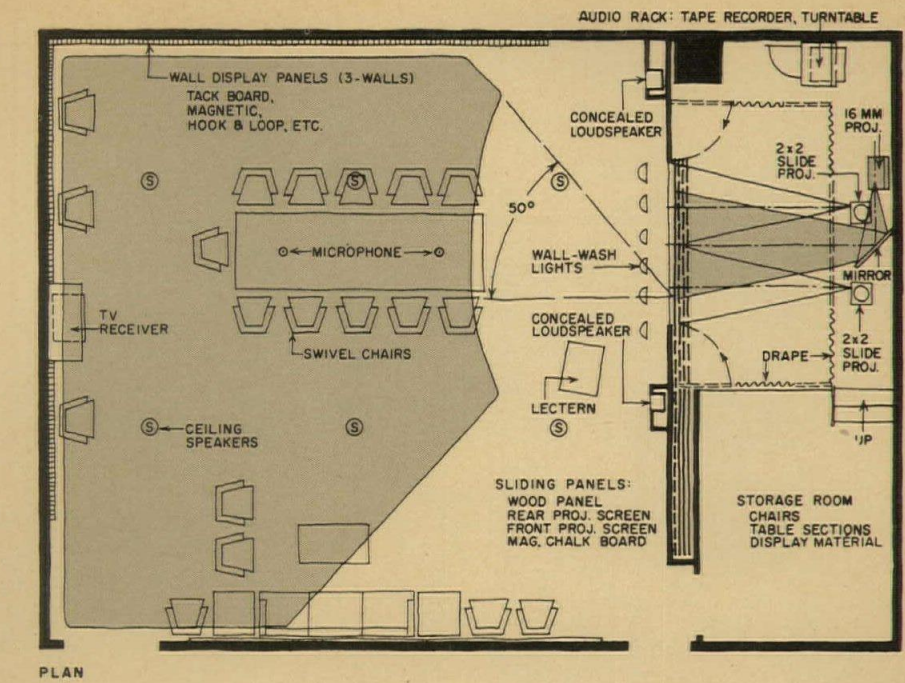
6. In permanent installations, rear screens should preferably be glass, usually $\frac{1}{4}$ in. thick up to 10 ft wide, $\frac{3}{8}$ in. thick beyond 10 ft wide. Mount dull side facing audience to kill reflections from the lighted room.

7. Sometimes dual image screens are angled, with a mullion in the center, figure 25(a). This permits wider sector viewing, but the idea is bad because a single picture cannot ever be shown on center, which is disturbing during a long reel or presentation. The arrangement shown in fig 25(b) permits a center picture, but now prevents dual images to be shown side by side at room center. Showing dual images on screens A and C, and skipping B, gives viewing "ping-pong" head movement. A straight screen, no mullions, is preferred, figure 25(c). This can handle one, two, or three images centered on room center line.

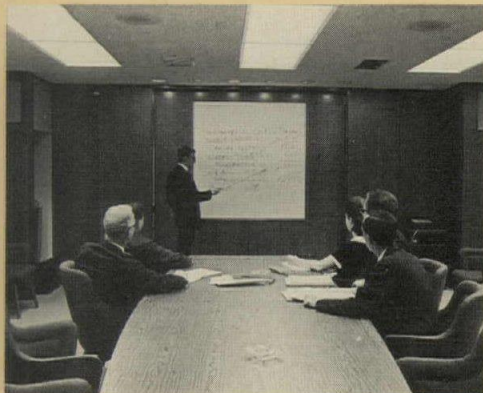
8. Paint the interior of rear screen projection room with a dark, non-reflective color. Use no shiny metal trim on tables, shelves, etc. This keeps reflections from the back of the screen from illuminating the rear space, thus reducing contrast on the screen.

SOME GEOMETRY PARTICULARS OF CONFERENCE ROOMS AND THEATERS

Figure 19: Partial sector seating adapted for a small combined conference-lecture room layout. Layout permits both rear screen and overhead projection.

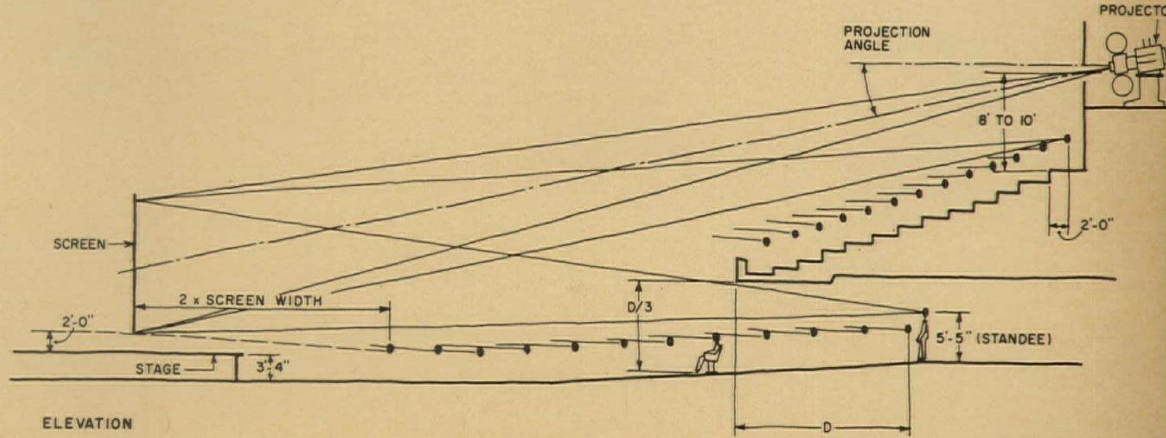


Photos Business Screen



Fixed rear screen equipment for this conference room can be curtained off when screen is not in use. Screen panels slide into wall, opening up projection area for use as a stage.

Figure 20: Standard theater geometry. Balcony capacity is usually one-third to one-half that of the main floor. Note that for good sound distribution, the balcony does not overhang the last row of seats by more than three times its height.



PROJECTION ROOM AND SCREEN GEOMETRIES

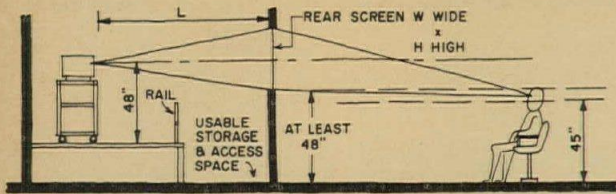


Figure 21: Mounting height of screen and projectors

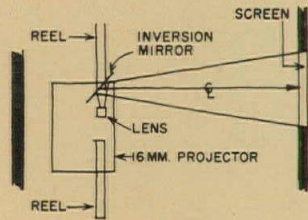


Figure 22: Placement of movie projector for rear screen use

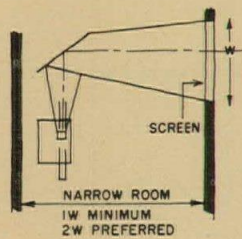


Figure 23: Folding light beam in narrow room

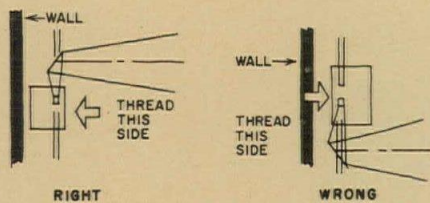


Figure 24: Threading movie projector from right (lens) side

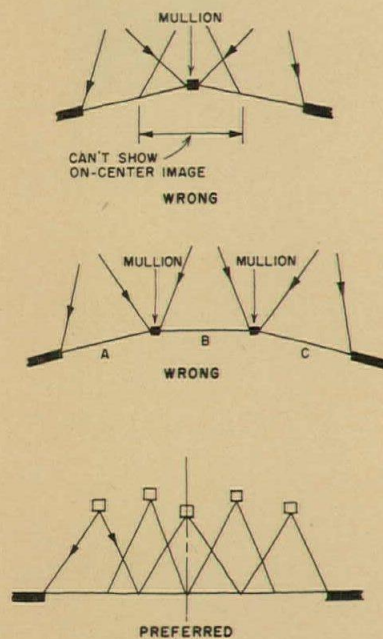


Figure 25: The use of mullions is not recommended

9. Unless a projector has to be mobile, don't use castered tables. They wobble, despite manufacturer's claims to the contrary. Bolt them down.

10. Furnish rear screen installations with a roll-down (manual or electric) front screen so that an overhead projector can be used. Arrange to tilt this screen back at the bottom, keeping it taut. A portable tilting screen is another alternative, preferable in some instances. Don't try to use a rear screen for front projection. The very features that make it a good rear screen make it a poor front screen.

Front screen systems

11. Allow 3 ft 10 in. as an absolute minimum between any two adjacent professional 35mm projectors for operation. All American projectors thread on the right side when looking from behind the projector.

12. Professional theater booths should be at least 10 ft deep from front to back. Some 35 and 70mm projectors are almost 5 ft long from end to end.

13. Porthole openings in the wall should be either single or double-glazed with water-clear 1/4 in. thick glass selected for optical use. One piece is sufficient if the acoustical treatment of the aperture wall is no better than the attenuation afforded by a single pane of glass, properly edge sealed. But if the application is a studio screening room with a low noise level requirement, then both the aperture wall and the glazed port must be effective sound barriers, and double glazing is called for. Separation between panes is essential to provide attenuation, and this must be in the order of 2 in. minimum. All glass should slope in a direction which will reflect the projected light beam down toward the booth floor. The beam should not be reflected back into the lens, or in the operator's eyes. If two panes are used, they should be parallel.

14. Observation windows may have their panes vertical. Their sound attenuating performance should be as good as the projection ports.

15. Fire shutters are still required by most building codes on all aperture windows for professional booths using 35mm equipment with high intensity light sources, even though nitrate base film is no longer used. This law could certainly stand some revision, especially for commercial installations in such places as advertising agencies and studio screening rooms.

16. Provide exhaust ventilation, at least 150 cfm per projector to take away the heat from carbon arc and xenon lamp houses. Smaller projector lamp houses may be vented into the booth. All booths should be air conditioned.

PROFILITE

GLASS that could change your thinking about design, lighting, strength, heat and sound insulation



PROFILITE

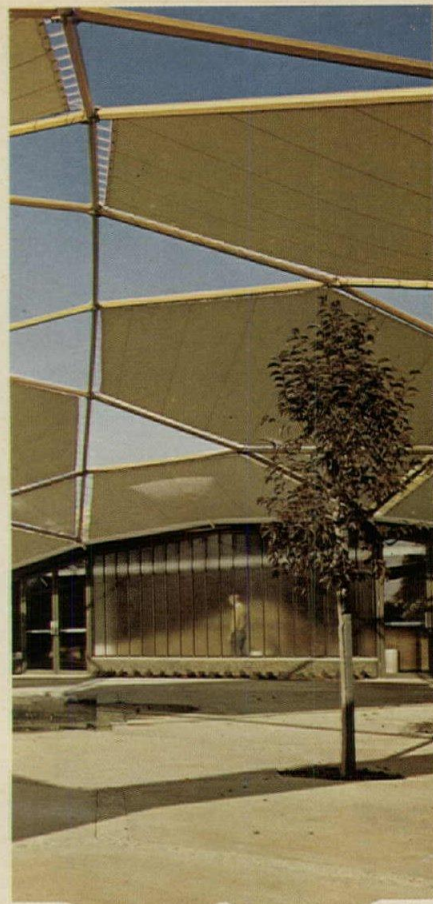
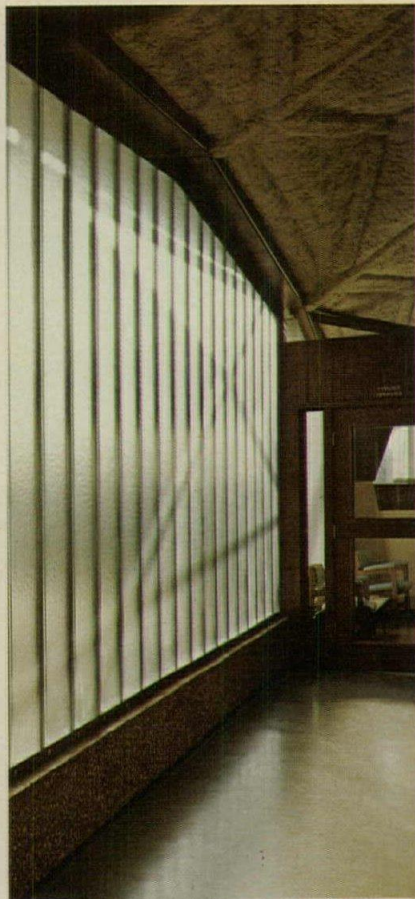
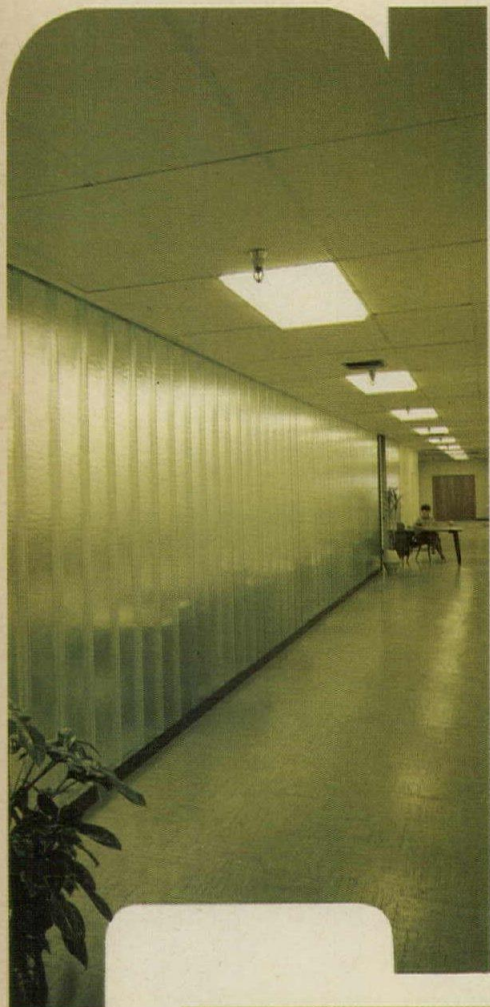
lets you use glass
as never before

MISSISSIPPI GLASS COMPANY



For more data, circle 78 on inquiry card

PROFILITE



PROFILITE

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

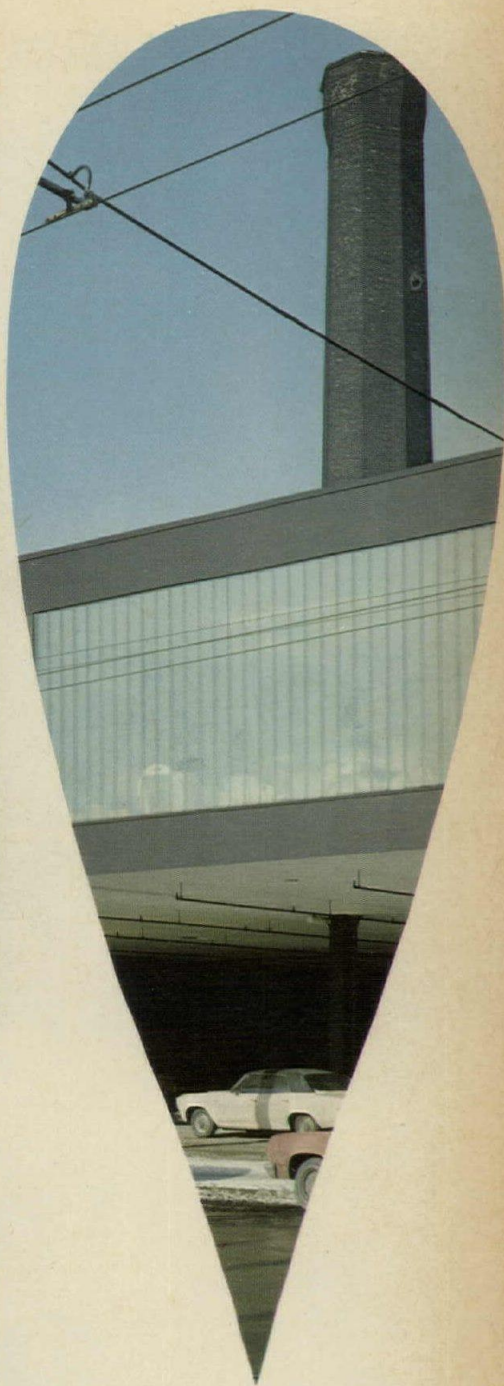
You need to think differently about glass to bring Profilite into your building plans. With it you have new design possibilities. It also offers new structural efficiencies. Picture the rising channels of Profilite giving their upsweep to building exteriors. Look down corridors where vast stretches of 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 SECTIONS so easily handled two men can install

Profilite sections are just under 12 inches in width ($11\frac{13}{16}$ ""). The stock lengths of 8, 10, and 12 feet are easily handled by two men without special equipment. Profilite weighs 4.34 lbs. per linear foot, so a ten-foot section could be lifted and set in place by one man if necessary and easily by a two-man team. Profilite is set in anodized aluminum sills supplied as part of the Profilite glazing system. Slip-in vinyl inserts seal the areas between metal and Profilite glass channels.



CHANNEL MOVEMENT
helps compensate as build-
ing 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.

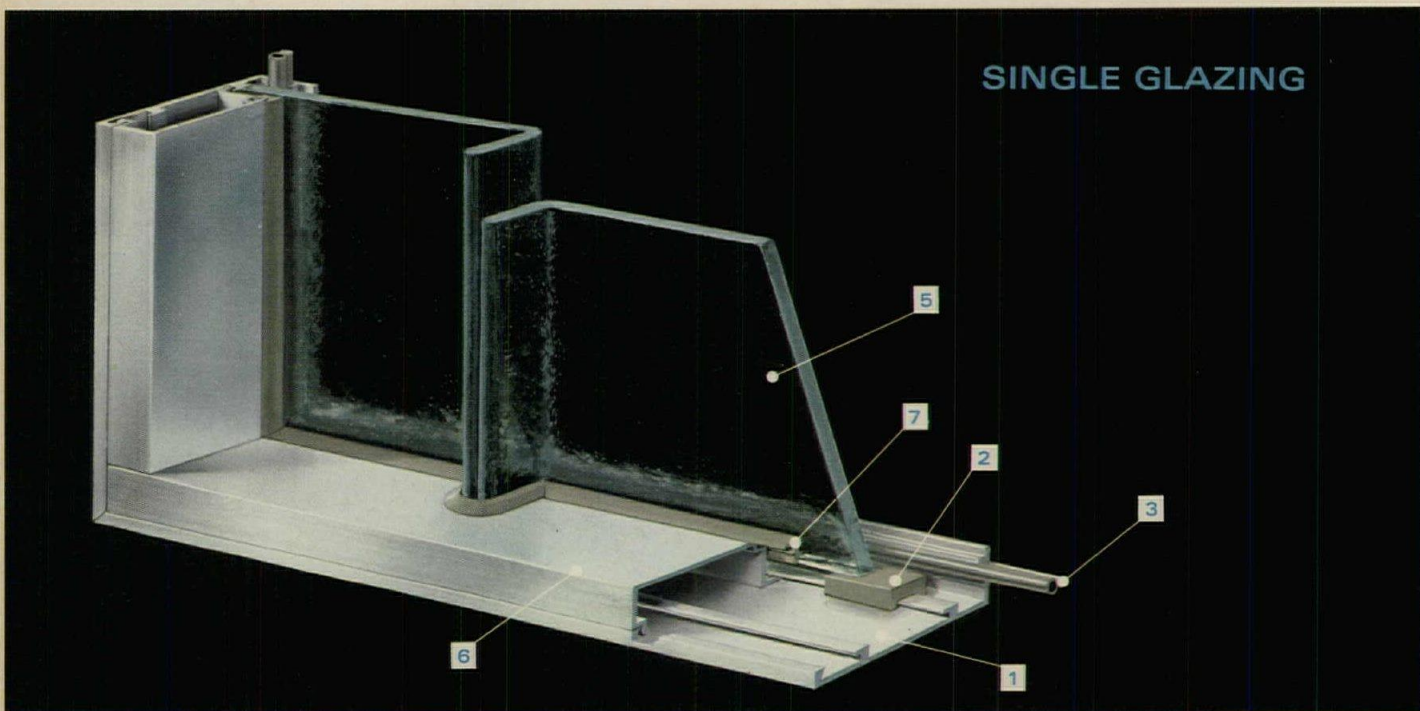
GIVES PLANTS CURTAIN WALL LOOK

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%.

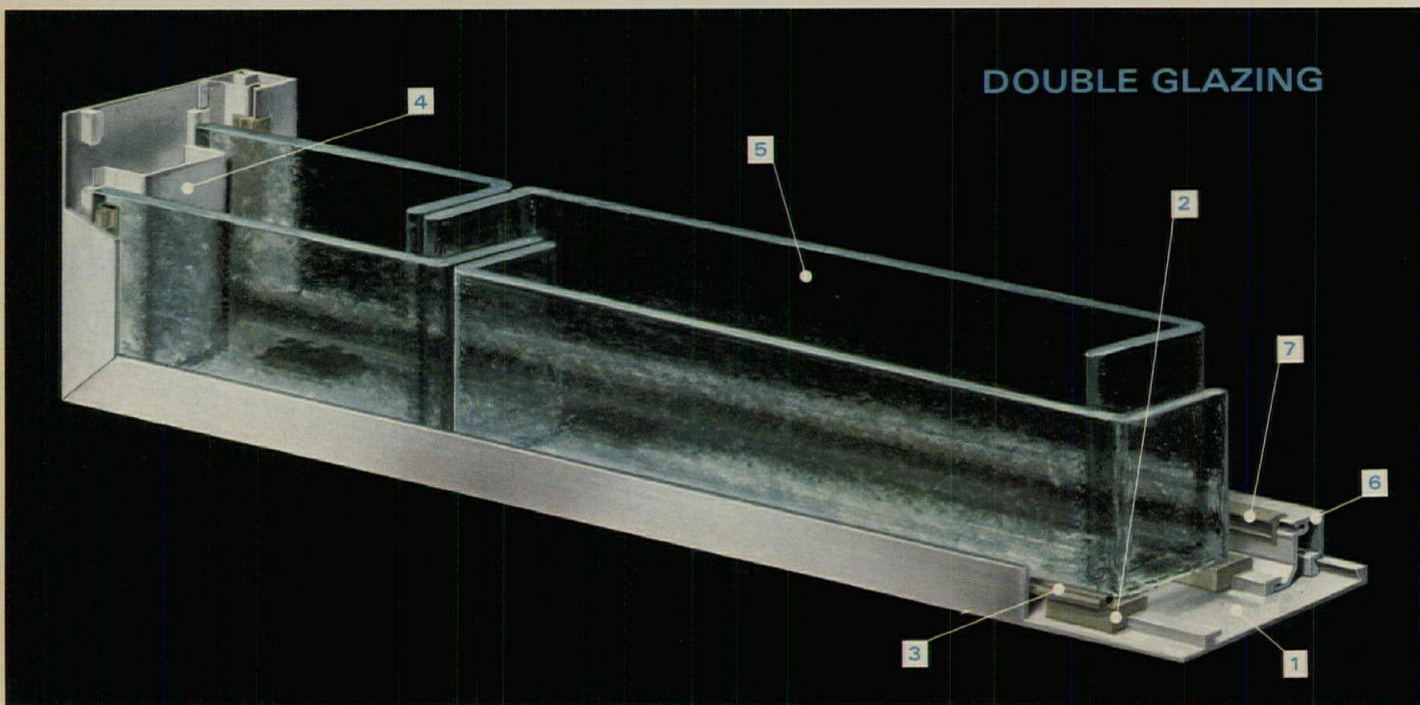


PROFILITE EASY TO INSTALL

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.



SINGLE GLAZING



DOUBLE GLAZING

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

Write for Profilite
Installation Guide
for detail glazing
instructions.



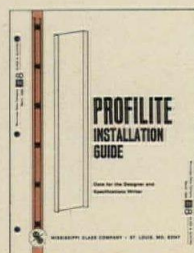
See our catalog in Sweet's 5

MISSISSIPPI GLASS COMPANY

88 Angelica Street • St. Louis, Missouri 63147

NEW YORK • CHICAGO • ATLANTA • DALLAS • SAN FRANCISCO • FULLERTON, CALIF.

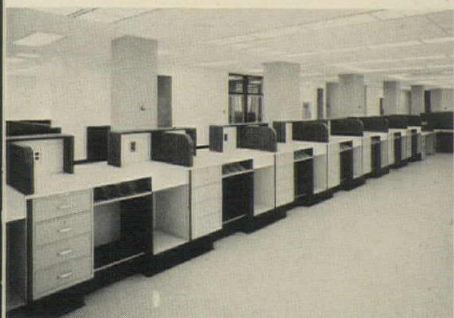
Largest Domestic Manufacturer of Rolled, Figured and Wired Glass



For more data, circle 78 on inquiry card

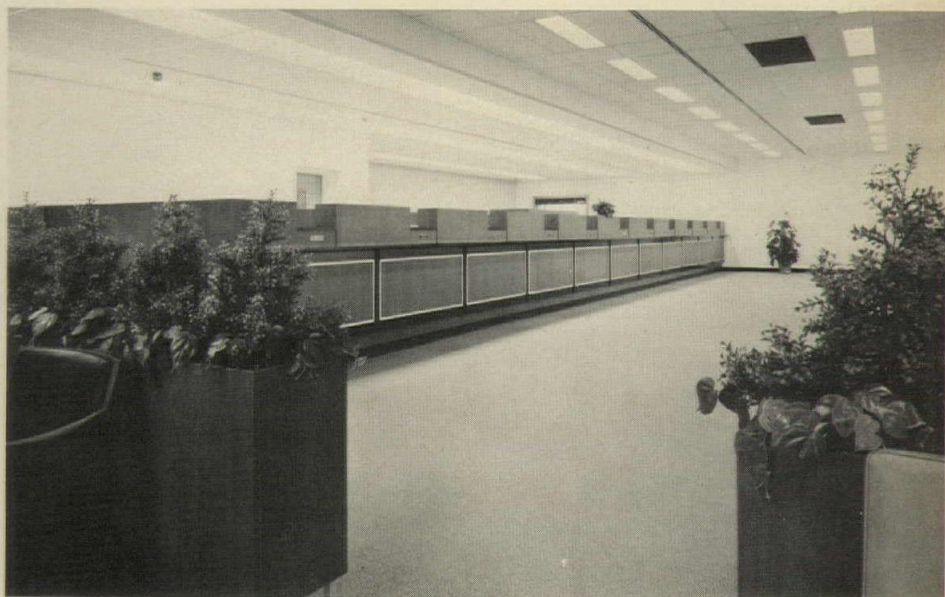
For more information circle selected item numbers on reader service inquiry card, pages 243-244

Modular financial furniture: "overnight installation, lifetime service"



Modular furniture designed especially for banking-financial interiors promises to be attractive, efficient, flexible, comfortable and long-lasting. Each "package" or line—simply described as decorative barrier-type counter furniture—presents innumerable configurations. And the flexibility of the basic configuration and mobility of components allow design freedom.

This "erector-set" furniture is constructed principally of improved high-quality particleboard and surfaced with high-pressure laminates. The abrasion-re-



sistant, color-fast laminates come in eight wood-grain patterns and four solid colors. The basic components can be easily modified with materials such as stainless

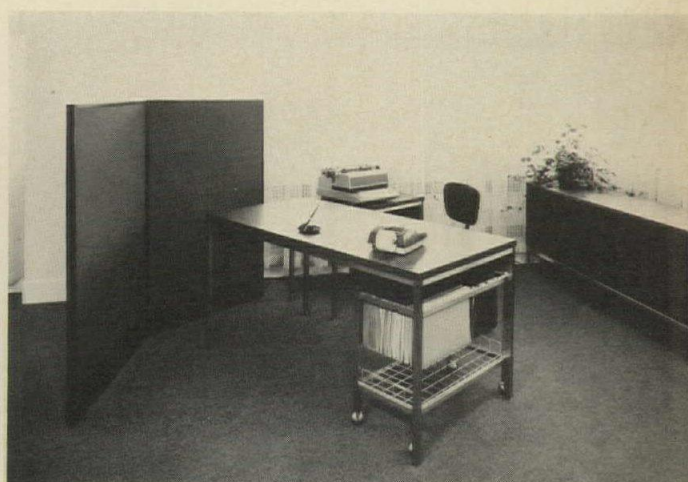
steel, Carrara glass, marble and terrazzo, or by alterations of fixtures and fronts. ■ The Mosler Safe Co., Hamilton, Ohio.

Circle 300 on inquiry card

"Fuzzy" office furniture takes the bounce out of random noises



Desks, files and mobile partitions finished in a textured nylon material, *Artitex*, have been acoustically engineered to trap and disperse audible sound frequencies. *Artitex*, which is fuzzy to the touch and has a light, airy look, comes in 28 colors, is abrasion resistant and can be cleaned with a vacuum. In the landscaped office

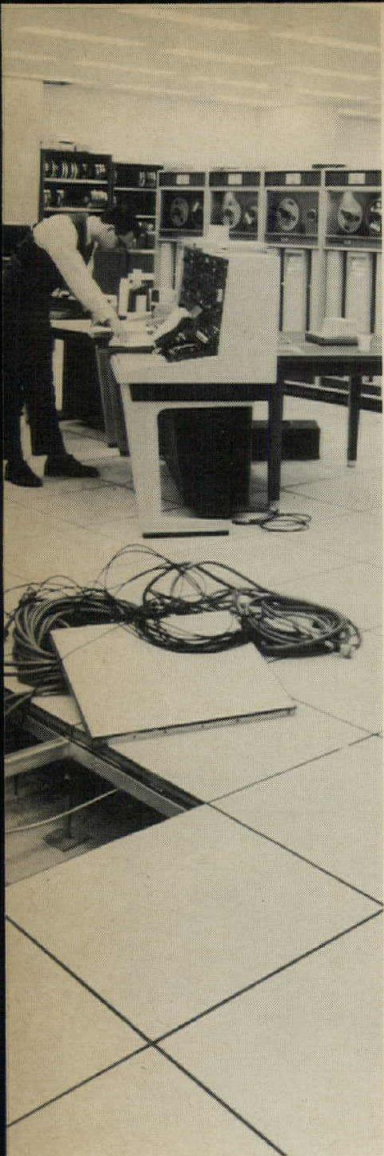


where there are no floor-to-ceiling partitions, this furniture should be especially valuable.

Units are interchangeable, mobile and flexible. For instance, a work table can be converted into a desk with snap-on side and front panels and a mobile set of drawers. A mobile file, also with snap-

on panels, slides under the desk on roll casters. A secretary's chair can be converted into a desk chair with snap-on arm rests. And an enclosed file unit also serves as a partition. ■ Art Metal, Jamestown, N.Y.

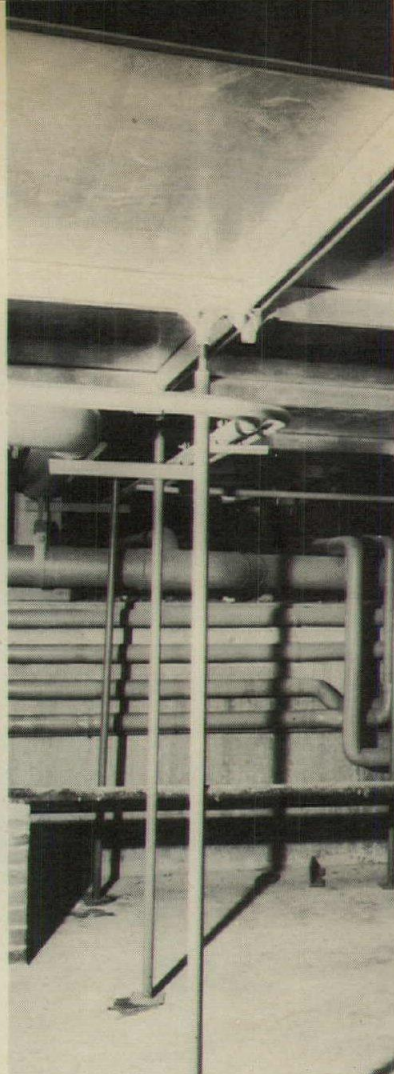
Circle 301 on inquiry card
more products on page 185



The idea started with computer rooms. Elaflor's vinyl plenum seal combined with Data-Aire modular air conditioning units gave highly effective under-floor cooling circulation while panels lifted out easily for instant access to utilities and cabling.



Now, see what it's done for a laboratory area. Electrical, water, gas, air, and drainage lines are completely concealed, yet completely accessible for repair or alterations. Lines can be brought up anywhere, even the middle of the room for full design freedom.



Lowered ceilings are a commonplace technique in renovation work. But here, they raised the floor. This avoids ripping out, provides an ultra-convenient place to run utilities. A simple way to even up different levels varying from inches to feet.



Elaflor provides ultimate flexibility for general office space. Utility and communications lines can be altered at a moment's notice, and with Liskey Space-maker Movable Partitions, office areas are equally flexible. Floor panels available in tile or plush nylon carpeting.

Solve a design problem with Liskey Elaflor, the only complete elevated flooring system.

Only Liskey offers complete freedom of design. Three basic suspension systems . . . rigid grid, removable stringer, or stringerless. Three floor panels . . . die-formed steel, steel-clad phenolic bonded core, or extruded aluminum. No need to substitute or compromise, pick the system that best solves your problem.

See our section in SWEET'S or write for our AIA file of detailed specifications.



LISKEY ALUMINUM, INC.

A Subsidiary of CapTech Inc.
Box 580, Glen Burnie, Maryland 21061
740 West 190th Street, Gardena, California 90247

For more data, circle 109 on inquiry card

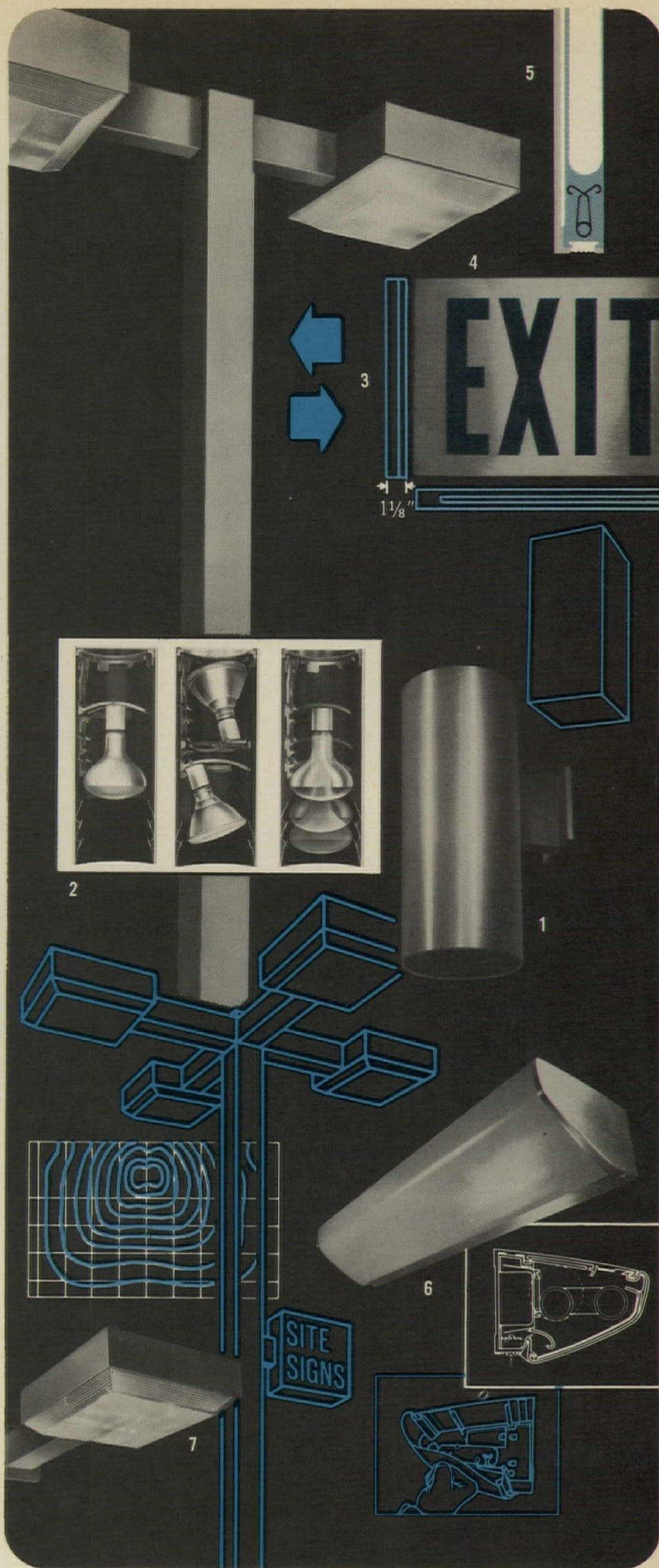
It Took 1,625 Completely New Ideas To Get Architects To Prefer MOLDCAST Lighting Fixtures

(HERE ARE SEVEN OF THEM)

1. The Controlux Cone*, a remarkable development in black specular reflectors, makes magic in Moldcast Cylinder Fixtures. This is the first hidden source fixture which permits the widest flood distribution (up to 108°) or the narrowest spot (33°) with no "hot spot" in the center, no sharp drop-off at the edges.
2. Lamp adjustability gives Moldcast Cylinders a truly unique flexibility. Raise or lower — go from a spot to a flood. Adjust the beam angle up to 20°. The source **remains** hidden (thanks to Controlux magic). You can alter your illumination effects with absolute precision **in the field** to meet specific requirements.
3. We've got the thinnest Exit Sign* made by anyone to date (a mere 1 1/8" sliver of a thing).
4. Our Exit Sign is also the most evenly illuminated (bet a thin dime you can't tell where the lamps are).
5. Our Exit Sign operates on a 50,000 hour lamp life **without** extraneous electronic components that increase failure probability.
6. Our Impacta 900 Wall Bracket was designed for people who combine the most refined taste with murderous aggression. Punch it . . . the lovely thing bounces right back. Our secret — We're the first to incorporate almost indestructible Lexan® into a rugged pre-stressed fixture design.
7. Moldcast Site Modules are the first **architecturally** conceived site lighting line. They aesthetically unify site and structure by extending the rectilinear geometry of modern building design throughout the site.

We concede that Johnny-Come-Lately has to run faster to catch up with the oldsters up ahead. We do it with new ideas by the gross. By completely disguising exceptional ruggedness and durability with unobtrusive classic design. With optical and mechanical innovations worthy of imitaton by others . . . later on. With such total product flexibility that we standardize most normally customized product variations (and pass on the savings).

* Patented



Discover a few more of the remaining 1,618 new Moldcast ideas.
Send for the complete Moldcast Product Catalog by writing:

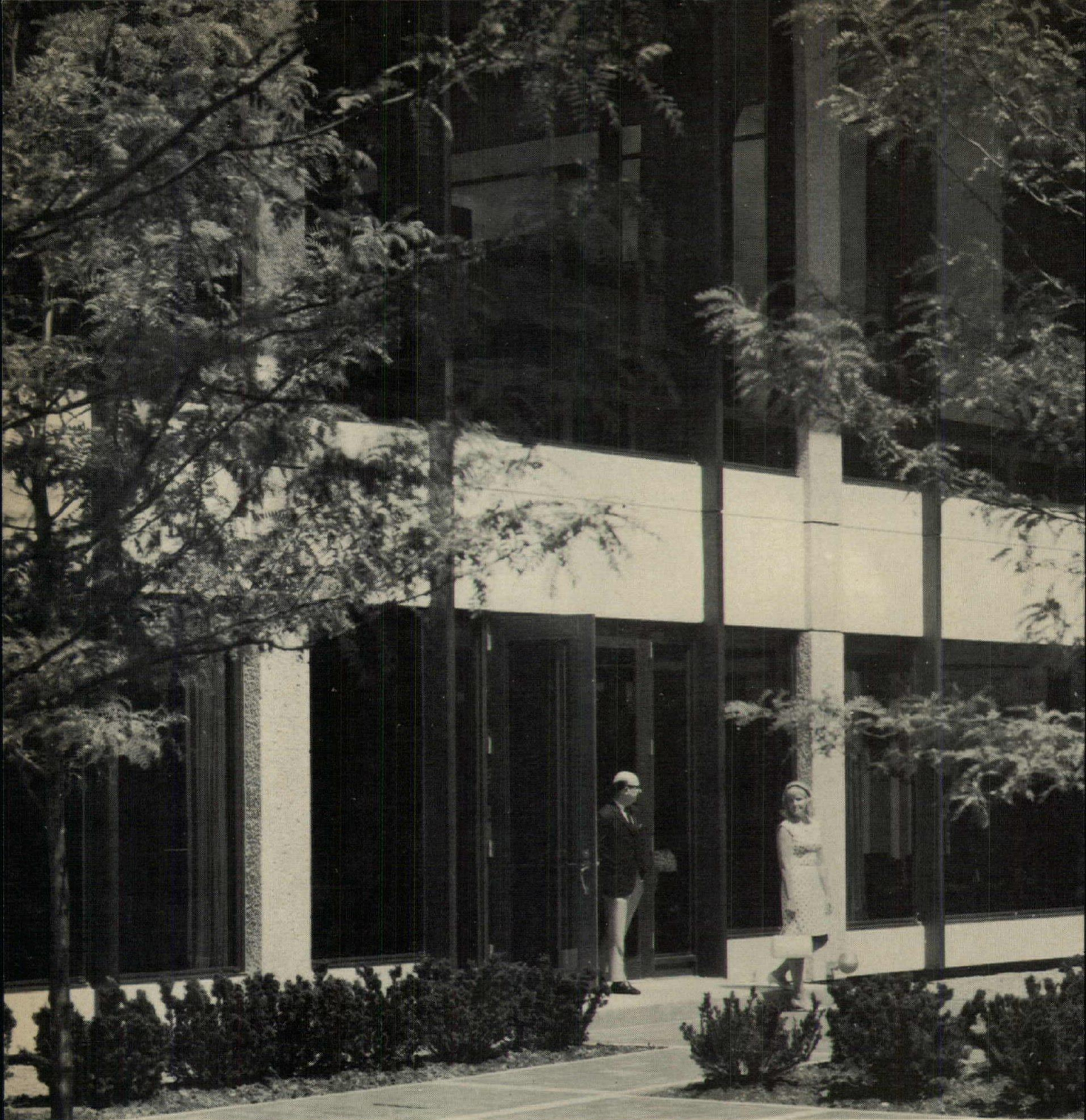
MOLDCAST MANUFACTURING COMPANY

164 DELANCY STREET, NEWARK, NEW JERSEY 07105 • In Canada: Verd-A-Ray Electric Products, Ltd., Montreal 9, Quebec, Canada

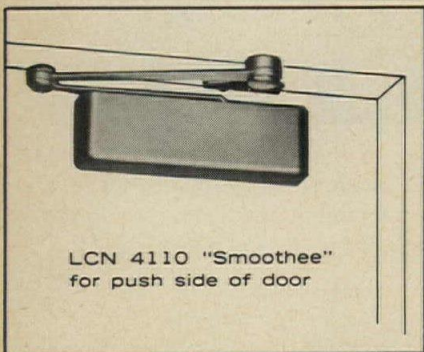
Serving Architecture Through Lighting

For more data, circle 89 on inquiry card

For more data, circle 88 on inquiry card



To make handsome doors practical...

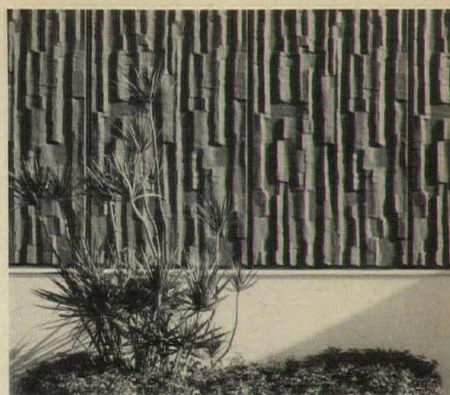


LCN 4110 "Smoothee"
for push side of door

People who notice such things comment often that the finest buildings they see always have LCN Door Closers. It's not true. It's not *always*—it is *usually*. Architects recognize the extra value in the expertly engineered LCN Closers. When they design beautiful doors, or when doors must provide real control under difficult conditions they know there's a better closer—LCN. In all styles—and all with a five year guarantee. Catalog free on request.

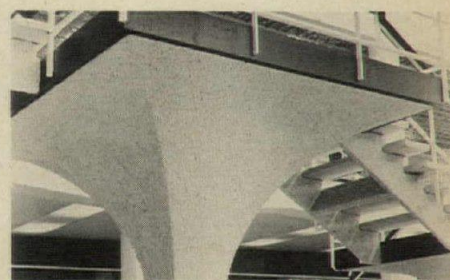
PHOTO: Scott, Foresman & Company National Headquarters, Glenview, Illinois.
Architects: The Perkins & Will Partnership, Chicago.

continued from page 165



SCULPTURED BUILDING PANELS / Facad, an exterior building panel, permits sculptured and textured relief in the design of buildings. The composition is asbestos-reinforced calcium silicate completely cured in autoclaves. The final product, a relatively thin slab of reinforced concrete, can be as large as 4 in. x 10 in., and can be used in any climate. Eight basic earth tone finishes and a choice of textures, patterns, finishes and depth of relief are available. ■ U.S. Plywood, New York City.

Circle 302 on inquiry card



AGGREGATE MATRIX / Artstone, an epoxy exposed aggregate matrix, is reported to be lightweight, strong and versatile. It has been used in high-rise apartments, banks, schools, and hospitals, and may be used on interiors and exteriors in new construction or remodeling. Stone colors, sizes and types may be blended, mixed or matched. ■ Marbleloid Corporation, North Bergen, N.J.

Circle 303 on inquiry card



RIGID FOAM / Heat- and fire-resistant rigid foam system withstands prolonged temperatures up to 300 deg F and is said to retain excellent dimensional stability. ■ Uniroyal, Inc., New York City.

Circle 304 on inquiry card

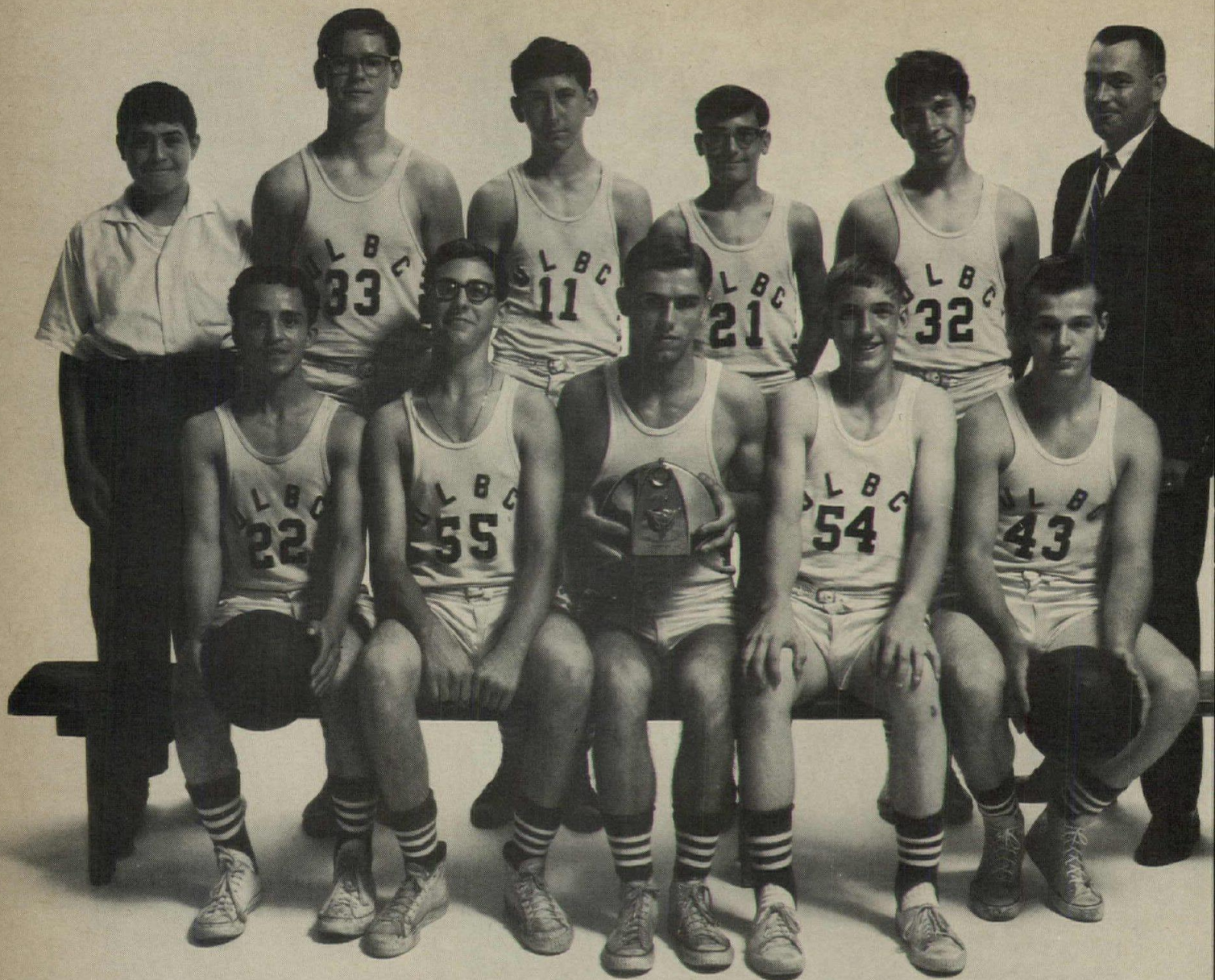
more products on page 188

add door control



LCN CLOSERS, Princeton, Illinois 61356
 A Division of Schlage Lock Company
 In Canada: LCN Closers of Canada, Ltd.

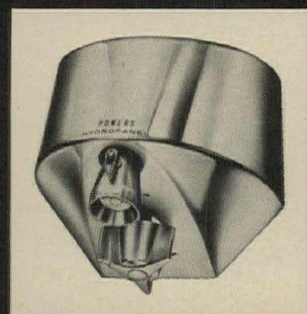
For more data, circle 90 on inquiry card



to scrub a team

and save water with a 2-in-1 shower unit,
Powers keeps you in control.

Newest twist in showers is Powers Hydropanel® shower unit. Adjustable shower head teams up with a self-contained, automatic water mixer—in one low-cost, overhead installation. Completely safe. No wall knobs. No sudden bursts of hot or cold water. Hydropanel dials instantly to a precise temperature for personal comfort, significant water savings. Powers total capability makes it possible. Our engineers will study your needs and help design your shower system. And whether you require a single control valve or a bank of Hydropanels, Powers keeps you in control. You can bank on it.

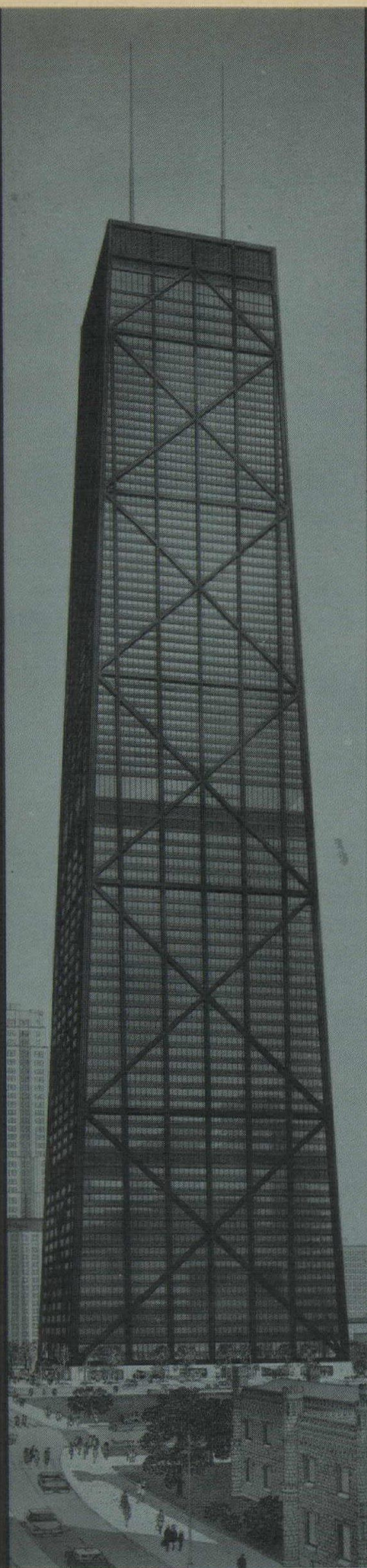


POWERS

The Powers Regulator Company
Skokie, Illinois

*A Name
You Can Trust...*

John Hancock



JOHN HANCOCK CENTER
CHICAGO, ILLINOIS
Architects Engineers:
Skidmore, Owings & Merrill, Chicago
General Contractor:
Tishman Construction Company, Chicago
Curtain Wall:
Cupples Products Division,
H. H. Robertson Company, St. Louis

*Depends On
A Sealant
They Can Trust...
PRC Rubber Calk®
Sealant*

The fabulous John Hancock Center, rising 100 stories above Chicago's "Magnificent Mile" will house 28 floors of offices, 705 apartments on 48 floors together with stores, restaurants, recreational facilities and on-premises parking. It is scheduled for completion in 1969 with partial occupancy in the Fall, 1968.

PRC Rubber Calk Sealant was specified for use on bronze colored curtain wall panels and the joints on the black aluminum covers which beautify the X-shaped steel cross members.

Selected because of outstanding adhesion to glass and metal, exceptional resiliency under expansion and contraction and superior resistance to weathering, PRC Rubber Calk Sealants assure the long-term performance so vital in a structure of this magnitude.

PRC makes a sealant to suit every construction need. Write for our colorful brochure "PRC Rubber Calk® Sealants For The Construction Industry" today!!

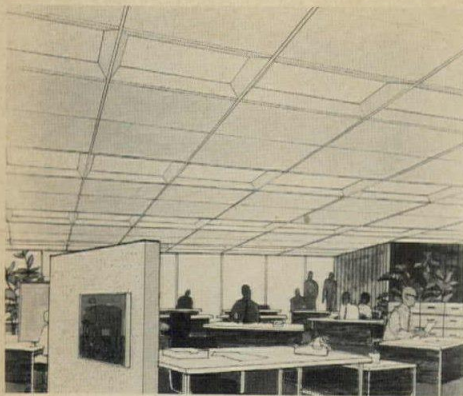


**PRODUCTS RESEARCH &
CHEMICAL CORPORATION**

2919 Empire Ave., Burbank, Calif. 91504
(213) 849-3992
410 Jersey Ave., Gloucester City, N.J. 08030
(609) 456-5700
PRC CHEMICAL CORPORATION OF CANADA, LTD.
95 Rivalda Road, Toronto, Ontario

For more data, circle 92 on inquiry card

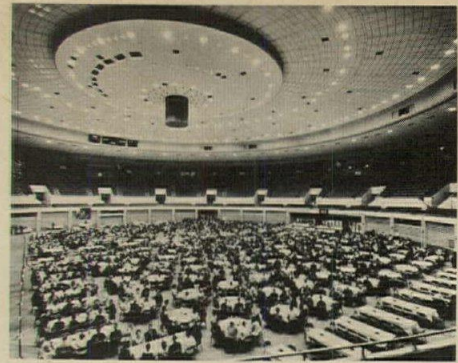
continued from page 185



COMPONENT CEILING / A system based on 5 ft multiples provides the components needed for acoustical control, air distribution, fire protection and lighting. The system is particularly recommended for interior landscaping because of its ability to accommodate any changes. ■ Conwed Corporation, St. Paul, Minn.

Circle 305 on inquiry card

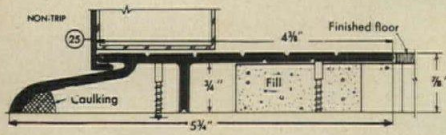
ELIMINATING ODOR / A chemical odoroxidant, *Purafil*, is reported to double the life of a purification system, eliminate frequent and difficult filter replacement,



and reduce the amount of outside air needed. A system using *Purafil* is part of the municipal auditorium and theater in Mobile, Ala., where 1,220 tons of air conditioning cools the 10,000-seat auditorium and the 16 meeting rooms. Another 400-ton unit cools the 1,950-seat theater. Air is circulated through 63 air handlers containing a total of 25,000 lbs of the odoroxidant which allows recirculation of air already inside. ■ Marbon Chemical Division, Borg-Warner Corporation, Washington, W. Va.

Circle 306 on inquiry card

— our 44th year



NON-TRIP SADDLES

For out-opening doors in schools and hospitals where safety is important. Available in extruded bronze or aluminum.

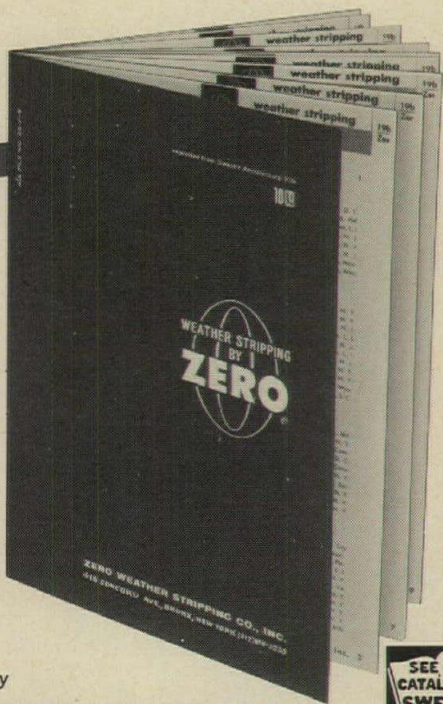


FINISHED FLOOR

the most complete and authoritative guide for—

- WEATHER STRIPPING
- SOUND PROOFING
- LIGHT PROOFING
- THRESHOLDS

Zero's 1968 Catalog shows many new products, contains 177 full size drawings.



SEE OUR CATALOG IN SWEET'S OR WRITE FOR COPY



Write today for your copy

ZERO WEATHER STRIPPING CO., INC.

Our 44th year of service to architects

415 Concord Avenue, Bronx, New York 10455 • (212) LU 5-3230

For more data, circle 93 on inquiry card

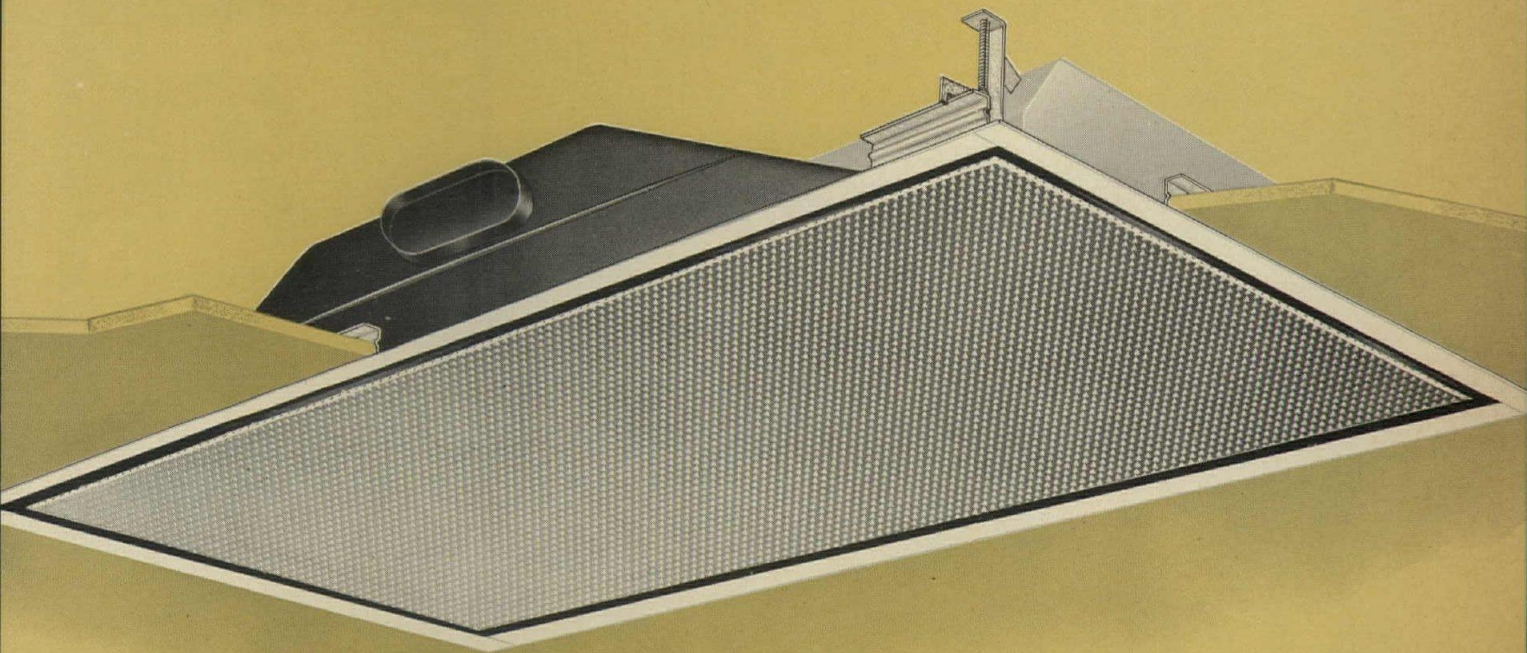


QUARTZLINE LAMP / Reports say this 1000-watt lamp produces 3 1/2 times as much light over its lifetime as the conventional incandescent lamp of the same wattage. The physical dimensions are identical to the 400-watt mercury and metal halide lamps, making possible the use of the three lamps with the same types of reflector and lens combinations. The high-performance tungsten-halogen lamp is intended for indoor and outdoor floodlighting uses, and for general illumination in industrial and commercial applications. ■ General Electric Company, Nela Park, Cleveland.

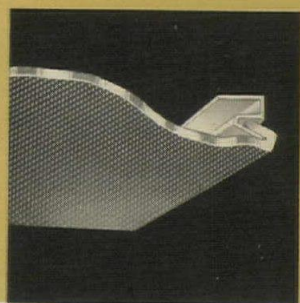
Circle 307 on inquiry card

more products on page 204

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



hd *



* 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.



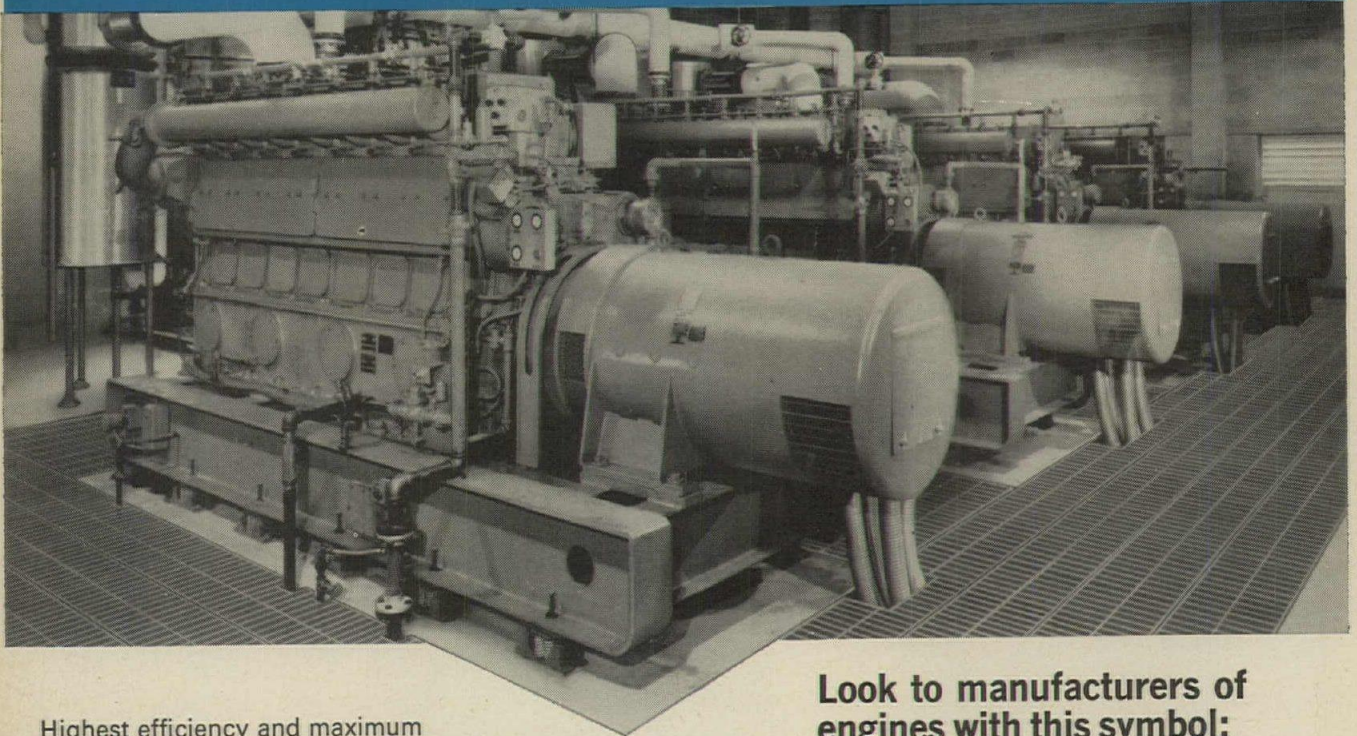
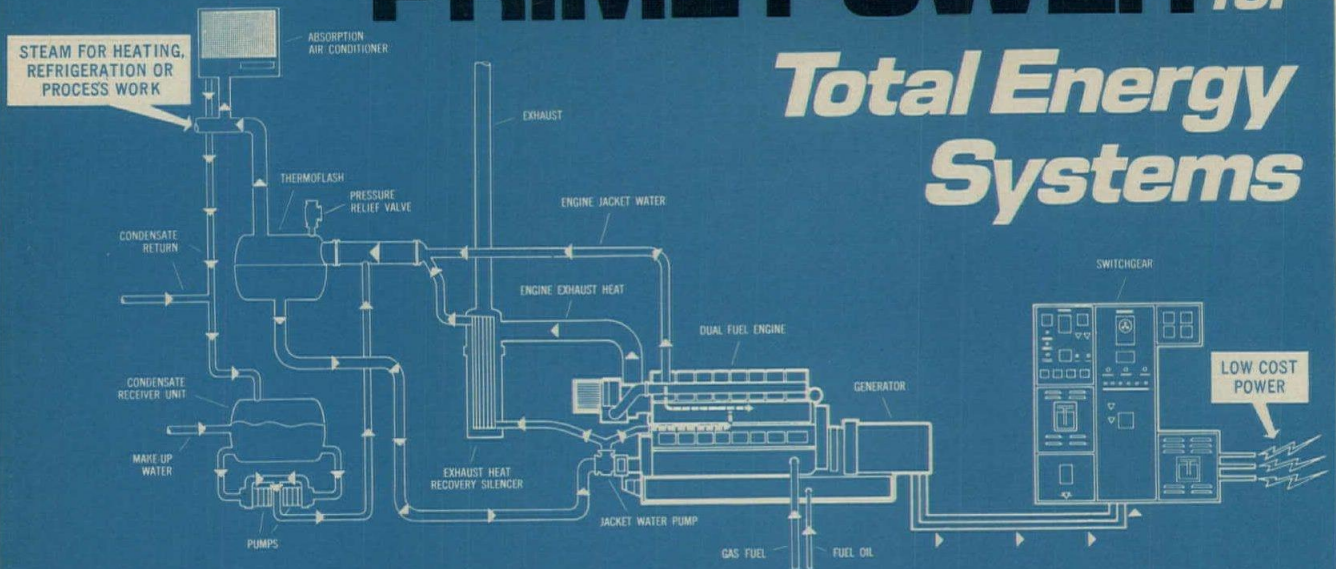
the Air-Lite Specialists

SECHRIST MANUFACTURING COMPANY

P. O. BOX 16775, DEPT. 86 / DENVER, COLORADO 80216 / (303) 534-0141

For more data, circle 94 on inquiry card

PRIME POWER *for* Total Energy Systems



Highest efficiency and maximum economy in total energy systems are realized only with correct choice of a dependable prime power unit.

The manufacturers comprising the Diesel Engine Manufacturers' Association offer a complete range of diesel, dual-fuel, or spark-fired gas engines to utilize the lowest cost fuel or combination of fuels available for any particular installation.

The experience and reputations of these manufacturers are your assurance of continuous, dependable operation. For information and technical assistance, contact the Diesel Engine Manufacturers' Association, 122 East 42nd Street, New York, N. Y. 10017.

Look to manufacturers of engines with this symbol:



CHICAGO PNEUMATIC • FAIRBANKS MORSE • COOPER-BESSEMER • UNION ENTERPRISE • INGERSOLL-RAND • NORDBERG • WHITE SUPERIOR • WORTHINGTON

For more data, circle 95 on inquiry card

For more data, circle 96 on inquiry card

Complete Industrial Panelboards

---An Inside Job

Until now, industrial panelboards were built in such a manner that the slightest modifications of circuitry meant, at the very least, troublesome hours of work for an electrician — and, in extreme cases, weeks of delay. Now, a new concept eliminates these headaches and, at the same time, provides advantages in safety and design flexibility of importance to engineers, electricians, contractors and users.

New approach to old problems

The solution is a new panelboard design developed by Square D Company. It incorporates vertical stacking of the bus bars, freeing a large portion of the lateral space required by old-style bussing. This I-LINE® design permits mounting any combination of circuit breakers. No special tools are required (see Figure 1). If a change in electrical requirements arises, additions or substitutions can be made without delay. To install or change over to a new 100-ampere breaker takes about 10 minutes with locally available I-LINE breakers versus more than two hours with other designs using connector assemblies and breakers which must be ordered from the factory. All components—boxes, interiors and breakers—are stocked by Square D distributors for immediate use.

Many new design features

Aside from easy assembly, I-LINE power panelboards incorporate a number of important benefits. An I-LINE circuit breaker, for instance, can be installed anywhere, regardless of the frame size or number of poles of the breaker opposite it on the bus bar stack. This is readily seen in the main illustration above. Lugs are front-removable, and special lugs are easily substituted when necessary. All terminals are UL listed for use with either

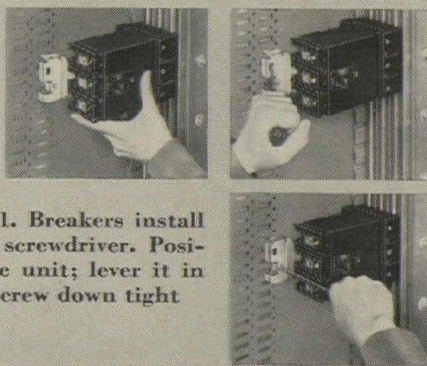
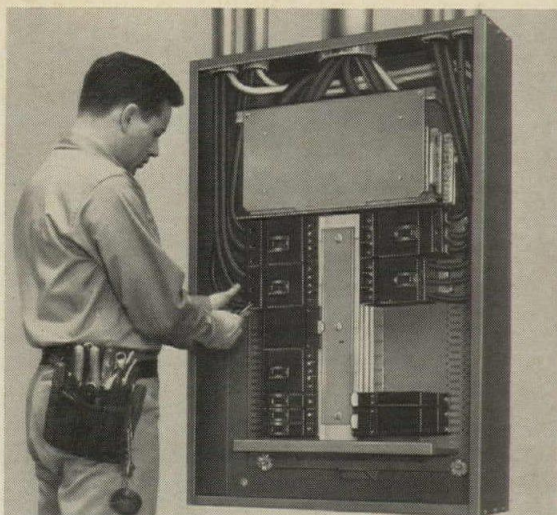


Figure 1. Breakers install with a screwdriver. Position the unit; lever it in place; screw down tight

aluminum or copper cable. A single bolt clamps the cable connectors to the respective bus bars, and complete joint maintenance means only the tightening of that one bolt. Provisions are made for a solid neutral in the main lug or main breaker compartments.

Integrated equipment rating

An extensive testing program conducted by Square D Company assures safety with every combination of breakers installed. Called the "integrated equipment rating," it is the short circuit rating of the complete



panelboard with branch circuit breakers installed. This testing (1) confirms the capability of the line-side bus and insulation assembly to withstand any ionized gases discharged from a branch circuit breaker during short-circuit interruption (discharges must not cause a line-side, phase-to-phase arc on the bus assembly), (2) establishes that any arrangement of branch circuit breakers can be made safely, without regard to frame sizes, and (3) verifies the safety of the physical bracing of the bus system.

Additional safety

The integrated equipment rating is only a part of the safety built into I-LINE power panelboards. Even with exterior and interior trim removed, the panelboard presents a "dead front" (Figure 2). A captive, hinged cover protects personnel from accidental contact with the main lugs.

Polyester glass insulators throughout the bus bar stack are as wide as the bus bars themselves to minimize the chances of accidental contact with bus bars or line-side connectors. Dead metal insulators and filler blanks provide additional safety within the completed unit.

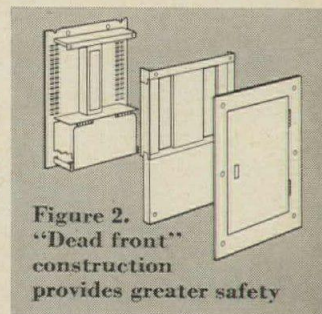


Figure 2. "Dead front" construction provides greater safety

Wide selection

Plug-on breakers range from 15-ampere, single-pole devices to 400-ampere, three-pole frames. All have mounting brackets and connectors attached and ready for installation. Optional designs include bolt-on connectors, Visi-blade breakers, bell alarm, shunt trip, under-voltage trip and auxiliary contacts.

For more data...

Further information on I-LINE power panelboards is available. Write to: Square D Company, Dept. SA, Lexington, Kentucky 40505. Or contact your Square D field representative or distributor.



SQUARE D COMPANY

Wherever Electricity is Distributed and Controlled

For more data, circle 105 on inquiry card

● at Tampa Greyhound Track, Florida . . .

Ultimate Spectator Comfort by Dunham-Bush, Naturally

Equipped with 1010 tons of air conditioning by Dunham-Bush, the enclosed grandstand and adjoining clubhouse offer ultimate comfort for 12,000 spectators at the Tampa Greyhound Track.

Designed to beat hot, humid "dog" days, the handsome grandstand is air conditioned by 16 Dunham-Bush roof mounted conditioners. Two packaged chillers in parallel supply chilled water to 9 air handling units for cooling the lower and mezzanine areas. The renovated clubhouse is served by 9 roof mounted packaged air conditioners.

"Imagineering" of the installation preserved

the beauty of design and the unobstructed view of the track.

Space-saving roof mounted Dunham-Bush equipment allowed optimum use of approximately 118,000 square feet of space.

This is only one of the many benefits offered by Dunham-Bush—your one source, one responsibility air conditioning, heating and refrigeration equipment manufacturer.

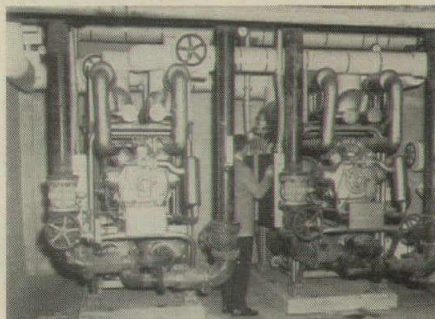
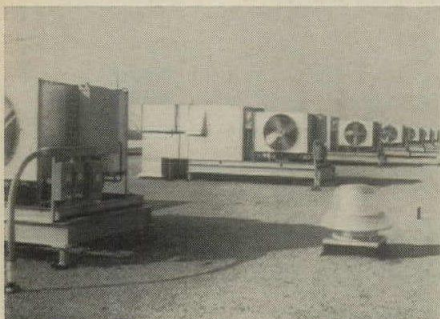
For complete technical and management-oriented information, see your nearest Dunham-Bush representative or write Dunham-Bush, Inc., West Hartford, Conn. 06110 • Weston, Ontario • Portsmouth, England.

ARCHITECT:
Russell J. Minardi, Tampa, Fla.
MECH. CONSULTING ENGINEER:
Julian C. Johnson, Tampa, Fla.
MECH. CONTRACTOR:
Ford Plumbing Co., Inc., Tampa, Fla.



DUNHAM-BUSH

one of The Signal Companies



For more data, circle 106 on inquiry card

CHF *Décor* TABLES



And now . . . the unique Décor Table Series*.
An exciting new concept with matching or
contrasting floor covering inlaid in the base.
Round, square and rectangular bases. Tops
available with patented ROCKEDGE® for the
life of the table. Another outstanding design
innovation . . .

from CHF — the Table People.

*Patent Pending

CHF

CHICAGO HARDWARE FOUNDRY COMPANY NORTH CHICAGO, ILLINOIS 60064

For more data, circle 107 on inquiry card

continued from page 188

Try your glass design problems on us....



LIKE:

- Life Sciences Laboratories
- Botanical Gardens
- Conservatories
- Solaria
- Atria
- Sludge Bed Enclosures
- Display Areas
- Skylights
- Pool Enclosures
- Research Laboratories
- Domes

We like to help architects—in fact, we've been working with some of the best of them for over a century. Our long experience in design and engineering of every conceivable type of glass or glazed structure (including plastic) is available without cost or obligation. We specialize in providing assistance to help you develop custom plans for any purpose. Our facilities are the most comprehensive in the country, enabling architects to meet their complete needs from just one source.

Consult Sweet's Architectural Catalog File, or write us about your project—no obligation. Need help immediately? Call us collect: (914) 591-8800.



Lord & Burnham

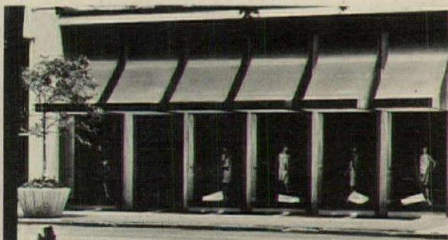
IRVINGTON-ON-HUDSON, N. Y. 10533
GLASSHOUSE LEADERSHIP SINCE 1856

For more data, circle 110 on inquiry card



BRONZE STAIRWAY / This bronze helix-shaped cantilevered stairway connects the board room in the penthouse of the new Evans Products building, Portland, with the executive offices. The stairway is center-hung from a bronze enclosed column of structural steel, and reportedly, because of the internal design, there is little harmonic-type vibration. ■ Oregon Brass Works, Portland, Ore.

Circle 308 on inquiry card



ALUMINUM SHEET / Aluminum architectural sheet, 1/8-in. thick, finished in *Du-ranodic* gray, was used in the canopies for this Detroit store. The gray color is integral in the aluminum alloy and is brought out in anodizing to impart a sapphire-hard finish. ■ Aluminum Company of America, Pittsburgh.

Circle 309 on inquiry card



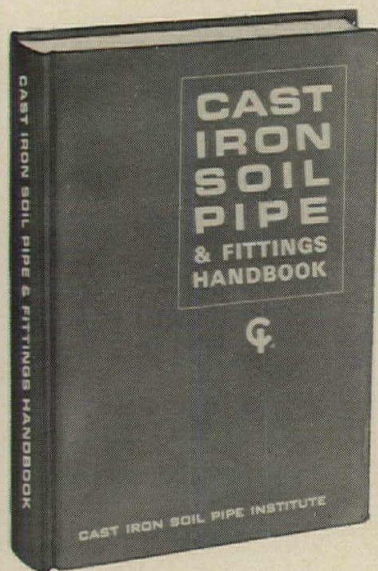
GLAZED CEILING PANEL / Total ceramic acoustical panel is said to meet the most stringent requirements for fire ratings, dimensional stability and resistance to moisture and corrosive fumes. The kiln firing of the panel makes it durable, and panels have no painted surfaces to deteriorate, yellow or craze. ■ The Celotex Corporation, Tampa, Fla.

Circle 310 on inquiry card

more products on page 205

ARCHITECTS ENGINEERS

This valuable new book is yours for the asking!



CAST IRON SOIL PIPE & FITTINGS HANDBOOK

A comprehensive, authoritative textbook, fully illustrated, complete with statistical tables, calculations and charts, giving abbreviations, definitions and recommended symbols.

Invaluable if you design, estimate or install plumbing systems. A \$5 value, FREE to qualified architects and engineers.

To receive your free copy, address a request on your company letterhead to:

CAST IRON SOIL PIPE INSTITUTE
1824-26 Jefferson Place, N.W.
Washington, D. C. 20036

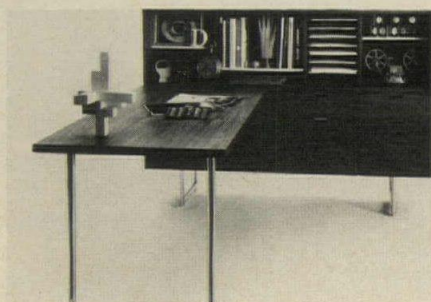
Allow 4 weeks for delivery

continued from page 204



REVERBERATION CONTROL / Cellular glass units attached to the four walls solved a sound problem in the multi-purpose gym at the University of Wisconsin. The *Geocoustic* absorbers reduced reverberation to 1.5 sec., and the "patch" technique enabled units to be attached without alterations to the existing pre-stressed concrete structure. ■ Pittsburgh Corning Corporation, Pittsburgh.

Circle 311 on inquiry card



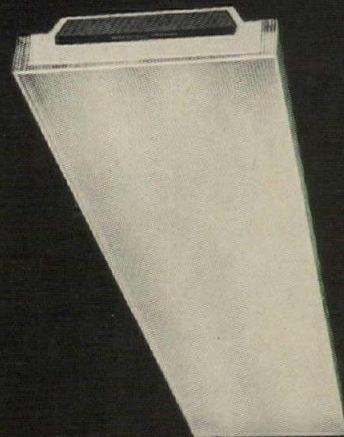
OFFICE-WITHIN-OFFICE / This desk combines the elements of table, credenza, shelves and file cabinets. Reference books, stationery and other supplies are all cubbyholed in open shelves, while file drawers and closed shelf space hold folders and bulkier supplies. ■ Robert John Company, Philadelphia.

Circle 312 on inquiry card



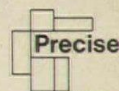
BUSINESS FURNISHINGS / Cantilever lounge chair with hand-polished, stainless steel frame is one of several new lounge chair designs. Harmonizing occasional tables complement chair styling. ■ Richard Thompson Co., Division of Glenn of California, New York City.

Circle 313 on inquiry card



Modular
Precise makes
it easy to
assemble all
the pieces
in your
master plan

This ceiling fixture with one-piece, injection-molded refractor complements any modular ceiling. That's because Precise is modular. Its 12" x 48" size is exactly 12" x 48" for example. It's also available in 16" x 48", 12" x 96" and 16" x 96". Add the vertical sides and ends and you have a unit that not only looks modular but is modular. You can arrange a handful . . . or hundreds . . . of units, and always be confident of a handsome total effect. Wakefield Operation, ITT Lighting Fixture Division, International Telephone and Telegraph Corporation, P. O. Box 195, Vermilion, Ohio 44089



WAKEFIELD LIGHTING **ITT**

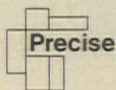
For more data, circle 108 on inquiry card

Modular
some things
go together
naturally,
and provide
compatible
design

Modular construction means a lot to both the architect and his customer. It offers flexibility and variety in use, because all dimensions are standardized.

No straggling inches—or fractions—are present to unbalance the general scheme.

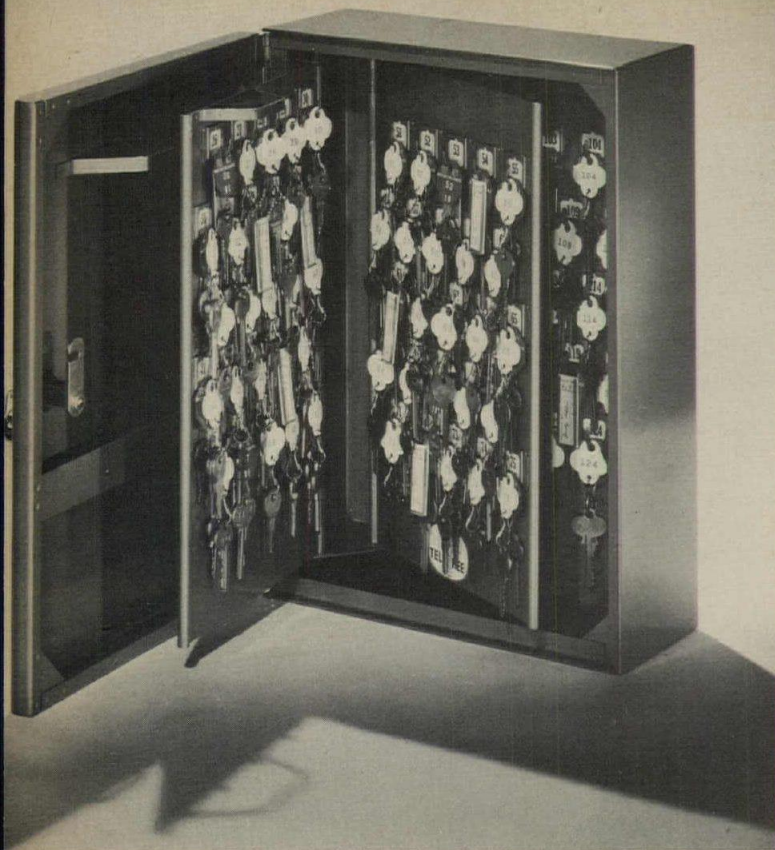
This creates an unrivaled quality of beauty. It's what we had in mind when we created Precise for commercial and institutional use. Wakefield Operation, ITT Lighting Fixture Division, International Telephone and Telegraph Corporation, P.O. Box 195, Vermilion, Ohio 44089



WAKEFIELD LIGHTING **ITT**

For more data, circle 108 on inquiry card

more products on page 208



**Should all
your clients'
security
be your
concern?**

You may be specifying a TELKEE key control system for some hospitals, schools and industrial complexes; but overlooking it on buildings where there are only a few locks.

A TELKEE system of key control is so simple, so relatively inexpensive, with so many advantages for your client, that it ought to be included whenever your hardware specifications call for 20 locks or more.

TELKEE means security, economy, convenience for *every* lock in every building . . . for restricted areas, storage of valuable supplies, confidential files, for any item with a lock. TELKEE guards against key loss and costly lock rekeying.

See Sweet's Architectural File or write today for your complete A.I.A. File: TELKEE Box 97, Glen Riddle, Pennsylvania 19037.

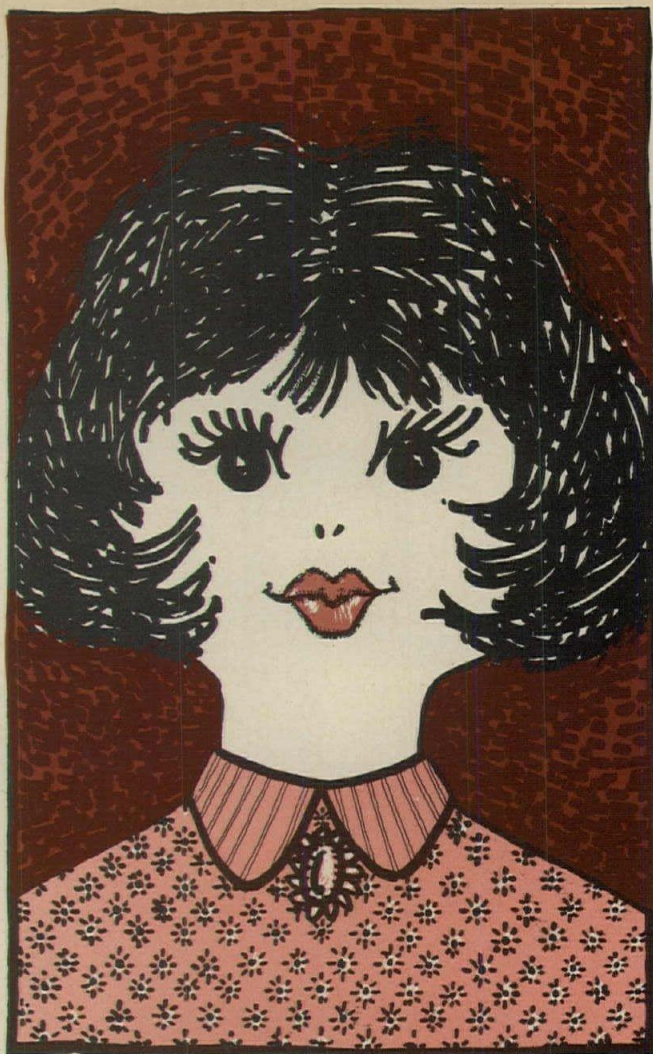
Specify a

TELKEE

SYSTEM OF KEY CONTROL

T-704

For more data, circle 111 on inquiry card



If you only knew
how often I think
of you, Horace,
Hutch & Sinkwell,
A. I. A.

Never heard of Horace, Hutch & Sinkwell, A.I.A.? Well, maybe the girls in that new office building aren't so good at remembering architects' names. But like the gal above they do appreciate it when an architect goes to the trouble of specifying one of Bobrick's attractive and convenient stainless steel, built-in dual vending machines for dispensing both feminine napkins and tampons.

And since about half the gals now use tampons, there's more than beauty involved in their appreciation of Bobrick's recessed dual-vend machines.

So how about it? Send for our free catalogue or see Sweet's File No. 23^a_{KI} (or Bobrick, File 25^b_{Bo}) for a description of vending machines available for dispensing Kotex® napkins and tampons.

True, your name may be forgotten but your good deed will live on in the hearts of all the girls.



Kimberly-Clark Corporation
Commercial Department Neenah, Wisconsin

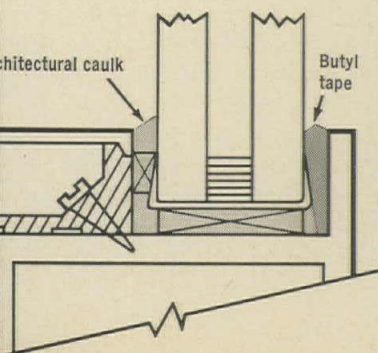
For more data, circle 112 on inquiry card

From 30° below to 100° above...

itect: Minoru Yamasaki Associates,
ingham, Michigan.
eral Contractor: George Fuller,
ago, Illinois.
ing Contractor:
y's Glass & Mirror Company,
Paul, Minnesota.
Manufacturer:
co Manufacturing Company,
eland, Ohio.



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.

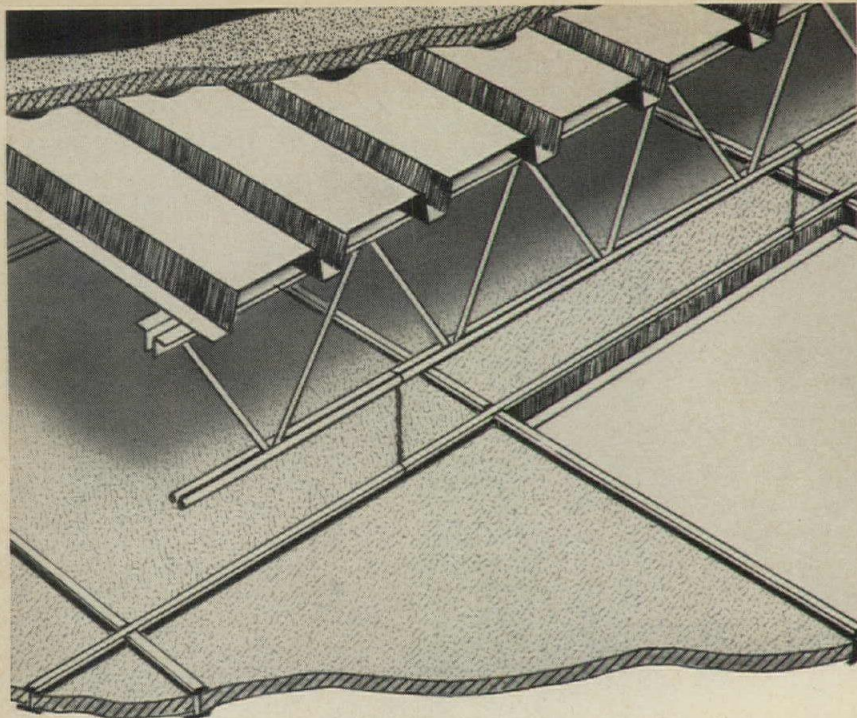
Butyl sealing tapes are also widely used for sealing mullions, exterior panels and the like. They are available in a variety of colors and shapes, usually with internal reinforcing to prevent distortion and squeeze-out.

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 113 on inquiry card

continued from page 205



1 HOUR RATING FOR STEEL ROOF DECK WITH CONVENTIONAL LAY-IN CEILING

A second 1 hr. test gets U. L. approval for roof/ceiling assembly. This time the deck span was increased to 7'-0", the suspended lay-in ceiling panels were conventional acoustical board, and a single layer of 3/4" insulation board was used over the deck.

This combination of lay-in ceiling and deck to span ratio provides an exceptional economical deck assembly. One that is strong and now fire rated.

Fill in coupon below and clip it to your letterhead for detailed information on this new fire rated system.

STEEL DECK INSTITUTE



Airtherm Manufacturing Co. • Armco Steel Corp. • Bowman Building Products Div., Cyclops Corp. • The Ceco Corp. • The Goldsmith Metal Lath Co. • Granco Steel Products Co. • Inland Steel Products Co. • Macomber, Inc. • The R. C. Mahon Company • Plasteel Products Corp. • Republic Steel Corp., Mfg. Div. • Roll Form Products Inc. • H. H. Robertson Co. • Wheeling Corrugating Co.

Fill in coupon and clip to your letterhead for your free copy

STEEL DECK INSTITUTE 9836 Roosevelt Rd., Westchester, Ill. 60153
Please send me complete information on new 1 HR. fire test.

NAME _____

TITLE _____

For more data, circle 114 on inquiry card

36-INCH RULE / This long rule measures up to 383 ft without being moved. Rule is lightweight aluminum that will not warp and is not affected by atmospheric conditions. ■ Fairgate Rule Company, Inc., Cold Spring, N.Y.

Circle 314 on inquiry card



THIN SPEAKER / *Twin-XX Twenty* hi-fi speaker system incorporates two of the recently introduced *Poly-Planer* plastic speakers into a single unit 1 1/2 in. thick. The space-saver, swing-away design includes a simulated oiled walnut frame with solid walnut base and a cane grille. Unit is said to produce "a boom-free bass, mellow mid-range and crisp treble." ■ Magitran, Cedar Grove, N.J.

Circle 315 on inquiry card



FURNITURE / A wide line of French and Italian reproductions includes chinoiserie designs hand decorated in gold leaf and raised lacquer, green and black tortoise shell, rubbed-through *tete-de-Negre* with antique gold and a chipped yellow with terra cotta. Shown here is a 32-in. square game table. The reversible top, which is plain on one side with chessboard on the other, reveals a backgammon well when removed. All three surfaces are hand-tooled leather. ■ Richard Wheelwright Inc., New York City.

Circle 316 on inquiry card

You've got to build a long lasting roof.

If it's not, you may be out in the cold!



From THE PAGEANT OF AMERICA. Copyright Yale University Press. United States Publishers Association, Inc., sole distributors.

Specify a lead roof. It'll last longer than any other kind. Lead is easy to use too, for flashing, standing seams, and batten roofing. Because, lead doesn't spring back at the man who installs it. It goes where he puts it and stays put the first time. That's where the economy comes in. Time saved in installation makes your job more profitable. Look to lead for design advantages in roofing, waterproofing, soundproofing, facades, and many others. There are countless imaginative uses for lead, that are perfect for your kind of architecture. Think about it! Build freer, build better with lead and find out for yourself. For more information write Lead Industries Association, Dept. L-7, 292 Madison Avenue, New York, N.Y. 10017

Build better with lead

For more data, circle 115 on inquiry card



IN 1828 ARCHITECTS HAD NO REASON TO CONSIDER HELIPORTS

Because, in 1828, Vittorio Sarti's helicopter was strictly a flying machine. There were no urban traffic snarls or airports far from city business districts. Today, the business use of helicopters is a growing reality. New twin-engine helicopters will eliminate flight restrictions over cities. If you are designing city centers, industrial plants, major building complexes and hospitals, now is the time to plan for heliports and helistops. It costs substantially less to include a heliport in your original plans than to add one later.

Free Heliport Design Kit

Send for Bell's free heliport brochure, plus an official FAA Heliport Design Guide. Simply fill out the information below and mail to:

Dept. 187G, Bell Helicopter Company, Fort Worth, Texas 76101.

Name _____ Title _____

Firm _____

Address _____

City _____ State _____ Zip _____

Remarks: _____



BELL HELICOPTER

FORT WORTH, TEXAS 76101 • A **Textron** COMPANY

For more data, circle 116 on inquiry card

OFFICE LITERATURE

For more information circle selected item numbers on Reader Service Inquiry Card, pages 243-244

PHOTOGRAPHIC LABORATORY / Equipment literature and planning kit offer information to help in planning the best operation for the individual situation—large or small. ■ Kreonite Inc., Wichita, Kan.

Circle 400 on inquiry card

SPECIAL SERVICE DOORS / Detailed 16-page catalog offers plan and sectional dimensioned views and architectural specifications for roof scuttles, smoke hatches, sidewalk doors, interior/exterior doors, basement entrance doors and the new type J and JD doors. ■ The Bilco Company, New Haven, Conn.*

Circle 401 on inquiry card

GRILLES AND REFACING SCREENS / A 24-page catalog presents architectural grilles and refacings for varied applications. Color photos show five different types of grille in building exteriors, and "before" and "after" pictures show renovation of one-story and multi-story structures. ■ Construction Specialties, Inc., Cranford, N.J.*

Circle 402 on inquiry card

ALUMINUM SPECIFICATIONS / "Specifications for Aluminum Structures" is a 64-page manual on determining allowable stresses in aluminum structures. Specifications, which are given for components of shapes instead of for particular structural shapes, are applicable primarily to buildings, although allowable stress tables are included for bridge-type structures as an appendix. ■ The Aluminum Association, New York City.

Circle 403 on inquiry card

STEEL DECK AND CONCRETE FORMS / Two catalogs cover the complete line of steel roof and floor deck, and permanent concrete forms. The deck catalog contains information on finishes, including a new corrosion-resistant finish, and includes a number of charts for figuring roof and floor loads and acoustical properties of built-up decks. ■ Bowman Building Products Division, Cyclops Corporation, Pittsburgh.*

Circle 404 on inquiry card

FLOOR TILE / Eight room interiors are featured in an 8-page brochure covering over 100 floor tiles. ■ Johns-Manville, New York City.*

Circle 405 on inquiry card

* Additional product information in Sweet's Architectural File

more literature on page 212

The stick system

**Discover steel load bearing architectural wall framing.
Discover Steelcraft.**



Steelcraft's Stick System consists of standard pre-engineered steel sections. Offers architects virtually unlimited design versatility and the aesthetic beauty of fixed glass exterior and interior wall openings.

Now you can design beautiful entrances, fronts, partitions, end walls, transoms and sidelites from standard, readily available sections. They're tailor-made to your job requirements from factory fabricated components and assembled locally by your factory trained Steelcraft Distributor.

You choose from a wide range of relatively slender steel framing members depths of 3, 3-3/4, 4-3/4, 5-3/4, 6-3/4 and 8-3/4 inches to meet your load bearing and wind loading requirements.

Discover the versatility, the design opportunity, the color, and economy Steelcraft's stick system offers you.

A Design Manual containing complete and comprehensive data on "sticks" is available to architects. Write Steelcraft, 9017 Blue Ash Road, Cincinnati, Ohio 45242 U.S.A.

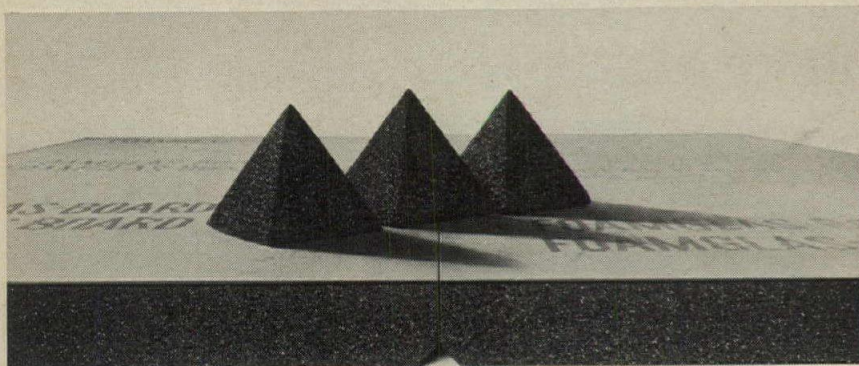


Steelcraft
finest name in metal doors and frames

For more data, circle 117 on inquiry card

Guaranteed to retain its insulation efficiency for 20 years ...at least.

FOAMGLAS[®]-BOARD roof insulation



In FOAMGLAS insulation, dry air is trapped inside millions of waterproof, closed cells. And, because it's cellular glass, it has very high compression strength and dimensional stability, and provides a rigid base for built-up roofing.

The beveled edges form continuous passages to relieve vapor pressure which can cause wrinkling and buckling of the roofing.

Only FOAMGLAS is guaranteed to

retain its insulation value, compressive strength and incombustibility, and not to absorb moisture for 20 years. Send for a copy of the guarantee and a sample of FOAMGLAS-BOARD, the ideal insulation for roofs, floors, plazas and parking decks.

Write Pittsburgh Corning Corp., Dept. AR-78, One Gateway Center, Pittsburgh, Pa. 15222. In Western Europe, contact Pittsburgh Corning de Belgique, S.A., Brussels.

The Insulation People



For more data, circle 118 on inquiry card

continued from page 210

AIR DISTRIBUTION / Two catalogs describe variable constant volume high velocity mixing boxes and reheat boxes. According to the catalogs, the system of heating and cooling sections of a building according to need results in quieter more efficient air conditioning. ■ Anemostat, Scranton, Pa.*

Circle 406 on inquiry card

HARDBOARD SIDING / The 24-page 1968 "Exteriors" catalog illustrates the X-90 Siding line. ■ Masonite Corporation, Box B, Chicago.*

Circle 407 on inquiry card

CERAMIC TILE / A 20-page color catalog shows over 160 standard tile colors and over 100 patterns and color combinations. The line includes glazed wall tile, frostproof heavy-duty glazed tile, porcelain ceramic mosaics, natural clay ceramic mosaics and more. ■ United States Ceramic Tile Company, Canton, Ohio.*

Circle 408 on inquiry card

FIRE DOORS / An 8-page catalog describes the line of swinging and sliding fire doors for industrial, commercial and institutional applications. Illustrations include door details and frame profiles. ■ Overly Manufacturing Company, Greensburg, Pa.*

Circle 409 on inquiry card

WATERPROOFERS, REPELLENTS / Color brochure presents full range of decorative and protective waterproofers and repellents. Included are three transparent repellents for masonry, seven ready-to-use bituminous blacks for light-, medium- and heavy-duty specifications, and a graded oxidizable iron powder that seals below-grade wall and floor surfaces, cracks, holes, and joints forming a water-impregnable metallic plating. Application photographs show some effects with *Colorcoat* or *Super Colorcoat*. ■ Sonneborn Building Products, Inc., Des Plaines, Ill.*

Circle 410 on inquiry card

I-BEAMS AND CHANNELS / A guide to section elements of the new Aluminum Association structural I-beams and channels is available in the form of slip-in pages for the existing "Structural Aluminum Design" handbook. The tables include torsion constants used in checking the local buckling and twisting strength of the new shapes. ■ Reynolds Metals Company, Richmond, Virginia.*

Circle 411 on inquiry card

* Additional product information in Sweet's Architectural File

more literature on page 216

For more data, circle 119 on inquiry card

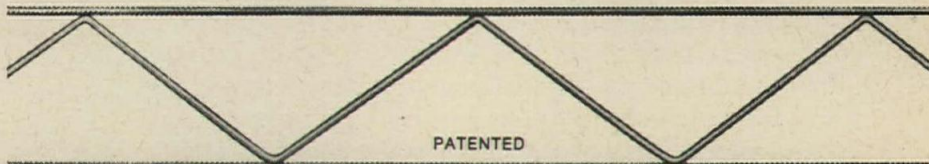
Short course in better masonry wall construction with versatile Dur-O-wal® products

When these Dur-O-wal products are at work, the result is better masonry walls. Check this list and you'll find Dur-O-wal has products for most any masonry wall application.

- ① Dur-O-wal Truss for single wythe, composite and cavity walls.
- ② Dur-O-wal Truss with Drip for cavity walls.
- ③ Dur-O-wal Trirod for composite and cavity walls.
- ④ Dur-O-wal Trirod with Drip for cavity walls.
- ⑤ Dur-O-wal Double for composite walls.
- ⑥ Dur-O-wal Double with Drip for cavity walls.
- ⑦ Dur-O-wal Corners available in all sizes and design types.
- ⑧ Dur-O-wal Tees available in all sizes and design types.
- ⑨ Ladur Type for single wythe, composite and cavity walls.
- ⑩ Ladur Type with Drip for cavity walls.
- ⑪ Ladur Type Trirod for composite and cavity walls.
- ⑫ Ladur Type Trirod with Drip for cavity walls.
- ⑬ Ladur Type Double for composite and cavity walls.
- ⑭ Ladur Type Double with Drip for cavity walls.
- ⑮ Ladur Type Corners available in all sizes and design types.
- ⑯ Ladur Type Tees available in all sizes and design types.
- ⑰ Continuous Rectangular Ties for composite walls.
- ⑱ Continuous Rectangular Ties with Drip for cavity walls.
- ⑲ Continuous Rectangular Tie Inside Corner. Available in all sizes, with or without drip.
- ⑳ Continuous Rectangular Tie Outside Corner. Available in all sizes, with or without drip.
- ㉑ Continuous Rectangular Tie Tee. Available in all sizes, with or without drip.
- ㉒ Adjustable Wall Tie (Rectangular Type) available in 6 sizes.
- ㉓ Adjustable Wall Tie (Z-Type) available in 6 sizes.
- ㉔ Rapid Control Joint Regular. For all wall sizes.
- ㉕ Rapid Control Joint No. 6 Wide Flange. For 6" walls only.
- ㉖ Rapid Control Joint No. 8 Wide Flange. For 8" and wider walls.

Dur-O-wal Truss, Ladur Type and Continuous Rectangular Ties are available in a complete range of sizes, weights and finishes:

For more information write for our new catalog which illustrates and fully describes all Dur-O-wal Products. Just write Dur-O-wal, P.O. Box 368, Cedar Rapids, Iowa 52406.



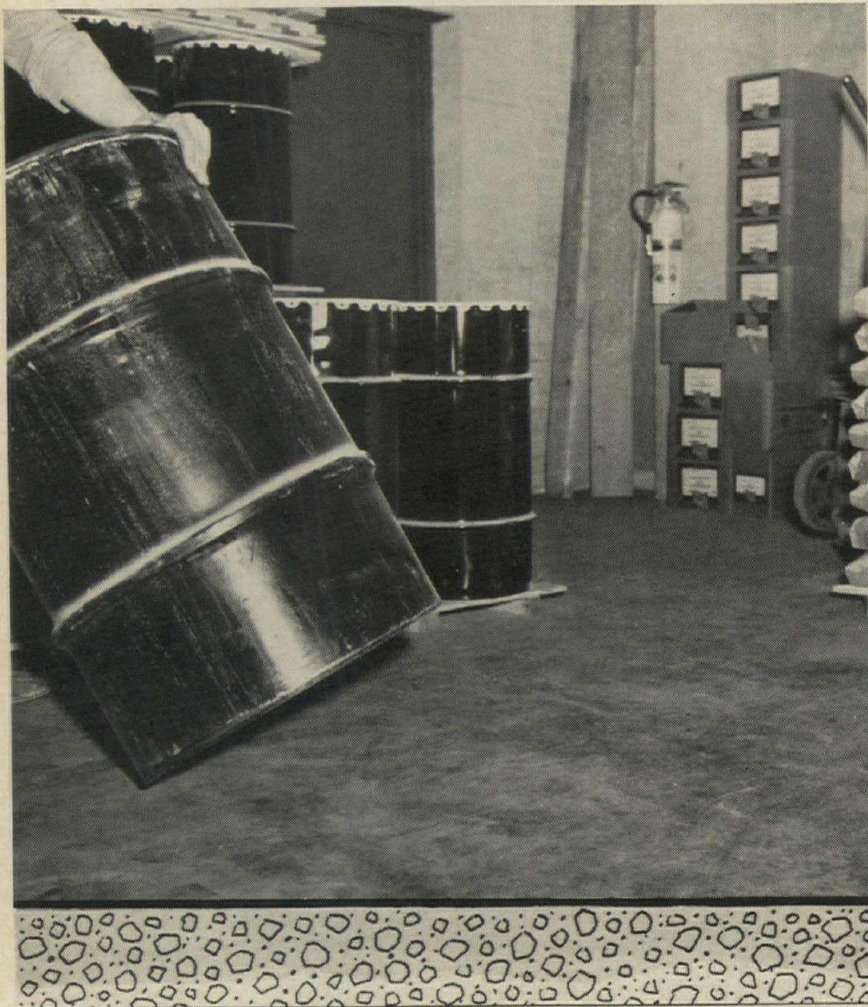
DUR-O-WAL®

THE ORIGINAL MASONRY WALL REINFORCEMENT WITH THE TRUSS DESIGN

DUR-O-WAL MANUFACTURING PLANTS • ALABAMA, P.O. Box 5446, Birmingham, Ala. 35207 • ARIZONA, 213 South Alma School Road, Mesa, Ariz. 85201 • COLORADO, 29th & Court St., Pueblo, Colo. 81001 • ILLINOIS, 625 Crane St., Aurora, Ill. 60505 • IOWA, P.O. Box 368, Cedar Rapids, Iowa 52406 • MARYLAND, 4500 E. Lombard St., Baltimore, Md. 21224 • MINNESOTA, 2653 37th Ave. S., Minneapolis, Minn. 55406 • NEW YORK, P.O. Box 628, Syracuse, N.Y. 13201 • OHIO, 1678 Norwood Ave., Toledo, Ohio 43607 • WASHINGTON, 3310 Wallingford Ave., Seattle, Wash. 98103 • Also manufactured in Canada.

For more data, circle 120 on inquiry card

New concrete floor surfaces: harden and protect them with



Hydroment and Polyclear

Specify Hydroment for all new concrete floors, particularly industrial applications. Hydroment has a compressive strength of over 10,000 p.s.i. which provides armor-like protection against severe abrasive wear. Repels grease, oil and water. No dusting or rusting! For the added assurance of getting the concrete floor you specify, use Polyclear—takes the guesswork out of curing concrete. We're in Sweet's—or write.

Specify Upco products for ceramic tile, concrete floors and wall surfaces.



The Upco Company
A SUBSIDIARY OF UNITED SHOE MACHINERY
4805 LEXINGTON AVE., CLEVELAND, OHIO 44103

For more data, circle 121 on inquiry card

continued from page 212

STEEL FORMS / A 48-page catalog gives the latest developments of steel forms for concrete construction. A new all-metal slab forming system eliminates re-shoring, flexible forms for round or curved structures, and "one-bolt" friction collars for round columns. Pictured are various form setups for tapered walls, tunnels, columns, corbels and offsets and simple walls. ■ Economy Forms Corp., Des Moines, Iowa.

Circle 412 on inquiry card

LAB FURNITURE / An 84-page reference manual for industrial, institutional and educational laboratories is divided into three sections: "Laboratory Furniture," "Fume Hoods," and "Service Fixtures." ■ Lab Fabricators Company, Cleveland.

Circle 413 on inquiry card

INSULATION / Eight-page booklet covers *Foamglas* cellular glass insulation for ceilings, wall linings, core walls and perimeters. ■ Pittsburgh Corning Corporation, Pittsburgh.*

Circle 414 on inquiry card

SCHOOL FOOD SERVICE / Based on studies of school feeding operations, a 48-page booklet covers the changing equipment and space needs for schools using disposable paper service. The booklet explains why disposables are gaining in popularity in school service. ■ Plate, Cup and Container Institute, New York City.

Circle 415 on inquiry card

STEEL JOISTS / The 1968 edition of "Specifications and Load Tables for High Strength Open Web Steel Joists, including Long Span Joists," contains all technical data for specifying joists to carry uniform loads on spans up to 96 feet. ■ Steel Joist Institute, Washington.*

Circle 416 on inquiry card

CONCRETE ADMIXTURE / *Placewel*, as described in a 20-page booklet, promises to enhance the strength, durability, and appearance of concrete. Tables and graphs present detailed performance data. ■ Union Carbide Corporation, New York City.*

Circle 417 on inquiry card

ROOF VENTILATORS / A 28-page catalog describes the complete line of centrifugal and axial aluminum roof ventilators. ■ Loren Cook Co., Berea, Ohio.

Circle 418 on inquiry card

* Additional product information in Sweet's Architectural File

more literature on page 230



This ceiling stays up where others won't.

It's called Ceramaguard.™ It'll stay up despite conditions usually found in factories, processing plants, shops. Despite constant moisture, extreme heat or cold, corrosive atmosphere, and regular cleaning. Because it's the first acoustical lay-in ceiling of a special ceramic material.

But there's more to Ceramaguard than permanence. Because it's there, heating and lighting are more efficient. And everything under it is kept cleaner. Because it's there, people have a place to work that's brighter, quieter, more pleasant.

Ceramaguard and other ceiling innovations are described in our folio. Please write for a copy. Armstrong, 4207 Rock St., Lancaster, Pa. 17604.

Or for more data, circle 1 on inquiry card.

Armstrong
Ceiling Systems that work

Marinas in your future?

Who do I
ask for help!



Ask MEECO for help in planning your marinas. They can offer assistance and dependability in planning and engineering of marinas backed by years of experience.

MEECO's unique modular construction allows you to custom plan a marina at a savings to your client. MEECO Marinas' long life and beauty assure you of repeat business, too!

MEECO MARINAS

MARINE ENGINEERING AND EQUIPMENT CO.
Box 518, McAlester, Okla., Phone (918) GA 3-6833

For more data, circle 122 on inquiry card



*Safety
can also be
BEAUTIFUL*

Sensible stair treads aren't necessarily like sensible shoes, flat heeled and unattractive. Melflex molded rubber treads come in colors that gladden the architect, yet carry the heaviest foot traffic safely year after year. Surface designs include diamond, smooth or abrasive strip surfaces. Our catalog shows the rubber landing material, runners, cove base and entrance mats to complete your installation. Write for it today!

**MELFLEX PRODUCTS
COMPANY, INC.**

410 South Broadway • Akron, Ohio 44308

For more data, circle 140 on inquiry card


**Information
Architects Have
Requested When
Planning**

**Schools—Colleges
Universities—Auditoriums
Hotels—Theatres—Arenas**

which include installation of
**SPOTLIGHTS, MOTION PICTURE
AND SLIDE PROJECTORS**

Typical data includes foot candle readings and diameters of spots at various throws, projection table with screen sizes and focal lengths of lenses, power requirements and mechanical dimensions. Send for free copies of informative brochures and specification sheets.

THE Strong ELECTRIC CORP.
253 City Park Avenue • Toledo, Ohio 43601

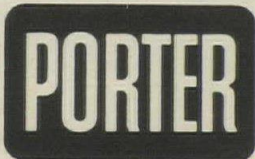
 A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION

For more data, circle 141 on inquiry card



81 PRODUCTS FOR CONSTRUCTION

Of the many Porter products, 81 are manufactured for construction alone...from concrete reinforcing bars to structural shapes...from pipe fittings to hand tools...from hose to conveyor belting...from fans to electric raceways. Call Porter. Pittsburgh, Pa.

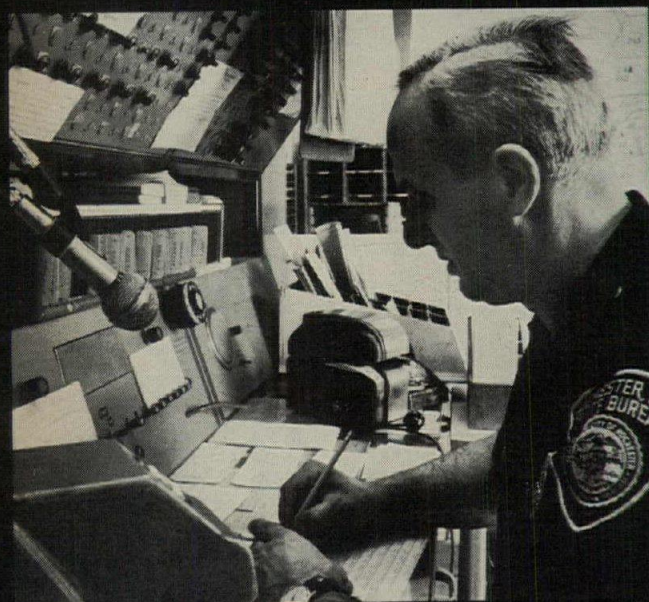
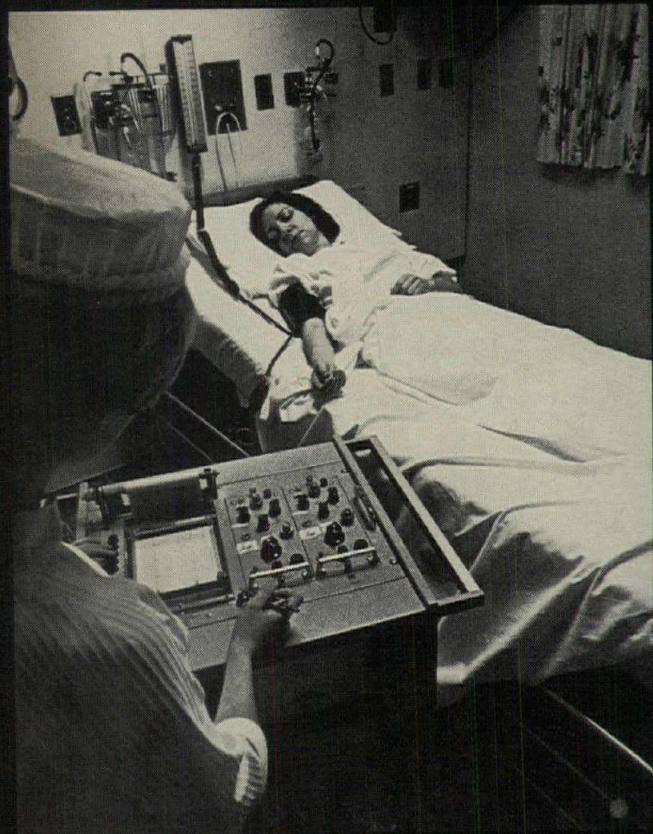


H. K. PORTER COMPANY, INC.

For more data, circle 128 on inquiry card

For more data, circle 127 on inquiry card

CORNING EC 70 AND EC 75 PANELS STOP THE RF INTERFERENCE, NOT THE LIGHT.



Now you can use fluorescents anywhere.

Our exclusive transparent conductive coating traps all RF radiated by the lamps, yet transmits over 70% of the light. A copper contact strip shunts the interference to ground. Now you can use the superior efficiency, economy, and attractiveness of fluorescent lighting, even in critical areas, with no worries about interference with the accuracy of vital equipment.

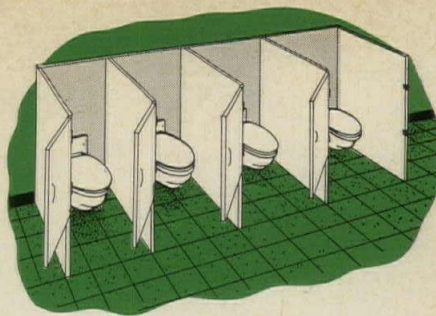
Meets or exceeds all applicable military specifications.

Only glass can give you this combination of high transmittance and no "noise." Glass that won't warp, burn, sag, or yellow. Ever. For specs and samples of EC 70 and EC 75 panels, write to Building Products Dept. 1906, Corning Glass Works, Corning, N.Y. 14830.

CORNING
BUILDING PRODUCTS

if you "value-evaluate" the restrooms
you will install off-the-floor fixtures

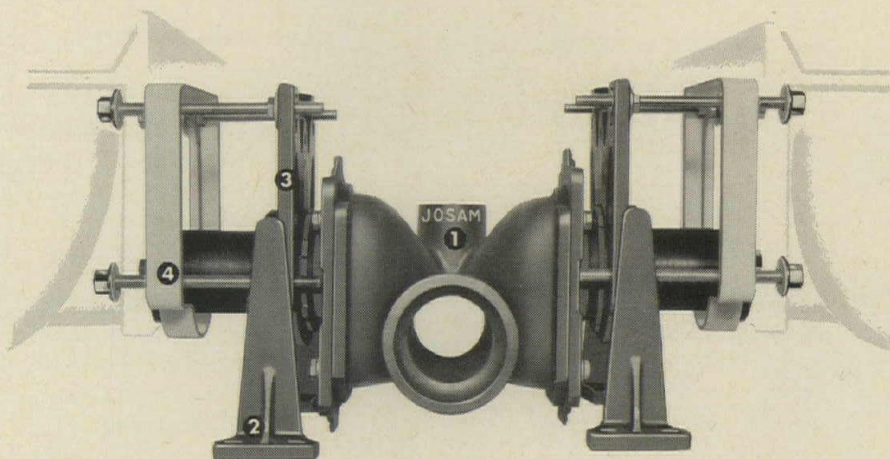
Evaluation of the savings in maintenance, space and materials makes off-the-floor fixtures first choice for modern restrooms . . . and they allow for greater freedom in the selection of floor materials.



if you "value-evaluate" the installation
you will use



UNITRON[®] CARRIERS



Evaluation of all the features offered by Josam Unitron Carriers provides the reasons why they should be your first choice for off-the-floor installations. Copied in various ways by other types, only the Josam Unitron Carriers offer all the features, the adaptability and the quality that cut installation costs.

If you evaluate the overall savings you will find that Josam Unitron Carriers provide a better job at lower costs every time!

For further information write for Manual F-5.

1 common vent
saves chase space . . .
reduces the number
of connections

2 positioning frame
Simplifies alignment
. . . saves time

3 buttress foot
Provides maximum
strength . . . saves
installation time

**4 invertible
carrier body**
Fits all types of
toilets . . . saves
handling time

**separate fitting
and carrier**
more adaptable . . .
save revision time



JOSAM MANUFACTURING CO.

MICHIGAN CITY, INDIANA

REPRESENTATIVES IN ALL PRINCIPAL CITIES

For more data, circle 130 on inquiry card



Books of exceptional professional interest from McGraw-Hill

1 ART IN ARCHITECTURE.

By LOUIS G. REDSTONE. **New.**

This excellent book serves as a study of and directory to the most recent and notable examples of the use of art in buildings. The examples represent a wide and varied cross section of types of buildings, and of varied approaches to the use of art forms. Works of well-known architects and artists, as well as of young and talented professionals are presented. The architect, designer, owner, or trustee can readily see from material that he may be able to find able and competent artists in his own area. The book is both a reference and a source of ideas for practitioners and clients alike.

252 pp., \$19.95

2 OFFICE PLANNING AND DESIGN.

By MICHAEL SAPHIER. **New.**

Using examples drawn from the experience of his own extremely successful design firm, the author lists usable standards, valuable dimensions and some "do's and don'ts" on the functional aims, aesthetics, and financial considerations of office planning. He stresses the need for thorough follow-through of every design from its initial stages to ultimate use. Many detailed drawings and photographs illustrate the various design solutions to specific problems. A number of valuable check lists are included.

256 pp., \$14.00

3 STRUCTURAL CONCRETE.

By R. PAUL JOHNSON. **New.**

This comprehensive book is based on lecture and laboratory courses in structural concrete given by the author for undergraduate and postgraduate students of civil and structural engineering at the University of Cambridge. It emphasizes fundamental principles, combining a breadth of subject matter with a depth of coverage unusual in books on this subject.

296 pp., \$12.50

4 STANDARD HANDBOOK FOR CIVIL ENGINEERS.

Editor FREDERICK S. MERRITT. **New.**

This one-volume handbook provides quick access to information essential to everyone engaged in civil engineering: consulting engineers, public works engineers, architects, contractors, material and equipment suppliers, inspectors and many others. Completely up to date, it covers methods and equipment as well as design. To insure authoritative treatment the editor drew on the knowledge and experience of some of the country's top engineers. Coverage has been specifically geared to the needs of working engineers. It is comprehensive, but each topic is treated as briefly as clarity permits.

1,100 pp., \$27.50

5 LEGAL PITFALLS in Architecture, Engineering and Building Construction.

By NATHAN WALKER, Walker and Walker; legal counsel to New York City Chapter, AIA; and THEODOR ROHDENBURG, AIA, Assoc. Professor of Architecture, Columbia University.

Every person sharing any degree of responsibility in any aspect of the building field, from initial contracts, site planning and design to completion should read this invaluable book. In readable, non-technical style, it covers the whole range of legal pitfalls which may beset responsible parties at every stage of the building process, with special attention to professional relationships and agreements, contracts and performance; liens and bonds; joint ventures, consultants, and employment agreements, as well as responsibility to the public.

288 pp., \$11.95

6 DESIGN AND CONSTRUCTION OF CONCRETE SHELL ROOFS.

By G. S. RAMASWAMY. **New.**

Designed specifically for professional engineers, architects, and consultants, this comprehensive volume emphasizes physical reasoning rather than abstract mathematics. Completely self-contained it presents all the necessary mathematical background for easy reference.

768 pp., \$24.50

7 STANDARD STRUCTURAL DETAILS FOR BUILDING CONSTRUCTION.

By MORTON NEWMAN. **New.**

This important reference covers all basic structural materials; presents each detail drawn to scale and fully described; gives you up-to-date coverage, with the latest methods and codes; features complete index for easy reference; reduces cost of structural drawings; prevents confusion delays; translates structural calculations into accepted methods.

361 pp., \$14.50

8 CREATIVE CONTROL OF BUILDING COSTS.

By The American Institute of Architects; edited by WILLIAM DUDLEY HUNT, JR.

This book shows how to establish cost control as a creative factor at the very beginning of the architectural process—and how to maintain it throughout construction. It helps the architect to determine realistic budgets at the outset, and discusses elements of design that affect building costs, as well as those future costs affecting a finished building during its lifetime.

256 pp., \$14.50

At your bookstore or direct from publisher
10 DAYS FREE EXAMINATION

McGraw-Hill Book Co., Dept. 23-AR-78
330 West 42nd Street, New York, N. Y. 10036

Send me the book(s) circled below for 10 days on approval. In 10 days I will remit for book(s) I keep, plus a few cents for delivery costs, and return others postpaid. Include local sales tax if applicable.

1 51365-5 2 54720-8 3 94051-0 4 41508-3 5 67850-8
6 51160-0 7 46345-5 8 01488-6

Name (print) _____

Address _____

City _____

State _____

Zip Code _____

For prices and terms outside U. S. write McGraw-Hill Int'l NYC

23-AR-78

continued from page 216

DOORS / Two 16-page 2-color catalogs present illustrations, diagrams, photographs and specifications on air-powered, electric-powered and manual industrial and cold storage doors. In addition to galvanized steel and aluminum cold storage doors of all types, white Kayon plastic cooler and dairy doors, that will not rust, corrode or tarnish and are highly resistant to dents and punctures, are described. ■ Clark Door Company, Cranford, N.J.*

Circle 419 on inquiry card

HOSPITAL COMMUNICATION / Information on a variety of systems is presented in a 20-page brochure that describes how the systems help improve staff efficiency, increase patient care and reduce operating costs. ■ Motorola Communications and Electronics, Inc., Chicago.

Circle 420 on inquiry card

HARDWARE / A 16-page catalog describes the full line of architectural hardware including the *Maximum Security System*. Included are locks, door closers, exit devices, hospital latches and miscellaneous hardware. ■ Sargent & Company, New Haven, Conn.*

Circle 421 on inquiry card

ASBESTOS-PLASTIC SHINGLE / *Fire-Chex* Class "A" Fire-Safety Rated roofing shingles in colors are shown in a 4-page brochure. ■ The Philip Carey Manufacturing Company, Cincinnati.*

Circle 422 on inquiry card

PARTITION SYSTEM / A 6-page brochure with an accompanying technical bulletin presents the KW 330 movable drywall partition system. Color illustrations include completed installations of the vinyl-covered wallboard system. ■ Kaiser Gypsum Company, Inc., Oakland, Calif.

Circle 423 on inquiry card

BUILDING PANELS / A 12-page 1968 catalog incorporates the latest color and size changes in the *Corrulux* fiber glass standard stock line. ■ Johns-Manville, New York City.*

Circle 424 on inquiry card

WALLS-PARTITIONS / The 1968 manual features product information on 6 major types of operable walls and folding partitions. Shown are five new applications and ideas on flexible space in schools, churches, hospitality, office-industrial and hospital buildings. ■ Modernfold, New Castle, Ind.

Circle 425 on inquiry card

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

For more data, circle 132 on inquiry card

new products must be much better

Allenco 1½" nozzle is much better because of its molded Lexan® body

Lexan, hi-impact thermoplastic is much stronger than many metals—weighs much less—costs much less

new nozzle has brass stem; adjusts from solid straight stream through any degree of solid conical fog up to 90°; tested to 1000 p.s.i. hydrostatic pressure; unaffected by severe temperature, shock loads or abuse

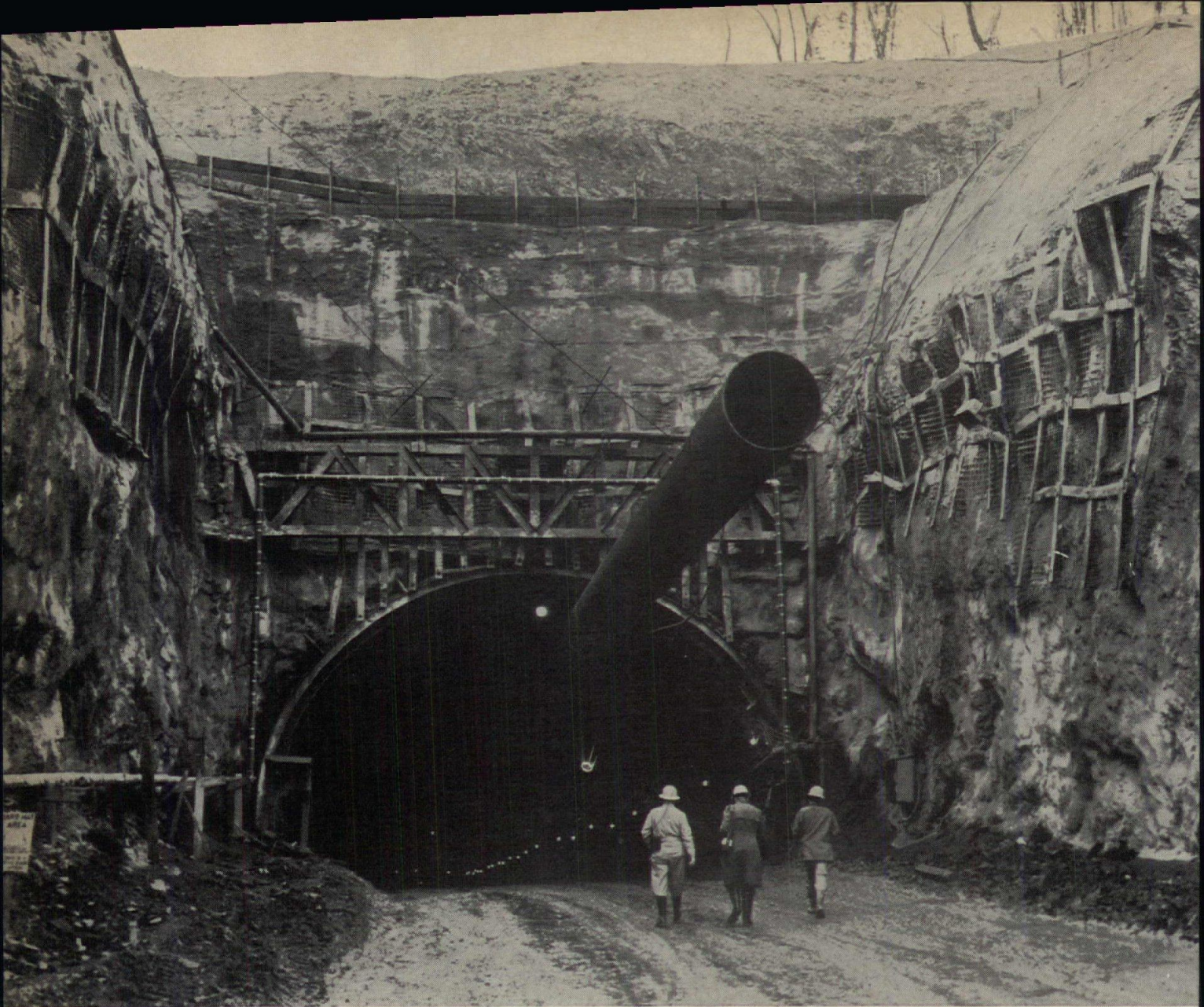
**new Lexan nozzle is exclusively
W. D. ALLEN**



Write or call W. D. Allen for complete specifications and prices

W. D. ALLEN MANUFACTURING CO.

2200 W. 16th St. / Broadview (Chicago), Ill. 60153 / 345-0230



Eastern entrance to new Pennsylvania Turnpike tunnel, one of three being added to solve traffic bottlenecks. Here, upper one-half of excavation has been completed. A second

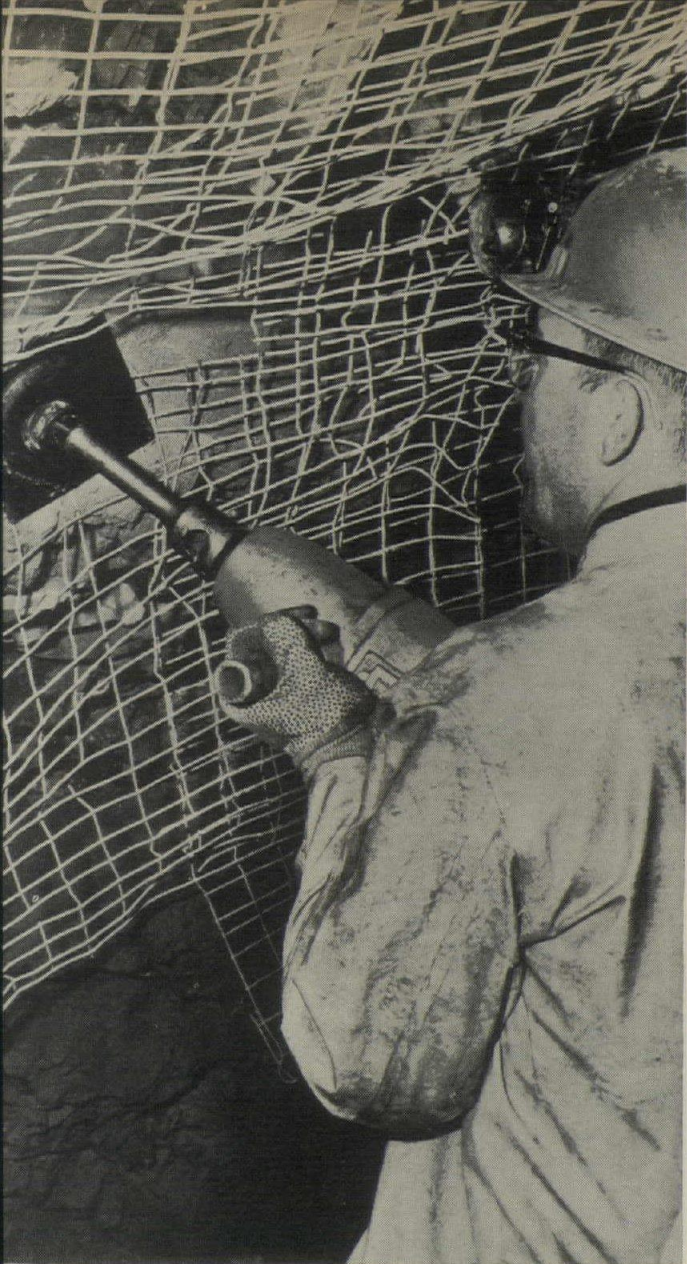
pass will increase tunnel height to 33 feet—a technique which, with the help of 50,000 Republic roof bolts, eliminated need for steel arches in 75% of the mile-long tunnel.

New techniques plus 50,000 Republic roof bolts open Tuscarora Tunnel to traffic sooner.

One of three tunnels being built to relieve congestion on the Pennsylvania Turnpike is the new "Tuscarora," near Burnt Cabins, Pa. Engineers determined early that excavating the upper arched section on first pass, then excavating the lower section on a second pass would save time and money. Further, if sufficient anchorage

existed, roof bolts could replace steel arches almost completely.

Republic roof bolts were suggested by Republic engineers on the scene—and specified because relatively few bolts could be installed at exact right angle to the bolt head bearing plate. The design of the Republic bolt head



Republic roof bolt being installed through wire mesh. New $\frac{5}{8}$ " diameter bolt, 72" long, secures rock. Special 6" x 6" x $1\frac{1}{4}$ " embossed bearing plate supports wire mesh and insures proper torque-tension contact for bolt head. Wire mesh protects against slabbing.

Republic roof bolts as used to support steel arches in this new tunnel.

and plate insured constant torque-tension relationship.

Engineers' predictions proved correct, and Republic bolts, supporting wire mesh and gunite, were utilized for roof support in more than 60% of the approximately one-mile-long tunnel.

Where steel arches were used, Republic bolts played an important part. To protect workers while drilling blast holes, arches were installed close to the advancing face—but were highly susceptible to blast damage. Pairs of bolts, supporting brackets across the arch flanges prevented blast damage. (See illustration.) The bolt-and-bracket arrangement, left in place, also performed another service—supporting both arches and roof during necessary undermining on the second, lower-level excavation.

At the time of this report, excavation of the upper arch of the new "Tuscarora" has been completed and exca-

vation of the lower portion is well under way—ahead of normal schedule in roof bolted areas, and in maximum safe working conditions.

Republic roof bolts can do as much for your next project. Full cooperation of our experienced bolting engineers on jobsite, is yours on request. No obligation. For immediate reply, write Republic Steel Corporation, Dept. 7052, 1441 Republic Bldg., Cleveland, Ohio 44101.



REPUBLIC STEEL

BOLT AND NUT DIVISION

1441 Republic Building • Cleveland, Ohio 44101

SPECIALISTS IN MINE ROOF CONTROL



For more data, circle 133 on inquiry card

The ubiquitous sealant

DAP® Butyl-Flex® installations are everywhere. It delivers best all-around caulking service in 9 out of 10 installations, staying on the job as long as 20-year sealants in many applications, when applied according to instructions.

Four new buildings for the Dayton, Ohio metropolitan area proposed by Brown and Head & Associates, Dayton. (A) Architect's conception of City Convention Center, consisting of a 50,000 square foot arena and 20-story, 250-room motor hotel. Lorenz, Williams, Williams, Lively and Likens, also of Dayton, were associated architects on the project. (B) Good Shepherd Lutheran Church, Washington Court House, consisting of 300-seat sanctuary, 20,000 square foot education wing, 3000-square foot administrative quarters. (C) City Transportation Center for rapid transit, bus, airline, and rail travelers, conceived for feasibility study. (D) Horticultural Center, including a 180 foot round dome for flower conservatory, single-story structure housing meeting rooms, green houses, and caretaker's quarters.



DAP Inc. General Offices: Dayton, Ohio 45401 SUBSIDIARY OF Plough, Inc.

- Please send me Technical Data bulletin on DAP Butyl-Flex butyl-rubber based caulk.
- Please have DAP representative call.

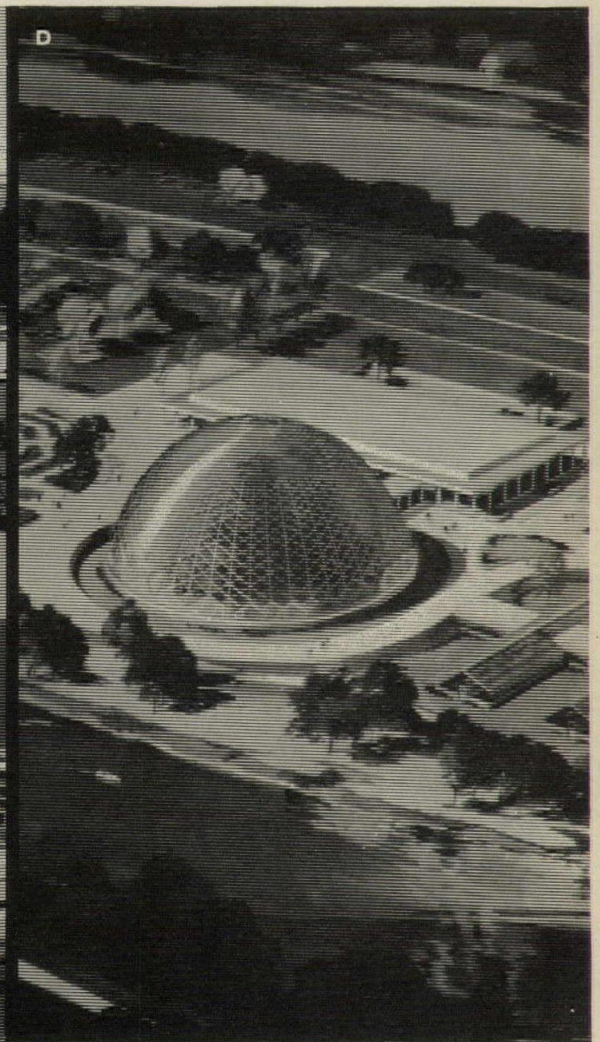
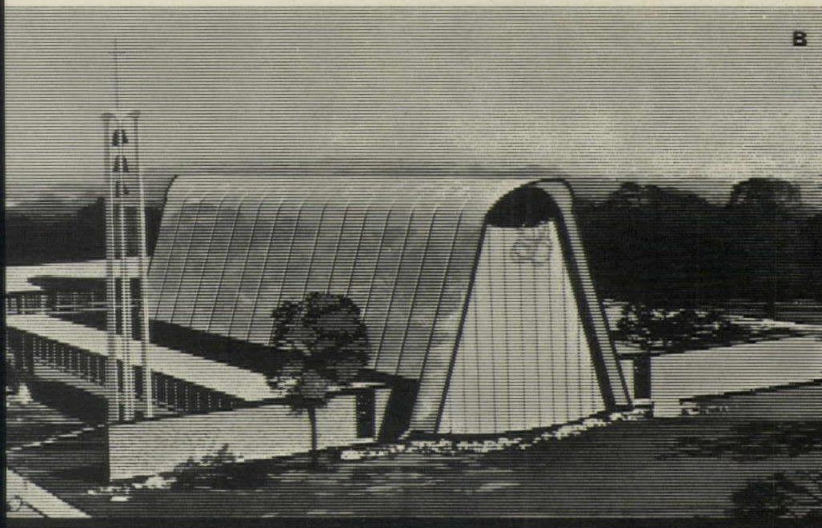
name _____ title _____ firm _____

address _____ city _____ state _____ zip _____

DAP Butyl-Flex is an outstanding caulk that can live up to the performance of higher-priced sealants in construction joints where movement is not excessive . . . accounting for 90% of all caulking-sealing applications. DAP Butyl-Flex delivers all the sealant advantages inherent in butyl rubber. It has 50% elongation factor for exceptional flexibility plus adhesive qualities second to none. Makes a long-lasting, trouble-free seal between similar and dissimilar materials such as aluminum, concrete, steel, glass, marble, wood, vinyls, painted surfaces. What's more, Butyl-Flex is easy and fast to use, cutting application time and costs. Guns on without mixing, heating, priming. To receive complete technical information and specifications, please send coupon.



DAP[®]
ARCHITECTURAL
SEALANTS



For more data, circle 134 on inquiry card

KEEP THIS DOOR CLOSED



We think big in overhead-type doors. (we think small, too)

Raynor custom builds doors big enough for giant diesel engines or small handcars. Matchless production facilities provide you with size ranges to expand your design limits. Available in wood, Raylon (fiberglass), aluminum or steel. Only Raynor custom manufactures every component in quality conscious Raynor plants

to assure smooth, trouble-free operation and longer life. Even springs are custom wound and load tested before they're matched to each door. Next time you specify overhead-type doors, depend on Raynor to deliver the size you need — the style you want — and the quality to protect your reputation.



RAYNOR
The Brand You Can Depend On

Raynor Manufacturing Company, Dixon, Illinois, Dept. H
Please send me free literature on Raynor garage doors.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

For more data, circle 142 on inquiry card

**if you
were sure
that one
publication
delivered
over 90%
of your
market potential..**

**wouldn't it
make sense
to place
all your
advertising
there?**



if your market is the building market, it makes sense to place all your advertising in Architectural Record

WHY USE JUST ONE PUBLICATION?

The real question to ask yourself is why use more than one publication if one is strong enough to do the job alone.

Let's consider the problem you face. Typically the prime objective of advertising in the building market is to get architects and engineers to specify certain products into the buildings they design. One of the hurdles advertisers must overcome is that architects and engineers are among the busiest and most sought after groups of people in this country. Small in number they control through their specification practices, the selection of virtually every product that goes into our nation's buildings. As a result they are deluged with magazines of all shapes, sizes and quality. Direct mail, catalogs, folders, brochures and salesmen flood into their offices. They can't and don't pay attention to them all. Under these circumstances how can you hope to get their attention? It's simple. Do what they do and cut out waste and duplication. Go where they find value. Take the available dollars and do your advertising in Architectural Record. Our editors already have their full attention and this cuts your work in half. Make the rapport we've spent 76 years building with the profession work for you.

WHAT ARE THE BENEFITS?

The major benefit of using just one magazine in a field rather than two or more is that it frees money to do some of the other things that are necessary to attract the attention of busy, involved people. Achieving a measure of impact in your advertising is a relatively simple thing to do. Let's take a look at some of the elements of impact advertising and see how putting the same dollars to work in a single publication will help you achieve that goal.

Dominant space units...it's a fact that on the average, larger space units get better readership than smaller ones. The advantages of 12 pages or 12 spreads in one strong magazine over six halves or six pages in each of several magazines is readily apparent. In short you can look bigger, seem more important and increase readership scores at the same time.

Maximum frequency...every available piece of research indicates that advertising readership scores also increase with frequency of insertion. The advertiser who runs in every issue of a publication gets higher scores than those who do not.

Strong copy and layout...while the basic strength of your copy and layout depends on the talent of your specialists, it's possible to enhance these elements through the use of four-color. Architectural Record is now offering substantial color premium discounts, similar to the traditional frequency discounts.

Thus by buying only the Record you get a double barreled discount, your ads look better and you get the higher readership scores that come with color.

Consistency...the concept of consistency in impact advertising involves planning over a period of years not just months. Although the benefits seem obvious it is one of the hardest elements to sell to top management. In our experience the best way to achieve its acceptance is through the careful application of the other three elements — dominant space units, maximum frequency and strong copy and layout. Apply these three principles effectively and the advantages of consistency follow naturally and rewardingly.

WHY RECORD?

That's where you'll find the active architects and engineers. Record subscribers handle over 90 per cent of the dollar volume of all architect-designed nonresidential and large residential building. This is a fact documented by a continuing state-by-state check of the activity of architectural