

ARCHITECTURE IN THE 1970'S
GEARING PERFORMANCE TO NEEDS
DESIGN FOR THE 1970'S
A NEW PROFESSIONAL CONSCIENCE
EDUCATION IN THE 1970'S
TEACHING FOR AN ALTERED REALITY
CLIENTS IN THE 1970'S
NEW REALITIES, MORE MANAGEMENT
BUILDING PROCESS IN THE 1970'S
THE TROUBLE WITH SYSTEMS
PRACTICE IN THE 1970'S
THE RESPONSE TO CHANGE

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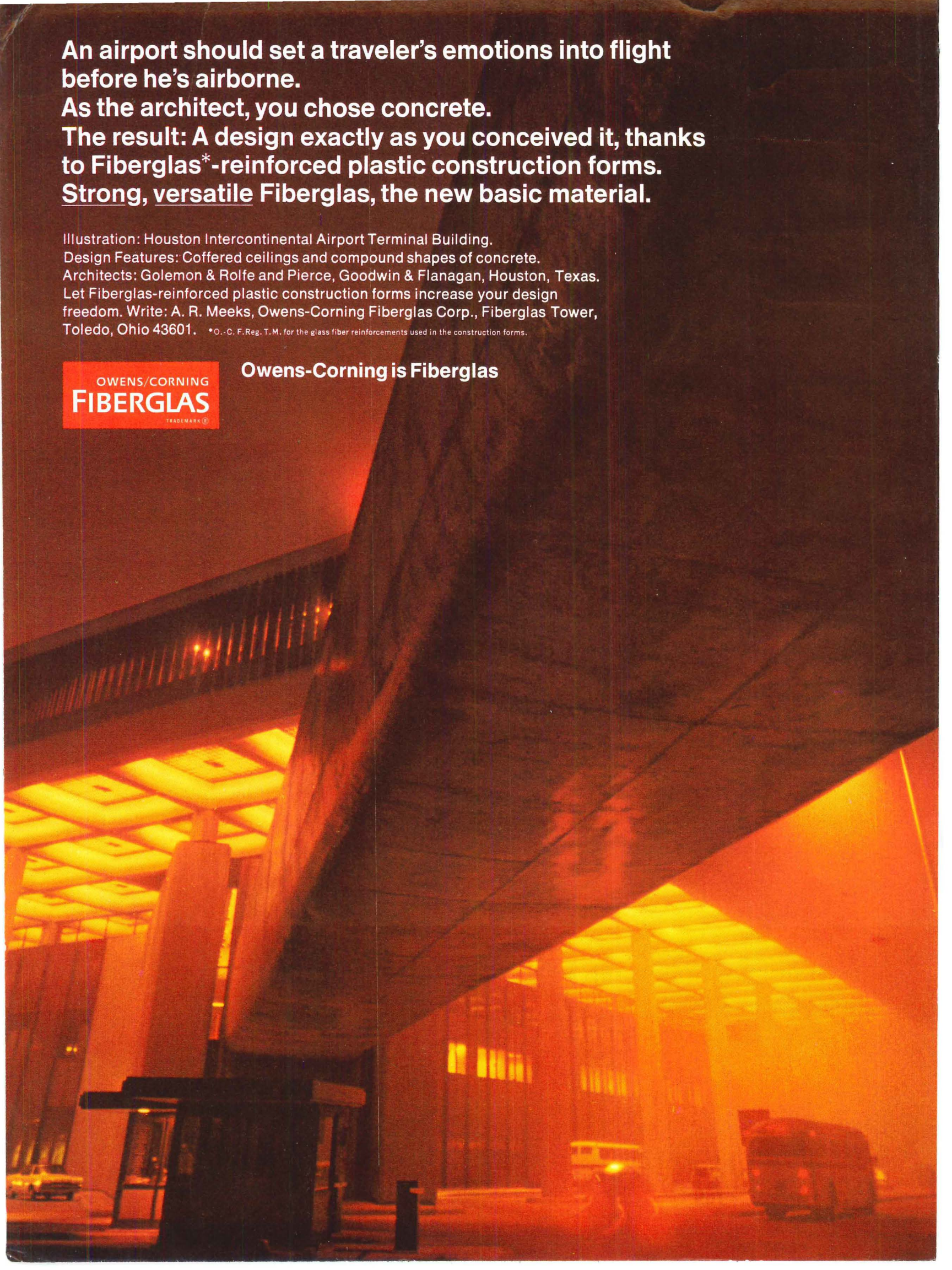
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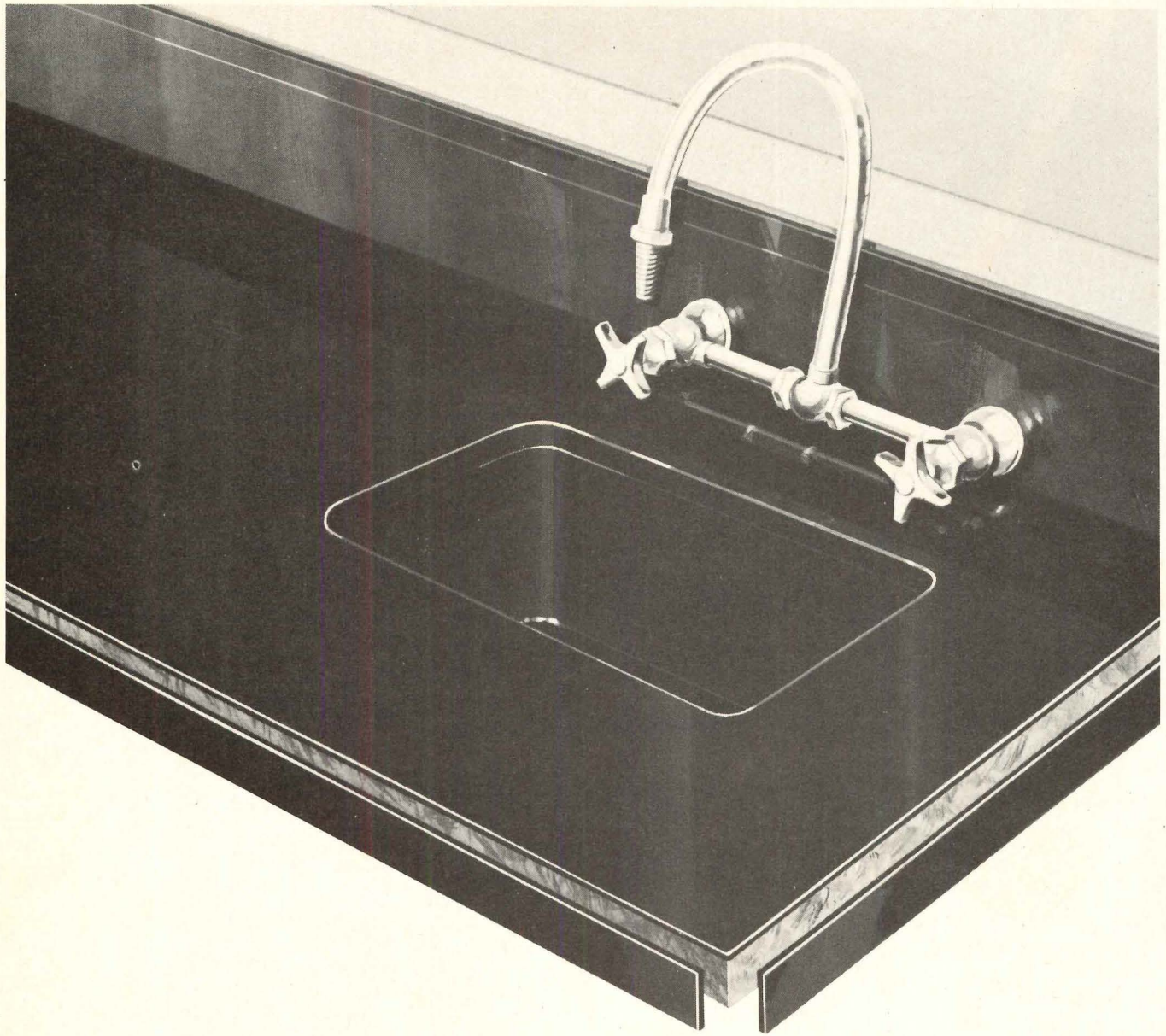
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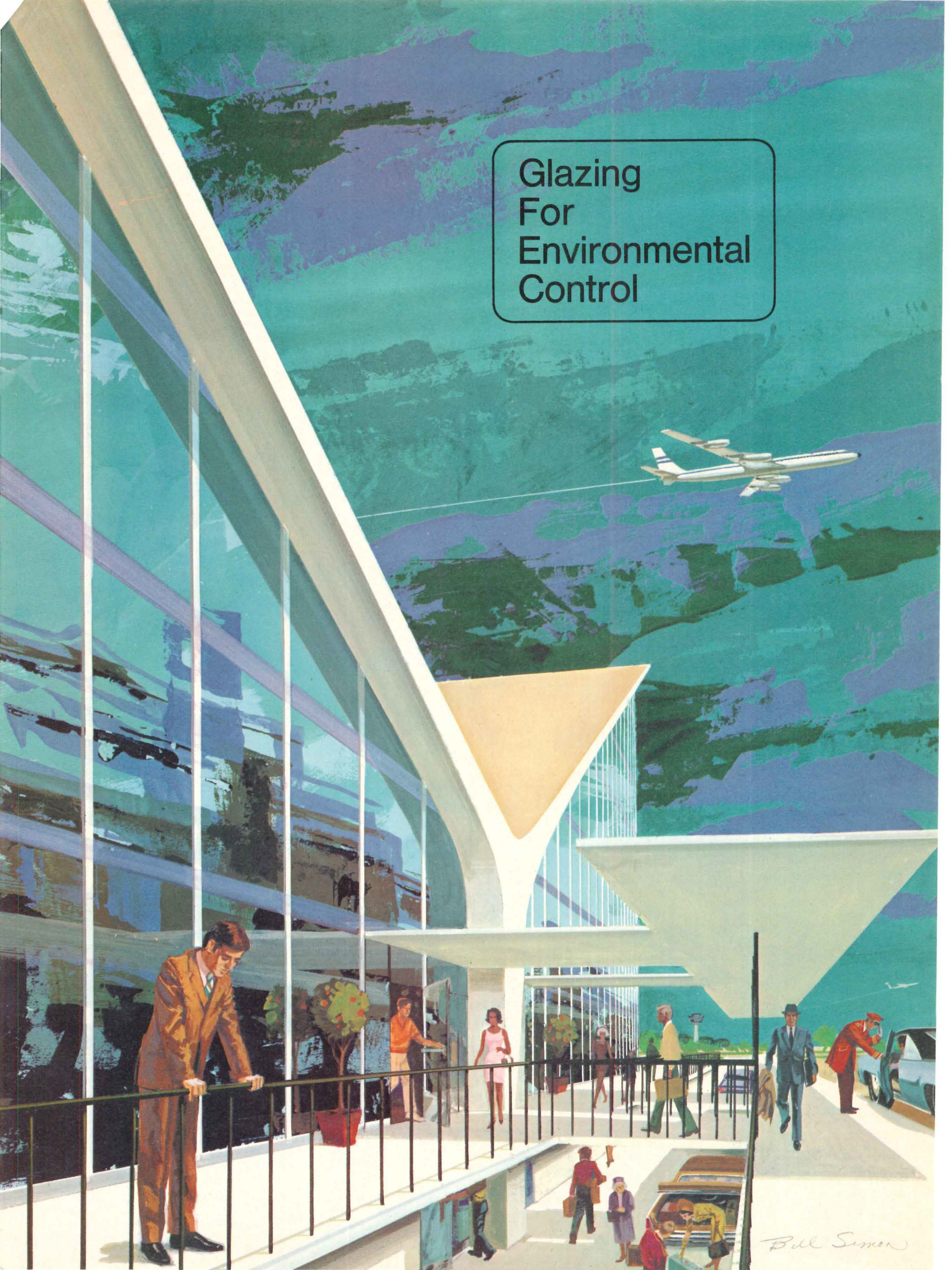
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ARCHITECTURE IN THE 1970'S: GEARING

117 GEARING PERFORMANCE TO NEEDS

An introduction to this special issue, which was written in an attempt to put some perspective on the very real problems of the 1970's: the role of the architect, architectural education, changing client demands, the "mystique" of systems, and the best way for an architectural firm to organize.

118 DESIGN FOR THE 1970'S

The nation's best architects are developing a broader sense of professional responsibility than ever before as part of their growing awareness that architecture is really about everything and affects everything. Architects are into more things, they are asking the hard questions which rarely get asked, and finding the answers to some of them. They are, perhaps for the first time, really thinking things through. The tasks, more deeply perceived, have become more complex. The solutions may be the result of approaches which are not conventionally considered part of the architect's role, and demand further procedures equally unorthodox. The article includes examples of some of these newer approaches, plus several case studies which illustrate what the good architect always endeavors to achieve.

128 EDUCATION IN THE 1970'S

The boundaries defining what should constitute an architect's education are disintegrating. Identical questions on education, submitted to teachers and practitioners, elicit significantly different responses. In our presentation of articulate opinions, however, there are some surprising areas of agreement. Jonathan Barnett presents a controversial proposal for abandoning the studio system.

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A photographic essay



Hardy, Holzman, Pfeiffer

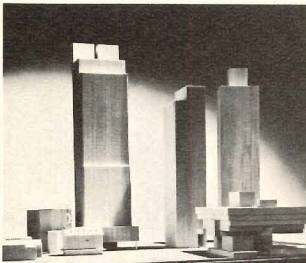
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PERFORMANCE TO MEET THE NEEDS

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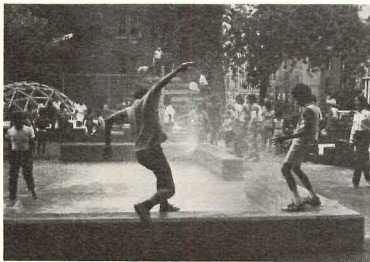
How is he responding to today's tight money market and to the rising tide of social protest? Is his



growing dependence on new management techniques beginning to affect the architecture of the '70s?

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An increasing number of architects are learning how to work for the poor community, and poor communities are learning to make their needs felt. Groups of all races in many parts of the



country are achieving an expanding role in design. While present efforts are a drop in the bucket compared to the needs, they are opening the way to a new form of planning and design—the alternative to "urban removal."

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The trouble with the systems approach to building: Systems building may produce "more" building for the money, but the question is whether or not the client really needs the "more." By its nature, systems building in large-scale projects tends to exert a leveling influence on over-all quality.

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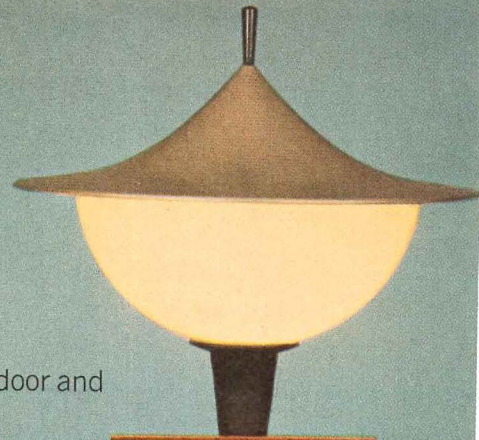
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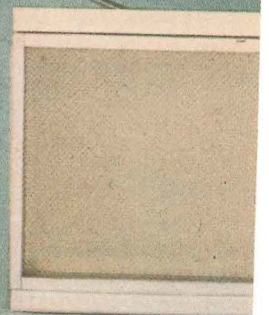
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The high cost of construction: What hope in the 1970's?

This issue is devoted entirely to trying to put some perspective on what's happening and what will happen to architecture and architects in the 1970's. Right now, the single biggest factor fueling the evolutionary revolution (see page 117) in architecture and the role of the architect is the high cost of construction. So, herewith, a non-economic (not too many figures) analysis of what we can (and can't) do about it.

It's my observation that what we're doing mostly right now is screaming about "the exorbitant demands of labor", complaining about the high cost of money, and pinning a lot of faith on Breakthrough's and "systems building." What we are not doing is facing some hard facts of life—and thus we are wasting time in getting on with the job that has to be done. So let's face those hard facts:

Construction costs have indeed become "exorbitant." From 1958 through 1969 (this year's figures, mercifully, are not in) construction costs have gone up over 40 per cent, while the adjusted Gross National Product went up only 27 per cent. The increase has been even more severe—over 50 per cent—for non-residential building. And it is true that it has been getting worse—before 1965, construction costs were climbing at a two to two-and-a-half per cent rate per year. Until lately, they climbed at a five to six per cent rate. Now the lowest figure economists will quote you is eight or nine per cent and many figure it's a lot worse, especially in the East where rates of 12 to 15 per cent are quoted by responsible builders.

Who, what, or where's the villain? Is it materials prices? Sure, in part. According

to our resident economists, materials costs account for about half of cost (exclusive of land) of a finished product, and have—after years of remaining virtually unchanged, moved up 20 per cent in the past five years, with most of that increase coming in the last two years.

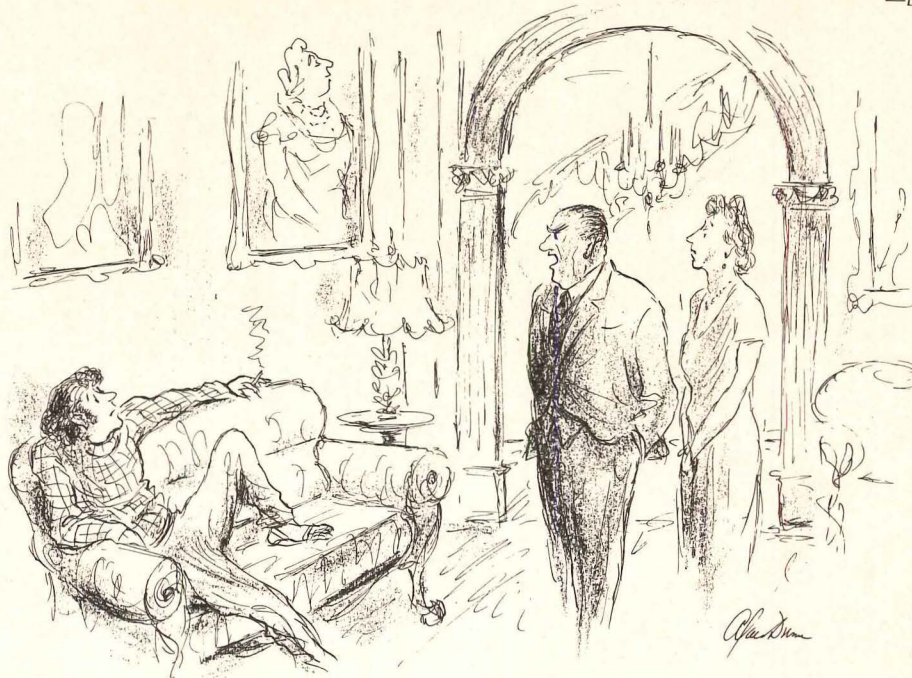
But what can be done about it? Manufacturers (like everyone else) are raising their prices because their costs are up and their profits are down. But there's a strong control here: good old competition. Chrysler Corp. has always kept General Motors in line on prices, and vice versa. At any rate, the increases in materials prices have been well below (like half) the general increase in construction costs; so can't we assume that this part of "the exorbitant costs of construction" are a fact we might as well live with?

What about labor costs? Yes of course. Labor costs jumped 25 per cent in the four years 1966-1969. This year they're climbing at a 15 per cent per year rate, and the end of this spiral is, what with two- and three-year contracts (averaging at least \$1.00 per hour) being signed this year, some years off no matter what happens. And since wages and productivity are linked, we must also consider that, during the past decade, construction productivity has risen at an annual rate of less than one per cent—the smallest such increase for any major section of the economy. Surely no reader needs from me a list of the faults with our present system in relation to labor—from featherbedding to build up overtime to absurd jurisdictional disputes to the immense bargaining power of the unions to restrictive practices of all kinds (and most notably restrictions on ap-

prentice programs that would increase the size of the labor force). So what's to be done about labor costs? In the short run, probably not much. Does anyone really think there are going to be wage rollbacks? Would you guess that productivity is going to increase drastically in the next year or so?

Long run, there is indeed room for hope of lower labor costs. The greatest hope, as McGraw-Hill economist George Christie pointed out in RECORD earlier this year, "probably lies in substituting materials for labor—in effect adding an additional step at the manufacturer's or producer's factory and eliminating one at the building site. The increasing emphasis being placed on off-site manufacture of larger building modules and components [perhaps packaged air conditioning systems are the best example] suggests that the application of mass production techniques to construction provides one of the most likely ways of curbing long-run inflationary tendencies."

And there is hope that the present imbalance of union power will be levelled off a bit. In Washington, you could get (though not for quotation) the feeling that many national union leaders see the long-range benefit of some changes (while understanding that their jobs depend on short-range results). Many union leaders realize that the new assault of wage demands is not justified in terms of productivity—and insiders say they are pressing their locals hard for "A fair day's work for a fair day's pay." (They can't admit to low productivity, so they call for "upgrading quality.") What else might happen (the climate seems right) in the long run? We might see legislation to reduce jurisdictional waste—especially in the area of permitting unskilled workers to do unskilled jobs. Pressure on the unions from the Federal government to allow more apprentices is intense, and many observers feel that the unions will cave in on this point as soon as their members are fully employed again. And we might just see a change in the imbalance of power between unions and



"Be careful, son, who you lump together under 'Environment!'"

contractors, through legislation that would permit negotiation by contractors covering a wider area (so that a striking worker cannot drive 20 minutes to the next county and work for another contractor). And the AGC is pushing hard efforts to "educate construction users about the inflationary effects which result when they require or permit their contractors to work during strikes . . . and other practices which tend to undermine the integrity of the local [contractor] bargaining unit."

What about money costs? At a Producer's Council conference on the impact of tight construction money, Bruce P. Hayden, a vice president of Connecticut General Life Insurance Company, put it plainly: After pointing out our present national commitments—pollution control, transportation systems, space exploration, health and defense—he summed up: "I am pessimistic about the supply of capital for financing construction, not only in the near future but for the next 30 years." Another quote from the conference: By George Lingua of First National City Bank of New York: "We're going to stay in a period of chronically high interest rates. . ." Is there any hope of easier money? One possibility is clients will get used to the idea of paying higher interest rates, and figure them as a cost of doing business. The other hope is new vehicles to bring money into the mortgage market. The traditional sources—thrift institutions and life insurance companies—are now over-committed in mortgages. What alternates? Perhaps government-established agencies—like Massachusetts' Mass Housing Finance Agency, or New York's State University Construction Fund—which have the power to issue tax-exempt bonds. Perhaps real-estate or mortgage investment trusts—which can go to the public and compete for money with the common stocks. At any rate, there seems to be a great deal of talk about such new devices.

And finally we have seen recently (alas!) what enormous leverage Federal

monetary and fiscal policy can have in one direction; surely there is some hope in the other direction.

What other hope is there for building costs? There's hope in new technology. As noted on this page many times before, I'm among those who don't think Operation Breakthroughs will work—at least in terms of reducing costs. But a lot of thoughtful people think that this kind of approach will work. At any rate, Breakthrough and the other industrialized system studies (see page 148) are surely important experiments and if they do work we will have part of the reversal in building costs we need.

Short of total systems, we may (as noted earlier) see continuing cost reductions through increased "packaging" of building components. Manufacturers, after a long period of inadequate involvement in field operations, have begun to put more of their time and great talents into solving building problems, instead of just manufacturing problems and selling problems. Bob Hastings, incoming A.I.A. president, suggested long ago that it would be much more efficient if—instead of steel producers, erectors, glass companies, and partition manufacturers—there were integrated companies prepared to build and fabricate, for example, the entire wall system, as designed by the architect. A long way off, but . . . ?

Another real hope is speeding up the building job. Many architectural firms (see article, page 160) are deeply involved in various techniques—"fast-track," "project sequencing"—to sharply reduce the design-and-build time for many new projects. The cost-cutting advantages, with costs going up at one per cent a month, are clear and large—much larger than the cost-cutting opportunities that seem possible through new technology, for example.

There's hope in better management of jobs by architects. Since this is the main subject of the last article in this issue (page 154), we'll pass it lightly here. But it's critical. A few months ago, RECORD (July, page

60) published an article on "Evaluating hidden costs factors" that spells out some of the costs of sloppy thinking or sloppy work by architects. It points out—and many of the same points were emphasized in recent conversations with officials of the AGC—that costs can be radically affected by failure of the architect (and his client) to face up to realities of the local construction picture and local practices. Examples: If large contractors who might be interested in bidding a job are too busy (and liable, therefore, to bid with a big premium if at all) can the job be broken into packages that smaller firms can handle? Are local contractors familiar with the materials and construction methods implicit in the design—and if not, can the design be changed? Have big jobs (for instance, an airport) siphoned off so much of the labor supply that costs are bound to be prohibitive? Are there other projects in the area that may compete for the same source of a critical material? Further, architects can directly cause bid premiums by incomplete construction documents, by a history of disruptive actions during construction, and unnecessarily or naively complex detailing. Bradford Perkins of McKee-Berger-Mansueto concluded the July article by suggesting that "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 an inefficient design is often less than 15 per cent, while market conditions can add up to 100 per cent in premiums . . . And adverse market conditions can usually be overcome."

So let no architect forget—lest he be reminded by being beaten for jobs by package builders and construction management consultants—that "gearing performance to meet the needs of the 1970's" means much more than design of buildings—it means getting them built on time and within the budget. Like an architect should.

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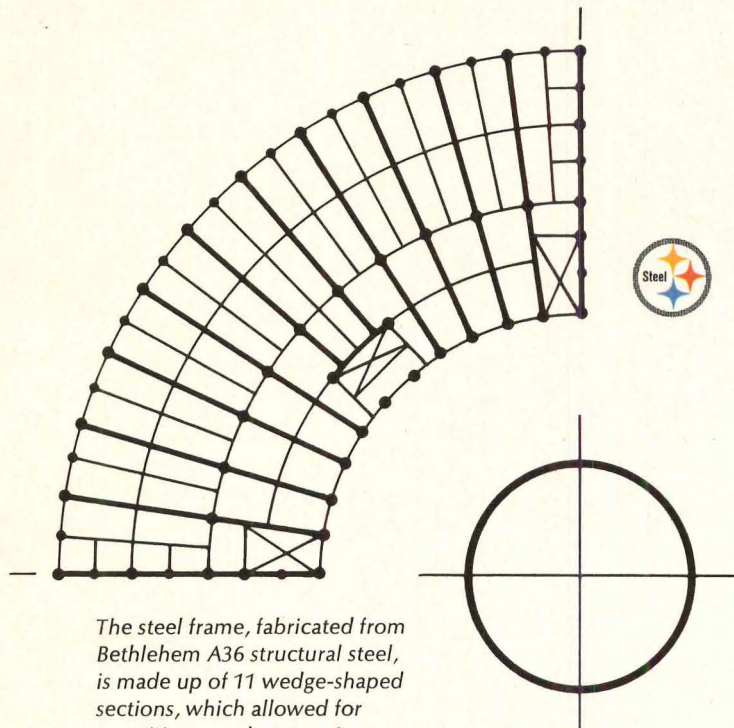
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Cost of steel frame lowered

by designing 11 repetitive
wedge-shaped sections

Architects: Ward and Schneider, Cleveland, Ohio. Consulting engineers: Barber & Hoffman, Cleveland. General contractor: Hill and Kimmel, Inc., Silver Spring, Md. Steel fabricator: Arlington Iron Works, Arlington, Va.





The steel frame, fabricated from Bethlehem A36 structural steel, is made up of 11 wedge-shaped sections, which allowed for repetition—and cost-saving—in fabrication.



New headquarters building reflects Arlington County's pride in its educational system

The bond issue that authorized the Arlington County (Va.) Education Center called for a building that would "reflect the importance" of the 26,000-student school system. Steel helped the architects achieve a striking building, at a cost below the budget figure.

The basic shape of the Center is an arc. A circular, domed planetarium was used as a radius point, and grid lines extend from that point to form 11 equal wedge-shaped sections in the main building. Here is where steel came into its own. Because of the repetition of the wedge shapes, structural steel could be fabricated using the same shapes repetitiously, at a significant saving in cost. To form the curves of the building, the steel frame was cut and fit from short straight sections. Bethlehem A-36 structural steel was used, and all connections were bolted.

The building takes advantage of a naturally sloping site, allowing for five stories at the outward curve of the arc, four on the inner face. The lowest level contains the school system's data processing center, the ground floor has the rooms most often visited by the public, and the upper three floors house staff offices.

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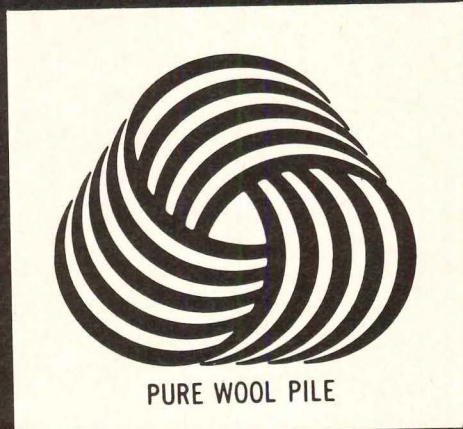
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The Arlington County Education Center has 58,800 sq ft of floor space including the Planetarium building. The Center was built at a cost well below the budgeted figure.



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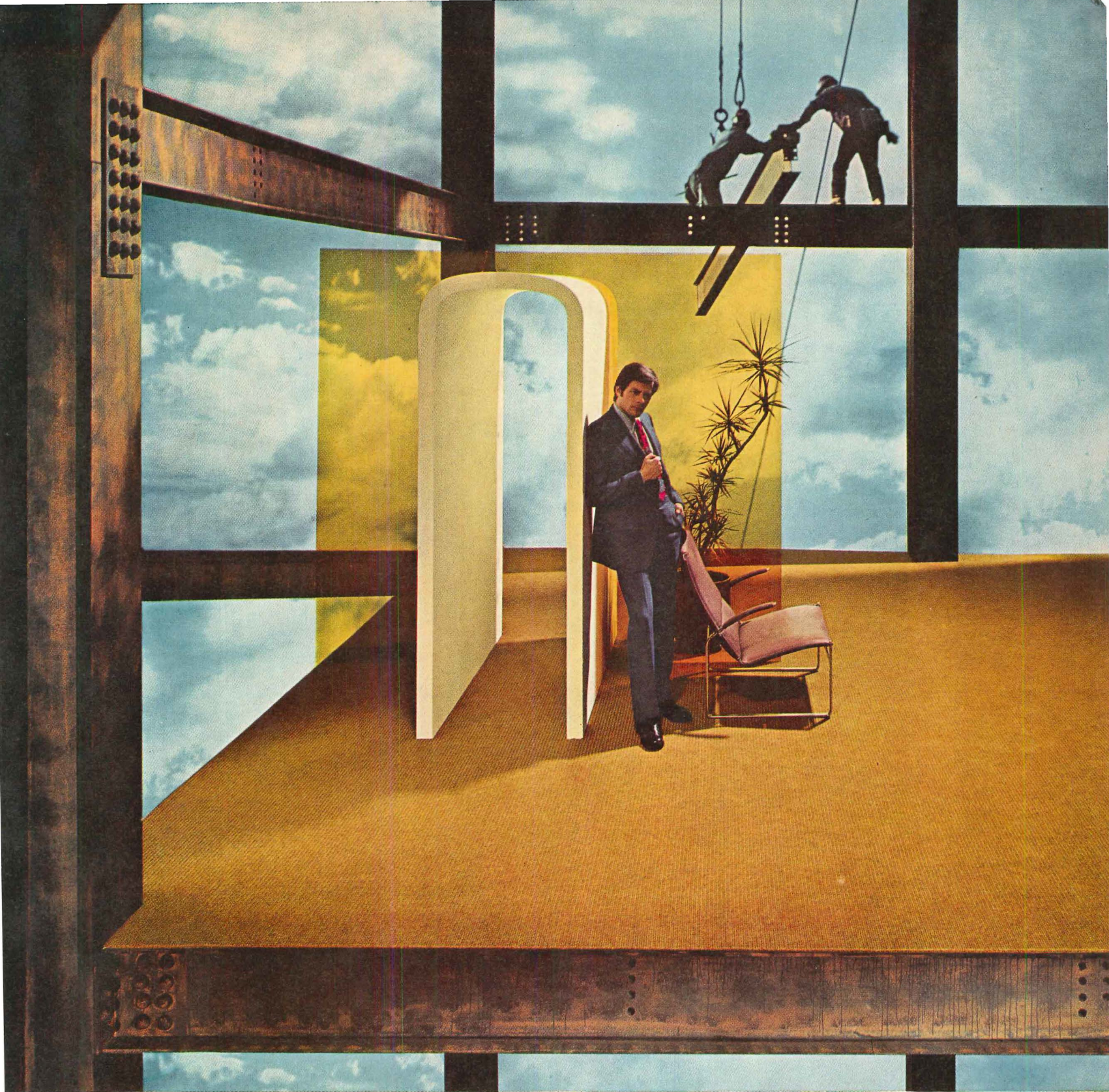
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What other kind of carpet could be so naturally resilient, so long-wearing, so soil-resistant, so luxurious? That's why architects, designers and other specifiers are innovating with Bigelow wool carpets—for schools, hospitals, and public buildings of every kind.

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Do your planning from the floor up. The first step is to call the first name in contract carpeting: Bigelow.

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Stay on your toes.

With the new Otis VIP-260 system,
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Because a computer controls and
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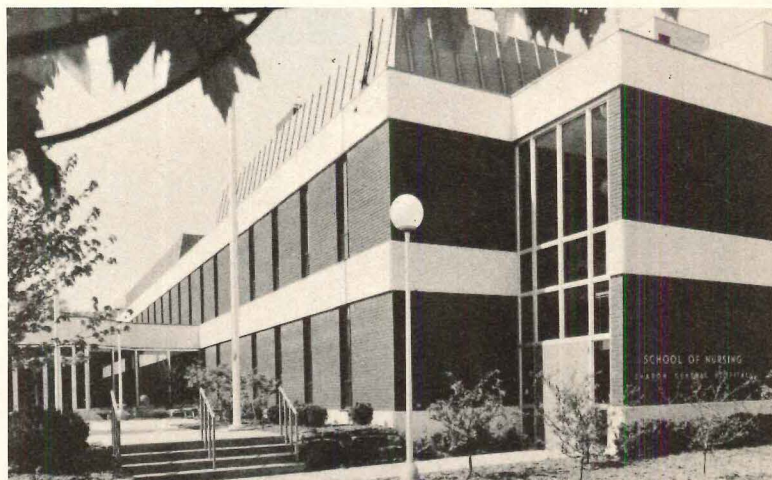


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From a functional standpoint, Terne metal has a durability measured in generations rather than years, and its inherent affinity for both form and color permits any visual roof area to become a significant component in design. These characteristics are probably sufficient in themselves to explain Terne's increasingly important role in contemporary architecture, but they are further enhanced by relatively moderate cost.

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St. Charles builds storage to match your needs. As in this sales and estimating office.

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COLORFUL CUSTOM CLASSROOMS *work wonders!*

Students and teachers are stimulated by classrooms that are handsome, colorful, practical and neatly organized . . . which describes every custom-classroom designed by St. Charles. Here is superb casework. Here is matchless efficiency. Here is an inspired choice of colors, materials and textures. Consider your food and sewing laboratories, arts and crafts classrooms, and all other special rooms requiring casework . . . and consider calling St. Charles.

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Creativity has no limitations when you work with a St. Charles dealer-designer. He believes in giving people their own way—in *everything!* Concept, colors, materials, dimensions, textures—without you or your client having to make annoying concessions. He can also free you of numerous details and expedite your concept to completion—from the unique custom features you specify to the preferences (and even whims) of your client.

Space-saving storage wall dramatizes St. Charles design, planning, workmanship.

In this custom kitchen, rich antiqued cherry doors are accented by colorful textured cabinets.



CUSTOM KITCHENS

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Another step towards a perfectly dry Manhattan.

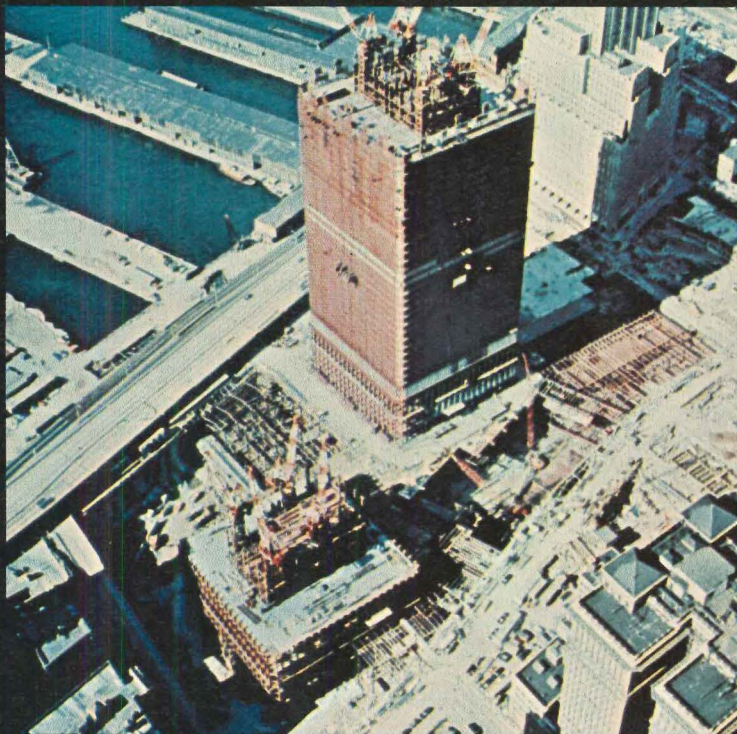


Photo Courtesy of the Port of New York Authority

New York City's World Trade Center, which will cover thirteen city blocks, will be one of the largest building complexes in the world.

And it'll also be one of the driest because Tremco sealants and glazing systems will be used in the right places.

Take the two 110-story twin tower buildings. They will use Tremco's Polysulfide Lasto-

Meric, the non-oxidizing, non-shrinking sealant. It's ideally suited to situations that anticipate dynamic movement of the joint. And provides excellent adhesion to metal without priming.

They will also use Tremco Acoustical Sealant to reduce sound transmission. And Tremco Curtain Wall Sealant on unexposed joints.

The Tremco glazing system —

Mono, Pre-shimmed 440 Tape and Vision Strip — is also recommended for the plaza buildings surrounding the skyscrapers. And there are good reasons why: Weather tightness. Windows that are evenly balanced for high wind loads. No pressure points. And neat sight lines. So whether you're planning to build a 110-story skyscraper or a one-story warehouse,

Tremco can solve the sealant problems. No, we don't have an all-purpose sealant. We're just an all-purpose sealant company. Call your Tremco Representative today and see for yourself.

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TREMCO
The water stoppers

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Building: Abraham A. Ribicoff Apartments, New Britain, Connecticut. Architects: Kane, Fairchild, Farrell, White & Rallis, Hartford, Connecticut. Joseph E. Kane, Architect-in-Charge.



A nice warm story about growing old... with Andersen Windows.

One day, a Hartford architect was commissioned to design a high-rise apartment for the elderly.

Naturally, he wanted to make it a warm and comfortable place. As homey as possible.

So he did.

Outside, he planted trees to look at. Colorful benches to sit on. Cheery lights to sparkle at night.

Inside, to keep things warm and cozy, he specified electric heat. And he also insisted that the windows be Andersen Perma-Shield® with insulating glass.

He knew, from experience, that these windows would seal out nasty cold-weather drafts. (If there's one thing old people hate, it's feeling chilly!)

He also knew that our Perma-Shield Casements would let in lots of light—to read and sew by. Lots of fresh air, too. (They provide top to bottom ventilation.)

Finally, and perhaps most important of all, he knew these windows were not only beautiful, but practical. They wouldn't need storm windows. And their vinyl exteriors wouldn't need paint!

So, that's our story . . . of how an architect helped make some older people warm and comfortable—with the help of Andersen Windows.

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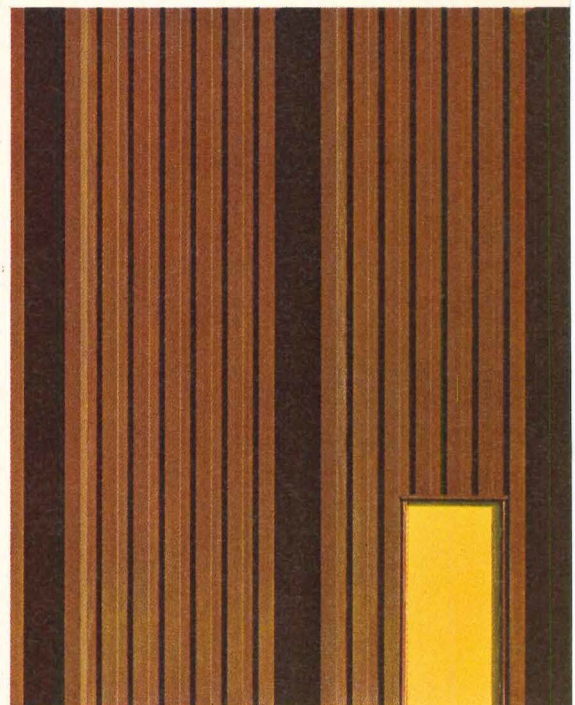
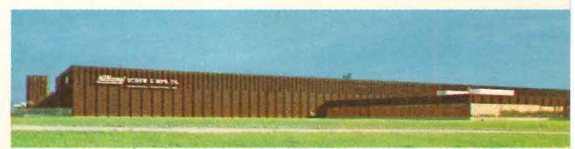
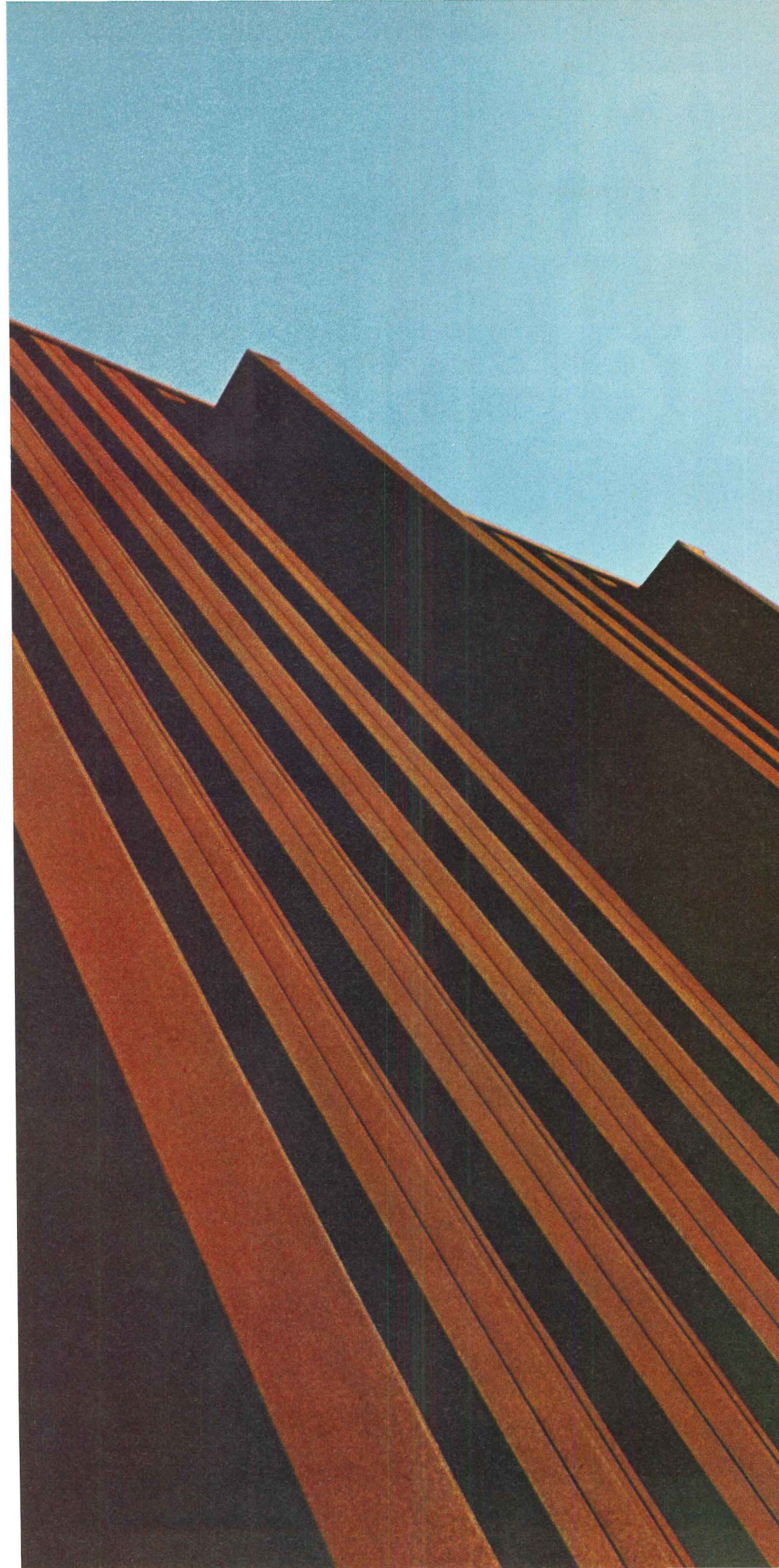


Cor-Ten Steel...naturally.

A natural choice for the combined 500,000 sq. ft. plant and offices of National Screw and Manufacturing Company, Mentor, Ohio. Another example that beauty doesn't have to cost more.

A bare COR-TEN steel exterior may look expensive but it's really one of the more economical materials you can use for industrial exteriors. And once it's up, you can forget normal maintenance costs—it takes care of itself. No painting, no cleaning, and since it's a high-strength steel it can take a pretty good beating. If it's scratched or marred, it simply heals itself. And the older it gets, the better it looks. Why not take a long hard look at bare COR-TEN steel for your next industrial structure. It's a natural.

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The other telephone

The Other Telephone is Executone Intercom. No institution, plant or office should be without it.

Because The Other Telephone is the better way to communicate with people *inside* an organization. Everyone continues to use his regular telephone, but for *outside* calls only.

Your clients will use the new Executone 411 System to talk directly with people in other offices. (If the person called is not at his desk, he can be reached anywhere on the premises within 10 seconds via Executone Pocket Page.) They will talk privately using the handset. Or use the "hands-free" feature to talk from anywhere in the office. And the

person called will do the same. Regular telephones are always open for important outside calls.

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Pick up your regular telephone now to find out more about The Other Telephone. Your Executone representative will help you analyze your clients' communications needs and come up with specific recommendations. Write for free portfolio, "Intercom Information for Architects." *Executone intercom*



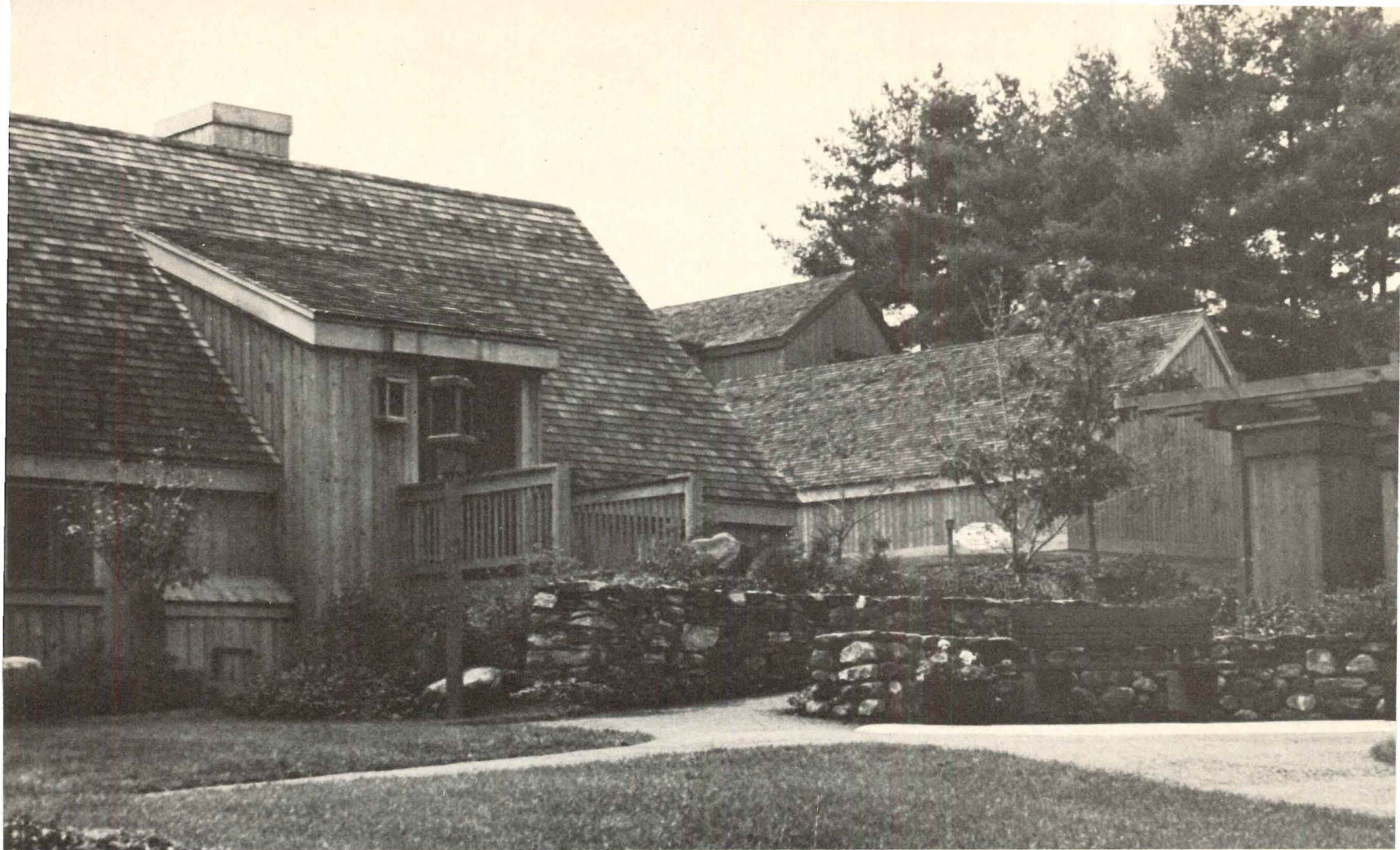
Lennox presents the "tenant system" of apartment comfort control

Indoor comfort is a highly personal need. Individual. And complicated. As apartment dwellers become more sophisticated in their comfort demands, so must the equipment that heats and cools their individual living areas. Lennox answers this need with a "tenant system" of comfort control (where the tenant completely controls his environment), as opposed to mass, central systems of take-it-or-leave-it heating or cooling.

continued overleaf . . .

Brooktown Apartments, Addison, Texas. 400-unit development of garden-type apartments styled for the casual, indoor-outdoor living of this Dallas locale. Each tenant controls his own Lennox heating and cooling system. *Inset photo:* New model, low-silhouette Lennox condensing units hide quietly. Architects: Burson & Hendricks. Developers: Brooktown Properties. General contractor: C. C. Blaylock Construction Co. Heating/cooling contractor: Citywide Plumbing & Air Conditioning.



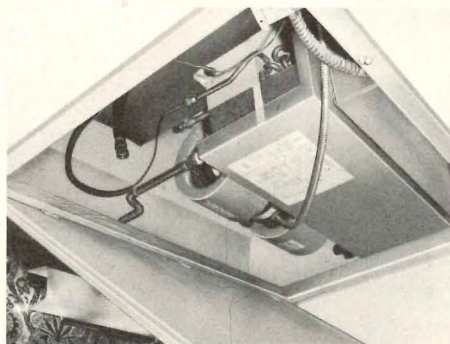


Heritage Village, in Southbury, Connecticut, is an all-electric condominium community planned for 2000 units in "houses that fit the land." Lennox equipment providing cooling for 1800 units and heating for 900 permits use of "tenant system" comfort control. Planning and design consultant: Charles Warren Callister. Developers: Paparazzo Development Corp.

continued . . .

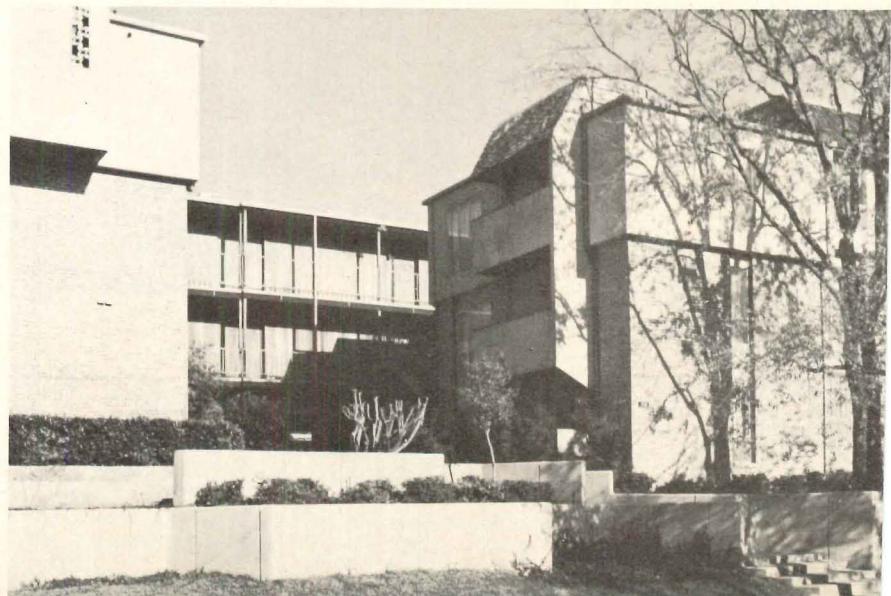
"tenant system" apartment comfort control

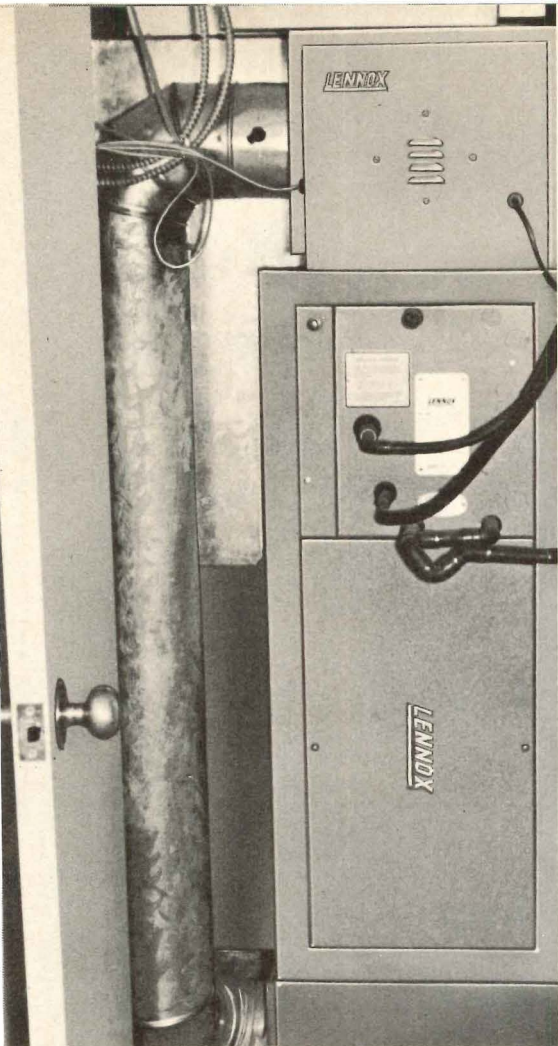
Lennox systems are designed to serve the owner as well as the tenant. There are scores of systems to select from. Every fuel. Endless sizes. Indoor. Outdoor. Through-the-wall. Both rooftop and ground units are compact, low silhouette, easily-concealed. They are all quality-built. They will last longer, cost less to maintain. Because they are factory-assembled and -wired, including controls, cost of installation is fully predictable (on-site labor is minimal). And cost of owning is fully predictable. Extended guarantees cover critical components.



Brooktown Apartments (preceding page) have hallway, bathroom or kitchen ceiling hideaway for easy access to compact Lennox electric heating/cooling units.

The Saracen, Dallas mini-rise garden apartments. Landscaped for hideaway-privacy effect, optimum land usage. Lennox ducted electric heating and air conditioning, "tenant system" comfort control. Rooftops conceal condensing units. Designed and built by the Brookgreen team (listed at right), plus consulting engineer Herman Blum.





Total Comfort in a closet: Complete Lennox Total Comfort System—electric heating, cooling, humidifying and electronic air cleaning equipment—neatly and compactly fitted into the closet of a Heritage Village condominium unit.



Mi Amigo Apartments, under construction in Dallas, is a complex of 149 apartments with individual ducted Lennox heating and air conditioning. New-design cooling units hide low on the rooftops. Architect: John Moss. Building Contractor: GTC Company. Heating/cooling contractor: Citywide Plumbing & Air Conditioning. Owners: George T. Connell and M. I. Harris, Jr.

Long-term service contracts are available. Being modular, failure of a unit affects only the area served. A network of 5000 Lennox dealers, with instant availability of parts, insures quick recovery of service. And because we build all the equipment, we accept total, single-source responsibility. If anything is wrong, we're wrong.

If you're planning a development, remember that comfort design is as important as esthetic design. Offer Lennox "micro-climates" with individual tenant control.

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See Sweet's 29a/Le, or write Lennox Industries Inc.,
807 S. 12th Avenue, Marshalltown, Iowa 50158.



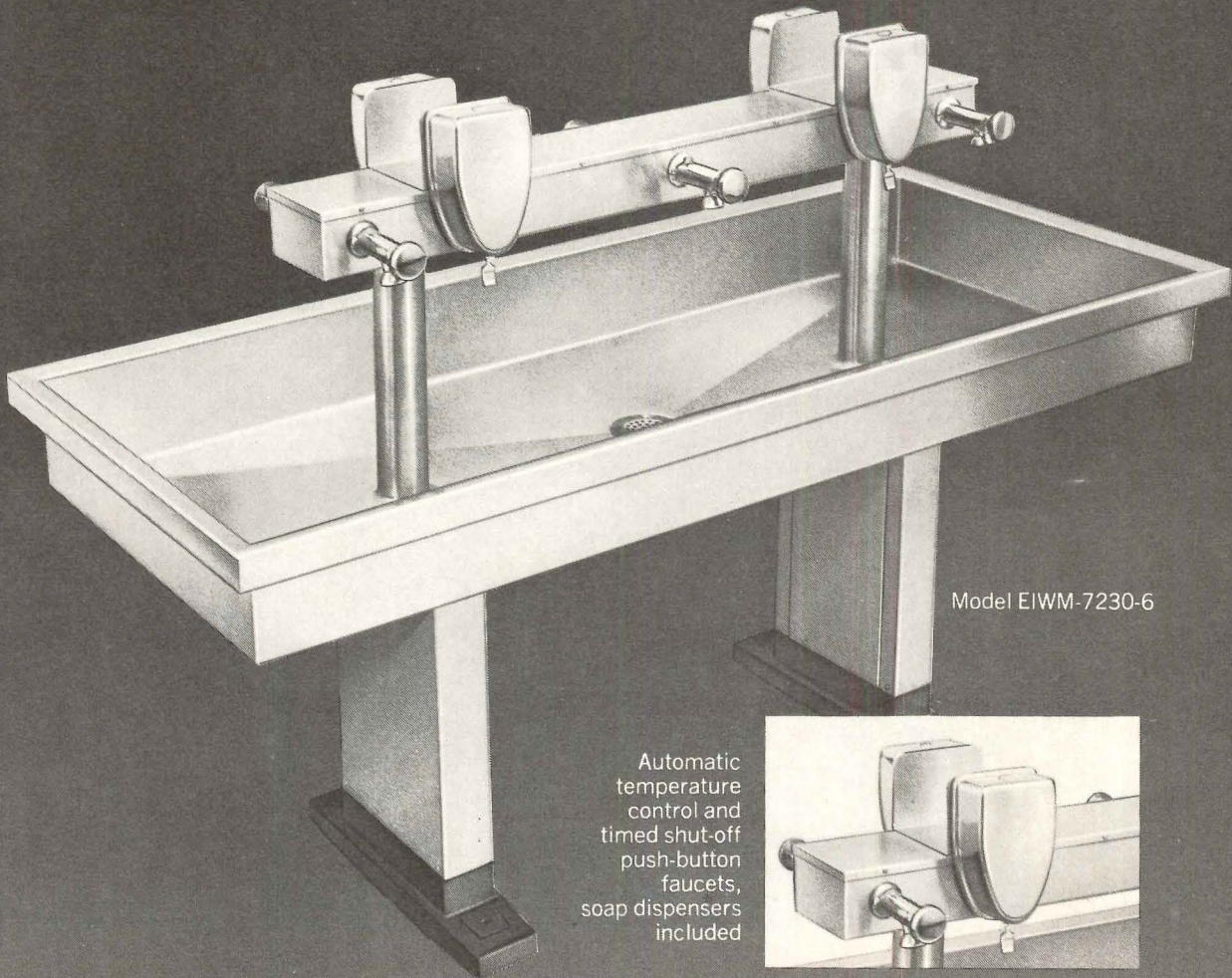
Brookgreen Town Houses, striking 230-unit development in Dallas. Imaginative planning includes efficiency town houses. Individually-controlled Lennox ducted electric heating and air conditioning; condensing units hidden from street. Architects: Ralph Kelman & Associates. Structural engineers: Chappell, Taylor & Mitchell. Owner/developer: I. C. Deal.

For more data, circle 14 on inquiry card

MULTIPLE STATION WASHUP SINKS

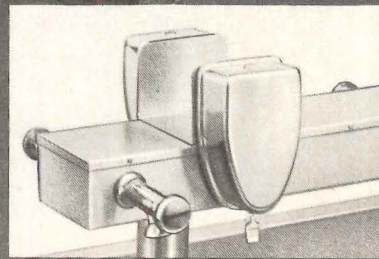
If it does a better job, it's from Elkay. The line of Elkay stainless steel wash-up sinks proves it. Multiple station sinks, both island and wall models offer delayed, automatic closing, push-button faucets, individual soap dispensers and automatic temperature controls. Unique design keeps floor clear for easy house-keeping, maximum user convenience and minimum maintenance. No drip channel rim prevents spillovers on floor.

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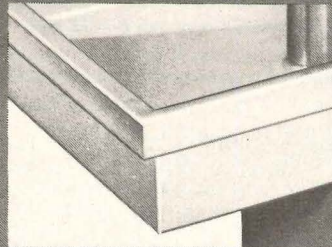


Model EIWM-7230-6

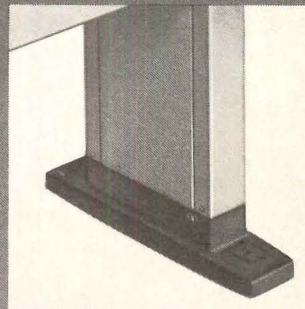
Automatic temperature control and timed shut-off push-button faucets, soap dispensers included




No drip channel rim



Pedestal supports with access panels simplifies maintenance



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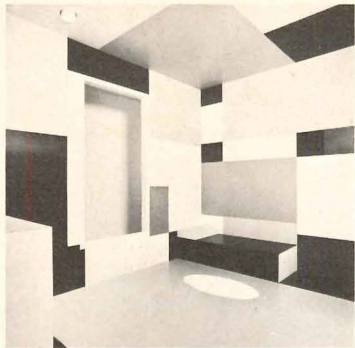
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News in brief

- A strong recovery in architecturally-planned construction** came in July. The Dodge Index rose to 259 (1957-59 equals 100), helped significantly by Chicago's 110-story \$100 million Sears Tower (September, page 41, this issue, page 95).
- The American Revolution Bicentennial Commission has recommended a national celebration** in 1976, with no single large scale Federally supported city "Expo." President Nixon has endorsed the recommendations, but he left the door open for special emphasis on Washington, D.C. The Commission urged Boston, Philadelphia, and Miami, all of whom had been competing to be the national focus of the celebration, to continue working out their plans with the prospect of some Federal aid. Philadelphia will develop one of the three centers it proposed last year (November, page 37). The Commission also expressed strong interest in proposals for special urban corridor projects in the Northeast involving high-speed trains, and Transportation Secretary Volpe is investigating the possibilities. President Nixon urged that the theme be changed from the "Festival of Freedom" to "The Quality of Life."
- A sweeping reorganization of the nation's largest civilian construction agency**, the General Services Administration, has been announced. The first major aspect of the reorganization is the creation of the Office of Operational Planning, which will consider advisability of Federal building sites in relation to availability of low and middle income housing, transportation, parking and other socio-economic factors. The new Office of Construction Management, under 35-year-old architect Walter Meisen, will work with local governments on the impact of construction or leasing programs. G.S.A. will also streamline its support operations, such as budget, using advanced computer systems.
- A Defense Department test for architect and engineer selection is against the public interest**, American Institute of Architects president Rex W. Allen warned last month. DOD units at Sacramento and Charleston will require "technical" proposals plus separate price proposals from firms already qualified by DOD to offer services to the government. "It is unreasonable to expect an architect or engineer to perform a substantial amount of his work without remuneration simply on the chance that he may get a job," Allen said. "To require sketches of proposed design solutions . . . before a detailed program is agreed upon by the client and the design professional . . . is contrary to standards of practice," Allen added. DOD last year retained 1,000 architect and engineer firms at a total cost of about \$87 million.
- The long-awaited new softwood lumber standards are now in effect.** The standards relate size to moisture content, thus insuring that the end product will be the same size whether it was seasoned or not. The possibility is strong that the lumber industry will have to begin calling the "two by four" a "1½ by 3½", its true dimensions under the new standards. There has been great conflict over the standards, and their coming into effect has not eliminated it. The Commerce Department is expected to give out detailed instructions for administering the standards in the next few months.
- A "Housing Rights" bill outlawing building codes, laws, and ordinances restricting use of new technology** in housing construction has been proposed by Rep. Bob Wilson (R-Calif.) Although it has little chance of passage this year, the discussion it arouses may make it ripe for passage next year, its sponsor hopes.
- Construction aid to depressed areas has been extended** through next June under the Economic Development Administration, authorized to spend \$770 million.
- The second International Conference of the Environmental Design Research Association** will be held October 23-30 at the Mellon Institute in Pittsburgh. Subjects will include Urban Systems, Computer-Aided Design, and Micro-Ecological Behavior. The seventh annual Architect-Researchers Conference will be held in Cincinnati November 1-3, sponsored by the A.I.A. Subjects range from industrialized housing to shelter for American Indians.
- Architect Ulrich Franzen, F.A.I.A., received the new \$5,000 Thomas Jefferson Award** for Architecture from the Bricklayers, Masons and Plasterers International Union of America for his contributions over the past decade. In accepting the award, Mr. Franzen said, "The ancient devices of city architecture—pedestrian traffic, tight streets or wide boulevards, vistas or squares, the life-giving mix of many activities interacting within an architectural framework—are not understood anymore—they have been sacrificed to a bookkeeper's vision of the city." Mr. Franzen donated his prize money to the A. Philip Randolph Institute for its Outreach program devoted to helping black youths enter building trades apprentice training.

Exhibitions: five open in New York, one in Chicago

■ "Three architects: Johnson, Roche, Rudolph," showing works in progress will run at New York City's Museum of Modern Art until Jan. 3.



John Hugelmeier

■ A room designed by Piet Mondrian, the "Salon for Madame B of Dresden" (above) is on view at the Chicago Art Institute, having been shown first at New York's Pace Gallery and the Los Angeles County Museum. The room, 12 x 14 x 10 feet, was made in Formica plastic. Formica went so far as to obtain the artists' own paint tubes to get an exact color match. The show will close November 8.

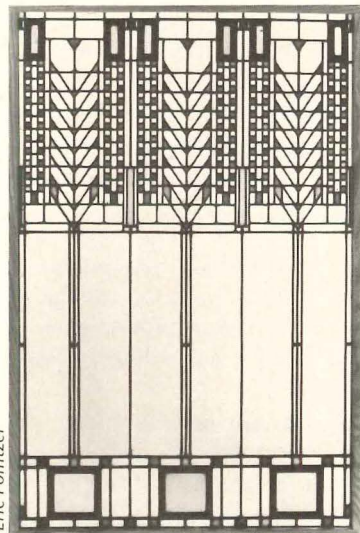
■ Windows (right) from Frank Lloyd Wright's Darwin Martin House (April, page 40) will be on view with drawings and blueprints for Wright's George Berdan House at the Richard Feigen Gallery in New York City through October 14. The windows come from the conservatory, which was demolished some years ago, not the main house, which still has most of its original windows. All the windows in the show have been sold, the going price being about \$2,000. They went to museums, a university—and architects.

■ "Hitler's Delusions of Grandeur: Architecture Inside the Third Reich," on view at the New York Cultural Center through November 8, is the first public viewing of the

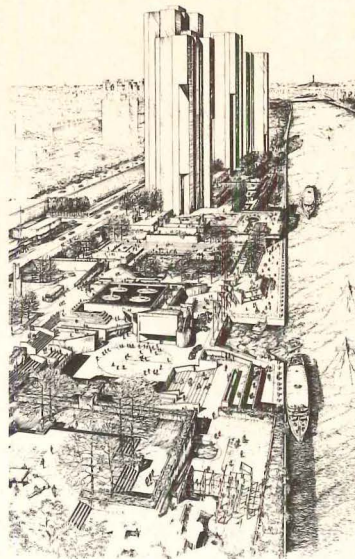
Fuhrer's own freehand renderings of colossal monuments, stadiums, and other monolithic structures for his post-war "Germania." The exhibition also includes photographs of Albert Speer's models of structures for Germania. The material comes from Speer, Hitler's architect and Minister of Armaments and War Production. Speer's memoirs have recently been published by Macmillan.

■ "Morris Lapidus, the Architecture of Joy," will run at the Architectural League of New York from October 9 to 31st. Along with the exhibition of Mr. Lapidus' work, there will be two nights of discussion, on the first of which Mr. Lapidus will speak, and on the second of which, a panel of well-known architects and critics will argue pro and con about his work. The show has stirred considerable controversy at the League.

■ "Another Chance for Cities," an exhibition of models and drawings for twenty projects to be built in New York State by the state's Urban Development Corporation will close October 4, after three weeks at New York City's Whitney Museum of American Art. An amply illustrated

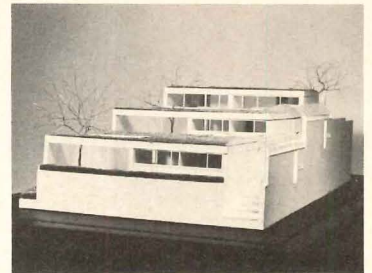


Eric Pollitzer



companion volume by Robert A. M. Stern, John S. Haggmann, and Peter Wolf and published by the museum compensates for the exhibit's short run. The exhibit features a house (upper right) designed by Wells/Koetter, architects, and manufactured by General Shelter Corp. Crowds watched the house installed in the museum's narrow sculpture court—it just made it—the night before the show opened.

The U.D.C. has gone out of its way to choose first-rate designs. Among those on view at the exhibit are Davis, Brody and Associates' and M. Paul Friedberg Associates' Harlem River Park (above, left) and scattered site housing for Ithaca, N.Y. by Werner Seligmann and Associates (right, center). Other projects shown—they vary in degree of completion—include Paul Rudolph's Waterfront housing in Buffalo, a proposal to build an air-rights sub-city over New York City's Sunnyside Railroad Yards (see also February, page 42) by Gruzen and Partners, housing in Binghamton, N.Y. by Ulrich Franzen and Associates, and a multi-use development



in Ithaca by Sert, Jackson and Associates.

The U.D.C. was set up by the state in 1968 as a public benefit corporation to increase low and moderate income housing, help alleviate unemployment, revitalize industry and expand community facilities. It may issue notes and bonds up to \$1 billion to finance its projects. The U.D.C. has the right to purchase land or condemn it, and it is not subject to local building codes. Its policy is never to enter a community to which it has not been invited, to work closely with that community during the design process and to build what it promises to build. Edward J. Logue, former urban renewal chief in New Haven and Boston, is head of the U.D.C.

As the exhibit shows, a major preoccupation of the U.D.C. is housing. It intends to build 25,000 units per year during the next decade. The U.D.C. is also planning new towns in Amherst, Lysander, and on New York City's Welfare Island (November 1969, page 40). U.D.C. is seriously investigating manufactured housing systems.

First U.S. architect admitted to British practice

Vincent A. DeGutis, a member of the staff of William W. Bond, Jr. and Associates, Inc., architects and engineers of Memphis, will be the

first United States architect to be admitted into practice in the United Kingdom. Mr. DeGutis will register this month under regulations that became effective January 1 (January, page 35). He continues working for the Bond firm.

Warships proposed for housing factories

Design Futures, a New York City design and engineering firm is working with naval architects Cushing & Nordstrom and housing manufacturer Shelly Systems, Inc., an Operation Breakthrough winner, to develop water based factories for delivering housing in New York and along the eastern seaboard. Converted Essex aircraft carriers (the ships above have been sold for scrap) are best for the job, says Design Futures. Each floating factory could produce an estimated

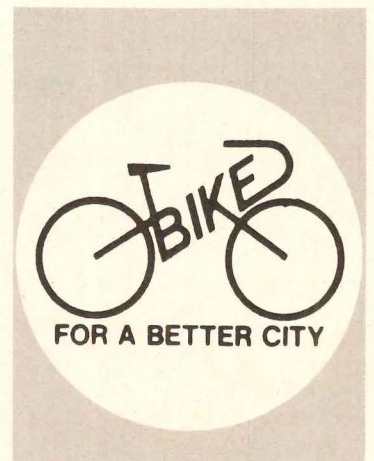


5,000 dwelling units per year, and could deliver the units as far north as Albany. Eventually, other ships could travel the Mississippi, the St. Lawrence, and the Great Lakes. The program's greatest virtue, say its proponents, is the elimination of the risk run by a land-based factory unable to reach changing markets.

Architect and his wife organize "Bike to Work"

Even Mayor Lindsay was cycling. The rush hour "Bike to Work" in New York City, organized by architect Barry Fishman and his wife last month, was such a success, it is expected the city will soon set aside a bike lane on a major avenue of Manhattan. Mr. and Mrs. Fishman, who bicycle everywhere ("I often have to ride on the sidewalks, but I can't do without it," says Mrs. Fishman) led a group of 1000 cyclists eight miles down Fifth Avenue and Broadway. Among other requests, they are asking: bike lanes; bike parking facilities; and bike garages in new buildings. Their efforts had strong support from environment groups; and they became so popular that a mannequin showed up in the window of Bergdorf Goodman's

elegant department store wearing a "Bike for a better city" button (below) which Mr. Fishman had designed to publicize the event.



Environmental education (man-made and otherwise) gets architects' help

■ Both Senate and House have passed bills to establish programs in environmental education through the Office of Education in Health, Education and Welfare. The House bill authorizes a separate Office of Environmental Education, the Senate bill works through agencies. After signing of one of the bills by the President, the program is expected to be operational by next spring, with first programs under way by next summer. Testimony by A.I.A. President Rex Allen and public education committee chairman James Pratt at hearings on bills was instrumental in adding the words "man made" to the description of the environment.

■ Four architectural students—Dan Conrad, Cal Poly; Janet Null, UC

Berkeley; Susan Jones, Washington; Bruce Webb, Montana—who were interns at A.I.A. headquarters last summer, worked on a prospectus for environmental education and have applied for HEW funds to continue their work.

■ A two-week test workshop for teachers held in Dallas, Texas, by Dallas Chapter, A.I.A., members under an A.I.A. grant, attracted 15 teachers to participate in an experimental curriculum which combined laboratory experiences with visits to actual environments. The curriculum is being refined for testing in other school districts.

■ The long-heralded K-6 curriculum for enriching social studies with environmental awareness, devised and written by northern California Chapter A.I.A. members, goes into broad testing in schools of the San Francisco Bay areas during the fall semester.

■ The Women's Architectural League of Utah, capitalizing on talks last spring by architects in 40 schools, held a two-day program in Salt Lake City for school officials, architects and W.A.L. members, with Elisabeth K. Thompson F.A.I.A., RECORD senior editor, as speaker and leader of a workshop session for supervisors of art and social studies programs, curriculum directors, A.I.A. and W.A.L. committee members. The program was aimed at implementation of a program in Salt Lake City schools.

■ Thomas A. Norton (right) of Norton and Hume, Architects, Inc., Stamford, Conn., has embarked on a program of speaking to elementary and high school students. Mr. Norton says he believes it is the architect's responsibility to educate people to the importance of environmental awareness. "The architect can, must, exert more influence



in the sound and sensible planning of our physical environment," Mr. Norton tells students, urging them to consider architecture as a profession. Mr. Norton also thinks not enough architects have been pulling their weight in terms of having a positive effect on the world we live in.

Notes on schools

■ The Rhode Island School of Design, which began its 93rd academic year this fall, will introduce a new concept in architectural design. The new plan, known as the "common curriculum," will eliminate departmental boundaries, and will combine the curricula of architecture, landscape architecture, interior design, and industrial design. Department heads will be known as program heads, and the faculty will belong to a divisional pool which will enable them to cross traditional barriers. Rather than choose a predetermined major, each student will design his own course concentration, with the help of an advisor. "The new educational structure is necessary to reflect relationships already emerging in the professional world," said Dean Donald M. Lay, Jr.

■ A national study of curricula standards will be led by Myles G. Boylan, director of Michigan State University's School of Urban Planning and Landscape Architecture for

the American Society of Landscape Architects. Mr. Boylan explains that greater emphasis should be placed on variety and flexibility in new accreditation policies to allow schools to meet certain standards yet give them latitude in deciding on their own directions.

■ Drexel University in Philadelphia, the only school in the country offering a baccalaureate degree in architecture entirely in the evening program, has substantially revised that program to provide greater flexibility and variety. As all students in the last three years of the eight-year program are required to work full-time in architectural offices, a good deal of elementary coursework has been eliminated. Drexel will request official accreditation next year.

■ George T. Manos will be the Acting Director of the Department of Environmental Design at the Philadelphia College of Art. Mr. Manos, a member of the department's faculty since 1968, is a partner in the architecture and environmental de-

sign firm of Manos/Moleski.

■ Princeton University has appointed Paul N. Ylvisaker, former New Jersey Commissioner of Community Affairs to be Professor of Public Affairs and Urban Planning. Princeton has begun a new two-year program leading to the degree of Master in Public Affairs and Urban Planning, a cooperative venture of the Woodrow Wilson School of Public and International Affairs and the School of Architecture and Urban Planning. As part of Princeton's increasing emphasis on cities, it has changed the name of its School of Architecture to the School of Architecture and Urban Planning.

■ The School of Architecture at Washington University in St. Louis has begun a combined degree program leading to a Master of Architecture and Master of Business Administration.

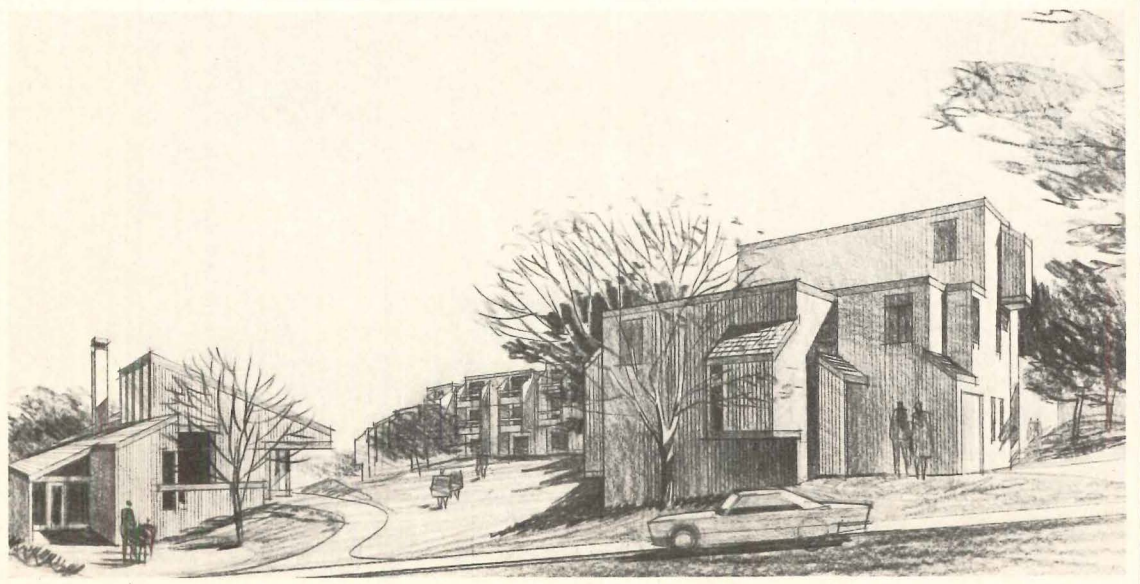
■ The University of California at Berkeley has begun a Ph.D. program specializing in architectural research, the first major one in the nation, according to the school. It

was started because "Architects have been almost completely dependent upon research from other academic disciplines and industry," says Gerald M. McCue, chairman of the Department of Architecture at Berkeley. Says McCue, "The problems of architecture demand a much surer hand than ever before in determining what technical and social requirements of buildings really are, especially in the present urban context."

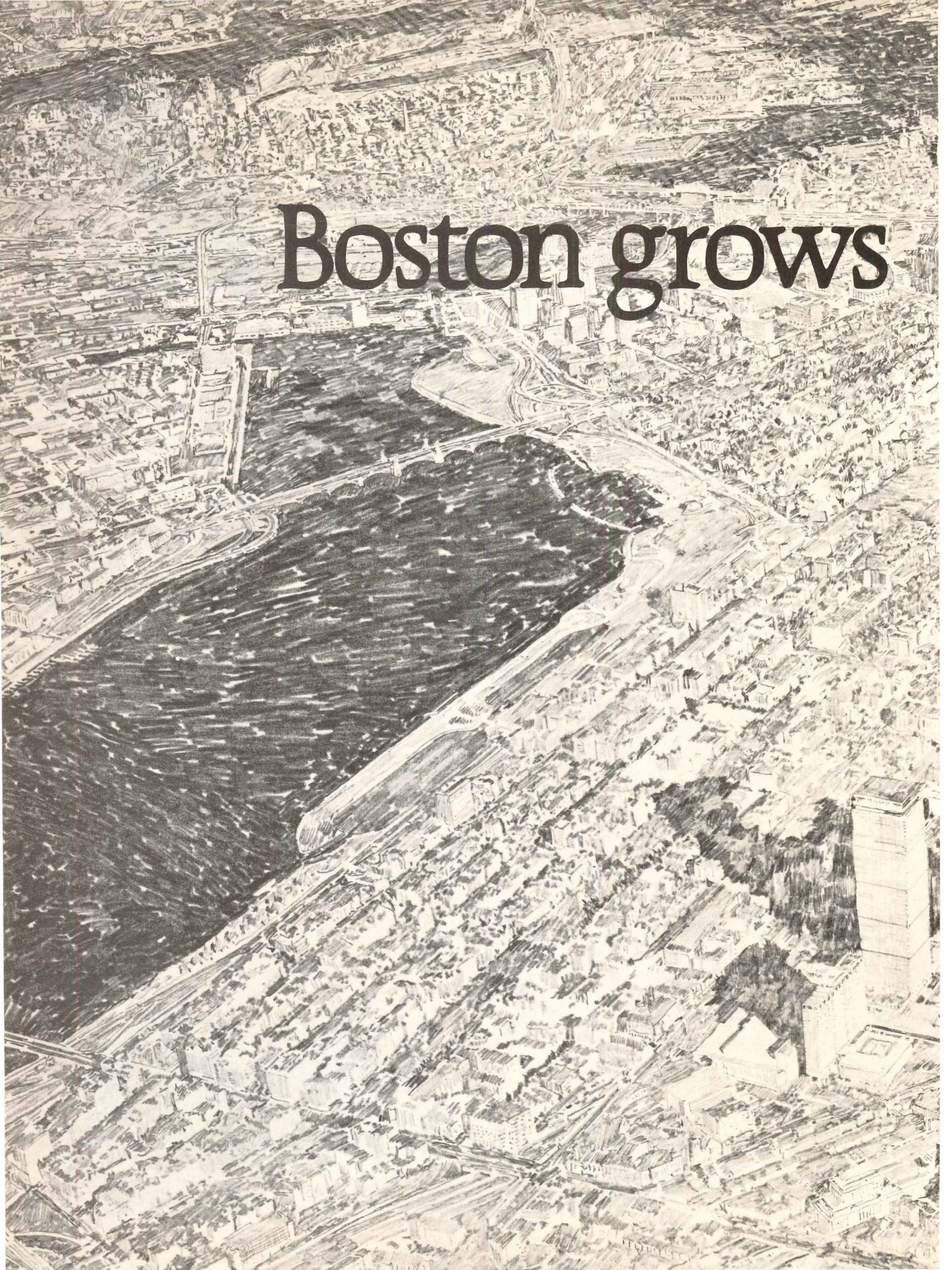
■ A humanistic Studies in Engineering program has begun at Princeton. It is meant to make civil engineers "as aware of esthetic and social values as they are of technical considerations," and to "establish a new source of scholarly contributions by the civil engineer to the work of the humanist," according to the school. An example of the latter has been the testing of gothic cathedral models, showing that a number of gothic design characteristics once thought to be entirely ornamental are integral structural components.

Good design comes to moderate priced housing in San Francisco

Architects Smith, Barker and Hansen have designed housing (right) to rent for about \$120-185 for one- to four-bedroom units on San Francisco's Diamond Heights. Mission Neighborhood Centers Inc., a non-profit sponsor, will build 104 units. 275 moderately-priced town houses were built nearby last year. Both projects are under the aegis of the San Francisco Redevelopment Agency. As Diamond Heights is a high-income neighborhood, the project is intended to be an example of successful income mixture. There will also be a modest multi-purpose community center. Structures will be of wood.



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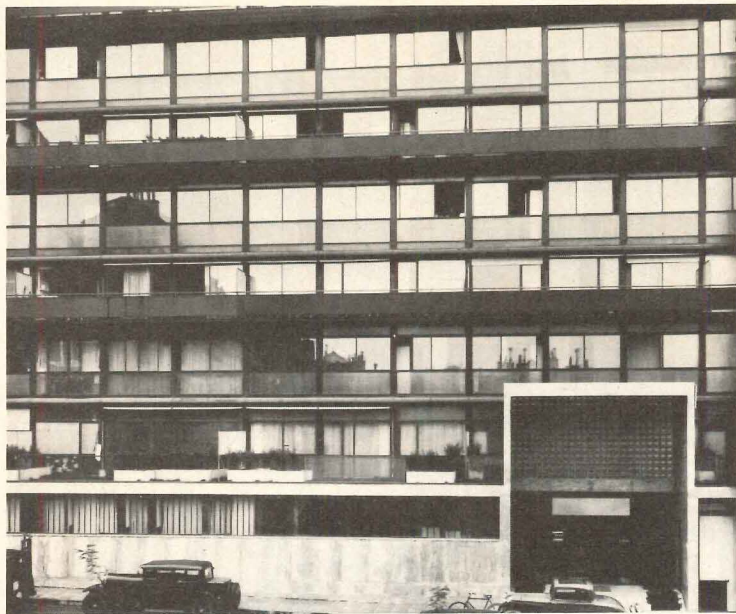
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BOSTON - SIXTY NINE



For more data, circle 22 on inquiry card



Swiss architects save Corbu's Clarté apartments

Le Corbusier's Clarté apartments (above), built in 1930 in Geneva were in serious danger of being torn down—if they didn't fall down—until the Federation of Swiss Architects came to the rescue. The building, which had deteriorated, was on a valuable piece of land, a sitting duck for developers. The architects asked that the building be declared

a national monument, safe from demolition, but the government dragged its feet, saying the building's poor condition was the main obstacle. So the architects decided to buy it themselves. They arranged a national subscription, asking the help of all Swiss architects and engineers. The owner gave them a low price, and the architects have announced success. They are now working on restoration.

Records: "Structures and Sound"

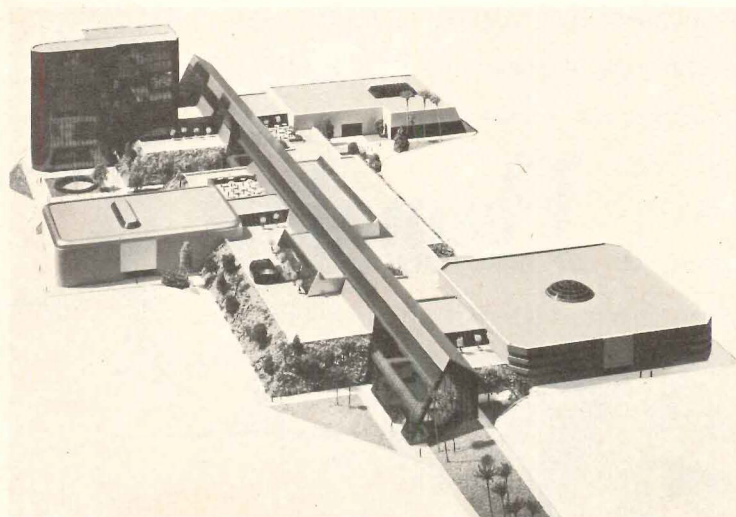
"Bach and Beethoven are the two greatest architects I know anything about," said Frank Lloyd Wright. Elaborating on the point, musicologist Karl Haas, of Detroit, has put together a phonograph record comparing architecture and music of

many eras (Aaron Copeland's music is compared to Wright's buildings here). Dr. Haas was recently awarded an Honorary membership in the Michigan Society of Architects for his contributions to the arts, and he made the album in appreciation of the honor. It is available from Magnetic Video Corporation, Farmington, Mich.

Embryo city to rise near LA

Architect Cesar Pelli, of Gruen Associates, has designed a shopping-office-recreation complex (below) for Arcadia, California meant to be a prototype multi-use urban center. The project, to be called the Santa Anita Fashion Park, will center on

an open-ended expandable spine, described by its designer as "a modern main street—multi-leveled and air conditioned." Other uses are attached to the spine and can grow or change independently of the mall. The \$50-million project is expected to be completed in late 1972.



Los Angeles hires Wallace, McHarg, Roberts and Todd for downtown plan

"We're late, but we've got to get started," said the chairman of the Central City Planning Committee, William J. Bird. After an intensive three-month investigation, Los Angeles hired the Philadelphia firm of Wallace, McHarg, Roberts and Todd to conduct a \$500,000 two-year study leading to a general development plan for Los Angeles' downtown. David Wallace will be in charge, and the firm will set up a Los Angeles office to work on the study. Said Dr. Wallace, "The Los Angeles Downtown Plan will be the first of the new breed of CBD plans, at a human scale, involving the technology of the future, and uniquely appropriate to Los Angeles."

The plan is expected to make extensive use of rapid transit, although a \$2.5 billion rapid transit bond issue was overwhelmingly defeated in the city two years ago. The firm has developed plans for the downtown business district of Buffalo, New York's lower Manhat-

tan, and two areas of Baltimore. Partner Ian L. McHarg has outlined his firm's work in ecological planning in his recent book, "Design With Nature." Mr. McHarg spoke on the subject at the American Institute of Architects convention in June.

A general plan for Los Angeles growth was announced early this year by the city's Department of City Planning. It would emphasize 47 urban centers and a combination of high-rise housing and single family homes, seeking to retain the suburban way of life while developing its urban character." Planning officials predict a population of 4,250,000 by the year 2000. Revival of the downtown area is a basic goal of the plan. Both rapid transit and more freeway construction are proposed. However, there has been some vociferous objection to any population expansion (the plan is designed to accommodate between five and eleven million people if necessary—present population: 2.9 million) and indeed some figures show a recent decline in Los Angeles County's population.



Vanishing Sullivan toured

"Everyone is urged to see Sullivan's famous structures before they fade into history," says W. R. Hasbrouck, Executive Director of the Chicago Chapter of the American Institute of Architects. The chapter sponsors tours of Chicago's significant buildings, which include Louis Sullivan's endangered Stock Exchange (February, page 42, September, page 35), the Gage Building, the Troesch building and the Auditorium, as well as buildings by Root, Jenney and others. The chapter also sponsors a four-hour tour of Frank Lloyd Wright's local structures.

NASA works on spaceship Earth

The National Aeronautics and Space Administration is establishing an Earth Resources Program (July, page 36) regional activity at its test facility in Hancock County, Miss., supplementing Earth Resources programs underway in Maryland and Houston. The Mississippi facility will stress research in the applications of remote sensing techniques, using planes, satellites (the first will be launched in 1972) and manned, orbiting Skylab spacecraft scheduled to be launched in 1972. In Mississippi and Louisiana, information will be used in such areas as the seafood industry, erosion and pollution monitoring of the Gulf Coast, area growth planning, forestry and agriculture.

NASA has also used high-altitude aircraft to aid the 1970 U.S. census in an effort to correlate land usage with census data.

Office tower gives a photo contest

Jeff Gould, 19, a professional photographer from Brooklyn, won \$500 first prize in the black and white category for his photograph of the Gulf and Western World Headquarters Building in New York City. The 44-story tower, Carson, Lundin and Shaw, architects, was completed this year and dominates the south-west corner of Central Park. There were seven other winners.



Dover delivers two stage lifts for the Milwaukee Performing Arts Center

(Plus five elevators,
an organ lift
and a pallet lift)

MILWAUKEE PERFORMING ARTS CENTER—Architects: Harry Weese & Associates. Theater Consultants: George C. Izenour Associates. General Contractor: Klug & Smith Co. Dover Oildraulic stage lifts, special lifts and elevators installed by Northwestern Elevator Co., Inc.

Another major performing arts complex uses Dover stage lifts for more flexible and adaptable space.

Uihlein Hall, dominant element in the Milwaukee Performing Arts Center, was planned to give equal staging facility to theater, symphony or opera. Two Dover lifts at stage front are used to extend the stage, orchestra pit or seating area as required by the type of performance. A third, with a lifting capacity of 26,400 lbs., supports a huge pipe organ at stage level, or lowers it out of sight in a pit at the rear of the stage area.

These special lifts, like the five elevators also installed here, are moved and support-

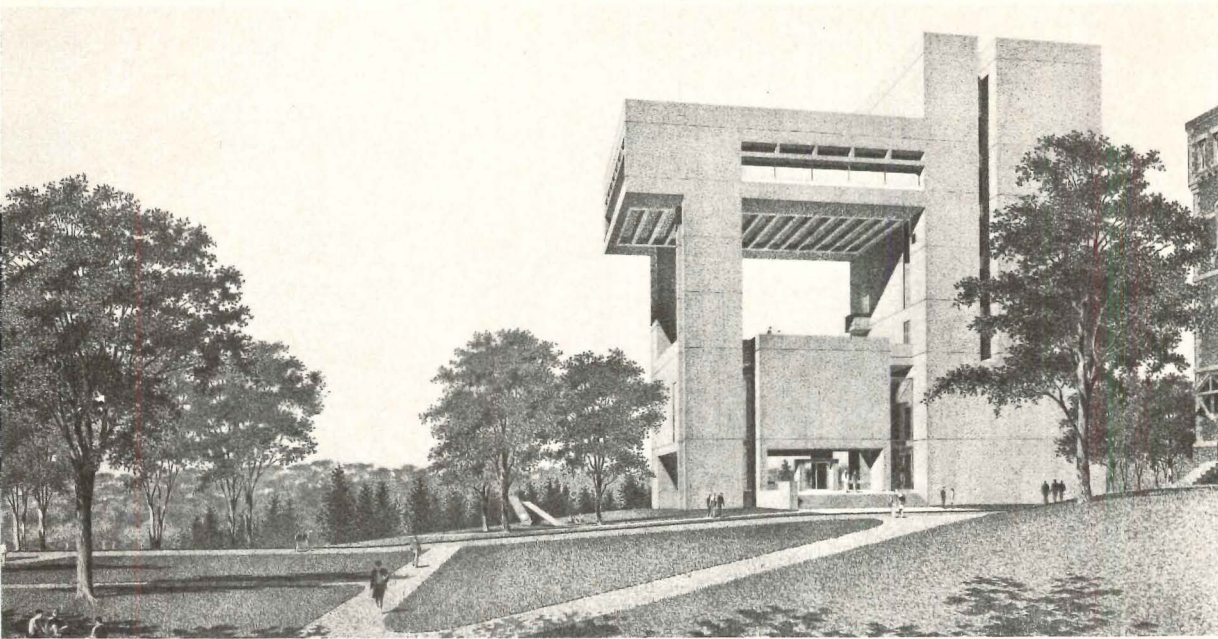
ed by Dover Oildraulic® cylinders, power units and controllers. Essential requirements of dependable operation and precise leveling are met by the sophisticated use of hydraulic power developed and refined by Dover over the past 40 years.

In planning any theatrical arts building, consult Dover for suggestions on use of Oildraulic lifts for maximum utility and versatility of available space. Our wide experience in stage lift design and construction can be most helpful. Dover Corporation, Elevator Division, Dept. A-10, P.O. Box 2177, Memphis, Tenn. 38102. In Canada: Dover/Turnbull.



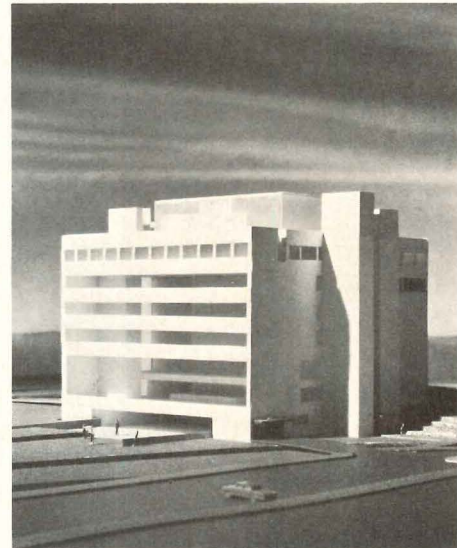
the elevator innovators

For more data, circle 23 on inquiry card



Herbert F. Johnson Art Center, Cornell University, I. M. Pei and Partners, architects, is named for its donor, the builder of Wright's Johnson's Wax building. It is conceived primarily as a teaching museum, containing neither classrooms, nor library, but having 16 galleries, a large lobby with exhibition space, and outdoor sculpture areas. The plan provides for future expansion.

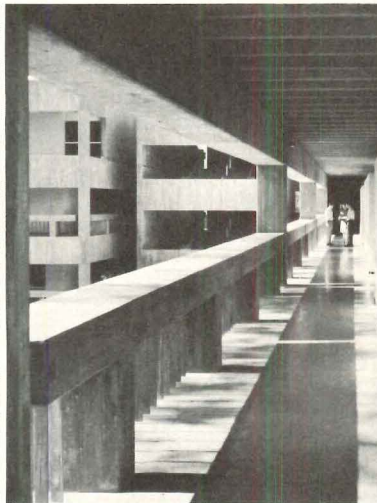
© Louis Checkman



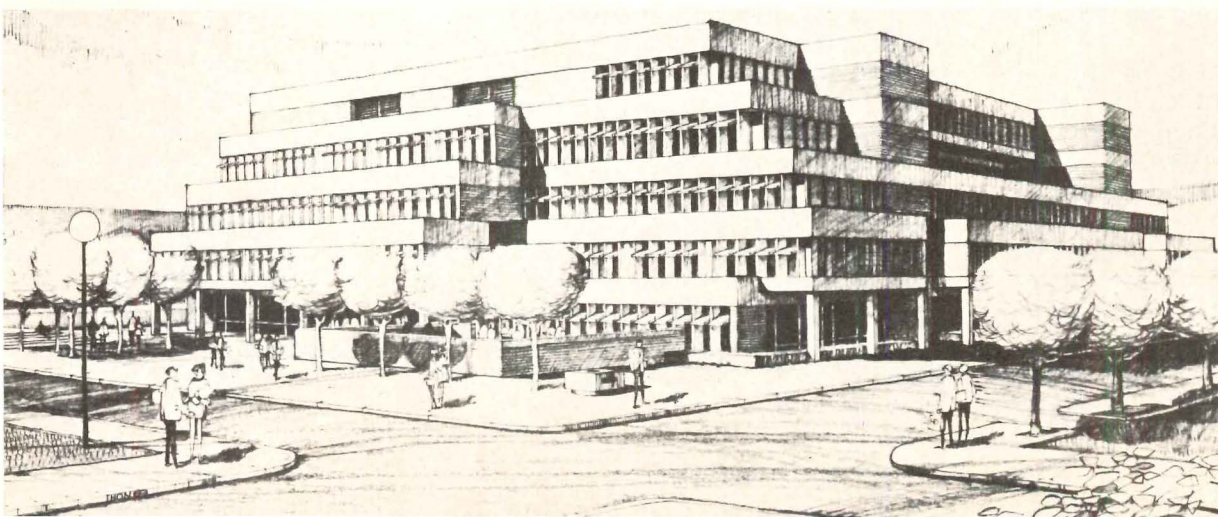
St. John's University School of Law, Jamaica, N.Y., Carson, Lundin & Shaw, architects adheres to a five-foot square module, and is square in plan. Arrangement of glass openings was determined totally by function. Stair and restroom towers flank a central axial corridor. Brick facades and upper story articulations are meant to harmonize with nearby buildings.



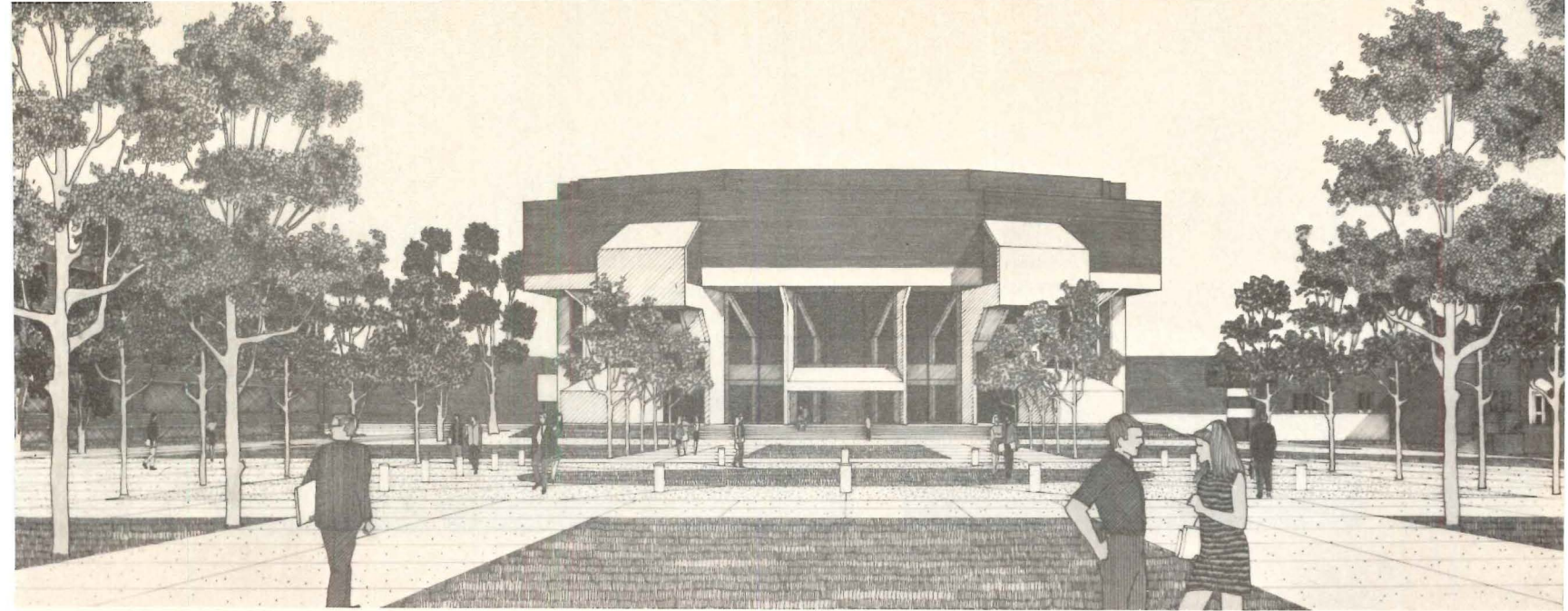
Four College Science Building, Claremont College, Claremont, Calif., Caudill Rowlett Scott and Everett L. Tozier architects, is one of nine winners of the Prestressed Concrete Institute's Eighth Annual Awards Program. The interiors, using exposed prestressed double-



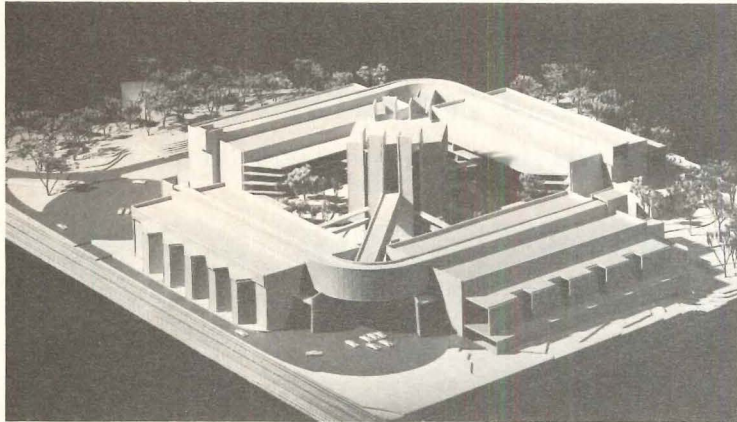
tees, reflect the structure. Cast-in-place concrete was used for the beam and column systems. Rex Whitaker Allen headed the jury.



Library at California State Polytechnic College, San Luis Obispo, Marquis and Stoller architects, is designed in a series of stepped-back terraced floors around a central courtyard. Exterior is of concrete with brick infill. "We've gotten away from monolithic stacks and mammoth reading rooms," say the architects. Outdoor reading terraces, skylights, and a colorful central staircase "main street" are meant to humanize the building, to be the largest on the campus.



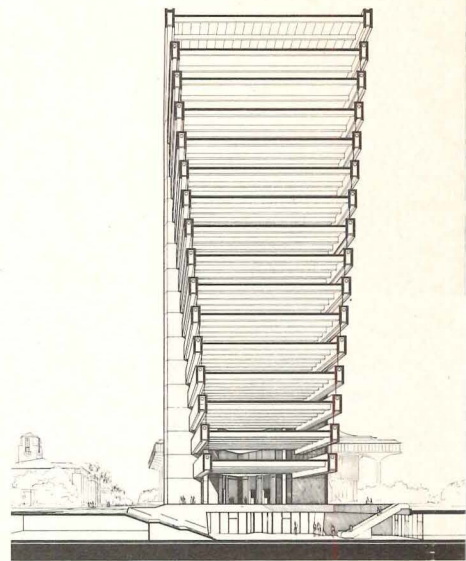
Alfred A. De Lardi



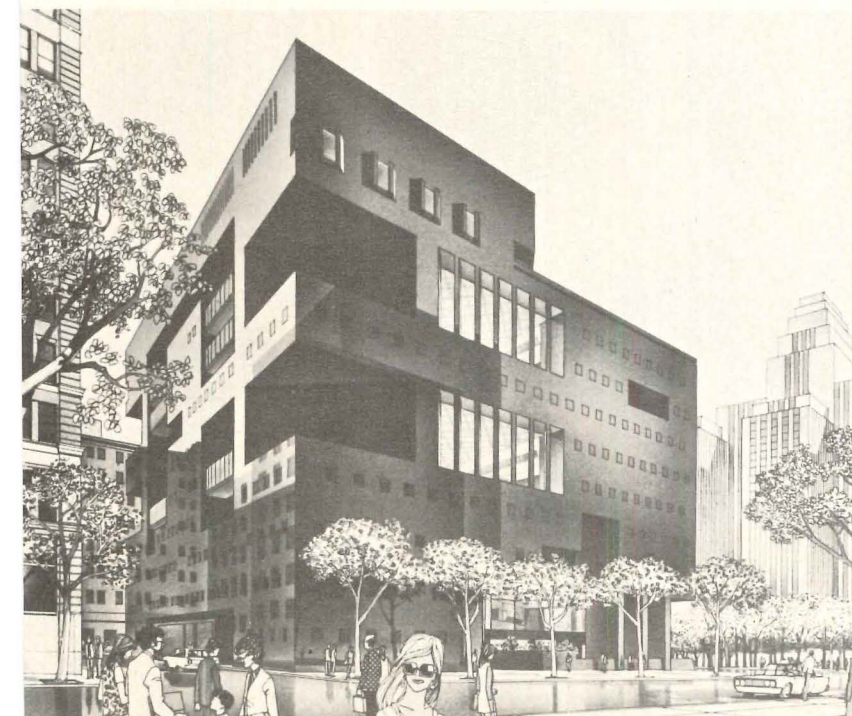
Smithsonian Institution Museum Depository and Support Facility, Silver Hill, Md., George M. Ewing Co., architects will provide a large permanent laboratory-storage facility and offices. The architects de-

signed a highly flexible storage system, provided for expansion, and endeavored to harmonize the large structure with its small-scale neighbors. Materials are precast concrete, poured concrete, and aluminum.

Fine Arts Center, St. Catherine's College, St. Paul, Minn., Hammel Green and Abrahamson, Inc., architects, has an auditorium for 1800 as its main exterior feature. The auditorium can be divided or modified by a moveable ceiling. The Center will also contain an experimental theater music studios, and listening center. It will also include a separate art building. The Minnesota Orchestra will open the hall in a grand dedication this month.

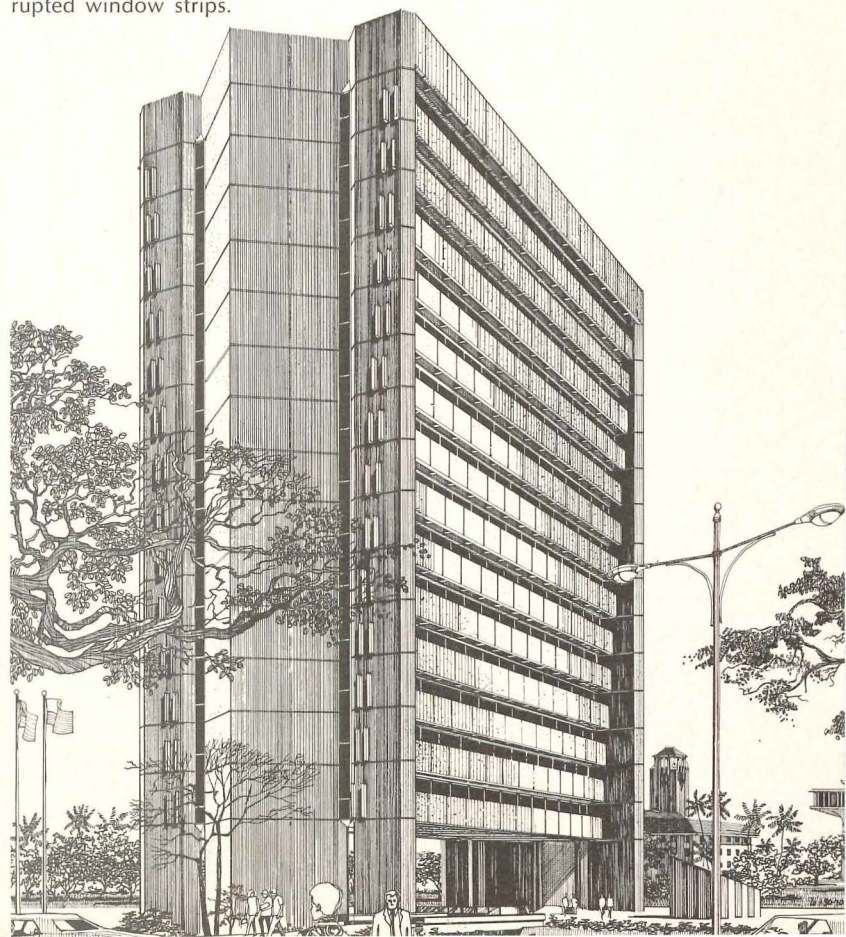


Honolulu Municipal Office Building, Naramore, Bain, Brady & Johanson, architects, was the winner in a statewide competition. The 16-story reinforced concrete building steps out towards the top (right). The ground floor is an open courtyard. Service cores and vertical structure are at the two ends, providing uninterrupted office space and uninterrupted window strips.



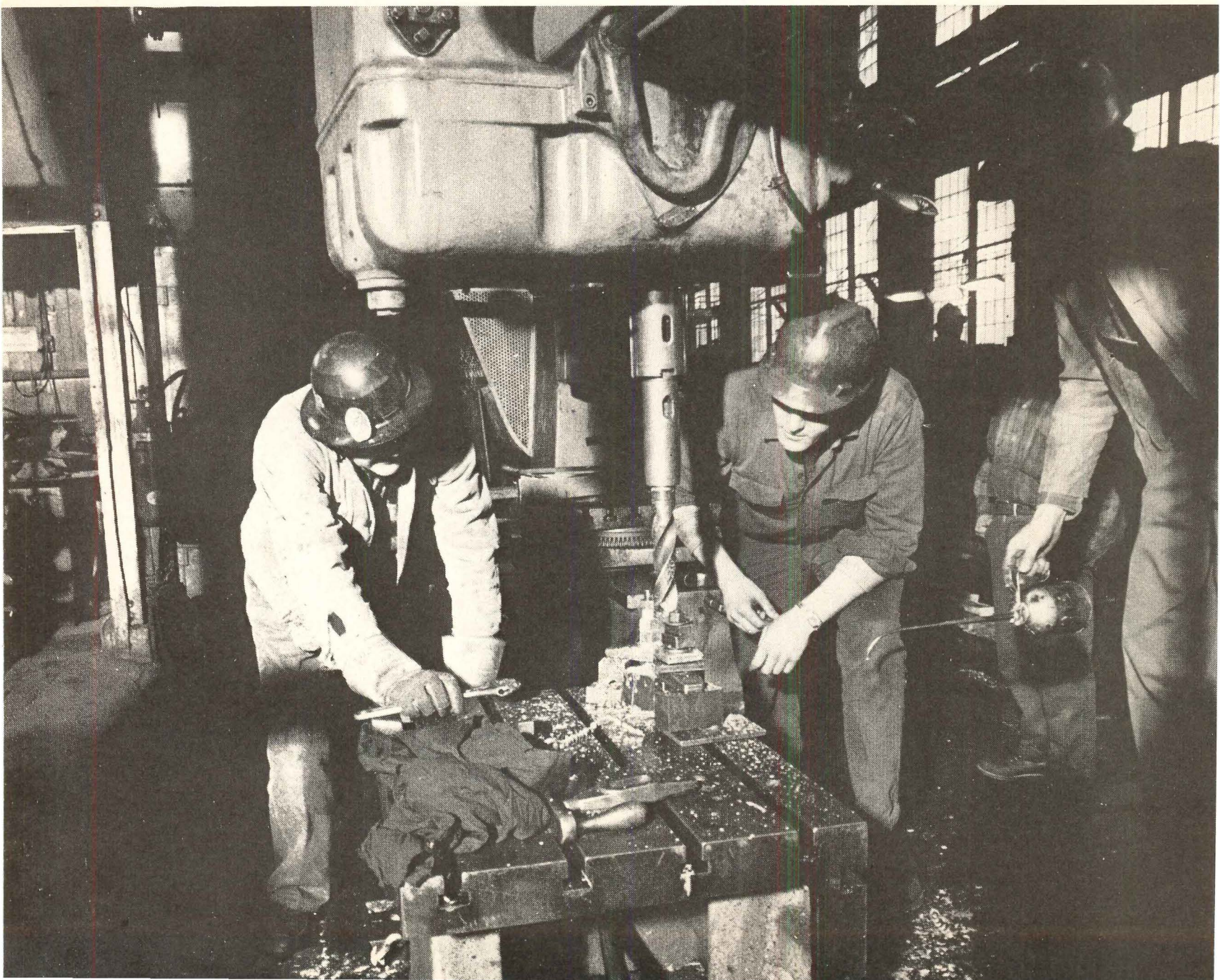
Family Court Building, New York City, Haines Lundberg & Whaeler, architects will contain 13 courtrooms, as well as court offices and chambers and outside offices. Exterior form develops from uses in-

side. Facing is dark polished granite. The need for large floor areas, combined with the elaborate needs of the clients, determined that the building should have a wide, low space. Cost \$27,000,000.



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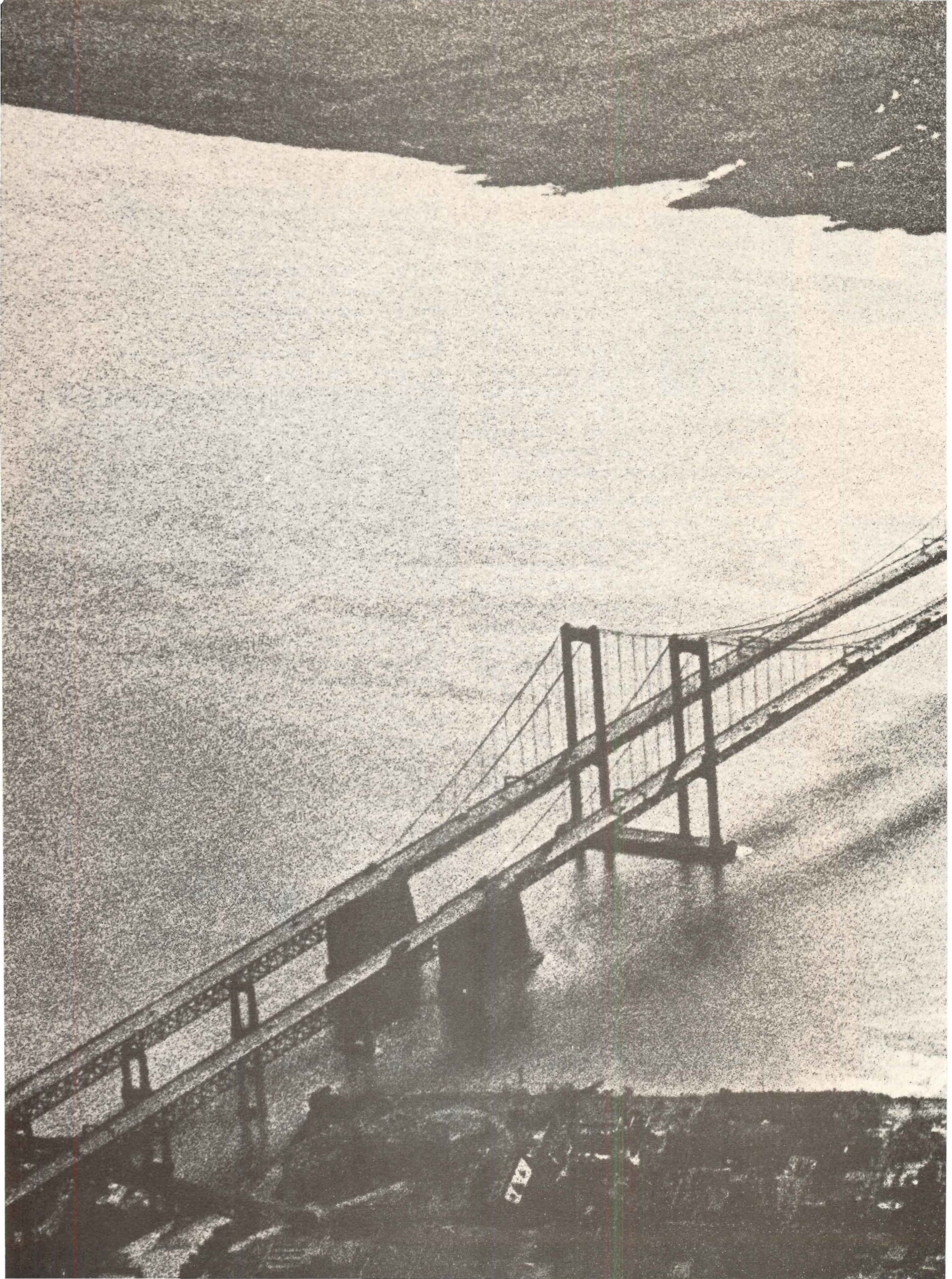


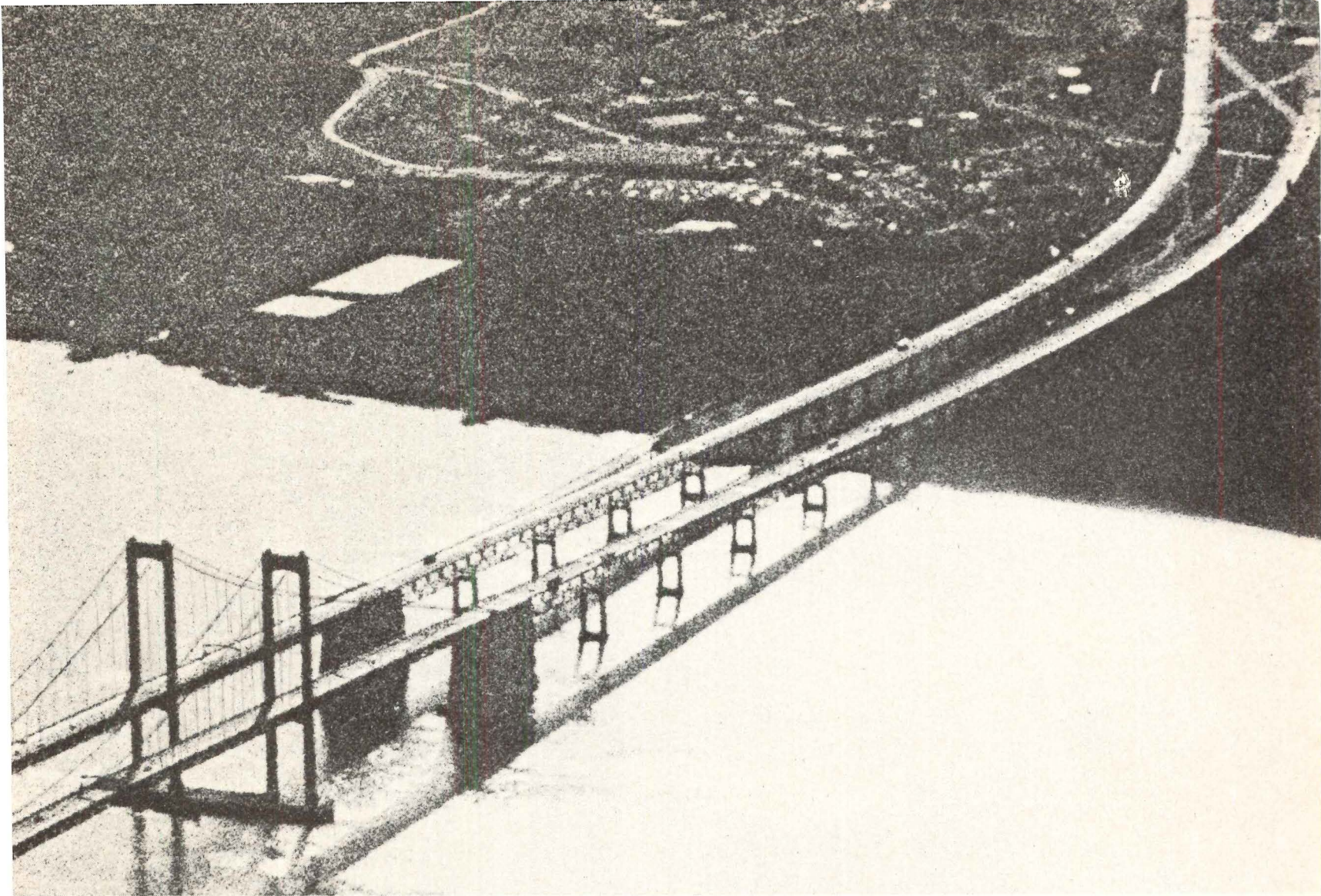
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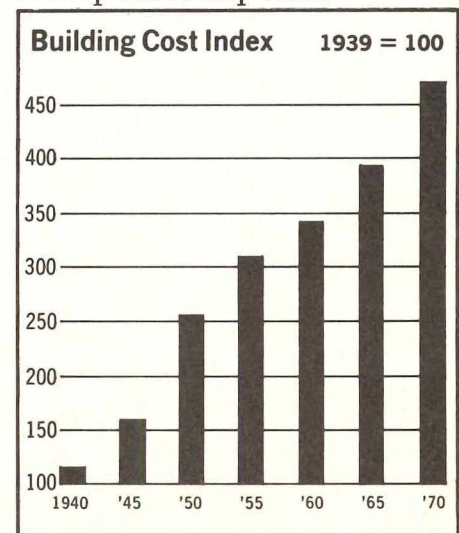
as acoustical ceiling and roof deck. And it keeps the noise down—up to 75%.

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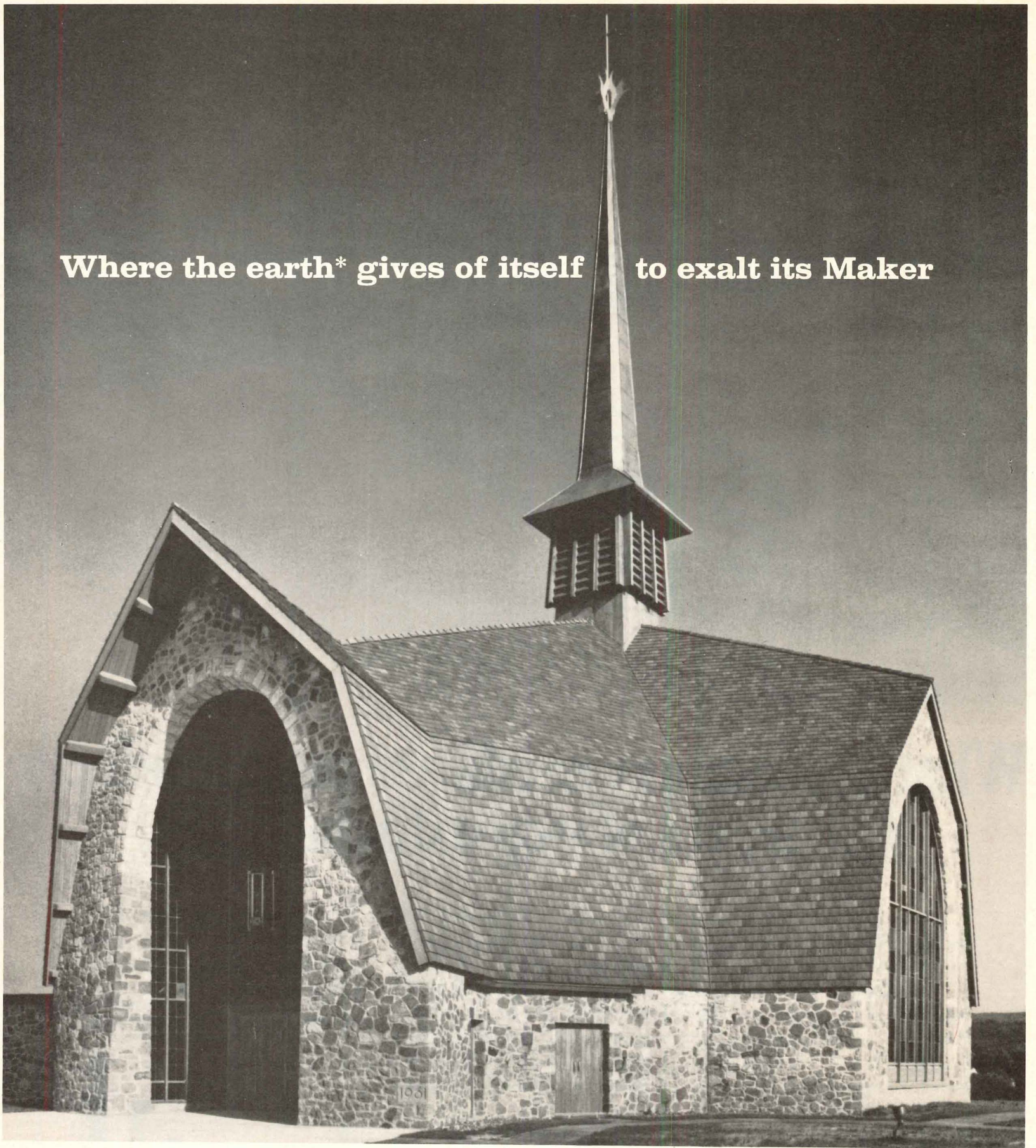


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Oakland-Alameda County Coliseum Complex Arena Building Architects/Engineers: Skidmore, Owings & Merrill, San Francisco

Glass-walled sports arena weatherproofed with Neoprene.

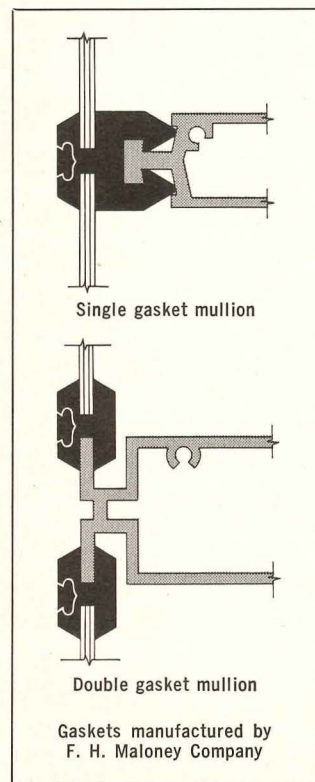
A bright new addition to the rapidly expanding San Francisco-Oakland Bay area is the Oakland-Alameda County Coliseum Complex, with its adjoining stadium, indoor sports arena and exhibit hall.

Striking feature of the Arena building is its 70-foot-high window wall sealed with structural gaskets of Du Pont Neoprene. It took nearly 10 miles of the preformed sealing strips to weatherproof the expansive glass facade.

Architects Skidmore, Owings & Merrill specified Neoprene gasketing for two primary reasons—neat appearance and long-term dependability.

Gaskets made of Du Pont Neoprene keep a tight grip between frame members and glazing, year after year. The gaskets stay resilient . . . adjust to normal building movements . . . withstand exposure to sun, rain, heat, cold, ozone and corrosives. And Neoprene won't propagate fire. It is inherently flame resistant.

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Air conditioning should be nothing to see.

Another great ceiling. This one at Rubbermaid's Route 5 Plant in Wooster, Ohio. Architect: Rubbermaid, Inc.

Air conditioning: All-air, Carrier Moduline® system.

Basic component: The Moduline air terminal. 12" x 48". Flush-mounted. Interconnectable plenum for quick installation. Automatic controls regulate flow of air (15-180 cfm) through linear slots in response to room temperature. The air discharged at the ceiling mixes evenly with room air for cool, comfortable conditions.

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Client advantages: Unequaled climate control throughout building. Low initial and operating costs, and lower renovation costs.

Applications: Office buildings, department stores, schools, hospitals, any multi-room building.

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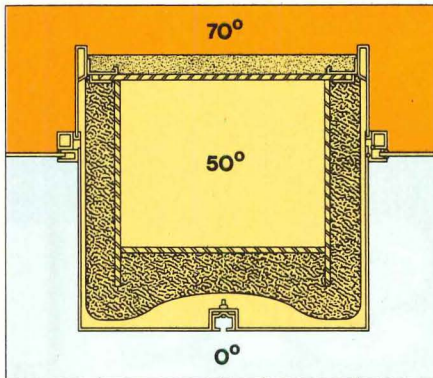




(Left)—Testing a prototype of the wall system by Cupples Products Division, H. H. Robertson Co., checked out the wind loading and thermal performances.

(Center)—Borrowing heat from the building interior, while placing maximum insulation on the outside surfaces of the columns, minimized the problem of thermal expansion of columns.

(Right)—Thirty staff members of Emery Roth & Sons, working in association with Minoru Yamasaki and Associates for eight years, produced over 15,000 sheets of drawings for the World Trade Center project.



Julian Roth, of Emery Roth & Sons, Architects, discusses thermal expansion at the World Trade Center.

"We solved the thermal-expansion problem of the aluminum column cover by the simple device of a sleeved joint that provided for movement. But controlling the expansion of the *steel columns themselves* was more complicated. Obviously, when steel columns go up 110 stories, their coefficient of expansion is a critical factor.

"To meet our performance criteria,

we had to hold the temperature on the *interior* of the column at 50 degrees when the *outside temperature* was zero . . . which normally could have been done by putting enough insulation around the steel.

"However, we had a *dimensional limitation on the space available between the column and the column cover*. So the problem was how to get enough insulation to meet the temperature specification, in the available space.

"In our development work, in association with Yamasaki, we hit on the idea of *admitting* heat in the *back* of the column, while *rejecting* it in *front* with insulation. Our final solution was to use fireproofing with high thermal-

insulation value on three sides and with plaster on the back, allowing some thermal transfer from the building.

"The aluminum fabricator contributed much of the testing and research that produced this solution. And it was good that they were able to . . . because architects just don't have the necessary research facilities. All of which points up the importance of close cooperation between well-equipped and well-staffed manufacturers and the building team."

The World Trade Center is a project of The Port Authority of New York. Engineering and development work was carried out under the direction of the Authority's World Trade Center Planning and Construction Division.

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Alcoa® Aluminum

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Design fire retardance.

Hetron® FRP resin is its own fire engine. Structurally safe and sound. Meets the stiffest building codes with flame-spread ratings less than 25.

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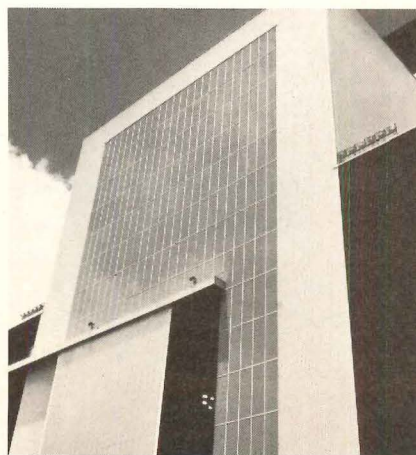
In auditoriums, restaurants, missile bases or

most any architectural shapes.

A rugged, proven construction material, Hetron takes stick and stone abuse. Keeps up appearances with little or no help. Inside and out.

Corrosion resistant. Shock-proof. Or a combination to fit your specs. Get Hetron durability and add to the life of your design. Contact Durez® now. 8000 Walck Road, North Tonawanda, N.Y. 14120.

*Cavrok®
simulated-brick
wall for
restaurant.*

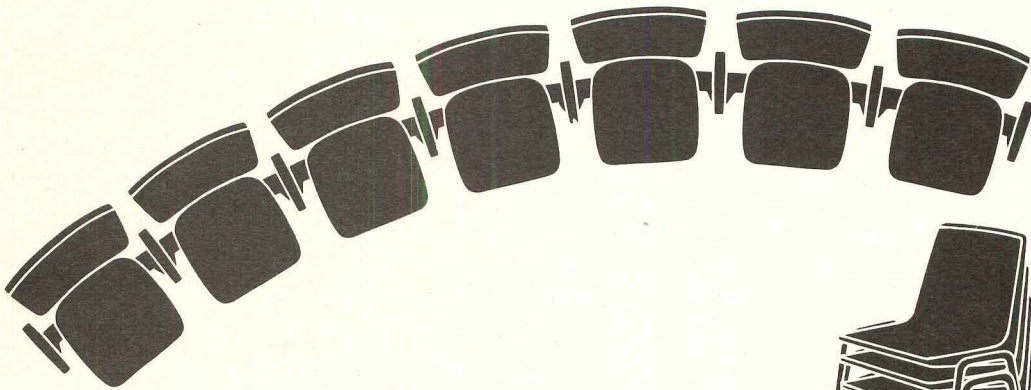
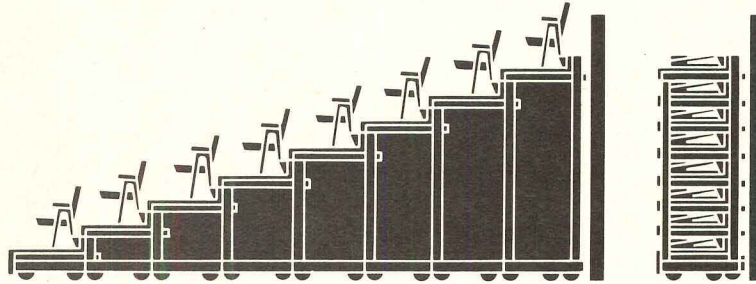
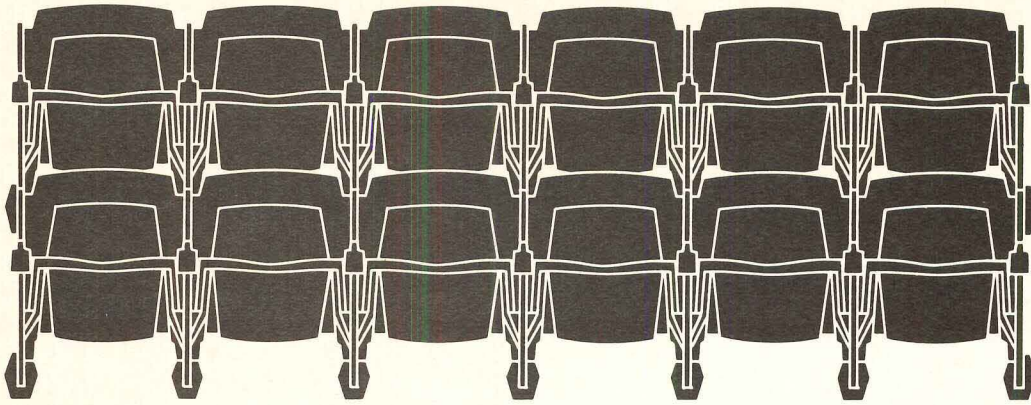


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Merritt Island, Fla.*

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Planning, products, installation — you just can't beat the American Seating Audience System. Let us tell you more about the many services we can render to the architect. **Write American Seating Co., Dept. AR-723, Grand Rapids, Mich. 49502.**

for the Environment of Excellence



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Lake Point Tower conquers the Windy City's weather—with an assist from Butyl sealants.

Will history repeat itself at "Big John"?

In Chicago, so the saying goes, if you don't like the weather, just stick around for a few minutes... it's bound to change.

Trouble is, the change is usually for the worse. If ever there was an acid test for sealants, the Windy City is it.

That's why we're especially proud of the way tapes made with Enjay Butyl rubber have held up in the famous Lake Point Tower. For three blustery winters and rain-swept summers, they've kept the wet in its place... outside.

With a track record like Lake Point Tower behind them, it's not surprising that tapes of Enjay Butyl rubber were selected for Chicago's newest skyline-buster, the John Hancock Building.

"Big John," as it's affectionately called, has enough windows to make it a glazer's nightmare. But since Butyl rubber tapes were used, we're betting it won't be anything of the sort.

Big John's sealants of Enjay Butyl rubber have a lot going for them. Ozone resistance, for one thing. Durability, for another. Plus all the accumulated experience we've amassed with Butyl rubber since we introduced it 30 years ago.

Ask your glazing contractor about it. Especially when you're involved with a building that has to stay dry — inside — for years to come.

Just say Big John sent you.

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

Lake Point Tower • Developers: Hartnett-Shaw & Assoc. Inc., Chicago and Fluor Properties Inc., Los Angeles • Architect: Schipporeit-Heinrich, Chicago • Glazing Contractor: National-Hamilton-Division of Bienenfeld Glass Corporation, Chicago • Sealant Manufacturer: Protective Treatments, Inc., Chicago • Windows are Butyl sealed Polarpane insulated glass. Polarpane is a Division of Combustion Engineers, Inc. John Hancock Center • Owner/Developer: John Hancock Mutual Life Insurance Co. • Architect: Skidmore, Owings and Merrill • Glazing Contractor: National-Hamilton-Division of Bienenfeld Glass Corporation, Chicago • Sealant Manufacturer: Protective Treatments, Inc., Dayton, Ohio •

For more data, circle 31 on inquiry card



ENJAY CHEMICAL COMPANY

128,300 sq. ft. of free-access Weberfloor . . .



pays off in new 12-story Chicago office building.

Typical of the growing trend toward access flooring in general construction is the American Hospital Association's new building, designed by Chicago architect, Richard O. Evans of Schmidt, Garden & Erikson.

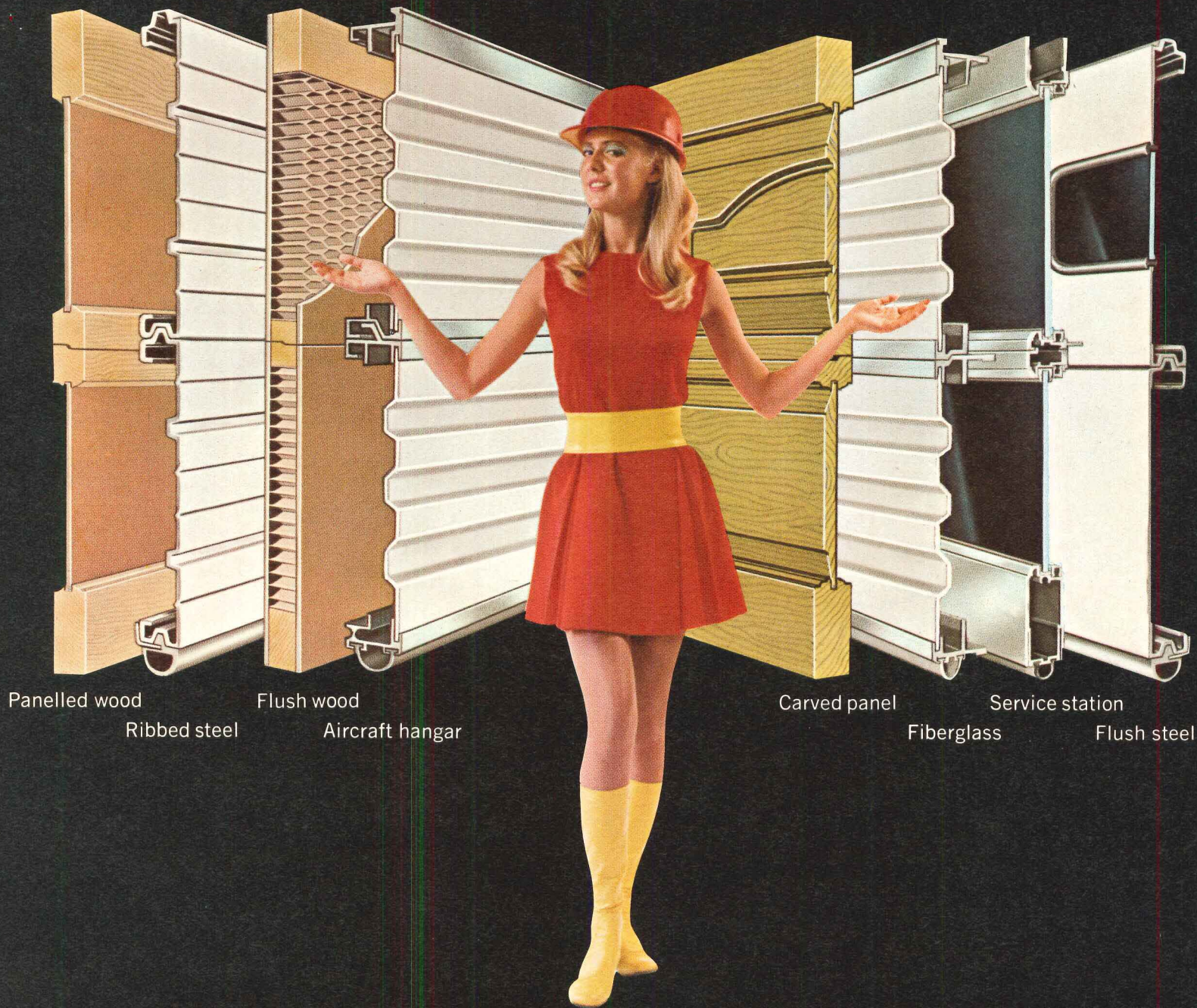
The structure's 128,300 square feet of free-access Weberfloor, 90% of it carpeted, was installed for less than \$2.00 per square foot exclusive of floor covering. Most of this figure will be offset by a combination of immediate savings in construction costs and future maintenance economies.

By providing ample, fully accessible underfloor space for electrical services, the Weberfloor system completely eliminated the cost of headers and raceways in the floor slabs. Pedestals were installed on the semi-finished slabs and then adjusted for height. Power troweling was eliminated. Floor slabs were poured as soon as formwork and reinforcing were in, with mechanicals installed later on top of the slab. Result: a shorter pour schedule that moved completion ahead a full month.

Future savings and complete flexibility in use of the building's floor space are even more attractive. Because Weberfloor panels can be raised and interchanged at will, electrical and telephone lines can be reached and relocated economically, without slitting carpets or drilling concrete.

Write for free booklet. The use of free-access Weberfloor in two major applications and its significant advantages for general construction are covered in detail. Write for your copy to Weber Architectural Products, Division of Walter Kidde & Company, Inc., 1340 Monroe Avenue N.W., Grand Rapids, Michigan 49502.

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Panelled wood

Ribbed steel

Flush wood

Aircraft hangar

Carved panel

Fiberglass

Service station

Flush steel

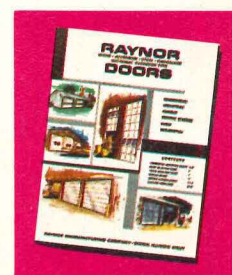
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And there's good reason for your peace of mind. Raynor is the brand you can always depend on. Selection? You name it, Raynor has it. Residential, commercial and industrial garage doors. In all essential, durable materials . . . wood, aluminum, fiberglass, and steel. Raynor incorporates the latest engineering advances. Custom-wound springs. Extra-heavy tracks. Customized

hardware. Electric operators for every door. And for further protection, permanent parts-list records are maintained at the factory for all doors. All these features allow Raynor to provide the finest guarantees in the industry. Add them up . . . you get selection, delivery, price and quality. All you can lose are your garage door problems. Raynor Manufacturing Co., Dixon, Ill. 61021.



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The epoxy/aggregate wall; So tough, it's beautiful.



This distinctive natural stone aggregate bonded with Shell EPON® Resin is four times stronger yet eight times lighter than concrete. Here's a beautiful way to create innovative architectural surfaces that can withstand anything from tropical to sub-zero temperatures, sunlight and humidity.

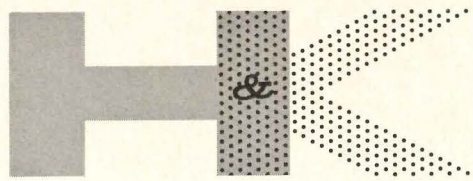
The wall matrix is easily trowelled onto vertical surfaces regardless of contour. Or, panels can be prefabricated and installed at a much lower cost than precast concrete. The matrix system dries in 24 hours to a self-cleaning finish.

Available in a wide range of colors and styles, epoxy/aggregate walls are beautiful inside or out. The unique mural effects are a stimulating challenge to a creative architect and designer. Write on your letterhead if you'd like a supplier of EPON resin-based surfacing to contact you. Shell Chemical Company, Polymers Division, Box 2463, Houston, Texas 77001.

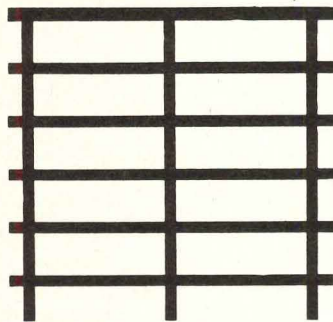
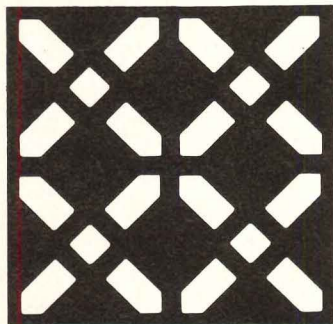
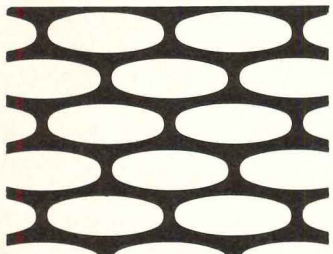
Shell EPON Resin is used in these exposed aggregate coatings installed by Desco franchised applicators and manufactured by Desco Chemical Co., P. O. Box 74, Buffalo, N. Y.

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LETTERS

We were delighted that PPG Industries should have used Number Two Charles Center in Baltimore to illustrate their advertisement in the August issue of the RECORD, because this is a project in which, we believe, both we and our client can have justifiable pride.

We would, however, like to tell you that the project should be attributed to Whittlesey, Conklin & Rossant, rather than Whittlesey & Conklin, since the official and legal partnership name was changed soon after we embarked on the project by the admission of Mr. James S. Rossant to full partnership.

Mary L. Blair
Conklin & Rossant
New York City

This is in regard to the article you wrote concerning the new Dallas/Fort Worth Airport. (August, pages 118-119). The credits should have been as follows: Hellmuth, Obata & Kassabaum/Brodsky, Hopf & Adler, Project Architects rather than Brodsky, Hopf & Adler listed as Project Administrators.

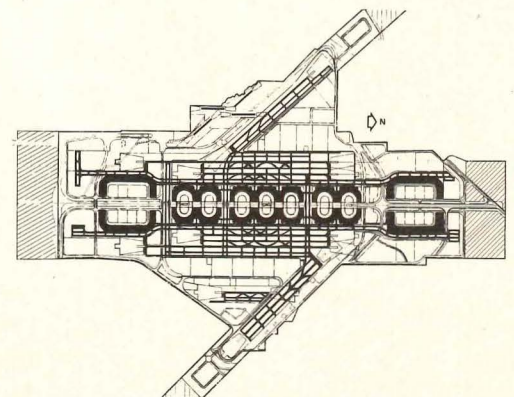
Gyo Obata
Hellmuth, Obata & Kassabaum
St. Louis

Certain statements included in the text of the article "Dallas/Fort Worth Revised" which appeared as part of Building Types Study 413, Airports, in the August issue are not factually precise. These inaccuracies were further compounded by the somewhat antique renderings of the airport project accompanying the article. Specifically, the Dallas/Fort Worth Regional Airport Board selected its architects, Hellmuth, Obata & Kassabaum/Brodsky, Hopf & Adler, on a joint venture participation for the terminals. It was my feeling that the article implied differently. Please note also that Tippetts-Abbett-McCarthy-Stratton are retained as engineers for the over-all airport project excepting only the terminal complex.

The renderings (below) will speak for themselves.

I am grateful for your publication's interest in the Dallas/Fort Worth Regional Airport, and similarly for the opportunity to clarify and update these data.

Thomas M. Sullivan, Executive Director
Dallas/Fort Worth Regional Airport Board
Arlington, Texas



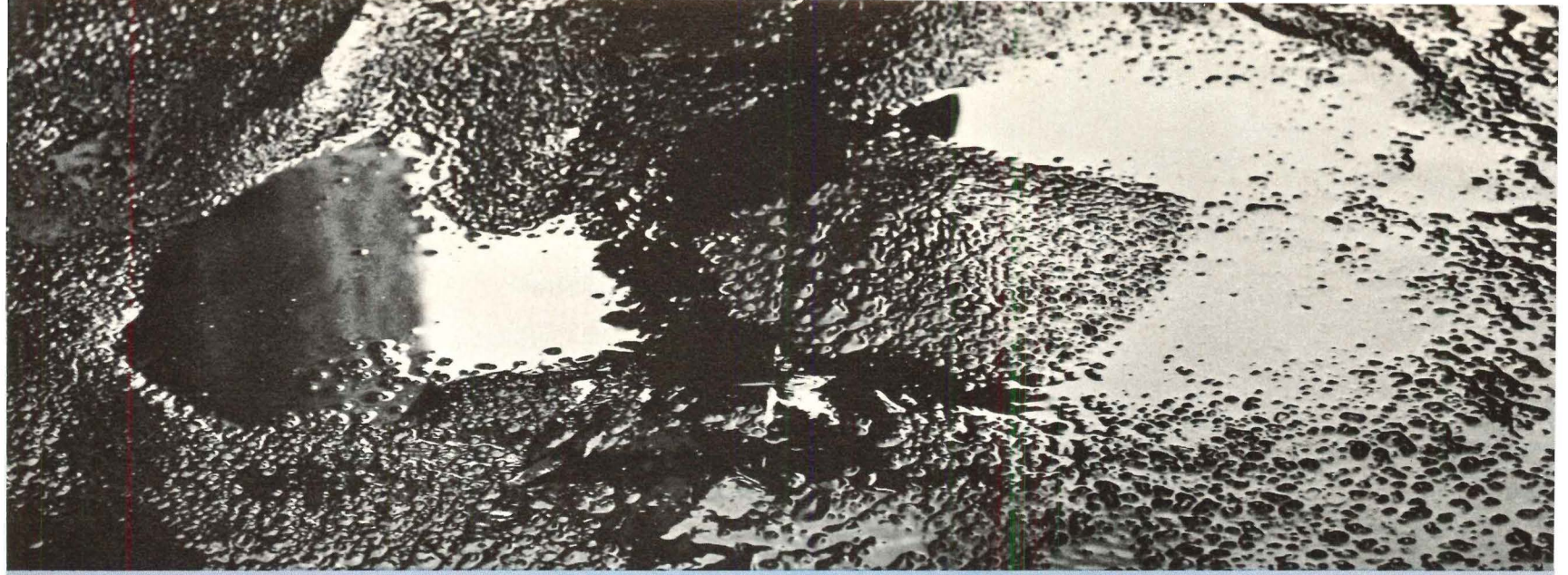
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 **SARGENT**[®]

New Haven, Connecticut • Ontario, Canada

A complete line of advanced architectural hardware, including the Sargent Maximum Security System



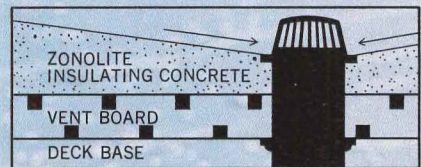
Ponding causes a whole deluge of problems. Zonolite roof deck systems turn them off.

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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.

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The Secret of the Masters

Breezing Up, Winslow Homer, National Gallery of Art, Washington, D.C., Gift of the W. L. and May T. Mellon Foundation



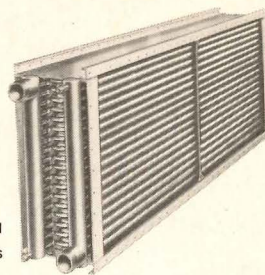
is in every can of PRATT & LAMBERT Paint



SUPERB REPRINT of this Master Painting on excellent quality paper, size 19 x 24 inches, may be had by sending \$1.00 to Department M2, Pratt & Lambert, Box 22, Buffalo, N.Y. 14240.

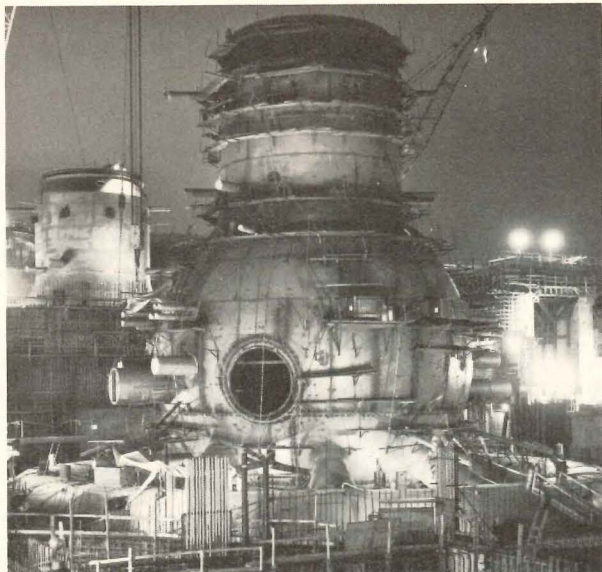
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World's Largest Nuclear Power Plant depends on Aerofin Coils for reliable operational cooling of drywell safety containment



Type C Cooling Coil

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TVA's Browns Ferry Nuclear Power Plant (Wheeler Lake, near Athens, Ala.) will have about 3¼ million KW generating capacity.

Architect-Engineer: TVA • (All on-site construction performed or supervised by TVA) except: *Primary Containment*: Pittsburgh — Des Moines Steel, Pittsburgh, Pa. — (GE Subcontractor) • *Reactor Vessel*: Babcock & Wilcox (GE Subcontractor) Mt. Vernon, Ind. • *Vessel Internals*: General Electric • *Fuel*: General Electric

TVA's first nuclear plant will generate over 40 million lbs. of steam per hour when completed. Design of the complex is a coordinated effort between TVA and General Electric with the latter responsible for the nuclear boiler and all of the power-train equipment.

Steam is generated directly in each of the three reactors. Aerofin is supplying Heat Transfer Coils for the drywell atmosphere "cooling" equipment of these reactors—and in this application "cool" means maintaining an average temperature of around 130°. Since none of the equipment within the drywell is accessible during plant operation, dependability is a prime requisite for consistent performance.

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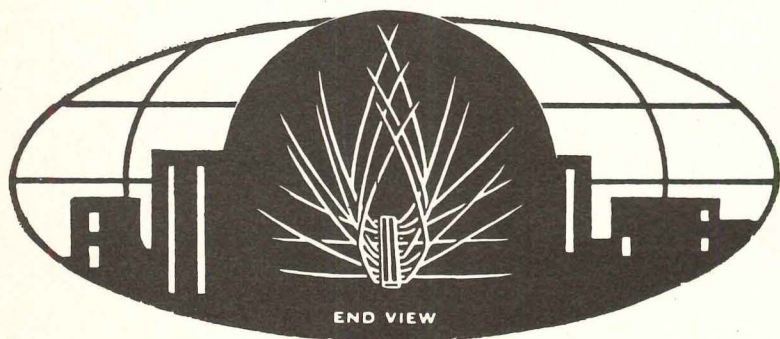
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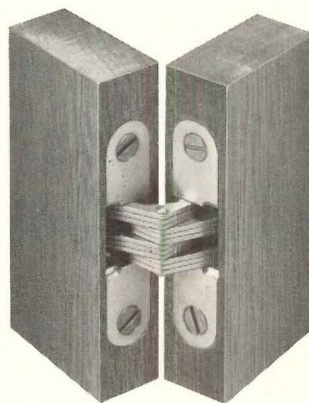
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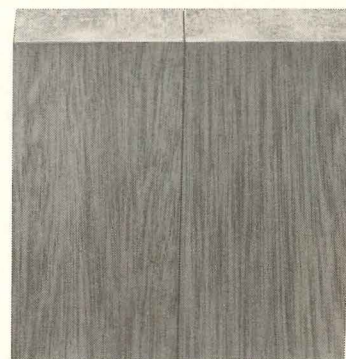
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The Soss Invisibles—for a custom look for any room! These amazing hinges hide when closed, eliminating unsightly gaps, hinges, and door jambs. They're the perfect hidden touch for doors, doorwalls, storage cabinets, built-in bars, stereos, and TV's. Specify the Soss Invisibles wherever looks matter. See listing in Sweet's or write for catalog: Soss Manufacturing Co., Division of SOS Consolidated, Inc., P.O. Box 8200, Detroit, Mich. 48213.



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Put a Bally Prefab Walk-In Cooler/Freezer in the kitchen. It's the way to more profit in Country Club feeding with beef and beer at the 19th hole . . . steak and salad for banquet crowds . . . chateaubriand and champagne for candlelight couples. Count on 'round the clock refrigerated storage in temperatures from 35° cooling to minus 40° freezing. Write for free 32-page booklet and sample of urethane wall.

**There's an
evolution in the
kitchen**



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BALLY PREFAB PANELS . . . FIRST TO PASS UNDERWRITERS' LABORATORIES (UL) FIRE TEST!

"The Inflation Fighter"

Shows you how you can control rising construction costs and operating expenses. This file doesn't cost you a thing. It can save you plenty. Just send the coupon.

The Code Book

... details permissive clauses of building codes, how they allow greater design flexibility, how construction dollars stretch further.

The High Cost of Burning

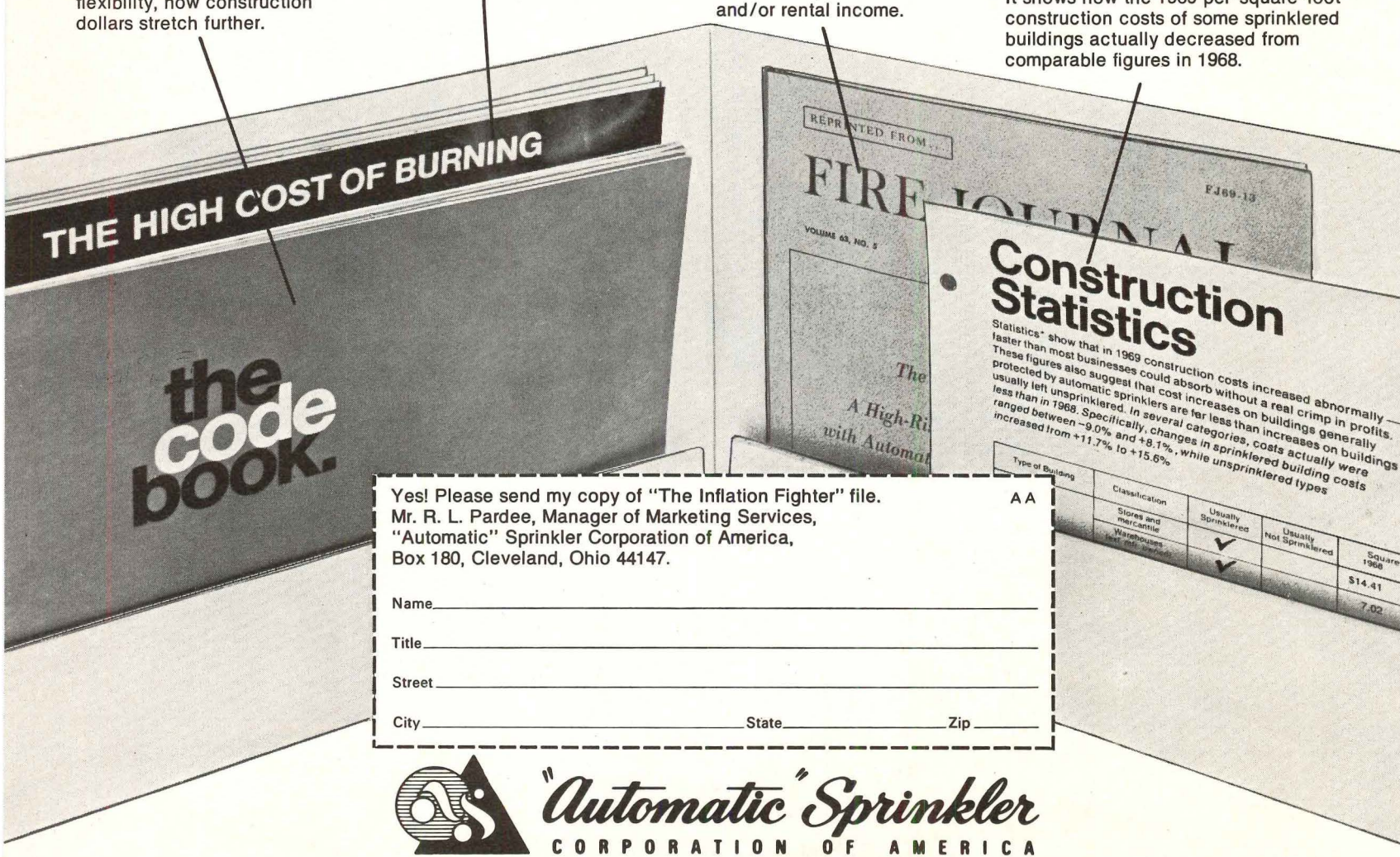
... the facts and figures about fire protection. It discusses how much "Automatic" Sprinkler protection can save you, and how fast it pays for itself in various types of buildings.

More usable space

... a reprint of a feature article in *Fire Journal*. Written by an architect, it's an eye-opening case history showing how automatic sprinklers provide additional space and/or rental income.

Construction Statistics

... an informative cost study of major non-residential building categories; sprinklered and unsprinklered. It shows how the 1969 per-square-foot construction costs of some sprinklered buildings actually decreased from comparable figures in 1968.



Yes! Please send my copy of "The Inflation Fighter" file. AA
 Mr. R. L. Pardee, Manager of Marketing Services,
 "Automatic" Sprinkler Corporation of America,
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 City _____ State _____ Zip _____

Construction Statistics

Statistics* show that in 1969 construction costs increased abnormally — faster than most businesses could absorb without a real crimp in profits. These figures also suggest that cost increases on buildings generally protected by automatic sprinklers are far less than increases on buildings usually left unsprinklered. In several categories, costs actually were less than in 1968. Specifically, changes in sprinklered building costs ranged between -9.0% and +8.1%, while unsprinklered building costs increased from +11.7% to +15.6%.

Type of Building	Classification	Usually Sprinklered	Usually Not Sprinklered	Square Feet
Stores and mercantile		✓		\$14.41
Warehouses		✓		7.02

 **"Automatic" Sprinkler**
 CORPORATION OF AMERICA
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COLORED PRECASTS

A choice of many— all with MEDUSA WHITE

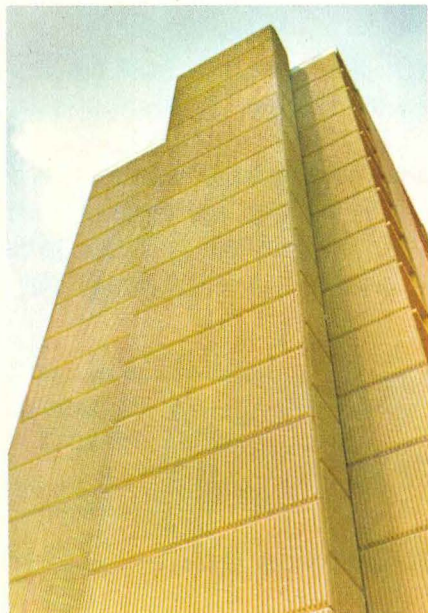
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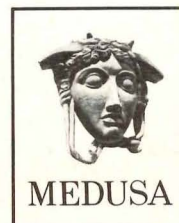
Write for new White Cement brochure,
Medusa Portland Cement Co., P.O. Box 5668,
Cleveland, Ohio 44101.



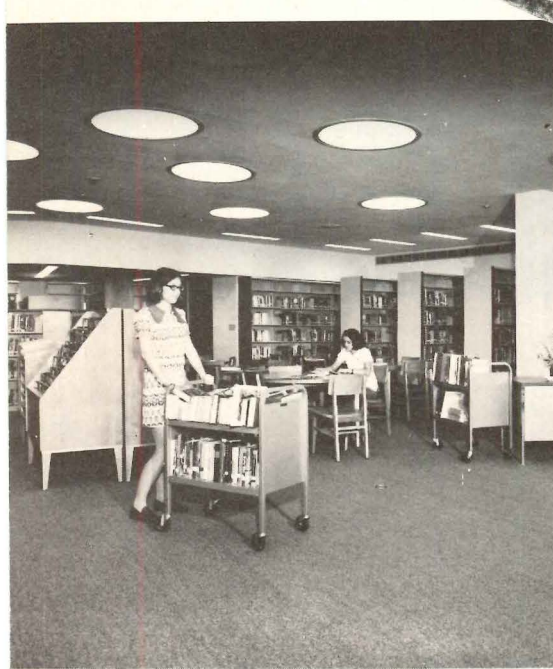
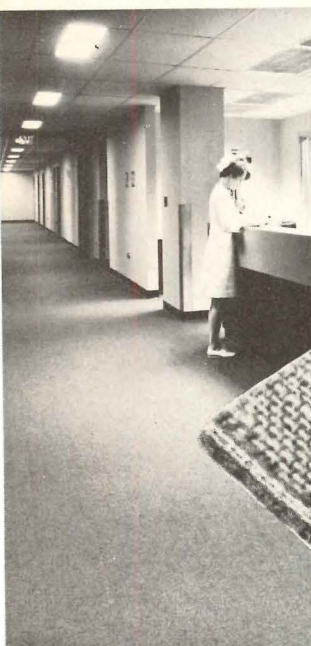
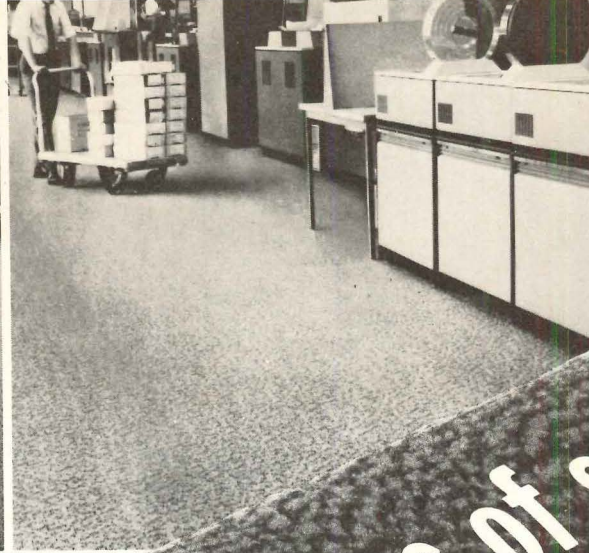
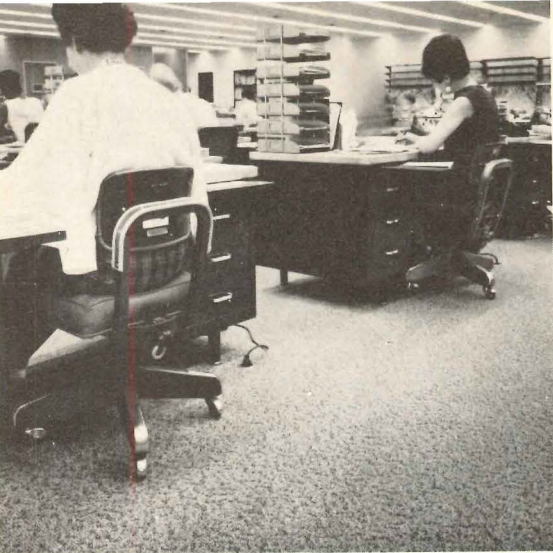
■ **CLEVELAND STATE UNIVERSITY** (Library and Faculty Tower)
Cleveland, Ohio. *Architect:* Outcalt Guenther Partners, Cleveland.
General Contractors: (Joint Venture) Blount Brothers Construction Co., of Birmingham; William Passalacqua, Builders, of Cleveland.
Precast Producer: Marietta Concrete Company, Marietta, Ohio. (Precast Units of Medusa White mixed with umber pigment).

■ **MUTUAL BENEFIT LIFE INSURANCE CO.**, Philadelphia, Pa.
Architects: Nowicki and Polillo of Philadelphia. Eggers & Higgins, New York City, New York. *Engineers:* David Bloom Associates, Philadelphia. Robert Rosenwasser, New York City, New York. *General Contractor:* E. Frankel Enterprises, Philadelphia. *Precast Producer:* Formigli Corp., Philadelphia, Pa.

■ **ADDISON SQUARE**, Cleveland, Ohio (Building System).
Architect: Barbitta James & Assoc., Akron, Ohio. *Developer and Contractor:* Ohio Turnkey Co. (Joint Venture); Tom-Rob Inc., Cleveland; Dillon Co., Akron, Ohio. *Precast Producer:* Sidley Precast Inc., Thompson, Ohio. (Medusa Colored Portland Cement – buff shade).



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Millions of square feet
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by one simple idea!

Direct glue-down installation of double Jute- backed carpets

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LOWER INITIAL COST — less than identical carpet plus separate underlayment, or foam or rubber backed carpet with equal pile specifications.

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EASY WHEEL AND CASTER MOBILITY — with standard contract pile construction, no mushiness to bog down carts, mobile equipment, secretarial chairs.

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Write for Architectural
Guide Specification
Prepared by
William E. Lunt, Jr., C. S. I.

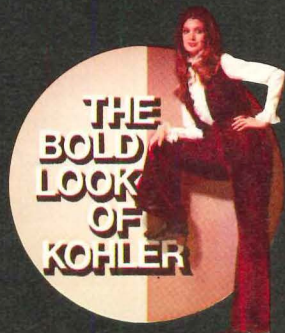
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America's newest toilet.



It's called the Rochelle—and, of course, it's made by Kohler. It's designed for today's bath and powder rooms. The Rochelle is a one-piece toilet with a low silhouette—only 19 $\frac{3}{4}$ " from the floor to the top of the tank. It has an elongated bowl and offers quiet flushing. Furnished with $\frac{1}{2}$ -inch supply fitting.

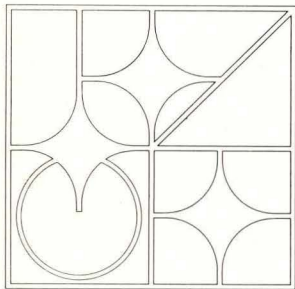


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Two awards are offered in each of the categories listed below—one for the best design in steel, with emphasis on aesthetic appearance, the other for the best engineering use of steel.

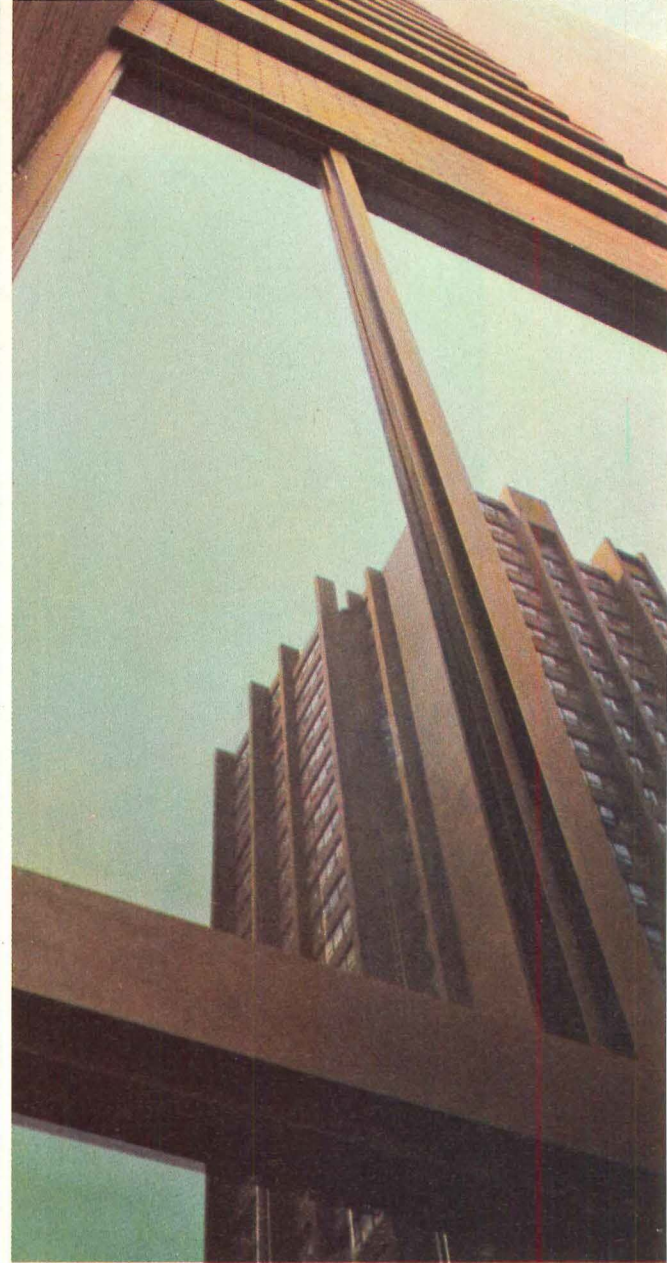
The categories are:
Appliances, housewares and household equipment
Agricultural equipment

Business equipment
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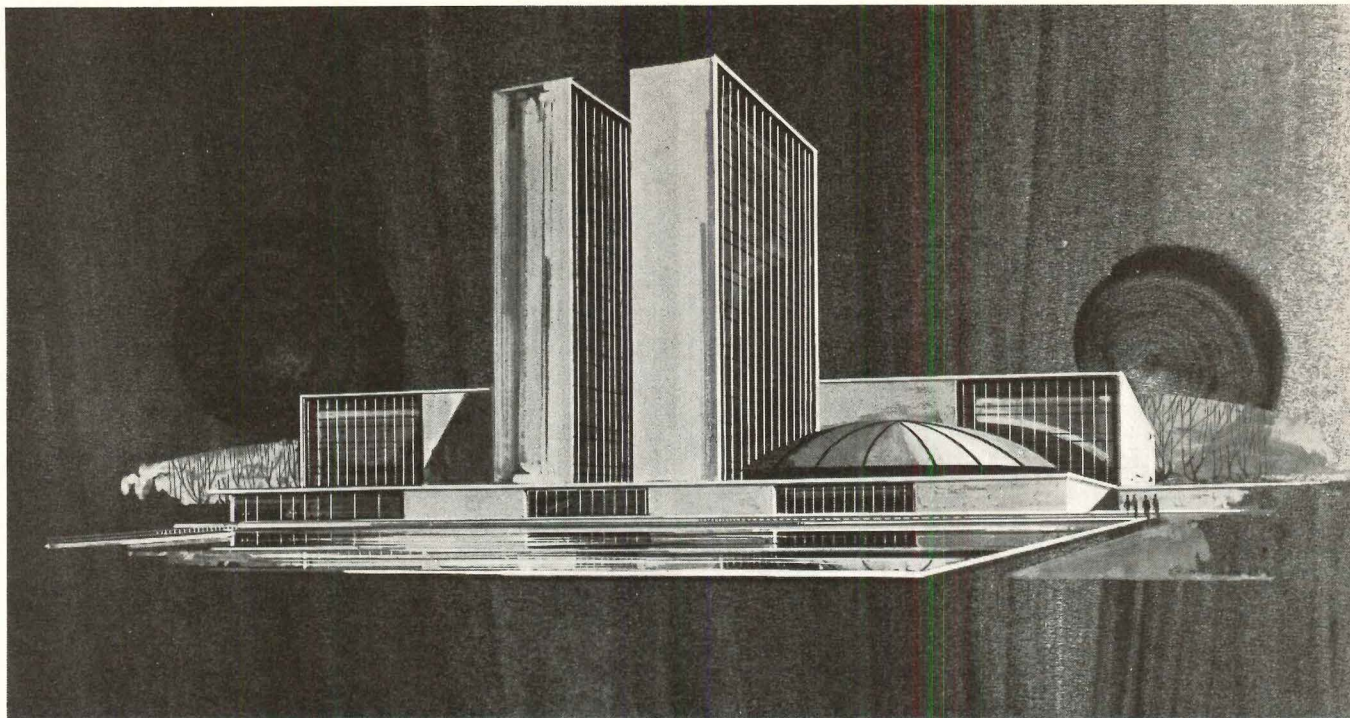
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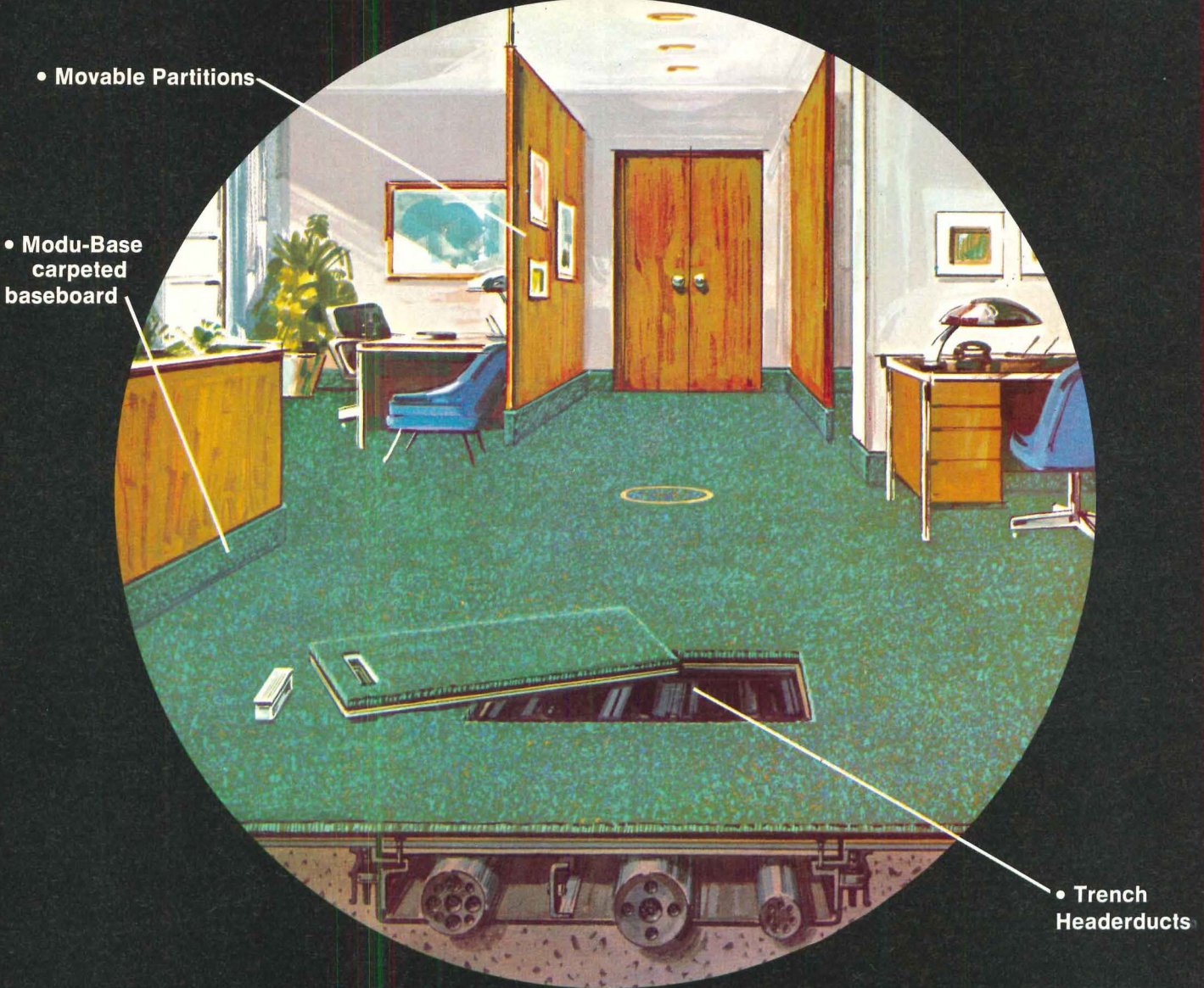


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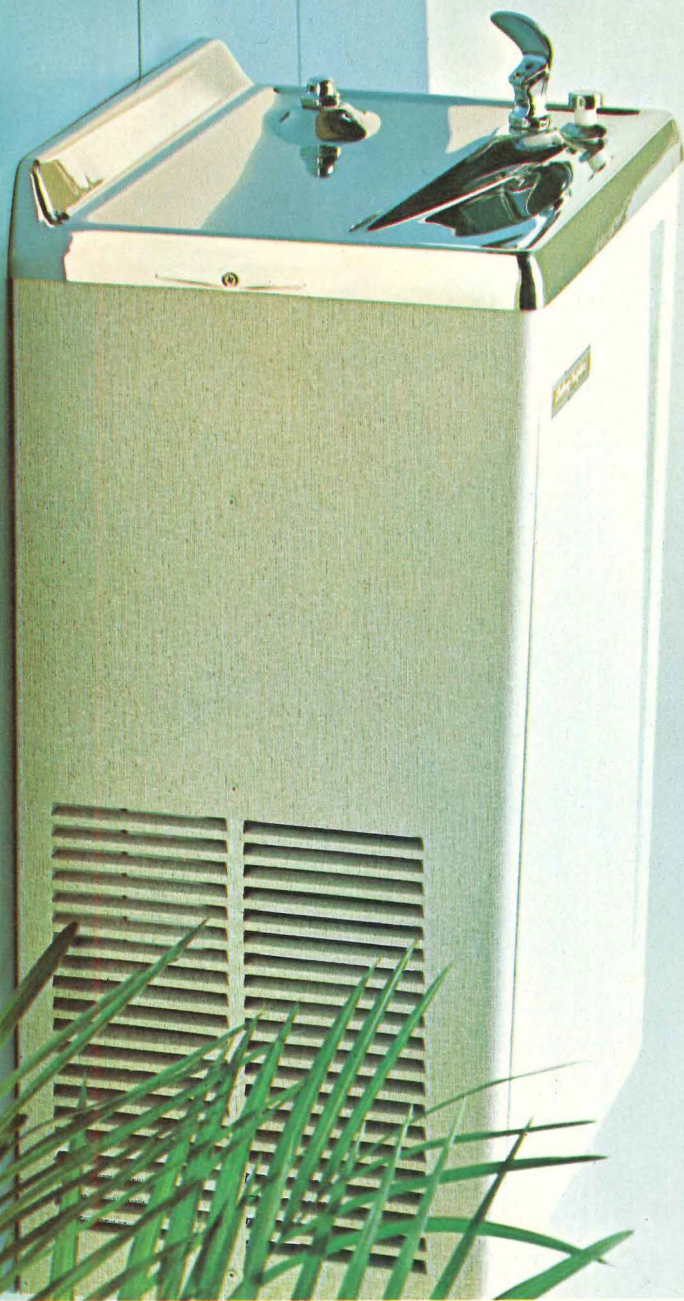
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LETTERS

continued from page 62

May I express my admiration for your excellent August issue, particularly the coverage of my New York apartment.

However, there is an error which is somewhat embarrassing for me. I am not chief designer of Kahn and Jacobs. Mr. Julian Von der Lancken is Director of Design for Kahn and Jacobs.

*Der Scutt
Kahn and Jacobs, Architects
New York City*

Kudos

Congratulations on your coverage of the Boston Convention—accurate and constructively to the point. I particularly appreciate your coverage of the Task Force on Professional Responsibility to Society.

*George T. Rockrise, F.A.I.A.
Vice President
The American Institute of Architects
San Francisco*

A note of thanks for your splendid piece on the Knights of Columbus [RECORD, August, pages 109-116]. We liked your cool, factual, non-histrionic approach.

*Kevin Roche
Hamden, Connecticut*

OFFICE NEWS

Charles W. Moore Associates, formerly MLTW/Moore Turnbull, recently announced the opening of their new offices at Essex, Connecticut.

Neuhaus & Taylor, Architects and Planning Consultants of Houston, Dallas and New York, have announced the appointment of **Jack M. Rains, A.I.A.** as managing partner; **Henry C. Hwang, R. P. Sweeney, Jr., A.I.A.** and **Paul M. Terrill, A.I.A.** as associate partners; and **Elmo M. Valdes, A.I.A.** as an associate.

Pfisterer, Tor and Associates, Consulting Engineers, New York and New Haven, Connecticut, have recently named **Walter D. Shapiro, P.E.** as partner and **William S. Kaminski, P.E.** as senior associate.

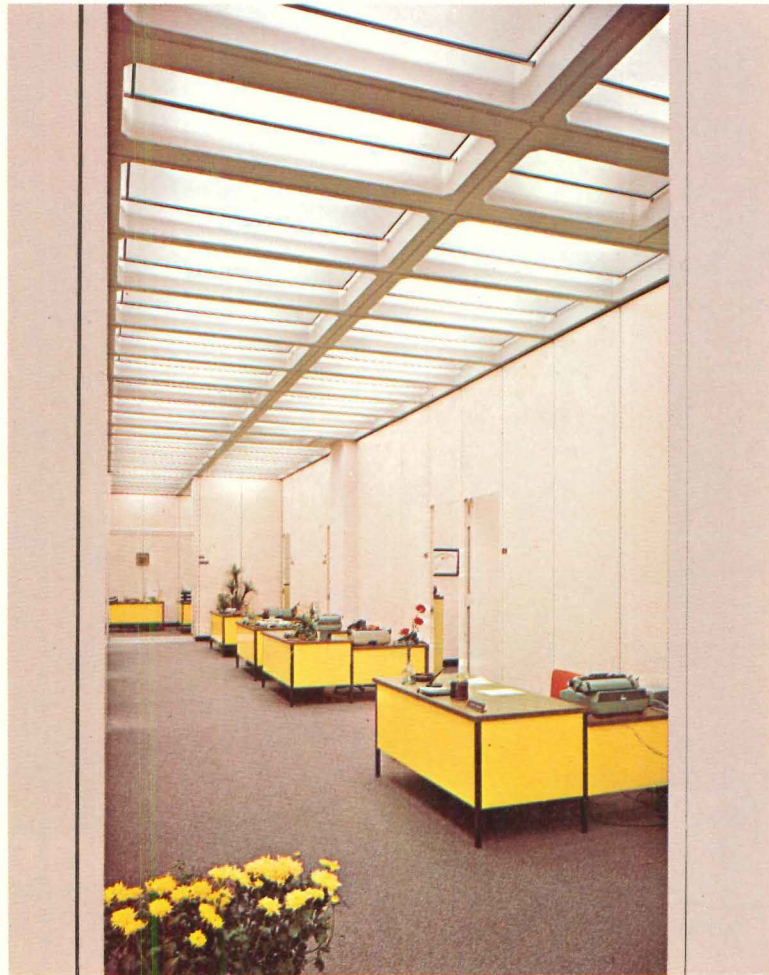
Frank R. Slezak, F.A.I.A. has joined **Kivett and Myers, Architects and Planners**, as director of the firm's new Kansas office located at 7600 State Line, Prairie Village, Kansas.

Doris B. Nathan and **Diane Serber** have become associates in the New York City firm of **Richard G. Stein and Associates, Architects.**

Lev Zetlin Associates, Inc., Consulting Engineers, announces its move to new offices at 95 Madison Avenue, New York.

Constantine Zissimopoulos, A.I.A. has announced the opening of his new office for the practice of architecture at Suite 206/11 South LaGrange Road, LaGrange, Ill.

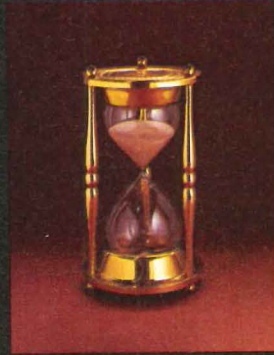
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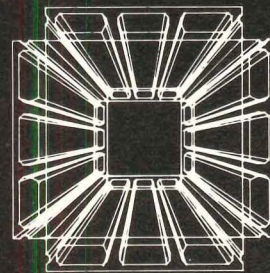
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Architectural economics: the concept of total cost

By Richard D. Steyert, Architectural Economic Consultant

The architect today works in a world where some clients demand the utmost quality at lowest cost while others are willing to cut all possible quality corners to get maximum return on investment. Economic pressures endlessly constrain the design process, so that the highest quality design within those constraints demands that the architect be as conversant with the skills of what might be called "architectural economics" as he is with the fundamentals of design. He must be able to deal intelligently with return on investment in order to protect his clients' interests and his own professional role.

The economic success of a project is generally determined in the first few weeks of preliminary design. After that, conceptual changes increase cost by causing delay.

It is not always realized that about 90 per cent of design man-hours are spent on work that can affect cost about 7 per cent plus or minus, while about 10 per cent of design hours are spent on preliminary design decisions which can affect costs 30 per cent plus or minus. Sophisticated computer programs can be used to save pennies by reducing the number of bolts used with the structural steel, while outdated rules of thumb on building economy establish overall building form.

"Architectural Economics," as defined here, seeks to bring analytic method into the cost-critical, early-design process. One can now do a number of alternate architectural layouts for a building or development site, input these alternatives into a computer, and receive an accurate, precise analysis of comparative economic feasibility. But the architect need not always have a computer at his disposal. Even simple calculations of the kind to be described can give new dimensions to design decisions.

Above all, it should be emphasized that quantitative analysis of this character is not meant to replace intuition and experience. It is meant to combine with the intuition and experience of the architect and developer and provide a proving ground for their ideas and concepts. Often analysis gives new insights which generate new springboards for design.

The developer and total cost

The developer for a project may be a speculative investor or may be a city trying to

provide low income housing. The speculator is interested in maximum return on his investment, whereas the city is interested in providing housing within well-defined cost guidelines. Both the speculator and the city are interested in all owning and operating aspects of cost, not just in construction cost.

The architect must realize that construction cost is only a part of total cost. Often, a savings in construction cost may, in fact, lead to an increase in total cost. The architect who keeps total cost in mind when making design decisions is a step ahead in satisfying his client.

Although many people are familiar with the statement that *Total Cost* is the sum of *Capital Cost* and *Future Cost*, the implications of exact definition of the components of those costs are by no means common knowledge—and they are important. The elements of capital cost are land cost, construction cost, design fees, and carrying charges. Future cost, in turn, contains operation cost, real estate taxes, and financing. These definitions are, in fact, simple enough, but a word of caution: calculating total cost is not quite as simple as it seems. We need first to develop the concept of the *Time Value of Money*.

The time value of money

The idea behind the time value of money is simply recognition of the fact that money invested earns money. If you put \$1000 into a savings bank at 5.0 per cent interest, in fourteen years you will have \$2000 in the bank. That is to say, the *Future Worth* of the *Present Amount* of \$1000 at 5.0 per cent in fourteen years is \$2000. Conversely, the *Present Worth* (sometimes called *Discounted Value*) in 1970 of a *Future Amount* of \$2000 in 1984 at 5.0 per cent is \$1000. If a housewife were offered \$1000 next week or \$1000 fourteen years from now, she wouldn't need to consult an economist to decide which to take. But if she were offered \$1000 next week or \$2000 fourteen years from now, she might not so readily realize that the two offers are equivalent.

There is nothing sacred about 5 per cent. Different investors have different interest rates for their time value of money. The housewife's expectation may be 5 per cent in a savings account. A developer may expect 10 per cent since he has many in-

vestment opportunities at this level and would refuse a project earning less.

The formulas relating present worth and future worth are easily derived and can be found in texts on investment practice. Time value of money tables have been formed from these formulas. An excerpt from such a table is shown here.

No. of Years	T.V.M. at 5.0%	
	Present Worth of Future Amount	Future Worth of Present Amnt
5	0.7835	1.276
10	0.6139	1.629
15	0.4810	2.079
20	0.3769	2.653
25	0.2953	3.386
30	0.2313	4.322

No. of Years	T.V.M. at 10.0%	
	Present Worth of Future Amount	Future Worth of Present Amnt
5	0.6209	1.611
10	0.3855	2.594
15	0.2394	4.177
20	0.1486	6.727
25	0.0923	10.835
30	0.0573	17.449

Note: More complete tables can be found in texts on investment practice such as *Engineering Economy*, by E. Paul De Garmo

Let us now consider a simple architectural problem involving the time value of money. An architect wishes to choose between a roofing product costing \$6000 with no maintenance and one of lower quality costing \$5000 with an expected \$1000 maintenance charge after ten years and another \$1000 after twenty years. The salesman for the higher quality product points out his costs only \$6000, versus a total cost of \$7000 for his competitor's product. But, he is wrong. He has not considered the time value of money. You can't add oranges and apples and you can't add present amounts and future amounts. The future amounts must first be converted to their present worth before the addition can be performed. Assume the work is being done for a developer whose time value of money is 10 per cent. Then, using the time value of money table, the present worth of the first \$1000 payment after ten years is $\$1000 \times 0.3855 = \385.50 . The present worth of the

second payment after twenty years is $\$1000 \times 0.1486 = \148.60 . Then the total cost at present worth of the salesman's roofing is $\$6000$, versus a total cost at present worth of his competitor's product of $\$5000 + \$385.50 + \$148.60 = \5534.10 . The architect will save his client $\$465.90$ by choosing the competitor's product.

The logic behind the above calculation is that if the developer were to invest $\$534.10$ at 10 per cent interest, he could withdraw $\$1000$ after ten years and $\$1000$ more after twenty years to pay for the maintenance. In actual fact, the investor will be unable to find a bank which will pay 10 per cent on his investment, but he will be able to earn 10 per cent in his own business.

Calculation of total cost

These principles of the time value of money make possible the calculation of total cost. With these T.V.M. formulas, we can transpose future costs to present worth of future costs. Then, both future costs and capital costs will be at present worth. As such, they can be added to obtain total cost. We are now in a position to quantitatively understand the cost implications of design decisions considering both capital and future costs.

In the bar graphs shown here are indicated costs for a typical twenty-story, one-hundred-sixty-unit Manhattan luxury apartment. The first bar shows where the construction cost dollar goes. The second gets these costs into better perspective by considering construction cost as a part of capital cost. In the third bar, the present worth of future cost has been added to capital cost to obtain total cost. The first bar presents the view of the contractor, but the third bar is the view of the client and of architectural economics. It should be the view of the architect.

A simple set of graphs of this form

keeps cost in proper perspective. Changes in design which involve increased cost don't look quite so big when viewed as a part of total cost rather than as a part of construction cost. A 10 per cent increase in structural cost sounds like a large increment to an owner. But structural costs are only 31.8 per cent of construction cost, (see graph), so this represents a $10 \times .318 = 3.18$ per cent increase in construction cost. And, structural costs are only 11.6 per cent of total cost, so that this is a $10 \times .116 = 1.16$ per cent increase in total cost. This increase in cost is more palatable when put in proper perspective. Whether or not the increase is justifiable is another question. The increase may be a small price to pay if the quality can generate higher rent.

Relating total cost to rent

Proper perspective of total cost can also indicate quantitatively the effect of changes in construction cost on rent. If an architect considers a design change which increases structural costs 10 per cent, he knows this will increase construction cost 3.18 per cent and total cost 1.16 per cent. But how much must rent be raised to cover the increased structural costs so that the owner maintains the same per cent return on his investment? Might in fact the improved design quality lead to a sufficient increase in rent to lead to increased profit?

It can be demonstrated mathematically that a 1.0 per cent increase in total cost will necessitate a 1.0 per cent increase in rent if the builder is to maintain the same per cent return on his investment. Hence, a 10 per cent increase in structural cost results in a 1.16 per cent increase in total cost and thus necessitates a 1.16 per cent increase in rent. The impact of changes in construction cost on rent now becomes elementary. The same method applies to office buildings, hotels, or low income housing.

We have seen that the way to obtain the increment in rent due to a 10 per cent increase in structural cost is to take 10 per cent of the figure attributed to structural cost in the total cost bar graph. An increase in land cost or operating cost would be treated analogously. Thus, the figure in the total cost bar graph represents a *Rent Amplification Factor* which, when multiplied times an increase in cost for the corresponding cost element gives the required percentage increase in rent.

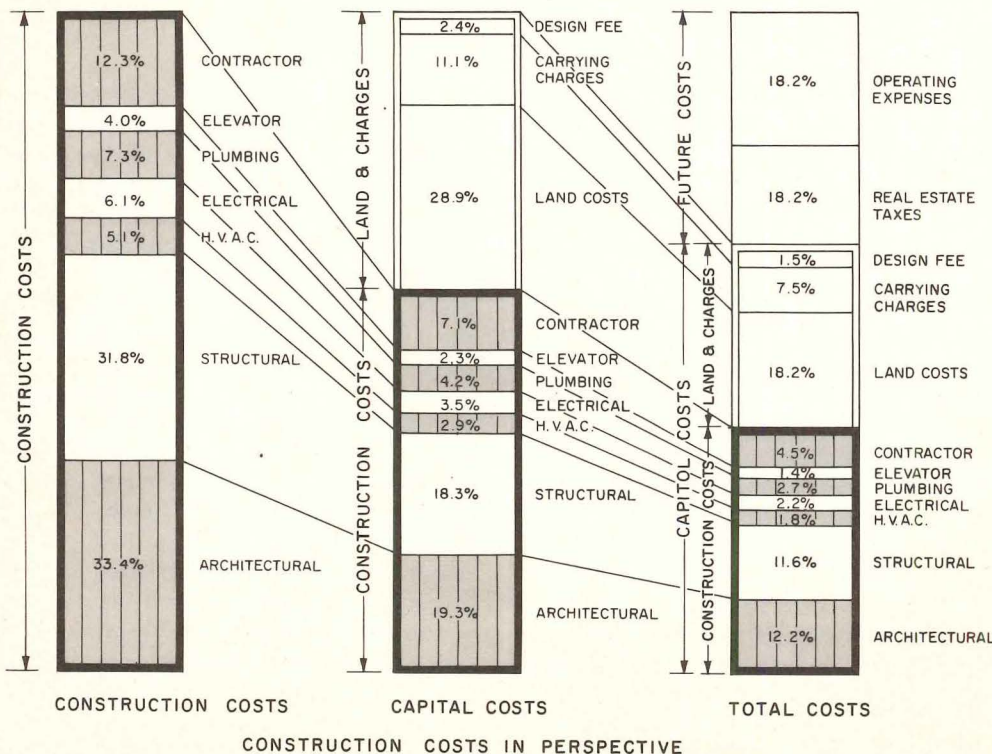
For example, consider the total cost of a high quality exterior wall with improved thermal insulation relative to a lower quality product. With the higher quality wall there is a 5 per cent drop in H.V.A.C. cost, a 4 per cent drop in building operating cost, and a 5 per cent increase in architectural construction cost. Then the effect on rent is as follows:

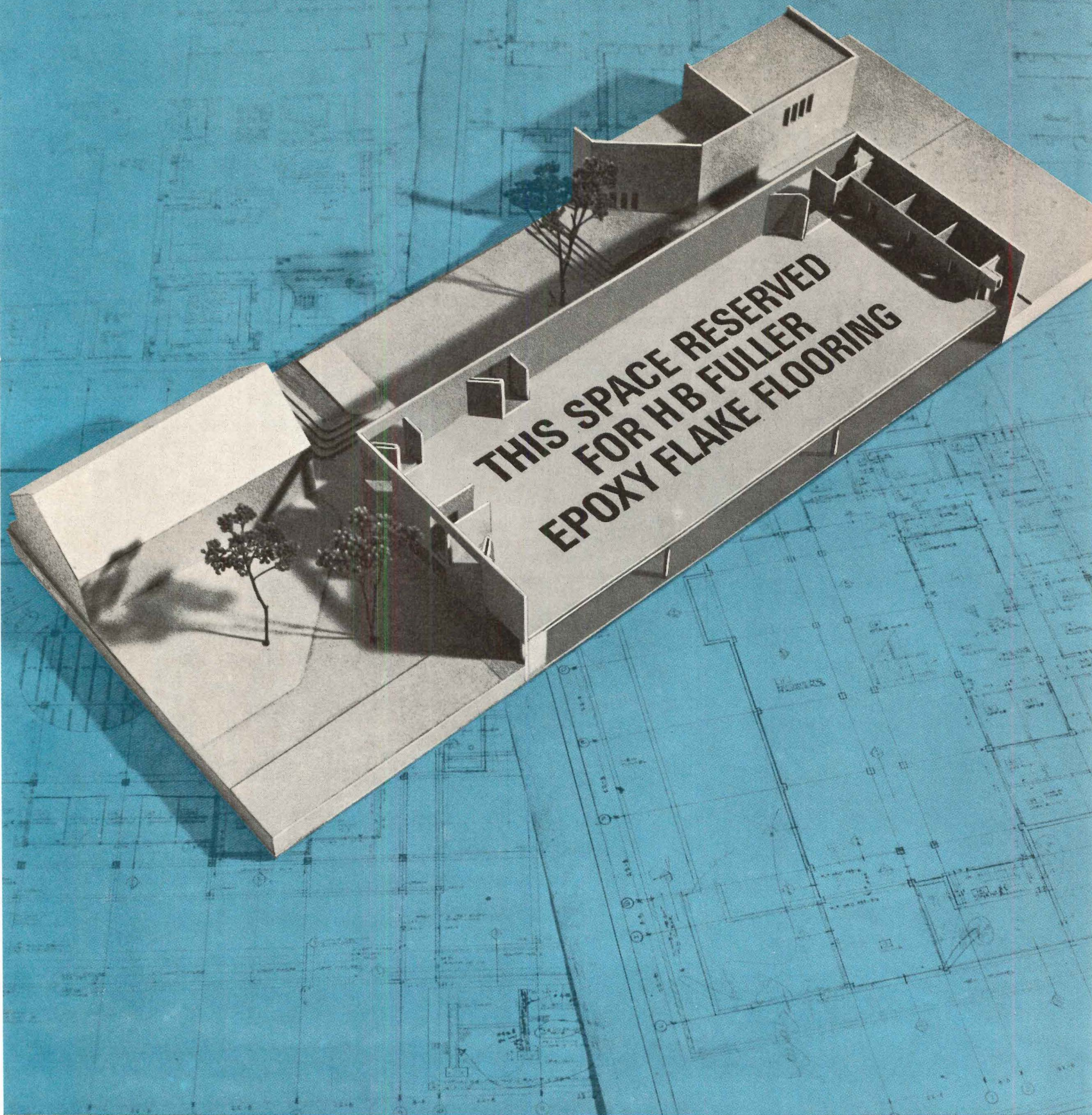
Cost Element	% Change in Element	R.A.F.	% Change in Rent
H.V.A.C.	-.05	$\times 1.8\%$	$= -.09\%$
Operating Cost	-.04	$\times 18.2\%$	$= -.73\%$
Architectural	+.05	$\times 12.2\%$	$= +.61\%$
Total Change in Rent			$-.21\%$

Consider our twenty-story, 160-unit luxury apartment building. The architect has worked out a floor layout with 140 bathrooms back-to-back on 70 stacks and 20 baths on single stacks. He knows the single stacks are more expensive, but they just couldn't be avoided. In fact, forty additional apartment units would have a much more satisfactory layout if the architect didn't feel constrained by the maxim that wet walls should be back-to-back. Everyone, including the owner, knows singly-loaded stacks are more expensive, and this is enough to discourage a design change.

Baths on singly-loaded stacks cost $\$325$ more per apartment unit than those on double stacks. The total cost of the building is $\$55$ per square foot, and the average unit is 1100 square feet. Thus, the total cost per average unit is $1100 \times \$55 = \$60,500$. If we convert forty additional units to singly-loaded stacks, we increase the total cost of those units by $\$325/\$60,500 = 0.54$ per cent. We know that rent increases the same per cent as total cost if the owner is to maintain the same per cent return on his investment, so there must be a rent increase of 0.54 per cent. If rent is $\$450/\text{unit}/\text{month}$, rent increases $\$450 \times .0054 = \$2.42/\text{unit}/\text{month}$ on the forty units converted to single stacks. Clearly a significantly improved floor plan can attract more than a $\$2.42/\text{unit}/\text{month}$ increase in rent.

This example demonstrates the difference between the qualitative and quantitative approaches. We knew from the outset that construction costs would increase. But knowing the direction of change is not enough. One must know how much change. And one must know the interaction of that change in construction cost with other factors of cost. With such quantitative knowledge an intelligent decision can be made.





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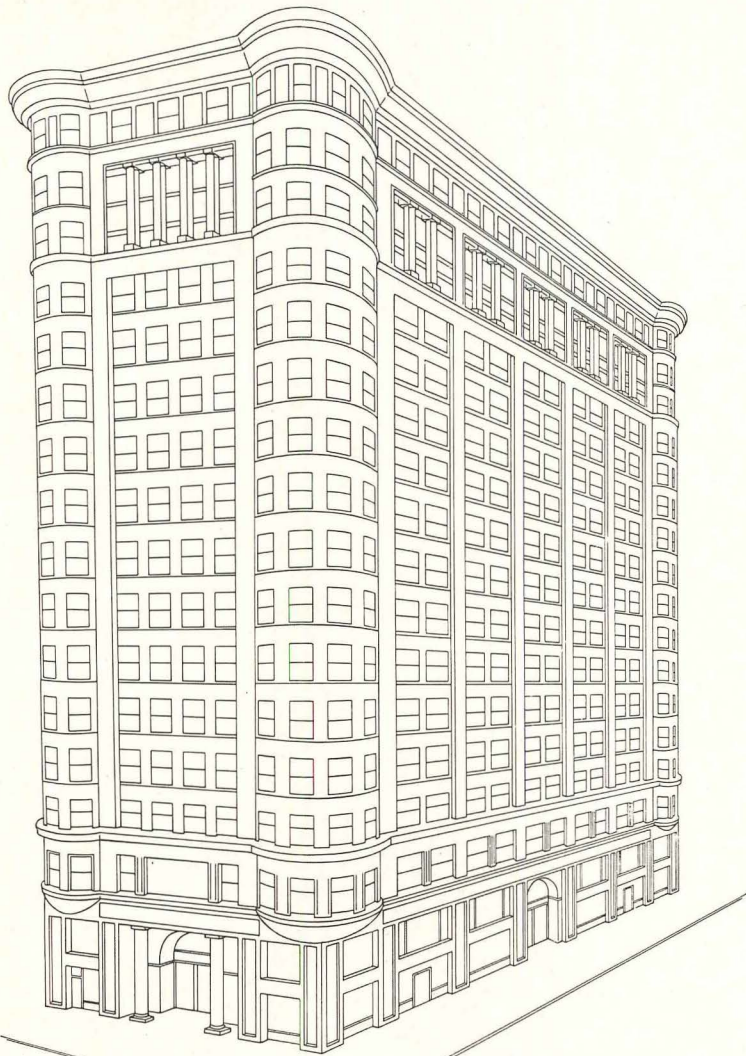
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2. Easy maintenance
3. Aesthetics
4. Price/Value

Polyester has better abrasion resistance than wool or acrylic, and it has less static than wool or nylon. It combines strength with beauty. Covers better than nylon. Has a better hand than nylon, acrylic, or polypropylene. It is non-allergenic, mildew-resistant, and mothproof. Resists fuzzing or matting. It is easy to clean. And polyester gives you more value for your dollars.

How to Choose Between Polyesters

Each fiber maker maintains standards for producing carpet polyester; each manufacturer has his own set of

standards for carpet construction. When you see the brand name "Fortrel," you can be assured that this is the polyester which has been tested by Celanese before it was released for manufacture and tested in the carpet itself.

Our testing program also includes comparative testing against other carpets of identical construction, made of other fibers.

The following evaluations, summarized from actual tests, should be of significance to contract specifiers:

Wear Life:

Test: National Bureau of Standards abrasion test.

Wool: wore through to back at 108,000 cycles.
Acrylic: showed similar wear at 128,000 cycles.

Fortrel: More than half of the pile remaining after 256,000 cycles.

Aesthetic Life:

Test: Five shampoos by commercial maintenance firm using standard rotary shampoo machines.

Wool: Showed badly distorted surface.

Acrylic: Holds up better than wool.

Fortrel: Had the least surface distortion.

Cleanability:

Test: The most common or most difficult stains encountered in restaurants, hospitals, motels and schools were applied and removed, using NIRC specified chemicals and procedure.

Fortrel proved dramatically superior to nylon (in a comparable construction and weight) both in stain removal and actual stain resistance.

Static Generation:

Test: Service test involving people in a commercial office installation. (No standardized accepted industry test has been developed.)

Nylon: Cold day complaints about static so severe, anti-stat spray had to be applied. (This finish wore off after a short period of time.)

Fortrel: No complaints about static build-up.

Cela-System

Cela-System is a service-oriented concept incorporating and coordinating all products destined for the contract field. To know more about Cela-System, contact:

Celanese Fibers Marketing Company
522 Fifth Avenue
New York, N.Y. 10036
Attn: Cela-System

 **ELA-SYSTEM**

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All-Steel[®]

NQO--the world's best panelboard-- NOW available with **Visi-Trip**[®]

Nowhere else can you get all the quality features that are standard equipment on NQO lighting panelboards.

For example, you get circuit breakers with the exclusive Visi-Trip indicator that tells you—instantly, even in dim light—which breaker has tripped (look at circuit #17 at right). You get the new Mono-flat trim with concealed hinges and trim clamps and a flush, tamper-proof lock. You get lugs approved for copper or aluminum conductors.

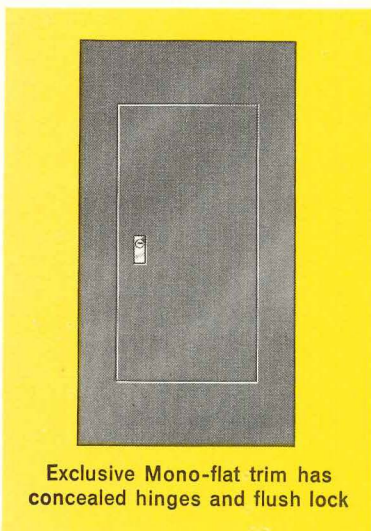
NQO panelboards accommodate 1, 2 and 3 pole QO circuit breakers. Main breakers up to 400 amperes are available. For extra safety, the panelboards carry an integrated equipment rating whereby all components are tested as a unit to verify the interrupting capacity of the complete device.

Square D has everything you need in lighting panelboards. Get complete details from your Square D distributor. Or write Square D Company, Dept. SA, Lexington, Kentucky 40505.

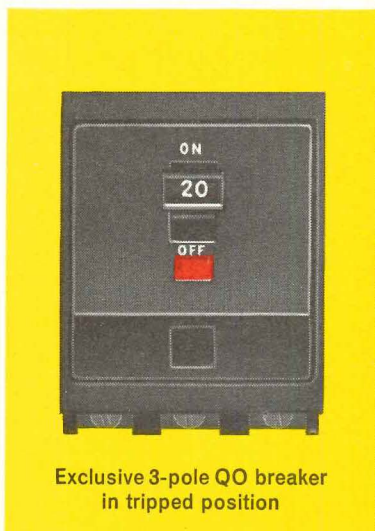


SQUARE D COMPANY

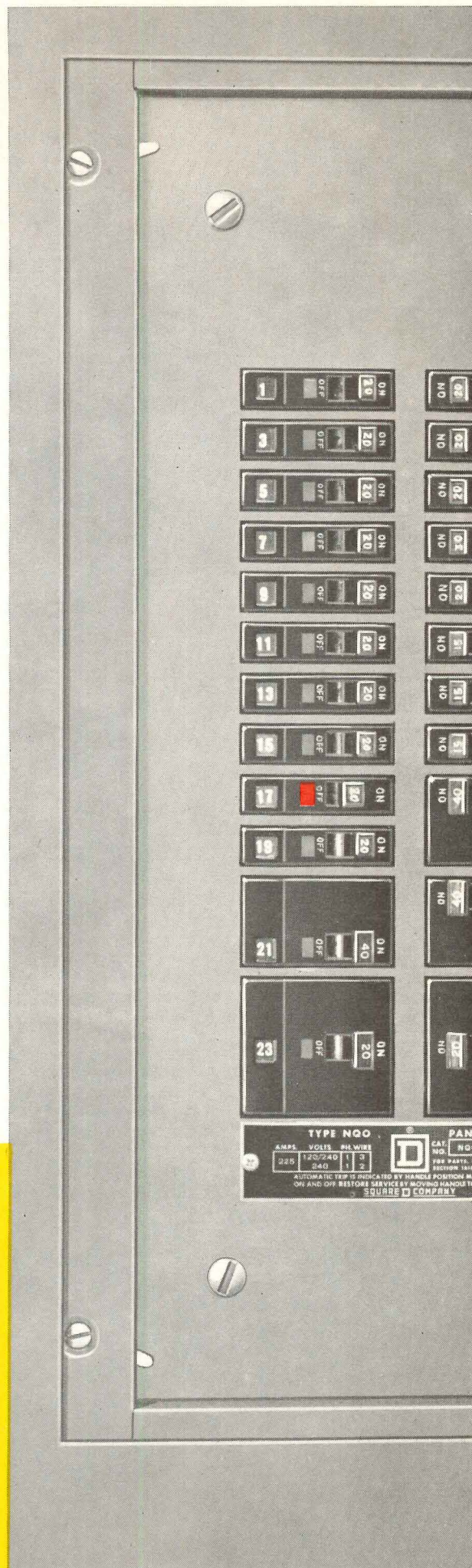
Wherever Electricity is Distributed and Controlled



Exclusive Mono-flat trim has concealed hinges and flush lock

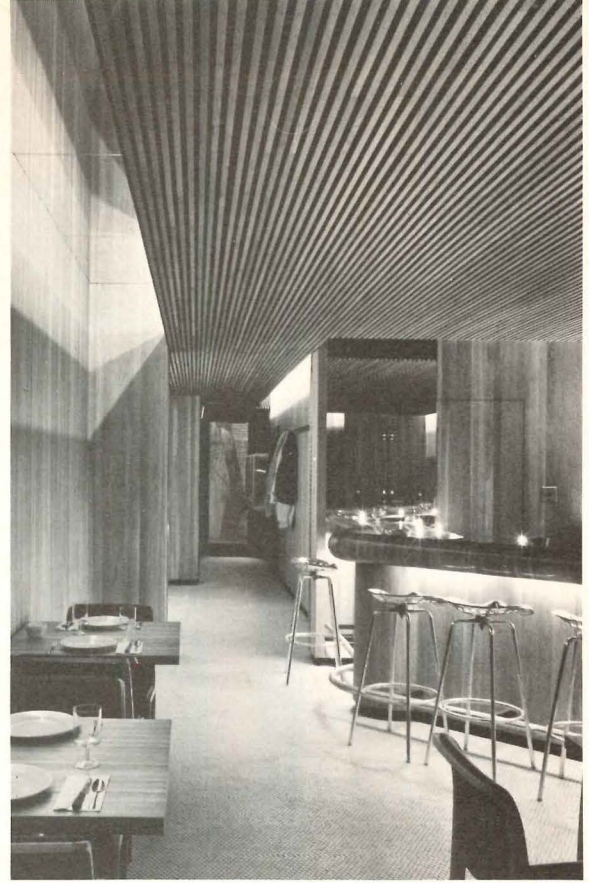


Exclusive 3-pole QO breaker in tripped position



DE 684-R

For more data, circle 60 on inquiry card



THE EDITORS OF ARCHITECTURAL RECORD
INVITE SUBMISSIONS FOR

RECORD INTERIORS

to be featured in the
January 1971 issue

... a program to recognize outstanding interiors designed by architects.

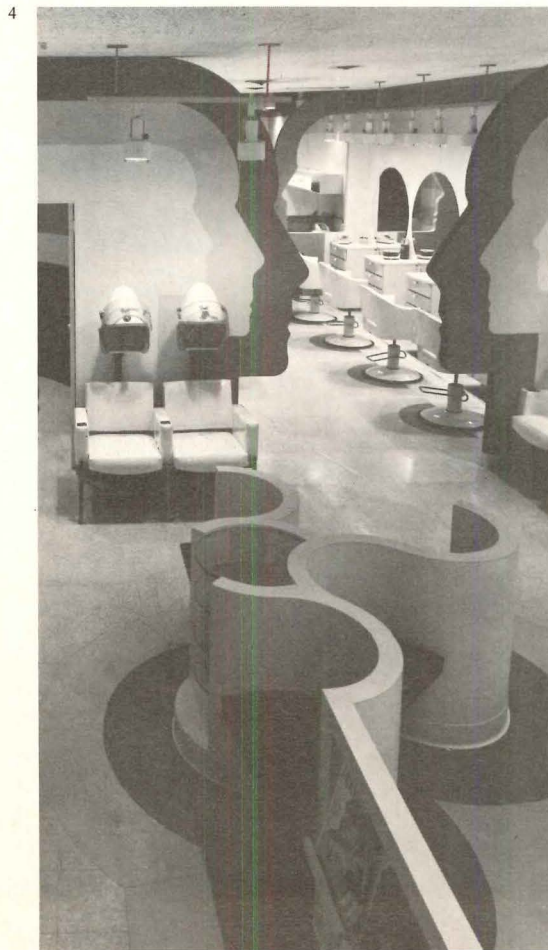
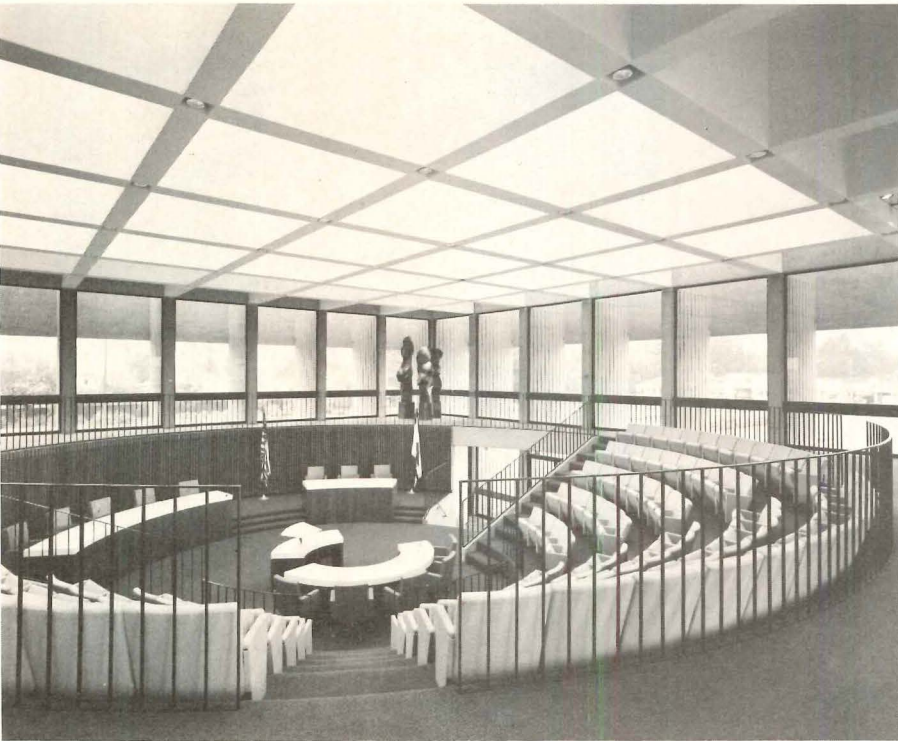
Last year, in response to the upsurge of activity and interest in design of interiors by architects, Architectural Record established a new editorial program—RECORD INTERIORS.

It is clear that the interest of the profession in interiors is growing and strengthening. And thus the interiors program—with citations to document and stimulate this significant area of expanded practice—will be repeated. Recently completed architect-designed interiors of all building types will be considered—remodelings and renovations as well as new structures—anywhere in the United States. Selections will be made by the editors on the basis of the excellence of the design solution for the particular client's individual program. Submissions from architects of new, unpublished work will be welcomed through November 1, 1970. No formal presentations are required, though material submitted should include plan, photographs or snapshots, and brief description and program.

RECORD INTERIORS OF 1971 will be published in the January 1971 issue of Architectural Record.

Write or telephone:

Herbert L. Smith, Editor in Charge
Interior Design Awards Program
Architectural Record

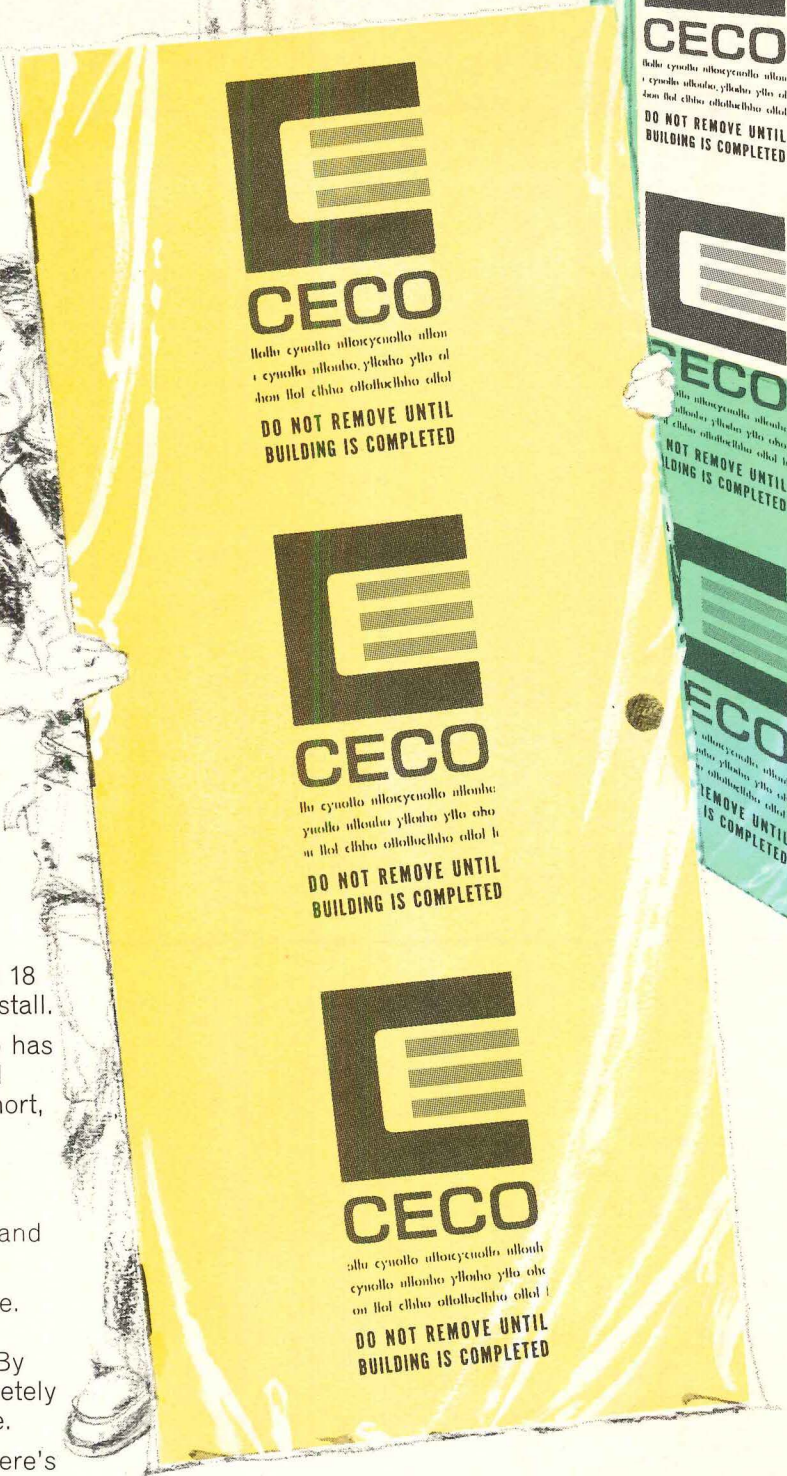


1 Congregation Beth Torah, Brooklyn, N.Y.
Architect: Richard Foster
Photographer: Norman McGrath

2 City Hall for Santa Rosa, Calif.
Architects: Jacques DeBret,
Richard Heglund
Photographer: Barbeau Engh

3 Clydes Bar, Washington, D.C.
Architect: Hugh Newell Jacobsen
Photographer: Robert C. Lautman

4 "metamorphosis", Great Neck, N.Y.
Architect: Alan Buchsbaum
Photographer: Norman McGrath



The New "Imperial"

...a truly fine steel door with rigid urethane core.

Here's a door that's exceptionally strong . . . a door that's rated heavy duty . . . a door that's available in 18 or 16 gauge steel . . . a door that's so very easy to install.

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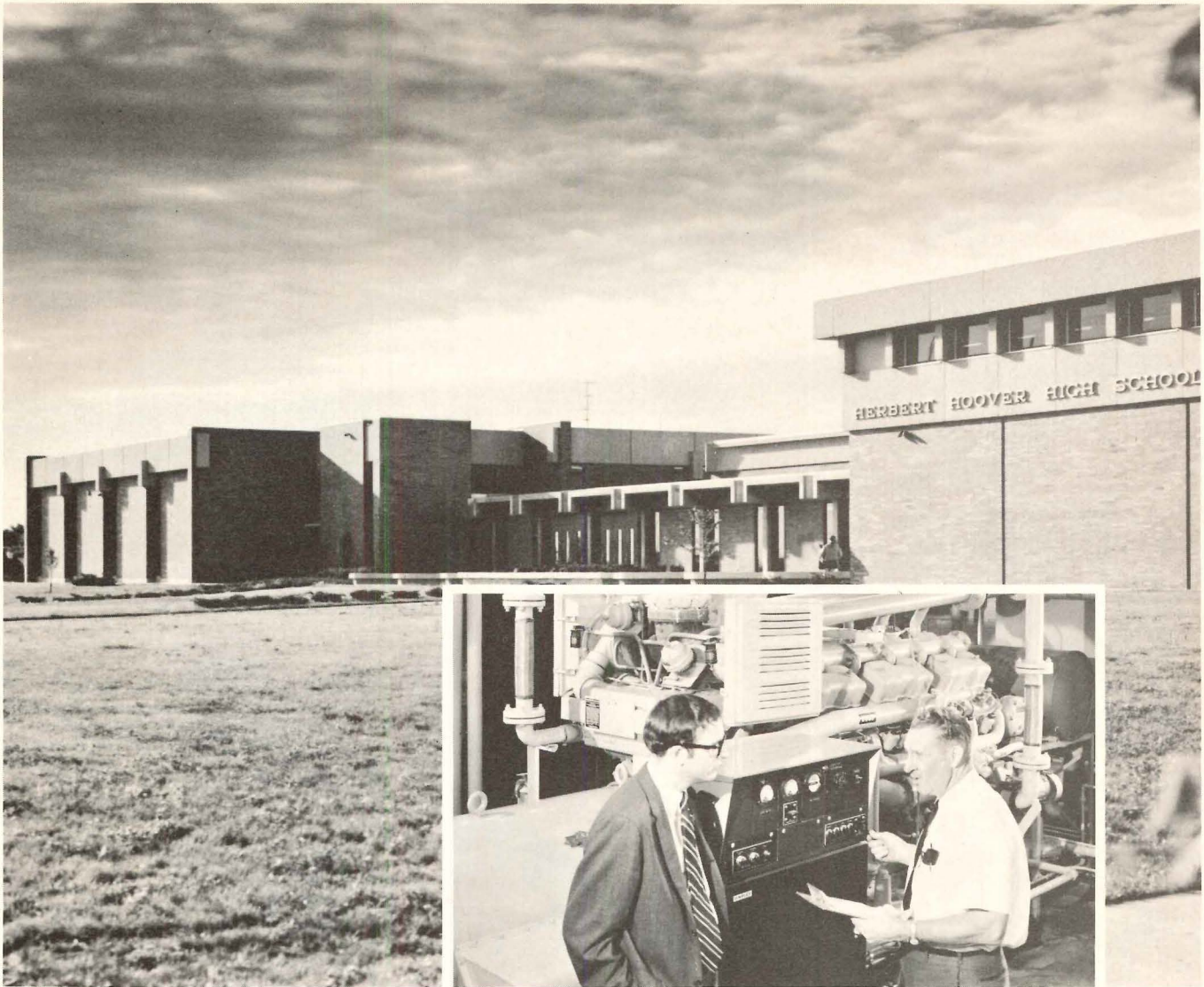
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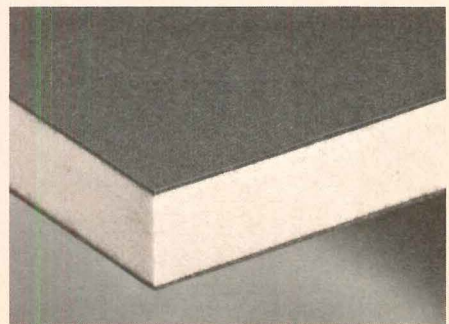
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CURRENT TRENDS IN CONSTRUCTION

James E. Carlson
 Manager of Economic Research
 McGraw-Hill Information Systems Company

Regions in perspective: Part 2, future trends

The trips that economic forecasters take out along the growth curves and trend lines of their profession can be pretty exhilarating ventures. When you get out a distance of a few years, the fabric of the roadbed—the hard facts and interrelationships of economic and demographic analysis—begins to wear thin. The further along you go, the bigger the potholes become, and the more they must be covered over with a lattice-work of hunches and guesswork. After a while, there is scarcely any roadbed at all, and forecasting becomes more an art concerned with the optimum way of filling the empty spaces.

A common pitfall in long-term forecasts is that the forecaster allows himself to become separated from the earth-time constraint, and begins to fill the voids with the potpourri of a timeless future, where everything is possible. One way to help skirt this snare is to gain a sense of perspective by looking *back* in time the same number of years you plan to look ahead, weighing the changes that have taken place.

Last month's article pointed out some of the ways in which the regional "mix" of construction activity has been affected by divergent economic and demographic patterns. Since these economic and demographic patterns shift over time, we concentrated primarily on the experience of the past five years. This month's subject is somewhat more difficult. The task will be to determine what the regional trends in construction will be like over the *next* five years. If our formula is correct, the best way of gaining a sense of perspective on 1975 is to look back on 1965, and recount the changes that have taken place.

The value of construction contracting in the nation grew by more than one-third between 1965 and 1970. This growth was augmented by strong cyclical gains—gains related to the upsurge in general economic activity during this time—in commercial and manufacturing buildings. The combined value of these two categories was up more than 50 per cent over this period. A doubling of hospital contracts, and a healthy gain in apartment building also rank with the construction highlights of the past five years.

Most of the gains in commercial and manufacturing building were concentrated in the regions where these building types typically account for a proportionally larger

market share of total building anyway; the Northeast in the case of commercial, and the Midwest in the case of manufacturing. The gains in hospitals were somewhat more evenly distributed in the sense that the regions with the strongest proportion of hospital building, the Northeast and Midwest, just maintained these proportions, without increasing their share still further at the expense of the other regions. In the case of apartments, though, a dramatic shift took place, with the Northeast yielding dominance to the South about midway through the period.

Growth in total construction during this five-year period, then, affected regional market shares in just about every conceivable way. It's not *that* these things happened, but *why* they happened that's important, though.

The boom in commercial building was primarily the result of the sharp upsurge in office construction. The value of office contracts went from 40 per cent of the commercial total in 1965 to more than 50 per cent this year. And the bulk of this office construction has been carried out in the Northeast, because that's where the prime sources of demand—the service industries, finance and insurance, and the national headquarters of large corporations—are located. Will the Northeast still be the prime region for office building in 1975? The area will need some time to digest the vast amount of office space coming on stream now, and in the immediate future, so a lean year or two may be in the offing. But, the region's long-run position as the commercial and financial center of the nation, and hence, the largest consumer of office building space, seems pretty secure.

The same cannot be said for the Midwest and manufacturing, though. The region's heavy reliance on the steel, machinery, automobile, and consumer durables industries makes its manufacturing output and its plant expansion programs extremely sensitive to cyclical swings in the national economy. The area's business cycles mirror the national pattern, but the amplitude of the swings is more pronounced. During the recent period of business expansion, then, some gains in the area's market share of manufacturing buildings were to be expected. The long-term trend is downward, however. Over the years, the region has


experienced a steady erosion in its market share of industrial building, as the manufacturing base of the country has become more diverse. Industry has been gradually moving South in search of raw materials and less expensive labor, and West in search of aero-space profits. These trends should continue through 1975.

The regional shares of hospital and health treatment building over the next five years should be little changed from the shares of the past five. The needs of each of the four regions are somewhat different—in the South and West it's primarily diagnostic and treatment centers, while in the Northeast and Midwest, it's long-term care facilities and core area general hospital facilities.

The dominant position of the Midwest and Northeast in terms of school construction should be enhanced still further by 1975. A national decline in elementary school enrollments will set in this year, and secondary school enrollments are leveling off. In response to these trends an increasing share of school construction will be oriented toward higher education than was true previously. And, the largest proportion of these institutions of higher learning are found in the Northeast and Midwest.

The next five years should see the Northeastern region regain some (but not all) of the ground lost to the South recently in the area of apartment building. Optimistically, the solutions to the critical housing problems of the Northeast's urban areas will be well into the brick and mortar stage by 1975.

As far as total building is concerned, long-term economic and demographic patterns point to the West and the South, accounting for a slightly larger market share at the expense of the Northeast and Midwest. The trend was obscured during the past five years: (1) by the exceptional growth in commercial and manufacturing building, the Northeast and Midwest's strong suits, and (2) the lackluster performance of housing, the building type the South and West stand to cash in on. The regional shifts will be more pronounced over the next five years, as housing gets a fairer shake, more moderate growth is experienced in the commercial and manufacturing categories, and the regional dispersion of manufacturing away from the Midwest continues.



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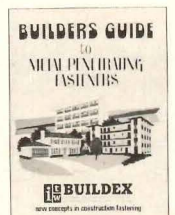
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INDEXES AND INDICATORS

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

INDEXES TO BE COMPUTER PRODUCED

Beginning in November, the cost indexes shown here will be produced by computer, and several additional indexes will be made available for each city. The basic input data will be weighted in different ways to produce a general construction index, a steel construction index, a masonry index and a frame index. The cost differential will continue to be available, thus the listed cities at right will each be represented by five indexes. The variety of construction types represented and the increased accuracy of computer-produced indexes should allow the reader an opportunity to make even better use of these indexes than was previously available. The building cost climb of the past four years shows no sign of abating, and frequent computation from these figures of the cost increase for the area in which he practices is a prudent move for every architect who wishes to remain informed about current cost conditions.

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 a second.

1941 average for each city = 100.00

OCTOBER 1970

Metropolitan area	Cost differential	Current Index		% change year ago res. & non-res.
		residential	non-res.	
U.S. Average	8.5	304.9	324.8	+ 3.68
Atlanta	7.5	384.8	408.1	+ 5.55
Baltimore	7.6	312.3	332.2	+ 1.71
Birmingham	7.2	288.5	310.2	+ 1.49
Boston	8.4	290.4	307.3	+ 3.41
Buffalo	9.2	337.1	359.0	+ 4.09
Chicago	8.8	352.3	370.6	+ 3.19
Cincinnati	9.0	320.0	340.1	+ 3.61
Cleveland	9.8	346.4	368.1	+ 1.88
Columbus, Ohio	9.0	325.9	347.1	+ 3.45
Dallas	7.7	306.1	316.1	+ 2.09
Denver	8.3	329.6	350.3	+ 2.79
Detroit	9.5	343.5	360.6	+ 1.57
Houston	8.1	298.3	317.7	+ 5.74
Indianapolis	8.8	289.7	308.6	+ 2.42
Kansas City, Mo.	8.3	291.7	308.8	+ 3.71
Los Angeles	8.3	326.6	357.3	+ 2.16
Louisville, Ky.	8.1	301.4	321.0	+ 4.29
Memphis	7.6	291.7	310.7	+ 1.66
Miami	8.6	329.2	345.5	+ 4.22
Milwaukee	9.2	360.0	383.5	+ 4.22
Minneapolis	8.9	327.9	348.5	+ 4.68
Newark	8.9	300.3	319.8	+ 4.27
New Orleans	7.9	294.7	312.2	+ 4.12
New York	10.0	336.2	361.7	+ 3.15
Philadelphia	8.6	319.7	335.7	+ 3.98
Phoenix	8.2	170.4	181.5	+ 3.89
Pittsburgh	9.1	304.2	323.3	+ 3.40
St. Louis	9.2	323.5	342.7	+ 4.74
San Antonio	8.1	125.4	133.6	+ 7.08
San Diego	8.2	124.8	133.0	+ 5.47
San Francisco	8.9	428.3	468.6	+ 4.64
Seattle	8.6	301.5	336.9	+ 3.93
Washington, D.C.	7.9	280.2	298.4	+ 4.81

Cost differentials compare current local costs, not indexes.

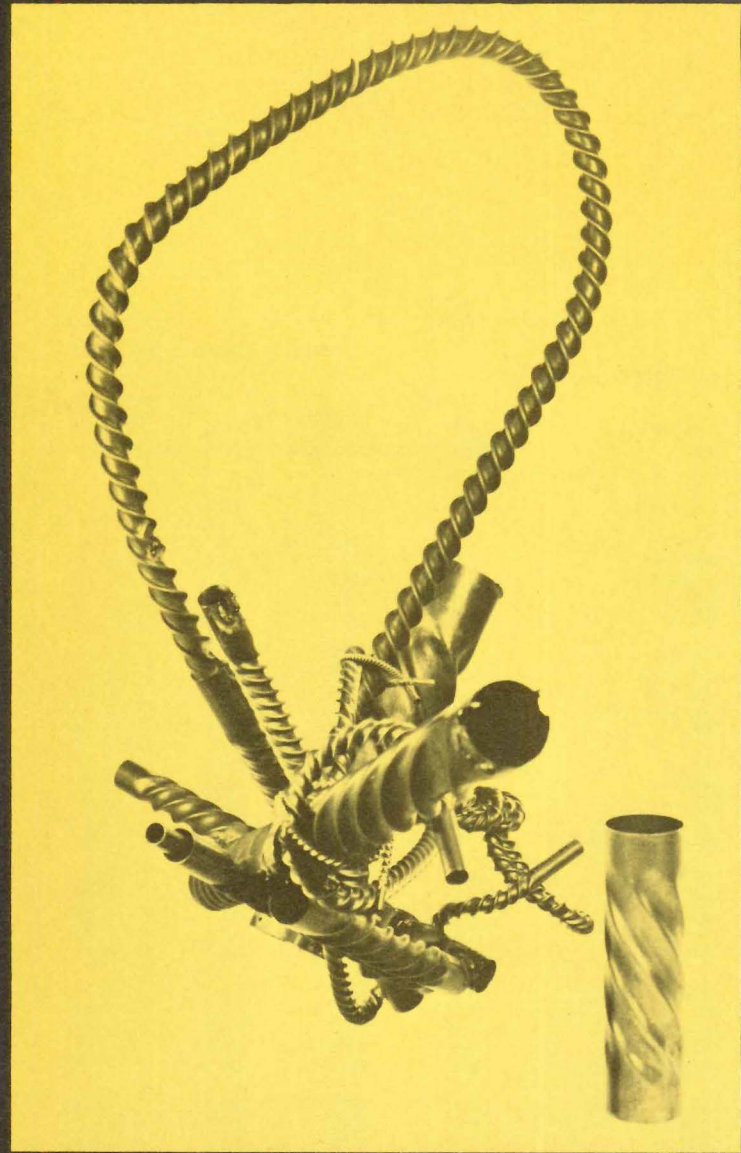
HISTORICAL BUILDING COST INDEXES—AVERAGE OF ALL BUILDING TYPES, 21 CITIES

1941 average for each city = 100.00

Metropolitan area	1962-1968							1969 (Quarterly)				1970 (Quarterly)			
	1962	1963	1964	1965	1966	1967	1968	1st	2nd	3rd	4th	1st	2nd	3rd	4th
	Atlanta	298.2	305.7	313.7	321.5	329.8	335.7	353.1	364.2	365.9	382.8	384.0	399.9	406.2	402.9
Baltimore	271.8	275.5	280.6	285.7	290.9	295.8	308.7	311.4	313.0	321.8	322.8	323.7	330.3	326.3	
Birmingham	250.0	256.3	260.9	265.6	270.7	274.7	284.3	288.4	289.9	302.4	303.4	303.5	308.6	305.9	
Boston	239.8	244.1	252.1	257.8	262.0	265.7	277.1	278.2	279.6	294.0	295.0	300.5	305.6	303.1	
Chicago	292.0	301.0	306.6	311.7	320.4	328.4	339.5	340.4	342.1	354.9	356.1	362.2	368.6	365.1	
Cincinnati	258.8	263.9	269.5	274.0	278.3	288.2	302.6	309.8	311.5	324.8	325.8	332.8	338.4	335.4	
Cleveland	268.5	275.8	283.0	292.3	300.7	303.7	331.5	334.9	336.7	357.1	358.3	359.7	366.1	362.7	
Dallas	246.9	253.0	256.4	260.8	266.9	270.4	281.7	287.2	288.7	307.6	308.6	310.4	314.4	313.0	
Denver	274.9	282.5	287.3	294.0	297.5	305.1	312.5	317.9	318.5	337.9	339.0	343.4	348.4	346.2	
Detroit	265.9	272.2	277.7	284.7	296.9	301.2	316.4	326.8	328.5	351.8	352.9	355.2	360.5	356.3	
Kansas City	240.1	247.8	250.5	256.4	261.0	264.3	278.0	281.0	282.3	294.5	295.5	301.8	306.8	304.5	
Los Angeles	276.3	282.5	288.2	297.1	302.7	310.1	320.1	323.7	325.4	343.0	344.1	346.4	355.3	349.3	
Miami	260.3	269.3	274.4	277.5	284.0	286.1	305.3	309.6	311.2	328.3	329.3	338.2	343.5	341.1	
Minneapolis	269.0	275.3	282.4	285.0	289.4	300.2	309.4	310.6	312.2	330.1	331.2	341.6	346.6	344.4	
New Orleans	245.1	248.3	249.9	256.3	259.8	267.6	274.2	285.5	287.1	296.6	297.5	305.4	310.6	307.9	
New York	276.0	282.3	289.4	297.1	304.0	313.6	321.4	324.9	326.6	343.4	344.5	351.1	360.5	353.2	
Philadelphia	265.2	271.2	275.2	280.8	286.6	293.7	301.7	304.6	306.2	320.0	321.0	328.9	337.7	331.7	
Pittsburgh	251.8	258.2	263.8	267.0	271.7	275.0	293.8	297.0	298.6	310.0	311.0	316.9	321.6	319.5	
St. Louis	255.4	263.4	272.1	280.9	288.3	293.2	304.4	306.8	308.3	323.7	324.7	335.2	340.8	338.0	
San Francisco	343.3	352.4	365.4	368.6	386.0	390.8	402.9	415.6	417.5	439.9	441.1	455.4	466.9	458.1	
Seattle	252.5	260.6	266.6	268.9	275.0	283.5	292.2	296.1	297.5	316.8	317.8	325.4	335.1	328.1	

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

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



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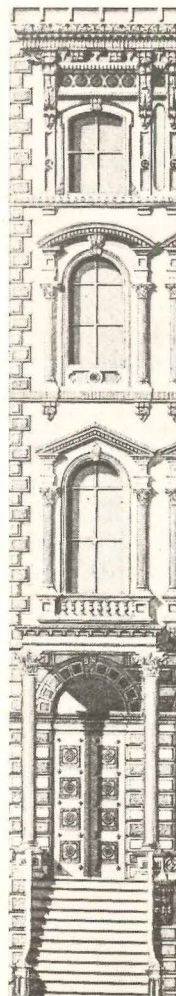
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THE ORIGINS OF CAST IRON ARCHITECTURE IN AMERICA

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**ILLUSTRATIONS OF
IRON ARCHITECTURE**

with James Bogardus's
CAST IRON BUILDINGS

Their Construction and Advantages

With a new Preface by Walter Knight Sturges
Reprints of the 1865 and 1856 editions

In combining two exceptionally rare documents of American architectural history, this work presents important perspective on the prehistory of steel high-rise construction in America. *Illustrations* is a handsome catalog of iron building-fronts available from Badger's firm, the Architectural Ironworks of New York, and also includes perspective drawings of buildings already completed by the firm throughout the world. *Cast Iron Buildings* describes the system of construction devised by James Bogardus, generally regarded as the father of cast iron construction in America.

\$37.50, two volumes in one
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Architects who value Value specify Jamison every time

You gain extra value in doing business with Jamison because Jamison produces the most complete line of cold storage and freezer doors. This means that you have fewer limitations in designing your projects, for Jamison doors are available in types and sizes and styles to conform to practically any requirement.

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If you value VALUE, call your nearby Jamison service office—they're in all major cities—for latest product data. Or write for 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.

COLD STORAGE DOORS BY
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Your Plans Are Never Complete Until They Specify Protection

If your plans do not provide for total protection . . . go back to the drawing board! No building is finished or functional unless you have specified full protection against fire and burglary, and have provided for supplementary communications and sound systems.

By planning for total security and sound systems in the initial stages, you guard against costly construction adjustments if the need for any of these systems has been overlooked.

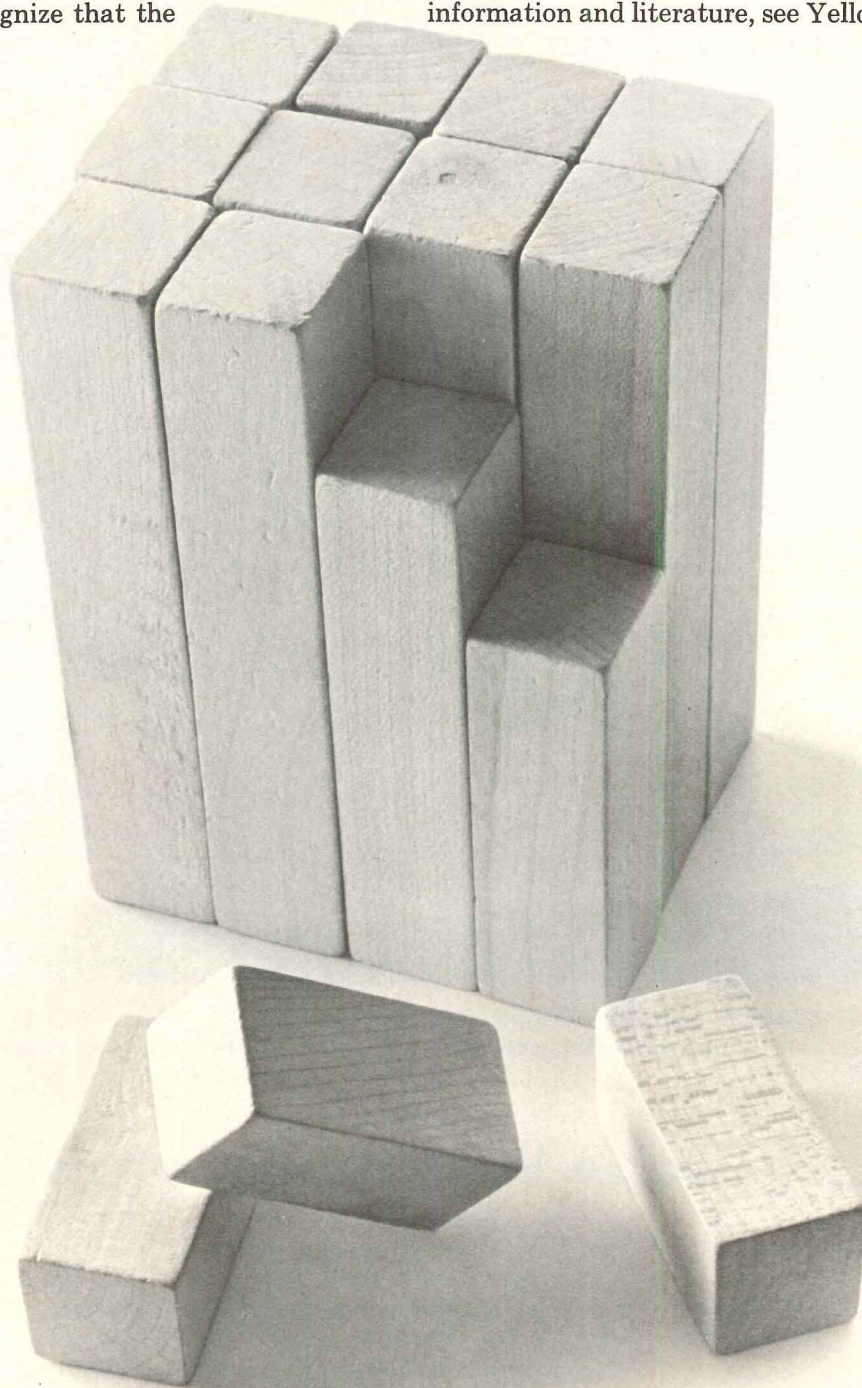
We know you are aware of fire regulations. You should also recognize that the

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ADT protection consultants will work with you in the planning stages. They will assist you in integrating total, custom-built protection and sound systems into your building.

And with ADT you get the entire protection package. ADT designs, manufactures, installs and maintains its own systems. ADT service keeps them in top operating condition.

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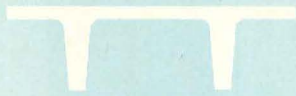
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PRESTRESSED CONCRETE

TRANSLATES ORIGINAL DESIGN IDEAS INTO DRAMATIC REALITY!

Mass-produced to exacting requirements, these typical prestressed concrete shapes point the way toward quality, economy and an early completion date for your next structure.



DOUBLE TEE

Basic floor and roof panel member, span range to 60 feet. Also made as giant double tee in spans to 125 feet. Simplifies and speeds erection of single and multi-story structures. May be used exposed with or without special finishing. Excellent for long cantilevers. Creates dramatic effect used vertically as exterior wall panels.



SINGLE TEE

Used for floor and roof structural decks in the longer span ranges, to 125 feet. Normally 6, 8 and 10 feet in width, each unit provides large coverage. Popular for exposed ceilings. Service systems can be channeled between stems, providing easy access. Ends can be custom shaped to provide architectural treatment when cantilevered.



I GIRDER

Generally used as long span beam to support extremely heavy loads. Serves as principal girder in many beam and deck systems. Spans to 120 feet.



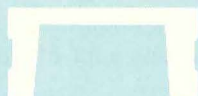
BOX GIRDER

Principal application is in bridges and as girder in heavily loaded structural framing systems. Void accommodates mechanical and electrical services. Ideal for industrial applications.



PILES AND COLUMNS

Square or octagonal piles in sizes beginning at 10" serve as foundation supports where poor bearing conditions are encountered. Precast columns, with or without haunches, are used as an integral part of the precast column-beam-deck concept which makes fast erection possible.



CHANNEL SLABS

A very rigid member with minimum deflection characteristics at maximum load conditions. Used where heavy floor and roof loads are encountered in short and medium span ranges.



INVERTED T BEAM AND LEDGER BEAM

These basic building beams reduce total structural depth since deck members can be supported on haunches. Mainly used with double tee, single tee and hollow core slabs for structural framing including the deck sections.



HOLLOW CORE SLABS

Major use is in office, commercial and apartment structures where flat ceilings are desired. Provides high insulation and low sound transmission. Voids may be used for mechanical and electrical systems. Shorter spans, to 40 feet. Also used as partitions and load-bearing walls.



WALL PANELS

...of every description are made in precast and precast prestressed concrete for partial and full story heights for curtain wall or load bearing use. An unlimited choice is available in plain, sculptured, textured, or exposed aggregate units of all shapes, sizes and colors. May include insulating material for improved thermal characteristics.

POST-TENSIONED PRESTRESSED CONCRETE

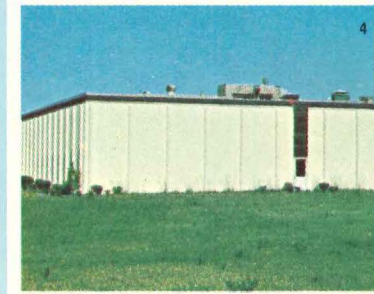
Post-tensioning is often used to connect precast prestressed concrete units. It can be combined with precast construction when continuous designs are desired. In segmental construction, precast members are post-tensioned together to further extend the already long-span capability of precast prestressed concrete.



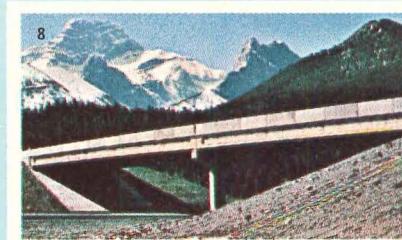
1. DOUBLE TEE ROOF
2. DOUBLE TEE EXTERIOR WALL



3. SINGLE TEE ROOF
4. SINGLE TEE EXTERIOR WALL
5. SINGLE TEE EXPOSED CEILING



6. PRECAST WALL PANELS
7. PRECAST WALL PANELS AND COLUMNS



8. PRECAST PRESTRESSED GIRDER BRIDGE
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PRESTRESSED CONCRETE INSTITUTE PCI

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ARCHITECTURAL STRUCTURAL

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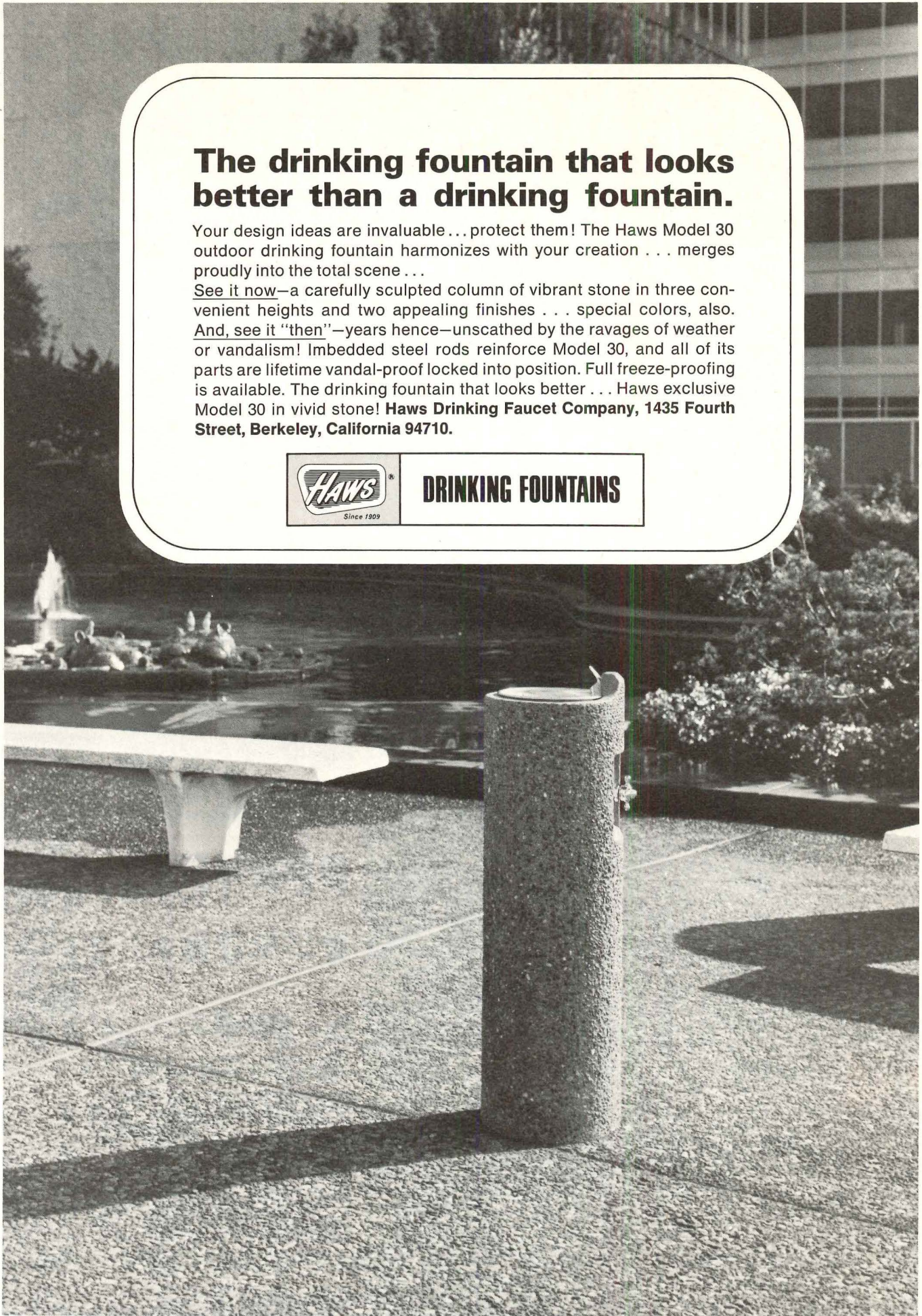
The drinking fountain that looks better than a drinking fountain.

Your design ideas are invaluable . . . protect them! The Haws Model 30 outdoor drinking fountain harmonizes with your creation . . . merges proudly into the total scene . . .

See it now—a carefully sculpted column of vibrant stone in three convenient heights and two appealing finishes . . . special colors, also. And, see it "then"—years hence—unscathed by the ravages of weather or vandalism! Imbedded steel rods reinforce Model 30, and all of its parts are lifetime vandal-proof locked into position. Full freeze-proofing is available. The drinking fountain that looks better . . . Haws exclusive Model 30 in vivid stone! **Haws Drinking Faucet Company, 1435 Fourth Street, Berkeley, California 94710.**



DRINKING FOUNTAINS



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Now we know that colors made from pigments have an uncanny ability to become part of whatever they're coloring. That's why we've made them part of our Acrilan® acrylic 2000+.

Of course, we've made some advancements over the last 20,000 years.

We use a method called solution dyeing. Color is added while the fiber is still a liquid. So when the liquid becomes Acrilan 2000+ it's red Acrilan 2000+ or blue Acrilan 2000+ and so on. And we've tried just about everything to get the color out. Nothing seems to work. Not enormous amounts of light, ridiculous weather conditions or the most bleach-filled detergents.

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of today.**

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Simpson

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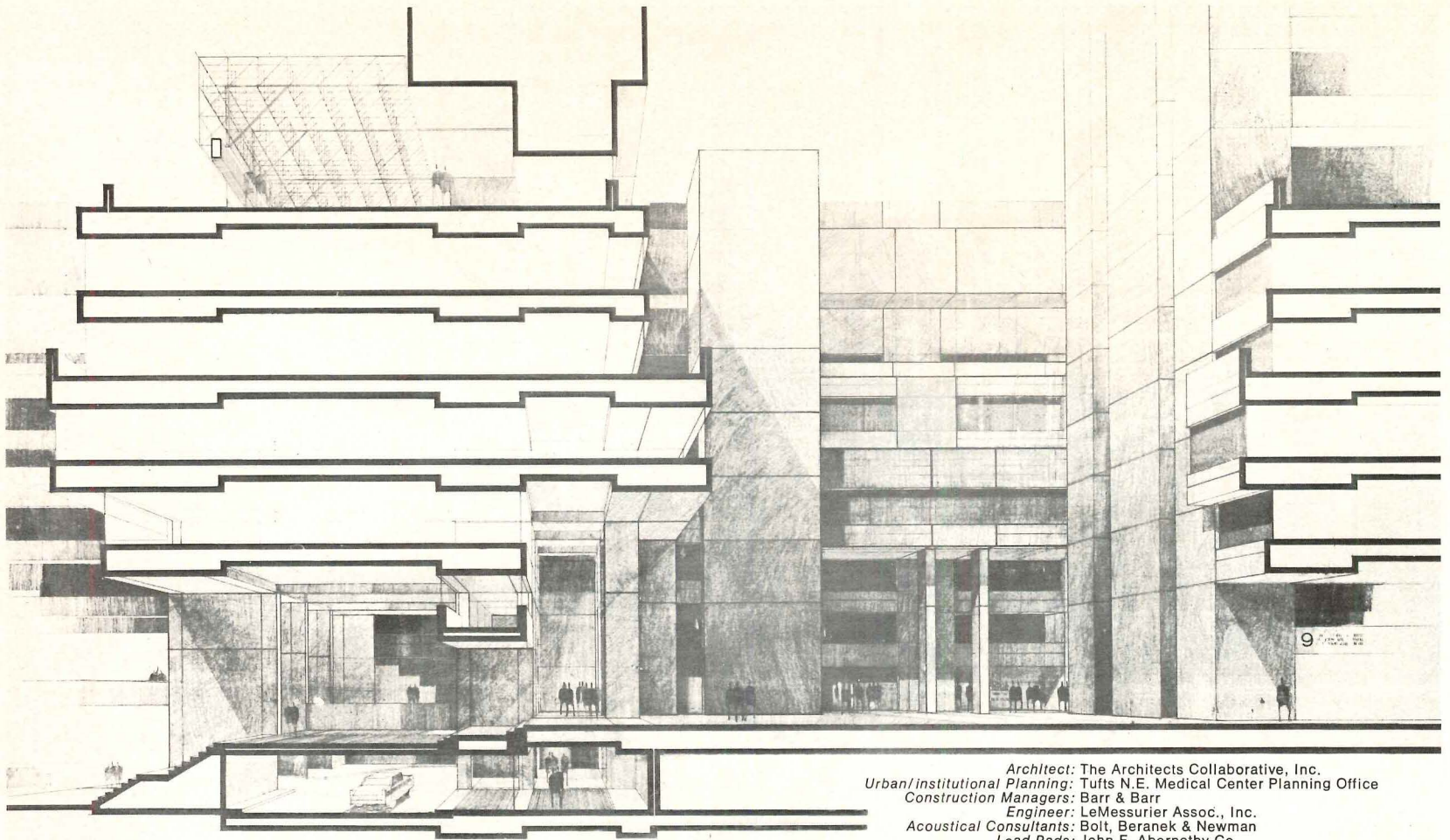
Each Simpson product is researched, designed and manufactured to be the leader in its field. And each is tested, inspected and retested to insure that it stays the leader. All this, plus prices that are among the lowest in the industry.

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Lead Vibration Pads Bring Healthy Quiet to a Modern Hospital

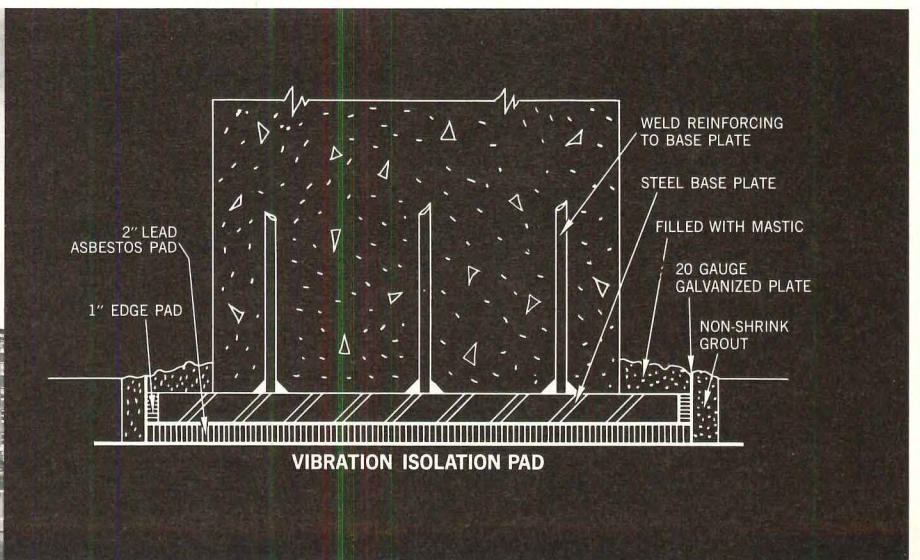
Nine years of painstaking research have gone into the planning of Boston's Tufts-New England Medical Center. As a result there has been a careful meshing of the needs of the community, hospital and patient. Advanced concepts of patient service dictated horizontal, as opposed to tower, layouts. This in turn made necessary the securing of air rights over Boston's busy Washington Street and underground transit system. Like other buildings

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Now that we've re-formulated our entire color system to jibe with the fashions and fabrics of the seventies—we've made specifying our colors easier, too.

The new Devoe color index book is cross-referenced to a bound set of color chips with self adhesive backs. You don't have to paper clip chips anymore, or tape them or staple them. Just peel them off the page and stick them to your specs.

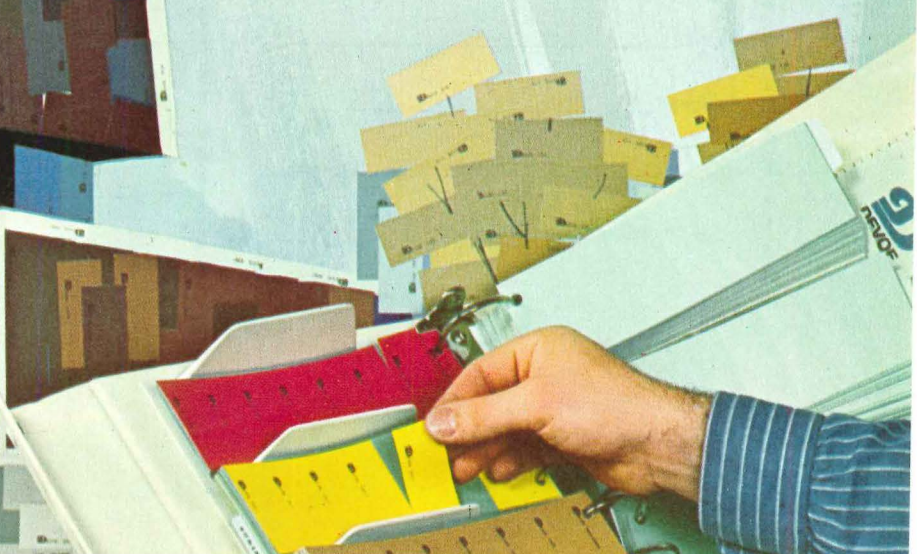
Ask your Devoe man about the Colors of the Seventies—available in all paint finishes, from flat to gloss, for any job. Produced with high-hide bases for improved coverage and greater performance.





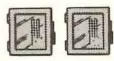


See your Devoe man.
Devoe Paint, Division of
Celanese Coatings Co.,
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ville, Kentucky 40202.

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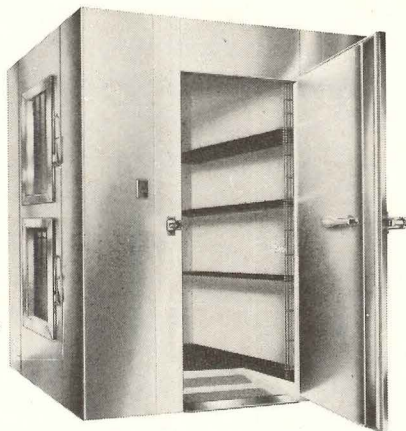


First with the fashion paint colors of the 70's



I want a walk-in with one full-length stainless steel door  and a steel plate, Ramp-In floor  and adjustable wire shelving  and an Automatic Defrost-Vaporizer  and two half-length glass service doors  and an Alarm System  and I want it yesterday. 

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




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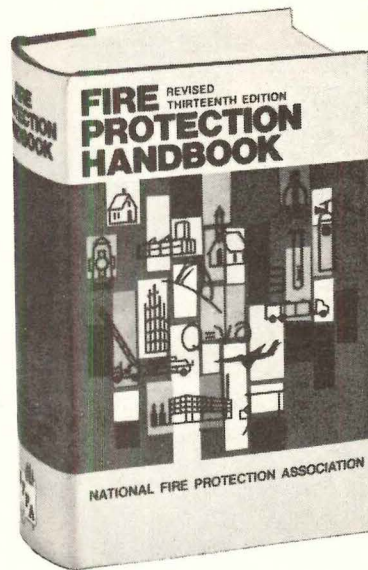
Does the sign Medical Records say more than the words?

It can. With engraved signs offered in the GRAPHICS 1000 SYSTEM, interior signing can reflect your design concept of hospitals, office buildings and schools with beauty and permanence. Choose new sign colors in any of the high pressure laminated plastics. Choose from handsome new type faces...new letter colors (achieved by filling the routed-out letters). Our catalog says it all.



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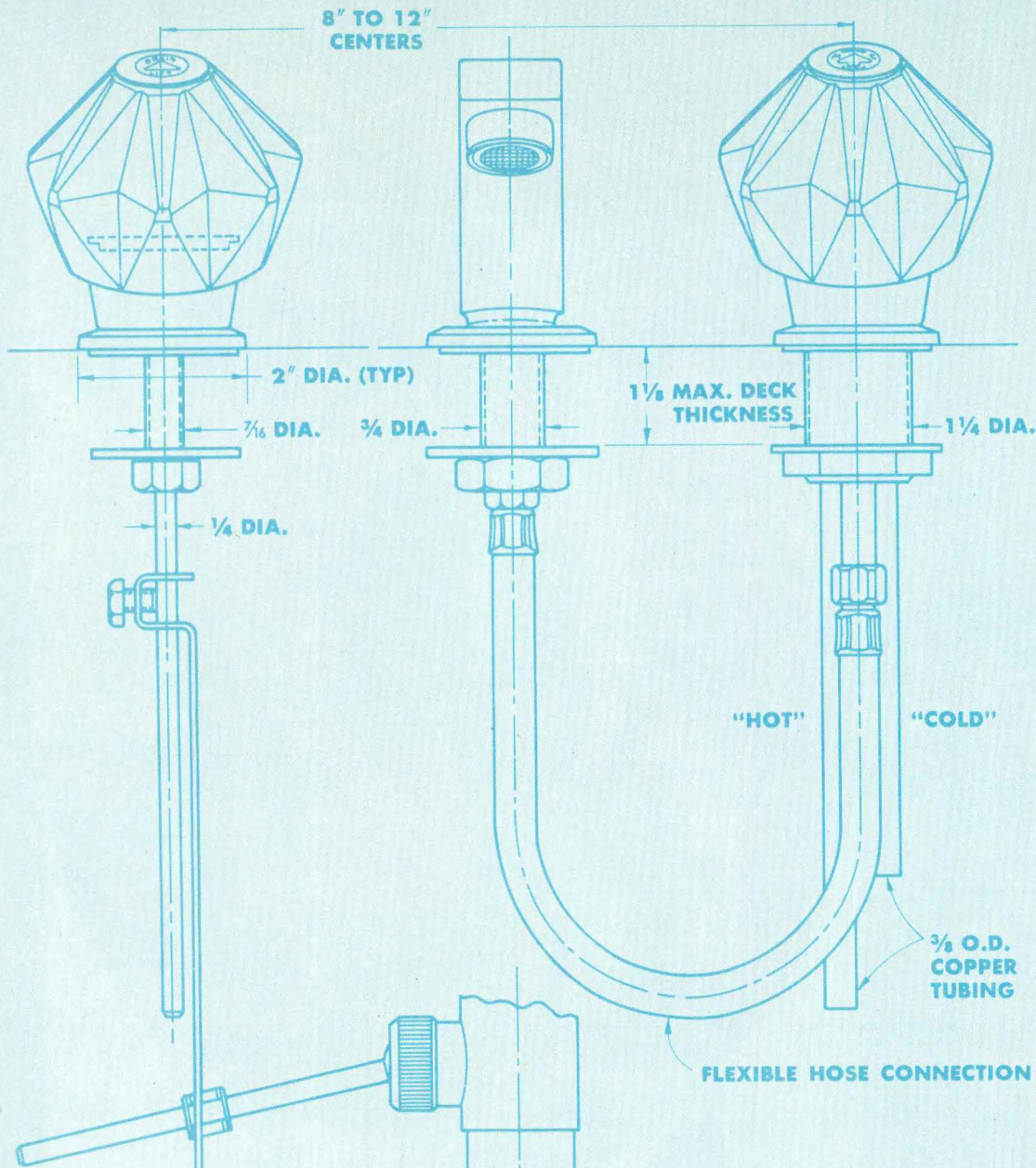
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The new Delta Fjord two-handled single handle valve is so easy to install, you could almost do it single handed.

What more could a profit-minded businessman ask for?

We've designed the Delta Fjord with a flexible attachment for easy installation. And you can spread our widespread anywhere from 6 to 16 inches. Making the Delta Fjord versatile enough to fit virtually *any* lavatory.

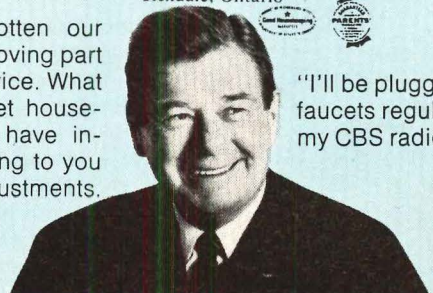
But don't ignore our new valve's looks. We've designed the Delta Fjord with today's fashion-con-

scious housewife in mind. In decorator finishes of chrome, brushed chrome, bright gold or satin gold. In models for the tub, shower and lavatory.

And we haven't forgotten our original concept of one moving part for maintenance-free service. What could be better? A faucet housewives will be crying to have installed . . . and not sobbing to you about return calls for adjustments.

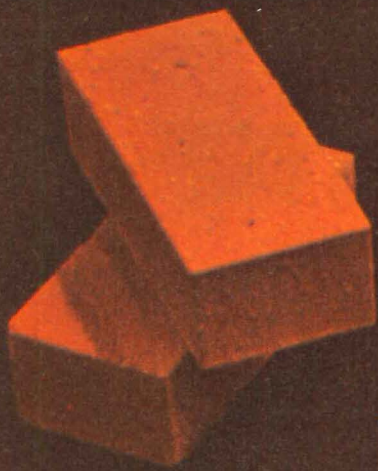
DELTA 

Div. of Masco Corp., Greensburg, Ind.
In Canada:
Delta Faucet of Canada, Ltd.,
Rexdale, Ontario



"I'll be plugging Delta faucets regularly on my CBS radio show."

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Hand-laid, earthy, textured floors, which, unfortunately, cost a fortune to install.

Brick Uniflor: easily installed sheet vinyl flooring. In an earthy, textured herringbone brick pattern made only by Nafco. The kind you'd get with a hand-laid floor.

At a fraction of the cost.

If you think you can't afford a great-looking brick floor, you haven't seen Uniflor.

Samples on request.



**Uniflor by Nafco,
the reasonable alternative.**

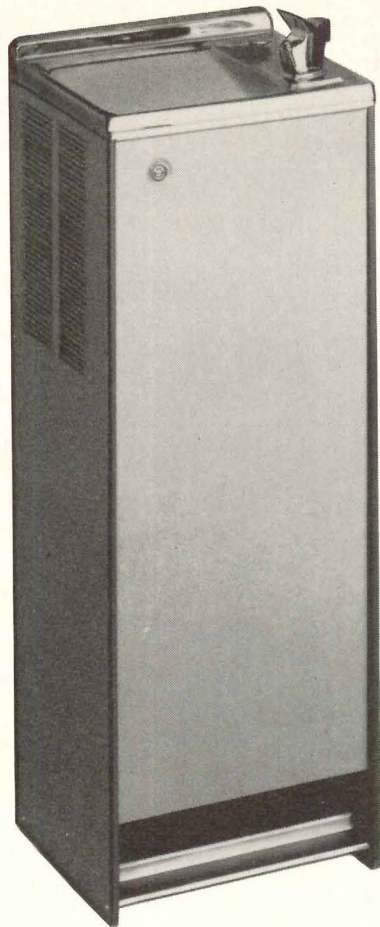
For complete information ask your Nafco representative or contact Nafco Sales Service Dept., P.O. Box 354, Florence, Ala. 35630 or phone (205) 766-0234.

See our complete line of quality flooring for residential and commercial installations in Sweet's Catalog.

The Water Works.

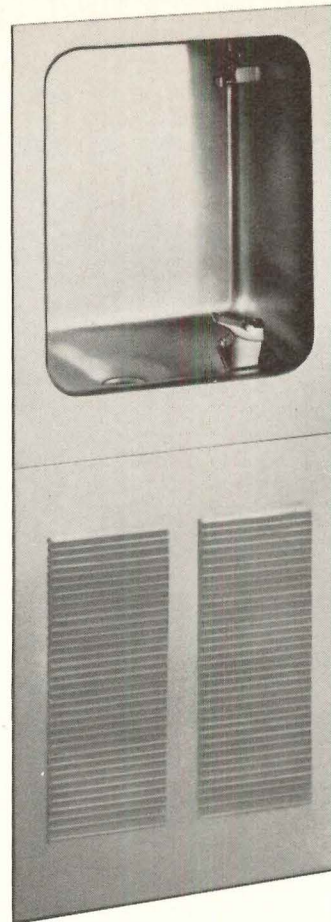
Heavy-duty floor model coolers

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



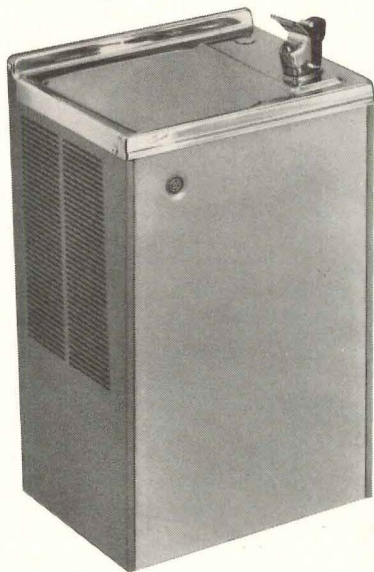
Totally recessed Water Cooler

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

Come in six colorful ways. Frost White, Platinum Beige, Metallic Bronze, Nugget Gold, Dusty Olive, and Coral Red vinyl . . . plus stainless-steel or two-tone olive-beige enamel. Mount easily with our time saving full-size installation template.



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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.



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...the finishing touch to unfinished business

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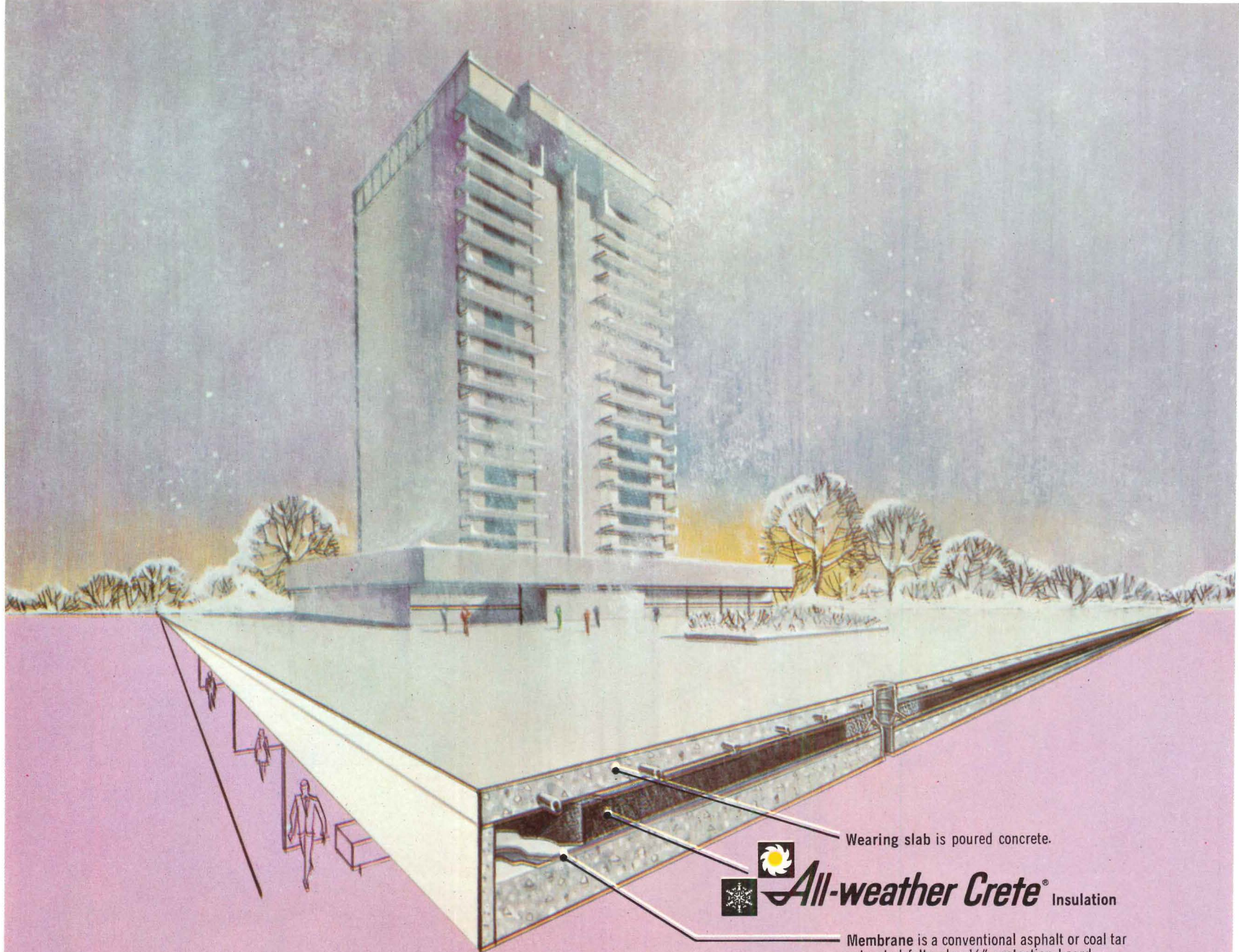
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plaza six

Will snow be a problem on your next plaza design? "Plaza Six", another proven All-weather Crete insulated plaza design, solves this problem with snow melting coils in sidewalks, ramps and loading areas over occupied areas.

There are seven other AWC Plaza Systems. Each is developed for a different purpose. These systems are being used today by leading architects throughout the nation. Why? Because no other type of insulation offers so many advantages in plaza construction. Heavy density All-weather Crete acts as an insulating cushion to protect the waterproof membrane, thus solving a failure problem often encountered in other systems. The K factor is .46; it has excellent load bearing capabilities and can be sloped or applied level. There are other advantages too.

Check out "Plaza One"—Two—Six—all Eight! Write for a full color brochure complete with diagrams and specifications. (You may want to design "AWC Plaza Nine" yourself.)

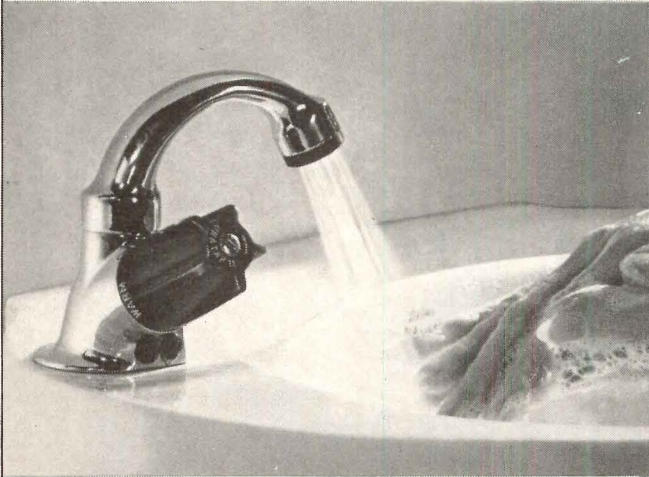


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to get your hands
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**And saves hot water
in the process.**

Unatap was scientifically designed to wash hands with a hygienic spray of water. A spray that is steady, concentrated. Yet Unatap does something else—it conserves water. In one test, it actually reduced hot water usage by 60%.

Unatap is a single tap which mixes hot and cold water and delivers a constant spray at the temperature you select. Result: more efficient hand washing. No waste of hot water.

Unatap is operated with the flick of a wrist. Its single control knob permits the user to operate the faucet and set the temperature simultaneously.

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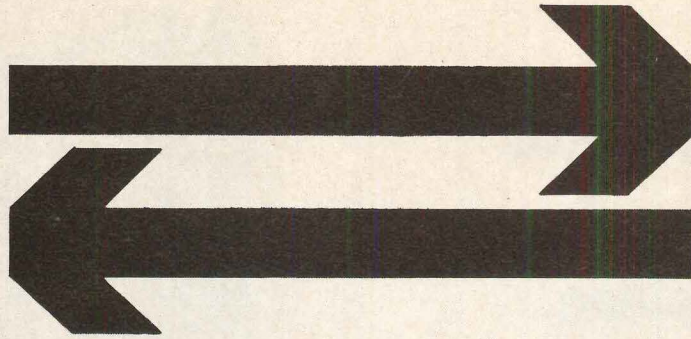
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Area of Interest: Commercial Institutional Industrial

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lets this pivot do things
no other pivot can!

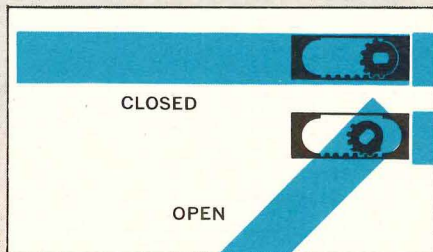
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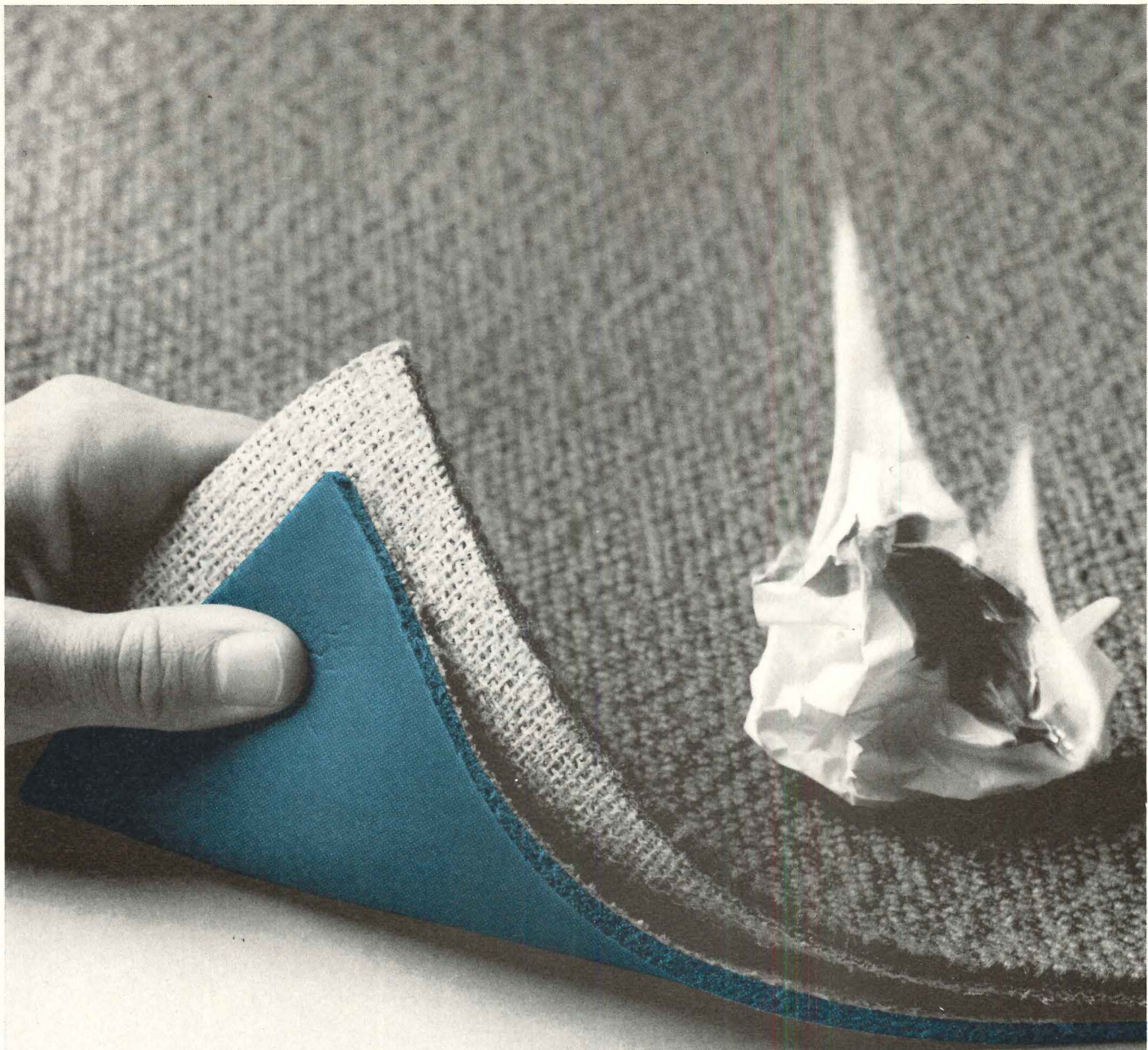
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ARCHITECTURE IN THE 1970'S GEARING PERFORMANCE TO NEEDS

The 1970's are and will be a time of uncertainty, and a time of certainty.

Right now, in the face of uncertainty about what is happening to the economy, the Federal government and many corporations and institutions have put a brake on their investment in building. And so some architects (along with all the other components of the building industry) are finding the going rougher (all the way to major layoffs) than it has been in a long time.

What is certain is that the decline in building cannot last. The reason is the simplest kind of economic fact: the demand—the real need—is too big.

And what is certain is that what everyone (architects and other designers, suppliers and materials producers, labor unions, investors, and clients—whether they are corporations, institutions, public groups, or individuals) has learned during this recession will affect the way we supply the demand that seems inevitable for the rest of the decade. There's a new kind of demand for knowledge before decisions are made; a new demand for management and the taking of responsibility. And when you realize that clients of all sorts—from governments to families—are going to invest in a trillion dollars worth of building in this decade, those new demands seem fair enough.

What of the role of the architect in the face of these new demands? For the few who insist blindly on "business as usual" and who have not, or will not, react to the changing business and management climate, one must see trouble. But in the research for this issue, editors have talked to hundreds of responsible architects, engineers, suppliers, contractors, consultants—and clients—and can responsibly argue a simple overwhelming point:

For the truly professional architect, the future holds no fears. The reason is simple: the truly professional architects have been, and are now, deeply involved in the process of readying themselves and their firms to function efficiently in the new, tougher marketplace. They are searching hard for the weaknesses in their organization—whether in design skill, in knowledge of building, in finance, in law, in reaching the market wherever it is. They are learning how to work with consultants of any discipline when a design problem that needs those skills comes up. They are learning how to effectively joint venture—when a job comes up that requires different skills, or just more men than they can muster. They are learning from developers "how the deal goes together." In short, they are learning how to identify the real professionals in and outside the profession, and are learning how to work with them effectively because they now appreciate what these other professionals have to offer. Understanding "how the deal goes together"—the total design, decision, and building process—does not mean compromise. It does not, it is important to note, mean make the project cheap.

The office space for a well-paid executive and his secretary is a small fraction (in the order of five per cent) of his cost to a corporation; and a much smaller percentage of his worth to the corporation—so most corporations make the decision of what quality building they should have on many other considerations than lowest first cost. In short—if necessary—our economy can tolerate high costs. It can certainly support the level of quality that is required by every good architect's professional conscience.

In the pages that follow, the editors discuss what seem to us to be the critical areas of concern for architects in the 1970's: design, and the new professional conscience (page 118); architectural education (page 128); the client and his new demands (page 138); the systems approach to building (page 148); and how architects are responding to the new demands (page 154).

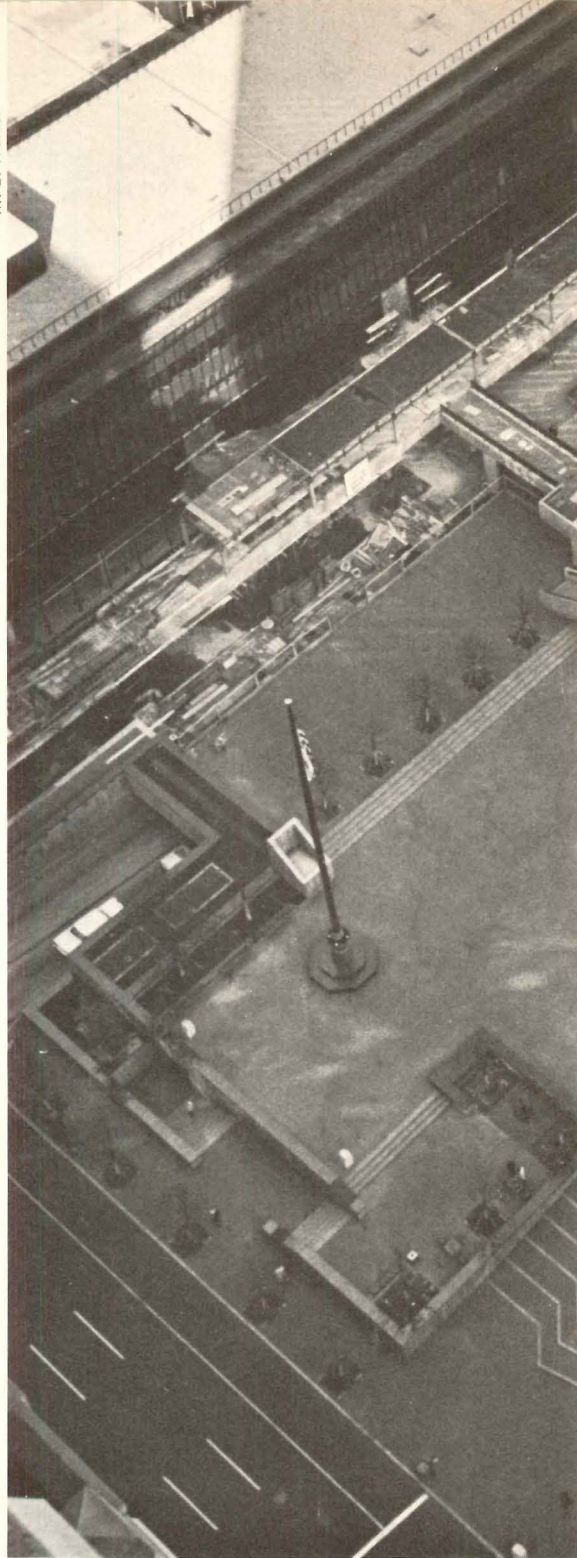
The need now is not for thoughtless concern. The need is for concerned thought.

—Walter F. Wagner Jr.

DESIGN FOR THE 1970'S A NEW PROFESSIONAL CONSCIENCE

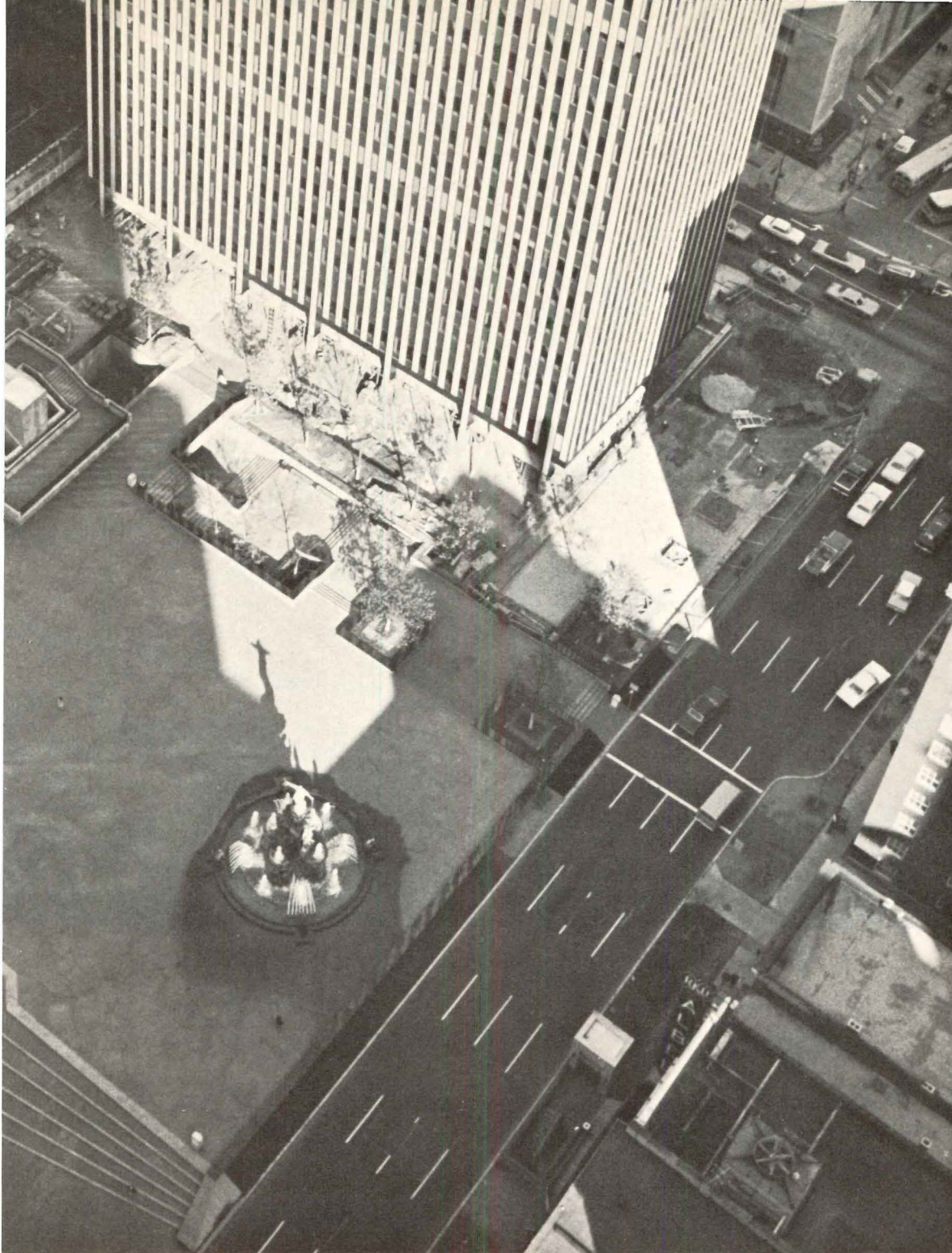
"... Happy the moment when professional questions are finally perceived in relation to everything else as they demand to be these days."—VINCENT SCULLY

M. E. Warren



Architects' goals are becoming wider and deeper

The moment for which Professor Scully hopes has arrived. Good architecture is still accomplished through the efforts of idealistic individuals—philosophers who dream of a better environment for mankind. Today, however, these architects are less doctrinaire; their approaches are empirical in a new way. At last they see how the architectural and planning theories of the recent past with their too rigid social and esthetic preconceptions often help despoil the environment and contribute to human misery. In response to this new awareness good architects are developing new processes through which to discover and fulfill a deeper scale of human needs within a broader scale of society. In their increasing awareness that



"Regardless of how architects will organize themselves for work in the 1970's it is certain that they will become more involved in process . . .

RTKL were the architects for Cincinnati's Fountain Square and for the parking garage beneath it. To arrive at a solution which would receive public acceptance the architects established a schedule of decisions to be agreed upon step by step."

architecture is really about everything and affects everything, these deeply committed designers are into more things and, perhaps for the first time, they are really thinking them through. The tasks, more deeply perceived, have become more complex.

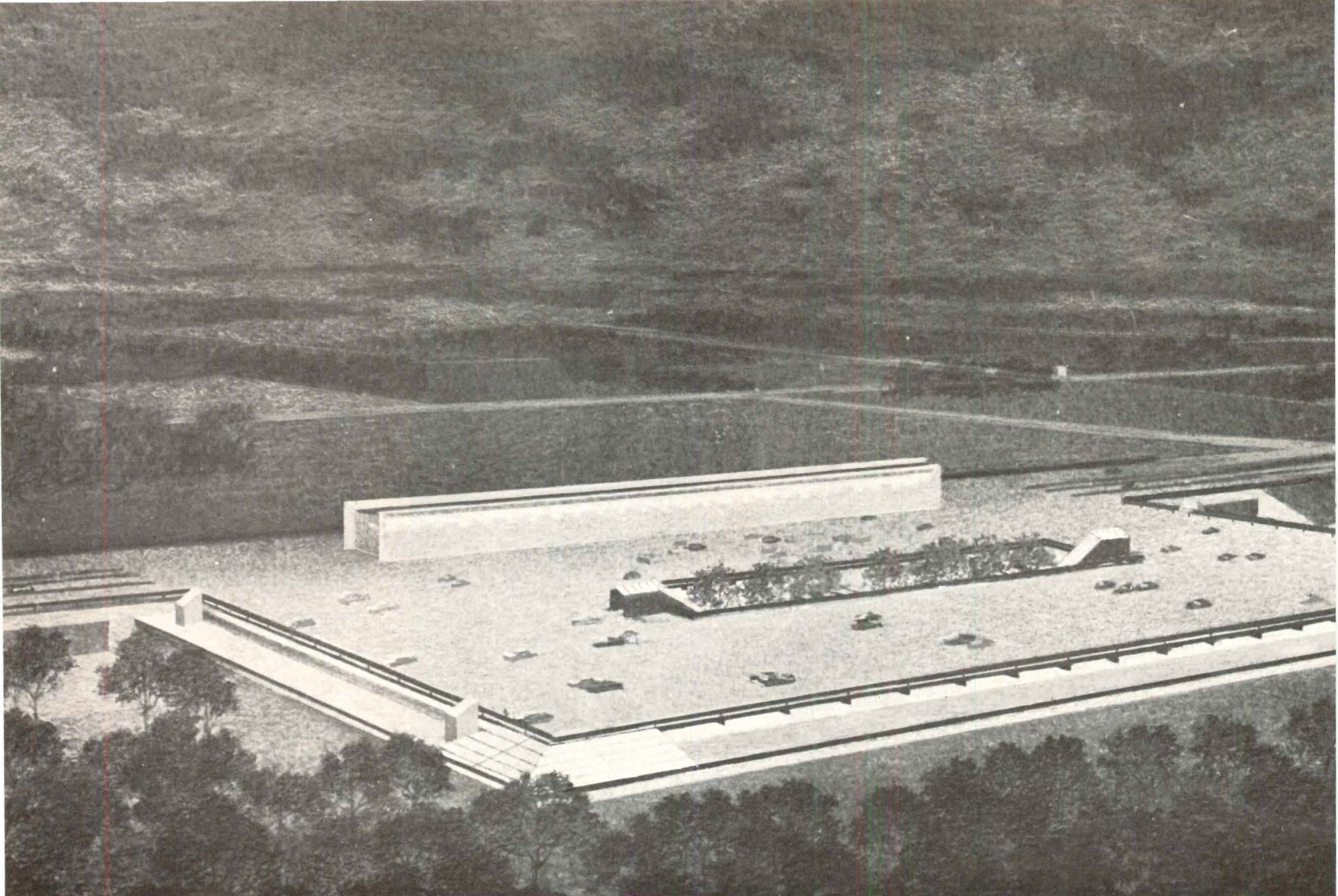
The good architect, in his professional role, and guided by his client's best interests, more often than before will see the building or planning task within a context of broader values than the client may at the beginning consider relevant or appropriate. Today's architect will do his best to make these values a part of his solution, doing so at the risk that the result will be misunderstood or misjudged. The client may learn to value this professional attribute or he may not, but in dealing with a first-class architect he soon discovers that the word "pro-

fessional" does not merely mean licensed by a state registration board or bound by the A.I.A. code of ethics. If the client considers the market place the ultimate measure of professional competence, rather than the successful implementation of wider cultural objectives, he may be disappointed in his architect and vice versa, unless he selects an architectural firm whose goals are similarly limited. Good architecture, however, is the reward of good clients and the good client is a man or an organization who sees, or in the planning process learns to see, that architecture is more than a purely utilitarian function and that in this "more" is everything essential to human life.

To give appropriate physical form to society's psychological, social, esthetic and practical objectives, the architect must first

understand them, intuitively and philosophically. If his understanding is deep enough his work will be sufficiently rich in symbolic content to transcend the utilitarian, give meaning to life and speak eloquently of the time in which it was built. The people who use his buildings must be at the center of his thoughts. He will create a social ambience which will not only enable them to do what it is that they do, but will give them options of doing other things as well.

The good architect is always contemporary. He doesn't work in a worn out style—one whose technological and formal potential has been thoroughly worked out, widely known and repeated so often as to have become a cliché, or no longer valid. Though he may and often does borrow forms or gain inspiration from the work of



"The good architect continually thinks of strategies of intervention which will bring forth environmental values not originally perceived as part of the problem"

The city of Oakland needed green space [as much as it needed a museum] and Roche provided it (right). In a current project, an industrial plant for Cummins Engine (left) . . . green space presented another kind of problem. . . . Roche commenced his analysis with the question as to whether from the ecological point of view the plant should really be there at all."

the distant or immediate past, or more frequently from the art of the present, his borrowings are neither banal nor inappropriate to the task at hand. Pure form is never exalted for its own sake at the expense of the functional task broadly defined, and it is never without symbolic content.

Can design at the highest level be done by a team?

There are those who say no, and among the most eloquent of these is Paul Rudolph: "Let's face it, architects were never meant to design together."²

Many say yes. William Wayne Caudill of Caudill Rowlett Scott asserts that: "Unless architects develop team consciousness, the profession has only a slim chance of survival. Those architects who still believe

that the complex building groups of today can be designed by one man working alone are deluding themselves."³

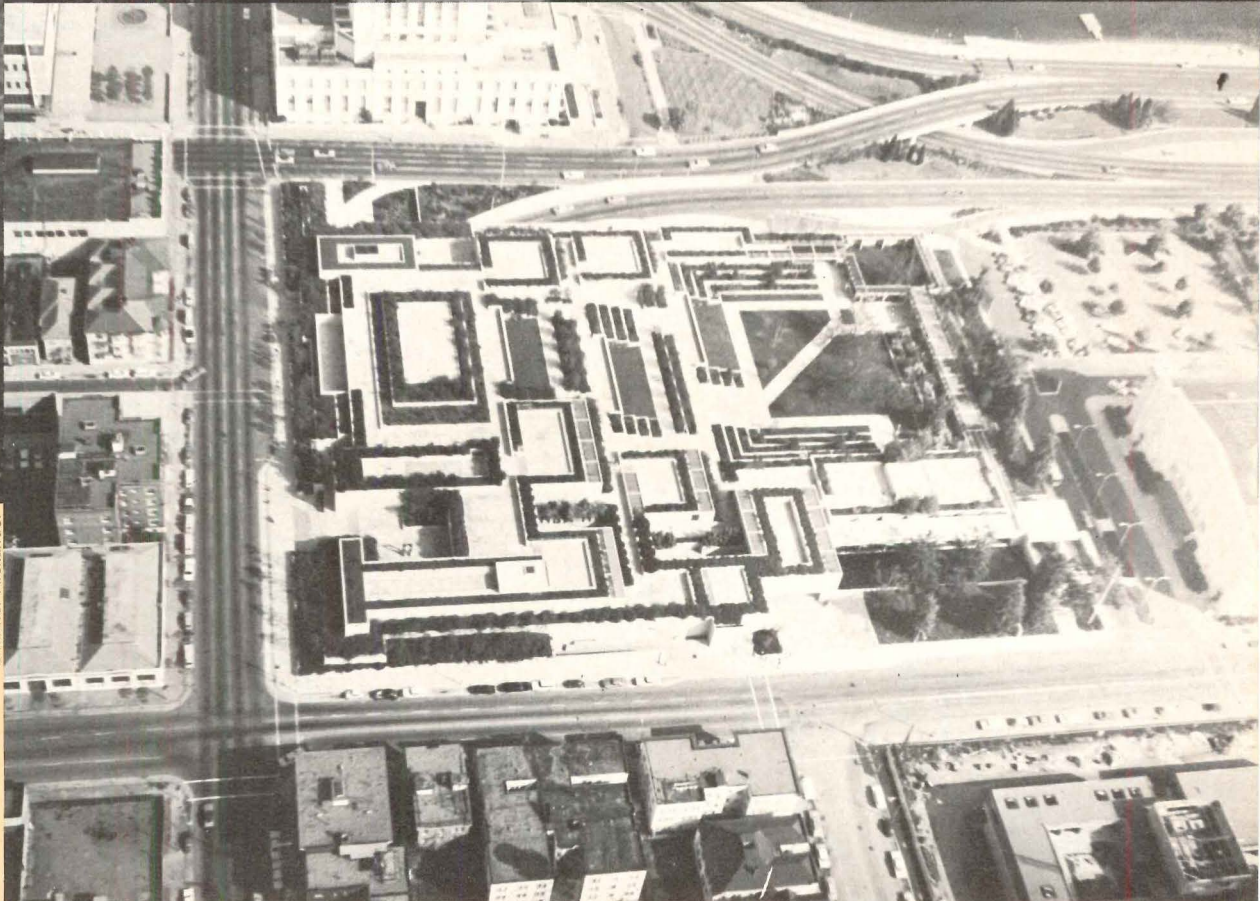
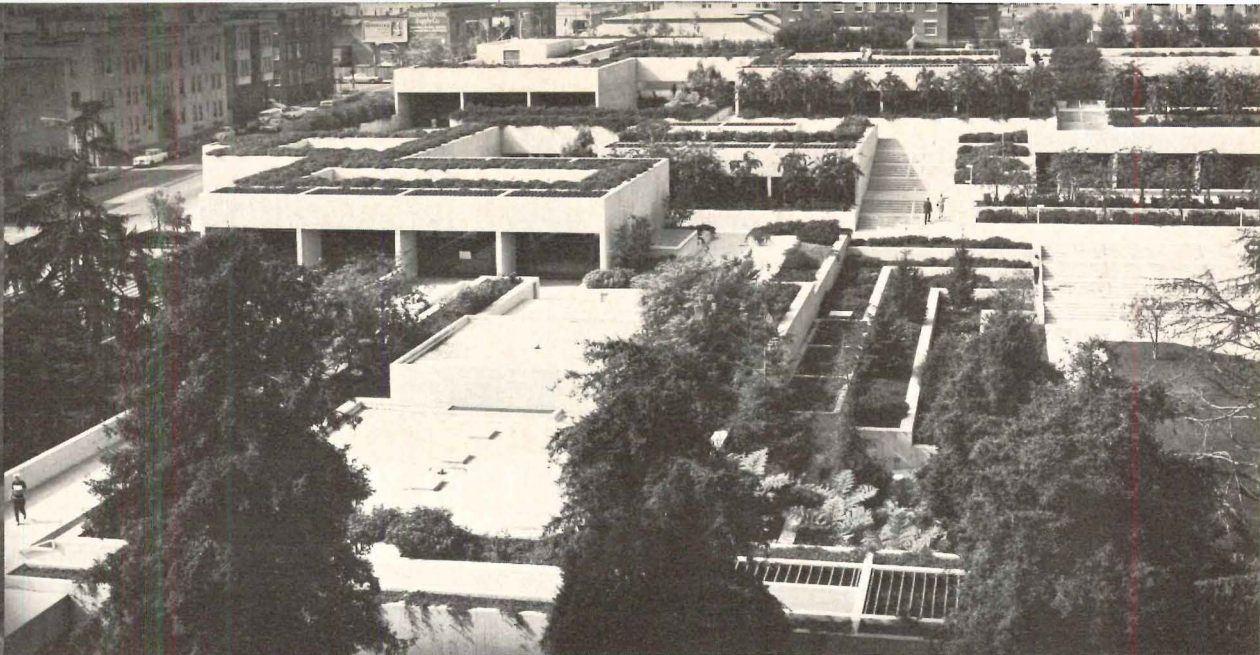
Caudill of course may be partially deluding his reader. No architect with work of any consequence works alone or would claim that he should. Architects with great stature as individual designers, such as Rudolph and Kevin Roche regularly collaborate with consultants of all kinds in the programmatic and technological aspects of their work, but the responsibility for the ultimate design creation and synthesis is neither delegated nor shared. Offices which stress teamwork, such as RTKL Inc., TAC and SOM actually consist of groups of studios headed by individual design partners with the final responsibility for giving physical form to programmatic content.

It is obvious of course that offices which are organized into a number of studios headed by strong design partners are able to produce a larger volume of good work than those in which only one man has ultimate design responsibility, for the simple reason that human energy is multiplied.

Design quality, however, now and in the future, would seem to depend primarily on the caliber of the individual architects involved, rather than the type of system under which they are organized.

Programming a process— a new approach by RTKL

Regardless of how architects will organize themselves for work in the 1970's it is certain that they will become more involved with process. To achieve their ends they



Chalmer Alexander

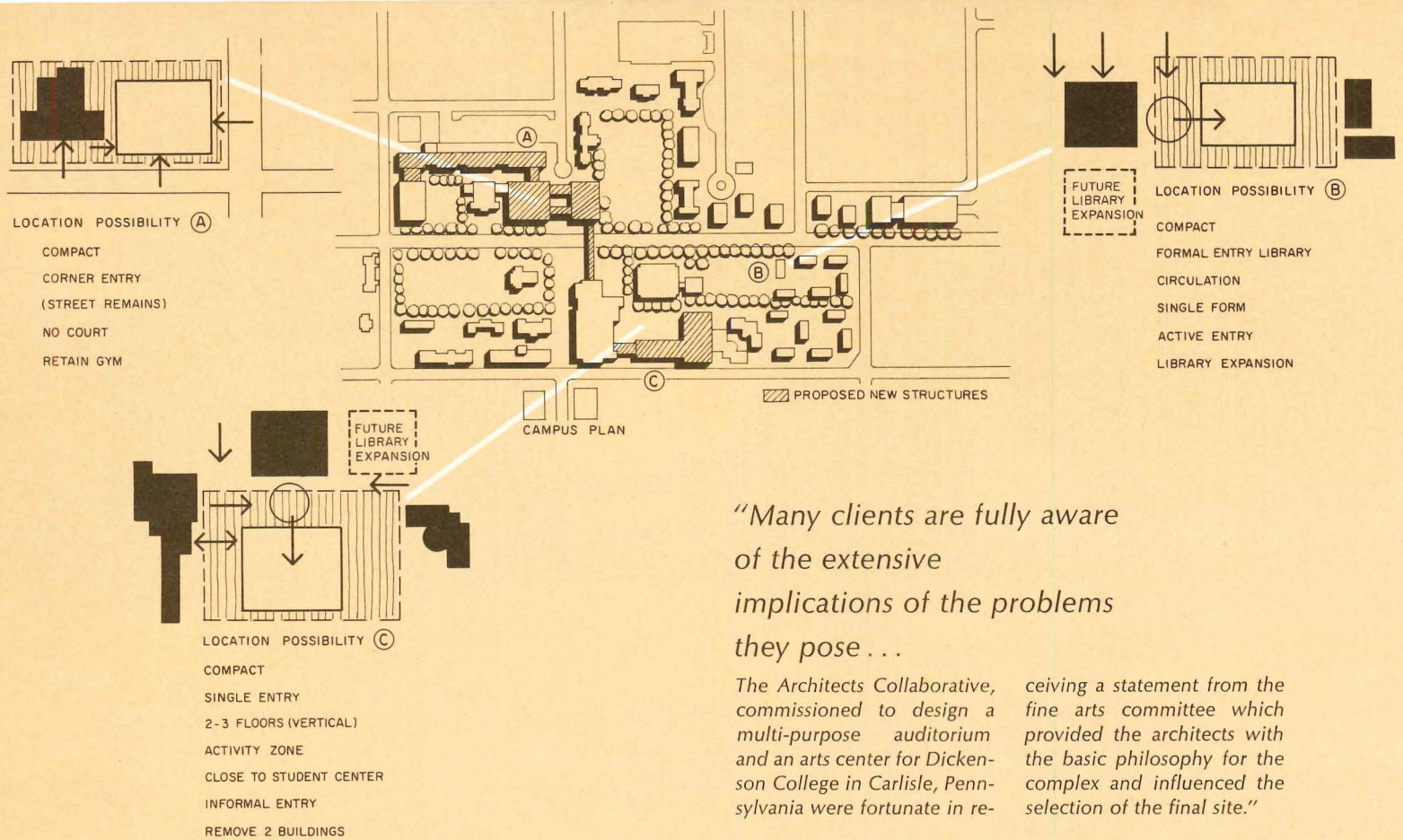
have already begun to develop new approaches which are not conventionally considered part of the architects' role and will demand of the architect further procedures equally unorthodox. Long before physical planning commences architects are helping to fashion the legal and administrative means to bring about desired change.

RTKL are pioneers in this type of effort. Their early start was made in 1963 to create a system of implementation for the redevelopment of the Central Business District in Cincinnati, Ohio. They were requested by the City Council and Planning Commission of that city to develop a plan for downtown renewal after three previous plans had failed to be approved by city officials. The planning process devised to overcome this stalemate was programmed as a series of alter-

natives to be evaluated and discussed—at open community meetings—with a group of city officials and community leaders. At each step this group, known as the Working Review Committee, selected one alternative which was then passed on to the City Council for ratification. The plan took the form of about 250 ordinances. Thus, when the plan was completed, it was in fact the law. Some of these ordinances were expressions of philosophy. Others were decisions relating to traffic patterns, location of parking garages, land use, and even design specifications such as the width of a sidewalk. Now, six years after the plan was completed, more than 80-per cent of the projects proposed have been built or are under construction. These include new office buildings, hotels, parking facilities, a second

level walkway system throughout the central core, and an underground garage topped by a major public plaza, Fountain Square (see pages 118-119).

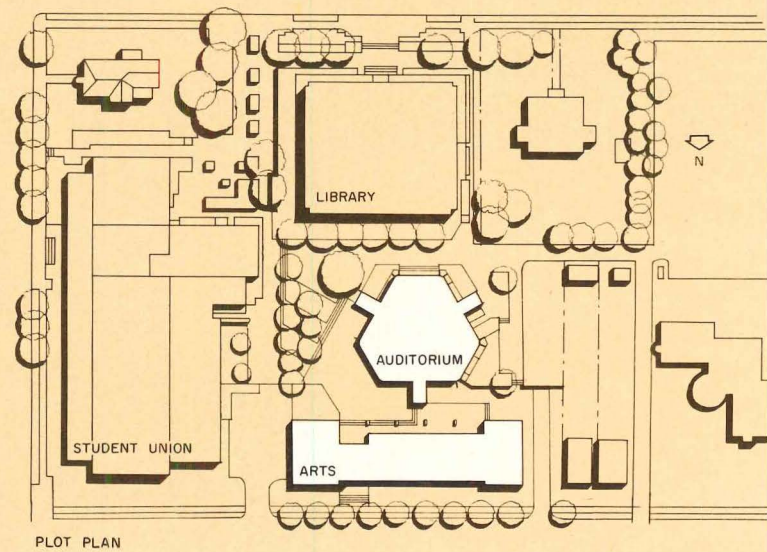
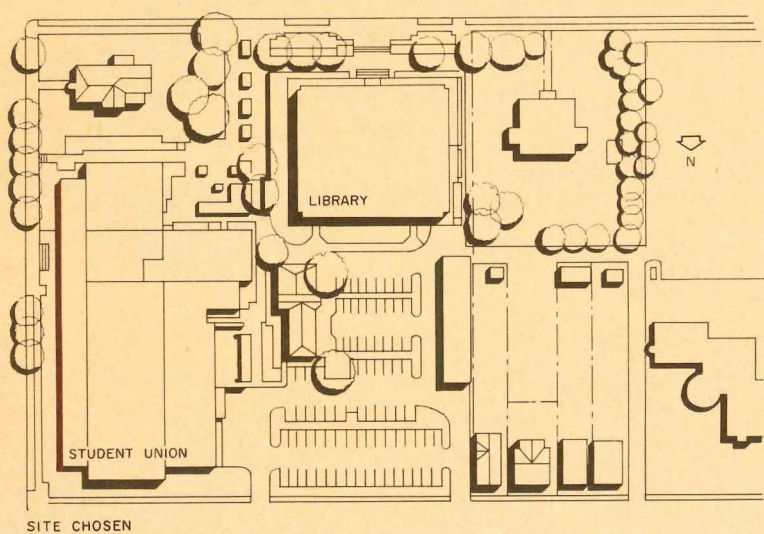
RTKL were the architects for Fountain Square and for the parking garage beneath it. To arrive at a solution which would receive public acceptance the architects once more established a schedule of decisions, to be agreed upon step by step. This schedule comprised choices as to strategic objectives: i.e., whether the space should become a park or a plaza; the appropriate range of functions; whether the structural loading of the garage should be designed to support a plaza with total flexibility, modified flexibility or limited flexibility; and finally alternative concepts for achieving a traditional character suitable to the plaza's dominant



"Many clients are fully aware of the extensive implications of the problems they pose . . .

The Architects Collaborative, commissioned to design a multi-purpose auditorium and an arts center for Dickenson College in Carlisle, Pennsylvania were fortunate in re-

ceiving a statement from the fine arts committee which provided the architects with the basic philosophy for the complex and influenced the selection of the final site."



element—a 19th century Neo-Renaissance fountain relocated on the site.

Refining the zoning instrument for better urban design

The New York City Planning Department's Urban Design Group, established by the Lindsay administration, consists of a team of two dozen young architects and planners which functions on the level of developing process. Their achievements to date have been well set forth in a recent article by Jonathan Barnett, the department's Director of Urban Design (January 1970, pages 131-150). Of their many accomplishments, perhaps the least complicated and therefore most readily comprehended, has been the successful use of the concept of a zoning incentive to build new theaters and

thus preserve the special theater district in the Times Square area of midtown Manhattan. In Barnett's words: "The expansion of the midtown office concentration had begun to threaten the continued existence of the legitimate theaters, which were an economic land use only because they were old and had been paid for long ago. No private developer can afford to build a major legitimate theater today, and there was no way for the city to insure the preservation of the old theaters.

"New York without its Broadway theaters and the Great White Way would not be New York, and the loss of a concentrated theater district would have a destructive effect not only on theater, but on the city's hotel, restaurant and tourist business—as well as diminishing one of the major attrac-

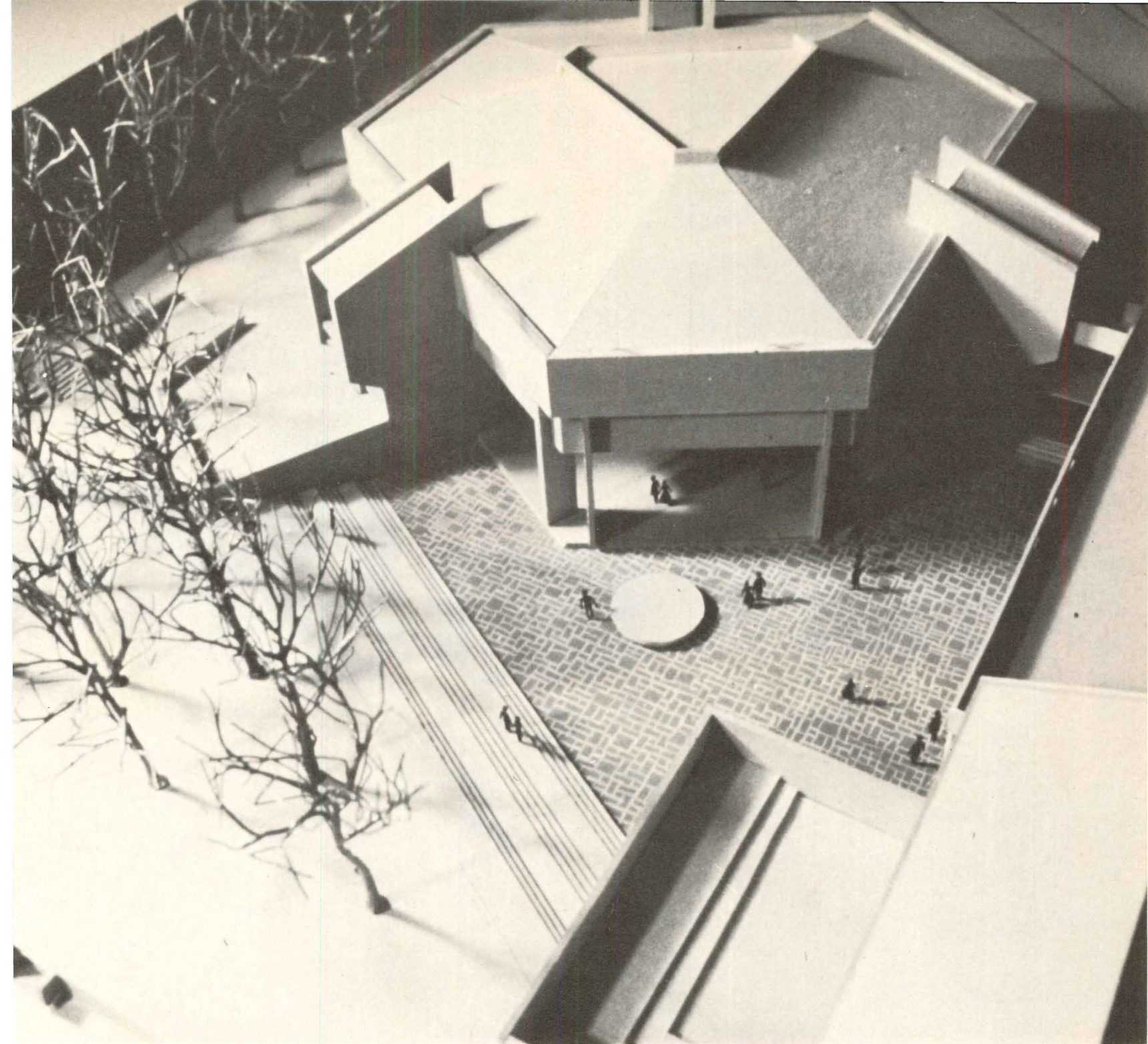
tions which produced the office building concentration in the first place.

"Within our new zone, extending from 40th Street to 57th Street and from Eighth Avenue to the Avenue of the Americas, developers can be given a bonus of additional floor space, similar to the one already granted for providing a plaza, if they build a new legitimate theater as part of their building."

In summing up the Urban Design Group's work so far, Barnett concludes: ". . . even the efforts of a small group can make an appreciable difference."

Strategies of intervention

If it is true that in our consumer-oriented society all the bright people are trying to



find out what it is that the dull ones want and giving it to them, the good architect is certainly an exception to this rule. Like the New York City Planning Commission's Urban Design Group he continually thinks of strategies of intervention which will bring forth environmental values not originally perceived as part of the problem, nor yet demanded by the client or the public. His strategy may involve only his capacity to think things through combined with strong powers of persuasion. Sometimes he scores a big victory, as did Kevin Roche in the design of the Oakland Museum (shown on page 121 and April 1970, pages 115-122). The firm of Kevin Roche John Dinkeloo and Associates was asked to design three separate structures to house the collections of Oakland's art, history and natural science

museums. Without being specifically requested to do so, Roche decided to take a broader look at the whole city. His extensive research suggested strongly to him that an urban park was needed on the site selected for the three museums. Roche envisioned the park as the first link in a chain of integrated work and leisure facilities needed to give order and coherence to the city. Because of the cultural interrelationships among the three collections, Roche concluded that they belonged in a single structure. The building, consequently, became a terraced form containing its three major components, with most of its functions underground. Museums and parks tend to go together and Oakland got both—thanks to Roche's vision, his ability to study a problem in depth and to convince.

Strategies of non-intervention—when doing less is more

The city of Oakland needed green space at its heart and Roche provided it. In a current project, an industrial plant for Cummins Engine still under development, green space presented another kind of problem. The plant is to be built on farmland on a site which is presently a corn field. Roche commenced his analysis with the question as to whether from the ecological point of view the plant should be there at all. After studying alternatives and concluding that it should, he then proceeded to design it to cover as little ground as practicable. Parking which normally eats up acres of land surrounding an industrial plant will be on the roof. Employee recreation spaces will receive the best orientation.



Phokion Karas

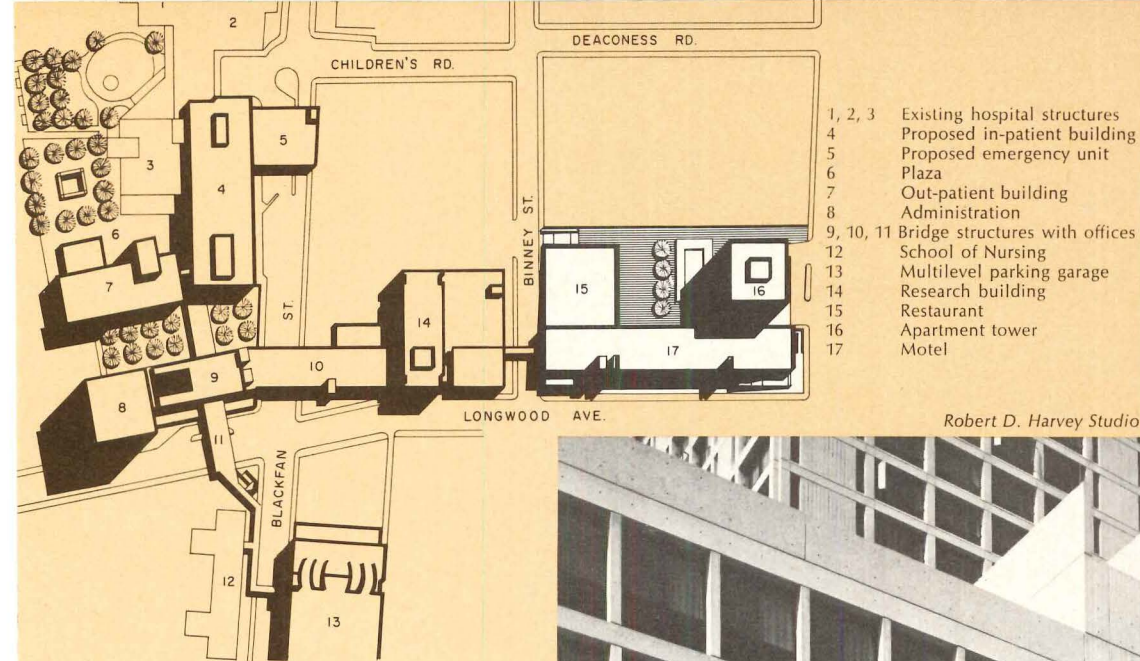
More clients now seek to build within a wider cultural and social framework

The Architects Collaborative, commissioned to design a multi-purpose auditorium and an arts center for Dickinson College in Carlisle, Pennsylvania (pages 122-123), one of the oldest campuses in the U.S., were fortunate in receiving at the beginning a well thought out statement from the college fine arts committee. This provided the two principal architects, Sarah P. Harkness and H. Morse Payne with the basic philosophy for the complex. Said the committee: "No art lives in a vacuum. Art is nourished by life itself. The arts—music, painting, sculpture, drama—interact one upon the other. Therefore a fine arts-cultural complex is seen as a center where one art can conceivably influence another, where the language of crea-

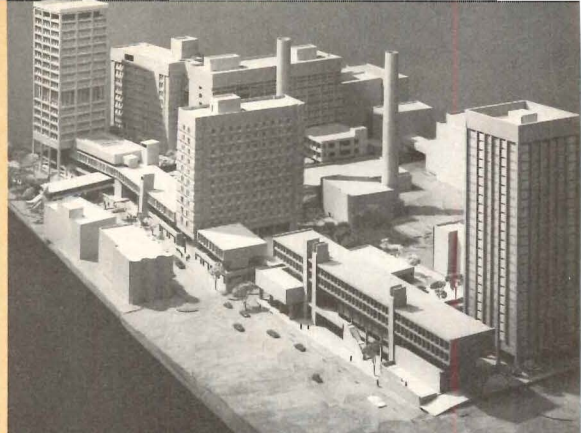
tivity has universality. Moreover such a center would provide a focus for the entire campus."

The college had tentatively selected a site for the auditorium and arts center on the main street next to the library (site B). TAC offered to study this site and all other possible locations and to list their advantages and disadvantages. Recognizing the fact that all colleges seem destined to grow, it became obvious that the Dickinson campus could become much more densely built up if three large green areas could remain. The first of these was the original campus common dating from the early 1800's; the second focusing on the chapel, developed later but was equally inviolate; and the third was the site tentatively chosen for the arts complex. The value of this latter

green area as an open space between the dormitories and the library—a common around which future development of the college would occur—seemed to be very great. Further, it was felt that to continue to line up buildings along the main street would provide no new focus or space. The final site on a parking lot on what was hitherto the back side of the campus (site C) was decided upon because it made possible a close relationship, both esthetically and functionally between the arts complex, the student union and the library. This solution required that two relatively small buildings be removed and the architects were not sure that the college administrators would go along with such a recommendation. They did, however, much to TAC's satisfaction.



Robert D. Harvey Studio



"Building within a broader framework calls for building at a larger scale over longer time spans with continuous architect involvement in the development of new concepts."

The Architects Collaborative began working for the Children's Hospital Medical Center over a decade ago, and since completing the master plan they have been sole architects. . . . Most interesting is the development of the concepts of mixed use which a new residential group, the newest \$7 million addition to this complex, embodies in a very creative way."

Phokion Karas



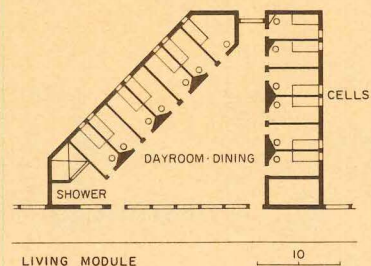
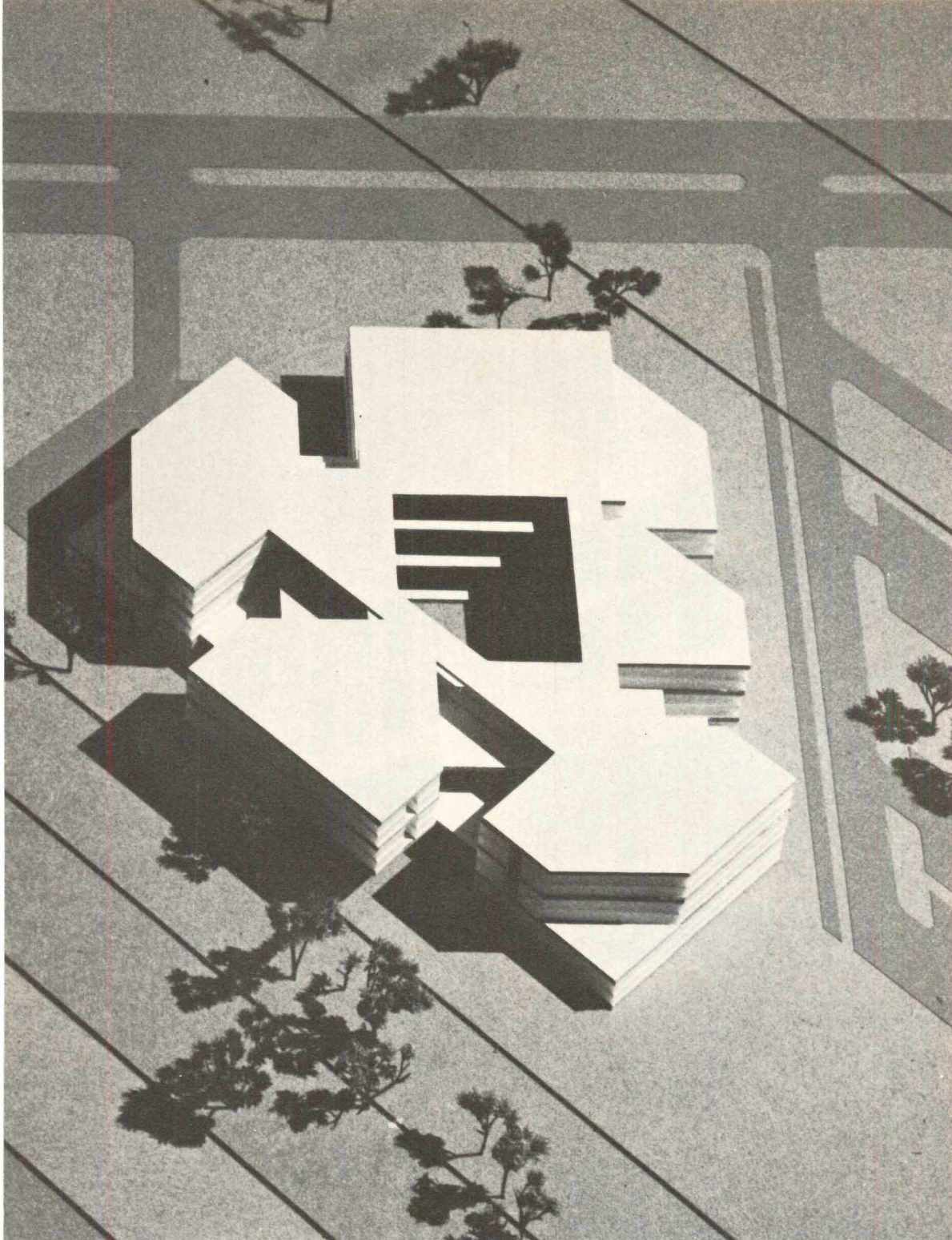
Architect involvement in the development of new concepts of mixed use

The Architects Collaborative began working for the Children's Hospital Medical Center (pages 124-125) over a decade ago, and since completing the master plan for the development of the complex, they have been sole architects. Under the leadership of TAC partner John C. Harkness the firm has established an impressive continuity for the growth of this center in both a formal and functional sense. Most interesting is the development of the concepts of mixed use which a new residential group, the newest \$7 million addition to this complex, embodies in a very creative way. The group includes an apartment tower mainly for the hospital staff and a so-called "Children's Inn." The latter is a highly inventive mix

which includes dormitory suites for interns, a motel with terrace and pool, a restaurant, garage, branch bank, small department store, pharmacy and a branch of the Harvard Coop. The architects developed this mix in response to the desire of the hospital for a facility which would make hospitalization less traumatic for children and parents alike. The motel portion of the complex lets parents stay close by their children while they are hospitalized, and in some cases lets the child stay in the motel with the parent while receiving outpatient medical care. The trauma of separation is thus diminished. The new mix also enhances employee relations since it provides services and facilities unavailable in the surrounding area. The apartment tower is a key factor in the recruitment of personnel.

The new mix meets many of the goals of the Boston Redevelopment Authority, although the Children's Hospital Center did not purchase land from the agency for this complex. More intensive use of institutional land as was done here is preferable to letting institutional facilities mushroom haphazardly all over the neighborhood, especially in consideration of increasing community protest against this type of growth. It is a planning advance also that the new center includes taxable as well as non-taxable property in a city where the normal pattern is for property after property to leave the tax rolls as it is absorbed by the encroachment of non-tax paying institutions.

All the problems of expansion which the Children's Hospital Medical Center has



“The good architect . . . makes social and ethical assessments of far greater subtlety than in the past”

Architects Kaplan and McLaughlin favor smaller schools as well as jails [and propose new sites for schools shown at right]. The proposed Community Correctional Facility for Omaha, Nebraska (left) reflects their belief that many fewer people should be jailed . . . and prisoners should be provided with maximum access to the community where rehabilitative programs of education, training and work are best held.”

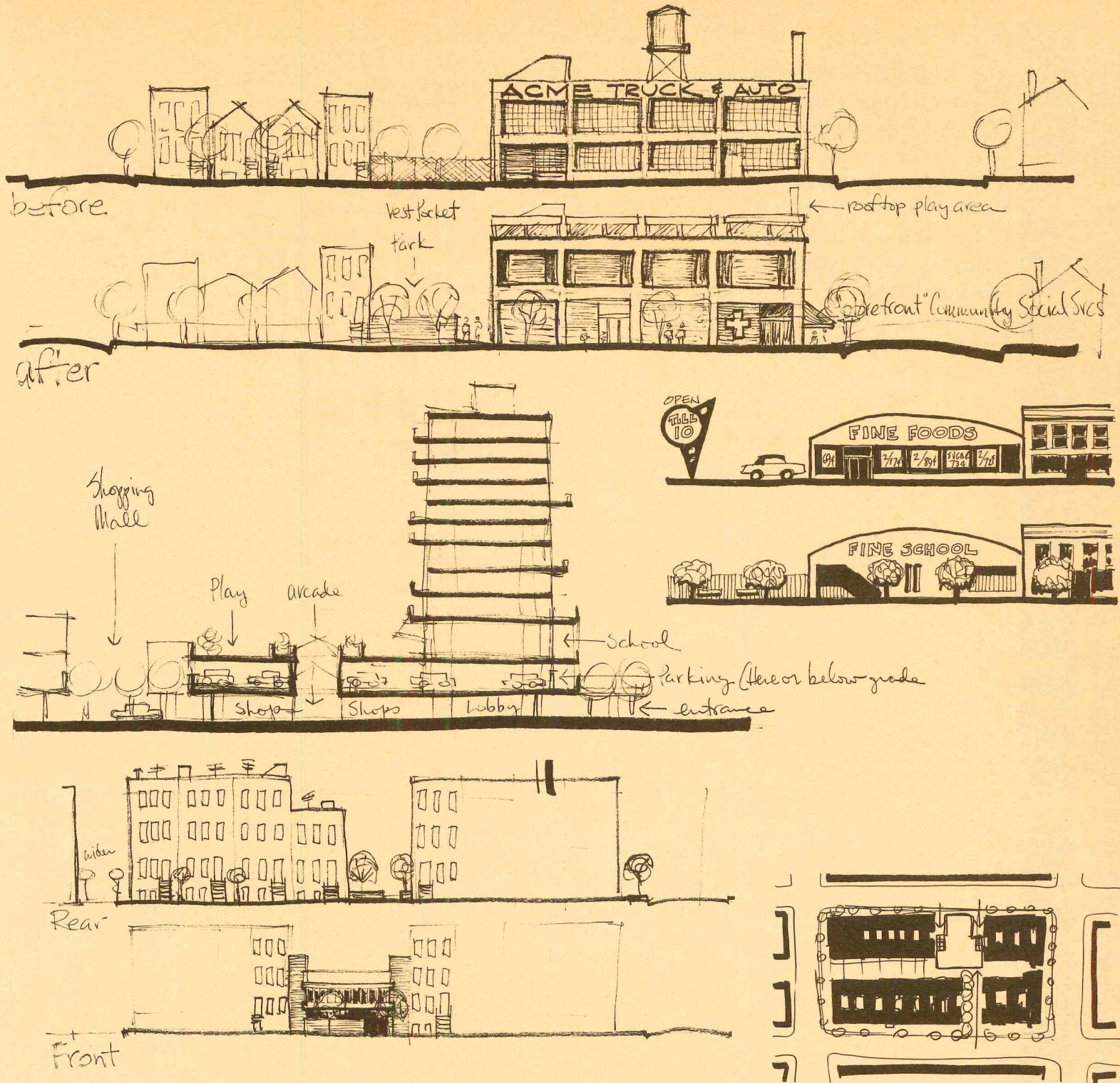
grappled with and attempted to solve over the past decade have broad implications for the practice of architecture in the 1970's. More and more work will be done at this and bigger scales. Although it is tremendously difficult to perform synthesis in a period like the present which still emphasizes specialization—fortunately the nation's best architectural firms, such as TAC, have the basic powers of analysis, the form giving skills, the patience and and the longevity to synthesize and give physical reality to the requirements of highly complex institutions in the throes of the immense task of transforming themselves.

Some architects would like to see institutions get a lot smaller

The firm of Ellis Kaplan and Herbert Mc-

Laughlin do intensive research in the social sciences which are relevant to each commission they take. This young office in conjunction with Kirkham, Michael Associates of Omaha were invited to develop criteria for and design a jail (called a community correctional facility) for Omaha, Nebraska. Before design the architects investigated the philosophical objectives of the institution; its organizational principles—both manifest and implicit; and the needs of its users particularly those of the prisoners. McLaughlin and project architect Roy Latka formed a project team with two sociologists and staff architect Brian Kesner. They used marathon encounter group techniques with diverse groups of consultant ex-prisoners, differentiated in terms of prisoner experience, age and race. They visited a wide range of cor-

rectional facilities and interviewed prisoners and staff. They toured parallel institutions (i.e., mental health centers) with a group of ex-prisoners. The entire project staff permitted itself to be locked up for a day in the existing Omaha jail. Extensive reading in the literature of correction was done and many interviews were held with the leading thinkers in the field. The architects concluded first—many fewer people should be jailed; second—fewer facilities that are specifically jails should be built; third—penalties should be uniform and made to fit the crime and not the individual; fourth—everything must be done to reduce a sense of vindictiveness and outraged morality in punishment; fifth—while recognizing the need for punishment it must be restructured; sixth—the need for control must be recog-



nized but reduced; seventh—prisoners must be provided with maximum access to the community where rehabilitative programs of education, training and work are best held. The actual jail which the architects are in the process of designing (page 126) will, as a result of the foregoing analysis, be small. Conventional wisdom would have built a 400-man facility for Omaha with extensive rehabilitation space within the prison walls. Said architect McLaughlin: "We have thrown out the standard rehab things—prison work programs are dismal failures. Further we want to reduce the size of the prison bureaucracy and get rid of prison industry as such. Not only will our jail hold only 200 prisoners but we are doing it in less space."

Architects Kaplan and McLaughlin favor

smaller schools as well as jails for the following general reasons stated in a soon to be published report which the firm prepared for Educational Facilities Laboratories with the aid of project designer James Diaz: first—greater educational flexibility reduces necessity for size; second—new technology and teaching materials can bring diversity even to a small school; third—administrative economy can be increased if schools are re-organized into smaller units where the teaching and learning actually occurs with administrative, technical and maintenance functions located elsewhere and serving more than one learning center; fourth—construction should not be more expensive per student and site acquisition should provide significant cost reductions. Some sites for smaller schools are shown above.

Summary and conclusions

Today's good architect invents new political and administrative instruments which effect significant environmental changes at the urban and regional scale, he tirelessly re-examines basic concepts and he makes social and ethical assessments of far greater subtlety than in the past. He knows that everything must be thought through again and that is how he starts.

—Mildred F. Schmertz

1 Vincent Scully, *American Architecture and Urbanism* (New York, Frederick A. Praeger, 1969), p. 254.

2 Sibyl Moholy-Nagy, Gerhard Schwab, Paul Rudolph, *The Architecture of Paul Rudolph* (New York, Praeger Publishers, 1970), p. 11.

3 William Wayne Caudill, *Architecture by Team* (unpublished manuscript).

EDUCATION IN THE 1970'S TEACHING FOR AN ALTERED REALITY

The comfortable old realities are shattered when students begin seeing architecture as identical with life and with our society, and when established practitioners think part of their professional responsibility is to be both a politician and a social activist. We need new ways of teaching within these frameworks, and some ideas are emerging now.

1. Is the design and organization of individual buildings and groups of buildings still the principal activity for which an architect should be trained, or should he be trained for something different? How would you describe the principal activities for which an architect must be trained?

2. Comment briefly on why an architectural student might benefit—or fail to benefit—from the following changes in an architectural curriculum.

- a. He may now undertake supervised participation in actual community projects for academic credit.
- b. He may now participate in the structuring of the overall curriculum of the architectural school.
- c. All students must complete two semesters of work in architectural offices for credit and pay, as part of their degree.
- d. The architectural school is removed completely from the university, and is re-established with equal financing under the control of the existing architectural profession of the state, city or region.

Within a field that has had in the past at least some sense of what it is supposed to do, and what its scope is, there is disagreement now about the boundaries between architecture and other professions and between architecture and the rest of the indicators of our culture. This disagreement is reflected in the answers we received to the two questions above—answers printed on the following pages.

The question "... is the design and organization of buildings and groups of buildings still the principal activity for which an architect must be trained..." was worded to suggest some limits, a framework upon which to establish an architect's working interest in social problems, in economics, in politics. Even today (as in 1950) one would have expected an answer something like this: To the degree that the life style of a low-income fatherless family in the slums affects the low-income housing project I am designing

and in which they live, I must understand that life style, and meet its needs. The government center, or the system of street signs, or the house in the woods that I design will affect and must respond to the needs of the people who will use it, and so I must understand those needs to the degree that they shape the architecture, my work. This characterization of the scope of an architect's working activities would have elicited broad agreement in the 1950's—from the functionalist practitioners—and would have been thought rather too broad by architects prior to the beginning of this century. Yet it is not clear that architects think this way in 1970.

Philip Meathe and Ted Seligson, for example (see comments on pages 130 and 131), might agree that such limits are a reasonable description of an architect's work, but they don't say it. It's not acceptable to set limits these days; it's not open minded, it doesn't keep one's options open.

The answers in total are striking in this sense; they imply no clear division between architecture—what an architect must know—and the social/environmental context of the country as a whole—what a citizen must know. E. G. Hamilton (page 130) says some of the people whom architects must serve, will require social and political guidance from him, along with architectural skills. Steve Izenour (page 130) says a principal base for architectural education is the willingness to look at, analyze and learn from people. Well, it is a good base for learning about life, too, and you don't have to go to college to do that. Troy West (page 130) expresses the attitude directly: A socio-political consciousness, an awareness of life, is all there is—that is architecture, in every way.

The trouble with this is it's not very helpful. Attempting to understand our society and manage our political institutions is much more complicated than trying to learn how to prepare people for managing and understanding architecture. Architecture is not society, only a part of it. We must have some conceptual framework for talking about smaller parts of the whole, when there are problems to solve. One of the problems now lies in our worrying about what roles today's students will be filling

tomorrow. We can't really know. We do try to guess but the basis for even the best guesses are dependent on variables we can't control. Rather than ultimate roles, we should be thinking more about ways of teaching, about frameworks that accurately describe where we are, about techniques that can transmit a sense of present architectural reality.

Some of the answers to our questions — particularly Denise Scott Brown's (page 133)—have made this distinction, as does Jonathan Barnett's suggestion that a case study approach to architectural building types, rather than creation in the usual studio, might be a better way of learning architecture (page 131). They both suggest that schools should provide a kind of design service—a prototype architectural firm—for clients that existing firms find unprofitable to serve. There are many such potential clients; from small tract builders to community associations. Such a design service would be useful and it would provide a concentrated teaching/learning environment very close to actual practice.

Architectural education in the 1970's could provide some radical changes if we follow some of these ideas with action. Of course, there must first be some basic level of agreement on a course of action and that is emerging too. Students, practitioners, and teachers do agree that students want to learn about architecture, not run the schools. They are there to be taught, and should be. This would have been a trivial observation ten years ago, and its gradual re-emergence as truth through the disruptions of architectural schools in recent years is (at least in part) a legitimate product of curriculum reforms and the replacement of deadwood faculty that must continue. There is a broad agreement that the university—rather than the office—is the place to learn, because the university has the tools to provide the compression and intensification of reality that is the basis of education. And (perhaps surprisingly) there is agreement that community projects—organizing in the “ghetto” for example—must be tightly planned to be of any real value to the student—or the community.

—Robert Jensen

Allan Lapidus, A.I.A. Associate in the firm of Morris Lapidus Assoc., New York City. Lecturer in architecture at Columbia Univ. Bachelor of Arch., Columbia.



The principal activities for which an architect must be trained are the design and organization of individual buildings and groups of buildings. If a person is not involved in the above, he is not an architect. The major change has been the definition of “design” not the definition “architect.” During the full flower of the Beaux Arts the design process involved the selection of the classical style you thought was appropriate and then rendering the living hell out of it. Whatever went on within the watercolor facade was a matter of little concern to the architect. In the Bauhaus system, “whatever went on” became the important part—“form follows function.” The current vogue is functional contortionism — all manner of convolutions occur in buildings in order that each individual function may be expressed on the exterior. This begets honesty, integrity and some nifty black and white photographs suitable for publication. But through it all, architects have been designing for other architects.

Now social consciousness has descended on the profession. Architectural students, followed by the avant garde of the profession and even some of the more respectable fuds are climbing aboard the bandwagon. There is a major difference in this latest swing. The “new design” is really designing for the people, and if the people for whom you are designing don't like it, then you had better believe it.

The people for whom architects must now design, and must deal with directly, is not the client, but the client's “client.” Not the people for whom they built the building, not for their peers, but for the people who use the building. The advent of this total logic will probably cause some cultural shock throughout the

profession—and the danger immediately apparent is one of overreaction.

For it must be remembered that so-called social architecture is still but one single phase of the architectural profession. There seems to be a mystique that in order to design for a particular group of people you either have to be a member of the group, or resort to highly contorted methods of approach. The idea seems to be developing that schools of architecture must teach voluminous courses on how to design for communities, as if this were surely the most complicated of all design problems. It is not such a difficult problem—it is simply a problem that has rarely before risen in the academic curriculum.

Actual participation in community projects can be an extremely valuable asset to an architectural program only if the student can place this experience within the context of his entire architectural education. The community project that he gets involved with is not typical of all community projects. They are all unique, and the danger of over-generalizing, or becoming an instant expert, is omnipresent. I think the intrinsic value of such projects is that they will teach students what it is like to go into a totally realistic situation—where the architect must deal with real problems of budget, municipal authorities, and the ultimate client, the community.

The question of architectural students structuring the curriculum of the school depends upon the current structure of the curriculum of the particular school. If total revo-

lution is needed, I think the students are very well qualified to provide it. A major question arises in what happens after the revolution. Theoretically, all the students' demands have been met. It is, therefore, assumed that all the archaic, irrelevant courses have been done away with. The question remains: What do you do with the archaic, irrelevant professors who have tenure?

It is also assumed that newer and more vital courses will be brought into the school dealing with the problems of the profession today. But I do not think students can be helpful in that section of the architectural curriculum which deals with developing the craft of the architect. The most voluminous commodity that students bring to a school of architecture is ignorance. They must, therefore, learn how to put a building together well. Any of the craft courses are bloody tedious, and some of them are absolutely unpleasant. But if the architect is to be effective, he must have these courses. And so some sort of happy compromise must be worked out so that there will be those on the curriculum committees who know which courses have to be included; and students who know what else should be included.

The cultural shock of loosening today's architectural students on established offices could not help but benefit both. The expression of mutual disgust that would occur in most instances would enliven many hours worth of conversation in both the smoke-filled university rooms and the suburban cocktail hours. But the idea of removing architectural education from the university and entrusting it to the architectural profession is one of the truly bad ideas of our time.

E. G. Hamilton, A.I.A. President, Omniplan, Inc., Dallas, Texas. Present Chairman of the New Examinations Development Committee for NCARB, which is creating a new registration exam for national use. Bachelor of Architecture, Washington University.



The problem within the profession is pointed up by your question — "Should architects be trained to design buildings, or trained to do something different?" It implies that there is one set of activities for which an architect, Capital A, must be trained. That day is over.

The scale of architecture has changed. It now includes extremely large and complex megabuilding at one end of the spectrum, and an accompanying need for a new order of technical and organizational skills. At the other extreme are the mass clients, unable to afford architectural services or express their needs intelligently, but requiring social and political guidance along with special architectural skills.

There are many opportunities for many different people with different motivations and expertise to make a contribution to the new "architecture."

Thus, any experience (including active participation in community projects) involving realistic contact with people and problems is valuable so long as it is conducted in proportion to other courses that prepare the student for professional action along with social concern.

Should students work some semesters in offices? Good idea. But the experience should not be limited exclusively to architectural firms.

Should architecture be taught in offices? No. The university has too much to offer to permit such isolation, and the profession is too narrowly oriented as it is.

Steve Izenour. Works in the office of Venturi and Rauch, Philadelphia. Bachelor of Architecture from Univ. of Pennsylvania, recent graduate in environmental design at Yale.



Historically architecture has been concerned with the design and construction of the individual building. If one of the ways we learn is to study and adapt the past for our own purposes, then the individual building as program, structure, form, philosophy, whatever, must be part of architectural education. It is good to remind ourselves that our first crack at a real building—even as we conceptualize megastructures—is likely to be a beach house for our in-laws.

Having knocked around in more than one architecture school it seems to me that at any given time each school, each teacher is defining "the principal activities for which an architect must be trained" differently. Educationally what seems more to the point is a sense of shared investigation between teacher and student, growing from a mutual interest in the problem at hand. In any case, each of us tends to select and train ourselves in whatever special direction interest, personality, and opportunity offers. The architecture student always gains from a project, whether it is community participation, structuring his own curriculum, or work study, as long as he tries to learn what "is" before deciding what "ought to be." The reality is the willingness to look at, to analyze, and to learn from people and environments other than the architecturally acceptable ones before deciding what "ought to be." But as an esthetic conceit, "ought to be" doesn't and shouldn't mean a damn.

Theoretically I like the idea of architecture being separated from what in many cases are the arbitrary restrictions of the university. But looking at the average level of imagination, intellectual competence, and taste evidenced by the practicing profession, I think the university—if they'll have us—is the lesser evil.

Philip Meathe, F.A.I.A. Vice President of the architectural firm of Smith, Hinchman & Grylls in Detroit, and past chairman of the A.I.A. Public Relations Committee. Bachelor of Architecture, Univ. of Michigan



There is little doubt that the activities of the architect broaden every year but. . . We cannot let these new demands disguise the fact that the first skill, the very heart of the profession is the architect/engineer function. In my mind, large firms will continue to increase the scope of the services they offer to the client, but the foundation of even the most comprehensive array of expertise will still be the architectural and engineering disciplines.

Every architectural student must be grounded in these basic fundamentals, but his education cannot stop there. After he has become a knowledgeable generalist, he can go on to develop a specialty, and I see no limits to these. I expect to see architect/lawyers, architect/business administrators, architect/planners, maybe even architect/sociologists and architect/economists.

Troy West and Group. Heads Community Design Associates, an advocacy architectural service in Pittsburgh, and was one of the leaders of the walk-out at the A.I.A. convention in Boston.



To students caught between guard and police, parents and TV, pollution and the pill, the world has an immediacy that was never for us. Hard hitting, eager, they come to architecture prepared for action with the ability to learn by doing. They meet a curriculum prepared by a faculty in another world. They are told that they will go through a series of exercises distilled by wise heads to train them—for what?

Take a new look at the universe, a new look at your life, an introspective psycho-personal ecology trip directed toward a personal resource inventory.

Only then can you operate in an integrated, all-related, live, act, think, do, grow process which has no definite terminals, doesn't get graded, isn't legal tender, and may take more than four years. Architectural education must deal with man in the process of making a life for himself and others—the process of community. The only meaningful architectural education must be a full participation in the world—it must be the actual making of life by neighbors; people are the life of architecture. There is no room for architecture conceived solely as the making of physical spaces.

Valid architecture must join hands with the people's struggling for their lives, and hopes, and dreams. Architecture must mean freedom for all men. Dialogue must be entered between young and old together or we will have only penal architectural schools where students serve them to become cogs in a system many now question. Schools are going to have to become productive communities where all can come and stay and go and come again. Where students will teach teachers, teachers will learn and teach students, and all will become people working toward making places that will once again be good to be in.

Theodore Seligson, A.I.A. Partner in the firm of Seligson Eggan, Kansas City, and active architectural preservationist. Bachelor of Arch., Washington University



Training architects only for the design and organization of individual buildings and groups of buildings is a narrow concept, and one that is historically false. The people who were traditionally given those responsibilities now entrusted to the architect were schooled not in a narrow, specialized sense but in a very liberal sense. As we know, architects planned the cities of antiquity and history—they were not only involved in the design of individual buildings, but also accomplished over-all planning involving the environment and society of the day. Many were, of course, accomplished sculptors, painters, inventors. The so-called Renaissance Man could typify what is expected of an architect today and in the future. The narrow curriculum that architects receive is a modern invention of specialization and it is a discredit to the profession that this narrowing has occurred. I do think that specialists—technicians, planners, designers, administrators, organizers, programmers—are necessary. But the architect—to fulfill the greatest potential for himself, for the community, for the world of the present, and for posterity—has to be the rare individual who not only absorbs a liberal and wide-range training, but who can apply that training and his practical experience in organization, decision-making, and judgment, to create functional and enriching spatial relationships at any scale.

I believe, further, that there should be three various levels of training within the profession. One is the technician level, leading to a technical degree. This would require a minimum of two years in certain specialized courses relative to the over-all planning process, which is architecture. Draftsmen, on-site project administrators, and other disciplines of the basic level required in the profession would be trained in this way. The second level would be a four-year degree in a particular discipline—mechanical engineering, structural engineering, traffic engineering, economics, psychology, graphic arts, two-dimensional design, industrial design, furniture design, interior decoration, landscape architecture, city planning, communications, space planning, programming, computer programming, project "captaining," accounting, or managerial training. The third and highest level, of course, is what I outlined previously—the multi-disciplined training in design and tactical decisions. This person should have at least two degrees, one of which is a four-year degree in liberal arts with a certain specialty applicable to his advanced degree, and a three-year degree in architecture, or a four-year degree in architecture.

After a student has four years of school with liberal curriculum and some area of specialization, he should apply his knowledge for at least one or two years in an architectural office, and then complete his remaining three to four years. Upon graduation after the full 9 to 10 years, an architect should have a brief oral examination and, if passed, he should be registered immediately.

Studio teaching is out of date

by Jonathan Barnett, Director of Urban Design,
New York City Planning Commission

As an employer I interview a hundred or more recently graduated architectural students every year; and, as a visiting juror, I see the work of many others. While these students are usually bright and talented, and clearly the product of a rigorous selection system, the education they are receiving seems to me to be going steadily downhill, with a marked acceleration of the decline in recent years.

One almost feels that many of the "prestige" and graduate schools have given up teaching altogether, so that only the more modest five-year programs are producing any visibly useful results.

At each job interview I solemnly look at flow charts of urban systems which are utter nonsense, and squint at 1/32" drawings of buildings that betray not even a rudimentary knowledge of structure or efficient arrangement. Frequently, I hear descriptions of workshops in the "ghetto" that were clearly a disastrous failure for everyone involved.

When I see how bright and eager and concerned these students and graduates are, I am tempted to tell them to ask for double their money back.

Their teachers, when I talk to them, are bewildered and angry. They find the students hostile and unreceptive, and they frequently have to contend with "revolutions." When the revolutionists end up running the school, they have done no better than the faculty; but the faculty still agree that something is wrong. Generally, they blame the students, whom they call "lazy" and "anti-intellectual."

In a situation like this, it is worth asking if "the system" is at fault. I think it is: not our entire American social system, but the studio system of teaching architecture—the unexamined basic assumption of architectural education.

Why should students be expected to produce designs for building types under totally artificial circumstances?

Why should students be expected to be original?

Why is there so little emphasis on formal instruction in lectures and classrooms?

Why teach design in a studio at all?

Today's architectural curriculum is the product of two basically contradictory systems: the Beaux Arts and the Bauhaus. From the Beaux Arts comes the idea of the design sequence, in which the student is asked to solve a series of increasingly complex architectural problems, from a "house for a sculptor" to a group of government buildings. The Bauhaus contributed the concept that the student must never copy, but work up his ideas from first principles.

Both curricula put little emphasis on

books and classrooms, and gave prime importance to the atelier, and the master.

It is hard to imagine a more disastrous heritage for a period of rapid technological and social change.

The Beaux Arts system worked because the student was not expected to be original. The principles of architectural composition were established, the general configurations for each building known.

The Bauhaus system worked because the problems given were not complex. Originality was possible because the student had time to assimilate the problem and rediscover basic principles.

The studio system works when the master knows all that the students need to know, and when the studio is part of the real world.

The studio experience for the painter is a "real life" experience, because of his control over the final product of his work. You could teach Beaux Arts architecture in a studio because it was a widely accepted system giving the sense of ultimate control; you could teach Bauhaus design in a studio, because the studio was also a workshop. You can't teach today's complex architectural processes in a studio without the experience being removed from reality. It becomes neither theory nor practice, but an exercise with its own rules.

The studio is also very ill-adapted to a situation where the body of knowledge is changing rapidly: The studio implies a master and an apprentice; if the master is not master of his subject, the student is apprenticed to nothing.

When there was a self-confident belief in "modern architecture," the studio system could linger on, depending on the individual capacities of master and student. Now that most people believe that "modern architecture" was both an illusion and a description of an unimportant problem, the last concept that could hold the studio system together is gone. "Revolution" coming from either the faculty or the students has tried to introduce "real-life" experiences into the studio. Students are sent into the woods to build little houses, or into the "ghetto" to "help the community."

Much more prisoners of the system than they realized, these revolutionists are foredoomed to failure. Their attempts ignore the basic principle of education, which is that it is supposed to be a reordering and compression of experience. The student should be spared the necessity of discovering for himself what other people already know (although good teaching is programmed to give the student a sense of discovery). If life is your teacher, then you are not in school.

The ultimate fate of the studio system has been to confuse ignorance with originality; particularly when architectural students have been set to solving complex social problems, for which they have no equipment beyond the architects' predisposition to arrange things for other people.

There are different ways of teaching architecture. First, an architect requires both specific information on a wide range of subjects, and the techniques for using and synthesizing this information to solve problems. The diversity of information that today's architect must learn goes far beyond structural and mechanical engineering and the nodding acquaintance with art history that most schools provide as the principal supplement to the studio course.

Architects need an introduction to such fields as perceptual psychology, urban sociology, local government, decision-making theory, physics, geology, zoning law, landscape gardening and city planning, as well as engineering and more general liberal arts courses, such as English literature, languages, and enough history to be able to recognize the propaganda enshrined in most histories of modern architecture.

Knowledge of a wide variety of subjects, however, must be accompanied by the process of learning how to put all this information together in the design of buildings. Most of the emphasis in the schools of architecture has been on the teaching of originality and creativity, subjects that may well be unteachable. The rationale for this policy is that the student will have plenty of time to learn technology in an office; in school he should concentrate on art.

The trouble with this analysis is that most people who have investigated the incidence of originality and creativity find that new concepts grow out of old ones, rather in the way that some mutations produce new species. The theory that students will be freed from preconceptions if they are kept in ignorance of current professional practice thus looks to be self-defeating, for a thorough knowledge of the field is a precondition to creativity. Isn't what has passed for originality in the schools in fact only fashion, and isn't such hot pursuit of the latest o.k. ideas more likely to force the student's thinking into preconceived molds than a wider professional knowledge would do?

There are other, saner, ways of providing design instruction. One is to borrow a leaf from the business schools and put more emphasis on analysis and less on synthesis. A case-study approach dealing with selected completed structures could take the student step by step through the whole process of designing a building. Crucial decisions could be isolated, and the students asked "what would you have done?"

Architectural drawing should be learned in the context of techniques of presentation, and be based upon an understanding of graphic design—rather than picked up in the course of preparing presentations of studio work.

Students could also learn something about detailing and the organization of contract documents, because, while the conventional wisdom is that these subjects are practical and should be learned in

an office, they are in fact eminently teachable in an academic context, and offices seldom give novices an opportunity to experiment with detailing. Because detailing is usually not taught in school, many architects are forced to defer this phase of their education until they open their own office, where they learn at the expense of their first clients.

The conceptual organization of buildings is also teachable in an academic context. After all, there are a relatively small number of organizational models for each building type, and questions such as turning corners, proportioning openings, making entrances, and so on, are all susceptible to categorization and analysis. History of architecture taught in terms of the design problems the architects were solving would be much more instructive than history taught as botany—that is, recognition and classification of species, and the assignment of correct dates.

When the student does try his hand at design in school, he should begin with problems that are clearly defined and within his range of accomplishment. A bus shelter or a house for a sculptor are not elementary problems, but among the most difficult, because they lack constraints and the range of possible choices is bewildering. A surgical suite in a hospital, a lecture hall, or some other subcomponent of a major building type would be much more suitable, as all of these could be studied in a classroom situation.

Finally, some method must be found to combine instruction and practical experience. Schools of architecture could form offices to engage in those aspects of architectural practice that commercial offices find unprofitable. In such a situation, a student might have more discretion than he would in a more conventional office, although he would have to be working under direct supervision of an experienced professional for the system to work.

Alternatively, more offices could reorganize their projects so that students could be employed to do some of the work. Students are in fact a good source of labor for some of the more tiresome aspects of office work. Their reward should be an opportunity to understand fully the scope of the project they are working on, and the office should resist the temptation to send the students out to fetch coffee or drawings from the printers.

This kind of curriculum reform is only possible if the schools can be freed from the burdens of the studio and its mystique. Instead of endless searching for "original" solutions to unformulated and misunderstood problems, the student would have the time to take useful and interesting courses, and to learn the fundamentals of the design process without the necessity of proving himself a "creative" architect. He would thus be better equipped to enter the profession as it is, and to grow and change with it in the future.

Denise Scott Brown, A.R.I.B.A.
Partner in the firm of Venturi and Rauch, Philadelphia. Taught five years at the University of Pennsylvania, two years at Yale University, one year each at UCLA and at Berkeley.



I feel that large numbers of architects will, one way or another—using computers, manufactured components and traditional methods—be producing individual buildings and groups of buildings. Further, I believe that the *physical* aspects of city planning and urban design will, increasingly, diverge from other areas of city planning and link themselves with architecture. Therefore, I think many architects should be trained for these traditional architectural activities, though with new dimensions added to their training to make them more aware socially, economically and politically, and more realistic and less romantic technologically.

These are the specifics, the action-oriented aspects of architecture; their great need is to be taught more efficiently both in their practical and artistic and their theoretical-contextual aspects.

Next, there will be further developments in architectural research, perhaps the most rapidly growing facet of architectural education and certainly the most widely ignored till recently. We should expect a preponderance of young instructors in architectural schools in the near future to be research rather than practice oriented, gaining their teaching material from their work in the university's institute for architectural research, rather than from architectural offices. Here the big questions will be: 1) The scope and content of research. At the moment research in design methodology is the big thing, having replaced the only fields of architectural research of long standing—innovative structures and building materials. But there are many other important research foci, social-architectural relationships being high on

the list of growing and worthy areas, and formal analysis (the analysis of architecture as form, style and symbol) being low but worth reconsideration. 2) The relation between research (pure and applied) and action—a particularly important topic in a professional, action-oriented field. As this question gets faced so we should expect some research-trained architects to head into policy fields related to architecture, filling positions in HUD, UDC, etc.

Community architecture will probably be developed primarily from a base within architectural research institutes at universities or in firms of young architects with a relation to the university, since this work needs funding and overhead support which must normally be supplied through institutional channels. As this activity is subversive of existing political and economic city-building mechanisms and their usual architects, its development may be impeded and it may prove too unprofitable for all but the hardest architects; therefore the schools should support it as part of their social and professional obligation.

The training of clients—of developers and building decision-makers in governmental, corporate and community organizations—is not now an offering of architectural schools. But since no other university departments offer it perhaps architecture schools will take it, running programs in conjunction with real estate, business administration and community organization departments.

In sum, there is no longer one way in which an architect should be trained, but a field of overlapping endeavors are emerging which broadly constitute architecture and architectural urbanism. Within it will be scope for many different kinds of careers, and architectural students are already show-

ing that this differentiation is what they want.

For the student, community projects can be extremely beneficial if well run and organized. If not well run, great periods of the students' time will be given over to waiting. Community action takes time, and can't be hastened for the educational needs of students. Similarly, an "on-going" student-community program can let the community down if no students register for it one semester and the previous students have all left. Again, more organization is needed to avoid harming rather than helping the community. Finally, "real life" is a good teacher (perhaps the best) but not all lessons can be learned this way. Abstraction and concentration of the elements of real life are as necessary in education as they are in art, precisely in order to help train us for real life.

Students should participate in curriculum planning—but that isn't the whole story. Part of today's call for participation represents a lack of trust (often well-based) on the part of students, and a fear that faculty or administration cannot or will not represent their best interests, in curriculum or administration. If the trust were there, the students might be content to withdraw from some aspects of educational policy making: 1) because some of it is time-consuming and not educational, 2) because they rely on the judgment of those who are

working at it.

Faculty members should to some extent "know better" (or why were they hired?). I haven't found a student who has not conceded this to some degree when in a situation of mutual trust and cooperation.

I question any method for "all" students. For many students, required office work would be a good idea, especially given the innate "entrepreneurial" leanings of many of today's activist architectural students. They want to be "in business" for the community. Also it would allow the schools greater financial leeway by reducing the scholarship and teaching burdens. But office work should be aligned with a tutorial program to help the student relate his office experience to his academic work. You can't rely on the offices to do this, or to give the student an "educational" rather than a narrowing experience. The school must help him make it so—anything else is abandonment. I would advocate office experience for some, research experience for others, and other combinations as yet undefined.

But the greatest need is for truly committed teachers with interesting things to teach and a willingness to be concerned with students as individuals.

There is one more important question (to my mind) on architectural education — and that's the place of studios. It's been denigrated and misused, but it's potentially the most interesting educational technique we can offer to the university at large (more and more "innovative" undergrad techniques in liberal arts education look suspiciously like studio). And, if well used, it is peculiarly suited to our own students. It does not have to be disorganized and anti-intellectual.

Architectural expression is extremely limited—
it runs the gamut from A to B.
It follows at the rules of regular Euclidian geometry
—mostly cubes, only sometimes cones or spheres.

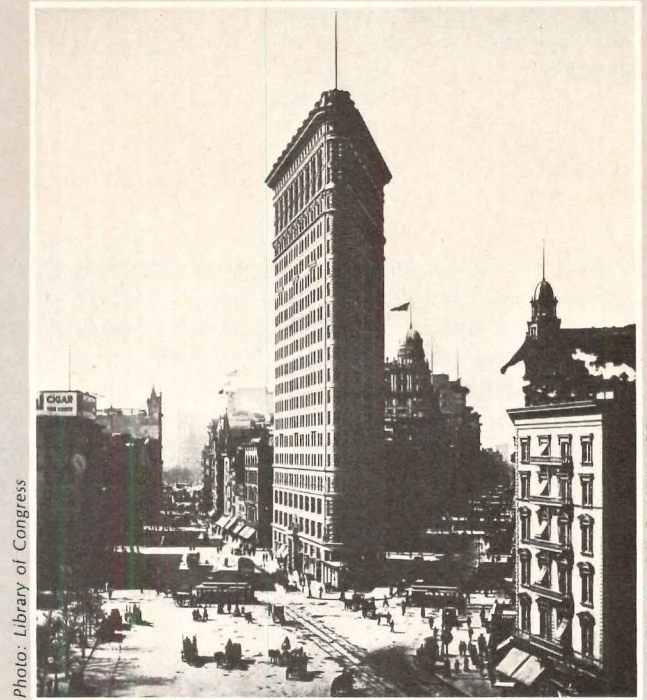


Photo: Library of Congress

FLATIRON BUILDING, NEW YORK.

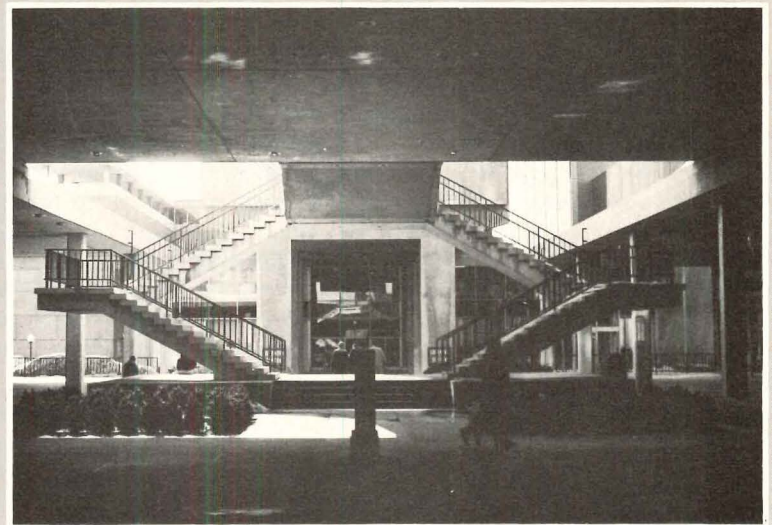
Pictures that might help us think about ways to make architecture

These photographs are pinned on the wall
of the conference room at the offices
of Hardy Holzman Pfeiffer Associates.
The reason:

“Most clients expect a building to look
the way most buildings look—based
on commonality or regular geometric shapes.
If they see something unfamiliar
they don’t consider it to be architecture.
These pictures help our clients
expand their vocabulary.

“The pictures also remind us to keep
expanding our vocabulary.”

—Malcolm Holzman



PRUDENTIAL CENTER, BOSTON (SYMMETRY LIVES!)

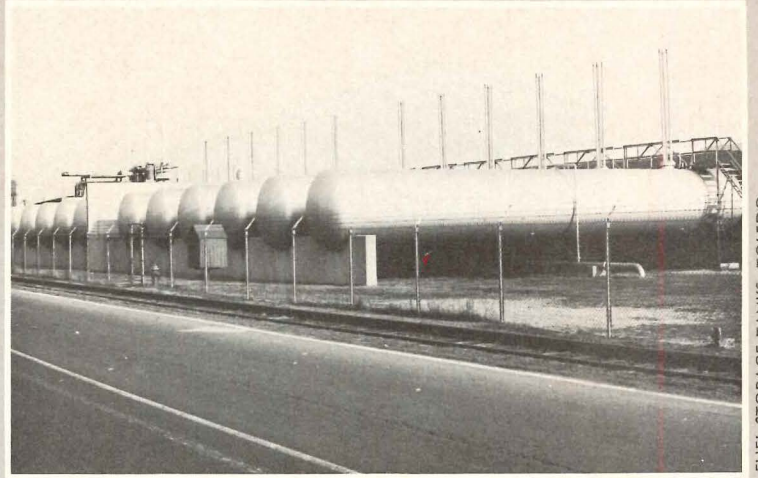


THE OLD PENNSYLVANIA STATION, NEW YORK

Architects are always putting
(have always put) buildings together
in commonality. Like this:



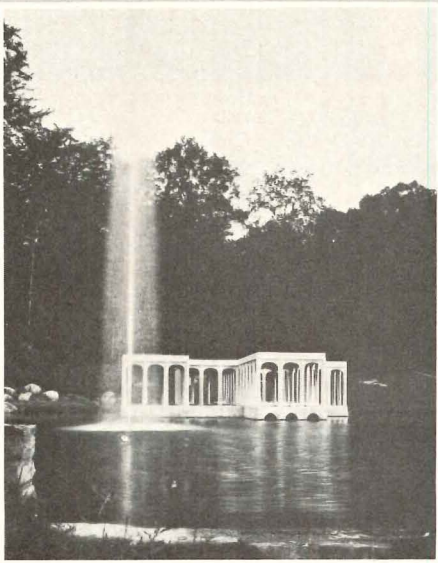
WORLD TRADE CENTER, NEW YORK



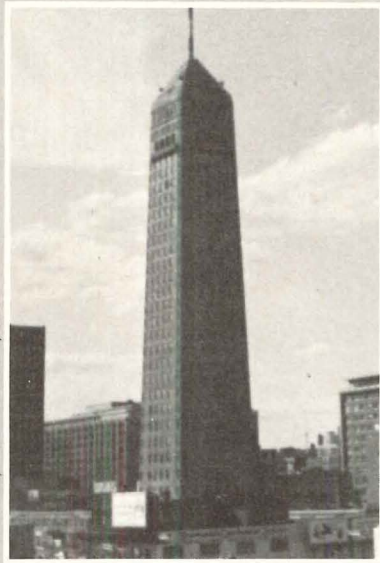
FUEL STORAGE TANKS, TOLEDO



FALSE TEETH ON DISPLAY, GOLDSBORO, N.C.



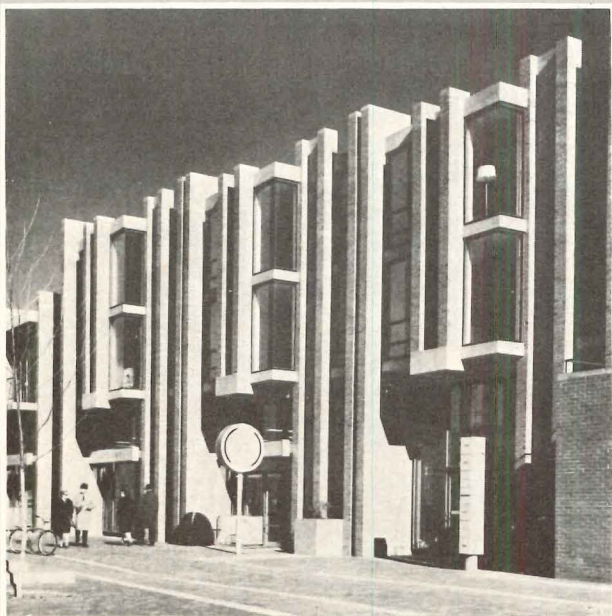
PAVILION, NEW CANAAN, CONN.



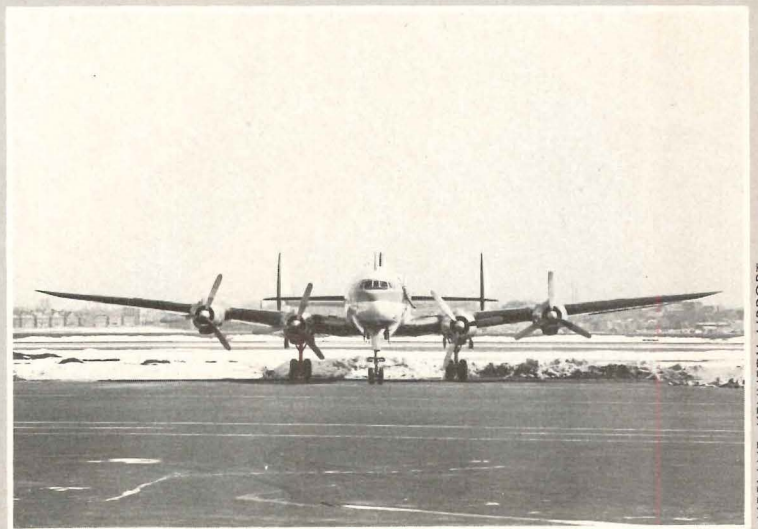
FOSHEE BUILDING, MINNEAPOLIS



CARS IN LOT, NEW YORK

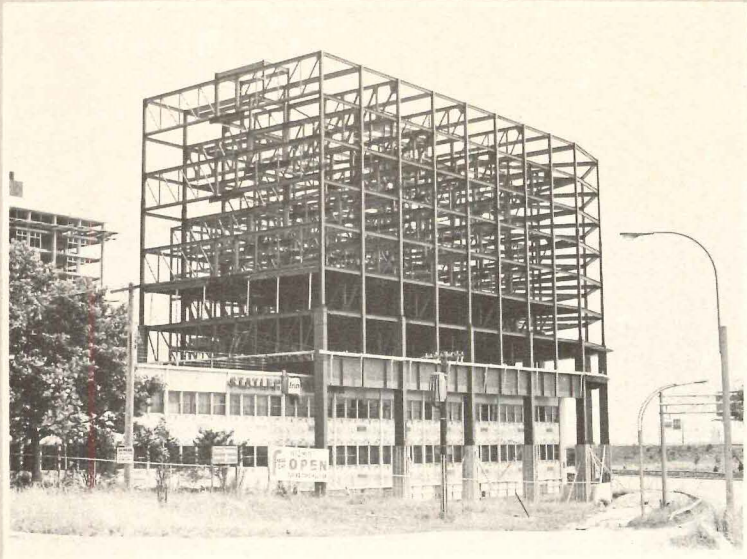


HOUSES, RESTON, VA.



AIRPLANE, KENNEDY AIRPORT

Sometimes architects put things together in common forms, but overlap them. Seldom is it intentional—but it could be great!



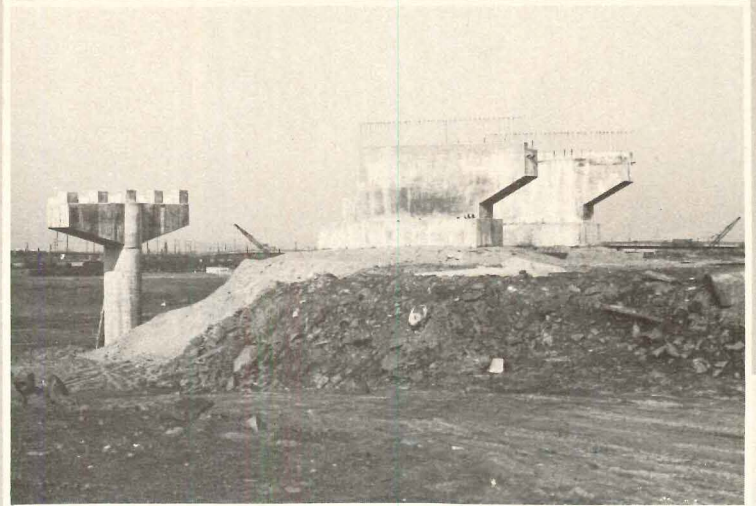
ADDITION TO EXISTING HILTON MOTEL, KENNEDY AIRPORT

People other than architects—like highway engineers or industrial engineers—put things together differently; in a much less formal, much less geometric way.

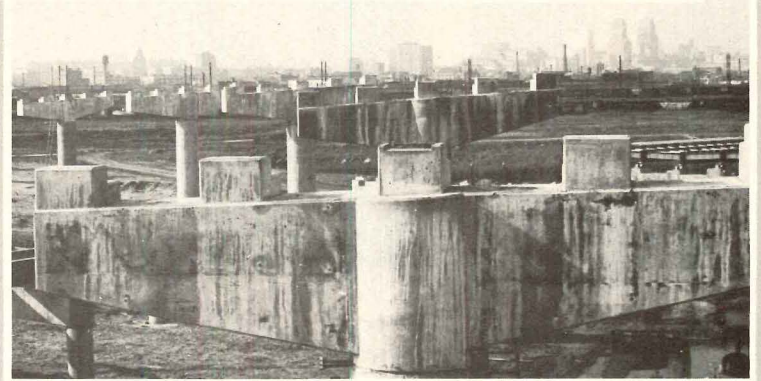


NEW JERSEY TURNPIKE/JERSEY CITY HIGH SCHOOL

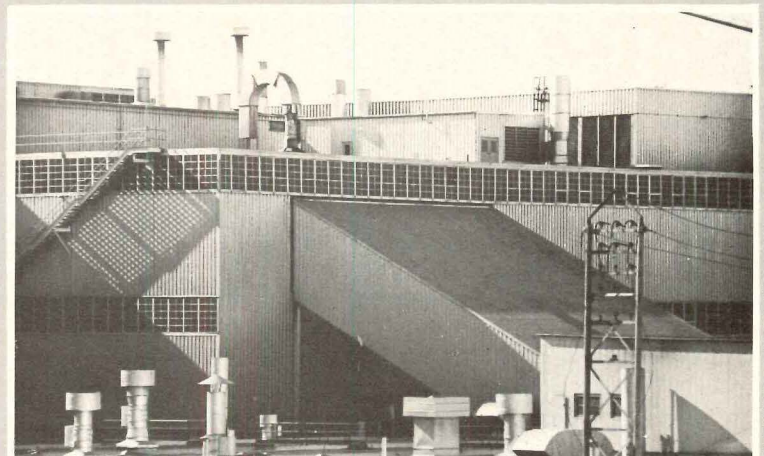
There is no reason, for example, why things cannot be incomplete—because the eye finishes them for you.



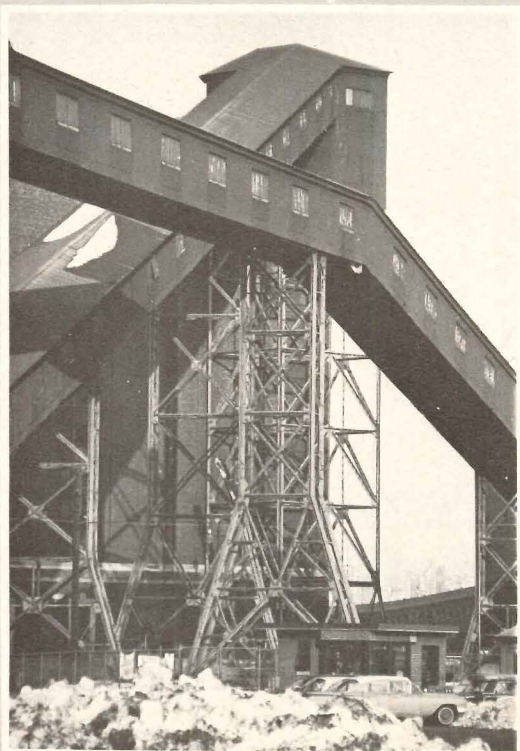
NEW JERSEY TURNPIKE



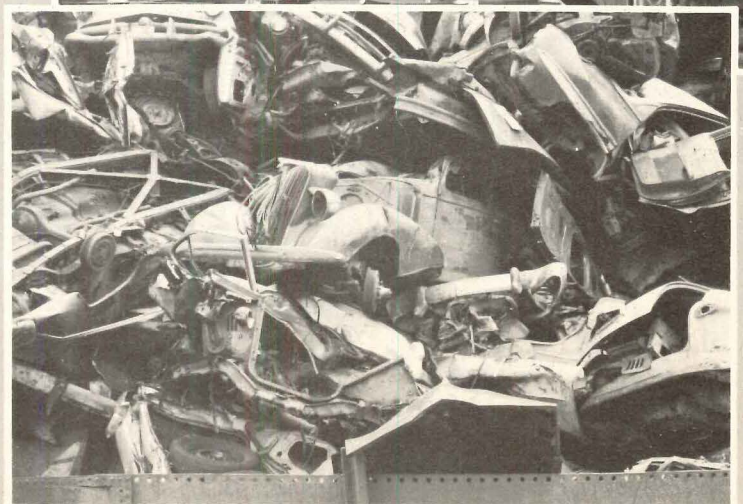
And there is no reason why things in opposition cannot be combined through the use of collision.



FACTORY ROOFS, TARRYTOWN, N.Y.



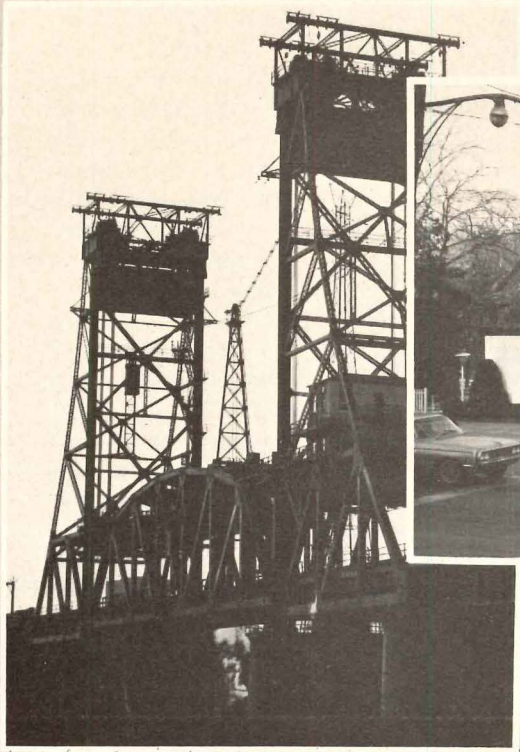
PUBLIC SERVICE POWER PLANT, NEWARK



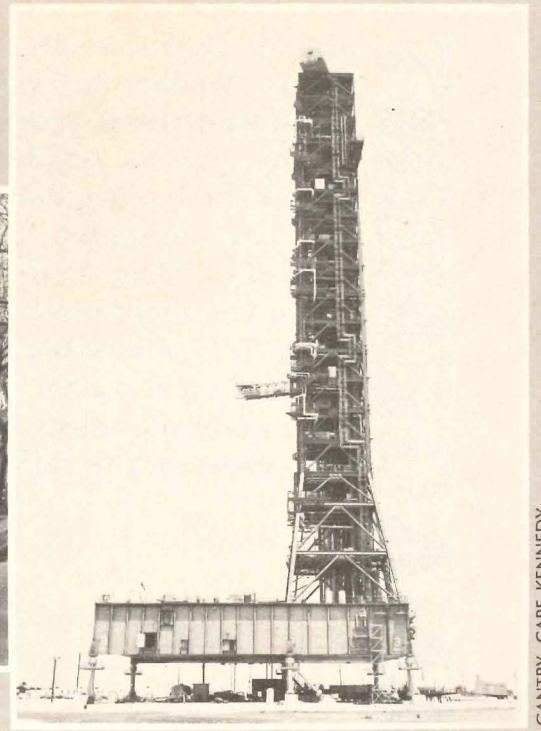
JUNK YARD, TOLEDO

Non-architects have designed a great many structures that should make us think about our regular geometric buildings differently . . .

RAILROAD BRIDGE, HACKENSACK, N.J.



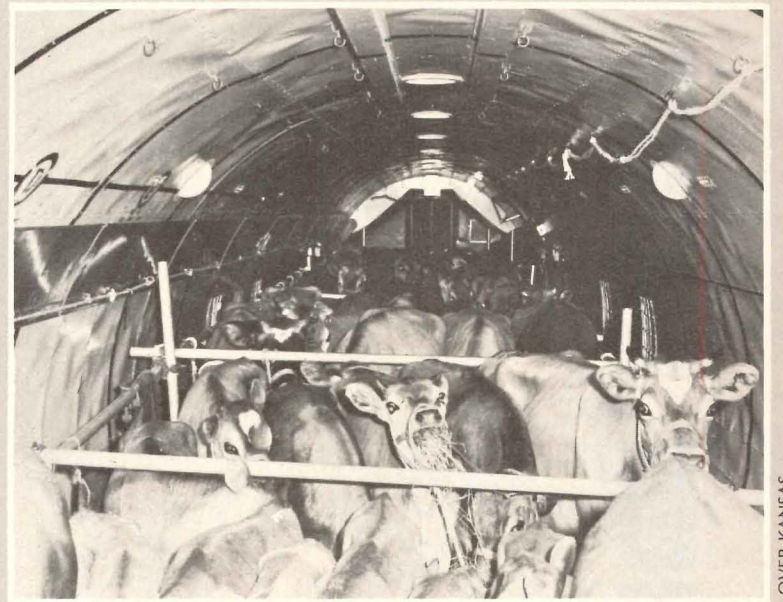
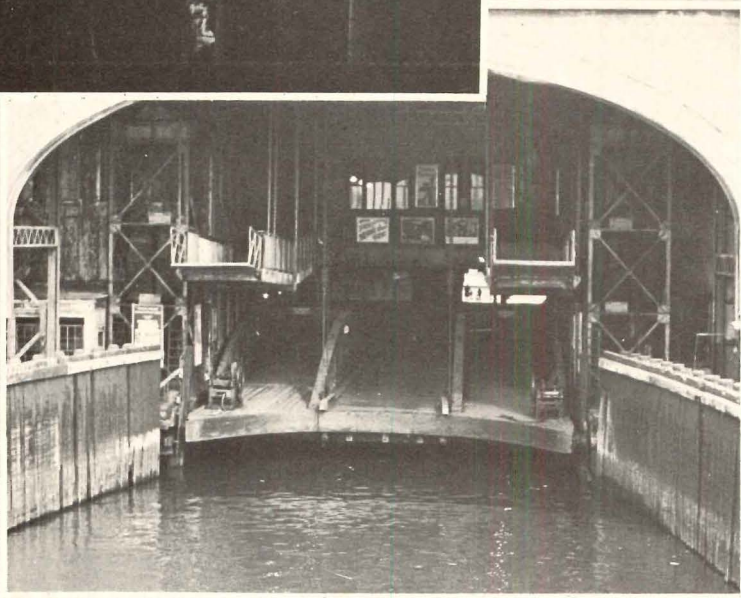
MOVIE HOUSE, WHITE PLAINS, N.Y.



CANTRY, CAPE KENNEDY

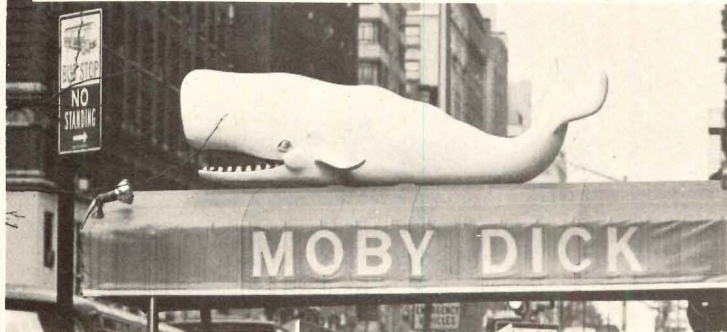
. . . their structures are very different. Designed the way people really operate. So . . .

FERRY SLIP, JERSEY CITY



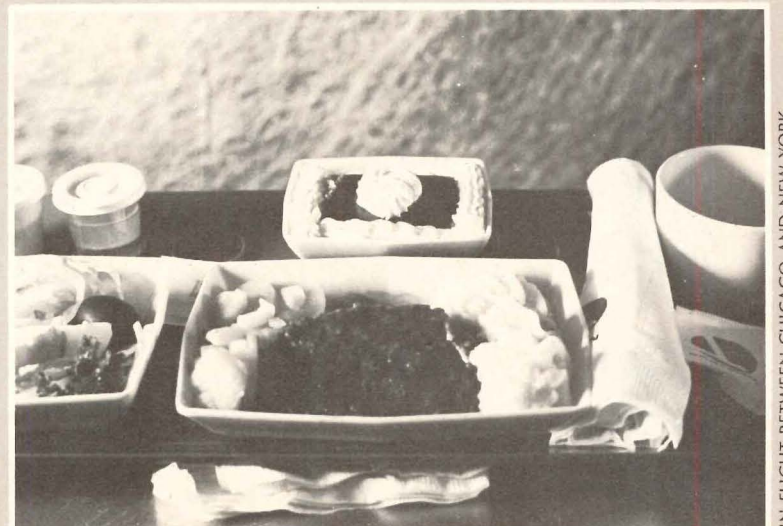
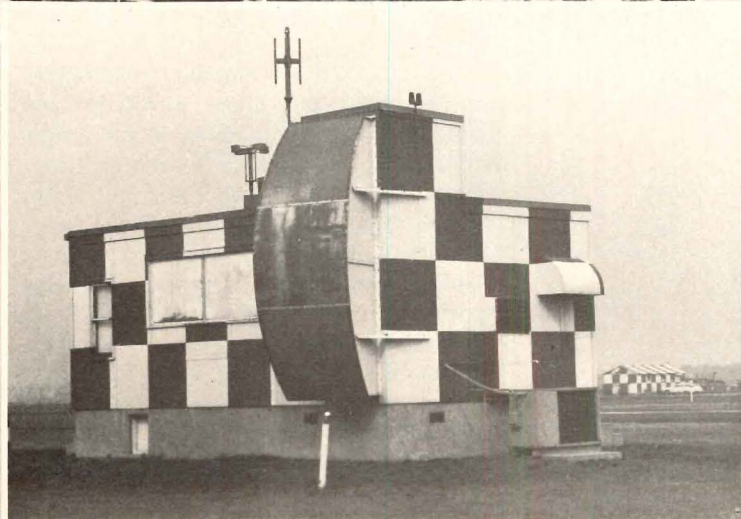
OVER KANSAS

SIGN, MADISON AVENUE, NEW YORK



. . . If cows can fly and people can eat plastic meals . . .

STRUCTURE, LAGUARDIA AIRPORT, NEW YORK



IN FLIGHT BETWEEN CHICAGO AND NEW YORK

. . . how come our buildings are not so different from the way they have always been? Hmmm?

CLIENTS IN THE 1970'S NEW REALITIES, MORE MANAGEMENT

Record talked to scores of clients. Whether they were giant corporations, Federal or state agencies, or advocate groups in the urban core, they are more sophisticated, more demanding, more concerned about how they spend their money than ever.

One point is clear: they need professional help—not professional posturing.

Finally, the biggest client of all—the public—is now involved and concerned. Remember who used to attend public hearings? A couple of lawyers, a local assemblyman and maybe a representative from the League of Women Voters. All that has changed and changed dramatically. Last spring, for instance, at a hearing to debate a proposed highway route outside Albany, a thousand citizens gathered to protect a small but friendly stream called the Bozenkill. At last report, the highway planners are looking for an alternate route.

The Battle of the Bozenkill will not take its place alongside Lexington, Belleau Wood, the Alamo or the Little Big Horn in the history of American grit. It is not likely to become a folk theme or have an aircraft carrier named after it. Its real importance is that it serves to represent many hundreds of similar skirmishes in towns and cities across the country. Whether these skirmishes take the form of picketing, marches, telephone campaigns or citizens' law suits, they all serve notice that the citizens, or large numbers of them, want a voice in the decision-making process. They want public discussion of the SST, DDT, plastic packaging and phosphates in detergents. They question the wisdom of fouling the oceans with everything from raw sewage to nerve gas. They want a part in shaping their schools and neighborhoods and they want some measure of control in the establishment of national goals and priorities.

Whether this phenomenon be called "participatory democracy" or "the politics of confrontation" or something else, its effect on government, on industry, on all manner of institutions—and on architects—is increasingly apparent. When Columbia University decided to build a new gymnasium in Morningside Park, *Ramparts Magazine*, a literary irritant to the Establishment, galvanized student and community resistance. The project was abandoned. Conservation groups spearheaded the successful attack on the proposed Everglades jetport. Dissident community groups forced Alexander's, a New York department store, to give up its planned expansion on Manhattan's upper West Side even though the new location would have meant 900 new jobs in the community. Citizens are better informed, better organized, more vocal and more effective in their lobbying techniques than ever before.

In this restless climate, government and business—and their architects and planners—have had to move slowly, often with public relations staffs running interference. When New York Telephone Company, particularly sensitive to public opinion, announced plans to build a new facility in Huntington, Long Island to relay signals from the World Trade Center to Eastern Long Island, the expected community reaction developed. Local television viewers anticipated more ghosts to match those already on their screens. They protested. Jack Collins, director of New York

Telephone's Buildings Engineering Department, discovered that by turning the proposed facility exactly perpendicular to the incoming signals from the World Trade Center, the pattern of interference could be tightly controlled. With the help of a microwave consultant, Collins found that by inclining the wall of the building some eight degrees out of the vertical, interfering signals could be made to bounce harmlessly into the air. Community resistance diminished and this project is going ahead.

But often the issues are more serious than television reception. When the same company identified an urgent need for a new wire center in Manhattan's Lower East Side, they purchased the necessary parcels of property in the heart of the city's Chinese community. Construction of the facility would have involved relocation of nearly 250 residents. Community opposition formed swiftly. The "Ad Hoc Two Bridges We Won't Move Committee" argued that relocation in this case would



Nell Hodgson Woodruff School of Nursing, Emory University, Atlanta
Robert & Company, Architects

entail extraordinary hardship. These 250 were members of an especially close cultural community that could not stand dismemberment. In addition, many of those involved spoke no English. New York Telephone listened but their need for space was critical. A collision was averted in the eleventh hour when The Educational Construction Fund, a public benefit corporation, intervened with a practical suggestion. ECF had title to a nearby property for which a school had been planned. The site was larger than necessary for school use, and ECF had been searching for a partner to develop the site jointly. New York Telephone, as it turned out, was an ideal partner and the project—with a new and complex design solution—will go ahead to everyone's benefit at the new location.

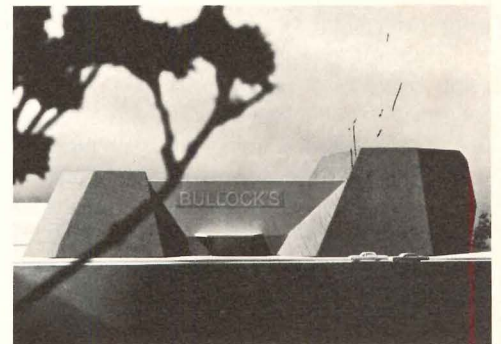
The lessons that these examples may offer can be summarized simply. In more and more cases, the frame of reference for the architect's client has been enlarged. The businessman or developer cannot move from assumption to decision without preparing for contingencies he has not had to cope with in the past. Most important, practical solutions can often be found and, in a climate of polarization and protest, success is likely to favor those clients—and those architects—who will look for them.

The money crunch has changed old clients and created new clients

When interest rates rose to their present heights, many lenders began applying a new market leverage. Life insurance companies, traditionally the largest source of mortgage money, began entering the real estate market as large equity participants. In the past, content to lend their money at fixed rates of interest, these companies placed 105 per cent loans just to get their money into circulation. A generation of millionaire-developers later, this practice

has turned around completely. In a recent issue of *Fortune*, William F. Leahy, vice president of Metropolitan Life Insurance Company says "In this market, we can make just about any deal we care to." Such deals today normally involve not only big equity participation but a bonus or "kicker" as a hedge against inflation. This "kicker" may run as high as 12 per cent over the coupon value of the loan. And that changes all the rules for the architect's client.

In addition, before investing in many projects, insurance companies often demand a preferred dividend to be paid out of a developer's first cash flow. These terms are too stiff for many small developers, and some that were under-capitalized have been driven into the woods. A few, with especially good track records, welcome the new terms. Jim Rouse, developer of Co-



Bullock's Department Store, Los Angeles
Welton Becket & Associates, Architects



1095 Sixth Avenue, New York;
New York Telephone Company
Kahn and Jacobs, Architects



Rossmoor Towers, Laguna Hills, California; The Rossmoor Corporation;
Bodrell Joer'dan Smith & Associates, Architects

lumbia, maintains that "this new canniness makes the insurance companies quicker to see opportunities. They have become more sophisticated lenders."

Real estate investment in the past has tended to be dominated by private capital. Except in the form of home ownership, it attracted only relatively narrow interest from the investing public. As credit has tightened, as stock values have dipped badly, as good sites have grown increasingly scarce, investors have turned in larger numbers to real estate. Not only do most large life insurance companies have active real estate portfolios, many of the larger commercial banks are forming new mortgage banking subsidiaries. Gordon Emerson, chief financial officer of Cabot, Cabot & Forbes Co., explains why: "A well managed stock portfolio may earn as much as 10 per cent. On real estate portfolios, returns may reach 14 or 15 per cent."

Public money can now enter the real estate market through several vehicles that are growing in popularity. The pooling of pension funds for mortgage accounts is one. The real estate investment trust is another. In the case of the latter, corporate taxes are avoided if at least 90 per cent of all profits are passed on to investors. And *this* changes all the rules for the architect's clients.

The new money game creates clients and jobs at a new scale

These trends not only indicate an incipient shift in the composition of investment assets, they offer the potential of sums large enough to tackle tasks at a new scale. This new scale is attractive to large, publicly-owned corporations who sometimes join with each other or other appropriate

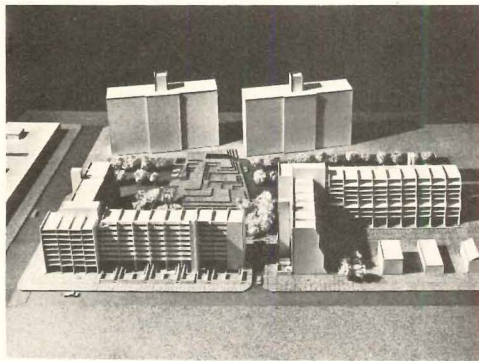
institutions to form consortiums for real estate development. For example: Kaiser and Aetna Insurance Companies have joined to develop a speculative housing complex on the 4200-acre McCormick Ranch in Scottsdale, Arizona. Alcoa, Inc. is building Century City in Southern California, and with Challenge, a West Coast development corporation, is generating a large scale housing development in San Francisco. Metropolitan Structures, headquartered in Chicago, is well into the development of a new town outside Montreal. Reynolds Metal and Gilbane Building Company have pooled their efforts for the erection of a speculative office building in Providence, Rhode Island.

But the pressure is on costs and on professional management

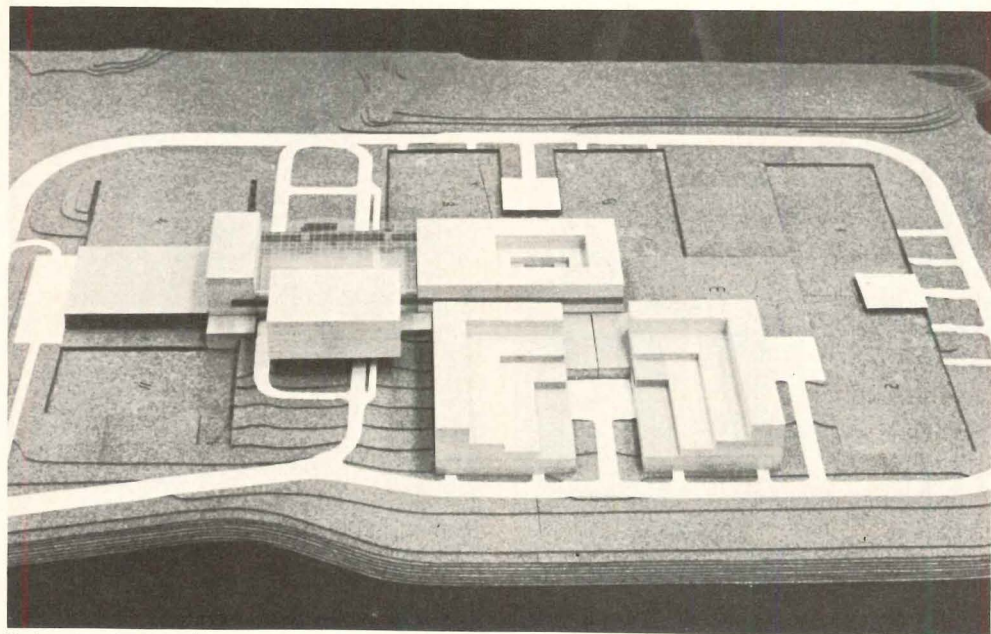
High interest rates and soaring costs have conspired to underscore the urgency of reducing design and construction time on all kinds of projects. The Olivetti Corporation of America, architecturally present in main streets across the country, sums up a widely held client view: "Olivetti is traditionally well disposed toward architects, with an

increasing appreciation of those who can flex their pencils within the confines of a trim budget."

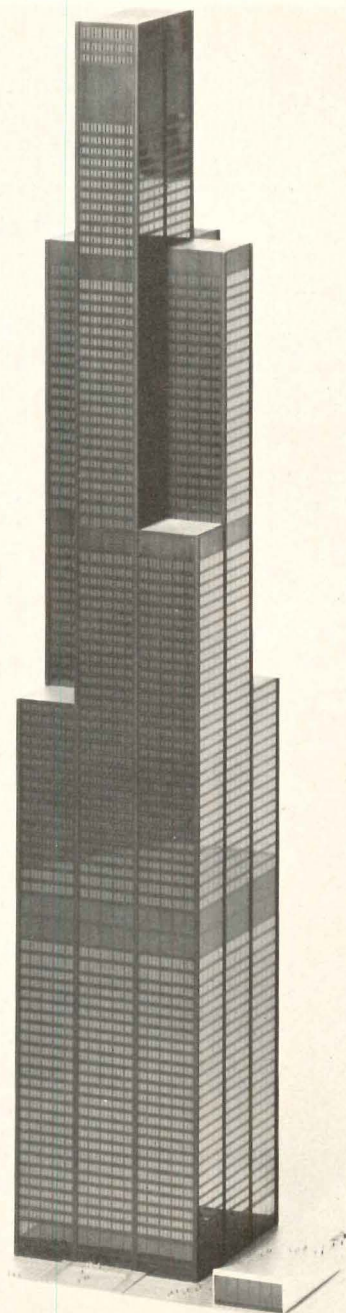
In an effort to come to grips with rising costs, owners and developers are expressing increasing interest in more sophisticated management techniques. Many of these techniques, spun off from the space program, are in widespread use. Older CPM and project networks have become commonplace. Several years ago, New York's State University Construction Fund, perhaps the biggest single client in the country, began to understand the savings inherent in "Fast-Track" and other forms of phased construction (see page 142). The cry everywhere is for intelligent project management. And as the scale of projects gets larger, this cry becomes imperative. Some real estate development firms have already geared up to provide the full range of management services these clients are seeking. Cabot, Cabot & Forbes, one of the most successful, markets itself



The Lefrak Organization Boulevard II Housing, Bronx, New York; Gruzen Associates, Architects; Dominick Salvati & Son, Associated Architects



University of Massachusetts, Boston Campus; Bureau of Building Construction, Pietro Belluschi/Sasaki Dawson Demay, Master Planners



Sears Tower, Sears Roebuck Inc., Chicago Skidmore, Owings & Merrill, Architects

to corporations and institutions as a professional client. They have long specialized in industrial parks, and have more recently begun developing prestigious commercial office buildings. Their range of services is comprehensive—they handle all phases of development and construction—and manage the buildings. But—significantly—they have given up an in-house design capability in favor of commissioning architects on a project basis for a negotiated fee. For their commercial work (for example, three neighboring towers in Boston—New England Merchant's Bank, Boston Company Building, and 60 State Street, see photos page 143) C,C&F normally seek architects whose skill and experience are known and whose name adds prestige to the project. In their industrial work, they usually seek out local architects whose ability to work within budget, schedule, and local building conditions has already been demonstrated. The firm's proposal appeals to many clients who wish to be relieved of the need to spend large amounts of management time on building project decisions and who gain the added benefit of multiple services under a single contract. Significantly, they do not build low-budget buildings—"We look for," says Edward Linde, "major tenants who want a quality building, because that is what we want to build."

The Lefrak Organization is another developer with a history of successful management operations. It has built, since

World War II, thousands and thousands of apartment units in New York City. While the apartments are much sought after by tenants for the value and close-in location they offer, few would describe the huge brick towers of Lefrak Village as handsome, or as offering ideal community amenities. But that experienced developer's growing concern for improved design and planning (as reflected in the design for Boulevard II housing, photo, page 140) is another harbinger.

At the new scale, new kinds of management control

Perhaps the most dramatic example of the new emphasis on management techniques is furnished by the University of Massachusetts' Boston Campus, now in planning. It is the largest building project (\$355 million) ever undertaken in New England. The site is a former garbage dump where underground fires have been burning for years. The site also has noxious gases both above and below grade, a thriving rat colony, large underground voids, and distant bedrock. On this Faustian site, in the incredibly short space of 33 months, Boston's Bureau of Building Construction is committed to raising six major university buildings. A project that would normally require five years to complete is compacted into two and a half. To manage this gargantuan undertaking, BBC has hired McKee-Burger-Mansueto, Inc. whose principal task will be to coordinate the efforts of some forty design firms, consultants, contractors and government agencies. As if this were not bedlam enough, MBM must open channels of communication to the community, the press, and local political organizations.

Searching for ways to bring this task into manageable proportions, the project managers telescoped design and construction into overlapping phases and regarded them from the start as a single process. Instead of submitting work for periodic public-agency review, inspectors from those agencies have been integrated right into the project team in an effort to stem unnecessary delays. Key to the success of the project is the largely computerized in-

formation system called CAPCON which ties together all the sub-groups in an unbroken chain of communication. Constantly up-dated, this information flow includes printouts of detailed project schedules, "hot lists" of critical activities and half a hundred other reports necessary to effective management of a huge project from design to final occupancy.

To imagine that a project of this complexity can breeze ahead without unlooked-for delay, without running up against the Babel syndrome somewhere, is almost certainly sanguine. But if this team, which includes some of the best architectural talent in New England, can meet even the majority of its commitments on schedule, it will be a victory of no small magnitude for project management.

Not all clients are so amenable to experiment as the Boston Bureau of Building Construction, but . . .

Even in Washington, the words are speed and efficiency

In order to streamline design and building procedures, Federal agencies with large construction budgets are turning to phased construction and insisting on better project management. General Services Administrator Robert L. Kunzig, in implementing the recommendations of a government sponsored study of GSA's construction contracting systems, anticipates substantial savings in time and cost.



Iwamasa Building, San Francisco
San Francisco Redevelopment Agency
Van Bourg/Nakamura and
Okamoto/Liskamm, Architects



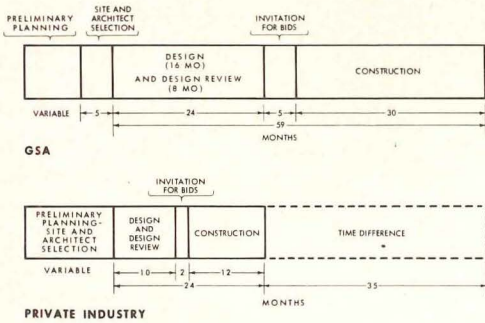
Olivetti Regional Office, New Orleans,
The Olivetti Corporation of America
Charles Colbert, Architect



Long Lines Equipment Building,
New York Telephone Co., New York
John Carl Warnecke and Associates, Architects

© Louis Checkman

**AVERAGE TIME FOR GSA AND PRIVATE INDUSTRY
TO DESIGN AND BUILD A \$10 MILLION OFFICE BUILDING**



In summary, these new procedures affect selection of architects, professional fees, cost estimating, design review and construction inspection. In particular, GSA does not anticipate "training" architects but, by constant review, expects to weed out from its files those design firms that cannot or will not pay strict attention to budget and schedule.

To assist in speeding up the design-construction process, GSA decision-makers are going out on visits to architects' offices for on-the-spot decisions rather than calling architects into a central office for review and long-delayed approvals.

The Department of Health, Education and Welfare is also committed to modernizing its construction management techniques. In creating its new Facilities Engineering and Construction Agency, former HEW Secretary Robert Finch identified the need for a new approach to managing the Agency's \$400 million building budget. FECA's new approach will be based on performance specifications and on the systems

concept. Like California's SCSD venture, FECA seeks the development of interchangeable components and plans a major effort to develop research programs in value engineering and life-cycle costing. "There is every reason to expect", says FECA director Fremouw, "that the results of systems buildings as applied to schools can be duplicated in hospital and office construction. . . The Departmental R&D program will recognize that [architects and engineers] will stand to benefit from a coordinated effort that mobilizes all other efforts in the national research community." While unclear whether they mean it, the intention is hopeful.

Nowhere is the need for efficiency more urgent than in the newly-reorganized Post Office Department where obsolete equipment and increased mail volume combine to make the situation critical. The Department's budget for fiscal 1971, expected to be about \$400 million, is earmarked for design and initial construction of some 10.9 million square feet of new post office space. The projected space figure for fiscal 1972 is nearly double. Over the next five years, the Department is anticipating the expenditure on construction of about \$2 billion.

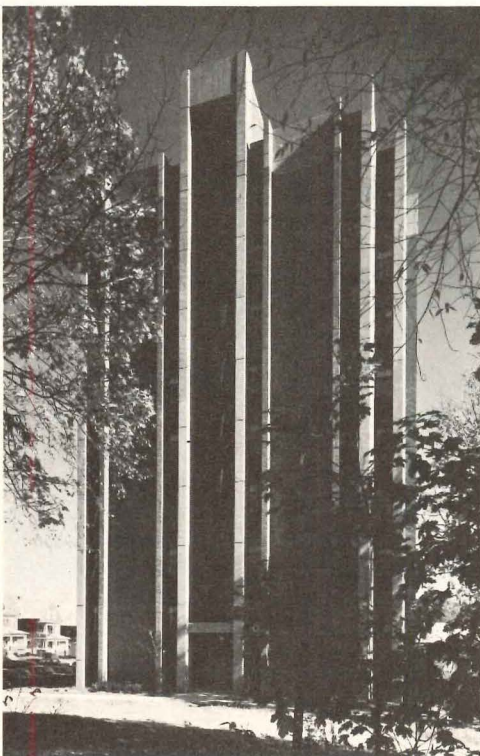
To manage this vast expansion program, the Post Office Department has already implemented phased construction. The total design time on one current 80,000 square foot project is seven months. Construction time on another building of a million and a half square feet is a year and ten months. Donald A. Koss, Director of the Department's Building Design Division, estimates "five to six years would have been required to design and build this structure under earlier procedures."

The architect selection process has also been simplified. The Department maintains a file of architectural firms who have expressed interest in specific projects. The eligibility of each firm is evaluated by

Facilities Bureau personnel. When functional requirements are identified, architects are contacted. A team of Post Office officials (usually two men) then visits each architect who has indicated his continued interest. First consideration is given to local firms. If they are small and the project large, the Post Office team inquires about the possibility of a joint venture with a larger firm outside the community. The team also investigates the applicant's work force and current design load. Recommendations are then made to R. E. Isaacs, Deputy Assistant PMG for Construction Engineering, who forwards the recommendations for final approval to Henry Lehne, Assistant Post Master General. The selection process is often completed within a few days and seldom takes more than two weeks.

Architects may be excused a lingering skepticism. These happy events, heralded here as a joyous augury, may end again in complete paralysis. But at this point they must be regarded as a clear statement of intention and, hopefully, as a self-fulfilling prophesy.

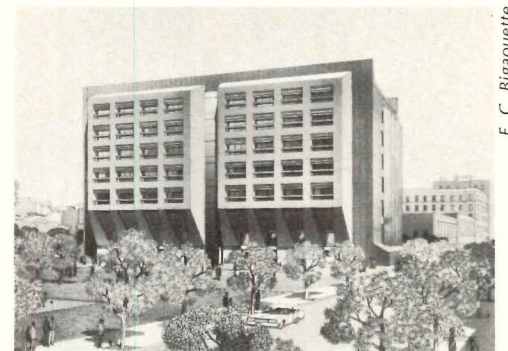
Charles N. Pratt



North Campus Dormitory, Trinity College, Hartford, Connecticut
Jeter & Cook Architects



State University Construction Fund, SUNY Stony Brook, Long Island;
William Kessler & Associates, Architects



New York Telephone Company, White Plains (before and after conversion)
Haines, Lundberg & Waehler, Architects

E. C. Bigaouette

Among traditional clients— new problems, new approaches

Colleges and universities, especially private institutions, are facing an uncertain financial future. The trend in recent years toward higher faculty salaries and lighter teaching loads has put an increasing demand on university budgets. This demand has been further strained in the past two years by recognition of the need to offer higher education to more students from low-income backgrounds. These financial burdens have risen far more sharply than income from endowments. While these new demands seem to many administrators to be entirely consistent with broad educational objectives, they have precipitated a crisis in higher education for which solutions are not immediately apparent. The need for new space of every kind continues to mount, but it seems likely to suppose that university construction budgets will get caught in the squeeze. (And surely buildings that are blown up, burned down, or otherwise assaulted will be harder to replace than before.)

Among commercial clients, certain trends appear to be emerging. The boom in regional shopping centers is slowing slightly owing to the current economic doldrums and to the growing scarcity of good suburban sites. Macy's, for instance,

will open only two new locations this year in contrast to previous years when they averaged nearly twice that number. They anticipate a return to their past average next year.

The "discount houses" have taken over much of the market for inexpensive, low-grade merchandise leaving department stores with a narrower market but an increasing demand for quality goods. As a result of this demand, stores like Sears and Bullocks are continually upgrading their merchandise. They are also, therefore, upgrading their physical facilities and their public images (see photos, pages 139, 140.)

The practice of commissioning architects to design exteriors and "store specialists" to plan interiors is limited to the larger national chains. Macy's Richard Belcher explains that "Many architects recognize the special character of store interiors and leave this field to the specialists."

What the clients need: professional help, not posturing

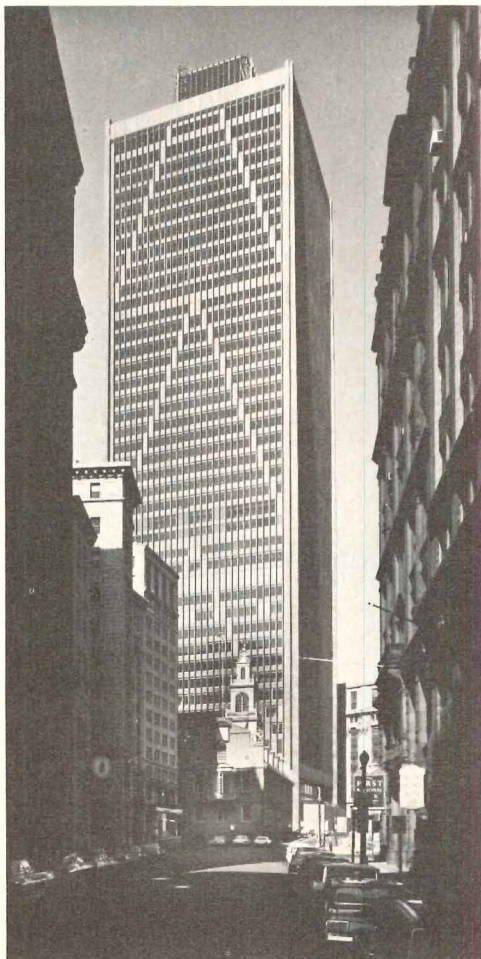
It comes as no surprise to architects that the credibility gap between the profession and its clients is not closing as rapidly as it should. The A.I.A.'s reformulation of the architect's role, as expressed in Comprehensive Architectural Services, smacked of the mock-heroic. More important, it did not convince architects, many of whom began organizing along the more realistic lines described in Bill Foxhall's study of new tools for the profession (see page 154.)

Clients, like architects, are given to exaggeration and caricature. They are fond of recalling occasions from the past when an architect proposed something that, but for timely intervention, would have pushed the client to the poorhouse door. Those occasions when an architect's responsibility and knowledge rescued a client from disaster, do not seem to print themselves so vividly on his mind.

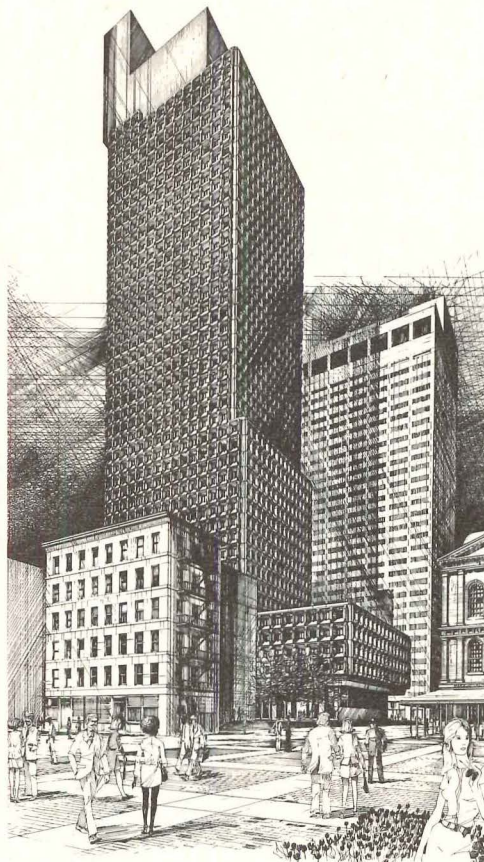
That architects have not always paid strict attention to budget, schedule and clients' needs is beyond dispute. They have sharpened and will continue to sharpen this focus in order to have the impact on the future that their instincts and abilities uniquely equip them to provide.

—Barclay F. Gordon

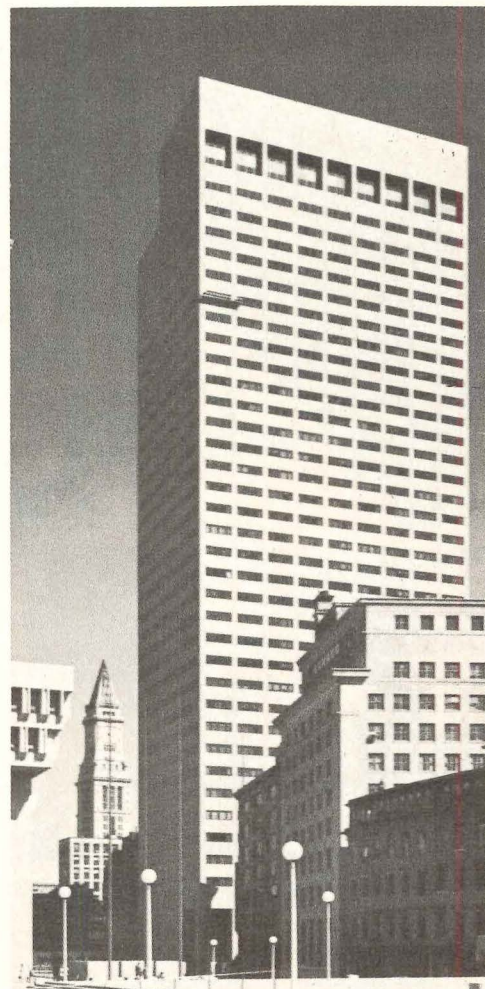
Ted Corchey



Boston Company Building, Boston,
Cabot, Cabot & Forbes Co.
Pietro Belluschi—Emery Roth & Sons, Architects



60 State Street, Boston, Cabot, Cabot & Forbes Co.;
Marcel Breuer/Herbert Beckhard, Architects



New England Merchant's Bank, Boston,
Cabot, Cabot & Forbes Co.
Edward L. Barnes—Emery Roth & Sons, Architects

Architects design for a new client: the poor

"Whoever the architect works for in dollars, he's working for the community." The idea may not sound new, but, for a change, it is being put into practice in an increasing number of instances, notably in poor communities. Perhaps more important, it is becoming basic to the outlook of many architects, especially young architects and students. The quote comes from Hugh Zimmers, a 33-year-old architect from Philadelphia who founded the city's Architects Workshop Community Design/Development Center, and who now spends a large amount of time away from the office of which he is principal, commuting to Washington, D.C. where he is an advisor to the American Institute of Architects and a member of its Task Force on Professional Responsibility to Society. Zimmers is a Republican, yet he, along with many of his co-workers, often finds himself in the position of a

radical, as a supporter of the poor as client. Who the poor are in a given community depends on geography, not race. Architects are working for blacks and Puerto Ricans in New York City, for Chinese in San Francisco, for Mexicans in Corpus Christi, for American Indians in Denver, for whites in Knoxville. Understanding the different cultural needs of these clients is essential. Item: For some groups, the kitchen is the central room, a need easily accommodated but requiring contact with the client. Item: A poor black family in New York might be horrified at the exposed brick living room wall so fashionable in renovated brownstones—they've seen enough exposed brick.

The role of the CDCs

Architects' services to the poor extend beyond design; and in many cases, design is only a minor part of their job. The Community Design/Development Centers, non-profit organizations which provide professional advice to poor communities, are examples of the variety of services architects

are furnishing. Generally, they do not make final designs, nor initiate programs, but rather, help communities form their programs—providing technical expertise, training, and ways of getting projects implemented. While CDCs usually do design work if requested, they do not want to compete with private firms. There are now 65 CDCs across the country. Six months ago, there were 50. The oldest, Harlem's ARCH (February, page 41), was founded in 1964.

CDCs usually have strong support from local A.I.A. chapters, (CDCs in Detroit, Seattle, and Pittsburgh work out of A.I.A. chapter offices, though they are more often independent). CDCs often work closely with government agencies, such as Model Cities and the Office of Economic Opportunity, which has given substantial funds to several CDCs. Other CDCs find money from foundations or private sources, as in Cleveland, where local businesses have made major contributions.

Universities have also given support to many CDCs: Kent State in Cleveland; Yale



Charles Painter

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Jonathan Hale



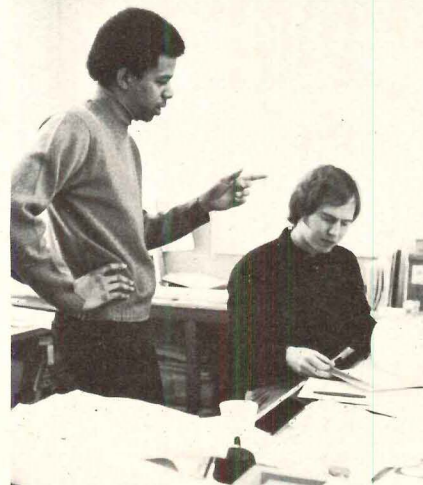
Bud Outlaw

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Planners

A) Alice Barkley leads an architect-client meeting in San Francisco; B) Architect Malcolm Hozman and clients Vincent Jones and Gerald Hages view plans for Brooklyn community center; C) Augustus Baxter, Philadelphia CDC head discusses plans with architect W. E. Cox; D) ARCH staff members Richard Fitzhugh and Randy Leach; E) ARCH head Arthur Symes with staff member Manuel Christina; F) Vernon Williams, A.I.A.'s new national Director of CDC Services; G) Topper Carew, head of New Thing, Washington, D. C.

Black Star



D



Black Star

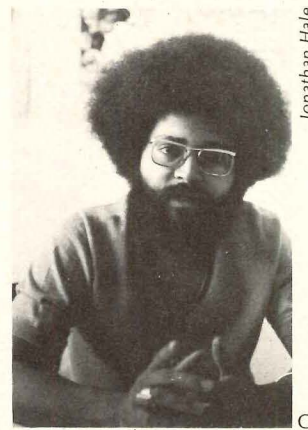
Jonathan Hale

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Jonathan Hale

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in New Haven; Harvard in Cambridge; the University of Illinois at Chicago Circle, which helped establish Chicago's West Side CDC; and the University of California Extension, through which the San Francisco CDC works.

CDCs are not looking for political trouble, but they occasionally find themselves at loggerheads with local governments, since part of their purpose is to fight for their communities. For example, a CDC in Chicago is fighting to prevent the destruction of a neighborhood for a junior college; and San Francisco's CDC was instrumental in getting an injunction to stop destruction of housing in Yerba Buena, calling for replacement of 2,000 units on the same redevelopment site. The Yerba Buena business center to go on the site was designed by Kenzo Tange, with McCue, Boone and Tomsick and Lawrence Halprin, and organized by the city's Redevelopment Agency. The local A.I.A. chapter and former Governor Brown, arbiter for the case, have supported the housing demands.

Tulsa's CDC, by contrast, has received great cooperation from the local government. In Tulsa, the greatest effort is a program to train the community to deal with government agencies; Model Cities and the Neighborhood Development Program are helping. The Tulsa CDC is also starting a program to train local tradesmen and contractors to bid more effectively for contracts.

A CDC has just been set up in Corpus Christi, Texas, to help hurricane victims. It will help its poor clients get damage claims fairly assessed, as well as working on rebuilding.

Another approach: the New Thing

Topper Carew is a young black architect in Washington, D.C. Three years ago, he set up the New Thing Art and Architecture Center—and it really is a new thing. It now has a staff of 40 in three buildings. New Thing is not a CDC; its purpose is much broader—to bring the community to life. As Carew sees it, the poor can't see beyond day-to-day;

they don't have goals because they don't know what the opportunities are. Carew compares New Thing to the Bauhaus because of the diversity and high level of its activities. There are complete darkrooms, professional film-making equipment, an African dance troupe, a graphics division, and a non-accredited high school. The quality of the work is very high, high enough that Carew hopes to make New Thing self-supporting before long. It works, says Carew, because it comes from the community itself.

In addition to these activities, New Thing does planning work and helps the community talk to the city about its planning needs. In an effort similar to Tulsa's, New Thing—using film to translate from plans to reality—has worked to educate its community to express its own needs. "The people downtown didn't know what had happened," says Carew. New Thing has alienated some architects by doing work for free, but Carew sees no other way, in some cases, to provide for people's needs.

Bud Outlaw



Jonathan Hale



Bud Outlaw



Sites

Most poor communities contain pockets of decay (left) which can spread rapidly; but they often also contain healthy businesses and institutions, as well as a surprising number of privately owned homes. Those on the lower right face the site of a proposed community center. Church grounds (right) were turned into a play area (next page).



Jonathan Hale



Jonathan Hale

He is bitter about what he considers the profession's lack of involvement and understanding, but he is also doing something about that: lecturing weekly at Yale. One of New Thing's more ambitious projects is a proposed system of decentralized classrooms, using the whole community as a school, with a central facility for specialized activities. Teachers would live in the community, the staff being hired directly by the neighborhood. "There is no separation between art and politics, given that architecture is an art," says Carew.

Private offices and the poor

"Money is the biggest problem," says Donald L. Stull, a black architect whose Boston firm is designing low-cost housing units by the hundreds. Since the poor must depend on outside sources of money, the architect is often uncertain who will pay him and when. On one Stull project, the firm will receive no money from its government sponsor until the buildings are finished. Firms working for the poor do not

generally do so at a sacrifice, however. They can't afford it, nor is it necessary. On the other hand, the amounts of money available for buildings for the poor are so small at present that only a tiny proportion of the needed work is being done. Stull has no illusions that his work isn't a drop in the bucket, but he does see a movement toward change.

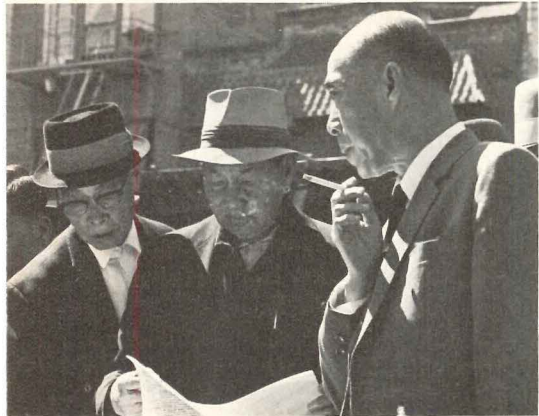
Hardy Holzman Pfeiffer Associates, in New York City, working on a way to provide cheap, rapidly built, but visually interesting community centers, have developed ways of combining pre-engineered building systems and unit components. The firm went to the Ford Foundation, which put them in contact with United Youth Action, a largely black community group in Brooklyn's run-down East New York section, which wanted to build a community center. Ford funded the preliminary design of the center. Now it is up to Model Cities, which has shown strong interest, to fund the project.

The center is to provide for active par-

ticipation as well as for passive appreciation of exhibits and events. Only activities which require separation will be enclosed. There will be large amounts of flexible, multi-use space, broken up by enclosed areas which will be separate factory-made structures. The center is to include teaching spaces, a bookstore, a swimming pool, a multi-use room for basketball and gatherings, a public library branch, offices, and various smaller facilities. According to the architects, all 60,000 square feet of the center will be ready for use within 145 days from Model Cities approval at a cost of less than \$925,000. They know it can be done because they built a similar project at Shaw University in North Carolina.

St. Ann's Episcopal Church was an increasingly isolated landmark in the decaying Morrisania section of the Bronx until Otis King, director of the Beekman Community Center, suggested a play area be made in the yard. Priest-in-charge Father Henry D. Moore, Jr. contacted architect Charles Jacob, of Wilton, Connecticut, who

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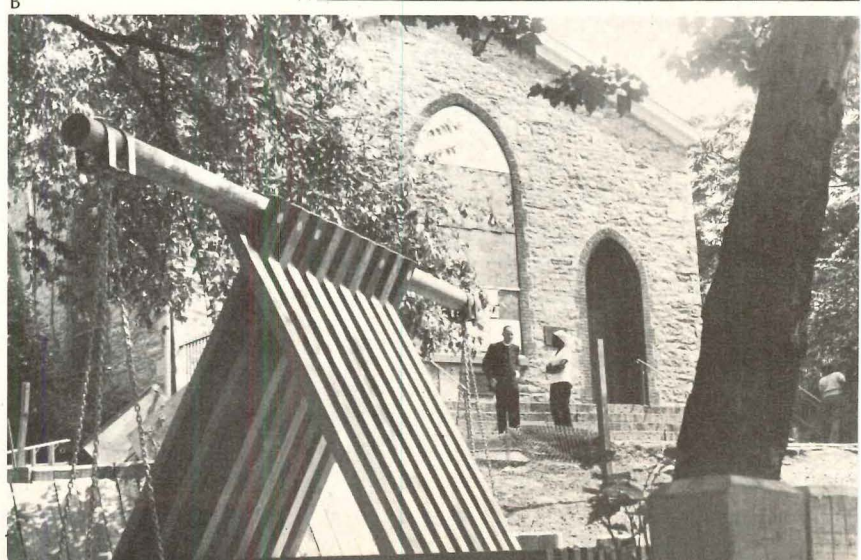
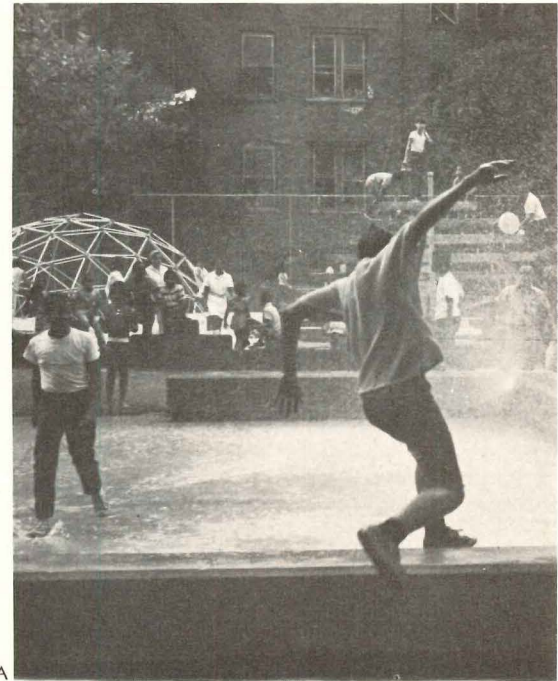
Clients

A) Residents of Chinatown, San Francisco; B) Reginald Thair, Tulsa; C) Virginia Smith, Chicago; D) Rev. Chuck Geary, Chicago; E) Akinbaloye Piankhi, Harlem, N.Y.



Projects

A,B,C) Beekman Community play area designed by Charles Jacob and George Cushine on the grounds of St. Ann's Church, the Bronx; D) Chinatown Community Center, San Francisco; E) Tulsa Superette, Tulsa's CDC head Bill Haney points out such projects are a small part of the CDC's program, whose main purpose is community education.



designed the three-level play area (below) with landscape architect George Cushine. The design was the result of numerous meetings with the local community. Money came from the church and private foundations. The top level is devoted to handball courts and a high school basketball court, with ample spectator seating; the middle level is a scrambling area with wooden climbing equipment; and the lowest level contains simpler climbing equipment and a spray pool for pre-school age children who will be supervised by neighborhood mothers in the Community Center's day care program.

A new architect

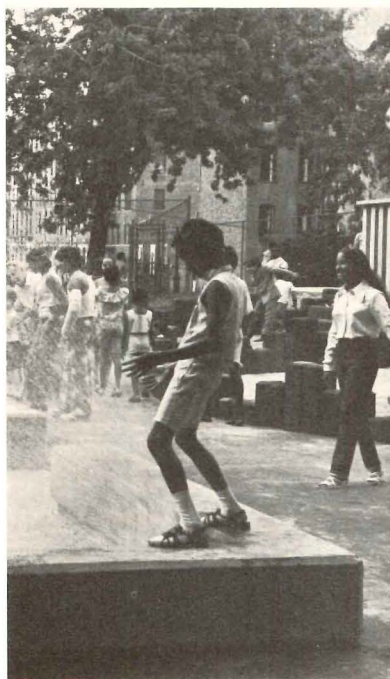
"Architects have historically worked for the kings," says Topper Carew. Those who have worked for the poor point out it is not essentially different from working for any other social group. What is different, though, is the idea that poor people can be clients. "An architect shouldn't design housing he's not willing to live in," says Ron

Bedford, former head of New Haven's Black Workshop CDC. Bedford and Carew believe architects have a responsibility to the poor client. They are bitter that the involvement hasn't been greater. Hugh Zimmers estimates there are only a few hundred architects deeply involved in designing for poor clients, with another 2,000 or so working fairly hard. Donald Stull believes the profession will gradually become more aware of the poor client as the present young, socially-conscious generation becomes established. But he worries they will get tired too soon. Zimmers does not believe working for the poor is a radical departure for architects; he points out that architects have traditionally devoted a substantial amount of their energies to community work of other sorts. Bill Haney, director of Tulsa's CDC says his work grows directly out of his having studied with Bruce Goff, "an important example of how to design from the owner's needs," but he believes the profession as a whole "has to shake itself out of its old habits."

The future

The poor client is getting increasingly serious involvement from architects, but money sources are decreasing. As Jim Reed, of the San Francisco CDC puts it, "In the old days, there was a pie to cut up; if you made enough noise, your client could get some of it. Now there's no pie." The A.I.A. is working on proposed legislation which would provide an operating budget for CDCs from federal money. They will ask for about \$3 million a year. The A.I.A. believes its proposal has a good chance. Getting money for building is another story. It is possible the whole effort to build for the poor client will collapse. Says Ron Bedford, "I don't believe the 'status quo' want poor people to live as well as they do. I'm very pessimistic." There is ample evidence to support such a view. Very little is getting built. But the poor are discovering that they can be the client, not the victim of public agencies. At present this new awareness of both poor and architects is the most hopeful sign.

—Jonathan Hale



BUILDING PROCESSES IN THE 1970'S THE TROUBLE WITH SYSTEMS

The trouble with the systems approach is that too many people—some professionals, but more so clients—think it is something it is not. Systems projects are set forth by their sponsors as the catalysts that will lead to breakthroughs in cost, time and quality. Question is whether they are this or primarily a new tactic. The tactic can only be as good as the *modus operandi* and the time will allow. What really is needed is better utilization of the knowledge and experience that exist. At any rate, these projects are valuable (if expensive) experiments.

The trouble with the systems approach to building—at least at present—is that too many people expect too much from it. The public, client, manufacturing and professional sectors expect that it can deliver more than is really possible—and seem to feel they can get better buildings faster, at the same or less cost, principally through the application of technology and new management tools and techniques. But unfortunately, the theories and techniques of industrial management (systems analysis, operations research, etc.) are sometimes being adopted—along with the jargon—too literally by systems-oriented groups in the building field.

By the same token, architects' and engineers' competence, experience—and the judgment that comes with experience—are given all too little credit. Also ignored is the fact that architects and engineers have always developed systems approaches of their own that apply to the kinds of building types that they work with.

"Systems" is, of course, being talked about by nearly everyone these days, even including the executive in the commuter-train bar car, because the subject is so much in print. But building industry attention has been focused on a number of building system demonstration projects that have been in the news over the past five years or so. Among these are the School Construction Systems Development and University Residential Building Systems projects in California; Operation Breakthrough sponsored by HUD; and the Study of Educational Facilities in Toronto. Because the SEF project is the most sophisticated to come along so far—involving the design professions to a high degree—and because the first 10 schools in the program are either completed or nearing completion, a preliminary evaluation of the results seems called for, and proper, at this time. Over the past several months the RECORD has talked to representatives of all the different types of participating organizations, including the SEF staff; architects and engineers who designed the schools; architects and engineers who served as consultants to sub-system bidders; sub-system contractors; technical advisers; and clients. Discussions with these groups were open and candid; participants talked freely about what they considered were the program's accomplishments and deficiencies. Their comments, while directed specifically to the SEF program, in general have validity for any program like this that might be undertaken.

What participants in the SEF program say—and some deductions

From familiarity with earlier demonstration system projects, and from what some of the participants in the SEF program said, it is clear that:

- There is no commonly understood or accepted definition of what systems building is. Evaluation generally has been superficial and from limited and, frequently, theoretical points of view.

- Because of the mystique, vagueness, and the "promise," systems projects have been a refuge for clients who cannot or will not analyze their own building-related problems, and take responsibility for their decisions.

- By its nature, systems building in large scale projects tends to exert a leveling influence on over-all quality, both from standpoints of utility and appearance. It may prevent some bad buildings, but it also may preclude some very good ones. Reason: the staff has to establish priorities and some norm for design; the effect of this is to presume that all clients needs are pretty much the same. This tends to put a lid on talent and enterprise, and limits diversity of approach. Also it tends to force design that suits the system rather than suiting individual needs of the client.

- A principal objective of a demonstration systems project obviously has to be to prove that the project can be accomplished in the first place to establish credibility; further, to insure that costs come in as projected. This can result in sacrifices in quality (particularly appearance) to prove a point.

- Design architects and engineers doing SEF schools have to stick strictly to the system to make it work. Manufacturers bids were based upon use of all standard components, exclusively. Non-system work was purposely priced very high to discourage its use.

- Clients got the impression from the SEF staff that design (planning) freedom would not be curtailed. Result was that clients sometimes insisted on more freedom than was possible without penalties arising from non-system work.

- Systems approach is the "magic" that automatically is going to give the client that which he is not really sure he is looking for; it gives him something better than he would have got if he had not used it.

- Systems make it much easier for the client not to do his homework.

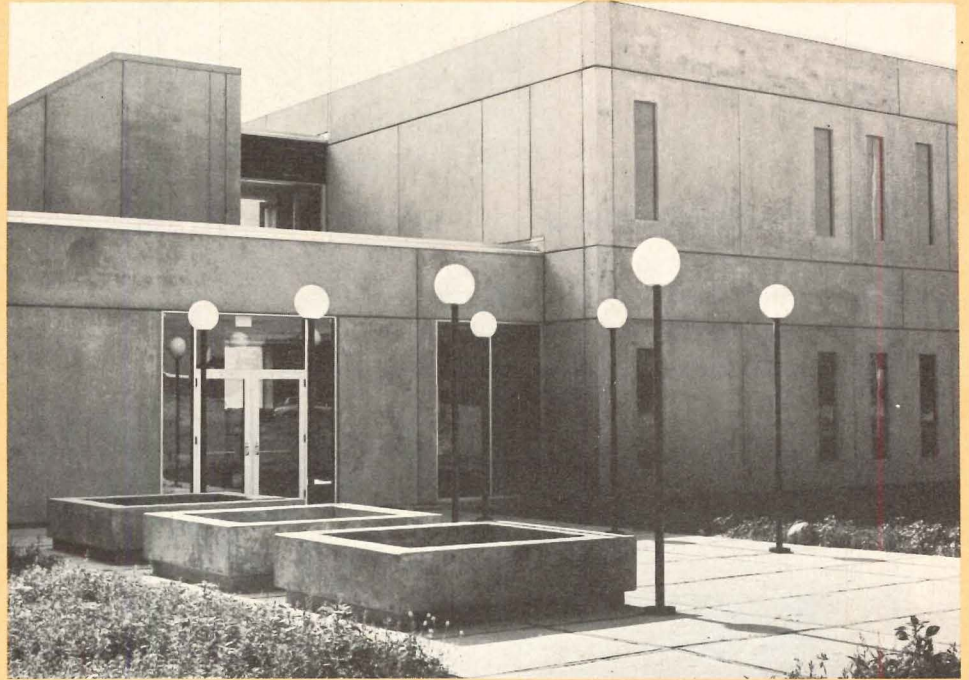
- Precoordination of components by manufacturers helps prevents major problems in the fitting together of components, but it does not eliminate field problems because each building is different in some respects; also, because the components are field erected, there still can be problems of alignment, attachment, etc.

- Systems may produce "more" building for the money, but the question is whether or not the client really needs the "more."

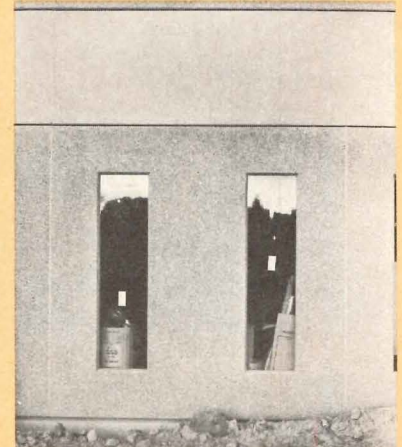
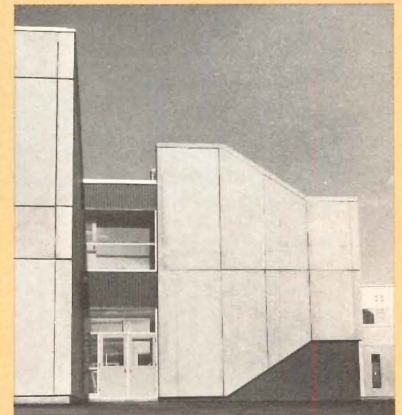
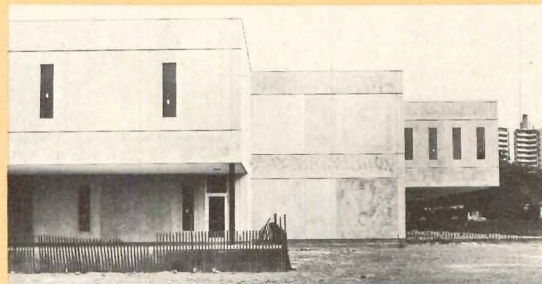
**Details of the SEF program—
from the people who were involved in it**

Key features of demonstration system building projects have been the performance specification and a guaranteed volume of building. In the case of SEF, performance specifications were issued for 10 sub-systems 1) structure, 2) atmosphere (hvac), 3) lighting-ceiling, 4) interior space division, 5) vertical skin, 6) plumbing, 7) electric-electronic, 8) casework, 9) roofing, 10a) carpeting, 10b) gymnasium flooring, 10c) finish hardware. Manufacturers or con-

The first of Toronto's systems' schools are finished and they all bear a family resemblance. Their exterior visual identity comes from the precast wall panels which comprise one of the 10 sub-systems that were bid in the SEF program.

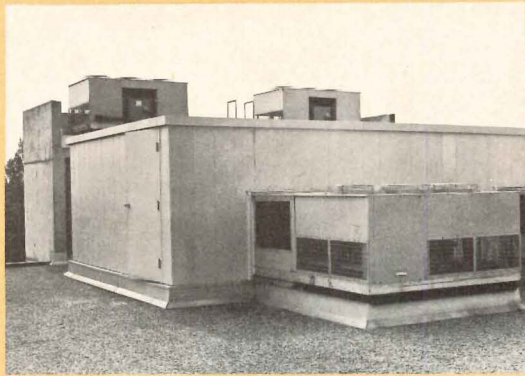


Basic precast units consist of a 4-ft high spandrel unit, and 10- by 10-ft and 5- by 10-ft infill wall panels ($U = 0.15$). Glass is 20- by 80-in. double-glazed units (one unit per 5-ft module, maximum). Variety was achieved by massing of volumes, using non-system stair enclosures as design elements, and using exposed aggregate on some later schools.

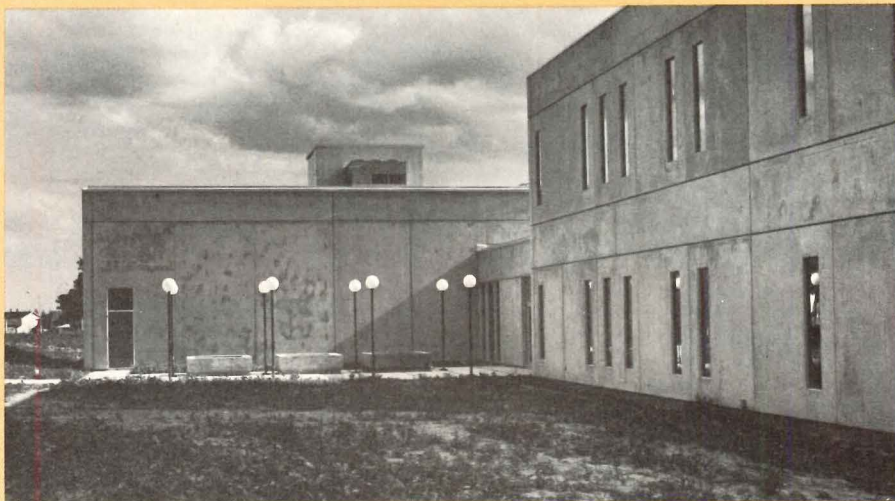


Costs for SEF schools have been coming in around \$20 per square foot. Roden Junior Public School was finished in nine months. The school at right is not in the SEF program, but was put out for bid on a design-build basis. It was built in about the same time as Roden, is fully air-conditioned and cost several dollars less per square foot.

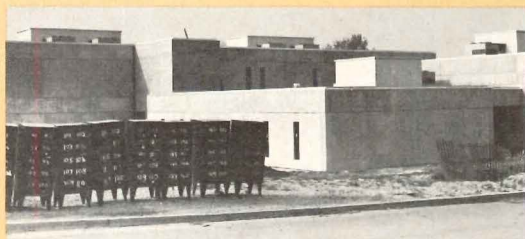
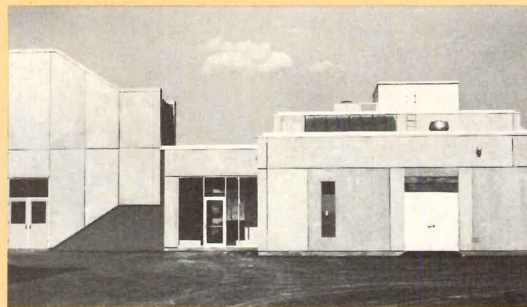




Using roof-top unitary heating and air-conditioning units in schools was a new experience for many Toronto architects and consulting engineers. They had mixed success in working in the units visually with the architecture. Sometimes units are hardly noticeable; occasionally they hardly can be missed.



The equipment used basically has a low silhouette, but SEF required the heating-cooling section to be put in man-high roof enclosures for cold-weather servicing (see top photo). In some three-story schools, split units were used—condensing sections on the roof, heating-cooling sections in interior machine rooms. When the site is below street grade, units are obvious.



tractors bidding on the project were told there might be as much as two million square feet of building and were given a guarantee of a minimum of one million square feet; current projections now are for 1.3 million square feet—the reduction a direct result of the market turndown.

What do proponents of the systems building project approach say it can do? They say: Because of the guaranteed “seed” market, manufacturers will be encouraged to innovate. Because components are pre-selected and are required to be pre-coordinated, architects and engineers will save the man-hours that this used to take them. Because components are standardized and delivery schedules can be prearranged, manufacturers can produce in volume, yielding reduction in first cost. Because of standardization, more components can be factory produced, reducing field labor, cutting down on the need for special skills, and improving over-all quality control. Because of precoordination, site cutting and fitting is minimized or eliminated. Because the specification is a performance specification rather than a prescription specification, manufacturers can suggest a wider variety of approaches; further, the pre-coordinating activity encourages integration of function.

Interfacing had built-in limitations for manufacturers

Component manufacturers who bid on the SEF program were required to interface (pre-coordinate) with at least two manufacturers in each category of components that had some physical relationship to their own. For example, the lighting-ceiling sub-system had to interface with at least two manufacturers, each, in the categories of structure, atmosphere (hvac), interior space division, vertical skin, plumbing, and electric.

Manufacturers could, of course, interface with as many manufacturers of related components as they wished to, or were encouraged to. Evaluation of bids was first based upon lump sum costs plus a consideration of potential penalties weighted according to functional and designability factors. Computer evaluation was then used to “sort” the proposals to determine the five lowest collective bids, each including the 10 subsystems. Final selection was made on the basis of technical judgment of which of the lowest five bids held the most promise for the program.

Because component manufacturers had to interface with so many variations of a given component type, they could possibly have been inhibited in coming up with the most functional and economical sub-system of their own that met the performance requirements. This situation also, in the early stages, could cause some manufacturers to hold back information about their own system until they could see who among the related component manufacturers stood the best chance of winning.

It has been estimated that all together the manufacturers who bid the project may have spent between \$2 and \$3 million for

the man-hours of their own forces and for fees of consultant architects or engineers they were required to hire to participate in the SEF bidding. The consultants' basic role was to interpret the performance specifications in terms of suitable materials or equipment, but in some instances equipment or elements were selected, and, in the case of the electric-electronic sub-system, new products were designed. Because of the high costs involved in bidding the SEF project (\$100,000 or more for a single manufacturer was not unusual), some people close to the program think this will encourage the formation of companies which will sell total school systems utilizing compatible sub-systems that now exist. (One such firm already exists in Toronto.) Some professionals conjecture that next time around total packages will be proposed for Toronto schools or perhaps will be asked for by the Toronto school system.

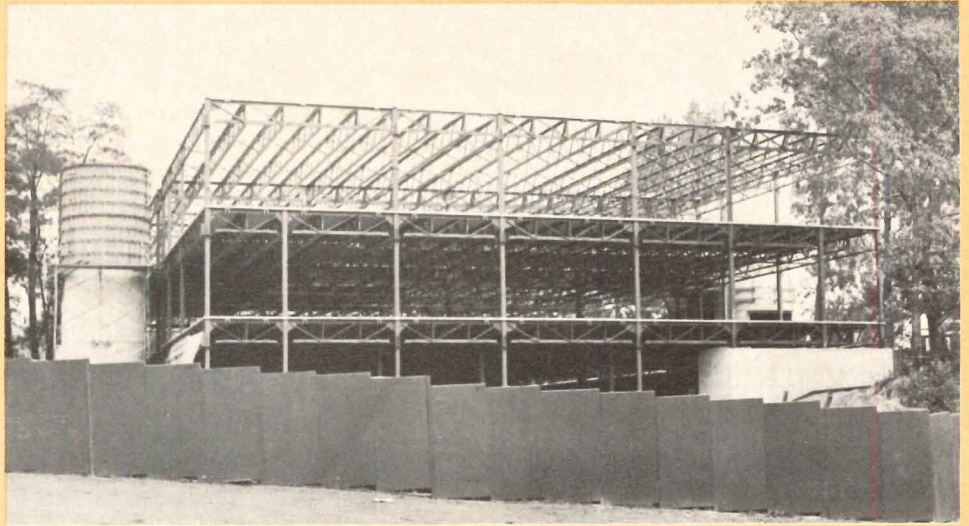
How the SEF project originated, and background on the early stages

Metropolitan Toronto is divided into six boroughs, and, unlike many large cities, each borough has its own school board. Because some boroughs are wealthier than others, in the past these were the ones with better schools. Recently The Metropolitan Toronto School Board was formed to help equalize educational expenditures among the boards. The Metro Board, which is made up of members of the borough boards, controls the building program and has a formula for how much schools should cost. At the time of the bidding on SEF, the formula called for a cost not to exceed \$19.10 per square foot, but recently it was increased to \$20.85.

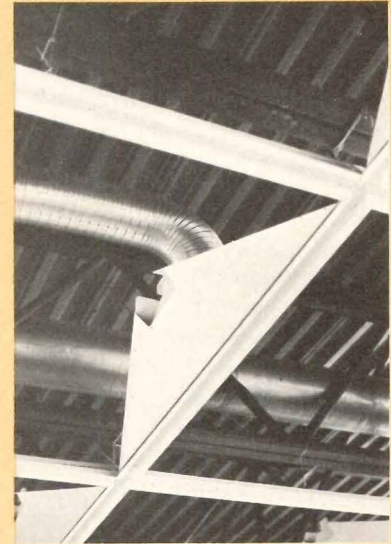
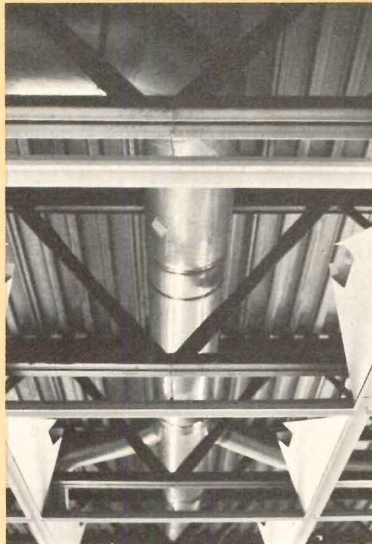
Borough boards had become increasingly frustrated by spiraling costs and were ready to try something new. So after a very influential trustee studied the SCS D schools in California and wrote a very strong report in favor of the approach, the Metro Board decided to establish the SEF program. SEF had an advisory committee of professionals and community leaders; the original chairman of the committee was an architect.

But the borough boards still had to be convinced they would not be sacrificing very much; that, in effect, they could have what they wanted. To make buildings work within the SEF budget, however, architects had to stick to very simple building shapes. It was technically feasible to build more complicated building shapes, but not within the cost parameters. In more than one case, architects told clients they could not have complicated shapes. SEF said they could. When some of the boards insisted on departures from very "blocky" shapes, they incurred cost penalties. Because many of the schools finished this year have gone over budget, next year's schools will have block massing.

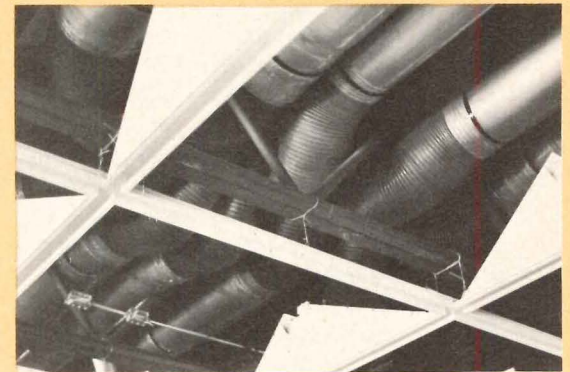
Other clients did not find the block-type design distasteful at all. In fact one architect had a client who, in describing his requirements, kept insistently drawing a



SEF required that the structure be capable of going as high as five stories. The open-web girders and purlins have the same depth, making it easy to interlace the ducts. Lighting-ceiling system coordinates easily.



Multiple flexible ducts are snaked up (right) to the multi-zone hvac unit on the roof. A novel aspect of the lighting-ceiling is the integral air boot which doubles as two ends of the lighting coffer. A heat-degenerative element supports the coffer above the grid providing a slot for air diffusion. In case of fire, dampers collapse, closing off air orifices.



square as the building shape he wanted; that's all we want, he said—just make it as flexible as possible because we don't know what we are going to do educationally. We want the freedom to do whatever we want. "That's it! Just give us a perfect cube." Obviously he had not done his homework. The system made it much easier for him not to, so he found the system very attractive.

Problems that developed in the management of the SEF program

The SEF program took a lot more time of people at a higher management level in architectural and engineering firms than traditional schools do. The problem was that the interfacing between systems had not been completely worked out. Architects constantly ran across problems which, if they did not fall clearly within one system in a simple way, took a lot of time—"six people and two days to resolve what should have been a two-minute decision." On a traditional job, the architects said, they would have scratched it out in the field.

The SEF system has been referred to as an "open-closed" system. That is, when many manufacturers were bidding and interfaced, there was a big variety of components and a broad mix of systems that met the performance specification. When the actual components were selected for the program, the system was "closed." Some architects felt that it was in the act of closing that many of the problems arose. While the manufacturers interfaced for all possible conditions they could foresee, it took actual construction to expose still further interfacing problems. But at that point there was no one strong identifiable force that finally closed the system. It was left up to all the various component manufacturers, management contractors and architects and engineers to effect the closing, and there were too many different motivations involved.

Designers of the first set of SEF schools repeatedly said that many of the problems in getting the schools built stemmed from the method of picking the management contractors. In a functional sense, there were no general contractors in the SEF program. Sub-system suppliers were, in effect, independent contractors, all having separate contracts with the Metro board. Management contractors (most of whom were actually general contractors) were appointed to "run" each of the jobs. Management contractors, however, had no leverage with sub-system suppliers because there were no penalties for delays in completion. Furthermore, the boards picked the management contractors by competitive bidding, and, as a result, the fees were too low, and clients had no control over the quality of the firms selected; as a result quality was highly variable in the program. Beyond this, management contractors were permitted to do the non-system work (such as foundations), which might be 15-20 per cent of the job, with their own forces. They were tempted to make up their "deficient"

fee on his work. In the second phase of the program, fees are being negotiated.

It would appear that some architects had more interfacing problems than others—particularly those who strayed from the "system" to satisfy requirements of their clients, and, in some cases, no doubt, to enhance appearance. But "little" fitting problems were always coming up. Frustrating to the architects was the fact that when interfacing disputes arose, and it was not clearly the problem of one particular sub-system contractor, the sub-system contractors affected were very reluctant to negotiate because they had not been instructed to do so by SEF. Nonetheless, architects had praise for the quality of sub-system contractors' work.

Only about half of the schools supposed to open in September were ready to. Incompletions can be attributed in large part to the SEF schedule, which many of the architects and engineers characterized as unrealistic—for example, the CPM did not provide any float time for winter construction. The result was that shortly after the start of the program, things started backing up. In fairness to SEF, it should be said that some of the back-up was caused by borough school boards who were concerned about where the SEF program was headed after seeing the initial results. Further they began to doubt the \$19.10 per sq ft cost, and held up for a while until they had certain assurances.

Many of the problems were a direct result of pushing the program a little too fast

To get the schools underway, many architects had to do their design without complete information. One architect said he was a week away from completing working drawings on a school before some of the final SEF catalogs (with details on components) were made available. But their bigger complaint was that they were not "flagged" about problems that seemingly must have occurred on previous jobs. There were literally hundreds of small problems and solutions which they think could have been sent out in the form of technical-level drawings to help solve the problems.

Manufacturers were not able to plan their production as they would have liked to. Sub-system manufacturers were told they would get drawings for maybe 10 schools at one time. But there was a delay in getting the program started—boards deciding which schools would be included in SEF, etc. And some architects, when they saw their particular school was not needed right away, did not "hit" the schools as fast as they should have. The result was that companies had to manufacture on a school-by-school basis. One manufacturer would ask for a guaranteed schedule next time.

Were architects and engineers able to save any time?

Some of the architects and engineers who were consultants to sub-system manufacturers also worked on the design of some

schools. These professionals were a lot more familiar with the SEF documents than many of the other participants. They knew more what the system could do and could not do. Further, being close to the program, they were probably more encouraged in trying to make the system work as it had been conceived. Architects and engineers in this category believe they will come out with a reasonable profit on their fee on the SEF schools, which was a standard percentage arrangement. One architect said that design time was about the same; working drawings were considerably simpler (drawings indicate so and so item as cataloged); but reported that field work and supervision was much higher.

The architects and engineers had a lot more paper work to do because they had to fill out the purchase orders for the components—obviously, a new role for them. SEF thought that the purchase order would help provide a form of in-house cost control; but, also, it was said that architects and engineers would not earn their full fee on working drawings, so they might as well earn it by doing the purchase orders.

One structural engineer said that he had saved about 30 per cent in engineering time (he did not have to draw any details). But another structural engineer thought that there was no savings in time, particularly because of having to fill out the purchase orders. Doing a rough summation of elements to check on budget might take two hours, but doing a purchase order could take two weeks. Also, he said that even though the manufacturer had designed the columns for the system, the structural engineer still had to check the columns, and "this took as much time as to design them."

How do the SEF schools stack up in cost, appearance, and function?

The SEF program will end up with around 1.3 million square feet of schools with costs running about \$20 per square foot and a little over. Some of the boroughs are unhappy about this because currently, with the economic turnaround, conventional schools can be bought for \$18 and less.

Many architects and clients are unhappy with the appearance of the precast panels. Trouble was that the precasters wanted the least expensive cladding system that would meet the performance specifications and win. Thus they insisted on a finish straight as it comes from the forms. They would not add any extra recesses or horizontal joints, because this was more than they needed to do for manufacture. They permitted no sand blasting or aggregate texture. After many of the schools were up, the manufacturers realized that something had to be done. Some of the schools now have sandblasted panels or exposed aggregate; clients were willing to spend the extra money for this.

There is also a sameness about the interiors of the schools, perhaps because of the pervasiveness of the ceiling, and the fact that the ceilings and partitions are white.

Dashes of color are added by painting the interiors of the exterior walls and the doors bright colors. The casework—which all the architects are highly pleased with—also adds bold spots of color.

Some architects fear that SEF may freeze school design in a mold. Schools in the last five years have been breaking out of a mold that had been cast in the previous 15, they say. Now there may be another mold.

A positive effect of the SEF program, they feel, is that the program may have encouraged some school boards to accept more open areas in schools. Further, the program may have forced some plant engineering people to examine their great files of do's and don'ts built up over the years.

There were a lot more non-standard system elements in many of the schools than the sub-system contractors thought there would be. And this was a big complaint. Sometimes this work was marked up by as much as 15 per cent over what it could be bought on the open market. In the traditional school approach, the kit of parts is much larger. But with SEF the system was bound to be incomplete the first time around, and costly premiums were charged for everything that was not in the catalog. Over-all cost picture then goes out the window.

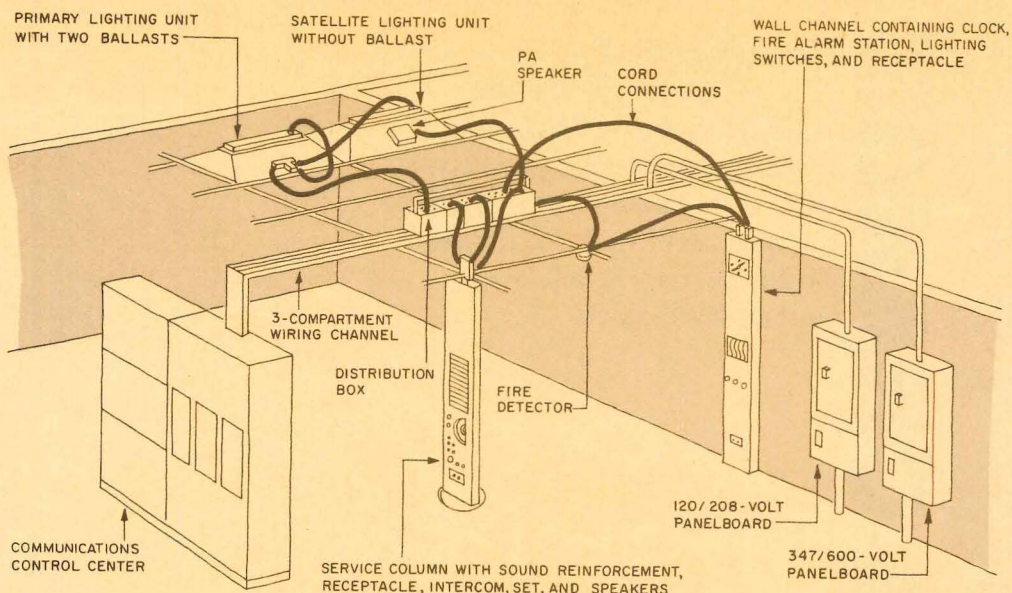
Because of the rigidity of the system, and because of the pricing power the sub-system contractors had over the architect, the architect was sometimes forced to do illogical things in order to be able to use standard components, rather than breaking out of the system in particular instances to make the solution logical and far more economical.

A number of professionals think that SEF might have come off better if they had asked for bids in the form of closed systems handled on a management contract basis.

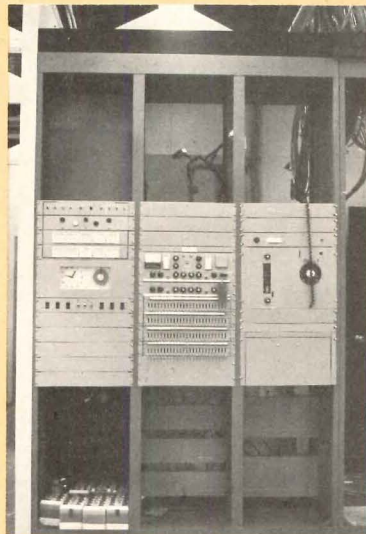
But some architects did not have too much in favor to say about fast track. They say, given the freedom to build any kind of a box you want to—"if you don't give a damn about human qualities"—you obviously can build a lot faster now. They cite apartment builders in Toronto as offering the best example of systems builders one can find. Builders have refined their standard methods into a system. But it does not follow necessarily that builders put up "good" apartments.

Others, more favorable to SEF, state that industry has to work in a systems approach and SEF was a beginning. There is nothing magic about systems design—the matter of interfacing, of trying to understand related problems. But some of the Toronto borough school boards thought in the beginning that this was going to be a magic solution to all their problems; that they would get away from all their headaches. Now they are partly disillusioned. The solution, the proponents feel, is in better defining the "interfacing" of client, architect and engineer, and management contractor.

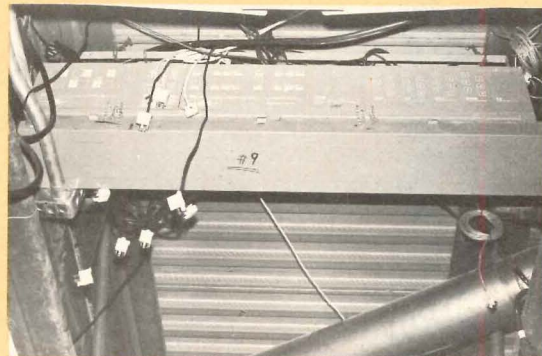
—Robert E. Fischer



The electric-electronic sub-system is technically the most innovative of the 10 sub-systems. Power and communication devices are connected to the general wiring system with flexible cords. Free-standing service columns are multi-functional.



Heart of the system is the ceiling distribution box which feeds power to lights and to receptacles, sound signals to speakers and intercom set on service column, and ties fire detectors and manual fire stations to the communications control center. Fire alarm is simulated siren over loudspeakers.



All photos Robert E. Fischer

PRACTICE IN THE 1970'S THE RESPONSE TO CHANGE

Increasing attention to management and the new supporting tools that help get bidding documents produced and construction put in place sustain architects in a role that is primary, exclusive and undiminished

"The tasks, more deeply perceived, have become more complex." So says Mildred Schmetz in her opening pages on design in this issue. And it is to both perception and complexity that the business of architectural practice is now responding.

Neither quality is new to architecture; but the degree of penetration into social needs and regional scope—self-generating its own complexities—is overlaid by burgeoning exterior complexities imposed by the cost spiral, the client evolution (that Barclay Gordon tells about beginning page 138), the financial maze, the technological complex—in short, the operating conditions that now surround us all.

Management is the visible, one-word response

Management is a broad-gage word; and some would tell us that it is a more or less exact science. Perhaps, for now, we can agree it is an operative umbrella word for many sturdy talents in our field. Then, we may proceed to separate some nodes of emphasis in what is, in fact, a single unifying array of talents and tools for one purpose—the practice of architecture.

For example, on these and following pages, we have arranged to look at:

- Organization for management
- Tooling up for management
- Architectural job management
- Project and construction management—and we are not deceived into belief

that these are truly separable subjects. Further, for purposes of illustration, we have mentioned some firms by name. Will those so named please bear with our brevity—and those not named remember we have not forgotten them? Attention must be focused somewhere in this intricate array.

The organization chart: framework or limit?

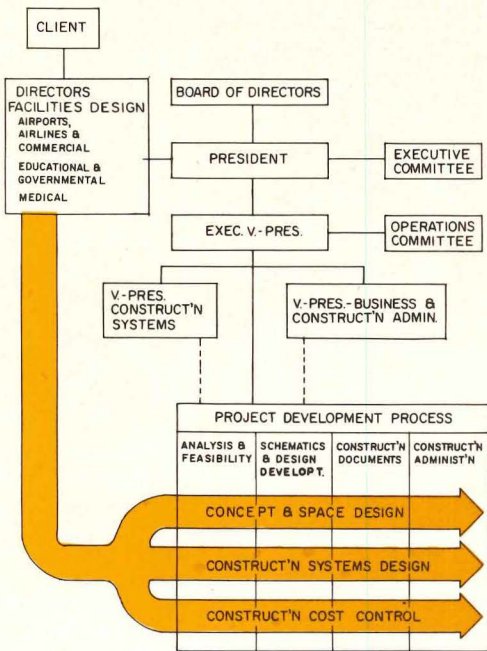
For a generation, the pages of RECORD have repeatedly shown ingenious charts of firm organization. Reproduced opposite are two charts from an early article (CPM: what factors determine its success?, RECORD, April, 1964) illustrating then how CPM fits in a design firm. (CPM? Already we are talking about the tools of management. But more of that later.) The purpose here is to show graphically the difference between vertical and horizontal organization. Two actual charts for the firms of Golemon & Rolfe and RTKL Inc. show how these forms can evolve in response to the logic of good management so long as the lines and boxes are not considered to express inviolable, "scientific" rules.

An old-line firm takes the new-line road

"At Golemon & Rolfe, we consider the practice of architecture to be the creation of art through . . . creative management, scientific method and talented persons."

Thus, Harry Golemon, second generation president of this long-established Houston firm, states the philosophy by

RESPONSIBILITY FLOW CHART



which he hopes the firm will evolve from its well-established three-dimensional image of skilled, engineering-oriented projects toward what he calls a fourth dimension, the spirit of the design.

The responsibility flow-chart shown above reflects a conviction that certain persons of specific experience and talent should be provided with both opportunity and responsibility for exercising their talents throughout the project development process. Thus, projects proceed, not through departments, but through a succession of special inputs to the design process.

This is the applied logic and the firm's stated position: that the architect must become involved in the decision-making process wherever it occurs with ever deeper penetration into those decisions that shape the environment—even before a building design is considered. This means penetration into social, political and economic arenas.

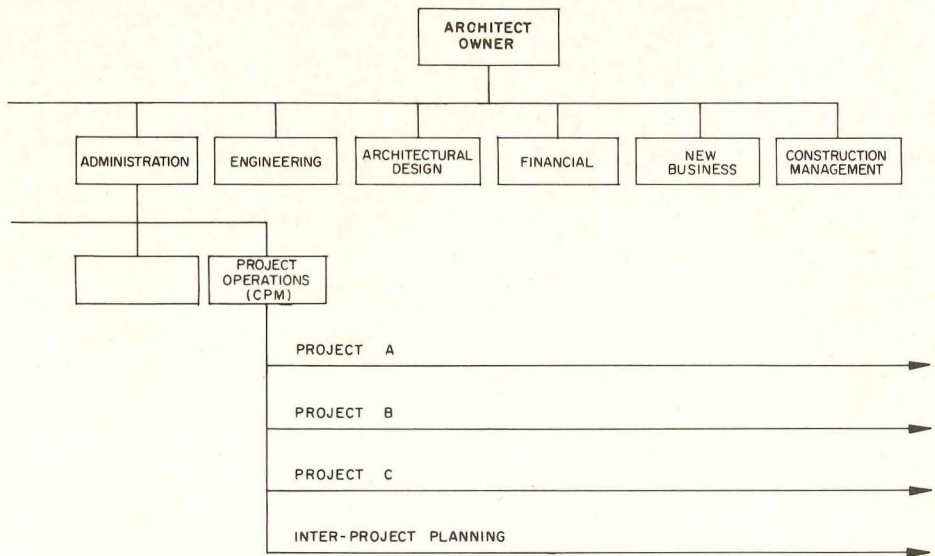
The board of directors, then, is made up of the president and executive vice-president, an attorney and a real estate economist who is also a certified property manager. This composition reflects broadening services in special interests of a growing clientele among developer-builders—now about half their practice. In this kind of work, says Golemon, a team approach is essential, and the architect needs a new arsenal of coordinating knowledge in real estate, finance and rental management.

The directors of facilities are all partners in the firm and are directly responsible to the client for all matters pertaining to a commission in any of the three special categories shown. Matters of contract are coordinated by the executive vice president, and the directors themselves report to the president. Not shown on the chart is a development committee made up of the president as chairman and the directors of facilities as advocates for their fields of interest.

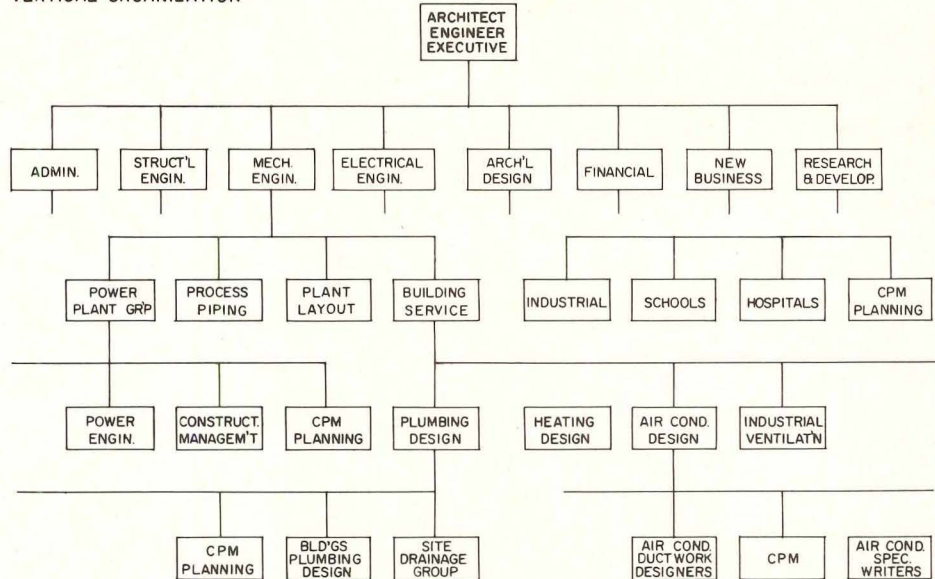
The executive vice president has re-

HOW C.P.M. FITS IN A DESIGN FIRM

HORIZONTAL ORGANIZATION



VERTICAL ORGANIZATION



porting to him an operations committee made up of the two vice presidents in charge of construction systems and business and construction administration. These two vice presidents, although they have no personnel assigned to them as such, are involved in decisions affecting the entire project development process, as indicated by the dashed lines on the chart.

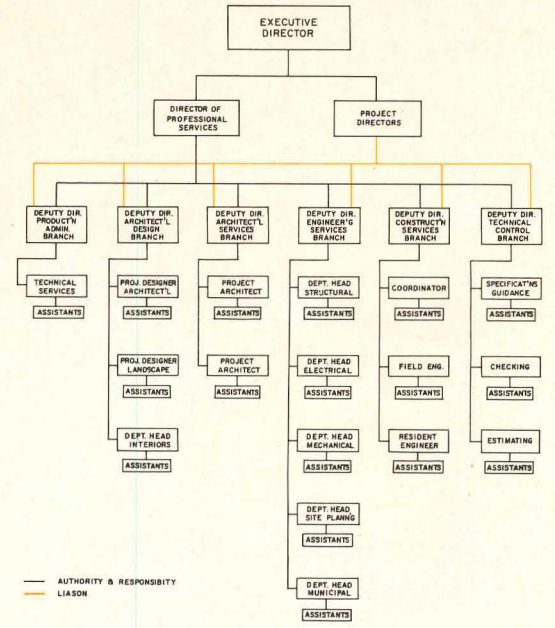
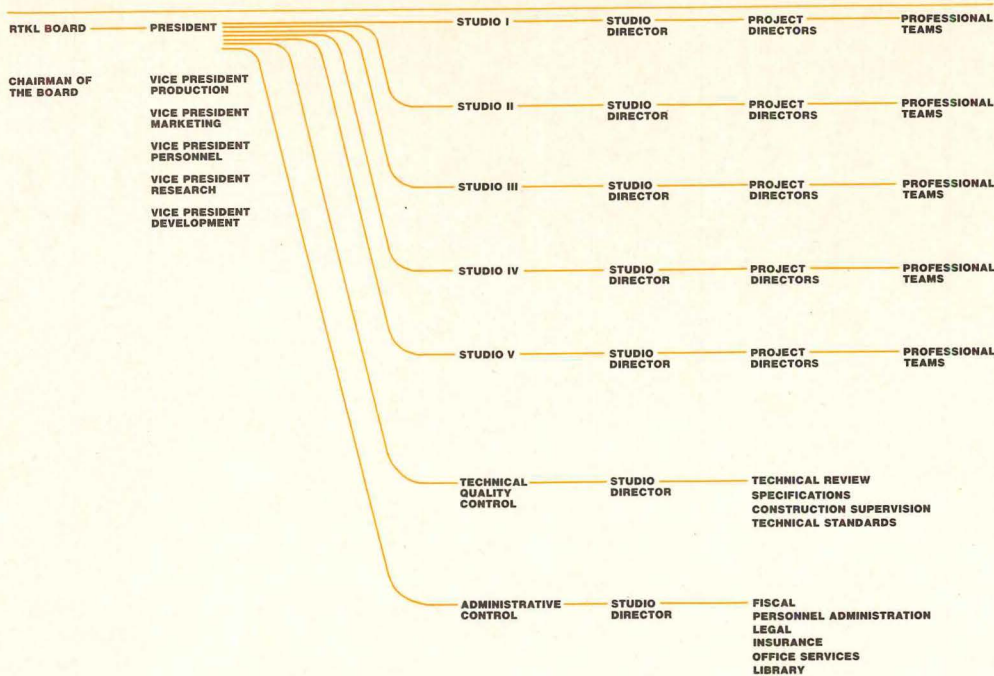
Project development for each job is set up in a network scheduling process similar to CPM as was described in a two-part article in the RECORD issues of February and March of 1967. Network task assignments and the man-hours estimated for each are related to computerized schedule and cost control as described in the next section on new tools.

Management for growth in size and scope

The emergence of urban planning on a big scale as real commissions for architects has introduced a management requirement for those firms who intend to offer that service. Further, the giant scale of work for some other clients—corporate, government, and investment-developer—is such

that large, diversified firms are the most visible first call for those clients. Good architectural firms of moderate size will be faced in the 1970's with a decision either to begin choosing clients to fit their capacities or embarking on rigorously planned programs of growth to handle the larger work. That decision will be based on the personal proclivities of the firms involved, as well as on the fact that there will continue to be a substantial market in moderate commissions.

These were some of the background ideas preamble to a description of growth plans for his firm by George E. Kostritsky, vice president of research for RTKL Inc. (the corporate name adopted in January 1969 by the Baltimore firm of Rogers, Taliaferro, Kostritsky, Lamb). The firm began in 1946 as a small architectural office in Annapolis, Md. Since then, the scope of practice has expanded to include downtown development plans, new town plans, campus master plans, and special studies, as well as a full panoply of more conventional building design work. At about the time of its incorporation, the firm had grown to 100 employees, of whom more than half



were either registered or had masters degrees in architecture, planning, or urban design.

The flow-diagram above illustrates two important aspects of the firm's approach to management. First, the president, Harold Adams, is a 35-year-old architect whose interests center on management. (This kind of bent, observes Kostriksy, is one that should have better opportunities to flourish through the curricula of architectural schools.) The decision to appoint an exclusively management head becomes important as firms reach 50 to 60 employees and is clear-cut as the 100-mark is reached.

The second point seen in the diagram is that the firm is structured in a series of more or less parallel studios for which management activities are shared by the vice president. Each studio has a principal-in-charge, a studio manager and directors for each of the assigned projects for which the studio is responsible from beginning to final documents. An additional studio called "technical quality control" handles all specifications, estimates and construction supervision. There is a cross-feed of management and technical experience at key points for all projects.

Joint ventures offer relief of growing-pains

The joint venture as a means of mustering diverse talents for accomplishing single large jobs is a familiar form of organization and has been described many times in the RECORD. RTKL has brought a new on-going interpretation to the joint venture concept as a means, not only for marshaling talent, but also for gaining geographically widespread points of outlet for their own considerable resources.

As the first step in a two-phase organization plan to reinforce the firm's resources in urban problems, RTKL has set up a series of joint ventures in growth areas across the nation. Instead of setting up

branch offices, they are finding compatible moderate-size firms in such widespread locations as Puerto Rico, Hartford, Minneapolis and California. These are set up as standing joint ventures in advance of any specific job.

The objective and advantage is that, so far, they have added about 750 expert people to the total scope of their firm and have gained widespread geographic representation without the capital expenditure usually associated with setting up branch offices. Further, they acquire the background knowledge of local conditions and other specific areas of expertise by the simple expedient of carefully selecting those firms with which they associate. RTKL, in return, offers the local firm the advantages of their own resources.

The second phase of the organization plan, and central to its basic purpose, is the foundation of a wholly-owned subsidiary called "Urban Concepts." This subsidiary (which could well become the parent of RTKL itself) has already acquired part interest in a socio-economic planning firm and is in talking stages of negotiation with other firms in the economics field dealing with space analysis, housing, land evaluation, financing and other urban-development fields. They are also talking to a major engineering firm.

Urban Concepts then will serve all of the joint ventures in a structured way which will be determined by the management conditions that develop.

In response to the question as to whether spreading work across the whole of the nation is a sound procedure in this field, RTKL points out that this is the way many large corporate clients work, and they may find some advantage in working with a firm similarly distributed. The joint venture mode of geographical distribution may indeed be a response to some of the lessons of the past in over-extension of branch offices in the profession.

How one post-war firm thrives on organization for service

The chart of organization for professional services at the top of this column is a segment of the over-all logic by which the firm of Lyles, Bissett, Carlisle & Wolff has grown from its founding in 1948 to its present 200-plus complement in four office locations. A comprehensive chart of the whole organization might show a management nucleus of the home office at Columbia, S.C., surrounded by and connected to satellite representations of offices in Washington, Alexandria and Raleigh and all neatly framed by administrative departments on one side channelled to the executive director, operating departments (planning, industrial, hospital, interior, etc.) on the other channelled through the director of professional services who is directly in charge of a central core of architectural design, engineering and technical services. Supporting this core would be a construction division in charge of all field work.

The fragment above marks a significant adjustment in 1968 of some aspects of professional services. Especially fore-arming for practice in the 1970's is the addition of a coordinating department in the construction services branch. This change was "to facilitate the processing and record keeping of shop drawings, samples and comparable submissions during the construction phase."

Another significant adjustment in organization, perhaps reflecting foresight in emerging "systems" applications, was a linkage of structural and electrical/mechanical engineering operations under a deputy director of engineering services and establishment of a new position called "electrical consultant, special projects" reporting to the deputy director.

However deeply this firm may elect to penetrate into the role now popularly called "construction management," it is—like many others—setting itself up with competence to do so. And it is a competence

backed up by computerized job-watching whereby the director of professional services gets a status print-out of every project in work at every significant interval and in all details of estimates, allocations and actual performance.

How another young firm gears up for developer clients

Well, organization isn't everything. Some firms, young firms, have problems of growth, not size; problems of getting started, not turning around an aging name-firm against its own momentum. We talked recently with young (35) William D. Peckham, who says he and his partner Fred F. Guyton had started eight years ago "with not much more than a conviction": that if they as individuals and architecture as a profession were to prosper—or even survive—in today's scene, they would have to design better mouse-traps as well as better monuments. So they started with warehouses.

They did homework on investment-development in such matters as true total costs and rent returns (see also Richard Steyert's piece on page 81 of this issue) and they welcomed developers as clients. They rejected those in-and-out developers who have only short-term commitments and chose only developer clients who retained at least 65 per cent of long-term ownership in their projects. Notable among these was the Linclay Corporation for whom they now do all that firm's architectural work in planning, design, interiors and landscape; but further, they begin very early in the search for real estate, analysis of economic feasibility and determination of the mix of industrial, commercial and residential buildings. Linclay is developer of large projects in the St. Louis area. Current is a giant development of over 800 acres planned for virtually "new-city" balance.

The mode of operation of the Peckham-Guyton 30-man organization (up from 4 men two years ago) is to assemble a task force for each project headed by a project architect who is responsible for all phases of services. If the project is in another city, the whole task force may move there for the duration. The firm principals also take an active part in all phases, and the virtually unpartitioned aspect of the home office in St. Louis makes for unlimited—not to say uncontrolled—cross-feed.

Organization chart? Peckham says it could only be a straight line. "It's esprit-de-corps that holds the whole thing together"—plus the fact that a project manager, after about five years, may be taking home as much pay as a principal. We're really in it for architecture, says Peckham, and all these real-world services aim at that goal.

Two other trends in architectural organization may gain momentum in the 1970's: First, there seems to be an increasing role for the self-client architect in developer affiliations a step further than Peckham's. Second, is the architect coordinator of other architects as is Rogers/Nagel/Langhart for Denver school projects.

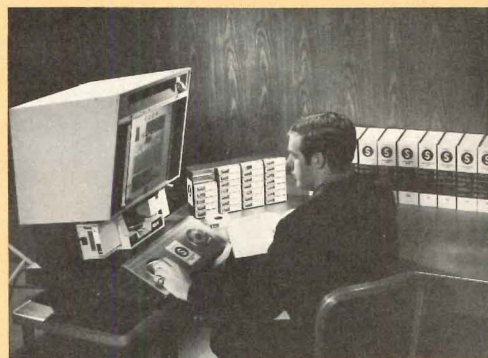
THE ARCHITECT'S NEW TOOLS IN THE 1970'S WILL BE COSTLY TO OWN BUT MIGHTY IN THEIR LABORS FOR: COMPUTATION, SPECIFICATION AND INFORMATION



Computers loom (right) in the array of new tools. This one works for Reynolds, Smith and Hills in house, as shown on page 158.



Adjunct to Sweet's familiar, bound architectural file is a microfilm cassette library and reader-printer combination (below) now on test in several architectural offices. The bound file content, identically indexed, is rapidly retrievable on the scanning reader and photo prints of selected pages quickly made (so far, in black and white only). The 28-cassette library has a few thousand additional pages of data in supporting categories (medical, landscape, etc.).



Xynetics, computer-plotter (above), is the \$100,000 draftsman now at work for Saphier, Lerner, Schindler, Inc. planning space for the new Sears building in Chicago.



Magnetic tape drives IBM Selectric typewriter at 150 words per minute for error-free specifications in copy reproducible by offset.



Evans and Sutherland's new line drawing system (below) is examined by Dr. Jerome Elkind of purchaser (\$100,000) Bolt Beranek and Newman and seller's president Ivan E. Sutherland.

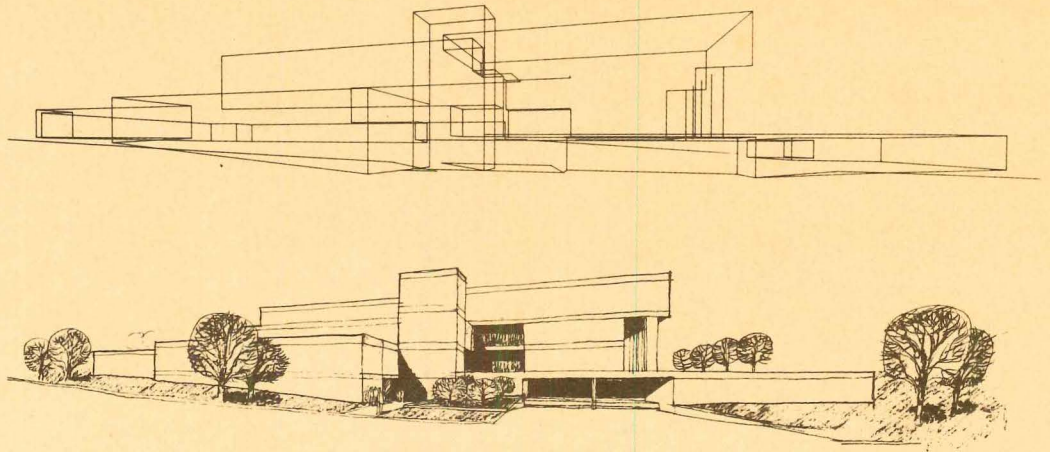
The sampling of new tools for practice in the panel on the previous page is barely representative of the burgeoning array of complex hardware that architects are being asked to rush out and buy. It does represent purveyors' attention to three important areas of practice routine: information retrieval, specification writing and the graphical output of coordinated information. It is to the last of these that exotic adjuncts to computerization will increasingly address themselves in the 1970's. Photo processes, too, are taking an increasing amount of the repetitive drudgery out of drafting.

Graphical computer output is scarcely new. The RECORD reported on the potential of the oscilloscope and light-pencil as early as March 1963—and has recorded "sketch-pad" and other developments periodically since then. But "exotic" and "development" are the operative words that have meant high cost and limited application. Now, there are converging streams of development that may bring cost and application into better focus in the 1970's: 1) computer programs in A/E fields are more abundant; 2) architects are more familiar with them and more sophisticated in their instincts about the limits of design application; 3) hardware in smaller, more flexible sets is available; 4) data-plotter output is more useful and the machinery less formidable (although still costly); 5) an increasing number of computer service centers has made expensive hardware available on line or shared time so that the investment picture is changing; 6) many architects are beginning to realize that a close-held proprietary attitude toward programs they have developed may be self-defeating—if not unprofessional. It forces them as well as others to keep reinventing the wheel in building their own libraries. A.I.A.'s launching of Masterspec (RECORD, May 1960) may be a first step toward broader professional attitudes.

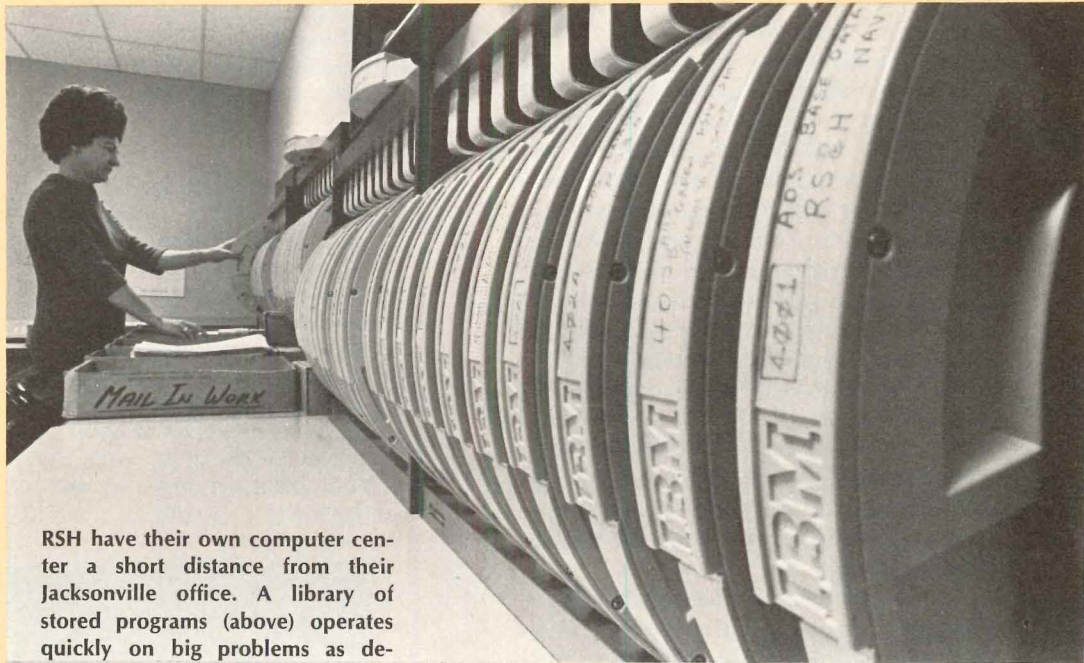
Several architectural offices have, in fact, made their in-house programs available to the profession, with or without fee. The illustrations on this spread were supplied by two such offices; Reynolds Smith & Hills of Jacksonville and Dalton Dalton & Little of Cleveland.

The two photos at right show computer equipment set up by RSH at a separate location where they are developing a set of programs called Architectural Design Systems. ADS has been used on large airport, military, and school commissions to quickly assess cost and other implications of design alternatives. Stored geometric models are related to materials and cost sub-systems. The designer talks to these programs through simple English-language coding sheets, and the machine responds with estimate print-outs. RSH has, at least temporarily, withdrawn from the business of serving other architects while ADS programs are further developed.

Skidmore Owings & Merrill, whose pioneering installation of computer hard-



Hand finishing the perspective output of DDL's data plotter takes care of "lost lines" and provides what they call "instant renderings" at any selected point of view.



RSH have their own computer center a short distance from their Jacksonville office. A library of stored programs (above) operates quickly on big problems as described in text at left. RSH equipment room is shown below.

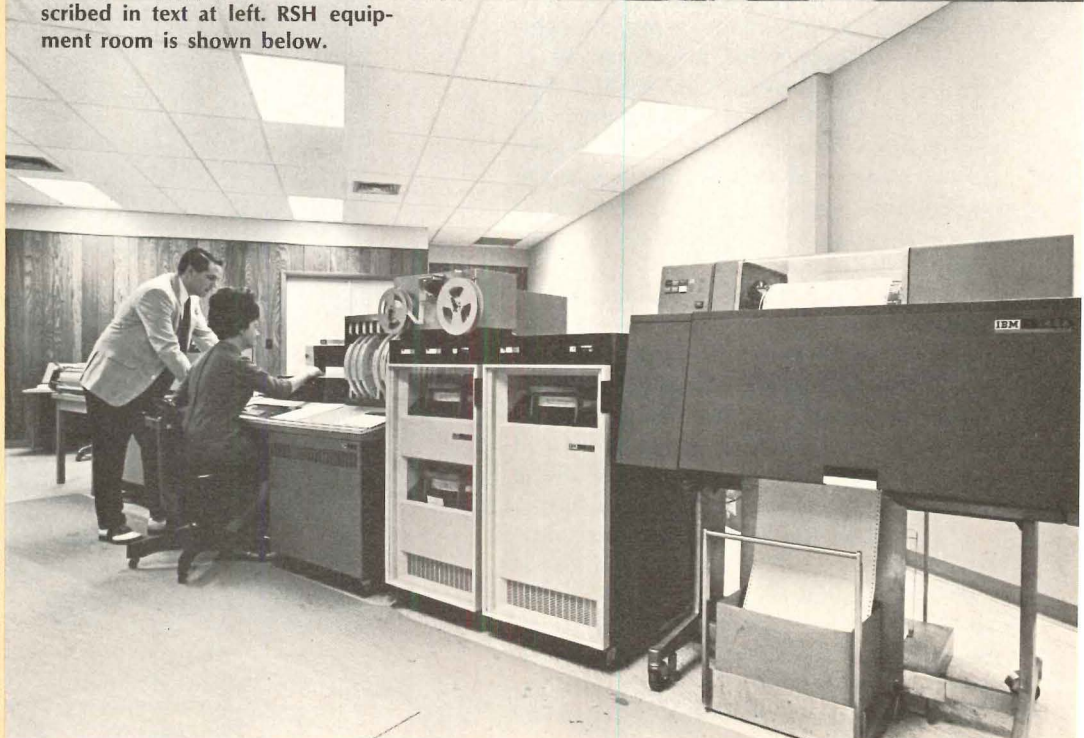


Photo: James E. Lubbock

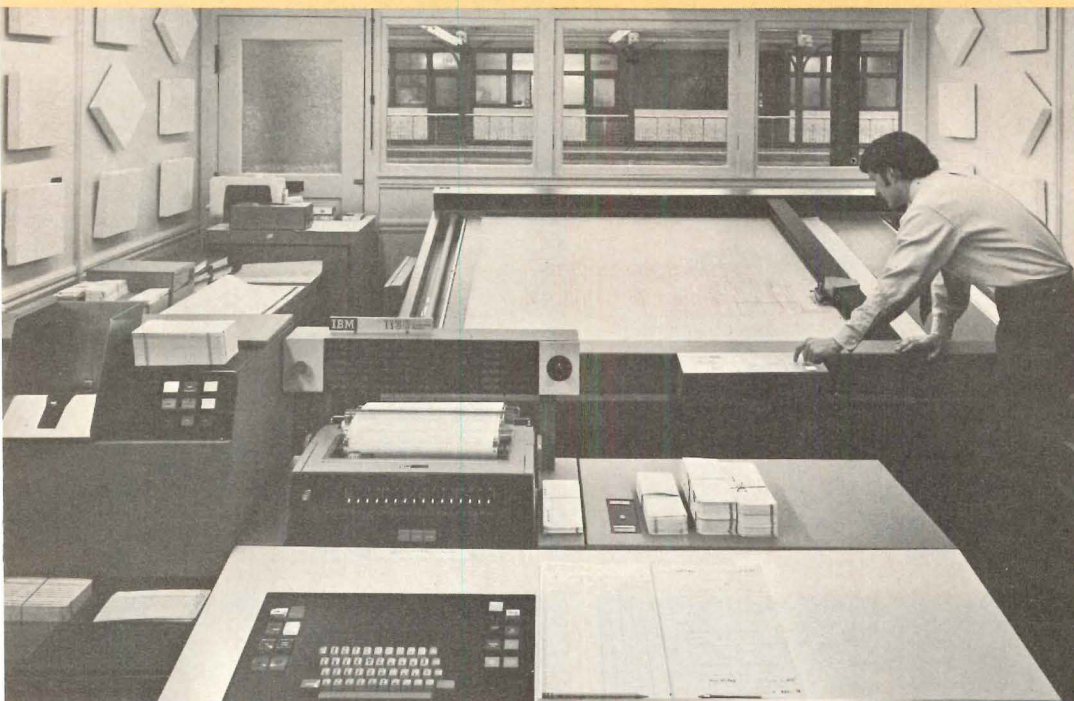
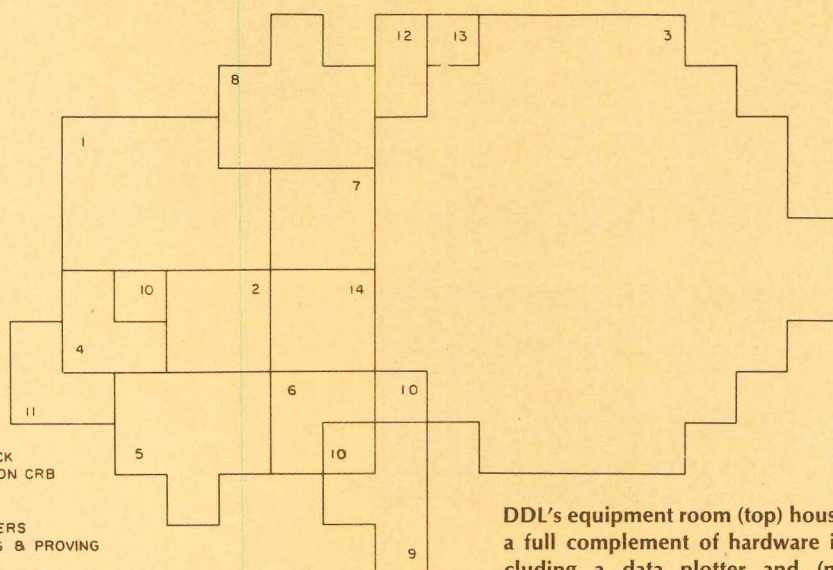
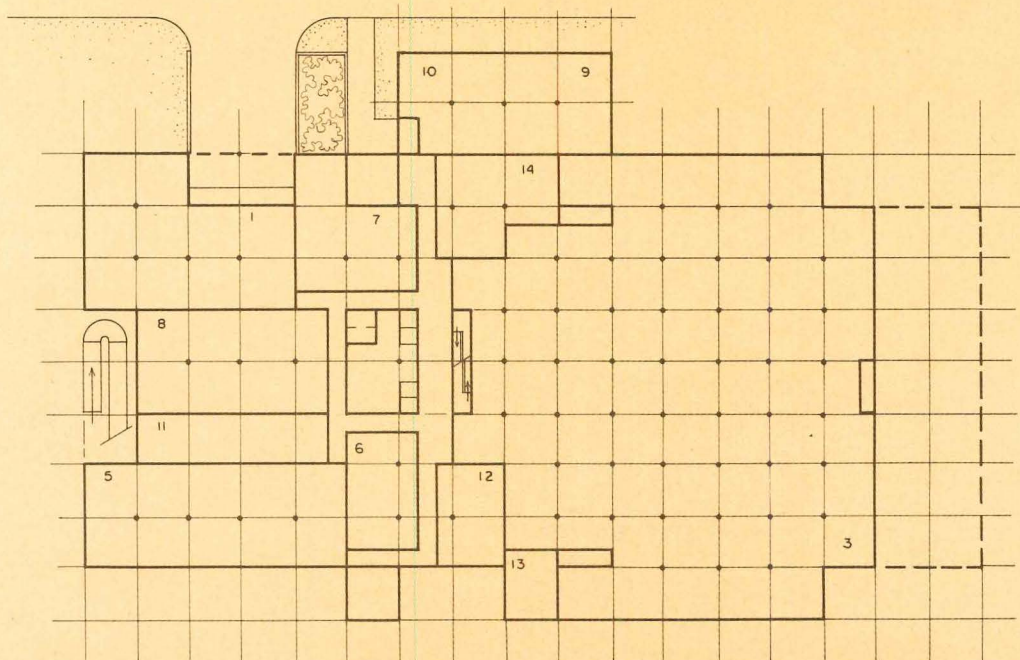


Photo: C. W. Ackerman



- 1. RECEIVING DOCK
- 2. ADMINISTRATION CRB
- 3. COMPUTER
- 4. STATIONS
- 5. SERVICE ORDERS
- 6. CONTROLLING & PROVING
- 7. MAIL ROOM
- 8. CMR
- 9. TOLL LIBRARY
- 10. ERROR CORRECTION
- 11. ACCOUNTS INFORMATION
- 12. TAPE LIBRARY
- 13. C. E. ROOMS
- 14. 519- RACK TIMING

DDL's equipment room (top) houses a full complement of hardware including a data plotter and (not shown) a station for input to outside service centers. Plotter's area/juxtaposition output (above) can be hand-converted to a floor plan retaining essentials (below).



ware has been a display center in their Chicago office, is another firm whose building optimization programs have been a more or less public spin-off.

William R. Orr of the Ft. Worth firm, Construction Service Company, developed computerized construction cost, graphics and schedule programs which are available on a time-sharing basis through the McDonnell Automation Company of St. Louis.

The former computer applications department of Caudill Rowlett Scott, having developed an array of programs in information retrieval, cost estimating, campus planning and feasibility studies, decided to make these programs available to other architects. CRS set up a separate corporation, CRS 2, with former associate partner Robert F. Mattox as president, to continue further development and release.

Dalton-Dalton-Little offers broad scope of computer services

The AE firm of Dalton-Dalton-Little in Cleveland and its highway-engineering oriented branch in Akron have invested heavily in both hardware and personnel to set up a computer service division of 16 specialists (including an architect) under the leadership of Irving I. Budish, a principal of the firm. The division has been under development for more than 5 years and serves both the firm itself and outside clients. Its computer library contains over 60 programs including several that extend the capabilities of graphic plotter outputs beyond most conventional limits. Other engineering programs coordinate geometry problems (COGO) surveying systems (SASSY) drainage, roadway, bridge construction and various building programs in structural, electrical and mechanical fields.

Dalton-Dalton-Little has about 14 programs of special interest to architects. These have to do with spatial allocations in multi-story plan layouts, estimating, lighting, perspective drawing, working drawings and schedules, mapping, urban land use and campus planning systems.

Cal Dalton, DDL principal, would be the first to caution those who would go forth and do likewise that computer hardware is expensive and its load factor is critical to any economies it can produce. As Robert F. Hastings, president of Smith, Hinchman and Grylls has observed: the decision to invest in computerization will depend on the short-term ability of computers to save on conventional business services while firm professionals are developing their programs.

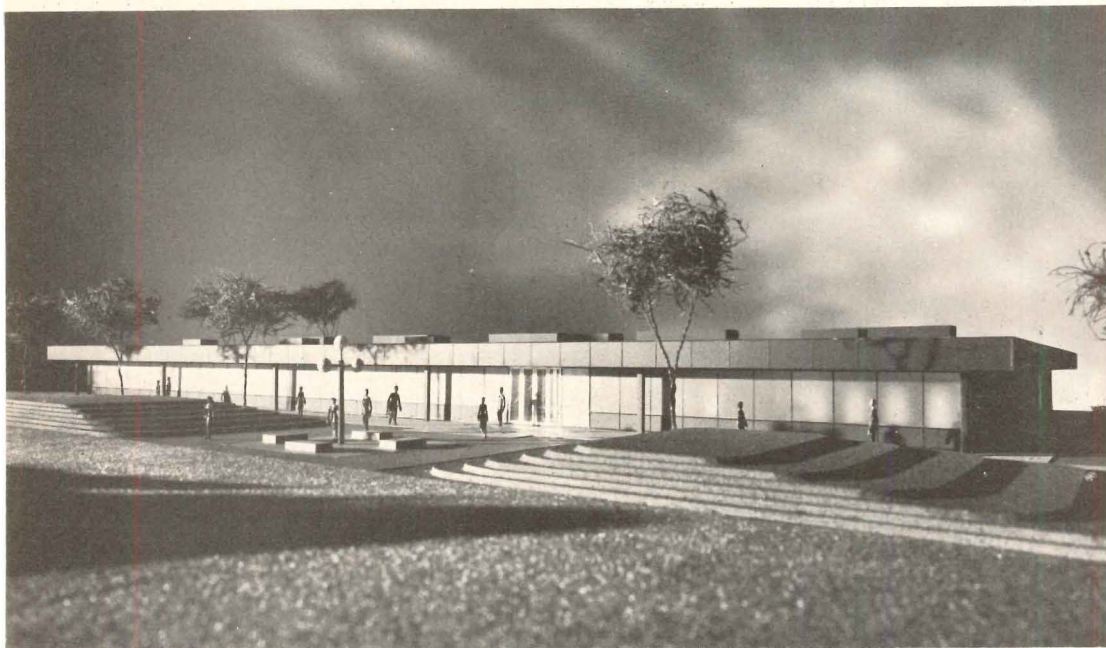
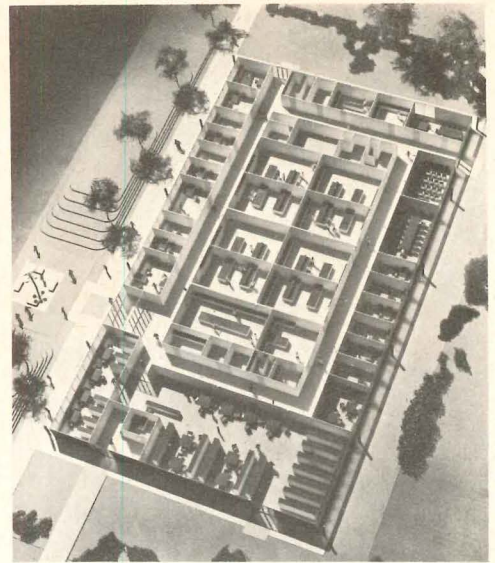
Prudently, Golemon & Rolfe called in an outside consultant (Lockheed Electronics) to study feasibility of computerization of that highly organized firm (see page 155). The conclusion was that even their internal network scheduling and highly developed statistical and estimating procedures could best be handled by outside services.

So the tools are marshaling, and modes evolve for their employment.

ACCELERATED PROJECT AND/OR CONSTRUCTION
MANAGEMENT MEANS:

- SORTING OUT THE TASKS
- PUTTING THEM ON TRACK
- TIME/COST/QUALITY CONTROL
- CLIENT-ARCHITECT-CONSULTANT-CONTRACTOR UNITY

Six buildings designed and completed in less than nine months on a new campus for the State University of New York through "fast-track" design and construction management by Smith, Hinchman & Grylls and the expediting know-how of the State University Construction Fund



of contents. Here we can only quote the conclusion:

"Substantial reductions in project delivery time (25 per cent) can be achieved with fast-track scheduling.

"Remarkable savings (45 per cent) accrue if a pre-selected systems approach is integrated into the process.

"If the continual delivery process were fully operative, the whole notion of project time would need to be rethought since, as classically defined, the project delivery time could be reduced to less than a year. Construction could operate in cycle with the university's annual incremental growth."

In October 1969, CRS put their money where their method was. They had been commissioned for additions to three elementary schools on Long Island: a total of 25,600 square feet. Here is the schedule they met:

30 October	1969	Board of Education engaged CRS
3 November	1969	CRS selected project team
19 December	1969	Four sub-systems released for bid
11 February	1970	Out-of-system work released for bid
11 March	1970	Construction begins
1 September	1970	Schools completed

Budget: \$1,415,000
Estimate: 1,028,756
Bid: 953,931

Under pressures of increasing construction costs and urgent needs for space—especially in educational and socio-medical facilities—some of the techniques of industry have been refined and applied to the design-and-construct sequence. The techniques have been evolutionary rather than revolutionary. But their application to these human-oriented types of facilities (rather than to warehouses and heavy industry) has introduced new complexities of program and new priorities for quality to what has heretofore been a rigorous demand for time and cost control.

Further, a spin-off from diverse attempts to probe and identify the developing concept of "systems building" has been effectively applied so that new meanings are implicit in phrases that, to some, may already have a familiar ring:

- Fast-track scheduling
- Pre-selected systems
- Continual delivery process
- Surge building
- Simplexes and subsets

The last item in the above list of jargon phrases may be a misfit in present company. It comes from the computer world glimpsed in previous pages and is illustrated in the

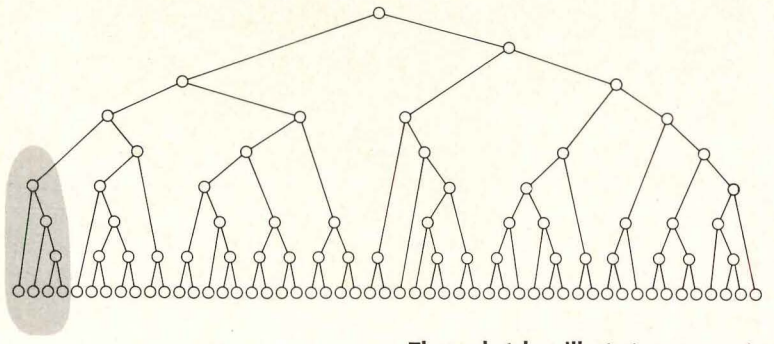
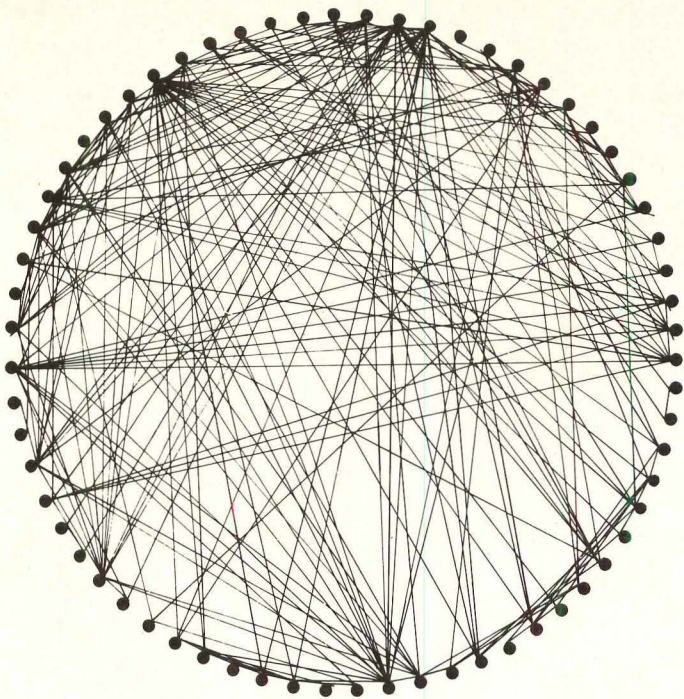
diagrams, above opposite, that deal with a management technique to handle sheer complexity of program.

Well, not much is really new in this new world of management, except perhaps our willingness to really organize and use the experience and knowledge we already have. The Heery and Heery project on pages 162 and 163 is a case in point.

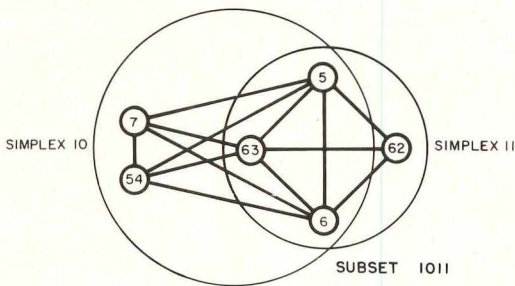
SUNY is as SUCF does

The State University of New York, faced with horrendous problems of over \$3-billion-a-year worth of construction on multiple campuses, calls on the State University Construction Fund for money and construction know-how. SUCF, in turn, calls in the professionals—yes, architects and others—to work with their own in-house professionals on design, construction and methodology. For example:

A 1969 SUCF commission in the study of method went to architects Caudill Rowlett Scott. A 40-page report dated November of that year is entitled "Fast-track and other procedures; a general study of design and construction management." The first three items in our phrase list are in its table



These sketches illustrate a computerized approach to sorting out complexities in the master plan for Brooklyn State Hospital for which Max O. Urbahn Associates were the architects. Some 65 requirements for commerce and communication among departments were input to the CLUSTR computer program described by Murray Milne (MIT Press 1969). Relationships are diagrammed in the circle. Simplexes and subsets are assembled in nodes, left, and built into the plan superstructure, above.



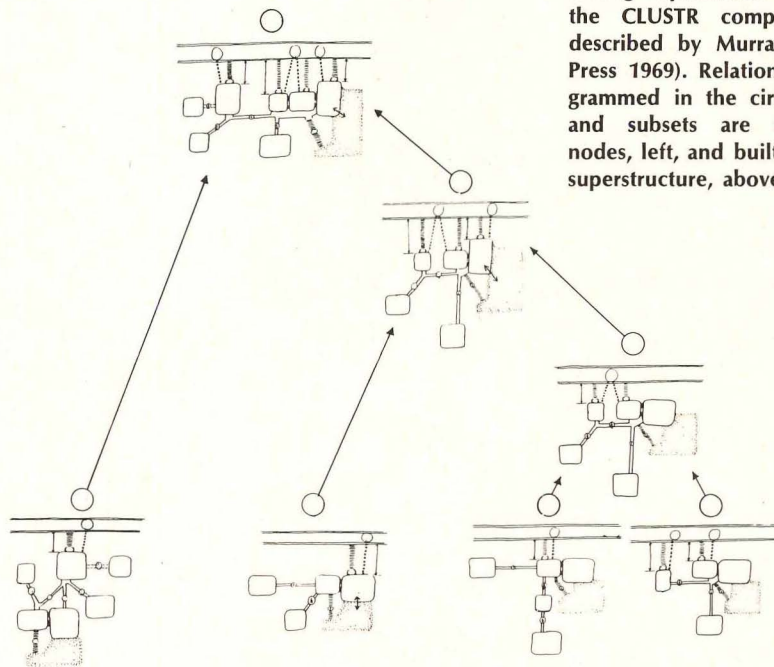
Every architect will recognize the implications of such a schedule in matters of detailed handling of procedures and people. The quality of the product? A quality that only architects preserve and that need not be compromised by any schedule.

SUNY musters forces for the battle of Stonybrook

Design forces, management forces and construction forces, armed with the know-how of fast-track and all its implications, were the primary need when SUNY faced an awesome crash program for its campus at Stonybrook on Long Island. Starting with a bare site in the fall of 1969, they had to provide 190,000 square feet of facilities (2/3 laboratory space) for a student population of 4500 ready for September 1, 1970.

Smith, Hinchman & Grylls Associates, Inc., long in the vanguard of management and resources for getting things done with sustained quality in the demanding arenas of Detroit, got the commission. James P. Gallagher, SH&G's director of public affairs, describes ensuing events as follows:

"Here is a blow-by-blow account of what happened between our commissioning in December, 1969, and delivery of the buildings on September 1, 1970. I have included the major reasons we were able to meet such a schedule, but there is no way of putting into words the determination by all hands that these buildings were damned well going to be ready when the students turned up in September. They were really built on faith: faith that everyone was working toward the same end.



"On December 18, 1969, SH&G sat down with SUCF and SUNY while they set their program requirements. The next day we told them of certain building shape requirements they should accept if we were to get the buildings finished by the September 1 deadline. Among them: a number of buildings rather than one or two larger ones (we wound up with 11); one story, with flat roofs. And bay sizes and ceiling heights were limited. SUCF accepted these limitations, and we said we could deliver.

"Within days, we had settled on a 5- by 5-ft. planning module, and 30- by 40-ft. structural bays. On January 5, we started grubbing out the land, and shortly thereafter poured foundations (since bay size had been established in the initial decision) and started erecting columns.

"By breaking up the general contract into sub-contracts, and by giving potential bidders an exact schedule for putting their products into place, we were able to get a number of bidders on each contract, and they could bid closely because they knew what their costs would be. If they had had to bid on an installation 18 months or two years away, they would have had to allow for all kinds of contingencies.

"Then we set up weekly meetings of architect, client, and contractors to iron out any difficulties that had come up. Everything on the agenda had to be decided at that meeting. Nothing could be put off for the later discussion. If there was disagreement on any problem, it was to be referred to Phil Meathe, our executive vice president, for his final and binding decision. Throughout the entire schedule, only one item was referred to him (something about a slight change in siting of one building). Everything else was hammered out at these weekly meetings, where the representatives of all three organizations had the authority to make decisions without checking with the front office before they acted.

"The contractors' agreements called for them to go on overtime whenever they fell even a day behind schedule, and our computer readouts gave us immediate warning if this was happening.

"Very early in the game, we knew that the manufacturer of a certain piece of electrical equipment was not going to be able to make his schedule. We had been in his factory and knew that no crash effort could make up the time. So we found another supplier.
(Text continued on page 164.)



**New York's new pool/play centers
—an exceptional performance
with time/cost/quality control**

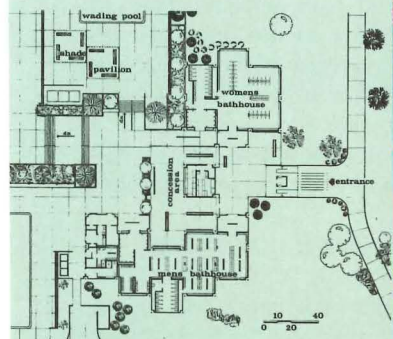
Bright colors, gay super-graphics and sturdy precast construction on a scale related to young patrons characterize the first six pool/play centers now completed in a crash program for 13 such centers throughout New York City's five boroughs. Design and construction of the first two completed took less than 11 months. The project was a tour-de-force by Atlanta architects Heery & Heery, commissioned on the basis of past demonstrations of "getting things done."



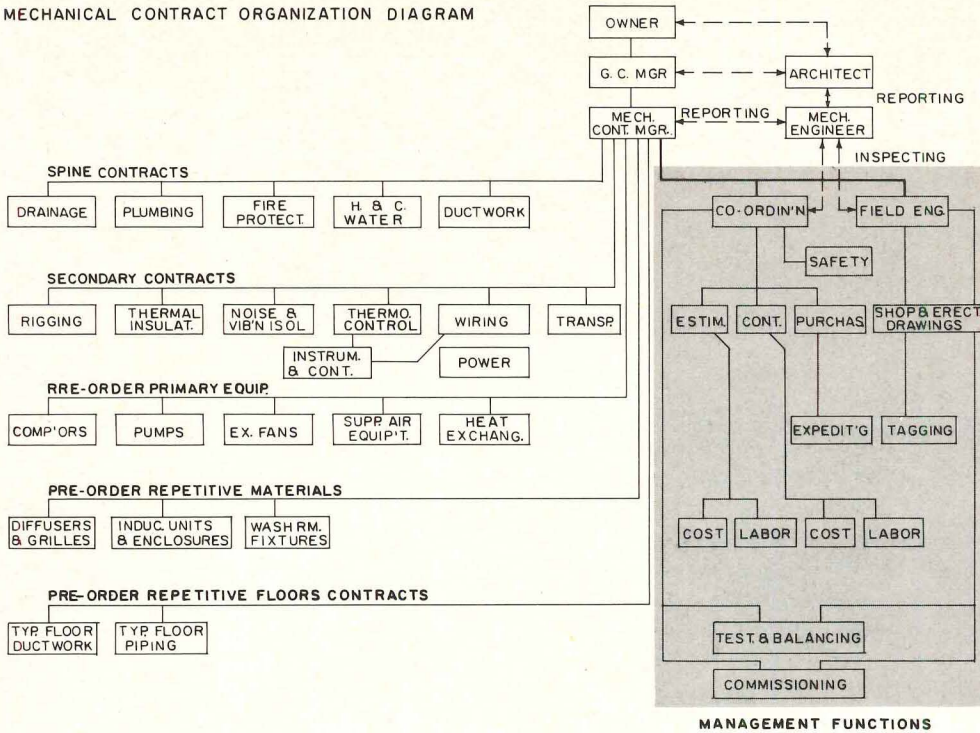


These pool/play centers, says Parks Commissioner August Heckscher, "are important and successful in terms of land usage and construction, time and cost". Daniel S. Garvey, assistant to Commissioner Heckscher for special projects, worked with deputies Elliot Willensky and William Ginsberg to expedite the projects. F. William Mitchell was the architect's project manager.

Sites of varying shapes range from one to four acres. Buildings are precast concrete systems of pavilion-like modules fourteen feet square. Building components and aluminum pool tanks were prefabricated by local manufacturers during final stages of the planning process. Pool floors are marked for basketball. These centers are of two types: the larger (top, opposite and plan, below) has an Olympic-size swimming pool, diving tank and wading pool; the smaller (all other photos) has a 75-by-60 ft. swimming pool and wading pool. Total cost of \$4.5 million was bid within five per cent of estimate. S. A. Bogen was mechanical engineer.



MECHANICAL CONTRACT ORGANIZATION DIAGRAM



Toronto's Commerce Court—a \$70 million dollar project in the downtown area for Canada's second largest bank—is being done on a construction management basis, but with a twist: there are three management contractors, rather than one. The new ones in the picture are mechanical and electrical specialty contractors. The work is split up into many separate contracts to control costs and expedite scheduling, as visualized in the engineer's diagram, left. The mechanical contractor's organization is below. Costs and labor are monitored for the client as illustrated.



(Text continued from page 161.)

plier on the West Coast who could meet the date, and gave the order to him, and canceled out the first supplier. We didn't wait until the date came up and he didn't meet it. We were not interested in penalties, only performance.

"At Stonybrook, we did the construction management as well as the design, which meant that we were enforcing the CPM, and we could get immediate decisions whenever design and construction clashed. If something had to be changed, we did not have to go through a third party.

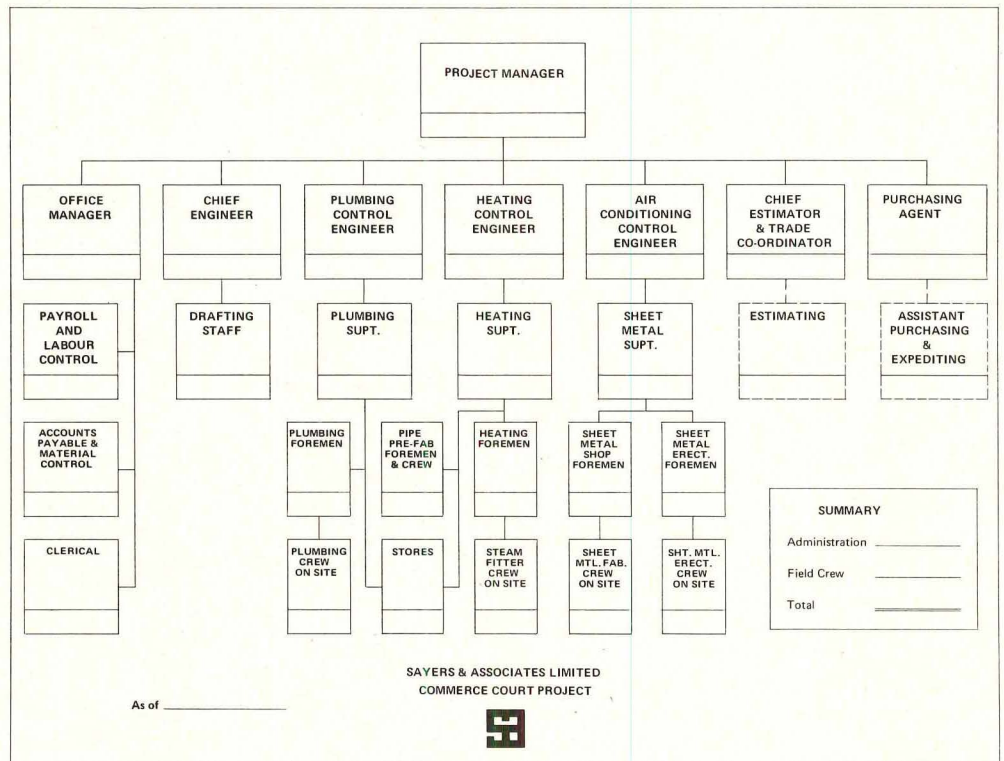
"Another key reason for meeting the timetable was the willingness of prime manufacturers to bid on component systems. Again, this was due to the fact that they had a definite date for start and completion of their installation. A number of firms bid component systems on an installed basis. This applied, for example, to all the steel and roof trusses, the HVAC units, interior wall systems, etc.

"Every effort was made to approve payments immediately for work put into place, without the normal 10 per cent holdback of the general and sub-contract system. This meant that subs could count on getting their money fast if they got the job done.

"In the spring, an appropriation that didn't come through caused SUCF to pull five of the 11 buildings out of the schedule, but later, the appropriation was made, and the five buildings went back in. They will be ready about Christmas, as we just couldn't make up the time lost waiting for the appropriation. But it would have been just as easy to finish the 11 on time.

"The criteria on which we base our estimate of \$3.4 million in savings reside in the last 25 buildings built by the Fund in New York. They took an average of 43 months from commissioning to delivery.

"This dollar saving does not take into



account the money that SUNY would have had to spend to provide classroom space for the students for the 43 months of normal construction time. While the figure is a guess, we estimate that it might have cost the university another \$3 million.

"Smith, Hinchman & Grylls did all the design, engineering and construction management at Stonybrook, and Johnson, Johnson & Roy (which is now a division of SH&G) did the planning, siting, and landscape architecture. Project manager was John Solo Rio, out of our Detroit office, and field superintendent was Mark Wilson. The buildings were under the over-all direction of our General Building Division headed by William Jarratt."

A knowledgeable client fosters project/construction management

When the Canadian Imperial Bank of Commerce had at last assembled all the parcels of land for a "super-block" development in downtown Toronto, management wanted to move very fast. They wanted to start construction way in advance of having a complete set of construction documents.

Five years earlier they had finished a large development in Montreal, and still had retained a skeleton "construction management" staff.

Consulting architect I. M. Pei and Toronto architects Page & Steele had worked out a large number of schemes that would have permitted developing the super-block

in land-purchase stages; but all at once the few property hold-outs sold their land. With zoning restrictions putting a ceiling on the maximum number of square feet of building, the final project—Commerce Court—evolved as a 56-story office building, two low-rise office buildings, and the bank's existing high-rise neo-classic office buildings.

The bank first thought it would manage the project with its own staff, but very soon decided to have it done on the outside, because they would in any case need a general contractor to handle coordination of general construction and the usual specialty subcontractors. The bank, however, does maintain a very active supervisory role with its own staff of construction specialists. Thus there developed an over-all management role called project management, provided by the client, and a construction management role filled by the contractors in concert with consultants.

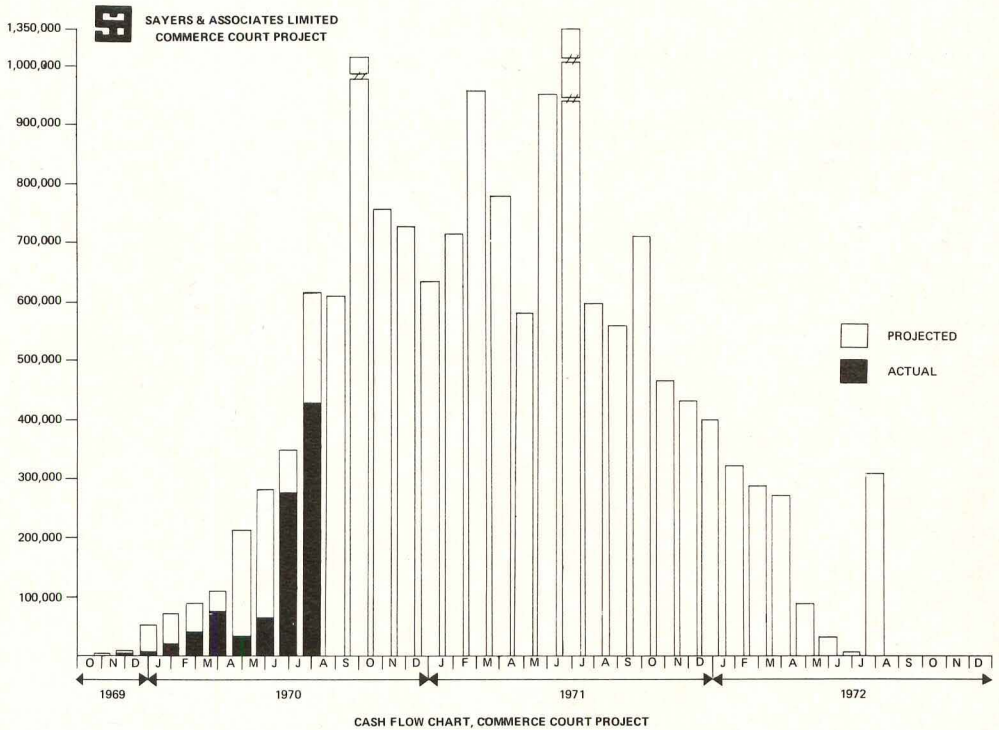
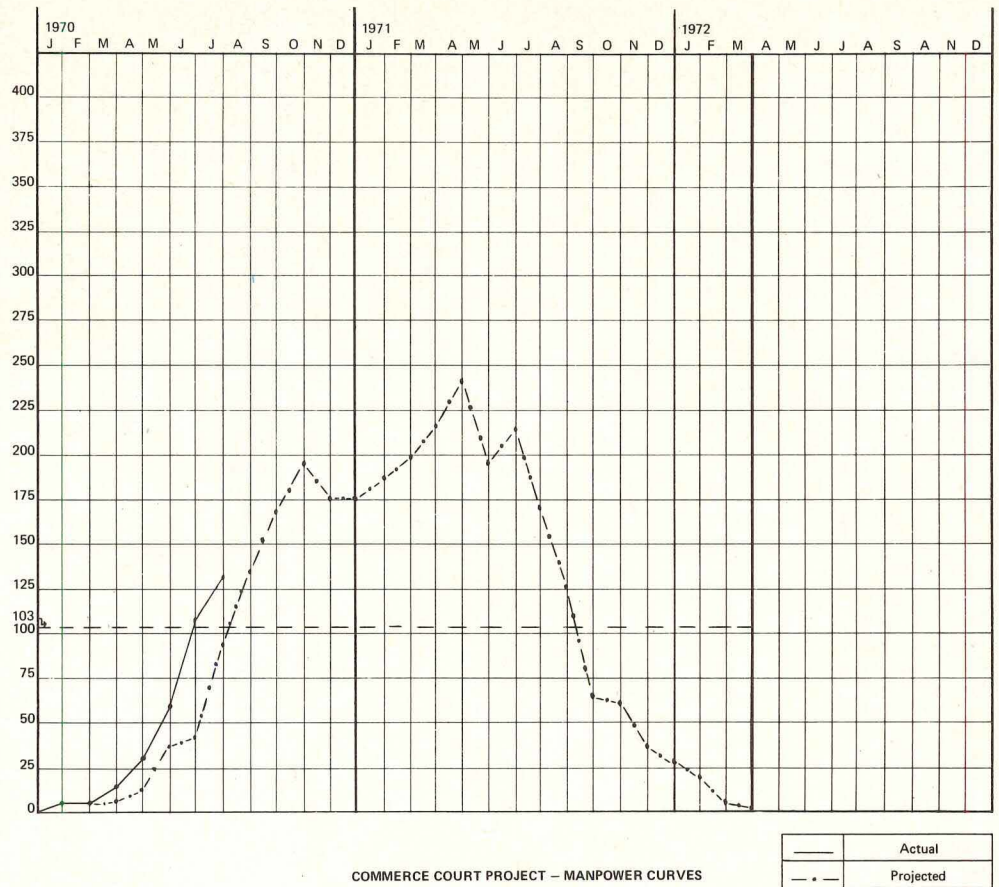
What is different about this project is that the client became convinced, at the urging of its mechanical and electrical consultants—G. Granek & Associates and Jack Chisvin & Associates—that it should divide the construction management into three parts: general construction (including structure), mechanical systems and electrical systems. Straight fees were negotiated with Mason-Kiewit, a joint venture, for general construction; with Sayers & Associates for mechanical systems, and with Standard Electric for electrical systems.

With the specialty contractors involved as management contractors, there was a much freer working relationship between them and the consulting engineers. This paid off in terms of improving the functional quality and performance of certain components. Example: a new type of trench duct for underfloor distribution was developed that has more rigidity and better access than conventional types.

The mechanical management contractor was to be responsible for expediting, coordination, project programming, checking, and also for such items as balancing, interference drawings and field engineering. The project was then split up into the following categories: 1) pre-ordered equipment; 2) pre-ordered materials, such as repetitive typical-floor ductwork and diffusers; 3) the sub-trades, such as insulation and thermostatic controls; 4) field contracting for piping and ductwork.

The advantage of splitting the mechanical contract into many separate direct contracts was to gain lead time and to permit the owner, through the construction management consultants, to control costs. The total number of separate contracts in the mechanical area will number in the fifties.

Bid openings have been held weekly, with representatives of the owner, architect, consulting engineers, and management contractors all present. Thus all fifty-plus bids in the mechanical area are out in the open for all those involved to evaluate. Of course the engineers look at the bid-alternates from



a technical point of view, the management contractors from an installation and delivery point of view. Much of the equipment could all be pre-ordered. Repetitive elements such as typical-floor ducting and piping could be fabricated off site.

To encourage the more accurate bidding of off-site fabricated items, the owner authorized the construction of mock-ups of various sorts, including an entire 50-ft bay of induction units.

The consulting engineers report that they have spent a lot more time in management than they had ever expected: reviewing multiple bids, revising drawings many times, etc. But on the basis of records kept

on costs, the client will come out way ahead in terms of his costs and the quality of the building. Moreover, he will have his building two years ahead of normal schedule.

Project/construction management, whatever the refinements of its definition and whatever its lines of protocol; whether it is performed by the architect, the client, or a specialist consultant; has one overriding characteristic: it brings order and unity to an historically fragmented procession from program through design to construction. The efficiencies and accelerations that redound to the economy are services to a prevailing goal of architecture. —William B. Foxhall

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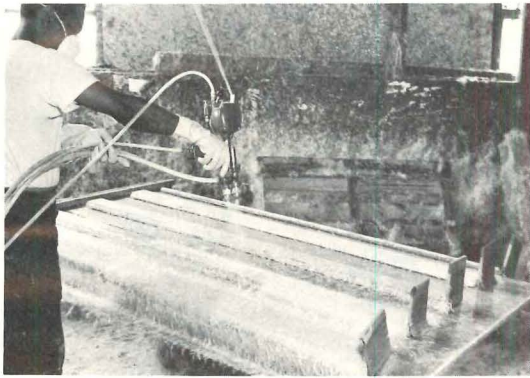
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For more information circle selected item numbers on Readers Service Inquiry Card, pages 249-250

Molded plastic elevator cabs installed in two New York buildings



A flame-retardant polyester resin made by Reichhold Chemicals, Inc. reinforced with chopped glass fibers has been molded into a small elevator cab for Automation House and a larger one for the new Georg Jensen's (see photo right). These are said to be the first structural use of plastic

in an elevator cab. The molding process affords design versatility and simplicity by making one-piece compound shapes possible; the cab top (top center photo) illustrates this. The plastic material is strong and easily maintained. Sheet steel cladding is used around the outside of the cab to com-

ply with elevator regulations, and vertical structural supports bonded to the outside of the free-floating side panels (top left photo) attach the panels to the floor. ■ National Elevator Cab and Door Corp., New York City.

Circle 300 on inquiry card

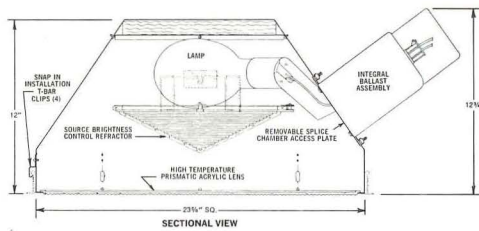
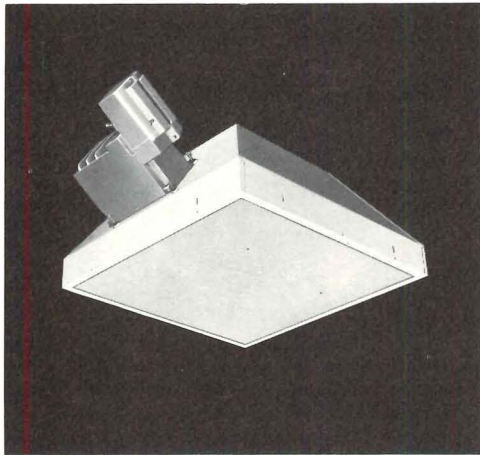
Treated natural wood used in imaginatively designed playgrounds



Specially treated wood playgrounds provide creative play space in two Tennessee parks. The use of wood allows the playgrounds to fit the rustic, natural park atmosphere. The wood is treated with *Cellon*, a process of pressing a preservative into the wood cells (without affecting color) so that the wood will be protected against decay and termite attack. The playgrounds were designed by Oliphant and Kersey, Inc., architects who were interested in stimulating imagination and providing a sense of freedom. ■ Koppers Co., Inc., Pittsburgh.

Circle 301 on inquiry card

more products on page 172B



MERCURY LUMINAIRE / Mercurume with a mercury vapor lamp is said to provide five times as much light as a fluorescent luminaire of equal size; with other high-intensity discharge lamps, it may provide seven times as much light. It has a 2 ft by 2 ft prismatic lens for efficient use of light

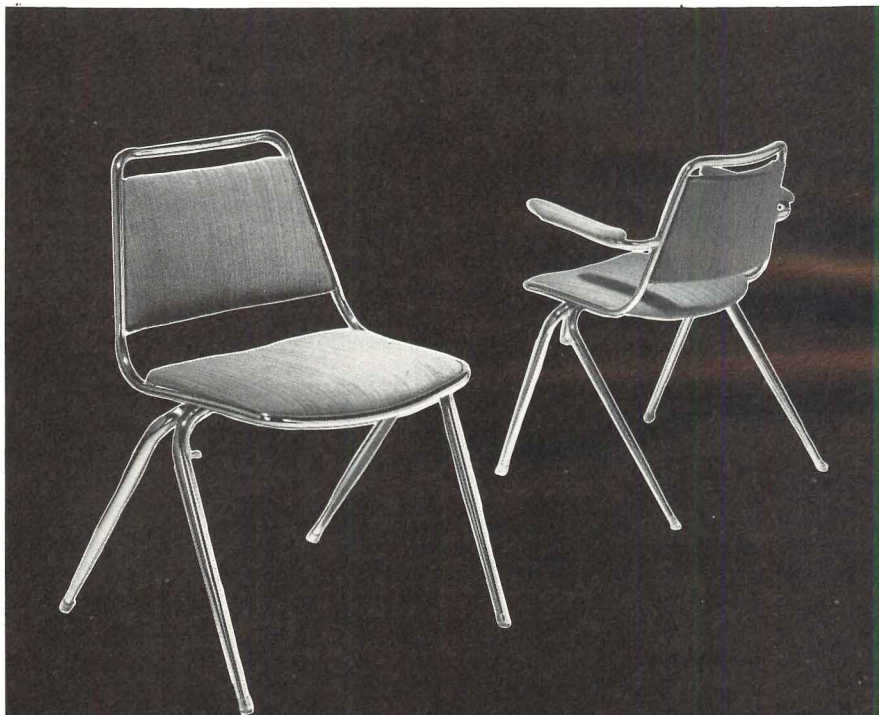
and for glare elimination, and a prismatic-glass refractor between lamp and lens provides even light distribution. The luminaire has a depth of 12 3/4 in. making it adaptable to most ceiling applications. ■ Holophane Co., Inc., New York City.

Circle 302 on inquiry card



CERAMIC CEILING / Ceramaguard is a high density ceramic ceiling which resists moisture and high temperatures. It is useful in warm, humid environments such as the food processing plant in the photograph above. ■ Armstrong Cork Co., Lancaster, Pa.

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ADDENDUM

A proposed airport installation of Rotopark appearing on page 141 of the August issue of the RECORD was designed by Bernard A. Marson, Architect.

more products on page 184

For more data, circle 142 on inquiry card

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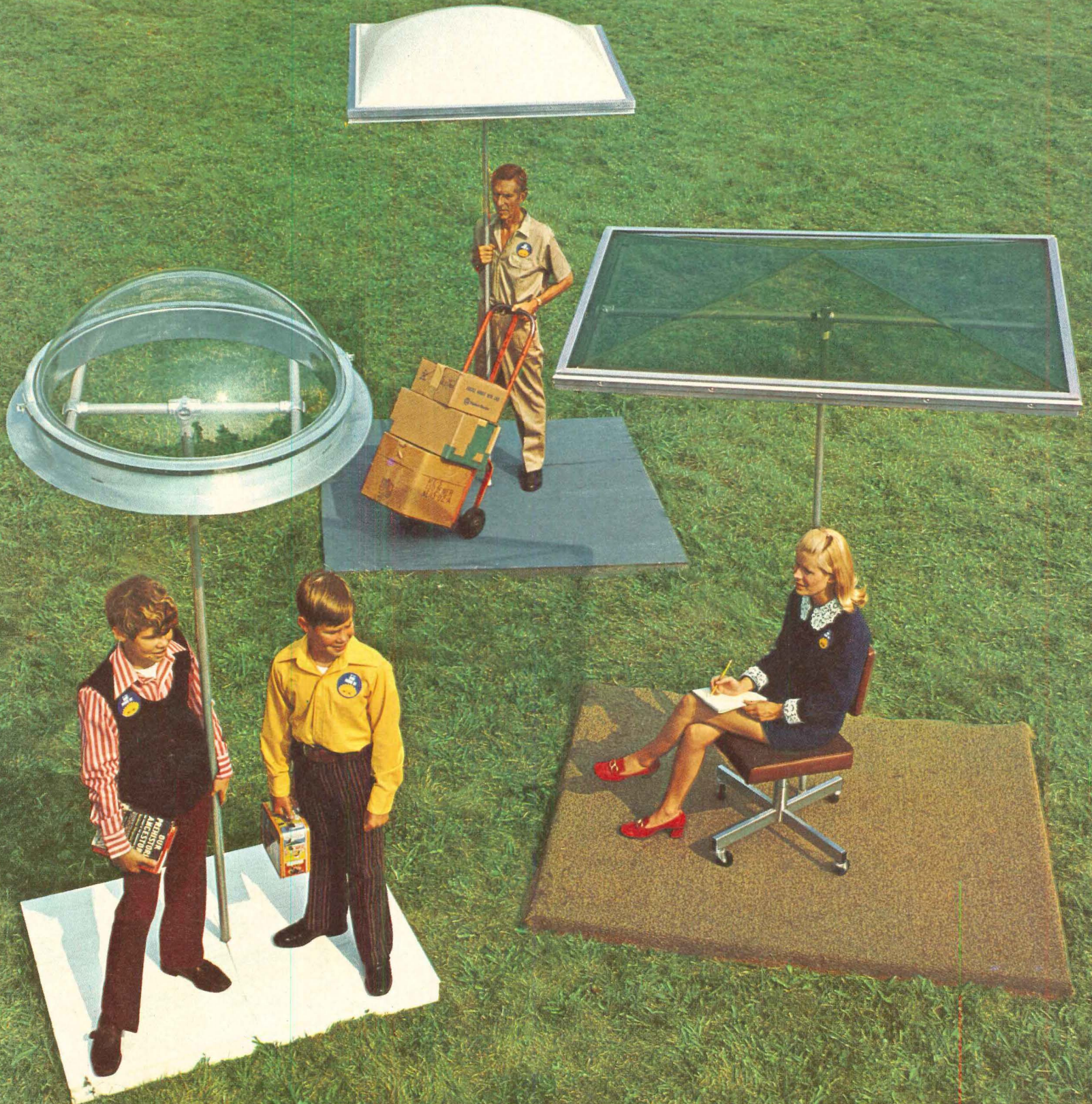


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continued from page 172B



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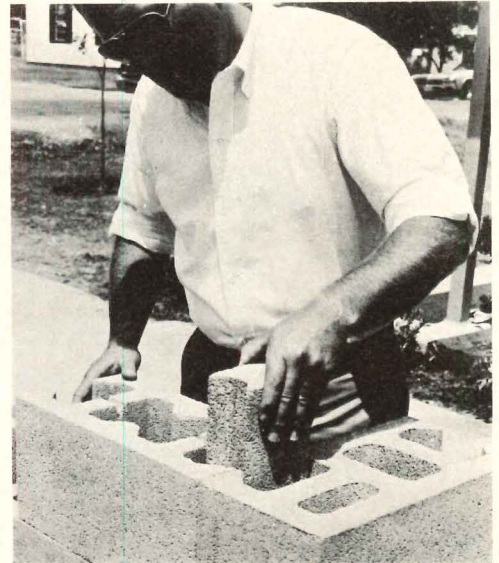


For more data, circle 102 on inquiry card

◆ For more data, circle 101 on inquiry card

CARPET BACKING / A polymer chemical carpet backing called *Omalon* is guaranteed not to break or pack down. It is light weight, non-shredding and non-ravelling, will not support bacterial growth and resists aging. It comes in flame retardant grades and can be used for contract carpeting. It is claimed to outlast rubber and to be tougher than urethane. ■ Olin Corp., Stamford, Conn.

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INTERLOCKING BLOCKS / *Interblock* is a system of interlinking concrete blocks. There are four block shapes: a stringer block, a half block, a combination block for corners and interiors, and an insert plug which holds the blocks in place both horizontally and vertically. The system does not require skilled labor, and therefore costs less than using mortar would. Corners and partitions may be reinforced by vertical steel rods in openings, and the remaining space filled with concrete. The exterior is sealed with a latex-based mortar which dries to a stucco finish. ■ Interblock Inc., Dallas.

Circle 306 on inquiry card



FOLDING SEATING SYSTEM / These folding chairs are mounted on aluminum risers which can be either manually or electrically extended and retracted to either make the chairs ready for seating or flatten them to maximize space. ■ American Seating, Grand Rapids, Mich.

Circle 307 on inquiry card
more products on page 186

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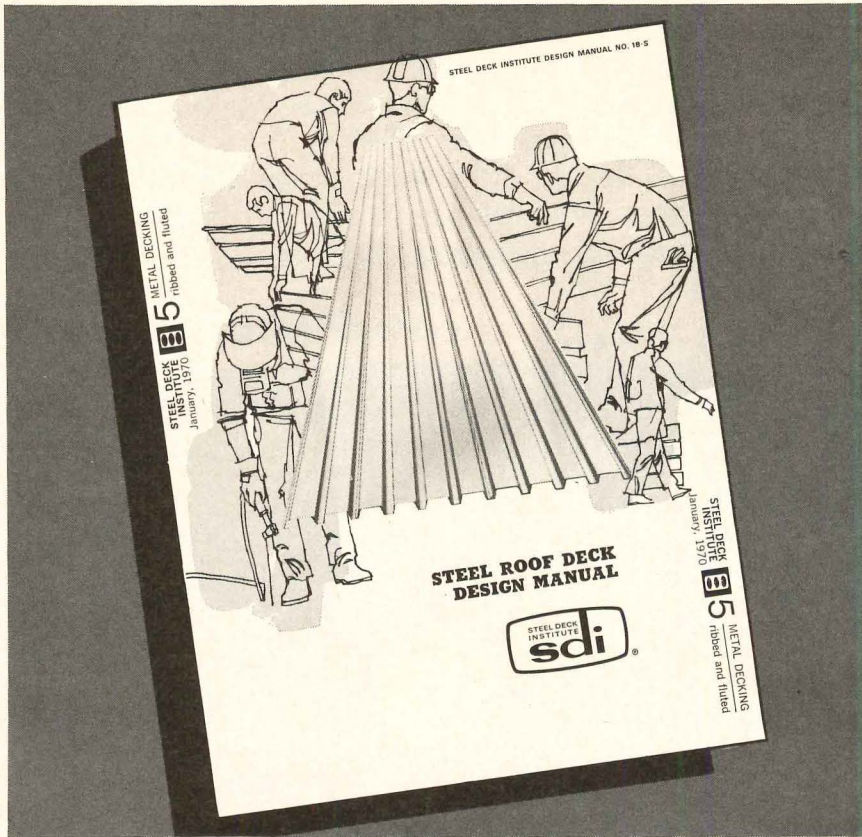
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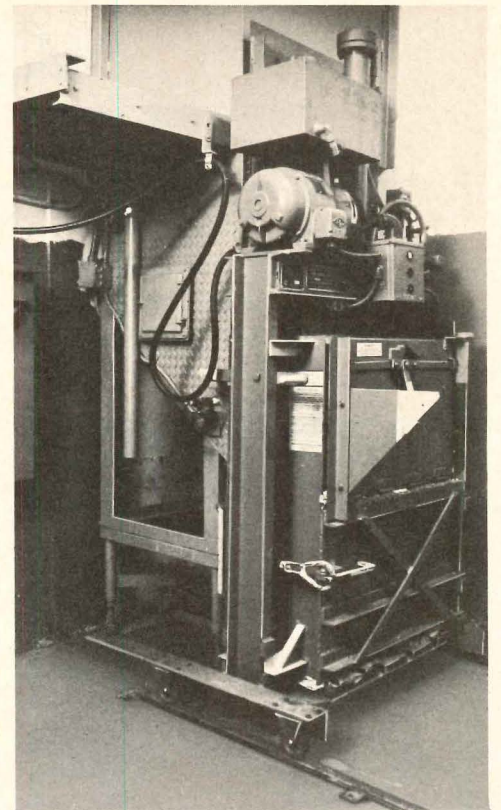
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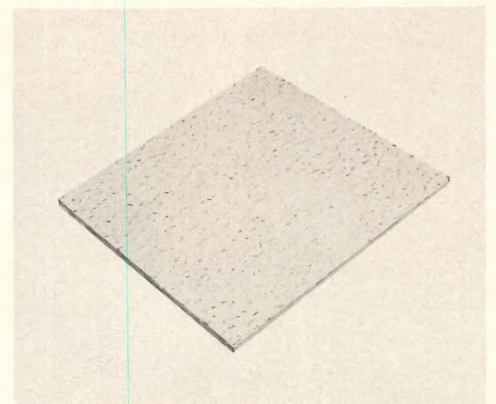
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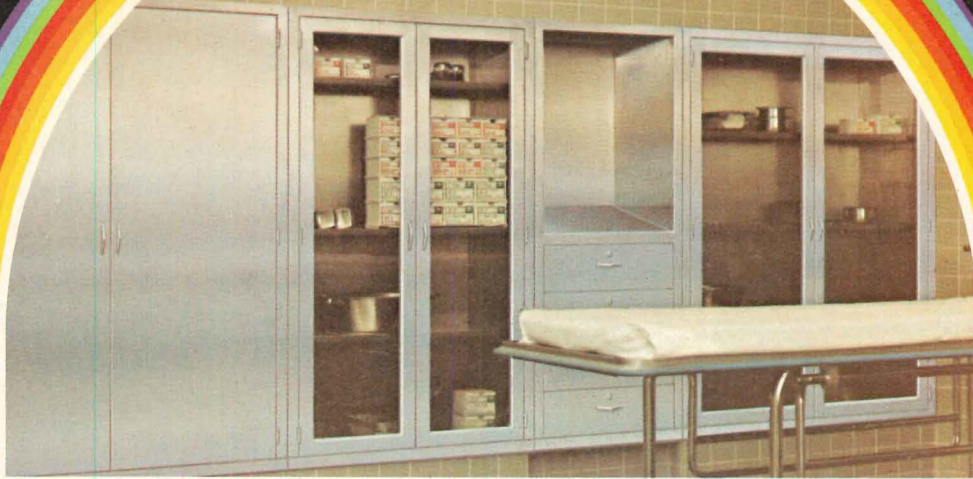
GARBAGE COMPACTOR / This trash pressurizing machine can reduce wet and dry garbage bulk to up to 1/20 of its size. The automatic compactor comes in six models which apply between 3,000 and 18,000 lbs of pressure to garbage. Some models wrap compacted trash in polyethylene bags. The smallest one can be installed in the kitchen; larger models can operate in apartment and office buildings, hospitals and restaurants. ■ The Compacker Corp., Washington, D.C.

Circle 308 on inquiry card



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Circle 309 on inquiry card
more products on page 200



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Marcel Breuer designs for Knoll.

The collection includes his classic designs: the Cesca chairs, the Wassily and Reclining chairs, the Laccio tables, and the Canaan desk.

Knoll International operates in 31 countries.



How did Memorial Hospital select Type 45 Thru-the-Wall air conditioning?

**They tested it
against
competitive
systems.**



That's right. The building engineer tested it . . . along with several competing units . . . in the hospital itself in Chattanooga, Tennessee. Type 45 was selected over the competitive units because it clearly demonstrated superior features. Features like two-section design to speed installation . . . internal insulation for super-quiet operation . . . separate condenser and evaporator fan motors to cut operating costs . . . heavy gauge steel . . . independent fresh air vents . . . complete selection of special control systems.



We invite you to test the Type 45 for your building. Any way you want. For new construction or renovation. We're confident it will excel in any competitive comparison, because it was built with your air conditioning needs in mind.

Contact your local American-Standard Sales Representative for more information, or write to:

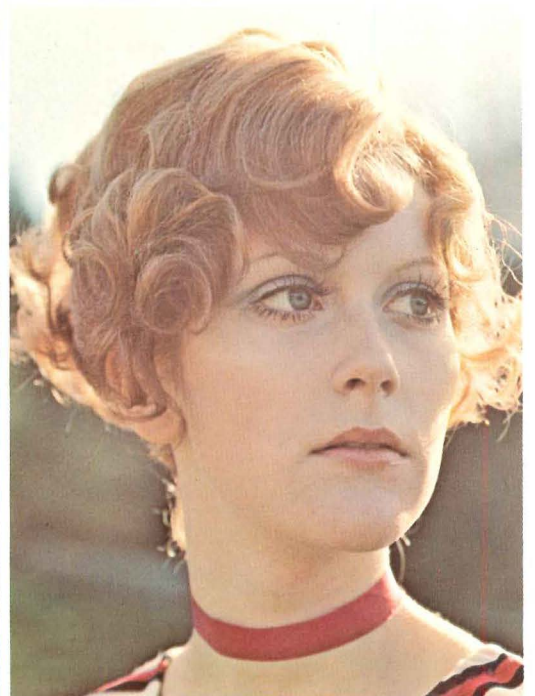
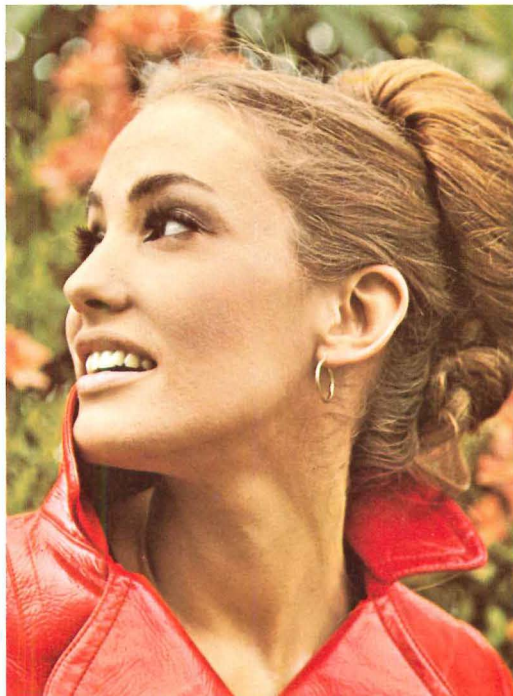
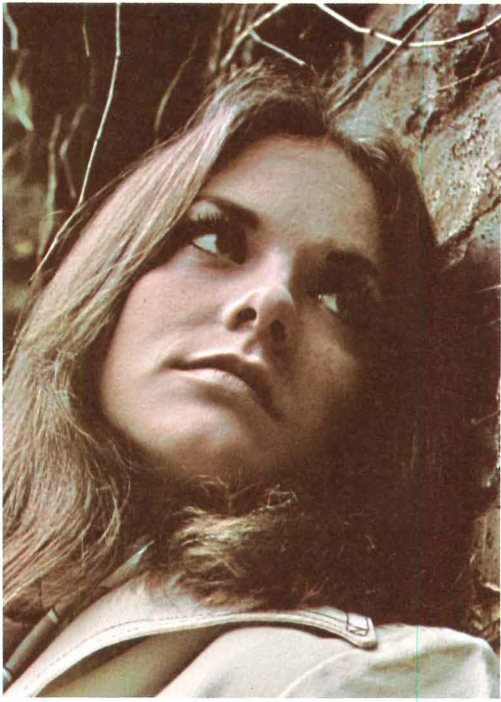
Working with air to keep people comfortable.

**AMERICAN
STANDARD**

COMMERCIAL AIR CONDITIONING DIV.
1300 FEDERAL BOULEVARD
CARTERET, NEW JERSEY 07008

For more data, circle 108 on inquiry card

Textured Plywood. It's more than just another pretty face.



Textured Plywood.

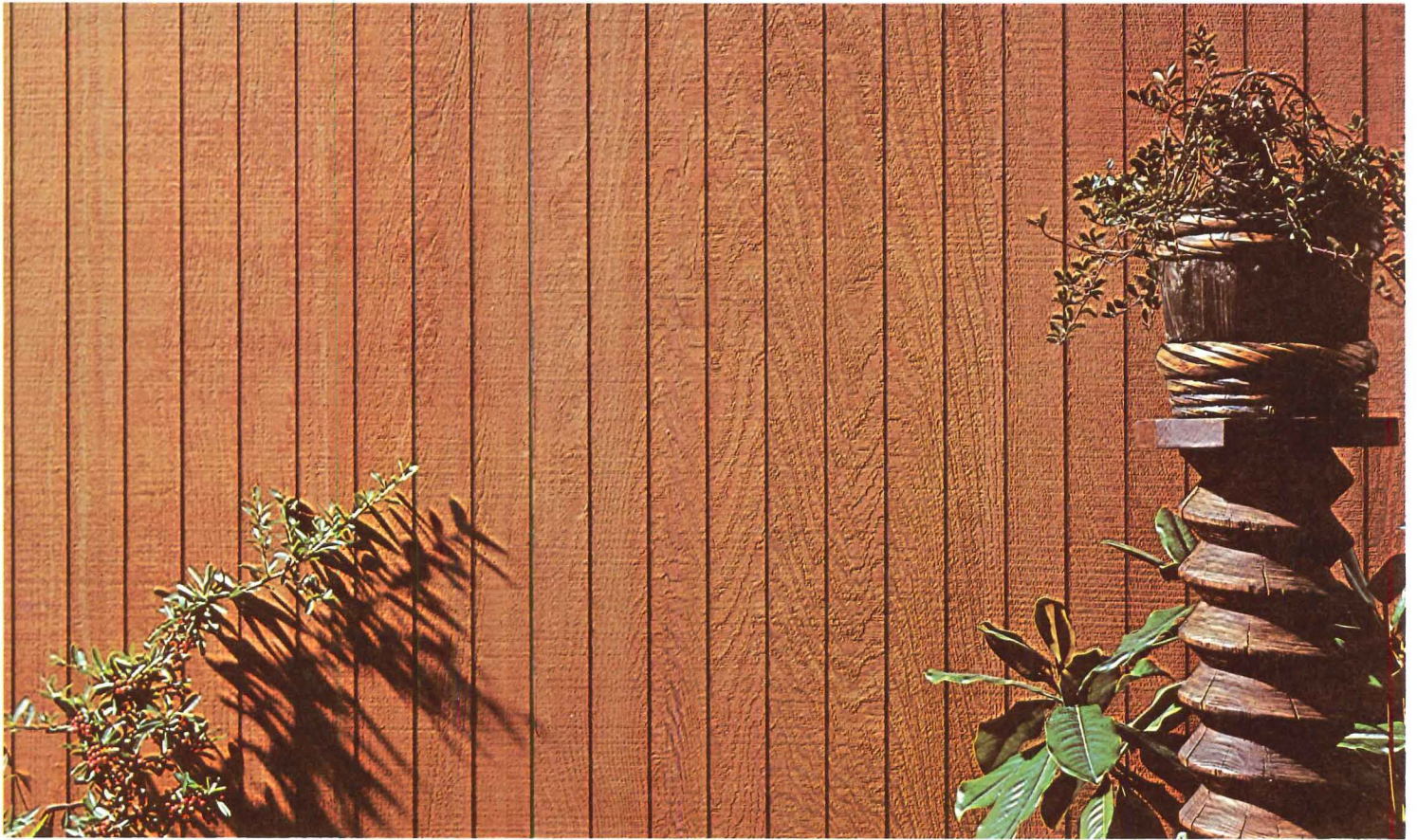
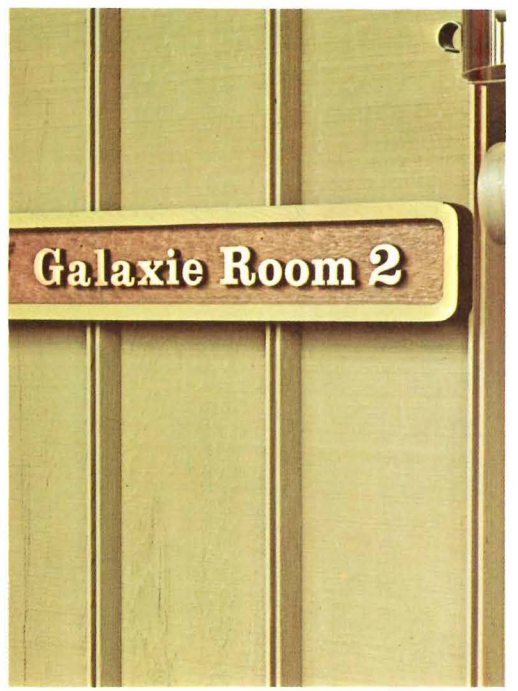
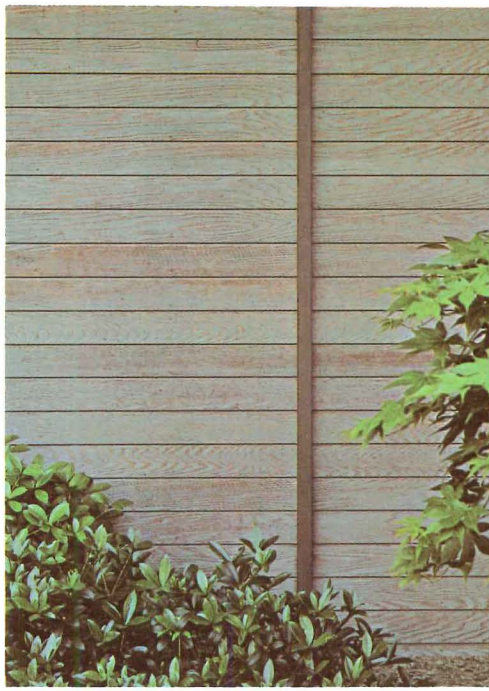
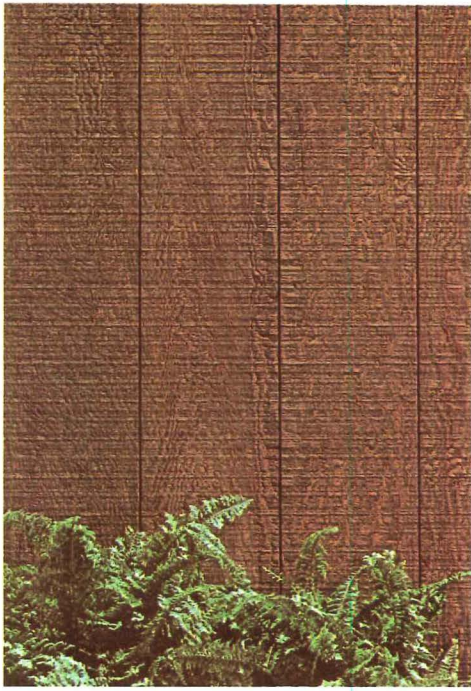
Versatile. It comes in 40 different styles and textures. For all kinds of apartments, townhouses, homes and commercial buildings.

Warm. It's rich. And natural. Inside or outside.

Tough. It's a built-in shear wall. Resists wind loads and impact. And weathers beautifully.

Economical. APA Single Wall combination siding and sheathing saves one application step.





Beautiful.



The facts behind the pretty face:

Finishing:

Textured plywood paneling and siding takes staining beautifully. Or you can apply acrylic latex paint without sacrificing the textured effect.

Interior Specifications:

When you use textured plywood for interiors, be sure to specify your supplier's top-of-the-line grade if you want clear paneling with a minimum of knotholes and with natural wood characteristics.

Species:

Douglas fir, cedar, redwood, southern pine, lauan, others. Sizes: 4x8, 4x9, 4x10 and 4x12. Basic veneer grade in panel face permits visible knots and repairs to knotholes. Panels with clear faces are available under manufacturers' designations such as "premium" or "clear."

The APA Story:

American Plywood Association is a nonprofit organization devoted to research, promotion, quality testing and inspection for more than thirty years. Included here are just a few examples of the beautiful, timesaving, economical systems and products developed by APA over the years. You can depend on them, just as you can depend on the DFPA grade-trademark. Make sure every panel you buy or specify bears this mark. It means the plywood has been subject to the rigid testing and inspection program of American Plywood Association. And that means you're getting the best possible plywood for the job.

And more facts:

**American Plywood Association, Dept. CM
Tacoma, Washington 98401**

Please send me your free textured plywood information package, including a full color idea portfolio, a guide to distinctive plywood sidings, application and finishing data sheets, qualified coatings directory, product descriptions and manufacturers' list.

Name _____

Title _____

Firm _____

Address _____

City _____

State _____ Zip _____

AR-100



Plywood quality-tested by the Division for Product Approval.





New Primitive... for a beautiful handcrafted look.

New Primitive™ ceramic tile has the uneven, handcrafted look that's so prized today. The surface has a natural cleft finish. The shading varies from tile to tile. The effect is rich, rustic, Primitive

And permanent. Tough, rugged Primitive is solid ceramic. It's the wall-to-wall floor that wears practically forever.

So clients get beauty they won't want to cover up, durability they can clean up with little effort.

Primitive is vitreous, frostproof, and stainproof. In seven glazed colors, one unglazed, and five shapes. Write for your full-color brochure on our newest idea. Primitive. American Olean Tile Company, 1421 Cannon Avenue, Lansdale, Pa. 19446.

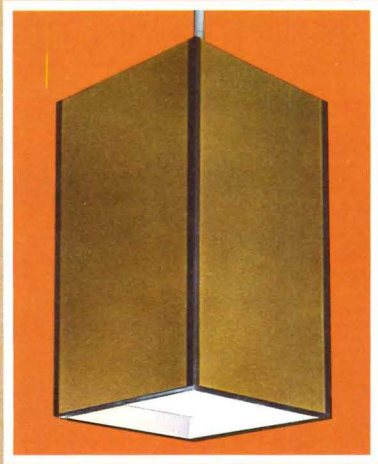
For more data, circle 110 on inquiry card

Primitive ceramic tile. It's the natural thing to use.

**American
Olean**

A Division of National Gypsum Company

**Wide-Lite introduces Spectra VI.
Sturdy enough for a gym,
silent enough for a library,
dramatic enough
for a designer.**



Spectra VI Indoor Luminaires are for mercury vapor, metal halide, and high pressure sodium lamps.

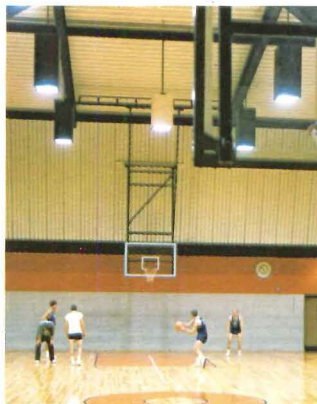
A new pendent luminaire has been added to the commercial indoor lighting choices from Wide-Lite.

Spectra VI answers pendent mounting needs with Wide-Lite* quality. This is a fixture practical enough for a gym, silent enough for a library, and dramatic enough for a modern airline terminal. Or a bank lobby, auditorium, supermarket, or shopping center mall.

The handsome geometric housing encases a basic, dustproof fixture design that yields the lowest cost per maintained footcandle. Wide-Lite has proved the outstanding performance of this exclusive dustproof design through years of industrial use—now these same benefits are available for the commercial user! All Spectra VI luminaires have integral, encapsulated SilentGuard ballasts for quick installation and quiet performance. A regressed trim completes luminaire design and is functional in increasing visual comfort.

Yet for all its structural dependability, Spectra VI is exceptionally cooperative with architects and interior designers. The decorative steel side panels are available in your choice of standard Golden Bronze or four other baked enamel colors. There's also an optional simulated wood-grain finish. Blend or contrast your lighting system with your interior.

Spectra VI by Wide-Lite. It's the new pendant that goes from game to library to air terminal with sensible style.



Twenty Spectra VI luminaires provide an average 81 footcandles of uniform lighting in this gymnasium. These fixtures have tempered, shock-resistant lens for maximum lamp protection—an important feature in such active-people applications.



"Wide-Lite" pendants make a dramatic design statement quietly in this Minneapolis library. Spectra VI luminaires are available in 400 or 1000 watt models.

Recessed Indoor fixtures by Wide-Lite are chosen for the Southeast's largest shopping mall.

Holly Hill Shopping Center is in Burlington, North Carolina. Its landscaped mall is 700 feet long, making this the largest covered-mall retail complex in the Southeast.

Holly Hill's mall is illuminated by only 64 Recessed Indoor Luminaires by Wide-Lite. (Five hundred incandescent fixtures would probably have been needed.) The IDs are mounted at 18 and 35 feet to give 22 maintained fc's over an 1800 square-foot area.

Five of the fixtures are equipped with Wide-Lite's exclusive LiteMatic emergency lighting feature. Two quartz lamps, integral within the dustproof ID, are on instantly should regular power fail.

Your representative has complete information on all the commercial indoor lighting choices from Wide-Lite, as well as the exclusive solid-state LiteMatic option.



It may be 41° outside, but customers and greenery on the Holly Hill mall enjoy year-round, comfortable temperature and good lighting from "Wide-Lite" Recessed IDs.

Wide-Lite®

P. O. Box 191, Dept. AR-1/71-1025
Houston, Texas 77001

Also manufactured in Australia, Belgium,
Canada, Mexico and Great Britain.

A Division of Esquire, Inc.

*Trademark of Wide-Lite Corporation

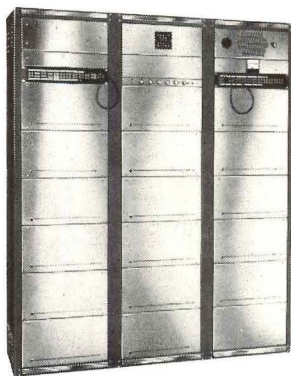
continued from page 186

**where industry
demands
unfailing
communications**

specify



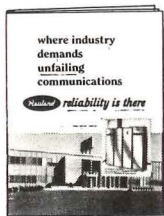
solid-state reliability



Rauland *Leader in Sound
for Industry...*

**OVER 1 MILLION WATTS OF SOLID-STATE
AUDIO POWER NOW IN SERVICE**

RAULAND high-power solid-state sound serves the communications needs of hundreds of industries, both large and small. Many of the installations have now been in continuous operation for well over five years without a single failure. Where unfailing communications are required, RAULAND reliability is there. If you specify sound or communications installations, RAULAND's 40 years of experience in the field is at your command. We specialize in working with architects and consulting engineers.



free

Send for this valuable brochure. It shows how RAULAND solid-state sound boosts production and cuts operating costs for America's most progressive companies.

Rauland-Borg Corporation, Dept. R
3535 W. Addison St., Chicago, Ill. 60618

Send brochure on Rauland Industrial Sound

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

For more data, circle 115 on inquiry card

◆ For more data, circle 112 on inquiry card

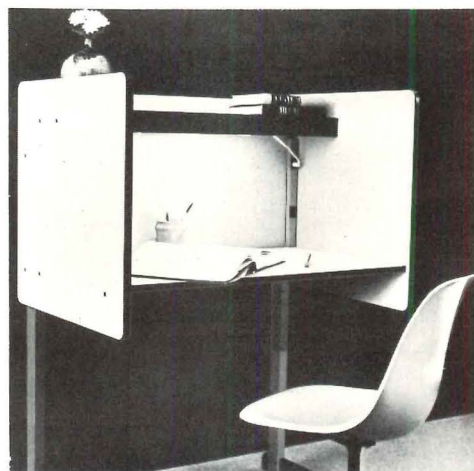
DOUBLE-DECK ELEVATORS / Standard Oil Company's Chicago building will have 40 two-story elevators to serve two floors at once, thereby carrying more passengers and improving service. The elevators will be arranged in groups of five, with computer controlled supervisory equipment for each group. These double-deck elevators are said to be the fastest available of their kind. (See RECORD, March 1970, p. 133.)

▪ Otis Elevator Co., New York City.
Circle 309 on inquiry card



BRASS FOUNTAIN / This new fountain is made of cast brass or cast aluminum. It is operated by a cross arm valve, but a push button bubbler is available, as well as vandal proof bottom plate, condensation proofing and special finishes. ▪ Western Drinking Fountains, Inc., San Leandro, Calif.

Circle 310 on inquiry card



ADJUSTABLE STUDY CARREL / This carrel can be adjusted to seven heights between 24 and 30 in. on a perforated metal running track. It has four electrical outlets for connection to other units, light, projection equipment, and audio material. The back of the carrel can be used for projection of visual material. ▪ Monitor Cabinets, Tacoma, Wash.

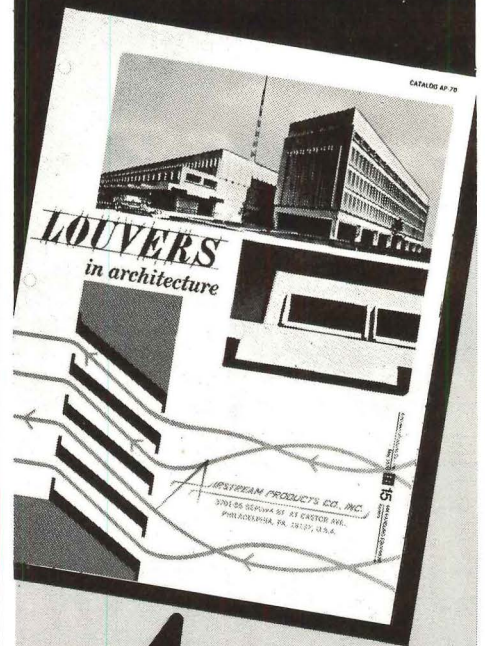
*Circle 311 on inquiry card
more products on page 240*

**new guide on ...
designing
with
louvers!**

Louvers in architecture play an important role in permitting the passage of air into or out of a building while helping to complement the design of a building.

Our new 36-page handbook offers the most complete technical guide to the selection of stationary and operable louvers, as well as sight shields, fire and smoke venting devices, dimensional accent panels and other architectural specialties. Just drop us a note on your letterhead, or use the inquiry card, for your copy of Catalog AP-70.

**it's YOURS
for the
asking!**



AIRSTREAM
PRODUCTS CO., Inc.

3701 SEPVIVA STREET, PHILA., PA. 19137

Manufacturers of Louvers ▪ Fire & Smoke Ventilating Devices ▪ Sunshades ▪ Vision Screens ▪ Access Hatches ▪ Dimensional Accent Panels

For more data, circle 116 on inquiry card



We make a lot of different ceilings
to do a lot of different things.

This one's thing is complete adaptability.

With this Armstrong Luminaire Ceiling System, you can match the size of the ceiling module to the size of the planning module of the building. Both the length and the width of the Luminaire Custom/Module are variable. This provides a range of module sizes from a minimum of 24" x 38" to a maximum of 60" x 72". Whatever customized dimensions you come up with, you get the standard benefits of *all* Armstrong Luminaire Systems—totally inte-

grated ceiling systems that combine the functions of lighting, air handling, and acoustical control—plus partition and sprinkler head adaptability. An Armstrong representative is in the best position to tell you more about the Luminaire Custom/Module and the wide range of other Armstrong Ceiling Systems. For his name and a copy of our Ceiling Systems folio, please write: Armstrong, 4210 Rock St., Lancaster, Pa. 17604.

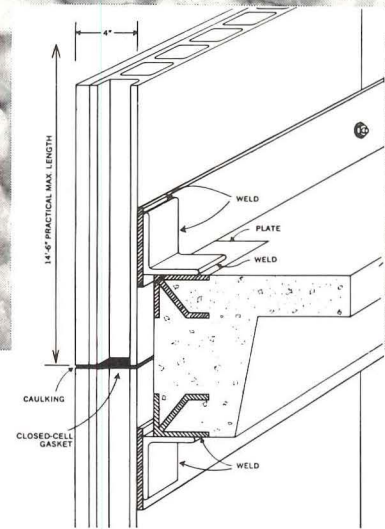
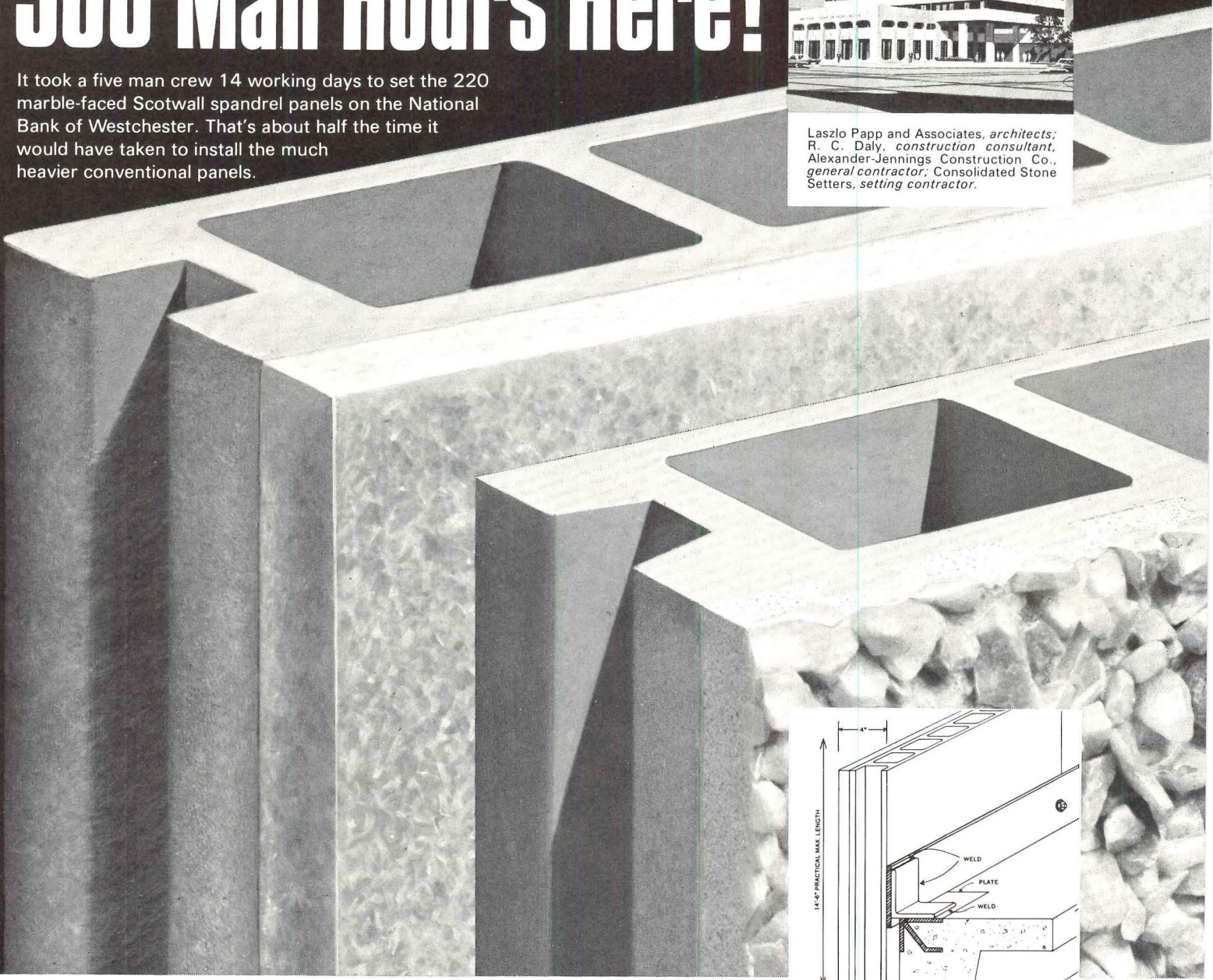
Armstrong / CEILING
SYSTEMS
THAT WORK

Scotwall Saved 500 Man Hours Here!

It took a five man crew 14 working days to set the 220 marble-faced Scotwall spandrel panels on the National Bank of Westchester. That's about half the time it would have taken to install the much heavier conventional panels.



Laszlo Papp and Associates, *architects*; R. C. Daly, *construction consultant*, Alexander-Jennings Construction Co., *general contractor*; Consolidated Stone Setters, *setting contractor*.



Scotwall panels have an asbestos-cement substrate faced with 7/8" marble or aggregate. The marble-faced panels weigh only 25 pounds per square foot and aggregate-face even less. They go up quickly with small crews and light equipment. Scotwall's combination of strength, stability and light weight permits a much lighter supporting structure and far greater design freedom.

The new Scotwall Panel System will give your buildings the beauty of marble or aggregate cladding for an in-place cost below that of many less desirable materials. Let us show you.

WRITE FOR YOUR COPY OF THE NEW SCOTWALL BROCHURE



Georgia Marble Company

11 PRYOR STREET, S.W., ATLANTA, GEORGIA 30303
A subsidiary of Jim Walter Corporation

COAST-TO-COAST CONSULTING SERVICE—Our engineers stand ready to assist you any time anywhere on any project involving marble or limestone. A phone call will put one of our men across the desk from you in a matter of hours. Phone 404/688-2861.



For more data, circle 113 on inquiry card

For more data, circle 114 on inquiry card

What in the world convinced an architect he could specify beautiful wood flooring for a showroom?

PermaGrain™ did.



Hall Chevrolet, Milwaukee (Wauwatosa), Wis.; Designer: Building Service, Inc.

PermaGrain now makes a wood floor in an automobile showroom feasible and practical. But PermaGrain is more than just wood. It's red oak impregnated with a liquid plastic and hardened throughout the pore structure by nuclear radiation.

Hall Chevrolet of Milwaukee finds that oil drips won't harm it. Tire chemicals won't stain it. Nor will grease. Nor gritty foot traffic. Nor snow-melting chemicals tracked in from the outside.

What PermaGrain does is give a dealer a prestige showroom to set off

the beautiful new cars. And very little maintenance is required to keep it sparkling.

PermaGrain is available in 12x12-inch prefinished parquet tiles, 5/16 inch thick. Installed cost is about \$1.50/sq. ft. Choose from six colors—Natural, Provincial, Americana, Barcelona, Gothic, Charcoal—as well as a variety of decorative pickets and feature strips.

Where can you use PermaGrain besides in showrooms? Use it wherever you want the warmth and beauty of natural wood combined

with remarkable durability and easy maintenance.

If you'd like to know more about PermaGrain, call 800-243-6000 toll-free for the name of the dealer nearest you. (In Connecticut, call 800-942-0655.)



ARCO Chemical Company
Division of AtlanticRichfieldCompany
260 South Broad St.
Philadelphia, Pa. 19101



Enjay Fibers And Laminates Company,
Odenton, Maryland 21113

Send product and availability information
on Enjay/Nevarmar Laminated Floor Tile to:

Name _____

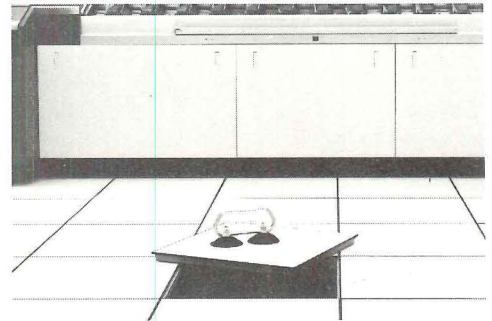
Title _____

Firm _____

Address _____

City _____

State _____ Zip _____



NO WAX

Thus no wax dust under foot when you put Nevamar LFT Laminated Floor Tile on your computer room floor system.

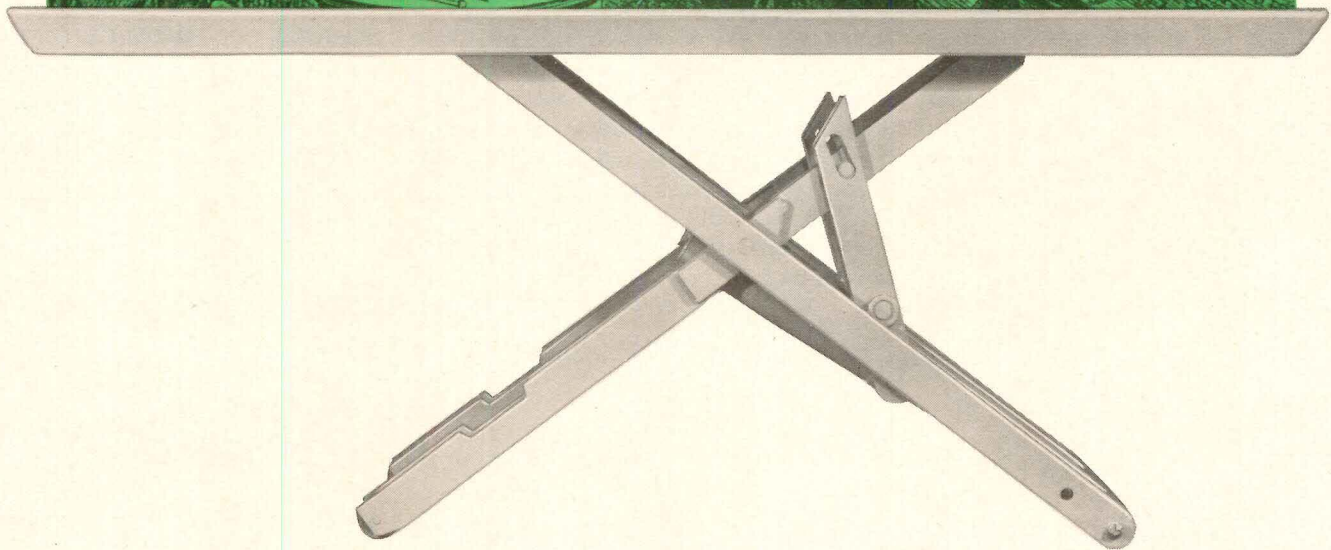
That's right. You never, never wax this extra-wear laminated plastic floor tile. No wax, so no wax dust to cross up computers or cause costly downtime.

Damp mopping is all the cleaning required, and scuff marks come right off. Think of the maintenance savings from this alone!

Get the money-saving facts now from your access floor system supplier, or send the coupon above to: Enjay Fibers And Laminates Company, a Division of Enjay Chemical Company, Odenton, Maryland 21113. An associate member of Access Floor Manufacturers Assoc. and Construction Specifications Institute.



**NEVAMAR
LAMINATED
FLOOR TILE**



We've Raised The Standards Of Civilization

Autoquip Corporation comes to the aid of the Empire with the Porta Contact Platform Lift. There are times when you'll feel it's the eighth wonder of the world: Where would civilization be if we couldn't solve problems that are impossible with conventional lifting devices?

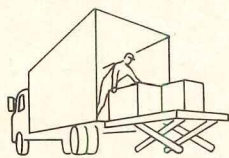
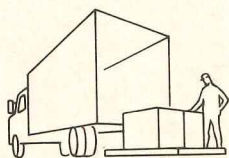
For example, when you're faced with a low dock or an excessively steep angle of inclination, the Porta Contact Platform Lift raises to the exact truck height to permit simple movement of goods in and out.

When there are no docks . . . a situation familiar in warehouse and chain store trailer unloading . . . the Porta-Contact raises from a ground installation, allowing the operator to move the goods from the truck to the platform. The platform is then lowered with the operator and goods, saving many manhours of labor.

When you're faced with severely heavy or awkward loads, the Porta-Contact can be used as a universal platform lift, loading from the floor to trucks at different levels.

In solving your particular materials-handling problem, be grateful for one of the greatest inventions since the birds, the bees, and the Italians . . .

The Autoquip Porta-Contact Platform Lift.



Write for description, literature and price.

Autoquip CORPORATION

1140 S. WASHTENAW AVE./CHICAGO, ILL. 60612

For more data, circle 119 on inquiry card

OFFICE LITERATURE

For more information circle selected item numbers on Reader Service Card, pages 249-250.

IRON / A 20-page catalog on enameling iron gives over 80 specific product applications. Described is the manufacturer's one-coat enameling iron and its architectural applications. Design recommendations for porcelain enameled parts and tips on fabrication, surface preparation and processing are included. ■ Armco Steel Corp., Middletown, Ohio.*

Circle 400 on inquiry card

WALL LINER SYSTEM / Three fire-retardant wall liner systems using a plastic laminate surfacing are described in a 6-page bulletin. The bulletin states the systems meet building code flame-spread requirements required for interior applications such as reception rooms, restaurants and offices. A list of system design criteria and physical properties is given. ■ Westinghouse Electric Corp., Grand Rapids, Mich.*

Circle 401 on inquiry card

GRATING / A line of grating for mezzanine flooring, walkways, staging platforms and stair treads is described in a 6-page brochure. The grating features an interlocking system which eliminates bolting or welding costs. Information charts show data on allowable loads at various spans. ■ United Interlock Grating, Columbus, Ohio.

Circle 402 on inquiry card

DOORS / A line of institutional doors is described in a 12-page catalog. Featured are solid-core doors with staved wood block or particle board cores, hollow-core doors with wood-grid or ladder-core construction and folding door units. Typical hardware specifications, light and louver openings, and door specifications are included. ■ Georgia-Pacific Corp., Portland, Ore.*

Circle 403 on inquiry card

HEATING PANELS / A line of electric radiant heating panels suitable for commercial, institutional and residential applications is described in an 8-page brochure. The panels, available for surface, T-Bar or flush mount ceiling installations, are backed with fiberglass thermal insulation. The brochure gives specifications and technical data. ■ 3M Company, St. Paul.*

Circle 404 on inquiry card

FURNITURE / A 56-page catalog describes a line of multi-purpose room furniture and gives space planning and room setting guidelines for various functions. The line includes folding tables and platforms, stack chairs and folding bars and lecterns, all available in a range of sizes. Specifications are included. ■ King Arthur Inc., Pennsauken, N.J.

Circle 405 on inquiry card

VISUAL COMMUNICATIONS / "Educational Equipment," a 28-page catalog, describes a complete line of visual communication equipment including chalkboard systems, panels and display cases. Specifications and installation data are given. ■ Educational Equipment Corp., Kent, Ohio.

Circle 406 on inquiry card

MASONRY / A 16-page booklet describes a line of glazed masonry units including scored, design and standard series. Applications and technical data are given. ■ The Burns & Russell Co., Baltimore.*

Circle 407 on inquiry card

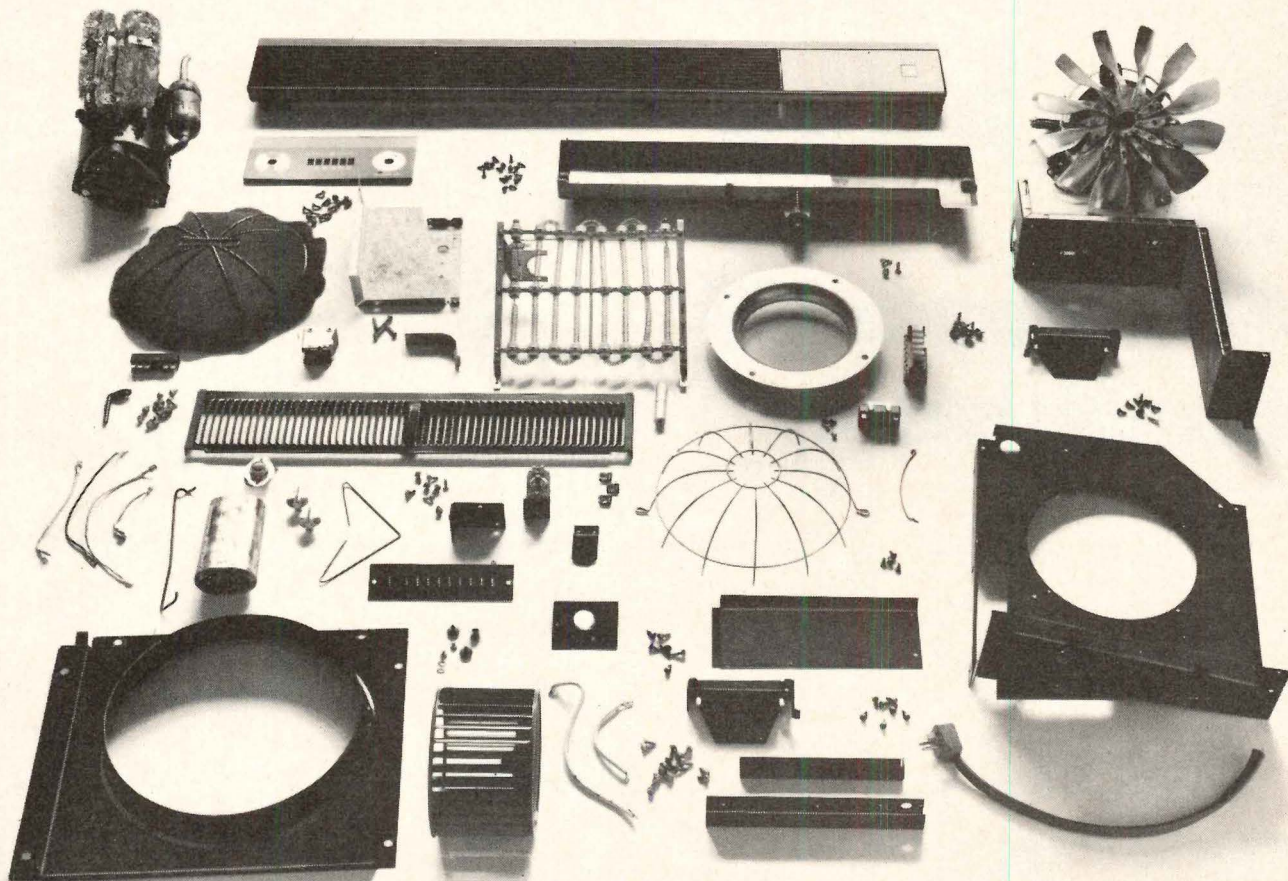
REDWOOD / Some redwood applications for patio paving are illustrated in a 4-page data sheet with installation diagrams plus information about grades and finishes. ■ California Redwood Assoc., San Francisco.*

Circle 408 on inquiry card

HOSPITAL COMMUNICATIONS / A 14-page catalog describes a complete line of hospital communications equipment. The catalog features a visual nurses call system including pushbutton cord sets, buzzer stations, dome signals and annunciators. Dimensional drawings and sample specifications are included. ■ Faraday, Inc., Tecumseh, Mich.

Circle 409 on inquiry card

We made a few changes



STEEL / A chrome-nickel steel, *Super Soft Stainless*, is described in a product bulletin giving the chemical composition, strength factors and physical properties of this metal. The bulletin states that, in addition to possessing the advantages of stainless steel, *Super Soft Stainless* forms easily without springback and is maintenance-free. ■ Sharon Steel Corp., Sharon, Pa.*

Circle 410 on inquiry card

BATHROOM CABINETS / A complete line of bathroom cabinets with framed mirror doors is described in a 16-page catalog. These cabinets are available in recessed swing door, surface mounted swing door and recessed sliding mirror models. Complementary lighting fixtures are also described. ■ Miami-Carey Co., Monroe, Ohio.*

Circle 411 on inquiry card

PENTHOUSE UNITS / A line of modular single-zone, multi-zone and dual-duct central station penthouse units is presented in a bulletin. These penthouse units provide single-source heating, cooling and ventilating in capacities ranging from 800,000 through 3,000,000 B.T.U. of heating (indirect gas-fired), and 35 through 150 tons of cooling. Performance data is included. ■ Lear Siegler, Inc., Minneapolis.

Circle 412 on inquiry card

DOORS / An 8-page booklet features a line of interior doors in six- and three-panel design. This line is available in passage, sliding or bi-fold doors. All doors are pre-primed, ready for finish paint coat. Sizes and specification data are included. ■ Caradco, Dubuque, Iowa.*

Circle 413 on inquiry card

SWIMMING POOLS / A 6-page folder describes a line of aluminum swimming pools containing detailed drawings of the manufacturer's uniflow system and automatic surface skimmer plus information on material, testing, erection, fabrication, welding and design detail. ■ Overly Manufacturing Co., Greensburg, Pa.*

Circle 414 on inquiry card

LABORATORY FURNITURE / A brochure describes a line of laboratory furniture including base units, wall cases, sink units, tables, fume hoods and accessory fixtures. Price lists are given. ■ Browne-Morse Co., Muskegon, Mich.

Circle 415 on inquiry card

TERRAZZO FLOORS / A 4-page catalog describes a line of epoxy and polyester terrazzo floors. Applications and installation details are included. ■ Kalman Floor Co., White Plains, N.Y.*

Circle 416 on inquiry card

COMMERCIAL OVENS / Electric convection oven ranges for the food service industry are described in a 4-page brochure. Typical time and temperature settings are shown. The brochure illustrates five different range tops. ■ General Electric Co., Chicago Heights.*

Circle 417 on inquiry card

BASEBOARD HEATER / A line of electric baseboard heaters is described in a bulletin listing the 27 available models with their lengths, electric and heating characteristics, weights and prices. A line of accessories is also described. The heaters are NEMA verified and U.L. listed. ■ Emerson Electric Co., Pittsburgh.

Circle 418 on inquiry card

PROTECTIVE PAPER / A reinforced non-staining paper covering designed to protect floor covering after installation from traffic problems from construction trades is described in a 4-page folder. The paper is reusable and may be applied to carpeting, tile, terrazzo, marble, wood and other finished flooring. Literature contains a product sample, roll size data, and suggested installation specifications. ■ St. Regis Paper Co., Attleboro, Mass.

Circle 419 on inquiry card

* Additional product information in Sweet's Architectural File

more literature on page 220

in our new Zonline heating/cooling unit.

We've made changes. Over 90 of them. Not just for the sake of change. To be better.

The new Zonline is quieter! We redesigned the air flow system and added a new two-motor fan system that automatically modulates air flow to cooling and heating requirements. We built a stronger room cabinet and gave it a urethane foam acoustical treatment for greater quietness.

The new Zonline is more rugged!

We're using heavier gauge metal in the outer case. The air/water seal has been laboratory tested in winds up to 75 miles per hour and the equivalent of 8 inches of rain per hour. This is rugged, heavy-duty commercial equipment built to withstand constant year-round usage.

And the new Zonline is beautiful!

Inside and out. From an exterior grille that can be integrated into the building design to the new optional simulated molded wood-grain finish of the interior cabinet, Zonline is new and good-looking. All controls are concealed under a door on top where they are easily reached.

If you're looking for terminal thru-the-wall heating/cooling units, see the new Zonline for office, hotel/motel, apartment, school or hospital. Available in deluxe and standard models for 208 V., 230 V., and 277 V., and a variety of installations. See your General Electric Central Air Conditioning distributor right away. Or write the Air Conditioning Dept., Commercial & Industrial Sales Section, Louisville, Kentucky 40225.



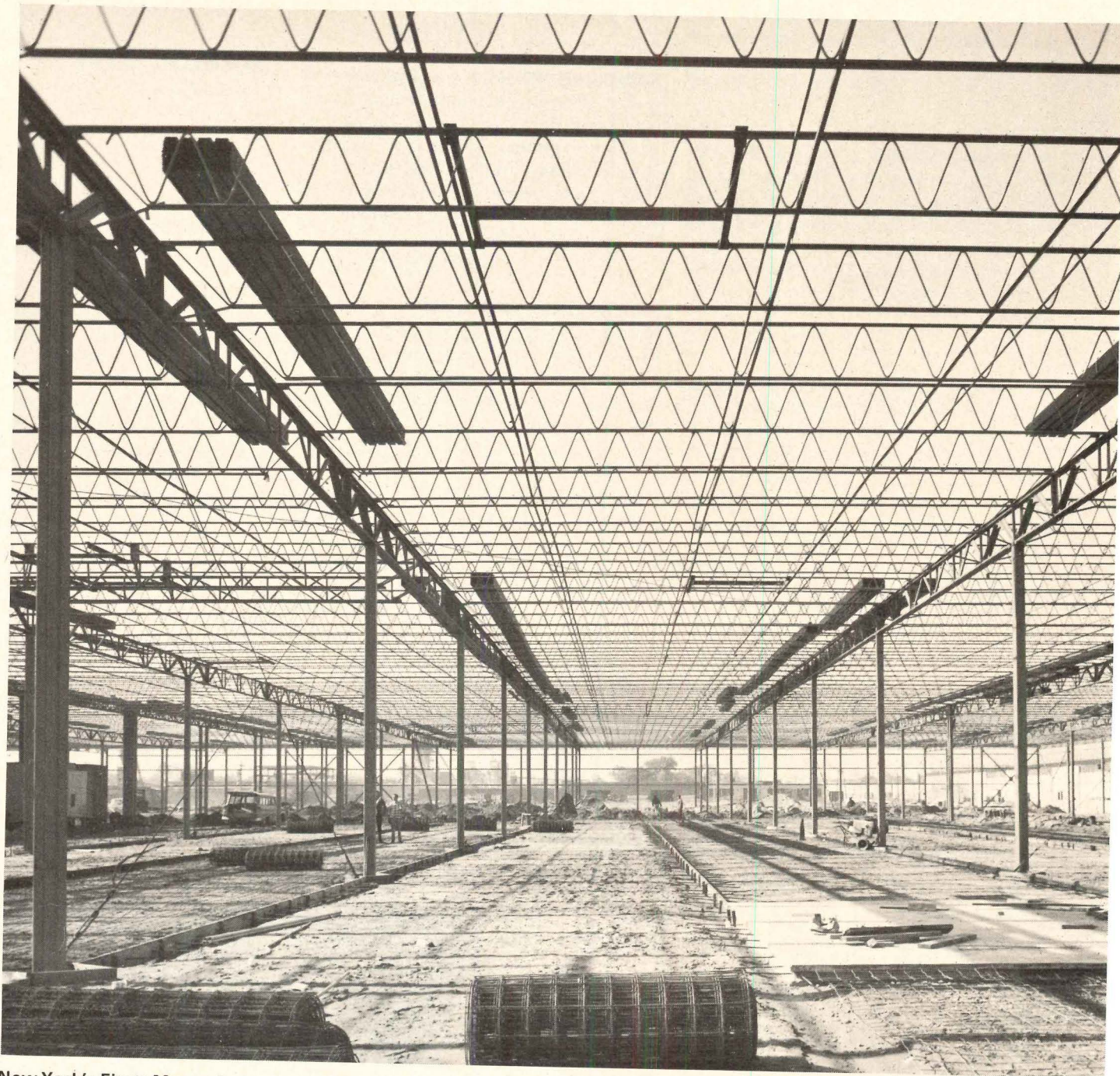
Our new GE Zonline heating/cooling unit.

For more data, circle 120 on inquiry card

Progress Is Our Most Important Product

GENERAL  ELECTRIC

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.

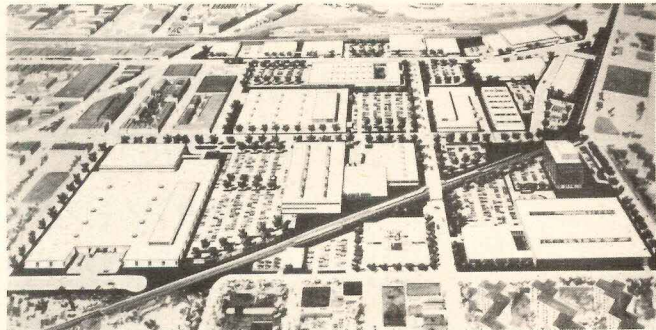
About 80 per cent of the available space has already been contracted for by such companies as Detecto Scales, Morse Electro Products Corporation, APL Plastics Corporation and Decitron Communications Corporation.

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.



Flatlands Urban Industrial Park, Brooklyn, New York
Sponsor: New York City Industrial Development Corporation.
Developer: Rentar Development Corporation.

"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 jobsite 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

Rule: All walls must be vertical.

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

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

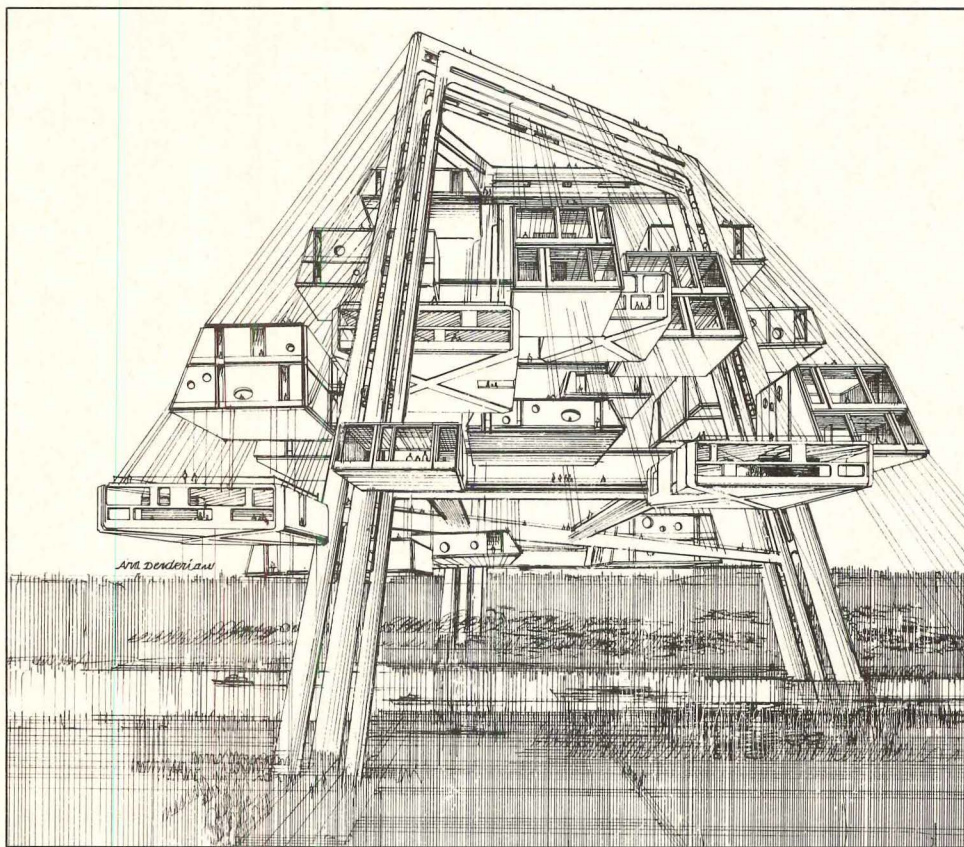
Men like Architect Ara Derderian, who parlayed vertical wall and sloped wall cable-hung units into this visionary exhibition center.

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

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

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

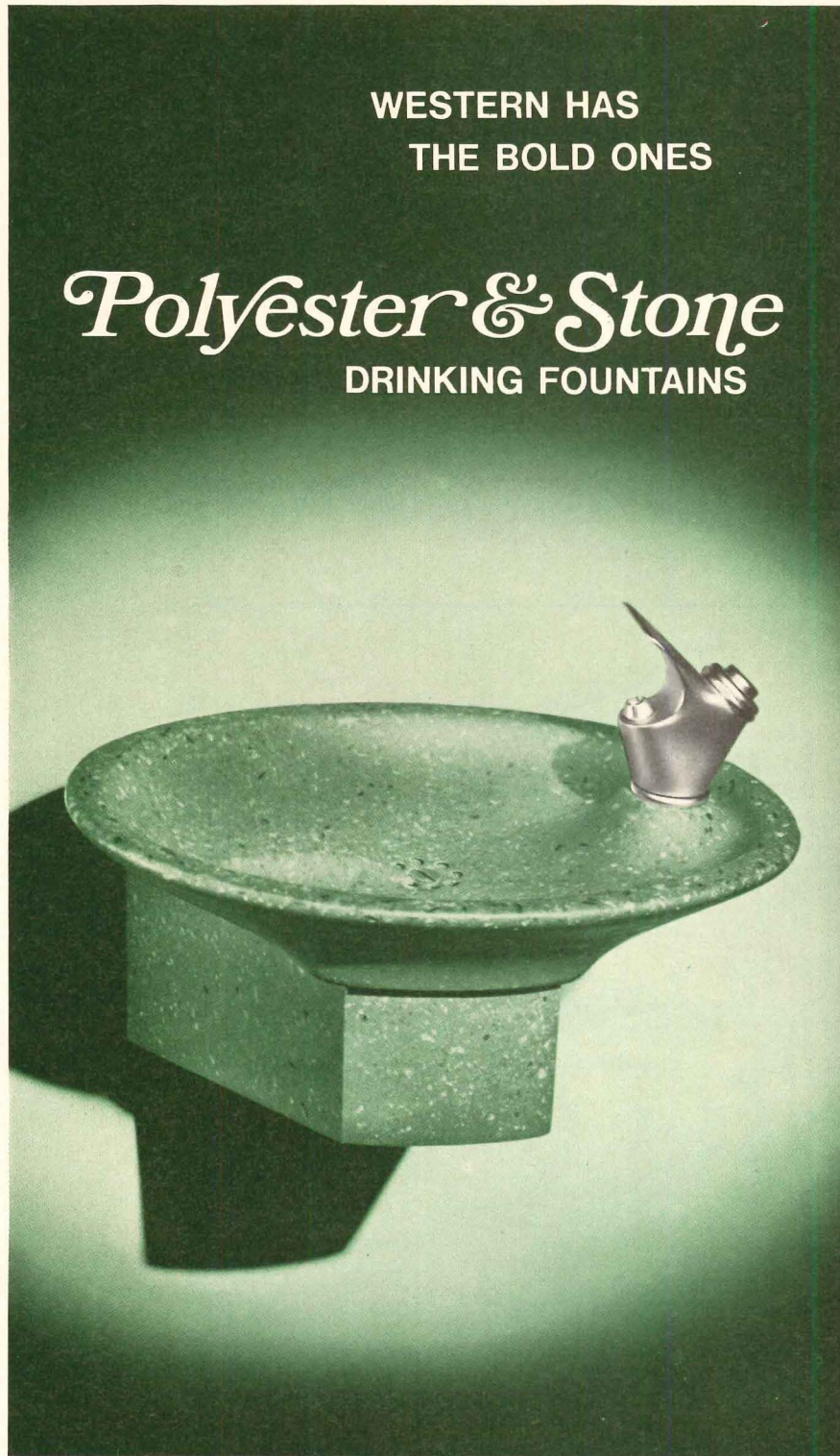
In this way, we repeal the law of gravity. And indicate to you that our imagination can keep up with yours. If only you'll let it.



Levolor Blinds. For architects who break the rules.

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

For more data, circle 122 on inquiry card



WESTERN HAS
THE BOLD ONES

Polyester & Stone

DRINKING FOUNTAINS

This attractive, lightweight, and durable polyester and stone drinking fountain is available in your choice of five glorious colors—grey, green, charcoal, white, and beige. Western also has nine other Bold Ones that go perfectly in any building.

Write for our complete catalog and see for yourself why the Bold Ones are your best bet.



WESTERN DRINKING FOUNTAINS, INC.

A subsidiary of Sunroc Corporation
14487 Griffith St., San Leandro, California 94577

For more data, circle 123 on inquiry card

OFFICE FURNITURE / "Mobiles", a 48-page booklet, presents a line of rearrangeable, relocatable office furniture composed of interchangeable components which may be assembled to form simple or complex work stations. Because the components are assembled vertically, the units conserve floor space while furnishing more work surface and storage space in a fixed area. Sections in the catalog include the construction of mobiles, standard mobile packages, problem solving with mobiles and mobile idea arrangements. ■ Steelcase, Inc., Grand Rapids, Mich.*

Circle 420 on inquiry card

WALL COVERING / A 4-page brochure describes a wall covering collection, intaglio vinyls, vol. two. Each of the designs is completely strippable and pre-trimmed. Over 20 patterns are illustrated. ■ James Seeman Studios, Inc., Garden City Park, N.Y.

Circle 421 on inquiry card

MOVABLE PARTITIONS / An 8-page bulletin describes a line of movable partition systems designed for offices, factories, schools and hospitals. These systems feature double-wall panels with packed air space for sound control plus slip-in panel assembly for ease of installation. The systems are available in four types of wall paneling and a wide variety of materials. Specifications and installation procedures are given, and graphs showing sound control characteristics are included. ■ Westinghouse Electric Corp., Grand Rapids, Mich.

Circle 422 on inquiry card

SIDING / A 6-page brochure describes a line of siding protected by a vinyl coating of thermo-setting acrylic on the face, edges and ends. These prefinished sidings have completely reversible weather-drip edges. This siding is available in horizontal lap and plain panels. ■ Boise Cascade, Boise, Idaho.

Circle 423 on inquiry card

SHOWER FLOORS / A 4-page booklet describes a line of one-piece shower floors giving the appearance of marble. These floors are available in recessed, corner, and corner angle styles in a variety of colors. Shower floor specifications and dimensions are given. ■ Kinkead Industries Inc., Chicago.

Circle 424 on inquiry card

LIGHTING FIXTURES / A 4-page brochure describes a coordinated system of pendant, post and wall lighting for interior and exterior spaces. Available in cast brass etched with antique finish, or cast aluminum in a smooth finish, the lighting system is composed of a variety of modular components, avoiding the need for special castings. ■ Lightolier, Jersey City, N.J.

Circle 425 on inquiry card

* Additional product information in Sweet's Architectural File

**The building sealant
that's guaranteed
for twenty years.**

The only one.

No other building sealant in the industry has more than a 5-year guarantee. Dow Corning building sealants are reliable enough to make a 20-year weathertight agreement. Durable enough to outlive it. Because they're silicones. Dow Corning® 780 building sealant is designed for use on porous surfaces while 781 is a glazing sealant for nonporous surfaces. Both have the same extraordinary advantages of weatherability and durability. These one-part, ready-to-use sealants apply easily in any weather. They cure quickly with a firm but ever-flexible bond.

And once cured, they're virtually unaffected by time or weather. The sealants adhere to nearly all building materials, including plastic, and come in popular architectural colors.

Dow Corning sealants are used to reseal buildings where other sealants have failed.

They often outlast the materials they join.

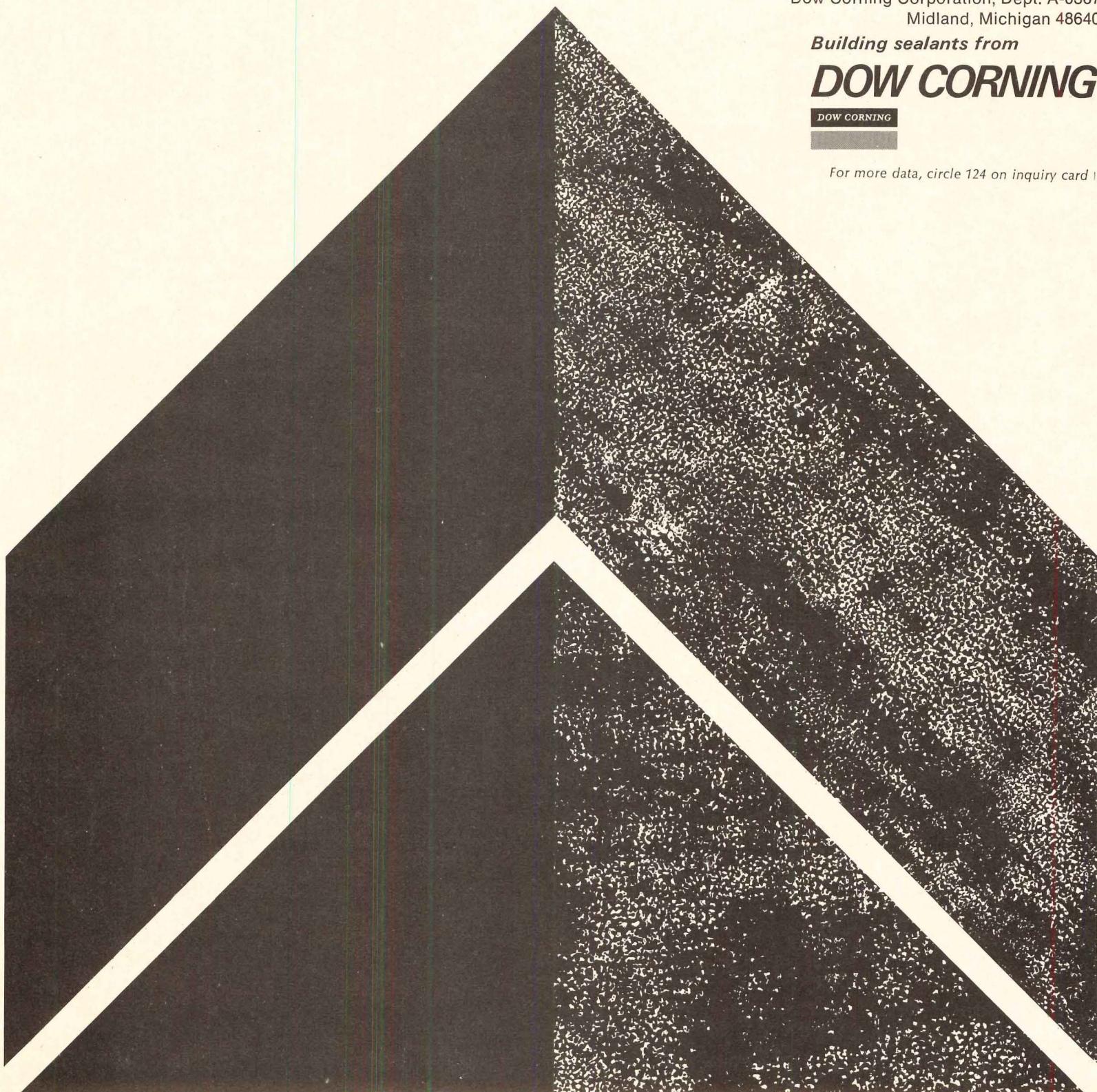
And that's what our 20-year guarantee is all about. For more information, write Dow Corning Corporation, Dept. A-0367, Midland, Michigan 48640.

Building sealants from

DOW CORNING

DOW CORNING

For more data, circle 124 on inquiry card 1



CBS LABS: Free-flowing design. Engineered for savings with heat-by-light.

Start with a striking architectural design. Add one of the most practical environmental control systems available today, and what do you have? The new CBS Laboratories research and development center in Stamford, Connecticut. A 2.75 million dollar structure, containing 80,000 square feet of floor space. Engineering cost analyses proved heat-by-light to be the most economical system for the CBS project.

The heat-by-light concept utilizes modern heat-transfer fixtures to capture up to 85% of light-generated heat. Some of this heat is used to maintain desired temperature in interior areas, with the rest channeled to offset heat loss at building perimeters. So it's almost like getting heat free.

All-Electric systems eliminate the need for boiler rooms, flues, fuel storage and handling. Result: greater design freedom for architects; substantial savings for owners. And that's not all! Because an All-Electric system requires less supervision, maintenance costs are significantly lowered.

The ultimate in design flexibility. At practical cost. You can be sure of both with All-Electric design. For information on heat-by-light, or any other All-Electric system, contact your electric light and power company. They'll be happy to shed more light on the matter.





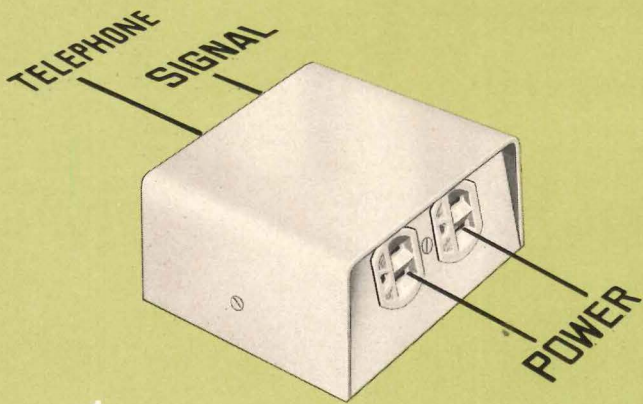
CBS Labs
Developers:
High Ridge Park Associates
Builders:
F. D. Rich Company
Architect:
Victor H. Bisharat
Consulting Engineer:
Werner-Jensen, Korst &
Adams

All-Electric design



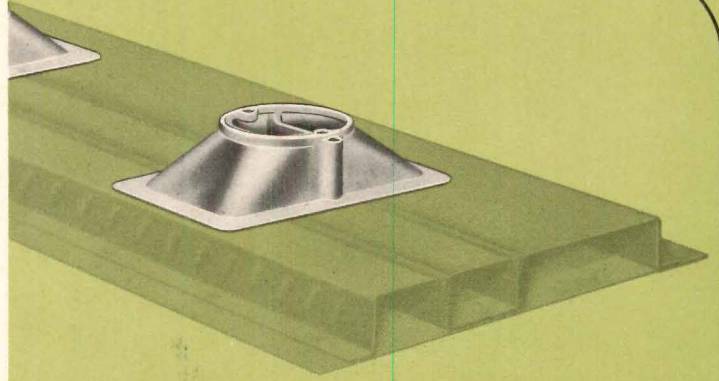
Live Better Electrically
Edison Electric Institute
750 Third Ave., N.Y., N.Y. 10017

For more data, circle 125 on inquiry card



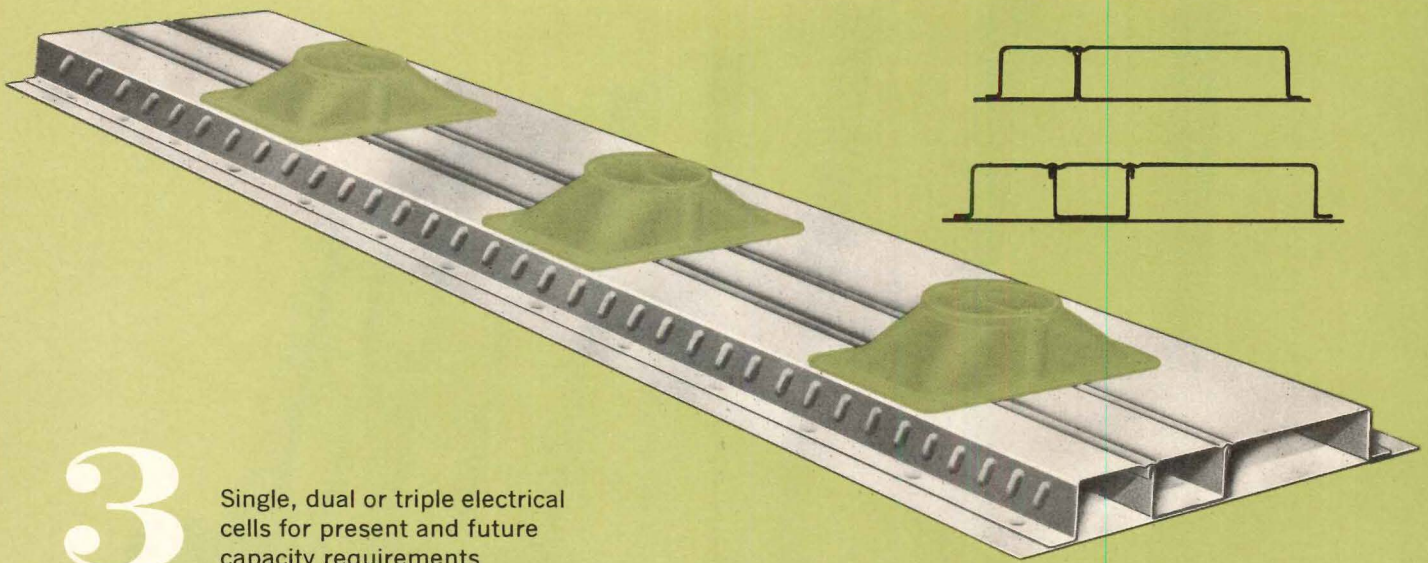
1

Single, dual or triple service in one contoured floor fitting



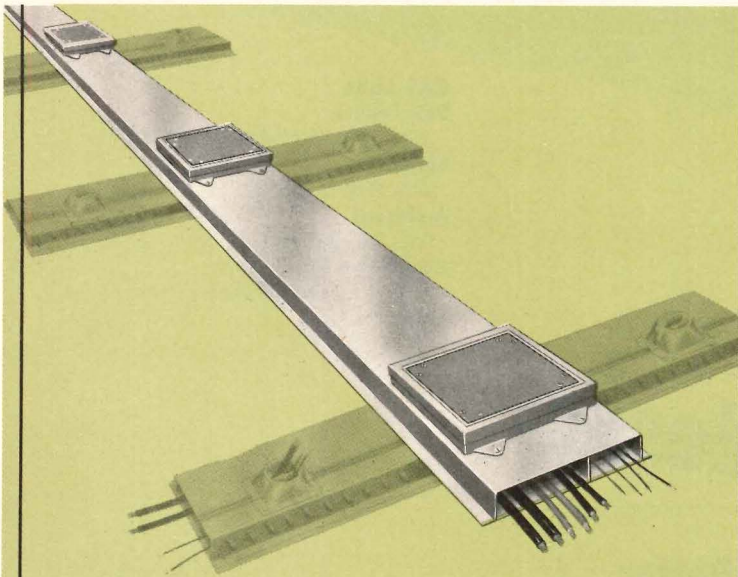
2

Matching pre-set insert for easy access to cells



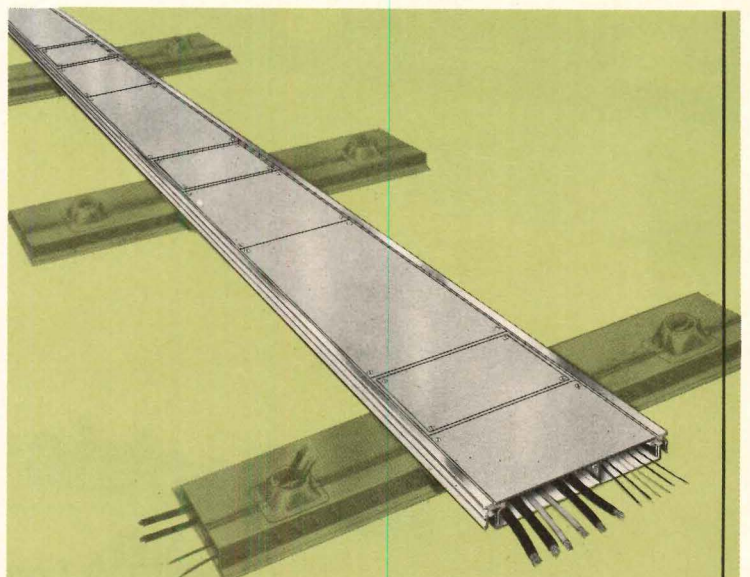
3

Single, dual or triple electrical cells for present and future capacity requirements



4

A variety of feeder systems to supply cells



5

Trench-way header duct with ready access from topside

For steel or concrete frame construction

CEL-WAY[®]

The one-source system for electrifying floors



A component from here, a component from there and jigsaw them all together. That's an impractical way to electrify a floor.

Granco's Cel-Way simplifies everything with a complete, coordinated system from a single source.

Here's everything you need to distribute telephone, power and signal service through the floor slab to any desired location.

Cel-Way provides a completely electrified floor of unmarred and uninterrupted beauty. It accommodates any desk or electrified partition arrangement, any building module. And the network of cells and pre-set inserts leaves the door wide open for future changes or expansion (four out of ten business telephones are changed or relocated each year).

Get the complete Cel-Way story now. Check Sweet's 1f/Gr, or write for Cel-Way product manual.

Granco Steel Products Company, 6506 North Broadway, St. Louis, Mo. 63147. A subsidiary of Granite City Steel Company.



IMAGINATION IN STEEL

For more data, circle 126 on inquiry card

Holophane

**The IES*
is establishing
new lighting
practices
for tomorrow's
schools.**

That's good news for tomorrow's students.

**Holophane has
the new
lighting system
that conforms
to those
practices today.**

That's good news for you.

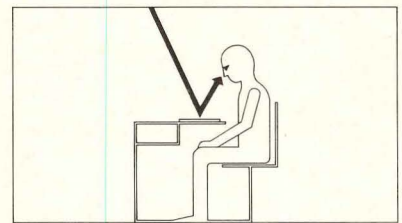
*Illuminating Engineering Society

**The beginning of a new era
in lighting. The end of the
veiling reflections problem.**

"Veiling reflections" is the term used to describe the glare that reflects from a printed page and makes it hard to read.

Percepta, a new precision, prismatic optical assembly by Holophane, is designed to eliminate that glare.

Percepta's specialized photometric distribution projects the light sideways, in a unique twin-beam pattern, rather than downward, as in conventional lighting. This means that veiling reflections (reflected glare) are directed away from the viewer's eyes, thus permitting optimum visual performance.



**Conventional lighting subjects
reader to veiling reflections.**

This means that reflected glare caused by overhead lights is minimized, and useful sideward light is maximized.

How much of a problem are veiling reflections? Enough that the new Illuminating Engineering Society recommendations state that their effects (loss of contrast) are to be considered in future evaluation of lighting systems.

**What's new about
the new IES practices?**

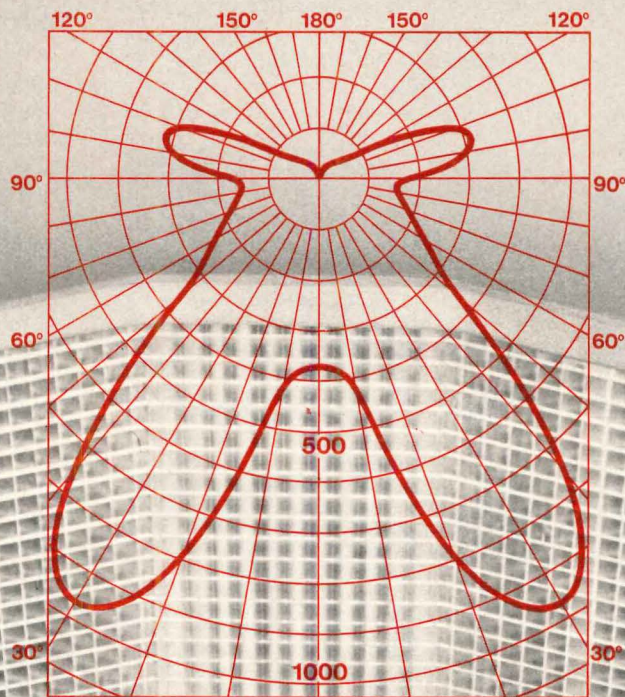
In June 1970, the IES adopted new guidelines for footcandle evaluation, as applied to task illumination measurement.

Whereas the "classical footcandle" measures light delivered to a given area, regardless of its glare-producing effects, the new standard of "effective footcandles" evalu-

(continued overleaf)

introduces Percepta.

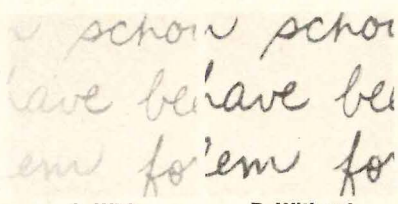
Photometric diagram of Percepta's light distribution. Note that the light projected directly down is substantially less than half that which is projected 30° to the side.



Holophane introduces Percepta. (continued)

ates the visual effectiveness of the light, as well as its quantity, and is related to the results obtained with a scientific reference standard, the illuminating sphere.

These two photographs show handwriting samples in the presence of veiling reflections and in their absence.



A. With veiling reflections. **B. Without veiling reflections.**

Photograph A shows a student's-eye view of the handwriting as it would be seen if his desk were struck by light from directly overhead and forward. What happens, of course, is that the pencil line glints when light strikes it at such an angle, almost as though tiny mirrors were placed on the paper. The result is loss of contrast, and therefore, loss of see-ability.

In Photograph B, the handwriting sample was struck by the same amount of light from the side, thus directing the veiling reflections away from the student's eyes, resulting in substantially improved contrast, and hence, better see-ability.

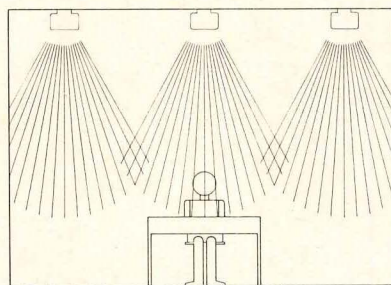
As you can see, it is loss of contrast that decreases visual performance, even though the amount of incident light in each case is the same. By defining illumination requirements in terms of effective footcandles, the IES has taken a major step forward in improving seeing conditions for students and office workers alike.

And it has exposed the villain of this piece—veiling reflections.

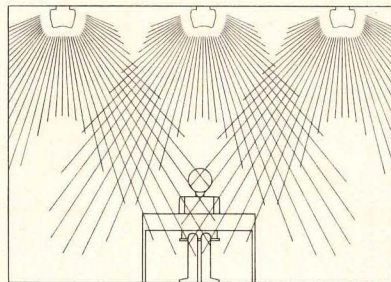
How does Percepta minimize veiling reflections?

As we have seen, veiling reflections are caused by overhead light-

ing, striking reading matter from a forward position. Merely moving desks to the side of the light fixtures, however, is not necessarily a workable solution—for this would result in a serious loss of usable floor space.



C. Conventional lighting distribution.



D. Percepta's lighting distribution.

Percepta's twin-beam light distribution, however, is sideward. Its maximum intensity is directed outward at angles greater than 20°. So a student sitting to the right or left of the light source will receive full illumination on his reading matter, and veiling reflections will be directed away from his eyes.

But what happens if, for one reason or another, a student winds up sitting directly under a row of Percepta fixtures?

No problem.

Because the light falling directly downward is such a small percentage of the total light that the veiling reflected glare will fail to materialize. The majority of this student's light will come from adjacent rows of fixtures, not the one directly overhead. So he'll be able to see his notes and textbooks better.

And if Percepta's going to become a best seller, it will be be-

cause of that: it makes for good reading.

What about costs?

Depending on various classroom space geometries, Percepta, because of its extremely high efficiency and unique design, will meet or exceed IES standards by using 4, 5 or 6 foot spacing on centers.

The initial purchase price may be more than that of the lighting we have known up to now. But you'll more than make up for the difference in the long run.

Because Percepta was designed to minimize not only veiling reflections, but installation and maintenance costs as well.

First of all, surface-attached Percepta enables you to avoid the installation costs associated with recessed fixtures. (The fact that Percepta can be surface-attached also makes it easy to install as replacement lighting in older schools and offices.)

Secondly, it uses only one fluorescent lamp per fixture, instead of two or more. This cuts lamp replacement costs.

And because Percepta uses fewer lamps and less wattage than conventional lighting, you wind up with a lower electric bill.

Finally, you also wind up with less heat from the lights and less heat from the ballasts. So you even save on air conditioning. (Or, if you don't have air conditioning, your rooms stay cooler.)

But there's one thing no one can put a price on. The improved visual performance—and indeed the healthy eyesight—of students or office workers.

And that's where Percepta will prove to be the best bargain of all.

For complete technical data write to:

Holophane Company, Inc.,
Dept. A-10,
1120 Avenue
of the Americas,
New York, N. Y. 10036.



HOLOPHANE

For more data, circle 127 on inquiry card

Selection of Electric Heat-Recovery System for Dallas Office Building Based on Versatility and Economy



The new headquarters building for the Gifford-Hill Company in Dallas, Texas.

PROJECT: The Gifford-Hill Building, Dallas, Texas. ARCHITECTS: Harwood K. Smith & Partners, Dallas, Texas. CONSULTING ENGINEERS: Zumwalt & Vinther, Dallas, Texas.

DESIGN CHARGE: To design a headquarters building containing executive and engineering offices for a large manufacturing corporation that would express architecturally the nature of the company's business—the manufacture of concrete and cement products.

DESIGN RESPONSE: The Gifford-Hill Building is a 6-story structure constructed of reinforced, sand-blasted, natural colored concrete with textured precast concrete panels on two sides and reinforced concrete and solar bronze glass on the other two sides. All six floors of the building are given over to executive, general, and engineering offices. A partial basement contains a mechanical room for the structure's electric space conditioning equipment. At the outset of the design, it was apparent that the building would have an excess of internal heat the year around, a fact that led to the selec-

tion of an electric heat-recovery system because it would make it possible to economically acquire heat where it was in excess, deliver it to spaces needing it, and reject the overage out-of-doors. Consulting Engineer Clarence Gilmore's design is a hybrid medium-pressure, constant-volume, ducted heat recovery system incorporating a single-duct network for the interior spaces and a double-duct network for the peripheral areas. (Described in detail in Item 6, Page 2.)

The system has proved to be very satisfactory, Mr. Gilmore reports, and adds that it offers the desired balance of compactness, modernity, reduced maintenance, and economy of operation. A major advantage of the system is its ability to handle the steady-state heating requirements of the peripheral zones during even the coldest weather without supplementary heat. Spaces near the two masonry walls, however, are affected by the thermal inertia of the masonry which tends to slow the return to normal temperature after a period of setback. At such times, duct heaters installed in these spaces are energized to aid in bringing them up to design temperature.

SEE REVERSE SIDE FOR DETAIL INFORMATION

Gentlemen:
 Please send the complete series of Electric Heating
 Case Histories as they become available
 to me at the following address:
 Name and Profession: _____
 Firm, University or other affiliation: _____
 Address: _____
 F Zip Code: _____

1 CATEGORY OF STRUCTURE:

Commercial—Office Building

2 GENERAL DESCRIPTION:

Area: 102,498 sq ft
 Volume: 1,230,500 cu ft
 Number of floors: six and a basement
 Number of occupants: 475
 Number of rooms: 100
 Types of rooms: executive and engineering offices, meeting rooms, kitchen, cafeteria

3 CONSTRUCTION DETAILS:

Glass: single
 Exterior walls: glass and insulated metal-panel curtain walls on two sides; 8" precast light-weight textured concrete sections (R=8) on other two sides; U-factor: 0.13 avg.
 Roof and ceilings: built-up tar and gravel on 1" rigid insul. (R=4) over concrete deck, steel deck and joists; U-factor: 0.18
 Floors: concrete
 Gross exposed wall area: 38,600 sq ft
 Glass: area: 13,700 sq ft

4 ENVIRONMENTAL DESIGN CONDITIONS:

Heating:
 Heat loss Btuh: 1,240,000
 Normal degree days: 2363
 Ventilation requirements: 20,000 cfm
 Design conditions: 10F outdoors; 75F indoors
Cooling:
 Heat gain Btuh: 1,930,000
 Ventilation requirements: 20,000 cfm
 Design conditions: 100F dbt, 78F wbt outdoors, 75F, 60% rh indoors

5 LIGHTING:

Levels in footcandles: 80-200
 Levels in watts/sq. ft: 2-8
 Type: fluorescent and incandescent

6 HEATING AND COOLING SYSTEM:

Two centrifugal chillers, one rated at 167 tons and the other at 133 tons, with double-bundle condensers supply warm and cool water to two air-handling units, one for the three higher floors, the other for the lower floors. The air handlers deliver cool air year around to induction boxes in the interior areas through a single-duct network. Pneumatic controls and dampers regulate the mix of cool primary air and warm air induced from the return plenum above the ventilating tile ceiling in response to zone temperature. Heat recovered from interior zones is transferred by the chillers to the warm water loop for the peripheral areas or to a roof-mounted water tower for dissipation outside. In the heating season both warm and cool air are delivered by the air handlers to mixing boxes in the peripheral areas through a double-duct system.

7 ELECTRICAL SERVICE:

Type: underground
 Voltage: 265/460v, 3-phase, 4-wire, wye
 Metering: secondary

8 CONNECTED LOADS:

Heating & Cooling (300 tons)	562 kw
Ventilation	127 kw
Lighting*	400 kw
Water Heating	42 kw
Cooking	108 kw
Other	138 kw
TOTAL	1377 kw

*Including outdoor lighting

9 INSTALLED COST:*

General Work	\$ 954,207	\$ 9.31/sq ft
Elec., Mech., Etc.	509,500	4.97/sq ft
TOTALS	\$1,463,707	\$14.28/sq ft

*Building was completed 1/66

10 HOURS AND METHODS OF OPERATION:

Building is occupied 57 hours a week; computer room operates 24 hours a day.

11 OPERATING COST:

Period: 7/12/67 to 7/11/68
 Actual degree days: 2450
 Actual kwh: 4,674,960*
 Actual cost: \$39,332.74*
 Avg. cost per kwh: 0.84 cents*
 *For total electrical usage

Billing Date	Degree Days	Demand	kwh	Amount
8/10/67		686	331,920	\$ 3,059.10
9/11/67		673	357,840	3,167.44
10/10/67	13	686	314,640	2,974.49
11/ 8/67	178	764	328,320	2,724.46
12/ 8/67	239	777	356,400	2,880.50
1/11/68	792	920	480,240	3,691.02
2/ 9/68	404	855	432,000	3,362.02
3/12/68	608	894	524,160	3,868.93
4/11/68	191	816	464,400	3,464.96
5/10/68	23	803	352,800	3,361.03
6/11/68	2	777	369,360	3,405.42
7/11/68		777	362,880	3,373.37
TOTALS	2450		4,674,960	\$39,332.74

12 FEATURES:

The double-duct system is capable of handling the steady-state heating requirements of the peripheral zones during even the coldest weather without supplementary heat. Spaces near the two masonry walls, however, are affected by the thermal inertia of the masonry which tends to slow the return to normal temperature after a period of setback. At such times, duct heaters installed only in these spaces are energized to aid in bringing them up to design temperature.

13 REASONS FOR INSTALLING ELECTRIC HEAT:

At the outset of the design, the physical characteristics outlined for the building indicated that it would have an excess of internal heat year around. The electric heat-recovery system was specified because it would make it possible to economically acquire heat where it was in excess, deliver such heat to spaces needing it, and reject the overage out-of-doors.

14 PERSONNEL:

Owner: Gifford-Hill Companies Retirement Trust
 Architects: Harwood K. Smith & Partners
 Consulting Engineers: Zumwalt & Vinther, Inc.
 General Contractor: Gotham Electric Co.
 Electrical Contractor: Bock Const. Co.
 Mechanical Contractor: Geo. Linskie Co.
 Utility: Dallas Power & Light Company

15 PREPARED BY:

C. B Mallet, Jr., Supervisor, Commercial Sales, Dallas Power & Light Company.


16 VERIFIED BY:

R R San Miguel
 R. R. San Miguel, Architect
Clarence F. Gilmore, P.E.
 Clarence F. Gilmore, P.E.



NOTICE: This is one of a series of case histories of buildings in all structural categories. If you are an architect or consulting engineer; an architectural or engineering student; an educator; 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



HILLYARD

FLOOR TREATMENTS

Used in America's Most Modern Athletic Complexes

Basketball Field House, in background, part of a new \$1.9 million Health and Physical Education Complex at Pan American College, Edinburg, Texas. Architect: Kenneth Bentsen Associates, Houston, Texas.

When Pan American College opened its 1969-70 basketball season in its beautiful new Field House, TROPHY® Gym Seal and Finish was on the floor.

Completion of the new physical education plant was the culmination of a 19-year dream for Pan American Athletic Director James A. Brooks, who went to Edinburg when the school was still a junior college with 320 students. In 1952, the college became a four-year school and Brooks' athletes began making themselves known. Basketball Coach Sam Williams twice took his team to the NAIA finals, winning the championship in 1963.

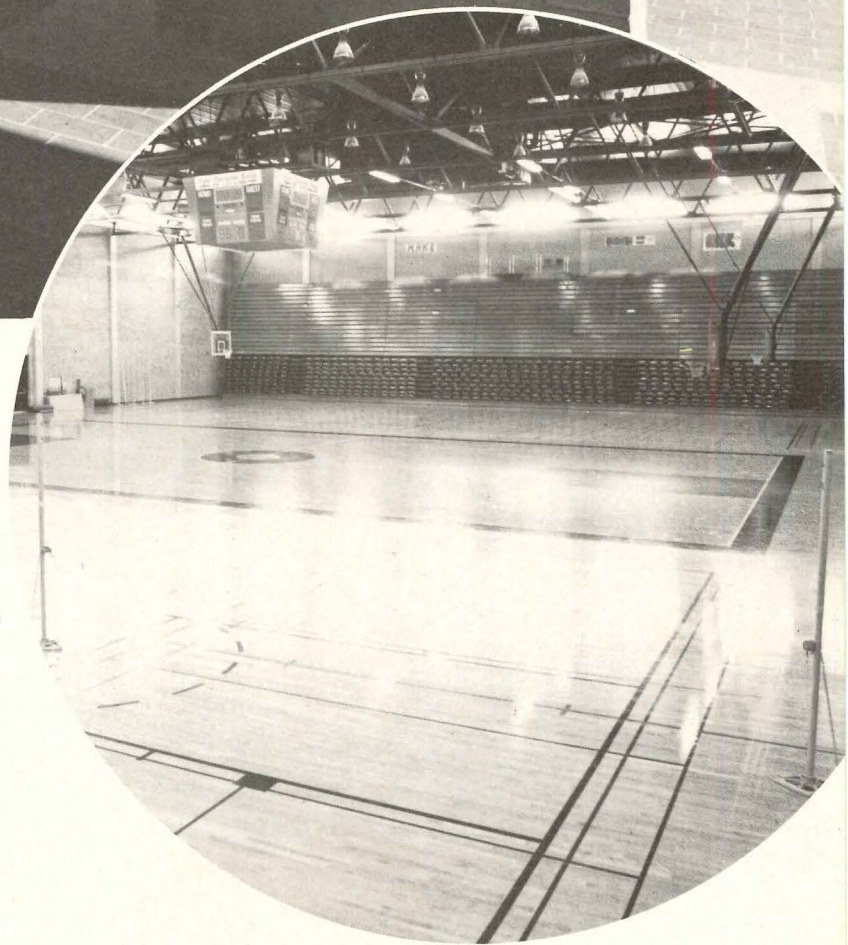
As in nearly 20,000 other gyms, arenas and sports complexes, TROPHY Seal and Finish was selected for the basketball and other wood sports floors. TROPHY forms a hard, smooth, slip-resistant, glare-free surface that is chosen most for championship play. It also offers unequalled wearability, beauty and ease of maintenance.

HILLYARD SPECIFICATIONS MANUAL FOR EVERY FLOOR YOU SPECIFY.

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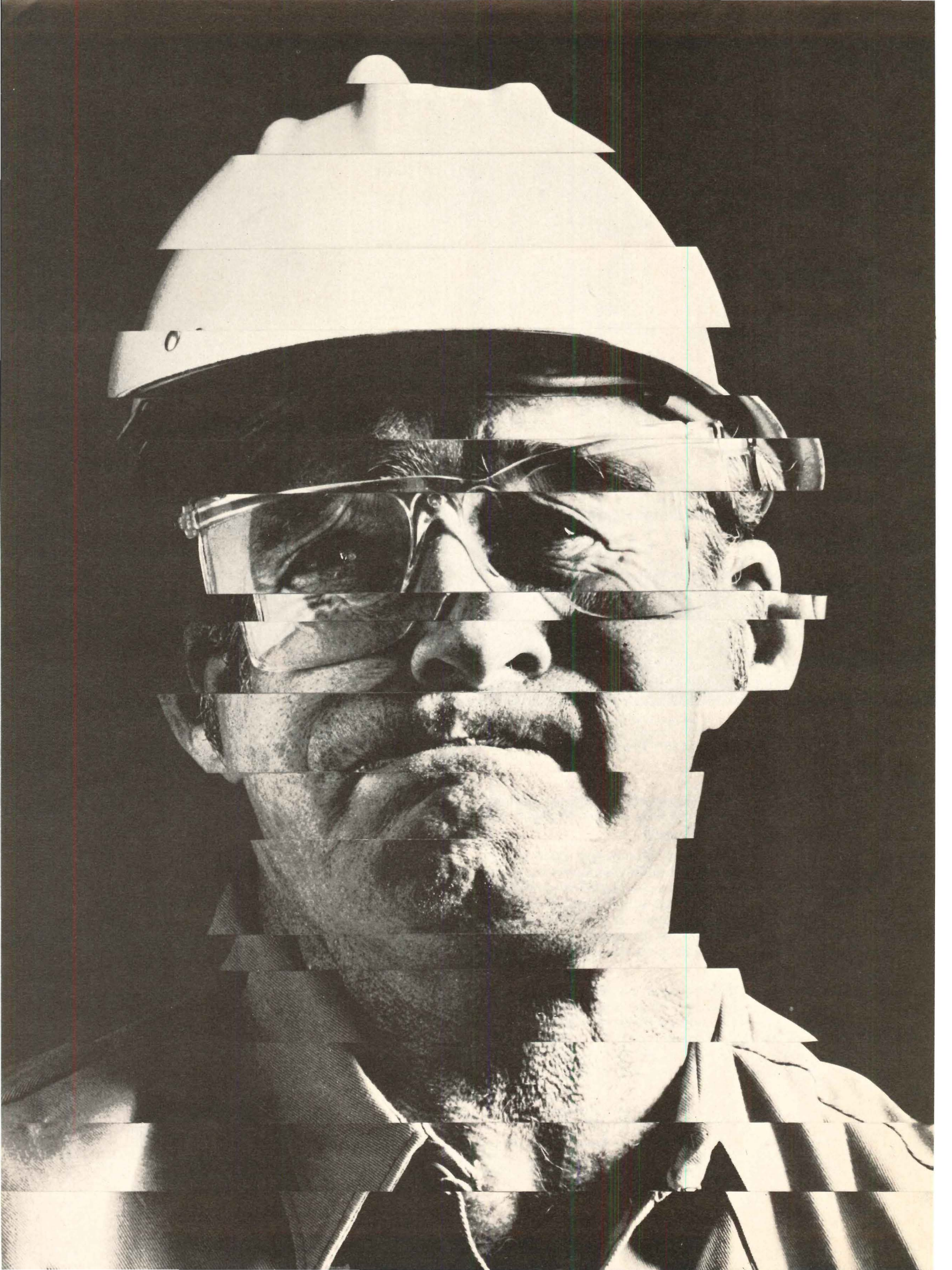


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Industrial noise pollution has always been a problem. It has contributed to worker discontent. It has been the cause of increased numbers of disability claims, which in turn, have caused higher insurance costs.

Now this serious problem has become critical. Critical enough to spawn legislation like the Walsh-Healey Public Contracts Act. Now a company who expects to get a government contract of \$10,000 or more must agree to keep in-plant noise at specified decibel levels. This can be accomplished by: (1) reducing the noise level at the machine itself; isolating noisy equipment; or baffling it by absorption barriers; (2) lowering the noise level with acoustical treatment of the building; (3) or by providing ear protection devices.

Combating noise with Acoustideck.

The added cost of making a new building structure acoustically efficient can be as low as a fraction of 1% of total construction cost. In turn this can help lower the cost of other noise reduction measures. Inryco Acoustideck not only acts as a structural steel deck but also serves as a sound absorbing ceiling. Its performance has been proven in the field and in the laboratory by more extensive testing than any other acoustical steel roof deck system. It is also available in the widest variety of profiles on the market. The same characteristics are found in structural elements of Inryco Acoustifloor[™] for multi-storied buildings and Acoustiwall[™] Insulated Wall Panels.

Send for booklets. (Fig. 4) Catalog 23-3 highlights key points on sound legislation, provides complete NRC ratings for Inryco Acoustideck. Catalog 23-1 gives a comprehensive view of Inryco Roof Systems. For copies contact your Inland-Ryerson sales engineer or write to Inland-Ryerson Construction Products Company, Dept. J, 4033 West Burnham Street, Milwaukee, Wisconsin 53215.

Inland-Ryerson can help you we solve other roof design problems as well.

Cable hung roof deck spans 360 feet (Fig. 1). The concave roof structure consists of a double layer of cables. The top layer is covered by Inryco roof deck and the bottom layer with Inryco Acoustideck. Inland-Ryerson designed a welding method to attach the deck to the cables. The Acoustideck was installed from the top, eliminating special scaffolding.

Folding Plate Design uses Inryco roof deck (Fig. 2). Acoustideck serves as an acoustical ceiling as well as a structural roof deck in a vaulted design for a high school library. Inland-Ryerson engineers came up with an economical steel folded plate design that helped the architect achieve excellent acoustical characteristics.

All-steel hyperbolic paraboloid roof used on hangars for giant 747 jets (Fig. 3). The engineering firm commissioned to design these huge hangars turned to Inland-Ryerson. A new product evolved—a high strength roof deck that becomes part of the structure itself, bearing part of the stresses instead of merely acting as an enclosure.

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Match the roof to your design. Design freedom is the keynote of Inryco steel roof decks, standard and acoustical. They are available in more profiles, cover a wider range of spans than any other. Ultimate design freedom is the result.

If you like, Inland-Ryerson will assist you in the design of individual projects, similar to the ones shown here, and help in the application as well.

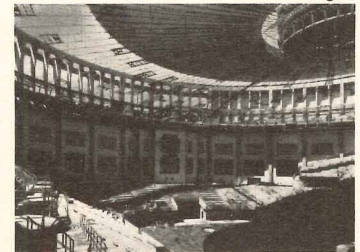


Fig. 1

SALT PALACE
(SALT LAKE COUNTY
CIVIC AUDITORIUM)

Architect:
Bonneville Architects
Consulting Engineers:
Zetlin, De Simone,
Chaplin & Assoc.



Fig. 2

J. F. KENNEDY
JUNIOR HIGH SCHOOL,
SALT LAKE CITY

Architect:
William Rowe Smith
Structural Engineers:
Hughes and Page.

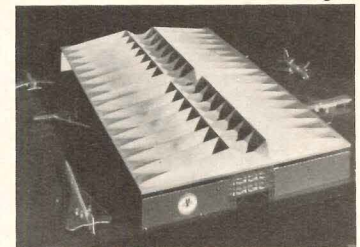


Fig. 3

AMERICAN AIRLINES HANGAR,
SAN FRANCISCO AND
LOS ANGELES

Architect:
Conklin & Rossant
Consulting Engineers:
Zetlin, De Simone,
Chaplin & Assoc.



Fig. 4

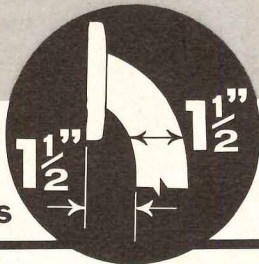
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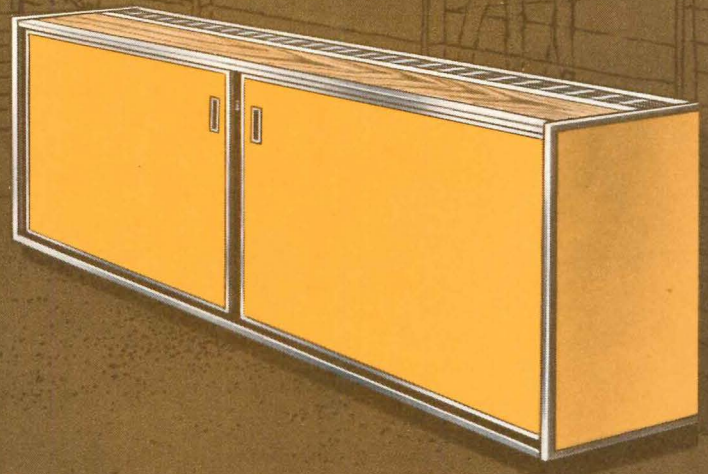
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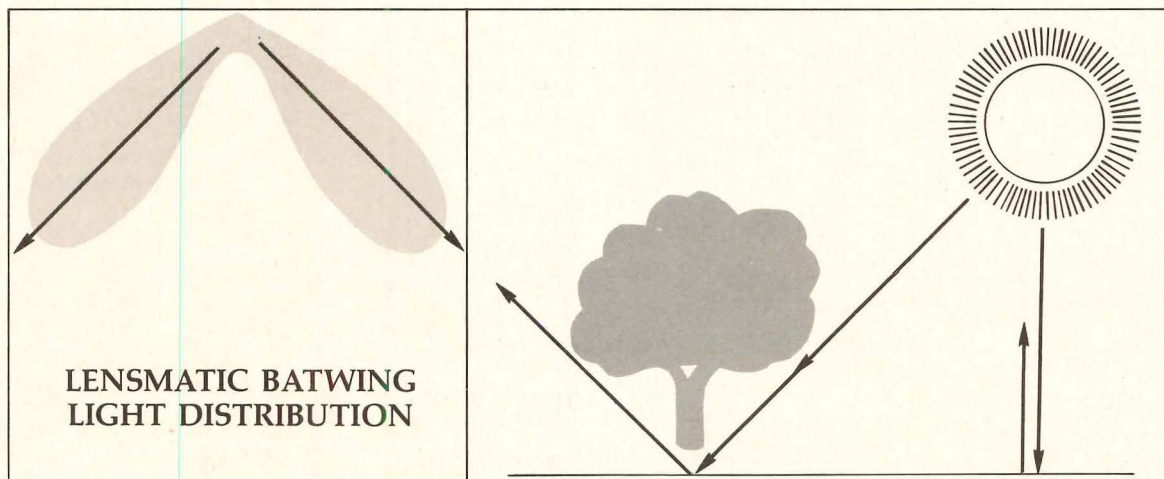
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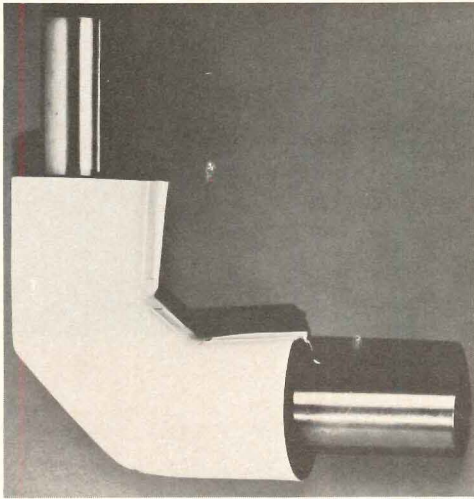
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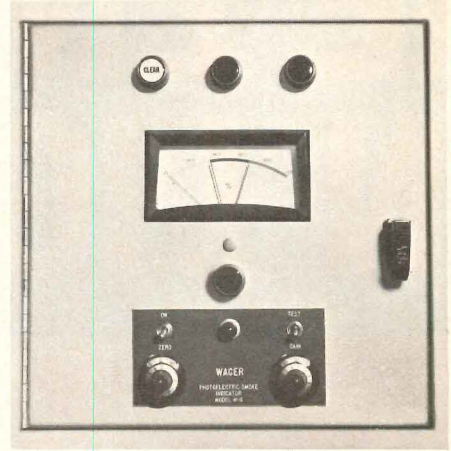
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PRE-CUT PIPE INSULATOR / This snap-on insulated jacketing is pre-cut to fit around pipe ells. After being snapped in place, the ell is sealed with plastic tape. The ell-shaped pieces are meant to complement snap-on pipe and duct insulation for cylindrical shapes. ■ Accessible Products Co., Los Angeles.

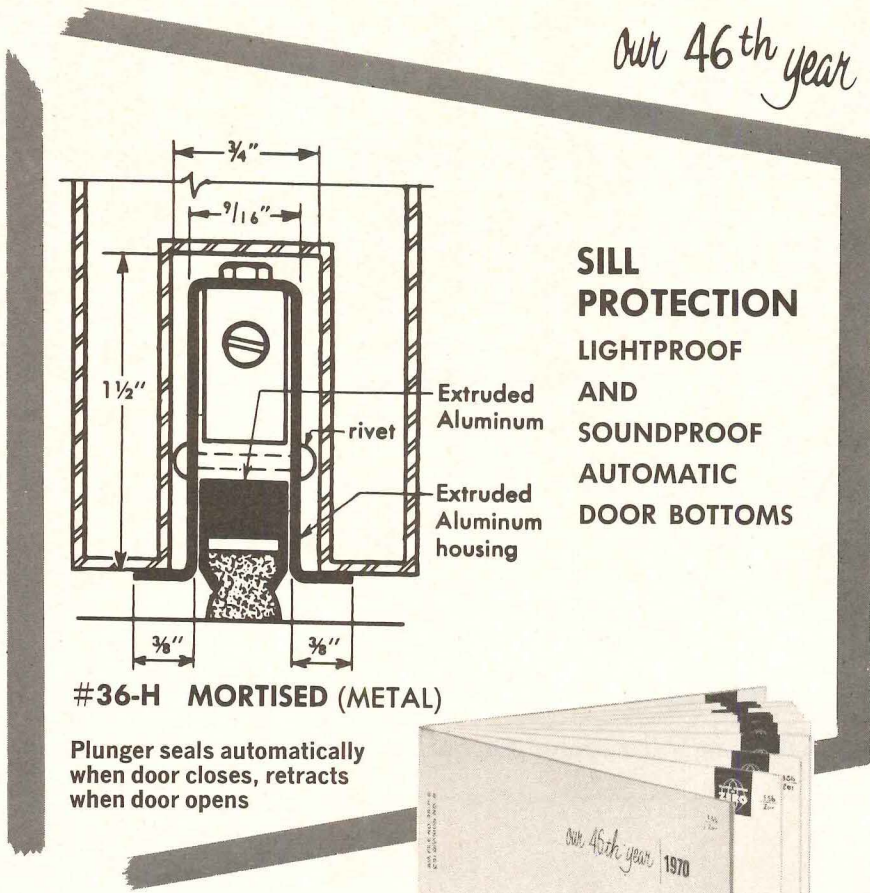
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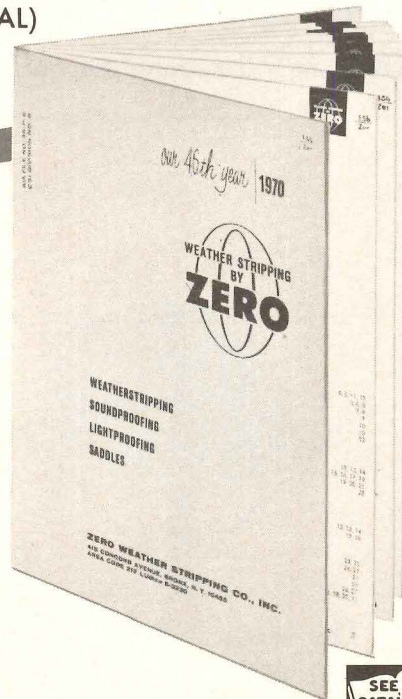
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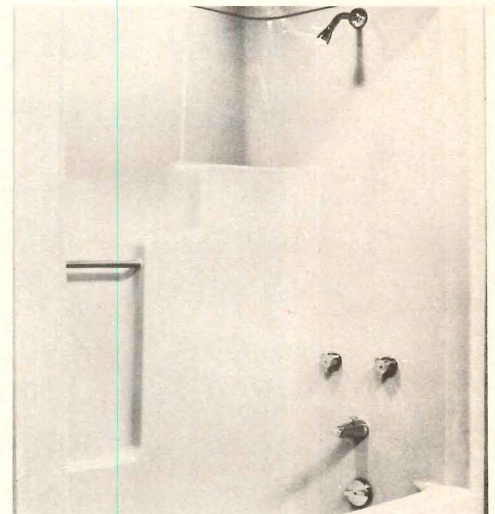
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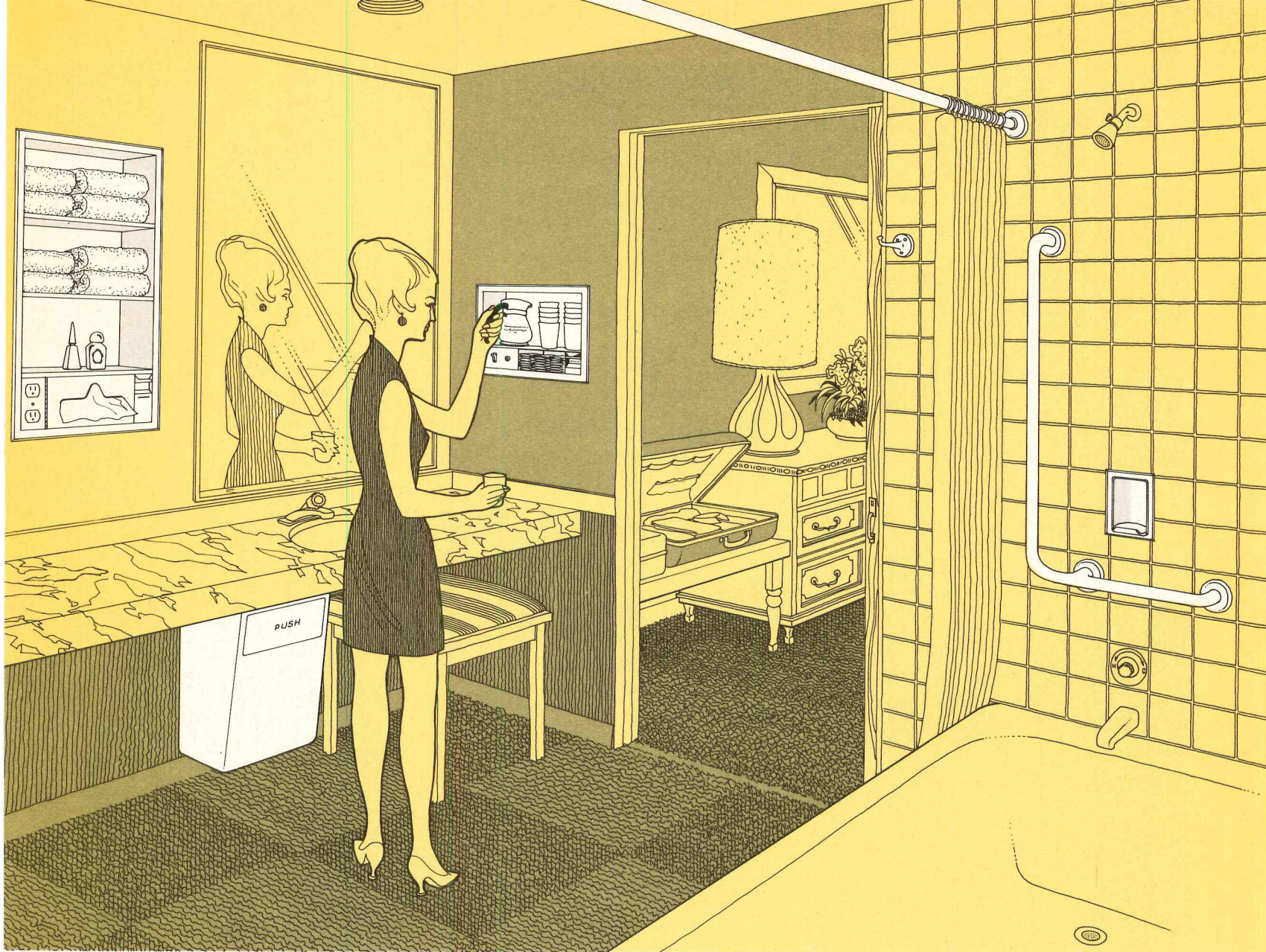
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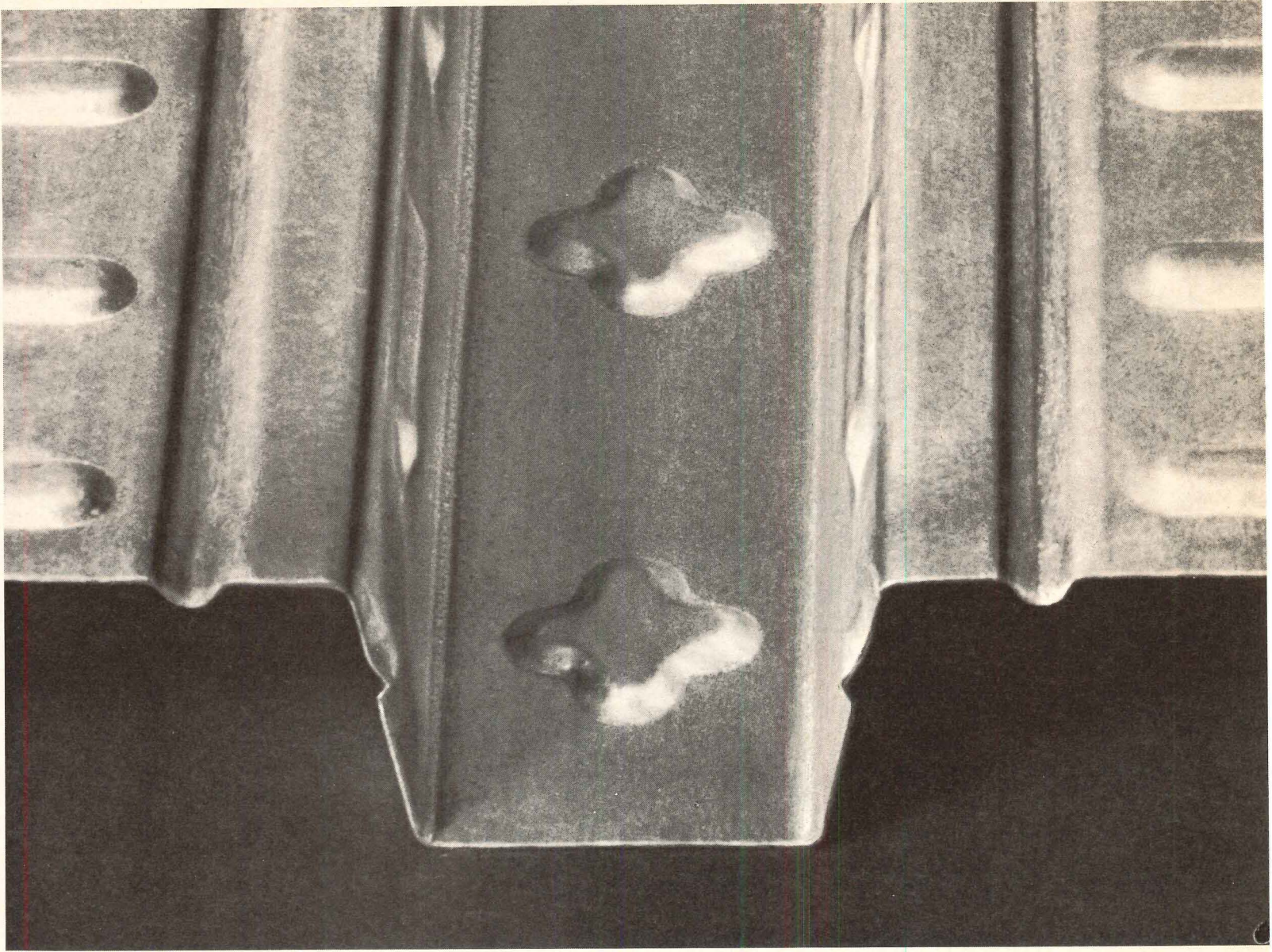
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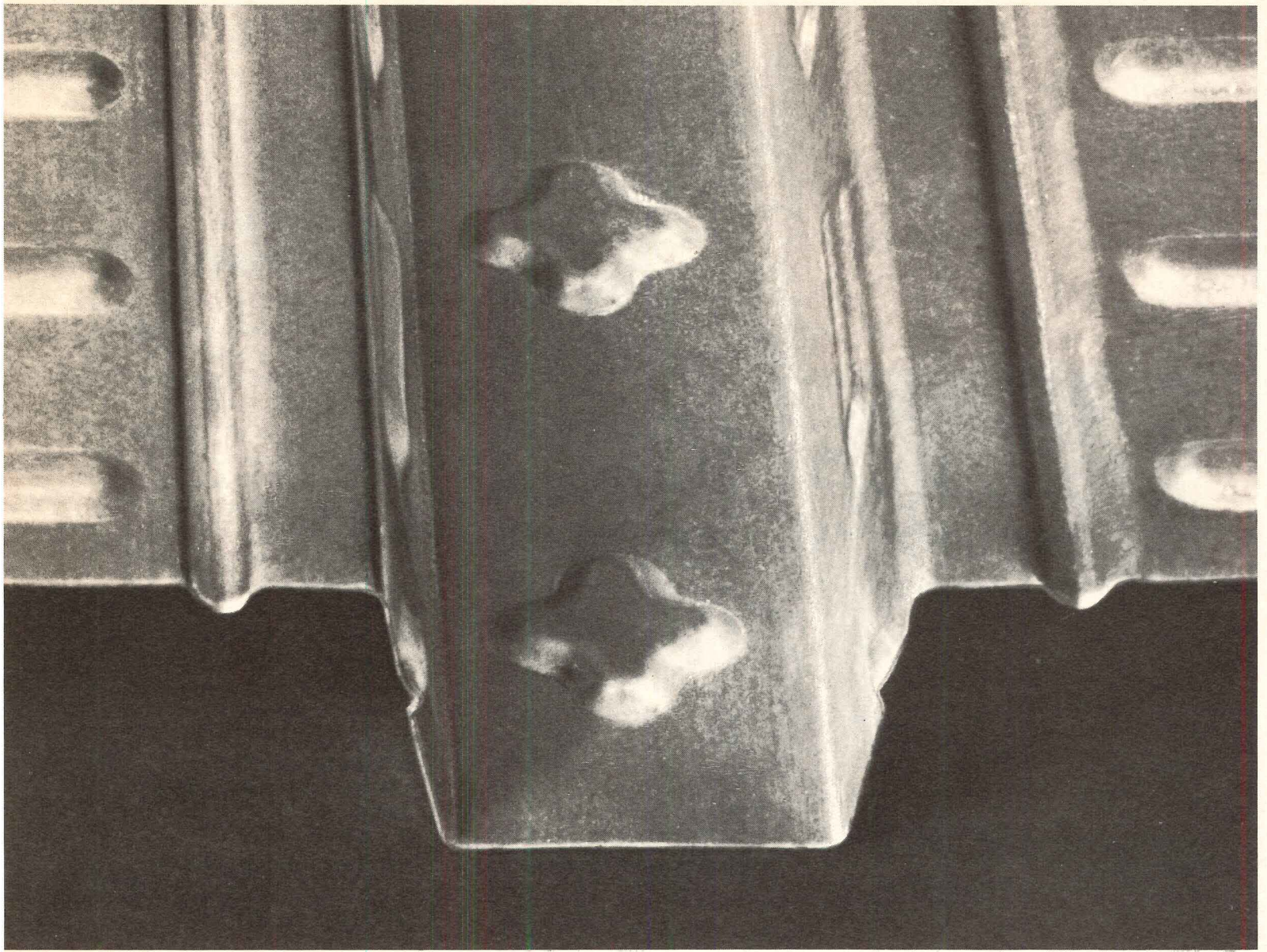
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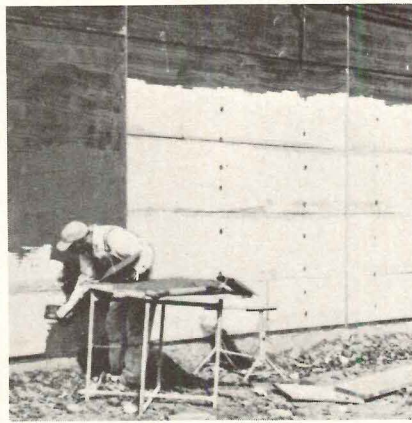
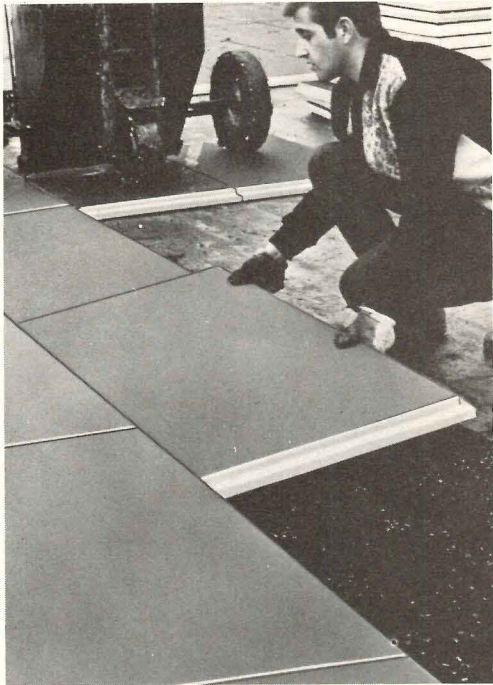
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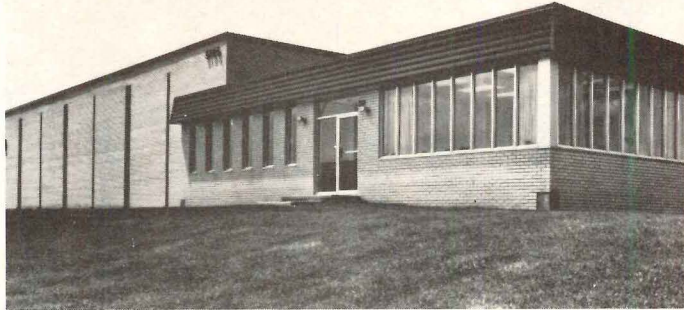
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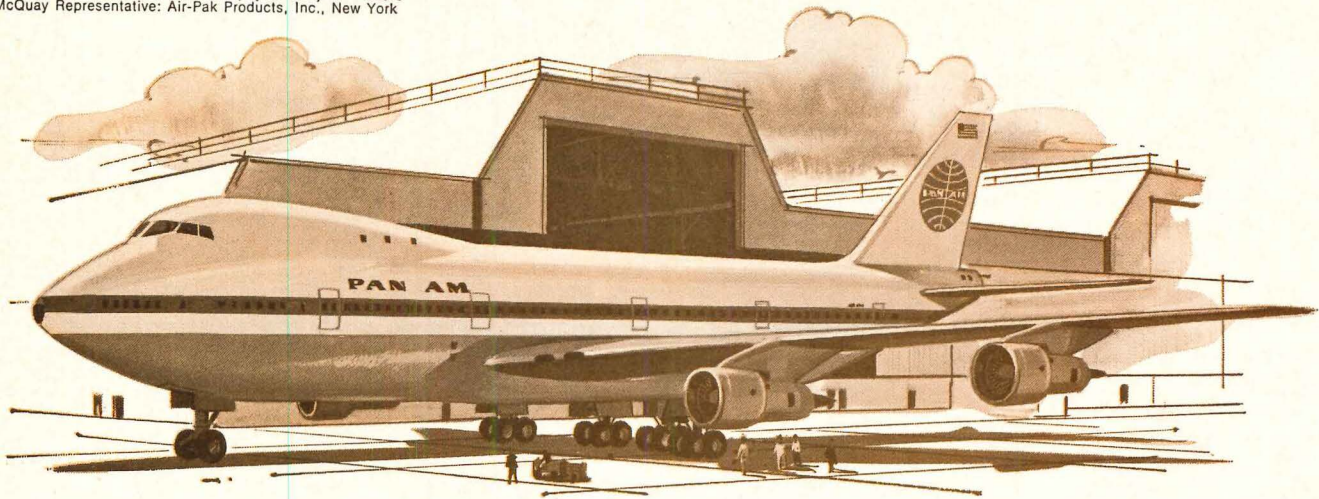
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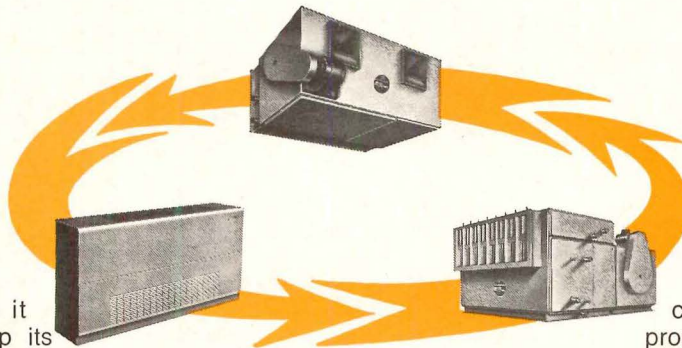
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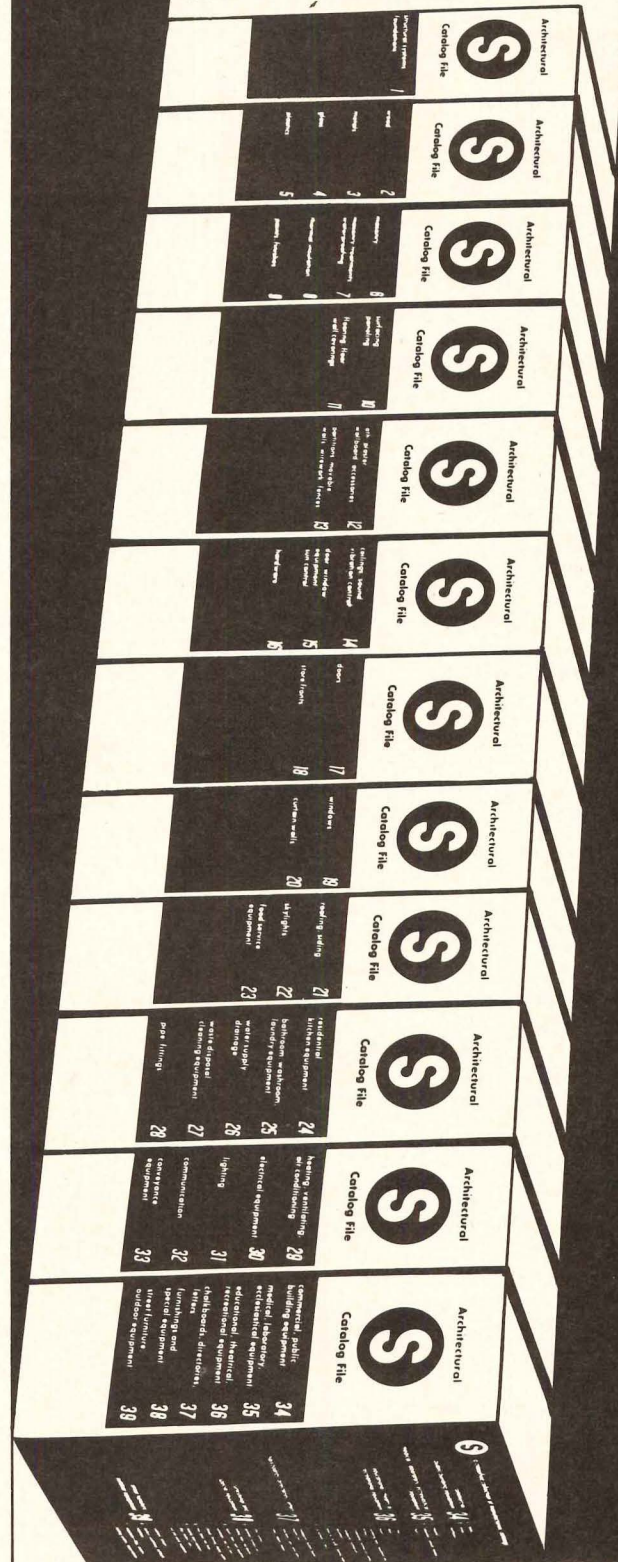
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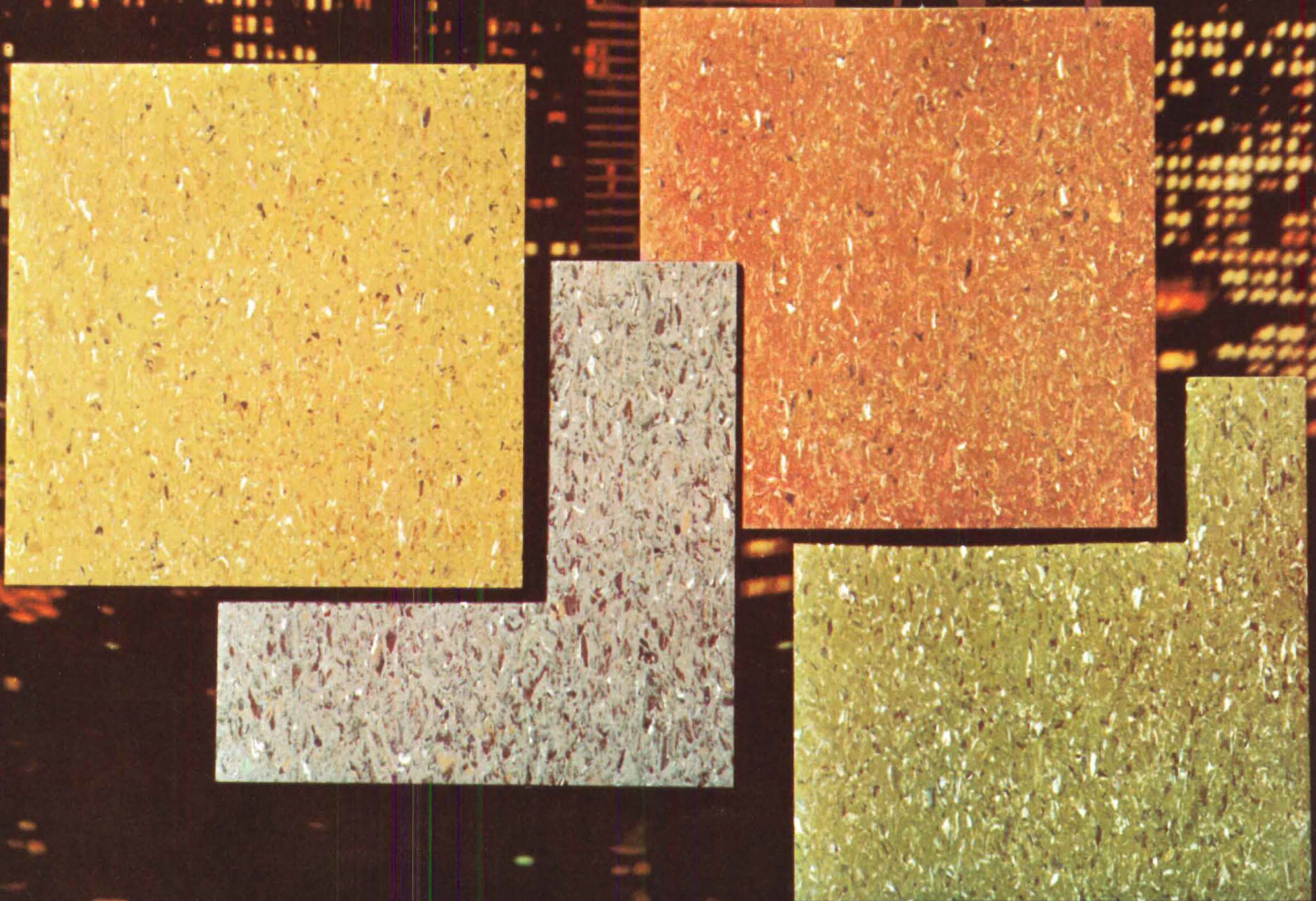
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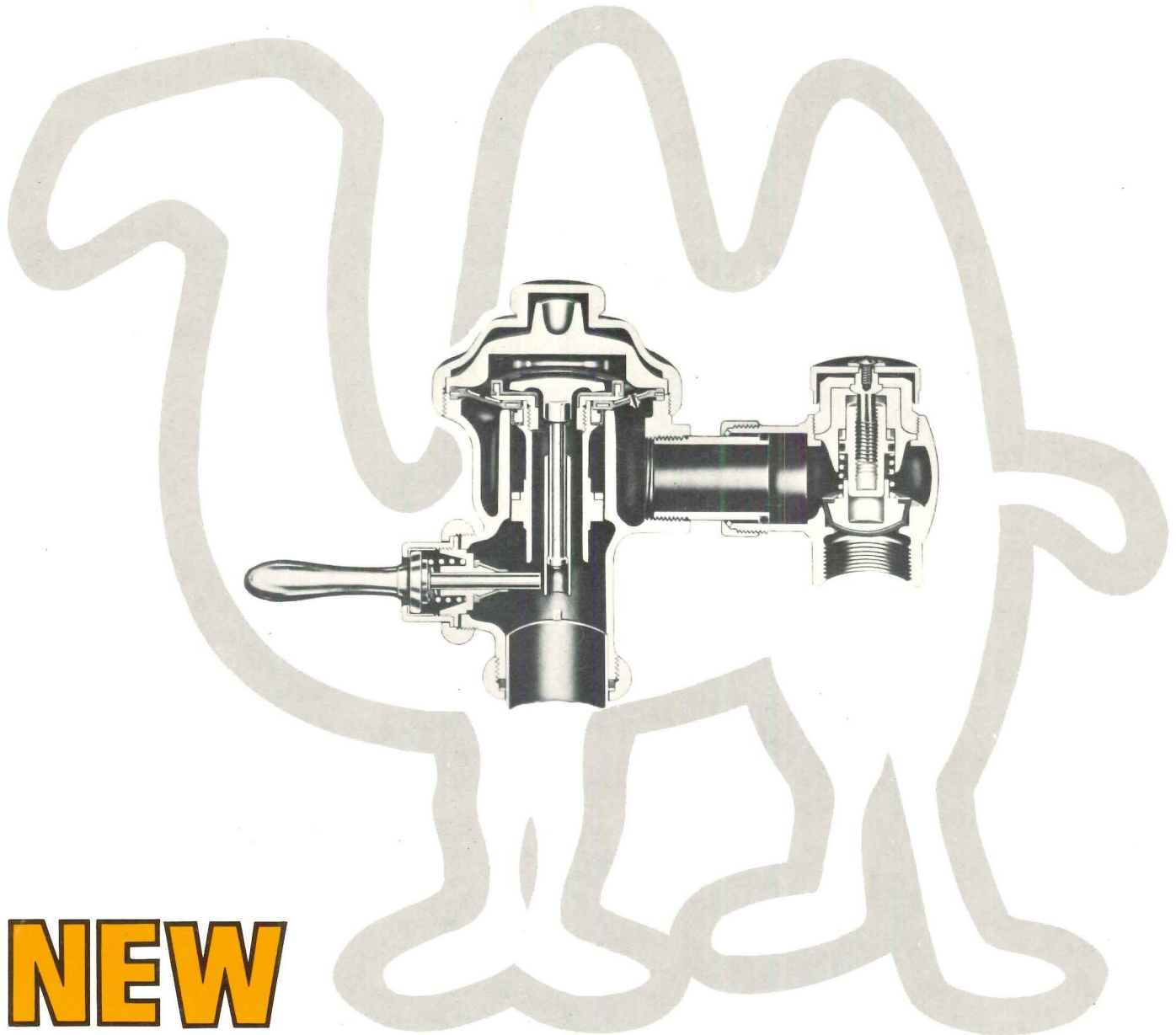
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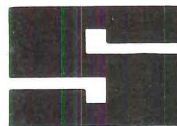
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