ARCHITECTURAL RECORD

JULY 1967 7  A McGraw-Hill Publication  Two Dollars per Copy

ADMINISTRATIVE CENTER FOR THE UNIVERSITY OF DETROIT BY GUNNAR BIRKERTS
BUILDING TYPES STUDY: URBAN HOUSING
AIR CONDITIONING: PART ONE OF A TWO-PART SPECIAL REPORT
AN ARCHITECT'S GUIDE TO EXPO 67
FULL CONTENTS ON PAGES 4 AND 5
Armstrong offers the widest variety of resilient floors. The best is the one that suits your design.

At the Childrens Medical Group, the best floor is Cushioned Vinyl Corlon.

The architects and medical staff had several clear-cut reasons for selecting Armstrong Cambrian® Cushioned Vinyl Corlon for use throughout this new medical facility for children.

First, Cambrian is comfortable underfoot. Its thick, vinyl-foam backing is a welcome relief to a busy staff that spends long, hard hours on its feet.

Second, Cambrian is quiet. Its ability to hush traffic noise and the clatter of dropped objects adds greatly to a relaxed, quiet atmosphere.

Sanitary requirements were also a major consideration. Because Cambrian Vinyl Corlon is a sheet vinyl floor, it has a minimum of seams—and what few seams there are, are sealed and waterproofed during installation—dirt has no place to collect. Nonporous vinyl Cambrian permits virtual clean-room conditions with only routine attention. And its tough vinyl surface delivers all the long-wearing properties long associated with Armstrong vinyl floors.

In addition to appreciating Cambrian’s striking good looks, the staff reports less fatigue, greater safety for children, and many favorable comments from visitors.

Would Cambrian be right for your next project? Your Armstrong Architect-Builder-Contractor Representative will be glad to investigate the possibilities with you. He has the world’s largest line of resilient flooring behind him, so you can be sure of an objective recommendation. He’ll help you choose the flooring that best suits your design. Call him. Or write Armstrong, 307 Rock Street, Lancaster, Pennsylvania 17604.

For more data, circle 2 on inquiry card
Quiet, Courteous and Safe are the words for Dover Elevator doors. The automatic operator engineered and manufactured by Dover employs harmonic motion to power both car and hoistway doors smoothly and quietly. No banging open and shut. No annoying clatter or rumble. Just the smooth operation essential on self-service elevators to inspire passenger confidence. Combinations of electronic and pressure-sensitive devices protect passengers entering or leaving the elevator car, yet minimize door-open interval to dispatch the elevator with least delay. This superior door operator is standard equipment on Dover-manufactured cabs for electric traction and Oildraulic* Elevators. Write for catalogs or see Sweet’s Files.
FEATURES

109 THREE-WAY FUNCTION EXPRESSED IN STRUCTURE AND FORM
Fisher Administrative Center at the University of Detroit:
Gunnar Birkerts & Associates, Architects

115 EXPO ’67—A BRILLIANTLY ORDERED VISUAL WORLD
A survey of the buildings that shouldn’t be missed at the fair an architect should visit.

127 FOUR BUILDINGS FOR BANKING
Distinction and individuality achieved without self-consciousness in effective solutions of functional requirements.

BUILDING TYPES

133 URBAN HOUSING DESIGN FOR NEW TOWNS AND OLD NEIGHBORHOODS

134 PLANNING THE NEW TOWN
Montgomery Village, a new town in Maryland located within a corridor city, is shaped by enlightened planning concepts required by a new zoning code.

142 REHABILITATION OF A BROOKLYN SLUM
Six blocks in the Park Slope district in Brooklyn to be rehabilitated within the context of a comprehensive plan for the entire district.

150 A NEW KIND OF TEAM SPONSORS REHABILITATION IN CLEVELAND
Three trade associations and a non-profit citizen’s group, aided by HUD, become a force for the renewal of the notorious Hough slum and commission architects to develop long-range plans.

A broad look at the technology of air conditioning in terms of the total architectural problem. Systems and components are examined in the light of changing needs of the client, the changing process of system integration, and the changing relationships between architect, engineer and manufacturer. The first of two parts in a RECORD special report.
ARCHITECTURAL RECORD STAFF

EDITOR
EMERSON GOBLE, A.I.A.

EXECUTIVE EDITOR
WALTER F. WAGNER, JR.

MANAGING EDITOR
JEANNE M. DAVERN

SENIOR EDITORS
ROBERT E. FISCHER
WILLIAM F. BOOYHALL
JAMES S. HORNBECK, A.I.A.
MILDRED F. SCHMERTZ, A.I.A.
HERBERT L. SMITH, JR., A.I.A.
ELISABETH KENDALL THOMPSON, A.I.A.

ASSISTANT EDITORS
SIDNEY A. ABBOTT
MARY E. ARENDAS
SUSAN BRAYBROOKE
JOHN SAMUEL MARGOLIES

EDITORIAL ASSISTANTS
JOAN F. BLATTERMAN
NANCY LOU MOORE
ANNETTE K. NETBURN

DESIGN
ALEX H. STILLANO, Director
WILSON E. WRIGHT III, Associate
MARY LU ADELAMAN, Assistant
SIGMAN-WARD, Drafting
JAN WHITE, Consultant

EDITORIAL CONSULTANTS
EDWARD LARRABEE BARNES, F.A.I.A.
WALTER CROPFIUS, 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

ARCHITECTURAL RECORD STAFF

NEW KINDS OF URBAN SPACES DESIGNED FOR LEISURE

Some new concepts of the role of parks in the life of a city, and the kinds of leisure uses that are appropriate to them, are developed out of a new program in New York City. Architects and landscape archi-

tects are, for the first time since the Thirties, playing the significant role of designing New York's public open spaces; and they are being encouraged to find fresh approaches. Next month's Building Types Stu-

dent will describe the program and show some of the first architectural results.

ARCHITECTURE THAT RESPECTS A LONG TRADITION

Edward Larrabee Barnes' U.S. Consulate at Tabriz, Iran, took its control-

ling architectural idea from the Iranian way of building, with a system of stucco-covered brick walls and domes set inside traditional walled compounds. Next month's feature will provide a first look at the com-

pleted building.

ARCHITECTURAL RECORD (combined with AMERICAN ARCHITECT, ARCHITECTURE and WEST-

ERN ARCHITECT AND ENGINEER), July 1967, Vol. 142, No. 1, Title © reg. in U.S. Patent Office © copyright 1967 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 & Tech-


OFFICERS OF McGRAW-HILL PUBLICATIONS: Joseph H. Allen, president; Bayard E. Sawyer, executive vice president; Robert F. Marshall, senior vice president—operations; vice presidents: John R. Callaham, editorial; John M. Holden, marketing; Huber M. Gemmill, circulation; Angelo R. Venezian, production; Robert M. Wilhelmy, controller.

CORPORATION OFFICERS: Donald C. McGraw, chairman of the board; Shelton Fisher, president; L. Keith Goodrich, Robert E. Slaughter, executive vice presidents; Donald C. McGraw, Jr., senior vice president, manufacturing services; John J. Cooke, vice president and secretary; John L. McGraw, 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 ad-

dress; 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.

Only Haws makes a bronze drinking fountain, and other distinctive models to match the excitement of your ideas.

Ask for your catalog today. Haws Drinking Faucet Company, 1441 Fourth Street, Berkeley, California 94710.

[Brand Logo] DRINKING FOUNTAINS
ASK A COMPLEX QUESTION — GET A SIMPLE ANSWER...

PRECAST WHITE CONCRETE PANELS

During the design of every building this question is asked...What exterior material will do this combination of things best: 1—Look great, 2—Be low in cost, 3—Be speedy to erect, and 4—Be economical to maintain. In a great many cases the answer is precast concrete panels made of Trinity White Portland Cement. They certainly worked out perfectly in Wesley Woods Towers, a convalescent home and apartment building for the retired, in Atlanta.

The 720 exterior panels at Wesley Woods have an exposed quartz and quartzite aggregate that give color and texture. The panels were cast ahead of schedule and were available when the frame was ready for them. Most panels take a compound curved shape—curved horizontally to the curve of the round towers, and curved vertically through the spandrel area. The curved panels are 5' x 8'; the flat panels for the connecting structure between the round towers are 4' x 5'. All are anchored with welded clip angles. All fit perfectly without on-the-site cutting.

Every architect can get expert advice on the use of precast white concrete from his local concrete products manufacturer. Call him.

Trinity White
PORTLAND CEMENT

A PRODUCT OF GENERAL PORTLAND CEMENT CO.

Offices: Chicago • Dallas • Houston • Tampa • Miami • Chattanooga • Fort Wayne • Kansas City, Kan. • Fredonia, Kan. • Oklahoma City • Los Angeles

Send for new booklet...“Precast White Concrete Panels and Window Walls.” Features dozens of examples of outstanding “precast” buildings from all parts of the country.

For more data, circle 4 on inquiry card

For more data, circle 5 on inquiry card
We have all heard so much about science, systems, or computers, and how they together will fix up everything in the future, that it is heartening to hear that perhaps something additional will be needed. This practical notion about a bit of extra sophistication or plain humanist experience comes from the right source, an official of the Department of Housing and Urban Development. He is Robert C. Wood, who was addressing the National Academy of Sciences. I shall quote extensively from his remarks.

"I want today to talk not about the glorious promise of applying science to urban design, but about the difficulties of doing so. I want to talk not about the admirable scientific and engineering capacity America now has, but about the additional capacity, the additional sophistication, that we need.

"I do not do so to discourage the involvement of scientists and engineers in the urgent and historic task of building urban America. Such involvement is critical to our success. I think, however, that we must not lose sight of what a complicated, arduous, adventurous and expensive job it is we have before us."

You will notice that he did not specifically mention architecture; it is I who take the liberty of reading "additional capacity, additional sophistication" as meaning architecture. If that seems too presumptuous, at least those are needs that put architects in the forefront of those thus challenged.

Mr. Wood went on to give four "facts-of-urban-life":

"First, the city is the most complicated system known to man. I am sure it is tempting for those best acquainted with the design demands involved to feel that nothing could be more complicated than getting a man to the moon and back. Such is not the case.

"Second, the city is and will remain the focus of intense conflicts. Differing ethnic groups and economic groups do not agree on the values or the ground rules which should guide the system.

"Third, any pure cost-benefit approach to urban programs will be doomed by their inevitable inconsistency.

"Fourth, in future urban planning we are dealing with entirely new orders of magnitude. Every urban physical and social pattern must be prepared to respond to explosive growth."

And: "Caution, then, is indicated when we talk glibly about building mathematical models or about viewing the city as a system. . . .

"As we are beginning to see, not only in our low-income urban ghettos but on our college campuses as well, there is a growing disinclination on the part of the less powerful segments of the community to accept passively the judgments of those accustomed to running things. Conflicts over the allocation of community resources which previously might have been quietly confined to people's hearts or their front stoops are now breaking out noisily on the streets, in city council chambers, and across the pages of the daily press. This is not a bad thing. Conflict and confrontation are often the necessary prelude to growth and change. It is only when conflict is carried on in a closed arena, with no possibility for accommodation or change, that it becomes truly destructive.

"In the past, problems of urban design were handled largely through intuition. Now we have new tools with which to work. But . . . further advances in scientific and engineering sophistication are needed. We must find ways to understand the personal, group and neighborhood identity, mobility and aspirations."

"It just might take some architectural orientation to make tolerable the environmental conditions in that explosive urban growth. Even if architects have to fight their way into the planning councils."

—Emerson Goble
The architectural demands of buildings on highways

We were going on (last month) about what is determining architectural tastes of the public abroad and at home. A bit more on the subject, this by architect Russell T. Pancoast, in his history of Miami architecture:

"Almost two decades ago a policy of tranquility in services and surroundings was tacitly abandoned as a background for tourism, then as now a chief support of Greater Miami's economic structure. In its place came an aggressively promoted policy of titillation that inevitably conditioned the approach to hotel design. Pleasure, excitement, ostentatious richness, all the outward signs of affluence and luxury—these were design standards quite as much as they were watchwords of successful hotel operation. They have been expressed with such prodigal imagination and such lavish hands as to create what is almost a monotonity of richness throughout the strip."

"This aura of architectural magnificence has had far-reaching results. On Miami Beach the resort hotel grew into a complete—and unique—maturity: a special sort of building type, geared to a special function and offering a variety of special services. The basic pattern is now being applied elsewhere; and the 'Miami Beach type' of resort hotel now offers its singular kind of glamour throughout the Caribbean islands, and in such widely divergent cities as Las Vegas and New York.

"Another startling phenomenon is the assemblage of architectural whims called 'Motel Row' that starts at Baker's Haulover and continues in an unbroken line along the ocean front to the residential village of Golden Beach. Owners of some of these fantastic outbursts have explained that their chief demand of an architect was that he design the highway facade so as to stop all traffic! Edward D. Stone's biting comment on this was to the effect that with so great a conglomerate of bizarre fantasies, the only traffic-stopper left would be a facade designed with architectural beauty and dignity."

The insights of the artist and the little black box

The present concern about science vs. people was summed up rather neatly by architect George E. Kostritsky at a recent meeting of architectural educators.

"What we rightly fear is the possibility that technological innovation, computerization and systems engineering will subdue or obliterate the poetic content of our environment and our lives."

"What he was really telling about was the reorganization of his own firm to meet the challenges of the times, as the principals saw "a metamorphosis taking shape." But he made it clear that they were not giving up any architectural convictions.

"We have in effect established a new charter which recognizes that while our immediate concern is with three-dimensional problems, we must grapple also with improving the total quality of life. Even as physical and social scientists are called on to contribute their skills, we hope the architect, or whatever in the future he may be called, will be there to inspire, to lead, to apply the broad perspective of the generalist and the insights of the artist."

What must we pay for environmental changes?

Speaking further about those coming changes caused by computerization (the little black box) and so forth, let me quote from a favorite speaker. He August Heckscher; the occasion was his leaving-taking from the Twentieth Century Fund to be Administrator and Commissioner, Recreation and Cultural Affairs Administration, Department of Parks, New York City.

"The key is the relation of man to the environment, and the interrelationship between the two. We get off the track just as soon as we assume that man can do whatever he wills to the environment and pay no price. Or when we think we can avoid the price by making man over so as to fit him for the new conditions. We get back on the track when we begin to test and analyze and measure—and when finally we heed—the interrelated effects of what man does to the environment and what the environment does to him.

"Disturbingly little is actually known about the residues and after effects of even such commonplace, everyday things as insecticides and detergents. Even less is known about the effects on the harmonious balance of nature created by the loss of various forms of plant and animal life. And when we come to trying to preserve species whose existence is threatened, we are pathetically helpless.

"The catalog of the unknown in this field could be indefinitely extended, proceeding into the effects of crowding and numbers on our cities, the strain on the nervous system of so much noise and on health of so much pollution. It is not only that specific programs of research can be built around such questions, but that research of all kinds must be influenced when we seriously and persistently concern ourselves about man's place within the physical world."

—E.G.
When you must select a lockset to meet both style and security requirements, specify Russwin Cylindrical Locksets throughout all your buildings. Distinctively designed with crisp clean lines, they provide lasting beauty and protection. Contact your nearest Russwin Distributor today or write for our latest brochure. Russwin, Division of Emhart Corporation, New Britain, Connecticut 06050. In Canada — contact Russwin Lock Division, Belleville, Ontario.

For more data, circle 6 on inquiry card.
Asg's Huewhite glass—a glowing band of light for a functional cluster of domes

Woman's Clinic, Lafayette, Indiana
Architect: E. H. Brenner, A.I.A.
even futuristic domes create an inviting, space-age setting for this women's medical clinic in Lafayette, Indiana. The cluster configuration is ideally suited to the clinic's purpose. It gives the four participating physicians separate obstetric/gynecology facilities for private practice under four domes. The remaining three domes provide common administrative, examination and reception areas. • Each of the domes is fringed at ground level with bands of ASG's Huewhite® light-diffusing glass. By day, the alabaster white glass suffuses the interior with glare-free natural light while insuring complete privacy. At night, the edges of Huewhite come softly aglow with interior light. • Huewhite is a member of ASG's complete family of plate, sheet and patterned glasses. For full information on Huewhite, including sizes and thicknesses, write: Dept. D-7, American Saint Gobain Corporation, P.O. Box 929, Kingsport, Tennessee 37662.
OUR MOVE

We move air evenly. We do it with a brand new kind of linear bar that moves conditioned air to the comfort zone (see our diagram). The bar economically and efficiently and quietly distributes air throughout the space. We call it the OCF Dimensionaire Ceiling System. It's a total ceiling system. Air, light, and sound. There's nothing like it.

THEIR MOVE

The expensive air (either heated or cooled) travels through the plenum, conditioning an unused section of the room. That's a waste of money. As you can see in this diagram, the conditioned air is distributed through the perforations, with greater force on one side of the room than on the other. That's a waste of comfort.

YOUR MOVE

We have a movie you should see. And a brochure. They tell everything about the OCF DIMENSIONAIRE CEILING SYSTEM. Mail the coupon now, before it slips your mind.

Dividend Engineering—to stretch your building dollar while improving building performance.

Name ____________________________________________
Title ____________________________________________
Address ________________________________________
City ________ State ____________

☐ Have your sales engineer call for an appointment to show the film.
☐ Mail the brochure.

OCF Dimensionaire Ceiling System

Owens-Corning Fiberglas Corp., Dept. DCS, P.O. Box 901, Toledo, Ohio 43601

AR-7
With so many well-known brands to choose from, why would an architect use a newcomer like Marshall Tiles for a $2,000,000 men's dormitory?

Not because he was looking for a bargain. Marshall Tile is no "cheap" tile. Matter of fact, we're a subsidiary of Monarch Tile — and you've known the quality behind that name for over 20 years.

What we offer you is unique in the industry. We limit our production to one tile size, one glaze and 14 colors — enough to satisfy just about every need. And we always maintain large inventories of those colors. That means you can get the color you want and the quantity you want, in the time and place you want it. Without costly delays.

When you think about it, that makes Marshall Tiles a pretty good bargain, at that.

Marshall Tiles, Inc.
Marshall, Texas 75670
For more data, circle 8 on inquiry card
This shower control protects your comfort
two ways. Beautifully by Speakman.

Dual-Safe Colortemp’s red and blue dial regulator lets you
pre-set the precise water temperature you enjoy most. Dual-
Safe Colortemp shower valves hold temperature constant—
automatically balances hot and cold water pressures.

So once pre-set—even though water is turned on elsewhere
in the house—a steady never scald, never icy temperature
is maintained. Never any burning or chilling surges of hot
or cold water.

*It’s what’s outside that counts.* Dial red for hot. Blue for
cold. In-between for just right. With Speakman Dual-Safe
Colortemp you can see what you’re doing—visibly pre-dial
the safe comfortable water temperature you desire.

*It’s what’s inside that counts.* Once the water is turned on
under normal operating conditions, a new Speakman twin
piston system instantly adjusts to hot and cold input varia-
tions—to maintain the safe comfortable temperature you
originally dialed.

Dual-Safe Colortemp for dual safe comfort in the shower.
Beautifully designed and exceptionally engineered by
Speakman. Why not let Speakman quality speak for you.

Send for complete descriptive literature without obligation.

*costs less really than you think/*by SPEAKMAN

SPEAKMAN® COMPANY • Wilmington, Delaware 19899 • In Canada write Cuthbert-Speakman • 47 Duke Street, Montreal 3, Quebec

For more data, circle 9 on inquiry card
For 24-hour a day selling power, high level security and visual appeal, architects and designers are turning to Cookson Overhead Rolling Grilles.

Across the country, the trend is toward the open, controlled-climate shopping mall. The need for weather-tight closures is eliminated. Only the need for security remains. Cookson Overhead Rolling Grilles can secure openings of up to 35 feet in width. For wider openings, use removable mullions or Cookson Side-Coiling Grilles.

For further information write for Bulletin 6701, or see us in Sweet’s.

"Best Way to Close an Opening"

THE COOKSON COMPANY
700 Pennsylvania Ave., San Francisco, Cal. 94107

For more data, circle 10 on inquiry card
The ORIGINAL Nylon-Fitted, Vibration-Proofed, ANODIZED Aluminum Grilles, Registers and Diffusers!

AirGUIDE Offers a Full Commercial-Specification and Residential Line to Meet any Design Requirements.

AirGUIDE’S U. S. PATENTED FEATURES!

- Nylon bushings in frame holes eliminate steel tension wires—no blade rattling or vibrations!
  U.S. Pat. No. 3,125,944

- “Corner-loc” miter construction is twice as rugged as any welded corner, tighter too!
  U.S. Pat. No. 3,125,944

  U.S. Pat. No. 3,125,944

- Nylon multi-louver mechanism is fool-proof. No rivets or linkages to rattle or vibrate. Trouble free!
  U.S. Pat. No. 3,145,642

- Vinyl inserts cushion Return Air and Door Grille blade assembly. Rugged I-beam mullion adds beauty and strength.
  U.S. Pat. No. 3,125,944

- Full replacement of defective units if caused by workmanship or materials.

WRITE FOR FREE CATALOG and NAME of NEAREST FACTORY AGENCY.

20-YEAR UNCONDITIONAL GUARANTEE!

MEMBER: Air Diffusion Council

795 W. 20th St.
Hialeah, Florida

For more data, circle 11 on inquiry card
For those who want the best, it pays to specify

**Complete Line of Care-Free Building Products**

That add beauty to any home or commercial building, while providing the added feature of no maintenance costs for many years. Rustproof aluminum will not stain, warp, rot or otherwise deteriorate. Any of these products are pre-painted with baked enamel. Others never require painting because of the beauty of natural aluminum finish. Precision-engineered for a quality, dependable installation. Be sure to specify Nichols Aluminum Valley, Flashing, Building Trim, Tensil-Rib Roofing and Siding, Roof System, Rain-Carrying Equipment, Gutter Cover or Building Corners on all your jobs.

**Hy-Tensil Aluminum Nails**

That are heat-treated for up to 15% greater strength than F.H.A. requirements. Won’t rust, spot or stain siding, so exterior repainting cycle is extended—meaning more savings for home or building owner. **Color-Match Any Job**

Painted nails are baked following each coat... for chip resistance and best paint adhesion. Available in standard or specially matched colors.

**Nichalloy Chain Link Fence**

A solid aluminum alloy fence provides many years of security and protection and an attractive touch to landscape. No painting necessary. No deterioration or corrosion from chipping. Maintenance-free. **Accessories**

That never rust, stain or bleed on aluminum or steel fence installations. Fence Ties, Barbed Wire, Brace & Tension Bands.

**Privacy Panels**

For seclusion and privacy with attractive design. Sturdy, Rust-proof. Painted white or redwood. Different heights.

For more data, circle 12 on inquiry card

**For More Information... Mail Coupon Today!**

For more information, please send me a free copy of the following literature:

- [ ] Nails Catalog
- [ ] Fence Brochures
- [ ] Building Products Brochure
- [ ] Have salesman call

Name

Firm

Address

City  State  Zip

Nichols Aluminum
P.O. Box 3808, Davenport, Iowa 52808
His heating and cooling costs are going up and up. Low-cost, water-susceptible roof insulation may work at first. But, gradually there’s a loss of insulation efficiency. Vapor barriers are not completely effective. They deteriorate. The movement of the building splits them. The moisture-laden air penetrates the insulation. Moisture forms through condensation, reducing insulation efficiency.

What to do? Specify STYROFOAM® RM brand plastic foam roof insulation. It’s the finest, most effective roof insulation you can buy. Remains effective even if the roofing leaks. Because it's not affected by water or water vapor, STYROFOAM brand plastic foam retains a permanently low “k” factor, which means lifetime insulation effectiveness.

Eliminates a major cause of roof blisters and subsequent leaking. Never rots, molds or deteriorates. Requires no vapor barrier. It's flammable and easy to install. A bundle of 100 board feet weighs only 25 pounds. It is tough. The skin will take the abuse of normal roof traffic without harm. For more information, write: The Dow Chemical Company, Construction Materials Sales, Dept. 71330, Midland, Michigan 48640.

No one will ever know you installed bargain roof insulation

(Until the owner blows his top).

For more data, circle 13 on inquiry card
For the better homes in any neighborhood it's wood panel doors.

Why wood panel doors?

Only panel doors made of wood add so much architectural interest—inside and outside. For this is the nature of wood. Only wood. Tasteful. Beautiful. Natural.

Both exterior and interior doors are available in a variety of distinctive styles as standard units. Ponderosa Pine Wood Panel Doors make the homes you design and build more interesting . . . set them apart from the rest.

Send for our DOOR BOOK. 16 pages crammed with decorative and practical ideas and uses for solid wood panel doors—ideas today's demanding home buyers are searching for. Send requests on your letterhead.

PONDEROSA PINE WOODWORK
and the Western Wood Products Assn.
Dept. AR-77, 39 South La Salle Street
Chicago, Illinois 60603
Jamolite doors look better and operate easier in all types of food service installations

In college cafeteria, Jamison Jamolite® plastic cold storage door maintains proper temperature in fruit and vegetable storage.

Female employees can easily open Jamolite doors one-handed. Note extra protection of stainless steel kick plate on door and frame.

Jamolite doors help save refrigeration because women employees can easily close the doors tightly. Available as both cooler and freezer doors.

Get complete catalog data by writing today to Jamison Cold Storage Door Co., Box 70, Hagerstown, Md. 21740

For more data, circle 15 on inquiry card
One man operates the Honeywell Control Center that starts, stops, adjusts, reveals, monitors, analyzes and checks almost everything in a modern, enclosed shopping center. Shown here: Southdale Center, Edina, Minn. Victor Gruen Associates, Architects.

Honeywell 1-man Control
keeps shopping center stores comfortable,
protects against fire and theft,
...and saves thousands every year.

Your clients will save enough in operating costs to pay for Honeywell automated control in 3 years or less, a 33% annual return on investment!

One man at the control center:
• reads and adjusts temperatures.
• starts, stops and adjusts equipment in every store.
• protects each store against fire and intrusion.

Five systems. Honeywell offers 5 different systems and more fire and intrusion detectors than anyone else, so you can pick exactly the protection you need for each commercial job.

Greatest reliability. Only Honeywell offers microelectronic circuitry for infinite life expectancy, unmatched reliability.

Personal follow-up. There's a field staff of Honeywell Building Automation Systems Engineers to help your clients get full payback.

In short, Honeywell can design, build, install, guarantee and service the complete temperature control and protection system you need for any commercial building you design.

Make us prove it. For examples of operating economies in other buildings, just mail the coupon.

FREE BOOKLETS!  
Send copies of Building Automation and Security Planning Guides.

Free a Building Automation Systems Engineer call with examples of operating economies.

Honeywell, Dept. AR 7-134
Minneapolis, Minn. 55406

Name: ____________________________
Title: ____________________________
Firm: ____________________________
Address: _________________________
City: ____________________________ State: __________ Zip: ______

Honeywell automation systems help make people more productive
Their new office helper is 7 feet tall

It's the new GF Over-file storage cabinet and GF Style 9000 file, of course! Together they end clutter and add beauty to a busy office. Everybody likes them.

The Over-file holds oversized items that would otherwise create storage problems. It is functional and decorative—and, with file cabinets, even serves as a partition to divide office interiors.

The Style 9000 file is new from GF, too. It has a flush front with inset pulls and label holders to complement today's professionally-designed offices. Available in a variety of colors and letter or legal widths.

For complete information, contact your nearby GF dealer or branch showroom. Or write for descriptive literature to Dept. AR-24, The General Fireproofing Company, Youngstown, Ohio 44501.
ornices in architecture have reemerged—but what a difference! The elaborately figured cornice at left has that desirable, natural tina that only copper and time can produce. It is still in excellent ndition after 53 years exposure to the elements. By contrast, the stillation at right shows how one architect kept pace with modern ornice design . . . one of the many examples of how copper lends ell so beautifully to modern architecture. No other material has ch latitude of design in its makeup or combines such beauty with dity. It is easily worked into just about any shape and form esirable . . . is ageless . . . takes on a mellowing patina with the years. or, it can be given the bronze look, so popular now, by oiling.

Little wonder that, even when sheet copper was in short supply, knowing architects continued to “design with copper in mind.” For, in addition to its practically unlimited design possibilities, its long life and ease of fabrication, copper, properly designed, is rated at the low­est cost per year of actual service of all roofing and flashing materials.

Get to know copper better. Send for Revere’s new 88-page Sweet’s insert. It was intended for the 1967 edition of Sweet’s but we missed the deadline. Don’t wait for ’68. Send for your free copy today. You will also receive free companion piece, “The 4 Revere Improved Systems of easy-to-install Flashings”, for the complete weatherproofing of masonry buildings.
You have to assume that any factory thoroughly tests its products... but, then what happens?

Typical of the carefully engineered and constructed Stewart & Stevenson emergency electrical generator sets is this unit developing 150 KW. Power is from a Model 8V71 GM Detroit Diesel Engine.

You are protected by an EXCLUSIVE Guarantee of duty—from Stewart & Stevenson

Some firms offer certificates by Independent Testing Laboratories.
Others offer guarantees against defective parts, workmanship and material.
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.
Stewart & Stevenson products are protected by two guarantees... the standard factory warranty against defective workmanship or materials and the time-proved Stewart & Stevenson guarantee of duty. There is no fine print or implied protection. The Stewart & Stevenson guarantee of duty specifies in plain and simple language what the equipment will do on your particular job... to your specifications. It provides further: "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."

Don't you agree that you should have the protection and assurance of the Stewart & Stevenson guarantee of duty? 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 Capital 5-5341

THE WORLD'S LARGEST DISTRIBUTOR OF DIESEL ENGINES

For more data, circle 18 on inquiry card
A complete line of advanced architectural hardware, including the Sargent Maximum Security System.

New Haven, Connecticut • Peterborough, Ontario
Robbins has come out with a new kind of continuous surface flooring that makes all other kinds of poured floors impractical.

It's called ULTRAFLOR

Every once in a while you get a chance to get in on something really new... design-versatile... and practical. Like Robbins completely new continuous surface vinyl flooring: ULTRAFLOR.

Unlike conventional poured floors... Robbins ULTRAFLOR can be installed anywhere permanent sheet vinyl can be installed... on or below grade. It exhibits its versatility in flash-coved, wainscoting... and floor-to-ceiling installations. And there are no installation problems with ULTRAFLOR. It can be installed easily, quickly, and professionally by the average floor mechanic. You see... Robbins continuous surface ULTRAFLOR doesn't have to be "manufactured" on the job. It's ready-made... ready-to-be-laid in continuous 6-ft. wide rolls. Another advantage of Robbins ULTRAFLOR is its backing... called MOISTGUARD... which eliminates discoloration by preventing any show-through of the subfloor.

And the finish coat... which Robbins calls N.S.U. 238... does even more than expected. It dries thoroughly within 24 hours... with a tough, non-slip, high-gloss finish that never requires waxing and is unsurpassed for its wearability. It can even be recoated after years of hard use for a new-again floor.

The result of all this is a beautiful continuous surface floor that can be installed in a minimum of time... with a cost factor proven acceptable to both commercial and residential customers. ULTRAFLOR adapts itself to any installation not only because of its durability and construction... but also because of its range of designer colors and patterns.

We think ULTRAFLOR is the kind of continuous surface floor you've always wanted to specify... but have never been able to buy before. Why don't you get in on it right now?
SO YOU THINK YOU BOUGHT A DIFFUSER...

A register...yes! A plaque...yes! But a diffuser...MAYBE!

You're paying good money for air diffusers, so make sure you get them. Remember: if it does not rapidly mix air and equalize temperatures, it is not a diffuser. Plaques and ordinary grilles are not diffusers.

Now look the field over. You'll find that only AGITAIR diffusers have genuine jet induction diffusing vanes. These vanes create high induction jets which induce greater quantities of room air toward the diffuser where it rapidly mixes with the primary air. Result: a perfect blend of homogenized air under controlled movement in every cubic foot of space served.

Don't settle for "look-alikes"... get the real genuine vaned diffuser... AGITAIR with jet induction diffusing vanes. Contact your local Air Devices representative for the complete diffuser story, or send for catalogs.

AGITAIR®

AIR DEVICES INC., 185 Madison Avenue, New York 16, New York
BETTER PRODUCTS FOR...AIR DISTRIBUTION • AIR CLEANING • EXHAUST
Pride of the Capitol District... Showcase of America

Some of the finest homes in the tri-state area surrounding Washington, D.C., are being built from the original designs of Edward R. Spano, A.I.A., by the W. C. & A. N. Miller Development Company. These homes depend exclusively upon the distinctive beauty and durability of Pratt & Lambert paint and varnish products for their unique look of quality.

Architects are invited to use Pratt & Lambert Architectural Services either through your P&L representative, or by writing the nearest Pratt & Lambert Architectural Service Department. There's no obligation.

3301 38th Avenue, LONG ISLAND CITY, N.Y. 11101
75 Tonawanda Street, BUFFALO, N.Y. 14207
4900 South Kilbourn Avenue, CHICAGO, ILL. 60632
1405 North Batavia Street, ORANGE, CAL. 92669
254 Courtwright Street, FORT ERIE, ONTARIO

PRATT & LAMBERT-Inc.
NEW YORK • BUFFALO • CHICAGO • ORANGE, CAL. • FORT ERIE, ONT.

For more data, circle 22 on inquiry card
Price Pfister—the only manufacturer offering two prestige lines with coordinated styling. Each line is complete and comprehensive in itself—coordinates with the other in any combination of valves and faucets for matchless decorator effects.

"FLOW-MATIC" and "CONTESSA" were conceived together, to provide a dramatic design continuity and flexibility, never before achieved in plumbing brass.

"FLOW-MATIC" combines the diamond-like effects of lucite, with our exclusive maintenance-free ceramic cartridge. "CONTESSA," our supremely elegant prestige line of dual handle fittings, combines brilliant crystal-like lucite handles with minimum-maintenance replaceable stem cartridge assemblies, and renewable seats.

Each line offers a complete and comprehensive selection of tub and shower combinations, tub fillers, shower valves, lavatory and kitchen fittings.

Price Pfister answers today's demand in fashionable homes, hotels and apartments for integrated design harmony. Specify Price Pfister— the world's largest independent producers of plumbing brass.

For more data, circle 23 on inquiry card
Carrier Bypass Weathermaster Units. Bypass Weathermaster® units automatically maintain room temperature dialed by occupant. Units come complete with control that improves performance, eliminates valve problems, and reduces installation cost.

Bypass damper provides varying coil capacity from zero up to 100 percent. In this cutaway, damper blade is half open. In actual operation, the damper assumes instantly the exact position required to proportion properly the amount of room air permitted to flow over the coil. If no change in capacity is required, the damper is held stationary. Water temperature and flow rate through the coil are constant. This eliminates water valves and throttling noises.

Attractive to look at!
Without an “or equal”
—the reason’s inside!

The photo shows one of the many architecturally attractive arrangements made possible by these high-velocity induction units.

The diagram shows how these units use the reliable and extremely simple bypass principle to provide automatic response to changes in a room’s temperature requirements.

Nobody else has perfected a high-velocity induction unit embodying this principle.

And we say “perfected” with evidence of this Weathermaster unit’s performance. Since introduction in 1936, more than 600,000 Carrier terminals have been successfully installed in high-rise buildings from coast to coast.

What advantages have these units? Design flexibility... factory-installed and factory-calibrated controls... instantaneous response to room temperature change... smooth and silent action, no water-throttling noises... water-control valves completely eliminated.

Besides being available with the automatic bypass control described here, these units come with a manual bypass or with water modulating capacity control. Models may be furred-in or installed in cabinets. Cabinets and accessory components offered in 7 decorator colors. All models ARI certified.

* * *
For complete information, get in touch with your Carrier representative. Or write us at Syracuse, New York 13201. Represented in Canada by Carrier Air Conditioning (Canada) Ltd.

Carrier Air Conditioning Company

More people put their confidence in Carrier air conditioning than in any other make

For more data, circle 27 on inquiry card
It's time to make allowances (just 30" by 30") for this new American-Standard bidet.

To non-traveled Americans, the bidet is a mysterious something that people use somehow in France and Latin America. You know, however, what this fine fixture means to all members of the family... washing with warm water and soap plus a spray rinse for complete personal cleanliness.

Now, many traveled Americans also know the bidet. And they like it. So American-Standard has made it easier to buy.

Our new Madval* bidet is moderately priced and a style-mate for the famous Cadet* toilet. You play a key role in the use of bidets. For you must provide for their acceptance by allowing an extra 30" of space (next to the toilet) for the bidet in the new bathrooms you plan.

For specifications and installation details, see your American-Standard representative. Or write American-Standard, Plumbing and Heating Division, 40 West 40th Street, New York, N.Y. 10018.

For more data, circle 28 on inquiry card
An unusual architectural competition has been held in San Francisco after the city's fire department came to the Northern California A.I.A. chapter for advice on selection of architects. What resulted was a competition which selected a panel of winners who could be drawn upon for further projects as they are needed. The jury selected four designs for premiation (with an award of $2,000 for each) from a field of 130 entries, and then designated the architect of one of the winning designs, Robert Wayne Hawley (front elevation of his submission shown below), for appointment by the city to be the architect for the first of this series of firehouses.

Commenting on this competition for selection of an architect rather than selection of a design, the jury report stated: "Deviation from a premiated design is almost inevitable during development into a working scheme. Consequently, the jury searched for aspects of design and concept that might give some clue to the ability of the author to face up to a situation requiring flexibility of mind together with strength of character, and as well, facility to improvise on a theme without loss of excitement of the original concept."

Commenting on Mr. Hawley's entry, the jury report stated: "The design is carefully studied in terms of proportion, scale and use of materials. The jurors commented that it 'looks like a firehouse.' It does, without any touch of historicism in design. Eminently adaptable to a residential neighborhood, it has dignity, a pleasing variety of surface treatment and fenestration and is not dependent for interest on special or intriguing details." Other premiated entries were by DeBrer, Bell, Heglund & Associates; James M. O'Neal with James C. Burleigh; and Thomas R. Aidala with W. L. Weber.

Serving on the jury were architects Ernest Born, Albert M. Dreyfuss, Charles Griffith, and John Lyon Reid, and William Gilmore, assistant fire chief, City of San Francisco (non-voting). Professional advisor was William B. McCormick.

Dr. William L. C. Wheaton has been appointed Dean of the College of Environmental Design at the University of California, Berkeley. He succeeds Acting Dean John E. Burchard, who will continue next year in a post-retirement teaching capacity on the architecture faculty.

Frederick Morris Wells has been elected chairman of the Department of Architecture at the College of Architecture, Art and Planning at Cornell University. Mr. Wells, who is the Andrew Dickson White Professor of Architecture, will continue to serve as chairman of the College's Department of Design.

Benjamin Thompson, professor of architecture and chairman of the Department of Architecture at the Harvard Graduate School of Design, will take a leave of absence for the academic year 1967-68 in order to continue his research on the use of visual media in teaching and to carry out his professional commitments. New chairman of the department is Jerzy W. Soltan, the Nelson Robinson, Jr. Professor of Architecture and Urban Design at Harvard.

James D. Gough Jr. has been appointed director of the School of Architecture at Montana State University, Bozeman. He has been acting director since August, 1966.

Alan Y. Taniguchi has been named director of the University of Texas School of Architecture, in Austin. He succeeds Philip D. Creer, who is returning to full-time teaching.

THE RECORD REPORTS

Sweet's plans

Interior Design File

A new product information service, Sweet's Interior Design File, is being planned by Sweet's Construction Catalog Services, a division of the F. W. Dodge Company. The first Interior Design File will be issued late in 1968.

The new file, similar in concept to Sweet's Architectural Catalog File, will consist of a series of bound, indexed volumes of manufacturers' product descriptions and specifications. The new file will be distributed annually to approximately 6,000 interior design firms, architectural firms with interior design staffs, and the design departments of major companies, institutions and government agencies.
Winner announced in St. Louis Gateway Mall competition

The firm of Sasaki, Dawson, DeMay Associates, Inc., architects, landscape architects and planners of Waterbury, Massachusetts, has won the $15,000 first prize in a national competition for design of the St. Louis Gateway Mall.

The jury commented that the winning design “achieves a powerful unity by the simplest of means. The careful sculptural treatment of the land gives a great calmness to the inner mall space and preserves the vista of the Old Courthouse and the Arch without the expense and complexity of grade separation. It offers a bold cohesive entity with great clarity of form; it shows masterly attention to the sightlines and to the visual separation of the longitudinal traffic streams. It unites the various urban elements, making the best use of existing structures and views.”

Members of the winning design team included Richard H. Rogers, associate in charge, Hideo Sasaki, Mark Battaglia, Tom Johnson, Vincent Nauseda, Charles Smith and Charles Turofsky.

Second prize of $4,000 was awarded to the St. Louis firm of Murphy and Mackey Architects, Inc.; third prize of $3,000 to Robert Frank LaRocca, landscape architect, with Willie Lang and Joseph Yee, landscape designers, of San Francisco; and fourth prize of $2,000 to Paul C. K. Lu, architect and landscape architect, and William Page, architect, of Cambridge, Massachusetts.

Serving on the jury, which selected the winners from among 57 entries, were architects Lawrence B. Anderson, Harris Armstrong, and Charles W. Moore, and landscape architects Thomas D. Church and John Simonds. The competition was sponsored by Downtown St. Louis, Inc. and the City of St. Louis.

Six trustees named for P.C. Educational Foundation

Six trustees have been named for the Producers' Council Educational Foundation, which was established in 1966 to provide educational courses, programs and seminars on a broad range of building industry subjects. One of the Foundation’s projects, Management Advancement Programs for Building Product Executives, will be held this fall in cooperation with the College of Commerce and Administration at Ohio State University.

The new trustees are: James M. Ashley, vice president, public relations, Libbey-Owens-Ford Glass Company, Toledo; architect Robert F. Hastings, president, Smith, Hinchman & Grylls Associates, Detroit; David S. Miller, senior vice president, The E. F. Hauserman Company, Cleveland; Elliott C. Spratt, consultant, Hillyard Chemical Company, St. Joseph, Missouri; Charles S. Stock, vice president, American Air Filter Company, Inc., Louisville, Kentucky; and Walter F. Wagner Jr., executive editor, ARCHITECTURAL RECORD.

Largest student convention meets in New York

For the seventh consecutive year the Association of Student Chapters of The American Institute of Architects held their convention concommitantly and in conjunction with the A.I.A. The student convention opened on Sunday, May 14, with registration at the New York Hilton. By the end of the week the total number of registrants reached 675, the largest number ever.

The national officers of the A.I.A. who presided over the sessions were Morton O. Spratt, president; Romeo C. Garcia, vice president, and Brent Porter, secretary.

Highlights of the first business session on Tuesday included the presentation of the Reynolds Student Prize of $5,000 to Kent C. Underwood of Columbus, Ohio, and a presentation by Benjamin Thompson of Harvard University entitled “Comments on a Bright Vision of the Future.” At the second business session on Thursday, the new $5,200 Urban Design Fellowship open to senior students of architecture for graduate study was announced by Leo J. Pantas of Eaton and Towne. Following this, Arthur Clarke, noted scientist and science fiction writer, presented a review of the “World of 2001” in collaboration with Professors Patrick Horsburgh of the University of Texas and the University of Notre Dame.

On Monday evening the first of three seminars programed expressly for students was held. The National Institute for Architectural Education sponsored a lecture at which time a study of “The Student and His Future Development” was delivered by Roger Katan. Bethlehem Steel Corporation presented Dr. Lev Zelikson on Tuesday evening with “Views an Predictions on the Structures of the Thin Millenium,” asking the question: “How will the buildings of tomorrow look and how will people live?” The Egg and Dart sponsored a design concepts seminar on Wednesday morning with O'Neil Ford and Samuel Zisman presenting their solutions to the problem of developing a new campus for Skidmore College of Saratoga Springs, New York.

The social climax of the convention week was the Beaux Arts Ball on Friday night held at the Ukranian National Home in the Bowery, featuring dancing to the beat of the South Hampton Marching, Racing and Clam Bake Society Dixieland Jass Band from Greenwich Village.
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, typewriter, 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.

For more data, circle 29 on inquiry card
A four-pipe system isn’t always the answer.

There could have been a profitable pool or penthouse on this roof.

And a garage instead of a boiler in the basement. If only someone had specified a General Electric Zonal System.

- GE Zoneline units could heat and cool the outside rooms.
- GE unitary units could heat and cool the inside, public rooms.

No rooftop cooling towers. No basement boilers. A significant increase in usable, rentable space.

Other advantages over four-pipe systems:

- Big first-cost savings.
- Lower maintenance costs.
- Lower heating/cooling costs in unoccupied rooms.
- A breakdown doesn’t affect the entire system.

From motels to high-rise construction, a General Electric Zonal System can save you space and money. For full specs, call your General Electric representative. Or write AP6-208, General Electric Company, Louisville, Kentucky 40225.

GE Zoneline heating/cooling unit. Room-by-room control. Choice of grilles. Fits over doors or under window seats. Through-the-wall or floor-mounted consoles.

GE Unitary systems—A full line from 2-20 tons, split, self-contained, with various heating means including GE famous Hi-Reliability Weathertron® heat pumps.

Air Conditioning Department, Appliance Park, Louisville, Kentucky.

GENERAL ELECTRIC

For more data, circle 30 on inquiry card
Philadelphia firm wins competition for Birmingham-Jefferson Civic Center

A design by George W. Qualls of Philadelphia firm of Geddes Bre Qualls Cunningham has won the stage national competition and architectural contract for the $25-million Birmingham-Jefferson Civic Center in Alabama. The civic center will cover a full block area in the northern section of Birmingham. The program called for a complex of buildings including a 13,000-seat sports coliseum, a 100,000-square-foot exhibition hall, a 3,000-seat concert hall, a 1,300-seat theater and restaurant, administration and parking facilities. The center is being funded through a special county-wide tax, and land acquisition is about to begin. Completion of the complex is scheduled for the spring of 1968, Birmingham's centennial year.

Also awarded was a second prize of $15,000 to Ralph Rapson of Rapson Architects, Inc. of Minneapolis, and a third prize of $5,000 to Fridstein & Fitch of Chicago, as well as five honorable mention prizes. All of the premiated designs are shown on these pages.

Serving on the jury, which narrowed the field of 276 entries to eight semifinalists last November and which selected the winners in May, were architect Max Abramovitz, Gyo Obata and John Carl Warnecke, and Harold Burris-Meyer, director of the University Theater, Florida Atlantic University, and John Fernald, Principal of the Royal Academy of Dramatic Art, London. Professional advice was given by architect William A. Briggs of Richmond, Virginia.

Winning design by George Qualls groups the four buildings around a large outdoor pool ringed with terraces and an amphitheater. In speaking of his design, Mr. Qualls noted that it creates "an inviting but sequestered part of the city to which anyone might come at any time. At times, when none of the functions are in session—for example, a Sunday afternoon—the general public would have access to the elevated terraces for a promenade. If necessary, the higher terrace system could be designed for the control of audiences attending functions in the four major buildings." The theater is designed to convert from a proscenium arrangement to a thrust stage.

(1) sports coliseum (2) concert hall (3) theater (4) exhibit hall (5) restaurant (6) offices and library
3rd prize of $5,000 went to Fridstein & Fitch for the design of a complex with three major structures: a coliseum, an exhibit hall and a composite facility. According to the architects, “the three major elements are arranged around a great central plaza and are interconnected by a series of tiered platforms. The three main platforms are linked at the center of the complex. The terrace which defines the surface of the central plaza is the primary exit level for all the varied functions of the buildings.”

Honorable mention went to Barry Elbasani, Donn Logan and Barakonski-Riley Associates for a design where the buildings were conceived as “simple structural containers” to allow freedom and flexibility of activities.

Honorable mention went to John Stuart Mill of Beckhart & Mill for a design which “is premised on using a single cover over the entire center, unifying all diverse functions and providing further interior elevated space.”

Honorable mention went to B. J. Hoffman and Hanford Yang Associates for a design which combines the buildings into one giant sculptural form with major elements articulated by pedestrian entrances to the central court.

Honorable mention went to E. N. Turano and Associates for a design where “music hall and theater reach out across the space to each other” and the roof of the exhibit hall is part of the plaza for outdoor exhibits.

Honorable mention went to James Martin Harris of Harris & Reed for design of a complex as “an integrated unit” with access to all functions from street level as well as through the central vertical circulation core.
The Regency Hyatt House in Atlanta, designed by Edwards and Portman, is an 800-room, 21-story hotel with the rooms arranged around a landscaped, skylighted and air-conditioned enclosed atrium which rises the full height of the building. Access to the guest-rooms, as well as to a superstructure 40 feet above roof level which houses a revolving restaurant, is by five glass capsule elevators suspended from a giant column at one side of the lobby. Each guest room has an exterior balcony. There are five floors below lobby level which house dining areas, convention hall for 1,700, meeting rooms accommodating 2,500, exhibition area and parking for more than 500 cars. Contractor for the $18-million building was the J. A. Jones Construction Company.

The Contra Costa County Hall of Justice, Martinez, California, designed by Frederick R. Confer & Associates, is a three-building complex consisting of a jail (at left in model) a 10-story administration building, and courts building. The administration building will house administrative facilities for all divisions of the County Sheriff's Department within one building. The jail building, which has a maximum cell occupancy of 16 inmates, will contain complete facilities for processing and holding male and female adults and juveniles. The courts building will house two Superior Courts and one Municipal Court. Circulation bridge will permit secure transfer of prisoners between the jail building and court facilities.

Mather House at Harvard University, Cambridge, Massachusetts, designed by Shepley Bulfinch, Richardson, and Abbott, will serve as a residence for 400 students. The $8-million complex will consist of a 21-story tower and a series of connected structures grouped around a central courtyard. The tower will contain both single rooms and two-man suites while the low-rise section will have suites for four men and for six men, each suite having a living room and alcove for refrigerator and hot plate. Another section of the low-rise structure will house a library and offices for tutors. Facilities provided in a separate two-story building will include a dining room, a grill and meeting rooms.
Interchange Tower in the Los Angeles Center area, designed by Richard L.ian & Associates, is a 38-story multi-useing. It will provide office space to clement an adjacent medical complex and by municipal offices with courtrooms on lver levels, as well as commercial and urant facilities for the area which will include the Bunker Hill apartment de­ment (see rendering at right). The $16- on building will include underground ginging and will contain 870,200 square feet.

The Bunker Hill Towers apartment development in Los Angeles, designed by Robert E. Alexander, F.A.I.A., and Associates, will ultimately consist of 40-story, 35-story, 30-story and two 17- story buildings as well as a series of two- and three-story structures. The $55-million project will provide 1,750 apartments and underground parking for 2,400 cars below landscaped plazas. The first increment of construction, on which ground will be broken shortly, will include the 30-story and the two 17-story towers, and will cost $22.5 million. Apartment sizes will vary from one­room studios to four-bedroom penthouses. General contractor for the first phase of construction is the Simpson Construction Company.

The Westchester County Courthouse in White Plains, New York, designed by Welton Becket and Associates, is a $28.3-million complex which will include a 20-story courthouse building and a 1,000-car, four-level parking structure linked by a three-story building which serves as a pedes­trian bridge. The top 12 floors of the tower will contain two-story-high courtrooms, with a typi­cal floor containing a large facility seating 144 and three smaller ones each seating 28. Complete separation of the general public and judges and jury traffic is achieved on all floors by a series of exterior cores. The lower floors contain related facilities such as the sheriff's department, offices, family courts and surrogate courts.

A 40-story office building in Boston, which will probably be called The Boston Company building, designed by Pietro Belluschi, with working drawings being prepared by Emery Roth & Sons, will have four external corner columns and the building's core providing total structural support for the office tower which rests on an octagonal, two-story base. The tower will be deep bronze in color while the plaza level will be sheathed with granite. The building, which is being developed by Cabot, Cabot & Forbes, will contain 685,000 square feet. An adjacent multi-level park­ing garage will be accessible from within the new building.
The Benjamin Rush Junior High School in Philadelphia, designed by Thalheimer & Weitz, received variances from the city's building code to accomplish two purposes—minimum window areas and completely interior classrooms. The use of triangular classrooms on the perimeters of the buildings permits one window to serve three rooms, and, by removing folding partitions, these spaces form a triple-sized areas. The two-story, $4,344,000 building contains approximately 180,000 square feet and will accommodate 1,250 students. The building will be of steel frame construction with brick exterior and aluminum windows and panels above glass area. Also provided is on-site parking for 150 cars and 21 buses.

The Jack Downing School, a facility for 651 students from kindergarten through eight grade levels, in Riverview, Michigan, designed by Eberle M. Smith Associates, has six large flexible class spaces for non-graded class and team teaching techniques. Each of these classrooms will have a three-man teaching team, located centrally, for 90 students. Each of the spaces has flexibility in the use of area and mobility of furniture so that students can be divided into groups of various sizes. The six class spaces are arranged around a multi-instructional center consisting of a theater, material center for audio and visual aids, and a television control center. The isolated kindergartens (located at the right in the model) have access to the theater. On the other side are special education and vocational areas. The $1,425,000 school is set for completion in January 1968.
The North Carolina Mutual Life Insurance Co. building in Durham, North Carolina, is shown here. Designed by Welton Becket, F.A.I.A., Architect, of New York City, this multi-story structure utilizes custom designed screening of Borden Decor Panel in rich Kalcolor Bronze finish. Created to complement and enhance the character of the building, the Decor Panel screens were custom designed and specified, individually fabricated, and tailored for special erection methods—all within a fixed budget. The savings effected by Borden's fabrication and erection techniques made it possible for the architect to use the handsome bronze finish as well—still within the initial budget.

Sturdy, lightweight aluminum Borden Decor Panel, in both custom and standard designs, is a versatile architectural medium, widely used for facades, screening, sunshades, dividers, partitions, grilles, etc. It is particularly valuable for refacing of existing buildings. For more detailed information on custom and standard Borden Decor Panel:

Write for latest full-color catalog on Borden Decor Panel

another fine product line of

BORDEN METAL PRODUCTS CO.
MAIN OFFICE: 822 GREEN LANE, ELIZABETH, NEW JERSEY  •  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 31 on inquiry card
Record Houses '67

Congratulations on another superb issue of Record Houses. It is by far, to me anyway, the best issue yet and I am very proud indeed to be included. The drawings and floor plans done by your staff are truly elegant and work admirably with the photos. It really is so spiffy that my eyes missed the part on page 85 that speaks of the living room opening out onto the swimming pool. This is a very minor oversight anyway.

Hugh Newell Jacobson
Washington, D.C.

I thought this year's Record Houses was the best one yet. It has a terrific overall dignity and attractiveness.

Ulrich Franzen
Ulrich Franzen & Associates
New York, New York

My comment after seeing the Record Houses of 1967: What a complete bore. You know, there are architects other than those who are members of the "School of Copyists."

Norman H. Grides
Prosldorfer & Smith
Mobile, Alabama

A double congratulations: (1) on your receipt of the Jessie H. Neal Award for having the best single issue in 1966 in your circulation category and (2) on the presentation of another superb issue of Record Houses.

Earl R. Flansburgh
Earl R. Flansburgh & Associates
Cambridge, Massachusetts

I was very pleased with the extensive coverage in the newspapers about Archi
tectural Record's house awards for 1967. I am very honored to have been included in your selection of these award winners.

Denoce Whitney Goubert
New York, New York

Bird sanctuary or egg farm?

I rarely write to editors of magazines, but I am prompted to do so by the article on page 151 of the May issue with respect to the library of the Institute for Advanced Study here at Princeton designed by Harrison and Abramovitz.

As a resident of Princeton and a close neighbor of the Institute, I think there is no question that this is indeed a handsome structure, and those of us who live near the Institute for Advanced Study and enjoy the privilege of walking on the grounds and through the bird sanctuary, which adjoins the library, clearly enjoy this splendid building.

My semi-negative vote, however, refers to the fact that libraries in general, and that of the Institute in particular, are used almost as much at night as they are in the daytime. It is at night that the neighbors and the surrounding community for miles around receive their greatest shock. On page 153, you report the roof structure in great detail. Specifically, you state, "...the curved soffit and haunch of a typical beam picks up the daylight from the north-facing panels and reflects it downward—or at night, serves equally well to distribute illumination from the concealed fluorescent tubes." It is at night that the sky over the library is lit up like the opening of a supermarket. Unquestionably, the design of the roof was a tour de force. It was a fantastic construction problem as well. I witnessed the construction of this building almost on a daily basis and, believe me, the forms necessary for the construction of the concrete roof were massive indeed and resembled the ribs-and-keel bracing of an 18th-century windjammer.

As I have indicated above, the irony of the situation is that the Institute has provided for the residents of the community one of the most desirable natural wooded sections and bird sanctuaries in this region. I am afraid, however, that the birds within half a mile of the library have had no more rest in the evenings than the chickens in the massive egg farms in New Jersey which are kept awake at night by artificial light so that they will produce more eggs. I raised this question with an academic friend who is an ecologist with a particular interest in bird life, and he agreed that the conditions were most unfortunate.

It seems to me that an architect has a responsibility for the environment in which he places his building as well as the beauty and function of that building. Even as a source of north light, referred to in your article, the point is debatable in this latitude. The number of days when the absence of cloud cover makes and particularly reflected light, effort for sustained reading is a small percentage of the total. Thus, artificial light the daytime is, more often than necessary. At night, however, and a night, the glare in the sky is unbelievable. When there is a bit of an overcast, this is a sight to behold, which can be clearly seen from U.S. 1 about a mile away. I don't know if either of the Messrs. Harrison or Abramovitz lives in the country but I would wager they would be censed if their night view were offended by the garish light of a shopping center on opening night, no less.

Ricardo A. Mestre
Princeton, New Jersey

Architectural photography

The May issue of Record came today, congratulations on the beautiful color cover and to Morley Baer for doing the first class photography job he usually does. This is absolutely the clearest, best tone reproduction I've seen on a cover in a long while.

George Zimberg
Architectural Photographe
Cambridge, Massachusetts

Kind words department

Let me take this opportunity to say how much I have enjoyed reading your first magazine. You are doing a good job providing the architects with an excellent publication.

Herbert L. Smith, III, A.I.A.
Norfolk, Virginia

I would like to take this opportunity to congratulate Record on its excellent format. In our office, after reading the magazine, we use it as a tear sheet and file as per the AIA periodical files. This gives us a great opportunity to keep the information to a minimum in bulk and to be able to, later, recall a maximum of information from the articles. This is the only professional magazine I know that does as good a job in allowing us to make this use of the material. The article and the photography, the short articles on specs, mechanical, book reviews, are all of the highest quality.

B. Milton Cuppy, Jr.
Cuppy Flagg Meek, Inc.
Indianapolis, Indiana
k Turbomaster systems chill water for 42-acre Allegheny Center building complex.

Allegheny Center, a development of Alcoa Properties, Inc., Oliver-Tyrone Corporation and Lewis E. Kitchen, is the first building property of its size to be heated and cooled by a centralized gas energy system. Over four miles of pipeline will transmit heating and cooling for 1,350 apartment units, 220 townhouses, an eight-story office building—plus 750,000 square feet of commercial space.

Three York open Turbomaster systems, each with a capacity of 2,000 tons, will furnish chilled water for cooling the entire complex. All heating-cooling equipment is located in a central plant; individual buildings in the Center will require no boiler rooms or heavy equipment.

This trend toward large centralized air conditioning systems is being felt in more and more communities. Because of the need for reliable equipment, many designers of such systems depend on York for the air conditioning components.

When you plan air conditioning—for any building or complex—get specification data from your nearby York Sales Office. Or write York Corporation, York, Pennsylvania 17405.

For more data, circle 32 on inquiry card
When he’s racing against time, the odds are better with VIP.

When he calls for an elevator, chances are it’s already on the way. Because a VIP elevating system is always on the alert. It predicts workloads by computer. Anticipates calls. And only VIP distinguishes car calls from hall calls, for precise predictions and faster service.

Otis

So many extras are standard with VIP.
Pile Vinyl.
12 colorful ways to floor your clients.

In simple black and white, we think we've come up with a pretty unusual new kind of floor covering. The name is Powerbond®.

It's unusual because it combines the luxury of pile with the practicality of vinyl. Without the disadvantages of either.

The Unique Powerbond Sandwich. Powerbond is constructed like a sandwich. With 4 distinct layers of materials fused together. (Fused, not simply glued.)

There's a super-dense surface pile of 100% continuous filament nylon with a circular cross-section. (219,000 tufts per sq. yd. Almost 3 times as dense as normal commercial carpet.)

Next, a polypropylene primary back. Then a pure vinyl precoat. Finally, a secondary vinyl cushion backing. Or a solid vinyl back plate, where extra cushioning isn't necessary. (Note the total use of vinyl. For ultimate stability.)

Powerbond is powerful. It anchors pile loops for life. In fact, they'll have to break before they can loosen or unravel.

Another thing. The vinyl backing allows Powerbond to be cemented to any type of floor. Permanently cemented. Not even moisture can affect it.

The Beautiful Wear Plan. There isn't a commercial application where Powerbond couldn't be used. Including hospitals, offices, schools, supermarkets, etc.

Its 12 colorful tweed combinations are easy on the eyes. While the super-dense pile is easy on the feet. It also muffles noise. Prevents expensive product breakage. And won't ripple or buckle. Ever. So anything on wheels rolls easily on its smooth surface. But people won't slip.

And talk about wear. Powerbond is rugged and abrasion-resistant. Scuff marks won't scuff. Or mark. Spiked heels won't spike. And traffic patterns won't show.

Maintenance is Last. And Least. The super-dense cylindrical-shaped pile is so super-dense it holds spills, dust and dirt right on the surface. So they can be vacuumed or sponged off. Quickly, easily. Without special know-how or special cleaning aids. So maintenance takes less effort, time and money. Which will really floor your clients.

Send more facts and swatches on new Powerbond Pile Vinyl.
Name_____________________
Title_____________________
Company__________________
Address___________________
City_______________________
State______Zip___________

COLLINS & AIKMAN
210 Madison Avenue, New York 10016
Contract Division, Dept. 11

*TM of Collins & Aikman

For more data, circle 34 on inquiry card
From molten volcanic depths ...the world's most effective roof insulation... Celo-therm*

MADE FROM EXPANDED PERLITE
(PROCESSED VOLCANIC ORE)

Celo-therm Roof Insulation is fire-resistant, as only the product of volcanic energy can be. It’s impervious to moisture, decay, deterioration and vermin. It takes heavy wheeling loads and deck traffic without a dent or fracture. And it has a superior new surface that bonds perfectly, permanently to roofing felts.

Used with approved adhesives or steep asphalt (12-25 lbs. per square), Celo-therm Roof Insulation meets Factory Mutual Class I standards for metal deck construction. Approved for UL Metal Deck Constructions No. 1 and No. 2. Has flame-spread rating of 25 — allowing favorable insurance rate on steel deck constructions.

And there’s more to tell. Write for technical data, full application details and samples.

* Trademark

THE CELOTEX CORPORATION • 1500 NORTH DALE MABRY
TAMPA, FLORIDA 33607
Subsidiary of Jim Walter Corporation

For more data, circle 35 on inquiry card
We punched holes in refractor design and increased efficiency 10%

Why argue with success? Our standard Photometric luminaire has been a top choice for school and commercial applications for some time. But we like punching holes in accepted standards—even our own. And in this case we punched 768 little square holes the length of our lens to make the first vented wrap around plastic refractor in the industry. Now air circulates freely throughout the unit, decreasing operating temperature, lengthening ballast life, and increasing efficiency almost 10 percent. The Vented Photometric is available with styrene or acrylic injection-molded refractors with the same strength as our popular solid Photometric units. 2-lamp 4-ft. and 2-lamp 8-ft. tandem fixtures are available. And they feature the same easy lift-slide-remove features with no latches or catches. Ask your Wakefield man or write for literature on the Vented Photometric . . . the only unit better than the Photometric.

ITT Environmental Products Division, International Telephone and Telegraph Corporation, P. O. Box 195, Vermilion, Ohio 44089.
These three important code approvals assure you of extra confidence when you use Dur-O-wal brand truss-design reinforcement for multiple applications in masonry wall construction. Write for your free copy of the new Installation Details Brochure. Dur-O-wal, P. O. Box 368, Cedar Rapids, Iowa.

Reinforce masonry walls and your confidence.

SPECIFY DUR-O-WAL

DUR-O-WAL MANUFACTURING PLANTS • Cedar Rapids, Iowa, P. O. Box 368 • Syracuse, N. Y., P. O. Box 628
• Baltimore, Md., 4500 E. Lombard St. • Birmingham, Ala., P.O. Box 5446 • Aurora, Ill., 625 Crane St. • Pueblo, Colo., 29th and Court St. • Toledo, Ohio, 1678 Norwood Ave.
• Mesa, Ariz., 213 So. Alma School Rd. • Seattle, Wash., 3310 Wallingford Ave. • Minneapolis, Minn., 2653 37th Ave. So. • Also manufactured in Canada.

For more data, circle 37 on inquiry card
When they said, “We want durability, beauty, and reasonable cost,”
...the men from Reynolds gave them all, with insulated aluminum walls.

Shirley of Atlanta, Inc. wanted their new office and distribution center to reflect the style-consciousness of their line of women’s wear. Standard Reynolds Aluminum 4" rib panels relieve the broad expanse with shadowed texture; a baked enamel Colorweld® finish adds lasting beauty.

This manufacturer is also assured of building economical to heat or cool. No other material at comparable cost offers as good a "U" value as aluminum, even when used as an unpainted, single-skin wall. In the Shirley building, an aluminum sandwich wall with only one inch of insulation has three times the thermal efficiency of a concrete block and face brick combination wall, yet costs only about half as much in place.

Configurations offered in the complete Reynolds line are Corrugated, 4" and 8" Rib, V-Beam, Roof Deck and two concealed fastener panels, CCP and Reyno-Wall®. All are used for a multitude of applications, ranging from renovation of tired old buildings to putting the best face forward on new factories or stores, warehouses or offices. Most are available in a variety of Colorweld colors and several natural finishes to fit any architectural motif.

Select Reynolds Aluminum and your clients will benefit for years to come. Choose Reynolds for your next commercial structure. Easy to maintain, remodel, or expand. See AIA File No. 12C, Sweets Architectural File 21b/Rey, or use the coupon below for full information.

REYNOLDS ALUMINUM Building Products

Watch "Spotlight," Tuesdays, CBS-TV

REYNOLDS METALS COMPANY
Building Products and Supply Division
325 West Touhy Avenue, Dept. AR-77
Park Ridge, Illinois 60068

Send me complete product file on Reynolds Aluminum Commercial Building Products.

Name

Company

Address

City State Zip
B. H. Backlund & Associates, Inc., of 4924 Poppleton Ave., Omaha, announce that Ralph H. Taylor, A.I.A. has joined their firm as vice president for architecture.

The Ballinger Company, architects and engineers in Philadelphia, have appointed Lauri J. Kurki, A.I.A. and Robert E. Wetmore, P.E. partners and Carl C. Colket has been made a senior associate. Francis Bartlett, A.I.A. has formed a partnership with Gaylord H. Forbes to be Bartlett & Forbes Architects at 226 Walnut Blvd., Rochester, Mich.

Leon Brand, A.I.A. and S. Hart Moore, A.I.A. have formed the architectural firm of Brand & Moore with temporary offices at 660 Bergen Ave., New York City.

Vinton P. Frost has been appointed director of client relations for Burke, Kober, Nicolas & Achuleta, a Los Angeles-San Francisco based architectural and engineering firm.

E. W. Carroll, F.A.I.A. and Louis Dauble, A.I.A. announce that George C. DuSang, Jr., A.I.A. and N. Patrick Rand, NSPE have been made partners of Carroll, Dauble, DuSang and Rand, Architects and Engineers located at 2501 N. Mesa Ave., Suite 303, El Paso, Texas.

William J. Conklin and James S. Rossant announce the departure of Julian H. Whittlesey from the firm of Whittlesey, Conklin & Rossant. The practice continues under the name Conklin & Rossant at 31 Union Square, New York City.

Samuel B. Nelson will become a vice president of Daniel, Mann, Johnson & Mendenhall, a planning, engineering and architectural firm located at 3325 Wilshire Blvd., Los Angeles.

Rodney S. Davis, A.I.A., former partner, Fisher & Davis, announces the formation of Rodney S. Davis Associates for the practice of architecture at Suite 827 Ideal Cement Bldg., 821-17th St., Denver.

The architectural firm of Kelly & Gruzen, New York and Newark, announces the admission of six new partners and the change of its name to Gruzen & Partners, Architecture-Planning-Engineering. The new partners are Rolland D. Thompson, Richard P. Rosenthal and Peter Samton, who have been associates in the firm of Kelly & Gruzen, and Norval C. White, Julian H. Whittlesey and William D. Smith, all formerly partners in their own firms.

Norbert W. Weinberg has been appointed Director of Design of Koebig & Koebig, Inc. an engineering, architecture and planning firm in Los Angeles, Calif. continued on page 69

For more data, circle 38 on inquiry card.
In lobbies—heat with Modine cabinet unit heaters, convectors or finned-tube radiation.

In offices—heat and cool with Modine fan coils; central station units for entire buildings.

Visitors’ lobby to shipping dock, Modine
In manufacturing—Modine make-up air heaters heat and filter fresh air, replace contaminated air.

On shipping docks—Modine steam, hot water or gas-fired unit heaters deliver heat on demand.

delivers the comfort

Tell me more. Please send information on Modine:

☐ cabinet unit heaters
☐ central station units
☐ convectors
☐ make-up air heaters
☐ finned-tube radiation
☐ unit heaters, gas-fired
☐ unit heaters, steam and hot water

Name ____________________________________________
Firm ____________________________________________
Address __________________________________________
City _____________________________________________
State ____________________________________________

Mail this coupon to Modine, 1510 DeKoven Ave., Racine, Wis. 53401.

For more data, circle 39 on inquiry card
Peachtree Center --

heart of a new, dynamic Atlanta

Square D is proud of its contribution to the development of Peachtree Center, core of an entire new downtown Atlanta.

A long-range project which may ultimately include seven major new buildings, Peachtree Center began with the completion in 1961 of the Merchandise Mart, the world’s first all-electric commercial building. The 30-story Peachtree Center Tower office building followed, along with the 800-room Regency Hyatt House, Atlanta’s unique new hotel. The latest addition to the complex is the Atlanta Gas Light Tower.

Square D supplied the electrical distribution and control equipment for each of these buildings. Such Square D products as switchboards, lighting panelboards, busways, underfloor raceways and motor starters assure the dependability and versatility required in a project with the scope of Peachtree Center. You’ll find these and other Square D products in factories, homes, institutions—wherever electricity is distributed and controlled.

For more data, circle 40 on inquiry card
Fuller Tuff-Lite® Matrix

gives old buildings a new, strikingly bold personality

Tuff-Lite® gives older buildings a new lease on life. Gives them a personality that can be strikingly bold, bright and interesting, distinctively different. Tuff-Lite®, an epoxy-based matrix, is ideal for refurbishing older buildings in yet another way. It is so lightweight—actually eight times lighter than concrete—it eliminates the need for structural reinforcement in old buildings and special load-bearing design considerations in new buildings.

Get the greater depth, the greater dimension possibilities in exposed aggregate construction with Fuller Tuff-Lite® Matrix. Use it for interior or exterior applications. Tuff-Lite® will bond to nearly any dry, clean substrate—concrete, brick, wood, etc. Can be applied to any surface shape

... flat, contoured, irregular, recessed or overhead. Its superior bonding strength allows more aggregate to be exposed for a more noticeable three-dimensional effect.

Tuff-Lite® can be troweled on at the job site. Or it can be applied off-the-job on prefabricated panels of plywood or other material. It is available in any color to blend or contrast with any aggregate. 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.

Aggregate may be seeded immediately after Tuff-Lite® is applied. Matrix cures in less than 24 hours. Saves time and labor costs.

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

H. B. FULLER COMPANY
1150 Eustis St., St. Paul, Minn. 55108, Dept. 26042

For more data, circle 41 on inquiry card
We're always asking if you've looked at Wheeling lately.
Today's question: Have you looked through Wheeling lately? Please do.
Observe the possibilities of Wheeling expanded steel mesh. This is eye-opening stuff.
It's the paintable, bronzeable, laquerable, galvanizable, rubber-or-plastic-coatable steel
of the future. You can see how all those perforations add versatility
and visual appeal. What you can't see is how the same perforations make it lighter per
foot, stronger per pound, and even more rigid than the original sheet of solid steel.
But we'll be glad to explain. Write us for a comprehensive expanded steel catalog.
You'll find there's more to our mesh than meets the eye.
(Who'd have thought the next breakthrough in steel would be the hole?)

Have you looked at Wheeling lately?

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

For more data, circle 42 on inquiry card

ARCHITECTURAL RECORD July 1967
THOSE ARE VENETIAN BLINDS ON THE WINDOW YOU CAN BARELY SEE THEM? THAT'S THE WHOLE IDEA. THEY'RE LEVOLOR RIVIERA BLINDS CAREFULLY ENGINEERED TO DISAPPEARING ACT THAT COMBINES FUNCTION WITH FELICITY.

IT FEATURES ONE-INCH-WIDE ALUMINUM SLATS NEARLY CLIMBING NEARLY INVISIBLE POLYESTER LADDERS AND, FOR AN ENCORE, TRANSFORMS EACH TILT CORD INTO A TRANSPARENT LIFT ROD (WE CALL THEM "MAGIC WANDS"). YOU CAN'T SEE THE RODS, DON'T WORRY ABOUT THEM. JUST ENJOY THE VIEW.

YOU CAN BARELY SEE THEM, THAT'S THE WHOLE IDEA. THEY'RE LEVOLOR RIVIERA BLINDS CAREFULLY ENGINEERED TO DISAPPEARING ACT THAT COMBINES FUNCTION WITH FELICITY.

LEVOLOR RIVIERA BLINDS WERE SELECTED FOR THE OAKITE PRODUCTS GENERAL OFFICE AND RESEARCH CENTER, BERKELEY HEIGHTS, NEW JERSEY. FOR DETAILS, WRITE TO LEVOLOR-LORENZEN, INC., 10V MONC, HERKEN, N.J.
Red cedar shingles and shakes:
to provide a mood of quiet, rugged beauty for school
Whether they're applied to roof, sidewall or interior, red cedar shingles and shakes give the impression of strength, good taste and beauty — from the moment they're first nailed into place.

Because they stay in place, looking their best for decades to come, they're excellent for keeping up appearances, too. And if you're working with expandable projects such as schools or clinics, shingles and shakes offer a special advantage: since new shingles and shakes are always cut to the same specifications, additional buildings can be made to match original plans exactly — three, five, even 20 years later.

But why not discover all the advantages of red cedar Certigrade shingles and Certi-Split handsplit shakes yourself? For more information, see our Sweet's Catalog listing 21d/Re, call or write:

RED CEDAR SHINGLE & HANDSPLIT SHAKE BUREAU
5510 White Building, Seattle, Washington 98101
(In Canada, 1477 West Pender Street, Vancouver 5, B.C.)

For more data, circle 44 on inquiry card
UNIT VENTILATORS

Circular, trapezoidal, hexagonal schools.
We give them the air they need.

There's no end to school design possibilities with AAF/Herman Nelson unit ventilators doing the heating, ventilating and air conditioning. AAF/Herman Nelson unit ventilators deliver fresh, clean air to schools with low window sills, schools without windows at all, to circular schools, cluster schools and schools with flexible floor plans. Whatever shape today's schools take, we make the ideal thermal environment to fit. Chances are, we've already got the classroom heating, cooling and ventilating system for the school you've yet to design. Or, if a school air problem has you cornered now, your Herman Nelson representative could well be a great help. In any event, call or write American Air Filter Company, Inc., 215 Central Avenue, Louisville, Kentucky 40208. By the way, Herman Nelson know-how and products are also available in Canada.
A complete line for any school application

SC (self-contained) UNivent is the most versatile through the wall unit ventilator ever. Lets you air condition an entire new building or older ones one room at a time. Can be installed first for heating and ventilating only, then sealed refrigeration section can be added when budgets permit. Cooling capacity is 45,000 BTU/hr. Up to 100% outdoor air for natural ventilation. Choose from seven fully automatic models, for steam, hot water or electric resistance heating. Readily fits supply piping from existing heating systems.

NELSON/aire cabinet heater and air conditioner. Ideal for offices, entrance-ways and smaller rooms. Thin-profile unit adapts to any wall thickness. Can be used with steam, hot water, or electric resistance coils. Self-contained units available in 8,000, 12,000 or 15,000 BTU/hr cooling capacities. Lets you air condition now or later.

CEILING UNIT VENTILATOR. New line offers unmatched flexibility with four outdoor air inlets, four return air inlets and four conditioned air outlets. Two models (1500 and 2000 cfm) handle up to 1/2" external static pressure. Ideal for remote locations. Other models for operation to 1/4" external static pressure include 750, 1000 and 1250 cfm capacities. Complete choice of coil options. Units can be mounted exposed, in soffit, partially or fully recessed, and concealed. Motor and bearings are sealed and permanently lubricated.

continued from page 56

Graham Latta & Donald Lynch, Architects have formed a partnership with offices at 3363 Glendale Blvd., Los Angeles, Calif.


Earl A. Freels has joined the environmental planning firm of Linesch and Reynolds in Long Beach, Calif.

Fred E. Bloch and Ronald J. Kiaer have joined the architectural and planning firm of Charles Luckman Associates as project architects in the firm's New York offices, and Samuel M. Burnett has been made a project architect in the Los Angeles office.

Manson-Jackson & Kane, Inc., of Lansing, Mich. have announced the appointment of Herbert J. Iverson as managing architect.

Tobias T. Stapleton has been named an associate in the firm of Lawrence E. Matson & Assoc. of Idaho Falls, Idaho.

Moffat & Moffat have formed a new partnership, Moffat Moffat & Kinoshita, Architects, Engineers and Planners at 55 Eglinton Ave. East, Toronto 12, Ont.

Moore and Hutchins, Architects announce the addition to the partnership of Gillet Lefferts, Jr., A.I.A. and William R. Evans, A.I.A. The firm will continue its practice at 800 Second Ave., New York City under the name The Moore and Hutchins Partnership.

The consulting engineer firm of Walter P. Moore, Consulting Engineer announces a change in firm name to Walter P. Moore & Associates, Inc. located at 2 Pinedale, Houston.

William C. Krommenhoek has been elected to be an associate with the firm Architects Robert Mosher & Roy Drew at 1255 Coast Blvd., La Jolla, Calif.

James W. Nicas A.I.A. and Gary L. Goldstein A.I.A. have formed a partnership for the practice of architecture under the name of Nicas Goldstein & Associates, Inc. at 3000 Farnam St., Twin Towers, Omaha, Nebraska.

Arthur C. Hauswald has joined the firm of P & W Engineers as Vice President, Structural Engineering. The firm is located at 309 West Jackson Blvd., Chicago.

Robert S. Berini has been appointed Chief of Surveys for Parlett Engineering, San Francisco and Richmond, Calif. consulting civil engineering firm.

Donald C. Hyde has joined the New York firm of Parsons, Brinckerhoff, Quade & Douglas as an associated consultant.

continued on page 73

FOR MORE DATA, CIRCLE 46 ON INQUIRY CARD
Montgomery moves people on 12 elevators at...

Del Webb's TowneHouse Phoenix, Arizona

Twelve Montgomery elevators move people and equipment at speeds up to 700 FPM in this striking new twenty-three floor tower. Montgomery E.S.P.® MEASURED DEMAND® controls traffic flow on the local and express banks of elevators.

Architect:
Flatlow-Moore-Bryan & Fairburn

Contractor:
Del Webb Corp.

Go high as you want... Montgomery high-rise elevators match performance to your design, with elevator traffic served precisely by E.S.P. MEASURED DEMAND® group supervisory control. Montgomery high-rise design and performance are "test tower" proved in our sophisticated research facility. And, you can count on dependable Montgomery maintenance service from one of 120 locations.

*Electronic Sensor Programming

Montgomery® Elevator Company Moline, Illinois 61265
ELEVATORS • ESCALATORS • MOVING WALKS & RAMPS
For more data, circle 47 on inquiry card
Write for FREE planning guide
Now, Georgia-Pacific files products in Sweet's by end use.

(You're right. It's about time.)

We felt you'd be more interested in a product's function than what it is made of.

For instance, now you won't have to waste time trying to figure out whether G-P's decorative hardwood paneling is filed under wood...or plywood...or wall covering...or what have you.

G-P paneling is filed where it should be: File 10b—"Paneling."

Georgia-Pacific product catalogs are filed 11 different places in the Sweet's Architectural File. Only the all-inclusive "Application and Selection Guide" is found under "Wood."

Sound logical? We think so.

One more thing. Once you've specified G-P products, the contractor will be able to get them. We make sure of that through our network of full-stocked wholesale distribution centers in 95 key locations across the country.

For more data, circle 48 on inquiry card
For roofs of unexcelled beauty and durability...

specify Ruberoid T/NA 200® roofing (with Du Pont TEDLAR®)

The bold sweeping curves of this roof for the New Chapel for the Sisters of Mercy of Notre Dame High School in Elmira, New York illustrate the remarkable effects that can be achieved with a roof of Ruberoid T/NA 200.

As functional and maintenance-free as it is attractive, this gleaming white pre-finished roof membrane will stay weathertight and beautiful for years and years. It's the ideal roofing material for roofs of unusual contour, on any slope.

The roof was fabricated by Hall Roofing & Sheet Metal Co., Inc., of Elmira and the T/NA 200 membrane was applied on the site. The smaller photos show some details of the construction.

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

Write today for full information on this unusual roofing material. Also available in pastel grey or green.

*DuPont's registered trademark.
...tough roofing from RUBEROID®

fire-resistant shingles

Ruberoid FIRE-GUARD 325-lb. residential shingles feature a built-in, special fiberglass blanket, in addition to other flame-resistant layers. U. L. puts these self-sealing shingles in top Class A rating for fire and wind resistance. Good looks too, in 7 modern colors!

corrosion-resistant siding

Ruberoid Corrugated Asbestos Sheets are an economical, weather-proof and fire-proof construction material for industrial buildings. This combination of cement and asbestos gives maintenance-free service indefinitely! Resistant to corrosive atmospheres. Easy to assemble without sheathing.

wear-resistant flooring

Ruberoid offers the most widely varied line of vinyl asbestos floor tile. Pattern shown above is ROYAL STONEGLOW® which combines the looks of stone with the practicality of vinyl asbestos. There are dozens of other exciting patterns to choose from.

For more data, circle 49 on inquiry card
Want to avoid the problems of drafts, distracting noises and smudgy ceiling areas? Of course you do.

Best way to lick them? Sylvania's Titan Troffer. It puts air where you need it most. Its linear air controllers let you vary air flow by degrees. You can choose any flow direction from 1° to 180°. With complete volume control, too.

And you get better lighting. Sylvania's Titan heat removal model air-cools its fluorescent tubes. Steps up lighting levels as much as a cool 15%—by removing excess heat.

And because the fixtures run cooler, room air requirements are cut down.

It just makes sense to look at Sylvania when you want Air Handling Troffers. We've got the broadest line of lighting equipment in the business—indoors and out. For any lighting need, just call your Sylvania distributor about the idea line. Sylvania Electric Products Inc., Lighting Equipment Operation, 60 Boston Street, Salem, Massachusetts 01970.
“I’ve got the easy way to compare specs!”

If you’re paging through dozens of plumbing and heating catalogs to find accepted equals, model numbers and capacities, you’re wasting your time!

We’ve made it easy for you. The new 1967 Plumbing and Heating Comparison-Selection Manuals combine current information on over 15,000 products made by 170 leading manufacturers. Indexed and tabbed in 45 separate product categories, they provide a fast, authentic reference tool for both new construction and specifying replacement equipment. All tables were checked in advance, for accuracy, by each manufacturer. One architect wrote us recently, “We saved enough time on just one job to repay the low cost of your manuals many times over.”

Price for one set (one heating, one plumbing manual) $25; three sets $54; five sets $80. Satisfaction guaranteed or your money back. Send your order and check today, to Mr. Bev Perry.

INDEX CREATIONS, INC.
P. O. Box 110
Madison, Wisconsin 53701
Telephone 256-8484

NEW FIAT
MOP SERVICE BASIN CUTS COSTS-IMPROVES MAINTENANCE

- Easier to handle and install
- Stainproof/stays cleaner
- Molded under heat and extreme pressure for super strength.

Now you can have upgrade janitor’s closets or maintenance rooms. MOLDED-STONE* from Fiat makes this mop service basin modern, attractive and fully functional, with greater utility and cleanliness. Features self-draining mop shelf, molded integral; cast brass drain; stainless steel dome strainer and line basket; crash-proof, extra-thick shoulders that need no protective cap. Super-strong MOLDED-STONE* cuts weight to 20% of masonry, provides a smooth, easy-to-clean surface.

See Sweets 25c or write for specifications.

FIAT PRODUCTS DEPARTMENT

Michael Court, Plainview, L.I., New York 11803

COMFORT CONTROL WITH HEAT ABSORBING BRONZE...
Therm-O-Proof insulating glass design flexibility.

Large bronze units, some 52" x 138", were utilized for interior temperature control and reduction of sun glare at Western Michigan University Student Center. This is another way architects can utilize one of the more than 200 configurations and combinations available from Thermoproof. This is “design flexibility” with Therm-O-Proof insulating glass... made more ways to fit more ideas.

Western Michigan University Student Center, Kalamazoo, Michigan

For more data, circle 33 on inquiry card

For more data, circle 133 on inquiry card

For more data, circle 31 on inquiry card

For more data, circle 57 on inquiry card
Now under the Seal of Security

**ONE-PART SEALANTS** adding application convenience to total performance and economy of Tested and Approved polysulfides

Ready-to-use structural sealants based on Thiokol's LP® polysulfide polymer have been in the field for about seven years.

Installed in thousands of buildings; checked and rechecked for behavior; subjected to constant improvement in the laboratory...one-part polysulfide systems have achieved levels of quality and performance satisfying Thiokol's Tested and Approved building sealants specifications.

In the cured state, premixed LP® polymer based sealants, covered by Thiokol's Seal of Security, assure advanced physical properties as do approved two-parts. Here's long, lively leakproofing service, weatherability without equal under severest stress of wind, rain, baking sun and freezing cold.

Tested and Approved polysulfide base sealants, properly applied, adhere to any and all building materials—in any combination—and add a unique strength of their own to the structure. The bond is virtually indestructible, while the compound retains rubbery flex allowing movement compatible with joined materials.

Now—with both one- and two-part systems meeting Thiokol's Tested and Approved sealant specifications—the Seal of Security is the only guide you'll ever need to total weatherproofing performance. For complete data, and names of Tested and Approved Sealant suppliers, wire, phone or write Thiokol.

---

For more data, circle 52 on inquiry card

ARCHITECTURAL RECORD  July 1967  77
How can you increase building "cubage" without increasing costs?

(Secret revealed on opposite page!)
"All air-conditioning systems steal usable space."

preposterous!

The Barber-Colman Heat-of-Light System® actually increases usable space in existing buildings and permits the design of new buildings with a smaller envelope and more income-producing space than was previously possible. Result: Your total building cost per occupant per year can actually be reduced. Clip coupon for more facts.

BEFORE Barber-Colman Company developed the Heat-of-Light System it was absolutely true that you had to sacrifice ceiling, floor and interfloor space to reap the advantages of efficient Environmental Systems.

In those days, light-generated heat was considered part of the air conditioning space load in the summer and it was not used as a source of heat in the winter. What a waste!

In the BHoL (Before Heat-of-Light) days, duct work was massive in cross section. Only the most progressive engineers and architects could envision 1967-model, small-diameter High Velocity Ducts that could squeeze into 5" with room to spare.

And, had you told them how much room could be added to a building through elimination of space-stealing reheat coils, hot air ducts, piping, boilers, and clutter-type diffusers, even they would have been skeptical.

Heat-of-Light System makes good economic sense

The modern Barber-Colman Heat-of-Light System is more efficient and costs less to install and operate than the traditional systems that do not take advantage of modern energy-conservation principles. Additionally, any increase in costs for automatic controls required to provide smaller-than-room-size comfort zones is more than offset by the reduction in ducting and other hardware by the HoL System.

Integrated air/light diffusers lend aesthetic simplicity

When you combine a lighting fixture and a Barber-Colman air diffuser, the sum of one plus one is considerably less than two. Multifunction diffusers provide maximum light levels and diffuse air, transfer Heat-of-Light to heat exterior zones, where it is needed and furnish local reheat when required. They provide Dynamic Sensing thermostat locations where the temperature of moving room air is measured. Response is up to 15 times faster than with wall-mounted thermostats.

Best of all, all Barber-Colman Heat-of-Light Systems, with or without troffer-delivered air, provide superior environmental control unobtrusively...quietly! Blended invisibly into the architect’s design, the Heat-of-Light System never intrudes...never detracts.

Automatic design freedom!

With the Heat-of-Light System, every overhead lighting fixture can provide an individually controlled air mixing and air distribution zone. Or other, equally inconspicuous diffusers can provide draftless air delivery and still conserve light-generated heat.

What does this mean to you as a designer? First of all you can move walls, and alter the space any way you want, and still provide each person or work-group with individual zone control without system changes. And you aren’t tied down to predesigned look-alike, "packaged" ceilings.

Barber-Colman controls furnished with a Heat-of-Light System permit these space alterations without regard to costly control system revisions. There is no need to run new pneumatic lines or electric wires. Once installed, it meets all future needs.

Control is the most flexible there is. You can place the set point dial on the wall, in a locked custodial closet, mount it on a central panel, or on a desk top. You name the place. We’ll provide a set point selector to meet your need.

Get the facts. To learn how much “cubage” you can add to your next building by using cost-saving, space-saving Heat-of-Light, use the coupon below, or contact your local Barber-Colman Field Office.

BARBER-COLMAN COMPANY
ROCKFORD, ILLINOIS 61101

In Canada: BARBER-COLMAN OF CANADA, LTD.
Weston, Ontario

Please have your local representative call me to arrange a computerized Feasibility Study.

Please send me your new booklet on the Barber-Colman Heat-of-Light System.

Name:
Title:
Company:
Street:
City______State______Zip Code______

For more data, circle 53 on inquiry card
Lock-Deck® decking was specified as a primary building material for this dramatic lodge—part of a year-round toboggan run—because of its structural strength, insulation properties, aesthetic appeal and design flexibility. The curved walls, flooring, decking, sloped and pitched roofs are all made of Potlatch Inland Red Cedar and Idaho White Pine Lock-Deck decking. For more information about this unusual structure, write for a special Architectural Report on Toboggan Lodge.

Lock-Deck is available in 4 thicknesses and 2 face widths
For details see SWEETS architectural file 1c/Po
Easier loans for commercial/industrial properties?

Businessmen seeking mortgage loans for commercial, warehouse, or industrial properties will, in the coming months, find credit somewhat more accessible, in some instances, less costly than present, according to Richard B. Morris, Buffalo, N. Y., president of the National Association of Real Estate Boards.

His remarks on the outlook for this segment of the mortgage market were based on the spring mortgage market survey prepared by NAREB's Department of Research. The study was based on data from 114 Realtors representing market areas throughout the country.

"It is anticipated that lenders will increasingly be receptive to applications for prime quality business loans," Mr. Morris stated, "but that the supply-demand relationship will not reach a level sufficient to create the type of pressure for placement experienced in 1965." He added that, as a result, the outlook for less-well-qualified borrowers is "not particularly bright."

Loans on prime commercial properties are actually seeking takers

Discussing specific examples, Mr. Morris noted that the easing in the supply of credit has had its greatest impact on the market for loans on prime location commercial properties with national credit leases.

Borrowers offering this caliber security, he reported, are actively being sought in some areas and are at least welcome applicants in most areas. The money market supply is currently ample in 45 per cent of the country and moderate in 46 per cent. "This degree of availability is fairly similar to that of a year ago and sharply up over last September, when an ample supply was limited to 7 per cent and a moderate supply was available in 36 per cent of the areas," Mr. Morris said.

He explained also that interest rates for these choice mortgages have declined one-fourth to one-half a percentage point since the Research Department's fall survey. The most frequently reported charge is 6 1/2 per cent, reported in 39 per cent of the nation. A charge of 6 3/4 per cent is now common in a fourth of the country, and a 6 or 6 3/4 per cent rate is reported prevalent in another fourth of the country. "In the remaining areas, borrowers, despite the high quality of the security, are paying 7 per cent or better," Mr. Morris said.

He reported that improvements have been made for mortgages with less security than the prime location with a national credit lease. However, as the strength of security decreases, the amount of improvement declines also. As an example, he noted that while there has been improvement in the mortgage situation for secondary location properties with local credit leases, "conditions are still quite bleak in many areas."

Funds for mortgages on this type of property are currently ample or moderate in about half the areas of the country, compared with a moderate supply reported in only 10 per cent last fall. Funds are still tight, however, in many areas.

An interest rate of 7 per cent is reported in about half the areas, similar to the figure for last fall. This spring a rate of over 7 per cent was reported in 17 per cent of the areas, compared with the 32 per cent of the areas reporting a rate of over 7 per cent last fall.

Turning to the warehouse and industrial properties segment of the market, Mr. Morris reported lenders are re-entering the market and, as a result of this revived interest, the outlook for the qualified borrower will further improve.

According to the NAREB report, 55 per cent of the areas quote an interest rate of 6 1/2 per cent or less for mortgages on this type of property, while last fall, 65 per cent of the areas reported a rate of 6 3/4 per cent or more.

Experts enlisted to solve tight money troubles for housing

Last year's home-building slump, and worries about a further tightening of the money supply later this year, have prompted influential leaders in Congress to call on the nation's experts for possible action to avert further problems.

Sen. John Sparkman (D-Ala.), long-time chairman of the Senate housing subcommittee and now chairman of the parent banking committee, has solicited views and suggestions from major banking and mortgage organizations plus various independent experts.

Their views, contained in a weighty volume of the housing subcommittee, will be discussed soon at a "town meeting" forum before Sen. Sparkman.

No one has come up with any panacea to assure designers of a continued flow of projects. However, the various spokesmen have suggested some reforms in the methods of long-term financing.
One common theme: the interest rate on FHA-insured and VA-guaranteed mortgages should be more flexible, responsive to market conditions and without an arbitrary ceiling imposed by legislation (currently 6 per cent).

The thrift institutions—mutual savings banks, savings & loans—that supply the lion's share of long-term money have suffered from rising interest rate competition in the past few years. Several groups urge that these institutions should be given greater authority to make loans other than mortgages to take advantage of short-term interest rate fluctuations.

Traditionally, large amounts of long-term capital have shied away from investing in mortgages—problems of monthly collections, fear of foreclosure, and other "sticky" aspects have made corporate bonds more attractive. Several experts suggest pooling mortgages and then selling shares of the aggregated debt.

Further, there is no uniform system (other than for government-backed mortgages) of determining the quality of the debt paper. Some suggest the government, through the Federal National Mortgage Association, should act as a trader for all mortgages, buying and selling whether the mortgages are backed by Uncle Sam or not.

These and many other ideas were discussed, probably next month, at Sparkman's hearings. What might remain to be seen. At least the government "recognizes there's a problem," says National Association of Homebuilders' President Leon Weiner.

Labor's drive to strike at construction sites heightens

This could be the crucial month in labor's long drive to have its "Situs Picketing" bill approved by the House of Representatives. The bill, H.R. 100, would permit secondary boycotts at construction sites, which in turn could cripple the architect's involvement as the owner's representative, says the A.I.A.

The legislation would tend "to deprive an architect of his free choice in the selection of building materials," the A.I.A. told Congress.

A.I.A. has joined forces with the home builders, the Associated General Contractors, and some 30 other employer organizations to fight the bill. Opposition to the measure has been growing, too.

Capital investments up for '67, McGraw-Hill survey reveals

American business now has plans to spend $64.38 billion on new plants and equipment in 1967, according to a year-end re-check by McGraw-Hill Publications' Department of Economics. This represents a 6.3 per cent increase over 1966, and the gain is nearly 1.5 percentage points higher than industry expectations indicated in an earlier McGraw-Hill survey last fall. Manufacturers now plan to spend $29.1 billion this year compared with $27 billion spent last year. Thus, manufacturers indicate that their planned increase is now more than 2 percentage points higher than it was last fall. The architectural slice of this investment pie could be considerable—and at least is certain to be bigger than last year's.

These are the highlights of a special survey conducted by the department during the month of January. While the over-all figures indicate only a small upward revision in industry's investment plans, the fact that they are up at all may come as a surprise to those who have been expecting sharp cutbacks in capital investment.

The over-all results of this survey indicate industry's confidence in the economy and in its own growth prospects. And while the level of investment currently planned will not generate as much steam in the economy as last year's expenditures, it is still sufficient to constitute a major element of strength in the business outlook.

This special check-up is based on replies received during the last three weeks in January. The companies queried represent every major field of industry from steel to commercial business and account for approximately 50 per cent of total capital investment. As in other McGraw-Hill Department of Economics plant and equipment surveys, this check-up is not a forecast. It represents the plans on the books of the companies at the time the survey was made.

A.I.A. clarifies employment rules

The American Institute of Architects has clarified the controversial sections 3.9 and 3.10 of its Standards of Professional Practice relating to employment of A.I.A. members by consulting engineers, planners, landscape architects and others, it was reported at a recent meeting of the Interprofessional Commission on Environmental Design (ICED).

The A.I.A. reported that the revised section 3.10 clarifies that A.I.A. membership is open to architects who are employed in professional positions by consulting engineers and other design professionals.

Last year some A.I.A. chapters denied membership to some architects employed by consulting engineers, resulting in the needed revision of these sections of the standards and precise interpretation of their meaning. Key to the revision is professional integrity.

A.I.A. told ICED that its standard were and are directed toward architects employed by "package dealers" and others as salesmen or in positions of a non-professional nature.
second boom in school building

akes a little perspective to appreciate full impact of what's happening to growth trend of school building the days. (That's the purpose of the art.) Right now we're well into a "second stage" of educational building, it's making the first stage look almost dead. The question is, how much longer will it last?

The first stage of growth began immediately after World War II and lasted until about 1956. Then followed a half dozen years of neither growth nor contrac tion. The second educational building boom got its start in 1962, and by last year had brought annual values more than 60 per cent above the highest level reached during the first great surge.

Basically, the explanation lies in the post-war baby boom. The response by our educational systems was to begin building the required elementary classroom capacity on a crash basis. And yet, it took until the latter part of the Fifties to accomplish this tremendous feat. By this time the pressure was starting to hit the secondary system, and though the need for adding elementary schools subsided, it was concurrently replaced by an equally urgent demand for high school facilities. Hence the period of fairly stable construction shaded in the chart.

Now, of course, we're off on another boom, and this time it's mostly college and university construction. Last year's contracts for college facilities were expanding three times as fast as either elementary or high school construction. But today it's more than a simple matter of relating past births to current classroom needs. There are some added complications. Enrollments in higher educational institutions are considerably lower in the aggregate (presently about six million students, compared with 13 million in high school) but are growing much faster. Building costs are quite a bit higher for college structures—between one-third and one-half again as much per square foot. In addition, educational building at all levels (but especially higher educational) has had a big boost with the passage of several major Federal-assistance programs.

Where does the trend go from here? Consider 1967 first. Last year's big credit squeeze not only created a crisis in housing markets, but it set school building back for a time as well. High interest rates forced the postponement of many educational building plans, and toward the end of 1966 and during the early months of 1967 the rate of contracting declined from last spring's peak. But once funds became available and long-term rates edged down a bit, the volume of state and municipal financing jumped sharply. This year's opening quarter set a new high.

Now, what about the longer-term outlook for school construction? In this context, financial conditions take a back seat to the more fundamental matter of the prospective growth of enrollments. And that's the subject for next month.

Building activity: monthly contract tabulations

<table>
<thead>
<tr>
<th>Year</th>
<th>Nonresidential Building</th>
<th>Residential Building</th>
<th>Total Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>3.5</td>
<td>2.7</td>
<td>6.2</td>
</tr>
<tr>
<td>1967</td>
<td>2.9</td>
<td>2.2</td>
<td>5.1</td>
</tr>
<tr>
<td>1966</td>
<td>2.4</td>
<td>1.8</td>
<td>4.2</td>
</tr>
<tr>
<td>1965</td>
<td>1.9</td>
<td>1.5</td>
<td>3.4</td>
</tr>
<tr>
<td>1964</td>
<td>1.6</td>
<td>1.2</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Part 1 of two parts
SPAN-DECK prestressed concrete structural floor and roof system provides an elegant atmosphere for special evenings—and a beautiful and economical setting for everyday living. The finely-textured soffit has a definite eye-appealing effect. Each ceiling has a built-in noise reduction factor that actually holds sound down to an NRC of 0.55 (findings of both the Riverbank Acoustical Laboratories and the Armour Research Institute). Precision manufacturing is responsible for the uniformity of this ceiling surface—each 48" SPAN-DECK soffit fits together perfectly to offer a minimum number of small, clean joints. Acrylic latex paint is all a SPAN-DECK ceiling requires—a definite savings in acoustical finishing materials and maintenance. THAT'S THE BEAUTY OF AN EXPOSABLE SOFFIT. For additional information, write your nearest SPAN-DECK supplier or Box 99, Franklin, Tennessee 37064.

For more data, circle 55 on inquiry card
Sometimes when you need more space inside it pays to put the walk-in outside...

Bally makes walk-in coolers, freezers and refrigerated warehouses for both places...

No room to expand the refrigerated storage space in the mass feeding facility or commissary you're modernizing? Your problem is easily solved. Simply specify an outside installation of a Bally prefab. Available in all sizes from 6 x 6 to 600 x 600 feet, and engineered to provide maximum refrigeration efficiency in tropic heat, arctic cold, snow, rain, wind... every extreme of weather.

Outdoor or indoor, Bally prefabs do their job superlatively. Insulation is 4-inch urethane (equal to 8½” fiberglass) U.L. rated fire-retardant, ASTM Test 1692-59T. Bally "foamed-in-place" urethane develops great rigidity, eliminating the need of structural members. 100% of every panel is non-moisture-absorbant insulation that retains its efficiency permanently.

Increasing size is easy with Bally add-on sectional construction. Relocation is equally easy. When it comes to refrigeration efficiency and fewer service problems, your client benefits from the use of any one of Bally's 76 self-contained refrigeration systems (½ to 7½ H.P.).

For both indoor and outdoor installations, look to Bally's Engineering Department for answers to all questions about refrigeration capacity, temperature requirements, winterized systems, and outdoor foundations. Write for Bally's 32-page booklet and urethane sample.

See our catalog in Sweet's Architectural File, No. 23a/BaL.

Bally Case and Cooler, Inc.
Bally, Pennsylvania 19509

For more data, circle 56 on inquiry card

Address all correspondence to Dept. AR7.
imported materials: new flavor or national threat?

estimated that imports amounting to over a half-billion dollars went into construction of domestic projects last year—a figure that will almost certainly double if this trend continues. The architect will benefit from such a situation will continue to prevail for that reason, provided it is not an easy task, since low cost is often the key factor in the selection of building materials. In this respect, foreign producers have a decided competitive advantage in certain items. This advantage—the ability to produce at a much lower cost than is possible in the United States—is often taken to mean the advantage of cheaper labor costs. To a large degree this is valid, but other countries also benefit from factors such as access to raw materials or from the development of specialized machinery. Also, some foreign products are competitive because of their esthetic appeal or simply because they are more technically advanced and now on the market.

High transportation costs overcome for key materials
Transportation costs are still the major obstacle to a sizable influx of foreign building materials. And, to a certain extent, building code variations also act against such an increase. Some foreign products, especially those that can be shipped in large quantities via low-cost sea transportation, have grown to be quite competitive in domestic markets. A few controls could reduce costs, have more than doubled lately and, on many products, despite high transportation costs, have more than doubled lately and command approximately 10 per cent of the domestic market. Most of these products are specialty items, such as marble, granite, and slate is the major supplier. Import duties average approximately 15 per cent of value.

Tariff changes will have a gradual effect
While foreign supply plays a major role in these five categories of construction materials, it is a relatively small factor in other categories. Some change is inevitable, but it is unlikely that there will be any sudden increase in the use of foreign building materials as the tariff cuts take effect. Over-all, the reductions will average 35 per cent, and they will be implemented gradually over a five year period. But the mere reduction of tariffs does not mean that imports suddenly become competitive where they were not before. Production costs still have to be substantially lower to overcome high transportation costs if an item is to be competitive in price. And even then, sales markets must be developed—not an easy task, since low cost is often equated with low quality.

Those imports that are now competitive with domestic materials will certainly benefit from the tariff reductions. They already have a foothold in the market and as competition intensifies, and price differences narrow, a few percentage points of savings on import duties can be quite significant.

The architect will benefit in the long run
Competition in building materials from imports has a most obvious benefit to the architect and his client—lower costs. When domestic producers find themselves losing their competitive advantage they will quite often undertake more intensive research to regain their position. This may take the form of new

ARCHITECTURAL RECORD July 1967
productive methods to reduce cost or the development of an improved substitute. In either event, the architect stands to benefit.

Even if it's just a better doorknob
A rather minor incident of a few years ago offered an interesting illustration of this. Doorknobs produced in Germany became popular with architects since they were designed with handles rather than in the traditional tulip shape. Up until then it was felt that handles would be likely to break, but the German manufacturers came up with the necessary solution to overcome this. Responding to this technological innovation, American manufacturers soon began producing doorknobs with handles.

The only caution in dealing with imported materials is for adequate specifying (if necessary) and careful specification writing to assure a quality product. It is a small price to pay when compared to the potential savings that directly, indirectly accrue from these materials.

Phased construction can increase costs in the long run

One problem the architect must inevitably face is the task of designing a project that will be built in phases. The client may request that contract documents be prepared so that the substructure can be let as a separate contract. Then while this segment is under construction, the architect can complete his work on the rest of the building. Or, more likely, the architect will be asked to design a project so as to permit future expansion. Both situations evoke the same question from the client: "how much more will it cost to phase the construction?"

Time and money are key factors in clients' decisions
In the first instance, time is the crucial factor and the builder may want to get the project under way as soon as possible. On the other hand, phasing for future expansion may be a speculative move. But more often it is dictated by funding considerations.

Even under the most favorable circumstances, a building constructed in phases will generally cost from 2 to 5 per cent more than the same project built all at once. Moreover, this additional expense will be incurred over and above any cost escalation that occurs with time.

Example: the elements of decision in hospital construction
On one recent major hospital project, this consideration proved to be only one of many factors that had to be weighed. Time was the immediate concern. This led to an analysis of the project with the thought of starting work on the foundation and basements while the architect completed the design of the remaining portions of the building. From a construction point of view, this proved to be feasible and other factors were considered.

Some thoughts were raised as to how the contractors would bid this kind of job. The contractor might give a low price on the substructure with the hope of getting on the job to enhance his position for the remainder of the work. The contractors bidding on the second phase might shave their prices realizing that they had to overcome this. But this was mostly conjecture and it seemed more likely that the client would end up paying twice for general conditions.

Time was the immediate concern. This any cost escalation that occurs with time.

Vertical and horizontal expansion can be equally costly
In another area of phased construction, the architect must occasionally decide whether to allow for future expansion either vertically or horizontally. Most often the decision is an obvious one, e.g.,
### 1967 Building Cost Indexes

<table>
<thead>
<tr>
<th>Metropolitan Area</th>
<th>Cost</th>
<th>Current Dow Index</th>
<th>% Change Year Ago</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Average</td>
<td>213.5</td>
<td>259.2</td>
<td>264.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>266.8</td>
<td>273.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>279.3</td>
<td>284.9</td>
</tr>
<tr>
<td>Atlanta</td>
<td>223.5</td>
<td>280.9</td>
<td>294.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>298.2</td>
<td>305.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>313.7</td>
<td>321.5</td>
</tr>
<tr>
<td>Baltimore</td>
<td>213.3</td>
<td>272.6</td>
<td>269.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>271.8</td>
<td>275.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>280.6</td>
<td>285.7</td>
</tr>
<tr>
<td>Birmingham</td>
<td>208.1</td>
<td>240.2</td>
<td>249.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>250.0</td>
<td>256.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>260.9</td>
<td>265.6</td>
</tr>
<tr>
<td>Boston</td>
<td>199.0</td>
<td>232.8</td>
<td>237.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>239.8</td>
<td>244.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>252.1</td>
<td>257.8</td>
</tr>
<tr>
<td>Chicago</td>
<td>231.2</td>
<td>284.2</td>
<td>289.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>292.0</td>
<td>301.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>306.6</td>
<td>317.1</td>
</tr>
<tr>
<td>Cincinnati</td>
<td>207.7</td>
<td>255.0</td>
<td>257.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>258.8</td>
<td>263.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>269.5</td>
<td>274.0</td>
</tr>
<tr>
<td>Cleveland</td>
<td>230.7</td>
<td>263.1</td>
<td>265.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>268.5</td>
<td>275.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>283.0</td>
<td>292.3</td>
</tr>
<tr>
<td>Dallas</td>
<td>221.9</td>
<td>239.9</td>
<td>244.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>246.9</td>
<td>253.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>264.9</td>
<td>268.8</td>
</tr>
<tr>
<td>Denver</td>
<td>211.8</td>
<td>257.9</td>
<td>270.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>274.9</td>
<td>282.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>287.3</td>
<td>294.0</td>
</tr>
<tr>
<td>Detroit</td>
<td>197.8</td>
<td>239.5</td>
<td>264.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>269.9</td>
<td>272.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>277.7</td>
<td>284.7</td>
</tr>
<tr>
<td>Kansas City</td>
<td>213.3</td>
<td>237.1</td>
<td>237.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>243.1</td>
<td>247.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>250.5</td>
<td>256.4</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>210.3</td>
<td>263.6</td>
<td>274.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>282.5</td>
<td>297.7</td>
</tr>
<tr>
<td>Miami</td>
<td>199.4</td>
<td>256.5</td>
<td>259.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>263.3</td>
<td>269.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>274.4</td>
<td>277.5</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>213.5</td>
<td>260.0</td>
<td>267.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>269.0</td>
<td>275.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>282.4</td>
<td>285.0</td>
</tr>
<tr>
<td>New Orleans</td>
<td>207.1</td>
<td>242.3</td>
<td>244.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>245.1</td>
<td>248.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>249.9</td>
<td>256.3</td>
</tr>
<tr>
<td>New York</td>
<td>207.4</td>
<td>265.4</td>
<td>270.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>276.0</td>
<td>282.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>289.4</td>
<td>297.1</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>228.3</td>
<td>262.8</td>
<td>265.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>265.2</td>
<td>272.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>278.2</td>
<td>280.8</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>204.0</td>
<td>243.5</td>
<td>250.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>251.8</td>
<td>258.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>263.8</td>
<td>267.0</td>
</tr>
<tr>
<td>St. Louis</td>
<td>213.1</td>
<td>257.5</td>
<td>256.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>255.4</td>
<td>263.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>272.6</td>
<td>279.0</td>
</tr>
<tr>
<td>San Francisco</td>
<td>266.4</td>
<td>327.5</td>
<td>337.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>343.3</td>
<td>352.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>363.4</td>
<td>368.6</td>
</tr>
<tr>
<td>Seattle</td>
<td>191.8</td>
<td>237.4</td>
<td>247.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>252.2</td>
<td>256.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>266.9</td>
<td>269.9</td>
</tr>
</tbody>
</table>

**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 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.**

### Economic Indicators

<table>
<thead>
<tr>
<th>YEAR</th>
<th>1964</th>
<th>1965</th>
<th>1966</th>
<th>1967 (QUARTERLY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE RATE</td>
<td>$2.41</td>
<td>$2.54</td>
<td>$2.61</td>
<td>$2.70</td>
</tr>
<tr>
<td>$1 BOND YIELD</td>
<td>4.70%</td>
<td>4.60%</td>
<td>4.50%</td>
<td>4.40%</td>
</tr>
</tbody>
</table>

**ARCHITECTURAL RECORD July 1967**
A single climate conditioning system would be
All the rooms in your plans were the same size.

But they aren't, are they? Schools have big rooms, small rooms, medium-sized rooms. Sometimes room sizes even change.

You couldn't possibly expect one type of climate conditioning system—unit or central—to do the best job in all these situations.

That's why we make both types—so you can custom-tailor a system for a school without compromising the students' comfort or the square foot cost.

Take a typical outside room. Sunlit part of the day, shaded the rest. Perfect for a Nesbitt unit ventilator. Set a Nesbitt unit at a comfort level and it maintains that level regardless of how radically conditions in the room change. (And you get flexibility with Nesbitt units. Mount them anywhere—wall, ceiling or floor...concealed or exposed. Use two-pipe or four-pipe systems. Use big capacity units where you need them, smaller ones where you don't. Run them on any fuel available.)

For clusters of rooms that have different needs—flexible rooms to accommodate varying student-teacher ratios, for instance—there's the Nesbitt Rooftop Multizone unit. All the benefits of a central system but it's out of the way up on the roof. And you save with the Rooftop Multizone because there are no fan rooms or penthouses.

If you're working on school air conditioning design, talk to your Nesbitt man. He's in a great position—he handles both kinds of systems so he has no axe to grind. He'll help you do the best job at the best price. What more could you ask?

Nesbitt, Environmental Products Division, International Telephone and Telegraph Corporation, Philadelphia, Penna. 19136.
WHAT MAKES AN OFF-THE-FLOOR INSTALLATION **COST LESS?**

- **common vent (1)**
  - Saves chase space
  - Substantially reduces the number of connections required in a battery of toilets

- **positioning frame (4)**
  - Simplifies alignment
  - Saves one or more hours of labor per bowl
  - Saves fixture breakage
  - Saves call-backs
  - Acts as template for wall finish, saving tile-setting time

- **invertible carrier body (3)**
  - Fits all types of toilets, blow-out or syphon jet
  - Saves handling time
  - Eliminates stocking and ordering of different carriers

- **buttress foot (2)**
  - Short Bulldog feet do not interfere with any type of finished floor
  - Saves installation time

- **fitting and carrier are separate**
  - Provide more adaptability to meet changing conditions of installation
  - Save revision time and labor

...put them all together...they spell **UNITRON**

**AND THERE'S NOTHING ELSE LIKE IT!**

Now...with all the other advantages of off-the-floor fixtures...there is no reason to allow installation costs to change your mind...if you use Josam Unitron Carriers and Fittings on the job. Every feature is designed not only to save time and prevent error, but to provide the adaptability that solves on-the-job problems.

The combined savings in space, materials and installation are substantial enough to make off-the-floor fixtures the logical choice on every job...if you use Josam Unitron Carriers! For further information, write for Manual F-4.

*Verification on request*

**JOSAM MANUFACTURING CO.**
**Michigan City, Indiana**

**JOSAM PRODUCTS ARE SOLD THROUGH PLUMBING WHOLESALERS**

For more data, circle 58 on inquiry card
architect, in particular, faces challenges in planning and design today which have no tradition or pattern. He is often with a world that is far from useful or joyful; a world in turmoil; a world seeking, without success, some form of order and balance in an era in which Humpty-Dumpty is king.

The problem is one of communication. The answer is not simply education, though some of our pseudo architectural critics could use some—hopefully from the school of hard knocks. As an associate editor recently said: “I have suffered considerable distress in reading what is being fed to the general public by called architectural critics in the popular press. It is easy to rattle off the patter the current preoccupations, and make great appearance of wisdom, but one can doubt that the catchwords accomplish anything very much besides perhaps impressing the unwary listener.”

The way for us to combat our erstwhile critics is to learn to talk freely and frankly with our clients; to support beauty for its own sake, and not as either a excuse or a justification for a strange functional solution; to handle our emotions, reports and submissions in a business-like manner; to recognize that in an era of change and confusion, careful communication can be our salvation; to deal with our clients as equals, for his money and our talent make us so. What helps me to communicate is certain knowledge, just as we need him, so he needs us.

If we are able, from the beginning to the end, to communicate the essence of our fee system; if we are able to convey that our hearts and minds, we and the client are inextricably bound together.

Statement: “The single most important problem is our percentage fee system.”

So now I would like to make some observations on our fee system—even though at an early age my mother cautioned me, “If you don’t have anything nice to say—don’t say it.” Well, in view of the intensity of my feelings on the subject, I think I am being reasonably nice when I say that the fee system which is based on a percentage of the cost of construction is archaic, impractical and immoral.

The percentage fee system is archaic because it presupposes that the architect is responsible for the cost of construction. This is not true. Instead, the responsibilities of the client are responsible for the cost of construction. The architect’s responsibility is to either fulfill the requirements in an aesthetic and efficient manner within the budget—or to advise the client, at an early date, that his requirements will result in a construction cost in excess of his proposed budget.

The percentage fee system is impractical because its fundamental premise is based on an irrational fallacy. Simply stated it is this: the more careful the architect is in trying to keep the cost of construction down, the less he gets paid. The more careless the architect is of the cost of construction, the more he gets paid. Not even a computer can make sense out of that!

The percentage fee system is immoral because it places the architect in the ambiguous position of having to defend his integrity. All of us, on occasion, advise the client to do something constructive even though it will add to the cost of the project. When this happens should we put ourselves in a position where we can be looked at with a jaundiced eye? We should no longer be willing to get ulcers from mountain climbing over molehills of suspicion.

Many of our clients believe that this entire process makes no sense; they agree there is no rhyme, reason or rationale for our present “percentage of the cost” fee system; they agree that it is nothing more than a rule of thumb gambling device, of which not even Las Vegas would be proud.

There are, however, three fee arrangements that are up-to-date, practical and moral:

- Where the scope of the work and the budget are agreed upon—the establishment of a lump sum fee for the architect.
- Whether the scope and budget are uncertain at the beginning of the project—the establishment of a percentage fee which will be convertible to a lump sum at the completion of the schematic drawings and schematic cost estimate.
- Whether the scope and budget are known or unknown—the establishment of a lump sum professional fee for the architect; plus his payroll costs, overhead costs, and out-of-pocket costs.

It may be of passing interest to you to know that 87 per cent of all the new contracts we have written in the last five years have been based on one of these three procedures. We don’t make any more money—but we don’t lose as much!

And the fee felony is frequently compounded, if the architect is on a percentage fee, and if, in turn, he places the structural and mechanical engineers on a similar percentage fee basis. For then, even though the client’s total budget is met, if the final costs of the structural and mechanical systems go over their individual budgets, the architect must pay the engineers more dollars of fee, and have less dollars left for himself! ’

I feel it is high time architects gave more thought to the making of a better living for themselves and their families. For its practitioners, architecture has a soul-satisfying stimulation, but at best, it is a tortuous occupation. For it is inherent in the nature of what they do that architects, large and small, find it mandatory to sustain their life on a steady diet of trials and tribulations. Neither our “professional status”, nor an increased profit, can shield us from these daily doses of duress, but a more equitable fee arrangement could make them more palatable.

A short time ago, an officer of the A.I.A. put it more succinctly when he said that: “It’s time that the architectural profession became a little more concerned about money—their own, and not just their client’s. Not because any of us are greedy, but because it is the one thing by which our society measures success, and success is the primary thing our society respects, and with respect comes
the power to exert influence. The profession has to understand and appreciate the relationship between money and power.” Oh, Diogenes; you have at long last, found your honest man!

Today I am the most fortunate of men—for, in addition to my family, I am able to have what I want above all else—the soul-stirring sense of satisfaction at seeing a concept become a reality. I believe with all my heart and mind, that one has as limitless an opportunity architects have today. For true everything we do affects the living, and leisure of our people.

Costs of architectural practice: bad news

One of every 12 architects lost money in 1966, and one of every four projects cost the architect more than his fee to execute. Those doleful statistics were part of the findings of the study of the cost of providing architectural services conducted by Case & Company, San Francisco management consultants. The first returns of the study were announced at the practice session of the 1967 A.I.A. convention in New York. Preliminary summaries of data still undergoing analysis were reported to the convention by Alf Werolin and Charles J. Marsh of the Case staff.

Purposes of the study are: 1) to ascertain the real cost of doing architectural work; 2) to relate cost to profit; 3) to find a basis that will permit a new fee structure.

Some 280 firms throughout the nation were asked to participate: 223 replied with usable data on 1,150 projects. All 280 firms were also visited or interviewed by telephone. Firms responded on two kinds of forms. One form asked for 90 items of information about the operation of the firm. The other was a project form which asked for 70 items of information on clients, scope and costs of specific individual projects. Five project forms were requested from each firm.

In addition to findings indicating that one of every 12 architects lost money in 1966 and one in every four projects was unprofitable, there were other causes for dismay. About 17 per cent of firms surveyed made no effort to schedule work, 23 per cent made no effort to control costs, and 47 per cent reviewed a financial report only once a year.

Charles Marsh stressed, however, that mismanagement was far from the prevailing condition and that the three most-often-heard architects’ complaints seemed reasonable.

First, architects complain of a cost/squeeze, and one clearly exists. Pre-tax income, or profit, in firms surveyed is down from 22.6 per cent of gross receipts in 1950 to 9.2 per cent in 1966. Main reason is rising salaries. While the building cost index has risen only 13 per cent since 1960 (and the architects’ fees for 84 per cent of projects analyzed were based on construction costs), pay for professional and other personnel is up from 25 to 44 per cent in the same period (see charts).

Second, architects say clients are “demanding more complicated and sophisticated service.” These demands include increased programing and engineering, feasibility studies and construction management with attendant increases in risk and liability.

Third, architects talk about the lack of quality personnel. Noting that the complaint seemed true enough on the surface, and admitting that the role of Case and Company was diagnostic, not therapeutic, Mr. Marsh nonetheless suggested that presently available personnel might be used to somewhat better advantage by simple upgrading of management procedures.

Calling the architects’ situation “a serious dilemma,” the consultants said architects were asking such questions as:

1) How can I continue to provide clients with attractive, functional sound buildings within their ever-stricter budget limitations?
2) How can I maintain quality design in spite of constantly rising costs for services and materials?
3) How can I manage my practice so that my monetary return is proportionate to my investment of time, money and effort—plus the value to my clients of my skill and knowledge?

With these questions as a kind of guide, areas needing remedial measures can be identified:

1) Overcoming the profit squeeze—budgeting job time; controlling costs; pricing services; using manpower effectively.
2) Determining better and more equitable methods of compensation.
3) Deciding which services architects should provide from their offices—which through consultation.
4) Planning profit into each job.
5) Educating the client and the public about what architects do, how they do it, and how they earn their fees.
6) Devising an information bank where architects can quickly obtain up-to-date facts pertinent to practice policies, employee benefits, methods and techniques.

Architects do not seem to be taking advantage of services the A.I.A. already provides in some areas, the Case consultants noted. With some research and information sources already finished under way, they warned against the possibility of duplication unless the resources of some sort of clearing house are fully exploited.

COST OF DIRECT PROFESSIONAL SERVICES COMPARED WITH BUILDING COSTS

COST OF INDIRECT SERVICES COMPARED WITH BUILDING COSTS

Architectural barriers. Sen. E. L. Bartle (D-Alaska) has introduced a bill to require ramps and other facilities for the handicapped in all future Federal buildings, but its prospects are dim. Meanwhile, the President’s Commission on Architectural Barriers, with an assignment to ease the problems of access for the handicapped, is increasing efforts to make sure architects consider the problem as one of the design elements of Federal buildings. Action on the bill is not likely to be rapid.
A new concept in modular space division:

New permanent-looking trackless walls form private rooms anywhere—in minutes

Create profitable smaller rooms quickly with Kwik-Wall portable walls that give you all the advantages of permanent and movable walls. Install or store anywhere (no tracks). Permanent look (including walk-thru doors). Lightweight and strong (air frame-type construction). Simplified installation (one-hand locking). Sound retarding. Kwik-Wall portable walls are available in your choice of 1526 decorator facings—laminates, vinyls, prefinished hardwood, print grains, and unfinished ready-to-paint. Kwik-Wall is also offered in panels that glide on ceiling-mounted tracks. Send in coupon today for more details.

KWIK-WALL CO., Box 319, Dept. A
Springfield, Illinois 62705

Please tell me more about KWIK-WALL movable walls.

Name
Title
Company
Address
City State ZIP
☐ New construction ☐ Remodeling
Room(s) dimensions:
Construction date:
☐ Send literature ☐ Have representative call

For more data, circle 59 on inquiry card
Carpet the Action Areas with...

Embossed

SUN & SHADE

INDOOR-OUTDOOR CARPET

with pile of 100% HERCULON®

polypropylene olefin fiber

Specify from 12 adaptable CarvTone colors—also available in contemporary smooth face

Add Krueger Tables and Seating Comfort to your menu

... and talk about taste in seating

Discerning restaurant managers know customer comfort is just as important as fine cuisine. That's why Krueger's new Pedestal Base Tables and 504 Stack Chairs are seen in discriminating restaurants. Here is elegant comfort, combined with lasting durability, promising years of impressive service. Serve your customers a generous helping of Krueger comfort—it just could become the specialty of the house.

130 Series brass base and column, marble laminate top. Choose from over 160 base/top combinations.

150 Series Base with Black accented chrome.

120 Series chrome column—black porcelain base

Heavy-duty 110 Series Base that defies tipping.

VISIT OUR SHOWROOMS...

Chicago – 1184 Merchandise Mart
Los Angeles – 8815 Beverly Boulevard

Write for our latest catalog

For more data, circle 67 on inquiry card
Any man who has even casually compared classroom unit ventilators knows that Schemenauer is positively unequalled in design, quality and engineering. He also knows that it costs very little more to go first class, which happens to make a lot of sound business sense when you're selecting a permanent fixture! The Schemenauer unit is made to give outstanding performance and economy of operation for at least 40 years. Models for steam, hot water, electric heating and chilled water cooling. Schemenauer Manufacturing Co., Holland, Ohio 43528.
Exterior load-bearing precast units in eight sizes plus cast-in-place columns and girders of Medusa White were used in this functional architectural beauty. Medusa White...the original White Portland Cement...enables the architect to attain full expression of his creative designs. Medusa White is unduplicated in whiteness. Use it with confidence. Ask your precast producer about Medusa White or write P. O. Box 5668, Cleveland, Ohio 44101.
If you have a special accent lighting problem on the boards, our Framing Projector is worth your consideration. It offers you complete flexibility in controlling the direction and shape of the light beam.

In fact, the Framing Projector can actually cut the edges of a lighted area, just as precisely as scissors cut paper. For example, you can illuminate a 3’ x 3’ painting with a 3’ x 3’ patch of light. You can light sculpture, displays and tables in the same way.

The Framing Projector features a low voltage Quartz Iodine lamp to give you precision and brilliance with 2,000 hours rated life. (This eliminates the constant relamping and readjusting of shutters found with conventional units using the G-16½ lamp.) And we have incorporated this optical system into two types of fixtures: surface mounted for use on a Lytespan track or over an outlet box; recessed mounted in an adjustable downlight—a new addition to The Calculite Group.

Write us for further information, or visit our showrooms. We think it’s a major step forward in accent lighting. The Framing Projector is one of the many efforts by Lightolier to better coordinate lighting with architecture.
Double egress!

Von Duprin UL listed Fire Exit Hardware for double egress fire doors. No mullion. No coordinator. No astragal on "B" and "C" label doors!

Here's a newly-listed fire door application—double egress doors with Von Duprin 88 vertical rod Fire Exit Hardware. You never need an astragal on "B" and "C" label doors—only on "A" label doors—and you never need a mullion or a coordinator on any door. That's news, because you do need astragals, mullions and coordinators with all other fire door applications. But that's Von Duprin, the only complete line of Fire Exit Hardware!

Von Duprin, Inc. • 400 W. Maryland St. • Indianapolis, Ind. 46225 • Von Duprin Ltd. • 903 Rue Simard • Chambly, Que.
Erickson and Stevens enhance a modern day “cave” in a sophisticated country home with ceramic tile.

The focus of this home located in a wooded area of Winnetka, Illinois is the “cave”—a room within a room. It was designed to meet the owner’s requirement of an intimate yet not isolated conversation area. The cave, as well as the surrounding entry, dining and living areas have ceramic tile floors.

The philosophy behind the design of this home is the use of a prismatic plan offering maximum opportunity to capitalize on spectacular views in all directions. At the same time, privacy is accommodated by the adaptation of individual, adjoining living “cells,” each with its own roof.

Throughout the home, architects Erickson and Stevens have made extensive use of ceramic tile for decorative as well as functional values. Bathroom vanity tops, tub enclosures and walls are finished in random blend ceramic mosaic tile with quarry tile floors. In the kitchen, counter tops and backsplashes are tiled for color harmony and durability.

If you're looking for a material with limitless possibilities in combined decorative and functional use, look for ceramic tile made in the U.S.A. and Quality Certified by the Tile Council of America. The triangular seal at the right is your assurance of glazed wall tile, ceramic mosaic tile and quarry tile that is tested to meet the most rigid government specifications. For more information about Certified Quality tile, a material that can be used with confidence indoors and out, write: Tile Council of America, Inc., 800 Second Avenue, New York, N.Y. 10017.

MEMBER COMPANIES: American Olean Tile Co., Inc. • Cambridge Tile Manufacturing Co. • Continental Ceramic Corporation • Florida Tile Industries, Inc. • Gulf States Ceramic Tile Co. • Hoffman Tile Mfg. Co., Inc. • Huntington Tile, Inc. • 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 Company • Summitville Tiles, Inc. • Texeramics Inc. • United States Ceramic Tile Co. • Wanczel Tile Company • Western States Ceramic Corp.
Want a building power system that gives you electricity, heat, and air conditioning—even in a blackout?

It's all yours.

The Garrett-AiResearch Total Energy System is yours to make money with by providing its power output to your lessees in high rise office buildings, apartments, or shopping centers. It's yours to rely on for uninterruptible power for hospitals, or critical industrial processes. It's yours to use as a way to lower overhead by regulating its power to your precise needs. It's all done with our AiResearch turbine modules. Exhaust gas heats water, produces steam, and powers air conditioning cycles; shaft power runs generators, pumps, and compressors. You buy only the modules you need now; more units can be added easily and economically as your power needs increase. To get all the facts on the system that's leading the trend to modern power, write: Total Energy Sales, The Garrett Corporation, Dept. 5D, 180 North Aviation Blvd., El Segundo, Calif.

AiResearch Total Energy Systems

For more data, circle 66 on inquiry card
The exposed steel in The Boeing Company's new Engineering Laboratory Building at Renton, Washington, is USS Cor-Ten Steel, the steel that "paints" itself as it weathers. It develops a tight, dense oxide coating that seals out corrosion; if it is scratched, it heals itself. The longer bare Cor-Ten Steel weathers, the better it looks. Nature provides its rich, earthy color and texture.

The exposed Cor-Ten Steel in the building is comprised mainly of 3" Tees and 16"-deep load-bearing columns. They frame porcelain panels on the second floor, and precast exposed aggregate concrete panels on the ground floor.

Bare USS Cor-Ten High Strength Steel is a natural for eliminating maintenance and for structural use. With a minimum yield point of 50,000 psi, it is about 40% stronger than structural carbon steel. Members can be lighter, more graceful, without sacrificing strength. USS Cor-Ten Steel is available in a full range of structural shapes, plates, bars, and sheets.

For full details on the use of Cor-Ten Steel in architectural construction, contact a USS Construction Marketing Representative through the nearest USS Sales Office, or write United States Steel, Room 4631, 525 William Penn Place, Pittsburgh, Pennsylvania 15230. USS and Cor-Ten are registered trademarks.
Color grout is here!

HYDROMENT JOINT FILLER—now stronger than ever—gives you ten colors to stir your imagination. There’s a color to match, accent or enhance any quarry tile or brick paver you specify. Best of all, Hydroment Joint Filler has a twenty-five year reputation for pleasing thousands of architects, owners and contractors.

Reason: it’s the one quarry tile and brick paver grout that is 1. dense, tight, non-shrinking, non-expanding. 2. highly resistant to corrosion and wear, quick and easy to clean.

We have a free data chart for you—“Handy Estimator For Upco Floor And Tile Products.” It’s yours for the asking.

Colors available: Tile Red, Tan, Terra Cotta, French Gray, Champagne, Brown (shown), Sand Beige, Black, White and Natural.

THE UPCO COMPANY 4805 Lexington Ave. • Cleveland, O. 44103 / a subsidiary of United Shoe Machinery

For more data, circle 67 on inquiry card
The upholstery on our chairs is more than nip and tuck

Carefully tailored upholstery in Sturgis 700 Line chairs is a detail that keeps them showroom-new even after long use. We cut the fabric precisely, then seam and welt it with care for custom-tailored fit. It won't ripple or sag.

Extra care in upholstering is one way we make Sturgis chairs look better, last longer. Deep comfort, precision-made frames and bases and flawless finishes complete the picture. Get to know the look of Sturgis chairs. Write today for a full-color brochure to Department AR-104, The Sturgis Company, Sturgis, Michigan 49091.
Finish of Kynar 500\textsuperscript{e} accents fresh ideas with long life at low cost!

Colorful sunscreen, mullions and gravel stops add decorative highlights to this new office building of Handcraft Metals Corporation in Cleveland. The color finish, made of Kynar 500, assures maximum color retention, long life protection of the metal.

Finishes of Kynar 500 offer you these three important advantages:

- New design opportunities through unlimited color selection. Finishes of Kynar 500 are liquid, can be roller-coated or spray applied for perfect color match between flat and contoured components.
- Long, maintenance-free life through high resistance to ultraviolet light and industrial atmospheres. Accelerated tests by Pennsalt, plus years of exposure data project 30 years of maintenance-free life!
- Lower initial cost when compared to other forms of long-life protection such as anodized aluminum or porcelain enamel.

Finishes of Kynar 500 are available from the nation's leading manufacturers of coatings. For a list of suppliers plus comparative cost data write Plastics Department, Pennsalt Chemicals Corporation, 3 Penn Center, Philadelphia, Pa. 19102.

Specify finishes based on Kynar 500!

For more data, circle 71 on inquiry card
The best mercury fixtures made come from Wheeler.

Double lamp High Bay Mercury fixture with integral ballast. Space-age styled with baked-grey enamel finish on die-cast aluminum body. Alzak-finished reflector (or porcelain enamel). Constant-wattage ballast. For 400 watt twin lamps. (Also available in single lamp model). For information write E. Quintilliani, Gen. Sales Manager, Wheeler Reflector Co., Inc., Hanson, Mass.

Designed by Paul Lamson Illuminating Engineer

For more data, circle 73 on inquiry card

Norris walk-in coolers, freezers and combinations are supplied in actual, not nominal, dimensions

When it comes to walk-ins, Norris deals in actual, not nominal dimensions. That means you get the size walk-in you specify to within 6" increments—whether it be a small storage unit or an entire walk-in warehouse.

Specifying Norris has other advantages, too. Like 3" walls that provide full protection over a 120°F. inside-outside temperature difference yet offer valuable extra interior space. Like your choice of frothed-in-place polyurethane or glass fibre insulation. And like modular, pre-fabricated construction that makes assembly quick and easy.

Norris walk-ins are available with your choice of accessories, and glass doors are available for both normal- and low-temperature merchandising applications. The next time you specify a walk-in, why not look first to Norris?

Write for descriptive literature designed to make it easy for you to specify!
Ugly. That's what you would expect a hunk of hardware to look like if it's protecting your door (and your life). Don't expect that from Yale. All our locks match muscle with grace.

Yale #197 1/4 maximum security deadbolt

YALE looks as good as it locks

For more data, circle 75 on inquiry card.
Both the form and the structural system of the Fisher Administrative Center at the University of Detroit make visually manifest the building's three-part division, which corresponds to its three-way function. The ground floor—several times the area of a typical office floor—contains facilities for activities that serve or deal with students, and is a low, horizontal, concrete element that makes a base for the superstructure. Locating it below the main entrance floor divides pedestrian traffic so the lobby, stairways, and elevator are free of congestion during peak hours.

Principal public entrance and access to the upper five office floors is from the raised podium or terrace level, reached from two sides. The four typical floors are laid out on a modular grid of 5-foot squares, with conforming ceiling troffers for air supply and lighting. The floor slabs are carried by concrete mullion-columns and by the core; the roof is suspended from the central core by concrete-encased steel cables. The top, or fifth, floor—for executive use—is thus free of columns and is fitted with continuous glazing for undisturbed vision.
Architect Gunnar Birkerts explains that existing nearby buildings provided numerous clues in the search for an expression of appropriate scale and character. Neighboring structures are mostly of limestone bearing-wall construction, with tall, narrow, deeply recessed windows, and with sloping roofs of red tile. The new building obviously echoes some of these characteristics, but without compromise and without laboring the idea. In denying the horizontals of the spandrels—by pushing them behind the glass—the building gains a more imposing look. This was the intention, since the new building is located near the future main gate.
These two photographs are a section through the building, showing the manner in which architect Birkerts has brought daylight into the heart of the indoor, level space. Note the sloping glass panels between the columns at terrace level.

The exterior palette is a simple and restrained one, consisting of lead-coated copper cladding, natural cleft Buckingham stone for mullions and terrace, heat-absorbing plate glass in aluminum sash anodized dark gray, and the natural concrete ground floor element. The building creates a total effect that is strong yet restrained, monochromatic but not dull.
FISHER ADMINISTRATIVE CENTER
University of Detroit, Detroit, Michigan

ARCHITECTS: Gunnar Birkerts & Associates
Almon Durkee, principal, project administrator
Keith Brown, associate for design

STRUCTURAL ENGINEERS: Hollorty, Widrig, O'Neill Associates

MECHANICAL ENGINEERS: Siegel, Swiech & Associates

LANDSCAPE ARCHITECTS: Johnson, Johnson & Roy

GENERAL CONTRACTOR: Utley-James Corporation
The general character of the interiors can be seen in these three photographs. Above, the president's office on the executive floor: note the ceiling and cabinetry of light birch—the furniture is bleached oak. At right, a typical second-to-fourth-floor office; below, a typical second-to-fourth-floor corner office. On typical floors, the ceilings are metal pans, and the floor covering is vinyl-asbestos tile. On all floors, the plaster walls are painted off-white and partitions are natural birch.
A BRILLIANTLY ORDERED VISUAL WORLD
expo 67 is a brilliantly ordered visual world—and almost everyone loves it. The inhabitants of our grey cities and drab suburbs have never seen anything like Expo, and it is attracting them in unpredicted, unprecedented, and indeed uncomfortable numbers. It is probably not fair to say that the huge public has been attracted to Expo by architecture alone, but once there, people are certainly exhilarated by it—and this is important. Some may realize that they owe much of their pleasure at the fair to skillful design, and will wish to see more of it in their everyday environment.

The site plan gives coherence and excitement to what would otherwise have been a vast and sprawling conglomeration of pavilions. This plan, subtle, varied and unobtrusive, provides an underlying pattern of circulation networks—express trains, minirails, vaporettos in pretty canals, Hovercraft in the river, skyrides from here to there, and footpaths and bridges which interconnect carefully related hierarchies of buildings, placed to make the most of their setting.

Expo, of course, can be criticized. Because it is much bigger, it has more mediocre pavilions than Mr. Moses was able to gather in Flushing Meadow. This fair, furthermore, has no one single work of the imagination to compare with the New York fair’s most memorable pavilion—IBM’s great egg in the trees, designed by Charles Eames and the late Eero Saarinen. But Expo’s good buildings are very good indeed, and there are many more very good buildings than at the New York fair.

When the five-millionth visitor passed through the turnstiles three weeks after opening day, the forecasters and computers had been topped by more than one million in predicting the gate. The citizens of Montreal, happily arriving and re-arriving by means of their handsome new subway, queue up by the hundreds at the popular exhibits, help to crowd the express and minirail platforms, clog the paths, spill over onto the grass and planting, jam the lunch counters, restaurants and bars, and stretch the lines which form outside the toilet facilities. Can the fair’s attractiveness withstand this onslaught? The planners are doing their best—main thoroughfares are being widened, buses now crawl along pedestrian paths and more restaurants and toilets are being rushed to completion. But the question remains: will success spoil Expo? —Mildred F. Schmertz
Frei Otto's German Pavilion on île Notre-Dame has a favored position in Expo's site plan. The elevated Expo express train makes a wide arc around it giving fairgoers on their way to La Ronde amusement area a fine view of its remarkable cable-hung roof.

The minirail (above left) allows a closer inspection of the tapered tubular steel masts and steel net in tension. From within, daylight is softened and warmed as it filters through the translucent membrane of polyester fabric. By contrast, the unfiltered light of the sky appears more intense, lending sparkle to the surrounding canal.
The outlines of the Quebec Pavilion on the Ile Notre-Dame are retraced at a respectful distance by the route of the minirail which snakes out over the water to give everyone a better look at one of the handsomest buildings at the fair.

Quebec's walls of mirrored glass transform the flags, clouds and buildings which they reflect into fragile, shifting abstractions which suggest early Cubist compositions. The French Pavilion next door looks far better in reflection (below) than in reality.

The displays within the Quebec Pavilion are as well done as the building itself—a happy design synthesis all too rare at Expo.
The incredibly beautiful United States Pavilion is the ultimate version of Buckminster Fuller's geodesic dome. This triumphant structure at Expo, a welded steel pipe and hub space frame 20 stories high and 250 feet in diameter at its equator, encloses a volume of 6,700,000 cubic feet within a transparent acrylic skin. Inside, the U.S. exhibit, witty, joyful, and gay, brilliantly commands a magnificent space. Understandably, it confounds those who expect to see only quantitative boasts of industrial strength, military power, scientific progress and cultural ascendance.
This Theme Pavilion, bridging a major circulation hub on the Île Notre-Dame, is identical in structural concept to its mate across the channel on the Île Sainte-Hélène. These great megastructures of rusted steel loom above the smaller pavilions and serve as landmarks for the visitor trying to orient himself. In each the entire structure is a space frame—floors and roofs as well as walls—providing immense clear span spaces as shown below and smaller volumes where required. Ductwork weaves through the interstices of the space frame and is accessible at almost any point.
Theme Pavilion: "Man in the Community".

Owner: Canadian Corporation for the 1967 World Exhibition; chief architect: Edouard Fiset; project architect: Roger Desmarais; consulting architects: Erickson & Massey

The Theme Pavilion is formed of great beams of spruce and fir, forming overlapping hexagons of gradually diminishing size, making a cone which encloses a splendid interior space with a garden and pool. This geometric lattice is 140 feet high and 285 feet in diameter at the base. Interlaced with translucent plastic at the junctures of the larger hexagons, it is open to the sky at the top. This beautiful pavilion is marred by singularly mindless exhibits which must be passed through before the graceful and restful oasis shown below can be reached.
Other noteworthy buildings at the fair: The Montreal Aquarium is a permanent structure and may become a model for aquaria everywhere. The Netherlands Pavilion nests within a “cocoon-like” space frame constructed of aluminum tubing and boasts a startling cantilever. The Scandinavian Pavilion overlooks a sculpture by Calder. Cuba’s exterior is diverting. Habitat has not been designed for the Montreal climate nor is it an acceptable approach to low-cost mass-produced housing as claimed. It is, however, the largest and one of the best looking pieces of Cubist sculpture you will probably ever
La Ronde has its own minirail from which one can admire its roofscape (above), and a sky ride in a gondola car that provides a sweeping view of this wonderfully planned amusement area.

There are wilder rides available, including one through the Gyrotron, and engaging vistas for those on foot.
The Expo express train platform at La Ronde (above) and the Bonaventure station of the new Montreal Metro completed in time for the fair (below) show the excellence which can be achieved by administrators who know that the design of transportation facilities merits the attention of good architects.
PLACE BONAVENTURE.
Owner: Place Bonaventure Inc.;
architects: Affleck Desbarats Dimakopoulos Lebensold Siao
—partner in charge, R. T. Affleck.
—project designer, Eva Vecsei;
mechanical and electrical engineers: James P. Keith & Associates;
lighting consultant: William M. C. Lam.

Place Bonaventure, a massive trade center
in downtown Montreal, should be seen by architects
along the trip to Expo. Shown below is its vast
exhibition space. Giant columns support
eight floors above.
Expo 67 has stimulated other construction in Montreal. Permanent new cultural facilities have been erected at the fair and elsewhere in the city. At Place des Arts, two new theaters now adjoin the major concert hall completed several years ago. They are housed in a single building. Shown below is the 1,300-seat Theater Maisonneuve and its adjoining foyer. The 800-seat Theater Port-Royal is directly beneath.
Each of these four buildings could have been a simple box and still have provided all the requirements of its program. But in each case both owners and architects sought distinction and individuality, and as a result the solutions—often made difficult by unusually small sites—and the architectural expressions are completely different. All have the essential of design quality.

A BRANCH BANK IN A SUBURBAN BUSINESS DISTRICT

The site for this branch is small but its location, in the center of the San Carlos business district, is advantageous for the bank. The unusual—and highly effective—form of the building evolved to meet the needs of the bank and the specific problems of the location. Warm, inviting colors are used on both the exterior (two shades of tan brick, a copper roof) and the interior (dark tan magnesite floor, charcoal gray carpet, natural wood). The glass wall at the main entrance, with its view to the banking space, is also inviting. The structure is concrete framed, with brick filler walls. The roof structure consists of laminated glued purlins resting on a concrete ring at column height and connected to concrete ribs. The ceiling is of natural hemlock, with a portion of it designed as lighting panel.
The formal placement of this building ignores the irregular shape of the corner site, using the setback for landscaping and providing an entrance accessible from both streets. As part of the solution to the program requirement for a building that would be "impressive and yet inviting," the building is placed on a low podium, and is reached by wide steps at both main and parking area entrances. The 20-foot overhang alters the basic cube of the building and, with the wide steps, large glass areas and elegant detailing, achieves the requested "inviting and gracious" appearance. Teak panels alternate with glass to form the enclosure. Structure is reinforced concrete with covered ceiling over banking area.
The site for this handsome bank building is a very small plot in a shopping center near a residential area. Eight vaults, the two at each outer end are designed on a slightly smaller module than the center four—give the building exterior a distinctive appearance and on the interior work with the sculptured columns to produce unusual spaces. The banking area is two stories high, unexpected spacious. A mezzanine floor at the other end of the building contains a meeting room for public use. Interiors are finished...
The interior is surprisingly spacious—two stories high in portions of the public banking area—and open, with full-height bronze glass on three sides to increase its apparent size. A mezzanine floor which overhangs the tellers’ area contains a public meeting room for community use. The columns are contoured in the upper sections and produce interesting spatial results as they sweep into the ceiling vaults.

HOPPING CENTER

Teak, with bronze details; floors are white terrazzo; banking fixtures were designed by the architect. Since the bank had to provide its own parking spaces and there was not enough space on grade, the building is slightly raised above street level to permit a basement garage.

This arcaded building, for the headquarters offices of an Oregon savings and loan association, was designed to meet the client's request for a "modern and impressive" building. Its brick exterior, dark in a city predominantly white because of its many marble-faced government buildings, recalls in material the old city hall across the street. But the brick—a special amber-rose in color—and the arches were used, say the architects, as a "romantic interpretation of regal." The arcade also serves as shelter in the rainy winter season and as sunshade for the interior areas in the summer. A shielded skylight floods the banking space with daylight. Mezzanine has offices, conference room and lounge.

Architects have yet to gain many opportunities to design new housing units, or plan the rehabilitation of old housing units, within the context of well conceived comprehensive plans. When they do have this opportunity, the quality of these units is often much better than the established standard.

The typical basic housing unit—whether new or rehabilitated—is a functioning space, essentially neutral in character, and standard in construction, which achieves its quality and desirability by its relationship to the favorable elements in its environment—attractive neighboring units, park and recreation space, well located community and cultural facilities and good transportation. (The Brooklyn slum brownstone and the Upper East Side luxury brownstone are essentially the same unit.)

The housing shown in this study is the work of architects who have been charged with the design and planning of the neighborhood, district or new town in which the housing is located. The broad-scale approach to the rehabilitation of slum neighborhoods is receiving impetus from private industry and non-profit organizations encouraged by newer governmental programs—notably rent supplement. Developers are constructing well planned new towns instead of tract housing in areas where stronger planning controls have recently been implemented. Results are encouraging, as the examples which follow will show. —Mildred F. Schmertz
MONTGOMERY VILLAGE
A NEW TOWN WITHIN A CORRIDOR CITY
IS SHAPED BY NEW PLANNING CONCEPTS
REQUIRED BY IMPROVED ZONING CODE

The town sector plan for Montgomery Village, shown in green on the area map (below) and at a larger scale in the open space diagram (opposite) conforms to the General Plan for the Maryland-Washington Regional District, prepared by the Maryland National Capital Park and Planning Commission and adopted January 22, 1964. This plan encourages the growth of a radial corridor system with Washington, D.C. at its hub, and recommends the development of a new corridor city at the town of Gaithersburg, Maryland, which lies between Rockville to the southeast and Germantown to the northwest. All three towns are on Interstate route 70S, Maryland Route 355, and the direct access railroad to the Washington Metropolitan Area. These arteries form the northwest spoke of the radial corridor system. Montgomery Village, adjacent to Gaithersburg, will for the most part lie within the boundaries of the future Gaithersburg corridor city.

Any developer wishing to construct houses in Montgomery County, the planning entity known as the land-Washington Regional District, which is presently zoned as residential, and permits a density of 10 dwellings per acre, must apply to the local district council with a fully conceived and well-conceived "town plan in hand. This plan must conform to the Town Sector Zone Section of the Montgomery County Zoning Ordinance. If the developer's plan so conform and is approved, the part of the county and the former rural residential zone becomes a town sector which allows urban densities in a range high enough to accommodate urban activities, but low enough to preserve open land for recreational purposes.

This new ordinance requires an entirely new approach on the part of the housing developer. He must hire a rate team of architects and planners to prepare a town sector plan which, when conforming to the new ordinance, promises of becoming a profitable enterprise. Montgomery Village, now under construction, and entirely financed by conventional borrowing on the part of its developer-builder, is one of the examples of this new kind of enterprise. A residential town for 30,000 people will occupy 2,000 acres of beautiful countryside near Gaithersburg, Maryland, 20 miles north of Washington, D.C. This new town is the work of four firms which are serving as primary planning consultants to Kettler Brothers, Inc., a private developer: Rogers, Taliaferro, Kostritsky & Lamb—responsible for town development, architectural design of multi-family and commercial units and architectural co-ordination of the total project; Mott & Hayden—planners for the greater Gaithersburg area, as well as for the over-all development of Montgomery Village; Greenhorne, O'Mara, Dewberry & Nealon—engineers responsible for developing road patterns and utilities on the project; Larry Smith Associates—economic and commercial consultants.

The town sector plan provides more than 557 acres of open space. Commercial, cultural and recreational facilities support the basic residential character of the town.

Circulation routes within the town sector, including major arterials and cul-de-sacs, are being constructed by Kettler Brothers, Inc. Schools, which will occupy 95.3 acres of land to be donated to the local school system by the developer, are located for family convenience and to serve as neighborhood centers. No residential area is more than a 15-minute walk from school.
The first community of rental townhouses and gardens to be constructed will be known as "Mills' Choice." As the site plan (left) indicates, the buildings are carefully oriented to preserve a view of the stream valley between the lake. This development is joined to the village center to the north of the road by a pedestrian underpass. The area includes a recreation complex with a swimming pool. Extensive open space is provided. The townhouses shown in site plan, plan and section (opposite page) will occupy sloping sites. The program required that they be two-story units designed for a maximum construction cost of $11.00 per square foot. On-grade parking has been provided at a density of 1.8 cars per unit. The units are tightly clustered on hillsides. Each group shares a central paved and landscaped courtyard and each unit has its own private courtyard. Parking is peripheral to each cluster. The buildings, domestic in character and deliberately understated, will be frame construction with brick masonry exterior and retaining walls.
The Village Center (above) will stand on a high ridge in the geographic center of Montgomery Village. To be built in several stages, it will ultimately include retail space, offices, 1,000 apartments and a variety of supporting facilities. The first phase, to be built in 1967, will include an information center and a covered swimming pool. The major pedestrian circulation in the Village Center is separated from vehicular routes and enters into the Center through underpasses. Buildings will be of brick masonry with slate roofing.
Detached single family houses are being constructed on the portion of Montgomery Village to be known as “Whetstone,” shown in the site plan (left). Those to the north of the site are clustered to preserve park land. The typical cluster, shown in plan and elevation (opposite page), surrounds a handsome pavilion court conceived as an architectural space rather than as a formless cul de sac. The court will be used for auto turn-around and visitors parking. This cluster plan accommodates four different models to be built within a sale price range of $45,000 to $58,000 including the lot. Each lot will be completely private from the neighbor. Every house will have an enclosed two-car garage. As in the neighboring Mill Choice development, these houses will combine frame construction with brick masonry. 
Base Unit
1. Span limited to maximum truss span or maximum span for 2x10 floor joists and rafters.
2. Length of base limited to 35 feet.
3. Base unit to include basement.
4. Area of base unit same for all houses—interiors to vary.

Appendages
1. Appendages limited to economical length of rafter—roof pitch and the necessary height for window sills.
2. Appendages will have no basement, and will either rest on a slab or be attached as a short cantilever.

Elements
1. Chimney to be located outside of base unit—connected with appendage and slab.
2. Stairs can be anywhere necessary—but are most economical if within the base unit.
3. Skylights to be the flat type and put in appendages—exception is a skylight over a stairwell.

A development house for Montgomery Village has been designed by architects Rogers, Tallferro, Kostritsky and Lamb. It consists of standard base unit shown in the diagram (above) and indicated in green on the plan of four basic two-story models (opposite page). To this base unit are added the various appendages which the owner requires. These adjust vertically to accommodate grades.
Rehabilitation of Park Slope North, the neighborhood shown in gray on the development plan for the entire Park Slope district (opposite page), was planned as part of a broad-scale study of the district which architect John H. Beyer of Victor Gruen Associates made for its client, the Park Slope North Improvement Corporation. As designated on the Brooklyn map (below) the Park Slope district does indeed slope, downward toward the East River from Prospect Park on the southeast to Fourth Avenue, a major route which forms the boundary to the northwest. On the northeast, Flatbush Avenue cuts diagonally through the old grid-iron plan, and to the southwest the district is defined by Prospect Expressway and the Greenwood Cemetery beyond. The total area comprises approximately 566.5 acres and 74,800 people.

The project was begun by two pastors, heads of churches located within a rapidly deteriorating Park Slope neighborhood. Reverend Michael Quinn of St. Augustine's Roman Catholic Church and Reverend Clifford A. Buck of John's Episcopal Church, sought help from the Frederick W. Richmond Foundation. The two churches and the foundation became sponsors of the rehabilitation demonstration, the latter providing funds for a 10 per cent down payment on the initial property to be acquired and for legal and architectural fees.

The project is being carried out with the assistance of the Federal government, acting through the Department of Housing and Urban Development (HUD) and the Office of Economic Opportunity (OEO). The City of New York is participating through the Rent and Rehabilitation Administration (RRA). Permanent financing will be provided by the Federal National Mortgage Association, under Section 221 (d) (3) of the National Housing Act, using the below-market interest rate provision, with rent supplements. This Section provides 100 per cent insured mortgages for non-profit corporations. Preliminary expenses for property acquisition and planning that were not paid for by the foundation were financed from an OEO grant administered by the Rent and Rehabilitation Administration.

The first phase of the neighborhood plan calls for rehabilitation of 17 brownstone buildings, four stories high, which were built between 75 and 100 years ago for single-family occupancy. Seventy-six new dwelling units will be created within these brownstones: 16 three-bedroom...
Patterns of traffic and open space which now exist (above) would be transformed into the proposed system (below). Improvement of the intersection of Fourth Avenue, Flatbush Avenue and Atlantic Avenue at the northwest edge of the district has already been planned as part of an urban renewal program for an adjacent sector. The four major east-west streets remain two-way. Alternate streets would be closed off for play, and those which remain become one-way. The four north-south streets within the district boundaries would alternate as heavier traffic streets. Community parking facilities are recommended along the Fourth Avenue edge.

Public transportation, while good, would be improved in the Gruen scheme. Existing subway and bus routes (above) are plentiful, and most Park Slope inhabitants can walk to the nearest subway station in five minutes. The new mass transportation plan (below) places the main two-way bus service on Fourth Avenue, a boundary street and the proper long-haul route to the subway stations. The planners propose that an electric minibus operate on Fifth Avenue, a narrow artery which should become a shopping mall. The scheme removes the Eighth Avenue bus route, since service is available on the adjoining north-south streets.

Existing urban characteristics at Park Slope boundaries, shown in the diagram (above), influence Gruen’s proposed guidelines of heights and densities of new construction (below). Because the Fourth Avenue and Flatbush Avenue arteries are wide enough to handle additional traffic generated by increased population densities, and since much construction can and should occur along these greatly deteriorated edges, Gruen planners propose that a boundary of high-rise apartments be erected surrounding new three-story apartments. Prospect Park is a great amenity. The plan discourages high-rise construction on its border.
The present population, number of existing dwelling units and current densities per acre are shown (above) for the four major areas defined by the crosstown streets. Gruen’s planners believe that 10,000 persons can form an urban neighborhood of comfortable densities, and convenient amenities, if the aggregate of shopping and service facilities, schools and open spaces form a center which is no more than 1,000 feet or a four-minute walk from its boundaries. The diagram (below) shows eight neighborhoods of this type. Major open spaces are located within the high-rise housing and linked by means of the play streets to the park.

The condition of existing structures, shown in the diagram above, was assessed, block by block, by means of a “wind shield” survey, supported by Community Renewal Program data supplied by the city. Gruen’s planners propose four distinct levels of action, shown in the plan (below), which correspond directly with existing conditions. The well built sound neighborhood near the park should be conserved. The area immediately adjoining it, which is beginning to decline, calls for conservation and spot rehabilitation nearer the park, and rehabilitation with spot clearance in the section which adjoins the perimeter slum to be redeveloped.
units to rent for $137 per month; 44
bedroom units to rent for $123
month; and 16 one-bedroom units,
ing for $108.

The Richmond Foundation, in-
viding seed money for the Park
North Rehabilitation Project, is ad-
ing the idea that non-profit organi-
have a major role to play in slum
habilitation. Frank C. Montero, trea-
the non-profit corporation puts it
way: "Non-profit groups have the
advantage of being able to operate
the flexibility and freedom sacred to
private entrepreneur. For instance,
tual insurance companies provide
profit service to their policy hol-
Non-profit effort in the housing field
provide equally effective service
tenants on a long-term basis without
need for return on investment.

"A public commitment to pro-
decent housing for all citizens is
basic necessity. For families whose
comes are too low to pay rents in
assisted housing market, there is
obvious need for subsidies if this com-
mmitment is to be honored and the pu-
ic interest served. Through various co-
inations of low interest rates, la-
write-downs, long-term mortgages, es-
estate tax abatement and rent sup-
ments, non-profit groups can provide
substantial number of the units requi-
"If it is argued that only public hous-
authorities should provide subsidiz-
housing, then the government will ev-
tually become landlord for more than
one million families, leaving little ba-
for comparison of costs, quality or ma-
agement; and because of its legal and
administrative requirements, it will pe-
petuate economic segregation.

"Perhaps the most creative and po-
tentially fruitful approach in provid-
genuine help where it is really need-
housing is the Rent Subsidy progra-
enacted in Congress in mid-1965. Und-
program, families must have an in-
come of not more than $4,300 a year to
qualify for rent help. When families
move into new buildings or rehabilitate
buildings, they must pay out 25 per
cent of their income in rent, and the gov-
ment pays the rest. If the income rise
enough so that 25 per cent pays the ful-
rent, the government subsidy ends.

"This is good for people undertak-
ing non-profit housing because it places
a financial cushion under the projects.
It also removes the risk of eviction of
low income and welfare tenants who
work and earn growing incomes."

It should be added that non-profit
organizations cannot fight the slums
without the assistance of private indus-
try. Robert F. Dormer, vice president of
both the Richmond Foundation and the
Park Slope North action area shown in plan (opposite page) and in the diagrams (below) consists of six existing city blocks, blocks away from Flatbush Avenue to north and bounded by Fifth and Sixth Avenues to the east and west. A section in decline, many of its brownstones to single-room occupants, a sure measure in statistical terms of worsening conditions. The number of non-whites in the area rapidly increases. The neighborhood anchored by two institutions—St. Augustine’s Roman Catholic Church near the river, and a public school to the south. The planners have transformed the six blocks into three superblocks for approximately 2,000 persons each. The play streets which bisect each superblock will provide limited automobile access and serve as fire and service lanes. They will connect with large semi-private play areas at the rear of parallel rows of brownstones. In addition, each brownstone may have a small private garden at the back. The planners note that it is inadvisable to make the area between the backs of brownstones into a public space if the street is to remain public.

A neighborhood park which will be bordered by new low-rise units has been introduced adjacent to the public school. A supermarket with parking beneath will be located nearby on Fifth Avenue, the commercial street. This superblock will thus become the nucleus of Park Slope North. Since the blocks are quite long in the east-west direction, a mid-block north-south pedestrian path will be developed to interconnect neighborhood-oriented community facilities.

The diagrams (below) show three possible alternatives for superblock design. In the first plan the intermediate street becomes a play street with access limited to neighborhood autos, fire and service vehicles. This is the scheme proposed for Park Slope North. In the second plan, the center street is used entirely for service and limited access and the backyards become a common play and sidewalk area. In the third scheme shown, backyards become the common access and service street, and the old street is transformed into a play area.
The old-law tenement vs. the brownstone—which should be rehabilitated? Old-law tenement rehabilitation can be socially valuable when performed as a stop-gap measure in a decaying area, but the repaired structures—still airless, viewless, yardless and several stories too high without elevators—will never be truly fit to live in and should eventually be torn down. The brownstone, on the other hand, is an ideal urban residential unit which can be continually renewed. It is a domestic building type which has not been essentially improved upon for centuries. Buildings are still being designed with the identical plan. All rooms except the service elements at the core receive light and air, yards are usually ample, and even the fourth floor is easily reached by stairs. Old-law tenements, built rapidly and in great numbers for poor immigrants at the turn of the century, have the stigma of poverty about them still, no matter how improved. The brownstone, socially neutral, is dependent on the neighborhood for its status—housing the rich on Manhattan’s Upper East Side, and the middle class and poor elsewhere. Where it has been allowed to decline the brownstone is easily upgraded, although its rehabilitation is expensive. Planners believe that the rehabilitation of a neighborhood of brownstones can attract a wide range of incomes and further desired integration.

Park Slope North Improvement Corporation, asserts that he is concerned disappointed with the performance of private industry in the rehabilitation of our cities. "In one case that I am familiar with, the largest retailer in the country—and a strong vocal supporter of renewal—spurned the opportunity to engage in the redevelopment of downtown of a city in New Jersey because of the beckoning attractions of competing suburban shopping centers. Very few of our banks—in spite of guarantees—seek out opportunities to participate in programs to provide housing for families whose needs are to be met only with some degree of public assistance.

"Plans for rebuilding our cities cannot be founded upon the assumption that more than a few industrial and commercial organizations will be guided in their investment decisions by the same concern for the public good that is expressed in their speeches, in their contributions to scholarships, or in spite of the fact that a number of urban renewal projects in various parts of the country have major organizations as developers, or as tenants of developers, the scale of the involvement is almost insignificant in proportion to the problems.

"If effective participation involving great financial risks and burdens that we could recognize the need for corporate caution. However, the burdens have been minimized through the ability of public agencies to undertake the difficult and costly aspects of assembly and clearance of areas suitable for new use, and the risks have been socialized through the device of FHA insurance. There are many non-profit organizations willing and able to undertake the operating responsibilities in connection with rehabilitated or new housing eligible for 100 per cent financing under the 221(d)(3) program. These non-profit groups can become an important force in achieving both business and social goals by providing a similar fund—but on a scale which I hope would be in keeping with the dimensions of the problem."
Redevelopment of Park Slope brownstones will first of removing the steps which formerly led to the "parlor floor" and hid servants' entrance and trash cans on the floor. New low walls, planting, paving steps will redefine this area and screen trash cans as the plan and drawings. Each house becomes a full four-floor New kitchen and bathroom cores will added and new finishes will be applied floors, ceilings and walls.
A NEW KIND OF TEAM—
THREE TRADE ASSOCIATIONS,
A NON-PROFIT CITIZENS’ GROUP
AND HUD—COMBINE TO REHAB SLUM

Two long slum blocks planned as a unit by architects A. Quincy Jones and Frederick E. Emmons will, it is hoped, act as a catalyst for the rehabilitation of a still larger area of Cleveland's notorious Hough slum. As can be seen in the plan (below), the center east-west street will be closed to traffic and converted into a public mall with commercial facilities and provision for small neighborhood industry. Rear yards will also become continuous public open space in which desirable community and recreational facilities will be introduced. Each house will have a small private garden at the rear. All three public malls will be linked together and to the perimeter streets to the north and south by a system of paths following the routes of former alleys. Perimeter lots for off-site parking will be located within a four minute walk of the area center. The drawings (opposite page) show proposals to improve the appearance of the houses by removing porches and extending eaves. More importantly, common terraces screened from the street will be created between houses.

For the first time a major industry group has joined with a non-profit neighborhood-based sponsor to rehabilitate slum using Federal mortgage insurance. The American Plywood Association, National Forest Products Association, and the Southern Pine Association have common cause with HOPE, Inc. (Our People Economically), to rehabilitate two slum blocks in Cleveland's Hough district, and have hired architects Quincy Jones and Frederick E. Emmons to establish planning guidelines. The associations have pledged $150 thousand in seed money with the aim of generating $2 million in FHA below-market rate loans. HOPE, Inc. will later manage the completed property and service the mortgaged housing units.

HUD experts estimate that there are at least five million housing units which could be rehabilitated in the U.S. at less than $10 thousand per unit; this adds up to a $50 billion market. Until now, only brick or multi-family housing has tended to get renewed, but some believe that a large percentage of the five million units awaiting transformation in our smaller cities and towns may be wood frame.

The three associations hope to achieve better and more efficient structural and installation systems in the process of rehabilitating Hough. By undertaking a specific project they also believe they can stimulate other segments of private industry to enter the rehabilitation field. In addition they wish to test the workability of existing legal and financial mechanisms and to be a force for the improvement of procedures which may prove unwieldy in the future.

The project area consists of 140 housing units including a few single-family homes. The J&Emmons plan increases this density to 180 units. Since all property will eventually be held in single ownership by HOPE, Inc. the planners have been able to develop common areas for community activities to take the place of badly deteriorated alleys and backyards. Construction will be phased for minimum disruption of residents—one series of units will be completed and occupied before construction is begun on the next.

Early publicity on the Hough project caused the price of yet unassembled land to increase by two to four times its actual value. Fortunately HOPE, Inc. had opted to purchase nearly 80 percent of the properties before prices went up on the remaining 20 percent. These remaining parcels were owned by absentee landlords many of whom had left the area after the riots of 1964. The lumber associations have forced the prices down again to reasonable levels by threatening to withdraw their support. The project is now quietly going ahead.
In the typical rehabilitation plans bedrooms are added where possible in the spaces between houses, more compact kitchens and bathrooms replace old facilities, and unnecessary partitions are removed. Extensive changes in floor and stair layout are not necessary since most of these frame houses, built as single-family dwellings, have served as three-story apartments for the last 30 years.
Air conditioning: new interpretation for architects

Air conditioning is hardly a romantic consideration in architecture. It is, rather, an indispensable environmental ingredient of the modern-day building—difficult to assimilate and make part of an organic whole. And, unfortunately, no technological breakthroughs are in the offing to eliminate this difficulty. In fact, the very nature of air conditioning—which involves air movement and air changes—works against simple solutions. And although many interesting developments have taken place in the area of physical co-ordination and integration of air-conditioning systems with structure, lighting and acoustics, this is only one facet of a complex and multi-faceted technical and economic problem. Further, even though industry is furnishing more sub-system elements in larger and larger pre-engineered packages, this does not eliminate the task of determining over-all system thermal performance requirements and economics in relation to each building design.

The architect no longer has to wonder about what sort of thermal conditions need to be provided for comfort air conditioning—these are pretty well set forth. He does, however, need to become even more concerned about the interaction of building design and air-conditioning system. He needs to be aware of what system characteristics are necessary to provide a continuity of comfort as the building is subjected to a variety of loads. There is a vast array of systems and sub-systems to provide thermal comfort. Selection will depend on a variety of interrelated factors having to do with thermal performance; degree of individual control desired; flexibility for future change; space requirements for equipment, pipes and ducts; how the owner wants to approach initial and operating costs; how difficult the system will be to design; what sort of maintenance help is required; relative costs and availability of energy sources. While a detailed analysis of some of these factors must be performed by the engineer, nonetheless the architect must become increasingly aware of their implications for building design, and he must consider their influence very early in his programming of a building.

Beyond these basic influences on system selection is the architect's concern for how sub-system components such as diffusers and other in-room elements affect room appearance.

The purpose of this two-part article is to provide the architect with an over-all view of air-conditioning system types; to familiarize him with some of the more important current trends in air-conditioning technology; to help improve the dialogue between architect and manufacturer; to help the architect in his working relationship with the mechanical engineer; and, finally, to help the architect program buildings better in their technical aspects.

—Robert E. Fischer
THE BIG PROBLEM: VARIABLE HEATING AND COOLING LOADS

Most buildings are air conditioned today. Many have to be neutralized to neutralize the heat from sun, lights and people. More glass is used—usually without the benefit of built-in shading effects of the deep window reveals of years past, although these are coming back in some facades. Lighting levels are reaching new highs—so much so that it often pays to recover heat from lighting fixtures to take care of a large part of the heating load in winter. More interior space is being utilized nowadays, since we need not depend on daylight for seeing—and this means that most building interiors are being cooled year-round.

So the problem is not one of deciding whether or not to air condition a building, but, rather, how to do it most effectively. And there's the rub. Cost of the air-conditioning system for a high-quality office building can run from 20 to 30 per cent, or more, of the cost of the building. Air conditioning takes space—often seeming like an oversize octopus with its tentacles of ducts and pipes winding their way through shafts, hung ceilings and chases.

Since air conditioning cannot be seen, in contrast to building structure, lighting, or even acoustical elements, it frequently gets neglected in terms of proper space requirements and performance. Naturally, there is no reason why necessary air-conditioning elements within the room—ceiling and wall diffusers and under-window conditioning units—should be unsightly. In fact, great strides have been made in recent years by architects working with manufacturers to develop air outlets that are unobtrusive. And even in some cases these elements can be made to do double duty. For example, linear ceiling diffusers can support suspended ceilings and be notched to receive movable sections. And these diffusers may disintegrate if the air is supplied ceiling plenum to perforated panels. Enclosures for under-sill terminals are designed with a clean pearance, are frequently made small and can be partly concealed within floor-ceiling sandwich.

In still another area, ceiling air supply and return openings have been integrated with recessed lighting fixtures—on the one hand, to give the ceiling more organized, less cluttered appearance; on the other, to remove light heat before it enters the room. This may be merely exhausted and rejected, but in many cases it is recovered to serve energy being used either to control the temperature of incoming summer air, to add heat to fresh air in winter to be raised to a higher temperature level by a heat pump system. Thus, two room elements which cannot escape the eye are gradually being refined in terms of both appearance and function. In the tiny room thermostat is having its face lifted by manufacturers, and in some cases, it is removed from the room altogether and placed above the ceiling to sense temperature of return air.

Architects want to conserve space, but there's an irreducible minimum. Architects, and of course their clients are concerned about how much space is taken up by the floor-ceiling sandwich for transporting air, and equipment room space for refrigeration and boiler fans and pumps, and cooling towers. This problem causes many to look to the future for thermoelectric cooling and heating, and, in the present, evaluating the possibilities of panel cooling. Even if these two techniques we
practical and economic today,*
and ducts would still have to have ducts
air for humidity and odor con-
more recently, to remove the
and lights,
architects and engineers have man-
reduce duct space requirements
igning structural elements to serve
by using double floors
by running up columns, pilasters and through
by coordinating duct and
ral elements to save space. The
economics of these approaches
are carefully appraised.
measures in space for basic
cooling and equipment have
ected by utilization of heat from
electric heating elements; room-
unit heating-cooling units; pur-
from a utility; heat pumps to elimi-
also by decentralization of smaller
coils equipment with installa-
in low rental or normally wasted

ing design characteristics
affect occupant comfort
superficial sense, the role of air con-
ing is simple—principally to pro-
ically comfort through the regula-
heat loss from building occupants. Heat
mands, while under-
ded, are still relatively complex in terms
air relative balance. For example, a
r not be reasonably cool, but have
jective effect of seeming "drafty."
room air temperature and humidity
nt be in their correct ranges in a
ce, but the hot radiant effect from

thermoelectric technique has been used for
refrigerators and for small air-handling units
on Wax building. Panel cooling has been used
ally in office buildings and hospitals.

glass exposed to the sun could create
comfort. Nonetheless, a general, but
basic, understanding of how the human
body exchanges heat with its surrounding
vironment will help the architect avoid
thermal environmental problems that are
expensive, or even nearly impossible to
remedy.

The definition of air conditioning is
simple enough: treatment of air so as to
control simultaneously its temperature,
humidity, cleanliness and distribution.
But the relationship between the basic
process and actual occupant comfort in
all parts of the occupied space—on a
year-round basis—is not so simple.

As has been said, controlled heat
loss is always required for the occupant.
The human body must dissipate waste
heat to the surroundings mainly by convec-
tion, radiation, evaporative cooling and
also by respiration. Generally, discomfort
occurs only when radiant effects (such as
sun or lights) or velocity and tempera-
ture of the air stream reaching an occu-
pant are out of balance with the amount
of bodily heat that the occupant of the
space needs to get rid of.

People are reasonably comfortable
within a fairly wide air temperature
range. For that matter, no comfort air
conditioning system maintains tempera-
ture and relative humidity within too
close limits. The usual range might be
about plus or minus 2 degrees. Adequate
mixing of supply and room air is a must.

Until problems should not occur ex-
cept where there are difficult air dis-
tribution situations, high radiant energy
loads, or wide and rapid load swings.

From a practical standpoint, what this
should mean to architects and their con-
sulting mechanical engineers is that
reasonable limits should be set on archi-
tectural elements which tend to in-
crease

BASIC TYPES OF
AIR CONDITIONING SYSTEMS

Unitary: room-by-room. The sim-
ples system. Has its own refriger-
ation. Heating can be hot water or
electric (resistance of heat pump).
Opening may be needed for con-
denser cooling and ventilation.

Unitary: packaged central system.
As with room conditioners, these
systems have their own refrigeration
and air mover. The package may be
adjacent to the space or remotely,
serving one or several zones.

Central-station air system. This sys-
tem comprises cooling and heating
coils, filters and fan, all at one lo-
tion. Cooling and heating energy
are provided separately.
BASIC TYPES OF
REFRIGERATION SYSTEMS

All common types of refrigeration systems produce cooling by the evaporation of a refrigerant. The liquid refrigerant in changing state to a vapor absorbs heat. In order for the vapor to be reconverted to a liquid state, it first must be compressed to a higher-pressure, high-temperature vapor. Then as it is cooled in the condenser by a medium such as water or air, the refrigerant once again becomes liquid, and the cycle is repeated all over again.

Mechanical refrigeration. A mechanically-driven compressor (motor, engine or turbine) produces a high pressure, high-temperature vapor. The condenser turns it to a high-pressure, medium-temperature liquid. The refrigerant leaves the pressure-reducing valve as a low-pressure, low-temperature vapor. In the evaporator the refrigerant is evaporated by absorption of heat from the air or water being cooled.

Absorption refrigeration. Here, the refrigerant is water. The water vaporizes in the evaporator and as it evaporates, absorbs heat. The vapor is attracted to the absorber by an absorbent, usually lithium bromide solution. The generator removes water from the absorbent.

In general, the demands placed on air conditioning as a system are much more difficult to meet than those of other building and environmental systems.

A structure, for example, is designed to known, or at least assumed, loading conditions. The problems in this area are more or less, developing and refining structural theory for new structural concepts and the determination of realistic loading conditions, especially in the areas of wind, temperature effects and vibration. By and large in acoustics, the "gray" areas are in the determination of subjective reactions to the annoyance of noise or the pleasure of music. And again, in lighting, the main problems are subjective ones—finding what types of luminous environments people find comfortable, relaxing or stimulating for spaces used either for work or recreation.

Perhaps the most difficult aspect of air conditioning is that it rarely operates under constant occupancies and design conditions. To make matters even more complicated is the fact that the air conditioning system consists of so many different sub-components. Thus although these components can be chosen with sufficient capacities to meet whatever demands are placed on them, it is difficult, if not impossible, at the present time to optimize completely the sizing of sub-components or the operation of these components in the total system. Some steps are being made, however, in the direction of optimizing sub-systems such as refrigeration plants the operation via computer control. For in the future is the possibility of theputer optimizing the operation of all systems of air conditioning. Since many of the sub-components, cost load operating data are either not available from manufacturers or are known, the computer could be set to monitor the performance of systems sub-systems and sub-components then write its own program for optimal system operation. This approach is known in the computer field as "active" programming.

To some extent, the architect must expect too much of modern-day technologies, particularly as applied to control of the thermal environment. Sometimes the fact that something can be done, is a relief, but it is given to over-all economics. Making a situation more difficult is the fact that sometimes the fact that something can be done, but it is done, without due consideration to cost, even if it is given to over-all economics. Making a situation more difficult is the fact that something can be done, but it is done, without due consideration to cost, even if it is given to over-all economics. In air conditioning, for example, achieving a comfortable environment is relatively simple. The problems in this area are more or less, developing and refining structural theory for new structural concepts and the determination of realistic loading conditions, especially in the areas of wind, temperature effects and vibration. By and large in acoustics, the "gray" areas are in the determination of subjective reactions to the annoyance of noise or the pleasure of music. And again, in lighting, the main problems are subjective ones—finding what types of luminous environments people find comfortable, relaxing or stimulating for spaces used either for work or recreation.

Perhaps the most difficult aspect of air conditioning is that it rarely operates under constant occupancies and design conditions. To make matters even more complicated is the fact that the air conditioning system consists of so many different sub-components. Thus although these components can be chosen with sufficient capacities to meet whatever demands are placed on them, it is difficult, if not impossible, at the present time to optimize completely the sizing of sub-components or the operation of these components in the total system. Some steps are being made, however, in the direction of optimizing sub-systems such as refrigeration plants the operation via computer control. For in the future is the possibility of theputer optimizing the operation of all systems of air conditioning. Since many of the sub-components, cost load operating data are either not available from manufacturers or are known, the computer could be set to monitor the performance of systems sub-systems and sub-components then write its own program for optimal system operation. This approach is known in the computer field as "active" programming.

To some extent, the architect must expect too much of modern-day technologies, particularly as applied to control of the thermal environment. Sometimes the fact that something can be done, but it is done, without due consideration to cost, even if it is given to over-all economics. Making a situation more difficult is the fact that sometimes the fact that something can be done, but it is done, without due consideration to cost, even if it is given to over-all economics. In air conditioning, for example, achieving a comfortable environment is relatively simple. The problems in this area are more or less, developing and refining structural theory for new structural concepts and the determination of realistic loading conditions, especially in the areas of wind, temperature effects and vibration. By and large in acoustics, the "gray" areas are in the determination of subjective reactions to the annoyance of noise or the pleasure of music. And again, in lighting, the main problems are subjective ones—finding what types of luminous environments people find comfortable, relaxing or stimulating for spaces used either for work or recreation.

Perhaps the most difficult aspect of air conditioning is that it rarely operates under constant occupancies and design conditions. To make matters even more complicated is the fact that the air conditioning system consists of so many different sub-components. Thus although these components can be chosen with sufficient capacities to meet whatever demands are placed on them, it is difficult, if not impossible, at the present time to optimize completely the sizing of sub-components or the operation of these components in the total system. Some steps are being made, however, in the direction of optimizing sub-systems such as refrigeration plants the operation via computer control. For in the future is the possibility of theputer optimizing the operation of all systems of air conditioning. Since many of the sub-components, cost load operating data are either not available from manufacturers or are known, the computer could be set to monitor the performance of systems sub-systems and sub-components then write its own program for optimal system operation. This approach is known in the computer field as "active" programming.

To some extent, the architect must expect too much of modern-day technologies, particularly as applied to control of the thermal environment. Sometimes the fact that something can be done, but it is done, without due consideration to cost, even if it is given to over-all economics. Making a situation more difficult is the fact that sometimes the fact that something can be done, but it is done, without due consideration to cost, even if it is given to over-all economics. In air conditioning, for example, achieving a comfortable environment is relatively simple. The problems in this area are more or less, developing and refining structural theory for new structural concepts and the determination of realistic loading conditions, especially in the areas of wind, temperature effects and vibration. By and large in acoustics, the "gray" areas are in the determination of subjective reactions to the annoyance of noise or the pleasure of music. And again, in lighting, the main problems are subjective ones—finding what types of luminous environments people find comfortable, relaxing or stimulating for spaces used either for work or recreation.

Perhaps the most difficult aspect of air conditioning is that it rarely operates under constant occupancies and design conditions. To make matters even more complicated is the fact that the air conditioning system consists of so many different sub-components. Thus although these components can be chosen with sufficient capacities to meet whatever demands are placed on them, it is difficult, if not impossible, at the present time to optimize completely the sizing of sub-components or the operation of these components in the total system. Some steps are being made, however, in the direction of optimizing sub-systems such as refrigeration plants the operation via computer control. For in the future is the possibility of theputer optimizing the operation of all systems of air conditioning. Since many of the sub-components, cost load operating data are either not available from manufacturers or are known, the computer could be set to monitor the performance of systems sub-systems and sub-components then write its own program for optimal system operation. This approach is known in the computer field as "active" programming.

To some extent, the architect must expect too much of modern-day technologies, particularly as applied to control of the thermal environment. Sometimes the fact that something can be done, but it is done, without due consideration to cost, even if it is given to over-all economics. Making a situation more difficult is the fact that sometimes the fact that something can be done, but it is done, without due consideration to cost, even if it is given to over-all economics. In air conditioning, for example, achieving a comfortable environment is relatively simple. The problems in this area are more or less, developing and refining structural theory for new structural concepts and the determination of realistic loading conditions, especially in the areas of wind, temperature effects and vibration. By and large in acoustics, the "gray" areas are in the determination of subjective reactions to the annoyance of noise or the pleasure of music. And again, in lighting, the main problems are subjective ones—finding what types of luminous environments people find comfortable, relaxing or stimulating for spaces used either for work or recreation.

Perhaps the most difficult aspect of air conditioning is that it rarely operates under constant occupancies and design conditions. To make matters even more complicated is the fact that the air conditioning system consists of so many different sub-components. Thus although these components can be chosen with sufficient capacities to meet whatever demands are placed on them, it is difficult, if not impossible, at the present time to optimize completely the sizing of sub-components or the operation of these components in the total system. Some steps are being made, however, in the direction of optimizing sub-systems such as refrigeration plants the operation via computer control. For in the future is the possibility of theputer optimizing the operation of all systems of air conditioning. Since many of the sub-components, cost load operating data are either not available from manufacturers or are known, the computer could be set to monitor the performance of systems sub-systems and sub-components then write its own program for optimal system operation. This approach is known in the computer field as "active" programming.

To some extent, the architect must expect too much of modern-day technologies, particularly as applied to control of the thermal environment. Sometimes the fact that something can be done, but it is done, without due consideration to cost, even if it is given to over-all economics. Making a situation more difficult is the fact that sometimes the fact that something can be done, but it is done, without due consideration to cost, even if it is given to over-all economics. In air conditioning, for example, achieving a comfortable environment is relatively simple. The problems in this area are more or less, developing and refining structural theory for new structural concepts and the determination of realistic loading conditions, especially in the areas of wind, temperature effects and vibration. By and large in acoustics, the "gray" areas are in the determination of subjective reactions to the annoyance of noise or the pleasure of music. And again, in lighting, the main problems are subjective ones—finding what types of luminous environments people find comfortable, relaxing or stimulating for spaces used either for work or recreation.
can be a problem during intermediate season operation, particularly some central systems.) This switching capability can be provided with a number of systems, but with some it can cause havoc with operating economy because of the necessary mixing of hot and cold fluids and the requirement of intermittent availability of heating and cooling flow from the energy plant.

Obviously, certain building types as laboratories and auditoriums require an “instant” type of response to changing conditions. But, surprisingly, though the newer auditoriums be-designed have sufficient capacity to handle the surge of cooling load, it is not unusual to find their air conditioning systems unsatisfactory because of wide variation in temperature, resulting in drafts from too little cooling at one time, or drafts at another.

With other building types, however, high wide load variations are not important; the architect can in many cases determine the extent of load variations at some design details. But this is particularly true in the matter of solar gains on east, west and south façades. There are large areas of glass on the south, it is easily possible to have a high temperature in winter than in summer because the sun’s rays are more perpendicular to the glass. In addition, there is moisture in the air on cold winter nights which greatly increases the available solar energy. This fact, frequently overlooked, has resulted in some overheated perimeter office spaces in the beginning of winter.

But what makes system design and operation most difficult are the wide variations in temperature demands of perimeter spaces with exteriors principally of shaded glass. (In general, heat absorbing glasses, alone, can reduce solar heat gain from, say, 30 to 50 per cent. White drapes increase these values to, say, 60 and 65 per cent, respectively. Reflective insulating-type windows can have solar heat rejection of 70 per cent.)

As can be seen from the graph on the first spread of this article, on a late November day, the heating load due to sun in a perimeter office with 75 per cent glass (heat-absorbing) is four times that lost by conduction to the outside. If the sun were suddenly hidden by clouds, the load would almost instantly plunge from 107 Btu/hr/sq ft of heat gain to 13 Btu/hr/sq ft of heat loss. While this example might seem to be an extreme case, it nonetheless can, and has, happened. Such a tremendous fluctuation is difficult for many systems to match in terms of continuity of comfort.

If internal shading had not been provided for in a situation such as this, it almost surely would have to be added later. Perhaps because of past difficulties, but also because of esthetic preferences, architects seem to be using darker heat absorbing glasses, and are beginning to use more reflective glasses. The dark glass ties in with a dark surround, the reflective glass with a light surround. Architects should realize that drapes should be light in color and of close weave to be effective. The architect and engineer should have a clear-cut understanding as to the exact selection.

Perimeter temperature control can be difficult in spring and fall

It is obvious from the foregoing discussion that the perimeter spaces of most buildings (except windowless, heavily-insulated exteriors) have a number fluctuating heating and cooling loads imposed on them, such that the perimeter

Single-duct variable air volume. This system provides temperature control by varying the volume of supply air through prescribed limits (avoiding drafts on the high side, stagnation on the low). The system may include reheat using either hot water, or warm return air from lights as the sources.

Multi-zone system. With this approach, mixing dampers are provided at the central fan-coil apparatus. The dampers mix the air in response to the demands of thermostats in various zones. While the multi-zone system is not new, it has most recently been applied to roof-top package equipment.

FOUR METHODS OF SPACE TEMPERATURE CONTROL
## A Glossary of Heating and Air Conditioning Terms

**Air Conditioning**—A process of treating air within an enclosed space so as to control simultaneously its temperature, humidity, cleanliness and distribution. (Comfort air conditioning provides for occupant comfort in a space in which adequate shielding from outdoor weather and solar effects and indoor lighting and equipment radiation is provided—to the extent the system does not have the capability to counteract them.)

**Air-Conditioning System**—In its most elementary form it can be a single-package refrigeration system including a forced-convection air-flow system with air blowing over the evaporator and directly into the space. A central system will use ductwork and may use a secondary fluid (chilled water) instead of a direct refrigerant.

**Air Entrainment**—The induced flow of room air created by the primary air stream from an outlet, the combination of which results in an ever-increasing mixed air-flow stream of increasing cross-section and lower velocity.

**Air Outlet**—Any opening through which air is delivered to a space to provide heating, cooling, humidification, dehumidification or ventilation.

**Air-And-Water System**—System in which two cooling mediums, air and water, are distributed to the terminal units.

**All-Air System**—System in which air is the sole cooling (heating) medium to the terminal units.

**Central Plant**—The complete assemblage of inter-connected equipment and auxiliary systems which function to produce or transform energy for the purpose of distribution and use outside the plant.

**Central Plant (Building)**—Plant which serves a single building.

**Central Plant (Building Zone)**—Plant which serves a single zone of a building.

**Central Plant (District)**—A plant which serves a group of remote buildings through an outside energy distribution system.

**Central Packaged Energy Producing Unit**—A matched assembly of major equipment and controls—either completely or partly factory assembled prior to field installation—with supervised installation and start-up available from the manufacturer. The unit may either constitute a central plant in itself or require interconnection with auxiliary equipment and systems furnished and specified by someone other than the manufacturer.

**Change-Over Point**—The outside temperature at which maximum use of outside air quantity in the system can handle the entire cooling requirements of the zone with zone refrigeration shut off. [This can vary for a particular building at different times of the year due to large variations in solar radiation—particularly with change of season, e.g., it can be much lower in fall and winter for south exposures.]

**Fan-Coil Unit (Room Or Central System)**—An air-handling unit containing a filter, air heating and/or cooling coils and a high- or low-pressure blower driven by a motor.

**Heat Pump**—A refrigeration system in which flow to the evaporator and the condenser may be reversed, thus allowing air or water passing through the evaporator (which normally cools) to be either cooled or heated.

**Internal Induction**—The inducing of room air through a circulation opening in a terminal unit caused by passing primary air through a nozzle(s), and the discharge of the mixture from the unit.

**Nozzle**—A flow control device used to increase the velocity of a stream of water or air.

**Primary Air**—The ventilation air or conditioned air supplied directly to a type terminal air unit, terminal air-handling unit or terminal outlet unit.

**Reheat**—Heat added to the cold primary air supply to a zone in order to maintain temperature control.

**Refrigeration System**—A closed-flow system in which a refrigerant is compressed, condensed and expanded to produce cooling at a lower temperature level and rejection of heat at a higher temperature level.

**Refrigerant**—A compressible vapor which abstracts heat in going from liquid to vapor (evaporation) and gives up heat in going from vapor to liquid (condensation).

**Refrigerant Condenser**—A heat-exchange device in which refrigerant vapor is liquified (condensed) by the removal of heat.

**Refrigerant Evaporator**—A heat-exchange device in which refrigerant liquid is vaporized (evaporated) by the absorption of heat.

**Secondary Energy**—Energy which cannot be used directly to produce shaft work but which can be used for useful process purposes. Examples:
- a. hot water for heating or process
- b. chilled water
- c. hot gases in a furnace
- d. low-pressure steam used for heating

**Terminal Unit (Room Or Zone)**—Final thermostatically controlled cooling and/or heating air-distribution unit served by a central all-air, air and water or all-water cooling plant.

**Terminal Attenuator Unit**—An acoustically lined box within which primary air is reduced to low pressure [single duct or mixing type].

**Terminal Air Induction Attenuator Unit (All Air, Air & Water)**—An internal induction terminal attenuator unit [normally single duct] which induces air from the space and mixes it with the primary air. In air-water system units, the units are room units only, and the room air drawn over the coil [protected by a lint screen] is large compared to the amount of primary air (e.g., 5:1).

**Unitary Heating Or Air-Conditioning Equipment**—Completely self-contained packaged equipment with secondary energy generating plant within the unit; also includes the additional packaged equipment provision for delivery of the energy so generated. The unit may be supplied with gas, oil and/or electric power with provisions for direct supply of heated or cooled air to a space or spaces on a single or multi-zone basis. Example: unit could include a direct fired heater (oil, gas, electric).

**Zone**—The largest single space or group of spaces served by a system, the temperature and/or humidity control for which is accomplished by single set of controls such that conditions within the spaces do not vary outside of accepted limits.
conditioning system must be capable of owning changes. In addition, in buildings, it is the perimeter offices of the most likely to be provided with dual control to suit individual preference. Not only are there changing but it is more likely for the perimeter especially in office buildings to have heating population loads — say, when reference is held in a private office. Of course the amount of lighting in building will determine just how significant changes in population will be. For instance, people must lose about 0.5 Btu per hour, which if you assume one person per 100 square feet will yield 4.5-5 Btu/hr/sq ft. If you assume medium-intensity lighting level requiring 60 watts per square foot, this gives Btu/hr/sq ft — nearly three times as much as people heat.

The interior zones of buildings have a nearly constant load — in most cases the days, cooling year-round. If interior spaces have to be divided up into office spaces, or if there is general office space, individual control can be provided out difficulty. Two recent techniques accomplishing this are variable air terminals and cellular ceiling manufacturers. The difficulty of intermediate season control of perimeter zones has led to manufacturer development and engineer of such systems as dual-duct air systems and 3- or 4-pipe water distribution system. Dual-duct air systems provide instant availability of either heating or cooling effects. And where a degree of individual control is desired for interior spaces, variable air volume systems are being increasingly played. The reason for this is that with outlets operating within prescribed time so as to avoid, on the one hand, drafts, and, on the other hand, stratification and stagnation of air, the system need only supply just enough cooling effect to satisfy load conditions. A constant-volume dual-duct system, however, must mix hot air of varying temperature with cold air to vary air temperature in accordance with the load. A three-pipe water system has hot and cold water supply lines and a common return. The reason, obviously, is to avoid having to provide returns for both hot and cold water. The economics of operation of a three-pipe system are difficult to predict, however. It is apparent that if one side of a building requires predominantly cooling, while another side requires heating, the mixing of hot and cold water is bound to be inefficient.

Even though the systems mentioned for perimeter-zones are being used more and more, it would behoove the architect not to overtax the system with excessive load variations. In addition, there are always “hidden” or unanticipated aspects of system-building interaction that frequently are not discovered until the building and system go through a “shake-down” period. Unfortunately it is true, and probably always will be to some extent, that much of the guideline information on building-system interrelationships must be obtained empirically. With non-standardized buildings, the client, to a certain extent, will have to expect, at the minimum, that the system will have to go through a period of adjustment. And if the building design presents the consulting mechanical engineer with a “brand new” and highly demanding situation, it is indeed possible that the system may not be perfect the first time around.

An example of an unanticipated condition arising out of a new design application is the multi-functional steel deck. Corrugated formwork spanning between wire-ways supported by stub posts set in the structural slab forms an open space for distributing air. For the interior, supply is through the lighting fixture; at the perimeter air is emitted up in front of the glass. Consolidated Gas Building, Detroit, associated architects and engineers: Minoru Yamasaki and Hinchman & Grylls.

THE FLOOR-CEILING SANDWICH DISTRIBUTES HEATING-COOLING

Cellular steel floor with integral ducts. Some of the cells have been slightly enlarged from those normally used with this standard manufactured material to provide sufficient space for air distribution. Cellular flooring manufacturers have also offered dual-duct mixing boxes compatible with the floor system.

Panel heating-cooling. Available as a manufactured item is a panel heating-cooling system having water tubes integral with the panels. The panels may be perforated to allow sound absorption by blanket insulation behind them. Another system incorporates the water tubes with lighting fixtures to remove lighting heat which can be recovered for use as reheat, or for elevation to a higher temperature by heat pump.

Multi-functional steel deck. This manufactured system of large-size cells provides self-contained ducts for air distribution, recessed space for lighting fixtures and perforated pans to be used with sound-absorbing batts.
INTEGRATED CEILINGS: NEW AIR DISTRIBUTION TECHNIQUES

All-panel system. Large-size acoustical panels form recessed troughs for lighting fixtures as well as flat ceiling area. Linear diffuser is designed to work with ceiling.

Lighting baffles as ducts. Deep baffles of this integrated system are available in the form of air-conditioning ducts. Another type of baffle is designed to receive partitions.

Ventilating ceiling. Perforated acoustical tile admits air to the room from a pressurized ceiling plenum. Ceiling also can be triangulated to receive lighting.


Dual-function linear diffuser (right). The first linear diffuser to be used also as a ceiling track to receive partitions was developed for use in the Union Carbide Building. Architects: Skidmore, Owings & Merrill; consulting mechanical and electrical engineers: Syska & Hennessy.
Architects and engineers are willing to develop custom, on-line units, with custom enclosures and conditioning elements. This means that the particular thickness (possibilities are good for windows deeply recessed) will mean a premium cost over a standard unit, a much longer lead time between placing the order and delivery; and the possibility that the unit will not have N.E.M.A. certification. Architects will find most manufacturers willing to provide assistance on styling possibilities. Also, some manufacturers can provide test units for prototype units once cooling units have been established and mock-ups made. Some manufacturers are also willing to become involved in the development of system components—more true for in-space devices (room units and concealed above-ceiling units) and air supply diffusers and ducts than in basic refrigeration equipment. In the latter area there is a trend toward more and more standardization of pre-engineered packages. There are several reasons for this, some of them obvious, but these will be discussed later.

The manufacturer reasonably expects that when he becomes involved in component development, his research and design expenditures will be written up in new product sales. One suggestion by a manufacturer is that management must expect a return of several times staff salary to warrant their undertaking a research and development project. Manufacturers report that architects becoming increasingly involved with elements that affect engineering design of system components and systems themselves. While this interest generally lies in areas affecting appearance, or the physical coordination of air distribution elements with the structure, it may extend to interest in developments such as industrialized building, which involves some understanding of the potentialities as well as the limitations of large-size, pre-engineered packaged systems. Special designs required by architects may range all the way from new component development and testing to meet specified performance requirements, to the much less demanding job of architectural detailing of air supply outlets—one architect may like perforated diffuser outlets, another architect slotted. Architects have also asked manufacturers to make multi-functional diffuser devices after their own designs; for example, combine the diffuser with a drapery track.

It is incumbent upon the manufacturer to do the research mentioned above. The consulting mechanical engineer, generally speaking, has no research facilities. Besides, his usual fees do not include money for research. Before embarking on a new-component development, the architect should make sure that the client understands the nature of the involvement—what sort of research needs to be done, by whom, and for how much, and the benefits to be derived from the development work. This is particularly important in the case of the unsophisticated client who has no foreknowledge of the respective responsibilities and areas of expertise of architect, consulting mechanical engineer, and manufacturer. If, for example, the manufacturer cannot be sure that the developed component will ever be used again, then these costs cannot be written off against the prospects of future business. At least, perhaps, the testing

---

**BASIC STRUCTURE FOR AIR CONDUITS**

Exterior columns as air conduits. In the new administration building at Princeton University, air supply to perimeter induction units is sent to ducts in corner columns from supply in the center core. From the corner ducts air goes to laterals behind the low-height spandrel, and contained within the induction units. Interior area is supplied directly from the core. Architect: Edward Larrabee Barnes; consulting mechanical and electrical engineers: Meyer Strong & Jones.

Roof structure as air conduits. Corrugated-shaped concrete roof structure of a new library at Princeton's Institute for Advanced Studies is designed both to carry supply air and to admit it into the room. Lighting is by natural light during the day and by fluorescent lamps concealed by lip near air outlet. Architect: Harrison & Abramovitz; consulting mechanical and electrical engineers: Meyer, Strong & Jones.
program will have to be underwritten by the client. The situation gets especially sticky when a manufacturer is asked to participate in component development, involving his personnel's time and research facilities, and then bidding is opened to all and sundry. He has less to complain about, of course, if he is paid for his development work. But he rightly feels he is being unfairly treated if he loses the bid, and is expected to absorb his development charges as part of the course of doing business—that is, with the expectation that the next job might be in his turn. Surprisingly, some clients may balk at the prospect of reimbursing a manufacturer for several thousand dollars in development charges, even though the building is costing millions. The manufacturer is hesitant to include this in his bid figure because he may, in fact, not get the job. While such jockeying is not uncommon, it would seem to be an unhealthy practice, making everybody's costs in the air conditioning field just a little higher.

Clients are looking for economies in both initial and operating costs

Demands from owners require much more than heretofore in the way of relative economic evaluations of various overall building system combinations. This is particularly true when the client is a non-profit organization such as a university or a government agency, since these organizations many times have less trouble getting initial appropriations than they do getting operating funds. A corporation, operating for profit, can, on the other hand charge off a large part of its operating and depreciation charges against taxes.

But even profit-making organizations are demanding more in the way of evaluation of alternate systems. One reason for this, no doubt, is the growth of cost-effectiveness techniques such as “value engineering,” but systems cost evaluation, the use of construction and cost consultants, and the like. Part of this picture, too, is the growing strength of finance, control and accounting functions of management. Management groups concentrate quantified, rather than judgmental, decisions based principally on experience. The same time there appears to be a weakening, generally, of owner engineering influence, except in the institutional area, with greater influence accorded administrative, cost accounting and purchasing staff groups. This means that the client many times is less knowledgeable technically, placing more demands on the building consultants and the manufacturer to “prove out” a system.

One manifestation of this trend is the development of computer programs quickly perform building load calculations, to “print-out” required air quantities, and, to some extent, make economic comparisons of operating costs. A number of specialist consultants are emerging in the areas of energy utilization such as energy conservation, all-electric buildings, total energy, pumps, and the like.

Still another manifestation of new management approach is the trend toward more “systems” purchasing a greater centralization of manufacturer responsibility for system performance. The latter has resulted in a trend toward broad-scope performance specifications rather than descriptive specifications for components and systems. If one manufacturer is providing the whole air conditioning system, or most of it, he may be willing to accept overall responsibility.
Heat recovery wheel. This device transfers heat from return air being exhausted to the outside, and thus normally lost, to ventilation air brought in from outdoors. One type of heat recovery wheel incorporates aluminum mesh as the heat-transfer medium. As the wheel revolves slowly, outdoor air is entered.

DEVICES AND SYSTEMS

Heat recovery via condenser water. Two similar approaches have been offered recently with unitary equipment to cope with the problems of control and operating economy when one side of a building may call for heating and the other side cooling. This could occur in buildings having large areas of glass, during intermediate seasons and occasionally in the winter. These two approaches both utilize heat rejected by refrigeration condensers in rooms requiring cooling. In one system, condenser water is circulated from a heat pump which is cooling to a heat pump which is heating. In the other system, heat rejected from an air conditioning unit condenser is circulated to a coil set in the supply air stream of another air conditioner.

Reheat by heat from light. Instead of lighting heat being dumped into the room, it can be exhausted through fixtures into a plenum. Then, if the air distribution system can usefully employ the reheat technique for temperature control, this can be accomplished by an induction box in the ceiling which pulls in heated plenum air to temper supply air.
**GROWING SOPHISTICATION IN COMPUTER CONTROL**

Computer in the new building for the International Monetary Fund in Washington, D.C. is designed to optimize the operation of the refrigeration plant. It will establish when and how long refrigeration apparatus is to run based on outdoor conditions, building loads, time of day, etc. The centralized control system also changes control setpoints throughout the building. The computer is shown above, at right.

Spond to fluctuating loads, but at the same time offer greater operating economies. An example is the variable-air-volume (VAV) terminal. A regulator device opens and closes in response to room temperature demands, varying the air volume within a prescribed range. There has to be sufficient air to prevent stratification, but not such quantity as to produce drafts. These devices rely on a high rate of air entrainment of room air to maintain an adequate circulation of mixed air—in fact, this had been one of the limiting factors on these devices in the past.

Single-duct all-air VAV systems are used primarily for interior zones, and for exterior zones only when there are not wide swings in load due to sun or transmission loss and gain through the wall.

One of the main advantages of the single-duct all-air variable-volume approach is, of course, that temperature control is achieved by varying the volume of the air supply rather than by mixing hot and cold air streams or by reheating the cold air stream. A well designed dual-duct system, however, could have very low energy losses because mixing would be minimized.

The VAV approach can be applied to exterior zones, also, by using reheat either by means of a water coil or by having both hot and cold air supply available. The latter implies either a dual-duct system or reheat by means of induced room air or ceiling plenum air when waste heat is reclaimed from lighting fixtures. Recovery of this lighting-fixture heat provides reheat at minimal cost. (The cold, high-velocity air stream "jetting" through an induction box sucks in warm exhaust air—generally 85°F, maximum—in the ceiling plenum to give the required supply temperature.)

The principal advantage of the reheat system is that it cuts down size of the central fan system, the operation system and some of the work by taking advantage of design factors. The reason is that peak demand will occur only in one perimeter zone at a time. For the interior, recovery of lighting heat, combined with the volume control concept can provide individual space temperature control over a wide range of load variations.

The problem of space for conduct systems has led to the use of high velocities and system pressures combined with the use of colder supply air. Supply air is transmitted at higher velocities and pressures, special flow regulating devices and sound absorbers are required to prevent noise problems.

Minimum duct size is particularly important with peripheral air distribution, for vertical risers, and, sometimes, for horizontal runouts of all-air systems.

High-pressure systems allow greater centralization of air-handling equipment which is important when shaft space is limited.

While a high-velocity system takes less space, it also requires more expensive fans, sound-attenuating treatment, and air-control devices, and also requires more fan horsepower than a low-velocity system. High-velocity systems also are more difficult to analyze, involving design, system balancing, and sound absorbers within the system, at the fan, and at terminal units.

Innumerable high-velocity system combinations are possible—high velocity plus low velocity; high velocity primary air or ventilation air plus water coil. Any of these can be combined with heat or booster cooling.

High velocity systems are used mo...
terior zones than interior zones for reasons. First, there is generally a far limitation on shaft space for ducts at the building perimeter. Second, the cooling load for the peripheral zones is not only highly variable, but the cooling load can be two to three times that of the interior zone. With central systems the perimeter must be zoned for exposure to accommodate mainly differences in solar and somewhat less for convection due to wind. More and more frequently, architects are finding that one side of a building may call for heat, while the other side calls for cooling. The system should be capable of varying air supply temperature for air- and water systems, and of water supply temperatures for air- and water systems. It is a minimum requirement for air systems.

Intermediate between room-by-room and complete central systems are the central unitary air-conditioning plants. Many more of these systems are being used today, and applications are growing as manufacturers improve them and add to their sophistication. Most types of air distribution and terminal units can be used with central unitary systems, except those that require a fairly high minimum pressure (e.g. air and water induction unit which induces a high ratio of room to primary air across a coil protected by a lint screen).

A limitation of these systems is that the engineer has more restrictions in matching equipment selection to building requirements. The reason is that there is, necessarily, a greater degree of standardization of equipment sizing, cooling capacity, control capability and fan pressure capability. Also the engineer is obliged to make a careful evaluation of packaged systems and pre-selected controls designed by the manufacturer. This is balanced to a large extent by the greater manufacturer involvement in application engineering and back-up of system performance.

**Good air conditioning counteracts air pollution**

While air conditioning is concerned first with environmental comfort, a no less important consideration is the quality of air in the indoor environment. The harmful pollutants in the atmosphere can be removed by air conditioning systems to the extent that they are usually unnoticeable, except sometimes in the case of severe odor problems. This is so even when special filtering provisions have not been made. Naturally, higher-performance central air systems with high-perform-

**Functions of the control center**

1. To indicate whether equipment is on or off, or is operating within limits.
2. To control. On-off or positioning switches to activate system elements and change set points.
3. To record. Recording devices such as charts, automatic type-writers or digital tapes.
4. To alarm. Abnormal conditions are signalled by audible alarms and annunciator lights.
5. To communicate. Audio and sometimes visual equipment (closed-circuit TV) allow monitoring remote equipment.
6. To display. Graphic presentations of air-conditioning sub-systems are shown to indicate various system check points.

**Functions of the computer**

In relation to the control center for more complete automation of air conditioning systems is illustrated in this simplified sketch. At the present time their use has been limited to large systems in a few installations for an office building complex, a university, a hospital complex and for the NASA Manned Spacecraft Center.
Initial, and does not require pre-treatment. Medical evidence has been slowly accumulating on the need for more complete removal of certain harmful particulate, gaseous and vaporous pollutants. A reasonable objective is to set limits on allowable concentrations. The best clues as to the magnitude of the air pollution problem in a particular general area could be obtained from air sampling stations established by various public agencies.

Naturally, industrial "clean room" type of filtering is a very special technique and is not needed in commercial and institutional practice. However, as a result of studies and tests by the U. S. Public Health Service and other environmental specialists, realistic high-performance design criteria and definitive standards have been set for hospital air-conditioning systems. These pertain particularly to quality of air filtration and recirculation or air. Today's filter performance standards rest on a surer base due to the demands of specialized facilities.

Generally speaking, the problem of shielding building occupants from the adverse effects of atmospheric air pollution involves the following:

1. Optimum placement of outside air intakes to obtain the cleanest possible air and to avoid recirculation from building air discharges.
2. The highest quality air filtering system economically feasible with adequate provisions for maintenance.
3. Additional provisions for removing gases, vapors and odors where these may be excessively high.
4. Additional provisions to allow maximum recirculation of space air and minimum outside ventilation air. When maximum outside ventilation air is essential, and does not require pre-treatment, then provisions should possibly be made for recovery of the energy in the discharge air to reduce refrigeration or heating load.

Centralized control is a feature that many clients expect One of the more glamorous, albeit potentially useful developments, is automated control of energy plants and systems and the related control of heating and cooling effects. New approaches to control centralization, coupled with the computer, promise higher efficiencies, improved performance and lower operating costs. In another area—design of mechanical systems—engineers see the day when at least much of the "dog work" can be turned over to the computer. Conceptualization must remain in the mind of the engineer working in concert with the architect.

Right now business management and institutional administrators very much want to get exposure with these new offsprings of "space-age" technology, sometimes being mainly interested in having one. So, as control manufacturers will tell you, perhaps too many functions were monitored in early control centers; the control center told operators more than they really needed to know. In any event, the more complicated and larger energy plants and air-conditioning systems are bound to require advanced control techniques for their operation to help optimize operation and cope with the problem of operating and maintenance personnel.

Practical advantages and future potential of centralized control First attempts to simplify operation and surveillance of increasingly complex systems used central control panels for each system or group of systems in a given machine room. The next step, oh boy, was to combine these control panels into one assembly with each machine grouping forming a segment of the building or building complex control center. With simpler systems the various gizmos could be displayed pictorially on panels, but with more complex systems it made sense to provide a scanning service for viewing on a selective basis. Each control center makes it possible for experienced operator to enlarge his capacity of supervision—an important consideration today.

A real benefit of centralized control is rarely mentioned is its use in troubleshooting the system during the "shakedown" period. Proper use of the computer in system operation will require that the engineer have a more detailed technical knowledge of all elements of the system and each mode of operation. Although the computer could be used to optimize system operation after the fact, it would seem more logical to employ the computer in optimizing equipment and component selection at the start.

Presently, the computer is becoming more important in load calculations, evaluation of seasonal energy consumption mainly in connection with computing fuel costs, particularly for total and all-electric approaches.

Use of the computer with the automated control center utilizes memory storage of equipment performance data and system response under actual operating conditions. Because of the greatly increased cost now of such a control center and current difficulties in programming, its use is currently limited to large installations and to a relatively small number of functions.

Part two of this article will cover: 1) the trend toward larger pre-engineered packages and systems, 2) education and training of architects and engineers with respect to air conditioning, 3) performance criteria and systems development.

This article has been prepared in collaboration with F. J. Walsh, consulting engineer.
Is elevated flooring too costly for general construction?

No! Says Architect Charles H. Harper, who used nearly three acres of it in this giant complex for Globe-Union Inc.

If you think of elevated flooring as a specialty item reserved for computer rooms, take a tip from Charles H. Harper, the Milwaukee architect who designed this 3-building research and administrative center for Globe-Union Inc. His plan called for 120,000 square feet of Weber elevated flooring, which Harper says netted out at about $1 per square foot. (That's for finished flooring, about half of which was carpeted.)

But cost was only one of Harper's problems. Time was precious. He had only 10 months to design and build the entire complex, and Weber elevated flooring gave him the flexibility he needed to meet this tight deadline. Walls and top decking were built first with a slab foundation. All utility lines, including plumbing, electrical, telephone, heating, ventilating and sewage, were installed on top of the slab after completion of the building shell. Installers worked rapidly and accurately under comfortable indoor conditions. Globe-Union gained too in structural flexibility. Offices and laboratories can be rearranged at any time without tearing up expensive flooring to relocate utilities.

Charles Harper proved that elevated flooring is practical for general use and offers many advantages. For complete specifications on Weber flooring and the full story of its use at Globe-Union (as reprinted from ARCHITECTURAL RECORD), write today.

For more data, circle 76 on inquiry card

WEBER
SHOWCASE & FIXTURE COMPANY
A DIVISION OF THE MERCHANDISING EQUIPMENT GROUP OF WALTER KIDDE & COMPANY, INC.
1340 MONROE AVENUE N W GRAND RAPIDS, MICH 49502 PHONE 616 381-7341
NOW FRAMELESS K-15 LIGHTING PANELS


KLITE® K-S-H, INC.
10091 MANCHESTER • ST. LOUIS, MO. 63122
Huge, new State University campus uses 65 miles of Anaconda copper tube for faster installation and dependable service

In LINK COPPER!


located on a 360-acre tract of rolling hills and woodlands, New York's new State University complex is being built with eye toward the future, in more ways than one—minimal maintenance and lasting service.

The early decision of the consulting engineers to specify copper tube for water supply lines and for waste and vent service was based on the many advantages copper offers—faster installation, space savings, time-saving preassembly operations and dependable, trouble-free service.

Making full use of the efficient "prefabrication" techniques possible with lightweight copper tube, mechanics bench-assembled, at the site, multiple units required for each floor. Each unit served two bathrooms and contained hot and cold water supply, waste and vent lines. The few connections required to join these units to the system reduced roughing-in and helped maintain construction schedules.

And looking even farther ahead, Consentini Associates specified copper tube because of its resistance to corrosion, immunity to rust, and its smooth interior for swifter flow and better sanitary conditions. A combination that adds up to minimal maintenance even after long years of service.

In terms of installation savings and long-range economical service, Anaconda copper tube is truly a product of unusual practicality... and far ahead of competitive materials. Next me, plan to use Anaconda copper tube right from the start... to come out ahead on your jobs. For further information, write: Anaconda American Brass Company, Waterbury, Connecticut 06720. In Canada: Anaconda American Brass Ltd., Ontario.

For more data, circle 77 on inquiry card

For more data, circle 78 on inquiry card
Attend the 1967 PCI convention and expo67
Montreal, Canada
October 8-12, 1967
Send for registration information.

Building with precision shapes of PRESTRESSED CONCRETE is quick, efficient and economical

Quick—because prestressed concrete prefabricated structural members are mass produced in the plant while site preparation and foundation work is underway. Delivered on an hour-by-hour schedule, the members are usually erected directly from the truck bed.

Efficient—because plant manufacturing makes it possible to mass produce members to exacting quality requirements. They fit easily into place—almost as simple as building with children’s blocks. And, your client can take advantage of earlier occupancy for more efficient corporate operation.

Economical—in many ways! Original cost, speedy erection, easy integration of service systems, elimination of maintenance, and advantageous fire insurance rates are major factors, which all combine for true economy.

For a beautiful, permanent, quality building in the shortest possible time, design it in prestressed concrete. Ask your local PCI member for complete information.

Send for your free copy of "PRESTRESSED CONCRETE—applications and advantages"

PRESTRESSED CONCRETE INSTITUTE
205 WEST WACKER DRIVE • CHICAGO, ILL. 60606

For more data, circle 79 on inquiry card
**ALL COVERING / Armored Velvet**, a tedge wall covering, is applied in two sic steps. A specially formulated epoxy resive is applied like paint to any sided surface—wall-board, masonry, od, glass, metal, paper or rubber. nute nylon fibers—as many as 300,000 r sq in.—are propelled at a 90-deg. gle by an electrostatic applicator onto e treated surface providing a perma- nt bond. The density can be controlled that finishes may create a felt (short hers), a velvet (medium fibers), or a ush (long fibers) effect. There are no ms or overlaps. Thousands of tiny air aces produce seasonal insulation.

The covering is reported to be fire retardant, waterproof, sound absorbent, heat resistant, and will not mildew or fade. It will not show hand marks, will not crush down and is abrasion-resistant. Vacuuming or brushing will remove surface dust, and stains come clean with soap and water or a cleaning agent.

Twenty-nine colors are available and color combinations and designs are unlimited. Armored Velvet may be applied to one wall for accent or to all walls. In bathrooms it will not discolor or leave drip marks because of steam. *Velvetex Industrial Corp., Detroit.*

Circle 300 on inquiry card

**GARAGE DECK COATING / Daratop** promises to seal parking garage decks against the damaging effects of winter de-icing salts dripping from cars and normal spillage of oil and gasoline. The materials penetrate and seal surface pores of the concrete so that the concrete itself takes the wear of traffic and the Daratop sealer is not disturbed until the concrete wears away. In addition, Daratop is reported to cost only 10 to 15 cents per sq ft.

The system is a two-step application of a base coat that seals the concrete pores, and a gray finish coat that provides added resistance against salts, gasoline, and battery acid. When applied to freshly placed concrete, the base coat acts as a curing agent and eliminates the need for other curing compounds. When applied to existing decks, only a thorough cleaning of the surface is necessary before application. *W. R. Grace & Co., Cambridge, Mass.*

Circle 301 on inquiry card

**AIR CONDITIONING / New lines include circular condensing units for home cooling and a water-cooled condensing unit especially adaptable to apartment house construction. The new units are lighter and are reported to reduce installation cost of central cooling systems in homes by as much as $75 to $150. Estimated installed cost of systems in small homes is reported as low as $600.**

In the cylindrical condensing units, (standard is available in five sizes from 18,000 to 48,000 Btu; deluxe is available in four sizes from 24,000 to 48,000 Btu) top air discharge permits freedom of unit placement by directing sound upward and away from surrounding houses. Cost reduction is due in part to the circular shape which is more economical to produce than a rectangle. The curved coil forms part of the supporting structure and also presents a greater coiled area.

The water-cooled condensing units are compact and quiet and will be concealed indoors, in a closet or even under the kitchen sink. They may typically be applied with water-conserving heat-removal devices such as a cooling tower, spray pond or fountain, or with water drawn from a well, lake or river.

Other new lines feature cooling coils for all types of furnaces, a new line of fan-coil units, and new electric heating coils which can provide all-electric heating and cooling. *Carrier Corporation, Syracuse, N.Y.*

Circle 302 on inquiry card

more products on page 174
LIGHTING FIXTURES / A 4-page brochure shows weathertight ceiling fixtures. Specifications for anodized case aluminum units in two 100-watt and two 60-watt sizes, and for elliptical, tapered and saucer diffusers are included. • McPhilben Lighting, Melville, N.Y.*  

Circle 400 on inquiry card

AIR DRYER / A 4-page bulletin describes six models of non-cycling air dryers. Units have capacities of 0 to 10 scfm at 100 psig and 100 deg F saturated inlet air. • Hankison Corporation, Canonsburg, Pa.  

Circle 401 on inquiry card

MODULE WALL / A 4-page, two-color folder stresses the ease with which movable walls can be erected in offices for more privacy, better noise control and greater office efficiency. Photographs show erection and indicate how the electrical and telephone wiring is recessed into raceways. • Petcor Industries, Muscatine, Iowa.  

Circle 402 on inquiry card

OPERABLE WALL / A 1967 catalog presents 16 pages of photos, diagrams and information on sliding acoustic barriers for meeting rooms, schools, and offices. Advantages of sound control, instant flexibility and low maintenance are explained. • The E. F. Hauserman Company, Cleveland, Ohio.*  

Circle 403 on inquiry card

TILE COLOR / The 1967 edition of color comparison charts for vinyl asbestos and asphalt floor tile has been brought up to date with all the new colors and designs in ½-in. and 3/32-in. gauges. The charts provide comparisons among similar colors offered by various manufacturers. Breakdowns are by patterns, size, color and gauge. • Asphalt and Vinyl Asbestos Tile Institute, New York City.  

Circle 404 on inquiry card

DOORS / "Discover Steelcraft" is a 12-page catalog giving information on fire resistance, thermal factors, decibel ratings, test data and relative costs for the full line of doors. • Steelcraft Manufacturing Company, Cincinnati.*  

Circle 405 on inquiry card

OUTDOOR LIGHTING / A 32-page comprehensive, illustrated guide to functional and decorative outdoor lighting covers the full range of residential landscape lighting topics. There are 90 photographs. • General Electric Co., Cleveland.*  

Circle 406 on inquiry card

EPOXY-TAR PAINT / A six-page technical bulletin entitled "AVIBEST-C Microcrystalline Silicate—Use In Epoxy-Tar Paint" explains that the product is composed of submicron, rod-shaped particles which contribute useful rheological characteristics when dispersed in paints and other liquids. It provides viscosity control and retards pigment settling. • FMC Corporation, Princeton, N.J.*  

Circle 407 on inquiry card

ROLLING DOORS / A 24-page catalog gives use, benefits, details, dimensions and specifications on metal service or fire doors, rolling counter shutters, rolling grilles, door operators and overhead type doors. • The Kinnear Manufacturing Co., Columbus, Ohio.*  

Circle 408 on inquiry card

WALLCOVERING / A 41-page sample book contains 33 wallcovering designs in 475 decorator colors. There are four different types of wallcovering. • Stauffer Chemical Company, New York.*  

Circle 409 on inquiry card

AIR HANDLING / A 4-page brochure explains how air handling silencers solve noise problems and provide flexibility of space design to suit tenant changes. • Industrial Acoustics Company, Inc., Bronx, N.Y.  

Circle 410 on inquiry card

DUCT SYSTEMS / A 12-page booklet describes Micro-Aire preformed fiber glass round ducts and duct board. Three types include preformed round with molded-in slip joints and plastic jacket; duct board with a factory-applied facing of 3-mil aluminum for field or shop fabrication; and preformed round with an integral, embedded aluminum seal. • Johns-Manville, New York City.*  

Circle 411 on inquiry card

FURNITURE / An illustrated catalog presents "user-designed" church, school and institutional furniture. Designs range from tubular steel folding chairs to tables guaranteed for 20 years to a key-shaped table that allows the teacher to give personal attention to eight pupils at once. • Adirondack Chair Co., Inc., New York City.  

Circle 412 on inquiry card

COMFORT SCREEN / An 8-page brochure explains that the vinyl-coated fiberglass yarn screening has been developed for control of radiant heat and shade windows and doors, to effect cooling and thus reduce air-conditioning costs. Homes, commercial buildings, hospitals, schools and industrial plants. • J. Stevens & Co., Inc., New York City.*  

Circle 413 on inquiry card

CEILINGS / "Ceilings for Enduring Beauty" is the title of a 28-page color booklet. The booklet presents a series of interiors in which ceiling tiles, suspended ceilings, and accessories have been chosen for appearance and acoustic control. Also featured are ways to low ceilings, provide extra lighting, hide pipes or ducts, and transform basement and attic areas into useful sleep and study rooms. • Wood Conversion Company, St. Paul, Minn.*  

Circle 414 on inquiry card

GLAZING MATERIALS / A new safety standard for types of glazing material used in building construction describes five types of transparent safety glazing materials that can meet some or all of the standard's specifications. Price of the standard is $2.50. • USA Standards Institute, 10 E. 40th St., New York City 10016.  

Circle 415 on inquiry card

AIR POLLUTION CONTROL / A 24-page technical bulletin contains information on seven basic types of wet scrubbers for removal of noxious gases, corrosive mists, and entrained solids. • The Cellite Company, Berea, Ohio.  

Circle 415 on inquiry card

* Additional product information in Sweet's Architectural File
B. V. Wyndham-Hall likes our wall covering.

As you probably know, Mr. Wyndham-Hall is chairman of the board of Little Wonder Gimlet Sharpener Corp. It's a position where a man needs all the prestige he can lay his hands on. Any wonder Mr. Wyndham-Hall had his office walls done in Pliant Wood?

For the most prestige for the price, look to Laminating Services — today offering the widest selection of wall coverings of any manufacturer, bar none. Pliant Wood, for instance, is genuine wood veneer with fabric backing. You can apply it to any flat or curved surface. It goes over existing walls without furring strips or without altering woodwork. It comes in over 50 species, in matched or random grades, (Mr. Wyndham-Hall, not unexpectedly, chose French Moroccan Walnut.)

There are many other Laminating Services wall coverings: Vin-L-Fab, offering hundreds of colors, textures and patterns, such as Vin-L-Fab "22" a solid vinyl that even comes in stripes and widths you specify . . . Wovan, for the soft beauty of real woven cloth . . . and velvety Vin-L-Suede of washable nylon flock. For complete details, write today for Brochure No. 100 AR.

LAMINATING SERVICES INC.
4700 Robards Lane, Louisville, Ky. 40218

VINYLs / Limited Editions is the name of a new collection of five designs captured in a broad spectrum of fifty colors. Shown is Basketry which gives the texture of hand-crafted straw, snipped into wedges, then fitted together in diverse ways. Available in 12-in. by 12-in. tiles and 36-in. slabs; 1/8-in. gauge. About $2.50 a square foot. • Amstco Flooring Division, American Biltrite Rubber Co., Trenton, N.J.

Circle 303 on inquiry card

CARPET TILES / Twelve-in. squares of Town-Aire carpet made of Vectra olefin fiber with foam rubber impregnated into the back are recommended for all types of commercial installations as well as for houses. Carpet tiles are spot- and stain-resistant and are cleaned by vacuuming. While tiles are recommended for high-traffic areas, should a tile become burned or need replacing, it can be easily removed and a new one inserted. Many patterns can be created. • Ozite Corporation, Chicago.

Circle 305 on inquiry card

WALL COVERINGS / A line of three dimensional sculptured polystyrene coverings includes Seville, Aztec, Tiki. Batten strips and corner molding in matching colors are provided, or regular molding can be used. The covering is said to resist fading, marring and coloration; is washable; and is highly resistant to damage from impact and abrasion. Also recommended for doors, cabinets and soft fits, and other flat surfaces. • K-Lux Products Div., K-S-H, Inc., Louis.

Circle 306 on inquiry card

JOINT SEALANT / A self-leveling pavement joint sealant combines adhesion with pronounced puncture and abrasion resistance with elongation and recovery properties. Designed for contraction and expansion joints in sidewalks, pavements, decks and other concrete structures, Sonola Paving Joint Sealant is a two-compound urethane system. It is reported unaffected by weather conditions.

Circle 306 on inquiry card

5 Accessory Features improv

Sturdy, pressure-type electric water coolers, available in either free-standing or wall-tite design. On both types, dual (hand and foot) operation is standard. Stainless steel receptor wipes clean and deep recess design prevents splashing. Exclusive Halsey Taylor two-stream, mound-building projector provides a satisfying, sanitary drink of water. Standard cabinets are gray baked enamel — also available in all stainless steel.

Write for NEW HALSEY TAYLOR CATALOG. Or look us up in SWEET'S or the Yellow Pages.

ANTIFREEZE PROTECTION

For loading docks, unheated buildings or other outside locations. Factory installed heating elements located inside cabinet thermostatically cut in at approximately 32°F. — cut out at 37°F.

THE HALSEY W. TAYLOR COMPANY
1560 Thomas Road • Warren, O. 44481

For more data, circle 80 on inquiry card
treme temperature changes, ozone moisture. It offers a minimum life expectancy of 20 years, shows no surface oxidation after aging and weathering, resists deterioration due to oils and chemicals. Sonneborn Building Products, Inc., Des Plaines, III.

SYNTHETIC SHINGLES / Wood shingles and tiles are pressure-impregnated with a retardant compound that resists the spread of flame with no sparks flying brands when subjected to air rents of 12 and 18 miles an hour. The ad also passed leaching tests equivalent to 800 in. of rainfall over a 10-year period. Red cedar given the treatment retains its natural color. The chemical has no adverse effect on galvanized nails, aluminum or copper gutters and flashing. Koppers Company, Inc., Pittsburgh.

CEILING FIXTURES / Weathertight units for canopies, corridors, shower rooms, garages and other wet locations come in elliptical, tapered and saucer shapes. One-piece precision cast aluminum construction has triple-ground satin aluminum or satin black anodized finish. Reflector is semi-specular aluminum anodized for permanence. McPhilen Lighting, Melville, N.Y.

EXPANDABLE WALL / Pabco Expandable Wall is suited for non-load bearing partitions in residences as well as for dividers in offices. The assembly consists of gypsum wallboard facings that are separated by heavyweight paperboard webs which extend the length of the panels. For non-fire-rated construction the panels are faced with 1/8-in.-thick gypsum wallboard. For 1-hour fire resistive construction they are faced with 1/4-in. type X gypsum wallboard. Panels can be easily dismounted. Pabco Technical Services, San Francisco.

PLASTIC LAMINATE PLANKS / The complete Lamidall line, plastic laminate planks and panels that are reported not to split, delaminate, check or crack, is more products on page 176.
PRODUCT REPORTS

continued from page 175

now guaranteed against defects of material or workmanship for the life of the building in which it is installed. Lamidall is reported practically indestructible in ordinary use in offices, restaurants, stores or in commercial or recreational areas. The polyester outer layer seals in the look of woodgrains, solid colors or various patterns. The material can be wiped clean with a damp cloth. • Woodall Industries, Inc., Carpentersville, Ill.

Circle 311 on inquiry card

DRAFTING TABLE / This unit features a 40- by 80-in. non-warping birch veneer top that is reversible, allowing the operator to utilize storage space in the unit immediately behind him; a 60- by 37- by 36-in. frame with 110-volt double electric outlet; a sliding step stand, and by 55-in. shelf. Options include a left full-suspension letter-size file box drawer, three-box-drawer or overhead unit with four shelves for drawings; bookcase unit with shelf compartment that fits into rear of table file drawer; tool drawer which can hang under the file drawer; and a steel or linoleum covered top. • Corry Jamestown Corp., Corry, Pa.

Circle 312 on inquiry card

STOP THIS — and STOP 90% of all ROOF LEAKS!

New building owners, prior to the Hickman System, should have blamed the weather and not the architect for the troubles and problems produced by roof leaks at eaves and expansion joints. Thermal reaction between roofing felts and metal water dam-cants, other than galvanized steel*, causes roofing felts to crack as badly as shown above. Now this condition can be prevented; refer to Sweet’s 21G-Hi and see proof that the Hickman System “gives positive control of roof water at eaves.” Also, see how tar drippage and water stains on building exteriors are prevented.

* When installed in maximum 10’ lengths to react independently have a thermal coefficient compatible with roofing felts.

Smart looking facia profiles in Kalcolor, Fluoropor (Kinar-500) and baked enamel enable you to combine wall beauty with positive roof perimeter protection.

HICKMAN Safeguard
fascia and water dam systems
and expansion joint systems

2520 INDUSTRIAL ROW, TROY, MICHIGAN 48084 PHONE (313) 536 3512

CAN YOU GUESS HOW THE SEVEN THOUSAND PLUS FEET OF ROOF PERIMETER ON THESE BUILDINGS ARE POSITIVELY PROTECTED AGAINST LEAKS? See Sweet’s 21G-HI.

LATROBE SENIOR HIGH SCHOOL, LATROBE, PA. BARTHOLOMEW-MOYER-WALFISH, ARCHITECTS

Circle 313 on inquiry card

OFFICE FURNITURE / A 66-in. credenza in pecan veneers provides easy access to all storage elements. The top-open file units make all material visible and reachable without bending. Vertical drawer pulls are designed to be gripped naturally by the outstretched hand without turning the wrist. The legs are joined to storage units by functionally expendable metal pins. • Jofco, Jasper, Ind.

Circle 314 on inquiry card

INFORMATION SIGNS / Transmissi on signs designed for central transit terminals provide complete route service information quickly and simply. When a question button is pressed, the sign incorporates both color coding and selective transillumination to produce the answer graphically. The particular route in question remains illuminated for seconds. • Devco Engineering Inc., Fairfield, N.J.

Circle 315 on inquiry card

For more data, circle 81 on inquiry card

For more products, on page 2
Medusa Custom Color Masonry Cements can add "personalized" beauty to any masonry wall. Charming buff shades for that “aged” colonial appearance. Matching colors for that modern, monolithic effect. Coordinated colors to a color scheme. Accent colors to match trim, roof, etc. All are available on-the-job, ready for sand and water with Medusa Custom Color Masonry Cements. Try some creative artistry with colored mortar. Ask your Medusa representative about the full line of Medusa Masonry Cements. Or write Medusa, P. O. Box 5668, Cleveland, Ohio 44101.
T-SQUARES / Four threaded steel inserts are permanently imbedded in the Lok-Tite T-square head, which is held in exact alignment by precision jigs during drilling and fastening operations. Machine screws bind the head to the blade. Edge liners are extruded by Perfex Plastics of Chicago. • Frederick Post Company, Chicago.

FLUORESCENT UNIT / A 100 per cent sealed and anodized aluminum fluorescent unit features a full framed and hinged enclosure of extruded aluminum, promising to eliminate danger of dust, rust, vapors, moisture, and corrosion. • Allite Corporation, Chicago.

WATER CLOSET / This elongated, piece closet combination features a full framed and hinged enclosure of extruded aluminum, promising to eliminate danger of dust, rust, vapors, moisture, and corrosion. • Allite Corporation, Chicago.

FOOD-PREPARATION STATION / The station has a refrigerator unit located at eye-level on the right-hand side. The unit is enclosed by easy-to-clean blue-vinyl clad doors with magnetic gaskets for positive closing. The liner of the refrigerator is one piece molded plastic with seams. • Market Forge Co., Everett, Mass.

REFRIGERATOR-FREEZER / Built-in refrigerator-freezer combinations in side-by-side, over-and-under and under-counter types fit kitchen arrangement in spaces from 18½ in. to 48 in. wide. • Sub-Zero Freezer Co., Inc., Madison, Wis.
STANDARD SUPPLY & RETURN REGISTERS & GRILLES

WATERLOO Air Diffusion EQUIPMENT

DESIGN ORIENTED ...... THE COMPLETE QUALITY LINE

MEMBER OF THE AIR DIFFUSION COUNCIL

WATERLOO REGISTER DIVISION
DYNAMICS CORPORATION OF AMERICA
CEDAR FALLS, IOWA
Ludowici-Celadon Company was selected to produce the ceramic roofing tiles, designed by Eero Saarinen & Associates, which were so important in the full development of the architectural character of Concordia Senior College.

For over 70 years we have been assisting architects and engineers in producing roofing tiles for their specially designed work.

In addition, we offer standard patterns in a wide range of colors of roofing tile in both the Interlocking and Flat Shingle types for contemporary and traditional designs.

Our representatives are always available to assist you on your special roofing problems.

**LUDOWICI-CELADON CO.**
75 EAST WACKER DRIVE, CHICAGO, ILL. 60601
Manuacturers of quarry tile, the nation's largest producer of roofing tile and NAILON Facing Brick
This good-looking terrazzo floor cured in 16 hours, weighs only 3 to 4 lb./sq. ft.

It's based on Shell Epon® resin.

Shell Epon resin is gaining rapid acceptance as a binder for terrazzo floors. It acts as both the marble chip matrix, and the adhesive that bonds to the substrate. The result is a highly durable, non-dusting floor with broad design and installation possibilities.

**Lightweight**—These “thin-set” floors are applied in thicknesses of 3/16” to 1/4” giving a weight of only 3 to 4 lb./sq. ft. compared to about 30 lb./sq. ft. for portland cement terrazzos. For new construction, less load-bearing capacity is needed. For remodeling, thin-set terrazzo can be installed on upper stories as well as lower floors, and elevations need not be raised.

**Fast cure**—Terrazzo based on Epon resin can be walked on in 10 to 12 hours, can be ground in 16 to 20 hours. This permits workmen to return quickly to the job site.

**Low maintenance**—The tough, smooth, chemical-resistant surface of these floors is very easy to clean.

**Flexible, crack-resistant**—Epon resin-based terrazzo absorbs impact, vibration and noise, resists cracking much better than portland cement. If desired, it can be made flexible enough to eliminate divider strips.

**Easy installation**—over wood, concrete and steel. Floor is applied in 5 steps: (1) Etching the substrate; (2) Priming the substrate; (3) Powertrowelling the binder/aggregate mix; (4) Grinding and grooving the surface; and (5) Sealing. A finish may also be applied.

**Why Epon resin?** Shell Epon resin is the ideal binder for thin-set floors. It has extremely low shrinkage, and adheres tightly to substrates. Its low odor permits installation in institutions and food plants with a minimum of operational interruptions.

Terrazzo floor systems based on Shell Epon resin are readily available in a wide range of colors. Mail the coupon if you’d like a supplier of these materials to contact you.

---

For more data, circle 1 on inquiry card

---

For more data, circle 14 on inquiry card

---

For more data, circle AR-9 on inquiry card

---

For more data, circle 19 on inquiry card

---

For more data, circle AR-7 on inquiry card

---

For more data, circle 18 on inquiry card

---

For more data, circle AR-6 on inquiry card

---

For more data, circle 12 on inquiry card

---

For more data, circle AR-5 on inquiry card

---

For more data, circle 11 on inquiry card

---

For more data, circle AR-4 on inquiry card

---

For more data, circle 10 on inquiry card

---

For more data, circle AR-3 on inquiry card

---

For more data, circle 9 on inquiry card

---

For more data, circle AR-2 on inquiry card

---

For more data, circle 8 on inquiry card

---

For more data, circle AR-1 on inquiry card

---

For more data, circle 7 on inquiry card

---

For more data, circle AR-0 on inquiry card

---

For more data, circle 6 on inquiry card

---

For more data, circle AR-3 on inquiry card

---

For more data, circle 5 on inquiry card

---

For more data, circle AR-2 on inquiry card

---

For more data, circle 4 on inquiry card

---

For more data, circle AR-1 on inquiry card

---

For more data, circle 3 on inquiry card

---

For more data, circle AR-0 on inquiry card

---

For more data, circle 2 on inquiry card

---

For more data, circle AR-3 on inquiry card

---

For more data, circle 1 on inquiry card

---

For more data, circle AR-2 on inquiry card

---

For more data, circle 0 on inquiry card

---

For more data, circle AR-1 on inquiry card

---

For more data, circle 11 on inquiry card

---

For more data, circle AR-10 on inquiry card

---

For more data, circle 10 on inquiry card

---

For more data, circle AR-9 on inquiry card

---

For more data, circle 9 on inquiry card

---

For more data, circle AR-8 on inquiry card

---

For more data, circle 8 on inquiry card

---

For more data, circle AR-7 on inquiry card

---

For more data, circle 7 on inquiry card

---

For more data, circle AR-6 on inquiry card

---

For more data, circle 6 on inquiry card

---

For more data, circle AR-5 on inquiry card

---

For more data, circle 5 on inquiry card

---

For more data, circle AR-4 on inquiry card

---

For more data, circle 4 on inquiry card

---

For more data, circle AR-3 on inquiry card

---

For more data, circle 3 on inquiry card

---

For more data, circle AR-2 on inquiry card

---

For more data, circle 2 on inquiry card

---

For more data, circle AR-1 on inquiry card

---

For more data, circle 1 on inquiry card

---

For more data, circle AR-0 on inquiry card

---

For more data, circle 0 on inquiry card

---
DIMMER / A 2,000 watt electronically controlled dimmer for incandescent lighting has one-piece construction, will fit a standard two-gang box, and does not require a separate remote power unit. An ivory cover plate snaps over the metal face plate. • Ideal Industries, Inc., Sycamore, Ill.

Circle 320 on inquiry card

Your VICRTEX Man knows a lot about Vinyl Wallcovering... he's at your service

The VICRTEX representative who helps you when you're working with vinyl wallcovering is a professional perfectionist. He'll follow through on the job after you write specs—you'll find him on the installation site checking wall preparation, hanging and inspection. Your VICRTEX Man is knowledgeable about every aspect of vinyl wallcovering—he can show you a whole world of color availabilitys, three-dimensional textures and design-conscious installations similar to the one you're working on. Depend on him to be alertly on the job before, during and after specifying time. It's easy to work with the best vinyl wallcovering—VICRTEX. You get top quality, easy application and maintenance... and a conscientious service from your personal VICRTEX Man. Find out for yourself why many leading architects and designers believe VICRTEX is an unbeatable combination of product and people. At your service from Hawaii to the Caribbean.

Write for our booklet "A Practical Guide to Specification, Selection and Use of Vinyl Wallcoverings." Do it today!

L. E. CARPENTER & CO.
Empire State Building, N. Y. 1, (212) Longacre 4-0080
Mill: Wharton, N. J.
Distributed in principal cities from Hawaii to the Caribbean, by:

Circle 321 on inquiry card

RADIATION CABINETS / Snap-on, slip-joint perimeter units have a flush, full-length extruded aluminum cabinet grille and narrow depth. Cabinets are 16-gage steel reinforced at frequent intervals with factory-welded internal gussets. • The Tran Company, La Crosse, Wisc.

Circle 321 on inquiry card

COOLING AND HEATING / Console Zonelines are designed particularly for curtain wall construction in apartments, office buildings, motels, nursing homes, hospitals and schools. No central compressors, chillers or towers are required. Climate can be controlled in each zone and each unit may be individually metered. No complicated duct and piping design is required. • General Electric, Louisville, Ky.

Circle 322 on inquiry card

HUMIDIFIER FOR HOT WATER HEAT / The fully-automatic Three S Humidifier featuring a fiber glass, non-corrosive water pan, fiber glass evaporating inserts, and a styrofoam float is set on the heating coil and is connected at the regular air vent. Air locks are impossible. • Three S Company, Estherville, Iowa.

Circle 323 on inquiry card

HUMIDIFIER FOR HOT WATER HEAT / The fully-automatic Three S Humidifier featuring a fiber glass, non-corrosive water pan, fiber glass evaporating inserts, and a styrofoam float is set on the heating coil and is connected at the regular air vent. Air locks are impossible. • Three S Company, Estherville, Iowa.

Circle 323 on inquiry card

For more data, circle 103 on inquiry card

Outstanding professional books from McGraw-Hill

1 THE URGENT FUTURE. People, Housing, City, Region. By ALBERT MAYER. New. Here a leading architect and city planner makes proposals—both imaginative and practical—for dealing with the disintegration of our cities. Alternate solutions are discussed, equipping the reader to make his own creative judgments.

176 pp., $16.50

2 PLANNING THE COMMUNITY HOSPITAL. By ROY HUDENBURG. New. This new book discusses the how and why of hospital design in terms of administrative and functional characteristics, based on six systems—housing, therapy, administration and business, supply, housekeeping, and utilities—as well as economic and social forces.

404 pp., $16.95.

3 HOSPITAL DESIGN AND FUNCTION. By E. TODD WHEELER. The functional program requirements of a general hospital are thoroughly and lucidly discussed in this excellent book. Programs and area analysis, budget control, patient care divisions, obstetrical delivery and emergency; isolation and asepsis; physical medicine, central sterile supply and many other important topics are examined in specific detail.

296 pp., $13.50.

4 Construction Lending Guide. A HANDBOOK OF HOMEBUILDING DESIGN AND CONSTRUCTION. By JOHN L. SCHMIDT, WALTER H. LEWIS and HAROLD BENNET OLIN. This book has been produced by the U.S. Savings and Loan League in cooperation with the American Savings and Loan Institute. It covers a general hospital are thoroughly and lucidly discussed in this excellent book. Programs and area analysis, budget control, patient care divisions, obstetrical delivery and emergency; isolation and asepsis; physical medicine, central sterile supply and many other important topics are examined in specific detail.

650 pp., $26.00.

5 HANDBOOK OF MECHANICAL SPECIFICATIONS FOR BUILDINGS AND PLANTS: A Check-list for Engineers and Scientists. By ROBERT HENDERSON EMERICK, P. E. Improve your specifications and drastically cut down preparation-time with this complete guide to perfect specification writing. Regardless of your experience, this is the place to look for full, authoritative guidance the next time you prepare specifications— for unfamiliar as well as for familiar equipment.

512 pp., $12.50.

At Your Bookstore or Direct From Publisher for

10 DAYS FREE EXAMINATION

McGRAW-HILL BOOK CO., Dept. 23-ARR-77
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) keep plus a few cents for delivery costs, and return other books postage paid.

1 040991-2 3 069505-6 5 019313-6
2 036857-7 4 055339-6

NAME (print)
ADDRESS
CITY STATE ZIP CODE
For prices and terms outside U.S. write McGraw-Hill Int'l, NYC 23-ARR-77

For more data, circle 104 on inquiry card

2128 ARCHITECTURAL RECORD July 1967
DOOL CONSTRUCTION / An economic study conducted by Ellerbe Architects of St. Paul, Minn, considers the feasibility and cost of building schools in colder northern U.S. climates and makes comparisons with the California School Construction Systems Development program. * Hough Manufacturing Corporation, Janesville, Wisc. * Circle 416 on inquiry card

TABLES / A 4-page brochure describes and illustrates turntables for solving traffic-control and limited-space problems. * Macton Machinery Company, Inc., Stamford, Conn. * Circle 417 on inquiry card

JOISTS / The "1967 Edition of Specifications and Load Tables" for high-capacity open-web steel joists is a work handbook with technical data to identify joists to carry uniform loads on spans up to 96 ft. * Steel Joist Institute, Washington. * Circle 418 on inquiry card

OFFICE PARTITIONS / A 32-page color brochure gives information on the color combinations and sizes of take-down and relocation panels, heights and widths, and specifications. There are details on colors and textured wood grain panels. Accessories also shown include wardrobe units, sliding doors, wickets, shelving, cabinets, and magnetic picture and coat hooks. * Steel Partition Company, Inc., Port Chester, N.Y. * Circle 419 on inquiry card


POLYPROPYLENE PIPE / A 28-page book features applications, installation techniques, fusion bonding and other detailed information. * Chevron Chemical Company, San Francisco. * Circle 421 on inquiry card

TROFFER / A 7-page booklet introduces the Aluminaire trimless regressed aluminum fluorescent troffer. * Silvray Lighting Corporation, Passaic, N.J. * Circle 422 on inquiry card

Additional product information in Sweet's Architectural File

ZERO WEATHER STRIPPING CO., INC.
415 Concord Avenue, Bronx, N. Y. 10455 (212) LUdlow 5-3230

For more data, circle 122 on inquiry card
Frank Lloyd Wright

FRANK LLOYD WRIGHT, his Life, His Work, His Words. By Olgivanna Lloyd Wright. Horizon Press, 156 Fifth Ave., New York, N.Y. 224 pp., illus. $7.50.


By H. Allen Brooks

Two books devoted to a single subject could hardly be more diverse in approach than these, and it is precisely for this reason that each successfully, if unintentionally, stands as the complement of the other.

Olgivanna Lloyd Wright presents a warm and humanistic biography of her husband which is richly interwoven with the master's words. Indeed half, or more, of the text is drawn from his writings or speeches with An Autobiography the most frequently quoted and with his recorded talks to the Taliesin Fellowship the prime source of his hitherto unpublished words. By this means the architect speaks for himself about his own work and ideas—his designing of Unity Temple, the sea shell as "housing" in Nature, the concept of organic architecture—and thus the reader obtains a vivid, first-hand account of Wright's philosophy as an architect. Around this is structured Wright's biography which, from the mid-1920's, is told by the person closest to Wright of all. In the recounting of the habits and happenings of his daily life the reader obtains an intimate view of Wright the individual rather than the Wright of public fame.

Surely this biography is not intended to supplant those already published but rather to reach an audience previously neglected. Its most valuable service will be as an introduction of Wright to America's youth—those whom he always sought to reach—and the layman for whom most previous biographies have been either too detailed or too single-minded in their approach. Yet the book has value for the specialist and the scholar as well, for not only does it shed more light on Wright the man but it offers the most detailed and complete list ever published of "The Buildings and Projects of Frank Lloyd Wright." At long last the chronological list first presented by Henry-Russell Hitchcock in 1942 (In the Nature of Materials) is up to date. Street addresses, unfortunately, have been excluded, yet these are generally available in Frank Lloyd Wright: Writings and Buildings, edited by Edgar Kaufmann and Ben Raeburn. The present list, made from the drawings at Taliesin, endeavors to record the date of each design's conception—which is the significant date to have—and these understandably vary at time from those already published. Incorporated also into the list is pertinent biographical information, a most useful addition which contains many facts not previously so readily available.

Norris Kelly Smith carefully explains, in the prologue to his book, that his is not a traditional biography in which the subject is related to his time, contemporaries and the Modern Movement, but rather "I have undertaken to interpret Wright's architecture mainly in terms of what he himself had to say and in terms of the expressive form of the buildings themselves." In effect, the author endeavors to relate Wright to the broad scope of history, or more precisely, the history of ideas. To do so is provocative and this is where much of the book's real value lies. When comparing the author's thesis that Wright is anti-Greek and basically Hebrew in thought to Vincent J. Scully's biography (the only other to assess Wright in similar breadth) which associates Wright with the Greek and proto-Greek world, some conclusions are indeed debatable. Yet Smith leaves Scully unmentioned in his text, obviously intentionally since both Manson and Hitchcock are sniffed at from time to time.

One statement aptly summarizes the entire book. The author notes, "I have argued at some length that the key to Wright's thought, and perhaps to Romanticism in general, is to be found in a characteristically Biblical and anti-Hellenic emphasis on the dynamics of personal being, as against the static and objective being-of-things; that that emphasis has tended to express itself in terms of polar tensions; and that polarities with which Wright struggled from the beginning, both in his life and his architecture, are at last fully clarified in the Kaufmann house and the Johnson building." The cogent chapters establish the disparate pole to which Wright is the more firmly linked—of Romanticism and the Bible—"emphasis on the dynamics of personal being." Thorlief Borman's Hebrew Thought Compared with Greek is here as the basis for discussion. With the chapter entitled "The Oak Park Years" begins the more formal chronology of the architect's life and work, and also the analysis of the "polarities," according to which Wright's prairie houses are distinguished as the "closest to the pole of formal regularity" or those "nearest the opposite pole" and this case for regularity inadvertently becomes the more convincing. Subsequent chapters, while tracing the vicissitudes of Wright's life, compare his work, his attitudes and his thoughts to those of Rousseau, Emerson, Nietzsche, to the Arthurian legend of the Round Table (his Taliesin Fellowship), and so on. Finally the polarities are reconciled. Wright's work, finding their clearest most characteristic exemplification in the Kaufmann house and the Johnson building, both of 1936.

Both of these texts have future reference value. Yet both presses have earnestly treated their book as fiction, and have not bothered to include an index.

The use of plastics

PLASTICS IN BUILDING. Edited by Irvin Skeist. Reinhold Publishing Corporation, 430 Park Ave., New York, N.Y. 466 pp., illus., $18.00.

PLASTICS IN BUILDING STRUCTURES. Pergamon Press, Inc., 44-01 21st St., Long Island City, N.Y. 32 pp., illus., $15.00.

Both of these books are interdisciplinary, drawing on chemists, engineers and architects as contributors. They differ in presentation and potential audience.
Crawford Introduces WEIGHT COUNTERBALANCE for Low-lift and High-lift Doors

Weight counterbalancing is old in principle and fairly common in vertical-lift doors. Now, Crawford introduces a system for applying this useful and economical method to low-lift and high-lift doors. Here’s how it works. This service garage door, for example, (above) is going up and down all day long, making hundreds of cycles in the course of a 12-hour day. Many other doors work even harder. On assembly lines 1500 cycles a day is not uncommon.

That’s brutal punishment for a conventional counterbalance spring. On an ordinary job the spring might last the life of the door, but on multi-cycle applications life expectancy shrinks. And, though special, heavy-duty springs can be used, they may not be the best answer. If the special spring should break, a replacement may not be available in local stock. This means delay, inconvenience, expense and lost production.

The Crawford Counterweight Mechanism is a simple, practical and economical solution to these problems. Any door can be counterbalanced to the ounce with these weights. Big doors, heavy doors, busy doors are no longer problem doors. Weights never tire, never break, never wear out. Give your big door a coat of paint, the Crawford man can stop in and add weights to bring it back to perfect balance. Any installation, old or new, low-lift, high-lift or vertical-lift, can be counterweighted. Also, big, heavy, busy doors can be equipped with push-buttons or set up for full automatic operation. Literature by return mail.

Write Crawford Door Company, 4270-30 High Street, Ecorse, Michigan 48229.
Food, flowers or phonograph records...
there's a boiler for every job

Name the job... and Cleaver-Brooks can supply the right packaged boiler for your requirements. That's because Cleaver-Brooks makes them ALL: firetube boilers from 15 to 700 horsepower... Springfield watertube boilers up to 125,000 pounds of steam per hour... Model 3 watertube boilers from 1,000,000 to 6,000,000 Btu input. Cleaver-Brooks also supplies a complete line of feedwater deaerators, pumps and water softeners. Contact your nearest sales representative for complete information... or write direct. Ask for our new book "Packaged Boilers and Accessories." Cleaver-Brooks, 3707 N. Richards St., Milwaukee, Wisconsin 53212.

...fired with imagination
by Cleaver Brooks®

For more data, circle 124 on inquiry card
Plastics in Building provides guidance for architects and engineers making minary evaluations of materials or cations. Plastics in Building Struc could be used by a structural de interested in designing a system. The first book was assembled by an ir, Irving Skeist, who selected 24 ors. A basic reference work, it has ters on everything from linoleum to ed-skin space grids. Editor Skeist brought the guns to bear at an edi—illustrations demon- e applications, appendixes and bib-raphies are used as needed, charts readable. Going a little beyond the c handbook function served by good of the material is a five-part series plastics uses abroad. The second book, Plastics in Build-Structures, is made up of papers read he (British) Plastics Institute confer-ere, organized with the Royal Institute British Architects, the Institution of actural Engineers, and the Institution Civil Engineers. The papers are usually rt, and can serve as introductions to cific concerns of the various areas hin plastics. Chemists and engineers omitted the greatest number of papers, seven contributors were architects, th United States architects included. ro papers deal with molded plastics throwns such as those used in Expo 's Habitat '67, and several deal with stics as structural materials, while hers discuss such concerns as fire and st problems. For the reader with a particular prob- the book, composed of conference aterial, might be likened to attending a conference or symposium—the chances he will find some papers too general, hers too tightly specific, but he may ke home a really important piece of formation relevant to his needs.

BIBLIOGRAPHY

KALLO'S VILLAS. By James S. Ackerman. J. J. agustin, Inc., Publisher, Locust Valley, New York. 1 Pp., illus. $5.00.

TECHNICAL SESSIONS PRESENTED AT THE 10TH ANNUAL INTERNATIONAL VISUAL COMMUNICATIONS ONGRESS. American Institute for Design and Drafting, 770 South Adams, Suite T10, Birmingham, Michigan 48011. 122 pp. Paperback, Members, $9.00; Non-members, $10.00.

SYMPOSIUM ON DESIGN AND DRAFTING MANAGEMENT. By The American Institute for Design and Drafting, 770 South Adams, Suite T10, Birmingham, Michigan 48011, 253 pp. Paperback, Members, $25.00; Non-members, $35.00.

COLOR SLIDE CATALOGUE OF WORLD ARCHITECTURE. By the American Library Color Slide Co., Inc., 805 East 45 Street, New York, N.Y. 10017, 173 pp., illus.


ROW HOUSES AND CLUSTER HOUSES. By Hubert Hoffman, Frederick A. Praeger, T11 Fourth Avenue, New York, N.Y. 176 pp., illus. $18.50.

CRITICAL PATH SCHEDULING. By Joseph Horowitz. The Ronald Press Company, 75 East 26 Street, New York, N.Y. 10010, 254 pp., illus. $8.50.

SHOPS AND SHOWROOMS, AN INTERNATIONAL SURVEY. By Karl Kasper, Frederick A. Praeger, T11 Fourth Avenue, New York, N.Y. 10003, 165 pp., illus. $15.00.

THE RESTORATION MANUAL. By Orin M. Bullock, Jr. Silvermine Publishers Inc., Norwalk, Conn. 181 pp., illus. $8.50.


ARCHITECTURE IN ANCIENT EGYPT AND THE NEAR EAST. By Alexander Badawy. The M.I.T. Press, 50 Ames Street, Cambridge, Mass. 02142, 246 pp., illus. $10.00.

ITALIAN VILLAS TODAY. By Marco Dezi Bardeschi, Transatlantic Arts, Inc., 365 Fifth Avenue, New York, N.Y. 10017, 239 pp., illus. $18.50.


THE RESTORATION MANUAL. By Orin M. Bullock, Jr. Silvermine Publishers Inc., Norwalk, Conn. 181 pp., illus. $8.50.

Want more facts? Specs? Send for this report.

TYLER PIPE INDUSTRIES

TYLER PIPE DIVISION. TYLER, TEXAS. WADE DIVISION. TYLER, TEXAS. EAST PENN DIVISION. MACUNGIE, PA.

For more data, circle 125 on inquiry card.
Record subscribers design over 90% of...

This is a fact documented by Dodge Reports. For the benefit of advertisers, Architectural Record conducts a continuing state-by-state check of the activity of architectural firms, compiling the number of projects — the types of projects — the dollar volume. Then this detailed construction activity is compared with the Record's subscriber galleys.

Thirty-eight such state-wide checks reveal that 93 per cent of the dollar volume of all architect-designed nonresidential building is in the hands of Record subscribers. This top verifiable market coverage means that when you advertise in the Record, you know that you are reaching the active architects and engineers.

Interested in the school market? Over 94 per cent of the dollar volume is in the hands of Record subscribers. Apartments? Record subscribers plan over 87 per cent of the apartment dollar volume. Hospitals? Over 93 per cent.

Why not discuss the Record's market coverage with your Record representative. He can furnish you with a "summary" of all architect-planned building as reported by F. W. Dodge, and Record's coverage of this activity.

Write or phone your representative today.

ARCHITECTURAL RECORD
330 WEST 42ND STREET
NEW YORK, N.Y. 10036

Eastern Air Lines Unit Terminal
Boston, Mass.
Architects: Minoru Yamasaki and Associates
Structural Engineers: Sett Finkus Engineers, Inc.
Architect-planned nonresidential building
And that means that nothing stirs ... not a sound. Because Spancrete floor and roof systems muffle noise ... cut sound transmission from floor to floor (from 49 to 55 decibels) ... and also eliminate those creaking and squeeking noises so common with wood floor systems. This is important in a town house, such as the one shown ... and it's even more advantageous in an apartment project.

Paint only was required for ceilings ... and floor coverings were applied directly over the Spancrete, providing economy along with attractive appearance of the exposed Spancrete ceiling.

Architects were particularly impressed with these Spancrete advantages:
(1) Cuts down finish cost. (2) Gives rustic yet elegant look; ties into open stairway plan. (3) Light fixtures attached directly to Spancrete ceilings — using duct work in plank to carry wiring.
continued from page 241


HOSPITAL PLANNING AND ADMINISTRATION. By R. Ullney-Davies and H. M. C. Macalpyle. World Health Organization, Distribution and Sales Unit, Geneva, Switzerland. 215 pp., illus. $5.25.


NORWICH HISTORIC HOMES AND FAMILIES. By Marion K. O’Keele and Catherine Smith Dorothea. The Pequot Press, Inc., Stonington, Conn. 112 pp., illus. $6.00.

SIMPLIFIED ENGINEERING FOR ARCHITECTS AND BUILDERS. By Harry Parker, John Willy & Sons, Inc., 605 Third Avenue, New York, N.Y. 10016. 361 pp., illus. $7.50.


FILIPPO’S DOME. By Anne Rockwell. Atheneum, 762 West 38 Street, New York, N.Y. 87 pp., illus. $3.50.

RUNCORN NEW TOWN MASTER PLAN. By the Runcorn Development Corporation, Chapel Street, Runcorn, Cheshire, England. 136 pp., illus. $8.00.


IDEAS FOR PLANNING YOUR NEW HOME. By the Editors of Sunset Magazine and Sunset Books. Lane Books, Menlo Park, California. 128 pp., illus. Paperbound, $1.95.


THE PAINTING OF THE LIFE OF ST. FRANCIS IN ASSISI. By Leonetto Tintori and Maillard Meiss. The Norton Library, 55 Fifth Avenue, New York, N.Y. 10003. 239 pp., illus. $1.95.


THE ART AND ARCHITECTURE OF MEDIEVAL RUSIA. By Arthur Voyce. The University of Oklahoma Press, Norman, Oklahoma. 432 pp., illus. $9.95.

For more data, circle 126 on inquiry card

For more data, circle 127 on inquiry card

ARCHITECTURAL RECORD July 1967 245

McPHILBEN’S NEW CONTOUR TRIM

30 LINE DIRECTIONALS

An illuminated cast face plate is set back 1/2” into a slim cast frame creating a neatly visible contour trim and the best directional signs today...exclusively McPhilben’s. New contour trim 30 line features:

- permanently light-tight appearance and performance
- precision cast aluminum integral construction
- 1 3/4” thin body in all models
- choice of triple ground satin aluminum or satin black finishes
- long lamp life with maximum brightness

There is no “equal” to McPhilben’s contour trim exits. Write for complete data on the new 30 line and be convinced.

For more data, circle 127 on inquiry card
Where standby power is a must...
gas turbine generators are a must

There's only one leader in gas turbine generator sets—and that's Solar. Here are 8 reasons why Solar's new 200 kw gas turbine generator set is the modern, practical way to provide standby electrical power to meet any need or emergency.

1. **Compact size, Light weight.** Solar's completely packaged 200 kw gas turbine generator set weighs only 4,000 lbs. and measures 96” x 51” x 62.5”—approximately ¼ the weight and ½ the size of an equivalent reciprocating engine system!

2. **Virtually vibration free. Low sound level.** There is none of the annoying vibration inherent in a reciprocating engine. Sound levels are attenuated to meet NEMA standards for residential operation.

3. **Start-up in seconds.** The Solar 200 kw gas turbine generator starts fast, has full power capability in seconds. No elaborate heating systems needed to keep unit ready for start-up as in the case of reciprocating engines.

4. **Easy, low-cost installation.** The set is quickly and easily installed anywhere from rooftop to basement. No special foundation or cooling water are needed. Thus, unlike a reciprocating engine, the Solar generator can be inexpensively moved to a new location if desired. The result: lower installed costs per kilowatt than any other form of standby power!

5. **Almost any site suitable.** The small size and light weight of the Solar set become particularly important where buildings requiring standby power were not originally designed for this needed equipment. Nearly all building codes and designs permit installation of Solar gas turbine generator sets. Many city and state governments are presently considering mandatory standby power legislation. So, whether you are designing a new...
**Building or adding standby power to an existing one, Solar gas turbine generator set should be your first consideration.**

**Low maintenance costs.** The simplicity and reliability of the Solar set minimize maintenance and operational attention. No expensive load banks required for periodic start-ups and checking. Components are designed for long life between overhauls.

**Superior performance.** The Solar 200 kw gas turbine generator excels reciprocating engines in the areas of frequency control, voltage regulations, transient response, and behavior in parallel as established by existing test data.

**Proven reliability.** The new Solar 200 kw generator set embodies the same principles proven so reliable in the Solar 750 kw gas turbine generator set which has demonstrated its reliability in hundreds of installations throughout the U.S.A. For example, these are the sets chosen by American Telephone and Telegraph Company to provide standby power at its disaster-proof, hard-site communications centers from coast to coast.

**Write for more complete information.** Brochures explaining in more detail the advantages of both the new Solar 200 kw generator set and the 750 kw generator set in supplying low-cost standby electrical power for a wide variety of applications are now available. Just write: Solar, Department P-266, San Diego, California 92112.

**SOLAR**

DIVISION OF INTERNATIONAL HARVESTER COMPANY

For more data, circle 128 on inquiry card
Pre-filed catalogs of the manufacturers listed below are available in the 1967 Sweet's Catalog File as follows.

### A
- Aerofin Corp: 235
- Air Devices, Inc: 30
- Air Guide Corporation: 18
- American Air Filter Co: 68, 69
- American Saint Cobain Corp: 12-13
- American Standard, Plumbing & Heating Div: 34
- American Telephone & Telegraph Co: 37
- Anaconda American Brass Co: 169
- Anchor Post Products, Inc: 232
- Andersen Corp: 205 to 208
- Architectural Record: 242-243
- Armstrong Cork Co: 2nd Cover, 1, 177
- Aurora Pump Div, New York Air Brake Co: 230

### B
- Bally Case & Cooler, Inc: 86
- Bangkok Industries, Inc: 222
- Barber-Colman Company: 78-79, 225
- Basalt Rock Co, Inc: 32-1
- Baxter, J. H: 194
- Bell Telephone System: 37
- Bethlehem Steel Corp: 190-191
- Blue Diamond Div, The Flintkote Co: 32-2
- Blue-Ray, Inc: 105
- Borden Metal Products Co: 45
- Bradley Washfountain Co: 212D

### C
- Carpenter & Co., L. E: 2128
- Carrier Air Conditioning Co: 33
- Celotex Corp: 50-51
- Cleaver Brooks Company: 240
- Collins & Aikman: 49
- Cookson Co: 17
- Corbin, P&F, Div, Embart Corp: 203
- Cramer Industries, Inc: 204
- Crawford Door Company: 239

### D
- Dover Corp, Elevator Div: 3-3
- Dow Chemical Co: 20
- Dur-O-Wal, Inc: 53

### E
- Eastern Products Corp: 3rd Cover
- Eaton Yale & Towne Inc, Yale Div: 108
- Eggens Hardwood Prods, Corp: 186
- Electric Heating Association, Inc: 187-188
- Engineered Products Co: 198

### F
- Flat Prods, Dept, American Cyanamid Co: 76
- Formica Corp: 231
- Fuller Co, H. B: 61

### G
- Garrett Corp, Air Research Mfg Div: 102
- General Electric Co: 38-39
- General Fireproofing Co: 24
- Georgia-Pacific Corp: 71
- Goodyear Tire & Rubber Co: 228
- Gypsum Association: 189

### H
- Hager Hinge Company: 233-234
- Haughton Elevator Company: 195
- Haws Drinking Faucet Company: 7
- Hickman Co, W. P: 176
- Honeywell: 23

### I
- Index Creations, Inc: 76
- International Steel Co: 196
- ITT Neubit, Inc: 50-91
- Jamison Door Co: 22
- Josam Mfg. Co: 92

### J
- Kanevich Co: 184-185
- Kelley Co, Inc: 198
- Kinney Vacuum Div, New York Air Brake Co: 212C
- Krueger Metal Products Co: 96
- K-S-H, Inc: 168
- Kwil-Wall Company: 95

### K
- Laminating Services, Inc: 373
- LCN Closers, Inc: 56-57
- Levolor Lorentzen, Inc: 64-65
- Libbey-Owens-Ford Glass Co: 197, 213 to 216
- Lightolier, Inc: 99
- Loren Cook Co: 190
- Ludowici-Celadon Co: 212
- Lyon Metal Products, Inc: 217

### L
- Marshall Tiles, Inc: 15
- McGraw-Hill Book Co: 2128
- McPherson Lighting Div, Emerson Electric Co, Inc: 245
- McQuay, Inc: 218-219
- Medusa Portland Cement Co: 98, 209
- Modine Mfg Co: 58-59
- Montgomery Elevator Co: 70
- Muson Rubber Co, R. C: 222

### M

### N
- National Gypsum Co: 183
- Nichols Wire & Aluminum Co: 19

### O
- Orco Industries, Inc: 68
- Otis Elevator Co: 222
- Owens-Corning Fiberglas Corp: 233-234

### P
- Pella Rollscreen Co: 23
- Pennsalt Chemicals Corp: 33
- Pittsburgh Plate Glass Co: 179
- Plan Hold Corp: 37
- Pomona Tile Mfg Co: 33
- Ponderosa Pine Woodwork: 37
- Portlatch Forests, Inc: 23
- Pratt & Lambert, Inc: 37
- Prestressed Concrete Institute: 23
- Price Piller Brass Mfg Co: 37

### R
- Red Cedar Shingle & Handsplit Shake Bureau: 23
- Revere Copper & Brass, Inc: 37
- Reynolds Metals Co: 37
- Robbins Products, Inc: 37
- Russwin, Div, Emhart Corp: 23

### S
- Sanymetal Products Co, Inc: 23
- Sargent & Company: 37
- Schenmaurer Mfg Co: 37
- Schlage Lock Co: 23
- Shell Chemical Co: 37
- Sloan Valve Company: 245
- Smith & Co, Inc, Elwin G: 37
- Soil Pipe Div, Tyler Pipe & Foundry Co: 245
- Solar Div, International Harvester Co: 245
- Spancrete Mfrs, Asso: 37
- Span-Dek Mfrs, Asso: 37
- Speaker Company: 37
- Square D Company: 37
- Standard Conveyor Co: 37
- Stevens & Co, Inc, J. P: 37
- Stewart & Stevenson Services, Inc: 37
- Sturgis Company: 37
- Summitcrest Carpets, Inc: 37
- Sweet's Catalog Service: 37
- Sylvan Electric Products, Inc: 74
- Symons Mfg, Co: 37

### T
- Talk-A-Phone Co: 23
- Taylor Co, The Halsey W: 174-175
- Thermoproof Glass Co: 23
- Thissol Chemical Corp: 23
- Tile Council of America, Inc: 23
- Tremco Mfg, Co: 23
- Trinity White, General Portland Cement Co: 23
See Sweet's.
24,964 pages of detailed product data.

In your Sweet's Files you'll find useful, readily available information from 1,497 manufacturers, including most of those listed in the adjoining index (see codes).

Save time. For immediate details, reach for your Sweet's Architectural Catalog File, Sweet's Industrial Construction Catalog File, or Sweet's Light Construction Catalog File.


Sweet's pays

For more data, circle 729 on inquiry card
When the sun gets too hot, cool off with Stevens COMFORT SCREEN.

Comfort Screen is a woven fiber glass fabric made for the control of solar heat and shade.

**Easy to install** in exterior fixed frames or on interior shade fixtures.

**Reduces interior temperatures** by blocking or reflecting solar heat.

**Reduces air-conditioning costs** both initial and operating.

**Permits see-through visibility** and, incidentally controls insects when used in exterior applications.

**Very low maintenance costs**—can be cleaned with soap and water or vacuumed.

Available in cool white, leaf green, aqua and grey. Stevens Comfort Screen Brochure 15e-St available in Sweets Catalogue. For other technical brochures on Comfort Screen and insect screening, write:

J. P. Stevens & Co., Inc.,
Fiber Glass Screening,
1460 Broadway, New York,
N.Y. 10036.

Stevens

For more data, circle 130 on inquiry card