ARCHITECTURE

Incorporating Architectural Technology December 1988 Five Dollars

Do it right.

Do it once.

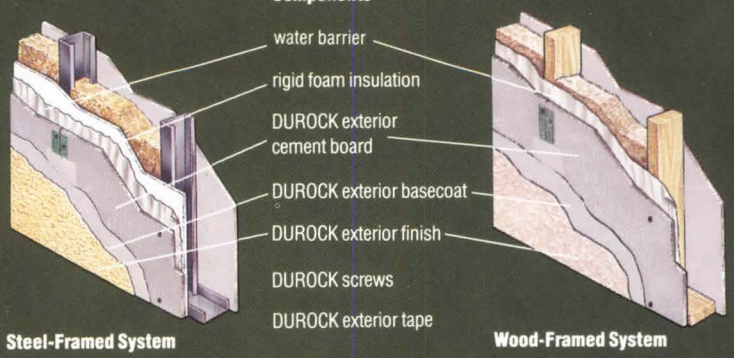
Do it DUROCK™ Exterior Finish Syste

The warmth of traditional stucco without the worry of doing it over. DUROCK system-matched components help you **do it right.** DUROCK Exterior Cement Board, attaching screws, joint treatment, and DUROCK Exterior Basecoat and Finish are all designed together, to work together. To give you solid, strong attachment. To speed construction. To give you quality assurance from the leader in construction technology—United States Gypsum Company.

Do it once, because the substrate resists dents and penetration. While the basecoat and elastomeric finish system withstand minor building movement, thermal expansion, and moisture.

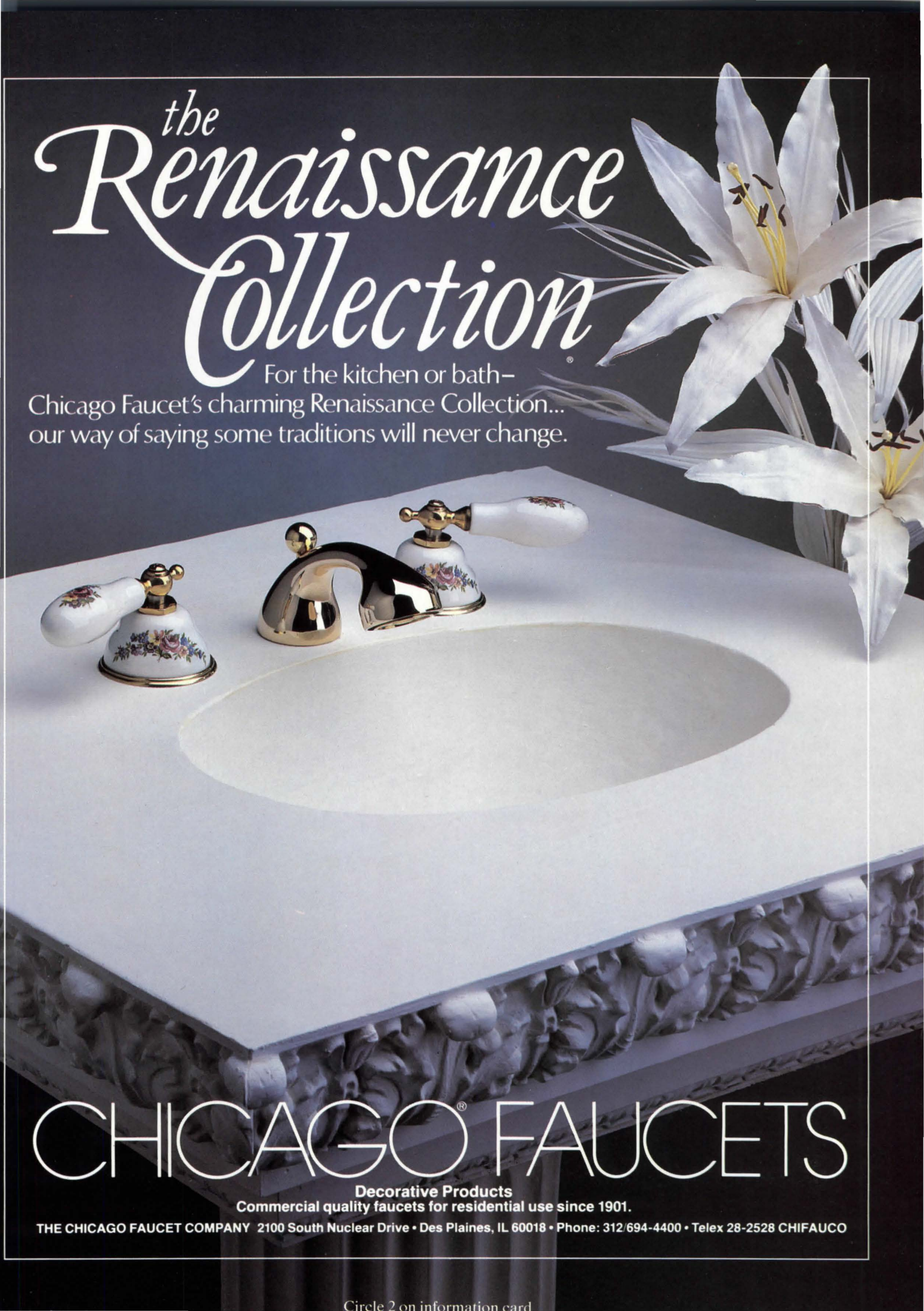
Enduring beauty in stucco-looks or textures in a spectrum of creative colors. Do it all, once and for all with DUROCK Exterior Finish Systems. Write us at 101 S. Wacker Drive, Chicago, IL 60606-4385. Dept.

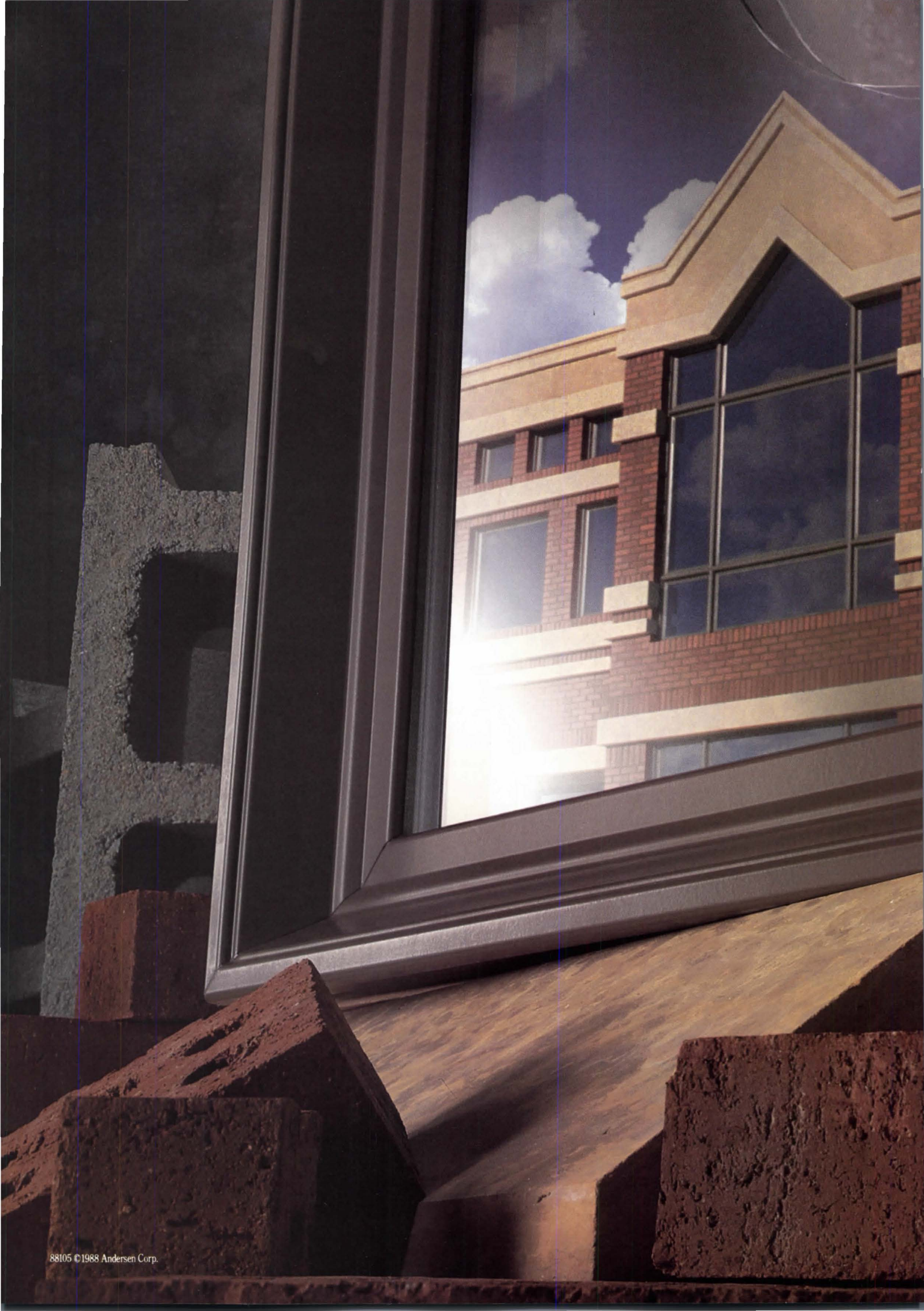
DUROCK System-Matched Components

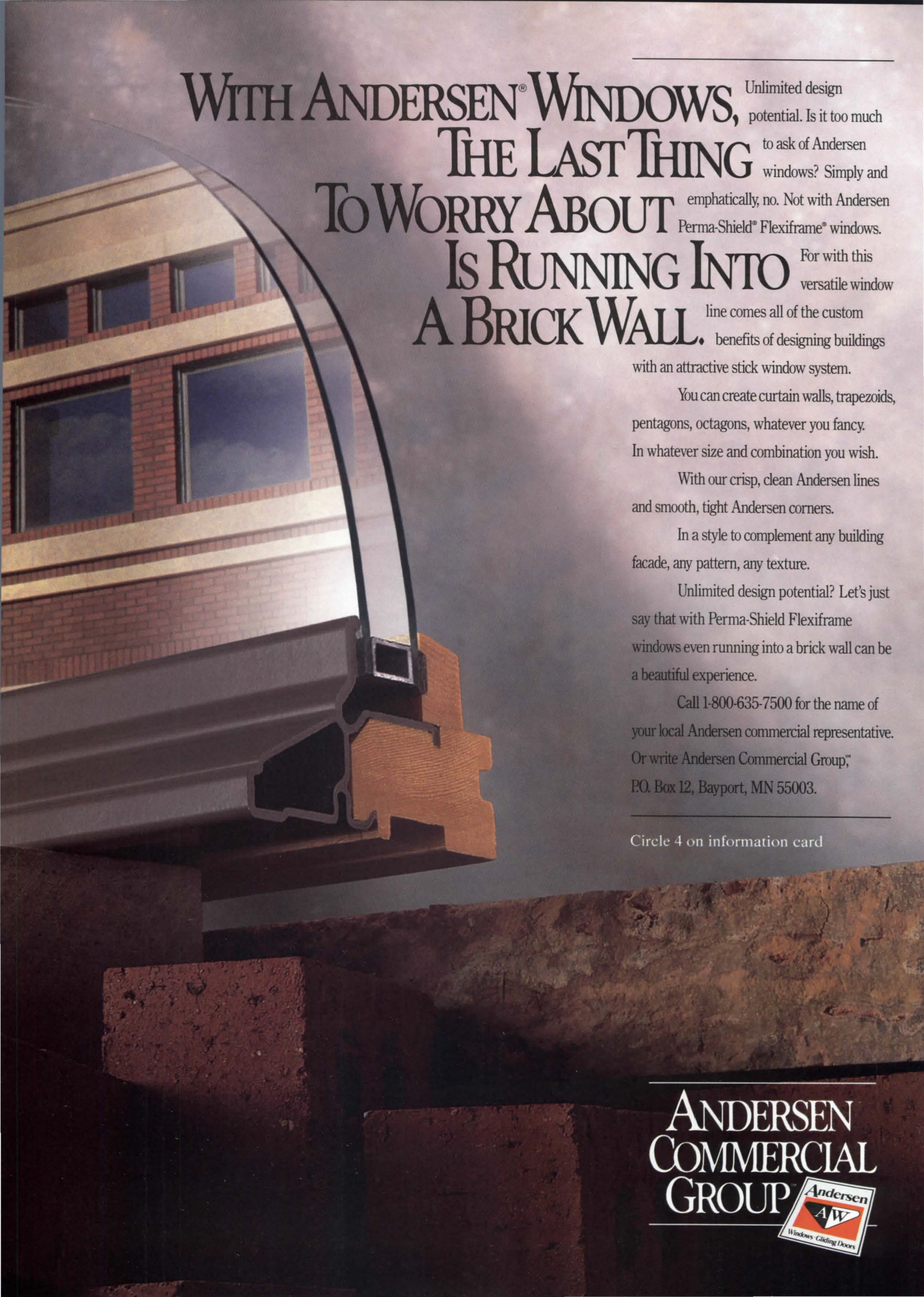


United States Gypsum Company

Circle 22 on information card




88105 ©1988 Andersen Corp.



WITH ANDERSEN® WINDOWS, THE LAST THING TO WORRY ABOUT IS RUNNING INTO A BRICK WALL.

Unlimited design potential. Is it too much to ask of Andersen windows? Simply and emphatically, no. Not with Andersen Perma-Shield® Flexiframe® windows. For with this versatile window line comes all of the custom benefits of designing buildings with an attractive stick window system.

You can create curtain walls, trapezoids, pentagons, octagons, whatever you fancy. In whatever size and combination you wish.

With our crisp, clean Andersen lines and smooth, tight Andersen corners.

In a style to complement any building facade, any pattern, any texture.

Unlimited design potential? Let's just say that with Perma-Shield Flexiframe windows even running into a brick wall can be a beautiful experience.

Call 1-800-635-7500 for the name of your local Andersen commercial representative. Or write Andersen Commercial Group,™ P.O. Box 12, Bayport, MN 55003.

Circle 4 on information card

ANDERSEN COMMERCIAL GROUP™

Andersen AW Windows/Gliding Doors

Zefiron® is a registered trademark owned by BASF Corporation.

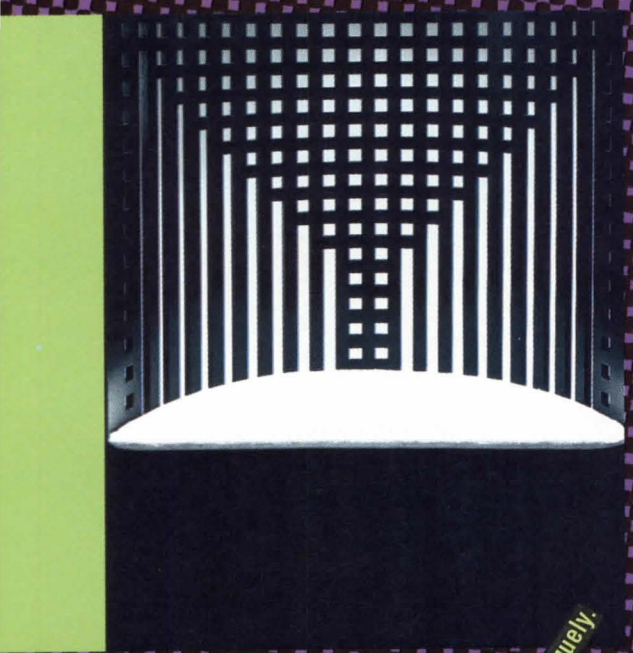
Like Loewy, we've engineered breakthroughs.

Creating a Legacy of Leadership in Fiber Design.

Like Wright, we've explored new forms.

Photo credits (left to right): Ceiling of Great Workroom, Johnson Wax Buildings, Frank Lloyd Wright, *Torkel Korling supplied by David R. Phillips*; S-1 Locomotive designed by Raymond Loewy; Willow 1, designed by C. R. Mackintosh *by Atelier International, Ltd.*; Louise Nevelson and her work, *Pedro E. Guerrero*.

Like Nevelson, we've examined new dimensions.



Like Mackintosh, we've backed our work uniquely.

It is the nature of leaders to break new ground. At BASF Fibers, that's just what we've done. We've created an unparalleled legacy of industry firsts in fiber design. In 1970, we introduced the advantages of solution dyeing to the contract market with our Zeftron® nylon fibers. We were first with a 10 year colorfast warranty. First with conductive carpets. First with contract carpet consultants. And first, more than 20 years ago, with a performance certification program guaranteeing the quality of every carpet that bears the Zeftron label from BASF. Like every other leader, we've been followed. But we haven't been caught. When you want to lead, remember the legacy of BASF, and tap into the spirit of innovation. Call 1-800-446-8953 today for a free brochure and the name of the BASF Consultant in your area.

Circle 6 on information card

BASF Corporation
Fibers Division

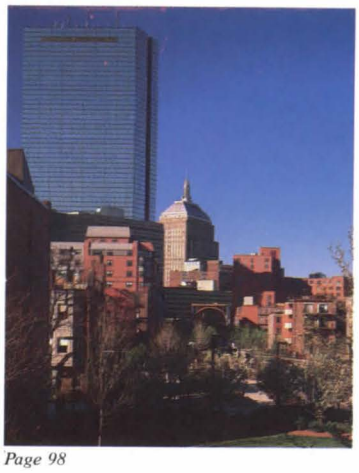
Zeftron® nylon

BASF

CONTENTS

Page 78

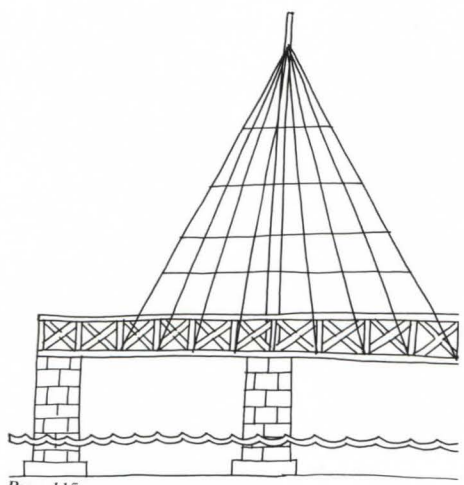
Page 82



Page 98

ARCHITECTURE, publication number ISSN0746-0554, official magazine of the American Institute of Architects, is published monthly by the American Institute of Architects at 1735 New York Ave. N.W., Washington, D.C. 20006. **Individual subscriptions:** U.S. and its possessions: $37 for one year, $55 for two years, $72 for three years. Canada: $43 for one year, $63 for two years, $82 for three years. Foreign: $61 for one year, $103 for two years, $145 for three years. Single copies, $5 each (except for May and September issues, which are $10). Publisher reserves the right to refuse unqualified subscriptions. For subscriptions: write circulation department, ARCHITECTURE, 1735 New York Ave. N.W., Washington, D.C., 20006; allow eight weeks. Quotations on reprints of articles available. Microfilm copies available from University Microfilm, 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Referenced in The Architectural Index, Architectural Periodicals Index, Art Index, Avery Index to Architectural Periodicals. Second class postage paid at Washington, D.C., and additional mailing offices.

VOL. 77, NO. 12.



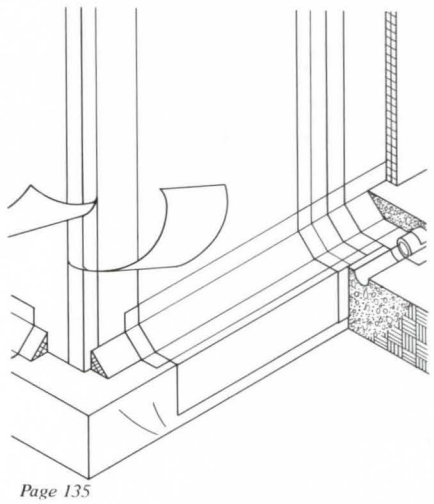
Page 115

Technology & Practice

Cover

Bifurcated ventilation tower for Back Bay Station, Boston, by Kallman, McKinnell & Wood (see page 98). Photograph © Steve Rosenthal.

News



Page 135

Richard Sabin's cohorts started calling him "Dr. Dirt" about a decade ago, back when he first got serious about getting *all* the dirt out of the water he mixes with his paints.

His objective? The "Indestructible Paint Job."

Dr. Dirt discovers hungry water.

In the years since, he's pursued this goal with uncommon zeal; sleeps with a beeper, for example, in case the nightshift needs help dealing with an imperfection.

(His wife, Robin, says she can't get him to take a vacation that takes him outside beeper range, and he doesn't deny it.)

Recently, Dr. Dirt made a discovery that might have gotten him at least a Nobel prize nomination if his specialty were more, ah, exalted.

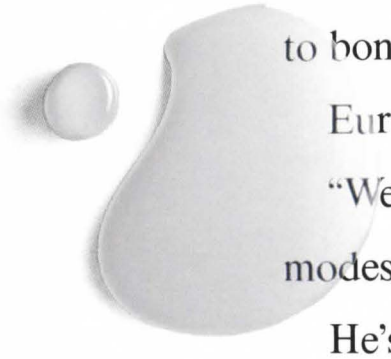
He figured out that zapping a mixture of purified water and top quality paint with a series of electrical charges caused the water to get "hungry" to bond with metal. Instantly and ferociously.

Eureka! The Indestructible Paint Job.

"Well, almost," says the good doctor, who's as modest as he is zealous.

He's also a paint foreman at our Tustin, California plant. So when you buy our desks, cabinets and bookcases, chances are good, their paint job is indestructible.

Almost.



Steelcase
The Office Environment Company

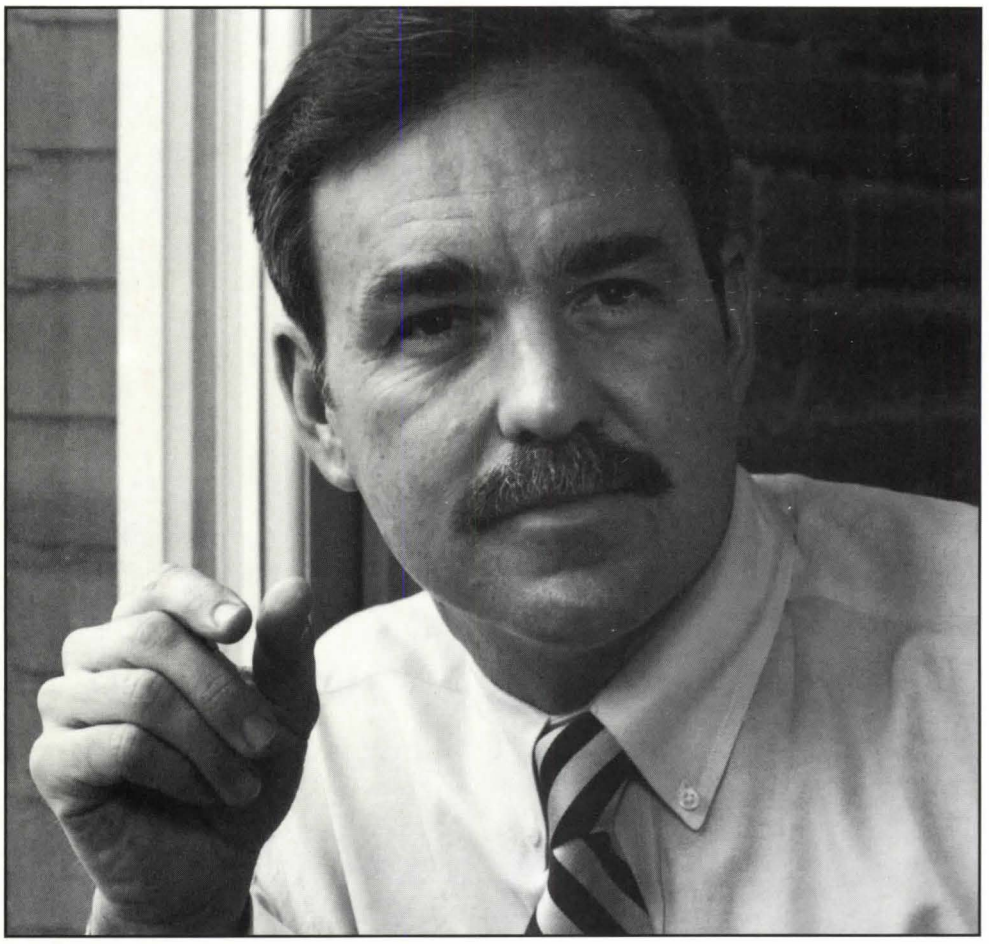
For more information, call 1-800-333-9939

"The DPIC education program has caused us to do continuing education, at the most basic contract level, that we probably wouldn't have gotten around to doing as a whole group. There may have been a person here or there that would have been enthusiastic about it, but their premium credit program requires all partners and technical staff to participate and take the exams. So, without the program, I think it would have been unlikely we would have gotten 100% participation. But because it is required, we do get it. In fact, we are considering making the DPIC tests, including reading the book, a requirement for all staff.

I can't imagine anybody not participating in the educational program, because of the cost savings aspect of it. I mean, let alone the fact that it can help your practice.

I think we've saved on the order of $30,000 over two or three years. We've found DPIC's premiums, with and without the education program, to be generally competitive, so we do regard it as a savings.

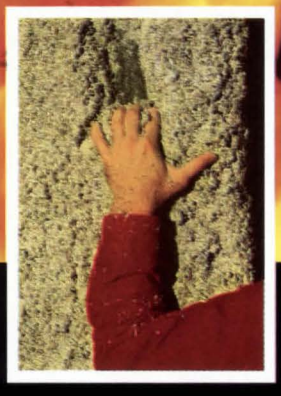
You might find another carrier that could provide the same insurance for that net amount. But I think DPIC has been conscientious, in not saying, 'OK, we'll lower our price and forget about the educational program', and I think that speaks well for them."



Jack Corgan is a principal of Corgan Associates Architects, a 65-person firm based in Dallas, Texas. He is also a former Assistant Professor of Architecture at Oklahoma State University. We value our relationship with his firm, and thank him for his willingness to talk to you about us.

WHEN THINGS GET HOT, YOU NEED A FIREPROOFING THAT HASN'T GONE TO PIECES.

MONOKOTE.®



Mineral Wool
Sprayed Fiber

Cementitious
Monokote

The building inspector has gone. The spray-applied fireproofing has been approved. Now the real testing begins. Electricians, plumbers and carpenters are on-site with wrenches, ladders and hammers. Normal job-site conditions can cause impact damage, abrasion and removal of soft, friable fireproofing materials. Just a small gap can be enough to jeopardize the specified fire-resistance rating.

In-place performance is critical! UL classified Monokote Fireproofing meets or exceeds all recommended levels of performance for in-place strength, durability and resistance to fire and abuse.

Judge for yourself. Compare cementitious Monokote to low density, friable materials. Compare bond to steel, surface hardness, durability, and air erosion. Compare the ability to resist damage from air movement found in elevator shafts that can cause dusting that contaminates sensitive electronic equipment. Compare manufacturer's published minimum standards — you'll find Monokote's are higher across the board.

Finally, compare service. Our national network of Grace professionals provide preliminary design and specification assistance, plus on-site application support when you specify Monokote!

Monokote Fireproofing. Specify anything else, and you're playing with fire.

For more information call (617) 876-1400 ext. 3170 or write W. R. Grace & Co., 62 Whittemore Ave., Cambridge, MA 02140.

GRACE
Construction Products

Circle 12 on information card

WHEN YOUR ROOF JUST HAS TO LAST.

PPG

A dependable roof is a way of life. It has to protect its owner from anything the elements can dish out; sun, chemicals, severe temperature swings, even acid rain. And look good doing it.

That's where Robertson comes in. With our Total Performance Roof. Protected by Versacor® PF. A coating system that combines our Versacor® epoxy base coat with a PPG Duranar® finish. And creates what is simply the most durable metal roof available.

What's more, the Versacor PF Coating System costs only about 15 cents more per square foot than most ordinary thin-film paints. So you can include it in your specs without running for cover.

Skeptical? We'll prove it. Just write H.H.Robertson Company, Department J-12, 400 Holiday Drive, Pittsburgh, PA 15220. Or call (412) 928-7500.

We'll send you a free copy of our Independent Test Results brochure. And show you how to get roofing problems off your back. Once and for all.

The No Compromise Roof

Circle 14 on information card

Robertson®

EVENTS

Dec. 8-Jan. 29: Exhibition of painting and sculpture by David and Sara Yerkes entitled "Art After Architecture," AIA headquarters. Contact: Lynne Lewicki at (202) 626-7467.

Jan. 8-11: National China, Glass, and Collectibles Show, Washington, D.C. Contact: George Little Management, 2 Park Ave., Suite 1100, New York, N.Y. 10016.

Jan. 9-11: Course on Cooling Systems and Cooling Water Treatment, Madison, Wis. Contact: E.K. Greenwald, Dept. of Engineering Professional Development, University of Wisconsin-Madison, 432 N. Lake St., Madison, Wis. 53706.

Jan. 9-13: Course on Advanced Air Conditioning Controls, Milwaukee. Contact: Johnson Controls, 507 E. Michigan St., P.O. Box 423, C-19, Milwaukee, Wis. 53201.

Jan. 10: Seminar on Lighting Retrofit Technologies, Providence, R.I. Contact: Jim Kirby, Energy Management Council, P.O. Box 541, Brattleboro, Vt. 05301.

Jan. 10-13: Asbestos Technique Workshop, Denver. Contact: American Industrial Hygiene Association, Continuing Education Dept., 475 Wolf Ledges Highway, Akron, Ohio 44311.

Jan. 12: Seminar entitled "Crisis in the Workplace," New York City. Contact: Karil L. Kochenderfer, Fleishman & Hillard, 1301 Connecticut Ave. N.W., Washington, D.C. 20036

Jan. 13-14: Workshop on the Design of Worship Spaces for Southern Baptist Churches, Orlando. Contact: Howard D. McAdams, AIA, Sunday School Board of the Southern Baptist Convention, 127 Ninth Ave. North, Nashville, Tenn. 37234.

Jan. 17-19: Annual Computer Graphics Show, New York City. Contact: David J. Small, Exhibition Marketing and Management Co. Inc., 8300 Greensboro Dr., Suite 1110, McLean, Va. 22102.

Jan. 23-27: Course on the Application of Infrared Scanners to Detect Building Energy Losses, San Diego. Contact: Paul Grover, Infraspection Institute, 33 Juniper Ridge, Shelburne, Vt. 05482.

Jan. 25-28: AIA Grassroots, Washington, D.C. Contact: Melissa Downey at Institute headquarters, (202) 626-7377.

Jan. 28-Feb. 1: Winter Meeting of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Chicago. Contact: ASHRAE Meetings Dept., 1791 Tullie Circle N.E., Atlanta, Ga. 30329.

Jan. 29-Feb. 2: Exhibition entitled "Archeology of the Present: East Meets West in Design," New York City. Contact: George Little Management, 2 Park Ave., Suite 1100, New York, N.Y. 10016.

Jan. 30-Feb. 3: Course on Building Inspection, Madison, Wis. Contact: Philip M. Bennett, Dept. of Engineering, University of Wisconsin-Madison, 432 N. Lake St., Madison, Wis. 53706.

May 5-8: AIA Annual Convention, St. Louis. Contact: Ketchie Brassel at Institute headquarters, (202) 626-7396.

LETTERS

Third Philadelphia Plan: In his otherwise splendid critique of the third plan of Philadelphia [Oct., page 77], Robert Campbell was remiss in not giving full credit for the preparation of the plan to Barbara Kaplan, executive director, and David Baldinger, deputy director, of the staff; and to Graham Finney, chairman, and Dean Lee Copeland of the Philadelphia city planning commission board. It is indeed their plan.

But Campbell also got it very right. The plan is both Daniel Burnham (a structure plan) and Jane Jacobs (a fabric plan), because that is what a city needs. The tension between the two is the essential dialectic of design.

Robert Geddes, FAIA
Philadelphia

Roofs and Wind: Sometime in 1987, the Factory Mutual and Underwriters Laboratories test procedures for wind uplift on roofs were stated as being essentially the same as in 1965, when it became necessary for us to evaluate their detail. We found grievous error, which was brought to the attention of both organizations. Richard Coursey's article, "Keeping Wind from Raising the Roof" [Aug., page 102], seems to confirm this lack of enough progress.

UL has added "negative uplift" forces, but neither UL nor FM appears to have eliminated a basic fault: clamping of the test panel on all four sides. There are now wind tunnels large enough to test full-sized conditions at extreme wind forces, and such testing should be done without further delay and should have industrywide support. We can test and design for even tornado forces if we will, probably without unbearable cost.

There may be some composite roofings that (if clamped or similarly anchored 10 feet on center or less, as in the tests) would withstand strong negative "airplane wing" uplift forces from above over the ridge of a low-sloping roof, plus sudden differential pressure. That is the essence of existing tests—finding the tension value of a clamped skin of that dimension, under whipping, gusting conditions.

Stated values of such tests do not represent real-wind conditions over any larger area. In 1965, insulation FM rated to resist 60 psf uplift failed at far less when solidly bonded but unclamped over large areas.

Robert E. Hansen, FAIA
Ft. Lauderdale, Fla.

AIA Documents: Joseph Dundin's article, "A Hundred Years (Or So) of AIA Standard Documents" [Oct., page 119] was very lucid and informative. I learned a lot from reading it. I also greatly admire his manner of presenting a subject that, in other hands, could have been confusing and overly technical.

Robert Paul Dean, AIA
Atlanta

Taiwan: I was glad to see Weiming Lu's article about the architecture of Taiwan, my homeland [Sept., page 94]. I would like to clarify and expand some points. First, the name of the "laboratory" in one of the photographs is the Institute of Ethnology of Academia Sinica. The institute was designed by Pao-Teh Han, who graduated from the University of Cheng-Keng, has a Master of Architecture from Harvard, and a Master of Fine Arts from Princeton. [Like C.Y. Lee, whose background was described in the article] Han also worked for the Boston Redevelopment Authority. During the 1970s, as chairman of the architecture department of Tunghai University, Han had a great influence on education in Taiwan.

Both Lee's Ta An public housing project and Han's institute are trying to transfer Chinese traditional architectural motifs to contemporary building in order to find a new style. However, the architects' approaches are very different. Han uses the traditional vocabulary directly, without changing or adapting the motif. He only uses the motif when the traditional language accords with contemporary life. It is the reason we find his work in projects with fewer functional restrictions and more emotional requirements. Changhua Cultural Center and Pon Hu Youth Center are two distinguished projects in the same style by Han.

The traditional languages are changed or adapted when they are integrated into a building by Lee. The garden at Ta An public housing collects a lot of various adapted traditional Chinese languages and provides an elegant and successful outdoor space. The flush globe roof is a very good example of Lee's style, and the spectacular form makes a strong impression on the city's skyline. But the roof is controversial. According to Feng-Shui (Chinese geomancy), many Chinese regard the shape as bad fortune. I feel this indicates a gap between an architect with a Western educational background and local inhabitants.

Jiahn-Min Huang
Garland, Tex.

No Classical Details: Concerning Philip Drew's article on Lewin Tzannes's Federation Pavilion in Sydney's Centennial Park [Sept., page 83], I wish to make one correction of fact. The columns are not "Doric" as stated. Indeed, there is not one detail in the project that is of an ancient classical style. In this way, I hope the design interprets with wit the particular requirements of building a new rotunda to replicate the original structure on the site.

Alexander Tzannes
Chippendale, Australia

Photo Credits: The photographs illustrating George Lucas's Skywalker Ranch in the October issue are by Guy Chambers (page 96, above), Marvin Wax (page 96, below), Douglas Dun (page 97), and Doug Salin (pages 99 and 100).

Performance beautifully expressed.

Adams Rite Series 3000 exit devices meet stringent fire codes, and do it with imagination and flair. Their performance is expressed in crisp, clean lines. And, they are available with equally sleek exterior trim.

Full-width push bars provide ease of actuation plus the security you would expect from the originator of the M.S.® Maximum Security Deadlock.

Choose from rim, mortise, surface vertical rod and concealed vertical rod configurations. All combine longtime reliability with timeless beauty . . . in a range of popular metal-clad finishes including brass, stainless and bronze.

When you specify the Adams Rite 3000 Series, your client will exit in style.

ADAMS RITE MANUFACTURING CO.

4040 SOUTH CAPITAL AVENUE, INDUSTRY, CA 91749, 213/699-0511

Circle 16 on information card

We've Written "The Book" About Glazing Performance. And Here's A Copy For You.

Heat Mirror™ insulating glass is based on the simple philosophy that neither the architect's design nor the occupant's desire for windows should be compromised by glazing limitations. That's why Southwall developed the only insulating glass that can offer *"Total Performance"*:

- **Superior Insulation** compared to triple pane or "low-e" coated glass.
- **Clear Solar Shading** to achieve the solar control of dark tinted or reflective glass while transmitting high levels of daylight.
- **Condensation Resistance** at exterior temperatures up to 45° colder than conventional double pane units.
- **Reduced Fabric Fading** by blocking most of the solar ultraviolet radiation.
- **Noise Control** for quieter interior spaces.

In other words, Heat Mirror offers you the freedom to utilize more glass in your design without the restrictions commonly associated with glazing products. That's true ***Design Freedom!***

Use the adjoining brochure to see how Heat Mirror™ can enhance the options on your next design. For immediate help on a current project, call our Architectural Services Department, toll-free, 800/365-8794.

HEAT MIRROR™

For Total Performance Windows.

Heat Mirror™ is a trademark of Southwall Technologies Inc.

Circle 18 on information card

Heat Mirror™ Insulating Glass

Design Freedom
Through
Total Performance

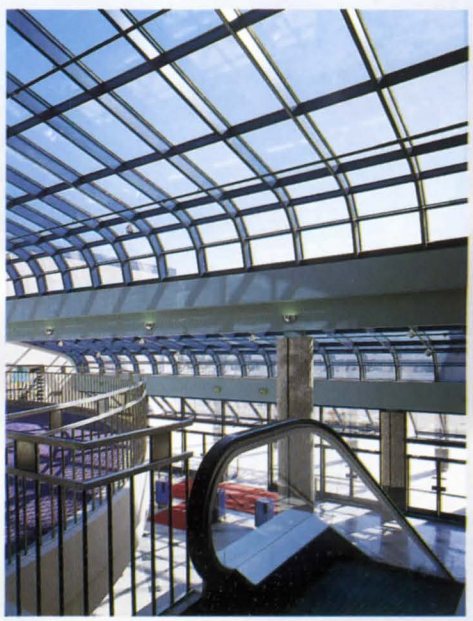
Heat Mirror™ From Southwall Technologies

Southwall Technologies pioneered the development of low-emissivity insulating glass in North America with the introduction of Heat Mirror™ in 1981. A world leader in vacuum sputter coating technology, Southwall combines state-of-the-art manufacturing and innovative product development with expertise in building energy performance.

Produced exclusively by Southwall Technologies, Heat Mirror is based on the simple philosophy that limitations in glazing performance should compromise neither the architect's design nor the building occupant's desire for windows. No matter what your design calls for—clear or tinted glass, in vertical or sloped applications, in any climate—only Heat Mirror offers you design freedom through *total performance.*

Southwall Technologies
Production Facility
Palo Alto, CA

Southwall's proprietary manufacturing techniques utilize vacuum deposition to provide products for the building products, aerospace, communications, and electronics industries.



Cineplex Odeon Theatre
Universal City, CA
Architect:
John Perttula

A dramatic 50-foot-high glass atrium dominates the lobby of one of the world's largest movie theaters, with 18 screens and seating for 6000. Heat Mirror was specified to provide high daylight transmittance while blocking solar heat.

Page 4

Clear Solar Control Glazings

Heat Mirror offers the first clear, non-reflective glass that blocks more solar heat than dark tinted glass.

Applications:
Historical Renovations
Schools/Restaurants/Hospitals
Museums
Retail Storefronts
Southern Residential
Sloped Glazing/Skylights
Solariums

Page 6

Tinted Solar Control Glazings

Heat Mirror insulating glass is available in a broad choice of colors, all with high light-to-heat ratios, for aesthetic versatility.

Applications:
General Architectural Use
Daylighting Applications
Curtainwalls
Sloped Glazing/Skylights
Solariums

Page 8

Clear High Transmittance, High Insulation Glazings

Heat Mirror 88 provides superior insulation in applications where solar heat control is not a concern.

Applications:
Northern Residential
Cold-climate Architectural
Passive Solar Applications
Fully-shaded Glass

Page 9

Heat Mirror "Total Performance" Benefits

All varieties of Heat Mirror insulating glass offer superior insulation, effective condensation control, improved year-round comfort, reduced noise levels, fabric fading protection, and enhanced plant growth.

Page 10

The Heat Mirror Insulating Glass System

Page 11

Specification and Design Guidelines

Clear Glazings That Block Solar Heat

In the past, architects considering clear glass for windows and skylights had few options for controlling solar heat. They could specify blinds or exterior shading, design smaller windows, or simply submit to using dark tinted or reflective glass. Unfortunately, all of these options block the sun's *light* along with its heat.

Today, there is an alternative. Heat Mirror 66/Clear and 77/Clear are the first *clear* glazings that offer better solar control than dark tinted glass or blinds. Heat Mirror frees you to enhance your design with clear glass in applications such as:

Historical renovations—to maintain original aesthetics.

Restaurants, schools, and hospitals—to ensure natural lighting, visibility, and occupant comfort.

Atriums and sunspaces—to add more light without burdening the HVAC system.

Southern residential applications and storefronts—where tinted or reflective glazings are aesthetically unacceptable.

Sloped glazing applications often have higher solar control requirements due to their increased exposure to direct sunlight. For sloped glazing, or for other applications where solar control is critical, consider Heat Mirror 55/Clear, 44/Clear, and 33/Clear. These Heat Mirror types have lower solar transmission and a slightly reflective appearance.

No matter which clear Heat Mirror glazing you specify, for whatever the required level of solar control, remember that all Heat Mirror products offer the additional benefit of more than twice the insulation performance of conventional insulating glass, for year-round comfort and energy savings.

Museum of Flight
Boeing Field
Seattle, WA
Architect:
Ibsen Nelsen and Associates

Naturally-lighted museum uses 55,000 square feet of Heat Mirror to cut estimated energy loads by 35 percent and meet one of the country's toughest energy codes.

Heat Mirror™ Performance Data: Clear Solar Control Glazings

Product/ Glass Type	Exterior Appearance	Glass Thickness (in)	Transmittance Daylight %	Transmittance Solar %	Exterior Reflectance Daylight[3] %	Exterior Reflectance Solar %	Winter Nighttime[1] U-Value[4] Unit Thickness 1″	Winter Nighttime[1] U-Value[4] Unit Thickness 1½″	Summer Daytime[2] U-Value[4] Unit Thickness 1″	Summer Daytime[2] U-Value[4] Unit Thickness 1½″	Shading Coefficient[5]	Relative Heat Gain[6]
Low Reflectance Heat Mirror—Recommended for Vertical Glazing												
HM 77/Clear	Clear	¼	61	32	23	33	.31	.22	.36	.25	.49	104
		⅛	64	38	24	39	.25	.22	.29	.23	.54	112
HM 66/Clear	Clear	¼	53	26	31	39	.31	.22	.35	.25	.41	87
		⅛	56	31	32	47	.25	.22	.28	.22	.45	93
Low Transmittance Heat Mirror—Recommended for Sloped Glazing												
HM 55/Clear	Clear/Silver	¼	45	21	37	43	.31	.22	.35	.24	.35	75
		⅛	47	25	38	52	.25	.22	.28	.21	.38	80
HM 44/Clear	Silver	¼	36	16	41	46	.31	.22	.35	.24	.30	65
		⅛	38	19	43	55	.25	.21	.28	.21	.33	70
HM 33/Clear	Silver/Chrome	¼	28	12	55	53	.31	.21	.34	.24	.23	50
		⅛	29	14	57	64	.25	.21	.28	.21	.24	52

All interior lights are clear glass. Data based on 1″ overall unit thickness except as noted. Other combinations and overall thicknesses are available; contact Southwall for specific information.

Notes to Performance Data Tables

Data shown are nominal values, based on glass manufacturers' published data, and apply to vertical glazing only. All data were calculated using WINDOW 3.1 Computer Program, Windows and Daylighting Group, Lawrence Berkeley Laboratory.

1. ASHRAE standard conditions for Winter Nighttime: 15 mph outside wind, 0ºF outside air temperature, 70ºF inside air temperature, no sun.
2. ASHRAE standard conditions for Summer Daytime: 7.5 mph outside wind, 89ºF outside air temperature, 75ºF inside air temperature, solar intensity 248 Btu/h • ft².
3. Heat Mirror insulating glass units typically have a less reflective appearance than competitive coated glass products (coating on surface #1 or #2) with the same *measured* reflectance. Interior reflectivity will be somewhat higher than the data listed, and is especially noticeable at nighttime.
4. U-value is a measure of heat transfer through glass due to differences in indoor and outdoor air temperatures, measured in Btu/h • ft² • ºF. The lower the U-value, the better the insulating performance. Calculations are for the center of insulating glass units; edge effects and window system frame effects have not been considered and will influence actual overall insulating performance of a window system.
5. Shading Coefficient is a measure of total solar heat gain through a glazing material relative to ⅛″ clear glass under the same design conditions. It includes both the solar energy transmitted directly plus any absorbed solar radiation that is re-radiated as heat into the interior. The lower the shading coefficient, the lower the solar heat gain.
6. Relative Heat Gain is the total heat gain through glass for a specific set of conditions. This value considers indoor/outdoor temperature differences and the effect of solar radiation. Units are Btu/h • ft². Relative Heat Gain is calculated for an ASHRAE Solar Heat Gain Factor of 200 Btu/h • ft²ºF and outside air 14ºF warmer than inside air with no exterior shading.

Swanton High School
Swanton, Ohio
Architect:
Lumm Bentley & Stokes

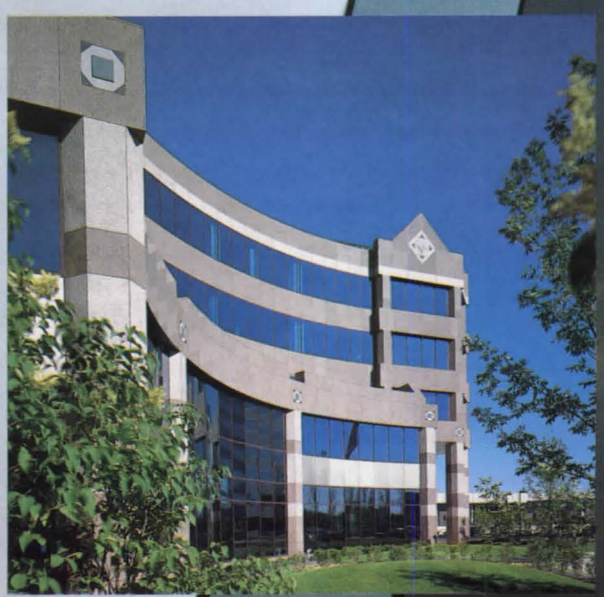
Renovation of 1904 school utilized clear Hear Mirror to maintain original aesthetics and preserve natural lighting, while providing superior solar control and insulation.

Tinted Glazings For Design Versatility

To respond to the full range of design possibilities, Heat Mirror insulating glass is available in a palette of brilliant colors—from bronze, gray, green, blue, and black, to special imported glass colors such as rose. And compared to other tinted or reflective glazings, tinted Heat Mirror glazings have high light-to-heat ratios, a major benefit for design strategies that take advantage of natural lighting.

Any of Heat Mirror's five solar control coatings (from the very low reflectance of HM 77 to the low transmittance of HM 33) can be combined with any base glass color, providing a wide range of solar control performance *within* a specific aesthetic group. (See tables on facing page.) By specifying different Heat Mirror types of the same color for different building orientations, the designer can use the optimal glazing for each elevation without compromising the overall aesthetics.

The outstanding thermal performance of Heat Mirror insulating glass frees your design from restrictions on glass area imposed by energy codes, and often allows for downsizing of HVAC systems. To see a sample and evaluate Heat Mirror's superior aesthetics for yourself, contact Southwall Technologies or your Heat Mirror insulating glass supplier.



Zapp Bank
St. Cloud, MN
Architect:
Korsunsky Krank & Erikson

Heat Mirror 66/Blue reduced up-front HVAC equipment costs by $59,000 and avoided the long leadtimes commonly associated with coated reflective glass.

Heat Mirror™ Performance Data: Tinted Solar Control Glazings

Product/ Glass Type	Exterior Appearance	Glass Thickness (in)	Transmittance		Exterior Reflectance		Winter Nighttime[1] U-Value[4]		Summer Daytime[2] U-Value[4]		Shading Coefficient[5]	Relative Heat Gain[6]
			Daylight	Solar	Daylight[3]	Solar	Unit Thickness		Unit Thickness			
			%	%	%	%	1″	1½″	1″	1½″		
Low Reflectance Heat Mirror—Recommended for Vertical Glazing												
HM 77/Bronze	Bronze	¼	35	19	11	15	.31	.22	.36	.26	.34	73
HM 66/Bronze	Bronze	¼	30	15	13	17	.31	.22	.36	.25	.29	63
HM 66/Bronze	Light Bronze	⅛	42	24	20	30	.25	.22	.29	.22	.37	78
HM 55/Bronze	Bronze	¼	26	12	15	19	.31	.22	.35	.25	.26	56
HM 77/Green	Green	¼	51	24	18	17	.31	.22	.36	.25	.38	81
HM 66/Green	Green	¼	45	20	24	17	.31	.22	.35	.25	.33	72
HM 55/Green	Green	¼	38	17	28	20	.31	.22	.35	.25	.30	64
HM 77/Blue	Blue	¼	39	20	12	15	.31	.22	.36	.26	.35	75
HM 66/Blue	Blue	¼	34	16	16	17	.31	.22	.36	.25	.30	65
HM 55/Blue	Blue	¼	29	13	18	19	.31	.22	.35	.25	.26	58
HM 77/Gray	Gray	¼	29	18	8	14	.31	.22	.36	.26	.33	71
HM 66/Gray	Gray	¼	25	15	10	17	.31	.22	.36	.25	.28	62
HM 55/Gray	Gray	¼	21	12	11	18	.31	.22	.35	.25	.25	55
HM 66/Graylite®	Black	¼	8	10	5	20	.31	.22	.36	.25	.23	51
HM 66/Rosa	Rose	¼	42	24	22	35	.31	.22	.35	.25	.39	83
HM 66/Amber	Amber	¼	30	17	13	20	.31	.22	.36	.25	.31	66
Low Transmittance Heat Mirror—Recommended for Sloped Glazing												
HM 44/Bronze	Copper Brown	¼	21	9	17	20	.31	.22	.35	.24	.23	51
HM 44/Bronze	Silver Bronze	⅛	29	15	26	35	.25	.22	.28	.21	.28	60
HM 33/Bronze	Copper Brown	¼	16	7	21	22	.31	.21	.35	.24	.18	42
HM 44/Green	Blue Green	¼	31	13	31	20	.31	.22	.35	.24	.26	58
HM 33/Green	Silver Green	¼	24	10	41	25	.31	.21	.35	.24	.21	47
HM 44/Blue	Silver Blue	¼	23	10	20	20	.31	.22	.35	.24	.23	52
HM 33/Blue	Silver Blue	¼	18	7	25	23	.31	.21	.35	.24	.19	42
HM 44/Gray	Gray	¼	17	9	12	19	.31	.22	.35	.24	.22	50
HM 33/Gray	Pewter	¼	13	7	15	21	.31	.21	.35	.24	.18	41
HM 44/Graylite®	Black	¼	5	6	5	22	.31	.22	.35	.24	.18	41
HM 44/Rosa	Silver Pink	¼	29	15	28	41	.31	.22	.35	.24	.29	63
HM 44/Amber	Yellow Gold	¼	21	10	17	22	.31	.22	.35	.24	.24	53

All interior lights are clear glass. Data based on 1″ overall unit thickness except as noted. Other combinations and overall thicknesses are available; contact Southwall for specific information.

Please see page 5, "Notes to Performance Data Tables"

Glazings with High Solar Transmittance and High Insulation

For many buildings in cold climates, solar heat gain through windows can be a benefit, reducing wintertime heating costs. In other applications, such as permanently shaded windows, solar heat control is not a concern and maximum transparency is desired.

For these types of design challenges, there's Heat Mirror 88/Clear. During winter months, Heat Mirror 88 lets in the sun's light and warmth, while preventing the escape of valuable indoor heat. And in the summer, Heat Mirror 88 reflects radiant heat away—keeping the outside heat out and the indoors cool.

When your design requires superior insulation, high transparency, and minimal solar control, specify Heat Mirror 88/Clear, the superior "low-e" glazing.

Private Residence
Long Island, NY

In colder climates, Heat Mirror 88's superior insulation reduces drafts and chilly spots near windows, and allows the use of larger glass areas.

Heat Mirror™ Performance Data: Clear High Transmittance, High Insulation Glazings

Product/ Glass Type	Exterior Appearance	Glass Thickness (in)	Overall Unit Thickness (in)	Transmittance		Exterior Reflectance		Winter	Summer Daytime[2]		
				Daylight %	Solar %	Daylight[3] %	Solar %	Nighttime[1] U-Value[4]	U-Value[4]	Shading Coefficient[5]	Relative Heat Gain[6]
HM 88/Clear	Clear	⅛	¾	71	48	18	29	.33	.37	.66	137
		⅛	1	71	48	18	29	.27	.31	.67	138
		⅛	1¼	71	48	18	29	.24	.28	.67	138
		¼	1	68	40	18	24	.32	.37	.61	126
		¼	1¼	68	40	18	24	.27	.31	.61	127
		¼	1½	68	40	18	24	.24	.28	.61	127

Please see page 5, "Notes to Performance Data Tables."

Heat Mirror "Total Performance" Benefits

While the different varieties of Heat Mirror insulating glass described on the previous pages offer a broad range of aesthetic effects and solar control performance, *all* Heat Mirror glazings provide a unique package of additional benefits. Heat Mirror goes beyond common "high-performance" glazing to provide *total performance*:

Superior Insulation

All Heat Mirror glazings provide higher insulation ratings than ordinary double-pane, "low-e" coated, and even triple-pane windows. In fact, Heat Mirror insulating glass insulates as well as an equal thickness of fiberglass wall insulation! Heat Mirror "transparent insulation" lets you design with *more* glass, while reducing heating and cooling loads.

Improved Comfort

Even when outside temperatures are very low, Heat Mirror keeps the interior glass temperature close to the room temperature, reducing drafts and chilly spots near windows.

Minimal Condensation

Heat Mirror resists wintertime condensation at exterior temperatures up to 45 degrees colder than conventional insulating glass, a particularly important benefit for pool and spa enclosures, computer rooms, and other high-humidity environments.

Reduced Fabric Fading

Heat Mirror insulating glass blocks most solar ultraviolet (UV) radiation, helping protect valuable furnishings and merchandise from fading and deterioration. Laboratory studies indicate that fabrics behind clear Heat Mirror glazings resist fading and retain their original color up to three times longer than fabrics behind clear single pane glass.

Noise Control

In noisy environments, Heat Mirror's unique construction insulates against unwanted sound transmission better than ordinary double-pane windows. Heat Mirror can be used with

(continued on next page)

Insulation, Comfort, and Condensation Comparison (Winter Nighttime Conditions[1])

Product[2]	U-Value[3] Btu/h•ft²•°F	R-Value[3] h•ft²•°F/Btu	Indoor Glass Surface Temperature[3] °F	Outdoor Temp. For Interior Condensation[4] °F	Indoor R.H. for Condensation[5] %
Heat Mirror Insulating Glass:					
With two ½-inch air spaces	0.22	4.5	58	−17	67
With two ⅜-inch air spaces	0.25	4.0	57	−7	63
With two ¼-inch air spaces	0.31	3.2	54	7	57
Conventional Glazing:					
Single Pane	1.10	0.9	18	51	14
Double Pane (½-inch air space)	0.48	2.1	46	28	42
with low-e coating, e = 0.40	0.40	2.5	50	20	49
with low-e coating, e = 0.10	0.31	3.2	54	7	56
Triple Pane (½-inch air spaces)	0.31	3.2	54	7	57

1. ASHRAE standard conditions for Winter Nighttime: 15 mph outside wind, 0°F outside air temperature, 70°F inside air temperature, no sun.
2. Insulation data shown are for Heat Mirror 66. Insulation values for other Heat Mirror types will vary slightly. (See tables on pages 5, 7, and 8.)
3. Calculations are for center of insulating glass units; edge effects and window system frame effects have not been considered and will effect actual overall insulating performance of a window system.
4. With 60% interior relative humidity (R.H.), condensation will form on interior glass surface (center of glass) when outdoor temperature drops to indicated value. Condensation may be present at edges of insulating glass unit at higher outdoor temperatures.
5. Condensation will form on indoor glass surface (center of glass) when indoor humidity reaches indicated value. Condensation may be present at edges of insulating glass unit at lower indoor relative humidity.

Noise Control (continued)

laminated glass on the inboard and/or outboard light for maximum noise control. See the table below for comparative Sound Transmission Class (STC) performance.

Comparative Sound Transmission Class (STC) Performance

Glazing Type (all glass ¼", all air spaces ½")	STC Rating
Single Pane	31
Conventional Double Pane	35
Heat Mirror (with two air spaces)	38
Heat Mirror (laminated inboard light)	42
Heat Mirror (laminated inboard/ outboard lights)	45

Improved Plant Growth

Heat Mirror's outstanding insulation eliminates the wide temperature swings that can be harmful to plant health. In addition, Heat Mirror blocks the infrared radiation that can scorch leaves, while letting in the light plants need for healthy growth.

The Heat Mirror Insulating Glass System

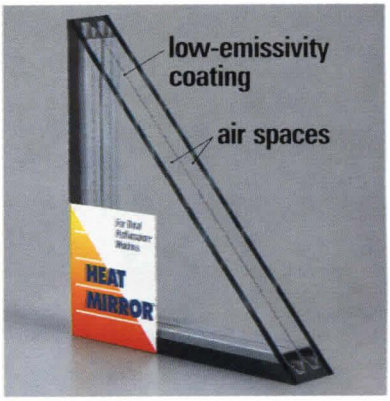
Total Performance Design

The unique Heat Mirror insulating glass system combines two distinct air spaces (to block heat flow due to convection and conduction) with a low-emissivity, wavelength-selective coating (to block radiant heat transfer and solar heat gain).

Heat Mirror insulating glass is manufactured by a worldwide network of licensed window and insulating glass companies. They use a patented system, developed by Southwall Technologies, to tightly suspend the Heat Mirror film midway between the panes of a sealed insulating unit. The result is an insulating unit virtually indistinguishable in weight and appearance from conventional double-pane glass, but with dramatically improved thermal performance.

Commitment to Quality

Only Southwall-approved materials (sealant, spacers, etc.) are allowed to be used in the manufacture of Heat Mirror insulating glass. These materials and the patented fabrication process are the result of years of extensive testing and product development. Southwall maintains stringent control on the quality of Heat Mirror insulating glass through comprehensive in-house testing, as well as ongoing quality programs at its customers' manufacturing facilities.



Cross-section of a Heat Mirror Insulating Glass Unit

Heat Mirror Durability

Heat Mirror insulating glass units have been tested for durability at independent laboratories under ASTM E774-81, recognized by the Insulating Glass Certification Council (IGCC) and the Sealed Insulating Glass Manufacturers Association (SIGMA). In these tests, Heat Mirror units have repeatedly received "A" level certification, the highest possible level. In addition, Heat Mirror has been tested and approved by the National Research Council of Canada (NRCC).

In all of the independent laboratory testing programs, there have been no measurable or observable changes in the Heat Mirror film or its mounting system.

Warranties

Southwall warrants the quality, performance, and durability of Heat Mirror film to the insulating glass manufacturer. Specific warranty information for Heat Mirror insulating glass units is available directly from licensed Heat Mirror insulating glass manufacturers.

Specification And Design Guidelines

Glass Types/Shapes/ Size Limitations

Heat Mirror insulating glass can be fabricated with annealed, heat-strengthened, tempered, laminated, obscure, or patterned glass as required. Heat Mirror is available in virtually any shape, including circles, round-tops, triangles, and trapezoids. Sizes are available up to 78 square feet, with a maximum dimension of 72 inches by 156 inches.

Thermal Stress Considerations

Heat Mirror can often be used with an outer light of annealed glass in applications where heat-treating of more absorptive reflective glass products would be required. However, heat-treating of the outer light of a tinted Heat Mirror insulating glass unit should be considered when high thermal stress is likely. High thermal stress situations include glass that is subjected to re-radiated solar heat (such as an inside corner), irregular shadow patterns, or excessive glass bite.

Visual Evaluation

Before making your final specification of Heat Mirror, Southwall strongly recommends that designers and/or owners view a full-size mock-up of glass and framing as intended for use on the job site.

Spandrel Matching

Since Heat Mirror is relatively transparent and spandrel glass is, by definition, opaque, the two cannot be matched precisely. When using a Heat Mirror variety with over 30 percent daylight transmittance, a contrasting or harmonizing spandrel glass is recommended. Contact Southwall for more information.

Glazing Guidelines

Good glazing practices, such as those recommended in the Flat Glass Marketing Association (FGMA) "Glazing Manual" and the Sealed Insulating Glass Manufacturing Association (SIGMA) "Recommended Practices for Vertical Field Glazing" and "Voluntary Guidelines for Sloped Glazing" should be followed when installing Heat Mirror insulating glass. *The edge sealant materials currently used in Heat Mirror insulating glass are not compatible with standard exterior flush glazing or butt-joint glazing applications, and must be protected from exposure to direct solar radiation.*

Sample Specification

All glass shall be Heat Mirror™ insulating glass units fabricated as follows: Exterior light *glass type, color, thickness*. Heat Mirror™ suspended inner layer *Heat Mirror type: Heat Mirror 66, 88 etc.* Interior light clear *glass type, thickness*. Total interior air space *overall air space thickness*. Overall unit thickness *sum of glass and air space thickness*.

The Heat Mirror insulating glass units specified above shall have the following performance specifications: Winter Nighttime U-value _____. Summer Daytime U-value _____. Shading Coefficient (no shade) _____. Daylight Transmittance _____%. STC Rating (if required) _____.

Availability

An international network of licensed glass and window manufacturers include Heat Mirror in their product lines. Contact Southwall Technologies for the names of suppliers in your area.

For immediate help on a current project, call our Architectural Services Department, toll-free:
800/365-8794

Southwall Technologies

1029 Corporation Way
Palo Alto, CA 94303
Telephone: 415/962-9111
Fax: 415/967-8713
Telex: 348337

YES! I would like more information about Heat Mirror™ insulating glass and its "Total Performance" benefits.

- ☐ Please send a copy of your Architectural Specification Guide
- ☐ Please send additional information
- ☐ Have a sales representative contact me
- ☐ I'd like to see a sample

HEAT MIRROR™
For Total Performance Windows.

Project Information:

☐ Residential ☐ Current
☐ Commercial ☐ Future

Building Type _____
Building Location _____

Name _____

Address _____

City/State/Zip _____

_____

- ☐ Architect
- ☐ Engineer
- ☐ Specifier
- ☐ Contractor
- ☐ Developer
- ☐ Other _____

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 401 PALO ALTO, CA

POSTAGE WILL BE PAID BY ADDRESSEE

SOUTHWALL TECHNOLOGIES
MARKETING DEPT.
P.O. BOX 10052
PALO ALTO CA 94303-9948

If someone else in your office has already seen this copy of *Architecture*, chances are excellent that the Heat Mirror brochure is missing. If that's the case, simply return the attached business reply card and we will send you a copy immediately.

YES! I would like more information about Heat Mirror™ insulating glass and its "Total Performance" benefits.

- ☐ Please send a copy of your Architectural Specification Guide
- ☐ Please send additional information
- ☐ Have a sales representative contact me
- ☐ I'd like to see a sample

HEAT MIRROR™
For Total Performance Windows.

Project Information:

☐ Residential ☐ Current
☐ Commercial ☐ Future

Building Type _____
Building Location _____

Name _____

Address _____

City/State/Zip _____

_____

- ☐ Architect
- ☐ Engineer
- ☐ Specifier
- ☐ Contractor
- ☐ Developer
- ☐ Other _____

Heat Mirror™ is a trademark of Southwall Technologies Inc. © 1988 Southwall Technologies

HEAT MIRROR™
For Total Performance Windows.

Southwall Technologies Inc.
1029 Corporation Way
Palo Alto, CA 94303
415/962-9111
Fax: 415/967-8713

If someone else in your office has already seen this copy of *Architecture*, chances are excellent that the Heat Mirror brochure is missing. If that's the case, simply return the attached business reply card and we will send you a copy immediately.

HEAT MIRROR™
For Total Performance Windows.

Southwall Technologies Inc.
1029 Corporation Way
Palo Alto, CA 94303
415/962-9111
Fax: 415/967-8713

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 401 PALO ALTO, CA

POSTAGE WILL BE PAID BY ADDRESSEE

SOUTHWALL TECHNOLOGIES
MARKETING DEPT.
P.O. BOX 10052
PALO ALTO CA 94303-9948

YES! I would like more information about Heat Mirror™ insulating glass and its "Total Performance" benefits.

- ☐ Please send a copy of your Architectural Specification Guide
- ☐ Please send additional information
- ☐ Have a sales representative contact me
- ☐ I'd like to see a sample

HEAT MIRROR™
For Total Performance Windows.

Project Information:

- ☐ Residential ☐ Current
- ☐ Commercial ☐ Future

Building Type _____
Building Location _____

Name _____
Address _____
City/State/Zip _____

- ☐ Architect
- ☐ Engineer
- ☐ Specifier
- ☐ Contractor
- ☐ Developer
- ☐ Other _____

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 401 PALO ALTO, CA

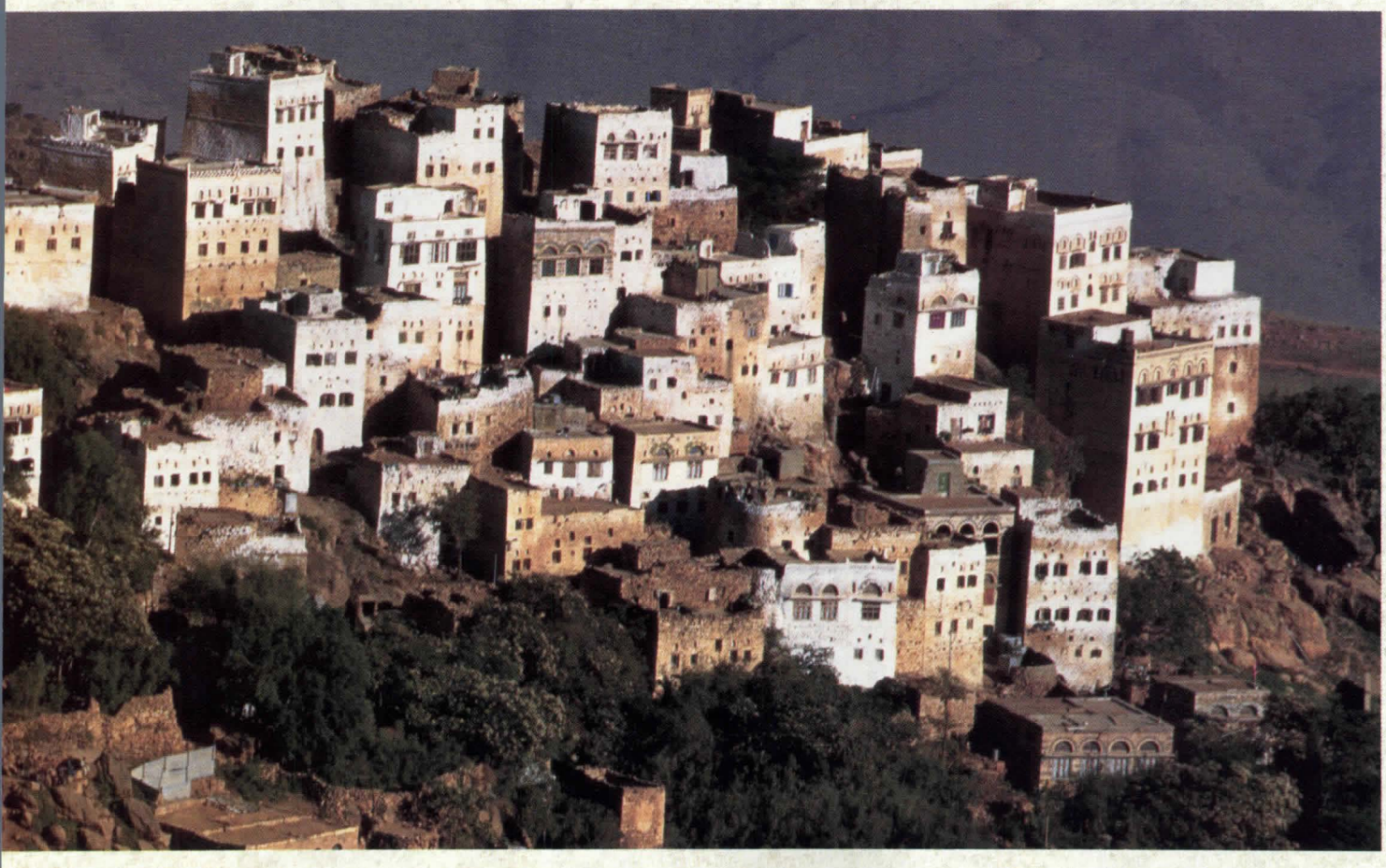
POSTAGE WILL BE PAID BY ADDRESSEE

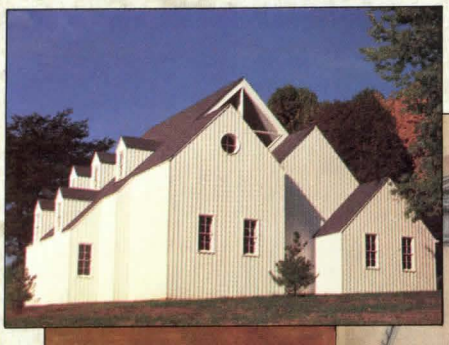
SOUTHWALL TECHNOLOGIES
MARKETING DEPT.
P.O. BOX 10052
PALO ALTO CA 94303-9948

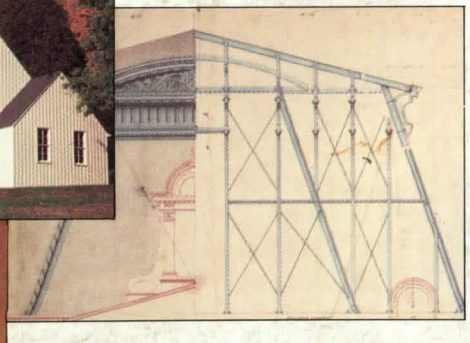
Explore

The Octagon Museum's

Traveling Exhibitions Program, accompanying lectures and symposia have been enjoyed by over a million people. Would you like to join them?







- The Golden Age of Ottoman Architecture
- The AIA Honor Awards
- Townscapes of Europe
- Robert Adam and Kedleston
- Women in American Architecture, 1888-1988
- Robert Mills, Architect: Designs for Democracy
- Architectural Drawings of The Old Executive Office Building, 1871-1888
- Building the Octagon
- Yemen: *A Culture of Builders*
- The Architecture of Richard Morris Hunt

Participating museums include Metropolitan Museum of Art, Boston Athenaeum, Amon Carter Museum, Los Angeles County Museum, Philadelphia Museum of Art, St. Louis Art Museum, Cooper-Hewitt Museum, and Royal Institute of British Architects

Exploring Architecture of the World

The Octagon Museum
The American Architectural Foundation
1735 New York Avenue, NW
Washington, DC 20006
Call for information: 202-638-3221

DENS-SHIELD™ TILE BACKER FROM G-P. IT'S NOT JUST LIGHT... IT'S WATER-TIGHT.

The lightweight, water-resistant properties of the common duck feather make it one of nature's most perfect designs. At Georgia-Pacific, these same features served as our inspiration in the development of Dens-Shield™ tile backer.

Easier To Handle And Less Expensive Than Cement Board.

Dens-Shield is a full 33% lighter than Durock® or Wonder-Board®–and far less expensive than cement board, as well. Because it's lightweight and easier to cut, Dens-Shield is easier to handle and easier to install. Dens-Shield gives the same 1 and 2-hour fire rating as cement board, yet saves you installation time, effort and cost–and no special cutting or drilling tools are required. Dens-Shield is also less brittle than cement board, so it's less likely to chip or break–especially at the corners.

Tougher On Moisture Than Conventional Gypsum Board.

Dens-Shield's revolutionary core consists of a unique gypsum material that provides greater water-resistance and dimensional stability. Fiberglass mats on the front and back add even more protection, and an exclusive water and moisture-resistant coating makes the face practically waterproof. Properly installed, Dens-Shield requires no additional water or vapor barriers to prevent moisture from entering the wall cavity.

Dens-Shield is ideal for use as a backer board for walls or ceilings in tile baths, showers, locker rooms, or other high-moisture areas. It can be tiled, painted or papered and is available either 4′ × 8′ × 1/2″ or 4′ × 5′ × 1/2″.

Check out the light-weight, tough-performing alternative to conventional tile backer. Specify Dens-Shield–the revolutionary material inspired by one of nature's most perfect designs.

For more information and the location of the Georgia-Pacific Distribution Center or Sales Office nearest you, call 1-800-447-2882, ask for operator #1.

Georgia-Pacific GP
MORE POWER to you!™

Circle 24 on information card

Cities

Birmingham: Where the Planning Is Easy

When Atlanta-based columnist Lewis Grizzard said in a column some time back that "it feels good to walk down the street in Birmingham," he was not referring to urban design. But there is evidence of it at work here. The approach has been low-key, gradual, and, yes, soft-spoken. There are, as yet, no prescriptive urban design ordinances—not even any FAR restrictions—in place. The operative factors appear to be luck, gradualism, and, now and again, vision.

One vision, the first large civic idea since the Depression, came just a few years after the early-1960s racial strife. In 1965 the Birmingham Chapter/AIA in cooperation with local leaders unveiled a "Design for Progress." It was, as they say, of its time. Photographs of the model show white-painted, blocky new buildings shouldering all aside. The luck is they didn't do it. At least, not much.

A combination of conservatism and little development activity put Progress on the shelf, but the city did select from this vision some strategic parts and implemented them quite well. A proposed civic center at the north end of the core became an international competition, Birmingham-Jefferson Civic Center, won by Geddes, Brecher, Qualls & Cunningham. Gyo Obata, FAIA, the lead design juror, felt it was the only scheme that could be built. It was built, in stages, between 1969 and 1976.

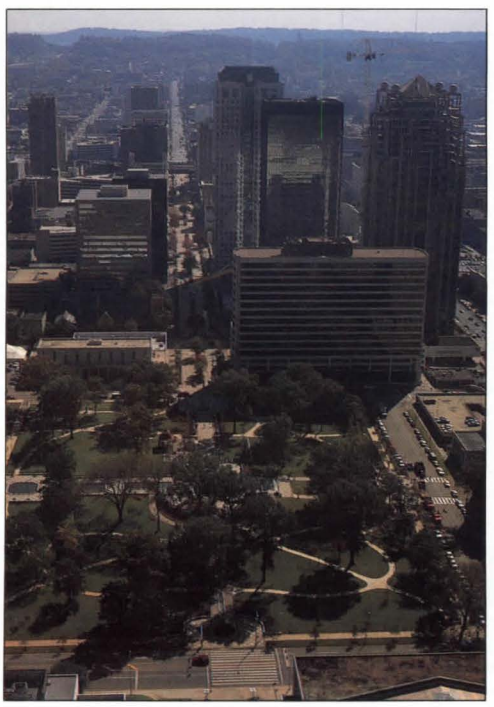
Also implemented was Birmingham Green. Proposed as a mall down 20th Street, the spine through downtown was designed and built (fortunately) as a street upgraded with brick paving, landscaping, and attractive street furniture.

These isolated moves made big impressions. Brutal as they may seem today, the precast slab panel forms of the new civic center—concert hall, theater, exhibition hall, and coliseum organized diagonally around a central space—left no doubt that architecture could powerfully shape the city. The center also reinforced the benefit of "centering." Rather than being strung out around some highway interchange, these buildings made a strong node at the northern end of 20th Street, albeit with an elevated expressway between the center and the city.

Birmingham Green, when completed in 1973, created another strong impression with urban design consequence: the street "as street" meant something. A collaboration between architect and landscape architect, it set a precedent for a score of other street design projects by the City of Birmingham that continue to this day. Most have been designed by landscape architects. The city has been a leading client for a profession that has blossomed locally, all to the good of urban design.

And then, in 1976, along came R/UDAT. A year before, at an AIA Grassroots meeting in Phoenix, Birmingham/AIA chapter president Gray Plosser, AIA, and fellow member Emory Kirkwood, AIA, learned about the Regional/Urban Design Assistance Team concept. They approached Mayor David Vann about holding one in Birmingham. He agreed to have the city sponsor a R/UDAT, but not with the regional scope proposed by the chapter. He wanted it to focus on declining neighborhood commercial areas in the city. (Birmingham is a center city with more than two-thirds of its 930,000 metropolitan population living outside the city limits.) Stanton Eckstut, AIA, was chairman of the R/UDAT study that addressed three distressed "towns" within the city: North Birmingham, Woodlawn, and Ensley. All three subsequently were funded for detailed design and implementation.

Below, the renovated Linn Park and the 20th Street spine in view toward Red Mountain.



John O'Hagan

"The R/UDAT may have been the seminal event that began elevating urban design in Birmingham," says Plosser. "It was the first to focus on comprehensive urban revitalization and the first use of urban design guidelines and design review."

Since the AIA chapter brought R/UDAT to town in 1976, the impetus for urban design has moved to City Hall. "It is an interesting contrast today between Atlanta and Birmingham," says Plosser. "In Atlanta the city has not been doing much in urban design, but the AIA is very active. In Birmingham it's the opposite. The city is deeply involved in urban design; the AIA is not."

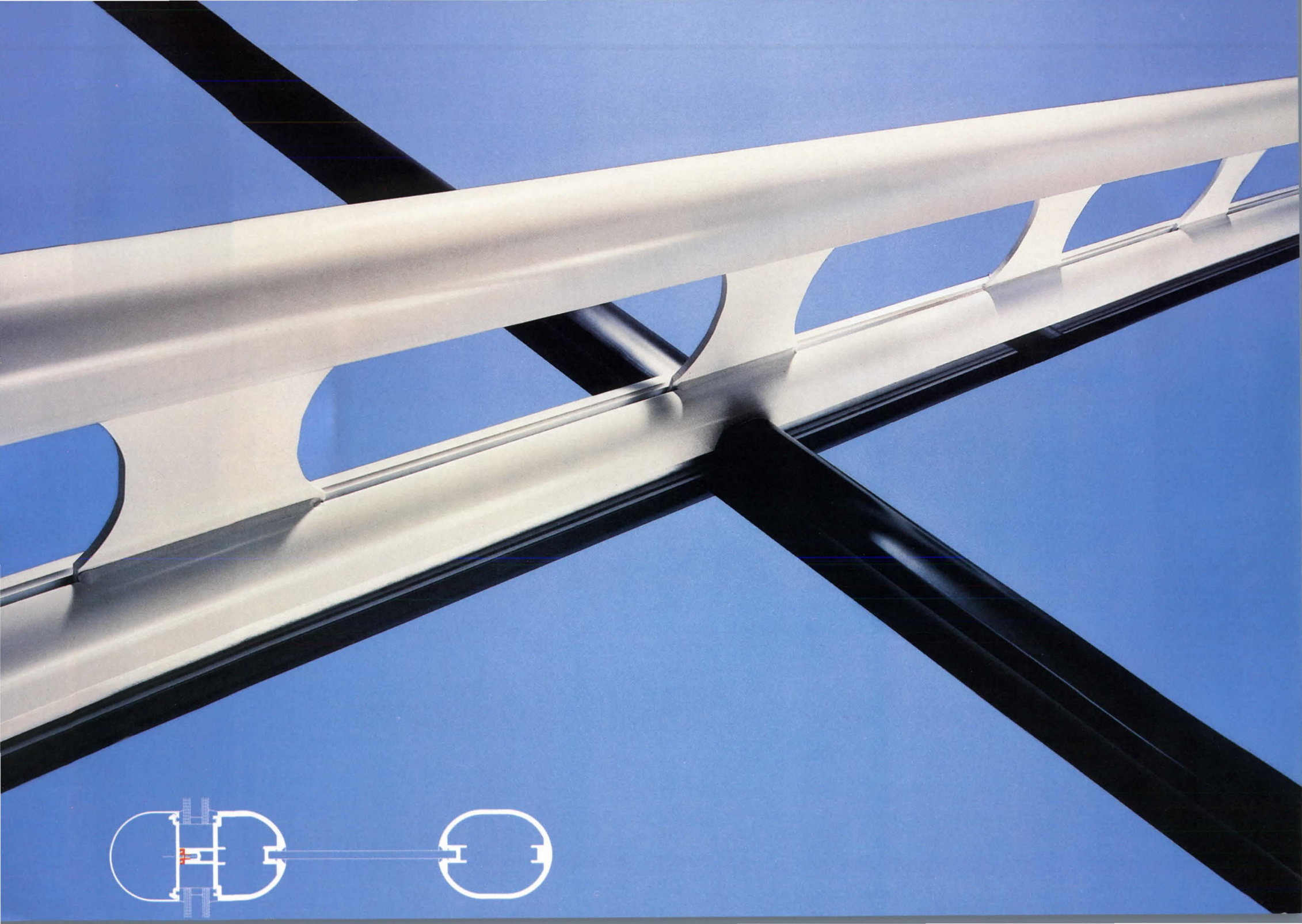
There are other urban design players. Operation New Birmingham, a nonprofit organization formed to advance public/private partnership on a variety of fronts in the city center, has been an active urban design proponent. So has the Birmingham Historical Society and the Junior League of Birmingham, principally through public education.

Operation New Birmingham has successfully promoted and processed historic tax credit projects in the city center. The retention and renovation of historic fabric has become a major component of urban design here. Between 1982 and 1988, more than 60 commercial buildings of varied size and period have been fully renovated at a total value in excess of $90 million.

As Paul Goldberger of the New York *Times* recently wrote of Pittsburgh, the older fabric is the glue that holds the city together. That is noticeably true in Birmingham. Plosser comments: "In contrast to Charlotte or Atlanta, we have had a healthier balance between the restorative aspect of city fabric and new building."

When it comes to new building, Birmingham has benefited from both luck and vision. It built little during the '50s and '60s, a fact now considered a blessing due both to what *remains* and what wasn't built. The primary landmark of this period is a 1969-vintage, 30-story silver glass bank designed by Welton Becket Associates. But it is softened at ground level by a raised, gray-granite base and tempered on its shaft with matte black aluminum mullions.

continued on page 22



TRUSSWALL

THE·SHAPES·OF THINGS·TO·COME

Trusswall from Kawneer introduces the rounded look to the high span entrance. Trusswall spans the clear story entrance area with the structural strength and the desirable aesthetic appeal of the rounded mullion. Formed by circular extruded aluminum chords connected by a separating web that adds stability, strength, and variety, Trusswall becomes a real design alternative.

There are two sides to every story.

On the outside, Trusswall presents a number of faces. One is the innovative circular cover for the sculpted look. Another is the more austere approach, silicone glazing, for an uninterrupted line. And the rectangular cover presents a third more traditional light.

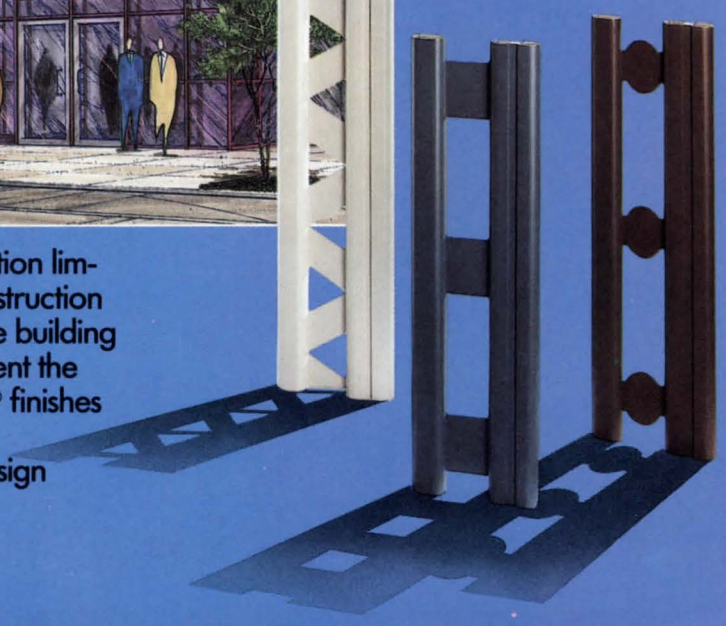
On the inside, Trusswall offers a customization limited only to the imagination. The two-piece construction allows the exterior finish to mix or mate with the building exterior while the interior chords can complement the interior attitudes. The color palette of Fluropon® finishes suggests even more design alternatives.

With four web options to choose from, design flexibility increases. The choices are offered. The choices are yours.

But while the design options offer flexibility, the integrity of the structure remains inflexible. A thermal break, and the flexibility of either ¼" or 1" glass attest to Trusswall being ready and willing to take on nature's harshest elements.

Trusswall. Further evidence of Kawneer's commitment to space.

Kawneer
THE DESIGNER'S ELEMENT.



For product information on Trusswall contact:
Kawneer Company, Inc. Department C
Technology Park—Atlanta 555 Guthridge Court Norcross, GA 30092

Circle 26 on information card

Cities *from page 19*

Newer buildings have been designed, generally with attention to context and urban design matters. A notable example is a cluster of new skyscrapers at the corner of Birmingham Green and Fifth Avenue North. Whatever their individual design strengths and weaknesses, these buildings do relate to the street and to each other. The group seems additive, not random. Design review, which has only recently been applied to 20th Street, was not the cause. Architects and clients made the moves. Height has been limited to just over 30 floors, not by FAR but the FAA: downtown is in the airplane approach zone of the Birmingham Airport.

It is a nice piece of luck, too, that four blocks down 20th, at First Avenue North, a similar cluster of skyscrapers built between 1902 and 1912 stand on all four corners, recently renovated. Jaquelin Robertson's argument, that clustered skyscrapers make more urban design sense than scattered ones, rings true here.

The city has seen a few ghastly fast-buck projects, the worst a turnkey building for the Social Security Administration by developer Franklin Haney of Chattanooga. But most buildings are by local developers, who have obviously exercised some care. There has been little hit-and-run speculation.

Birmingham remains a small big city, and individuals can have wide impact. That has never been clearer than in the distinguished public-servant work of Mike Dobbins, a Yale-educated architect with career stops at the Office of Midtown Planning in New York City under John Lindsay and in New Orleans as a transportation planner and Tulane University instructor. Dobbins came to Birmingham in the late 1970s and took a job as a planner with the county and then the city.

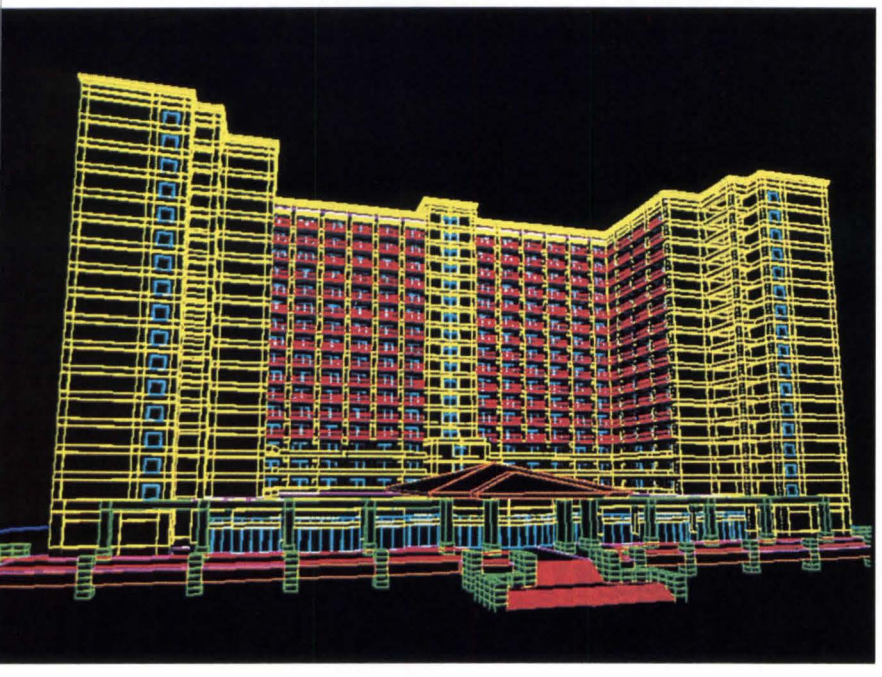
Dobbins began in neighborhood revitalization. He had the patience to sit through citizen input meetings and the skill to forge from grass-roots needs and design standards a combination that would work: the Commercial Revitalization District and, later, other district formulations. This process was gradual. In North Birmingham, Woodlawn, Ensley, and Five Points South, broad constituencies (residents, businesses, propery owners) were developed. As the process of balancing public investment and goals with private development became more familiar, new areas were created—by demand. Much of the Birmingham city center is now a patchwork of 10 special districts that begin to knit together. Virtually all neighborhoods have seen at least some urban design and public streetscape investment. Under the administration of Richard Arrington, Birmingham's first black mayor, the emphasis on urban design has expanded.

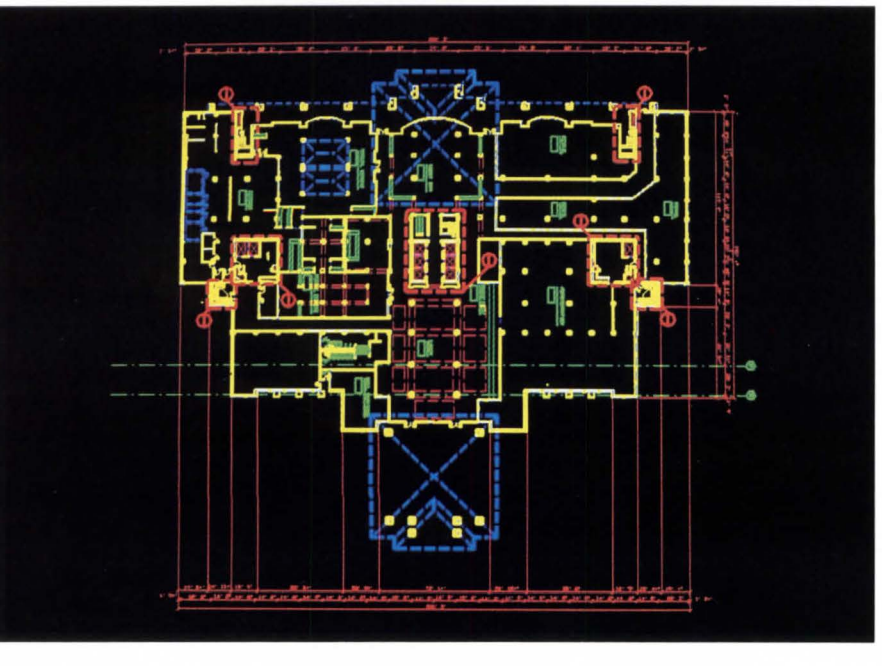
When it comes to private development, how is Birmingham different from more publicized urban design programs? "In some ways we have more teeth, in other ways less," says Dobbins. "We try to create a threshold of design. We negotiate with each owner on building improvements, and our only standard is that it looks better. We want their expression incorporated in the district." But the district designation does have meaning. For the Midtown Urban Redevelopment District, which covers some 50 square blocks of formerly industrial land between downtown and the University of Alabama medical center and campus, there is a set of standard design guidelines. In this area there will be less renovation and more new construction. All districts have a mandatory design review process before building permits are granted. "But the majority of our design review committee members are not design-trained people, and that's deliberate," says Dobbins. "We have attorneys and real estate people and interested citizens. The design people are equal with the others." Can this be called democratic? Dobbins doesn't mind if it is.

The real news about urban design in Birmingham, of course, is that there's any at all. Except for historic districts, consciously managed growth remains a rarity in the region. The South tends to resist anything that smacks of control. And it tends not to think abstractly. It could be that Birmingham's backing into urban design, finding something that works and then doing a little more, may be an adaptable model.—PHILIP MORRIS

Mr. Morris is executive director of Southern Living *magazine.*

News continued on page 26





Concept to completion... a synthesis of design

Intergraph offers an architectural system that integrates the design office. Our CADD system understands the creative process – the language of design, the dynamics of presentation, the precision of drawings and documentation.

Intergraph's flexible environment enhances the collaborative design effort, providing accurate communication and avoiding duplication of work.

Master the creative process... concept to completion.

Call today for information on Intergraph's advanced system for architectural design, presentation, and production. 800-826-3515 or 205-772-2700.

Designed by The Callison Partnership, Seattle and San Diego.

INTERGRAPH

Circle 30 on information card

The model shown above is Castlegate's *Symphony*™ 9-panel door in Ice Crystal/Clear Bevel/Brass Caming combination, with sidelites, door lites and elliptical transom.

Style. And Steel.

Circle 32 on information card

With new *Symphony*™ Steel Entry Systems from Castlegate, you get the perfect harmony of steel and style. The same customers who want elegance can now enjoy functional beauty as well. Because *Symphony* offers everything your customers want. Beveled glass door lites in detailed designs of brass caming. And the added beauty of transom lites. In entry-system styles from colonial to contemporary, and everything in-between. ◆ And Castlegate gives you the support that helps you sell, like our Builder Model Home Program. ◆ So impress them with Castlegate style and quality, too. With *Symphony.*

This is Castlegate's *Symphony* double door in Baroque/Clear Bevel/Clear Glass combination with door lites and rectangular transom. Also available with matching sidelites.

◆

CASTLEGATE®
ENTRY SYSTEMS
A NORTEK COMPANY

P.O. Box 76
911 East Jefferson Street
Pittsburg, Kansas 66762
1-800-835-0364
In Kansas: 1-800-362-1179

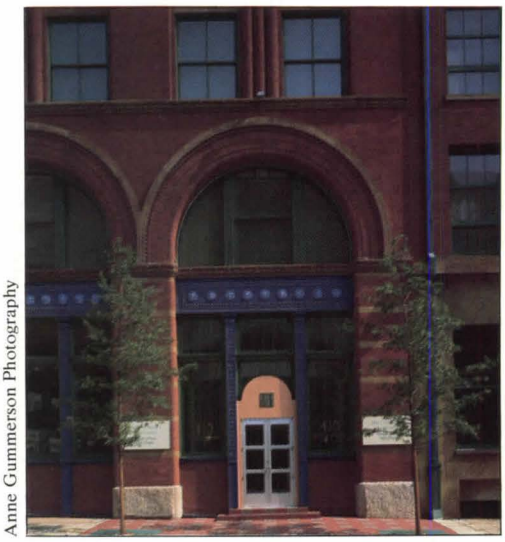
Redevelopment in Baltimore's Gritty Downtown Market Center

Mixed-use developments and festival marketplaces—Detroit's Renaissance Center and San Francisco's Embarcadero Center, Baltimore's Harborplace and New Orleans's Riverwalk—have infused highly visible concentrations of new construction in U.S. downtowns over the past 20 years. Another, less dramatic tactic is exemplifed by St. Paul's Lowertown Redevelopment Corp. (see Nov. '83, page 72) and Baltimore's Market Center Development Corp. These have attempted to reknit gritty old downtown sections piece by piece, with emphasis on rehabilitation. This is the story in Baltimore.

As recently as the 1950s, the intersection of Lexington and Howard, where four big department stores competed, was Baltimore's retailing core. In the next block there thrived Lexington Market, one in the city's chain of flavorful farmers' markets, while theaters and storefront shops lined surrounding streets. But the old section was bled dry by suburban stores and downtown shifts—a couple of blocks to the southwest with Charles Center in the early '60s and then a few blocks farther south with the Inner Harbor in the late '70s. Along Howard, Lexington, and nearby streets, wig and pawn shops took over the storefronts, theaters were boarded or went porn, and three of the four department stores closed their doors.

Today, some form of building rehabilitation is complete or under way in most blocks east and west of a mile-long strip of Howard, which itself has been repaved, landscaped, and decorated with a series of four 30-foot arches. Lexington Market has been enlarged and integrated with a new subway stop. Apartments have been fit into former factories and loft warehouses, and into an old YMCA and a high school building. One commercial row has been linked and renovated into a cluster of apartments located over and behind the stores; the shops still front the street, but apartments are now oriented toward a new courtyard in the center of the block. In other blocks, new row houses fill in former gaps. Little parks and street improvements also are scattered through the area.

Below, Marlboro Square apartments, a converted factory, by CDC/Burns & Geiger.



Anne Gummerson Photography

The work collectively amounts to continuing renovation of an area on the west side of downtown that is interesting and potentially vital. Lacking the architectural and demographic cohesion of the typical Baltimore neighborhood, it ecompasses 225 acres on 54 blocks and includes the University of Maryland graduate campus and hospital, the old garment district, and an area unofficially called Chinatown. Planning, design, and management of the area is by the Market Center Development Corp. of Baltimore, a quasi-public entity created nine years ago by City Hall.

"Market Center is not a glamor project," says Robert Tennenbaum, AIA, president of the corporation. "Nor are the individual projects glamorous in comparison to Inner Harbor development. What we are trying to do . . . is to revitalize the old, gritty part of downtown one project at a time, mostly [with] quality rehabilitation." Ninety percent of Market Center's work is rehab, estimates Richard Stein, corporation chairman.

Stein, a former department store executive, and Tennenbaum head a staff of about a dozen located on an upper floor of the old Hecht store at Lexington and Howard. Working from its own detailed block-by-block master plan originated in

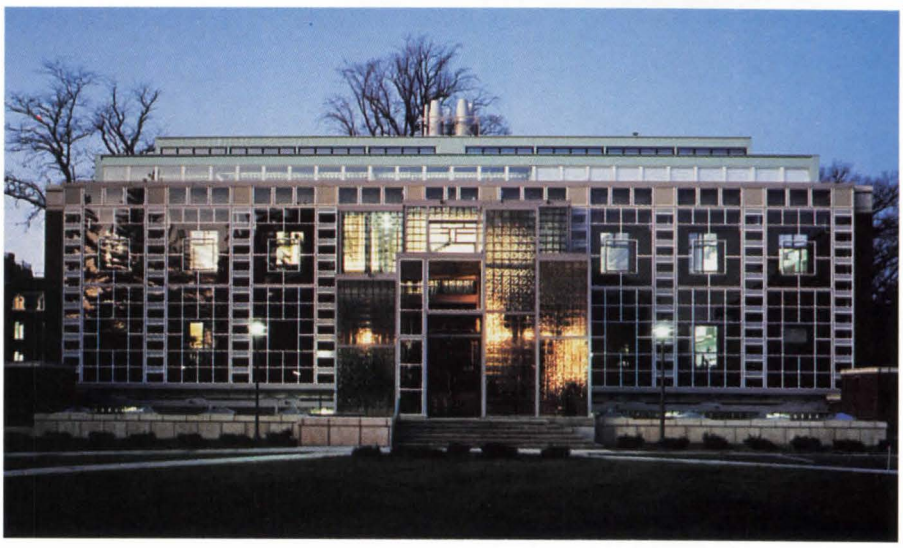
continued on page 30

CALL FOR ENTRIES

PC GLASSBLOCK

2nd Annual Architectural Design Awards Competition

Pittsburgh Corning's first Design Competition was a spectacular success! So popular, the 1989 competition is now underway. As with the 1988 program, the purpose is to reward outstanding applications featuring PC GlassBlock® products as a central element.



1988 First Prize Winner, Completed/Existing Category: Seeley G. Mudd Chemistry Building, Vassar College. Architects: Perry, Dean, Rogers & Partners.

The Jurors

As you read this, we are contacting leading architects and deans of architectural schools to be our judges. Jurors will be announced in the next appearance of this ad.

General Information

1 Projects To Be Considered

Exterior, interior or specialty construction incorporating PC GlassBlock® products as a central design element in residential or commercial applications.

2 Eligibility

Architects and interior designers, architectural or interior design firms, schools of architecture and/or their individual students or classes are eligible.

3 Entry Fee

$75 per submission; however, there is no fee for entries submitted by schools of architecture students.

4 Entry Deadline

All entries must be received by 5 p.m. Eastern Time, Friday, April 28, 1989.

5 Categories

Existing, Planned/In-Works, Conceptual.

6 Entry Acceptance

Contingent on verification of eligibility and agreement of the entrant's client to cooperate in the competition. All clients will be contacted, and final acceptance rests with Pittsburgh Corning.

7 Awards

First and second place and up to three honorable mentions per category, at the discretion of the jurors.

8 Prize Amounts

Project Category	1st Place	2nd Place
Existing	$2,500.00	$1,500.00
Planned/ In-Works	$3,500.00	$2,500.00
Conceptual	$6,000.00	$4,000.00

9 Notification of Winners

Winners will be notified by mail or telegram no later than May 22, 1989.

First and second place winners will be honored at a banquet ceremony in Pittsburgh, Pennsylvania on June 15, 1989. For student winners, travel and hotel expenses will be paid by Pittsburgh Corning Corporation (up to 5 individuals).

10 Publishing of Winning Entries

Entrants agree that if their submission(s) wins, they release and authorize Pittsburgh Corning Corporation to use such entries in advertising, and agree to provide additional graphic materials, if needed and available.

To obtain full details, submission requirements, and official entry forms, please call the Pittsburgh Corning PC GlassBlock® Products Hotline: 800-992-5769.

PITTSBURGH PC® CORNING

Pittsburgh Corning Corporation
800 Presque Isle Drive
Pittsburgh, PA 15239

Circle 38 on information card

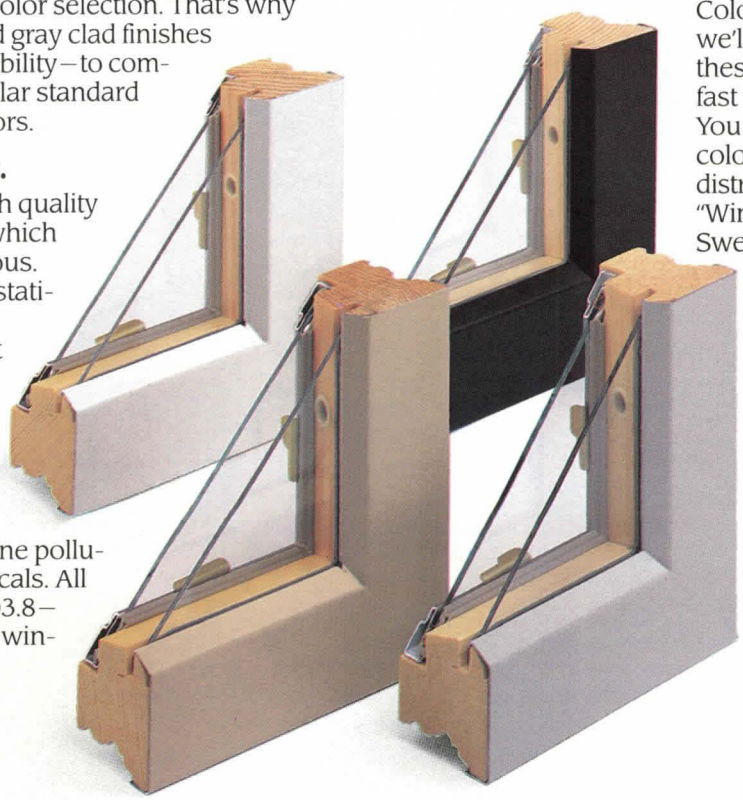
Now, Pella doubles your choice of window colors.

Pella® introduces Tan and Gray colors to their standard brown and white offerings to meet your need for greater design flexibility.

We've always listened to what features architects and builders want in windows and doors. Today, owners are demanding a greater color selection. That's why we're offering new tan and gray clad finishes—on an accelerated availability—to complement our already popular standard white and brown clad colors.

Let us color your thinking.

These are the same high quality architectural finishes for which Pella Clad Colors are famous. They're baked-on, electrostatically applied finishes that shrug off the many ills that coatings are heir to: fading, chipping, cracking, peeling, blistering and chalking. Not to mention their resistance to the corrosive action of acid rain, salt spray, airborne pollutants and corrosive chemicals. All conform to AAMA spec 603.8—your assurance that these windows endure and endure.



Accept no limitations.

Of course, we still offer dozens of Pella Custom Clad Colors. If you have a specific color in mind, we'll match most any sample. But even on these custom orders you'll marvel at our fast turnaround time.

You can obtain information on these new colors and free samples from your Pella distributor. Look in your Yellow Pages under "Windows", call Sweet's BUYLINE or consult Sweet's General Building File. Or send us the coupon below.

Bring your designs to Pella.

Please send me the current literature on new Pella Clad Colors.

Name_____

Firm_____

Address_____

City_____

State_____ Zip_____

Telephone_____

Pella Windows and Doors, Commercial Division
Dept. T44L8, 100 Main Street, Pella, Iowa 50219
Also available throughout Canada.

Pella®

Circle 40 on information card

Left, one of four arches on Howard Street Transit Mall. Below left, 'RedwoodArch' by artist Linda DePalma, the end piece of a one-block pedestrian mall.

Cities *from page 26*

1980, the staff helps developers plan and then carry out projects, analyzing each site initially and then in consort with a developer's design team. The staff then helps shepherd a project through the city's public approval process, including, when needed, local and/or state historic preservation reviews.

Funds from local, state, and federal sources have kept the corporation afloat and financed public improvements. Federal sources have included Urban Mass Transit Administration funds, Urban Development Action Grants, Community Development Block Grants, industrial revenue bonds, and funds from the Housing and Urban Development Department's 108 Loan Guarantee Program and the National Endowment for the Arts. The most innovative source for project development has been a city-created Trustee Loan and Guarantee Program. With an urban development bank of $150-200 million funded by a combination of citizen-approved bond issues, federal grants, capital budget, and earnings, this program, considered the source of last resort, "has made projects happen" when conventional financing was difficult or impossible to find, says Tennenbaum.

Other than regulations particular to the district, like a strong facade rehabilitation ordinance, the corporation has no special quality-control teeth. The results are across the board, from low-end developer-driven quality to expensive and caring adaptive-use/restorations. But it counts for something that the Market Center staff is physically located in the area, knows the developers first-hand, and, as Tennenbaum indicates, has no reticence to apply pressure for compliance.—ALLEN FREEMAN

Awards and Competitions

Presidential Awards Program Cites Ten Projects for Design Excellence

The 1988 Presidential awards for design excellence were presented last month in Washington, D.C., to 10 federally sponsored projects and programs. Conducted every four years to honor exemplary federal design achievements, the award program honored three projects in architecture, two in urban design and planning, three in engineering, and one each in landscape architecture and graphic design.

The Vietnam Veterans Memorial was designed for the National Park Service and the Vietnam Veterans Memorial Fund by Maya Ying Lin of New York City, with the Washington firm Cooper-Lecky Architects. The accompanying sculpture "Three Soldiers" is by Frederick F. Hart of Markham, Va. In honoring the Vietnam Veterans Memorial, the jury said, "This one superb design has changed the way war memorials—and monuments as a whole—are perceived as the creation of an integral space rather than an object."

The O'Hare Transit Line, a 7.6-mile extension of Chicago's rapid transit system linking the airport with downtown, was cited as a "critical and creative balance of both function and form." The Department of Transportation's Urban Mass Transit Administration commissioned a different Chicago firm for each of the four stations—Murphy/Jahn (winner of a 1987 AIA honor award for its design); Skidmore, Owings & Merrill; Metz, Train, Youngren; and Perkins & Will. The jury said that the transit system "shows how well the public can be served when skillful and imaginative design is joined with enlightened transportation planning."

The renovation of the Delaware Aqueduct between Lackawaxen, Pa., and Minisink Ford, N.Y., was honored for responding to pragmatic concerns while maintaining the historic integrity of the original structure. Constructed as a canal aqueduct in 1847-48, it is the earliest surviving work of John A. Roebling. Beyer Blinder Belle, Architects & Planners, of New York City, Ammann & Whitney of New York City, and Abba G. Lichtenstein & Associates, Designers, of Fair Lawn, N.J., restored the aqueduct for the National

continued on page 32

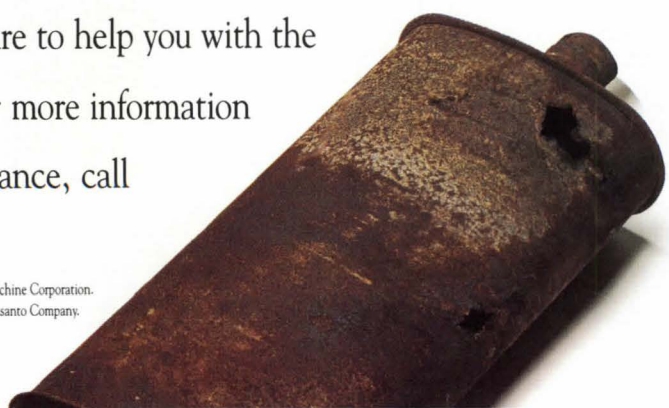
Laminated glass. Because Victorian Apartments wanted high style, not high decibels.

It's an increasingly common problem. A site so noisy you're not sure you can make it habitable. Let alone marketable. So you're stuck, between the need for sound control on one hand and the need for good architecture on the other.

The solution: windows of laminated architectural glass with Saflex® plastic interlayer, like these being installed in the Victorian Apartments.

Laminated glass lets you put in the windows you want, and keep out the sounds you don't. All at a cost that makes sense.

Find out more. Send in the coupon and we'll send you a free copy of our Acoustical Glazing Design Guide, plus IBM* PC-compatible software to help you with the specifications. For more information or technical assistance, call 1-800-325-4330.



*IBM is a trademark of International Business Machine Corporation.
©Monsanto Company 1988. ®Trademark of Monsanto Company.

MCCSF-8-100

Yes, please send me free information on laminated glass for sound control.

☐ Send the Acoustical Glazing Design Guide. ☐ Send the computer disk.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

PHONE (_____) _____

Send to: Monsanto Company, 800 North Lindbergh Blvd., Dept. 204, St. Louis, MO 63167

A1288

Laminated glass. Making a clear difference.

Monsanto

SAFLEX®
PLASTIC INTERLAYER

Circle 42 on information card

Awards and Competitions *from page 30*
Park Service and Department of the Interior.

In urban design and planning, the Pennsylvania Avenue Plan (see page 78) was cited as an "outstanding example of urban redevelopment." The Pennsylvania Avenue Development Corp., Sasaki Associates Inc. of Watertown, Mass., Grenald Associates Ltd. of Narberth, Penn., Tippetts-Abbett-McCarthy-Stratton of Washington, D.C., and Herbert S. Levinson of New Haven, Conn., were honored. "Both the plan and its implementation set a standard in design quality and public-private partnerships that should inspire cities across the country," said the jury.

The Southwest Corridor Project, a 4.7-mile extension of Boston's transit system (see page 98) also was honored. The Orange Line extension project was designed by Stull & Lee Architects and Planners of Boston for the Department of Transportation, the Urban Mass Transit Authority, and the Massachusetts Bay Transportation Authority. Kallmann, McKinnell & Wood and Cambridge Seven Associates designed individual stations.

Two bridges were cited for excellence in engineering: the Department of Transportation's New Sunshine Skyway Bridge in Tampa/St. Petersburg, Fla. (see page 113), designed by Figg & Muller Engineers Inc. of Tallahassee, Fla.; and the East Huntington Bridge spanning the Ohio River, by Arvid Grant & Associates, Consulting Engineers, of Olympia, Wash.

Also honored was the graphics and exhibitions program of the National Gallery of Art in Washington, D.C.; the National Park Service's Boxley Valley land use plan for the Buffalo National River in north central Arkansas; and NASA's International Ultraviolet Explorer Spacecraft and Telescope developed at the Goddard Space Flight Center in Greenbelt, Md.

The Presidential design awards are administered by the Federal Design Improvement Program, a special project of the National Endowment for the Arts' design arts program. The 10 winners were selected from among 500 in a two-stage jury process. In the first stage, 68 projects were selected to receive federal design achievement awards.

First-stage winners in architecture are: Alewife transit station, Cambridge, Mass.; Bear Valley Visitor Center in Point Reyes, Calif.; Technology Center in the Republic of Botswana; Bowling Facility, Karlsruhe, West Germany; Illinois Council on the Arts "Building by Design"; Charleston Waterfront Garages, Charleston, S.C.; U.S. Court of Appeals Building, Pasadena, Calif.; Fifth Street Renovation, Santa Monica, Calif.; Housing for Elderly, Eastern Shore, Md.; Nashville Union Station; Navy-Marine Reserve Training Center, Buckley ANG Base, Colo.; St. Louis Union Station; Treasury Building restoration, Washington, D.C.; U.S. Embassy in Colombo , Sri Lanka; U.S. Embassy in Kuala Lumpur, Malaysia; U.S. Post Office, Kings Mountain, N.C.—LYNN NESMITH

Preservation Projects Honored In Federal Awards Program

Honoring some of the most outstanding historic preservation accomplishments since the passage of the National Historic Preservation Act of 1966 (NHPA), the President's Advisory Council on Historic Preservation has given awards to 28 projects across the United States.

This one-time, special recognition was designed to celebrate two decades of success under the act and was jointly sponsored by the Department of the Interior. Awards were made in two categories. The first, which included 10 projects, was President's Historic Preservation Awards recognizing achievements in privately supported preservation.

Designed in the English Renaissance style by Edmund M. Wheelright in 1901, Boston's Horticultural Hall declined into disuse. The Horticultural Society rehabilitated the building to house its offices and rare books collection and leased office space to a developer in return for a $4 million investment in the renovation.

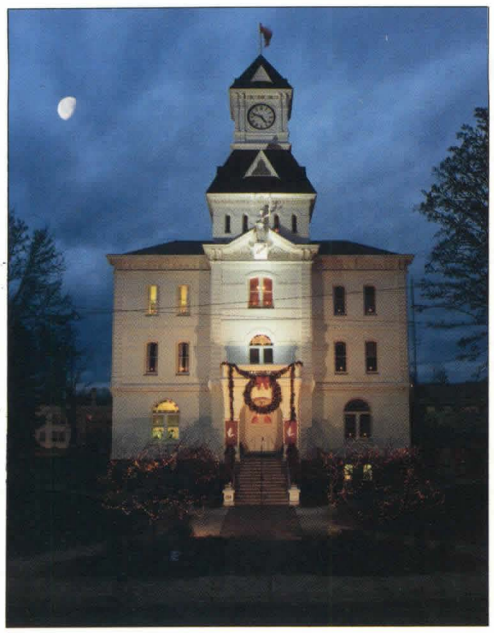
The Meyer May House in Grand Rapids, Mich., designed in 1908 by Frank Lloyd Wright, was restored to its 1916 appearance by Steelcase Inc. for use as a house museum. Restoration research included interviews with Wright family members and study of historic photos and all published and publically recorded information about the house, in addition to an analy-

sis of the building itself. Structural alterations made after 1916 were reversed, and all finishes, furnishings, landscaping, and decorations were returned to their original appearance.

Ensuring the perpetuation of historic street facades, the Philadelphia Historic Preservation Corp. has accepted 117 facade easements on real estate valued at more than a half-billion dollars. Easement donors pay into a fund that supports the inspection and enforcement of these easements, which prohibit exterior alterations of the properties.

Preservation Techniques Inc. was honored for researching and teaching the most cost-effective means of maintaining and restoring commercial and institutional buildings while retaining the buildings' architectural integrity.

Other projects judged to exemplify the contributions of free enterprise to historic preservation included the Alexander Hotel, Reidsville, Ga., where local citizens donated thousands of hours to rehabilitate a turn-of-the-century hotel into a civic center; the 1830s Gaylord Building, Lockport, Ill., a materials storehouse during construction of the Illinois and Michigan Canal, which was renovated into a mixed-use project by the Gaylord Lockport Co. and has contributed to local economic redevelopment; the preservation of the Nantucket Island town center and revitalization of the seaside town by a nonprofit group devoted to historic building restoration, documentation, and research; restoration



Courtesy of Benton County/© Gene Warneke

The restored Benton County Courthouse in Corvallis, Ore.

of the Newel K. Whitney Store in Kirkland, Ohio, once the home of Joseph Smith Jr., founder of the Mormon church; the 19th-century, Queen Anne-style Shelburne House in Shelburne, Vt., restored for use as a seasonal inn; and *Technology and Conservation* magazine, Boston, which publishes information on preservation and conservation research, techniques, and products.

The National Historic Preservation Awards, the second and larger category, were given for projects that have used financial assistance from the federal government as the catalyst for preservation.

The oldest courthouse in Oregon still in use, the Italianate Benton County Courthouse in Corvallis, was built in the late 1880s. It was cited for its outstanding solutions for providing modern pipes, wiring, and fixtures for handicapped accessibility while still respecting the original architectural details.

The 1902 Northern Pacific Railroad depot in the town of Livingston, Mont., was designed to attract sophisticated travelers to Yellowstone National Park. Passenger service is no longer provided by the railroad, but the restored depot remains a gateway to Yellowstone.

Rehabilitation of the Walter Baker Chocolate Factory into housing for the Dorcester, Mass., community sparked other improvements in the neighborhood. The rehabilitation of this historic building for a major change of use was cited for its effective utilization of preservation tax incentives.

The goals in restoring the Grand Opera House in Wilmington, Del., were similar to those when it was built in 1871—to bring culture to the state and enhance its attractiveness as an emerging commerce center. The restoration has been an important element in the revitalization of the commercial district. The jury praised the opera house as one of the finest examples of existing cast iron architecture.

continued on page 36

How prepainted Galvalume™ sheet gives architects something to cheer about.

To architects, it's a statement.

To University of South Carolina sports fans, it's "The Tailgate Club."

That Stadium Place manages to be both an architectural statement and a comfortable place for a victory celebration is due in no small part to the material chosen for its unique roof treatment: prepainted Galvalume sheet.

Owner:
O. C. Shell, Columbia, SC
Architect:
Architectural Design Associates, Columbia, SC
General Contractor:
Crouch Construction Company, Irmo, SC
Component Supplier:
Metal Building Components, Inc., Houston, TX
Prepainted Galvalume Sheet Supplier:
Bethlehem Steel Corporation, Bethlehem, PA

The architects, Architectural Design Associates, actually designed the roof first. Said Project Architect John Watkins, "A building makes a statement by how it meets the sky and how it meets the ground."

They wanted a vaulted ceiling, covering a large 7,000-sq-ft second floor that could be flexibly partitioned-off into various spacial units as needed.

Critical to their concept was that roof and soffit be of the same material, in the same bold color. Panels of prepainted Galvalume sheet enabled them to execute that concept cost efficiently.

And the low weight of the prepainted Galvalume sheet panels made it possible to span the open space with a minimum of complexity. This translated into savings on the roof support system and helped keep the project within budget.

Furthermore, corrosion-resistant prepainted Galvalume sheet enabled the architects to execute a high, peaked roof (30 feet off the ground at its lowest point) that is virtually maintenance free.

Both the roof and soffit panels were fabricated by Metal Building Components, Inc. (MBCI) from 24-gauge prepainted Galvalume sheet. The roofing is MBCI's Traditional Series S18-C square batten clip panel. Their eight-inch-wide Artisan II panel is used for the soffits.

If you're ever in Columbia, South Carolina, and are lucky enough to be invited to a private victory party at the "Tailgate Club," raise your eyes as you raise the roof.

You'll find something else to celebrate.

For information on Galvalume sheet and its many applications, telephone toll-free **1-800-352-5700, Ext. 400.** Or write: Bethlehem Steel Corporation, Bethlehem, PA 18016.

*Galvalume is a trademark of BIEC International, Inc.

Bethlehem BETHLEHEM STEEL

Circle 50 on information card

Awards *from page 33*

The Guaranty Building, Buffalo, N.Y., designed by Louis Sullivan in 1895, is significant in the development of high-rise construction and is one of the earliest remaining examples of the skyscraper. By 1977, the historic building stood empty and was going to be demolished, but a group of private citizens convinced a developer to return the Guaranty to its former status as a first-class office building. Its original lighting scheme was carefully re-created in recognition of the fact that the building was one of the first to use electric rather than gas lighting. Ornamental luminaires were recast, and carbon filament bulbs like those of Sullivan's day were used to create the historic quality of light.

One project was honored that depended entirely on federal funds: the West Front of the U.S. Capitol, preserved and stabilized as the only surviving structure of the original Capitol still visible from the outside. The project contributed substantially to preservation technology by way of the materials research conducted by the National Bureau of Standards to restore and replace sandstone blocks and carved stones.

Other National Preservation Award winners included the Bridgeton, N.J., property rehabilitation program, which guides the preservation and improvement of the city's historic district of 2,200 buildings, primarily to provide housing for low-income residents, making the buildings livable for this generation and preserving them for the next; the Capital Hotel in downtown Little Rock, long neglected when concerned citizens found a developer to renovate it, and now a catalyst for revitalization in the city's downtown business district; the Department of the Army's historic preservation program, which has shown creativity and integrity in rehabilitating a water filtration plant at Fort Belvoir, Va., that now is an emergency shelter for the homeless; the Felton, Calif., covered bridge that for nearly half a century was the only road access to the unincorporated village and is believed to be the tallest covered bridge in the U.S.; and preservation of the cast iron facades of the Washington Street Historic District in South Norwalk, Conn., which has helped revitalize a depressed waterfront.

All of the honored buildings and programs were completed within the last 10 years and are listed in or eligible for the National Register of Historic Places.

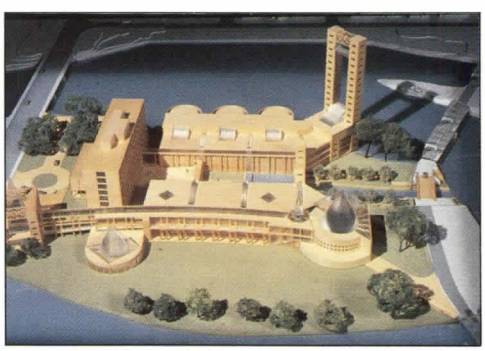
—Elena Marcheso Moreno

Safdie Wins Competition to Expand Ottawa City Hall

Moshe Safdie, in association with Murray & Murray Architects, has won a two-stage design competition for the $53 million renovation and expansion of the City Hall in Ottawa.

On Green Island overlooking the cascades of the Rideau River, the City Hall complex is located on Sussex Drive, the capital's ceremonial boulevard, which links Parliament Hill and the residences of the prime minister and the governor general. The selection of Safdie to design the municipal complex comes less than six months after the opening of his acclaimed National Gallery of Canada, at another prominent site on Sussex Drive (see Sept., page 98).

Safdie's winning scheme (shown below)

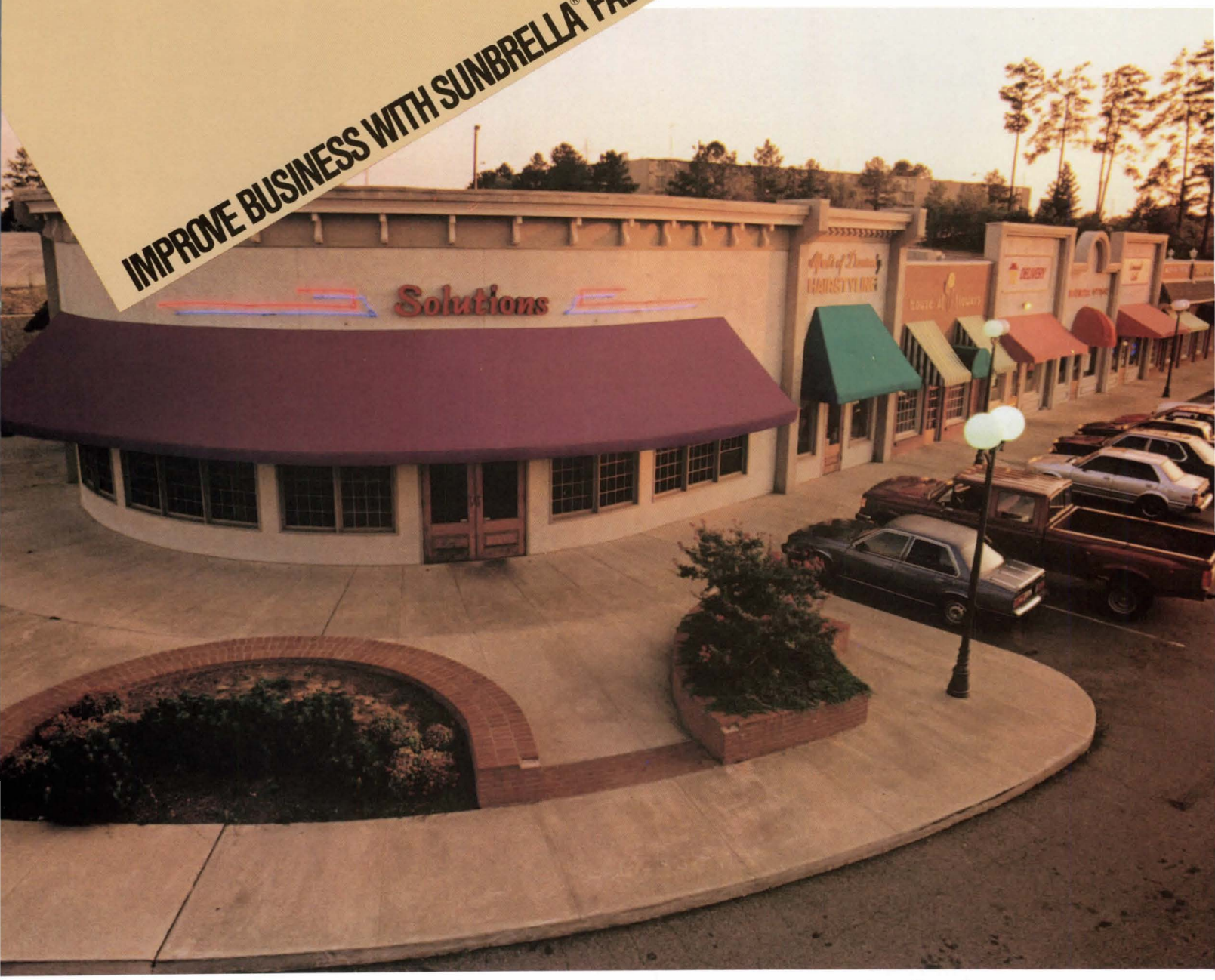


will incorporate the existing limestone, glass, and aluminum City Hall, completed in 1958 by Canadian architect John Bland. A new curved colonnade along the southern facade will serve as the main circulation path; a structure of steel, aluminum, and glass will enclose this colonnade and rise to form a section of the roof. Stainless steel conical forms set within pyramidal glass structures are located along this spine. The scheme also proposes a series of outdoor gardens and interior landscaped courtyards; an observation tower will anchor the northeast corner of the complex. Construction will start in 1989 and is expected to be completed in 1992.

—Lynn Nesmith

News continued on page 40

IMPROVE BUSINESS WITH SUNBRELLA® FABRIC.



It's easy to improve almost any business by using Sunbrella awnings, canopies or other treatments. Because there's no prettier way to give a facade a facelift or make an interior more inviting.

And using Sunbrella is good for your business, too. Because nothing pleases your clients more than our beautiful looks, tough performance and long-lasting style. **No Wonder It's The #1 Acrylic Canvas In America.** The fact is, no other awning or marine canvas sells as well as Sunbrella. Or equals our 108-year reputation for quality. Furthermore, Sunbrella offers these unique acrylic advantages:

- Our stripes, solids and patterns are colorfast so they won't fade for years.
- Both sides are identical. So awnings, patio covers, room dividers—you name it—look great from every angle.
- Tiny pores let the fabric breathe. This means moisture and hot air don't get trapped...so the fabric stays fresh and new looking.
- The same tiny pores let light through while providing protection from the elements.
- Sunbrella is made from man-made fabric, so it resists rot and mildew.

Plus it's easy to clean—all it takes is soapy water and a brush.

- Sunbrella comes with a five-year limited warranty that no other acrylic fabric can beat!

Choose From The Broadest Selection In The Industry. From bold, bright stripes, solids and patterns to subtle pastels, Sunbrella also has the right look for any business. In all, we offer 88 choices...far more than any other acrylic canvas. Which means whatever look you want, we have a fabric to fit. So improve business after business by using Sunbrella. Look in the Yellow Pages under "Awnings & Canopies" for the name of the dealer nearest you.

Glen Raven

SUNBRELLA

Glen Raven Mills, Inc., Glen Raven, NC 27215
® Registered trademark Glen Raven Mills, Inc.

Circle 54 on information card

Only one other face is better known for miraculous facelifts.

Comedienne Phyllis Diller has pulled quite a joke on Mother Nature and Father Time. Her facelifts have created a look that some call miraculous.

You can achieve the same amazing results with any commercial remodeling project through the magic of Alucobond® material.

Made with two tough sheets of aluminum and a thermoplastic core, Alucobond material can take an outdated building and turn it into an ultramodern structure. A transformation that can be performe economically and without major construction.

Alucobond material is virtually flat and doesn't oil-can like other metal building facings. Yet it's versatile and flexible enough to be formed or molded to the most exacting specifications.

Erection is fast and easy, usually without the

Northfork Savings Bank, *Mattituk, New York*
Distributor/Fabricator: Lamparter Associates, Hauppauge, New York
Architect: Lawrence Smith Associates, Hauppauge, New York

need to adapt existing building members.

Even maintenance is made faster, easier and cheaper. The surface is kept sparkling clean with nothing more than detergent and water.

Only Phyllis' feathers are more colorful than Alucobond material. We offer 64 shades in all, including five anodized finishes. Lengths up to 28 feet, three standard thicknesses and two widths add to our material's remarkable diversity.

For more information on Alucobond material and for case histories with photos, call (502) 527-1376. Or write Alucobond Technologies, Incorporated, P.O. Box 507, Symsonia Road, Benton, KY 42025.

Retrofit with Alucobond material. And give any old building a miraculous new lift.

ALUCOBOND TECHNOLOGIES

ALUCOBOND®

MATERIAL

More than just a pretty face.

Circle 56 on information card

Board to Consider New Policy On Interior Designer Licensing

At its October meeting in Toronto, AIA's board of directors authorized a task force and advisory committee to develop and review specific recommendations on interior designer licensing by state legislatures. The AIA board also adopted a comprehensive education policy. In other recent Institute action, AIA's public outreach task group has developed a report intended to provide a "blueprint" for creating, both nationally and locally, a more effective public awareness program "to help the profession reach beyond itself to the public it serves."

At the board meeting lengthy discussions were conducted on AIA's existing policy "Licensing: Building Industry Design Professionals," which was approved in 1985 and reaffirmed in 1987. AIA President Ted P. Pappas, FAIA, also reported on a series of meetings over the past few months with representatives of the American Society of Interior Designers and the Institute of Business Designers. The board committed to continuing the discussions with ASID and IBD and has agreed to continue exploring possible avenues of agreement with those organizations.

In addition, the board authorized the Institute's licensing law task force, headed by Robert Broshar, FAIA, and its government affairs advisory committee, chaired by Robert H. LeMond, FAIA, to work on recommendations for a revised policy on interior licensing and requested a full report be presented at the next board meeting.

In response to the board action on the licensing policy, Pappas said, "The review of this important subject represents a positive first step toward greater collaboration with other professionals in the design industry. In the final analysis, all of the affected parties must come together. We are optimistic that the cooperative spirit evident in prior discussions will continue in the future."

The Institute's new education policy addresses diverse issues including public awareness, academic standards, continuing professional development, alternative careers for architects, and nonprofessional education. As part of AIA's public outreach, the education policy states that "environmental education should begin at an early age and continue throughout life so the environmental sensitivity thus achieved will become an essential ingredient in all human decision making."

The policy reaffirms AIA's support of the professional degree and states that "diversity in how the fundamental skills, knowledge, and judgment are achieved in professional architectural degree programs is beneficial to the profession." The policy also encourages postprofessional study, research, and service.

For continuing professional growth, AIA supports internship as an "essential complement to formal education as preparation for the practice of architecture." The Institute also supports existing programs such as the Intern-Architect Development Program (IDP) and other "structured efforts that enhance internship." The policy also states that AIA believes that it is the "architect's individual responsibility to maintain a professional standard of competence and, therefore, advocates a lifelong learning process and encourages all architects to place a high personal priority on the pursuit of continuing education."

Addressing issues of nonprofessional and paraprofessional education, the AIA policy says these "programs can serve a useful function in the design and construction industry . . . [and] a system of formal documentation and review of nonprofessional and paraprofessional programs should be created."

Recognizing that the role of the architect is expanding, the policy states that "the traditional view of the architect as private general practitioner has changed as the spectrum of architectural activity has broadened and become more diverse."

In conclusion, the policy supports education counseling in architecture at all levels and "access to career counseling in order to facilitate informed decision making."—LYNN NESMITH

Pappas Reflects on his Term As President of the Institute

In his 11th month as president of AIA, Ted P. Pappas, FAIA, prefers to continue looking toward the future rather than at the past. And when asked about his accomplishments during his tenure as president, Pappas says he hopes he has helped in some way to identify and influence the critical issues facing the profession and that, because of the Institute's Vision 2000 program, architects will be better prepared to meet the challenges of the 21st century.

"Working on Vision 2000 has been particularly rewarding," said Pappas. "It is exactly what architecture is all about and should be about. The program addressed the issues of society rather than how to make more money or have more power or improve the architect's image." However, Pappas also said that, although the first stages of the multiyear program have been very successful (see Sept., page 27, and Oct., page 27), AIA must maintain a long-term commitment to problems facing not just the profession but society at large. "It's one thing to hire someone to tell you what the trends and challenges are and all the implications. But unless we change our structure and our attitude and get out and really do something, it's only PR," said Pappas.

When asked about increasing public awareness, Pappas said that for an outreach program to succeed "you have to show them, you can't just tell them. The bottom line is that the architect must do something to gain the confidence and respect of the public." Pappas praised AIA's environmental education program as an "honest outreach program. But it's more than just an outreach—the original idea was to help young people learn about architecture." He also praised the R/UDAT program for solving "real problems" on a local level.

After a year of speeches, conferences, meetings, and traveling as AIA's ambassador, Pappas believes he has developed a great understanding of not just the architectural profession but the entire construction industry. "I used to think architects were unique—an engineer, an interior designer, or a contractor was a completely different type of person without the sophisticated appreciation of the world that an architect possesses," he said. A year after "extensive and intensive" exposure to allied organizations, he has developed "a new respect" for the other members of the design team. "I've come to recognize that many individuals in these related design fields have attributes similar to architects'," he said.

"The architect is the professional who pulls it all together, but it has to be in an atmosphere of cooperation, of collaboration," he continued.

Pappas charged AIA's incoming leadership to continue to foster an air of mutual respect. "There has to be a rebuilding of bridges that in many instances we have actually destroyed because of our overconfidence," he said.

Pappas predicts that not only the profession but the entire country will be forced to respond to the limits facing our society. He believes "the formulas and institutions and attitudes that were effective in our country over the past 50 years will no longer work, and those who retain this inertia of continuing that mentality are wrong. We are living in a world of limits—limits of energy, limits of growth, limits on the ability to compete."

Pappas also believes that architects and the Institute must become more involved with research. "The profession of architecture and the design and construction industry have not invested sufficiently in terms of time and money, in research of construction techniques, materials, or making things more affordable," he said.

continued on page 44

Anything you can do,

Kroy Can Make Better.

A shortcut to success.

In any business, looking letter-perfect can be the key to success. If you look professional, people take notice and gain confidence in what you're doing. Success seems to come naturally. It's easy to spot a winner. With a Kroy 360™ on your side, you can look as good as you are.

A thousand ways to use it.

Whether you're presenting, designing, labeling or sign making, a Kroy 360 makes it easier than ever. Its digital keyboard is so easy to operate that you can letter anything just the way you want it, in seconds. In a variety of impressive typefaces. That can make a big difference in the way you're perceived by others.

Now it's PC compatible.

With our new PC interface and software, you can create beautiful lettering straight from your personal computer.

Nothing could be simpler.

Everyone from the mailroom to the boardroom can put a Kroy 360 to good use. Soon everything around you will have the crisp, clean, distinctive look of Kroy. That's a nice reflection on you.

With a new Kroy 360, your ideas look bigger, brighter, bolder and better. And so do you.

KROY®

Winners Use It.

Please tell me more about the Kroy 360.

☐ We own a _____ lettering system.
☐ I'm interested in using it with a PC.
☐ We'd like a Kroy 360 demonstration.
☐ Send literature on the Kroy 360.

Name _____

Title _____

Company Name _____

Street Address _____

City _____ State _____ Zip _____

Phone ( ) _____

If you're ready for a shortcut to success, call 1-800-328-1306. In Arizona, call 1-948-2222.
Mail to: **Kroy Inc., 14555 N. Hayden Road, Scottsdale, Arizona 85260** 2977-A

OUT OF SIGHTLINES.

EFCO's Shadowline™ is a high performance ribbon window system with hidden mullions. A factory glazed system which provides an exterior butt-glazed appearance with sightlines as narrow as 3/8". The operating vents are indistinguishable from adjacent fixed lites. Installation is performed from the building's interior and requires no structural glazing at the job site.

For performance specifications regarding the Shadowline and other EFCO windows, refer to Sweet's (Section 08500/EFB). Or call us toll free.

1-800-221-4169
(In Missouri 1-417-235-3193)

EFCO

More Windows, More Ways, Than Anyone™
EFCO CORPORATION, P.O. Box 609, Monett, Missouri 65708-0609

Circle 60 on information card

The Institute *from page 40*

Active in architectural education issues, Pappas stresses the importance of integrating liberal arts and business with the traditional design and technical subjects. He fears that many schools of architecture are "preoccupied with the icons of the profession, of fashion and vogues, and indifferent to the real issues facing society."

Pappas compared his architectural education, steeped in a modernist tradition, with the current atmosphere at many colleges. "I think we are at a real serious time of searching for an esthetic," he said. "I think a new esthetic will come, but it can't be imposed."

Throughout his year as president, Pappas has emphasized social concerns and the architect's responsibility to try to improve the quality of life. In his inaugural speech he quoted Louis Sullivan, who said: "An architect who acknowledges no obligation to society at large . . . is not an architect in my sense of the word—he is an outlaw!" Pappas continued, "I might not phrase it that way, but Sullivan understood the importance of architecture in shaping the quality of life. And he understood how much architects have to give, through their involvement in the community, and most importantly through their architecture. For him, art—and truth—flowed from an understanding of human values and the character of the nation and its people."

—Lynn Nesmith

Conferences

National Trust Conference Explores Changes in Preservation Movement

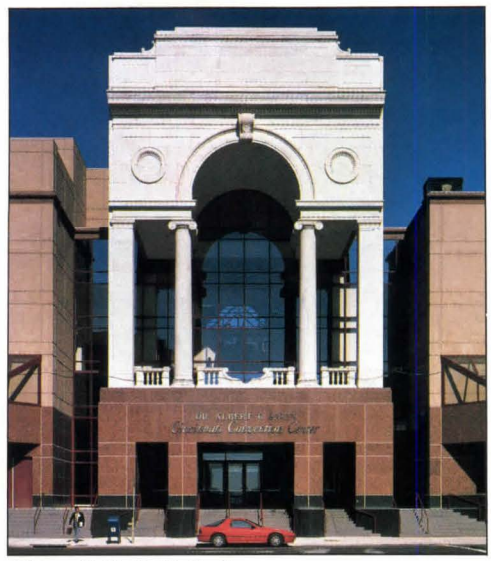
For almost a week of crisp October days, Cincinnati hosted the 42nd annual meeting of the National Trust for Historic Preservation. About 1,200 attended the convention, which was timed to coincide with the Queen City's 200th birthday and, it was widely believed, to strengthen the voice of local preservationists.

"When the world ends, you want to be in Cincinnati," Mark Twain once commented, "because everything happens there 20 years late." Having avoided the indiscriminate bulldozer of urban renewal experienced by more progressive cities, Cincinnati retains a fine stock of landmark-quality commercial and residential buildings. But preservationists are smarting from the recent failure of city leaders to enact historic district designation for the financial district and a plan that would have directed development away from the area's architectural gems. "The crane is still the sign of progress," said James B. Selonick, chairman of the Cincinnati Historical Conservation Board.

The recently renovated Albert E. Sabin Convention Center, which housed most of the convention meetings, symbolizes the uncertain place of preservation in the city's development strategies. The Palladian arch affixed to one side is a relic of the old Albee Theatre, which was razed to make way for a could-be-anywhere hotel alongside Fountain Square, the city's heart. Some convention meetings were held in places more likely to lift preservationists' spirits: the Omni Netherland Hotel, its art deco magnificence freshly restored, Samuel Hannaford's Cincinnati Music Hall and Phoenix Building, and the Taft Auditorium.

If, as always, stories about lost and endangered buildings made up a good portion of corridor talk at the Trust convention, the better news, also very evident, was of growing power and accomplishment. The convention theme, "Preservation: The People's Choice," followed a *Time* magazine cover story in November 1987 that pointed to the "great change of heart" that had taken place in the nation's view of its legacy of historic buildings. Said J. Jackson Walter, the Trust's president, "Preservation was going mainstream." The crowd was buoyed by news that Congress had approved federal purchase of a large site in Virginia adjacent to the Manassas National Historical Battlefield, to prevent a developer from building a huge mixed-use shopping center on land including the site of Gen. Robert E. Lee's memorable attack. The "big win," Walter told participants, resulted from the combination of national advocacy and grass-roots persistence.

Sabin Convention Center by the local firm Baxter Hodell Donnelly Preston.



© Wayne Cable/Cable Studios

The meeting also coincided with the 10th anniversary of the Trust's Main Street program, one of the most successful interventions ever in community economic development. Main Street's founder, Mary Means, recalled how, somewhat by serendipity, the simple concept emerged that saving old buildings in old downtowns had to go hand in hand with restructuring the economic environment in which they functioned. Main Street stores had to emphasize distinctive assets and not ape features, such as extensive parking, that were superior in suburban malls. Main Street now has operated in 26 states and, according to a recent Urban Institute study, has attracted some $880 million in private investment, rehabilitated about 9,000 buildings, and created 5,600 jobs.

Surprisingly, many opted to attend convention sessions that tracked the Trust's current program thrusts—advocacy, public education, heritage tourism, minority issues, and growth management. While the preservation movement is still rooted in the grass-roots foot soldiers for whom preservation is a passion, it is also broadening its goals and becoming far more businesslike, professional, and strategic.

Conferees talked about politics and economics, legal protections and exactions, advocacy, alliances, and complicated financial deals that made projects economically feasible despite advice, familiar to every preservation developer, that "this is a project no sensible person would ever undertake."

Over and over again, it was stressed that historic preservation is more than fixing up old buildings. Said Pamela Plumb, a member of the Portland, Me., City Council, it is a prescription for revitalizing "big cities and little cities, cities that are old and cities that are relatively recent."

"Historic preservation isn't about monuments, it's about ourselves," said former Arizona governor Bruce Babbitt, the keynote speaker. And, just as those concerned with conserving the natural environment have extended their thinking from monumental parks to wetlands and habitat, so are preservationists expanding their sights. "Inevitably we have to look beyond grand houses to ordinary houses, to main streets and neighborhoods, and learn from the past they evoke to create our future," Babbitt said.

The philosophical and commercial success of preservation in recent years is one of the most profound changes affecting the architectural profession, commented AIA's president, Ted Pappas, in a luncheon address. While architects often have been seen only as advocates of the avant-garde, he said, and historic preservation is not the profession's main objective, rehabilitation nonetheless is becoming the largest source of architectural activity.

AIA sponsored two well-attended sessions that considered ways to reconcile building codes with historic preservation.

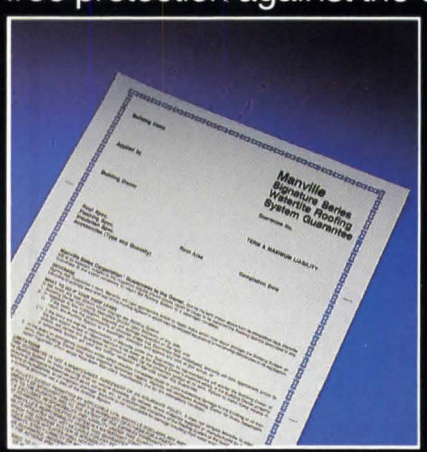
continued on page 48

YOU CAN TELL
A LOT ABOUT A ROOF
BY HOW ITS OWNER
FEELS ABOUT
BAD WEATHER.

A MANVILLE ROOF GUARANTEES YOU'LL APPRECIATE EVEN THE WORST WEATHER.

A better roof means a better guarantee. And Manville offers the best backing in built-up roofing.

For 130 years, Manville has been manufacturing roofs that let building owners laugh at the weather. Our built-up roofing still represents the best in durable, trouble-free protection against the elements.



But the roof itself is only part of the story. In addition to the high quality roofing felts, asphalts, and insulation, Manville also provides a full line of engineered accessories designed to fit your roofing needs. Plus, the most comprehensive systems guarantee program in the industry.

And the Manville Approved Roofing Contractor program assures you of a knowledgeable, experienced, approved installer who works directly with your Manville sales representative and district engineer to get your job done right the first time. He's the best there is.

Better materials, better specifications, Manville approved contractors, and the best guarantee in the industry. Everything it takes to make building owners smile at even the worst weather.

For more information on our roofing systems, see your Manville sales representative, or contact Manville, P.O. Box 5108, Denver, Colorado 80217-5108.

Circle 64 on information card


Manville
Total
Roofing Systems

Conferences *from page 44*

More than 14,000 buildings have been restored and rehabilitated under the federal tax incentive program—buildings whose standards of safety have long been surpassed. To qualify for the tax credit, a restored building must be certified by the secretary of the Department of the Interior as having met federal standards for authenticity. Many such reviews have involved a great deal of interplay between officials, architects, and investors. "The bottom line," said Maryln Kaplan of Cannon Design, "is that there's a lot of judgment. . . . There is no cookbook solution—it depends on use, the condition of the building, the environment, and other things."

The important thing, panelists stressed, is to look at the intent of the code. Is the building safe? What is the level of risk the public is willing to take? Speakers discussed various ways to deal with the challenges of retrofitting historic buildings with additional exits, enclosed stairs, safe railings, access for the handicapped, seismic safety, and sprinkler systems.

Recent code changes allowing more flexibility for architects to provide a reasonably increased *overall* level of safety in historic buildings, without necessarily meeting individual requirements, were lauded. Such flexibility raises important questions, such as how to train officials who administer these innovative codes and how to inform the architectural profession about the reductions of hazards to health, safety, and welfare that are negotiated under these optional codes. It is difficult enough, given the 44,000 agencies and jurisdictions that administer codes and the multiple spheres of national influence, to track pertinent codes in a particular place, much less decisions reached by negotiation.

Despite optimism about the widening influence of preservation, there were undercurrents of concern. One uncertainty was the outcome of the election and its impact on preservaation policies. High-level spokesmen from the environmental community, representing Michael Dukakis and George Bush, assured the group that the candidates would be more sympathetic to environmental issues than the Reagan Administration.

Another concern was the falloff of 35 percent in applications to the National Park Service to certify projects for tax credits. The Tax Reform Act of 1986 reduced incentives for preservation and enacted other changes that make syndication less attractive to investors. The failure of preservationists, working with the environmental community, to enact an American Heritage Trust, which would have provided a flow of federal funds for preservation and parkland projects, was bemoaned.

In many neighborhoods, minority residents' fears of gentrification remain a large stumbling block to preservation. This is a pivotal issue in Cincinnati, for example. Only 1,500 of the nation's 60,000 historic districts relate to ethnic heritage.

A session on growth management dealt with the impact on historic preservation of recent Supreme Court decisions reversing certain local government land use regulations. While experts initially saw these as chilling the climate for land use regulation, the feeling now is that the decisions are less damaging than first thought—but neither should they be dismissed. Up ahead, predicted Chicago preservation developer Richard Roddeweg, developers and preservationists will be tangled in increasingly sophisticated legal and economic arguments.

Despite such concerns, the preservationists' mood was upbeat. Pappas told them, "The support that you have marshaled is nothing short of remarkable. . . . More and more architects are involved in preservation. This involves no loss of creativity. We treasure the outstanding architects of the past, as we hope later generations will treasure our work."

—Phyllis M. Myers

Ms. Myers is a senior associate with the Conservation Foundation in Washington, D.C.

NOBODY CAN TOP A THRESHOLD LIKE PEMKO.

Pemko announces PemKote™; an incredible skid and corrosion-resistant stainless steel metallizing process.

It's state of the art technology. Aluminum, brass or steel, PemKote™ tops them all. We do it with stainless steel. It's abrasive stainless steel at a price you can afford.

5-Year Guarantee.

PemKote™ is tougher, more corrosion resistant than conventional abrasive coatings or castings.

And no matter what shape or size Pemko metal threshold you need, we offer it in an attractive, neutral-colored stainless steel abrasive finish. Use it as is or stain it to fit decor.

Easy To Maintain.

Unwanted grease, paint or rubber stains can be quickly removed from PemKote.™

Get the power of stainless steel at a fraction of the cost. And right now, get a free sample of the incredible PemKote™ finish.

Just send this coupon to Pemko for your

FREE SAMPLE

COMPANY NAME

NAME

TITLE

ADDRESS

CITY STATE ZIP

PEMKO

P.O. Box 3780
Ventura, CA 93006
(805) 642-2600

Branch Office and Plant
Memphis, TN
(901) 365-2160

Circle 70 on information card


Close
Move
Open
1
3
6

Another Hardheaded Dover Breakthrough On The Three Basic Elevator Functions.

The World's First Totally Integrated Microprocessor Control System For Hydraulic Elevators.

We're particular, actually stubborn, about refinements in state-of-the-art technology for hydraulic elevators. Remember, we invented them.

Other manufacturers have made a lot of noise with assorted bells and whistles. Dover has been quietly and patiently perfecting the greatest advance in hydraulic elevators since we invented them 51 years ago. DMC-I®—the first totally integrated microprocessor control system.

Our new DMC-I elevator closes the doors more reliably. Moves the car to the next floor more efficiently. Opens the doors more dependably. What else is an elevator for?

Other brands have offered add-on microprocessor functions on a onesy, twosy basis, like bandages. Only Dover has taken the years and millions of dollars necessary to perfect a total, built-in system. Because only Dover's volume as the industry leader made it feasible for us to invest such vast resources in its development.

Dover F.A.S.T. unit gives instant performance analysis.

DMC-I has a unique new hand-held F.A.S.T. unit that is literally a "window" into the microprocessor controls. It allows us to reprogram up to 40 elevator functions in minutes. It provides instant analysis of existing performance, permitting faster, more thorough preventive maintenance.

If you're buying or specifying elevators for low or mid-rise buildings, you need to see what DMC-I can do. Call your local Dover office or write Dover Elevator Systems, Inc., P.O. Box 2177, Memphis, TN 38101.

DOVER®
ELEVATORS
Making more elevators makes Dover No. 1

RADII, THE DESIGNER'S WATER COOLER. BY OASIS, OF COURSE.

When anything less won't fit your design, there's Radii. It's the bi-level water cooler that delivers 8 GPH of chilled drinking water for the general public as well as the handicapped. You'll find a full line of Oasis Radii water coolers and fountains—designed to fit your design.

See your Sweet's or Hutton Files for details. Or your nearest Oasis distributor. He's listed in the Yellow Pages. Ebco Manufacturing Co., 265 N. Hamilton Road, Columbus, Ohio 43213-0150.

OASIS®

WATER COOLERS BUILT WITHOUT SHORTCUTS.

Circle 72 on information card

Park West Development
Phoenix, Arizona
Architects: Shepherd & Boyd

Most people use Clearprint vellum for something they can't even see.

Erase on Clearprint vellum and what will you see?

Nothing.

Even if you draw and erase the same line 12 times, your work will still look neat and clean. Without ghosts, smudges or thin spots.

That's why Clearprint vellum has been the industry standard for over 50 years.

Exceptional vellum starts with exceptional raw materials. We only use the finest-grade, 100% new cotton fiber. Then we treat it with an exacting proprietary process. It must then pass through 38 quality control checks.

The result is vellum of superior durability, erasability, permanence, transparency and resistance to age. And it comes in sheets and rolls in 16-, 20- and 22-pound weights.

Try Clearprint vellum and see what you've been missing . Return the coupon. Before this offer disappears.

Yes, I'd like to give your vellum a close look. Free!

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Phone _____

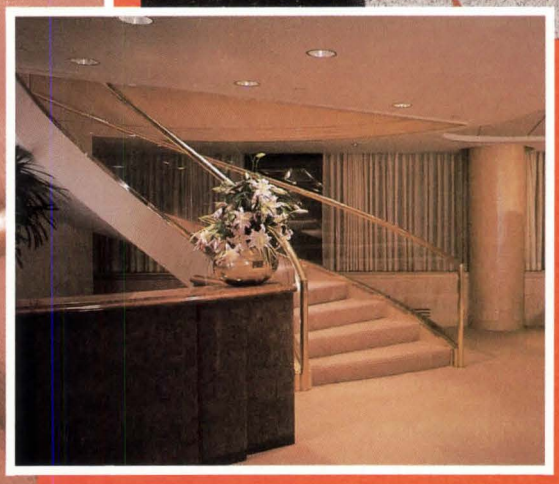
CLEARPRINT®

Plan Hold Corporation
17421 Von Karman Ave. Irvine, CA 92714-6293

A12

Circle 74 on information card

JB® GLASS RAILING... THE CLEAR CHOICE



JB Glass Railing is an economical system of metal railing components for use with ½" and ¾" tempered glass panels as structural balusters. Handrails are available in aluminum, bronze and stainless steel, together with end caps, internal splice connectors, corner bends and a vinyl protective insert to shield the edges from direct contact with metal. Julius Blum designed this system of metal railing with matching stock components to speed fabrication and assembly, thereby saving you time and money. In Bulletin No. 3011, you will find the same attention to time-saving economics: complete, concise information on stock metal components for the fabrication of self-supporting glass panel railings. Call or write for Bulletin No. 3011 or our complete Catalog 14.

Julius Blum is the nation's most complete source for architectural metals.

JB® JULIUS BLUM & CO., INC.

P.O. BOX 816, CARLSTADT, NEW JERSEY 07072
800-526-6293 (201) 438-4600 FAX: (201) 438-6003

Circle 76 on information card

BOOKS

An Essay on Urbanism In the Guise of a Review

The Prince, the Architects and New Wave Monarchy. Charles Jencks. (Rizzoli, $14.95.) **Community Architecture: How People Are Creating Their Own Environment.** Nick Wates and Charles Knevitt. (Penguin.) **Building Community: A Third-World Case Book.** Edited by Bertha Turner; introduction and conclusions by John F.C. Turner. (Building Community Books.)

On May 30, 1984, the Prince of Wales created a right royal brouhaha. Speaking on the occasion of the 150th anniversary of the Royal Institute of British Architects, he accused architects and planners of designing "for the approval of fellow architects and critics" rather than for users and of having "consistently ignored the feelings and wishes of the mass of ordinary people" in Britain.

In the four years since, the Prince has made several more speeches, emerging as perhaps the world's most conspicuous architectural commentator. No matter what the occasion, he always returns to hammer at one point. Buildings and cities are for their inhabitants; and the public is rarely consulted. To the chagrin of his detractors, he draws swarms of newspaper and television journalists to report his quest to shake up established attitudes toward cities. And he delivers his message with an engaging freshness.

The issue at stake is whether we as architects are able to see in every building we design a microcosm, not just of city-building but of society-building, an evolution of cultural heritage, and an expression of collective values that future historians may label "a civilization." This idea runs counter to the notion of a city as an aggregate of art-object buildings designed by artist-architects. And it runs counter to the "top downward" notion that the technicalities of design and development are so complex that they are best handled by small circles of professionals behind closed doors.

The United States prides itself on being the world's most open democracy. The participation of citizens in determining the future of their own communities is as old in this nation as New England town meetings. The tradition was already 150 years old when Thomas Jefferson wrote: "I know of no safe depository of the ultimate powers of society but the people themselves; and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them but to inform their discretion."

Yet historical evidence shows that Americans have been as feckless regarding these principles as the British. It took the civil rights movement and the thousands of marchers behind the Rev. Martin Luther King Jr. to remind white America that ghetto and rural blacks are citizens too, and it took the riots and flames in Detroit, Washington, Pittsburgh, and other cities in the wake of King's assassination in 1968 to assert the right, not just of minorities but of every individual in our society, to be included, informed, and heard.

In Britain there have been similar riots. Liverpool, London, Birmingham, Manchester, and other cities erupted in 1980. In a 1985 riot at a model housing estate, Broadwater Farm in London, one policeman was hacked to death and nearly 300 police and civilians were injured.

Yet it is interesting that in Charles Jencks's articulate, short new book, *The Prince, the Architects and New Wave Monarchy,* the connection between the riots and Prince Charles's concern with "the desperate plight of the inner city . . . [and] with the cycle of economic decline leading to physical deterioration and countless social problems" is not underscored. Instead, Jencks chooses to focus with sophistication and wit on the war of architectural styles he gets such a kick out of—high-tech versus postmodern, brutalism versus deconstructivism—and on whether the Prince should enter such architectural arenas at all or should simply play polo.

As a result, Jencks pays little heed to the meaning of what Prince Charles is saying again and again, as in his speech to London's top financial executives, that it is "high time we concentrated our collective efforts on unleashing the vast, transforming, and regenerative potential which lies within the individual as a member of his community . . . the enormous human potential and resource waiting to be given the incentive and encouragement to play a fuller part in the common good; waiting to be released from over-numerous shackles of bureaucracy and the all-pervading atmosphere of 'the professionals' knowing what is best for you."

In the United States the effort to tap citizens' concern for improving the quality of life in their own cities and to tap their rich resources of local knowledge began in the 1960s. The early pioneers encountered enormous obstacles. There was no mechanism for funding contracts; elected officials were afraid of the consequences; agencies felt their powers were being usurped. But events themselves took over. In the wake of civil rights came demands for other rights: the drive of neighborhoods to set their own agendas; a focus on ethnic and historical roots; a growing concern to preserve historic buildings and districts; a sense of local cultural and social holism. Slowly officials saw not threat but initiative in their own electorate, and agencies looked for a way to harness these new forces. Undoubtedly the spread of citizen architecture and the success of AIA's R/UDAT program were linked to echoes of the deep democratic tradition in the United States of local self-determinism that stretches back to the nation's urban roots in New England.

In Britain, as in this country, there was scant precedent in recent decades for this kind of democracy. Since World War II, several government-funded new towns and thousands of council housing estates had been built, many of them complete with shops and schools; and many were regarded by planners, architects, and politicians worldwide as models of their kind. But for tens of thousands of families they were environments of no choice—places designed for them by architects and planners in remote offices without their consultation, places where by covenant they could make no changes to their units inside or outside or to the landscaping. In innumerable city developments traditional streets of row houses were declared blighted and replaced by tower blocks or four- or six-story maisonettes in parklike settings that violated traditional ways of life and disregarded local cultures.

None of this was done cynically. Britain is a society in which feudal class structures have continued into this century and only recently have begun to change. After

continued on page 57

VPI rolls out two great flooring advances.

Now you can get all the advantages you've come to expect from VPI, in two new sheet vinyl floor coverings. Both offer outstanding long life, enduring beauty and ease of maintenance.

Choose attractive Custom Royale™ in ten subtle, marbleized colors. Custom Royale is designed for heavy traffic in health care facilities, retail stores, schools and manufacturing and research environments.

Or choose slip-resistant Sure-Trac™ available in six colors. Sure-Trac's unique surface, either plain or embossed, affords high traction in kitchens, food and chemical processing plants, entrance ways and similar areas.

New VPI homogenous sheet vinyl flooring is made from top quality materials. Patterns and colors are permanent, and won't wear off under heavy traffic. It's resilient, so it's quiet underfoot, comfortable and less tiring to walk on. It resists cuts, gouges, indentation and abrasion, as well as damage from common chemicals.

Now, when you think sheet vinyl flooring, think VPI. Custom Royale and Sure-Trac... lasting beauty on a roll. Two more innovative answers to your flooring needs, from VPI.

VPI®

Floor Products Division
3123 South 9th Street, P.O. Box 451, Sheboygan, WI 53082
Telephone 414-458-4664 • Telex 910-264-3891
Fax 414-458-1368

See our catalog in Sweet's.

Circle 78 on information card

Books *from page 55*
World War II the devastation of the bombing, particularly in industrial cities, mandated rapid rebuilding. Huge government-sponsored architectural offices were set up. And, in seeking precedent in the pioneers of the modern movement, young British architects found the hierarchies of class division and the gratuitous nobility of the worker strongly entrenched in the classics of the white architecture of Le Corbusier, *de Stijl,* and the Bauhaus.

Was it the fault of the architects that they did not recognize the speed and significance of change all around them? If it was, then it was also the fault of the government, which allowed laissez-faire market forces to shut down the traditional industries of the cities in the north, forcing the brightest of the new generation to migrate, generally to London, leaving behind high unemployment in communities whose roots had been undermined. Against this background the riots occurred.

And against this background the new movement of community architecture grew, parallel to citizen architecture in the United States. Sociologists like Willmott and Young issued bold warnings in the 1950s in *Family and Kinship in East London,* and there were pioneer writings by Colin Ward and others. But for the most part they were not heard. It was the example of Black Road in Macclesfield in the early 1970s that dramatized a small but electrifying alternative. With the help and leadership of a local architect, Rod Hackney, the people fought the local government's plans to demolish their "blighted" houses and relocate them to new housing. With money garnered from grants and mortgages, they set up a community trust and self-help programs. Within 12 months they restored their houses to the standards required by the Housing Acts, and in the process they restored their community. What began in Macclesfield became, over the next 15 years, the national movement splendidly described by Nick Wates and Charles Knevitt in their somewhat partisan book *Community Architecture: How People Are Creating Their Own Environment.*

That citizen architecture in the United States and community architecture in Britain emerge from different histories cannot be allowed to cloud the important fact that both are addressing urgent social and urban issues with similar techniques. The decline of heavy industry in Britain, the Ruhr, and the U.S. urban Northeast challenges cities to transform their skills and their local political institutions if they are to be competitive as we enter the 21st century. What is required, on a continuing basis, is the teamwork symbolized by the R/UDAT program, in which the finest interdisciplinary minds in architecture, sociology, political science, investment, and law are brought together with citizens, agencies, and elected officials of the communities themselves to hone local policies and to bring to bear the strategies and resources to implement them.

Because Pittsburgh is the U.S. archetype of such a city, an international conference, "Remaking Cities," was held there last March, sponsored jointly by AIA and RIBA. Delegates came from the United States, Britain, other European countries, and Third World countries. In statement after statement, new vocabularies for physical design were shown to be derived from context rather than external fiat, from the bottom up rather than the top down, whether the example was urban regeneration such as that performed by community leader Tony McGann in Liverpool or architect John Thompson in London, or the self-help processes in Third World countries such as Pakistan, Egypt, and Peru, shown in Bertha and John Turner's revealing new book of case studies, *Building Community.*

Enough demonstration projects already exist. Citizen architecture and community architecture are here to stay and are a growing force. Nothing will stop the voice of grass-roots citizens from being heard. For example, since the Pittsburgh conference and R/UDAT in March, more than

continued on page 59

Colors that get down to business.

For health care and hospitality, office buildings and small businesses, PermaColor™ warranted commercial carpets come in over 150 beautiful colors that don't quit. Specify colors that you never dared to before. Even lighter shades work overtime to resist stains and fading. Amoco guarantees it for five full years.

PermaColor™ BY AMOCO

5 YEAR STAIN AND FADE RESISTANCE LIMITED WARRANTY

For warranty details and more information, call: **1-800-BY-AMOCO** or write: *Advertising and Merchandising Department, Amoco Fabrics and Fibers Company, 900 Circle 75 Parkway, Suite 550, Atlanta, Georgia 30339.*

Scotchgard® Carpet Protector

Scotchgard® is a registered trademark of the 3M Company.

AMOCO

Amoco Fabrics and Fibers Company

FY-1-B-9-88

Amoco Fabrics and Fibers Company makes fibers and yarn, not finished carpet.

Circle 82 on information card

Books *from page 57*

100 programs and projects have been started in the Pittsburgh area, the majority involving citizens. The basic language is three-dimensional, contextual urban design—the language of policies and agreements negotiated by all parties and of public-private partnerships in the drive toward implementation.

The need now is clearly for empowerment initiatives. Once these are in place, agencies such as community development corporations and tenant alliances, working hands-on with architects to solve local problems, will generate appropriate and perhaps surprising architectural form.

—David Lewis, FAIA

Mr. Lewis is a principal of UDA Architects, Pittsburgh.

Man Made the Town. Michael Middleton. (St. Martin's Press, $24.95.)

Man Made the Town distills the findings of one of Britain's foremost town planning advocates. Michael Middleton, who was director of the Civic Trust for 17 years and is a thoughtful and experienced man, shows us in his own photos and tells us in no-nonsense language how towns and cities have successfully tackled problems of change, conservation, land reclamation, and new transportation systems. Examples are from everywhere in the West: Paris, Munich, Baltimore, Amsterdam, Seattle, and, of course, the British Isles.

The coastal town of St. Monans, in Fife, was restored by the National Trust for Scotland.

Although it has no charts, graphs, or laundry lists, this is a practical, factual book. For Middleton, town planning is the art of the possible—an improvement here, a tearing down there, preserving what calls for preservation, dealing with details but constantly bearing in mind the overall purpose, which is simply to make a town in which people can go about their business conveniently and find themselves in surroundings conducive to a reasonably civilized life.

Here there is no talk of the "Ideal City" or even the "City Beautiful." No call to "make no little plans since they have no power to stir men's blood"—nothing radical. The word "utopia" is not in Middleton's lexicon. A town, he suggests, is like a coral reef—an accretion formed slowly over the years but subject to the forces that change societies. The view that the forces may be violent enough and the changes sudden enough to destroy the reef does not seem important enough to discuss. Hence, no radical proposals.

Yet, for many of us, mutation rather than gradual change better describes our perception of our cities; and the picture of all of us barely out of the cave with our primeval egos and ids in a highly complex sci-fi world may well be fact rather than the product of overwrought imaginations. It is certainly possible that we will be buried in garbage, poisoned by

continued on page 61

Our designers sit on some of their best ideas.

Pictured are *Brookside* by Sumner Adams. *Carrington* by Earl Koepke. *Lorado* by Burkhard Vogtherr. *Beaumont* by Gary W. McCracken. *Avenue* by Erling Revheim. And they're all designed and built to sit around a long, long time. Call 1-800-482-1616.

KIMBALL ARTEC®

THE CHOICE THAT WORKS

DIVISIONS OF KIMBALL INTERNATIONAL, JASPER, IN 812-482-1600

Circle 88 on information card

Books *from page 59*

pesticides, fried by the sun as the ozone layer disappears, or slowly boiled as the greenhouse effect intensifies. Our chances of being blown up are high, and the booming, proverty-stricken Third World pretty soon will degrade our living standards.

But the voice of Middleton is not the voice of Cassandra, and that's a good thing, since there seems no cure for our global horrors, while there are ways of curing some of the ills afflicting our towns.

In France they had (and, as I learn from *Man Made the Town,* still have) an organization with the acronym PACT, which translates as "protect, improve, preserve, change." Middleton gives case histories of towns that on a larger or smaller scale have done just that. He asks us not to blame the stereotyped villains: the wicked developer, the bureaucratic planner, the politician who settles for short-term expedients, the busybody who in the name of preservation blocks any change. Instead he calls for the widest possible participation in the planning process (shades of the '60s!).

"Our towns and cities belong to all of us . . . [and] fundamental options and implications must be spelled out more clearly and honestly than at the moment, both nationally and locally." Middleton here is speaking of Britain, but that shoe fits everywhere.

Man Made the Town should be read by all who are interested in town planning. Its 230 pages and hundreds of illustrations show how some people have improved their towns and—who knows?—may inspire us to do likewise.

—Percival Goodman, FAIA

Mr. Goodman is an author, historian, and professor emeritus of architecture at Columbia University.

The Public Face of Architecture: Civic Culture and Public Spaces. Edited by Nathan Glazer and Mark Lilla. (Free Press, $25.)

The starting point for this extremely good book, as stated in the introduction by the editors, is a belief that the public world we build today is much less satisfactory than the public world our forebears were building a hundred years ago. This is true whether we look at the public street or square, the hotel or shopping center, the city hall or courthouse.

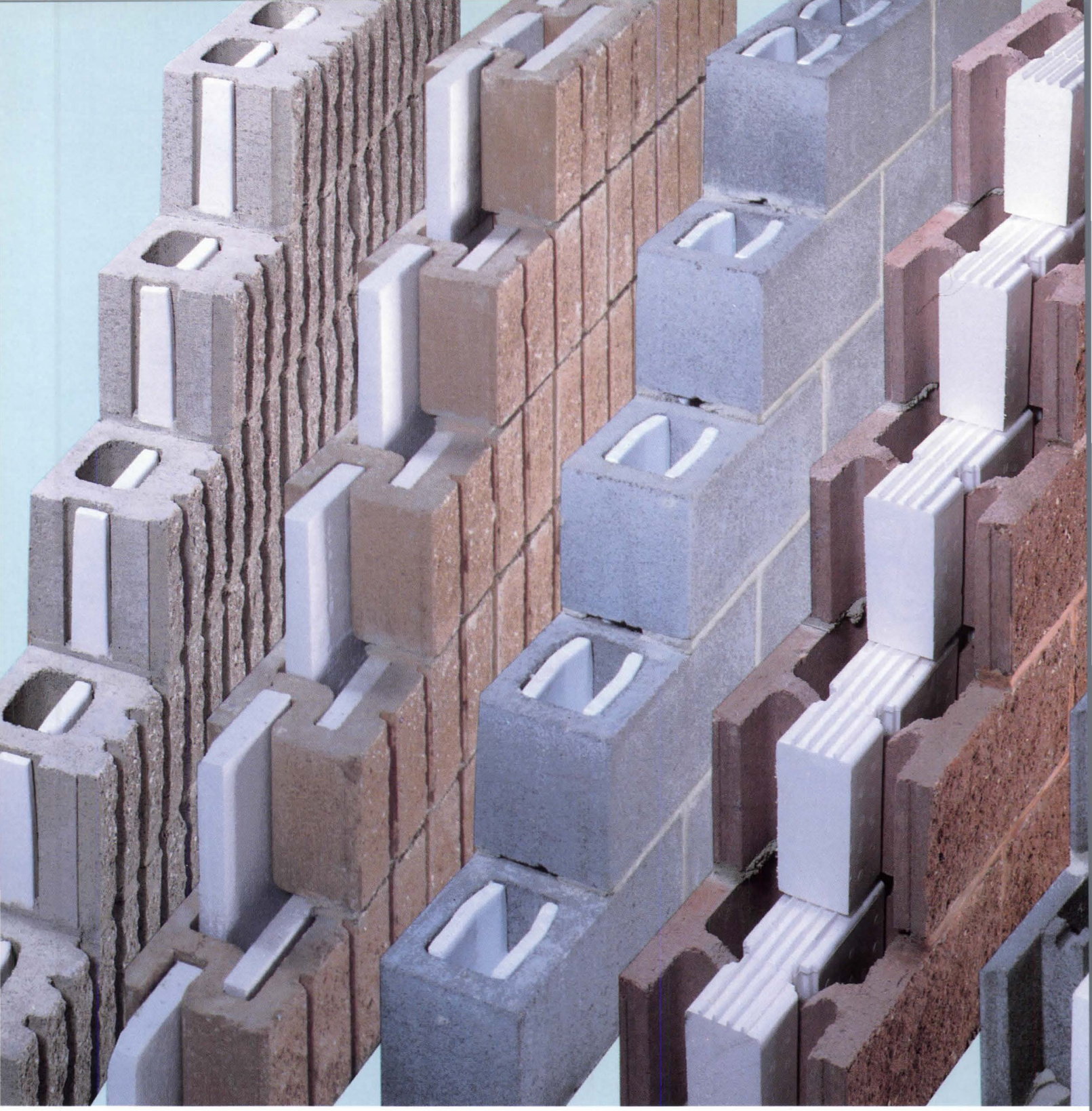
Few, probably, would quarrel with that assumption. The editors go on to suggest some conditions that cause the problem, and then conclude: "We are in the grip of a deep intellectual confusion about the nature of public life that has paralyzed attempts to cope with those conditions. . . . There is at the present time an astonishing absence of clear reflection among architects and critics about just what the public space *is.*" The rest of the book is essays by architects, philosophers, sociologists, critics, and historians, each trying to supply a piece of that "clear reflection."

What became *The Public Face of Architecture* began life as the winter 1984 issue of *The Public Interest* magazine. The book's editors are also editors of the magazine. Nathan Glazer, the senior of the two, has long been an urbanism buff as well as one of America's leading sociologists and author of *Lonely Crowd* with David Riesman, *Beyond the Melting Pot* with Daniel Patrick Moynihan, *Ethnic Dilemmas,* and other books.

The *Public Interest* issue was memorable, but the book is much better. The original set of contributions has been enlarged by the inclusion of provocative older essays, some of them classics, by the likes of Hannah Arendt, Lewis Mumford, Richard Sennett, Camillo Sitte, Walter Benjamin, Jane Jacobs, Frederick Law Olmsted, William H. Whyte, Charles W. Moore, and Jaquelin Robertson, among others. The result is a small encyclopedia of wise insights into the nature of the public world. It's a very uneven book, with its share of filler, but one from which every literate architect or planner can learn.

Some of the most brilliant essays derive from sources an architect doesn't ordinarily run across, which is one of the reasons this book is so valuable. The philosopher Hannah Arendt, for instance, considers

continued on page 64

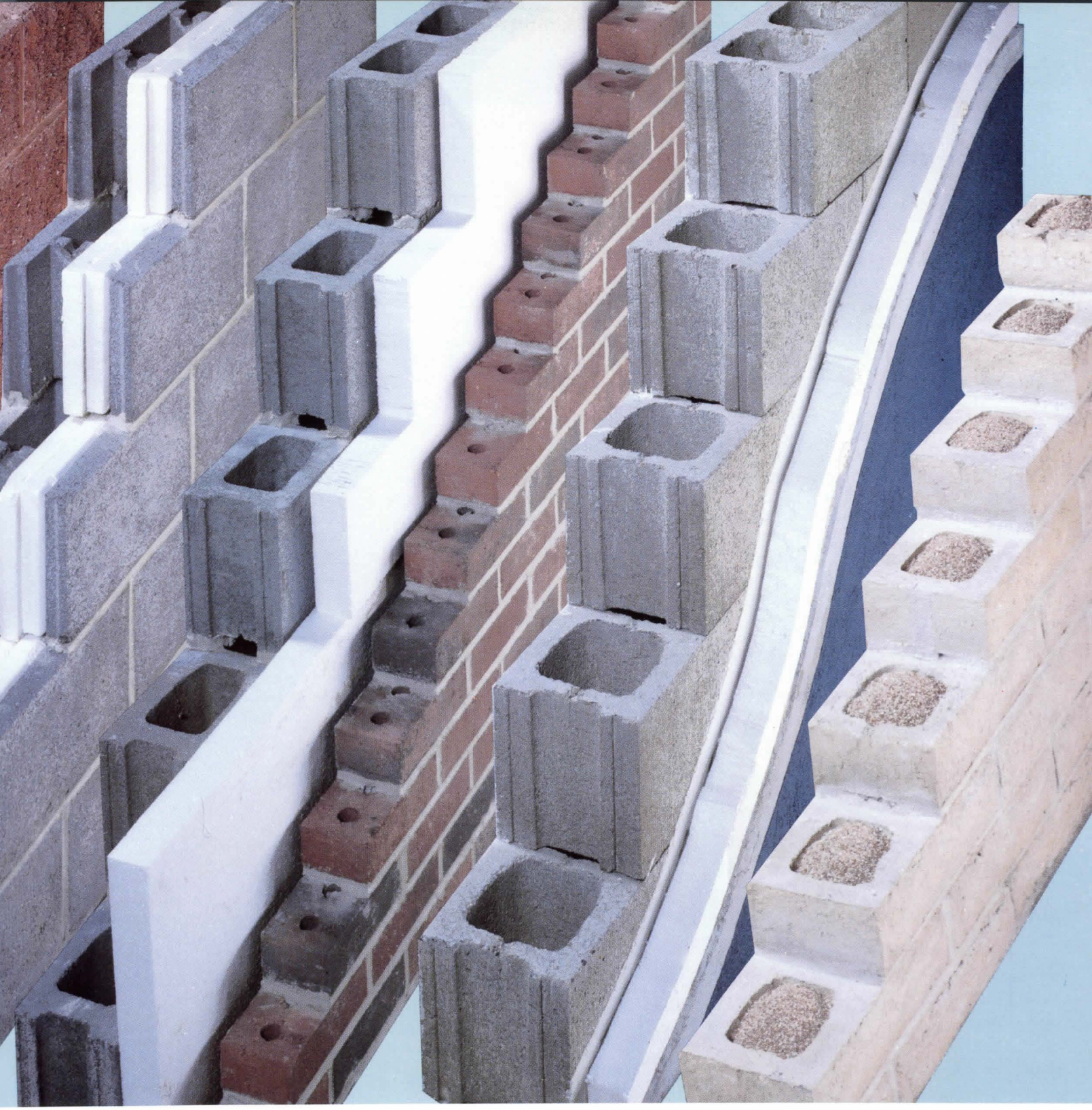


CONCRETE MASONRY INSULATED WALLS deliver high thermal performance and won't rust, rot or burn.

The wall sections illustrated here are all designed and constructed with the most versatile building material on the market—insulated concrete masonry. In addition to delivering high "R" values and complete fire safety, concrete masonry walls are loadbearing, sound absorbing and energy efficient.

And, as you can see, there's a wonderful new world of shapes, sizes, colors and textures, jus waiting for the touch of talented designers.

These are not exotic pie-in-the-sky products. All of these wall systems—and more—are available now from your local NCMA



ıember/producer. Discover the concrete ıasonry advantage. Contact your local ICMA member now, or mail the coupon for ɔmplete information. The wonderful new ɔrld of block is as close as your telephone.

NATIONAL CONCRETE MASONRY ASSOCIATION

302 Horse Pen Road • Herndon, Virginia 22070

hone (703) 435-4900 FAX (703) 435-9480

ircle 94 on information card

Marketing Department
National Concrete Masonry Association
2302 Horse Pen Road • Herndon, Virginia 22070

Please send me complete details about insulated concrete masonry wall systems.

Name _____

Company Name _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

AR12-88

Books *from page 61*
the nature of publicness in a selection from her book *The Human Condition.* In eight pages, she says more on this subject than one might glean from a lifetime of reading the architectural press. Here's an excerpt:

"The public realm, as the common world, gathers us together and yet prevents our falling over each other, so to speak. What makes mass society so difficult to bear is not the number of people involved, or at least not primarily so, but the fact that the world between them has lost its power to gather them together, to relate and to separate them. The weirdness of this situation resembles a spiritualistic séance where a number of people gathered around a table might suddenly, through some magic trick, see the table vanish from their midst, so that two persons sitting opposite each other were no longer separated but also would be entirely unrelated to each other by anything tangible."

Not easy reading, perhaps, but unforgettably perceptive.

Another indispensable essay is by Roger Scruton, the British philosopher of art. Scruton advocates the primacy of the street space as the essence of the public world. Although his bias in favor of classical details is arguable, his larger insights aren't. Here is one:

"Plate glass facades leave us overexposed to observation from those behind them. Blank concrete screens seal us off from whatever they contain. A street must avoid all such extremes. It must provide us with walls that are pierced, and openings that are civil and friendly." He coins a lovely phrase: "the street of congenial facades."

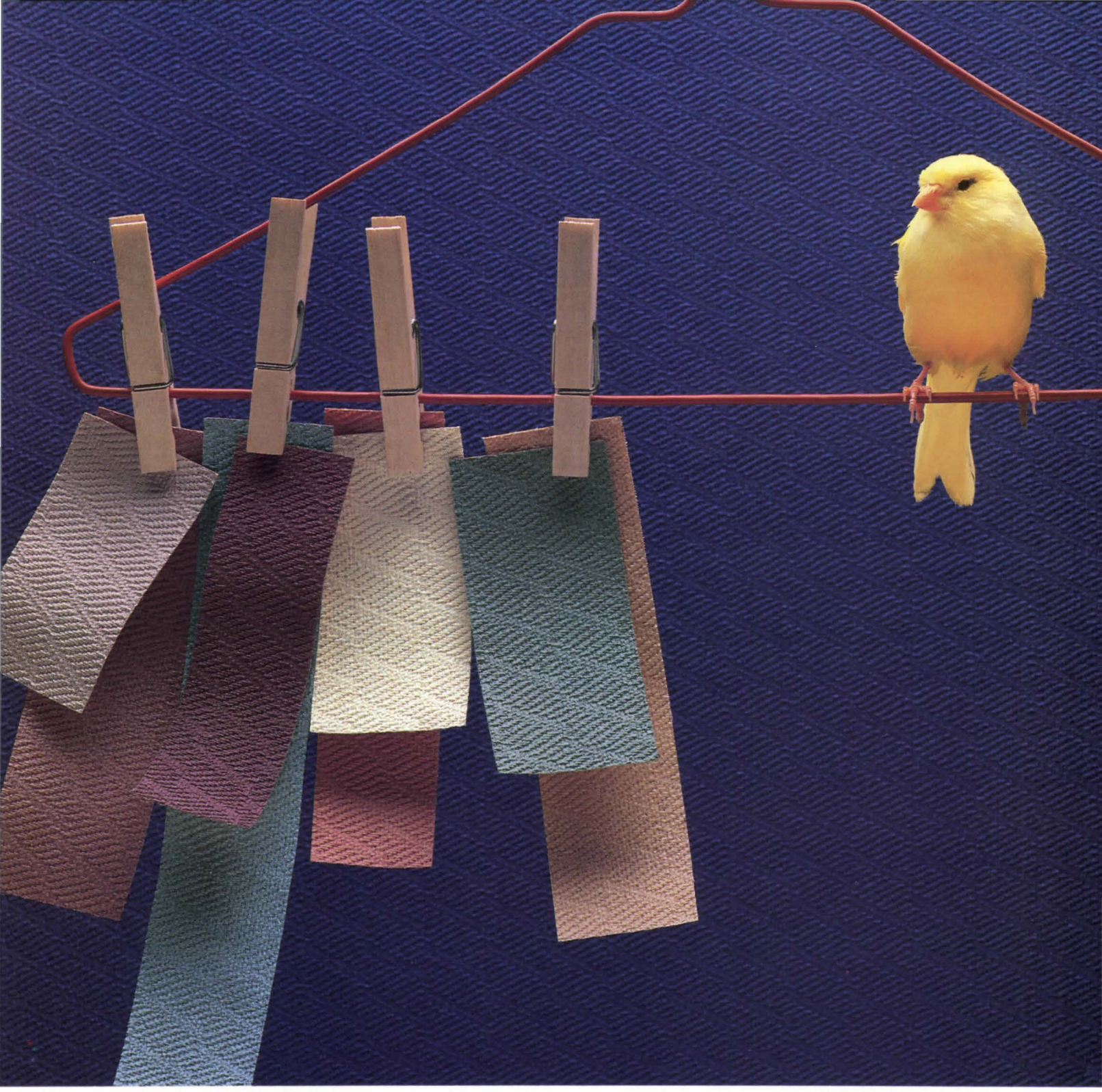
Scruton has little use for traffic planners and other specialist exemplars of disaggregated thinking. He argues that "the correct way to plan a street is not as a means of access to other things, but as an end in itself—a place that can be enjoyed for its own sake." This sentence, alas, is itself a victim of disaggregation and really should be amended to read "not *merely* as a means of access." In real life, as Scruton notes, ends and means tend to interpenetrate.

It's always invidious to single out one piece in a collection such as this, where most are valuable. Still, one I especially liked was Donlyn Lyndon's essay about the messages that are communicated to us by different architectural treatments of public buildings, from colonial times to the present. Another was William Hubbard's thoughtful consideration of the Vietnam Veterans Memorial, in which he comes down in favor of adding the statue of three soldiers. Richard Sennett offers a telling excerpt from his classic *The Fall of Public Man.* There's no harm, either, in revisiting Jane Jacobs or Camillo Sitte or Lewis Mumford, all seminal thinkers who today are more often cited than read.

Toward the end of the book comes a self-contained section on public art. It begins with a commonsense article by Douglas Stalker and Clark Glymour entitled "The Malignant Object: Thoughts on Public Sculpture," which argues that a moral government shouldn't be subsidizing public art that nobody but the avant-garde (which invariably selects it) really likes. (The authors might have queried whether the avant-garde *really* likes it, either, but they don't.) Three or four short essays then comment on this one, and the section ends with a rebuttal by Stalker and Glymour. The format—lifted, obviously, from the letters columns of intellectual journals like *The New York Review of Books*—works well and might have been explored further.

The Public Face of Architecture is a generally conservative book that looks askance at the wisdom of experts, the chic of elitists, and the cheerleading (so often guilt-tripping) of futurists. Again and again, in different essays, it tries to make sense of the present by looking closely at what worked in the past. It has many thoughts but almost no illustrations. For that and many other reasons, it is a bracing antidote to the overly trendy, overly visual world of architecture that is the only one most architects read about.

—Robert Campbell, AIA



INTRODUCING DEIDRE.
A DELICATE BALANCE OF TEXTURE AND HUE.

Guard® Wallcovering presents Deidre, a unique embossing that evokes the "tailored" look of a classic fabric weave. The richness of the embossing makes it ideal for camouflaging imperfections in wall surfaces. And with the flexibility of over 40 color selections, function and form were never in better balance.

CONTRACT VINYL WALLCOVERING

Columbus Coated Fabrics • 1280 N. Grant Ave.
P.O. Box 208 • Columbus, Ohio 43216 • 614/297-6032

Circle 100 on information card

BORDEN

The new Monogram built-in refrigerator has something new built in. A dispenser.

For years, it seems to have been taken for granted that free-standing refrigerators should contain all the latest technical advancements.

While built-in models have mostly been left to rely on good looks alone.

But now this state of affairs is about to change.

We are introducing a built-in refrigerator that is as sophisticated as anything available today, and yet as aesthetically appealing as any of the more conventional built-ins.

Its major advantage is obvious.

Unlike any other built-in, this new Monogram refrigerator offers ice and water through the door.

But its other virtues are less readily apparent.

For one thing, it's the only built-in that is controlled *electronically.*

Its vital functions are constantly monitored by a computer which enables this refrigerator to do such things as warn users if the interior temperature is too high.

Beep when the door's been left open.

Or let them know if there's been a power failure.

It also has another outstanding virtue.

Capacity.

Unlike conventional 36″ wide built-in refrigerators, this one measures 42″.

Which means it can hold things that are impossible to put into smaller built-ins, such as full-sized party trays.

We've also given it microwave-safe Quick Serve™ trays that slide *under* the shelves, to free up even more space.

Plus a built-in wine rack.

Along with this new refrigerator, we are introducing electronic single and double wall ovens.

A highly versatile *electronic* modular downdraft cooktop.

An exceptionally good-looking *gas* cooktop.

And a matching compactor.

Together with the other Monogram products, they form something no one else offers.

The only complete *line* of built-in appliances.

Which can make life a lot easier when you're specifying products for a new kitchen. Because you no longer have to deal with several different companies.

Instead, you only have to deal with *one.*

And it's a company that goes just a little further when it comes to service.

Who else offers a source of information as *comprehensive* as the GE Answer Center® service?

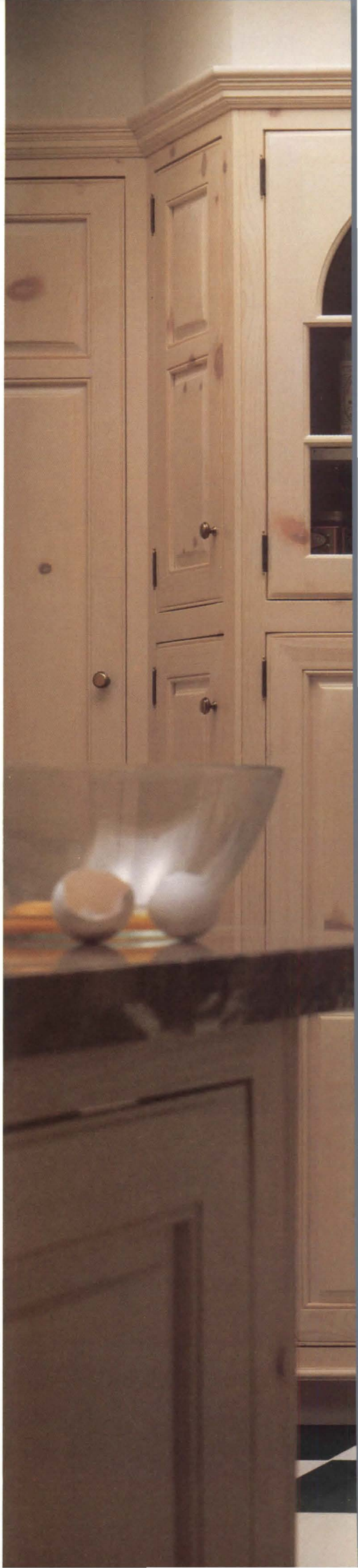
(Just call 800-626-2000 any hour, any day of the week.)

Who else backs their products with a nationwide network of *factory-trained* service professionals?

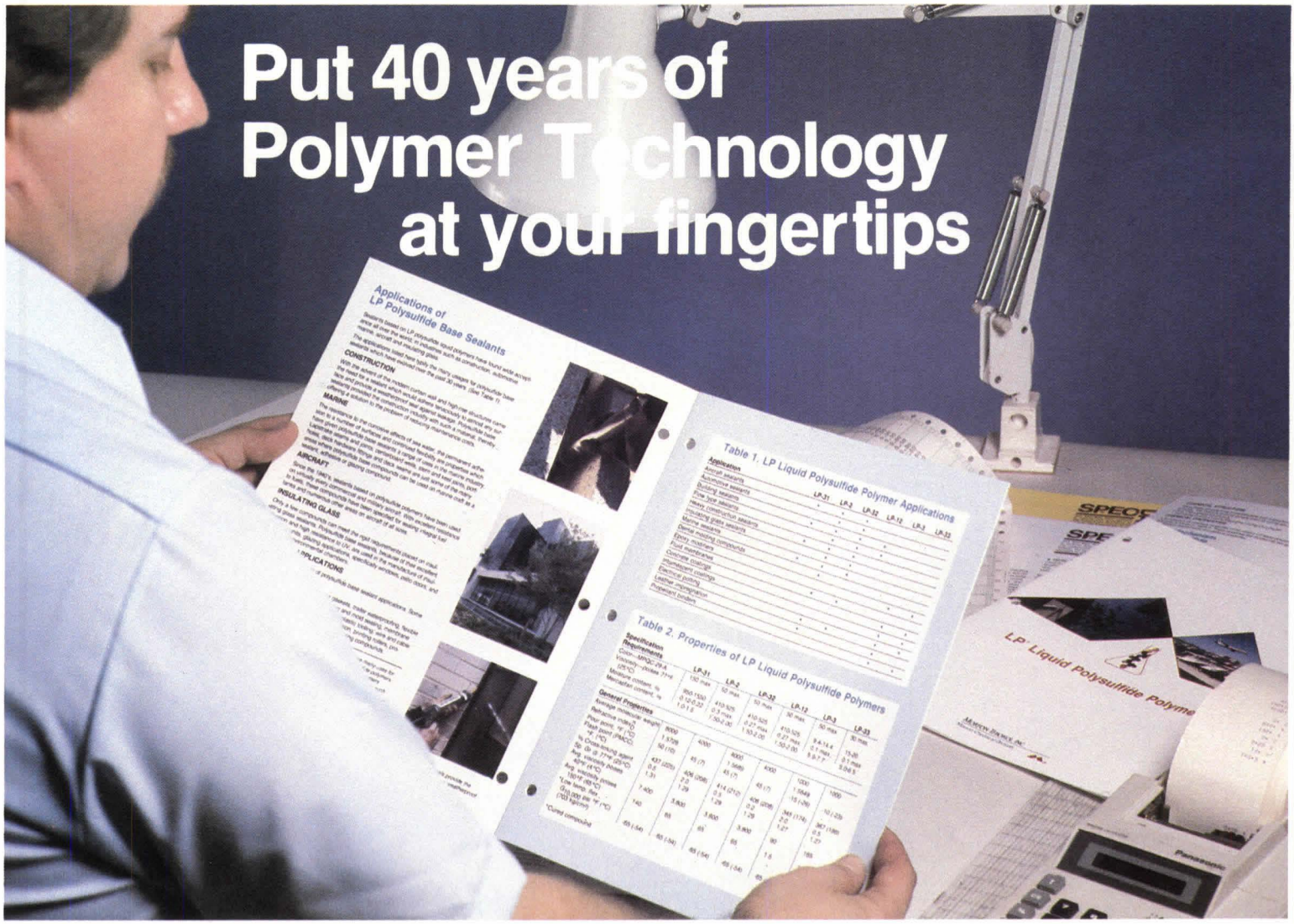
No one else.

Only GE.

Monogram.



Circle 102 on information card



LP® liquid polysulfide polymer

- **Excellent adhesion to most substrates**
- **Excellent resistance to oils and solvents**
- **Excellent resistance to aging, ozone and oxidation**
- **Good stress-strain properties**
- **Good electrical properties**
- **Good temperature flexibility**

Specify the polymer that's been performing worldwide for more than 40 years.

Applications:

- **Aircraft**
- **Airfields**
- **Buildings**
- **Bridges**
- **Boats**
- **Canals**
- **Highways**
- **Insulating Glass**

Put the facts at your fingertips. Send for your copy today!

®Registered trademark

MORTON THIOKOL, INC.

Morton Chemical Division

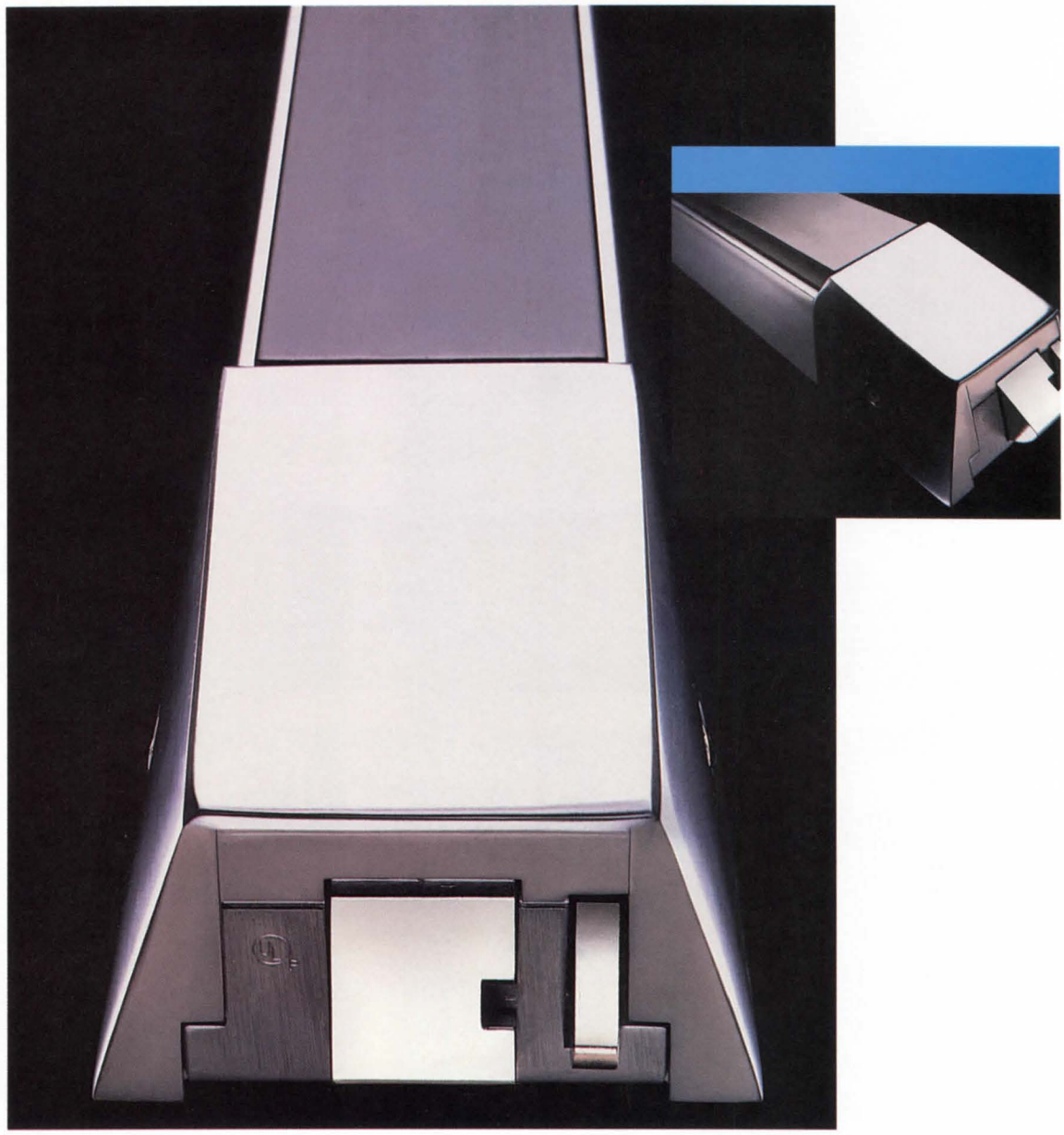
Circle 104 on information card

333 West Wacker Drive, Chicago, Illinois 60606

Mkt - Comm. - A

DESIGN FREEDOM

RUSSWIN STYLE



Russwin Designer Bolt™ Exit Devices give you more standard solutions to your custom design creations.

The Russwin Designer Bolt line has the selection you need to eliminate any worry about compromising your own good design sense. Unlike other exit devices, Designer Bolt won't limit your design in form or function.

Clean and contemporary, Designer Bolt trim and finish options will satisfy virtually any creative criteria. Designer Bolts also feature a broad range of functions including: rim, vertical rod, and mortise lock.

All other Russwin Door Hardware lines offer the same depth of choice: mortise locksets, SecurityBolt, door closers and cylindrical locksets. They all provide the appearance, performance and long lasting quality to support your interior and exterior creative design efforts.

Learn more about Design Freedom, Russwin Style. Call or write for complete information.

RUSSWIN DIVISION
225 Episcopal Road
Berlin, CT 06037
1-203-225-7411
FAX: 203-828-7266

RUSSWIN

EMHART RUSSWIN

Circle 106 on information card

Don't let heat treating spoil the picture.

ECLIPSE® reflective glass from Libbey-Owens-Ford effectively ends tempering distortion.

Because in most vision applications, there's no need to heat treat. Even with the coating glazed second surface. No ripples or waves. No disappointments. An industry breakthrough.

ECLIPSE reflective glass spells design freedom. With deep, rich color and a surprisingly subtle reflectivity. Blue-green. Grey. Bronze. And with the reflective coating glazed first surface, a distinctive silver. As unique as your own work.

Stop being bothered by the heat.

Color your vision with ECLIPSE® reflective glass.

Circle 108 on information card

ECLIPSE®
Reflective Glass

Libbey Owens Ford
A member of the Pilkington Group

Philadelphia	800-523-0133 (out of state) 800-331-1910 (in state)
Chicago	800-999-9753 (out of state) 800-999-9753 (in state)
Atlanta	800-438-2330 (out of state) 404-242-8860 (in state)
San Francisco	800-843-8552 (out of state) 800-247-7764 (in state)

ARCHITECTURE

The State of the Cities: Paradox

By Andrea Oppenheimer Dean

This is the best, the worst, and the most confusing of times for American cities. The most wonderful and deplorable things occur side by side—affecting people who are sealed off from each other, even if they brush shoulders. Each weekday morning in Washington, D.C., for example, regiments of nattily dressed careerists emerge from futuristic subway stations to a refurbished downtown that looks better than it has in half a century. It also feels better, if you can ignore the bands of tattered homeless people, whose fastest growing segment is families with small children. Some beg at subway entrances, some huddle on grates, most just wander the streets aimlessly. The subway administration locks them out of its stations at night.

Across the nation, and especially on the two coasts, downtowns are being revived as cities retrieve their waterfronts, restore their trove of historic buildings, transform blocks of decrepit housing into expensive neighborhoods, and fashion upscale retail enclaves. Gracing many old cities are new museums, art galleries, and performing arts centers. All this activity has produced some splendid buildings, and, though the majority are undistinguished, the overall effort shows more sensitivity than previous postwar attempts at urban revitalization—a result, in part, of architecture's recent liberation from the garrote of esthetic ideology and dogma.

But these considerable acts of resuscitation add up to mere "islands of renewal in a sea of decay," as urban geographer John Berry says. Outside the still-vibrant downtowns of the big metropolitan areas, "much of the older city continues on a downward curve," writes planner and architect Jonathan Barnett, FAIA, in *The Elusive City.* Civil rights advocate Roger Wilkins, of George Mason University, puts it more bluntly: "What we have is suburbs and semicities for white people, and Third World inner city enclaves for blacks. Boston's Back Bay has nothing to do with Roxbury; Washington's Georgetown is in a different universe from Anacostia."

Cities have always been repositories for the poor, but today's poor are different from the migrants and immigrants who in the past worked their way up beginning in big cities with a pick and shovel or a sewing machine. It can't be done anymore. There are two major reasons: the first has to do with a permanent structural change in the U.S. economy; the second with increasingly rapid suburbanization. Together, these trends are transforming our cities more radically than at any time since the Industrial Revolution of the 19th century.

As the economy has shifted from the manufacture and distribution of material goods to service and knowledge-based industries, vast numbers of inner city, blue collar jobs have simply vanished. Others moved to the suburbs as cities were made obsolete for manufacturing and warehousing by advances in transportation, communications, and production methods, as well as rising urban land costs and the spread of population and public services. The loss of middle-income, urban manufacturing jobs has created a city labor market polarized between highly paid professional work and badly paid service jobs.

Between 1967 and 1982, the 12 major Northeast-Midwest cities from Boston and Philadelphia to St. Louis and Milwaukee lost 1.6 million jobs, of which 1.3 million were in manufacturing, according to John Kasarda, a sociologist at the University of North Carolina at Chapel Hill. During the same period, the suburban rings of these cities added 2 million jobs. Equally important, in 1986 approximately 42 percent of all jobs in the economy were filled by workers with at least some college experience, and 22 percent of all workers had completed four years of higher education, according to the National League of Cities.

For urban blacks without a high school diploma this has meant a rising spiral of unemployment, from 7.6 percent in 1969 to 30.4 percent in 1985—a year when nationwide unemployment was at a record low. Accompanying the loss of low-skill jobs in center cities is increased, often permanent dependence on government subsidies and/or the underground economies of drug dealing, crime, prostitution, or, at best, barter and in-kind work.

Suburbanization has played a major role in inner city joblessness and poverty. As the white population accelerated its flight to the suburbs and exurbs that began after World War II, retail trade and consumer services followed their middle- and upper-class customers, further exacerbating blue collar job declines in the cities. When the black middle class next moved out, it took with it neighborhood institutions, businesses, and sources of employment. Left behind were wastelands occupied by those least educated, least employable, least able to cope—the largely black, so-called underclass.

By 1985, racial-ethnic minorities composed the demographic majority in most of our largest Northern cities. In the 20 largest cities of the Northeast and Midwest the white population fell by more than 2.5 million, or 13 percent, between 1960 and 1970 and by another 4 million, or 24.3 percent, by 1980, according to political scientist Paul Peterson of Harvard. He adds that the poor black population in the same cities grew by 1.75 million (35.8 percent) between 1960 and 1970 and by more than 200,000 (3 percent) between 1970 and 1980.

In addition, Hispanics now comprise 8.1 percent of the national population and 33.9 percent of California's. Though Asian immigration has quickened during the 1980s, the last Census Bureau figures are from 1980 when Asians made up only 1.6 percent of the U.S. population. Neither Asians nor Hispanics are as mired in poverty as blacks. Many Asians have succeeded beyond their brightest hopes, and most Hispanics, according to Peterson, tend to have a stimulative effect on the urban economy, to be less segregated from whites than blacks, to live in growing cities in prosperous parts of the country, and to intermarry more with whites. "America is still the land of opportunity except for born-in-America blacks," says George Sternlieb, director of the Center for Urban Policy Research at Rutgers University.

He adds, "The U.S. is decentralizing more rapidly than any society in history. In this latest wave of suburbanization we're moving everything: workplace, funplace, healthplace." New technologies and communications, plus cheaper suburban land costs, have reduced the advantages of being in concentrated cities for knowledge-based industries. Adding incentive for businesses to move is the American people's preference for living near and driving to work, which inexpensive automobile transportation makes possible. An obvious but less acknowledged reason for suburbanization is the "white majority's deliberate policy of segregating itself from both poor and nonpoor minority group members," says Anthony Downs of the Brookings Institution. The outcome is new suburban cities with one thing in common: they are growing in white, upper-middle-class areas.

Their rapid growth and its effect are made evident by a few examples. Since 1960, Los Angeles's share of the metropolitan office market has declined from 60 percent to 34 percent. Two subcities in the Atlanta metropolitan area together added 18.2 million square feet of office space between 1980 and 1985, while Atlanta itself gained only 4.3 million. The new area of Tysons Corner, in the Virginia suburbs near Washington, D.C., already has more office space than any pre-World War II downtown in Virginia. "This is happening to every downtown in the country," says Christopher Leinberger, co-author with Charles Lockwood of "How Business Is Reshaping America."

Their article, appearing in *The Atlantic* two years ago, was the first lay introduction to the new pseudo-urban concentrations that have popped up at suburban freeway intersections everywhere

Illustration by Brian McCall

to grow with the vigor and logic of Topsy. Leinberger and Lockwood dubbed these growths "urban villages," though they usually comprise strung-together, sealed megastructures surrounded by cars and devoid of streets, charm, and urbanity. Maybe subcities is a better term. Though they vary in form, subcities resemble a more advanced stage of what Lewis Mumford, in 1962, called "Roadtown": "an incoherent and purposeless urbanoid nonentity, which dribbles over the devastated landscape and destroys the coherent smaller centers of urban or village life that stand in its path."

The importance of the new subcities is evident in AIA's Vision 2000 survey of "expert panelists," which concluded that the trend most likely to be a major influence on 21st-century architecture is the "urbanization of suburbia."

It isn't going to go away; the consensus is that decentralization is irreversible. The test, says Sternlieb, was the energy crunch of 1979, which brought the worst recession since the Great Depression. Contrary to predictions and to blacks' fears of losing municipal control to whites, the 1979 energy crisis didn't slow suburbanization or bring the hoped-for return to the cities. Though Sternlieb and others believe that urban yuppies have been a blessing for cities, they regard them as a demographic fluke. "Statistically trivial," says Sternlieb, while pointing out that the now-middle-aged Baby Boomers are nesting in the suburbs and exurbs.

Answering the charge that gentrification displaces the poor, William H. Whyte, in his new book, *City,* quotes HUD's assertion that of all moves by the poor only 4 percent are caused by displacement. Whyte goes on to show that the problem for the poor is not the improvement of neighborhoods but disinvestment by landlords and owners who let buildings go to rot or torch them. The worst perpetrator of such neglect, he points out, is the federal government, which has slashed new construction of low-income housing during the past eight years while annually abandoning or selling to the private sector 500,000 units.

Where does all this leave our diminished older cities? Are they doomed to become caricatures of a bygone era, an urban equivalent of Disneyland?

It isn't that the old downtowns haven't grown; it's just that the subcities have grown much faster. The old central business districts, which still have the greatest concentration and broadest selection of skilled employees, will remain the chosen locations for those businesses and professions that rely on face-to-face contact to create the trust needed for complex negotiations, and that want streets, restaurants, and watering holes to meet in, says sociologist Kasarda. Whyte elaborates, "More than ever, the center is the place for news and gossip, for the creation of ideas, for marketing them and swiping them, for hatching deals, for starting parades. . . . This human congress is the genius of the place, its reason for being, its great marginal edge. This is the engine, the city's true export."

Whyte adds that the most new jobs are generated by new small firms that start and flourish in cities, because they need access to a wide range of specialized services and people, which they aren't big enough to provide in-house and won't find in isolated subcities.

Leinberger believes that in the long run the growth of subcities will strengthen central business districts as headquarters for financial institutions, prestigious professional firms, government, and convention business. The subcities, he says, will attract a different clientele. Subcity and old city, he believes, are interdependent rather than competitive, and each must be strong to fortify the other. "The reason New York and Washington have exploded while Baltimore stagnates," Leinberger says, "is that Baltimore's metropolitan area is weak." The Baltimores, unfortunately, outnumber the New Yorks and Washingtons, especially in the Midwest.

Pittsburgh, an example of a successfully reborn former steel city, illustrates that resurrection is possible but few will be chosen, and even then it'll still be touch and go. Jack Robin, Pittsburgh's veteran chairman of urban redevelopment, explains that his city's recovery is due to its survival as a central administrative district and its ability to keep within its borders universities with research capabilities, the arts, sports, entertainment, and other amenities. Critically important, says Robin, has been "a very good public school system, an excellent administration with longevity, an active redevelopment agency that wasn't afraid to use government instruments to protect the economy, active cooperation of the civic and business leadership, and the ability of the city's institutions to welcome change rather than resist it." Pittsburgh has a relatively small minority population (25 percent black).

Though Pittsburgh's unemployment rate is very low, its river and air clean, and its downtown shiny with new corporate headquarters, Robin fears for its future. "We have a sinking central city population," he says, "and the fear that our tax base can't support its needs." He believes regional government is the only answer.

Pittsburgh's problems are multiplied in most U.S. cities. For, once decentralization picks up speed it becomes self-reinforcing and has predictable adverse effects. As more high- and middle-income people move out, cities have to raise taxes and usually cut public services to support their increasingly black and poor populations. That chases more people out, and, as their populations decline further and more influential citizens leave, cities

lose political clout in Congress and state legislatures. Redistricting after the 1990 census will further reduce the political influence of cities.

Wolf Von Eckardt, Hon. AIA, former architecture columnist for the Washington *Post* and *Time* magazine, believes "the only remaining significant role for cities is that they are cultural centers and good places to be." A few days after he said this a Washington *Post* headline proclaimed an "Arts Boom Around the Beltway."

There's one thing left. It has to do with a broader kind of culture, described by Mumford when he said the main function of the city "is to enrich the future by maintaining in the midst of change visible structural links with the past in all its cultural richness and variety." Subcities can't do the job. Cities are still "the centers of spiritual and community consciousness," as Leinberger says. To illustrate he tells how the renovation of Union Station in St. Louis has drawn throngs from the entire region. "People come together and feel part of a whole," he says. "In Boston James Rouse put up a fruit stand and 10 million people came by to feel part of something." Jay Brody, AIA, director of the Pennsylvania Avenue Development Corp. in Washington, adds, "Tysons Corner will never have a White House, Chinatown, small stores, and the like, and festival marketplaces are more adventuresome retailing than anything you see in urban villages."

A word, then, about festival marketplaces. The lively urban retail centers, based on the model developed by Benjamin Thompson, FAIA, and developer James Rouse, attract the lunch crowd and tourists in cities across the land. But for serious shopping even city dwellers go to the suburbs, to which most large retailers have moved their high-volume stores. Downtown shopping centers can't survive unless they offer something different from the suburbs—hence the preponderance of specialty shops and festival markets. Not surprisingly, the design model of most downtown retail complexes is the suburban mall: an inward-focused maze, usually with an atrium or two. As the suburbs become urbanized, America's old downtowns are becoming *suburbanized*.

Some cities have looked to the instruments of their decline for salvation and welcome the construction of suburban shopping malls downtown, writes Whyte. He adds that, like their suburban model, city malls will be car oriented and will require vast amounts of parking—dead spaces. Another price, Whyte adds, may be a second-level walkway system that grows until there are two cities: an upper-level one for the white middle class, a street-level one for blacks and lower-income people.

But many cities are also becoming more urbane. "Just as cities lose their pre-eminent position in urban America, we're discovering what the city ought to be, and there is some interest and pride," says Von Eckardt. "As the contrast between poor and rich increases, the rich areas have gotten better sidewalks, more benches, cafes, fountains, and it's wonderful, even if it's only a very small part of the city. Historic preservation has made all the difference." Weiming Lu, director of the Lowertown Redevelopment Corp. in St. Paul, Minn., adds that recent examples of rehabilitation are far more successful than 10 years ago, and "the amount is phenomenal."

It is so phenomenal, in fact, that AIA's Vision 2000 program concluded that "the rehabilitation market is soon likely to outgrow the entire nonresidential construction sector." There is a caveat, however, in the Tax Reform Act of 1986, which altered nearly all the factors related to income tax that had made investment in historic rehabilitation attractive. The result was a 35 percent reduction in approved projects in fiscal 1987 compared with fiscal 1986, according to the National Trust for Historic Preservation. The Trust is lobbying to reinstate earlier tax benefits.

Among the happy byproducts of increased interest in historic preservation, thinks Barnett, is a revival of the principles of picturesque order underlying garden-city and garden-suburb design. "Recent thinking about tall buildings in urban areas," he writes, "is that they should be contained within a matrix of pedestrian-oriented uses and that public spaces when they occur should be designed to attract use, not simply to provide a setting for buildings." Megalopolis is out of favor, and that's a vast improvement.

But many architects feel that conventional, no-holds-barred development cannot produce great cities. "In the world of private developers," says John Belle, FAIA, of Beyer Blinder Belle in New York City, "the highest level of design amenity is in atriums and gallerias, which have taken the place of public spaces, and I don't think do the job." Jaquelin Robertson, FAIA, of Cooper Robertson & Partners and dean of the University of Virginia architecture school, deplores postwar American cities as "horribly planned, cheaply built, hope-sappingly ugly places." But he acknowledges that "many recent developer projects are infinitely better than they were 20 years ago, except they're too big." Robertson, who adheres to the small-is-beautiful school, asserts that "if you filled empty blocks within the old cities with small buildings you could house the projected U.S. population growth for 50 years within the old infrastructure. You wouldn't have to let another gas or water permit."

Robertson is also convinced that architects, recent architecture school graduates, and even the lay public are far more knowledgeable and sophisticated about urban design than their counterparts in previous generations. "Finally, architects understand that the design of cities is more than the design of single

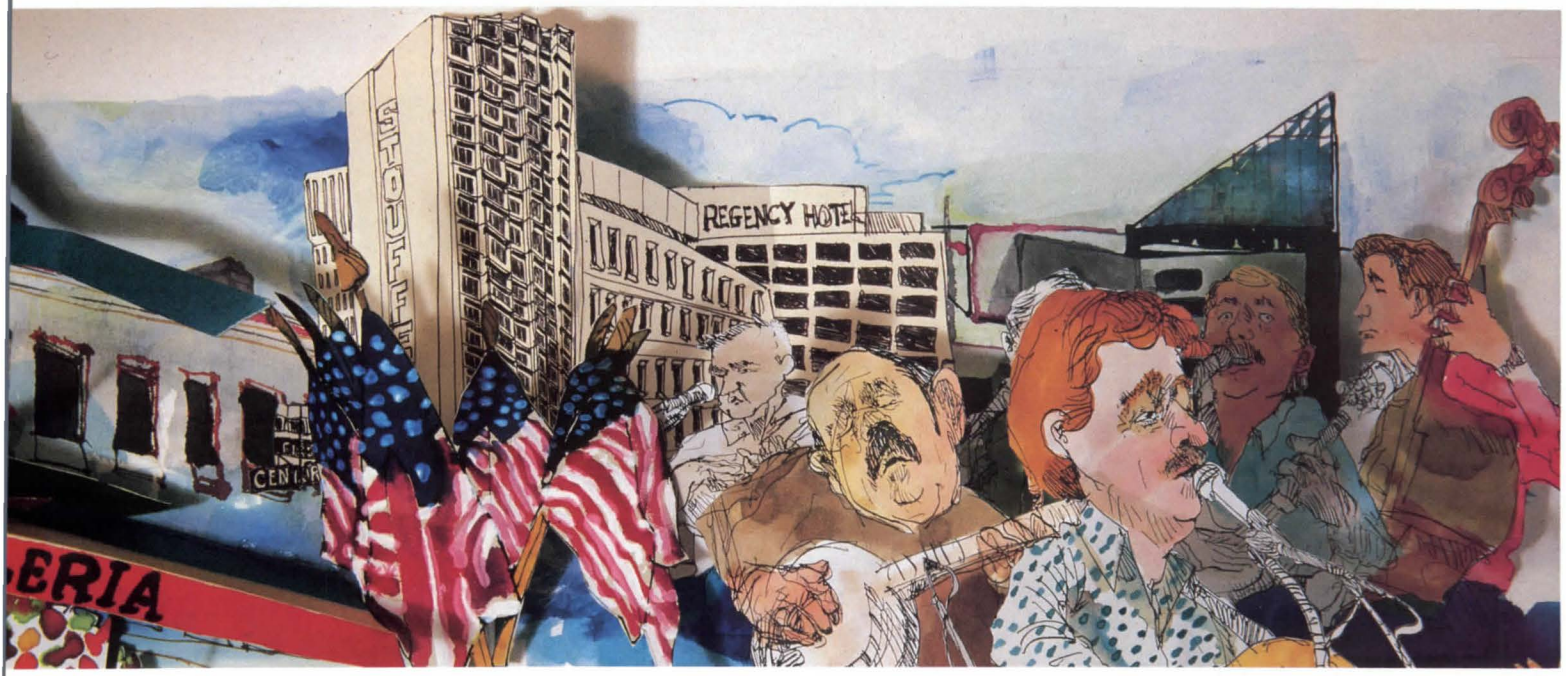


Illustration by Brian McCall

buildings," he says. "Students are becoming urbanists, and the newspapers give enormous space to urban issues—they didn't used to." Robertson believes that, for a variety of reasons, we have entered an era of increasingly demanding urban design regulations, which he considers "a very positive development." Barnett adds that the trouble with most American cities is that they "lack charm, and charm is a product of regulation."

Attempts to regulate and slow growth are spreading nationwide, as is the imposition of impact fees that require developers to help pay for everything from roads to housing. (These fees are being used to substitute for general property taxes and declining state grants-in-aid.) According to the Urban Land Institute's *Development Trends, 1988,* "An unprecedented number of cities and counties have enacted slow-growth measures. Growth is perceived as synonymous with inconvenience." Many communities also see increased regulations as insurance for their property values. An additional spur to the growth management movement is increasing traffic congestion—the result of decentralization, which engenders suburb-to-suburb commutes. In many families at least two people head in different directions, whereas in the past they drove downtown together or took public transportation.

Among the better known examples of growth management is San Francisco's Proposition M of 1986, which put a cap on downtown commercial development. The same year, Proposition U in Los Angeles cut in half allowable floor-area ratios in most commercial sections of the city. In 1987, San Diego voters approved a "Quality of Life" initiative limiting residential development to 8,000 units in 1988 and to progressively fewer each year after 1991. All new units must meet requirements for air quality, water and sewer systems, solid waste disposal, and traffic. Also in 1987, the State of Texas adopted the most comprehensive enabling statute for impact fees seen to date, assuring that fees will be imposed in a more uniform, equitable, and reasonable manner. One conclusion from all this, says Leinberger, who is preparing a new article for *The Atlantic* on growth management, "is that we're looking at a decline in private control over land use decisions. It will mean fewer small developers, more large company developers who can afford to wait 10 years to wade through the process. The big are going to get bigger."

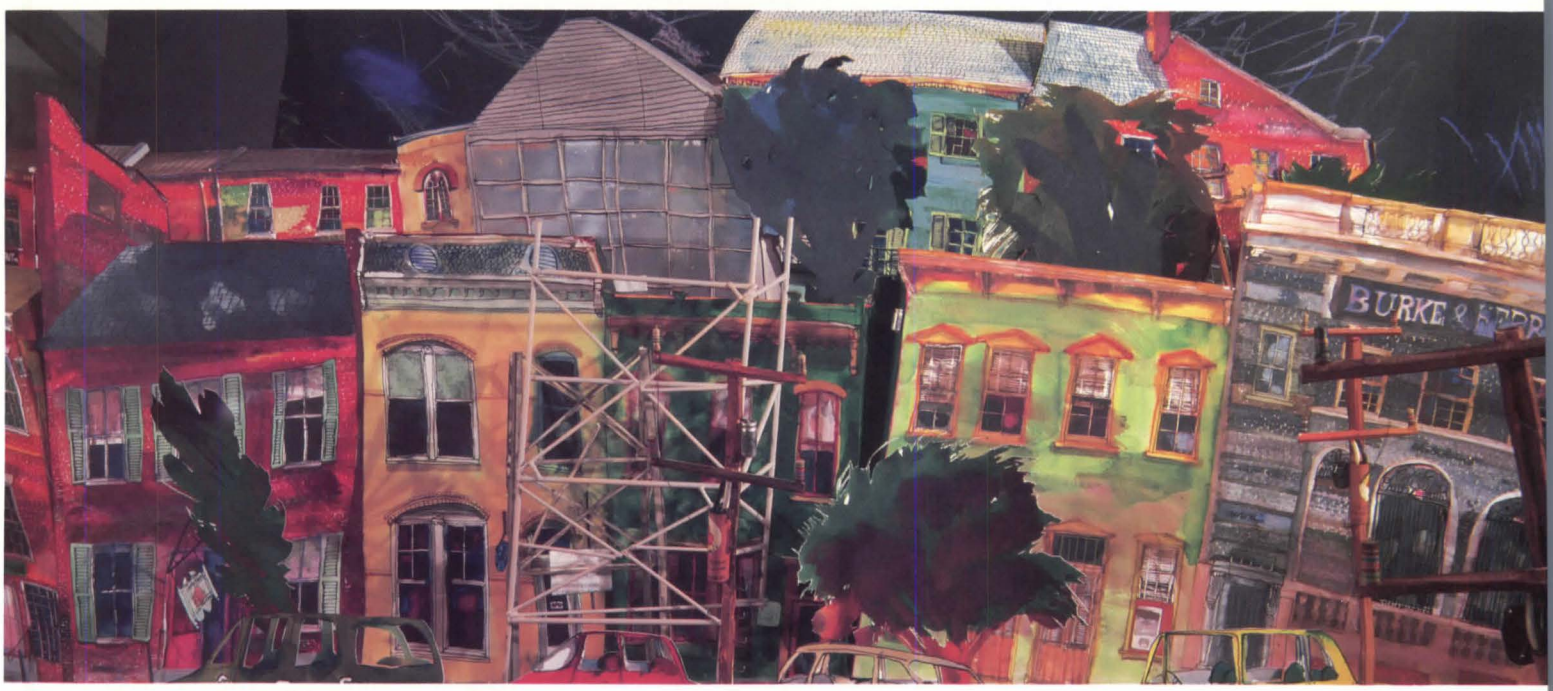
Because the economic and regulatory environment is already making the conduct of business more complex and costly, public/private collaboration is fast becoming the modus operandi among many developers. One result is more use of and respect for urban planners. David Wallace, FAIA, of Wallace Roberts & Todd in Philadelphia, explains, for example, that the developers of the Penn Landing project in his city banded together and asked his firm to conduct a study for linking the project with the rest of Philadelphia and to make a presentation to about 15 agencies. "The purpose was to let the developers know if they were going in the right direction," Wallace says. "This is happening all over the country, because of the horrendous complexity of getting approvals, especially on environmental impact issues. It has put planners back into business."

The prospects for architects, however, are less clear-cut. William Slessig, an architect and former director of downtown planning and development in Denver, now specializes in getting the principal players together for big city projects. He says that one consequence of the diffusion of power in development is that "designers are out of the power base, because discussions at the beginning are around economic development and growth management." Architects will have to find ways to enter the development process far earlier than they now do.

Growth management and increased regulation are bound to affect the future appearance of cities. According to Roger Lewis, a teacher of architecture who also writes a column in the real estate section of the Washington *Post,* words like "context" and "regional impact" are increasingly heard in connection with growth management. It may, therefore, produce greater variety, less sameness among American cities. Similarly, mandatory review of projects may result in better buildings. Dean Macris, director of San Francisco's Planning Commission, ticks off the names of distinguished architects his city has employed for review, among them Gerald McCue, FAIA, Richard Bender, Robert Campbell, AIA. Under the banner of growth management, Macris's commission recently completed a plan and impact report for San Francisco's newest and largest megaproject, Mission Bay. It will include 6.5 million square feet of commercial space and 7,700 units of housing, 30 percent of which will be affordable housing. Says Macris, "I think we're going to see more cities involved in these large projects trying to work out a situation to produce housing where jobs are going to be." Mission Bay will provide about 25,000 new jobs.

This brings us back to the problem of spiraling urban joblessness and poverty and some of its possible solutions, and it raises yet another problem: the increasingly severe shortage of affordable and low-income housing. Both poverty and the housing shortage have reached crisis proportions in most American cities.

The New York City Commission on the Year 2000, for example, concluded that "dealing with poverty must be the primary focus of the city's energies. The challenge for the future is to build on the middle-class strength of New York by bringing far more people up from poverty into the middle class." As novelist Saul Bellow has said, "What is rarely hinted in other cities is condensed and enlarged in New York."



The Reagan revolution has not trickled down to the inner city. The rich, as we know, are getting richer, while the middle class, the poor, and especially blacks, are losing ground. Recent Census Bureau figures show that in 1987 the poverty rate went down for whites to 10.5 percent but rose to 33.1 percent for blacks. "The reason the black underclass is not being lifted up by the rising tide of economic prosperity," writes sociologist Kasarda, "is that most aren't even on the boat."

In her new book, *Families in Peril,* Marian Wright Edelman of the Children's Defense Fund shows how joblessness and poverty are the principal cause of fatherless black families. The largest "single cause of single-parent black families is the failure of first marriages to form," she writes. (The percentage of black males aged 20 to 24 who are married is 11.9, compared with 27.3 percent of white males.) The decrease in marriages among young blacks has paralleled declining employment prospects of black males.

And, though black teenage pregnancies are declining, more than 40 percent of black families are headed by women. Among the consequences is the highest child poverty rate in 20 years (one out of five black children are poor, according to the Census Bureau). Edelman blames the federal government's stinginess. She writes, "AFDC (Aid to Families with Dependent Children) takes less than 1 percent of all federal government expenditures. It is the critical source of support for one out of 15 Americans, yet we devote to it one-225th of our GNP."

Kasarda adds, "Where stable husband-wife families are few, pimps, pushers and toughs replace working fathers as role models for young males. Their cultural isolation and socialization-by-the-street prevent many from developing interpersonal skills that are as important as technical skills in obtaining and holding a job."

Especially disturbing is that while educational and job-skill requirements rise, so do high school dropout rates. In New York City and Los Angeles, for example, four out of 10 students don't finish high school. This not only dooms the dropouts but also jeopardizes American industry, because the so-called Baby Bust will bring a severe shortage of qualified labor in the 1990s and beyond. Sociologist William Julius Wilson (among others) feels this will benefit poor blacks, especially since "for the first time in the 20th century the ranks of central-city blacks are no longer being replenished by poor migrants."

Most of the proposed solutions to black unemployment and poverty fall into one of two main approaches or combine the two. The first aims aid to the ghettos, the second channels it directly to needy people.

Edelman, an advocate of the first approach, explains, "By and large, many Great Society programs did not fail. We just didn't put enough into them, for long enough, or with enough oversight to assure targeting, careful implementation, and thus success." But the nation's huge federal deficit coupled with miniscule public support make major new federal programs for the ghettos unlikely. Also, channeling more money into the ghettos would further weight the anchor tying urban blacks to areas of least opportunity.

The goal of programs aimed at individuals rather than at ghettos is to lighten that anchor or raise it altogether. "Imagine what would have happened in the South in the first part of this century," says Kasarda, "if the great numbers of disadvantaged people who moved north in search of a better life had been tied to their localities in some way and were unable to leave." Among the recommendations proposed by advocates of aid to individuals rather than ghettos are strategies to make low-skill suburban jobs accessible to inner city blacks, including the installation of computer networks specifying job opportunities and subsidies for job searches and transportation; tuition vouchers allotting the same amount of education money to each child for use at a school of the parents' choice; and a system of housing vouchers, enabling people to live where there is work, usually in the suburbs.

Splendid ideas, but remember Yonkers? City Council members in that midsized New York city courted municipal and private bankruptcy last summer rather than agree to a court order mandating the construction of 200 units of low-income, scattersite housing in the predominantly white side of town. Though it generally takes less dramatic forms, theirs is a pervasive attitude, born of racism, fear of the unfamilar, and fear that the family's nest egg will be devalued. (Nationally, real estate is 60 percent to 70 percent of the average person's net worth).

Most cities are getting to the point where they have two types of housing—fantastically expensive on the one hand, slums on the other. As Nora Richter Greer wrote in a July 1988 article on housing in this magazine, "As 1990 approaches, so does a housing crisis of a magnitude not seen in the United States since Franklin D. Roosevelt called a third of the nation ill housed as he launched his New Deal."

The 1949 housing bill promised "a decent home and a suitable environment for every American family." Forty years later, the most sordid slums look good to millions of Americans who have no homes at all. Our housing situation is this nation's shame, and the prospects for turning it around look fairly grim.

Is the same true for the future of America's old cities? What are their prospects?

An economic report by the National League of Cities predicts that the growth of complex electronic production networks will make the economies and futures of cities increasingly inter-

Illustration by Brian McCall

dependent with each other, with the wider national economy, and with the international economy. "Cities that understand and build on these interconnections among networks and economies will establish the foundations of their economic future," says the report.

Between 1980 and 1985, industry's investment in information technologies jumped from 25 percent to 40 percent. The era of factories and heavy industry in cities is irretrievable, and foreign competition will tend to prevent low-skill wages from rising appreciably. The changed economy will benefit mainly coastal cities, which, in addition, are also regional centers. Some West Coast cities are already feeling the benefits of the Pacific Rim countries' economic boom.

Kasarda believes that successful cities of the future must develop computer-age infrastructures to give them advantages for processing and transmitting information. "As a start, concerted efforts must be made to 'wire' cities so that businesses locating in them can quickly and efficiently receive, process, store, and transmit immense amounts of data and information," he writes. "Those cities that take the lead . . . will hold a competitive edge over those whose infrastructure remains geared to an older industrial age."

Taking a relative idea several steps further, John Eberhard, FAIA, foresees a new and innovative generation of urban systems, powered by recent revolutionary advances in science and technology. "Tomorrow's urban construction will be made up of integrated assemblies that contain no separate structural system, no pipes or tubes for water or waste, no roads or subway tunnels for movement, no wires for communication, no personally operated vehicles, and no dependence on fossil fuels," Eberhard predicts.

Our existing urban infrastructure, meanwhile, is crumbling from years of neglect. A 1987 survey of local officials, sponsored by Touche Ross, the International City Management Association, and the Privatization Council, reported that 52 percent of local administrators expected to spend at least twice as much on capital facilities in the next five years as they have in the last five. AIA's Vision 2000 program concluded, "The market gaining the most momentum for the 1990s is the need to rebuild decaying infrastructure in older America's public, institutional, and private sectors. America's oldest market, the Northeast, is already its busiest market."

Consultant Richard Mudge says new methods of financing need to be found; most of it now comes from users through special property tax assessments and from impact fees on developers. As the Conference of Mayors reported, "Meeting today's capital improvement and public service needs demands that partnerships be formed among all levels of government and the private sector. City government, private companies and foundations, the education community, religious groups, and others share the responsibility for community well-being."

Even with their overwhelming difficulties, there is cause for confidence in the future of American cities. Jonathan Barnett believes inner cities may well become America's next frontier. "People have reached such far-out locations in the suburbs and traffic congestion on suburban thruways has become so horrendous," he says, "that the next hot property may be the old working-class neighborhoods. The Bronx is suddenly regarded as valuable real estate."

Jaquelin Robertson points out that among the lessons recently learned is that "old buildings were better built and we like them better, and that a city's best potential is in its oldest, poorest neighborhoods. The trashiest construction is in the suburbs we just finished building." He adds, "I would bet that we reclaim the center city and decant the poor into what will be a doughnut of blight around gentrified areas."

It's beginning to happen. A recent Urban Land Institute report proclaimed, "Inner cities are of increasing interest to developers of high-tech parks. . . . Inner cities contain a wide variety of obsolescent buildings and underdeveloped parcels of land that are economically adaptable for high-tech incubator projects." As additional sweetener, many cities are providing incentives for industrial investment, including low-interest loans, grants, training, and education programs.

Kasarda foresees a future of cities with smaller populations composed largely of people who actually want to live there and have job opportunities nearby. The result, he says, would be "a far more vibrant central city than results from present policies that unintentionally warehouse millions of disadvantaged in U.S. cities to the benefit of neither." His vision assumes, of course, that we succeed in thinning the ghettos by providing low-income housing in the suburbs. The present national mood makes that unlikely.

But moods, by definition, change. Historian Arthur Schlesinger Jr. sees the late 1980s as "the equivalent of 1928 or 1958. There's a lot of pent-up idealism. That will increase, and in the 1990s we'll enter a phase that will be more like the 1930s and 1960s." Let's hope, though, that 1990s social activism is different from that of the '30s, with its noxious, drum-tight, totalitarian ideologies of the right and left. Let's also hope that it is more inclusive than '60s attitudes—not "us against them"—and that it is more clearheaded and realistic, skillful and informed about the needs of the nation and its cities.

"The future," as Mumford said, "is never a mechanical extension of the past." So, there is hope. □

Pennsylvania Avenue: A Quarter Century of Renewal

A new book chronicles its transformation.
By Donald Canty, Hon. AIA

America's longest-running continuing act of urban design, the renewal of Washington's Pennsylvania Avenue, is having an anniversary of sorts. It was a gleam in John F. Kennedy's eye on or soon after his inauguration in 1961 (participants and historians differ on whether the project actually was born during his ceremonial drive from Capitol to White House or later). But it was just 25 years ago that the first tangible steps were taken toward realization.

The story is told in the new AIA Press book *Pennsylvania Avenue: America's Main Street* (text by Ted Landphair, photographs by Carol M. Highsmith) in a foreword by Sen. Daniel Patrick Moynihan of New York, who was a principal organizer of the first President's Commission on Pennsylvania Avenue as assistant secretary of labor in the Kennedy Administration and has been sporadically involved in the endeavor ever since. Moynihan writes:

"A day or so after the funeral [of President Kennedy] President Johnson invited Mrs. Kennedy to the oval office and asked what he could do for her. She asked for Pennsylvania Avenue. The enterprise acquired official if somewhat skeptical sanction, having been wholly informal under J.F.K."

At the time, the north side of the avenue was close to slum status, the south being occupied by the hulking barrier of the Federal Triangle. Even in 1970, when legislation to create the Pennsylvania Avenue Development Corp. was before Congress, there were 10 completely vacant buildings in the proposed redevelopment area (Fourth to 15th streets) and another 82 vacant above the ground level. There had been a 42 percent loss of business on the avenue in the years 1960-69, the book recounts. The legislation was signed in 1972.

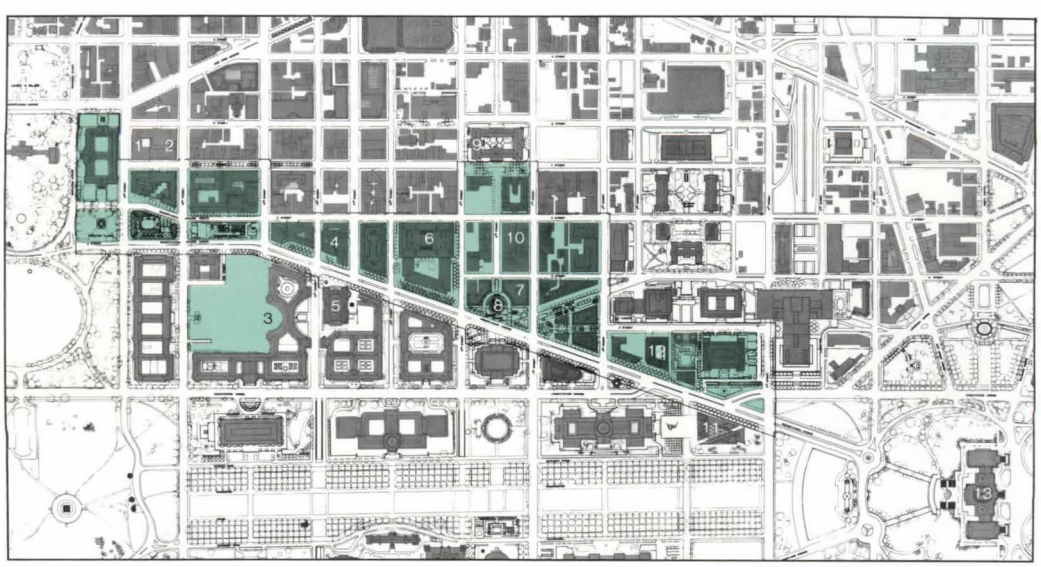
Today, a Rip Van Winklish visitor who hadn't seen it since the '60s would find the avenue transformed into a bustling boulevard boasting many interesting incidents, architectural and otherwise, if not the overall coherence that the original planners sought.

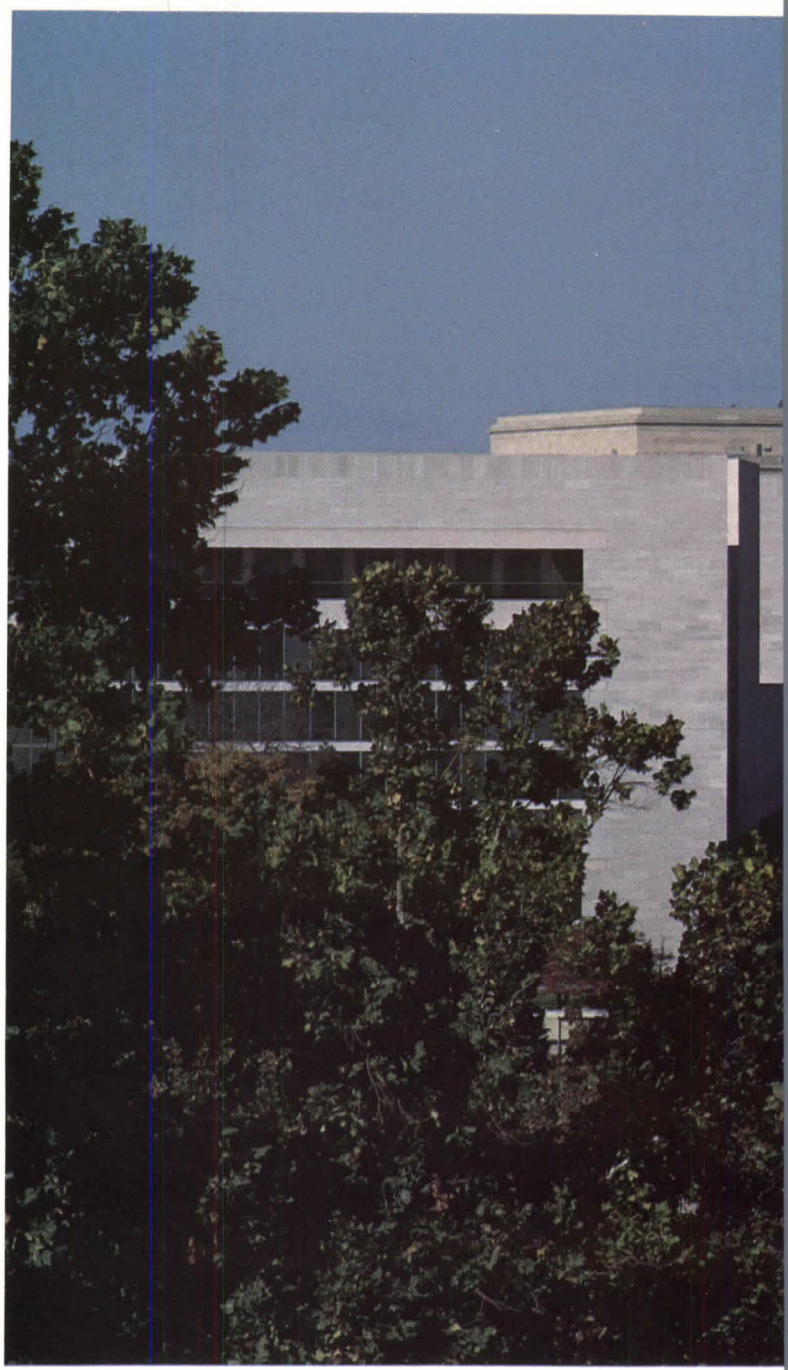
Starting from the western end there is little architectural distinction in view except for some splendid renovations: the Washington and Willard hotels, the Old Post Office Building, the Pennsylvania Building, and, soon, the Evening Star Building. Ironically, all of these (except the Post Office tower) would have been wiped away by the original plan.

At midpoint in the redevelopment zone is a wonderful combination of old and new in what locals still call the Apex Liquor Store building, now Sears House. Between it and the horror of the FBI building (built, the book notes, before the avenue's planners "could get their hands on it") is the site for PADC's most ambitious, and in some ways most perilous, undertaking yet.

Called Market Square and designed by Hartman-Cox, it is a mixed-use development containing offices, shops, restaurants, and—at long last—1,200 units of housing. Getting housing on the avenue has been one of the planners' most frustrating and controversy-generating efforts.

Facing page, the western end of the avenue with its remarkable restorations. From left in photo, on the north side, the Washington and Willard hotels and the Pennsylvania Building. Tower at right is Old Post Office. In map below, PADC's redevelopment area is colored.





On the avenue Market Square will take the form of two pugnaciously neoclassical buildings arced like cupped hands around a circular Navy memorial. Clearly the project takes its architectural cues from the Federal Triangle, long considered the capital's most totalitarian architecture but now edging its way back into qualified favor.

Between the Navy memorial and the National Portrait Gallery to the north will be an arts promenade including a renovated Lansburgh's department store that will provide more housing and cultural facilities. In all, this cross-axis could be the most life-filled and urbane precinct of PADC's domain—if all goes well and the historicism doesn't get heavy-handed.

At the east end of the PADC zone, where the avenue begins its ascent toward the Capitol, is the avenue's only widely acknowledged contemporary masterwork, the East Building of the National Gallery of Art. I.M. Pei's decade-old gallery has a new neighbor across and just down the avenue by another famous architect, Arthur Erickson's Canadian Chancery.

Left, the site of Market Square (rendering above) with the circular Navy memorial and behind it the spires of Sears House. Above, the eastern end of the avenue from the Capitol. At left in foreground, the East Building of the National Gallery of Art; across the avenue in foreground, the allusive Canadian Chancery. Far right, the chancery courtyard, nearing completion.

Allen Freeman

It says good things about the avenue's progress that the Canadians wanted very much to build here, but the almost completed result is a rather odd collection of disparate elements. The building quotes repeatedly from its context—a colonnade from the end of the Federal Triangle, a knife edge from the East Building—but never quite comes together as a coherent whole.

John Woodbridge, FAIA, PADC's first executive director, now practicing in San Francisco, says in the book that "we had some of the most eminent architects in America produce some of their most mediocre work." But Woodbridge also says of the avenue's renewal: "These things don't happen in this country with grand, autocratic gestures. They happen by accretion. Like the piecemeal additions to the U.S. Capitol over a couple of centuries, they can add up to something wonderful, even when not all of the pieces are that wonderful."

By the time its enabling legislation runs out in 1992, the book notes, PADC will have presided over more than a dozen mixed-use projects involving $1.3 billion in private investment and spent $100 million for public improvements. The latter have included such amenities as six new parks, new lighting and paving, and the planting of 700 willow oak trees and countless flowers.

One architectural participant, Robert Calhoun Smith, FAIA, says of the renewed avenue: "It has become an architectural laboratory, an incredible mixture of old and new, large and small, government and private sector. Yet somehow it all works." □

Allen Freeman

City Beautiful Civic Center

In San Francisco an effort to restore a classic master plan. By Allen Freeman

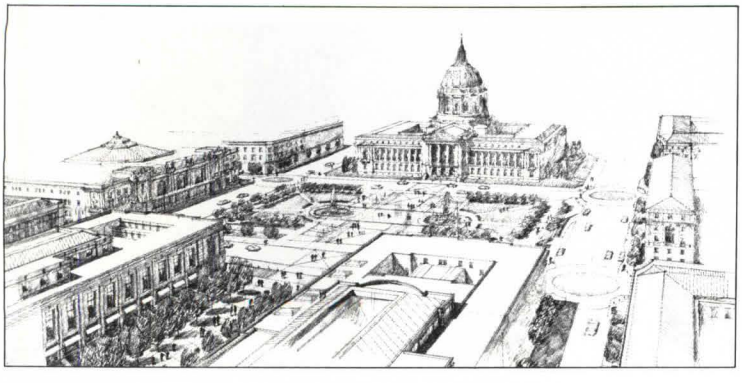
Rooted in the grandest of late-19th-century aspirations, the San Francisco Civic Center is this country's most concise enduring statement of the City Beautiful movement. Unfortunately, most modifications and additions since World War II have either contradicted or awkwardly expressed the Beaux-Arts spirit exemplified both by the original plan authored by John Galen Howard, Fred Meyer, and John Reid Jr. and the great domed centerpiece, Bakewell & Brown's City Hall of 1915.

Now, as new work is envisioned, San Francisco seems ready to dust off the 1912 plan and adhere to it more closely than at any time since the rise of modernism. As first steps, the city has created a historic district within the Civic Center and sought funding to replace the 1916 Public Library (the P-shaped building at far right in the photo at right) with a new one across Fulton Street, install an Asian art museum in the old library, and upgrade Fulton down to Market Street (at lower right in photo).

The early-1930s photograph below shows the Civic Center Plaza as originally designed by A.L. Warswick in 1914 and completed 11 years later under Reid, the city architect. Its current hard-edge configuration, obscuring all visual axes save Fulton Street, is a late-1950s design by Wurster, Bernardi & Emmons and Skidmore, Owings & Merrill/San Francisco. A redesign with soft contours similar to the original's is suggested in the drawing below. It is part of a sensitive and sensible package of recommendations generated by a July 1987 urban design charrette organized by the San Francisco Chapter/AIA. The salient message comes through in architectural guidelines: cleave to the Beaux-Arts.

It is a lesson born of example, for the last decade has produced

Three views of the Civic Center: below, during a '30s labor rally; right, as is looks today; and bottom, in design proposal.



© Robert W. Cameron

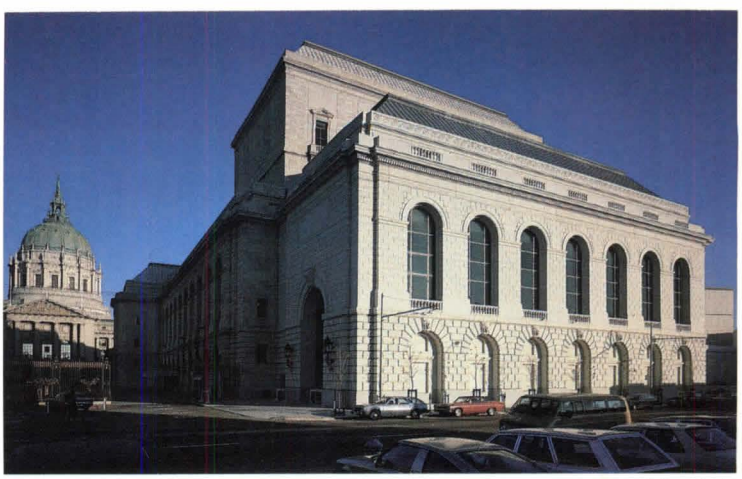
© Jane Lidz

© Jane Lidz

© Peter Aaron/ESTO

a building crop of stylistically odd hybrids. The two most prominent—Davies Symphony Hall (middle left) and the State Office Building (top left), both by SOM/San Francisco—comprise bookends for an older pair—the Opera House and Veterans Building of 1932, bona fide Beaux-Arts buildings (whose side elevations are shown above right) by City Hall architect Arthur Brown Jr. Despite taking design cues from Brown, the SOM buildings hem in rather than enlarge the Beaux-Arts ensemble.

Symphony Hall, completed in 1980, smoothly turns its corner in a diagonal relationship with City Hall and picks up the Opera House's cornice height and roof form. But from there it takes off into its own eccentric realm. The precast and glass skin seems to be pulled tight from the sides like a child distorting its face, while a pair of semicircular platforms protrude like ears and hover high on the extremes of the arcing facade as if about to detach themselves. Perhaps more important, the potential urban



© Jane Lidz

Allen Freeman

Above, City Hall flanked by Veterans Building and Opera House. Building portraits are, from top, State Office Building, Symphony Hall, Ballet Building, and Opera House addition.

relationship expressed in the arcing corner facade is short-circuited at street level by a weak front door pulled to one side.

The State Office Building, which mirrors Symphony Hall's general form, does open to the corner with a fanning staircase, but the stairs, like the other major architectural elements—punched windows and a heroic portal dominated by a state seal enlarged to billboard proportions—are overscaled. Pedestrians, cut off along most of the street by walls, landscaping, and a highly visible ramp, feel progressively diminished as they approach.

Because of its secondary location directly opposite the Opera House stage house, the 1981 San Franciso Ballet Building (far lower left) by Beverly Willis, FAIA, would in any case be a minor player in the Civic Center scheme. As built, it is a fairly straightforward box broken by a cutaway corner entry that orients it toward City Hall and a drive-through with a classical *trompe l'oeil* mural. Above are training and rehearsal spaces and offices.

The decade's most modest Civic Center addition, SOM's 1979 stage house addition to the Opera House (photo at left), is the most harmonious and distinguished. Performers' lounges, dressing rooms, costume studios, etc. that were cut from the original budget in the early 1930s are provided in an envelope whose relative newness is barely discernible. It exactly picks up the original building's classical vocabulary, and, although clad in precast, is scaled, colored, and textured in units that approximate the abutting terra-cotta facades. This expensive little addition suggests that the most felicitous way to relate new construction to Beaux-Arts classicism is to carefully insert more of the same. □

Urban Design in Miniature

In an idyllic San Francisco suburb. By Donald Canty, Hon. AIA

Photographs © Photo/Stephenson

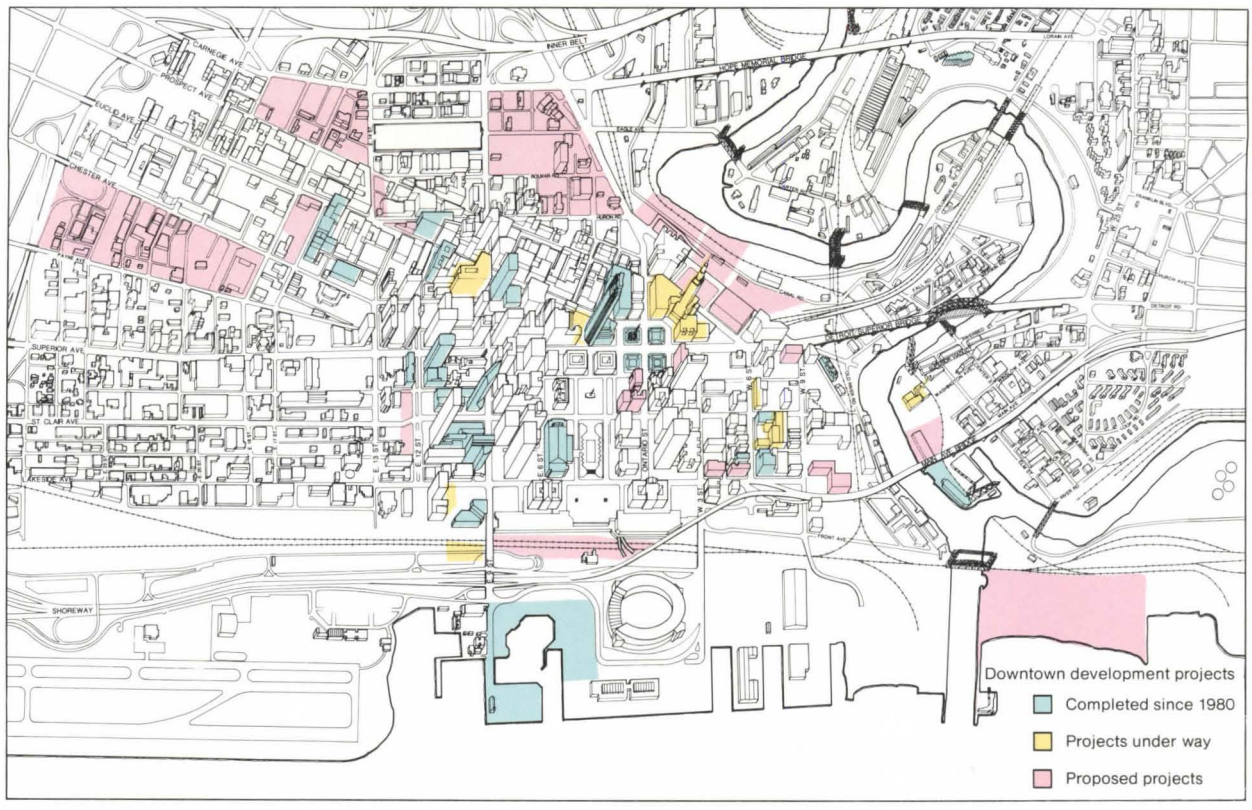
Top, looking down on the commercial core of Point Tiburon, with the ferry landing and the town's main street angling at 45 degrees from the divided road. Above, the shoreline park. In aerial, facing page, the park parallels the road. Residential portions of Point Tiburon are to the right of the road, clustering around the commercial core with its lagoon. Traffic circle at center left links new buildings and the old main street.

There aren't many towns anywhere with sites to rival Tiburon's, at the tip of a hilly Marin County peninsula on San Francisco Bay with the Golden Gate Bridge and the city's skyline dead ahead. It's a tiny town (population 8,000), very conscious of its natural beauty, a difficult place to insert a 38-acre, mixed-use development with 155 condominium units (including 20 below market rate) and 23,000 square feet of commercial space. It took Fisher-Friedman Architects 10 years and countless community meetings to do so with neighbors literally looking over Rodney Friedman's shoulder (he lives on the hillside of Belvedere Island, just above Tiburon).

Fisher-Friedman not only produced a very pleasant set of buildings, it took the occasion to reorganize Tiburon's mini-downtown and shoreline and give it some new amenities (some, but not all, as trade-offs for development permissions). Before Point Tiburon, as the development is called, the town had a genuinely quaint main street (Paradise Drive) on the water, but next to this strip was the ferry landing, which was generally a sea of passengers' parked cars, and beyond that a shoreline made up of a roadway and more parked cars.

Fisher-Friedman, first of all, left the main street alone. Across the road into town, beside the principal commercial center, the architects provided parking lots for ferry passengers as well as customers. The shops and restaurants and some of the condominiums are deployed around a three-and-a-half-acre lagoon, traversed by a pleasant pedestrian bridge that from some vantage points seems an extension of the bay.

The shoreline is now a well used park, and a circle in the roadway provides a visual link between the old main street and the new development. It is, in all, a skillful piece of urban design in miniature. □



In Cleveland, of All Places

Urban rebirth, complete with starchitecture. By Jonathan Barnett, FAIA

Cleveland's urban design and planning policies have helped create more than a billion dollars in new downtown development, built or under construction, since 1980.

Cleveland, like other cities, depends on its downtown as the main source of jobs and tax revenues. When George Voinovich was elected mayor in November 1979, it was clear that the business center needed special attention. In 1978 Cleveland had run out of money and defaulted on its debt; at that time only one new downtown building was going up, while other city and suburban centers were booming.

Despite negative publicity about the default and about the day the Cuyahoga River "caught fire," downtown Cleveland had a heritage of splendid civic buildings grouped around a mall designed by Daniel Burnham. It also had three 19th-century shopping arcades, the impressive marble and limestone architecture of the Terminal Tower complex on Public Square, the Warehouse District, three elegant old theaters, and the Erieview Plaza area, which had expanded the downtown office center through urban renewal in the 1950s and '60s.

Other assets included Cleveland's famous symphony and art museum, major league sports franchises, a rapid transit line connecting downtown to the airport and the eastern suburbs, and the city's scenic location on the shores of Lake Erie.

Default also had concentrated the mind of the Cleveland business establishment, which realized it had better emulate leadership in cities like Pittsburgh, Baltimore, and Hartford and work together for civic improvement. The result: the founding of Cleveland Tomorrow in 1980, which has created such development initiatives as a venture capital fund and a housing development fund, as well as helping to raise $1.3 million in private money for the city's "civic vision process," a three-year effort leading to the publication of both a downtown plan and a plan for the whole city.

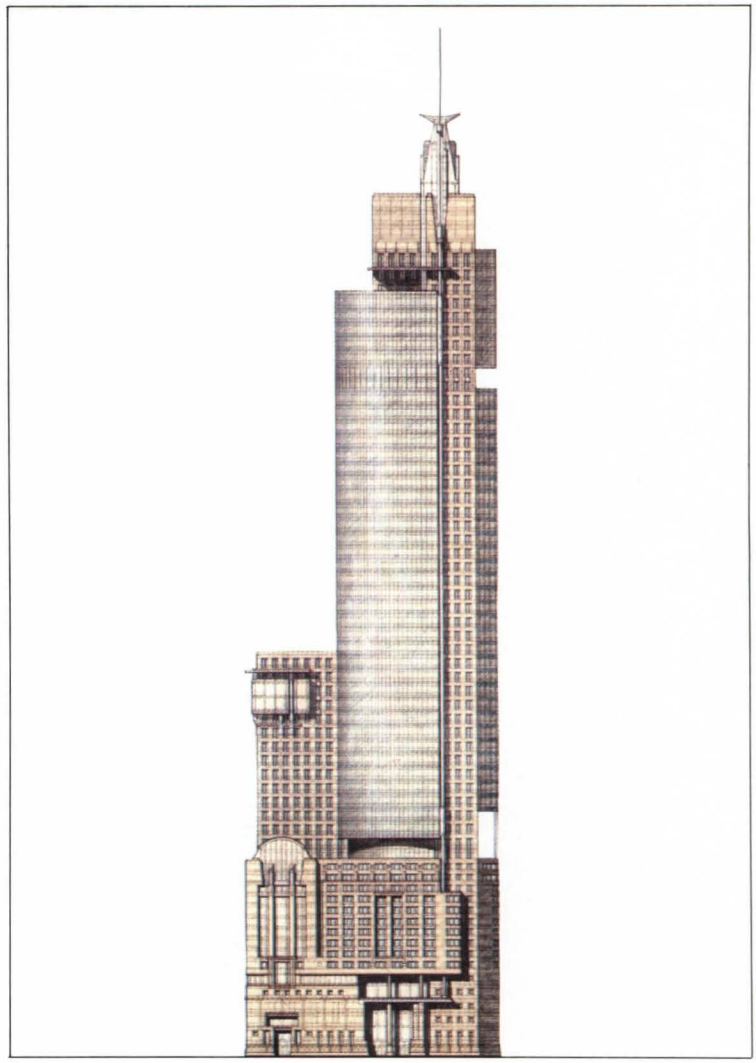
The first office buildings to be developed in the early 1980s —One Cleveland Center, Ohio Bell, and Eaton Center— represented the newfound commitment of business to downtown, satisfying space requirements that had grown during the uncertainties that surrounded default. Land for the first two of these buildings came from an inventory of urban renewal sites that had been done many years earlier.

But the principal symbol of new hope for downtown Cleveland was the December 1980 decision by Sohio (now B.P.-America) to build a new headquarters, the largest project proposed for Cleveland since the Great Depression. In return for the commitment, however, Sohio wanted a more prominent location than could be found in the real estate market, so it looked to the city for help. The city's director of planning, Hunter Morrison, and community development director, Vincent Lombardi, dusted off urban renewal procedures not used in years to identify sites adjoining Public Square for the new office tower and its parking garages, to prepare the community development documents necessary for acquisition, and to set design guidelines for development.

Public Square, the heart of Cleveland's retail district, was already being renovated, with the help of state capital grants, in accordance with a design by Sasaki Associates. An important guideline for the Sohio building was that it support the aim of bringing new life to Public Square by preserving street-level retailing. Therefore the main parking for the development was placed in the center of an adjacent block, leaving room for future office and retail buildings on both sides.

The city was less successful with some of the other urban design criteria. It was unable to save the historic Cuyahoga Building, which occupied part of the Public Square frontage of the

Mr. Barnett has been a consultant to the City of Cleveland on urban design issues since 1981. He is director of the graduate program in urban design at New York's City College and an adviser to several other cities, including Pittsburgh, Norfolk, Va., Kansas City, Mo., and Charleston, S.C.



Two new buildings complete the frontage of Public Square. Above left, Cesar Pelli's Society Center preserves the original Society Bank building by John Welborn Root. Above, the Ameritrust headquarters by Kohn Pedersen Fox resolves complex contextual relationships of buildings on Public Square and terminates the diagonal axis of Euclid Avenue.

site. Moreover, the massing criteria for the new Sohio building caused problems for the developer, producing an impasse when the city's Fine Arts Advisory Committee refused to approve the development. The committee had jurisdiction because the site, adjoining Public Square and on axis with the Burnham mall, was in a "public land protective district," but review was not required until there was an almost-complete set of contract documents. The city was not going to tell the developer of such an important project to scrap millions of dollars worth of drawings and start over, but in fact the building did not respond fully to its prominent site by recognizing the axis of the mall or by completing the spatial enclosure of Public Square.

After multiple meetings of the Fine Arts Advisory Committee, Mayor George Voinovich was able to work out a compromise. Sohio's development consultants and architect—Hellmuth, Obata & Kassabaum—agreed to reshape the upper part of the tower; and Sohio agreed to purchase an additional property, which allowed moving the floor plan to make the tower line up better with the mall. The designers also added elements to strengthen the frontage on Public Square.

The controversy over the Sohio building established the principle that how Cleveland develops is as important as how much development takes place. But this kind of last-minute rearrangement is hardly the best way to do urban design, and no one in either the business community or the city wanted to go through such a public controversy again.

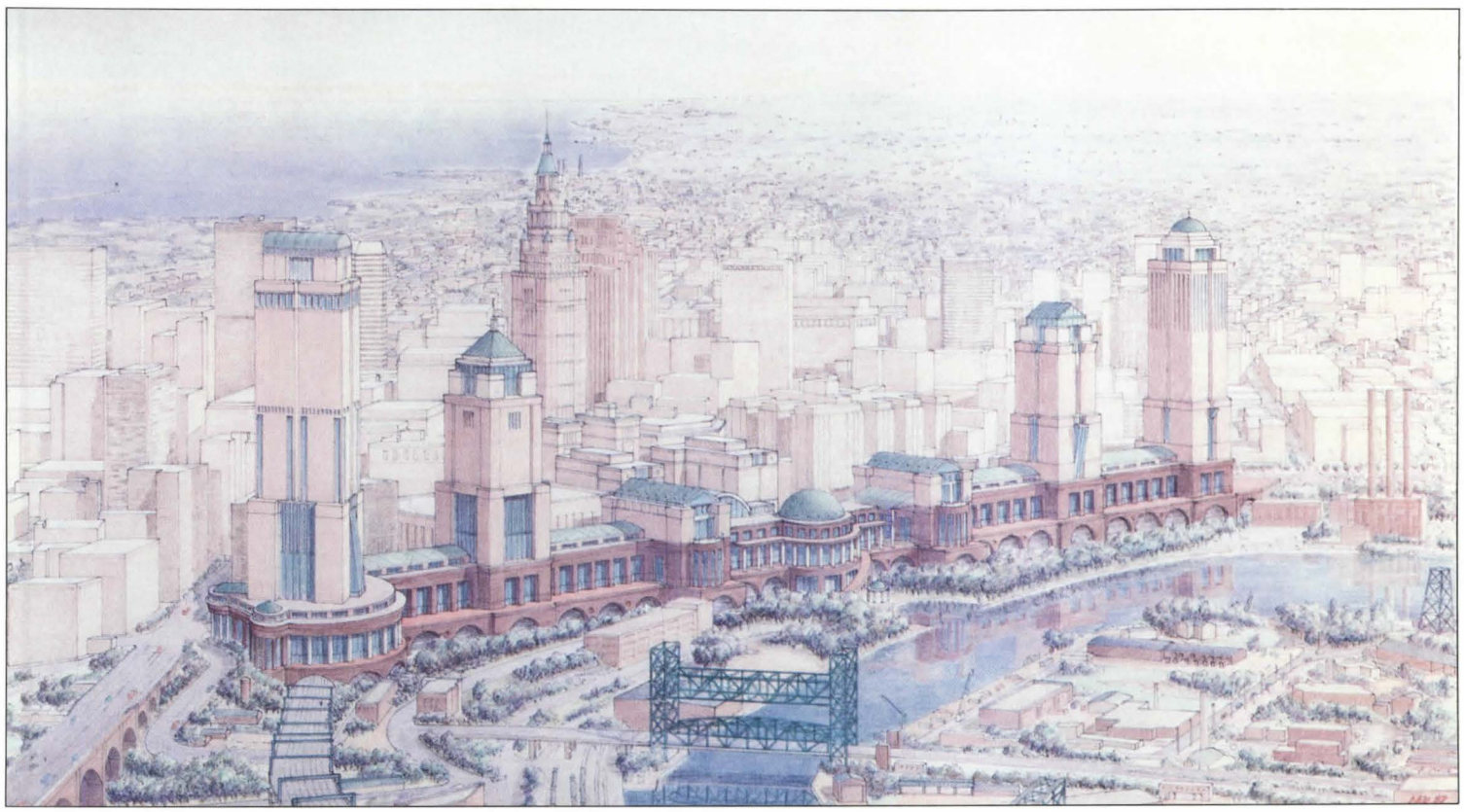
One role for the downtown plan, under the direction of Robert Bann, has been to set design criteria for all of central Cleveland, identifying the issues on prominent sites well in advance of development. The city's urban design requirements are now brought into the development process much earlier, with developers often holding informal preliminary consultations with the Fine Arts Advisory Committee and the City Planning Commission.

The new Society Center, designed by Cesar Pelli, also on Public Square, saves the hundred-year-old Society for Savings Bank, one of the best works of John Welborn Root. A third new building on Public Square, the Ameritrust headquarters designed by Kohn Pedersen Fox, resolved a complex bundle of design criteria, including recognizing the cornice line of the Terminal Tower complex and placing a curving wall to terminate the axis of Euclid Avenue, which enters Public Square on a diagonal.

Cleveland's convention business decreased during the 1970s because its convention and exhibition center was no longer competitive and there were not enough good hotels. The city has just completed a $23 million renovation of the convention center, and a new convention hotel is planned in the Society Center. The city has obtained an Urban Development Action Grant (UDAG) to support the hotel and is giving a real estate tax abatement as well. Tax abatement proposed for the Ameritrust headquarters would assure the inclusion of a new hotel in that complex also. Property tax abatement is drastic medicine to use in downtown redevelopment, but the opportunity to improve the hotel and convention industry, plus the employment and payroll taxes hotels provide, make the trade-off worthwhile.

A vital retail district is another important ingredient in a successful downtown. Cleveland has two downtown department stores, Higbee's and the May Co., across Ontario Street from each other on the south side of Public Square. They anchor a retail concentration of about 1.3 million square feet (including the two stores), approximately 40 percent of all the retail space downtown.

The Higbee's building is actually part of the Tower City complex, constructed between 1918 and 1934, which also includes



Tower City by the Ehrenkrantz Group & Eckstut. I.M. Pei's Rock 'N' Roll Hall of Fame and Museum will be at center.

the downtown terminal of the rapid transit system, a hotel, and several office buildings, the most prominent being the Terminal Tower office building by Graham, Anderson, Probst & White with its distinctive baroque spire. Construction of the complex ceased during the Depression, leaving much of the original grand design incomplete. Little additional development was done until most of the Tower City buildings were purchased in the early 1980s by Forest City Enterprises.

The new owners are in the process of adding a 350,000-square-foot specialty retail and restaurant center to Tower City with a Ritz-Carlton Hotel and an office building, all designed by RTKL Associates. The four-level retail concourse is slipped adroitly into space once occupied by a railway terminal and will ultimately connect Public Square with additional shopping and office buildings along the Cuyahoga riverfront, in accordance with a long-range plan designed by the Ehrenkrantz Group & Eckstut.

The financial structure underpinning Forest City Enterprises' development includes something like $60 million in public money: federal transportation grants for realigning and improving the rapid transit tracks; grants for street reconstruction (as the streets through the project are actually bridges over low-lying land); some $20 million in UDAGs for the retail project itself; plus another $9 million UDAG for the adaptive use of the adjoining Old Post Office building, now owned by Forest City.

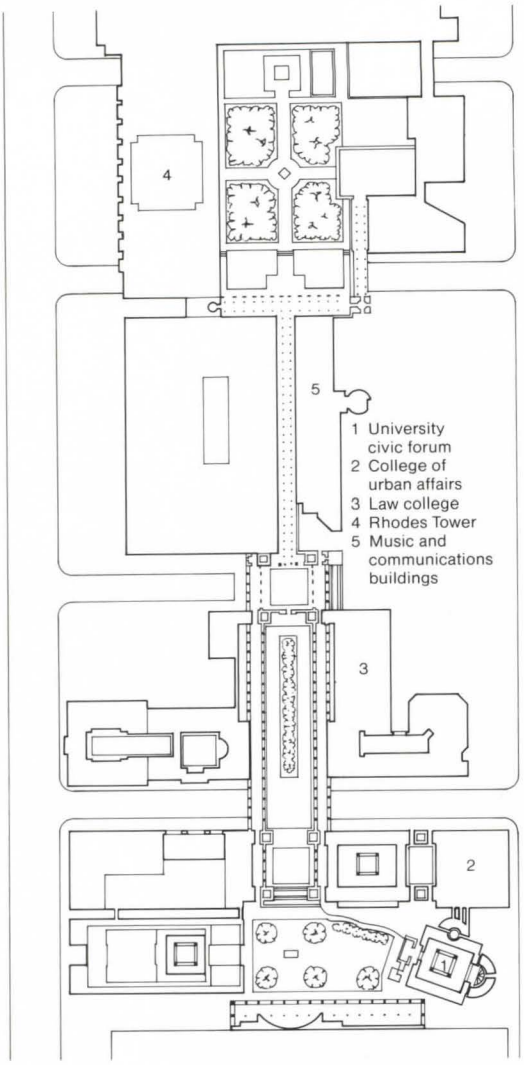
Cleveland is also to be the site of the Rock 'N' Roll Hall of Fame and Museum, having beat out Chicago, Philadelphia, and San Francisco with a commitment to raise $28 million in federal, state, and local private money toward the museum and entertainment complex's overall development cost of $48 million. The Rock 'N' Roll Hall of Fame board has selected a site in Tower City, on the Cuyahoga River at the end of the axis from Public Square. The Hall of Fame architect is I.M. Pei & Partners.

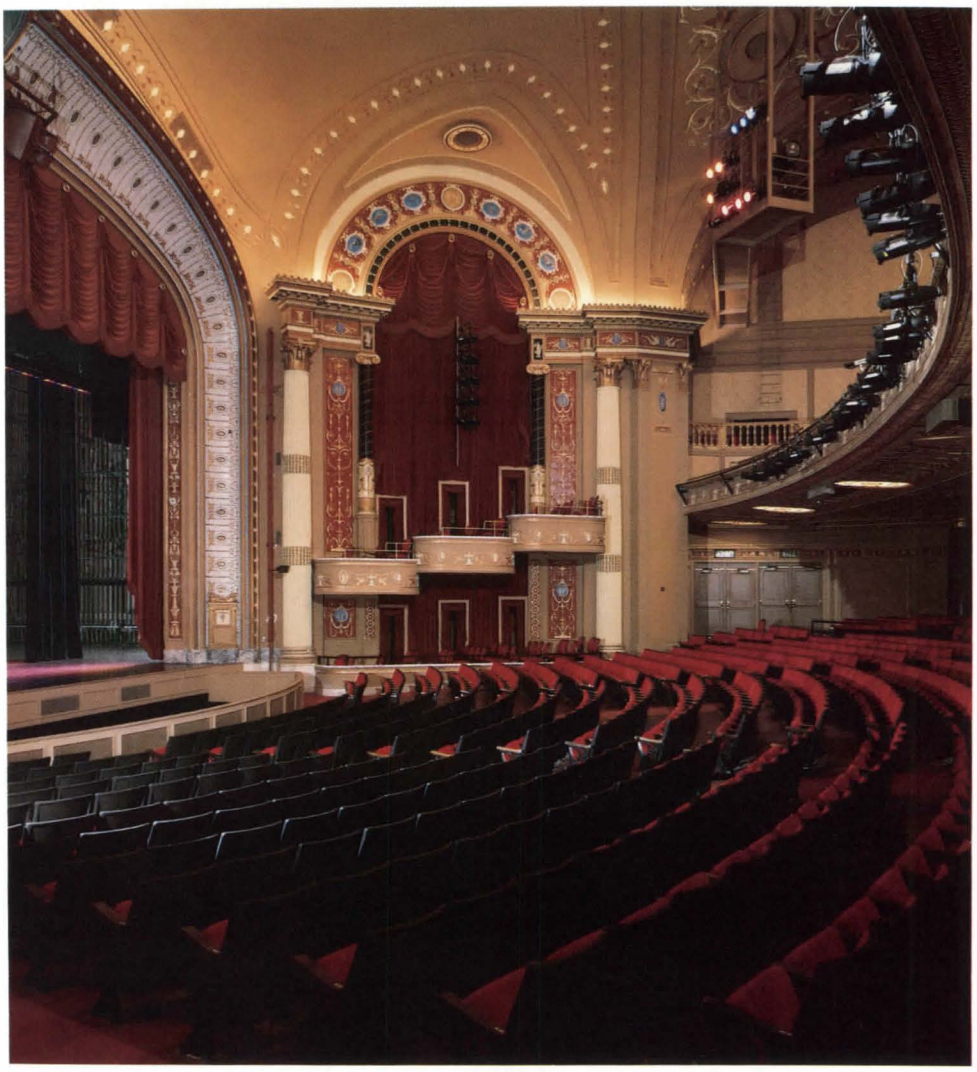
Thus Public Square will become a major retail, office, and hotel concentration, anchored by a powerful tourist and entertainment attraction.

Another important retail development has been the construction of the Galleria on what was once a huge plaza in the Erieview urban renewal district, downtown's other major office center. The winds off Lake Erie had made the plaza uninhabitable for most of the year. An investigation of how to improve the plaza design led to the conclusion that an active interior environment probably made more sense than a not particularly ornamental outdoor space. About one-fifth of the plaza area, in a location sheltered from prevailing winds, was left to provide for outdoor dining in good weather; the rest of the site, with the help of a UDAG grant, has become 150,000 square feet of restaurants and specialty shops under a vaulted glass roof. The architect was Kober/Belluschi Associates.

While taking action to secure downtown Cleveland's future as an office and retail center and an attractive convention site, the city has also been active in making downtown a more pleasant setting for its working population, and ultimately for a residential population as well. The method has been to divide the area around the central part of downtown into districts and prepare a plan for each, after consulting with the individuals or groups having the biggest stake in the future of the area, thus bringing these "stakeholders" to an agreement and securing their cooperation in implementing each district plan.

The Flats is the name that was given to the land on both sides of the Cuyahoga River west of the higher ground on which the center of downtown Cleveland is built. A charrette held as part of an Institute for Urban Design conference in Cleveland in 1983 helped demonstrate the potential of the area to several developers who subsequently have bought and built there. An early public commitment also helped: two small public parks along the water's edge are initial elements in a plan to place parks and boardwalks along all the river frontage.





Above left, plan for Cleveland State University by Barnett and Peterson links university to downtown through Playhouse Square. Above, interior of Playhouse Square's Theater, restored by Van Dijk, Johnson & Partners.

Today the area is a center for restaurants and nightlife, with terraces lined with tables on both sides of the river. The water is cleaner than most urban rivers and filled with pleasure boats. Elements of an industrial landscape are still visible, however, and every so often a giant 650-foot ore boat comes down the channel, dwarfing the other boats and the buildings on either side. But there is movement toward rebuilding an old power house as a marketplace in the Flats, and the "Ox-bow" district of the Flats, on the west side of the Cuyahoga opposite Tower City, now seems poised to become a residential neighborhood.

The Warehouse District plan began with its designation as a Cleveland landmark and placement on the National Register of Historic Places. Loft living in the mode of New York City's SoHo has come to the warehouse district, as well as more conventional small offices, galleries, and restaurants. The city has backed these efforts with a streetscape program and with applications for UDAGs to support individual developments.

The three magnificent theaters that form the center of Playhouse Square were saved from demolition by citizen action in the 1970s. Today they all have been restored through the efforts of Cleveland's business and philanthropic communities, grass-roots fund-raising, and grants from the city, county, state, and federal governments. The result is an elegant and well equipped performing arts center comparable in size and diversity of offerings to the Kennedy Center in Washington, D.C.

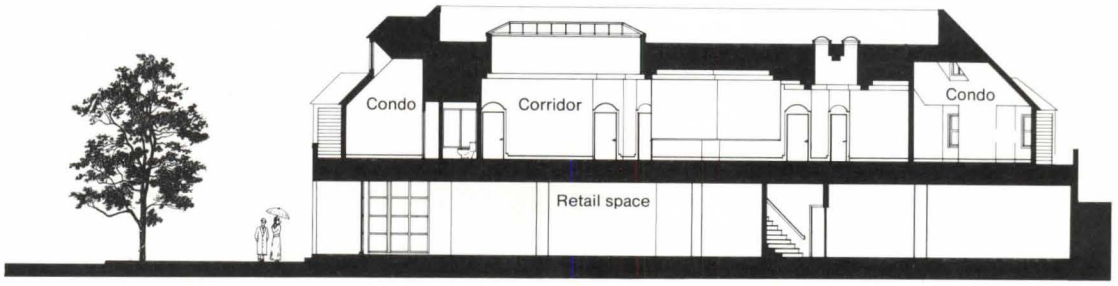
The area around the theaters has several large, older office buildings and was once a carriage-trade retail district anchored by the Halle Bros. department store. The whole Halle chain went out of business in the early 1980s; by then most of Playhouse Square's specialty retailing had closed or moved away. In the meantime, however, the market had rediscovered the older office buildings with their elegant lobbies, and some of the individual retailing buildings have become headquarters for small corporations or firms. Today the Halle building has been renovated as offices, with new specialty shops on the ground and mezzanine floors and a food court in what was once the basement. New kinds of ground-floor retailing and restaurants in the area are supported by office workers in the daytime and the theater crowds at night.

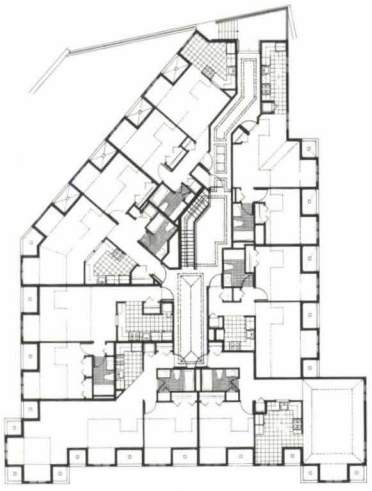
Now, new construction is beginning in the Playhouse Square area for the first time since the 1920s: a hotel and a small office building. The Playhouse Square Foundation, with the aid of a UDAG, has built a 750-car garage to support the theaters. And the Cleveland Foundation recently funded a study to explore the design of an underutilized block between the Playhouse Square complex and Cleveland State University. The uses proposed would support both and would link the Cleveland State campus to downtown through Playhouse Square.

The State of Ohio has just completed a state-funded, $11 million park on the lakefront, the first step in bringing downtown development out to the water. As with Baltimore's Inner Harbor, public investment in open space is generating private commitments. The first such development is to be a new building for the Progressive Insurance Co., which will consolidate operations now located in the Cleveland suburbs and bring them downtown to Frank Gehry's design for a 1 million-square-foot office tower on the lakefront.

Design and planning for downtown Cleveland would not have gone very far without Cleveland's impressive record in attracting state funding and $130 million in federal grants since 1980, under economic development directors Gary Conley and Andi Udris. But it is the overall urban design and planning strategy that sets priorities, creates the confidence that brings in private investment, and assures that the changes made to downtown Cleveland will add up to a coherent environment. □

Kaleidoscope





Second floor condominiums

Photographs © Fred George

Sprightly New Anchor for A Stylish Suburb's Downtown

Westport is a small, affluent town on the Connecticut coast, among whose 26,000 residents live Paul Newman, Patty Hearst Shaw, and Phil Donahue. The town's Main Street is a would-be Rodeo Drive, lined with high-fashion boutiques and chic eateries. Architecturally, Main Street had little worthy of emulation by architect Roger Ferris, of Southport, Conn., who wisely chose to break with the street's dense pack of cheek-by-jowl storefronts and give it a little breathing space in the form of an 11,000-square-foot, mixed-use building that steps back from the street and then climbs, dormer upon dormer, to a clock tower.

Usually, breaking the wall of a street is a planning no-no. But Westport's Main Street is a narrow artery that, 150 years or so ago, was lined with colonial-era clapboard houses that were gradually replaced by storefronts. Ferris's building provides a spatial respite from the narrow sidewalks where pedestrians brush against each other and navigate around window-shoppers. Pulling the building back from the street gives welcome elbow room and a "forecourt" for the street-level retail establishment to show off its wares. The streetside arcade is a bit ambiguous—it seems to want to connect with the awninged promenade along Main Street.

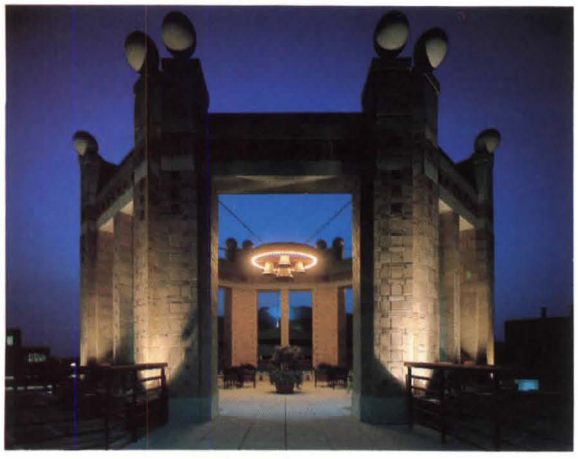
The building's weak point is discovered when, traveling north, you come to the end of the storefront (which turns a corner) and find yourself beside a long, blank wall that borders the service alley (perhaps better placed on the building's south side). Here you have to backtrack or cross the alley to an island of planters to rejoin the pedestrian life of the street.

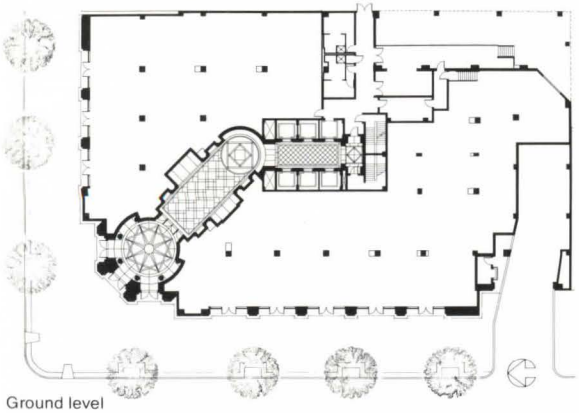
Although this building reads as three stories, giving it the presence it needs in its urbanistic role, it has only two floors. The second is residential, comprising seven condominiums of approximately 700 square feet apiece. Living space "above the store," as it were, is a sound planning move, and the condominiums offer great snatches of street life from their dormer windows. Those in the second row bring light into the condominiums' story-and-a-half spaces. The units are entered on the building's more private east side, away from Main Street. The site slopes up a full story, allowing the units to be entered at grade level.

The clapboard siding, trim boards, and standing-seam roofs give this building a scale of detail that is comfortable to the pedestrian. Gray is the predominant color along the street, and in this the building falls in line with its neighbors. The dormers lend an interesting massing and profile, and the clock tower a corner anchor.—Michael J. Crosbie

Above and far left, the corner where the arcade meets the service alley. Facing page: bottom right, the skylighted second-floor stairwell; above, the arcaded Main Street facade with shops.

Facing an Intersection with An Impressive Corner Tower





Ground level

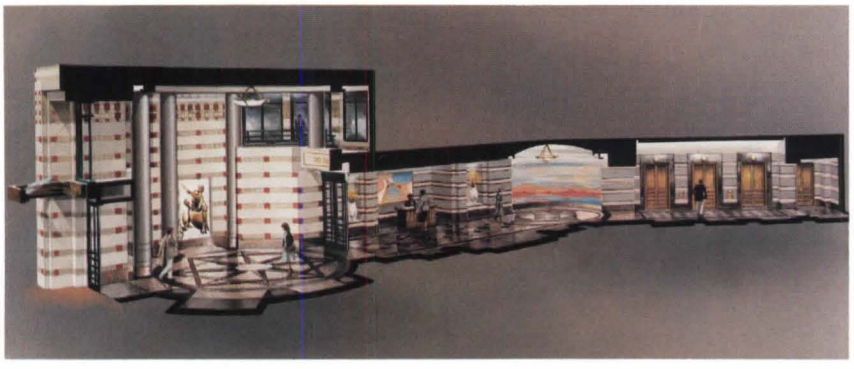
Top, the corner roof terrace within tower's crown; note the suspended bells. Immediately above, the entrance rotunda in the tower's base. Cutaway drawing accurately represents spaces but not colors or appointments.

Over the past 25 years, great hunks of the Washington, D.C., commercial core have turned into the esthetic equivalent of stale bread. A height limit, real estate prices that dictate building to maximum allowable envelopes, and a long tradition of speculative builders catering to conservative tenants have conspired to make K Street N.W. and precincts that spread north and south a sea of banal boxes ranging from bland '60s modernism to heavy-handed '80s postmodernism.

Recent attempts at place-making have focused design attention at the building corners that face street intersections—not a bad idea in itself. But most of the resulting turrets, clock towers, and mini-Blenheim rotundas seem misfires. Republic Place by Keyes Condon Florance (David King, design architect) is a savvy, if slightly corny, exception.

An office building of just under 300,000 square feet, Republic Place's profile, materials, and ornament suggest Washington apartment houses of pre-1930 vintage that line portions of Connecticut Avenue and 16th Street. Its corner peels back to reveal three implied tower elevations, each penetrated by a door. The embedded tower rises to an open, freestanding, octagonal top capped by ball-finials. Here several bells are suspended above a roof terrace. Building mechanicals are contained in a set-back "penthouse" that maintains a flat profile. One floor down, urns and large ball-lights line linear terraces. The rooftop is a dramatically lighted nighttime display.

Curtain wall organization is out of Sullivan (expressed vertical frame, slightly recessed fenestration and infill), with facades logically and tightly woven. The skin is a geometric pointillist composition of tan and terra-cotta colored brick and precast whose darker accents lend texture when viewed from a distance without becoming harsh or horsey close up; where spandrels are



expressed, colors reverse to light on dark. The first story and a half is alternating strips of brick and precast over a waist-high band of granite. Windows, segmented with dark red muntins, are slimmer on the tower and beside it and at the building's party-wall extremes.

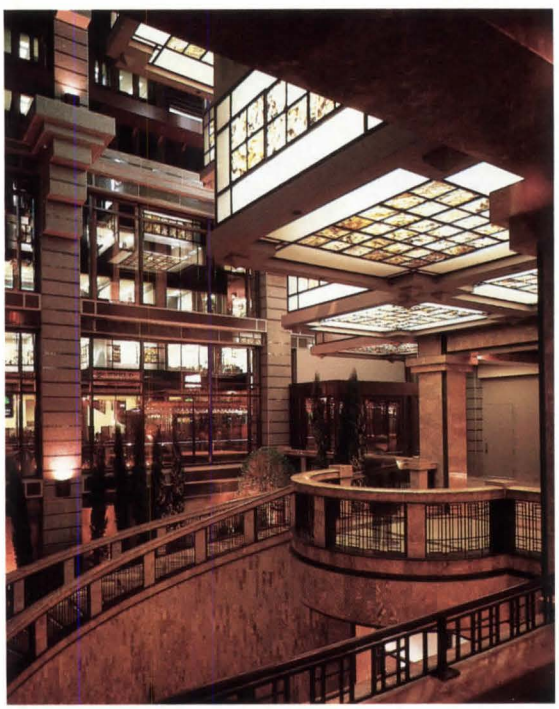
The public portion of the ground floor is an unusual linear arrangement of three spaces that dogleg from the two-story corner rotunda through a single-story corridor and into the elevator core (cutaway drawing, above). Walls and ceilings of plaster veneer over sheetrock are highly articulated with reveals, setbacks, and grooves; rotunda columns are spray painted to resemble stone; the floor is geometry in stone. Also designed by the architect are lobby pendant lights, building logo, wall planters, and railings. All come together handsomely.

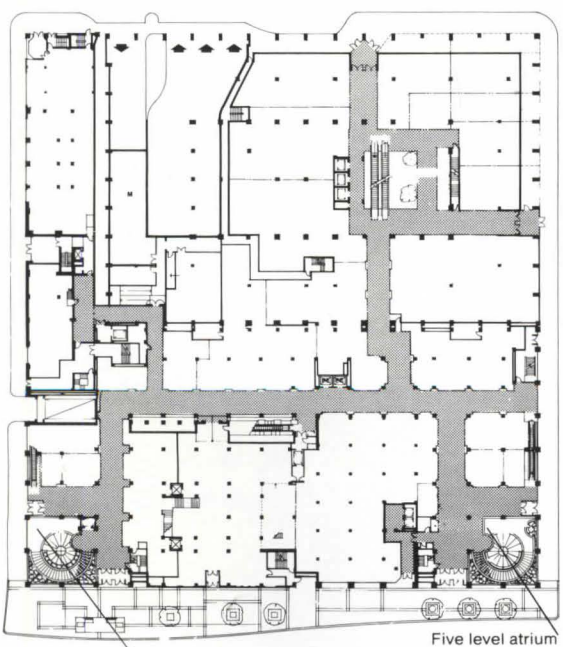
On the street, Republic Place has an exceedingly friendly ground-level presence. In addition to three tower entrances, there are eight shopfront doors, each covered with a jaunty awning. Huge terra-cotta flowerpots punctuate the sidewalk next to the facade. Altogether, it is a building that people notice and have opinions about. Most of the ones I've asked like it.

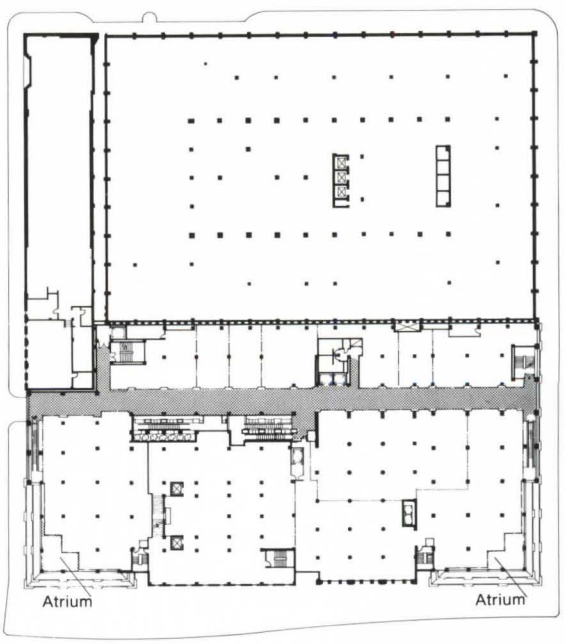
—Allen Freeman

Photographs © Dan Cunningham

Linear Complex Strung Along A Downtown Minneapolis Mall







Drawing at top of the page is full Nicollet Mall elevation; the third building from the left is the only pre-existing piece in the composition. Photos above show one of the corner atria (left) and the core of the interior spine that parallels Nicollet. Facing page, the block from the southeast.

Photographs © George Heinrich

As a piece of urban design, the Conservatory in downtown Minneapolis is a welcome and healthy dose of extroversion. On the other hand, its interior architecture could lower its voice.

The Conservatory, by the Minneapolis firm BRW, fronts Nicollet Mall in the block just south of Johnson/Burgee's IDS Center. In organization and design spirit, the new building counters the widely admired and much bigger early-'70s complex. Where at ground level the full-block IDS Center focuses inward on its atrium core, the Conservatory, on half a block, is oriented outward toward Nicollet. IDS is pivotal; the Conservatory is linear. IDS seems woven from one piece of cloth; the Conservatory is a patchwork. IDS towers; the Conservatory hunkers.

The Conservatory's four building entities line Nicollet, their front facades emerging curiously from a set-back, boysenberry-colored glass wall like heads poking through a curtain. The two end pieces—tapering, mirror-image, four-story constructions three bays wide—are hard to categorize. Unconvincing as buildings that might stand alone, they are neutral, almost tenuous presences that flank two dissimilar, more traditional facades. The taller of these, a circa 1909 office building that rises to eight stories, is in fact the only pre-existing part of the ensemble. The four-story facade next door looks as if it might have been there awhile, but in fact it replaces a 1920s facade that proved too fragile to preserve. None of these is particularly distinguished architecture, but they are friendly, humanly scaled, and penetrable.

The twin end pieces, with approximately three times as much glass as solid wall, seem the most penetrable. They are mini-atria pulled to the corners, open at ground level three bays wide and three deep and closing in toward the corners as they rise in zigzag overhangs. Meanwhile, stairs swing down a level in semicircles; horizontal and vertical surfaces are backlighted through translucent, highly grained marble; and structure is clad in stone panels whose veneering is emphasized with metal corner reveals. As the photographs suggest, there is a lot going on here. Design principal David Bennett, FAIA, says he attempted to suggest in contemporary terms the richness of urban retailing around the turn of the century. I see it as overstatement.

Interior circulation works off the corners into double-loaded corridors of storefronts stacked on four levels parallel to Nicollet. Up escalators feed off the atria at both ends; down escalators are clustered at the center. Although augmented by a pair of elevators, it is a stingy vertical circulation system that contributes to disorientation within the building, especially for first-time visitors. Bennett explains that the developer saw additional escalators as occupying too much leasable retail space in a constrained site. Indeed, the building's backside butts an early-'60s-style, two-story shopping mall with parking decks above, plus a sliver building on the southwest corner. The developer has purchased the older mall, punched through the party wall, and plans to refurbish it in the image of the Conservatory.—Allen Freeman

Photographs © Steve Rosenthal

Architecture Along A Transportation Spine

Boston makes the most in amenity out of a new MTA line.
By Robert Campbell, AIA

Except for the waterfront, much of which was developed privately, the Orange Line is the biggest public improvement in Boston in decades. Within a single right-of-way, the Orange Line project comprises a brand new, 4.7-mile-long rapid transit line (the Orange Line proper); a commuter rail line; a long-distance Amtrak line; and, up above, roofing all those uses, an almost unbroken green finger park.

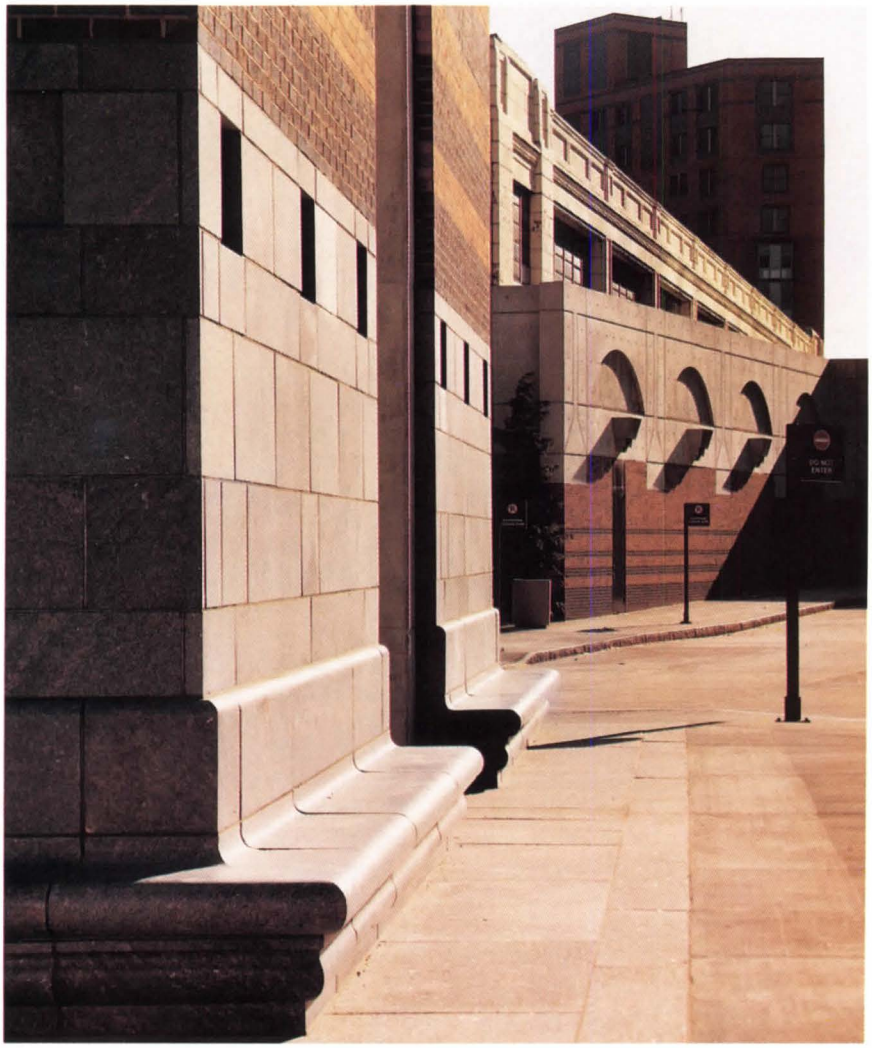
The park extends like a spoke from the center of the city out to a place called Forest Hills, where it adjoins Franklin Park, the Arnold Arboretum, and Forest Hills cemetery. In other words, the Orange Line—besides its transit functions—is a major late-20th-century addition to the "Emerald Necklace," the network of connected parks created for Boston by Frederick Law Olmsted.

More about the park later. Architecturally, what's visible about the Orange Line is the stations. There are nine of them, designed by different architects. They're spaced comfortably close together, so that often you can see one station from the next. Of the nine, three are especially important because they not only serve the rapid-transit trains but also function as stops on the commuter or Amtrak lines and/or as bus stations. They're "intermodal," as the traffic people say. These three big stations are Back Bay Station by Kallmann, McKinnell & Wood, Ruggles Station by Stull & Lee, and Forest Hills Station by Cambridge Seven Associates. All are distinguished pieces of architecture.

Back Bay Station is the nearest to the center of town, half a block from Copley Square, and is the most interesting as design. It replaces an old New York, New Haven, and Hartford railroad station that once occupied the site. The new Back Bay is three stations in one: a stop on the Amtrak line, a stop on a number of commuter lines from the Boston suburbs, and a stop on the Orange Line. Sorting out so many movement systems on a narrow, tightly constrained site was a challenge. And the station had other needs. It is a pedestrian midblock arcade, linking Clarendon and Dartmouth streets. And it is a landmark signaling the junction of two neighborhoods, the Back Bay and the South End.

Back Bay Station pulls all those functions together with one bold gesture: a tall, bright concourse, spanned by a vault of great laminated wood arches and filled with light from high glass-block clerestories. The concourse evokes the nave of a basilican church and also recalls Victorian commercial arcades and railroad sheds. It contains the ticket booths and the stairs and escalators to the Orange Line below. Straight on one side, the concourse curves almost imperceptibly on the other, tracing and making manifest the century-old curve of the rail line buried beneath it.

Left, KMW's Back Bay ventilation tower. Below, station is framed by Pei's Hancock parking garage and tower beyond.



Photographs © Steve Rosenthal

Facing page, the navelike concourse of KMW's Back Bay Station with its continuous series of wooden arches is flooded with natural light from high clerestories of glass block. Top, KMW's monumental ventilation tower meets the ground with a granite base and an encircling bench; the station's auto drop-off circle is beyond. Above, ticket lobby waiting room has large mushroom columns and circular benches accented with lighting fixtures.

Besides the concourse, there's only one significant space—a ticket lobby and waiting room opening off the concourse's south edge. It too is an amazing room, as chock-full of big concrete mushroom columns as an ancient Egyptian hypostyle temple. A bronze statue of the civil rights leader A. Philip Randolph, so realistic that it's surreal, takes the place of the temple god. A bit self-indulgently architectural, perhaps, this room nevertheless works well.

Back Bay Station is a sophisticated design, one that rewards close inspection. All its parts are fully thought through. One notices the way the wood arches come to rest on shaped concrete haunches, and the elegant brickwork, striped in orange and gray-purple to symbolize, one supposes, the mingling here of the Orange Line and the commuter lines (the standard graphics of which are coded purple).

The best element, perhaps, is a brick tower, out in the drop-off circle behind the station. Functionally, the tower is only an exhaust vent, but the architects have made it into an eloquent form, with a split shaft and trussed pediment. As with many public buildings of the past, including Charles McKim's nearby Boston Public Library, the tower's granite base widens into a seat for passersby. If you stand behind the tower and look through the slot in its middle, you see that it precisely frames the John Hancock Tower a block away: one architect's private homage to another.

There's a sense of thickness, of tangibility, about Back Bay Station. It presents itself as something *made,* something firmly shaped out of real, recognizable, durable materials and strong joints. It has none of the thin cardboardish character of so much architecture of both the modern and postmodern movements. Though the KMW designers are, as usual, astonishingly eclectic, drawing architectural ideas from many periods of history, the result isn't at all pastiche but a fresh, solid new reality.

Back Bay's only serious fault is the slight sense of letdown when you enter the navelike concourse from either end and realize you're not going to be able to walk down it. Its center is too chock-full of booths and stairs and escalators and fences. The great vaulted entrance you see from outside thus makes a promise the interior doesn't quite keep. You can walk the length of the concourse along side aisles, but not beneath the vault.

Kallmann, McKinnell & Wood has now created more major civic buildings in Boston than anyone else since McKim, who did Symphony Hall and much of Harvard as well as the public library. Along with the new station, KMW's credits include City Hall and the superb new Hynes Convention Center. Associated with KMW on the Back Bay was Bond, Ryder & Associates.

© Peter Vanderwarker

Above, Stull & Lee's Ruggles Station. Facing page, above left, north elevation of Ruggles Station faces directly onto the Northeastern University campus; above right and below, Ruggles concourse symbolically and actually links Fenway to Roxbury and gives access to transit, buses, and commuter rail below.

The next major station as you head outward on the Orange Line is Ruggles, designed by Stull & Lee (the firm that also created a handbook of design standards for all the stations). Like Back Bay, Ruggles is lifted above mere functionality by a dramatic vaulted concourse. But, whereas Back Bay's concourse parallels the tracks beneath it, the Ruggles concourse crosses above its tracks at almost a right angle to them. By so doing, it becomes a powerful image of connection. It is a symbolic and actual bridge between the Roxbury neighborhoods on one side, largely black and poor, and the Fenway and Back Bay neighborhoods on the other, largely white and yuppie. On the Fenway side, Ruggles serves the half-developed rear of Northeastern University, onto whose campus it opens directly, and nearby institutions such as the Boston Museum of Fine Arts; on the Roxbury side, besides much vacant land, there are a major high school and a housing project.

The empty land at both ends makes Ruggles hard to judge as architecture. At the moment it seems too grand for its setting and purpose, like a stranded ocean liner. But as ever-expanding Northeastern—by some measures the nation's largest university—fills in its property, and as the City of Boston proceeds with plans for back-office space and housing on the Roxbury side, the powerful arched gateways at either end of the Ruggles concourse should take their proper place in the urban context.

Architecturally, Stull & Lee have taken a very different approach from KMW. Ruggles has none of the earthy solidity of Back Bay. Instead it's a high-tech exercise in glass and white-painted steel, a building of almost nautical lightness and tension. Inside, the concourse resembles the Crystal Palace. The arched entrances at either end are especially successful; a sort of abstraction of Palladio in flat concrete and glass, they employ history to persuade us of their civic importance while remaining modern and fresh. At Northeastern the station entrance is a north-facing wall, a boundary condition for the university. Since this wall doesn't get much sun, it is ingeniously brightened by glass block that glows from behind. At Roxbury, by contrast, the entrance isn't wall-like but pushes forward like a jack-in-the-box across empty space, reaching toward the community.

© Ben E. Watkins

Robert Campbell

© Peter Vanderwarker

© Steve Rosenthal

The third of the big stations is Forest Hills, by Cambridge Seven Associates with Robert L. Wilson as associated architect. Here again the context governs the architecture. Forest Hills is the terminus of the Orange Line, although the commuter and Amtrak lines of course continue beyond. Its metaphors are therefore not so much those of movement or connection as those of village, of center. A cluster of hipped glass roofs suggests an outdoor produce market. A clock tower, abstracted to the point of being an architectural diagram, suggests a town hall or perhaps an old-fashioned train station.

The immediate neighborhood at Forest Hills is much smaller in scale, much less institutional than at Back Bay or Ruggles. It consists largely of houses and shops.

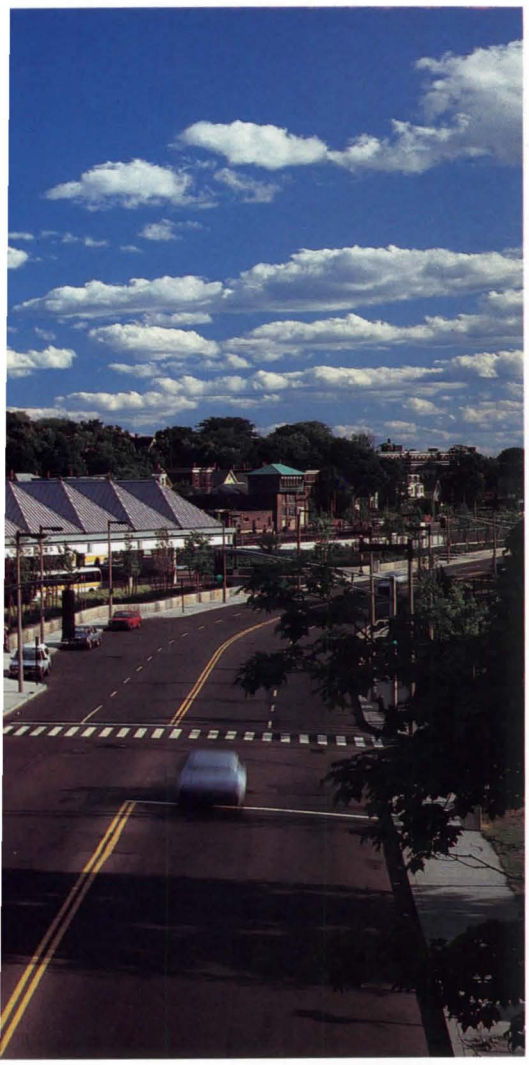
The architects responded by breaking down their inevitably large structure into an aggregation of modular pieces. There is none of the deliberate, and appropriate, reaching toward civic monumentality of the other stations. As at Ruggles, the materials are glass and concrete—used, however, not to make a single grand and elevating gesture but to achieve some degree of transparency and modesty.

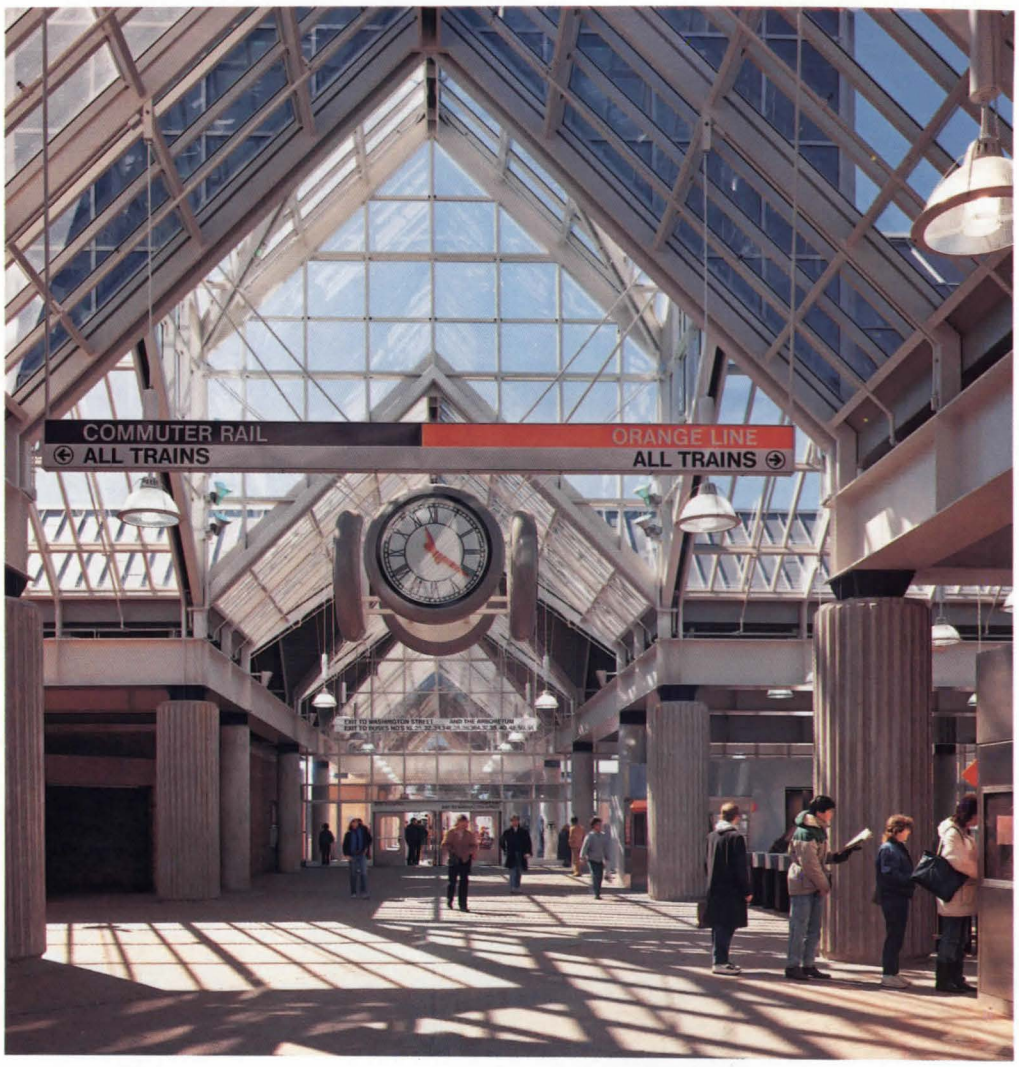
Forest Hills is incomplete; much work remains on the side where the station steps down to meet a shopping street. Slightly chaotic in appearance at the moment, Forest Hills should work much better when it's finished.

© Ben E. Watkins

© Ben E. Watkins

Top, at Cambridge Seven's Forest Hills Station the low-scale and abstracted clock tower responds to its less urban context. Far right, facing page, Forest Hills Station's hipped glass roofs fill the main concourse with natural light. Right, above, a portion of MTA's linear park looking toward the Hancock Tower. Right, Orange Line ventilation shaft disguised as a typical South End row house by Stull & Lee.





© Steve Rosenthal

It's important to realize that there's a lot more to the Orange Line than three pieces of good architecture. To understand that, a little history is necessary. Originally, what is now the Orange Line wasn't supposed to be transit at all. It was going to be the final link in Interstate 95. A wide swath for that highway—the so-called "Southwest Corridor"—was ruthlessly cleared by widening the existing Amtrak right-of-way through a string of largely residential neighborhoods. But in the late 1960s opposition to the highway grew strong. In 1971 then-governor Francis Sargent canceled it and created a Southwest Corridor Project to figure out what to do with the vacant corridor. The project, headed by Anthony Pangaro, gathered people from the disparate neighborhoods into a model planning process. Meanwhile, the state was persuading the federal government that the money—more than half a billion dollars—intended for the Interstate should instead be made available for rapid transit.

As the planning progressed, the Orange Line came to be conceived as a sort of zipper through the city, a means of reconnecting neighborhoods on either side that had long been separated by the railroad. Today it zips together the Back Bay and the South End, the Fenway and Roxbury, and the severed halves of Jamaica Plain. Each station is planned as a physical link between the neighborhoods on either side, and the parkland above the line becomes common meeting ground, with basketball courts, passive green areas, bike paths, and other uses. Not all the corridor will be park. Infill housing, schools, shops, and commercial space, too, have been or are being developed as part of the overall corridor. The park strip itself, although pleasant, would benefit from a sense of greater continuity. It reads as a somewhat random and formless string of spaces and uses, although it will surely improve as the trees grow. The most in-town stretch, by landscape architects Moreice & Gary, is the most successful.

There are too many names to credit for this vast civic improvement in Boston. Major conceptual planners included Stull & Lee, who did much of the urban design program as well as guidelines for all the stations, plus Charles Hilgenhurst & Associates, Roy Mann Associates (landscape), and Wallace Floyd Ellenzweig Moore.

Only one serious doubt remains about the Orange Line. When the Massachusetts Bay Transportation Authority this fall took over maintenance, including that of the park, the city collectively held its breath. In America, it's much easier to build civic improvements than to maintain them. So far, there's been virtually no vandalism on the Orange Line, perhaps because so many citizens' groups were involved in planning it. And the MBTA's record on maintenance is by no means bad. But in the case of the Orange Line park—a strip of public open space running through and between radically different neighborhoods—maintenance will be the ultimate test of success or failure. □

...it's everything you'd expect

C&S National Bank, Northpark Town Center, Atlanta, Georgia
Designer: Pat Bennett / Architect: Audrey Grant

C&S National Bank, Concourse, Atlanta, Georgia
Designer: Donna Bennett / Architect: Audrey Grant

...and more!

Matchless beauty, superb styling and outstanding durability. You expect that in the commercial carpets you specify. And you get it when you choose carpets made with Ultron® 3D nylon from Monsanto.

But you also get a whole lot more. Like permanent static control. Superior soil hiding ability. Perfect luster level. Rich, clear colors. And a dazzling array of attractive textural effects and patterns.

Ultron® 3D nylon. It's the advanced generation carpet fiber that makes the designer's job easier. From great restorability, to remarkable colorfastness, its outstanding performance features are adding real value to today's commercial carpets.

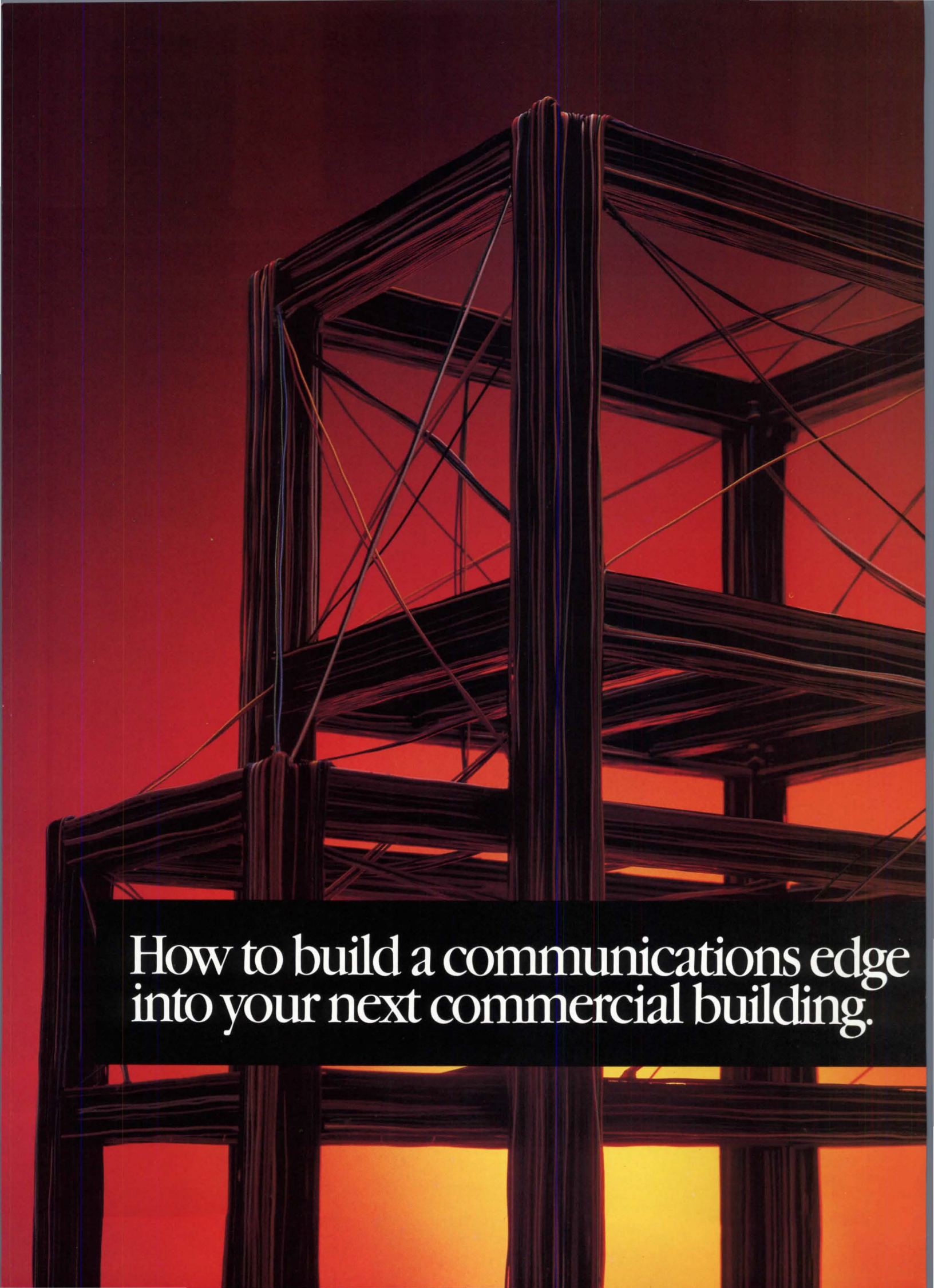
Ultron® 3D nylon carpet fibers from Monsanto - truly everything you'd expect. And more!

Monsanto Contract Fibers

ULTRON® 3D

MONSANTO CHEMICAL COMPANY
320 Interstate North Parkway
Atlanta, Georgia 30339
(404) 951-7642

Circle 110 on information card


How to build a communications edge
into your next commercial building.

AT&T's Premises Distribution System: A single wiring system that meets all your clients' communications needs.

Once, setting up the right building communications system was simple—all you had to worry about was wiring for telephones.

Today's building environment is far more complex, requiring a variety of voice, data and image systems, often from a variety of vendors. Each supported by an individual wiring scheme designed for it alone. Making it difficult to meet the communications needs of each of your clients.

Well, now AT&T can make the installation, expansion, and integration of communications systems simple again. With a complete wiring system that provides connectivity for the various types of equipment your tenants may wish to use: the AT&T Premises Distribution System (PDS).

A lot to take advantage of. AT&T's PDS incorporates every necessary element—from the cabling plan to the system administration products.

All of which results in a number of distinct advantages.

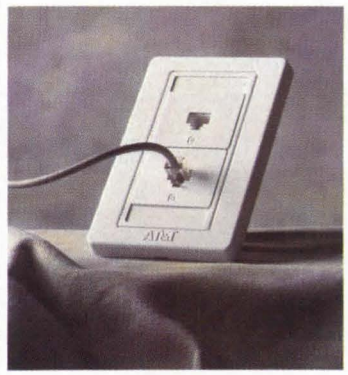
The advantage of accountability—PDS is backed by a firm AT&T commitment to provide connectivity with virtually every major vendor's equipment, including AT&T's.

The advantage of flexibility—PDS makes it easy to use the best product for each communications function. Your tenants are not locked into a single vendor's technology. And PDS supports voice and data transmission, as well as image, digitized video, and other forms of communication.

The advantage of expandability—PDS allows users to connect equipment through universal jacks that fit standard wall outlets.

The "AT&T" advantage. PDS is backed by a comprehensive range of consulting, design, engineering, and service support to ensure the system meets current and future communications needs. Our Application Assurance Program is a commitment that your PDS will support certified applications for a full five years.

For more information, call AT&T at **1 800 247-1212, Ext. 597** or mail the coupon. Or contact your authorized PDS distributor.



AT&T's PDS is a comprehensive system of basic components, from inside wire to electronic apparatus, including the Universal Information Outlet above, through which users can access PDS with hardware from virtually any vendor.

AT&T Arch 12/88
P.O. Box 1278, Morristown, NJ 07960-1278.
Please send me more information about the AT&T Premises Distribution System.

Name _____

Title _____

Company _____

Address _____

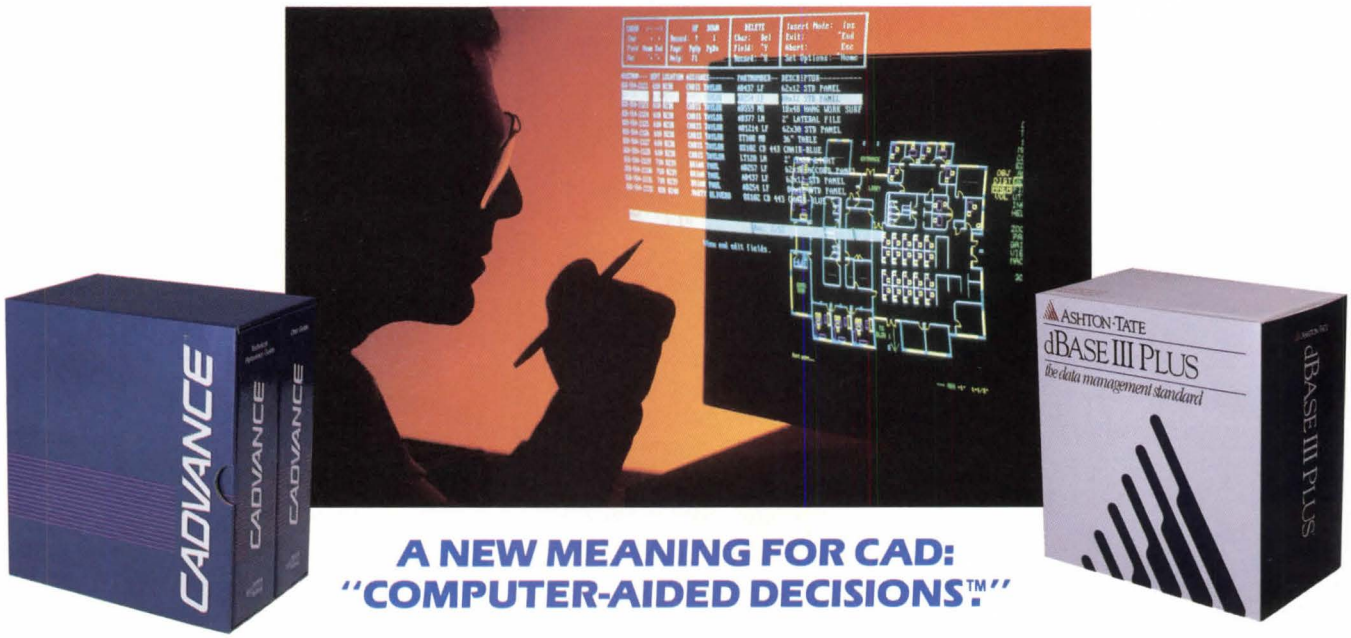
City _____ State _____ Zip _____

Phone ( ) _____

AT&T
The right choice.

Circle 112 on information card

THE CADVANCE/dBASE CONNECTION.



A NEW MEANING FOR CAD: "COMPUTER-AIDED DECISIONS™"

Link Drawings to Data and Data to Drawings.

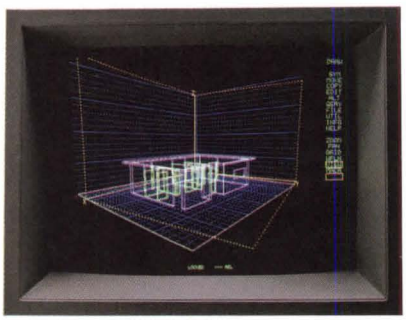
There's more to CAD than fast drawings. At least at ISICAD there is.

Now you can directly link CADVANCE® PC-CAD drawings with non-graphic information in dBASE® files for a total solution to information management.

CADVANCE Advances.

CADVANCE goes beyond ordinary computer-aided design and drafting on your PC. It allows you to manage the information behind the pictures, and puts you in total control of your project.

By linking drawings with data in a relational database, you increase the intelligence of your drawings. Keep track of inventories, estimates, costs, locations, schedules—and report on them easily. Evaluate alternatives quickly, completely and economically. Gain control of project information so you can make better, faster management decisions: "Computer-Aided Decisions."



VGS—The new standard in 3D user interfaces.

Instant Updates.

With the CADVANCE/dBASE connection, your database can be updated directly from the graphics screen—without exporting, without delay, without repeating steps, and without complication. When you change information in the drawing, it is reflected in your database. And vice versa. Information is always consistent, so you avoid potentially costly errors.

The Latest in 3D.

In addition to advanced information management capabilities, CADVANCE Version 3.0 offers full 3D drawing and visualization capabilities, including an innovative user interface called the Visual Guidance System (VGS™). The VGS sets a new standard for 3D design and gives you the easiest, most intuitive interaction with 3D available today. See for yourself how easy 3D really can be.

	CADVANCE®	AutoCAD®	VersaCAD Design®
Direct two-way link to dBASE	**Yes**	No	No
3D VGS user interface	**Yes**	No	No
AE/FM application features	**Built-in**	+$1,000	+$1,000

CADVANCE, Computer Aided Decisions, and VGS are registered trademarks of ISICAD, Inc. dBASE is a registered trademark of Ashton-Tate. VersaCAD Design is a registered trademark of VersaCAD Corp. AutoCAD is a registered trademark of Autodesk, Inc.

TIME FOR DECISION

☐ Please have a dealer call me.

☐ Please send your free brochure that explains how successful companies are making the CADVANCE/dBASE connection.

For immediate response call **800-556-1234 Ext. 281** or **800-441-2345 Ext. 281** (in Calif. only). Or send in this coupon.

Name _____ Phone (____) _____

Title _____

Company _____

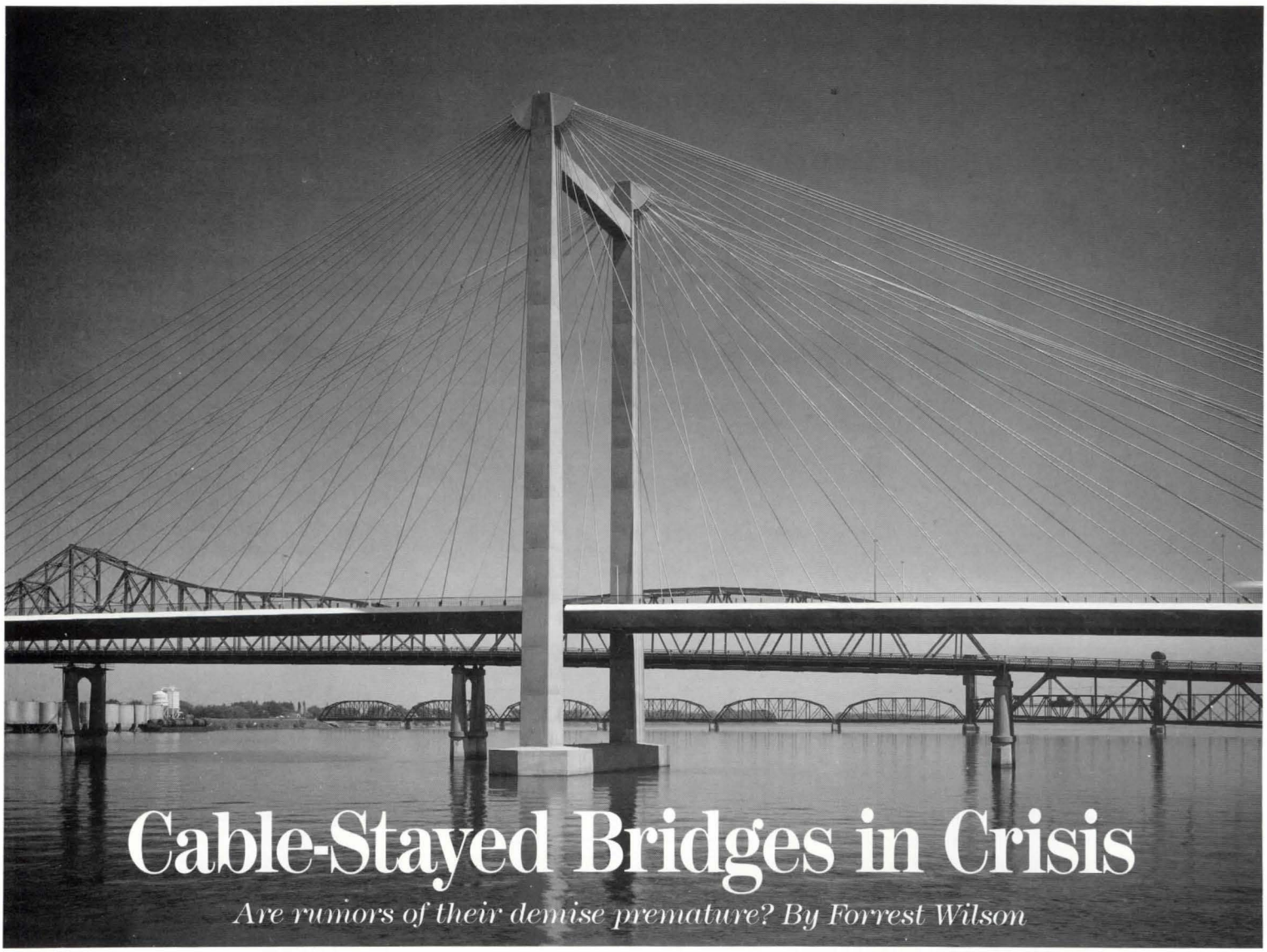
Address _____

City _____ State _____ Zip _____

ISICAD

ISICAD, Inc. P.O. Box 61022, Anaheim, CA 92803-6122

Circle 114 on information card



Cable-Stayed Bridges in Crisis

Are rumors of their demise premature? By Forrest Wilson

Cable-stayed bridges are breaking down, according to a two-year worldwide survey that found more than half of them built since World War II to be in serious trouble and many on the verge of collapse. Stewart C. Watson and David G. Stafford, reporting last April in *Civil Engineering* magazine, identified cable corrosion as the problem. Even though all the cables were protected, nearly every protection strategy tried has failed. Damage is reported to be universal.

Ulrich Finsterwalder, the renowned German structural engineer who designed the first of the postwar generation of cable-stayed bridges, set Watson and Stafford on their survey with the warning that cable-stayed bridges are "in a state of very serious premature distress." The life expectancy of some is predicted to be less than 20 years.

The great Maracaibo Bridge in Venezuela, designed by Riccardo Morandi and completed in 1962, needed its concrete-covered stay tendons replaced during the past 10 years. They will need replacement again very shortly, say Watson and Stafford. The Kohlbrand Bridge in Hamburg, West Germany, completed in 1981 as the first multicable-system bridge, required complete cable tendon replacement after three years of service. The cable covering of the Pasco-Kennewick Bridge over the Columbia River in Washington State had a predicted life of 25 years yet had to be replaced after three years, says the report.

"I take Stafford and Watson's story with a grain of salt," says Walter Podolny Jr., an engineer with the bridges division of the Federal Highway Administration. "These problems relate to early cable-stayed strands in Europe built during the 1950s and 1960s. They used locked coil galvanized strand, which was the only corrosion protection they had. These bridges are now 20 to 30 years old and suffering. Beginning in 1978 with the Pasco-Kennewick Bridge, we used different systems with better corrosion resistance." (Podolny ignored the cable-cover problems.)

T.Y. Lin, designer of spectacular bridges including a 20-year-old cable-stayed bridge in Formosa that he describes as "trouble free" and the Kwang Fu Bridge in Taiwan, agrees with Podolny. People get scared, Lin says. The situation is not as serious as some say. A bridge is designed for 50 or 60 years but actually should last 100 years if properly maintained.

What appears to be controversy is in fact another indication that engineering is not an exact science. Engineers faced with a new problem make their best calculated guess at a solution. Mistakes are inherent in the system and are the foundation of subsequent improvement. If one accepts that fundamental precept, then the story behind cable-stayed bridges becomes meaningful.

There is little news in the claim against cable-stayed bridges—

Above, the Pasco-Kennewick Bridge, the first U.S. concrete cable-stayed bridge, by Arvid Grant Associates and F. Leonhardt.

© Hedrich-Blessing

Courtesy of T.Y. Lin International

Courtesy of T.Y. Lin International

Left, the Ruck-a-Chucky Bridge project, designed by T.Y. Lin International and Myron Goldsmith, FAIA. The two photos above show the Maracaibo Bridge in Venezuela, designed by Riccardo Morandi, the first multispan cable-stayed bridge in the world.

they have been in trouble since the 17th century. But there is nothing wrong with their basic concept, says Podolny, and the problems are now better understood. Many ideas that did not work in the past have been made workable as many of the small problem areas have been identified and studied. Structures seldom fail because of design concepts—it is usually mundane details that precipitate larger problems that bring them down.

Something that is new, however, is the proliferation of cable-stayed bridges since World War II, following the destruction of a great number of bridges in Europe. Because materials were in short supply, minimum-weight design was emphasized and cable-stayed bridges were in some instances 40 percent lighter than their prewar counterparts. This advantage, combined with speed of erection and esthetic appeal, made cable-stayed bridges attractive alternatives to truss and suspension bridges.

The first bridge of the cable-stayed renaissance was the Stromsund Bridge in Sweden, completed in 1955. Podolny and John B. Scalzi, authors of *Construction and Design of Cable-Stayed Bridges* (John Wiley and Sons, 1986), say that from that time to 1972 there were 43 cable-stayed bridges built or under construction; two years later, the number had grown to 50. In 1977, there were 62 cable-stayed bridges in 19 countries. Now there are more than 200, many with serious corrosion problems linked to loading and vibration. The stress variations in cable-stayed bridges with strong motion vibrations accelerate corrosion by wearing away or breaking down the integrity of the corrosion protection systems, claim Watson and Stafford.

How do suspension and cable-stayed bridges differ? Bridges with decks supported by hangers from the catenary sag of high-strength steel cables, chains, or I-bars are suspension bridges. Bridges that support the bridge deck directly with cables are cable-stayed. Suspension bridges support the bridge deck at relatively short intervals using vertical hangers that extend from the cable to the deck. The primary cable is flexible. Cable-stayed bridges support the deck directly at several points along the span and are like cantilevered trusses but require much less material. Their simple form makes them easier to inspect and maintain than suspension bridge cables and hangers. Cable-stayed bridges fill the gap between long-span girder bridges and suspension bridges. They are beautiful and are lighter and cheaper than both.

The geometry of bridges is determined by size, wrote Myron Goldsmith, FAIA. Different sizes require different structures, each of which has an upper and a lower limit. The longest plate-girder span is 860 feet, while the simple truss has been used up to spans of 720 feet and the continuous truss to spans of 1,000 feet. The spans then increase rapidly: the steel arch spans 1,600 feet; the cantilever bridge, 1,800 feet; and the suspension bridge, a present maximum of 4,200 feet with predicted limits in the range of 10,000 feet.

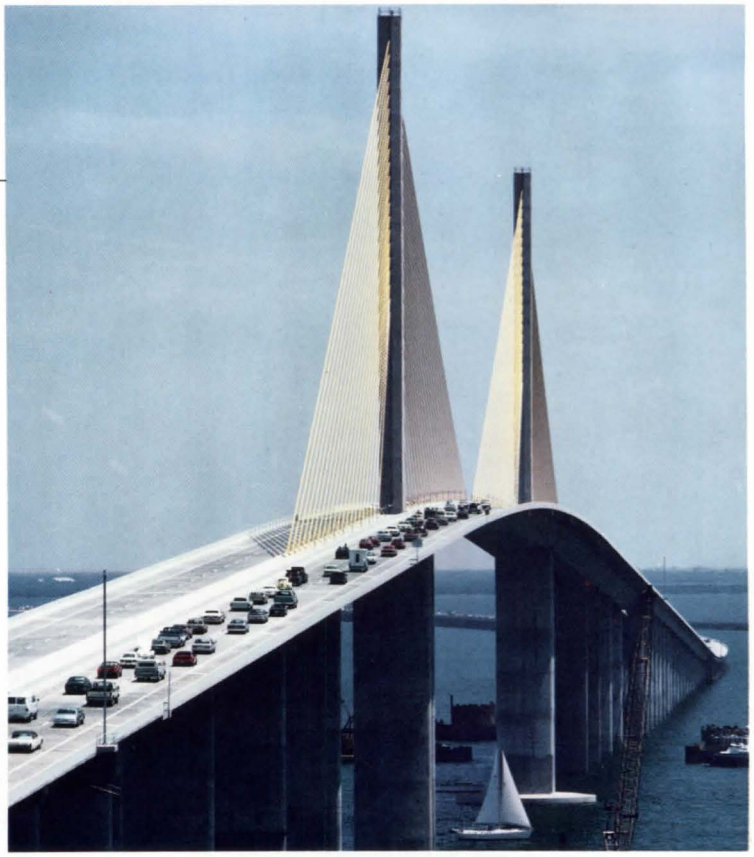
At certain limits the structural system stops being efficient, as can be seen by comparing the weights of railroad plate girders of different spans. At a span of 150 feet the structure weighs 400,000 pounds; at 600 feet it weighs 4.5 million pounds. An increase of four times in span multiplies weight eleven times. Weight increases rapidly for each incremental increase in span, and for this type of construction the practical limit is reached at a little over 700 feet.

Every structure has a maximum and a minimum size. Above 2,000 feet, the suspension system reigns supreme, while below 400 feet it is minimally efficient. An optimum size may be found somewhere between the extremes, concludes Goldsmith. There is a proper range of sizes for bridges, as for ants, antelopes, and aardvarks. It is curious that Goldsmith, a talented designer, did not include cable-stayed bridges in his chart or calculations.

The first vehicular cable-stayed bridge was the John O'Connell Memorial Bridge at Sitka, constructed by the State of Alaska highway department in 1972. A 1,200-foot center-span structure was planned to cross Long Island Sound three years earlier, but the idea was abandoned because of environmental concerns.

The Pasco-Kennewick Bridge, completed in 1978 by Arvid Grant & Associates in collaboration with Leonhardt & Andra, was the first concrete cable-stayed bridge in the United States. Lin proposed a cable-stayed bridge to cross the Bering Strait, linking Alaska and Siberia. He also proposed to span the middle fork of the American River, near Auburn, Calif., with a cable-stayed bridge. The Ruck-a-Chucky Bridge, with a span of 1,300 feet on a curve of 1,500-foot radius, was designed in 1978 but never built. The Luling Bridge over the Mississippi was completed in 1983. A cable-stayed structure over the Ohio River between East

Courtesy of T.Y. Lin International



Left, the Kwang Fu Bridge by T.Y. Lin International, built in 1977 in Taiwan. Above, the Sunshine Skyway Bridge, with its 1,200-foot main span, stretches 4.18 miles across Tampa Bay.

Huntington, W.Va., and Proctorville, Ohio, was completed in 1985. Bridges at Weirton, W.Va., Steubenville, Ohio, and Richmond, Va., were completed recently. But perhaps the most impressive is the longest cable-stayed bridge in the world, the Sunshine Skyway Bridge crossing Tampa Bay in Florida, completed in 1987, with a main span of 1,200 feet.

Cable-stayed bridges for centuries have held a seductive fascination for engineers, though their appeal has not been universal. The English in the 19th century, as well as the greatest of 20th-century American bridge builders, O.H. Ammann, felt that stays detracted from the clean lines of the catenary suspension cable. Roebling's stays on the Brooklyn Bridge have been called redundant, but one snapped in 1981, releasing enough energy to instantly kill a pedestrian on the bridge walkway.

New Zealand engineer H.J. Hopkins, in *A Span of Bridges,* wrote that "these bridges are statically indeterminate, being sensitive to changes in cable deformation, and time may show them to be irrelevant diversions from the true funicular. Certainly the unsymmetrical Severin Bridge at Cologne [with three balanced cable-stays radiating from the top of a tower on a pier that divides the bridge into two unequal spans] . . . is unlikely to be a step forward."

Despite Ammann's and Hopkin's views, however, bridge builders today are fascinated by the form and clarity of structure. The variety of fan- and harp-shaped stay arrangements and the great diversity of sculptured towers and decks are beautifully expressive variations on a simple theme. The relationship of deck support to cable attachment is as clear as the depth of beam to column spacing in classic trabeated building structures. As Pier Luigi Nervi said during his Harvard lectures in 1962, a characteristic of all great architecture is that structure and esthetic expression cannot be separated. Nowhere is this more apparent than in the cable-stayed bridge.

The art called engineering

Technical progress in bridge building is measured in longer spans and in less weight of structure supporting greater loads. The challenge of bridge design is to find the best means of connecting the pathways people have chosen to follow in the pursuit of their needs and desires. The history of bridges is told in the increasing cunning of bridge designers. The wonder of bridges is why the simple goal of connecting pathways often creates such difficult challenges and inspires bridge builders to design such beautiful structures.

New materials and new construction techniques may be the cause of failure, says design and diagnostic engineer Lev Zetlin. Science records natural phenomena observed and interpreted by scientists. The accuracy of measurement, instruments, calibration, and mathematics used to describe physical relationships determines the reliability of the science. Zetlin counters that engineers, to formulate theories, must venture beyond scientific findings and extrapolate them to apply to phenomena that have not been measured.

The effects on bridges with which engineers feel comfortable are wind oscillation and stability. Engineers have had a century of experimentation to control those effects. With cable-stayed bridges, however, the secondary effects of stress corrosion and vibration are becoming more critical, and empirical knowledge of those nonlinear phenomena is limited.

Lightness in all structures, whether bridges or buildings, is a major issue in failures, says Zetlin. Every structure is subject to dynamic loading, and engineers have much to learn about dynamic behavior. Cable-stayed bridges are light, and the vertical loads of the deck are released directly on the cable. The secondary effects of vibration and corrosion are likely to be quite different from the primary condition designed for and are certainly outside the range of structural codes and engineering experience.

John M. Hanson, president of the investigative engineering firm Wiss, Jenney & Elsner, amplifies Zetlin's comments. "When we went to school," Hanson recalls, "we were taught to analyze a building structure by its strength and stability. Engineering research has, for many years, concentrated in this direction. Yet structures today fail for entirely new reasons. Parking structures, for example, do not fail from lack of strength but from lack of serviceability."

The collapse in 1983 of the Mianus Bridge on Interstate 95 in Connecticut was a tragic demonstration of secondary effects.

© Richard Kevern

Dame Point Bridge in Jacksonville, Fla., above, topped the Sunshine Skyway with a 1,300-foot center span. Designed by Howard Needles Tammen Bergendoff, it opened in late October.

A skew bridge, in which girders are hung off of cantilevers by vertical straps connected to pins, the Mianus Bridge was constructed in the mid-'50s. It had only two parallel main girders, while skew bridges constructed earlier had more. The load had, over time, generated secondary lateral forces on the main girders that pushed the straps off the pins. There was no fracture of the straps and no shearing or crushing of the pins under the load. The lateral forces that caused the collapse did not take full effect until 25 years after the bridge's completion.

"A concrete structure designed today to withstand the same loads as one designed in 1916 will be at least 25 percent lighter. In the past many structures concealed serious errors by employing high safety factors, which, fundamentally, are admissions of ignorance. Engineers in 1916 might have got away with miscalculating secondary effects, but the same mistake today will draw blood, says Michael C. Soteriades, chairman of the department of Civil Engineering at Catholic University.

Any desired change causes changes that may be undesirable and unpredictable. The stress corrosion we are seeing in cable-stayed bridges is an unwanted result of their lightness and the longer spans to which they are being taken. But, despite its serious consequences, stress corrosion is a minor event in the history of bridge building. It will be corrected, as were the problems of material elasticity, column buckling, and wind oscillation.

In defense of cable-stayed bridges

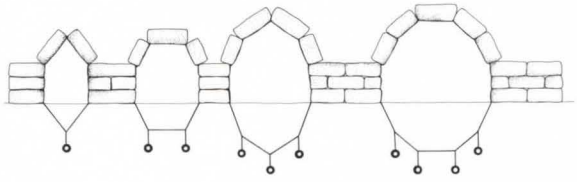
How can the problems of cable-stayed bridges exist today, despite lessons learned from the suspension bridge disasters of the 19th century, the development of building science over the past two centuries, and the emergence of computer science and new structural theories?

For one thing, maintenance is usually lacking, Lin explains: "They buy a bridge and forget about it." Building interiors are protected, but bridges stand out in the cold. The fact that the deck is fully exposed is a basic problem. If carefully constructed and designed, cable-stayed bridges should not require more maintenance than other bridges.

Research must continue because corrosion is a problem that affects all kinds of structures, including buildings and stayed towers. We must recognize that cable-stayed bridges have wind-induced vibration problems and so must have dampers in the anchorage areas, which are the most highly stressed and vulnerable, says Podolny.

But improvements and new forms are always evolving. Cable-stayed bridges are certainly no worse than any other type of bridge, says Lin. The cables are exposed and can always be improved. Lin believes the problems some new bridges are having are due to the separation of contractor and engineer: the engineer designs without thinking about construction and the contractor is ignorant of design problems. The contractor's point of view cannot be ignored, Lin concludes.

Real events cannot be explained by inaccurate theories. Forging new theories is difficult and requires great effort, as exemplified by the development of plastic design theory in steel and ultimate strength theory in concrete, says Zetlin. Both required many years and hundreds of millions of dollars but are closer to actual structural behavior than the theories they replaced. Because the new structural systems are so light, Zetlin suggests that nonlinear theories such as those employed in airplane and electrical design might be useful. □



Bridge Design Through the Years

By Forrest Wilson

Although the art of bridge building has been developing since ancient times, there has been more change in the design and building of bridges during the past two centuries than during all of previous history. While the great aqueducts of ancient Rome are awe-inspiring, the arch spans of the bridges are unimpressive—the longest is less than half the diameter of the Pantheon's dome. Still, the Romans built wonderful timber bridges, the most famous of which was Trajan's 3,528-foot-long bridge over the Danube at Dobreta, designed in A.D. 104 by Apollodorus, a Greek architect from Damascus. In another noteworthy undertaking, Caesar ordered his engineers to build a trestle bridge over the Rhine in 10 days. They did.

By the Middle Ages, bridges were being pressed into service as offensive weapons during wars. Konrad Keyser, a 14th-century engineer and author, wrote a military treatise that includes drawings of floating, folding, and catapulted bridges. Bridges for running pikemen and heavy cannon were much more daring than those designed for peaceful traffic; military engineers of the day were not concerned about long-term deflection and the niceties of bending moments.

Some of the prototypes for the bridge structures we use today began to appear in the 17th century. For example, suspension bridges of rope were standard equipment in French and British armies of that time. In 1616 Faustus Verantius, once administrator for Emperor Rudolph II of Hungary, designed a wrought-iron-link, cable-stayed bridge after his retirement from government service. Andrea Palladio designed a wood-truss bridge patterned after Apollodorus's design for the Danube crossing. (Palladio's was much shorter.) And an iron-chain suspension bridge was used in 1734 by an army from Saxony to cross the Oder River in Prussia. A Swiss carpenter built wooden cable-stayed bridges, including one completed in 1757 with a span of 193 feet. It was strong enough to carry 25-ton carriages but was burned by a French army in 1799.

Top: Hooke's demonstration of arch, 1670. Above: Ponte San Martino, first century B.C. Below: London Bridge, circa 1200.

Drawings by Forrest Wilson

By the end of the 18th century there was a body of knowledge concerning the behavior of elastic materials pertinent to bridge building, but it was slow to develop. Galileo did not begin work on the theory of bending until 1600. Leonardo da Vinci mentioned bending theory and a machine for testing the tensile strength of wire. His diagram of the parallelogram of forces, the key to most problems of elementary structural mechanics, was largely ignored. Toward the end of the 17th century, Robert Hooke proved that the deformation of an elastic body is directly proportional to the applied force. In 1705 Jacob Bernoulli published a dissertation on the deflection of beams. Euler's solution to the problem of column buckling did not appear until the mid-18th century. In 1748, Giovanni Poleni, a professor of experimental philosophy at the University of Padua, proposed an explanation for how the line of force in an arch acts. He had been investigating cracks in the dome of St. Peter's.

But if these engineering theories were to move bridge building forward, a "new" tensile material with known and controllable properties had to be found. Stone bridges did not collapse because of material failure; rather, the joints between the stones slipped, causing arches to become stress mechanisms and eventually to tumble. On the other hand, cast and wrought iron of the quality manufactured in England during the early 19th century had all of the required properties to further the investigations of building science. Iron was durable, had high tensile strength, was available in large quantities, and was

cheap enough to use for bridges, making it the bridge structure material of choice.

The history of bridges in America parallels that of Europe. The first American bridges were simple log spans, but by 1630 there was a proper wooden bridge over the Mystic River in Medford, Mass., and in 1662 a "Great Bridge" crossing the Charles River at Cambridge. The Sewell timber bridge over the Charles, completed in 1786, had 40 lamps for night lighting.

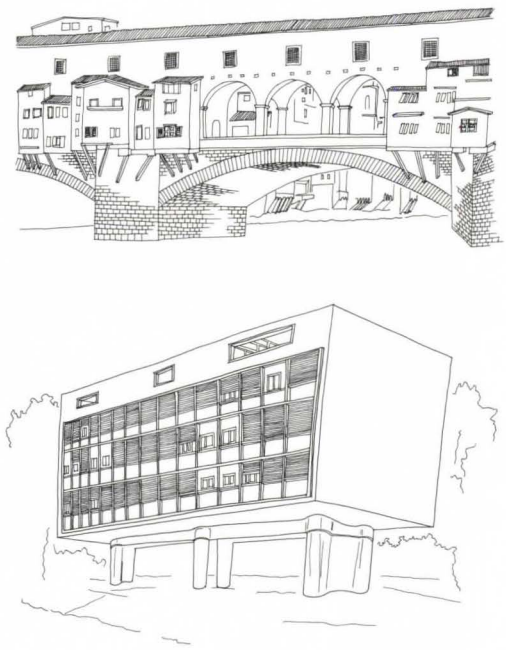
There were, of course, simpler solutions to spanning a river, such as floating bridges. But these tended to sink. As they did, new timbers were added. A crossing of Glenview Pond in Connecticut begun in the 17th century finally became a timber wall resting on the pond bottom in 1916.

The end of the 18th century and the beginning of the 19th were the era of the turnpike and the Conestoga wagon in the United States. Later, canals were dug to compete with turnpikes, and railroads extended the canals. By midcentury, the railroads dominated transportation. Then, in the 20th century, trailer trucks cruised American turnpikes at 70 miles an hour, drove railroads out of business, and ushered in the great suspension bridges of America. The Golden Gate Bridge over San Francisco Bay was completed in 1937. The Verrazano-Narrows Bridge, linking Brooklyn and Staten Island, was finished in 1964. With a clear span of 4,260 feet, it is the longest suspension bridge in the world—60 feet longer than the Golden Gate.

Timeline of modern bridge design

1779: The world's first cast iron bridge is built near Coalbrookdale in England. John Wilkinson proposes the idea. (He also predicts iron houses and iron ships and has an iron coffin cast for his burial.) The bridge is made in the foundries of ironmasters Reynold and Darby to a design by architect T.F. Pritchard. The design is significant because it is reminiscent of a stone arch, if you picture the mortar joints as iron ribs and the stone blocks left out. Its joints are patterned after timber connections. It weighs 378 tons and has a clear span of 100 feet. (The bridge still stands, preserved as a monument to the iron industry.)

1780-1820: Following Coalbrookdale, other cast iron arch bridges are built in Europe, but most fall down. Engineers conclude cast iron is an unsafe building material.



Top: Ponte Vecchio, 1345. Above: Corbusier's Pavilion Suisse bridges urban space, 1930.

c. 1800: From the beginning of the 19th century, railways supplant canal traffic in Britain, whose railway bridge building is considered the greatest in the world. The challenge to build great bridges is demanding because they must cross bodies of navigable water at high levels with as few piers as possible.

1800-1840: This era marks the golden age of wood-truss bridges in America. By the 1830s, railroads are making heavy demands on American bridge builders. Iron is introduced to counteract heavy moving loads as trains travel across the bridges.

1801: Thomas Telford and James Douglas design a 600-foot-long, cast iron bridge to span the Thames in London. A Parliamentary committee disqualifies itself as unable to judge such an audacious scheme, and a new committee of mathematicians, bridge builders, ironmasters, and professors is appointed. The project dies in committee, and a stone bridge gets built instead. Douglas goes to Paris to join the revolution. Telford goes to Scotland.

James Finley's 80-foot metal suspension bridge is the first in the world to employ a rigid, level deck suitable for vehicular traffic.

1817: British engineers Redpath and Brown design a 110-foot, cable-stayed footbridge with wire cable stays fastened to a cast iron tower.

1818: A 259-foot-long, cable-stayed pedestrian bridge over the Tweed River in Scotland is destroyed when oscillation induced by the wind causes its chain stays to break at the joints.

1820s: Ithiel Town's lattice truss and the Howe truss are introduced. The Howe truss proves to be ideally suited for use with wrought iron tensile members.

1821: The French government sends C.L. Navier, an outstanding teacher and researcher, to England to study suspension bridges.

1823: Navier returns to France and publishes *Rapport et Memoire sur les Ponts Suspendus,* a historic review of suspension bridges, and proposes theoretical methods for analysis.

1824: A cable-stayed bridge at Saale, near Nienburg, Germany, spanning 256 feet and supported by forged chain link stays, collapses. The cause is unknown, but overloading by people gathered to watch a river festival is suspected.

1825-1842: This period marks the golden age of wire-cable suspension bridges, most built in France. The French complete 114 bridges; the British, 17; the Swiss, five; and the Germans, four. Louis-Joseph Vicat proposes improvements in cable spinning, and two French bridges use this improved spinning method.

1825: Poyet, a French architect, proposes a new type of system of radiating cable stays. However, interest in construction of cable-stayed bridges reaches a low ebb due to numerous structural failures.

1826: In Paris, Navier designs *Le Pont des Invalides*, a chain suspension bridge with a main span of 557 feet. The bridge falls into the Seine.

1830: Navier's analysis of the collapse is termed "brilliant." He blames contractor dishonesty.

The French government, concerned for the safety of suspension bridges over the Rhône, appoints Vicat, a noted researcher and talented bridge builder, to investigate. Vicat advises categorically against use of

I-bars in suspension bridges in favor of wires. He conducts exhaustive corrosion experiments and warns that rigorous bar inspection is essential but seldom possible to achieve.

The South Carolina Railroad provides the first regularly scheduled rail service in the United States.

1836: The first all-metal bridge in America is built. It has a cast iron span of 80 feet and replaces a Finley suspension bridge built in 1810.

1838: Richard Delafield designs a cast iron arch bridge over Dunlap's Creek in Brownsville, Penn. It is said to be the first major arch bridge in the United States.

c. 1840: There are now more miles of railroad than canals in the United States.

1844-1850: John Roebling builds six suspension structures, five of which are aqueducts. The aqueducts' modest spans carry heavy loads of five or six feet of water for their entire lengths.

1844: The Pratt truss, suitable for all iron members, is invented.

1846: A double-web box-girder railway bridge spanning 50 feet is built by James Millholland.

1847: Roebling and Ellett both submit proposals for a bridge crossing the Niagara gorge. Ellett wins the contract. He then organizes a kite-flying contest among local boys and offers a $5 prize for flying a kite to the opposite bank. He uses the kite string to tow stouter cords until a wire rope is attached to both banks and then rides across the river in a wire basket suspended from the rope. For his next stunt, Ellett builds a suspension bridge with a seven-foot-wide deck and rides his horse over the bridge, which has no handrails. He collects tolls from thrill-seekers crossing the bridge once the rails are installed. The trade is so profitable that Ellett neglects to build the actual bridge. He is fired and Roebling is hired to complete the job.

1849: The Britannia Tubular Bridge over the Menai Straits in Wales is designed by engineer Robert Stephenson and ironmaster Sir William Fairbairn. It has four box-girder spans, two of which are 460 feet long. Extensive testing of the bridge advances knowledge of the strength of materials and engineering structures. Model tests establish its general strength, along with the effects of lateral wind pressure, thermal loads, repeated live loads, and stress on the iron plates and riveted joints (there are 2 million rivets in the bridge). Two other bridges designed by Stephenson open in Britain.

Ellett builds longest suspension bridge in the world, with wire cables and a span of 1,000 feet, over the Ohio River at Wheeling, W.Va. Its deck is 20 feet wide, and its parapets are used as bridge stiffeners.

c. 1850: Investigations of vibration, impact stress, and metal fatigue continue. A. Wohler, a German railway engineer, investigates fatigue and impact stress of railroad car axles.

British mills turn out 2½ million tons of iron annually, almost all of it puddled wrought iron. Britain's steel output tops 60,000 tons.

Wendel Bollman and Albert Fink, engineers for the Baltimore & Ohio Railroad, invent the Bollman and Fink trusses, respectively.

The Atlantic coast is connected to the Great Lakes by rail.

1853: The Atlantic coast and Chicago are connected by rail.

1854: Ellett's Wheeling Bridge is destroyed by wind.

1855: Roebling completes the Niagara Bridge, the first suspension bridge to carry railway trains. It spans 822 feet between towers, with a 24-foot-wide upper deck and a 15-foot-wide lower deck. Sixty-four diagonal stays and 56 underfloor stays are anchored to the cliffs on either side.

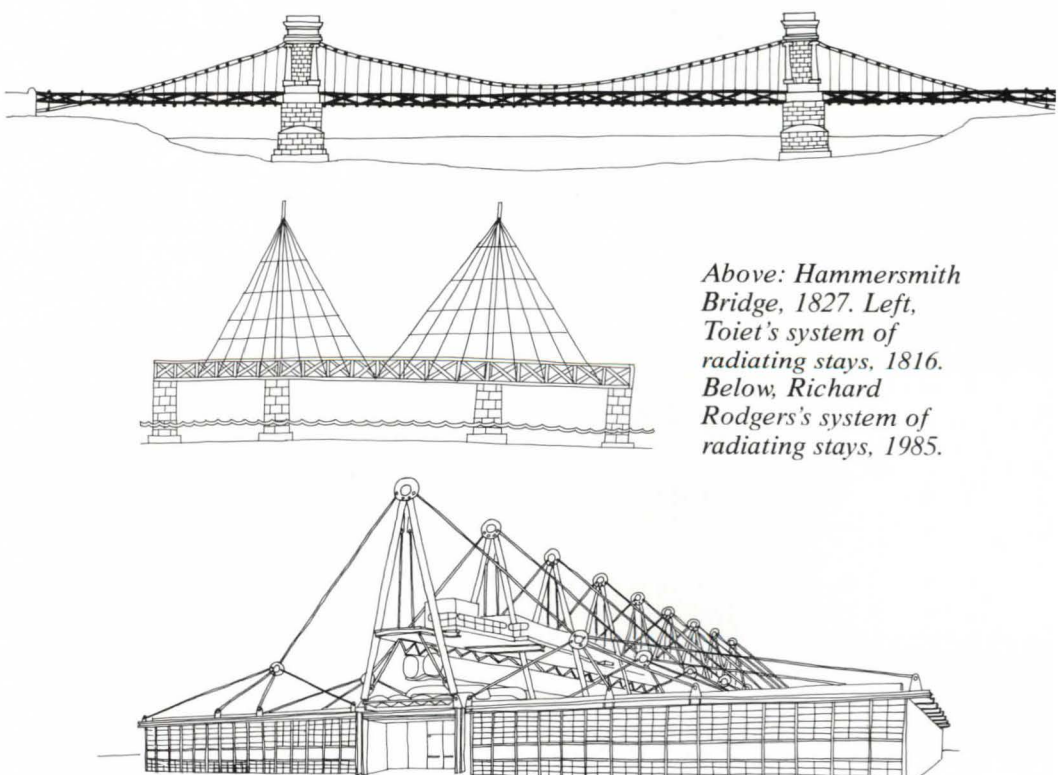
1856: The Atlantic coast and the land west of the Mississippi River are connected by rail.

1857: William Kelly in the United States and Henry Bessemer in England simultaneously discover a method to make cheap steel. The American patent is awarded to Kelly in June.

A typical "proof of performance" is conducted on the Crumlin Viaduct. The test involves six engines and a wagon, totaling 380 tons, run to the center of the 150-foot span. Its deflection of 1/1440 is ruled acceptable.

1864-1910: Steel making further improves, and worldwide the steel industry doubles its output each decade until 1910.

1864: The Clifton suspension bridge at Bristol, England, designed by I.K. Brunel,



Above: Hammersmith Bridge, 1827. Left, Toiet's system of radiating stays, 1816. Below, Richard Rodgers's system of radiating stays, 1985.

Drawings by Forrest Wilson

spans 702 feet. It is completed by Brunel's friends after his death.

1865: The Post truss is patented.

1869: The continental United States is crossed by rail from coast to coast, with the final connection at Promontory Point, Utah.

c. 1870: Iron and steel bridge parts are standardized, mass produced, and shipped to all parts of the United States.

1873: The Albert Bridge, a suspension bridge spanning 400 feet over the Thames, combines suspension and stay cables.

1874: The Eads Bridge over the Mississippi River at St. Louis is completed. Its arch ribs of cast steel have a clear span of 520 feet and a rise of 47 feet. The Eads Bridge continues to carry increasingly heavy highway and railroad traffic and remains one of the nation's most celebrated bridges.

1877: New cables are spliced in to replace corrosion-damaged cables on Niagara Bridge.

1879: The railway bridge on the River Tay in Scotland collapses, barely a year after its opening. Thirteen high girders and 12 cast iron piers topple into the Tay, carrying with them 75 people and a 110-ton train. Inquiry concludes the failure is due to faulty design and materials and poor workmanship.

1881: The wooden decks and trusses are replaced by iron and steel decks and trusses on the Niagara Bridge.

1883: The Brooklyn Bridge, spanning 1,595½ feet, officially opens on May 24. Completed after John Roebling's death by his son, Washington Augustus Roebling, and the son's wife, Emily, the bridge cost more than $21 million and more than 20 lives during its 13 years of construction.

The Williamsburg Bridge in Brooklyn is completed; it spans 1,600 feet with stiffening girders 40 feet deep.

1885: Corrosion is discovered on rollers under saddles, which had become inoperative on Roebling's Niagara Bridge. Horizontal forces are found to have damaged the stonework of towers. Iron towers replace the stone towers.

1890: The Forth Bridge in Scotland, designed by Sir Benjamin Baker, becomes the most famous cantilever bridge in the world. It uses 54,000 tons of open-hearth steel and has two major, 1,710-foot-long spans made up of two cantilever arms connected by a 350-foot-long span in the middle. Perched 150 feet above the water, its structure is so large and complex that year-round corrosion maintenance is required.

1897: The Niagara Bridge is dismantled and replaced by a heavier bridge. (This heavier bridge later will be replaced by a still heavier bridge designed for modern traffic. Neither replacement bridge is a suspension structure.)

c. 1900: This era marks the beginning of the automotive industry in the United States, with the assembly line introduced in 1915. It also heralds the start of the North American roadway network.

1905: A.N. Kryloff, a Russian engineer, proposes solutions to the problem of lateral vibration of bridges under traveling loads.

Scientists discover that the early suspension bridges were too flexible and collapsed due to excessive vibration and moving loads. This flaw is overcome in later bridges by stiffening trusses. Further research indicates that moving-load vibration diminishes with increase of span and weight.

1926: The Philadelphia/Camden Bridge is built; it has a suspension span of 1,750 feet with 28-foot-deep stiffening girders.

1929: The Ambassador Bridge, a suspension bridge linking Detroit to Windsor, Canada, spans 850 feet, employing stiffening trusses 22 feet deep.

1931: The George Washington suspension bridge opens. Designed by O.H. Ammann, it crosses the Hudson River in New York City with a span of 3,500 feet.

1937: The Golden Gate Bridge, also by Ammann, is a suspension span of 4,200 feet. It was designed as part of an integrated transit scheme for San Francisco that began the year before with the Oakland Bay Bridges. These are twin suspension bridges with a central common anchorage spanning the western arm of the bay. The original plan was for three main spans of 2,310 feet each with two side spans, but experiments disclosed that undesirable resonance would have been likely between the continuous spans.

1940: The Tacoma Narrows suspension bridge, with a clear span of 2,800 feet over Puget Sound, opens on July 1 and shakes itself to death on Nov. 7. The deck is 39 feet wide and stiffening girders are eight feet deep.

1958: The North Bridge in Düsseldorf is completed, a cable-stayed bridge of 853 feet, with side spans of 354 feet.

1960: The famous multiple-bowstring-truss bridge over the Severn River at Sharpness, England, built in 1879, is destroyed when a large oil tanker collides with a pier.

1964: The new Forth Road suspension bridge spans 3,300 feet, next to the famous Forth cantilevered bridge.

The Verrazano-Narrows Bridge between Brooklyn and Staten Island is the longest suspension bridge in the world to date.

The worst bridge disaster in American history occurs when the 700-foot, I-bar, chain suspension bridge at Point Pleasant, W.Va., collapses, killing 20 people as the structure falls on top of cars crossing it.

1966: The Severn Road Bridge, a suspension structure in England, spans 3,240 feet. Its deck is designed as airfoil section, like the wing of an airplane. This bridge has a shallow, box roadway deck and a lozenge-shaped stiffening beam that measures 75 feet wide and 10 feet deep in the middle and tapers to thin edges. Its section is 110 feet wide, which is 10 feet wider than the section of the main span of the Coalbrookdale bridge. The sections are aerodynamically and hydraulically stable. For construction, the contractor floats each 60-foot deck section weighing 130 tons down the river and lifts it into position.

1976: The Sitka Harbor Bridge in Alaska opens as the United States' only cable-stayed vehicular bridge.

1986: Now there are 18 cable-stayed bridges in use. They are designed with multistay systems, segmental concrete constructions, composite steel and concrete superstructures, parallel-strand stays, and other types of structures.

The Sunshine Skyway Bridge in Tampa Bay, Fla., has a main span of 1,200 feet and sits 175 feet above the water.

1988: Engineers Steward C. Watson and David Stafford announce that half or more of the world's 200 cable-stayed bridges are in serious structural trouble. □

Cool

a

warm

day the

way

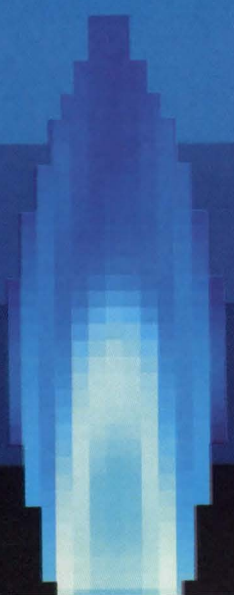
you

warm

a

cool

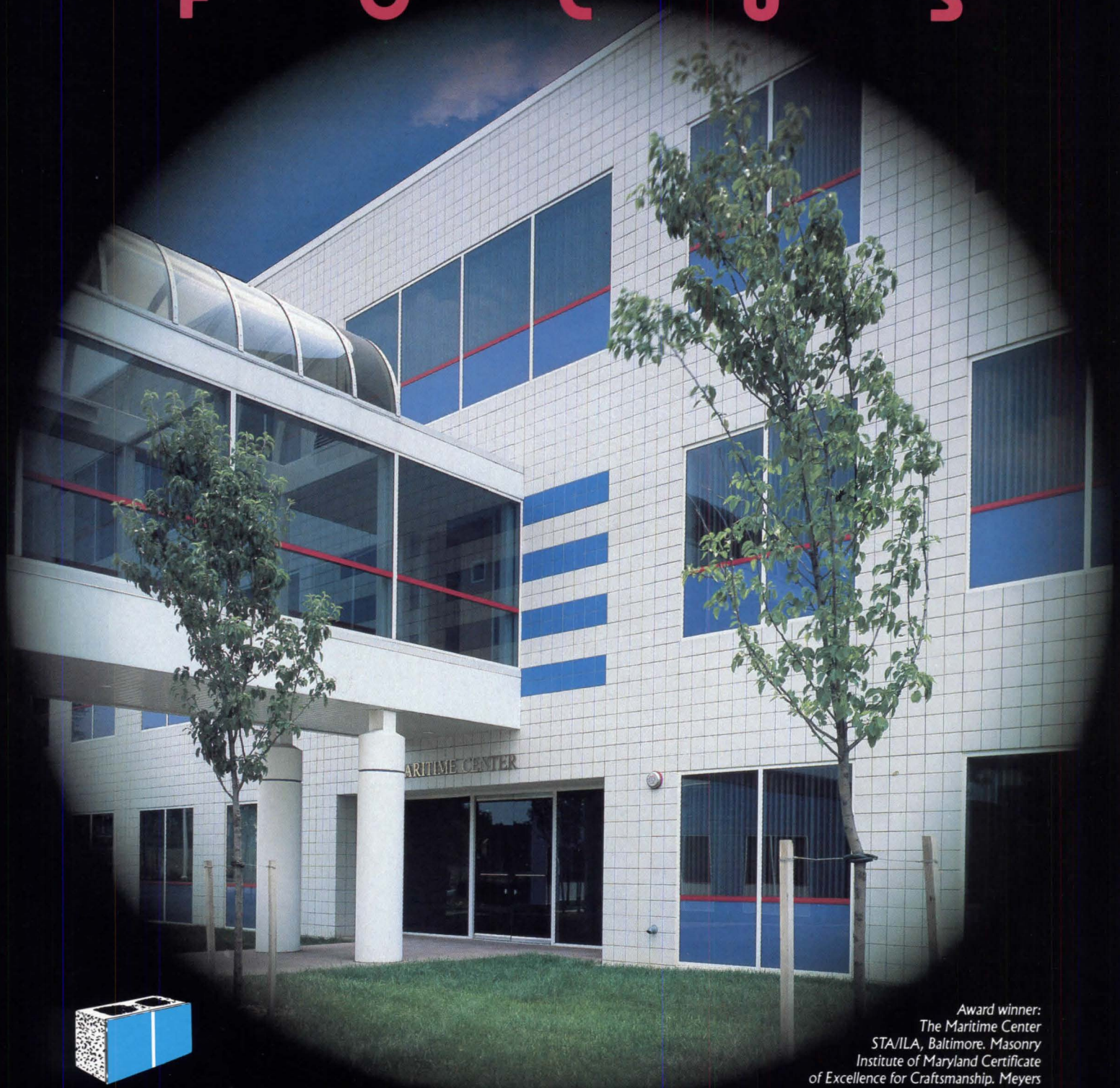
one.



Today, a new generation of advanced gas cooling equipment brings to commercial air conditioning the same economy and reliability that gas brings to heating. Before you design your next project, let your gas company show you how right gas cooling can be. Gas. America's best energy value.

Circle 116 on information card

DESIGN FOCUS



Award winner: The Maritime Center STA/ILA, Baltimore. Masonry Institute of Maryland Certificate of Excellence for Craftsmanship. Meyers & D'Aleo, architects.

Spectra-Glaze® factory glazed concrete wall systems provide an extraordinary focus on design flexibility plus low initial and life-cycle costs. Select from the endless possibilities that unlimited color, scoring, pattern and texture will provide. Plus you'll save the cost of on-site finishes and subsequent refurbishing. It's the glazed surface with a sharp focus on design & economy, backed by decades of proven performance.

THE FOCUS GROUP . . .

Spectra-Glaze II®

FACTORY GLAZED MODULAR WALL UNITS

A Physician's View of Hospital Design

The impact of verticality on interaction. By James K. Stoller, M.D.

As a physician and a resident of hospitals, I am affected daily by hospital architecture. The designs of the hospital buildings in which I work frame my daily travels, the travels of other hospital denizens, and our mutual chances to meet and communicate face to face. Because good communication among doctors, nurses, and patients is a keystone of successful medical treatment, hospital designs that encourage communication among health care providers are architecturally successful.

This essay is a clinician's view of one aspect of the impact of hospital architecture on clinical life—the way horizontal spaces in hospitals encourage face to face encounters among health care providers. The specific example concerns the construction of a new hospital—Brigham and Women's Hospital in Boston—and how replacing an old horizontal building with a new vertical one restructured interactions among the hospital staff.

I was an intern and resident at the Peter Bent Brigham Hospital between 1979 and 1981. The original building of 1912 was designed in the popular pavilion style, which had developed as a result of the theories of that time regarding infection transmission. It was thought advisable to build a hospital as a series of separate, freestanding wards so that physicians and nurses attending patients on different wards had to go outdoors, thereby preventing contagion of infection from one ward to another. At the Peter Bent Brigham Hospital (known as the Brigham), the pavilions were laid out in Wards A through F going east to west, with a main building and cafeteria at the east end (see Figure 1).

The Brigham's design was quite successful in its day, but, as commerce between wards increased, the trips outdoors became more uncomfortable, especially during Boston's long winters. The wards eventually were connected by a cloistered path to allow physicians and nurses greater ease of moving between wards. At first the path was covered but not enclosed, but the need for more protection soon became clear. As a result, the cloistered path was transformed into a ground-level tunnel through which all commerce between the freestanding wards passed. The tunnel provided the only pathway by which staff could get from one ward to the next, and from the cafeteria to each of the wards. Furthermore, with the cafeteria at one end of the complex, everyone—doctors, nurses, medical students, visitors, and service personnel—needed to move through this single tunnel space to get from one point in the hospital to any other point.

Dr. Stoller is a staff physician and the head of respiratory therapy, department of pulmonary diseases, at the Cleveland Clinic Foundation.

Over time, this tunnel became known affectionately as "the pike," short for turnpike. For interns and residents—often tired and in need of the moral support of their peers—it was a place to seek sanctuary from the exigencies of the wards, and to meet and chat. The more senior medical staff used the pike to get from their offices to the wards and the cafeteria, so the pike also was a natural meeting place for interns and residents with their seniors. Eventually, the pike became the primary site for "curbside consultations," in which interns and residents sequestered senior staff to describe cases and seek advice. Adding to the pike's usefulness were many apselike alcoves along its length, which assured privacy for the curbside consultations, preventing interruption and breech of patients' confidentiality to passersby.

Boston's old Peter Bent Brigham Hospital, built in 1912, had patient wards designed in the popular 'pavilion' style, which meant that the health care personnel had to walk outside to get between wards. At a later date, the outdoor walkway was enclosed, creating the long circulation path fondly known as 'the pike.'

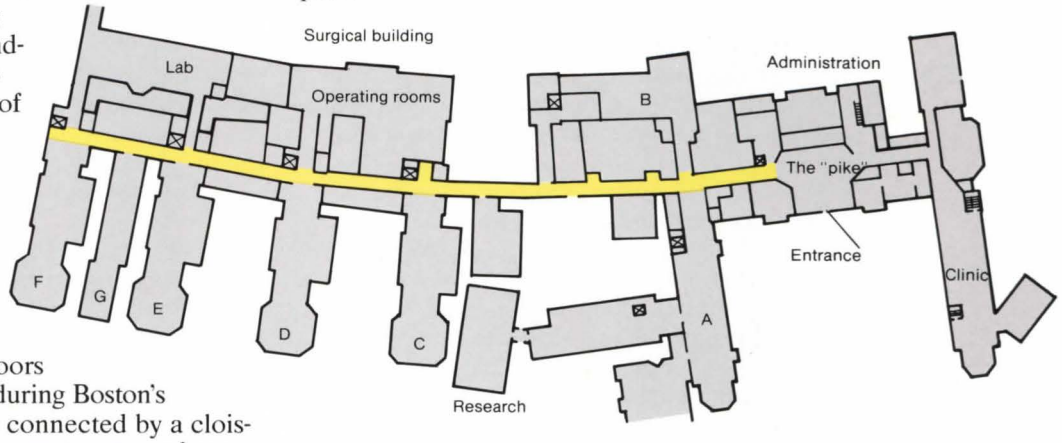


Figure 1 Peter Bent Brigham Hospital

If I have painted the scene well, the reader will appreciate the tremendous interactional and educational value of the pike. It was a place where the residents garnered essential day-to-day advice about the management of their patients and learned "up close and personal" from more senior physicians. To summarize, the pike had several very advantageous features: commonality of space, frequency of use, desirability of being there, and privacy.

As striking as the pike's impact on human interactions at the Brigham may seem, its importance was appreciated only when a new hospital was built and the old hospital abandoned. The new one—the Brigham and Women's Hospital (the agglomeration of the Peter Bent Brigham and the Women's Lying-In Hospital of Boston)—was built as a traditional modern hospital—tall and vertical. It is 16 stories tall, with wards arranged in a clo-

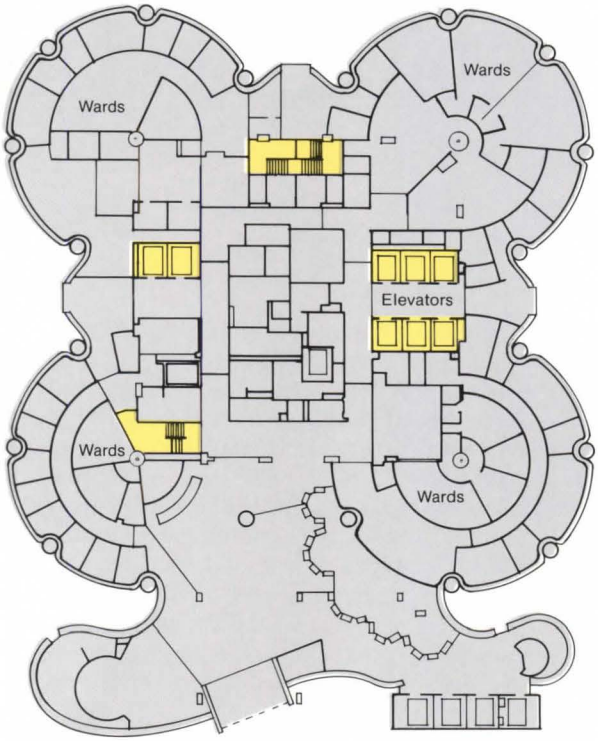


Figure 2 Brigham and Women's Hospital

Left, a centralized bank of elevators in the Brigham and Women's Hospital limits chance communication among the hospital staff.

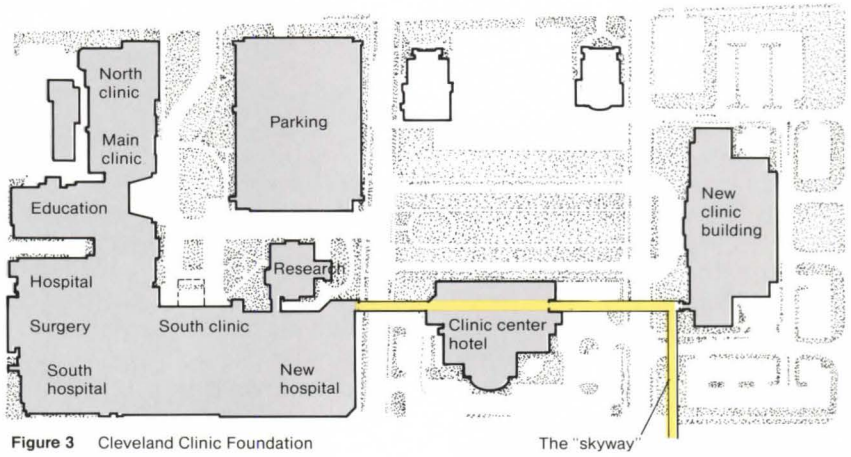


Figure 3 Cleveland Clinic Foundation

Above, plan of the Cleveland Clinic Foundation, which uses an elevated, horizontal path known as 'the skyway.'

verleaf pattern around a central bank of elevators (see Figure 2). There are no easily accessible stairs, so the central elevator bank became the main conduit for hospital traffic—doctors, medical students, nurses, nursing students, patients, and patients' visitors.

Many who had experienced the old Peter Bent Brigham Hospital readily appreciated the impact of the new building on their interactions. Although the elevator bank presented a common space with considerable frequency of use, private conversations with and about patients were no longer possible. In fact, the urge to continue clinical conversation in the elevators quickly became a problem for patient confidentiality, and signs discouraging such conversations began to appear in the elevators—signs that never had been needed on the pike. The elevator trips were short, the lack of privacy frustrated any desire of interns and residents to consult senior physicians, and these conversations rarely began *after* the elevator ride unless the parties happened to be getting off at the same floor, which was rarely the case. Thus the richness of interactions we had enjoyed in the pike was compromised. The new variable was the elevator, swift and efficient, replacing a horizontal common space where people mingled as their time allowed.

Although there probably is no way to measure the impact of this change on clinical interactions, there is no doubt that informal teaching in curbside consultations was curtailed in the new hospital and that therefore the camaraderie that interns and residents had enjoyed in the old Brigham also had been compromised. One of the Brigham's former residents once said that the reason for the erstwhile fellowship of the house staff was the presence of a common enemy—the old building—which, despite all its physical discomforts and somewhat dilapidated condition, provided a special place for the human contact so necessary for the junior staff's professional development.

I now work at the Cleveland Clinic Foundation, where, as at the Brigham, the architecture demonstrates the impact of horizontal spaces on clinical interactions in a hospital. Although relatively new (built in 1984), the Cleveland Clinic Foundation has a component that resembles the pike of the original Brigham—an enclosed, elevated passage about one-eighth mile long, connecting the hospital building with the ambulatory care building at opposite ends of the campus (see Figure 3). Delightfully, this modern pike, here called the "skyway," has a similar effect on health care providers.

The skyway is the only indoor conduit for passing between the two buildings. Just as in the old Brigham, this passageway brings people into a common space and facilitates their meeting. I can only guess that the skyway was designed primarily for some other, practical reason, probably as an indoor circulation space between buildings, rather than specifically to encourage curbside consultations. But whatever the reason for its design, its success in promoting meetings is a clear and important spin-off. No bank of elevators can ever encourage interactions in the manner of the skyway and the pike.

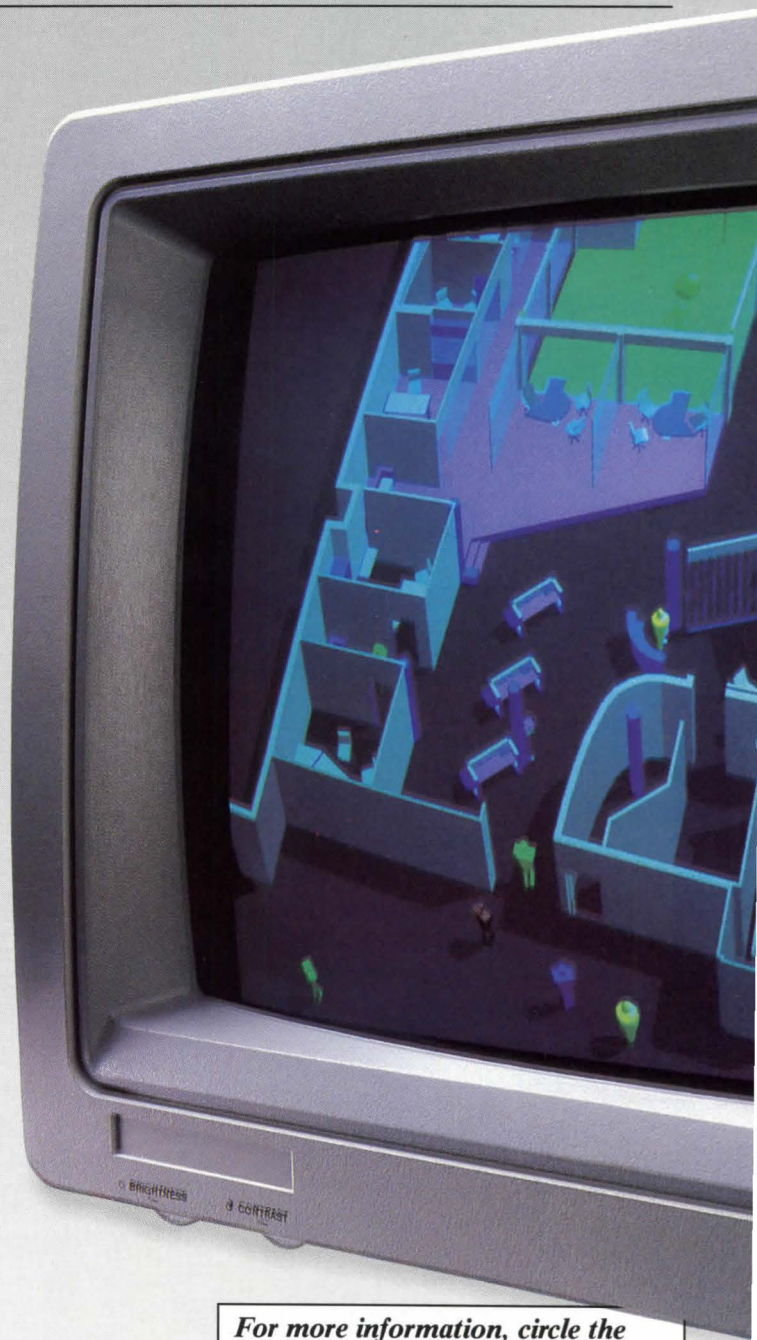
It seems to me that the lessons for hospital architects are simple: (1) One of the ways that physicians-in-training learn is through informal, impromptu conversations with senior physicians whom they encounter throughout the day. (2) These curbside consultations are encouraged when junior and senior physicians use a common space during their daily travels. (3) The common space—often a horizontal structure rather than an elevator—should permit privacy so that consultations are not discouraged by the risk of breeching patient confidentiality.

In an era favoring the vertical over the horizontal for hospital design, architects might easily overlook these important principles, but I offer my impressions as a building user, in the hope that they will be remembered. □

The author acknowledges Thomas McCormack, director of construction at the Brigham and Women's Hospital, for providing the plans in Figures 1 and 2.

Why are today's progressive architects turning to Point Line® CADD?

S I M P L I C I T Y



Building productivity.

"Fast is an understatement! After installing Point Line CADD, it took me less than a day to learn and it has increased my productivity every day since. That's good business."

Peter A. Combs, A.I.A.
Combs Gould Associates
Atlanta, GA

As easy to use as your imagination.

"After just three months our new Point Line CADD system had us turning out work faster than our sales department could ship it out. No one's faster with implementation when we install a new update or train a new operator. Point Line is clearly superior."

Donald J. Frost, A.I.A.
MSI General Corporation
Milwaukee, WI

A unique marketing tool.

"We looked at 15-20 different software packages. No one else compares with Point Line's integrated 2D and 3D programs, easy-to-learn commands and fast screen regeneration capabilities. We can

get the jobs out quicker, with more detail and added saleability. It gives us a real marketing edge."

Clare Henry Day, A.I.A.
Day & Associates
Redlands, CA

There is a difference in software performance.

If you would like to see for yourself how Point Line could save you more time, money and increase productivity, call 608-256-3025 or write Robi Graphiks, 122 E. Olin Ave., Suite 270, Madison, WI 53713.

For more information, circle the appropriate inquiry card number:

1. Send me literature on Point Line CADD. Circle # 120
2. Name of the nearest dealer. Circle # 122
3. Coupon redeemable for FREE Architectural CADD Symbols Disk with purchase of CADD module. Circle # 124

POINT LINE®

THE PERFECT WORKING RELATIONSHIP

Our new 18 Series pen plotters have been developed to work the way you work.

The range includes two dual mode models, which offer both cut sheet and roll feed for unattended plot production. You have the choice of loading any media size from E to A, including "in-between" sizes.

The 18 Series heralds a new era in convenience of use, thanks to a variety of unique features:

The Smart Buffer™ plot buffering system accepts your entire plot file in just seconds, freeing your computer for more productive use.

The Pen Manager™ system ensures that your pens do not fail by exchanging them before they run out of ink.

The Area Manager™ optimizes pen changes and pen path, enabling you to reduce your plot time by as much as fifty percent. Add to this an impressive plotting speed of 47 ips and you know that plots are produced quickly.

The Soft Landing™ pen head mechanism guarantees you clean, crisp lines of the highest quality.

The plotters also include built-in pen and media storage to help you stay organized. The 18 Series pen plotters are more than just plotters: they are complete plotting stations. And of course, 18 Series plotters work with all CAD software and hardware systems. In short, you'll find the perfect partner.

Schlumberger Graphics

Schlumberger Technologies

Circle 126 on information card

Schlumberger Graphics
385 Ravendale Drive
P.O. Box 7169
Mountain View
CA 94039 - 7169
USA
Phone. (415) 964 7900
Fax. (415) 961 - 6152

How A/E Firms Lose Federal Jobs

An inside view of their mistakes in presentation.
By Jon T. Adsit, AIA

After 12 years serving on architect/engineer screening panels for three federal government agencies, it has become painfully clear to me that most A/E firms are unaware of the time factor that directly affects the judging of their submissions, Form 254 (Architect-Engineer and Related Services Questionnaire) and Form 255 (Architect-Engineer and Related Services Questionnaire for Specific Project). In fact, if architects knew just how little time is available to review submissions, they probably wouldn't do many of the things they do.

It is an unfortunate fact of life that screening panels have minimal time to review individual A/E submissions. The reason for this is that it is not unusual for a major federal construction agency to receive as many as 70 or 80 submissions on a given solicitation. With three days typically allocated for screening 254/255 submissions, each panel member has no more than 10 minutes (on average) to review any single submission. Therefore, the properly prepared 254/255 submission must be able to communicate its message within this 10-minute window.

For those who may doubt the validity of the 10-minute window, let's take a hypothetical example. A building "gut and rehab" project encompassing approximately 100,000 gross square feet of space is the type of project that might draw 75 responses from a *Commerce Business Daily* solicitation. The screening panel, consisting of three to five members, is given three days to review the 75 submissions. Three days (24 working hours) sounds like a lot of time, but on a closer look we find that one hour each day is lost in the morning trying to get the panel members dislodged from their regular work assignments and into the conference room; one hour is lost due to lunch; a half-hour is lost to rest breaks (typically one in the morning and one in the afternoon); one hour is lost at the end of each day for concluding business, returning phone messages, etc.; and about 20 minutes each day is lost due to interruptions and bathroom breaks (panel members tend to drink a lot of coffee). This erosion of available time reduces the original 24 working hours to 12.5 actual working hours. Converting actual working hours to minutes and dividing by 75 confirms the 10-minute window.

Another fact of life that is directly tied to the 10-minute window is that screening panels generally are eager to find reasons for throwing out, or marking down, a submission. With as many as 70 or 80 submissions and minimal time, panels are not worried about finding three to six highly qualified teams for the short list. Consequently, confusion in a 254/255 submission generally is fatal nine times out of 10, and ambiguity will more often than not result in lower scores. Give your firm a fighting chance by making sure your 254/255 submission is completely responsive to both the solicitation requirements and the specific project to the maximum extent practicable. Don't give the panel reasons for keeping your firm off the short list.

Many A/E firms are still concerned about preselection on federal projects. They shouldn't be. In today's A/E contracting environment, preselection is not an issue. The Brooks Act selection procedures, which are an integral part of the Defense Acquisition Regulations and the Federal Acquisition Regulations, typically make the selection process on federal projects more equitable for A/E firms than do similar procedures in the private sector.

Performance, on the other hand, is a big issue with federal agencies. Because of this, bias based on a firm's past performance can be a pivotal factor. Lackluster or poor performance on previous work done for an agency acts like the kiss of death. This is true particularly if the poor performance has been documented officially in the agency's files. Naturally, a track record of good performance on previous work is likely to enhance a firm's standing with the screening panel and may result in a higher than normal score. Average performance on previous work is neither a minus nor a plus. If your firm falls into this category, like the Avis car rental company, you're just going to have to try harder.

Another consideration that A/E firms may neglect in preparing 254/255 submissions is agency policy. If you're going to pursue federal work seriously, you need to check agency policy. Some agencies will not award a prime contract to a firm that already is under contract. Some agencies may also practice an unwritten "spread the wealth" philosophy and will have their own program objectives regarding small-business set-asides. Keep your consultants in mind, too, when checking agency policy. Some agencies are reluctant to award a large contract to a firm that

Sketches by Jon Adsit

'Panels tend to get burned out near the end of each day.'

Mr. Adsit is senior facilities architect at the National Institutes of Health in Bethesda, Md. He has served on and chaired A/E selection panels for NIH, the General Services Administration, and the Department of the Interior.

has a consultant already working on a large contract for that agency. Since a firm's project response capability often is a key concern, lower scores may result if this is the case.

The 254/255 submission itself must be clear, concise, and easily read to take full advantage of the 10-minute window. It also must concentrate on project-applicable specifics. In order to score well, a 254/255 submission *must* be customized for the project under consideration. Today, now that word processors abound and proposal-writing software is readily available, there simply is no excuse for not customizing a submission. Submissions also must attempt to address specific concerns to the greatest extent possible. This is not always easy to do, but it's an area where firms good at marketing will succeed, while "CBD chasers" will fail.

The following suggestions should help you take advantage of the 10-minute window on your next 254/255 submission.

1. Eliminate ambiguity with regard to office location (where's the work going to be done?) and personnel by office (who's doing the work and where are they located?)
2. Make sure that staff allocation by discipline is clear (Part 4 of the 254 and 255, called "Personnel by Discipline"). It can be confusing if a firm's treatment of "multiple hat" personnel is unclear.
3. Be crystal clear on joint venture submissions. Indicate the rationale for the joint venture and the allocation of partner responsibilities. Don't indicate a joint venture submission unless there truly is one. Don't use "affiliated" responses. The government contracts with prime A/E firms and joint ventures. "Affiliated" A/E firms are a nonentity at worst and an ambiguity at best.
4. List all the consultants you intend to use. It's better to cover the waterfront by including a consultant you think you might need than not to list the consultant. Panels sometimes are looking for particular capabilities in applying the published rating criteria for a particular project. Don't forget to submit a current 254 for *every* consultant listed in the 255. Not all solicitations require this, but smart firms will do it anyway.

'Screening panels generally are eager to find reasons for throwing out, or marking down, a submission.'

5. When possible, use consultants you have worked with before. Team dynamics and the familiarity of working together to ensure good project control and quality results are especially important in the minds of panel members. If you need to use a consultant with whom you have not worked before, try to use one that has experience working with the targeted agency.
6. List under proposed key personnel only project experience that is applicable to the project in question.
7. Use Part 10 of the 255 for project-specific information. Present information concisely in "briefing paper" style. Streamlined language, underscoring for emphasis, and bullets to highlight facts can be very effective in communicating project-specific data.
8. Limit project experience to appropriate similar projects. A few good examples are better than a lot of nonapplicable projects.
9. Date and sign the 254 and the 255.
10. Don't assume the agency has your current 254 on file, even if you sent it last week. Not all agencies maintain a current 254 reference file.
11. Make a commitment to the information you submit in the 255. Don't "bait and switch." A firm that changes office locations or personnel after making the short list on the basis of originally submitted information may severely compromise its chances of winning the project. Any switch has to be perceived by the panel as being in the best interest of the agency. If it isn't, you've blown your opportunity to win the project.
12. Don't play games with the solicitation requirements. For example, if your firm is not located in the geographical area of consideration, you're better off passing on the project than contriving a convoluted arrangement with a local firm. A typical example would be a large firm using a small local firm to "front" the submission as the prime A/E. Although some firms may think this is creative proposal writing, such tactics always are viewed by the panel as schemes to circumvent the solicitation requirements and are scored accordingly.
13. Respond to *all* aspects of the solicitation. Don't leave anything out, and don't assume anything.
14. Read the solicitation carefully if you plan to use supplemental data—it isn't always allowed. If supplemental data is allowed and you plan to use it, make sure it's meaningful, and cross-reference it to the 255 so that it's easy for the panel to find.
15. Make a concerted effort to include only meaningful information. Contrary to popular belief, A/E submissions are not evaluated by the pound. A small amount of relevant, project-specific data generally is viewed far more favorably by a screening panel than a lot of general information and unnecessary verbiage.

One last point: Make your 254/255 submission as distinctive as government standard forms and good taste will permit. Unless your submission is one of the first reviewed on a given day, the chances are it will not receive the attention it deserves. Panels tend to get burned out near the end of each day. A distinctive submission is likely to capture interest and assure your firm a fair day in court.

The best advice to any firm is do your homework up front. Know as much about the targeted federal agency as you can in terms of agency mission, programs, facilities, internal operations, budget projections, concerns (political and nonpolitical), and attitudes in general toward A/E firms. By doing your homework, you will be in a far better position to fine-tune your 254/255 submission to the needs of the targeted federal agency. If your submission has taken advantage of the 10-minute window, the result will be more bang for the buck and a better chance of making the short list. □

Performance Without Sacrifice

Engineered for extraordinary performance. Designed for exceptional aesthetic appeal. The Classic series of surface mounted door closers from Rixson-Firemark.

- The clean, uncluttered geometric line...
- cold, rolled steel arm...
- durable *metal* cover for uncompromised plated finishes...
- A precision mechanism characterized by cylinder tolerances held to .0005 of an inch.

Indeed, this is the Classic surface mounted door closer.

RIXSON

RIXSON-FIREMARK
A MARK IV INDUSTRIES COMPANY
9100 West Belmont Avenue, Franklin Park, Illinois 60131 (312) 671-5670

Circle 128 on information card

ARE PEN PLOTTERS DRIVING YOU CRAZY?

It's the waiting that gets to you first. The agonizing wait as your pen plotter draws. And draws. And draws.

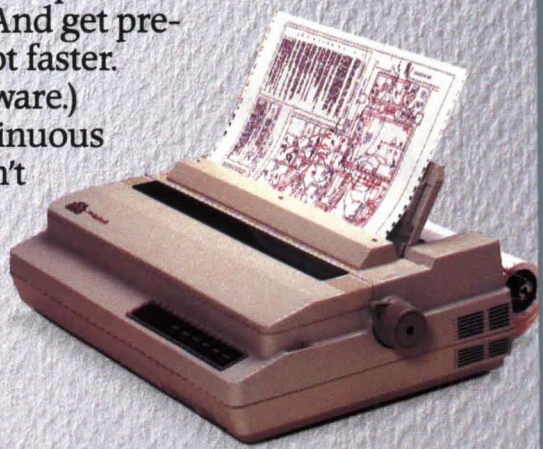
Then sooner or later, the pen dries up. And so does your patience.

Don't get mad. Get the JDL 850 GL+ plotter/printer. And get precision 2-D or 3-D color plots—on A to C-size media—a lot faster. (Faster still with our new AutoCAD™ ADI Fast Plot™ software.)

And the 850 GL+ won't keep you on edge. With continuous roll media, plot spooler and auto configuration, you won't need a "plotter sitter" to keep an eye on the inkwell.

Call or write JDL and join the thousands of 850 GL+ users producing intricate design drawings, architectural renderings, and job-specific CAD applications.

And leave the ink blots behind.



JDL
Japan Digital Laboratory

2649 Townsgate Road, Suite 600, Westlake Village, CA 91361. West: (805) 495-3451 East: (704) 541-6352

Nationwide service by BRUNING AutoCAD is a registered trademark of Autodesk, Inc.
HP-GL is a trademark of Hewlett-Packard Corporation. ©1988, JDL

Circle 130 on information card

Hardware for Communicating Architectural Ideas

By Oliver R. Witte

Few of the groups an architect encounters are easily persuaded to accept new ideas, mostly because they find it difficult to visualize the effect a proposed building will have on them. Many a worthy project never made it to working drawings because of uncertainty by lenders, zoning boards, planning commissions, buyers, tenants, citizen committees, or others.

So far, computers have been put to work primarily on the last phase of design development—the preparation of construction documents—with some nod toward marketing the firm itself. Now attention is turning to using the computer to market the firm's ideas.

Current graphics software does a remarkably fast and accurate job of representing how a proposed building's spaces and shapes will be organized, colored, textured, lighted, and supported. Displays on the computer screen are vivid and lifelike. "Walk-arounds" and "fly-throughs" are almost old hat. The latest CADD programs even enable an architect to work in apparent three-dimensional space rather than just in a 2D representation of 3D space.

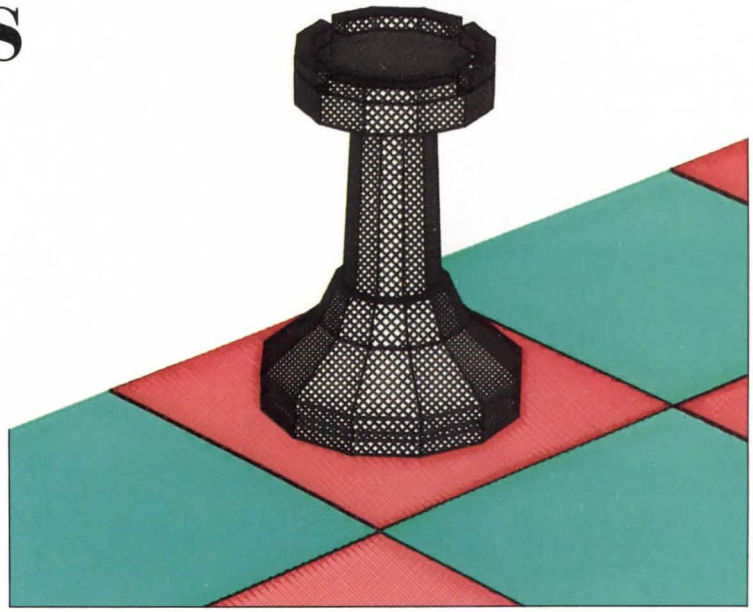
The weak link has been in transferring the computerized display to hard copy so others can study, understand, and work with the architect's ideas. What follows is a look at the hardware that can help architects make this transfer. It includes plotters, dot matrix printers, ink jet printers, color thermal transfer printers, laser printers, electrostatic printers, and film recorders (slide makers). They range in price from a couple hundred dollars to more than $150,000, but even the most expensive can be affordable if it turns on a light in the mind of an influential doubter and thus permits an otherwise dead project to be built.

In choosing an output device, it is crucial to coordinate it with software that can instruct (drive) the device properly. The advice used to be to select the software first and then the hardware. But today it is more effective to think in terms of buying a matched set capable of generating the desired documentation. If a computer program is not capable of driving the preferred output device, one answer might be to consider another program.

With printers, resolution is an important consideration. Other things being equal, the higher the resolution the crisper the output will look. But other things often are not equal, and, as with land planning, it's not how dense you make it, it's how you make it dense. Color, for example, affects the perception of density. So does the size of the dots.

Buyers must trade off resolution, speed, and price. In general, the unaided eye cannot distinguish differences in the smoothness of an arc printed with a resolution higher than 400 dots per inch. For text, 300 dots per inch is considered close to typeset quality. Research by one manufacturer shows a bigger jump in the perception of quality from 200 to 250 dots per inch than from 250 to 400.

Although there are numerous ways to convey visual information, this article will deal primarily with paper and film.



Plotters

Plotters are used primarily by CADD programs to produce working drawings. Although distinctions are blurring, it may still be said that plotters draw lines, whereas printers place dots or characters. Some vendors are starting to call a plotter any large format device that generates working drawings from a CADD program. However, the older definition is used here.

Because CADD programs store their data as lines (vectors), plotters have proved to be simple, efficient CADD output devices. Some 20 percent of all plotters are purchased by architects. Mechanical engineers buy 20 percent and design engineers 50 percent. Business graphics users make up only 10 percent of the market because plotters are not most efficient with fills and text.

Plotters contain three systems: a drawing tool, a medium on which to draw, and the electronics and hardware that take the image from the computer. Different sets of vendors sell each kind of component, and a high-quality drawing requires that all three work together. Most plotters move both the medium and the drawing tool simultaneously.

Most architects prefer size formats E (36x48 inches) to D (24x36 inches). Most manufacturers also offer a roll-feed option in 36 or 24 inches wide. They permit the longer dimension to be extended as desired. Other popular formats are A (8½x11 inches) and B (11x17 inches).

Manufacturers now are waging a specifications war involving speed, reliability, repeatability, and accuracy. Other important issues include number of pens, ease of use, support, amount of memory to hold the drawing while it's being plotted, ability to program the plotter for common applications, damping, pen and vector sorting, warranty, and noise.

Comparisons can become quite complex. Speed is particularly

The drawing above, created with Versacad software, was produced with a Houston Instrument DMP-61 plotter equipped with a six-pen changer using disposable-ink drafting pens on mylar film.

tricky. How fast the drawing tool moves across the sheet is important if the plan has a lot of long lines. If most lines are shorter than four inches, then acceleration—how long the drawing tool needs to get up to full speed—may be more significant. On another level, the speed of the drawing tool means little if it is so fast that the line quality deteriorates. Damping is an attempt to slow down the drawing tool just before it slams into the drawing medium.

Furthermore, the raw speed of the plotter means little if the computer driving it is tied up during the entire plotting process. Plotters accept a only small amount of information at a time and then ask the computer to send more. The situation is so serious that architects often will buy an inexpensive computer and dedicate it solely to driving the plotter. Some plotters now have a buffer that, if big enough, can accept an entire drawing, respond to repeated calls for data, and return control of the computer immediately to the user.

Still further, most CADD programs output vectors in the order they were entered. If the architect draws for a while with one pen in one corner and then switches to another pen to draw in the opposite corner, the plotter will follow the same sequence. Some vendors equip their plotters with the ability to search the buffer and rearrange the drawing sequence for optimum efficiency.

Finally, none of these tricks mean much if they are so difficult to use that the operator spends more time researching manuals than in productive design. To cut through all the components of speed, vendors talk about "throughput," which is the total time it takes to get a hard copy once the drawing is completed.

But beyond throughput, speed—however measured—is significant only if the quality of the drawing is acceptable. In the final analysis, both speed and quality are subjective judgments. The best way to make a selection may be to test-plot a typical drawing on a variety of devices and see which meets the firm's needs best. The comparison is worth some time because large-format plotters range in price from $3,995 to $27,000.

Drawing tools

Control over plotting quality requires attention to the other two components of a plotter: the drawing tool and the drawing medium.

The two kinds of drawing tools are pen and pencil. The pen is by far more common, but the pencil is new and poised to make a serious challenge. The first plotter pens were refillable with liquid ink. Three years ago, disposable pens were introduced. Disposables eliminate the chore of cleaning the pens, but they don't offer as wide a range of colors or line widths. The line quality is identical to the unaided eye or to the blueprint machine. Options in pen tips include stainless steel, tungsten carbide, jewel, ceramic, roller ball, ball point, fiber, and plastic. The choice depends primarily on the drawing medium. Not all tips are available from all vendors. The ceramic tip, for example, is available primarily from Pentel, which pioneered it. For final plots, Clearprint recommends a stainless steel tip on vellum. Plotter pens can cost as little as $7.95 for a pack of four for business graphics or as much as $27.75 for a tip, $15.50 for a refillable pen, $2.40 for ink, and $12 for a cleaning kit.

The pencil is the hottest new plotter drawing tool. Because it does not depend on ink flow, it can zip along at twice the speed of a pen on plots with long lines. Its line quality is consistent and it reproduces well. Pencil on mylar is dark enough to be indistinguishable from ink when printed. Pencil lead is less expensive than pen and ink. Small last-minute changes are easy to make by erasing and redrawing by hand. And pencils don't leak.

Plotting media

The final ingredient in quality plotting is the output medium. Typical options for plotters include polyester film, vellum, and sulphite bond, which comes in opaque and translucent versions. High-gloss bond and clear polyester often are used in small-format plotters for business graphics to be handed out or displayed on overhead projectors.

Polyester film is the most durable and is used for archiving. Vellum is 100 percent cotton rag paper that has been treated to make it translucent. It is durable enough to be suitable for final plots. Sulphite bond paper is used primarily for check plots—translucent if it is intended to produce diazo prints and opaque if it is not. Translucent bond is more economical than vellum.

If drawing quality is unsatisfactory, the fault often can be traced to a poor match between drawing tool and drawing medium, inadequate maintenance of refillable pens, or too high a plotting speed. For example, a roller ball tip usually is not recommended for use on polyester because the abrasive finish will cause excessive wear of the tip. Fiber tip pens work better on acetate than on vellum.

Complaints about pens running out of ink declined when manufacturers introduced the transparent reservoir. Users can tell at a glance when ink is running low.

Dot matrix printers

Dot matrix printers continue to be the workhorses of the computerized office. This category used to be called "impact printers" because it included daisy wheel printers that placed fully formed characters on a page, much like a typewriter. But sales of daisy wheel printers have dropped sharply because they are slow, expensive, and unable to handle graphics.

Dot matrix printers are used primarily to output text and spreadsheets, and they do it inexpensively and reliably. Small, nine-pin units produce readable output for as little as $250. Printers with 18, 24, or 27 pins offer higher resolution at a price of $750 to $1,600. The cost per page for dot matrix printers is lower than for any other type of computer output device.

Because they are impact printers, dot matrix units can accept continuous, multiple-part forms. They print envelopes more conveniently than laser printers, and wide-carriage models can generate larger-size documents. They also are flexible enough to print graphics in color and text accented with italics, underlining, and strike-through.

But dot matrix printers are limited in their ability to produce graphics and a variety of text sizes and types, compared with other options. They are also relatively slow and noisy. For top speed, users select draft mode, which might be unacceptable for office use because of the obvious dot pattern. "Near letter quality," or NLQ, is better but slower. "Letter quality" (LQ) is intended to suggest that the text looks as if it had been produced on a good typewriter. Furthermore, dot matrix printers work most productively with "tractor-feed" forms, which leave tiny dots of paper on all four sides when the page is separated. Printing on stationery is inefficient without an optional feeder.

Ink jet printers

Ink jet printers are among the fastest growing output devices. Among color devices, they now rank second in market share behind plotters and account for 24 percent of sales volume. Ink jet printers work much like dot matrix printers. A print head puts down dots of ink as it moves across the page. But rather than striking a ribbon, the ink jet sprays droplets of ink.

Ink jet printers have been available for years but never caught on because the nozzles tended to clog and require maintenance. They are catching on now because manufacturers have improved their reliability and because modeling and paint programs need a device that works with dots of color from a raster format. Printing speed in black and white is about two pages per minute, which is comparable to a dot matrix printer but a third the speed of a laser. A full page in full color takes about four minutes.

Color thermal printers

Color thermal printers also reproduce computer images in color, but they do it differently from ink jets. In one process, the print head liquifies a wax-based ink from a plastic roll and transfers it onto the page. The density of resistors in the print head determines the resolution of the printer.

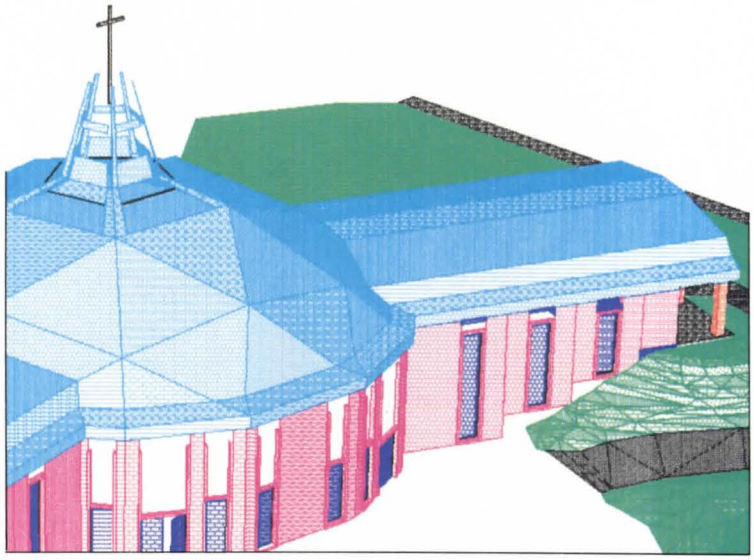
Sales of color transfer printers have been limited by prices, which start at $5,000. (Other kinds of thermal devices cost $200 or less, but they are suited only for text.) Last year 13,400 color thermal printers were sold, compared with 215,000 ink jet printers.

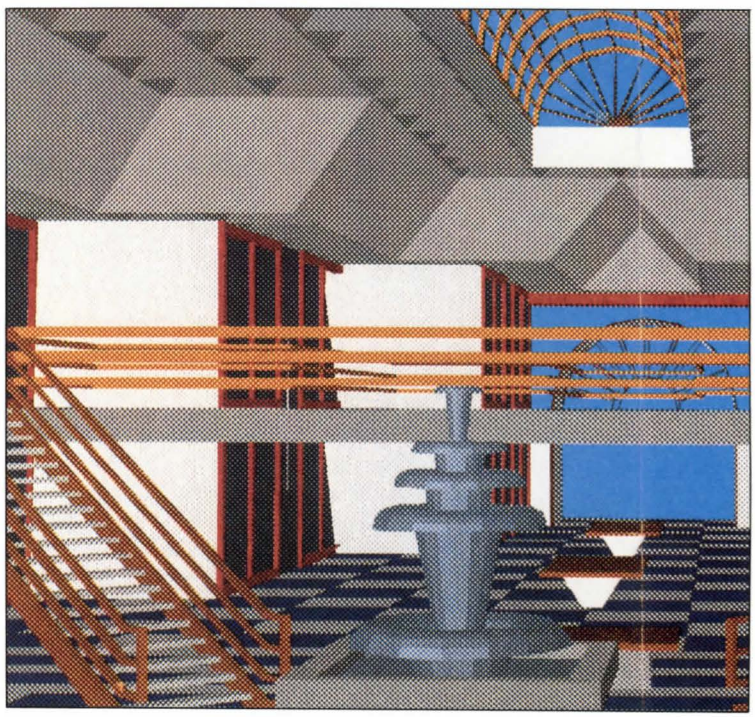
Electrostatic printers

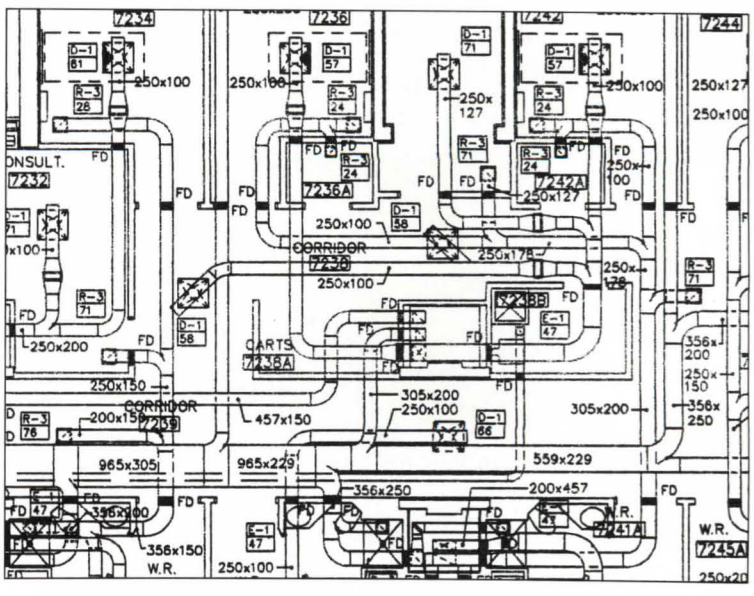
Those who consider the pen plotter a dinosaur see as its successor the electrostatic printer. It writes directly on coated paper. An electrically addressable print head puts a charge where the image is intended to go, and the toner is applied directly to the charged portion of the paper. A major break this year cut the price of monochrome electrostatics in half and brought it into the $20,000 range. Only 9,700 electrostatics were sold last year, but a 10-fold increase is expected this year and steep gains are expected to continue in coming years.

Electrostatics solve the biggest problems with plotters: slow throughput. The plotter can become a major bottleneck as drawings bunch up for output at the conclusion of a major project. The speed of electrostatics is measured in the number of inches per second that it takes the drawing to roll out of the printer. A typical speed is one inch per second.

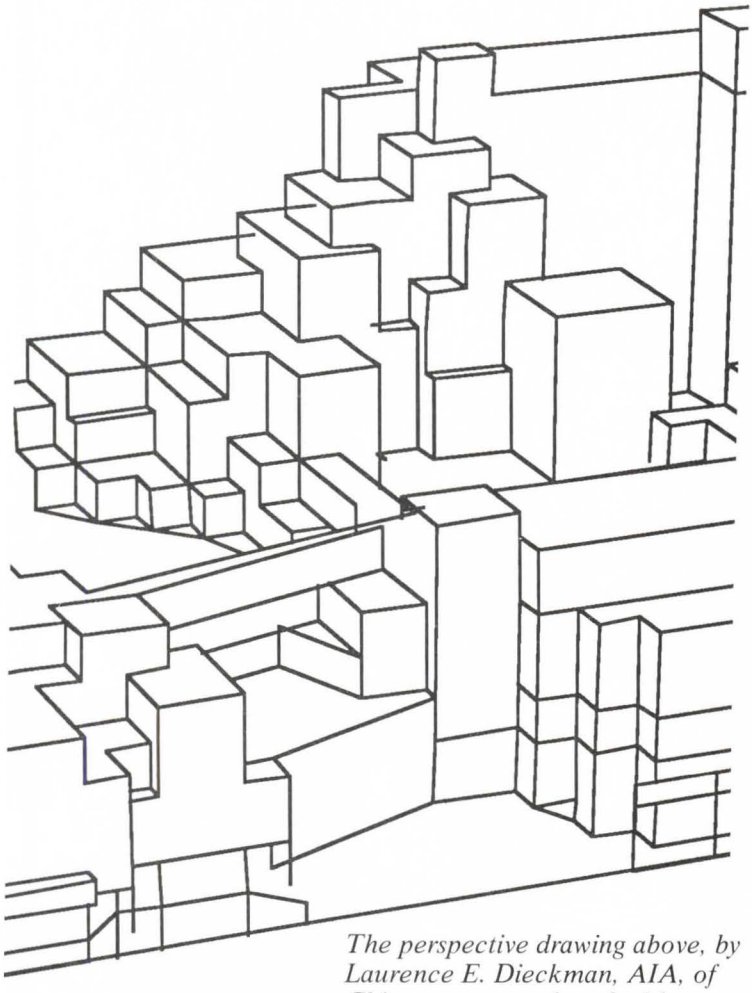
Comparing speeds of electrostatics and plotters is difficult. A simple drawing with only a few lines might actually go faster on a plotter. The electrostatic must convert the vector information in a CADD drawing to dots. The process is called rasterizing



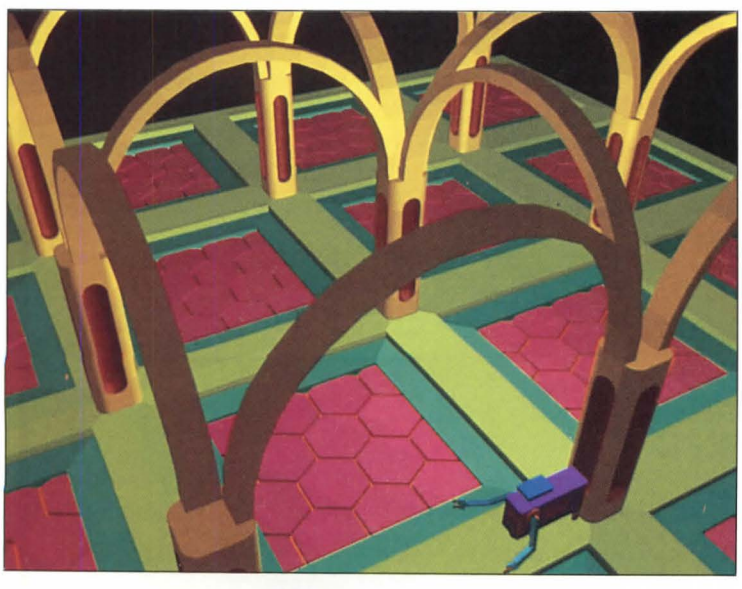




The church in the top drawing, created with Versacad software, was printed on an HP PaintJet Color Graphics Printer, an ink jet printer that can produce a full page in full color in four minutes. The interior atrium shown in the middle drawing was produced using Autoshade by Autodesk and printed on QMS Colorgrafx, a thermal transfer printer. The plan in the bottom drawing was produced on a Versatec electrostatic printer, which prints with dots rather than lines. The model used for this drawing, 8524 HR, has a resolution of 400 dots per inch.



The perspective drawing above, by Laurence E. Dieckman, AIA, of Chicago, was produced with MacPerspective software and printed on the QMS-PS 810, a laser printer.



The drawing above was produced from a slide taken directly from a computer, using Visual Information software from Dimensions and a Matrix Instruments' SlideWriter, a digital film recorder.

and is a major reason why electrostatics are so expensive. Another is their bulk and weight, which runs 400 to 500 pounds.

Because electrostatics print with dots rather than draw with lines, they also can do halftones and renderings, although this capability has not been well developed yet.

Laser printers

Instead of charging photosensitive paper and placing toner on it directly, as electrostatics do, laser printers use a light beam to charge a photosensitive drum that picks up toner and fuses it to the paper. From a practical standpoint, this means that lasers can use plain paper whereas electrostatics require photosensitive paper.

The big difference in laser printers is whether they understand PostScript, a page description language by Adobe. PostScript is slower and more expensive than non-PostScript printers, but powerful enough to have become an important standard. Also important to architects who want to print out a CADD drawing for review is the ability of the printer to understand plotter commands.

More than 600,000 desktop laser printers were sold last year. Most produce six to eight pages per minute (once the image is on the drum) at 300 dot resolution in A size. Color is not available at an affordable price, and few desktop laser printers handle paper larger than legal size.

Film recorders

Film recorders are important to architects because they enable images to be taken directly from the computer to 35 mm slides. Previously, the most common method for getting a computer image on film was to photograph the screen. The equipment is expensive, ranging from $2,000 to $30,000, and the slides can be generated from overnight services via modem for a few dollars each. But the ability to control the process directly and to get same-day results might make an in-house capability worthwhile.

The two kinds of film recorders, analog and digital, offer opposite advantages. Analog film recorders, the less expensive option, take the image from the screen. They are are WYSIWYG (what you see is what you get) to a fault. Without a high-resolution screen, the jagged curves will make the slides look rough. On the other hand, the equipment is inexpensive and the image capture time is measured in seconds. About two-thirds of all film recorder sales are for analog models. Polaroid is the best known manufacturer.

Digital film recorders take their image from the computer. The resolution will look crisp, but the imaging times, especially for complex drawings, are measured in minutes, as many as 30 in some cases. □

For information from suppliers of plotters, printers and materials discussed in this story, circle the appropriate numbers on the information card in the back of this issue.

Plotters, circle No. 401
Printers:
Dot matrix, circle No. 402
Ink jet, circle No. 403
Color thermal, circle No. 404
Electrostatic, circle No. 405
Laser, circle No. 406
Film recorders, circle No. 407
Drawing tools, circle No. 408
Plotting media, circle No. 409

Introducing a small feature that will change the way you think about HP plotters.

Surprised? So are a lot of people who think HP quality, reliability and performance are out of their reach.

The exceptionally versatile line of HP DraftPro plotters starts at just $3995 for the C-D model. And now the line has been expanded to give you a complete choice of paper sizes.

The new DraftPro DXL goes from A to D for $4995. And the new DraftPro EXL goes all the way from A to E for $6495.

All three have been rigorously tested to HP standards. Which is the main reason we can offer a one-year on-site warranty—four times longer than the competition.

So call us at **1-800-752-0900, Ext. 623G.** We'll send you complete information and a sample plot. It will make you do a lot of positive thinking.

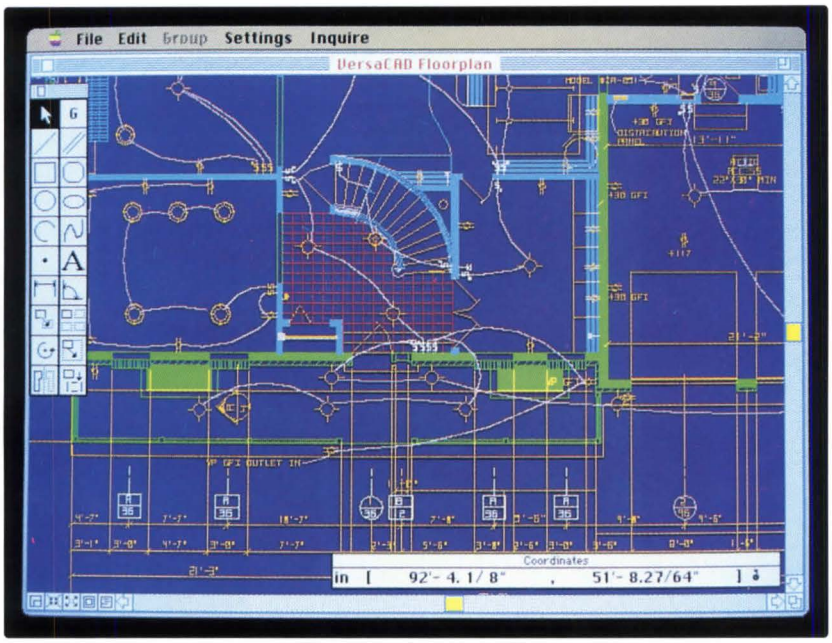
The new DraftPro series.

Suggested U.S. list price.

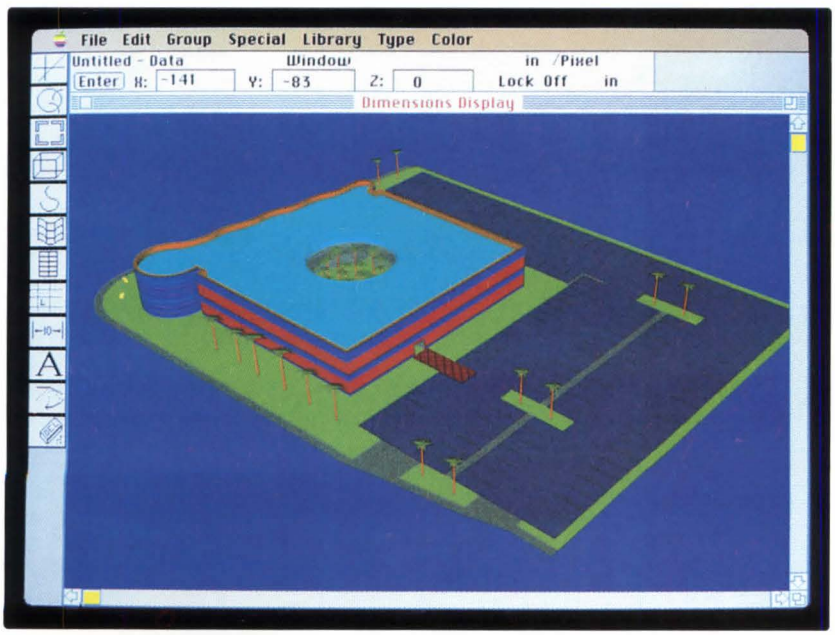
HEWLETT PACKARD

Circle 132 on information card

Everyone is capable of greatness if given the right tools.



VersaCAD/Macintosh Edition gives you the production drafting power of the CAD standard, rated tops by the toughest reviewers in the business. And the value continues with a bill of materials, database, user customization and other enhancements for fast productivity.



Dimensions leads the field by providing the 3D tools for conceptual design, analysis, modification and presentation. With its high-precision database, you can create a true 3D model in up to 8 simultaneous views, then use color shading to display your design in its best light.

While a pencil and paper may be all you need to start an idea, exploring and refining it into something great takes a lot of effort. A computer will help, but professional CAD programs can be confusing. Until now.

With the combination of VersaCAD and Dimensions 3D on today's powerful Macintosh computer, drafting and design are integrated as never before.

Both programs take full advantage of the intuitive Macintosh interface. And with a direct translator between the two, your designs can be moved back and forth with ease. Take a floorplan from VersaCAD and quickly extrude it into a full-color Dimensions rendering. Or design your model in Dimensions and automatically extract orthographic views to create VersaCAD working drawings.

Whichever way you prefer to work, the VersaCAD/Dimensions combination has the simplicity to get you started fast and gives you the power to do your best.

For more information on how you can achieve greatness, call **(714) 960-7720** today.

DIMENSIONS

Visual Information, Inc., (818) 918-8834

VERSACAD®

Macintosh EDITION

Versacad Corporation, (714) 960-7720

Circle 134 on information card

Selecting Below-Grade Waterproofing

When selecting a below-grade exterior waterproofing, you have to make the right choice the first time. Once the waterproofing is installed and the backfill is in place, you won't get a second chance. Making the right selection from the variety of products on the market today isn't easy. The trick is in establishing a set of guidelines for making your choice. Although some of the guidelines will pertain to both vertical and horizontal applications, this article deals with waterproofing applied to below-grade vertical surfaces.

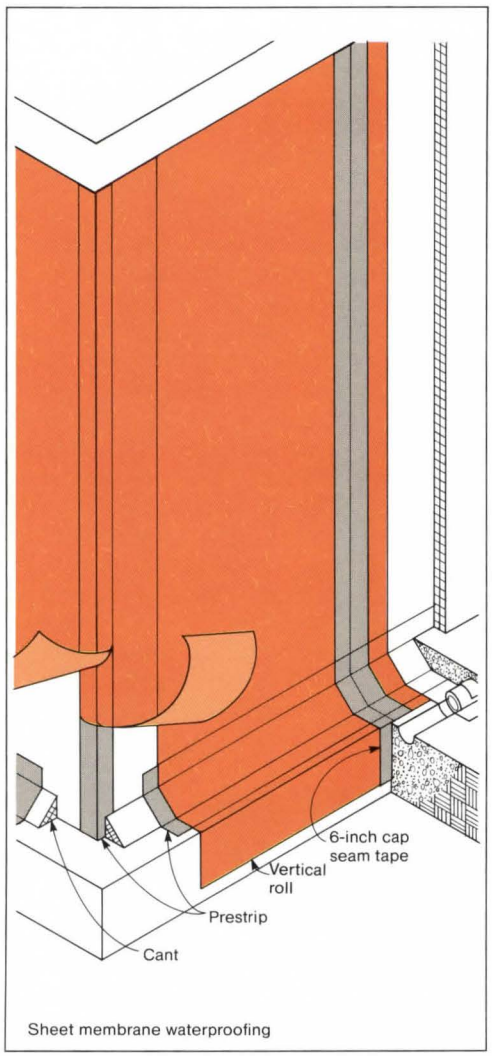
What constitutes a waterproofing material as opposed to a dampproofing material? Because of a lack of uniformity in testing methods and procedures, even the industry has found it difficult to define the difference.

To be considered waterproofing, a material's permeability must be "very low" under hydrostatic conditions. The permeability of a dampproofing material must be only "low" under the same conditions. The difference between low and very low permeability is, at best, arbitrary. Because of this ambiguity, many architects, engineers, and contractors choose waterproofing material based on a system of *perm rating*. A waterproofing material should have a perm rating below one. Because materials with a perm rating of one or higher are able to pass water vapor, or "breathe," they are considered unsuitable for waterproofing.

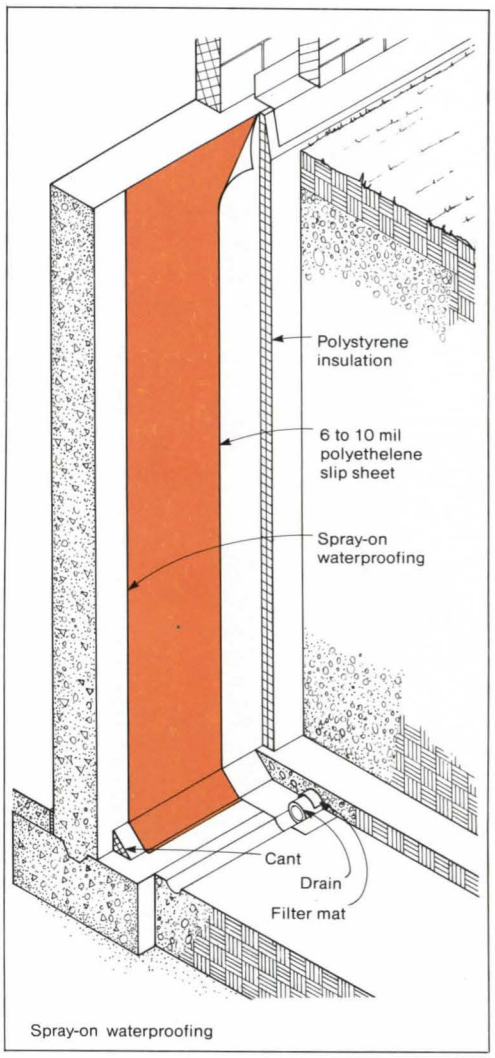
However, even if a project calls for very low levels of water vapor infiltration, materials should not be selected on perm rating alone. The amount of hydrostatic pressure expected in a building application also can be critical in material selection. For a small commercial building, hydrostatic pressure around the foundation is not a crucial factor, particularly if tile drains are installed and working properly. But as a building's foundation gets deeper, the amount of hydrostatic pressure it has to withstand increases. Prior to selecting a material, tests should be made to determine the amount of head that can be expected. Then, the waterproofing manufacturer should be required to submit data to show that its system can withstand those pressures. As a rule, a waterproofing system that can withstand 50 feet of head for an extended period will be acceptable for most applications.

Because of the hydrostatic pressure underground, some materials that have been used successfully above grade as dampproofing aren't recommended for use below grade. For example, acrylic latex emulsions tend to erode when in contact with free water and/or hydrostatic pressure. Other dampproofing materials can become brittle over time if some of their chemicals are dissolved by water. Dampproofing that becomes brittle is likely to crack and split as temperatures vary.

Insulated drainage board systems are new products designed to help dissipate hydrostatic pressure from backfill by draining the wall in the vertical plane. These drainage boards are meant to be applied over the membrane; they do not serve as a membrane replacement. They also protect the membrane from damage during construction, much like protection board.



Sheet membrane waterproofing



Spray-on waterproofing

Application

Waterproofing usually is applied seven to 20 days after the concrete foundation is poured. It must not be applied to "green" concrete, which can release enough moisture to cause blisters and pinholes in spray-on, liquid-applied, and directly-adhered waterproofing systems. Also, surface water can cause a directly-adhered system to debond.

Once the concrete has cured, the question of who is responsible for substrate preparation arises. A typical waterproof membrane spec might call for a concrete substrate that is "smooth, monolithic, and free from voids, spalls, loose aggregate, and sharp protrusions, with no visible coarse aggregate," yet not specify responsibility for its provision. As a consequence, substrate preparation often is overlooked

when the specs are written, possibly resulting in job delays that cost a good deal of money. In addition, the quality of the substrate preparation can affect the membrane's short- and long-term performance.

Membrane performance also can be affected by the complexity of the waterproofing system itself. Normally, the simpler the system, the better the results. Sheet and panel systems generally require a large amount of mechanical or chemical accessories for sealing seams and patching, all of which the architect must specify. During bidding and construction, the contractor should not be permitted to eliminate or substitute accessories. Substitution could void the warranty, possibly making the architect responsible if leaks occur.

Selection criteria

Leaks most often occur at substrate cracks that the waterproofing is not able to bridge. Over repeated cycles of temperature change, a membrane should be able to bridge an ⅛-inch crack without damage. To continue bridging during cycles when the crack is opening and closing, a membrane should be elastic enough to allow at least 300 percent strain (elongation).

The membrane material also must have good memory—the ability to recover its original shape after it elongates. Memory varies from material to material. Ideally, a material should be able to mimic the substrate, expanding and contracting with it. Waterproofing materials that can't mimic this movement of the substrate may get pinched in cracks as the substrate begins to contract. The trade-off, however, is that most materials with very good memory are not as puncture resistant or as resilient to irregularities in the substrate as those with lower rates.

Some products compensate for less elongation by the ability to reseal themselves. Bentonite clay products will reseal themselves in the presence of water and external pressure, and liquid-applied hot rubber reseals under external pressure and heat. A product should be able to reseal at least ⅛-inch-wide cracks that occur after application.

Water that can't get through a membrane will seek out cracks or joints (particularly where dissimilar materials come in contact) and then pass through the foundation wall. Water may come through the wall many feet from its origin.

The performance of the membrane, once water is between it and the substrate, will depend on how it is adhered to the substrate. Sheet membranes don't conform to irregular substrates as well as do spray-on and liquid-applied products. The foundation wall, particularly if it is constructed of concrete block, must be parged to ensure a smooth dense surface over which the sheet membrane can be installed. Liquid-applied rubbers, urethanes, and spray-on bentonite clays do a better job of waterproofing around pipes and conduits that pass through the foundation walls than do most semirigid sheet products. They also tend to be less expensive than sheet membranes when there are a large number of pipes and mechanical openings. Many sheet products, however, are more durable than spray-on or liquid-applied membranes, and are less susceptible to damage before backfill is applied. For most types of waterproofing, a protection board should be installed immediately after the membrane is in place

to prevent damage before and during the backfill operation.

For sheet membranes, particularly if they are to be subjected to high hydrostatic pressure, the architect should pay closest attention to the joints and seams between sheets. Field bonds, either glued or mechanical, rarely are equal in strength to the base material, with the exception of heat-welded seams. If possible, installation should be scheduled during warmer weather, because freeze/thaw cycles can loosen and debond sheet and liquid-applied membranes from a concrete substrate. Also, temperatures below 40 degrees Fahrenheit slow the curing process of many solvents and glues used in liquid-applied or sheet membranes, and freezing can damage water-based membranes.

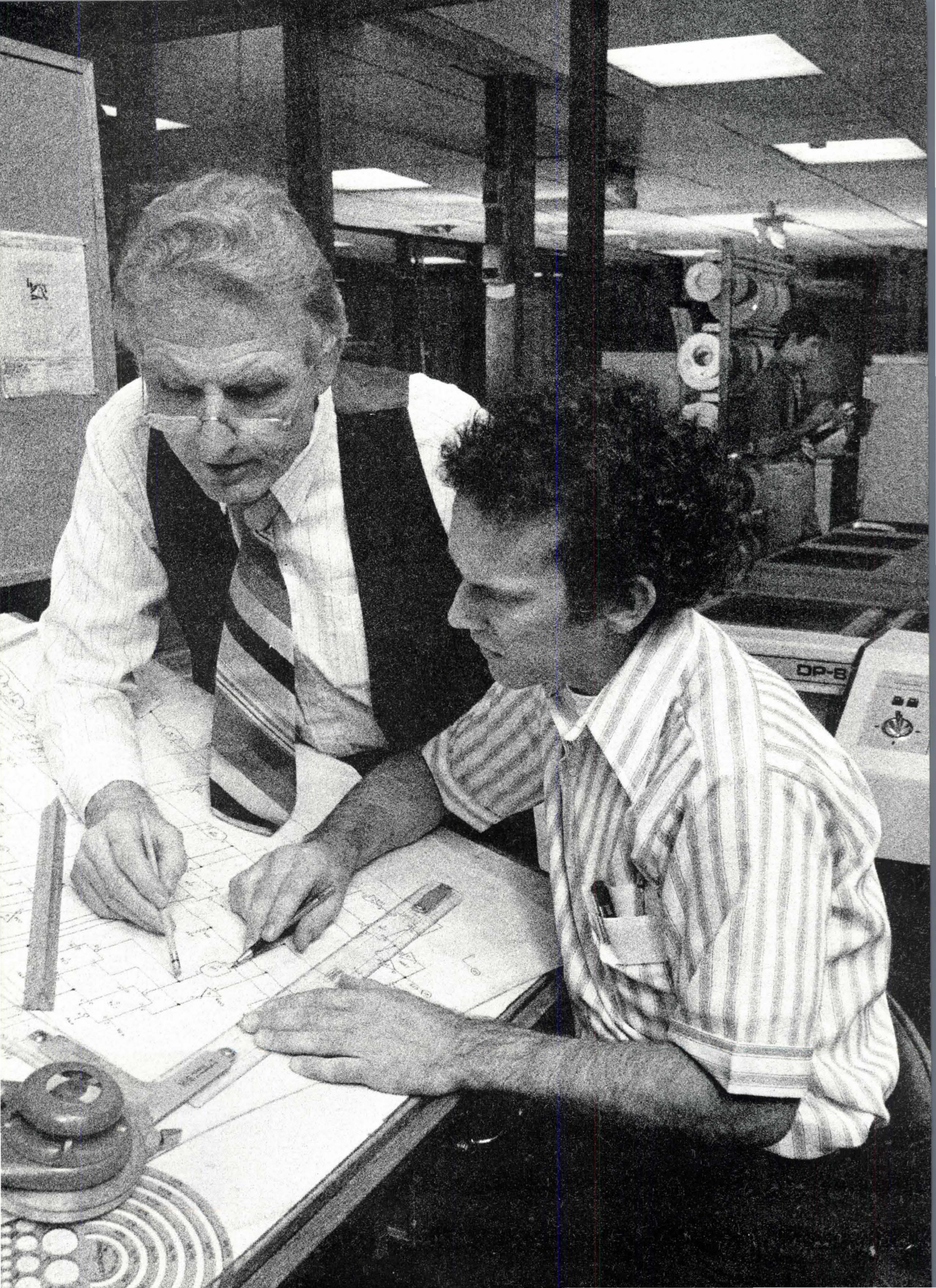
Architects also should ascertain that the components of the waterproofing system are chemically compatible. For example, some liquid-applied waterproofing products such as urethanes or asphaltic rubbers contain solvents that will degrade polystyrene insulation. Glues used to adhere the protection/insulation boards to the waterproofing also should be examined for compatibility with both components. Furthermore, some waterproofing materials react with chemicals within soils. For instance, bentonite clays do not perform well in saline soils. Sulfates, chlorides, hydroxides, and acids in the soil are harmful to other waterproofing materials. If there is any doubt, the soil should be analyzed and its compatibility verified with the manufacturer.

Rules of thumb

- Select a system that terminates four to eight inches above grade. Systems terminating below grade have a notorious record for problems, usually as a result of groundwater entering along the top seam.
- Good drainage is essential for long-term waterproofing. Drain tile should be placed approximately four inches below the top of the floor slab. The top of the drain should be covered or encased with a filter fabric. The amount of aggregate and its placement depend on soil type, amount of groundwater expected, and depth of the foundation. Where possible, slope the drain at least ⅛ inch per foot, and close off the end with wire mesh to keep rodents out.
- Waterproofing always should be placed directly on the substrate, be it concrete or concrete block. Attaching an insulation material directly to the substrate and then installing the waterproofing over the insulation isn't recommended below grade.
- A slip sheet of six-millimeter polyethylene between the membrane and the backfill can help prevent soil settlement from dragging the waterproofing membrane away from the substrate.
- Specifying the proper backfill density for compacted soil (between 85 and 88 percent on the Modified Proctor Density scale) is extremely important. Density above 88 percent can induce stress on the walls and impede drainage; density below 85 percent can result in some settlement.
- Hot-applied, self-leveling products are a danger to the workers when applied vertically, and therefore should be avoided.

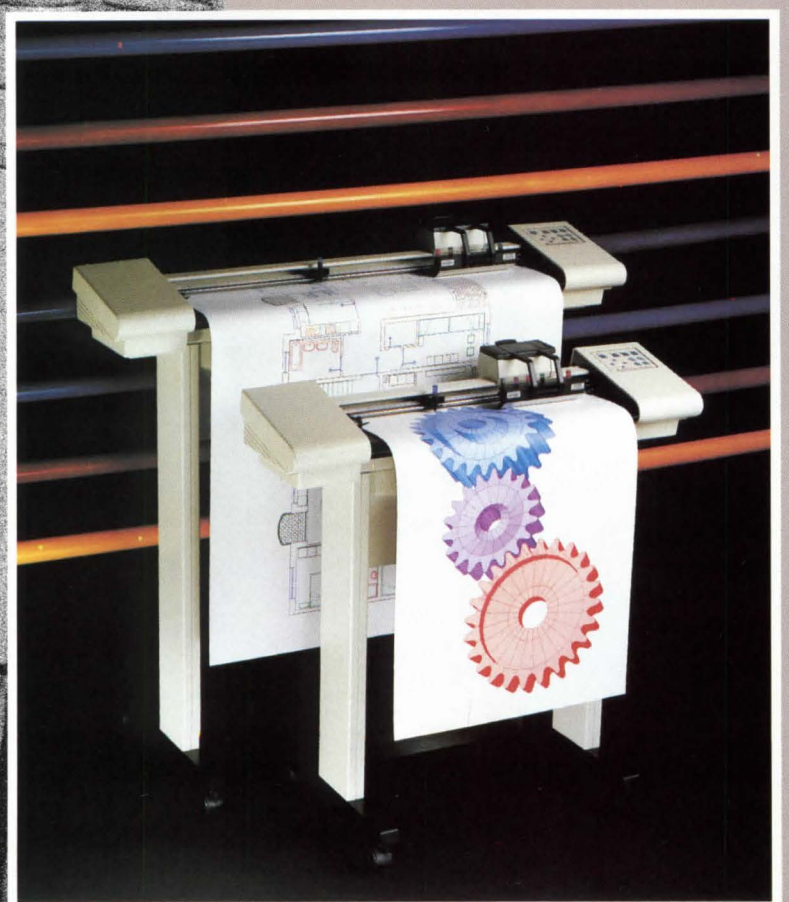
—Timothy B. McDonald

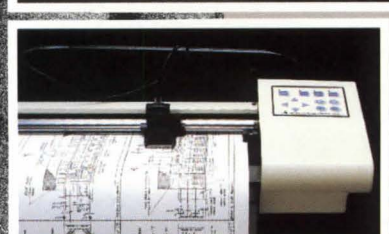
Brent Anderson, author of Underground Waterproofing *(Stillwater, Minn.: WEBCO Publishing Co., 1983) contributed to this article.*

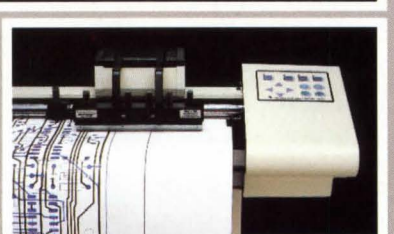


For nearly three decades, companies have drawn on Houston Instrument.

Now it's your turn.







Select a Houston Instrument™ plotter, and you're not only opting for the best price/performance on the market—you're choosing an industry leader with a proven track record. For nearly 30 years, companies have relied on HI for quality products, reliable service, *and* attractive prices.

Take HI's sleek new DMP–60 Series plotters—they're designed to impress even the most demanding CAD professional. Industry experts agree:

"Houston Instrument's DMP–61 delivers a remarkable combination of high speed, gorgeous plots, and very competitive price."

PC MAGAZINE *Editor's Choice Dec. 22, 1987*

HI's commitment to solid, innovative products is underlined by designed–in versatility. The SCAN–CAD™ option lets a DMP–60 Series plotter double as a scanner. The Multi–Pen accessory speeds colorful, complex drawings. And HI's one megabyte buffer board lets the DMP–60 Series plot several originals—without tying up your computer.

Proven performance, proven value—that's HI plotters. Flexible. Fast. Accurate. Software compatible. Reliable. And backed by HI's PRIORITY RESPONSE™ customer support programs which include overnight product–replacement service, leasing, and warranty coverage.

All this from an industry leader that companies have drawn on for nearly three decades—Houston Instrument.

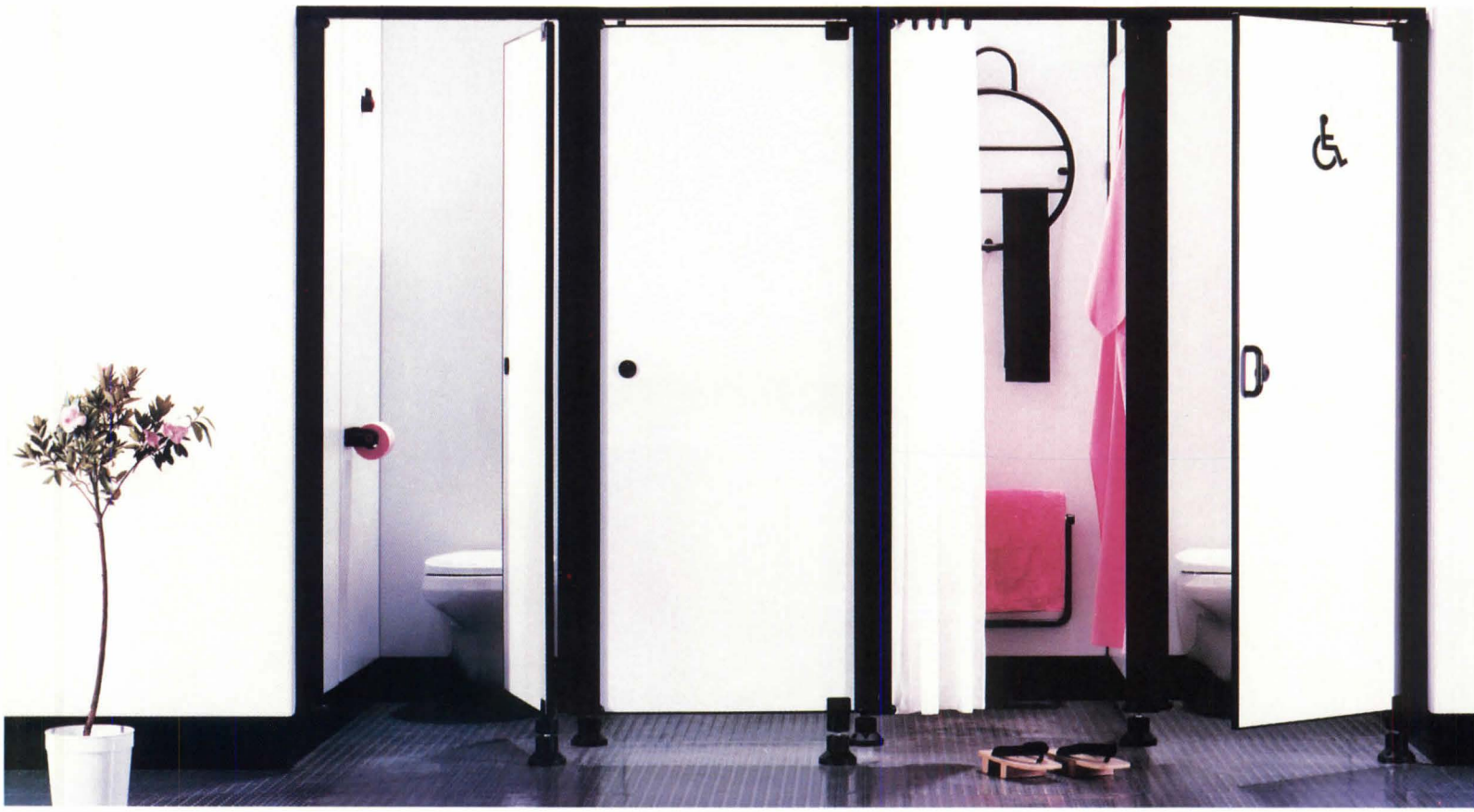
Now it's your turn. Begin by calling 1-800-444-3425 or 512-835-0900 or writing Houston Instrument, 8500 Cameron Road, Austin, Texas 78753.

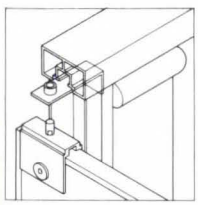
HOUSTON INSTRUMENT
A DIVISION OF AMETEK

Circle 140 on information card

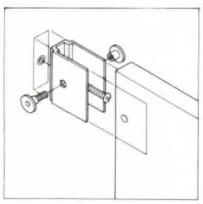
THE DESIGN COUNCIL · 1986 DESIGN AWARD · AN OUTSTANDING BRITISH PRODUCT ·

The Beginning of a New Era in Strength and Beauty for Bathroom Partitions, Dressing Rooms, and Shower Units.

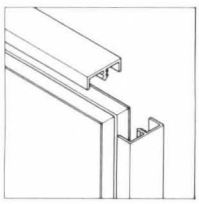




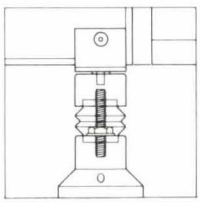
The top hinge incorporates a hinge pin which locates with a nylon bush in the hinge bracket. The hinge is factory fitted. Black rubber bumpers are fitted to the top and bottom of door jambs.



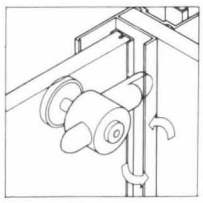
A pre-drilled epoxy coated aluminum wall bracket which is plugged and screwed to the wall.



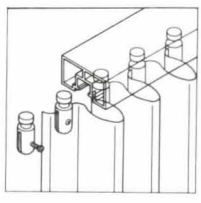
The non-removable extruded aluminum edge trim is available in anodized or epoxy powder coated aluminum. Plastic laminate panel facing or to specification.



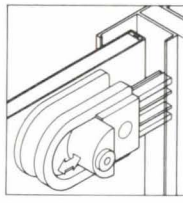
Adjustable foot with screw adjuster hidden by bellowes-type sleeve. Made from black glass-filled nylon, it also acts as the hinge pivot.



Black glass-filled nylon Lotus lock body with a red rubber bumper incorporating an emergency release facility.



Black glass-filled nylon curtain runners which are non-removable once the headrail is fitted.



Black glass-filled nylon Combat lock with a red rubber bumper incorporating an emergency release facility.

Now Available

CORIAN®
Solid Beauty That Lasts

Thrislington Cubicles

Thrislington Cubicles, 11739 Sheldon Street, Sun Valley, California 91352: Telephone (818) 504-0806: Telefax (818) 504-0913: SEE US IN SWEETS!

Circle 142 on information card

MEET OUR INTERIOR DECORATORS.

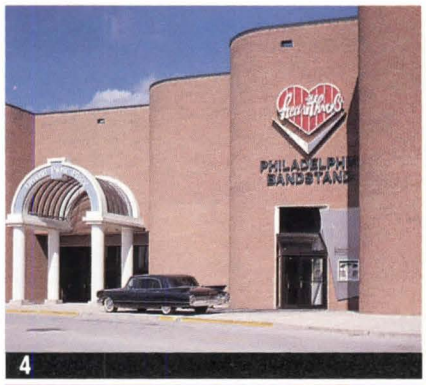
Sprinkler heads designed to blend quietly with their surroundings. So quietly, in fact, you have to look closely just to see them. A decorative detail like the color of a carpet or reflection of soft light. Of course, aesthetics aside, Star Sprinklers still meet your toughest standards for fire protection. They're listed by Underwriters Laboratory and approved by Factory Mutual. So next time you're considering a new interior, consider our interior decorators. Call 1-800-558-5236 for details. In WI 414-769-5500.

STAR SPRINKLER CORPORATION

307 W. Layton Avenue • Milwaukee, WI 53201
A Grucon Company

Circle 144 on information card

Hyatt Regency Milwaukee



4


5


6


3


2


1

At first glance, it's difficult to imagine how these six different buildings are related. But if you take a closer look at their histories, you'll find they all share a common theme: the washrooms in all six buildings have been refitted with Sloan flushometers.

True, these buildings don't look old enough to need major plumbing repairs. But the fact is, the original flushometers that were installed just didn't hold up. Even after repeated servicing, they continued to malfunction. They didn't shut off properly. They leaked at the stops. In some cases, they even flooded the washrooms. In short, they weren't Sloan flushometers.

Unlike substitutes, Sloan flushometers offer proven, reliable service. With built-in quality at an affordable price. That's why today more buildings are equipped with Sloan flushometers than with any other brand.

Only Sloan's rugged, tamper-proof design can assure the quiet, dependable operation so critical in buildings like these. Plus, Sloan flushometers are built to last for years with only minimal, routine maintenance—an important consideration for specifiers who value time and money.

The next time you consider specifying a substitute, think about these six buildings. Then specify Sloan. The first time.

Another six reasons to specify Sloan... the first time.

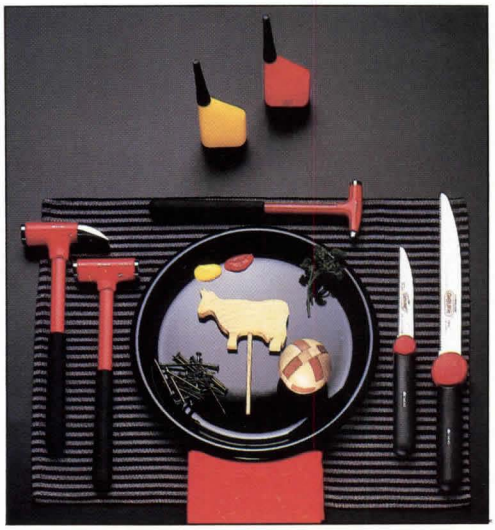
1. Valley Forge Park Place, King of Prussia, PA **2.** Virginia Mason Hospital, Seattle, WA **3.** Swedish Hospital, Seattle, WA **4.** Heartthrob *Cafe, Orland* Park, IL **5.** Spruance Hall, Embry Riddle University, Daytona Beach, FL **6.** Foster Plaza Building No. 6, Pittsburgh, PA

SLOAN VALVE COMPANY
10500 Seymour Avenue, Franklin Park, IL 60131
A Tradition of Quality and Pride

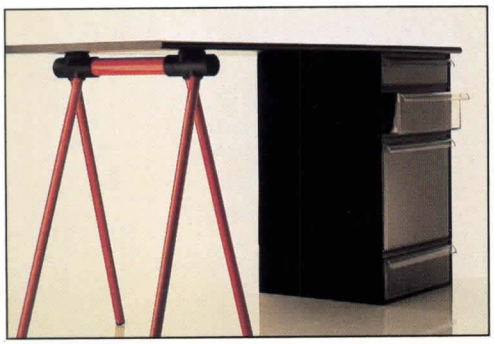
Circle 146 on information card

PRODUCTS

Quality Tools
Ergonomically designed, functional hand tools by designer Michio Hanyu for Takagi Tools Inc. are sleek, lightweight, and constructed of such high-quality materials as chrome-finished carbon steel. The Claw Hammer shown in the far left-hand side of the picture (right) received an Honorable Mention from *Industrial Design* magazine's 1988 Annual Design Review and is currently sold at the Museum of Modern Art in New York City.
Takagi Tools Inc.
Circle 411 on information card



Elevated Work Stool
Allsteel's Buhk 1000 Operational stool (below, center) is part of a seating line called the Buhk 100 series, designed by award-winning contract seating and furniture designer Peter Buhk. The entire line consists of five different models. The Operational stool shown here is designed for users working at elevated work surfaces and features lots of elbow room (the model may be ordered armless if preferred), additional upper back support, and a foot ring that is directly attached to the seat and moves with it whenever the height is adjusted. The foot ring is color-coordinated with the overall finish of the stool.
Allsteel Inc.
Circle 410 on information card



Contemporary Office Furniture
Designer Olaf Von Bohr created the simple work furniture (above) for Kartell USA. The legs and crosspiece are of epoxy-powder-painted glass tubing and come in white, black, and red. The black supports are of glass-reinforced nylon. The accompanying top is of thermoset laminated board and is available in black, gray metalized, or white decorated colors.
Kartell USA
Circle 413 on information card

Ingot Table Collection
The Ingot table (right) is newly designed by the Cassina Research and Design Group of Milan for Atelier International Ltd., specifically for the contract market.

Ingot's name is derived from its cast metal base elements, which are stacking plates separated by colored ring connectors of either red, black, or gray.

Tabletops are available in round, square, rectangular, and "racetrack" shapes and in 19 sizes. The tabletops come in either standard Formica, a laminate, or a range of polymeric coatings in gloss, semigloss, or matte finishes. Coated finish tabletop edges are offered in a beveled or a rubber-bumper design, and molded PVC edging surrounds the laminate tops.
Atelier International Inc.
Circle 412 on information card

Products *is written by Amy Gray Light*

Sterling™ Strip
... from carton to finished floor in one day

hoboken® WOOD FLOORS

We're all you need to know.

Hoboken Wood Floors is delivering another innovation ... square edged (no bevel), urethaned, pre-finished, solid oak strip for same day installation and use.

These floors are virtually maintenance free, require no finishing and eliminate worries as to color consistency.

Four distinctive colors are available.

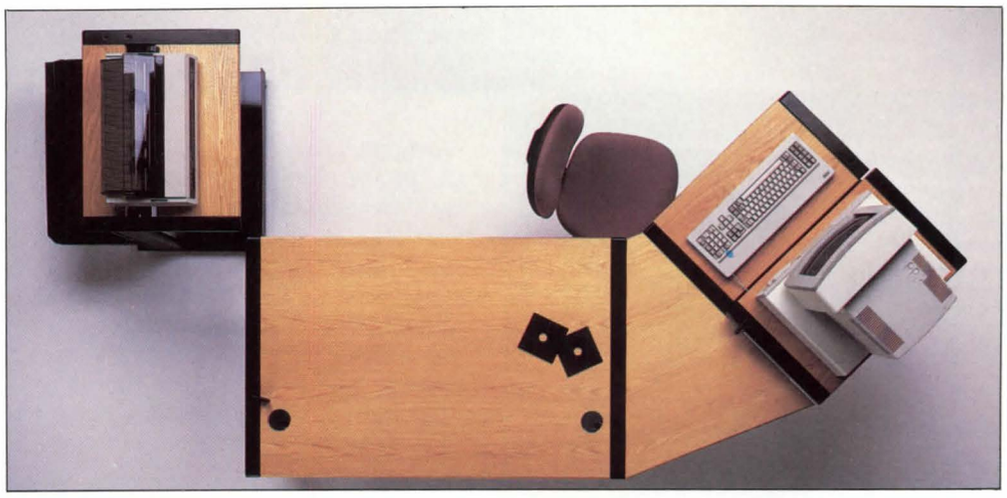
The product is Sterling™ Strip by Bruce ... your source is Hoboken, the industry leader in wood flooring.

For more information call us today ... we're all you need to know about wood floors.

Wayne, NJ	Stoughton, MA	Watervliet, NY	Oakville, CT	Boston , MA	New York , NY
(201) 694-2888	(617) 341-2881	(518) 274-0274	(203) 274-5476	(617) 426-4343	(212) 759-5917

Circle 148 on information card

Computer Furniture
Krueger offers the DataBord 920 workstation (right), in laminate surfaces, high-pressure melamine wood grains, and hardwood veneer. The DataBord line includes a variety of single and dual work surfaces, printer stands, surface extensions, storage units, turntables, tilt platforms, and manuscript stands. The user may adjust working heights of the station with the crank of a knob while seated at the desk.
Krueger
Circle 435 on information card



Inflatable Seals
Inflatable seals by Seal Master Corp. offer a simple and attractive alternative to sandbags and seawalls for flood control. The seals, built of an elastomeric tube molded within a compact envelope, are applied to the periphery of the object to be sealed and then are inflated to ensure a properly tight fit during flooding. The seals are designed to roll smoothly between their low-pressure (deflated) configuration and high-pressure (inflated) configuration, thus compensating for variations in fit and permiting full protection at all times.

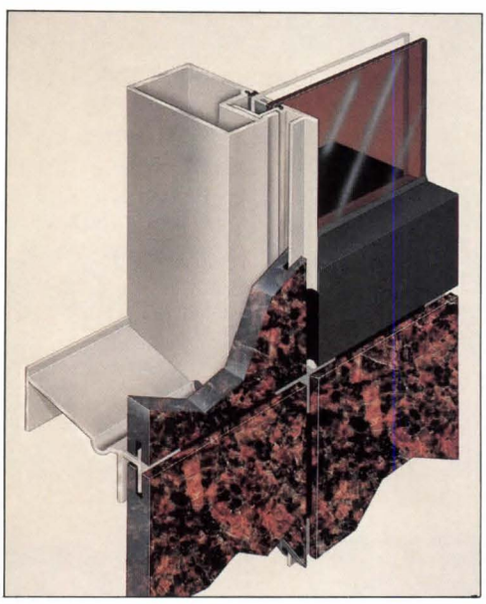
Although normally operated with compressed air, the seals also may be inflated with any type of gas or with liquids if a means of cooling is desirable in a particular application. Regardless of the inflation medium provided, a constantly regulated and filtered source is recommended.

Seal Master can suggest a number of typical cross sections for the seals however, each batch is made to order based on configuration, attachment and mounting requirements, and the temperature and atmospheric conditions of a particular application. Selection and combination of the type of fabric reinforcement and elastomeric to be used in the seal also are dependent on the type of job. Made-to-order manufacturing allows for spliceless units and correct placement of air connection fittings.

Seal Master inflatable seals have been deployed successfully as part of a flood control system at Washington Harbor, a commercial/residential complex located on the Potomac River in Washington, D.C. Designed by Sverdrup and Parcel, consulting engineers, the barrier portion of the control system consists of 50 floodgates that are lifted by crane from underground pockets and locked in place when floods threaten. Each gate has two inflatable and one compression seal. In three years of operation, the gates have been used and have protected the building effectively on 10 different occasions.
Seal Master Corporation
Circle 414 on information card
continued on page 146

Stone Curtain Wall System
Smith's lightweight stone curtain wall systems (below), do not need steel truss supports.

Pre-engineered, three-centimeter-thick granite panels are held in place by a captive mechanical means designed to ensure alignment. Unitized panels are slipped into aluminum extrusions for attachment to the building from room side, aiding a fast and accurate erection. The systems offer great flexibility in the use of panels made of granite or other natural materials. They incorporate a pressure-equalized chamber design and internal drainage mechanism. The system is compatible with Smith Therm-A-Frame or custom-designed windows.
E.G. Smith Construction Products
Circle 441 on information card



Vinyl Tile
Armstrong Commercial Floors' Premium Excelon vinyl composition tile offers the Stonetex and Excelon Supreme line of tile that is appropriate in large areas where a monolithic, nondirectional look is desired. The color and pattern of the tile extends all the way through the wear layer. The tiles are designed for durability and the ability to resist grease, alkali, and diluted chemicals.
Armstrong World Industries
Circle 427 on information card

Multi-Housing Laundry Room Guide
A 16-page "Multi-Housing Laundry Room Concept, Planning, and Design Guide" published by one of the nation's largest suppliers of coin-operated laundry systems, covers such topics as determining laundry room location, room size, and number of machines needed; room design guidelines; electrical, gas, plumbing, venting, and exhaust system requirements and specifications; sample room layouts; and recommendations to ensure that laundry facilities function as a residential amenity. Written with the architect, builder, and developer in mind, the guidelines apply to all types of high-rise and low-rise housing, including apartments, condominiums, senior housing, and student housing.
Web Service Company
Circle 428 on information card

New Office Offerings for the Workplace
Showcased in SunarHauserman's showroom during Designer Saturday '88 in New York City were products focusing on the working environment: Design Option Wall, Race, and the Cameron Workwall.

The new Design Option Wall is an easily movable wall system that has a common panel construction with vertical power chases and other options, including a prewired base. The Race features a horizontal beam that carries power and communications cabling at workstation height throughout the office. The Cameron Workwall is a compact, prebuilt unit containing credenza, upper storage, tackboard, and light cavity. Available in maple, mahogany, and cherry finishes, the Cameron Workwall comes with standard drawers on both sides of the credenza or with drawers on one side and lateral files on the other. Units measure 63 and 78 inches wide and 66 inches high. Upper storage is available in closed and open versions. Additional units, 33 inches wide and 66 inches high, also are offered with open and closed bookcases and a closed wardrobe.
SunarHauserman
Circle 429 on information card

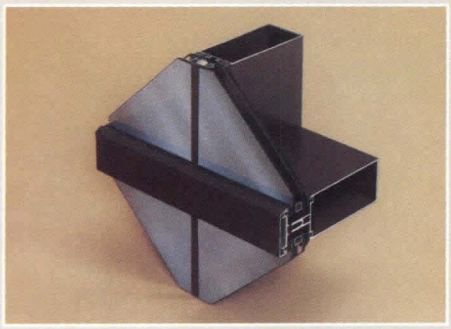
Lighting System Eliminates VDT Glare
Siemens Lighting Systems has a high-tech luminaire designed to eliminate reflected glare on VDT computer screens, to reduce contrast, and to cut energy consumption. The system is discussed in a brochure entitled "Introducing a Baffling New Way to Eliminate VDT Glare."
Siemens Lighting Systems
Circle 430 on information card

High-Security Lock
The J4 high-security cylinder lock combines the standard features of all the Best Lock products, such as a key removable core that has a cylinder ring, face, and keyway disc made of a hardened stainless steel alloy. Special patented features in the core are designed to deter picking of the lock and to resist attack.
Best Lock Corporation
Circle 431 on information card

Floor Heating System and Heating Cables
The ESWA Floor Heating System makes the heating system an integral part of the floor with a source that distributes the heat evenly over a large area. The ESWA system typically is one-half the cost of hydronic systems. It can be controlled manually or automatically and also can be manipulated by individual setback clocks or through a master control capable of regulating 10 individual heating

continued on page 149

United States Aluminum's Series 3100 Silicone Curtain Wall creates beautiful undisturbed architectural reflections.



Series 3100 Curtain Wall system offers the architect an option which blends a glass wall with two-side conventional support horizontally and two-side silicone support vertically to form a superior structural design.

Design Features

Thermally Broken — Interior aluminum framing is thermally isolated from the exterior by continuous thermal spacers, interlocked with the horizontal pressure plates.

Labor Savings — Pressure plates are factory fabricated with thermal spacers installed, pressure bolt and weep slots prepunched. Reusable injection molded nylon twist-in and twist-out temporary glass retainers. System accommodates ¼″ and 1″ glazing infills.

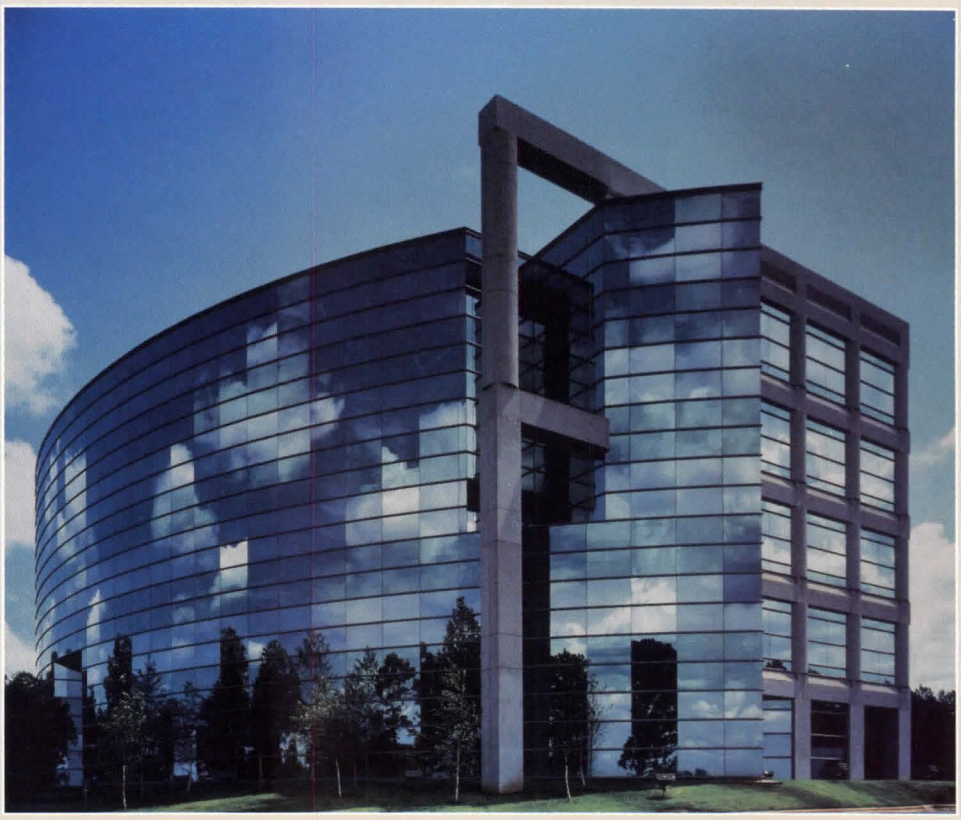
Horizontals — Face covers have a beveled water shed edge. Injection molded nylon water deflectors are furnished at joint intersections for positive water control.

Super Mullions — In addition to 3½″ and 5″ deep mullions, 8″ deep "Super Mullions" are stock items for high span conditions.

Performance — Certified test reports that meet or exceed AAMA 501 standard test procedure for E-283 air infiltration, E-330 structural performance and E-331 water penetration, are available.

United States Aluminum gives you over 25 years of proven quality.

Available in clear, bronze, or black anodized finish or custom painted to architect's specifications. See us in Sweets 08400/UMV



Circle 156 on information card

For complete information call 1 (800) 527-6440, in Texas call 1 (800) 442-3247, or write:

United States Aluminum Corporation

Manufacturing Facilities

3663 Bandini Blvd.
Vernon, California 90023
Telephone (213) 268-4230

200 Singleton Drive
Waxahachie, Texas 75165
Telephone (214) 937-9651
or (214) 299-5397 metro

6969 West 73rd Street
Chicago, Illinois 60638
Telephone (312) 458-9070

720 Cel-River Road
Rock Hill, South Carolina 29730
Telephone (803) 366-8326

Subsidiaries of International Aluminum Corporation

Customer: Pritchard Paint & Glass, Charlotte, NC • Architect: Jenkins-Peer Architects, PA, Charlotte, NC • Photos By: Dennis Nodine Photography, Charlotte, NC

VISTAWALL
GLAZING SYSTEMS

Mor::Front can give you 576 different looks.

Not bad for a standard system.

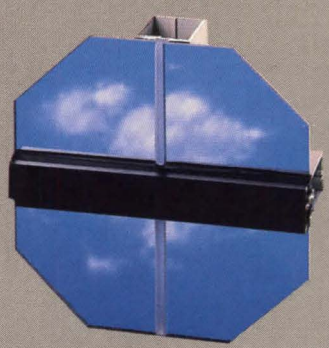
Our new Mor::Front system is almost beyond description. Ribbon window, nine-foot-high butt glaze storefront and standard storefront applications are all possible with this system.

Plus, you get four mullion options, and a choice of 13 durable finishes. Or any custom color you like.

And with Mor::Front, you can actually save money by painting the interior with a less expensive finish.

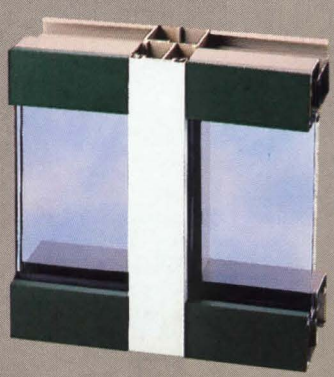
All this adds up to quite a storefront.

For more information on this versatile system, contact your nearest Vistawall location. (Sweets 8.1 and 8.14/VIS or 08400 and 08900 VIS)



Variation #186

- 1/4" Vertical Butt Glazing
- 2 1/4" Mullion
- 1 3/4" Horizontal
- Exterior Glazed
- Black Exterior
- Beige Interior



Variation #427

- 1" Glazing
- 2 1/4" Mullion
- 2 1/4" Head & Sill
- Interior Glazed
- Hartford Green Horizontal Exterior Caps
- Bone White Vertical Exterior Caps
- Beige Interior

1827 Auger St. Tucker, GA 30084
(404) 938-3359

11 Wellington Road Lincoln, RI 02865
(401) 333-2906

P.O. Box 629 803 Airport Road
Terrell, TX 75160 (214) 563-2624

816 Kiernan Avenue Modesto, CA 95356
(209) 545-5231

VISTAWALL
ARCHITECTURAL PRODUCTS
A Division of Butler Manufacturing Company

Circle 158 on information card

Products *from page 146*

zones from one location. Although typically placed under marble or tile surfaces, the system also may be used with surfaces such as linoleum, hardwood, or carpet. Supplemental heat can be provided with ESWA Radiant Ceiling Elements, which are stapled to the underside of ceiling joists before the ceiling finish is applied.

ESWA heating cables are designed for heating interior floors of concrete slab construction, as well as for outdoor applications of snow melting, soil warming, and frost protection. The UL-listed cables are manufactured with a cross-linked, polyethylene-insulated resistance wire in four varieties and a number of different resistance values, designed to suit each individual application.
ESWA Heating Systems Inc.
Circle 432 on information card

Radon Control Matting
Enkavent, a three-dimensional geomatrix matting from Akzo Industrial Systems, (right), is designed to reduce radon levels by preventing radon gas from penetrating slabs and foundation walls. The matting is designed so that it provides a channelway, collecting radon and venting it to the atmosphere through exhaust pipes.

The Enkavent, which is hinged to connect the foundation wall to the subslab, is placed fabric side down on the ground and covered with a vapor barrier. A flanged vent pipe is then set over it, and the slab is poured over the system. After the matting is set in place, radon gas vents through the pipe before it can penetrate the building's interior. The matting can be used in new house construction or installed in existing crawl spaces.
Akzo Industrial Systems
Circle 418 on information card

Finish System Resembles Stone
A new Aurora matrix manufactured by Senergy Inc. achieves the look of real marble and granite, reputedly at half the cost. A thin coating of the matrix is troweled over a base coat of plaster and portland cement to the desired thickness. Using a pattern pistol-type gun and hopper, 1/16-inch colored aggregate is then sprayed onto the matrix, and an acrylic sealer is rolled over the stone aggregate for a smooth, monolithic surface. The matrix comes in a variety of standard and custom colors.
Senergy Inc.
Circle 417 on information card

New Periodical Index
A periodical index in the related areas of architecture, housing, and construction goes beyond standard periodical listings (topic, building type, designer, location) to include other pertinent information such as keywords, graphics, projects, participants, and photographs. Each article in the Search system is coded by magazine name, issue date, page number, and article length. The index contains information on 14 building-related magazines.

The computer-run software system will be available in February on a quarterly

continued on page 150

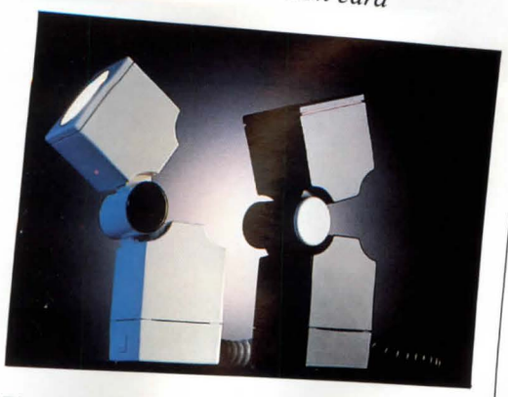
Products *from page 149*
basis in hard-copy format. A computer diskette version of the data base will be introduced to subscribers by mid-1989. Search's creator, architect Don Colangelo, developed the idea as an answer to his frustration over what he perceived was the underuse of industry magazines in his office, which he felt languished on the shelf after the initial perusal.
Search Publishing Inc.
Circle 416 on information card

Wall Sconce
The Filicudara wall fixture by Steven Lombardi for Artemide Inc. is shown (below) in anodized aluminum. The fixture is designed to work with a regular 100-watt incandescent bulb or, for a different effect, with a candle. The diffuser is constructed in white polyester.
Artemide Inc.
Circle 426 on information card

New Model Revolving Door
A 14-foot-diameter automatic revolving door called the Grand Revolver and described as a "moving vestibule" by its manufacturer, Horton Automatics, can accommodate as many as four people walking abreast through its entrance. Large packages and furniture can pass through the entrance easily as well, eliminating the need for an adjacent swing door.

The four-wing automatic revolver is activated by a microwave motion detector adjusted to detect pedestrians up to six feet from the door. To accommodate slower pedestrians or delivery persons pushing handcarts, the door is equipped with a button that, when pushed, activates to slow the door from its preset four revolutions per minute to two RPM. A voice annunciator alerts incoming users every seven seconds that the door is in slow speed and not to push. After two revolutions at the slow speed the door automatically resets to its normal speed. The door can be manually rotated if the power is off.

Introduced last February, the door's flat glass design consists of an enclosure of flat glass sections set in extruded aluminum rails that are angled to conform to the rotation of the door.
Horton Automatics
Circle 421 on information card



Task Lighting Fixtures
Lighting Services Inc.'s MRXG low-voltage task lighting (above), fixtures feature a freestanding compact unit with a weighted base and an adjustable, self-looking swivel for the beam. The unit also features integral on/off switching and a nontangle coiled cord. The weighted base provides stability, enabling the unit to be placed on desktops or shelves to illuminate vertical surfaces such as pictures, photographs, or wall hangings.

Optional features of the MRXG series include a large selection of glass color filters, contrast-color swivel caps, beam conditioners (eliminating light striations), louvres, light-blocking screens, and museum-quality, UV-blocking safety glass. The metal die-cast fixtures use the MR-16 low-voltage light sources available in 20 to 75 watts, in all beam spreads. The light is available in chip-resistant black, white, and silver aluminum paint finishes.
Lighting Services Inc.
Circle 422 on information card

Damp Control for Buildings
The AET-Technique is a two-stage process of drying out buildings that is based on the physical principles of electrolysis and electroosmosis. The technique provides a high degree of protection against the recurrence of dampness by desalinating and drying stone or brickwork.

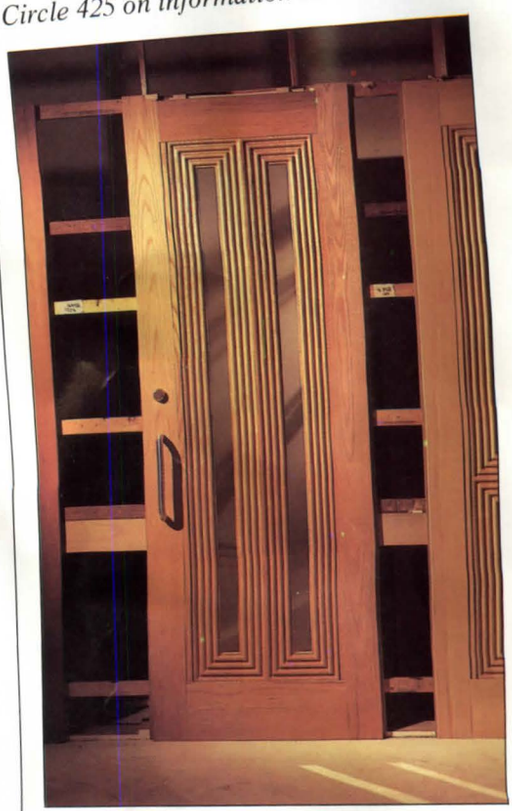
In the first stage (roughly 12 to 20 weeks), soluble salts are isolated in the water within the masonry by specially designed desalination electrodes at the same time the masonry is dried electrokinetically. The second stage involves electrokinetic blockage and in some cases chemical blockage for long-term water resistance. The AET-Technique, developed by the Bauakademie and the Akademie der Wissenschaften of the German Democratic Republic, is suggested particularly for the maintenance and protection of cultural and historic buildings and monuments for restoration work.
Ogilvie Taylor and Associates Inc.
Circle 424 on information card

continued on page 152

Wood Doors
Max wood doors in various woods and in solid or glazed options are newly available from Forms + Surfaces in a diverse range of carved door designs. Custom or standard doors are offered with two carved panels set in a stile and rail frame, or fully carved with narrow hardwood stiles (below). Door faces are carved in red oak, mahogany, white fir, and redwood.

Door stiles and rails of a matching hardwood species are available, as well as door pulls and lever handles that match each design.

Forms + Surfaces
Circle 425 on information card



Flashing for Roof Windows and Skylights
Velux-America Inc. specializes in roof windows and skylights and offers prefabricated, dry mechanical flashings that require no caulking or mastic for their installation. Velux Type L flashings are designed for use with thin roofing materials such as slate, shingles, and cedar shakes. The flashings are interwoven with the roofing materials and directly fastened to the roof window or skylight. Type H flashings are recommended for high-profile and extra-thick roofing materials such as Spanish tile, concrete tile, flat tile, and corrugated roofing. The sill flashing piece is fabricated with a lead apron, which can be folded and formed across the roofing material. Type VP Curb flashings enable the window to be raised 10 degrees to achieve the required pitch of at least 20 degrees. (This type of flashing is not designed for flat roofs.)

For installing roof windows or skylights, the manufacturer recommends using a minimum of three feet of roofing felt paper on both sides of the window and a minimum of 18 inches folded up against the side frames and interwoven with the step flashing to provide additional insula-

 Circle 168 on information card

tion and waterproofing. For paired and grouped roof windows, a prefabricated system of gang flashing is available in both the Type L and H versions mentioned above.

Velux-America Inc.
Circle 415 on information card

CREDITS

Point Tiburon, Tiburon, Calif. (page 86). *Architect: Fisher-Friedman Associates, San Francisco.* Project managers: Russ Stechschulte, Steve Haines. Mechanical engineer: Charles & Braun. Structural engineer: Robinson Meier Juilly. Electrical engineer: Belden Inc. Civil engineer: Tillson-Bliss Associates. Landscape architect: A.M. Guzzardo Associates. Soils: Harding-Lawson Associates. Acoustics: Charles Salter Associates.

Republic Place, Washington, D.C. (page 94). *Architect: Keyes Condon Florance Architects, Washington, D.C.* Structural engineering consultant: Baskam & Jurczyk. Electrical and mechanical engineering consultant: Girard Engineering Ltd. Contractor: Omni Construction Inc. Owner: Oliver Carr Co.

Back Bay/South End Station, Boston (page 98). *Architects: Kallmann, McKinnell & Wood Architects, Boston, and Bond Ryder, New York City.* Principals: Michael McKinnell, AIA; Gerhard Kallmann, AIA; Henry Wood, AIA. Project manager: Hans Huber. Job captain: Kathy MacKenzie. Project team: Peter Bacot, Jack Bialosky, Marsha Cuddeback, Gary Gardner; Emily Kuo, Spiro Pantazi, Ken Roberts, John Salem, and Kevin Triplett. Line design engineers: Kaiser Engineers/Fay, Spofford & Thorndike. Structural engineer: Weidlingers Associates. Mechanical and electrical engineer: Cosentini Associates. Landscape architect: Moriece & Gary.

Ruggles Station, Boston (page 98). *Architect: Stull & Lee, Boston.* Engineering consultant: PRC Harris. Lighting consultant: William Lam. Landscape architect: Carol Johnson Associates.

Forest Hills Station, Boston, (page 98). *Architects: Cambridge Seven Associates, Cambridge, Mass., and Robert L. Wilson & Associates, Tampa, Fla.* Principal in charge: Charles Redmon, FAIA. Principal: Robert L. Wilson, AIA. Project manager: Bobby Poole, AIA. Project architect: Robert Galloway. Construction administration: Douglas Lawton. Structural engineer: LeMessurier Associates. Construction engineer: Leroy Callender. Mechanical engineer: Shooshanian Engineering Associates. Electrical engineers: Thompson Engineering Co., Electric Time. Lighting consultant: Howard Brandston Lighting Design Inc. Contractor: White, Morrison, Knudson, Mergentine. □

ANNUAL INDEX

Advertisers Service Section

Musson Rubber Co.'s color brochure contains illustrations and specifications of fire safety and other rubber floor and stair tread systems. The catalog features many different marbleized or plain raised and surface designs in decorator colors. Also included are rubber landing and riser materials, vinyl treads and risers, and fluff cord and traffic tiles. Circle No. 300

Point Line CADD's brochure features fast, easy, affordable CADD information for architects. The catalog runs through integrated 2D CADD, 3D Solid Modeling, and Paint software for high production drafting and presentation graphics. Circle No. 298

Wirsbo Co.'s brochure on radiant floor heating for new or retrofit residential and commercial buildings discusses the amount of energy savings possible and the construction of the system as well as detailing installation features, specifications, and technical data. Circle No. 296

Houston Instrument's brochure details its line of DMP-60 Series drafting plotters, pen plotters that may be easily expanded to meet future office needs. Circle No. 294

Circle 172 on information card
Circle 174 on information card

MAIN OFFICE
1735 New York Avenue N.W.
Washington, D.C. 20006
(202) 626-7300

James P. Cramer
Group Publisher
Jesse Sims
Production Manager
Bernard F. Kroeger
Circulation Manager
Kelly L. Collins
Assistant Circulation Manager
Nancy Perri
Assistant to the Publisher
Bob Kliesch
Publisher

ADVERTISING SALES OFFICES
New York/Connecticut (215) 254-9800
Michael J. Davin
994 Old Eagle School Rd., Suite 1010
Wayne, Pa. 19087
New England (404) 980-6740
James A. Bauschka
6520 Powers Ferry Rd., Suite 200
Atlanta, Ga. 30339
Philadelphia/Pittsburgh (215) 254-9800
George T. Broskey, Eastern Sales Manager
994 Old Eagle School Rd., Suite 1010
Wayne, Pa. 19087
Southeast (404) 980-6740
James A. Bauschka
6520 Powers Ferry Rd., Suite 200
Atlanta, Ga. 30339
Midwest (312) 527-1055
Jack E. Bergren
Barbara Mitchel
1337 The Merchandise Mart
Chicago, Ill. 60654
Jack E. Bergren (414) 786-4286
2530 Coach House Dr.
Brookfield (Milwaukee) Wi. 53005
Southwest (314) 569-3210
Richard Grater
1466 Summerhaven
St. Louis, Mo. 63146
West/Northwest (619) 450-6462
James A. Anderson, Western Sales Manager
5830 Oberlin Dr., Suite 300
San Diego, Calif. 92121
Europe 0211-65-2031
Erich Hillerbrand
Media + Marketing Services
Eitelstrasse 32
4000 Dusseldorf 30
West Germany
Canada (416) 833-6200
Donald C. Fenn
148 King Road E.
King City, Ontario LOG 1KO CANADA

Did you miss valuable information offered by advertisers in last month's issue of ARCHITECTURE?

The manufacturers listed below and on the following page were advertisers in last month's issue who are anxious to provide you with their latest product information and literature for your planning needs. To receive this helpful information, just circle the appropriate numbers on the adjacent self-addressed, postage-paid response card.

A/E/C Systems '89. Send for more information on attending or exhibiting at A/E/C Systems '89—June 5-8, Anaheim, CA Convention Center. *Circle No. 21*

AT&T Technologies. Premises Distribution System: A single wiring system that meets all your client's communications needs. *Circle No. 111*

Above View Inc. Send today for more information on our Suspended Plaster Ceiling Tiles. *Circle No. 67*

Adams Rite Manufacturing Co. Adams Rite Series 3000 exit devices meet stringent fire codes, and do it with imagination and flair. *Circle No. 15*

Akzo Industrial Systems Co. Nothing rates like the Enkasonic® System for sound control between floors. Send for more detailed information today. *Circle No. 173*

Alucobond Technologies. Retrofit with Alucobond materials and give any old building a miraculous new lift. *Circle No. 87*

American Gas Association. Send to receive full details on advanced gas cooling equipment. *Circle No. 187*

American Plywood Assoc. To receive more information on APA-trademark panels, send for our free booklet. It'll help you lower the cost of raising a roof. *Circle No. 113*

American Stair-Glide Corp. PORCH-LIFT vertical wheelchair lift is a safe, simple solution to architectural barriers. Send for a free brochure. *Circle No. 61*

American Standard. Our Ellisse™ Petite Suite has beautifully flowing lines and delicate forms, perfectly scaled and proportioned for smaller bathrooms. *Circle No. 53*

Andersen Corp. Custom-sized geometric windows are backed by the nation's largest window manufacturer. Ask your Andersen distributor about Flexiframe.®

Andersen Corp. The Andersen Commercial Group™ exists solely and uniquely as a resource for architects who use Andersen products in commercial building applications.

Architectural Area Lighting Inc. Send to receive a copy of our new catalog. *Circle No. 183*

Aristocast Originals. Sculptured crown mouldings, niches, traditional mantels, medallions, and other fine architectural details add old world elegance and value to any home. Send for our free color catalog. *Circle No. 77*

Armstrong. Send for our brochure on Ceiling Edges. All in 2′x2′ regular lay-in. *Circle No. 1*

Armstrong. Send for more information on our new vinyl floors—Suffield.™ *Circle No. 3*

Armstrong. Send for more information on our grid accessories for new ceiling systems—Ceiling Accents. *Circle No. 5*

Bethlehem Steel. Send for more information on Galvalume™ sheet and its many applications. *Circle No. 101*

Bilco Company. Specify the door that matches the floor—Bilco's Type "T" floor door. *Circle No. 177*

Brite Vue Glass Systems Inc. Send for complete information on Brite Vue Tempered Glass Entrance Systems. *Circle No. 59*

Brite Vue Glass Systems Inc. Brite Vue Aluminum Doors clad in brass or stainless steel. Now you can design monumental entrances at an affordable price. *Circle No. 123*

Brite Vue Glass Systems Inc. Brite Vue Revolving Doors form luxurious appearing entrances and deliver smooth, efficient performance year after year. Send for complete information. *Circle No. 141*

CNA. No professional liability insurer offers you a broader range of coverage choices than the CNA Insurance Companies and Victor O. Schinnerer & Company Inc. Send for more information today. *Circle No. 121*

California Redwood Assoc. Free folio of literature for architects illustrates the beauty and performance of redwood. *Circle No. 153*

Carlisle SynTec Systems. The next time you need a roofing system try a Quality Roof by Design . . . try Carlisle. *Circle No. 39*

Chicago Faucet Co. Send for the Chicago Faucet Co.'s brochure highlighting two collections of their decorative faucets and fittings for bath, kitchen, and bar installations in a 12-page color catalog. *Circle No. 155*

Columbus Coated Fabrics. Introducing Filaments, the unique new texture from Guard® Wallcovering. Send for free sample swatch. *Circle No. 75*

For product information and literature from advertisers in this issue of ARCHITECTURE, circle the appropriate numbers appearing on the advertisements.

Commonwealth Aluminum. Commcoat™ Flurodize® Coil, the new surface anodized can't match. Send for more information today. *Circle No. 169*

Coyne & Delany. Handles are a risk . . . eliminate them with a Delany Sensor Faucet.® *Circle No. 9*

Cupples Products. Truly great architectural masters understand that magic of detail in their buildings. And now, you can create a little magic of your own with Graphiclad panels by Cupples. *Circle No. 33*

Cupples Products. Through a proprietary process graphic images are photo-transferred in Duragraphic™, a fluoropolymer coating from PPG, to aluminum sheets. Send for more information on this revolutionary new product. *Circle No. 37*

Cupples Products. Graphiclad panels, this unique cladding is very affordable, putting ornamentation within reach of just about everyone—and every budget. Send to receive more information. *Circle No. 41*

Curries Co. For renovating, retrofitting, or remodeling, we complete the picture. Send for more information for all the hollow metal doors and frames you need. *Circle No. 27*

DCAS. Clemson University announces a National Two-Stage Design Competition for a Performing Arts Center. Send for additional information today. *Circle No. 167*

DPIC Companies. Professional Liability Insurance for design professionals. Send today to receive further details. *Circle No. 43*

DuPont Antron. Carpet of Antron Precedent® brings maintenance costs down to earth. *Circle No. 83*

Eclat Intelligent Systems. Send for more information on el:Intellifile—a complete Design Library on a silver platter. *Circle No. 31*

EFCO Corp. Send to receive performance specifications regarding the Shadowline™ and other EFCO windows. *Circle No. 13*

Florida Tile. Presenting the NATURA Granite Series with the strengths and qualities of a new generation of glazed paver tile. *Circle No. 147*

Fry Reglet. Fry's Aluminum Architectural moldings add a third dimension to your designs. Send today for more information. *Circle No. 185*

General Electric. Introducing the first truly sophisticated built-in—the new Monogram dispenser refrigerator. *Circle No. 85*

Georgia-Pacific. Send for complete Dens-Glass exposure test results, product information, warranty, samples and a brochure outlining Dens-Glass application details on a variety of recent projects. *Circle No. 189*

Glen Raven Mills. At last an indoor/outdoor fabric worth weaving into your designs—Sunbrella Firesist.® Send today for more details. *Circle No. 29*

Grace, W.R. Ice & Water Shield offers the most cost-effective, long-term protection against ice damage and windblown rain damage on the market today. *Circle No. 35*

Haworth. With everything from fanlights to fabrics, wood to glass, PLACES™ gives you the freedom to create the spaces you always wanted to. *Circle No. 97*

Haws Drinking Faucet Co. Haws drinking fountains and water coolers, used as renovation tools, can help make the job a sparkling success. *Circle No. 137*

HEWI. A range of high quality nylon hardware items that allow versatility in combination and individuality of expression. *Circle No. 165*

Hewlett-Packard Peripher. We'll send you an original plot and a complete information kit on the new Hewlett-Packard Electrostatic Plotter: 406 D.P.I. *Circle No. 107*

Houston Instruments. For nearly three decades, companies have drawn on Houston Instruments; now it's your turn. Send to receive more information. *Circle No. 129*

ISICAD. Design systems for the real world. Send today for more information on how ISICAD can meet your design requirements. *Circle No. 117*

Illinois R.B. Jones. A way to protect yourself through a specially designed liability policy. Send for more information today. *Circle No. 55*

Intergraph. Send today for more information on Intergraph's advanced system for architectural design, presentation, and production. *Circle No. 57*

J.P. Stevens. Introducing the Stevens Hi-Tuff Plus™ Total Roofing System. Send for more information. *Circle No. 161*

Kalwall Corp. The most highly insulating, light transmitting composite systems for walls, window-walls, skyroofs and window replacement. *Circle No. 51*

Kawneer Co. Inc. Today, windows are a bigger part of architectural design than ever before. Send for more information on Kawneer's window line. *Circle No. 139*

Keuffel & Esser. For high-performance plotting insist on Comstoc® Plotter Media. *Circle No. 143*

LCN Closers. When you want value and quality, specify and insist on LCN Closers . . . period. Send to receive more information. *Circle No. 103*

Libbey-Owens Ford. ECLIPSE® reflective glass offers incredible design freedom to create building facades. Send for product literature. *Circle No. 179*

Mitsubishi Chemical Industries. A-Look Ex: the lightweight, flexible, unbreakable mirror for exterior use. Alpolic: the lightweight, rigid, bendable composite material. Send to receive more information. *Circle No. 175*

Monsanto Chemical Co. Laminated glass lets you put in the windows you want, and keep out the sound you don't. Send to receive a free copy of our Acoustical Glazing Design Guide. *Circle No. 47*

Musson Rubber Co. "Carpet-like surface" heavy duty entrance tile. Send for free brochure and samples. *Circle No. 127*

National Car Rental. For AIA members about to take a trip, here's a going away present. Send for more information today. *Circle No. 181*

Parallam. The new engineered wood product that expands your creative horizons. Send for more information today. *Circle No. 45*

Peerless Lighting. The unique optics in the Peerless Small Office Fixture makes the entire office seem brighter and better lighted. Send for more information. *Circle No. 89*

Pella. The significant difference in windows. Send today for the latest literature on Pella for commercial window replacement. *Circle No. 99*

Plan Hold. Get a grip on your filing problems. Send for a free catalog. *Circle No. 91*

ProSoCo Inc. SUREKLEAN® Restoration Cleaners make the dirtiest masonry building look like new again. Send for more information. *Circle No. 171*

ProSoCO Inc. New Conservare® Breathable Masonry Coating protects older masonry. *Circle No. 191*

Rambusch. Rambusch creates with stained glass, metal, wood, gold leaf, crystal, fabric, paint, lighting, and extraordinary skill. *Circle No. 105*

Red Cedar Shingle. Send for a free copy of the "New Roof Construction" guide. It's everything you need to stay on top of cedar roofs. *Circle No. 69*

Rixson-Firemark Division. Rixson's Smoke-Chek™: efficient, reliable just when you need it most. From the pioneer and leader in smoke-activated door control. *Circle No. 145*

Rohm & Haas Co. Send to receive more information on the durability of Rohm & Haas 100% acrylic polymers. *Circle No. 65*

SPI Lighting. Here are lasting esthetics and advanced lighting technology that have evolved as one: the Renaissance. *Circle No. 23*

SieMatic. Kitchen interior design. Send for your full-color Kitchen Book and a Specifiers Manual. *Circle No. 109*

Sloan Valve. SLOAN Flushometers offer proven, reliable service. Next time you consider specifying a substitute, specify Sloan. *Circle No. 81*

Sonin Inc. Introducing the new Sonin Electronic Distance Measuring Instruments. Send today for further details. *Circle No. 11*

Southwall Technologies. Send to find out how Heat Mirror can open up your design options. For immediate help on current project, call our Architectural Services Department (800) 365-8794. *Circle No. 17*

Spectrum Glass. Introducing the Duratec Structural Spacer Glazing System. Send for complete details. *Circle No. 151*

Spectrum Glass. Spectrum's wide array of high performance glass products could be instrumental to resolving your fenestration problem. *Circle No. 157*

Stanlock Division/Standard Products Co. Neoframe window is an innovation in the fixed-glazed window market. *Circle No. 71*

Steelcase. A chair for mind fitness—The Sensor Chair. *Circle No. 7*

Stucco Stone Products. With lightweight Cultured Stone® you can achieve the beauty of natural stone at a fraction of the cost. *Circle No. 163*

Surveyors Supply Co. Hewlett-Packard calculators now at a new low price. Offer expires 12/31/88. Send for information today. *Circle No. 125*

Thermador/Waste King. Introducing Thermador's new 5000 series Dishwashers. Send for more information. *Circle No. 49*

University of Oregon. Faculty positions open. Complete applications due January 31, 1989. Send for more details. *Circle No. 79*

Velux-America Inc. For more information about VELUX Gang Flashings, send for a free copy of our brochure "The Complete Guide to Roof Windows and Skylights," and a price list. *Circle No. 63*

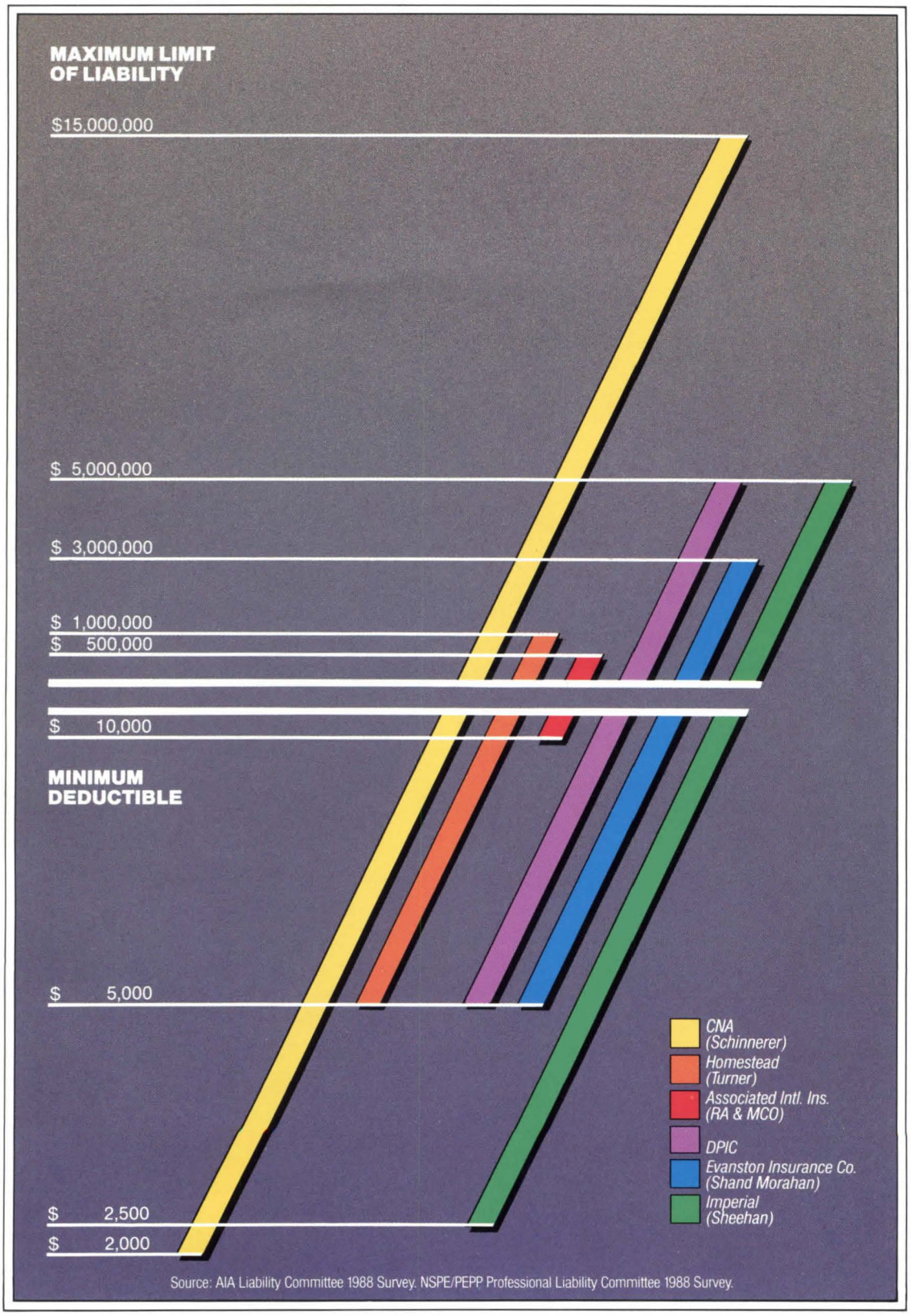
Versacad. With the combination of Versa CAD and Dimensions 3D on today's powerful Macintosh computer, drafting and design are integrated as never before. *Circle No. 119*

Weslock. We're now a part of JP Industries, and we're bigger and better than ever. Send for a new catalogue. *Circle No. 115*

Wirsbo Co. Send today and find out all the benefits of radiant floor heating. *Circle No. 159*

 Circle 176 on information card

It pays to look high and low for your liability protection.



No professional liability insurer offers you a broader range of coverage choices than the CNA Insurance Companies and Victor O. Schinnerer & Company, Inc. These choices give you greater control over your insurance costs by letting you more precisely match your coverage to your needs.

The chart shows two examples of the flexibility you have with CNA coverage offered through Victor O. Schinnerer & Company, Inc. CNA's flexibility accommodates all sizes of firms by providing the lowest deductible of $2,000, minimum liability limits as low as $100,000 and maximum liability limits as high as $15 million.

The stability of the CNA/Schinnerer program is unsurpassed. We've offered coverage to architects and engineers continuously since 1957.* Your future stability can be assured by our financial strength and by CNA's A+ financial rating from the A.M. Best Company.

We also offer extensive loss prevention seminars, newsletters and other guidelines to help you minimize claims. But, if one should arise, we maintain claims offices throughout the country to help you.

Look high and low. You won't find a better quality professional liability program than ours. To learn more, have your independent agent contact Schinnerer.

*CNA/Schinnerer is proud to have earned the commendation of the AIA and NSPE/PEPP.

Victor O. Schinnerer & Company, Inc.

Underwriting Manager
Two Wisconsin Circle
Chevy Chase, MD 20815-7003
(301) 961-9800, Telex 892340

Chicago, (312) 565-2424
New York, (212) 344-1000
San Francisco, (415) 495-3444

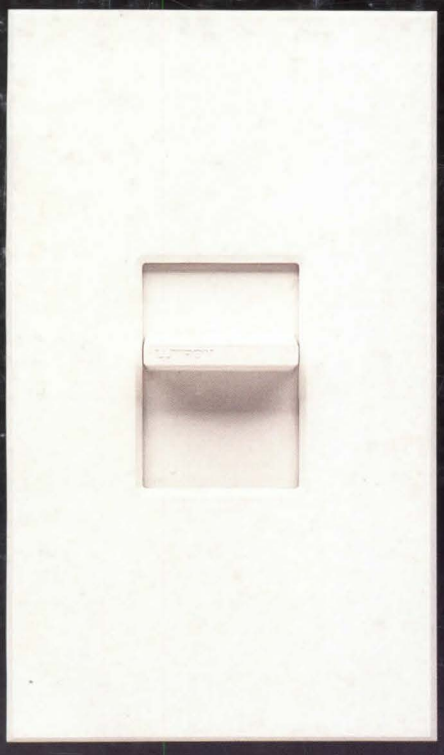
CNA
For All the Commitments You Make®

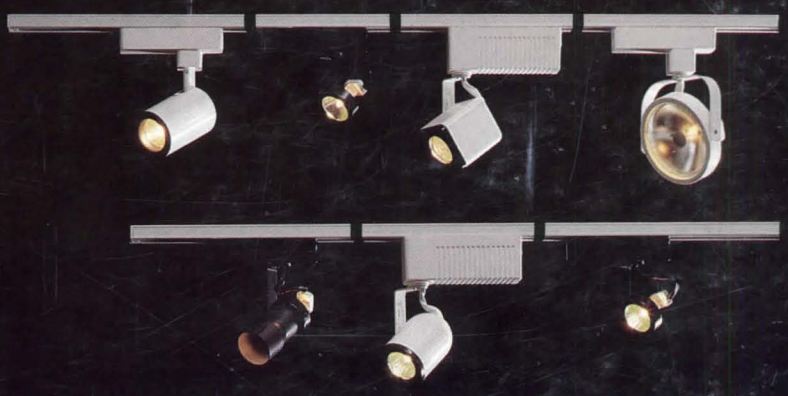
Coverage for this program is provided by Continental Casualty Company, one of the CNA Insurance Companies.

Circle 178 on information card

NEW!

Lutron dims ELECTRONIC Low Voltage lighting





NEW Sol-Lo™ Technology... (Solid-State Low Voltage)

Lutron introduces ***Sol-Lo*** dimming technology, the only dimmer technology expressly developed for electronic (solid-state) transformer low voltage lighting.

In response to the need to control electronic low voltage lighting, Lutron developed special **Sol-Lo** dimming circuitry after an extensive engineering research and development program.

Sol-Lo technology is now available in these Lutron products:

Specification Grade

Nova T☆, NTELV-300 300W capacity (UL)

Nova, NELV-450 450W capacity (UL)

Designer Style

Skylark, SELV-300P & SELV-303P 300W capacity (UL)

Quiet Dimming of Electronic Low Voltage Fixtures

All Lutron **Sol-Lo** technology dimmers feature:

- Advanced circuitry for quiet dimming—without annoying transformer or lamp buzz.*
- Overload protection, voltage compensation and short circuit protection.
- Soft-start—helps extend lamp life.

Call the Lutron toll-free **Hotline** for a free *Guide to Dimming Low Voltage Lighting* (describes dimming ELECTRONIC and MAGNETIC low voltage lighting).

For help with applications, systems layout or installation call the ***Lutron Hotline*** toll-free:
(800) 523-9466 (800) 222-4509 (Pennsylvania)
(215) 282-3800 (Outside U.S.A.)

*Typical fixture is inaudible in a quiet room of 27dBA at a distance of 3 feet.

LUTRON®

Lutron Electronics Co., Inc.
205 Suter Rd.
Coopersburg, PA 18036 U.S.A.

CALL TOLL-FREE FOR LUTRON DISTRIBUTORS IN YOUR AREA STOCKING THIS PRODUCT.

Circle 180 on information card