A RESEARCH LIBRARY FOR NORTHWESTERN UNIVERSITY BY NETSCH OF SOM
A SCHOOL FOR SMALL CHILDREN AS BIG AS ALL OUTDOORS
A PARABOLIC-ARCH HOUSE BY BREUER AND BECKHARD
BUILDING TYPES STUDY: OFFICE BUILDINGS
FULL CONTENTS ON PAGES 4 AND 5

ARCHITECTURAL RECORD
JULY 1970 A McGRAW-HILL PUBLICATION TWO DOLLARS PER COPY
For the men's shop, floor planners chose the warm look of inlaid brick and wood—the Dungate™ design in Coronelle Vinyl Corlon. A major element in the total decor, Dungate's bold pattern makes the few seams disappear.

In the gift area, Coronelle Vinyl Corlon in the Briarcrest™ design provides the understated elegance of ceramic tile with medallion insets. A special feature is Briarcrest's "2-inch match". While the pattern repeats every 54 inches, it can be matched every 2 inches, to save material. (Floor design copyrighted by Armstrong.)

This is the Jewel Turn-Style Family Center in Merrillville, Indiana. Under one roof is everything from a supermarket to a gift shop to a haberdashery. Also under one roof is a variety of distinctive Armstrong floors.

ARCHITECT: Teutsch Associates, Inc., 9575 Higgins Road, Rosemont, Ill.
INTERIOR DESIGNER: Bob Cavennaugh, Jewel Turn-Style, 3030 Cullerton Drive, Franklin Park, Ill.
FLOORING CONTRACTOR: Mammas & Zeheralis, 3746 Arthur Street, Gary, Ind.

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Armstrong

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Dover designed a special Oildraulic® Elevator to meet the unusual requirements of the Squaw Valley Cable Car Terminal at Olympic Valley, California. The car measuring 11' 6" x 28' will take 120 skiers (one cable-car full) from the main entrance level to the cable car level. The car is glass-walled, and moves in a glass-enclosed hoistway with no clutter of overhead cables or machinery. Total lifting capacity of 45,000 lbs. is provided by the powerful Dover Oildraulic cylinder and power unit. ARCHITECTS: Shepley, Bulfinch, Richardson & Abbott, Boston, Massachusetts. GENERAL CONTRACTOR: Campbell Construction Co., Sacramento, California. PHOTOGRAPHER: Julius Shulman, Los Angeles. Dover Oildraulic Elevators installed by Valley Elevator Co., Sacramento, California.
Dover delivers
elevators to give a lift to 120 skiers at once,
or to a single handicapped child.

At Litchfield Junior High School, Litchfield, Conn.,
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ed so that handicapped students might move more
easily among the three classroom levels. Like the
school, the elevator is distinctive, being pre-engi-
neered to fit a specified hoistway size and thus sav-
ing on engineering costs and delivery time. OWNER:
Town of Litchfield, Connecticut. ARCHITECT: John
M. Johansen, FAIA, New York City. GENERAL CON-
TRACTOR: C. H. Nickerson & Co., Inc., Torrington,
Connecticut. PHOTOGRAPHER: John Veltri, New
York City. Dover elevator installed by Eastern Ele-

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traction elevators for high-rise
buildings. Write for catalogs.
Dover Corporation, Elevator
Division, Dept. A-7, P. O. Box 2177,
Memphis, Tenn. 38102.
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60 Evaluating hidden cost factors
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SOM partner Walter Netsch designed this building in 1964, and it is now just complete. A major work of architecture, it marks a transitional phase in the development of Netsch's current design approach, leading to the crystallization of his well-known 'field theory'.

97 A school for small children as big as all outdoors

Architect Gary Lindstrom has designed a lower school building for the New Canaan Country School campus that is white and bright, as full of light as it is light-hearted.

101 It's Not Just the Cities, fifth in a series by Albert Mayer

Last month, Mayer listed the great issues, limiting the kind of development we are going to maintain. The first of these—Land as a Public Resource vs. Speculative Commodity—was discussed in the last article. In this article, Mayer discusses Slogansen vs. the Real Action Courses.

107 Two industrial buildings

Two buildings—one a technical center for an engine company by architect Harry Weese, the other a garment distribution center by architects Knorr-Elliott—show that handsome results are obtainable by the simplest means, used with sophistication and restraint.

115 A parabolic-arch house by Marcel Breuer and Herbert Beckhard

Seemingly a radical departure from Marcel Breuer and Herbert Beckhard's residential architecture, this house uses a concrete parabolic arch for its structure. But it is, on study, unmistakably the architects'.

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119 Three office buildings

These three buildings are different in size—one is a six-story commercial and architects' office in Cambridge, Massachusetts; one is fifteen stories high on a crowded site in Chicago; and one is a prestigious fifty-two story bank in San Francisco—but they are all very much alike in what they do successfully. These office buildings show a common ability to enhance the city immediately around them; to make that part of the city a better place to be in by providing additional closure for a fragmented street or a new visual strength and assertiveness in the midst of chaotic commercialism, or by providing additional pedestrian open space on an intensely-used downtown block.


122 Blue Cross and Blue Shield Building, Chicago. Architects: C. F. Murphy Associates


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133 Equipment that works on the refuse disposal problem

Presently, refuse is either burned or dumped. The problem is that incinerators for apartment buildings, schools and other buildings make smoke, and solid waste has been taking up too much space. Incinerator smoke can be virtually eliminated with a type of collector called a scrubber. Solid waste can be shrunk in volume with a device called a compactor. This article tells how the equipment works, the quality aspects that should be considered, and how much space is required.

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presidents: John J. Cooke, senior vice president and secretary; Gordon W. McKinley, vice president and treasurer.

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THIS ISSUE is published in national and separate editions. Additional pages of separate edition numbered or allowed for as follows: Western Section 32-1 through 32-4.

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ROBERTSON
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Wouldn’t it be nice if everybody had a trust fund?

In the latest issue of the ARCHITECTURAL RECORD NEWSLETTER, written by our Washington editor, Ernie Mickel, there’s an item headed: “A.I.A. supports highway and mass transit trust funding.” Mickel reports that “William L. Slayton, executive vice president, American Institute of Architects, urged Congress to legislate a unified trust fund for roads and mass transit. He said architects would like to see highways, subways, bus and rail rapid transit financed from a single transportation trust fund generated from user taxes.” But Mickel reports that, somewhat predictably: “Road building interests [and no doubt truck interests, the American Automobile Association, et al, et cetera] oppose the lumping of mass transit with highways; want the present single-purpose trust fund continued.”

Well, it’s easy enough to see why. For the past 41,000 miles (since the early 1950’s) that segment of the building industry concerned with highway construction has been rolling merrily along, come hell or high water or tight money. We are now—and have lately been—spending something like $8 billion a year on highway construction. $4.5 to $5 billion of this comes out of the Federal highway trust fund—funds earmarked out of user taxes on trucks, gasoline, tires and the like. This unique Federal disposition of money (I wish more of my taxes went for things I liked and needed) is, as has been pointed out on this page before, many many times more money than goes into, say, Model Cities. And it is enough, unless my long division is off, to pay outright for the construction of at least a quarter million housing units, complete with wall-to-wall carpeting, per year. All this is not to mention the $2 billion to $3 billion that state and local governments add to the kitty so that the Federal money doesn’t go to some less deserving (i.e., other) state or locality.

Mind you, I am not now, nor have I ever, advocated the violent overthrow of the Federal Highway Program. I understood back in the 1950’s, I still do, that in the interests of The National Defense we had to have some alternate to the railroad system to move troops and materiel from here to there. But I find that I can now also get to Mount Mansfield (Stowe, Vermont, to non-skiers) in three hours instead of the seven hours it took ante-Interstate 84. (Except that now I have to drive, which I hate, instead of having the alternate choice of the ski trains that were a lot of fun and that ran until the new highways put them out of business.) So I sometimes wonder, on my way to Vermont, whether we haven’t forgotten why the highway trust fund got started and shouldn’t start wondering about alternate uses for all that earmarked money.

I also wish to state unequivocally that I have nothing against trust funds. I wish—for instance—that there were trust funds for slum rebuilding, low-income housing, moderate-income housing, parks and recreation land, air-pollution control, water-pollution control, all kinds of physical and mental-health facilities, and schools—from day-care centers to graduate schools for the doctors we need so badly. I wish I had a trust fund. There has just been signed in Washington a $3-billion user-tax-paid trust fund for the construction of airports over the next five years.

So—while I am against neither the Federal Highway Program, nor trust funds, nor Bill Slayton’s proposal for a unified trust fund for roads and mass transit—it does seem that maybe now is the time to reconsider the whole idea of trust funds—and instead collect the tax money and then trust the Congress to listen to all the arguments and put the money where it is now most needed.

George Christie, the chief economist of McGraw-Hill Information Systems Company, put it well and strongly to the House Subcommittee on Fiscal Policy, chaired by the Hon. Martha W. Griffiths of Michigan: “Maybe we have reached a point where the trust fund concept itself ought to be looked at. Can we determine 10 or 15 years in advance, as we thought we could back in the early 1950’s, that earmarking $7 to $8 billion a year would be the best and most efficient and most appropriate allocation for our resources in 1969? I rather think that if we had options on how we wanted to spend this money today we might spend it differently. . . . I point this out,” Christie continued, “because there is under consideration [the bill had not yet passed] the notion of doing virtually the same thing in the area of airport construction. We are considering a trust fund approach for airports to be built over the next 10 years. Certainly we need airports. . . . I would not want to see, however, the solution of this problem take the rigid lines it did in the highway trust fund approach of the past decade. I would want to see more flexibility built into the funds provided for airport needs in the future. . . . The question should be asked: Can we really determine priorities that far in advance?”

The answer, of course, is no. And so as long as everybody can’t have a trust fund, how about everyone taking their needs and goals to the appropriation committees?

—Walter F. Wagner, Jr.
Powerful postscript to "Why Not a Nationwide Plan for Recreation"

In the May issue (page 131) senior editor Betty Thompson made an compelling argument for a strong national plan for recreation land use. Pointing out that the National Outdoor Recreation Plan, prepared by the Bureau of Outdoor Recreation, has never been published, Mrs. Thompson said: "No one knows whether it is a good plan or a bad one, whether its scope is indeed broad enough to meet the needs of a growing population and an increasingly urban one, whether it is imaginative or innovative, whether it is flexible or inflexible. Yet there was never a time in this country's development when a plan based, one must hope, on an intelligent study of the needs, means, wants and dreams of the American people was more needed to assure a constructive, beneficial, rewarding use of leisure time—and the best and most far-sighted handling of our natural resources."

Soon after that story went to press, Secretary of the Interior Hickel similarly stressed the need for planning in his proposal to raise the Land and Water Conservation Fund—made up of revenues from outer shelf mineral leasing, Federal recreation area entrance and user fees, sale of Federal surplus property and motor boat fuel taxes—from the present $200 million to $300 million. "It is urgent," he said, "that we move now to bring recreation opportunities to the people... especially in the urban areas where the needs are the most out of balance, suitable open spaces are getting scarce and land costs are spiralling. Three quarters of the population live in and around our major cities... We must bring more parks to the people to relieve the social pressures in these crowded areas... We have got to keep our authorizations and appropriations parallel so that we can pay for our recreation areas at the same time that we select them."

As Mrs. Thompson points out: "All the more reason why a comprehensive plan for the recreation needs of this country should be made, published, discussed and, finally, after due consideration, adopted. Without it, it will be impossible to establish the balance mentioned by Secretary Hickel. With it we can not only bring parks to the people, but preserve both the quality and variety of outdoor experience."

Borrowable idea: architectural tours guided by architects

According to W. R. Hasbrouck, executive director of the Chicago Chapter of the A.I.A., the Chicago architects have inaugurated a program of architectural tours. Two are offered to organized groups upon request: the Chicago School of Architecture tour and a Frank Lloyd Wright tour of Oak Park and River Forest. All tours are given on glass-topped sight-seeing buses by trained architectural guides. The tour program started in 1968 by the firm of Fitch Larocca Carington Jones.

"During the past two years," reports Robert Carington, "we have exposed thousands of people to the treasures of Chicago architecture. Our tours have been given to groups ranging from grammar school students to alumni associations."

The chapter charges $3.50 per person for the Chicago School tour and $5 for the FLLW tour.

Architects and the single-family house: lots of involvement

Just how involved are architects in the design of single-family houses? The RECORD's Research Department recently made a survey to update its answer to that question for sales-promotion purposes. The results interested me greatly, and—thus—are reported here:

Last August, a survey was mailed to a national cross section of 1,000 architectural firms whose names appeared on the 1969 market list for Sweet's Architectural Catalog File. There were 341 returns (34.1 per cent). The summary of findings:

1. 85 per cent of the architect respondents design houses.
2. In the last year, 70 per cent had designed houses for individual owners—20 per cent had designed houses for builders.
3. In the last year 237 architect respondents had designed for individual owners a total of 866 houses valued at $48,214,000.
4. In the last year 68 architect respondents had designed for builders a total of 2,687 houses valued at $65,070,000.
5. The cost of the average house designed for individual owners was $54,400. The average house designed for builder clients cost $24,400.
6. 46 per cent of the architect respondents say they make money designing houses—54 per cent say they don't.
7. 42 per cent of the architects indicate that they experiment with ideas in houses that they later apply to non-residential work.

Coming in the RECORD next month

The new format of the Table of Contents (see pages 4 and 5) squeezed out the "Coming in the Record" section that we have published for so many years. Henceforth, therefore, it will appear here.

August will include: a 16-page feature on Interiors, including a report on Neocon 2 as well as a portfolio of first-rate architect-designed interiors. Also: a Building Types Study on airports, a kind of design that is being rethought in offices across the country because of the impact on terminal facilities of the 747. There will also be presentations of Kevin Roche's Knights of Columbus building in New Haven, and Raymond Moriya's Ontario Center of Science and Technology.
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With a little obvious prejudice, we think it bodes well that the home of the nation’s Federal housing program is so solidly and handsomely headquartered.

Architects: Marcel Breuer and Herbert Beckhard.

Photograph: Ben Schnall
Architectural precast concrete knows virtually no restriction in shape, size, color, texture and depth of design. With it, you will know no restraint save architectural and structural integrity. These thoroughly practical panels react to light and shadow to create surfaces of sculptural intensity, brightening the face while adding brawn to modern building design. Perhaps that’s why so many of today’s most inventive architects, in creative partnership with precasters who transform design into concrete reality, are turning in ever-increasing numbers to this supremely versatile material.

The telescoping of construction time is yet another of prestressed concrete’s attributes. And who knows better than you do the bite on-site labor costs take from today’s building budgets? While site preparation and foundation work proceed, precast prestressed units are mass produced in the plant and move to the site on schedule for placement directly from truck to structure. Prestressed concrete members fit together so quickly and with such nice precision that your most anxious, eye-on-the-calendar client intent on early occupancy will approve.

Another structural method employs post-tensioned prestressed concrete. When cast in place, this type of construction takes on any shape you choose. Post-tensioning is often used to tie precast prestressed concrete units together. It is also combined with precast construction when continuous slabs are desired. For example, parking decks are frequently post-tensioned while precast units are used for structural framing. In segmental construction, now in ever-widening use, precast members are post-tensioned together to further extend the already long-span capability of precast prestressed concrete.

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For more data, circle 11 on inquiry card
Cast-in-place white concrete goes tall in Tulsa

Tulsa's sparkling new City Hall and Police Court complex represents a unique collaboration between architect, concrete consultant and contractor.

Design specifications called for an eleven story cast-in-place concrete post and lintel exposed construction—of subtle texture and warm white color. Trinity White, with its superior uniformity and whiteness, was combined with aggregates to produce the color tone desired. Special fabrications fiberglass reinforced plastic forms were used in the casting process. Then, light sand blasting revealed the natural color of the aggregate—the only finishing required. Results: a graceful exterior that will retain its appearance, with little or no maintenance, for decades to come.

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The effective use of pre-cast concrete panels coupled with cast-in-place white concrete that is clean and uniform, opens a whole new world of flexible architectural design possibilities. Tulsa’s new cast-in-place City Hall is beautiful evidence.

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Put PPG Performance Glass to work in your next building. It can help realize significant savings in mechanical systems costs, reduce brightness, aid in temperature control or reflect to enhance the exterior design.

Contact a PPG Architectural Representative for technical data or write: PPG INDUSTRIES, One Gateway Center, Pittsburgh, Pa. 15222.

PPG is Chemicals, Minerals, Fiber Glass, Paints and Glass. So far.

For more data, circle 15 on inquiry card
New Denver tower... Prudential Plaza will have 1200 fpm Montgomery elevators.

[Prudential Plaza, joint venture of Del E. Webb Corp., and Prudential Life Insurance Co. of America, is the first major investment in Denver’s Skyline Urban Renewal Project.]

Montgomery Elevator Company’s more than one million dollar installation in the new 27-story office tower will include four high-rise 1200 fpm gearless elevators, five high-rise 700 fpm gearless elevators, and four low-rise 300 fpm geared elevators. All high rise units will be under the command of Montgomery’s latest group supervisory control, ESP Measured Demand, with Zones of Service. The result will be Denver’s fastest elevators, and the Mile-High City’s most efficient elevator system.

Montgomery will also install two 48” escalators in the Mall section of Prudential Plaza.

This combination of People-moving capability is characteristic of Montgomery Elevator Co.: high speed, high-rise elevators; mid-range elevators; low-rise oil hydraulic elevators; escalators with exclusive two-steps-level entry and exit; moving walks and ramps; powerful heavy-duty oil hydraulic freight elevators; and hundreds of special designs to satisfy unusual requirements. In all these ways, Montgomery moves people—dependably, quickly, safely.

Architect: Flahow, Moore, Bryan & Fairburn; Albuquerque
General Contractor and Owner: Del E. Webb Corporation; Phoenix

For more data, circle 16 on inquiry card
LENNOX PRESENTS

a season for shoppers

...the modular concept in year-round comfort

In Beachwood, Ohio—
a Cleveland suburb—LaPlace
shopping center blends
New Orleans elegance with modern convenience and year-round comfort
in some forty businesses such as (clockwise from lower left): the Inner Circle restaurant,
Le Potpourri gourmet shop's wine cellar, the mall, and Park View Federal
Savings & Loan Association. (See next page for credits.)

The modern merchant recognizes the sales value of shopper comfort. Storewide or through an entire mall, it's good business to keep the temperature even, the air fresh, the comfort continuous. And the economics are especially sound where the comfort comes from Lennox modular heating and air conditioning systems. With comfort designed in from the start.

...continued overleaf
The 63,000-sq. ft. LaPlace shopping center utilizes the modular comfort concept of heating/cooling/ventilating each shop or office with its own unit or units. Among the 180 tons cooling installed, Lennox equipment serves comfort needs from the rooftop—single-zone, single-package air conditioning with electric heat elements in the cabinets. Architect: Andonian & Rusza. Owner: Park View Federal Savings & Loan Association (James W. Male, president). General contractor: The Bolton-Pratt Co. Heating & air conditioning contractor: The Brewer-Garrett Co.

continued...

**shoppers' season: a modular comfort concept**

In shopping center planning, Lennox modular heating and air conditioning systems offer everything that’s needed: comfort, economy, flexibility, design freedom. For initial cost savings, there are Lennox rooftop flash-in-place mounting frames, shortened duct runs. Plus time-and-labor savings from factory assembly, wiring and testing—including electric or pneumatic controls. For predictable long-range savings: quality-built systems with long life, little maintenance. And extended guarantees on critical components.

The modular nature of Lennox equipment prevents a total system breakdown. If failure occurs, only one area is out of service. And, because repairs usually are simpler, recovery is faster. Then, there’s Lennox single-source responsibility for equipment and controls; if anything does go wrong, it’s on our back.

Compact, low-silhouette Lennox units protect your design freedom. Modular concept simplifies future growth. Scores of systems to choose from. All capacities. Single-zone or multizone. Rooftop or ground level. Compatible combinations. Any fuel. Before planning your next development, consider the esthetics, the comfort, the economics, when the comfort’s from Lennox.

See Sweet's 29a/Le, or write Lennox Industries Inc., 804 S. 12th Avenue, Marshalltown, Iowa 50158.
Glamorous Centre Laval in Montreal is 400,000 sq. ft. of patron convenience and comfort—in fifty stores, six restaurants and the mall itself. The major portion of its shoppers’ season—all-year heating/cooling/ventilating—comes from Lennox single-zone modular equipment: 53 combination rooftop gas/electric units and 17 remote cooling units. Lennox supplied the units for all the allied stores for a total capacity of 433 tons cooling, 15,870,000 Btuh heating. And some 90% are equipped with Power Saver™ which cools free when the outside air temperature is below 57°F. Architects: Mayers and Girvan. Mechanical Engineer: Levine & Jonas. Owners: Centre Laval, Inc. Owner/Developer: Fregoe Construction, Inc.

Phase II of The Mall was a major expansion, almost doubling the original 332,000 sq. ft. of the giant Louisville, Kentucky, shopping center. Shoppers’ comfort in eighteen of the twenty stores, plus the mall, is assured by Lennox single-zone combination gas heating/electric cooling units. The twenty rooftop units, rated 3 to 22 tons, provide more than 200 tons cooling capacity. Architects: Katzman & Associates, New York City. Owner/developer: The Rouse Company, Columbia, Md. Heating/air conditioning contractor: Hussung Mechanical Contractor, Inc.
Proven results

Kawneer wall/window capability tames the elements on any size building.

Ground zero to top, the ultra-rise wall/window installation has to stand up to the widest, wildest range of turbulence and temperature of every weather condition.

So—as a result of Kawneer's attention to detail on many of America's most emulated larger buildings—Kawneer wall/window systems handle more modest size installations in stride. The Kawneer-clad building—commercial, educational, institutional, or apartment—keeps the outside out, the desired environment within.

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HIGH NEGATIVE PRESSURE

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CIRCULATING RAIN, SLEET, SNOW
BLANKET HUMIDITY
LOW NEGATIVE PRESSURE

Bank of America, San Francisco, Calif.
Architects: Wurster, Bernardi and Emmons
Skidmore, Owings and Merrill
San Francisco, Calif.

General Contractor: Dinwiddie, Fuller and Cahill
San Francisco, Calif.

Kawneer Company, Inc., a Subsidiary of American Metal Climax, Inc., Niles, Michigan • Richmond, California • Atlanta, Georgia • Bloomsburg, Pa. • Kawneer Company Canada, Ltd., Toronto

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THE KAWNEER CONCEPT:
Attention to detail

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Architect: Linscott, Kiene and Haylett
Kansas City, Mo.
General Contractor: Bob Eldridge Construction Co.
Kansas City, Mo.
Light is to look your best by. And here's new Ultra-Lite®, to match your motif by.
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Four 1000-watt mercury vapor or metal halide lamps
see to that. With light on the ground, not in somebody's eyes.
New Ultra-Lites. They're the newcomers among hundreds of light touches we can show you.
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Accesso is the most convenient ceiling system ever. What's more, Accesso members aren't locked permanently, so you're not locked into the building module. You're free to locate, and relocate, lighting fixtures and air-handling devices wherever you like. And because the Accesso system—exclusively—can also be used to suspend metal-pan ceilings in high-humidity areas, you can specify just one ceiling system for the whole building.

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KEENE CORPORATION

SOUND CONTROL DIVISION

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The door not only opens in a swinging arc, but also shifts laterally away from the jamb. What a difference this makes for flush-mount precision! Paneled walls can have doors about anywhere you wish without framing, clutter, or gaps. No other pivot can give this two-way movement. No other pivot hinge can show off door action to such good advantage.

Let your Hager representative show you the desk-top miniature that reveals all that's hidden.

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News in brief

The Dodge Index of architect-engineer planned construction rebounded in April to 277 (1957-59=100). The latest month’s seasonally-adjusted advance was due mostly to renewed strength in industrial and commercial building. Institutional construction sagged in April as educational and religious construction had financing problems. Apartment projects gained.

A unified view of the global effect on climate of pollution is the goal of a major M.I.T. conference of authorities on many aspects of the problem. One purpose of the conference, which will run throughout this month, is to do “homework” for the 1972 United Nations Conference on Man and the Environment. The aim will be to ascertain rates, routes, and reservoirs of pollutants, to study their global effects and to determine what options are available to us and what priorities need to be established.

Construction workers’ demands could double wage rates in three years, according to a spokesman of the Associated General Contractors of America, who argues that productivity has only increased at the rate of 1 per cent per year during the last five years. According to the AGC, construction strikes are up 100 per cent over the same period a year ago with settlements averaging over 18 per cent a year.

The Labor Department’s “Washington Plan” will require contractors on Federally-assisted projects in the Washington, D.C. area to employ increasing percentages of minority workers over the next four years. Directors of Metro, which is building the city’s subway, wholeheartedly adopted the plan.

Chrysler Realty Corporation will build the largest planned community in Michigan, working with Levitt and Sons, Inc. Northfield Hills, which will be a suburb of Detroit, will also be the first community to be developed under the state’s new zoning concept of Planned Neighborhood Development. Architect Minoru Yamasaki is in charge of over-all architecture and master plan.

A joint venture company to deal with environmental problems has been formed by ten leading engineering firms in the San Francisco Bay area. Engineering Research Associates (acronym ERA) will bring together more than 300 engineers and architects to give pollution control and waste disposal problems a broad-based approach.

A slowing rate of U.S. population growth may reduce the need for new town construction, according to a report done by William Alonso, of the department of City and Regional Planning, University of Calif. at Berkeley. The report says the U.S. population will increase by 75 million by the year 2000 at the present rate of growth, rather than the widely accepted estimate of 100 million. Present metropolitan areas are said to be able to absorb about 80 million more. That moves the saturation point up to the year 2002.

Planned Unit Developments are the housing wave of the future, according to architects and developers who met last month at the Pacific Coast Builders Conference. Architect Charles Delk, A.I.A, told the conference the public must be educated to the virtues of cluster housing. Also at the conference, Oakland Hunter, president of the Federal National Mortgage Association promised “Fannie Mae” would maintain its support of the homebuilding industry despite the stresses of the current money market. Three business leaders told the conference the biggest contributor to the slowdown in the purchase of homes is the feeling of uneasiness regarding the political situation abroad and domestically.

American Institute of Steel Construction Architectural Awards of Excellence entries must be received by September 1. The $4,000 Pilkinson Travelling Scholarship in Architecture, the richest prize open to young Canadian architects, went to Ronald W. P. Hoffart, a 23-year-old graduate of the University of Manitoba’s School of Architecture, for his “new urban living mode,” a plan for restructuring Winnipeg through decentralization and mixture of functions. The 1970 Eaton Yale and Towne Urban Design Fellowship of $5,200, administered by the A.I.A., went to Donald R. Simpson of Philadelphia. The Grand Award of the New York Association of Consulting Engineers’ Engineering Excellence Awards program went to the Newport Bridge, Newport, R.I., the U.S. Steel Building in Pittsburgh, and the John F. Kennedy Center for the Performing Arts in Washington, D.C. Architect Marcel Breuer received First Prize in the structural category for his New York University Technology II Building.
Worcester, Mass. opts for high-quality renewal

A group of prominent architects and planners are putting their stamp on Worcester, Mass., in a major way. In 1966, the city held a competition for the rebuilding of a large portion of its downtown core, to include local stores, two large department stores, Filene’s and Jordan Marsh, neither of which are used to building in inner city areas, two office buildings, a 4,500-car garage, and a 360-room hotel and convention center. Welton Becket and Associates, Architects won with a design that included a 475-foot long by 62-foot high shopping “Galleria” (above). Graphics for the Galleria, as well as the hanging light sculptures shown, were designed by Chemayeff and Geismar. Other art works for the Galleria were chosen by Annie Damaz (see also “City Walls” below). The Becket project will form an “L” around the city’s common, which, itself, is being redesigned by landscape architects Sasaki, Dawson, DeMay Associates. The multistory garage will border the outer edge of the project.

Worcester Center Associates, the developer, is a joint venture of the Beacon Construction Company and the Berenson Corporation. The work is under the supervision of the Worcester Redevelopment Authority. Several other notable buildings are rising in downtown Worcester. Architects Sert, Jackson & Associates, Inc., will do a theater near the hotel. Curts and Davis will do the nearby library. Benjamin Thompson and Associates, Inc. have designed an apartment tower; and Kevin Roche John Dinkeloo and Associates have designed an office tower (July 1969, page 42).

Architects recommend mini-freeway system for Phoenix area

A transportation concept replacing the usual urban freeway with a network of small, narrow, limited access roadways, is being recommended for Scottsdale, Arizona by a team consisting of Taliesin Associated Architects, Earle V. Miller, Engineers, and John D. Herbert and Associates, Economists in a study prepared for the Arizona Highway Department. The roadways would be built for auto traffic alone, deferring construction of truck routes until they were more necessary than they are now. This would result in cheap, light, esthetically appealing (or, at least, less damaging) structures.

Dendraten: structure designed for cities in the sky

“Within ten years ... There will be no wheels and no roads but only anti-gravitational transport”—Marshall McLuhan, 1968. Anticipating this not-so-far-fetched possibility, two Italians who may or may not have read McLuhan, Massimo Maria Cotti and Tullio Rolandi, have designed a dwelling tree permitting direct access to any level from external space. It is, they say, a tree for the atomic age, a “Dendraten.” They have put out a small book with beautiful drawings to illustrate the concept.

The book argues town and housing design would automatically and radically change upon the introduction of air cushion vehicles. Dendraten houses would be “nests” in the branches of a tree whose trunk could contain necessary social services such as stores and recreation facilities and whose roots would contain independent heat and power sources. Each branch would have a small garden restricted to the use of the few families whose living cells were attached to it.

NASA plays the World Game

“Ecological Surveys from Space” is the name of a new illustrated book put out by the National Aeronautics and Space Administration. “With cameras and other sensing devices on orbiting satellites, the whole world’s surface can be surveyed in a variety of ways, as often as necessary, to help meet increased demands on the Earth’s resources,” says NASA. The first Earth Resources Technology Satellite will go into orbit in 1972.

Environment group brings architects into the act

The Environmental Action Coalition, a New York City organization which, among other achievements, organized an enormously successful Earth Day (May, Page 40) is getting architects involved in a personal and hard-working way. The Coalition’s leader, Fred Kent, who is in his mid-twenties, studied urban planning at Columbia University, where he met many of the planners and architects now working with him.

Fred Kent believes it’s imperative that architects get involved, not just as architects, but as individuals. This non-architectural, non-professional commitment, he says, is just as important as the ability to design a better environment. Many of the problems are so pressing and immediate, the only solution is to go in and fight, publicity being the ultimate weapon. Architect Lee Harris Pomeroy, for example, helped organize the highly successful rejuvenation of the block on which he lives, but he now finds himself on the garbage commi-
A host of innovations mark two new rapid transit systems

Pittsburgh’s new Transit Expressway (above) will consist of computer-controlled cars moving on rubber tires. The vehicles were chosen because of their lack of noise, simplicity of operation and non-pollution. They run on their own wide tracks. Speed—sometimes as low as 15 mph at a switch—is the only drawback, but on the 11-mile line now being built it isn’t a serious problem.

BART, the San Francisco Bay Area’s new rapid transit line, is said to be the fastest in the world—top speeds of 80 mph—and it will be automatically controlled by computers (above right). The console operator can talk directly to train attendants and make announcements to passenger stations. Support facilities, such as ventilation fans and fire alarms will also be under surveillance from the central computer console.

U. Mass./Boston: Immense new campus to rise by the sea

On Columbia Point, a spit of land on Boston’s southeast edge, the Boston campus of the University of Massachusetts is to be built. It will be the largest building project ever undertaken by the Commonwealth of Massachusetts and will attempt to make the utmost use of a confined site.

Architects Pietro Belluschi and Sasaki, Dawson, DeMay Associates, Inc. designed the master plan. Fourteen major buildings are to be completed by 1980 for the use of 15,000 students. The first phase will include a science center by Anderson, Beckwith and Haible; the first of six “colleges” by Halde- man and Goranson Associates, Inc.; a second college by Cambridge Seven Associates, Inc., a library, the university’s domin- iant building, by Harry Weese and Associates; an administration building by Marvin E. Goody and John M. Clancy, Inc., and a central service building by Geometrics, Inc. All except Harry Weese (Chicago) are local firms.

The buildings will be closely coordinated with regard to materials, size, shape and circulation patterns, for which criteria appear in the master plan. The six colleges will be academic as well as social units. A one-way road loop will encircle the campus. Pedestrian circulation will include a long seashore promenade. The planners hope the community will make use of this facility, as well as several academic buildings to be open for community use.

Follow-ups

Alcatraz: Fire destroyed three buildings on American Indian-occupied Alcatraz last month, including the Victorian-warden’s house (May, page 39). The Alcatraz Indians claimed the fires were started by a group of whites. Three days earlier, the Department of the Interior had declared its intention to convert the island into a park, destroying all the prison buildings and even changing its name. The Indians said they wouldn’t leave without a fight. Another band of Indians occupied a California campground belonging to the Pacific Gas and Electric Company.

SST: The House has voted by a narrow margin to go ahead with the supersonic transport (February, page 36), but the Senate has yet to decide on the plane.

Federal houses restored amidst high-rise housing

Ten early 19th century houses and one dating to the 1700’s will be rehabilitated as part of a 1335-unit middle income housing project, within a vast area of renewal and expansion in lower Manhattan. The plan is especially notable because early New York houses have been demolished by the acre in recent years.

The housing, named for Washington Market, which occupied the site for nearly 100 years, is designed by Oppenheimer, Brady & Associates/Ar- chitects, Barry Goldsmith proj- ect designer, and Pruyn-Bergen and Associates, Architects. The old houses will be surrounded by low buildings: a school, duplexes and townhouses. The only tower adjacent to the houses will be across the street, casting its shadow to the north.

The housing is also designed to harmonize with the rest of the redevelopment, which will include commercial buildings and a community col- lege (June, page 148) directly to the west, by architects Caudill Rowlett Scott. Pedestrian walks will continue the city’s grid street pattern; stairs and walks will lead to college circulation points.

The most “historic” of the houses were built in 1797 and 1818 by John McComb, said to be the first American born and trained architect. He designed New York’s celebrated City Hall. All the houses will require extensive restoration, having been converted for use in the market. HUD will provide the funds.

“Grope Fest” honors Gropius

Admission was “by metallic decora- tion only,” as friends, admirers and co-workers by the hundred of Walter Gropius gathered at The Architects Collaborative in Cambridge, Mass., last month. It was the “fiesta à la Bauhaus—drinking, laughing, loving” Gropie had called for in his 1933 testament in the event of his death.

MRS. ISE GROPIUS AND HER GRANDDAUGHTER, ERIKA FORBERG, AT THE “GROPE FEST”

ARCHITECTURAL RECORD July 1970 37
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Eight Annual Bard Awards Presented by City Club of New York

Bard First Honor Awards for Excellence in Architecture and Urban Design went to the Concert Halls of the Juilliard School and the Muse of the Bedford-Lincoln Community Center. An Award of Merit went to the Wagner College Student Union. Six additional Awards of Merit were given for innovative Manhattan shop designs. Those not shown here were Creative Playthings, Walker, Hodgetts, Mangurian and Godard, architects; Latinas, Bill Hock, architect; the Rive Gauche Boutique, by Isabel Hebey and Justin Henshel, A.I.A.; and the Richard Feigen Gallery, Hans Hollein, architect. Jury members were Giorgio Cavaglieri, F.A.I.A., James Rossant, A.I.A., Dean Bernard P. Spring, A.I.A., and Max O. Urbahn, F.A.I.A.

The Wagner College Student Union

The Wagner College Student Union (Staten Island), The Perkins and Will Partnership, architects, “solves an architectural problem . . . more characteristic of the suburbs than of high-density areas in our city . . . But it is a design of great brilliance, wit and skill,” the jury said.

The Concert Halls of the Juilliard School

The Concert Halls of the Juilliard School (January, page 121), Pietro Belluschi, F.A.I.A., architect, Catalano and Westermann, associate architects, add “three of the finest halls the jury has seen anywhere” to New York City’s short supply of good halls.

The Muse, the Bedford-Lincoln Neighborhood Museum

MUSE, the Bedford-Lincoln Neighborhood Museum, Hardy Holzman Pfeiffer Associates, architects, is part of the Brooklyn Children’s Museum. It was converted from an existing automobile showroom and pool hall for $31,500. The jury said it was “impressed by the fact that so much life could be created with such limited resources.”
Paraphernalia (left), Ulrich Franzen, architect, was among the six shops chosen for Additional Awards of Merit in the Board competition. Dresses are concealed from direct view in large drums; there are also no window exhibits. Instead, attention is focused on slides of the clothing for sale projected continuously on a large screen set about twenty feet back within the store and clearly visible from the street.

Zum-Zum (right), another of the six shops, is a chain of restaurants whose architects were Paul K. Y. Chen and George Thiel. Interiors are of tile (red floors, white walls) and wood (counters and seats), with brass trim. Acoustical tile ceilings contain exposed globular light bulbs.

Portland, Oregon A.I.A. announces 1970 Annual Design Award winners

The jury, consisting of architects Demitri Vendensky, William Hocking and Eric Vartianinen, "impressed with the general quality of architectural design submitted," gave six awards and put all 45 entries on exhibit at the Portland Art Museum. Winners not shown are: The Permanente Clinic, Beaverton, Ore. Wolf/Zimmer/Gunsul/Frasca/Ritter, architects (Honor Award); Cluster Cabins, Sunriver, Ore., Church and Shiels, architects (Merit Award); and South Park Hall Addition, Portland State University, Wolf/Zimmer/Gunsul/Frasca/Ritter, architects, which also received a Merit Award.

American International Forest Products, Inc. office building, Fletcher, Finch and Associates, architects, attempts to reflect the different interior areas by scaling volume, size and height in relation to the functions and number of people housed.
Tuck Mall Center, Dartmouth College, Campbell, Aldrich and Nulty, architects, contains a library above a plaza and three 75-seat lecture classrooms, a 350-seat auditorium, a computer services area, and audio-visual service space. The sloping auditorium roof is paved with brick steps to serve as an amphitheatre and outdoor seating area.

Administration Building, Middletown State Hospital, Middletown, New York, Prentice and Chan, Ohlhansen, architects, will be faced in high-gloss aluminum sandwich panels, zipper-gasketed with neoprene. A windowless service core wall faces a parking lot and coal pile, while other sides are extensively glazed.

Newton Senior High School, Newtonville, Mass., Perry, Dean and Stewart, architects, groups its 2,750 students into six "houses" in three four-story nodules. Room sizes vary greatly according to use. All spaces are oriented towards a central circulation spine. The building is also planned for extensive community use and easy public access.

Niagara Frontier Performing Arts Center in Lewiston, State Park near Niagara Falls, N.Y., Vollmer Associates, architects, is conceived as a summer pavilion with 3,000 lawn places complementing the 2,500 interior seats. Air-flow louvers will allow the sides and rear of the auditorium to be closed for daytime performances.

Pedestrian mall at the City University of New York Graduate Center is part of the remodelling of an old office building for school use by architect Carl J. Petrilli, Samuel J. DeSanto, project architect. The mall spans a block in mid-Manhattan, providing a "vest-pocket campus."

Burlington Industries executive office building in Greensboro, N.C., A. G. Ode, Jr., and Associates, architects, suspends four office floors from a steel roof frame supported by diagonally-braced exposed steel trusses. Walls are topaz-tinted mirrored glass. The steel is painted brown. Roof frame engineering required extensive use of computers.
Bally urethane foam insulation first in nation to pass UL Fire Test for walk-in refrigerator panels

For the first time ever, Underwriters' Laboratories (UL) has granted a 25 low flame spread rating to a urethane foamed-in-place Walk-In refrigerator panel. It was awarded to Bally and now in most states qualifies their panels to receive the same low rate which insurance authorities apply to masonry refrigerated structures.

Bally's low flame spread 25 rating meets the most stringent building codes of major cities... earns substantially reduced insurance rates (ask your insurance broker)... and, most important, provides a vastly increased measure of safety in hospitals, nursing homes, schools and colleges, hotels and motels, restaurants and clubs... wherever masses of people congregate and maximum fire protection is critical.

This major advance in design is the culmination of four years of extensive Bally research. Success results from combining the chemistry of higher cost pour-type (not frothed) urethane and the mechanics of foaming it in place with complex thermal controlled high-pressure molds.

Look for the UL label... it is assurance of a 25 low flame spread rating. You will find it on every Bally panel. Architects, Food Service Consultants, Specifiers... to make sure your clients get the advantages of this new urethane, use this paragraph for insulation specifications:

Insulation shall be 4" thick rigid urethane foam (poured-in-place, not frothed). It shall conform to ASTM Fire Hazard Materials Test #E-84-61 and have a low flame spread rating of 25 or less with a certifying UL label on every panel. The expanding agent shall be only Freon 11 with an inherent pressure of 38 PSI when foam is heated to 150°F. Thermal conductivity factor ("K") shall not exceed 0.118 BTU per hour (Square Foot) (Fahrenheit degree per inch). Overall coefficient of heat transfer ("U" Factor) shall not exceed .029. The insulation must remain stable at a temperature range of -90°F to +250°F.
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**Estimate based on engineering analysis of tested assemblies with similar construction.

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The F. W. Dodge 1970 construction outlook: midyear update

By George A. Christie, Vice President and Chief Economist, McGraw-Hill Information Systems Company

Has the business slowdown which has been so evident in most other parts of the economy finally caught up with the construction industry, too? Probably, though the way 1970 started off it was beginning to look as if the demand for nonresidential buildings and other facilities (as well as the ability to finance them) was limitless. The Dodge Index of total construction contract value averaged 209 during the first three months of 1970, setting a new quarterly record. Our specially-constructed index of architect/engineer designed construction soared even higher—to a peak of 2941!

But along with spring came signs that the best part of the year was already history. A gentle but noticeable decline had begun to set in, one which could be expected to gather momentum in the months ahead. This development, if it continues, fits the general outline of the original 1970 Dodge Construction Outlook issued last October. Things are a bit behind schedule, though. We expected that anti-inflationary restraint of the economy would begin to cool the boom in industrial and commercial building by the start of this year. The next step—contingent on an easing of credit—was to be a mild recovery of the depressed housing market. With these two trends more or less canceling each other, we've been looking for 1970's most important change to be in the mix rather than in the total amount of construction contracted.

This pattern, still the most likely course of events, has been reluctant to develop until now. In the opening months of 1970, nonresidential building soared to a new peak and then dropped off as the spring quarter began. Housing's year-long decline bottomed out in the early months of the year and the relaxation of credit restraint offered the hope that recovery was near at hand. The next few months' results will tell how well these changes are taking hold.

A couple of inconsistent developments in the early months of 1970 obscured the picture a bit. One was the extraordinary total of utility construction: over $2 billion of work started through April. That's more than in any entire year prior to 1968. Another was the amount of highway work contracted. The President ordered highways and certain other Federally financed projects cut back so that construction resources could be shifted to housing. Apparently no one took this edict seriously, since highway contracts increased in the first quarter while housing declined.

One unfortunately reliable force in the construction market has been cost. Fully three-quarters of 1970's early lead over 1969 contracts has been due to nothing more than the inflation of values over the year. And with the inflation-recession issue more critical than ever at mid-1970, a new look at the economic environment is appropriate.

Economic environment/mid-1970

At this point in 1970, the Administration's highly publicized "economic game plan" for bringing inflation under control is in need of some half-time modification. To no one's great surprise, the intermediate goal of slowing economic activity (to squeeze out excess demand and create a climate for price stability) was finally accomplished. In fact, the first quarter's $5 billion decline in GNP (measured in constant prices) was even a bit more than policymakers had bargained for. So, too, were the sharp drop in corporate profits and the quick rise in unemployment from a safe 3.9 per cent in January to a dangerous 5 per cent in May. Yet it all seemed in vain as prices kept rising as fast as before. For the time being it was the worst of both worlds: recession with inflation.

Responding to these circumstances, the Federal Reserve made its long-awaited move to monetary ease late in March. This step removed one critical element of uncertainty from the original 1970 Dodge Construction Outlook.

The question now changes from when to how much credit expansion can we anticipate.

The Reserve Board's chairman recently assured the business community that he intends to supply enough money to keep the economy expanding without adding to inflationary pressures. Now that the Federal budget has shifted into deficit, however, he doesn't have a great deal of room in which to maneuver. A budget deficit, like credit ease, is useful for heading off a recession, but it, too, aggravates inflation. This year's shift from surplus to deficit, which will worsen when the surtax expires on June 30th, takes away some of the opportunity to ease credit during 1970's second half.
except at the cost of more inflation. (Retention of the surtax, on the other hand, would give some much-needed flexibility to the management of the money supply. It would seem a more appropriate, though less popular, blend of economic policy for this year's problems.)

The private sector has been counted on this year to deliver a major thrust to the economy through continued high business capital spending and rising consumer investment in housing. If business sticks by its current plans to raise capital spending eight per cent in 1970, those outlays (along with some inventory rebuilding) would be an important prop to the sagging economy. But having seriously overestimated this year's profits, businessmen are now reevaluating 1970's investment goals to see how much of this year's planned new capacity can be postponed until 1971. Housing is ready to move ahead in this year's second half but its potential for growth is limited by the rate of credit expansion and by Federal appropriations for housing programs. Neither prospect is very exciting.

Even if these several stimuli—easier money, a budget deficit, high capital spending, improved homebuilding—don't all quite live up to earlier expectations, their combined thrust should be enough to get the economy moving ahead again in the second half. But compared with the outlook at the start of 1970, the enforced "slowdown" has turned out to be a bit more severe than its name implies, and the expected recovery a bit more tenuous. Our updated 1970 Dodge Construction Outlook, modified by these and other events, follows.

Construction/1970

The estimates shown in the table are a blend of 1970's initial very high rate of construction contracting with the moderately lower rate expected in the months ahead.

The over-all result: a present estimate of $68.5 billion in total construction contract value for the year, a bit higher than indicated by our previous forecast. A small (two per cent) increase over 1969's value is now expected, though physical volume will be less.

Much of the change from our earlier analysis is concentrated in the nonresidential categories, especially electrical utilities, and in construction costs higher than previously expected. Another change is in the "contour" of 1970's construction market. This Update anticipates that the year's lowest rate of contracting will be reached in the third quarter; at that time nonresidential building will have slipped, but housing will only be in the early stages of recovery. There will be a mild improvement in the fourth quarter, as housing picks up.

The housing outlook still depends almost entirely on the availability of mortgage money. Because both government and business are expected to be heavy long-term borrowers in the capital markets later this year (with government financing its deficit and business lengthening last year's excessive short-term borrowing), it's not likely that very much of the year's expansion of the money supply will be of great benefit to potential homeowners seeking mortgages. Rates will come down only slightly, money will remain scarce, and the pressure of demand for housing will go largely unrelieved in 1970.

Expected developments over the balance of the year are likely to inhibit contracting in the Northeast and Midwest, where commercial and industrial building are especially important. All regions should gain from any improvement in housing.

Evaluating hidden cost factors

By Bradford Perkins, McKee-Berger-Mansueto Inc., Construction Consultants

Exact quantity take-offs and careful unit pricing do not always insure an accurate construction cost estimate. Care in both areas is essential, but there are many other factors which have significant effects on the final cost of a construction contract.

Some of these factors—for example, the accuracy of the contractors' own estimates—duly prediction. Others, however, can be analyzed and, to some extent, quantified. Therefore, qualitative and quantitative analyses of local construction markets are becoming increasingly important elements of cost management programs.

These analyses do not have a standard format because each project differs from all others, but some general areas covered are:

1. local geographical, sociological and economic factors; 2. contractors' interest in and capabilities for the job; 3. labor availability and cost; 4. availability of materials; 5. owner and designer factors.

The first set of factors, including data on population density, proximity to urban centers and accessibility via major traffic routes, can readily indicate potential problems. The construction industry's capabilities in smaller towns can be strained by the requirements of a large project, so the estimator should take note of the work experience and size of local contractors' firms and labor pools.

The character of a town can also have other potential effects on costs. In one town outside New York, for example, the construction industry depends heavily on one owner for work. Therefore, local work has to be suited to this employer's construction program. In another area, organized crime often determines the number and interest of bidders.

General market information such as that described rarely provides the details necessary for either design decisions or final cost estimates, but it does indicate where further research is necessary. It is the research on local contractors, labor, material and owner-architect factors which can and should help shape the final plans.

Lack of interest raises costs

Contractor interest and capabilities are often the major additional cost considerations. A New York community college was bid at over $100 per square foot last year. In retrospect, this well-known disaster resulted, at least in part, from a shortage of contractors with both adequate bonding capacity and interest in the project. Only two firms were willing to bid on a city project that would last four years, and neither was willing to take it without premiums which approached 100 per cent.

Shortages of large, interested contractors have been common for several years in the major cities. However, similar situations appear on small projects in other areas.

A recent development of the reverse type is the "negative escalation" now experienced on small projects in many regions. Smaller projects tend to dry up sooner because their owners are more sensitive to national economic slowdowns, inflation and financing problems. In Boston and many smaller cities, for example, owners are reporting as many as eight bidders on projects under $5 million. As a result, some over-all project costs have temporarily leveled off or declined in spite of the continuing increases in labor and material prices.

Multiple contracts help on large jobs

Interest is only one of the two important contractor considerations; the other is capability. In small cities and rural areas, local contractors may not be able to build a complex project efficiently. An inexperienced contractor facing a complex project usually adds a significant premium to his bid—if he bids at all. What usually happens is that large outside contractors have to be encouraged to bid since they have to expect problems working in a new area with a limited pool of skilled labor—large outside
contractors add premiums also. It was in part this experience which recently prompted Cornell University in upstate New York to let a large project in several small packages so that it could be handled by local contractors.

On a smaller scale, many contractors will add a premium for handling new materials. Fiberglass duct, for example, should be cheaper than metal in many cases, but the premiums being added by inexperienced contractors have made it more expensive than sheet metal on recent projects.

Check list of key questions

Unfortunately, there is no central source for this information. However, by calling A.G.C. chapters, local contractors, and other industry sources, it is usually possible to obtain partial answers to the following key questions on this subject of contractor interest and capability:

How many contractors in one area work in a given category of construction? How many bids does a project of a given size normally receive?

Is there so much directly competing work in the area that there is a reduction in the number of potential bidders?

Is the seasonal factor any more pronounced than is normal for the construction industry?

Are there ways of stimulating increased contractor interest?

What is the prevailing contractor attitude toward unusual design or site location?

Are local contractors familiar with unusual materials which might be employed on the project?

Is there likely to be any reduction in the number of bids or bid premiums resulting from minority hiring or training requirements?

Are local contractors finding construction loans unusually difficult to obtain?

Labor shortage may restrict design options

A major factor in contractor interest and capability is, of course, the local labor force. A cost estimator must know the local wage rates, be aware of shortages in critical trades, prevailing premiums necessary to obtain local labor or induce migration, trade jurisdictions, and any other factors which can have cost ramifications.

Shortages can be an important factor. An architect recently designing a project in upstate New York was informed of a shortage of carpenters. This helped him during schematic design as he realized that several design options, such as a poured-in-place concrete structure, were closed. All estimates and designs in the Lordstown, Ohio, region have taken account of a shortage in most trades due to the heavy demands of the new General Motors plant being built there.

Local work practices are also important. In many areas prefabricated components such as pre-hung doors are disassembled and then reassembled on site because of local union rules. In other areas, belligerent locals prevent use of any new labor-saving materials or techniques.

Training programs can add premiums

Currently, the most controversial labor factor is minority employment. Few building-trade locals, other than laborers, have significant minority membership. This has made it an explosive issue. In response to community pressure, an increasing number of public and private owners are inserting minority training and hiring clauses into their construction contracts.

Not only have the unions resisted, but the contractors have regarded such programs as an additional risk and an unknown cost. As a result, some contractors avoid projects covered by such clauses and others add premiums. Despite contractors' denials that they add premiums, detailed bid analyses indicate that most add as much as 10 to 20 per cent to their bids for large minority hiring and training programs.

Strikes are a similar risk and another unknown cost for the contractor to estimate. Therefore, it is important to check on the expiration date of existing contracts, the likelihood of strikes, the size of the increases likely to be negotiated in the next contract and related factors. The high bids on the community college mentioned earlier resulted in large part from the contractors' uncertainty about future labor settlements. In such extreme situations it has become necessary to split the project into smaller contracts to fit the schedule of major contract negotiations.

What to ask about labor

Information on these and other labor-related cost factors can be supplied by the local contractors and construction trade associations, minority group representatives and other related sources. These are important questions to ask:

Are the jurisdictions of unusual size?

Are there any jurisdictional disputes which might affect the project?

Are there significant variations in the labor supply due to seasonal factors?

Are there extreme shortages in any trades, and if so, will they cause premiums and/or delays in construction schedules?

What inducements are required to encourage migration to the area?

What is the impact of training programs; and what is the availability of minority workers?

What are the basic and fringe rates for each trade?

When do local contracts expire, what increases are scheduled in existing contracts, and what percentages are predicted for the next contract?

Is local labor cooperative or belligerent, and what is its level of interest in the project?

What to ask about materials

Materials are usually less of a problem than either contractors or labor, but on some projects material supply considerations are critical. Too often designs include materials that are either unavailable locally or unfamiliar to local contractors. In other cases too many projects are competing for the same material. When any of these situations occur, it is worth devoting part of the market study effort to this subject. Some of the basic questions are the following:

Are any of the critical materials unusual or difficult to obtain?

How near—or how far—is the project site to the nearest major source of materials?

Are there other projects in the area which may compete directly for the same materials?

Are there complications—shipping limitations, delays, etc.—in supply due to unusual materials?

Which materials are on national rather than local price scales, and are any local materials unusually expensive or inexpensive?

What about job conditions

The last area, and most difficult to research for a full market study, is the owner-designer factor. There are a few good clients who actually attract additional bidders or an unusually large number of bidders for their projects.

Most owner-architect cost factors are negative, however. Recently, New York's subcontractor association told the city that its members have added up to 20 per cent to their bids on city projects to account for slow payments.

Some architects are known to cause bid premiums too. Consistently incomplete construction documents, disruptive actions during the construction phase and unnecessarily complex designs are some of the most common reasons.

Therefore, more market studies are including such questions as the following:

Do the owner's administrative or inspection procedures cause significant problems for the contractor?

Does the architect have a reputation for causing problems or providing inadequate construction documents?

Are there problems which the owner or architect can help mitigate?

If the market study reveals serious problems in any of the above areas, it is possible to save more money concentrating on overcoming adverse market conditions than by refining costly segments of the design. The difference between an efficient and inefficient design is often less than 15 per cent, while market conditions can add up to 100 per cent in premiums.

Adverse market conditions can usually be overcome. Split contracts, expedited payment procedures, careful selection of local materials, contractor orientation meetings, and careful timing of bids and other techniques are being used with increasing frequency to solve market problems. The first step, however, is to identify the problem.
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LABOR COSTS: A RECESSSION-PROOF INCREASE

During the past twelve months, average annual wage increases in the construction industry were at the 15 per cent level, and no end to this spiral is in sight—most construction wage contracts cover several years, insuring substantial increases each year. Many contracts are keyed to a July date, thus the labor component of the cost to build will be pushed up significantly in many cities this month. Since labor contracts stretch out over a period of two or three years and increases are built into the contract, the current high level of construction labor costs is recession resistant. Materials prices are also increasing but at a much slower rate than wage rates. The net effect is a squeeze on the contractor's percentage of profit and overhead leading inexorably to increasing numbers of contractor failures and bankruptcies.

Unbalanced pressures on building costs will continue well into 1970, and the client who did not accept the 3 to 4 per cent annual increase in building costs in the mid-sixties may do himself even more harm by postponing construction. The old maxim about hindsight has proven to be true once again.

Building cost indexes

The information presented in the tables indicates trends of building construction costs in 35 leading cities and their suburban areas (within a 25-mile radius). Information is included on past and present costs, and future costs can be projected by analysis of cost trends.

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

Differences in costs between two cities can be compared by dividing the cost differential figure of one city by that of another.

### JULY 1970

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

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Costs in a given city for a certain period may be compared with costs in another period by dividing one index into the other; if the index for a city for one period (200.0) divided by the index for a second period (150.0) equals 133%, the costs in the one period are 33% higher than the costs in the other. Also, second period costs are 75% of those in the first period (150.0×200.0=300.0) or they are 25% lower in the second period.

ARCHITECTURAL RECORD July 1970
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UN Mistakable VALUE. Rare English smoking pipes from the Nat Sherman collection. Made from 100-year-old briar from Greece, the pipes are perfectly matched in weight, balance, and grain. There’s a history of value behind every new Jamison door, too . . . in quality construction, performance, and Jamison service.

Architects who value Value specify Jamison every time

Jamison cold storage doors are the leading specification in many of the country’s largest and most progressive organizations. The reason? Jamison doors continue to demonstrate their value year after year through dependable service, outstanding efficiency. This is value that reflects the basic high quality of Jamison doors . . . quality design, construction, and materials. Jamison’s sophisticated quality control program is like no other. It operates on strict engineering department specifications and tolerances, and is geared to deal with the newest materials and manufacturing techniques.

You can be sure that full value will go into the projects you design by specifying Jamison every time. For latest product information, call the Jamison service office near you — they’re in all major cities — or write for a copy of the new Jamison guidebook, “How to Select and Specify Doors for Cold Storage Warehouses and Food Processing Plants.” Write to Jamison Door Company, Box 70, Hagerstown, Md. 21740.

For more data, circle 40 on inquiry card
New CELRAMIC® Insulating Roof Fill

CUTS
WEIGHT,
WAIT AND
WATER

Cross section of fill (actual size) shows excellent dispersion of Celramic nodules.

Celramic Roof Fill eliminates the traditional problems with insulating concrete. Reason: drastic reduction of water-cement ratio to .52, about the same as for structural concrete.

Low water-cement ratio brings curing time within manageable limits. You can usually roof over in two days. Base for builtup roofing is strong, durable concrete, not a weak, powdery surface.

Celramic fill gives you reliable, lasting strength, because shrinkage is less than 0.12%. Residual moisture is negligible. Dry density is just 22-23 lbs./cu. ft.

Key to low water requirement is the aggregate—Celramic nodules. The nodules are sealed, closed-cell glass spheres that are nonabsorbent, inorganic and incombustible.

Over steel centering, Celramic fill has a two-hour rating under ASTM E119 fire endurance test. Insulating value is real (K is .88). Spherical shape of the nodules gives Celramic fill easy workability. It can be sloped for drainage.

For the significant improvements you get with Celramic fill, in-place price is very reasonable. Send for free sample and technical booklet. Pittsburgh Corning Corporation, Dept. AR-70, One Gateway Center, Pittsburgh, Pa. 15222.

Celramic fill is not presently available west of the Rockies.

PITTSBURGH CORNING

Aggretate is Celramic nodules of sealed closed-cell glass.

Celramic fill is easy to work, but won't bleed through joints.

For more data, circle 41 on inquiry card

For more data, circle 42 on inquiry card
enjoy these 4 "architects' freedoms"

1. FREEDOM OF CEILING DESIGN

1. No other ceiling system offers so many architectural design possibilities! T-Line is available in any size module; linear or modular types for luminous, coffered or tiled ceilings.

2. Your complete freedom to choose any type or brand of ceiling panels, lighting and partitions gives T-Line Ceilings the greatest architectural, environmental and performance possibilities of any ceiling system.

3. Titus manufactures only the air diffusion and ceiling suspension components of T-Line. You have complete freedom to specify any type or make of other components. This permits installation in the conventional manner with a clear-cut division of the trades.

4. Titus knows air distribution, having manufactured air diffusion products over 24 years. With T-Line, the air pattern is adjustable a full 180° — can provide each modular unit of space with the air distribution to fully satisfy any present or future room requirements.
when you specify TITUS T-LINE Coordinated Air Diffusing Ceiling Systems

(only T-Line gives you all these freedoms)

3. FREEDOM FROM CONFLICT BETWEEN BUILDING TRADES

4. FREEDOM FROM AIR DISTRIBUTION PROBLEMS

THE AIR DISTRIBUTION PEOPLE

TITUS

For more data, circle 43 on inquiry card
From 20 to 2,000 beds.
From San Diego to Bangor.
We provide complete communications systems for health care use.

DuKane.

Upgrading patient care. Raising efficiency of hospital and nursing home staffs. DuKane complete communications systems are proving themselves right now in large and small health care facilities from coast to coast. We start with the design stage. Continue through installation and system check-out. And then service your equipment on a 24-hour availability basis. All possible because DuKane has over 200 authorized sales/service outlets strategically located throughout the country. More than anyone else. All equipped to handle your full range of communications assignments. Visual and audio-visual nurse calls. Personnel registers. Intercom and telephone equipment. Time and utility controls. Public address, wireless paging, room-status panels, staff-residence communications, and complete patient entertainment audio-visual equipment. All from one proven, dependable source... via a nationwide network of local sales/service offices. DuKane.

DuKane Corporation • Communications Systems Div. • St. Charles, Ill. 60174 • World Wide Distribution

For more data, circle 44 on inquiry card
Of course it's a Haws drinking fountain

... a beautiful drinking fountain shouldn't be too obvious. Agreed? Carefully-sculpted to enhance your ideas... clad in the native splendor of cast stone (five colors, two finishes). The Haws Model 30 outdoor drinking fountain stands exquisitely in harmony with its setting... any setting. A fountain? It could almost pass for a work of sculpture. Yet this sly harmonizer is incomparably rugged—a fountain for all seasons, kid-proof, weather-proof, freeze-proof! Write Haws Drinking Faucet Co., 1441 Fourth St., Berkeley, Calif. 94710.

The drinking fountain that looks better than a drinking fountain—Haws Model 30 in vivid stone.

For more data, circle 51 on inquiry card.
Modern rack storage is fast, dependable and efficient. But it isn't fireproof.

If you put your stock in rack storage, protect it with "Automatic" Sprinkler's Suprotex®...the world's finest Supervised Pre-Action Sprinkler System.

Suprotex detects the fire, fills the system with water, and sets off an alarm — simultaneously — before fire heat fuses a sprinkler. That's fast. Fast enough to minimize or eliminate water damage. Suprotex is the ideal fire protection system for mechanical or automatic rack storage facilities. It is immune to electrical failure, and eliminates accidental water discharge if sprinklers or piping are damaged. And it's an excellent system for unheated storage areas as well as heated areas. Maintenance is minimal. Suprotex requires only occasional inspection of the mechanical system, and eliminates periodic parts replacement. Suprotex meets all requirements described in NFPA 13 and is UL and FM approved. It combines fast, dependable Rate-Of-Rise® detection and fusible link sprinklers.

"Automatic" Sprinkler can design and install a sprinkler system to protect any storage facility. Automatic or manual. Simple or complicated. Rack or high pile. A system that assures maximum fire protection at minimum insurance rates.

For more information, write Mr. R. L. Pardee, Manager of Marketing Services, Dept. G-A, "Automatic" Sprinkler Corporation of America, Box 180, Cleveland, Ohio 44147. Or look under "Sprinklers — Automatic — Fire" in the Yellow Pages.

"Automatic Sprinkler Corporation of America
Division of A-T-O Inc.

For more data, circle 52 on inquiry card
Don’t destroy our forests!

Nevamar is so close to the real thing even Mother Nature gets confused. About our woodgrain plastic laminates.

Our exclusive Fresco finish, for example, not only looks like wood, it feels like wood. Because random sap lines are etched in the surface. Just like the actual grain.

With Fresco, then, you can use plastic laminates any place you'd normally use wood... without compromising purity. Or beauty. And in a few other places too where you want resistance to stains... scratches. Send for a sampling of our finishes and see for yourself... the many creative applications.

Fresco... another example of Nevamar’s leadership in dimensional finish laminates.

Nevamar: a wonderful way to save our trees... and keep America beautiful.

ENJOY

NEVAMAR

newest look in Laminates

Enjay Fibers And Laminates Company
Odenton, Maryland 21113
A Division of Enjay Chemical Company

FRESCO

Dimensional finish plastic laminate

For more data, circle 53 on inquiry card
70,000 ft² of masonry-with no seams?

... and no cracks after 10 years. It was easy with insulating board made of Styropor® expandable polystyrene foam from BASF. Styropor insulating board does more than give you a low installed cost on any job. It gives you higher insulating values, or better compressive strength, or a non-dusting board, or immediate supply from a coast-to-coast network of molders and wholesalers.

Styropor gives you all those values plus the freedom to design unique new buildings such as 70,000 ft² of seamless masonry that doesn’t crack—or—cold storage units that go up quickly and economically—or—roof decks that go down fast and save heat year after year.

Styropor® expandable polystyrene gives you all those extra values because BASF Corporation is dedicated to providing not only an excellent insulating product but total support for you, including on-the-spot technical service that assures you the most effective building at the lowest possible cost.

**STYROPOR®**

BASF

BASF Corporation
100 Cherry Hill Rd., P.O. Box 181
Parsippany, N.J. 07054
(201)-263-0200

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For more data, circle 54 on inquiry card
The University of Virginia Architectural School practices what it teaches in lighting.

In the school's Lighting Demonstration Center, students study and experiment with lighting and light sources. In their classrooms, drafting rooms and design areas, students see effective lighting techniques in action. It's the practical application by the school of what it teaches about proper lighting and its effects.

At night, students see for themselves how General Electric Mod-U-Line* fluorescents not only enhance interior decor, but add to the aesthetic qualities of the building itself. And night or day, they are surrounded by the advantages of Mod-U-Line applications throughout the school: Space-saving ability—either 2 or 3 will fit into a 2' x 2' fixture; compact leg spacing that gives architects, engineers and owners design flexibility; extra strength from heavier glass and braced ends; extra brightness and better maintenance of brightness through life; greater ease in storing, handling, installing and maintaining.

In short, the features of this compact, symmetrical lighting fixture make it ideal for today's modular design concepts. If you agree, you'll want to see your GE Agent about Mod-U-Line—and all GE lamps. Or write to us . . . General Electric Co., Large Lamp Dept., C-004, Nela Park, Cleveland, Ohio 44112.

*Trademark of the General Electric Company (Mod-U-Line made in West Germany).

GENERAL ELECTRIC
The Water Works.

Heavy-duty floor model coolers
Instant cold water every time. Also instant hot water available on all models ... factory-installed. Vandal-proof push-button bubbler. Foot pedal fully recessed.

Totally recessed Water Cooler
No bumping in the aisles. Ideal for hospitals, schools or public buildings. Stainless-steel or bronze-finish basin, bubbler and grille. Exclusive mounting box lets you reverse the cooling system so the grille doesn't show.

Wall Mount Water Coolers

Semi-recessed coolers
Extend only 9½ inches from wall. Brushed stainless-steel basin and one-piece cabinet finished in beige vinyl, beige enamel or brushed stainless-steel. Also available in over-all bronze finish.

All these Water Coolers are backed by Westinghouse Nationwide Sure Service. For complete details, see Sweet's Files. Or refer to "Water Coolers" in the Yellow Pages. Westinghouse Water Cooler Dept., Columbus, Ohio 43228.

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

For more data, circle 56 on inquiry card
Lightning bolt

Split-second response to the slightest touch makes the EXITER II* fire exit bolt fast and foolproof. Streamlined styling too. Unmistakably Russwin.

Russwin, Division of Emhart, Berlin, Connecticut 06037.
In Canada – Russwin, Division of International Hardware.
Ponding causes a whole deluge of problems. Zonolite roof deck systems turn them off.

Zonolite® has roof decks for everything. For the slope-to-drains. For hurricanes. For protection against fire. And for insulation.

Roof deck systems certified by Grace-Zonolite. Available everywhere in the U.S. and Canada. Installed by approved applicators each and every month of the year.

Just talk to your local Zonolite representative. He'll be pleased to consult with you and come up with a recommendation that will satisfy all your design requirements.

Want to correct a roof deck problem. Or better yet, prevent one in the first place? Say the word!

Just say Grace.
The Northwestern University Library by Walter Netsch of SOM is a complete break with the tower and podium designs which, in recent years, have been so widely accepted as good solutions for major campus libraries. This break with current tradition is partly the result of considerations of the physical environment and scale of the campus, but even more importantly it grew from a total reassessment of the functions of a university library as a user-directed structure, in which all members of the campus community enjoy the same freedom of access to the collections and where access to and communication with one another became principal design goals. Netsch's solution to this freshly conceived program has generated a building of crystalline beauty—certainly a major work of twentieth century architecture.
Reconciling program and site
—a problem of scale

The site of the Core and Research Laboratory Library on the Evanston campus of Northwestern University is near the shore of Lake Michigan overlooking a large man-made lagoon, as shown in the photographs this page. Programmed to accommodate a so-called core-library (a collection of 50,000 basic books which are indispensable to each of the disciplines taught at the University) and a research collection of 1.2 million volumes, the new structure has a total interior net space of 329,941 square feet. Walter A. Netsch, SOM partner in charge of the library, sought a design solution which would minimize the apparent bulk of this huge structure to bring it into scale with the older Deering Library to which it is attached, and other adjacent campus buildings.

Organization of elements

Netsch has described his basic solution as follows: "Sheltering and enclosing a broad plaza are three levels of three research towers (photos, plot plan and elevation this page), the octagonal entrance 'lantern' and Deering Library (photo opposite page). Beneath the plaza a single area exceeding 90,000 square feet has been devoted to cataloguing, reference, bibliography, periodicals, technical services, data processing, receiving new materials and administration. This space forms the main level and acts as a transitional base—physically as it connects to the Deering Library, and esthetically as a nodal interchange on the main northsouth campus walk. This level functions as a walk interchange to the passive meadows of the lagoon and lakefront campus, and will eventually connect to a new complex which will include student services, art and music and the performing arts.

"The first level above the plaza contains those special group reader environments that logically participate on the plaza—the core library, the reserve collection, an assembly room, the poetry and audio-visual spaces and the student and coffee lounges. Reached by a separate stair from the entry lantern, each of these spaces can function independently of other library activities."
Exterior and interior expression
According to Netsch: "The programmatic forms (the seminar, study and carrel alcoves in the research collection); the combined orthogonal-radial column spacing; the relatedness of textured concrete and limestone to the older Deering Library all contribute discrete design elements to the exterior structure. The primary contribution, however, came from the combined common purpose of maximizing edge to give light to as many individual readers as possible and to give this immense library an over-all reader scale as a collection and as an object in the environment." The geometric variety and size of the columns and overhangs provide a sheltered foreground which emphasizes the lake and campus vistas. Netsch has designed the building, both inside and out, "to become at times an object, at other times a place, and at other times a continuous event. For all of this to happen, a building must be both used and perceived—fortunately a common set of goals for a library."

How the library functions
Netsch's plans for this building have a crystalline geometric beauty rarely found in the work of his contemporaries. Since the library was designed before Netsch had fully developed his now famous Field Theory, it is not a two- and three-dimensional lattice of interlocked rotated squares as his subsequent designs have been. The strong radial patterns formed by stack and study areas converging toward informal reading centers do prefigure the Field Theory, however, and represent an important step in its development. As in the Field Theory the geometries of this structure disallow the arbitrary and capricious. They appear to function superbly, as careful study of these plans will prove.

In each of the research towers the major collection is shelved in an environment of radial book stacks, which make search easier, and enclose readers in small private libraries, leaving the periphery of each collection to windowed carrels, conference seminars, faculty studies and future electronic recess centers. In the center of each floor is an informal seating area related to the search cycle.
Clarence L. Ver Steeg, chairman of the faculty planning and building committee, points out that the library is strongly user directed. Entering freshmen and distinguished scholars alike enjoy the same freedom of access to the collections and all library services and facilities in a setting conducive to the maximum integration of people and books. Private study and research space for undergraduate as well as graduate students is made possible by the individual seating at any given moment of 40 per cent of the undergraduates, 80 per cent of the graduate students in the sciences and the humanities, and more than 30 per cent of the social science and humanities faculty—an achievement unequalled in any other university library.

Because of the internal arrangement of carrels, group study rooms, faculty studies and typing and seminar rooms, each person can find the particular study environment he wishes.

**Library plan facilitates academic goals**

Each level of each tower not only provides for a close relationship between the user and his resources, but between different types of users—the undergraduate, graduate and faculty—thus fulfilling one of the principal academic goals of the library and university, the preservation of the sense of human scale in an intellectual environment which makes a community of scholars possible. The radial pattern of book stacks integrates the three types of users at the perimeter of each level of each tower by a planned sequence of seminar rooms, faculty studies and graduate and undergraduate carrels. This pattern is repeated 12 times in each research tower. Each level of each tower contains 120,000 volumes, and the three towers combined have more than 1,600 carrels. The three research towers include a total of 18 seminar rooms, 136 faculty studies, 50 faculty carrels and 18 typing rooms.

Corridors (right top) link the three towers. Here the inevitable change in noise level provides an aural break. Located in the corridors are exhibit spaces, book charge-out stations, elevators, internal telephones and toilets. Staff work centers border the corridors.
Interior design

Netsch's design team, including Robert D. Kleinschmidt, project designer for the interiors, developed a new type of library seating which consists of a complete line of chairs and stools of bronzed steel tubing enclosing a structural plastic seat shell supporting the special upholstery module. Two of these seating types appear in the photos (right and above right). Special carpets, tables and bentwood study carrels (above right) were also designed by SOM.

CORE AND RESEARCH LABORATORY
LIBRARY, Northwestern University,
Miller Campus, Evanston, Illinois.
Architects and engineers: Skidmore,
Owings & Merrill, Chicago—Walter A. Netsch, partner-in-charge of design; Fred W. Kraft, partner-in-charge; Albert J. De Long, project manager; John Hartmann, project designer; Robert D. Kleinschmidt, project designer for interiors; Silvio J. Belmonte, project engineer; Contractor: Pepper Construction Company.
A SCHOOL FOR SMALL CHILDREN
AS BIG AS ALL OUTDOORS

The new lower school (kindergarten through the third grade) building for the New Canaan Country School is full of light and well organized space and lots of happy laughter. The first two are due to the architect, Gary Lindstrom, and the third element is the appreciative response of the building’s young users. A major requirement of the program was that each classroom have direct access to the out-of-doors so that the children could play immediately adjacent to their classrooms. This allows them to go in and out frequently and enables the teacher to keep an eye on their play; and it is only a few steps to the cool shadows of nearby sheltering trees and a couple of chapters of Sylvester and the Magic Pebbles. The building’s white clapboard walls and shed roofs provide a comfortable domestic scale which the children can relate to. They also tie in the new structure with older buildings in the school’s complex. Along these lines, the fieldstone foundations of the old building were incorporated by Lindstrom into the new design.

The Lower School program called for eight classrooms (two for each of the four grades), administrative offices, and a conference room which serves the latter while also accommodating individual instruction. The core of the building is a large multi-purpose commons room. It is used by the entire school and for extracurricular events as well. A rainy day play area for the smaller children, the room is large enough to hold school-wide assemblies and is also used for dance classes for various grades. The accompanying music filters into the surrounding gallery-corridor, but the latter, and carefully planned storage units, act as soundproofing for the classrooms. Natural light is provided for both corridor and commons room by an articulated arrangement of inward-facing dormers containing clerestory windows. Seen from differing vantage points in the landscape, the constantly changing massing of the multiple shed roofs gives the building its particular character: playful but not cute, somewhat indigenous, essentially functional.
Interior areas of the building are unusually well lighted. Besides clerestory windows in shed roof gables, there are windows in the upper half of two-story entrances (one at each corner of the building where gallery/ corridor intersect) and at intervals along corridor. In addition, cutouts in the upper half of wall dividing commons room and corridor add to lightness and openness of both areas without sacrificing privacy. All interior walls are plastered and painted off-white. Carpeting covers all floors except commons room which is oak flooring and main lobby which is the same bluestone as its outdoor counterpart.
IT'S NOT JUST THE CITIES

by Albert Mayer

In last month's article, the great issues essential to any program to enhance the environment were outlined, and the first—Land as a Public Resource vs. Speculative Commodity—was discussed. Here, Mr. Mayer argues for producing low-income housing through public corporations and public interest groups.

Part Five: Sloganese vs. the real action courses

To create a humane environment, it is essential to recognize and reverse obsolescent but still dominant trends, take a strong positive line commensurate with the toughness of the tasks. This takes imaginative decisiveness and determined action. The defensive tendency is to call on more of the same when it has already passed its zenith, or to call for reliance on devices or institutions that have been brought into being for other types of purpose and prevailing conditions. These are often the first reactions so that one can postpone fresh thinking and grappling, take refuge in the familiar, in an afterglow of inapplicables that once worked or were thought to have worked or work in other conditions. By analogy no longer valid, they evoke past triumphs, create the sedative and semi-comfortable attitude that it ain't really all that difficult, and as we did it before, we can do it again.

I propose first to take on the proposition of doing the job by hallowed methods or formulas old or more recent, or even current, show that we can't do the miracles in sloganese; and then to take on and adopt the second half: the exhilarating toughness of the real job, which is to hammer out new and burgeoning institutions.

Three slogans encompass the bulk of this kind of thinking, and anyway will serve as adequate indices:

Do it by private enterprise.

Do it like NASA.

Do it by systems analysis.

These evocations do have some partial validity, of course. Each one has some contribution to make, which should be analyzed, distilled, and brought to bear. For different reasons none of them, and no analogue, can be the central instruments.

Our job of creating the needed humane environments deals with living men, women, children in such diverse stages of development and background, habit, outlook, emotion, varying degrees of non-communication, that these instruments are just absurdly incapable of producing the fruitful processes and solutions. But the verbiage is simple, enticing, nostalgic. Unless they are realistically disposed of, they will keep fogging up the windshield, keep deflecting us from the real course or courses; at the minimum, delay us through detours in reaching the goals.

There is a sort of deification of business, of private enterprise, a feeling that it has a magic of accomplishment, that if only left unshackled from the stupidities and irrelevancies of government and of do-gooders, it could solve anything. The conventional confidence in its virtue and virtuosity is a danger. For that reason I have marshaled an array of both theoretic points and actual experiences from the most varied realms of private enterprise on various planes, to deflect this almost instinctive turning to a kind of father-image or rich successful uncle image.

Consider first the suitability of private business, its potential within its own definitions and parameters; then, its record. We are talking now not of its essential role in economical fabrication, and in other and even more innovative ways reducing first costs of construction. We want to get all the help we can from it in its ingenuities and inventiveness in physical terms, in terms of more efficient production of homes and other construction, in systematizing distribution, in rising quality and in economy of maintenance.

What is being referred to here is the easy slogan that private enterprise should be the complete entrepreneur, to assemble, build, invest in, manage, buy and sell, living accommodations—including, and
perhaps especially, low-income housing. It should be enticed into this field by the potential of profits competitive with its customary opportunities. The late Senator Robert Kennedy, and the Kaiser Committee, pushed in Congress for a formula that by means of limited dividend plus accelerated depreciation would produce a 15 or 20 per cent return, or more. This accelerated depreciation is of course a form of subsidy that is not called subsidy. The question is whether such necessary subsidy should go to private business as the optimum and chosen vehicle, or whether there are far better instruments at hand for developing, which will do the job better, with less subsidy because they do not require such profits, and with more sensitivity and understanding.

“... the strength of private enterprise is in mass production, in producing and distributing commodities, equipment, machines, goods: hard and tangible. Its genius is in mass production in great quantity . . .”

There are two ineluctable characteristics that are inherent in private enterprise—by its own definitions—which, to my thinking, make it basically unsuitable to undertake the essentially socially sensitive role in the homes and therefore daily lives and problems of the people—especially the lower-income people:

First, the strength of private enterprise is in mass production, in producing and distributing commodities, equipment, machines, goods: hard and tangible. Its genius is in great quantity. In producing and selling a car or a suit of clothes, or an airplane trip, there is no need or occasion for concern about family problems, about the lives of the purchasers, about the daily inter-relations among people in neighborhoods. These matters, all-important for daily living and community relations, are just not the scope or competence of business, of profit and loss.

Second: In essence the profit motive that is at the very basis of private enterprise is not on any broad scale suited to the required sensitivities and to the social supremacy of people and environment. Its basic loyalty and all its basic criteria are by definition geared to the profit of its stockholders. In any last analysis its decisions must be reached on that basis. In case of conflict, management’s allegiance as such is always beyond question, however personally charitable individual stockholders or managers may be. This is an overall characterization of philosophy and practice. For some years I have been accumulating a number of situations to see whether the facts and patterns bear this out. Indeed they do, across the board, and in the most prestigious range of businesses. Consider instances:

The matter of air pollution, and the automobile industry which is by general acknowledgement and acclamation the beau idéal of private business. C. W. Griffin Jr., writing in the Saturday Review as long ago as May 22, 1965, quotes S. Smith Griswold, chief of Los Angeles’ Air Pollution Control District, that the automobile industry has been engaged in a “great delaying action.”

“Everything that the industry has disclosed it is able to do today to control automobile exhaust was possible ten years ago,” says Griswold. No new principles had to be developed, no technological advance was needed, no scientific breakthrough was required. Crankcase emissions have been controlled by a method in use at least half a century. Hydrocarbons and carbon monoxide are being controlled by relatively simple adjustments of those most basic engine components—the carburetor and ignition systems.

Why has this action required ten years? . . . Control of air pollution does not make cars easier to sell; it does not make them cheaper to produce; and it does not reduce come-backs on the warranty. To people interested in profits, expenditures for the development and production of exhaust controls are liabilities.

More recently (1970) it has been noted that automobile manufacturers are making it virtually impossible for customers elsewhere to obtain the pollution-reducing equipment required of cars in California. So, a continuum of policy.

Within the well-established, long-recognized parameters of private enterprise, this is just how the game must be played by successful competitive management. Another instance: Under the heading “Noise Level Called a Peril to City Life,” one of the chief culprits cited is the air compressor or drill. The regular noisy model sells for around $30,000; the quiet model for 30 percent more. William L. Wearly of Ingersoll Rand, the manufacturer, said that sales of the quiet one were “insignificant,” “not a drop in the bucket”.

“The question is whether such necessary subsidy should go to private business as the optimum and chosen vehicle, or whether there are far better instruments at hand . . . which will do the job better . . .”

While on the subject of the automobile industry, consider this second aspect. After persistent exposure by Ralph Nader and subsequent legislation, the motor companies recalled millions of cars for inspection and repair. A report in The New York Times noted that as of May 10, 1969, General Motors had recalled 6 million vehicles since 1965; the entire industry a total of 13 million since 1966. The delays involved for car owners to have the necessary repairs and replacements made have constituted a saga in themselves. . . . One situation constitutes a particularly egregious chapter. Again, from reports in the Times:

March 28, 1969: “The March 18 recall included 10,400 school bus chassis with a potential brake system defect that was involved in at least two accidents and one death.”

April 17, 1969: “The General Motors Corporation said today it was asking that 4000 school buses across the nation be taken off the road because an effort to repair a brake defect had created another brake defect. . . . But yesterday General Motors told its dealers to stop making the repairs and was asking that the 4000 buses not be used again until they were fixed again. . . . In the past, some vehicles have been recalled more than once to correct different defects, but this is the auto industry’s first recall on top of a recall.”

In the Sunday News (New York) of May 11, 1969, there is an advertisement: “Keep it dependable. KEEP your GM CAR ALL GM.”

Many such instances illustrate that there are substantial flaws in the widely-held faith in business efficiency, know-how, performance infallibility. Consider also this case in connection with reports on the Long Island Railroad’s delays and unreliability. Philip Scott, president of the Budd Co. of Philadelphia,

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phia, “apologized for his company.” Budd tried to do too much too quickly, did not allow a long enough period for tests and put the cars into revenue service too soon!” Too bad.

And while dealing with the subject of non-infallibility in high private places, everyone has heard or experienced the grim humor of the A.T. and T.’s troubles in 1969 and 1970, especially in New York. A large part may have been due to explosive growth in demand, beyond predictability, as claimed. But consider items that can scarcely be placed under that rubric:

“As for Benton and Bowles, its problems persist. Last week the agency discovered that its listing was inadvertently left out of the new phone books.”

And, “A representative of the (State Public Service) Commission asked newsmen not to report the names of stores listed where (burglar) alarm systems were out of action, for fear burglars might be encouraged to visit such concerns.”

Also “Delays beyond dates promised sometimes reached six months.”

Thus, in the very web and woof of private profit enterprise there are inherent characteristics that preclude it from properly handling the delicate environmental-housing-community complex—with of course some admirable individual exceptions—or much the less coax it on by attractive profits.

Before getting into the future situation briefly consider the present and the history of some of the more famous disreputables: the infamous “608’s” by which for a number of years FHA-appraised-and-guaranteed mortgage loans were made which were later found to be in excess of the builder’s total cost, he pocketing the difference. 608 became known as the windfall clause; not a few exceptional cases but many many cases and hundreds of millions of dollars of windfalls.

For a second group of disreputables, consider those who go in anew to purchase slum properties, not as going enterprises to furnish housing but to buy as cheap property, in expectation of land price increments later, for urban renewal etc. Meantime: minimum expenditures, maximum neglect. In a fascinating or horrifying series in the Washington Post of March 24-28, 1968, there is a story with chapter and verse, of individuals in the names of corporations buying hundreds of down-at-heel properties in the Shaw slum area where renewal was shortly expected (one, 300 properties; one, 60; etc., etc.) to hold for re-sale.

There was good reason to expect this, for as noted in the installment of March 26, in the previous Northwest I Renewal Area, just south of Shaw, “In several instances land records show slum real estate investors were able to collect profits of 25 to 100 percent in one to three years by buying, and later selling to the government.” A number of specific cases are cited. One: In April 1962 a dummy bought 33 M Street for $8,500. Two days later it was taken over by Mr. B. for $10,000. In October 1964 B. sold it to the Redevelopment Land Agency for $16,000. Thus about 100 percent profit in 17 months.

I have no intention of equating these grim skulduggeries with the “high-type core” group, whom it is so eagerly sought now to get into poor people’s housing. These are almost wicked caricatures of the ingrained habit of considering landshefter-houses as a commodity. But this very syndrome will be seen to have the most fatal consequences for any level of private enterprise in poor people’s housing; that quite different institutions are required.

This conception of commodity-without-ultimate-responsibility will now be seen to be prominent also in the high-type business and in government policy. Consider a case-type in housing. Already there has been noted the case of owners and mortgagees (savings banks heavily among them) “walking away” from slum buildings after letting taxes accumulate, maintenance and safety spiral downward. This merely shows in another way that slum and low-rent housing are just not suitable for the conventions and priorities of private enterprise, that we need new institutions. But, what is newly happening? This same ultimate walk-away syndrome is being offered as inducement for very high-level enterprise indeed to start the whole thing over again, freshly.

There is a very well publicized and highly praised case of a prominent utility helping to finance development of a very large slum rehabilitation in a ghetto, on the basis of 6 per cent plus accelerated depreciation which runs profit to some 15-20 percent in the early years. A letter of analysis from the company’s counsel was later noted which says in part “It is the 200 percent double declining balance and the permissible 150 percent of straight line depreciation which gives the private businssman the satisfactory 15 to 20 percent profit for which he is looking... After year ten, from a tax point of view the project should be disposed of, since there no longer exists any meaningful tax shelter.” Again, the commodity-profit and profit-allegiance outlook, without ultimate responsibility.

In short, and again, this very crucial sector of the social-housing-community-environment area is just not the proper realm for private enterprise. This does not mean the office buildings, luxury apartments and homes, hotels, are not still suitable for these organizations. To sharpen the issue consider a recent headline which reads “What can private enterprise do about slums?”, and ends thus: “But if the private enterprise system is to be preserved, a profit factor must be built into the welfare situation.”

While as part of our total system, the technical-industrial operation of creating physical buildings does involve a private profit, the operational and social aspects are of a quite different character, require different institutions.

Several other points need to be made as to the pace and sensitivity of private enterprise quasi-private enterprise, in the creation or recreation of environment and living community:

One of the most notable phenomena of the last decades is the decentralization of industry, and to a much less extent of office buildings, out of cities. This has accentuated an imbalance in that large

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3 New York Post, August 7, 1969.
6 Ibid., Raymond Adams of an alarm company.

numbers of workers can find no housing nearby that they can afford. They must commute from the low-rent rundown areas of the cities. Reasonably diligent investigation discloses no cases where the employer has made attempts to see these workers provided with good housing nearby, whether as a precondition to moving out when his position is strong, or afterward. Suburban and exurban attitudes being what they are, business chooses to let it go at that. If business really meant business, it could exercise enormous creative leverage. In another context, the specific case of Remington in Lonoke, Arkansas, has previously (Part 3, December 1969) been described (and decribed).

As for New Towns, all of which so far in the U.S.A. are being developed by straight private enterprise, I have at length in The Urgent Future (Ch.6), and in this article (Part 3), shown why this is the wrong instrument. One may grant that, as in Columbia and to an extent elsewhere, virtuosity in technical and traffic and recreational solutions and in some cases a degree of self-containment are achieved. The major motivation of land profit is universal and primary in this set-up, which immediately forfeits the main cost-social benefits available. And, the private entrepreneur has not yet and probably cannot afford to place serious income-and-racial mix high enough in his priorities so that he will “wait it out”, place it at the top of his determination. This all-important part of the job as far as national well-being and social peace are concerned, he just cannot achieve. This requires the outlook and the financial strength of the “new” instruments to be discussed. One of these new instruments is in the course of being forged in the development of Columbia, where in 1969 the Columbia Interfaith Housing Corporation, an ecumenical group had under way the construction of a scattered site operation of 300 units for lower-middle income families in Wilde Lake Village. Others are to follow, but in toto, an excessively minor proportion.

Thus there are occasional exceptions to these inherent limitations, mentioned from time to time in this series. There are also examples of public-spirited undertakings by private business enterprises that are quite separate from the main profit operations. And businessmen are active with other community elements in forming public interest development groups which are becoming one of the key elements in housing and environment. These point a way to the dynamic and effective new instruments to be discussed more closely later.

Dealing with slogans: NASA, systems analysis, computers...and limitations.

Originally, in speaking of Miracles by Sloganeer, two other slogans were included: Do it by NASA, Do it by systems analysis. We will deal with these much more briefly, because they have much less of an historic and inviolate background to be exorcised. Here, as in the case of private enterprise, the danger is through naiveté or disillusionment or unwillingness to think the problems through (in terms of new, suited means and solutions), to reflect ourselves into means that have been applied to enterprises with other characteristics. The trick is to abstract the elements of value and applicability, and use them to the extent possible, as adjuncts in a basic process suited to our specific problems.

“The trick is to abstract the elements of value and applicability, and use them to the extent possible, as adjuncts in a basic process suited to our specific problems.”
have already explored the 'living' problems of riot control, slum removal, waste disposal, mass transportation—but they find little of the cool logic of mathematics or what one speaker called the 'inertness' of complex military machines. . . .

"Yet both Mr. Engel and some of the people-oriented Mayors, political scientists, sociologists and public administrators who attended the forum expressed some hope that systems analysis could help. . . .[Agreed. A.M.]

"A modern social system such as a city or the transportation complex in the Boston-to-Washington corridor has little of the arrangement and none of the harmony of the dictionary definition, and some speakers questioned whether either should even be called a system. . . .

"Mr. Couler said the cause of today's social confusion was not inadequate governmental systems but a very poor immigration policy on the part of the American Indian. . . ."

A related matter of pat answering: the application of computers, and the hidden limitations. Jay Forrester in Urban Dynamics has attempted to cut through the urban tangle by using a computer to simulate the interaction of major factors that cause a city to act and react as it does. He draws conclusions and recommendations, many of which seem stimulating but in toto quite inadequate. The reason seems to me to be that his soft ware, probably of necessity, includes the city only; not the regional and national matrix in which it lives or doesn't live. The city is not a free-standing entity, and it just isn't in the cards yet to make an adequate national total and particulate model. So, though it may be irritating to have to admit it, the method falls down as of now and near future at least. As of a remote date, this could have great promise; as now presented, considerable danger. . . . Thus in all three cases: help and potential, not the single magic. In all these cases, potential tools; not the essential institutions, only aids to them.

6 What are the alternatives?
Public corporations, public interest groups.

As in the case of the previous analyses, consider the characteristics of the new, under two heads:

The basic suitability, the validity and drive of the underlying impulses, and the rewards.

The pragmatic record.

In these forms there are very powerful motivations that are released and gushing into existence and action, from initial trickles or flows that have always operated. These should be encouraged and centered on the vital environmental realms that are our concern. In the forms and frameworks we discuss here, there is the impulse to great achievement, great competitive achievement as in private enterprise. However, there is a sublimation. The primary measure is not wealth amassed for self and stockholders, not the enormous salaries and stock options of the top executive world, but public service, discovery, innovation.

On one's boards of directors one draws upon the benefits of great business brains and ingenuities, on detached service as it were; freed, in this capacity, from the business parameters, the stock options, the stockholder-as-god. One uses also the ablest people in social motive and invention, often of science. These forms are already a serious factor, must and will become more so, in these action fields. Freed from the motivations of maximum profit, they are likely to develop complete rather than warring motivations.

It is not only the cream of the current college and university graduates who are now seeking non-business opportunities, but almost daily one reads of a mature business executive who is opting out for a service career (and not just spare time or tangential or "philanthropic"), establishment lawyers who are rearing in obscure submerged areas, educators leaving the Harvards for the Negro Miles Colleges. So, this is not just a question of mavericks and odd balls, but a strong new direction. The idea whose time has come.

So much for the inherent character of the new chosen instruments. Now, a brief examination of the types that are discerned, and that should proliferate to handle the jobs.

7 Public corporations—like the TVA—distill the concerns of government and people.

The British Development Corporations for New Towns (eminent citizens, usually seven, appointed by government, who select a general manager); Inter-State and other Commissions and Authorities here (e.g. New York Port Authority whose board of eminent citizens is appointed by the State Governors, select their manager or executive director); Housing Authorities; the recent New York State-Urban Development Corporation; State Universities. These combine the dynamics and the relatively unhindered directness of action that are often found in the private business enterprise, but with the sole criterion of the public welfare. Also, they distill the public concerns of government and people, to a considerable extent freed from the tyrannies of government procedures (red tape to you); and the dangers of ossification, of entrenched civil service.

As one illustration of the alertness of this group equal to anything in private enterprise, a recent article on containerization notes the great lead of the New York Port. "Thanks to a 10-year lead over its rivals—the Port Authority began working on containerization in 1955—the port as a whole faces clear sailing ahead." The TVA illustrates another facet or summation of facets in the comprehensiveness of its continuing human-environmental adventure, the evidence of the forward-oriented harmony, the so many elements in which its pioneering has been leading the way or pointing a way—besides economics and prosperity—the quality of air and water, restoration of field and forest, big new dimensions and direction. Their A Quality Environment in the Tennessee Valley is guaranteed by me to fill the spiritual lungs with heady drafts.

8 Public interest groups—like United Housing Foundation—can operate where there is no profit.

Here, generally, there is no element of direct government interest or appointments. Citizens band


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together to create genuinely non-profit enterprise hospitals, "private" universities, foundations, cooperatives. In housing and environmental development such groups are more recent, but in the last decade there has been considerable proliferation and accumulated experience, even expertise; based on churches, labor unions, businessmen-citizens development groups; lately, locality and neighborhood groups.

Let us list a few. We have the example of ACTIONhousing and AHRCO, a group of Pittsburgh and Allegheny County largely business leaders who have contributed and loaned substantial sums to a fund that offers seed money, technical help, loans to moderate and to a certain extent low-rental housing. Their accomplishments are on considerable scale, over the range of new developments and rehabilitation. Another notable example is the Metropolitan Detroit Citizens Development Authority consisting of businessmen, along with labor, civic, church and minority citizenry, leaders from ghetto neighborhoods. It is a non-profit enterprise which operates with a revolving fund of $4,500,000, has energized greater funds from other groups, and works with local community sponsors in Detroit, Pontiac, Flint.

We note two more examples of church-based groups, a great and growing number around the country:

The Rev. Channing Phillips and a strong group in Washington forming the Housing Development Corp., had under way in 1969 or completed something over a thousand units in different areas, both their own operations and catalyzing other sponsors; and actively developing new ones. The Plymouth non-profit housing corporation in Detroit (Plymouth United Church of Christ) some 500 new and rehabilitated units, and moving rapidly ahead. These have also additional dimensions. Basically local minority in composition, they have tenant representatives on their board, and several important businessmen. They now have considerable expertise, and have formed management and consulting entities which help other sponsors, have now started to train local workers and contractors. . . . The Acorn Urban Renewal in Oakland, California (yes, Oakland!) includes 900 low and moderate income units in the minority area, sponsored by the Alameda County Labor Council. . . . These are not unique examples, but selected out of hundreds.

AFL-CIO states that as of 1969, 230 housing developments are under way sponsored by labor unions.

The two large-scale cooperative organizations, Foundation for Cooperative Housing and United Housing Foundation, have done and are doing scores of thousands of units across the country. There is in these the added dimension of cooperative control, community and educational activities, generally self-propelled, a stretching of the people's sense of control or at least participation over a considerable area of their own destinies.

So, in all these groups there is not only the bread-and-butter of housing, but a whole gamut of what may be called integral and expanding by-products of physical-social development, and expansion of people. Somewhat the TVA principle. They are in quite different scale, context, particular applications. But they are similar in the sense of not being restricted to, but enhancing the original main purpose.

The great point is this: after the revelations and breakdowns we have seen and are going through at so many points in the environmental continuum, is it conceivable to think of housing-environment as a private interest, or does it not overwhelmingly need to join the essentially social company or essence of the hospital, the university, open space-and-park, health center. There are private hospitals, private schools, private clubs for recreation, private camping grounds. But these are fractional, marginal, not the essence, not the grand diapason. Low- and some moderate-income housing-environment belongs here, not in the private sphere which has so broken down in the really critical areas, in the one-third to one-half of our people's living. This belongs partly in the realm of government, to a much greater extent in the realm of these "new" instruments. As has been seen, they are not so new really, but new in the sense of becoming the chosen instruments on the grand scale.

Before leaving these, in what may be felt is an aura or euphoria of accomplishment and future accomplishment, two major caveats must be heavily underlined.

First, the alarming headline "Non-profit Home Builders Fear Curbs by FHA." Eugene A. Guldledge, the new FHA Commissioner in the Department of Housing and Urban Development stated "... We found ourselves more and more working out ways to increase the role of the non-profit sponsor in housing production. I want to have that role reversed. The non-profit sponsor does not belong in housing production except under a very limited set of circumstances." It should be noted relevantly that he has served as president of the National Association of Home Builders.

Second, New York State Urban Development Corporation has been much applauded here, and rightly. But see its own note: "UDC has been authorized by law to issue notes and bonds up to $1 billion, but it is required to carry out its programs without any increase in State or local debt." There are no direct grants or non-repayable subsidies to finance its activities—-with ultimate users repaying the bonded indebtedness. Magnifying and translating this fine print, it means that of itself with all its merits, the corporation can't create housing for low-income people on a very considerable scale. It is still desperately incumbent on us to smash through to far, far greater than eyedropper subsidies, federal and state. This gigantic caveat applies, of course, to all these groups.

So, we have some very fine instruments, that should become the chosen instruments. The best succeed in both their main thrust and in their interest. In colateral living elements—as the TVA states it, our multiple effort and contribution to meet both kinds of human needs—a decent living and a living environment as well; and as the cooperatives do. But the vital fine print says that to make these instruments really perform, we must vastly, vastly, increase the government's financial contributions for subsidies that equalize people's means with costs of meeting them.

"TVA's publication—
A Quality Environment—
Is guaranteed by me to fill the spiritual lungs
with hearty drafts."

Unless we deal with these basics and institutional issues, we are just chasing our tails. . . ."

9 Italics by me.
1. TECHNICAL CENTER
FOR CUMMINS ENGINE COMPANY, INC.
HARRY WEESE AND ASSOCIATES, ARCHITECTS
FISHER-SPILLMAN, ASSOCIATE ARCHITECTS

This new Technical Center—known as Building Number 64—at the Cummins Engine Company in Columbus, Indiana, is the most recent structure in the company's building program, and a handsome addition to this industrial plant. A manufacturing plant for heavy engines is not the usual place to look for fine architecture, but Cummins is no usual company. Its president, Irwin Miller, is the one-man spark plug who has made Columbus a veritable museum of contemporary architecture through his initiative and the incentives he has provided the city to engage some of the country's finest architects to design its new buildings. (Among the famous names: Eliel and Eero Saarinen, Edward L. Barnes, John Carl Warnecke, Harry Weese.) Private enterprise and some institutions have likewise responded to his stimulus. In 1962 he engaged Harry Weese—whose design for Cummins' Engine Test Laboratory had already set a high standard for future development—to master plan the site of the company's operations, and

the new building, designed by the same firm, is located according to that plan. The importance of the master plan transcends the site, however, for it is the last link in the city's traffic plan, and calls for removal of the nearby New York Central tracks, rerouting and widening of the River Haw for flood control, and redevelopment of adjacent road systems.

This Center, housing 600 engineers and supporting personnel involved in research and development of engines and of new forms of power, is actually two buildings, a large two-story research building, and a five-story office building, located midway along the facade of the research building and connected to it by a tunnel below grade and a glass-enclosed bridge at the second floor level, with main entrance at ground level. The two buildings were designed, Harry Weese says, "around the concept of highly integrated structural and mechanical systems, for the most part using standard components, and achieving improved functional
Columbus is in a river flood plain, a disadvantage in certain respects, but an advantage in others. The Cummins master plan envisions rerouting and widening the river bed near the company property, and making of it a pleasant, tree-lined, naturally landscaped waterfront area. Removal of old railroad tracks and redevelopment of nearby road systems will further and very visibly improve the property.
advantages and favorable costs. The delta truss in the research building, for instance, serves the overhead mechanical needs of general illumination, ventilation and specific piping. But beyond that it emphasizes the interior volume, providing an unexpected architectural quality to the space." The delta truss, set on steel columns in 32 by 48 foot bays, frames the ground floor structure of the research building, providing an open, flexible space within which are movable enclosures for use as shop areas, laboratories and offices, insulated from noise, dirt and grime emanating from adjacent engine test cells, bench test areas and other very noisy and dirty operations.

The research building is a steel framed structure, 450 by 386 feet in area, with enclosing walls made up of precast concrete curtain wall panels similar to those developed for earlier Cummins buildings by the same architects. It functions as two wings—one for test cells, the other for a Pilot Center—and general facilities.

The office building is sited at a 90-degree angle to the research building elevation to open up the view for offices which otherwise would, in a parallel siting, face only the concrete walls of the research building. Its structure is reinforced concrete, with a two-way floor system in which ribs are paired to form channels for air distribution and deep coffers for lighting. Interior partitions are coordinated with this double waffle slab module. In contrast to the research building, the office building walls are more glass than concrete, but concrete is nevertheless the strong expression of the building, largely because of the handsome sunshade detail which is repeated on all four sides.

BUILDING NUMBER 64, TECHNICAL CENTER, Columbus, Indiana. Owner: Cummins Engine Company, Inc. Architects: Harry Weese and Associates; Fisher-Spillman, associate architects; structural engineers: The Engineers Collaborative; mechanical engineers: Cosentini Associates; electrical engineers: Litogen & Schlossberg; landscape architects: Dan Kiley; contractors: Frank Messer & Sons, Inc.
Since the Cummins plant is located within the town, the exhausts it produces are a problem of no small dimension to so civic-minded a man as Irwin Miller. Consequently, the research building exhaust systems have been carefully engineered to minimize pollutant emission. A larger than necessary volume of air is circulated to dilute the smoke; noise is muffled as much as possible. Within the building the test cells—where the greatest amount of noise is generated—are sealed for acoustic insulation.
The interior of Koret of California’s new Distribution Center in South San Francisco is “like a giant closet,” say the architects, Knorr-Elliott of San Francisco, “full of bright-colored clothes.” Because this is a very busy center, the racks don’t stay full long. The center is completely automated; to handle the volume of garments that it does, it has to be. One million garments a month come in, are checked for quality and color control, automatically sorted, hung on their proper racks, and subsequently selected for shipment according to orders. The building that houses this impressive operation is a handsome one, located on a landscaped corner site in an industrial park south of San Francisco.

Good looks and function are inseparable here: even the landscaping, although used to enhance the site, works to control dust, in which this windy location would otherwise abound, and which is intolerable to the operations that go on within the building. The grassy mounds cut the wind and screen the parking areas. The building is designed for expansion both vertically and horizontally: the central two-story element over the entrance lobby shelters what will be a circular stair to the second floor when that is added. The parapet is high for present actual needs, but was designed to act later on as the sill for second-floor windows, so that new and old brick facing would not be juxtaposed. Warehouse and shipping areas can expand laterally, independent of each other and of the checking-repairing department. The building is windowless except in the employee cafeteria at the front of the building. Although it is not air conditioned—the receiving shipping area is normally open at both ends, admitting ample air—the air that circulates to the warehouse is filtered to control dust, one of the major problems that this kind of building involves. Two other warehouse problems of major importance are lighting, which must not be too intense for too long a period on any one garment or batch (it causes fading), and ventilation. The lighting
problem was solved—after much research with little resulting data—by using the simplest industrial fixture in a deep shield which throws light down on the edges of the aisles but not on the garments. Ventilation is a problem, not because of people's needs (only eight employees are actually in the warehouse at any one time), but because of the particular odor of stacked synthetic garments. By providing a large volume of air from an auxiliary system (located in the two small rooms at the back of the building) for the first floor and from the roof for the second level, and by the use of an open steel deck and frame system, ample air circulates to minimize the odor.

DISTRIBUTION CENTER, South San Francisco, California. Owner: Koret of California. Architects: Knorr-Elliot and Associates; structural engineers: Tolt and DeNevers; mechanical and electrical engineers: O’Kelly & Schoenlank; landscape architects: Anthony Guzzardo and Associates; contractors: McDonald & Nelson.
The handsome daylit lobby with its unusual skylight serves the quasi public areas and will serve as entrance to the second floor when it is added. Beyond the lobby, the Center's operations go on: the flow of garments from check-in to shipment, over thousands of feet of conveyor belts, slide rails and towlines, is continuous in a one-way flow pattern. A 2800-foot long tow system carries 300 computer-controlled carts through both levels of the storage areas where they automatically pick up merchandise by order, routing it finally to the shipment area. Two major dust controls are successfully used (dusty garments are unsalable): a filtered air supply in large enough volume to keep the environment fresh, supplied at rear wall on first floor and from roof at second, and post-tensioned concrete, poured in 100-foot squares, in which a harder than usual aggregate was used to eliminate cracks and resulting dust. The building design expresses the three-part operation of the Center: checking, repairing and quality control, and employees' cafeteria at the front; directly back of this area, the brightly lighted receiving-shipping department; at the rear, the almost square, 250,000 square foot, two-level warehouse, with a storage capacity of 1.5 million garments. The building covers only one-half the site; the rest is open space. The Cabot, Cabot and Forbes industrial park in which it is located requires off-street parking, 40-foot setbacks, concealed truck entrances, and sign control. Knorr-Elliott have designed 17 buildings in the park.
A seemingly radical departure from Marcel Breuer and Herbert Beckhard's previous house designs, this recently completed house on Long Island nevertheless incorporates many familiar elements that give it the unmistakable stamp of the firm: the use and detailing of concrete; contrasting materials and textures; design for "sun and shadow." A beautifully worked-out parabolic arch structure (side-walls, sun screen and partitions are all free-standing and non-load-bearing) generates the design of expansive and dramatically varied living spaces. The use of a radical structural-formal concept is itself a consistent theme: "We still design one or two private houses a year," said Breuer in a November, 1966 RECORD portfolio, "for clients who are interested in experimental ideas." The clients were willing: this is their second Breuer-designed home (The original one, built in 1945, was one of Breuer's first H-plans, designed for a young family.) Now, with all but the youngest son married, the owners wished to enjoy an open, unzoned plan, with exposure to a fine view their new site had. The basic concept dates from a 1959 project for an Aspen, Colorado site carefully adapted to suit the owners' program and the land.

GELLER HOUSE

1. Entry
2. Living
3. Sunken area
4. Dining
5. Kitchen
6. Utility
7. Bedrooms
8. Dressing room
9. Garage
A parabolic form for the roof structure was used in large part, explains architect Beckhard, to orient and expose a spacious and open-planned living area to an unusual and sweeping view. A picturesque salt marsh stretches out to the horizon, with nearest buildings a great distance away. The entire area is a wildlife sanctuary and is thus protected from encroaching development. As frontage is on a relatively busy street, the entry side (photo left) is set back and blanked off with stucco. The house is for a family of three, with an extra bedroom as well as studio for visiting children and guests. Bedrooms are banked along the entry side. Their low, 8-foot ceilings permit the studio and a sauna on the second floor (plan not shown), providing a dramatic contrast to the main, full-height living area. The studio balcony overlooks the living area to share the view. All bedroom windows open onto the entry court, containing a sculpture garden and baffled by 3-foot, 6-inch walls.

The parabolic arch form permitted a main space of generous size and proportions shown in the photos here. The living area is sunken, gaining height for one low end. The emphasis is on informality, with kitchen, dining and living all free of partitions and contained within the one space. Materials, both inside and out, are beautifully detailed, chosen for practicality, and to articulate elements and emphasize spaces. Concrete texture for the arch and sunscreen comes from butt-jointed boarding; poured-in-place concrete for the fireplace and wall is bush-hammered to reveal the stone aggregate. Floors of main spaces are bluestone; bedroom floors are carpeted. Partitions are painted gypsum board; ceilings are textured insulating cork, painted white over the main space and studio, with bedrooms left a natural dark brown to further emphasize spatial differences. Neutral colors predominate, with bright color for the red-upholstered seating area.
GELLER HOUSE

The arch is cut out at the sides for added openness (photo right) and terminates in point supports. Tension members to absorb thrust are cast in place under the floor. Slip connections for partitions permit vertical movement of the arch. Computer analysis was used to ensure free deflection. Garden walls (below) have a heavy concrete texture achieved using board and batten forms and were placed to protect the south-oriented terrace from winter winds, thus permitting year-round sunbathing while providing privacy from neighbors to the east and west. The depth and pattern of the sun-screen were in fact designed to let winter sun flood the interior while keeping out the sun in summer. The wall at left in photo below in fact is side of carport, which is partly sunken to maintain a 5-ft. 6-in. height. Views from inside are shown at right, with the main interior space opening both to the south terrace and to the north toward entry and upper-level studio.
THREE OFFICE BUILDINGS

These three office buildings are different in size—one small, one "medium" and one large—but they show a common ability to enhance the city immediately around them. They make that part of the city a better place to be by providing additional closure for a fragmented street, or a new visual strength in the midst of crowded anonymous buildings, or by providing dramatic stylistic continuity with a whole region's architectural tradition.

1 CLOSURE AND APPROPRIATE SCALE FOR A STREET IN CAMBRIDGE

Though Massachusetts Avenue is the main corridor between Harvard University and Massachusetts Institute of Technology, it has remained an anonymous area, neither part of the academic communities nor a community in its own right. The office building above and on the following two pages (in part occupied and owned by its architect, Hugh Stubbins and Associates) is a new focal point for this street, enhancing it commercially while at the same time maintaining the scale and intimacy of Cambridge as a whole. The six-floor facade reflects the line of older buildings along the street and required parking is in the rear, off the street. The principal exterior material is concrete on both the poured-in-place columns and precast spandrel facings, all painted a light brown. The brown color is appropriate to the existing neighborhood, as exposed concrete might not be; paint eliminates water staining and the need for expensive formwork craftsmanship. The simplicity and cohesiveness of the facade is continued with the windows, which are straightforward spans of glass between the concrete. The facade as a whole gives a needed sense of closure to a fragmented but important street.
At ground level the office building is undercut to widen the sidewalk; there are lively planting areas, a row of trees, and a giant "1033" painted on the brick front. The offices of Hugh Stubbins and Associates occupy the sixth and part of the fifth floors. The sixth floor (right, above) contains the main reception area, associates' offices, the library, conference rooms, print room, and drafting areas. Associates' offices ring the drafting area, separated from it by glass partitions, so that the open plan provides views of the Boston-Cambridge skyline for everyone. There are two levels of parking in the rear, approached from either Massachusetts Avenue or an adjacent side street. LeMesurier Associates, Inc., a Cambridge structural engineering firm, occupies the third and fourth floors, with a private stairway connecting them (see section, above). LeMesurier was the structural engineer for the building itself and has a financial interest in it with Stubbins.
A standard partitioning system was used throughout the building, on a 2-foot by 4-foot module. The partitions do not always meet the exterior wall at a column or mullion; a typical window is 6 feet high by 18 feet wide, with only one mullion within. Where a partition meets this glass surface, they are simply connected by a neoprene gasket, which is not disturbing from the outside. Stubbins' office designed all its own furniture, including drafting tables and low dividers. The office at left shows a particularly handsome birch desk; a full circle with about one-fourth of it sliced off to form a flat face for the chair.

STRENGTH AND COHESIVENESS FOR A CROWDED BLOCK IN CHICAGO

Designed by C. F. Murphy Associates, this new 15-story building on North Dearborn Street at Wacker Drive is the administrative center for Blue Cross and Blue Shield in Chicago. It is a muscular, positive architectural statement on a site crowded by parking lots and a river, within a rather chaotic mixture of high-rise residences, light industry, and commercial stores. Concrete is both its frame and its exterior finish, so that the building's major structural material is also its primary design element. The eight large vertical concrete shafts combine with the eight smaller concrete columns near them to act as structural members; shafts are also duct enclosures for the heating and air conditioning. Columns and shafts carry the eye skyward, counter-balancing the strong horizontal emphasis of the concrete spandrels and cornices. The perpendicular surfaces have directional and rhythmic bush-hammered corrugations, while the horizontal surfaces are smooth, with the tie-holes exposed. The concrete ceiling of the ground floor public service area (above) continues the strength of the building inside. The brick and teak of the counter and the teak of the seating units—room for some 40 people—maintain the unity and harmony of the space.
The spacious lobby (above) is enclosed by clear glass walls set back 12½ feet from the sidewalk. The burnt-faced brick floor extends five feet beyond the exterior walls, establishing continuity with the exterior perimeter. From the south side of the lobby a bold concrete stairway (opposite page) leads directly to the employe cafeteria on the second floor. As the photos indicate, the core of the building at the lobby level is exposed, bush-hammered concrete with solid teak planking in the elevator corridors.

The lobby sculpture above was designed for the building by Louise Nevelson.

The employees' lounge (left) on the third floor is a warm, bright area with comfortable leather seating units, red cube tables, game tables and gay prints on the walls. Here again, teak was incorporated into the design of the furniture. In this space and throughout the building, air supply is integrated with the recessed air handling light troffers.
Typical floor plans (left), the section (right) and the lobby photos indicate that the floor area surrounding the central service core is column-free. Planned on a five-foot module with movable partitions which may be elevated in any line of the grid, the design exhibits consideration for maximum efficiency and flexibility throughout the structure. In the HVAC shafts are high-velocity air supply ducts which serve a four-pipe induction system which provides cooling, heating and ventilation to the perimeter of the building. The shafts also contain the main exhaust-recirculation ducts for the entire building, domestic hot and cold water and waste and vent risers for wet stacks.

THE SCULPTURAL EXPRESSION OF TRADITION IN SAN FRANCISCO

The new Bank of America tower in San Francisco—a joint venture of Wurster, Bernardi and Emmons, Skidmore, Owings & Merrill, and with Pietro Belluschi as consulting architect—is a delicately changing piece of sculpture to the pedestrian in the city. It is faceted, like finely cut crystal, into a thousand surfaces that change their patterns and color depending on the angle at which you see them; the facade can appear to be long, square tubing bundled together with the corners showing, or it is zig-zagging horizontal lines, or it is a checkerboard seen in perspective. It is a building that makes its transitions well, like San Francisco itself. The rhythm of constant corners along one facade prepares the eye for the real corner and the adjacent facade; one hardly knows where the 90-degree change in plane has been made. It has a top that ends assertively and in proportion to the whole; the building could not as successfully have been ten stories shorter or taller. As the eye moves to the ground a projected bay becomes an indented bay at the second floor, while the column faces remain in the same plane. The Bank of America tower is uniquely suited to a city where the bay window has been traditional since the 19th century. The tower has become, and will remain a key architectural monument in San Francisco.
Two decisions were made almost at once by the architects—1) the building should be dark in color, 2) it should not be an austere rectangular box—and the results of these decisions are the tower's most significant attributes. Its faceted, flowing walls provide a continuous rhythm of interior and exterior bays around the facade, as these photos indicate. The bay window is a strong element in San Francisco's cityscape, variously explained as a way of bringing in more light on dark foggy days and as a means of obtaining more floor space than a building lot provides. The windows greatly enliven vistas along hilly streets and preclude monotony with their undulating rhythms. The Bank of America's walls are thus a modern, abstracted, version of a regional tradition, and are easily recognizable by citizens as a link with the best parts of their past.

The views looking east along Pine Street (above) and west along Pine Street (right) indicate the
steeply sloping site and the extensive planting areas along the street. The placement of the building on the site was influenced by the slope of the site, which falls steeply from Kearny Street on the west to Montgomery Street—San Francisco's Wall Street—on the east. On-site parking was required, and it was put underground (below the concourse level); this dictated, with the sloping site, that the tower be on Pine Street. The main banking offices will be contained in the Phase II portion of the project, a broad, low building now under construction (shaded portion of plan, left).

The tower's color is dark red, with a polished surface that is highly reflective. San Francisco has always been a white city, when seen from any of the hills around it, and as dark buildings begin to appear, the citizens are becoming concerned about their effect on the whole. Both Don Emmons and Pietro Belluschi have given two principal reasons for the building's dark color. One, white tends to make any object appear larger than it really is and black tends to diminish it. The large building is, in effect, contained by its definite color. Two, it is dark so the windows do not stand out as "holes" in the facade. This allows the walls to be the strong pattern-making element and the tower can be more easily read as a sculptural unity.

The setbacks and the building's profile make window washing an intricate procedure. Belluschi has said this issue influenced several decisions regarding the facade's detailing and its amount of undulation; the solution is certainly ingenious.

A W-shaped basic work platform moves up and down the facade within permanent grooves set in the interior corners of the bays. The platform is at all times positively attached to the building, and it is computer controlled—it won't work until all switches are "go". The window-washing system was designed by Manning and Lewis, New Jersey.
The monumental proportions and subtle changes in scale at the base of the tower can be seen best from the plaza side of the block (three photos at left). The International Banking Division of Bank of America occupies the second floor of the tower, and this has been set off from the leased office space above by inverting rather than projecting the windows at the second floor, and making the glass area larger. Inside, this International Banking floor is spacious and dramatic (photo, above).

The detailing of the building is exceptional in its craftsmanship and precision. This can be seen in the transition between wall and window in one plane, in the shape of the octagonal piers at the base, in the way the pier surfaces grow into walls, in the ceiling pattern which reflects the plan, and in the ceiling's carefully integrated downlighting. Such attention to detail is, of course, too rarely found in office buildings these days.
The concourse level of the Bank of America (above, left) shows the imaginative use of lighting to emphasize important crossroads, and again the careful attention to detail. A forty-fifth-floor executive's office (left) shows how a full bay of the wall system may be used within a partitioning pattern, and the panoramic view it provides.

Equipment that works on the refuse disposal problem

Presently, refuse from buildings such as apartment buildings, schools, and the like, is either burned or dumped. The problem is that incinerators can make smoke; further, solid waste has been taking up too much space. Incinerator smoke can be virtually eliminated with a type of collector called a scrubber. Solid waste can be shrunk in volume with a device called a compactor. This article tells how the equipment works, the quality aspects that should be considered, and how much space is required.

by Herbert Kaplan Research-Cottrell, Incorporated

Today's affluent, convenience-oriented society generates refuse at a daily per capita rate that now exceeds five pounds and is expected to hit eight pounds by 1980. At the same time, limitations on the disposal of such refuse are resulting from increasing intolerance of pollution and the decreasing area of suitable disposal sites. Restrictive legislation is already on the books in most large cities, affecting apartment houses, institutions, and commercial sources of refuse. Legal challenges and political problems have been holding up strict enforcement in many cities but this picture is changing rapidly, because the problems won't wait.

Already in most large cities it is extremely difficult to find space in which dumping of refuse is still acceptable. In most smaller communities the problem is not acute, but it is only a matter of time before the pinch is felt everywhere. Ultimately, there won't be any suitable space available within reasonable trucking range of communities of any substantial size. Already collection and transportation constitute 80 per cent of refuse disposal cost. Solutions proposed for that day range from railroad shipment to empty mines and unpopulated wastelands to processing plants that hopefully can convert refuse into reusable materials with little or no remainder to be dumped.

In the more immediate future, however, planning is directed to more efficient use of such disposal sites as are still available, to make them useful longer. This means reduction of the volume of refuse, and reduction of its unsanitary nature, before disposal.

Both goals can be accomplished by suitable incineration, either in municipal incinerators or individual incinerators. The financial situation of most communities means that municipal incinerator capacity tends to lag well behind the growing rate of refuse generation. It is all cities and towns can do to keep up with refuse from the individual houses and small multifamily units—it being impractical, technically and politically, to pressure them into changed disposal practice at this time. But owners of larger buildings are being, or soon will be, required to do their own refuse incineration or to compact refuse before it is collected.

Incinerators need collectors to minimize particles emitted to the atmosphere

Incineration of course is not new. What is new is the requirement for incineration with minimum air pollution. Incinerators are notorious air polluters because their basic "fuel" and combustion conditions are far from optimum. It is recognized that incinerators cannot be expected to meet the pollution control standards being imposed on industrial furnaces, but the requirements now stated in legislation or being established by regulatory authorities are tighter than can be met by simply improving incinerator design and operation. The particular pollutant content from a modern incinerator averages roughly one grain per standard cubic foot of gas (actual combustion gas conditions restated as dry gas at 32°F). But the chimney gas limit under the legislation now coming into force in most large cities is 0.2 grains per standard cubic foot, and in some cases may be as low as 0.1.

It is not too difficult to design a collector for the 80 per cent efficiency required to accept gas containing 1 grain of pollutants per scf and discharge it with 0.2 grains. In some cities all that is required is demonstrated ability to achieve a 0.2 grain output. Once a particular design has been tested and passed, it is eligible for installation on any incinerator covered by the city's regulations. But it is becoming more common to require testing of each installation to demonstrate that the combined system of incinerator and collector does not exceed the
Operating principles are shown for a typical venturi-type scrubber, designed especially for incinerator gas cleaning. Inlet gas is quenched by spray head (1), then is drawn through one or more venturi constrictions (2). Accelerated flow through the venturis causes violent mixing so that water droplets capture particles from the gas. Lowered gas velocity and upward gas travel in area (3) causes heavy particle-laden drops to fall to sump. In mesh-filled de-mister section, mist drops coalesce into larger drops, heavy enough to fall to sump. Fan produces enough pressure differential to draw gas through venturis and de-mister, and then discharges gas into chimney. Sludge from sump is discharged to sewer. Water is recirculated to spray head. Make-up water is added to replace that lost in sludge and from evaporation.

0.2 to 0.1 grain limit. In such circumstances, the less effective the incinerator’s combustion is, the more effective the collector must be. A simple collector may be satisfactory on a new incinerator with dual chambers, direct outside air intake, modern combustion controls and other features of modern incineration practice, but more sophisticated collector design will be required for most existing incinerators and even for many rebuilt and upgraded older units. Also, the history of pollution control suggests that the pollution limits of today will not stand, but will be tightened in the future. Thus even in new construction, a high-grade collector is probably a good investment; what may be excess capability today may be required capability before its design life has been served out.

A scrubber does the best job for non-industrial-type buildings

The four types of equipment used by industry for removal of particulate pollutants from gases are the electrostatic precipitator, the mechanical or cyclone collector, the bag filter, and the scrubber. Of these, only the scrubber is suitable for incinerators of small and moderate size.

About 40 per cent of the particulate matter in typical incinerator combustion gas is less than 10 microns (1/2500 in.) particle diameter. The mechanical collector is only efficient in collecting particles larger than 10 microns, and the possibility of moisture condensation from the incinerator gas could mean problems of corrosion and plugging-up with wet particles. The fabric filter can collect very small particles, but it is also subject to fouling by wet particles, and its fabric cannot withstand gas temperatures as high as those at an incinerator exit.

The electrostatic precipitator is the preferred choice for true pollution control in large municipal incinerators, since it can tolerate the gas temperatures involved, collect very small as well as large particles, need not present a moisture or corrosion problem, and has very low operating cost. But the “fuel” in a smaller incinerator at any given moment, particularly a flue-fed type as used in apartment or institutional buildings, may range from mostly wet garbage to mostly dry paper. As a result there can be wide variations in gas temperature, moisture content and particle content. The electrostatic precipitator is so sensitive to operating conditions it cannot be designed to operate efficiently over a wide range of variation in such gas conditions. But a scrubber can accept hot gas and of course is indifferent to moisture content. Further, corrosion-resistant materials of construction can be used.

The term “scrubbing” is applied to a wide variety of operations, sometimes as elementary as simply spraying water into a flowing gas stream, or blowing the gas stream against a wetted baffie. But considerable sophistication is required to accomplish efficient particulate removal, at reasonable cost, in minimum space, without excessive water consumption.

For adequate performance it is necessary to be able to collect small as well as large particles. The smaller particles are, the more readily they are wafted to window sills, terraces, clotheslines, and other points. And, though the smallest particles may constitute a small proportion by weight of the total pollutants in a gas, unfortunately, the smaller the particles are, the more visible they are as they emerge from a chimney. This can be illustrated by imagining trying to see a falling penny from a block away, compared with an equal weight of talcum powder blown into the air.

It is also unfortunately true that the smaller particles are, the more difficult it is to scrub them out of gas. Small, lightweight particles can follow the gas stream around baffles, or even around water droplets. It is necessary to accelerate the gas, and mix the gas and water turbulently, so that particles will impact water droplets with sufficient momentum to penetrate and be captured.

Operation of the Research-Cottrell scrubber is typical of scrubbers designed by experienced manufacturers to incorporate the necessary features for small and medium-sized incinerators. Gas entering at as high as 1600°F is quenched by a high-volume flow of water. Then it flows down through flooded venturis, accelerating the gas stream and causing the turbulent mixing necessary for impact between particles and
Operating principles are shown for a typical refuse compactor. Level sensor on hopper initiates cycle. Compression ram moves forward compressing material that has fallen out of hopper. Ram returns, allowing more material to fall from hopper, and moves forward again. Ram strokes continue until predetermined density has been reached, measured by the hydraulic pressure necessary to complete the ram stroke. Then the vertical ram forces compressed slug out of compression chamber. Slug may drop into can or other container which may in some designs be indexed into position by a "carousel" so that the custodian does not have to remove and replace each container as soon as it is filled.

water. Particles in the gas therefore become thoroughly wetted. Then the gas stream is made to flow up, the heavy wet particles drop into a sump.

The clean, wet gas continues through a mesh which causes mist droplets to coalesce into large drops which fall to the sump. Sludge moves down the inclined bottom of the sump and is periodically flushed through a sewer connection. A weir maintains sump water level, from which a pump recirculates water through filters to the quench spray and venturis. Water consumption is limited to that lost through evaporation and the periodic sump flush. The unit is shop-assembled and installed as a package occupying 6 sq. ft. of floor space, complete with sump, pump, and exhaust fan. Operation is automatic, requiring no attention beyond periodic maintenance.

**The other current approach to refuse disposal—compaction**

Compaction may be an acceptable alternate to incineration. It not only reduces volume substantially but reduces—though does not eliminate—odor and rodent attraction at dumps. Sanitary landfill techniques can minimize odor and rodent problems, though questions of the possible contamination of underground water supply may remain in many locations. Also, compaction may be advantageous to building owners in communities that do not yet require either incineration or compaction, if haulage and/or dump charges are based on volume rather than weight.

Where compaction is required, there is less agreement among communities on the desirable final density than exists on the standards for particulate content of incinerator gases. Inquiries received by Research-Cottrell from around the country mostly specify densities ranging from 500 to 750 pounds per cu. yd.

Most compactors now being utilized are to some degree automatic, and utilize hydraulic force for compaction. Some designs compact refuse by forcing it into containers. Others compact entirely within the unit, minimizing the possibility of container damage and spillage. In the Research-Cottrell compactor one or more strokes of a horizontal ram compresses the refuse into a cohesive slug about 15 in. in diameter and 12 in. high. Then this ram remains in its forward position while a vertical ram ejects this compacted slug into an elbow attached to the unit. As additional slugs are ejected into the elbow, slugs are discharged from it into an expandable plastic sausage-type bag. The elongated bag is designed to permit tie-off to any desired length and weight.

Because the refuse passes between the compactor directly to the plastic bags, odors, vermin and spillage, usually associated with cans, are eliminated. Operation is automatic, a cycle being initiated by a level indicator in the hopper. Refuse slugs are compressed and forced into the expandable plastic bags—which can contain over 10 ft. of slugs while the unit is unattended. A custodian only visits the installation periodically to remove and tie off the bags and place them for pickup.

Such a compactor can handle bottles, cans, broom handles, and similar items. If some unusually strong object should jam the compactor, the cycle automatically stops. Ram motion can then be controlled manually, to jog the object into more favorable position for compaction or to permit its removal. Various safety controls including automatic fire quenching are part of such a compactor installation, and, if desired or required, automatic spray devices can be included to dispense disinfectant, insecticide, and deodorant.

Some municipalities have shown preference for compaction rather than incineration plus air pollution control for an unscrupulous building owner or manager because it is physically possible to circumvent compactor operation. A scrubber or other collector has to have a gas bypass for protection against excessive gas temperature, and it might be suspected that the bypass is being used at night when chimney emission cannot be visually detected.

**Space requirements for scrubbers and compactors; quality considerations**

A compactor requires somewhat less basement space than an incinerator and scrubber. Its installed cost is about the same as that of a scrubber. Operating costs are approximately equal. The water and auxiliary fuel cost of an incinerator and scrubber are

---

**Installation of a refuse compactor**

The compactor is shown at the top left. Compression and slug ejection are accomplished by hydraulic rams, one horizontal and one in the vertical housing in the foreground. Hydraulic power is supplied by a separately-mounted pump, partially visible at the extreme left. In this design, slugs are forced through an elbow into a long plastic tube that maintains sanitary conditions between periodic custodial visits. When the custodian visits the otherwise automatic installation, he ties off the tube into individual bags containing one or more bags, as dictated by handling methods, and installs a fresh plastic tube on the elbow.
roughly balanced by the container handling when refuse is compacted rather than incinerated.

A typical compactor occupies floor space about 4 by 8 ft, exclusive of whatever provision may be made for automatic cycling of empty containers to its discharge point. It will fit under an 8-ft ceiling. Considering access space and provisions for separate mounting of its hydraulic motor and drive (which help reduce noise), automatic bag expansion and bag storage, at least 10 by 20 ft should be allowed. Compactors are only in one size, large enough for any non-industrial requirement. In small buildings, the unit simply operates less often than in a large building.

A typical scrubber is made in three sizes, the largest requiring less than 4 by 6 ft of floor space, plus clearance for access. Height to fan discharge is under 6 ft. The three sizes are rated 1500, 3000 and 6000 cfm of combustion gas at 1600°F inlet temperature. These would conservatively handle apartment buildings of 400, 800, and 1600 rooms respectively, determined by New York City room count standards. Or they can handle buildings with 110, 220 or 440 bedrooms according to standards of the Incinerator Institute of America, based on burning three times a day.

Components are small enough to be carried through ordinary doors; then the units are assembled in place.

The best guarantee of good performance over a long life is an experienced manufacturer with a reputation for quality to be maintained. The general considerations involved in selection are performance, reliability, ease of maintenance, and trouble-free operation. Initial cost-cutting is almost certain to result in high operating costs, particularly with respect to custodial attention and repair labor and parts.

Important quality considerations for compactors are: Look for industrial-grade control and hydraulic components, products of well-known manufacturers. Compactor duty is rugged, so equipment designed for industrial duty is needed to assure long life. When service and parts are needed, downtime will be minimized if the components are those of a major manufacturer with extensive nationwide sales and service representation.

Check provisions to avoid spillage. The optimum type of compactor is one which compacts entirely within the unit, rather than completing compression in the container. This allows use of paper and plastic containers and eliminates the danger of distorted or burst cans. A "carousel," "sausage tube," or other provision to automatically accept material from the compactor, reduces the frequency of need for custodial attention.

Automatically-actuated water spray or COs fire extinguishing is a must, because fires in refuse chutes are common. An automatic extinguishing device is desirable.

The unit should be capable of compaction to at least 25 lb/cu ft. and should be ruggedly constructed, with generous hydraulic design, for years of service without distortion or excessive wear.

Look for design features to minimize operating noise. One of these is separate mounting of the hydraulic pump and its drive motor, with flexible hose connections to the compactor proper, so that motor and pump vibration are not transmitted to the sheet metal of the compactor, producing an airborne noise source.

Look for ease of access for servicing, cleaning, and dislodging of jams. A sufficiently powerful and rugged compactor will break up almost anything, but occasional jam-ups must be expected.

For adequate scrubber performance, turbulent mixing of gas and water via venturi- or orifice-plate devices is recommended to successfully remove small particles. A water recirculating system, while not essential, can significantly reduce operating cost. Generous sizing is important. Look for highly corrosion-resistant materials of construction, not only in the obvious areas but in details throughout the unit. Moisture is not the only problem; refuse contains sulfur which results in dilute sulfuric acid, and many man-made materials such as polyvinyl chloride plastics generate gases which result in dilute hydrochloric acid. As is true with compactors, rugged construction will pay off in long trouble-free life, and motors, switches, relays and similar components should be from well-known manufacturers.

Section shows details of an upgraded incinerator, as required by the New York City Housing Authority. Plan shows location of a scrubber in relation to the incinerator and other basement areas, typical of an installation in one of the apartment buildings operated by the Housing Authority. Drawings and specifications were developed by engineers Burn & Roe for the Housing Authority.

IMPORTANT FEATURES OF INCINERATOR SCRUBBERS:

Except from New York City Housing Authority specifications

1. The incinerator gas scrubber shall be based generally on the following operating principles:
   a) Thoroughly quench and wet the flue gas by means of low-pressure water sprays or a water bath.
   b) Increase velocity and turbulence of flue gas, entrained particulates and water droplets by constructing the area through which the mixture must pass.
   c) Impinge the gas mixture against a water surface, wetted plate, or against wetted walls of the scrubber.
   d) Reduce the velocity of the gas before passing mixture through water entrainment eliminators or mist separators.
   e) Discharge cleaned gas, free of entrained water and mists, through an induced draft fan to the gas exit duct.

2. The scrubber unit design and construction shall incorporate self-cleaning provisions to prevent plugging and minimize maintenance.

3. The scrubber unit and internal parts, including quench chamber, baffles, moisture separators, water storage tank, and all components in contact with water and/or incinerator products of combustion, except the induced draft fan, shall be fabricated from type 304 or type 316-L stainless steel of no. 14 gage minimum thickness.

4. Piping shall be stainless steel, flexible plastic or engine-authorized equal, especially selected for resistance to corrosion and erosion.

5. The induced draft fan shall be a heavy-duty, industrial, multi-blade, extractor-type fan designed for maximum expected scrubber exit gas temperature. The fan housing shall be provided with a continuous drain return to the scrubber water tank. The fan shall be constructed of the following or engine-authorized equal materials: housing —type 316-L stainless steel or cast iron; hub —(same); blades and/or wheel— 316-L stainless steel.

6. Vibration dampening mounts and supports shall be provided for the fan, pump and their drive motors.
Anchor "Permafused"® Chain Link with corrosion-resistant aluminum framework, fabric of handsome, rugged Woodland Green vinyl thermofused to steel. Ideal where requirements are strength, minimum upkeep, attractive appearance. Also available: fabrics in steel or aluminum, framework in galvanized or vinyl-coated steel.

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For more data, circle 59 on inquiry card
If you’ve always felt that high-performance ceilings are an infringement on good design... take heart.
Now there is **COMPAC**
the ceiling of the 70's.

Compac is the complete ceiling that comes in a carton!

It signals the end of piece-by-piece ceilings. Compac is a wall-to-wall system of unified modules, each a pre-engineered "package" of homogenous components that eliminates any need to combine a diversity of separate products and materials.

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Compac is oh, so versatile. The 3'-square center luminaire can be supplemented by incandescent spots, downlights, or left blank to form an infinite variety of ceiling patterns. Columns present no problem; Compac accepts them in the center, or at module intersections. A partition track on all sides assures complete freedom in placing movable walls. And Compac's non-linear effect offers an uncluttered sweep of ceiling plane without visual monotony.

Simple, fast, functional and handsome...truly, Compac is your kind of ceiling.

For more on COMPAC, please turn page.

*For more data, circle 60 on inquiry card*
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Compac is no experimental concept, but a fully developed ceiling system which has been exhaustively tested and performance proved.

DANIEL BUILDING (main floor), Birmingham, Alabama ARCHITECT: Lawrence S. Whitten & Son

THESE 3 ALTERNATE "FACES" FURTHER EXPAND COMPAC'S DESIGN CAPABILITIES

FLAT/REGRESSED
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For its full potential to be realized, Compac must be projected into the building function in the planning stage. The earlier you write for the complete story the sooner you and your clients can start realizing the benefits of:

COMPAC ...the ceiling of the 70's.
PLAY AREAS / TimberForm modular prefabricated units can be attached to each other to form a large variety of total play environments (see photo above). They come in kits containing finished, preservative-treated Douglas fir and Malaysian hardwood members with chamfered ends and eased edges; all hardware is included. Sufficient weight and horizontal surface is provided to eliminate the need for footings or any foundation other than the mud sills included in the kit. ▪ Niedermeyer-Martin Co., Portland, Oregon.

Circle 300 on inquiry card

PROGRAMMED PILE CARPET / Allureau is the first carpet to be made of "Programmed Pile," a new wool fiber designed to use less wool to get the same bulk, density and resilience. This is possible because of a recently developed machine that artificially produces extra crimp as a phase of the carding process before the fiber is spun into yarn. Allureau is intended for residential use, but 4 other carpets, including 2 contract carpets, using this specially processed wool are expected to be available in the Fall. ▪ Karastan, New York City.

Circle 302 on inquiry card

VERSATILE UPWARD-ACTING DOOR / This extruded aluminum upward-acting door is designed for adaptability and maximum strength for use in service stations and industrial and commercial buildings. The panels come in a variety of sizes, and combinations of glass, aluminum, fiberglass, louvers and exhaust port installations. The shape of the satin, anodized aluminum extrusions accommodates vinyl weather seals and gasketing to protect against leaks and rattles. Connections are double screwed, and all tracks, rollers, hinges, lift cables and other fixtures are heavy duty. The door easily accommodates hand chain and reduction gear for motor or mechanical operation. ▪ Kinnear Corp., Columbus, Ohio.

Circle 301 on inquiry card

PLASTIC CAR BARRIERS / Car Stop traffic and parking control units made of polyethylene are corrosion resistant and easy to install because they are lightweight. They come with steel pegs for installation without need for special equipment, and are in 36 and 80 in. lengths. ▪ Worden Co., Loudonville, N.Y.

Circle 303 on inquiry card

LIBRARY FURNITURE / Exposed structural end-frames of red oak accent this collection of library furniture which includes tables and chairs as well as such specialized items as card catalog assemblies, circulation desks and carrels. The cabinet surfaces are urethane coated for a tough, durable surface. ▪ The Worden Co., Holland, Mich.

Circle 305 on inquiry card

CEILING SHIELDS / These round or square protective shields are made to be installed around air vents. They are easily wiped clean and prevent dirt from becoming ingrained in acoustical or plaster surfaces. ▪ Ceiling Protectors, Coral Cables, Fla.

Circle 304 on inquiry card

REPLACEMENT WINDOW / This aluminum replacement window can be installed in 2 hours, for it uses existing openings and does not require custom-hung millwork or remodelling. The double-hung unit is designed to raise on concealed balances and has permanently magnetized bars on both sash to make the window draft-proof. All exterior wood trim and sills are covered with heavy aluminum shielding. The window is made to tilt inward for cleaning from inside. ▪ Georgia-Pacific Corp., Portland, Oregon.

Circle 306 on inquiry card

More products on page 142

ARCHITECTURAL RECORD July 1970 141
WATER-BASED SEAMLESS FLOOR / This poured-on seamless floor consists of a pigmented base coat with vinyl chips throughout, covered with a thicker transparent acrylic plastic layer. Both layers are water-based and therefore non-toxic and non-flammable. The floor can be applied in one day and can take light traffic the next day and heavier traffic 24 hours after the last coat is applied. The fully hardened floor is slip-resistant yet high-gloss, non-static, stable to light, has a surface warmer than tile and resists common household chemicals. The system adheres to a wide range of materials including linoleum and vinyl- asbestos and asphalt tiles. Morton Chemical Co., Chicago.

Circle 307 on inquiry card

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Suite 1400, Minnesota, South Dakota, North Dakota

For more data, circle 61 on inquiry card

For more data, circle 62 on inquiry card

DORMITORY FURNITURE / The Astra collection of dormitory furniture features surfaces of high-pressure plastic laminate for easy maintenance, and a 16-gauge steel center guide with vinyl self-lubricating back plate and side guides on front rails. Morton Chemical Co., Chicago.

Circle 309 on inquiry card

For more data, circle 61 on inquiry card
Since 1881 the Standard Operating Procedure at R-Way has been to build the finest furniture possible. Styling and faultless craftsmanship are blended to create distinctive pieces that will enhance any office. The choicest woods, perfectly matched veneers and flawless finishes are combined to make R-Way a preferred source in the office furniture field. R-Way also produces a complete line of chairs, settees and occasional pieces to complement all desk styles.

S.O.P. at R-Way also means a large inventory for prompt delivery, blanket wrapped in R-Way trucks, plus custom designing in quantity orders. Write R-Way Furniture, Box 718, Sheboygan, Wisconsin 53081, for our catalog of contract furniture.
"The installation of AllianceWall porcelain-on-steel panels will save us an estimated 70% in maintenance labor costs."

That's the prediction of the plant engineer at one of the world's largest manufacturing facilities who also made the following statement: "We tested these AllianceWall porcelain-on-steel panels for 10 months under the most punishing conditions and are convinced they are the most practical, economical material we could have chosen."

"These AllianceWall panels never require painting or scrubbing and we proved to our satisfaction that steam cleaning won't harm their finish. We also found the panels are mar-proof, scratchproof and can't be written upon," he said.

AllianceWall porcelain-on-steel panels can be installed over existing walls by your own maintenance crew at a minimum of cost. The panels are fully protected under our standard guarantee. Panels won't corrode or appear to age. Choose from 107 standard colors that stay bright and new looking indefinitely.

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For more data, circle 63 on inquiry card
FOR WALLS MEANT TO BE SEEN-NOT HEARD: NEW WALLCRAFT.

Wallcraft is the new soft wall covering from E. T. Barwick Industries. Unlike most wall coverings, Wallcraft is made of densely tufted or flocked man-made fibers on durable synthetic fabric backings. It can be applied to almost any wall surface almost any shape. Application may be at the site or prefabricated on wallboard or partitions.

Wallcraft is ruggedly long-wearing and easily maintained. Vacuuming or simple detergent sponging are usually sufficient for cleaning. Sound absorption is unusually high, too. Wallcraft absorbs up to 50% of the noise that hits it. It meets federal specifications for flame spread of less than .25.

Beautiful. Durable. Economical. Easily maintained. There’s never been anything like Wallcraft, the quiet one from Barwick. Consider its advantages for schools, offices, hotels, shopping centers, nursing homes. For details contact: Wallcraft Contract Interiors, Division of E. T. Barwick Industries, Inc., Chamblee, Georgia 30341.

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The industry bible for DWV systems is the Wade Specification Manual.
It tells you all about our Carriers. The specs, the types, everything you need to know in order to specify the Wade Carrier that's right for the system you're designing.
Our bible also gives you specification and product information on everything else we make. Everything from roof drains, to water hammer arrestors, to interceptors, cleanouts and floor drains.
All of these DWV system products are designed, engineered
and manufactured to the highest quality standards by the Wade Division of the Tyler team. The team that makes everything you need for a total cast iron DWV system.
Things like cast iron soil pipe, No-Hub Couplings and TY-SEAL® Gaskets from our Soil Pipe Division and things like waterworks and municipal fittings from our Utilities Division.

Next time specify from the bible.
To get your free, registered copy, simply write us on your letterhead.
If it goes into a cast iron DWV system, Tyler makes it.

We swear to that on a stack of bibles.

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For more data, circle 65 on inquiry card
Versatile Electric System Provides Simultaneous Heating and Cooling in Dean Junior College Library

Dean Junior College Library in Franklin, Massachusetts—a handsome addition to the college campus.

**PROJECT:** Dean Junior College Library Building, Franklin, Massachusetts. **ARCHITECT:** Oscar R. Paden, Beverly, Massachusetts. **CONSULTING ENGINEERS:** Anderson-Nichols & Co., Boston, Massachusetts.

**DESIGN CHARGE:** To design an “image” library building at the principal access to the campus, capable of accommodating 500 junior college students, 90,000 books, and 35 faculty offices for the Humanities and Social Science Departments.

**DESIGN RESPONSE:** Architect Oscar R. Paden’s design is a handsome structure of Colonial red brick, limestone, and solar gray glass with 33,484 square feet of floor space on three levels. The middle floor, main entrance, and open promenade deck are just above campus level. The window areas are shaded from solar radiation by the overhang of the upper floor and the deep limestone column-piers. The lowest level, which is partly below grade, contains 35 faculty offices, numerous seminar and “team study” rooms, a media center for new techniques in learning, open random seating areas, and storage space.

The middle level contains a control and charging center, an all-night study room, reading areas, library offices, and book processing areas. The top level contains a periodicals center, reading, reference, and collection areas, and a kitchen and large multi-purpose room used for seminars, meetings, and social/recreational activities.

Electric through-the-wall heating/cooling units condition the perimeter areas of the two upper floors. The lowest floor and interior zones are served by independent ducted systems incorporating duct heaters and split-system air conditioning units with air-cooled condensers located outside the building. Electric baseboard units installed along exposed walls provide supplementary heating as needed.

Consulting engineer Ralph Trufino says that the electric system was selected because it met the requirement of simultaneous heating and cooling, would be extremely quiet, would cost substantially less to buy and install than equivalent systems using flame fuels and as a result would cost about the same to own and operate. And, he adds, it is living up to all expectations regarding cost and performance.
1. CATEGORY OF STRUCTURE: Educational—Library Building

2. GENERAL DESCRIPTION:
   Area: 33,484 sq ft  
   Volume: 426,000 cu ft  
   Number of floors: three  
   Number of occupants: 500  
   Number of rooms: 70  
   Types of rooms: bookstack areas, reading rooms, faculty offices, study rooms, multi-purpose room, kitchen, technical resources center

3. CONSTRUCTION DETAILS:
   Glass: double solar gray  
   Exterior walls: brick and concrete block cavity wall, 1/4" polyurethane insulation (R=11); U-factor: 0.06  
   Roof and ceilings: built-up roof on 1" polyurethane insulation (R=7), lightweight concrete on steel deck, suspended acoustical ceilings; U-factor: 0.10  
   Floors: concrete slab and carpet  
   Gross exposed wall area: 15,800 sq ft  
   Glass area: 5300 sq ft

4. ENVIRONMENTAL DESIGN CONDITIONS:
   Heating:  
   Heat loss Btu/h: 11,200,000  
   Normal degree days: 6700  
   Ventilation requirements: 9000 cfm  
   Design conditions: 5% outdoors; 75% indoors  
   Cooling:  
   Heat gain Btu/h: 1,400,000  
   Ventilation requirements: 9000 cfm  
   Design conditions: 91°F dbt, 76°F wb t outdoors; 78°F, 50% rh indoors

5. LIGHTING:
   Levels in footcandles: 25-75  
   Levels in wats/sq ft: 1-3  
   Type: fluorescent and incandescent

6. HEATING AND COOLING SYSTEM:
   Electric through-the-wall heating/cooling units condition the perimeter areas of the two higher floors. The lower floor and interior zones are served by independent ducted systems incorporating duct heaters and split-system air conditioning units with air-cooled condensers located outside the building. Electric baseboard units installed along exposed walls provide supplementary heating.

7. ELECTRICAL SERVICE:
   Type: underground  
   Voltage: 277/480v, 3-phase, 4-wire, wye  
   Metering: secondary

8. CONNECTED LOADS:
   Heating & Cooling (150 tons) 440 kw  
   Lighting 65 kw  
   Cooking 12 kw  
   Water Heating 12 kw  
   TOTAL 529 kw

9. INSTALLED COST:
   General Work $539,720 $16.10/sq ft  
   Elec., Mech., Etc. 204,800 6.13/sq ft  
   TOTALS $744,520 $22.23/sq ft  
   *Building was completed 9/68

10. HOURS AND METHODS OF OPERATION:
    Building is occupied approximately 12 hours a day, seven days a week, the year around.

11. OPERATING COST:
    Period: 10/14/68 to 10/14/69  
    Actual degree days: 6821  
    Actual kwh: 826,800*  
    Actual cost: $12,855*  
    Avg. cost per kwh: 1.55 cents*  
    *For total electrical usage

12. FEATURES:
    Temperatures in each area are controlled by independent zone thermostats and by a central clock programmer which turns off cooling and ventilation whenever the building is unoccupied during the summer and sets back temperatures for such periods in the heating season.

13. REASONS FOR INSTALLING ELECTRIC HEAT:
    The electric system was chosen to obtain the advantage of low capital expenditure, attention-free operation, simplicity of design and installation, and completely flexible zone control.

14. PERSONNEL:
    Owner: Dean Junior College  
    Architect: Oscar R. Padjen  
    Consulting Engineers: Anderson-Nichols & Co.  
    General Contractor: Fay Construction Co.  
    Electrical Contractor: Balcom Electric Co.  
    Mechanical Contractor: Boston Filter Co.  
    Utility: Massachusetts Electric Company

15. PREPARED BY:  
    John T. Casey, Local Sales Manager-Commercial, Massachusetts Electric Company

16. VERIFIED BY:  
    Oscar R. Padjen, AIA

NOTICE: This is one of a series of case histories of buildings in all structural categories. If you are an architect or consulting engineer, or an educational or engineering student, a government employee in the structural field, a builder or owner, you may receive the complete series free by filling out the strip coupon at the left and mailing it to EHA. If you are not in one of the above categories, you may receive the series at nominal cost.

ELECTRIC HEATING ASSOCIATION, INC. 437 Madison Avenue, N.Y., N.Y. 10022
These columns and spandrels are covered with porcelain-enameded steel

Here is Century 21 Center, in Los Angeles, a stately 15-story structure with a subtle difference.

The difference shines out from the crisp column and spandrel covers, which were developed in porcelain-enameded steel panels. Porcelain-on-steel was chosen because it offered better performance. And it proved more economical than other materials.

Porcelain-enameded steel is strong, yet light in weight. It consumes a minimum of space, is quick and easy to install, stays clean and new-looking. It can be designed in myriad colors and textures and embossments, permitting broad latitude in architectural expression.

Bethlehem supplies special enameling sheets to fabricators who form and coat architectural panels. Write us for a copy of the Porcelain Enamel Institute's brochure on the new matte-finish Nature-tone hues. Bethlehem Steel Corporation, Bethlehem, PA 18018.
Where there are lots of people, there's lots of refuse.

There's a better way to handle it and cut costs, too.

Hospitals, hotels, schools, restaurants.
An E-Z Pack Stationary Compaction system economically solves the problem of what to do with the growing amounts of refuse.
Refuse is simply dumped into the compactor hopper, then compacted to a fraction of its size in a closed, detachable container.
No more mess. No more unsightly, unsanitary trash areas. No more air pollution due to incineration. And since more refuse is stored in less area, added space is available for more profitable use.
Ask one of our experts to survey your building. He'll recommend the E-Z Pack collection/compaction/container system for the cleanest, most economical refuse handling. E-Z PACK COMPANY, Division of Peabody Galion Corporation, Galion, Ohio 44833

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Architectural simplicity is enriched with the warmth of tone and texture. Char Bronze, Mirror Chrome...walnut, rosewood, teak...mix the finishes as you will to complement the crispness of this design. The options are yours; so are the opportunities.

See this and other Alma Series in our showrooms in High Point and Chicago (Space 1140, Merchandise Mart). You may consult our catalogs in Sweet’s Interior Design File or write Alma Desk Company, Dept. AR-04, Box 271, High Point, N.C. 27261.
DON'T LET YOUR ROOF TURN INTO A POND.

Tapered FOAMGLAS automatically slopes a flat deck for positive drainage. The roofer simply places factory-tapered FOAMGLAS and roofs over immediately. An added advantage: single-contractor responsibility.

FOAMGLAS is completely waterproof, strong and dimensionally stable, so it's an excellent base for built-up roofing. It's guaranteed. For further information, contact Pittsburgh Corning Corporation, Dept. AR-70 One Gateway Center, Pittsburgh, Pa. 15222.

For more data, circle 68 on inquiry card
Here's how M. Arthur Gensler, Jr. & Associates, Architects, lifted 60 years off the appearance of the Hearst Building in San Francisco. Instead of making costly structural changes, they used canvas to cover the multiple store signs that cluttered the street floor. The result: a fresh, clean, unified look in keeping with the character of the fine old building.

Steel tubing with welded connections provides all the support needed, so there's greater design freedom at far less cost than with heavier building materials. The fabric is a 10.10 ounce, all-cotton army duck, acrylic painted and treated to weather any outdoor job.

Whenever one of your remodeling projects calls for a complete face lift, talk it over with a canvas products manufacturer. He has what it takes to handle the whole operation without a wrinkle.

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Gossen is introducing a new kind of material for mouldings to the residential and manufactured housing markets. And you can't blame the competition for cracking under the strain.

Gossen uses VYCELL® resin, Goodyear Chemicals' new cellular PVC compound. It gives mouldings the look, feel and workability of wood. But they won't crack, split, warp or shrink. Or support combustion.

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This year we'll be holding sneak previews of Sweet's Architectural Microfilm Library system in hundreds of architectural offices across the country. We have spent five years and over one million dollars working on it. And we're still working on it. With these previews we'll be able to tell just how much more work needs to be done.

Ours isn't the first such system and it probably won't be the last. But we plan to make it the best. Several companies have already put theirs on the market. Together with all the problems they are still having with them. Which become your problems. Like cost. Like locating information. Like browsing and comparing. Like queuing up at the reader/printer. Like color.

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For the record, Sweet's Architectural Microfilm Library is not just microfilm. Together with Sweet's Architectural Catalog File, the most used source of product information in the construction industry, it forms a complete system combining the advantages of printed and filmed data.

There are many other facts about microfilm we'd like to discuss with you off the record. If you're interested, just send your name and address to: Architectural Microfilm Library, Sweet's Division, McGraw-Hill Information Systems Co., 330 W. 42nd St., New York, N.Y. 10036.
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This sculptured facing of easy-to-install, thin, molded, reinforced cement panels can be used in a total wall element; as spandrel panels, fascias, balcony panels or soffits.

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We make a lot of ceilings to do a lot of different things. This one's thing is durability.

It's the kind of durability you need if you're putting a ceiling in a swimming pool or bottling plant or factory or open-air garage; the kind of durability that's built into Armstrong Ceramguard®. Even when saturated, Ceramguard retains its rigidity and span strength. It won't warp, buckle, or sag. And since it's immune to freeze-thaw cycles, Ceramguard can handle outdoor applications. Additionally, Ceramguard offers excellent acoustical control, air-distribution capabilities, and rated fire protection. An Armstrong architectural representative is in the best position to tell you more about Ceramguard and the wide range of other Armstrong Ceiling Systems. For his name and a copy of our Ceiling Systems folio, please write Armstrong, 4207 Rock Street, Lancaster, Pennsylvania 17604.

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USS American Bridge announces a new name in the curtain wall business...
USS Architectural Products
the curtain wall contractor that puts it all together

USS Architectural Products offers total curtain wall capability. We offer American Bridge's 70 years of experience and know-how and the finest curtain wall system available. That's the USS ULTIMET Curtain Wall—and that's a story in itself...

In USS ULTIMET, we're supplying the broadest range of quality steel curtain walls in the industry. There's USS ULTIMET in Stainless Steel—the first, quality stainless curtain wall at a competitive price.

There's USS ULTIMET in bare COR-TEN Steel—the natural weathering steel curtain wall. If it's color you want, there's a whole spectrum to choose from with USS ULTIMET in Color Coated Galvanized Steel. And we've just added a beautiful new curtain wall material that you'll be hearing and seeing more of—USS ULTIMET in Bronze Clad Stainless Steel—the real thing—not just a substitute...and the cost will be a pleasant surprise. Horizontally and vertically pivoted windows, projected windows and narrow stile entrance doors complete the package.

We'd like to show you what our total capability can do for you. If you have a curtain wall job that you're putting together, we can put it all together for you in USS ULTIMET. Call or write J. Alan Myers, General Manager, Architectural Products, American Bridge Division of United States Steel, 5 Gateway Center, Pittsburgh, Pa. 15230. Phone: (412) 433-3267.

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

When it can't, he can.

We know you'd like an all-purpose trouble-free construction joint sealant. So would we. But right now, MONO's as close as we can come... and it won't do everything, any more than any other types and brands we've tested. So, MONO's good and works so well under the kind of adverse conditions (dust and moisture) that are common to the job site, that we suspect many construction people actually look on it as an all-purpose sealant. But actually Tremco's business isn't based on selling any all-purpose sealant. Instead we're a single-purpose company. We're The Water Stoppers and we want to give you leakproof security in every joint on the job. So we make not one, but fourteen other sealants besides MONO, like a very good polysulfide (Lasto-Meric), a highly-regarded preformed tape (440) as well as a dozen others with special purposes. The only all-purpose item in our catalog is the Tremco Representative. He has been thoroughly trained to provide you the proper sealant for each application and is ready to give job-site assistance before, during and after each project. Why not give him a call next time you run into the sealant gap? He'll get you across every time. The Tremco Manufacturing Company, Cleveland, Ohio 44104; Toronto 17, Ont.

For more data, circle 88 on inquiry card
The Relocation Problem Solved

An urban renewal concept by Frost Associates, New York City

Objective: To provide new housing and new light industrial, commercial and other community facilities in slum areas with minimum dislocation of the present residents and businesses.

Concept: Redevelop a slum, one block at a time, by building a residential high rise tower or towers in existing back yard space to accommodate families living in adjacent existing buildings. Next, replace obsolete tenements with new industrial-commercial-community buildings having a uniform height not exceeding four stories. The roofs of these low rise structures can provide recreational opportunities for people of the community. Children could play here, not in the streets.
Procedure:
Select a project block with sufficient rear-yard space near an avenue end of the block to provide a site for a residential tower.
Relocate the occupants of only one or two buildings on street frontages if they have to be razed for access to the rear-yard site of new construction.
Pour the foundation and the slip form concrete core which will be the supporting structure and contain elevators, exit stairs and halls for the dwelling units which will surround the core (See floor plan.) Also, construct entrance-lobby space between the tower core and the street frontages.
Construct a structure to support the dwelling units to be hung below.
While core construction is proceeding, manufacture the dwelling units in an off-site location using materials and methods most suitable for complete fabrication including equipment, built-in appliances and cabinet work,
accessories, and interior and exterior finish. Deliver the completed dwelling units by truck and trailer to the building site, and put them in place around the core with a derrick on top of the core.

When the tower has been completed, move into it the families occupying existing residential buildings in the project block and relocate the businesses into vacant commercial spaces in the project block or nearby. Demolish the vacated buildings.

As about half of the area becomes available for the new industrial-commercial-community facilities, proceed with construction using materials and methods selected for maximum speed and minimum cost. When the low structure has been completed, move in new and displaced businesses. Proceed with finishing of roof area with recreational and other open-space facilities and with landscaping.
L-O-F GLASS FOR URBAN RENEWAL PROJECTS

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For information on Libbey-Owens-Ford hi-performance glass, contact an L-O-F Architectural Construction Specialist. Or call your L-O-F Glass Distributor or Dealer listed under “Glass” in the Yellow Pages. Libbey-Owens-Ford Company, 811 Madison Avenue, Toledo, Ohio 43624.

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Typical Floor Plan
Under-drafting.

Draw less. Let photography handle your repeat drafting chores.

If you're retracing design elements that are repeated again and again in a drawing, you're overdrafting. Same thing applies if you're retracing a design that's part of another drawing.

Save time. Underdraft with Kodagraph Films and Papers for a welcome change. Let them do the repetitive work—photographically.

Talk it over with your local Kodak Technical Service Representative. Or write Eastman Kodak Company, Business Systems Markets Division, Department DP 767, Rochester, New York 14650.

DRAWING REPRODUCTION SYSTEMS BY KODAK

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You're better off with Beneke on


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New hinge benefits from Beneke

With the new elevated hinge, former hard-to-reach bowl surfaces conducive to moisture and bacteria accumulation are eliminated when seat and lid are in the "UP" position.

With the seat down and lid up, the streamline design of the hinge shield facilitates comfort and cleanliness. Wetness can't seep through into the actual hinge assembly.

The seat itself is molded from high impact polystyrene plastic with carefully contoured depth for maximum comfort.

The bowl and seat are cleaner because the hinge is higher. The Beneke HI-RISE* heavy duty plastic toilet seat is the first to feature this important sanitary breakthrough: the rotating mechanism is elevated well above the bowl, so thorough cleaning is accomplished quickly and easily without removing the seat. The best seat is the cleanest seat. The HI-RISE is the cleanest because it's the easiest to clean.

The Beneke HI-RISE is available in open front and closed ring models for both regular and elongated bowls.

You're better off with Beneke on.

Beneke Corporation

Columbus, Miss., Chicago, New York, Washington, D.C., San Francisco, Toronto, Paris

For more data, circle 90 on inquiry card
Two more firsts for Macomber:

New York's First: Macomber open-web framing and tubular columns rise in Flatlands Urban Industrial Park.

Times Square Stores General Offices and Warehouse, Flatlands Urban Industrial Park, Brooklyn, New York. Architects and Engineers: Engineers Incorporated of Newark; Dr. Jacob Feld, New York, Consulting Engineer.
Open-web framing and the industrial park come to New York City

Flatlands Urban Industrial Park in New York City is the site of the first use of high-strength open-web steel framing and hollow steel columns under the new code of the City of New York. And the first supplier of these weight-saving framing members is Macomber Incorporated, the company that introduced the open-web steel joist to the building construction industry.

Flatlands was conceived and is being developed by Rentar Development Corporation of Rego Park, New York. It is, in effect, a privately-financed urban renewal project that is transforming 96 acres in the heart of Brooklyn into an ideal place to live and work.

Ten thousand modern apartment units — not a part of the Park but conceived in conjunction with it — surround a commercial-industrial complex of clean, modern buildings, pedestrian malls, walkways and fountains.

Some 9,500 people will eventually work in Flatlands Industrial Park. There will be an area hospital for their convenience, and a day-care center for children of working mothers.

About 80 per cent of the available space has already been contracted for by such companies as Detecto Scales, Morse Electro Products Corporation, APL Plastics Corporation and Decitron Communications Corporation.

Newest major structure in the Park is the 265,000-square-foot home of Times Square Stores, built to accommodate executive offices, computer center and central warehousing for stores throughout Metropolitan New York.

For this portion of the Park, Macomber supplied open-web cantilevered girders, tubular columns, open-web joists and horizontal bridging, as well as structural steel framing for the mezzanine.

Arthur Ratner, President of Rentar Development Corporation, reports that his firm was so well satisfied with the quality of Macomber products and service that Rentar has awarded Macomber the contract for the largest building planned for the Park — the 425,000-square-foot future home of Detecto Scales.

Redhill Construction Corp., of Garden City, New York, served as general contractors for the Times Square project. Marvin C. Rothenberg, Redhill’s owner-engineer, found that working with Macomber as a single-source supplier of framing and decking greatly facilitated the progress of construction.

"The whole Macomber system was perfectly engineered," Mr. Rothenberg said, "and delivery was so well coordinated, that we not only saved time on erection of the steel, but the other trades were able to follow up immediately. For example, the roofers were able to come in right on the heels of the steel erectors because both the framing and decking were scheduled in by Macomber. Tight scheduling and delivery also greatly reduced the problem of materials storage."

Framing was erected by Gem Steel Erectors of Brooklyn. According to Joseph M. Polito, Gem’s secretary-treasurer, "Macomber was excellent to work with. The few problems we ran into were straightened out by Macomber immediately, right on the job.

"As for the Macomber framing system, we found it easy to use. Even though our men weren’t familiar with open-web framing, they required no re-training whatsoever. Macomber engineering and fabricating helped us get the steel up fast, with a minimum of job site work."

Open-web steel framing, now that it has won city approval, promises to speed the development of many new areas in New York. If they are all as attractive and as serviceable to humanity as Flatlands Urban Industrial Park, the face of Old New York will take on a youthful, healthy look.

For your copy of Macomber’s new Open-Web Framing Design Manual, write to Macomber Incorporated, P.O. Box 8830, Canton, Ohio 44709.

MACOMBER INCORPORATED
SUBSIDIARY OF SHARON STEEL CORPORATION

For more data, circle 51 on inquiry card
In October, for the first time in years, Architectural Record will devote its entire issue to just one subject—a topic of such pressing importance that Record editors are willing to suspend all regular features in order to have the space and the time to devote to it:

ARCHITECTURE IN THE '70's:
GEARING PERFORMANCE TO MEET THE NEEDS

The building needs of the '70's are going to be tremendous. A trillion dollars worth of building will go up between 1971 and 1980 and architects and engineers will design most of it. There will be a greater need than ever before for the unique skills, knowledge and professional commitment of architects and engineers.

Architectural Record's October issue will be dedicated to helping architects and engineers bring their skills to bear most effectively on the problems that lie ahead of them—to take maximum advantage of the expertise that they alone can bring to the building industry.

The issue will put into perspective for them:
• The needs—What the client really wants and really needs
• The means—A clear explanation of what the professional architect and engineer alone has to offer a building client
• The constraints—An analysis of the cost and sociological problems that face the entire building industry
The October issue of Architectural Record will also work hard at selling your building products. It will gain the thoughtful attention of the people most vital to your building product sales—the men who design buildings and specify the products that go into them. It will reach more of these important prospects than have ever been available before...over 40,000 paid architect and engineer subscribers...the same people who, F. W. Dodge verifies, are planning over 90 per cent of the total dollar volume of all architect-designed building in the U.S.

Architects and engineers will be in a mood receptive to new ideas when they read the October issue. They will be looking to the advertising pages for product information and ideas they can put to use. Your advertising will have intensive readership and a long selling life. Ask your Architectural Record representative to tell you more about “ARCHITECTURE IN THE ’70’s.” It could be your best advertising buy of the year.

Among the titles of some of the provocative chapters are...

“What Makes A Great Architect Great?”


“Clients. How Have Their Attitudes and Requirements Changed?”

“How Are Architects and Engineers Already Responding and Organizing to Meet the New Attitudes of Clients and Increasing Work Loads?”

“Is Labor Really the Villain it’s Made out to Be?”

The October issue will present a wealth of information and, more importantly, ideas—ideas that architects and engineers can put to work in their practice, ideas that can help them realize the full potential of their profession.

Architects and engineers will read and re-read this issue, devoted in its entirety to a subject uppermost in their minds. It will work hard for them for a long time to come.
If you don't do it, it won't get done.

GIVE THE UNITED WAY
Why is this the only man allowed to apply All-weather Crete insulation?

Because he's a specialist! Only he, in your area, has the experience and the specialized equipment necessary to install this multi-functional insulation on roof decks as well as plaza systems. He is a highly specialized contractor trained and licensed by Silbrico Corporation to apply All-weather Crete insulation under strictest quality control. This skill and selective licensing protects designers and owners alike.

Contact your local AWC specialist. He can supply you with detail drawings illustrating different membrane systems, wearing surfaces and drainage patterns. If you don't know his name, write us — we'll send it to you along with illustrated literature of roof deck types and plaza systems used by many of the nation's most successful architectural firms. (No obligation.)

Just write Silbrico Corporation, 6300 River Road, Hodgkins, Illinois 60525 . . . . or call (312) 735-3322.

SILBRICO

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Every night at sundown something happens to good old American ingenuity.

We Americans have the best highways in the world but only during the daytime. At night headlight glare virtually puts us back in the dark ages. There was never any adequate answer before but now we've invented one: Glare Barrier.

Glare Barrier is a new kind of anti-glare screen for divided highways and it costs less to install and less to maintain than anything else. But it's not the only thing we make for the building and highway construction industries. We make more than 120 other products.

We make Bridge Form, for example. It's used in the construction of road surfaces on bridges. Besides being a big money-saver—compared to wood forms—it's faster and safer to work with.

And, for another example, we make Steelcrete—a fiendish tangle of expanded metal and concrete reinforcing bars. It's also another money-saving product. It stops bank vault robbers from robbing bank vaults.

But just saying we're big isn't enough. Here are some facts: We have 53 sales offices, warehouses and fabricating plants covering every major marketing area in the country. Plus a field force of nearly 300 people.

And our research staff is busy working on 28 new products. So take advantage of our size. And our ingenuity. Specify Wheeling.

Wheeling Corrugating Company
A DIVISION OF WHEELING-PITTSBURGH STEEL CORPORATION

96% of what we make builds highways, buildings and reputations.

For more data, circle 93 on inquiry card.
Comparison is still the surest way to measure quality. And we're confident our classroom unit ventilator will pass the test because it's the finest available today. But don't take our word. Convince yourself with a fair comparison. Compare the heavy extruded aluminum air outlet grille, the exclusive wall-aligning strip, the student-proof plastic laminate top, the 12 contemporary colors. Compare the heavy cored, double walled doors and end caps, the slide-out fan board, the special long-life motor with only one moving part, and the extruded aluminum construction on all leading surfaces. Then compare the superior design and construction of our matching auxiliary units... bookcases, sinks, tray racks. We could go on and on, but we'll let you do it. It's hard to stop when you start comparing, but we're convinced you'll finally stop with Schemenauer units. Call your nearest Modine representative for comparison details, or write directly to us. Modine Manufacturing Company, 1510 DeKoven Avenue, Racine, Wisconsin 53401.
Tested and Approved Sealants based on Thiokol LP® polysulfide polymer for steel-grip bonding—Rubbery flexibility—Highest resistance to weather, wear and aging. Total waterproofing . . . on a long term basis.

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Republic steel

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