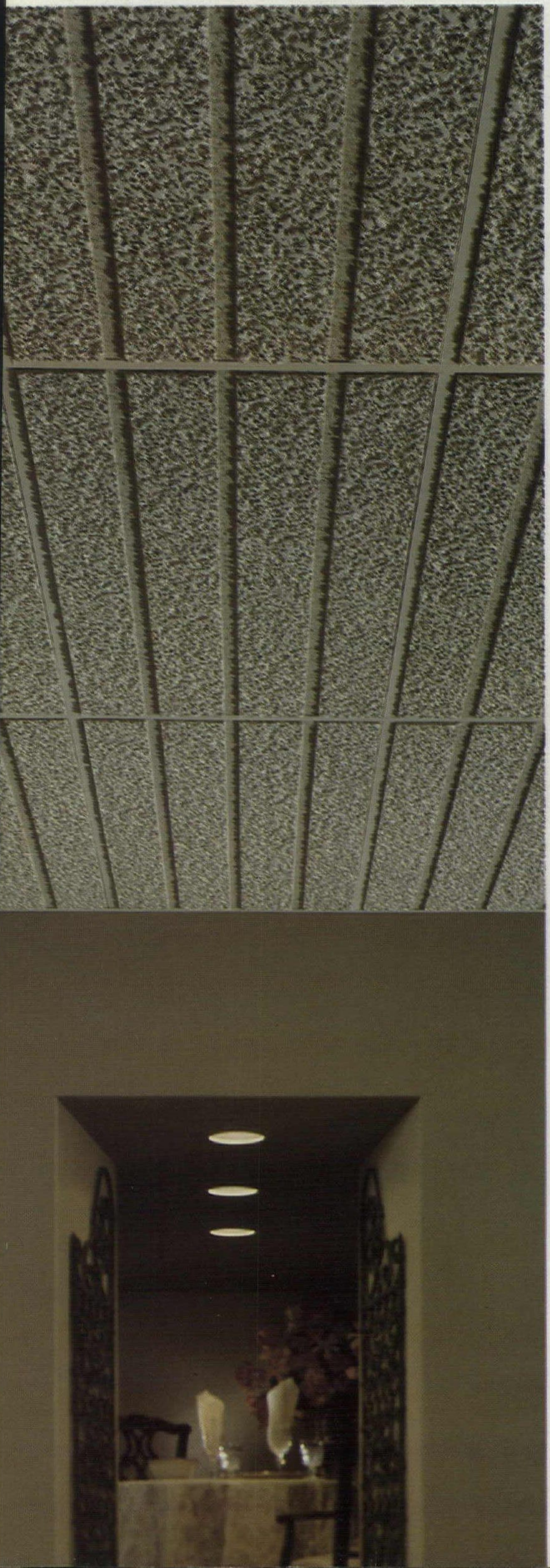
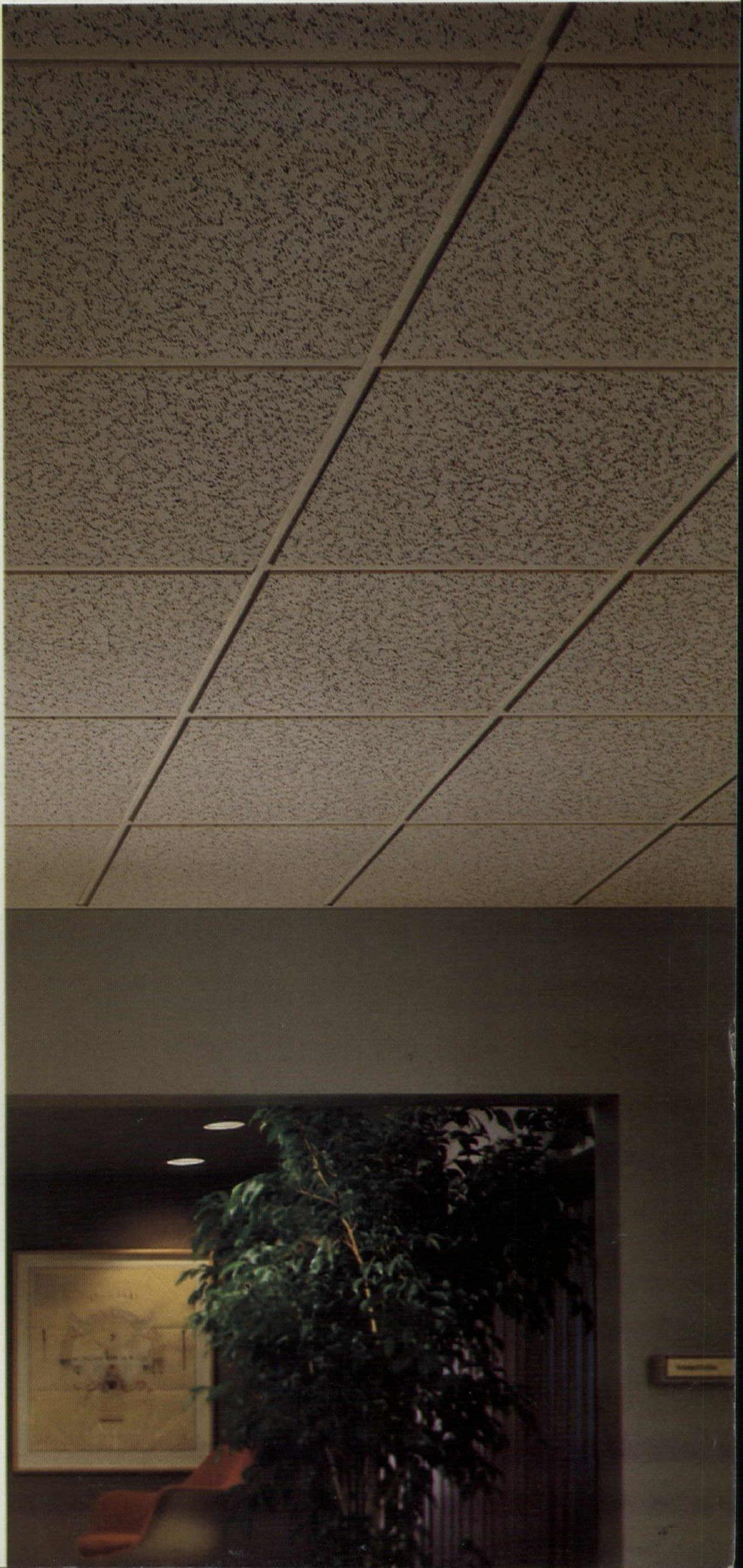
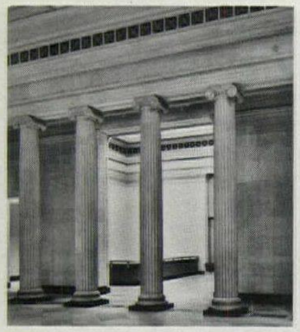
Progressive Architecture

August 1983

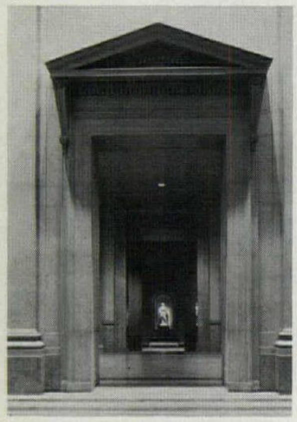




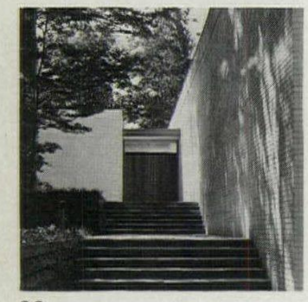
Progressive Architecture



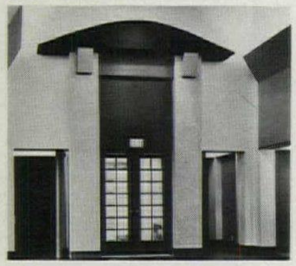
66



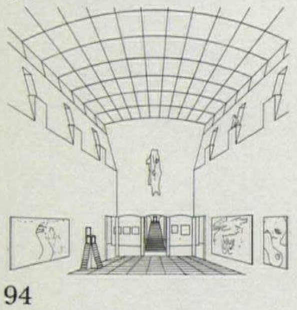
76



82



88



94

Cover: *The Environmental Education Center, Liberty State Park, New Jersey (p. 88), by Michael Graves, Architect. Photo: Cervin Robinson.*

Penton/IPC

Progressive Architecture (ISSN 0033-0752) is published monthly by Reinhold Publishing, A Division of Penton/IPC: Philip H. Hubbard, Jr., President; Harry I. Martin, Robert J. Osborn, Vice-Presidents; Penton/IPC: Thomas L. Dempsey, Chairman; Sal F. Marino, President; N.N. Goodman, Jr., Benjamin L. Hummel, Paul Rolnick, Executive Vice-Presidents.

Executive and editorial offices, 600 Summer St., P.O. Box 1361, Stamford, CT 06904 (203-348-7531).

Subscription information:
Send all subscription orders, payments, and changes of address to Progressive Architecture, P.O. Box 95759, Cleveland, OH 44101 (216-696-7000). When filing change of address, give former as well as new address and zip codes, and include recent address label if possible. Allow two months for change. Publisher reserves right to refuse unqualified subscriptions. Professionals include architectural and architectural-engineering firm personnel and architects, designers, engineers, and draftsmen employed in allied fields.

Subscription rates, payable in advance, are:

Professional:	U.S.	Canada	Foreign
1 year	$25*	$33	$ 60
2 years	45	53	115
3 years	70	85	—
*Student rate also			
Nonprofessional:			
1 year	$45	$60	$ 85
Single copy:	$ 7	$ 8	$ 9

Indexed in Art Index, Architectural Index, Engineering Index. Second class postage rates paid at Cleveland, Ohio, and additional mailing offices. Volume LXIV, No. 8. Printed in U.S.A.

ABP MPA

Walls that take hard sounds and hard knocks.

Vinyl Soundsoak™
Acoustical Wall Panels

Whether it's classroom or offices, some places are bound to be noisy. And while you can't stop the noise, you can help control it with Vinyl Soundsoak Acoustical Wall Panels.

With an NRC of .55, Soundsoak panels take the edge off hard sounds, making it easier to work in noisy places.

And these easy-to-maintain vinyl-faced panels are damage-resistant to handle hard knocks.

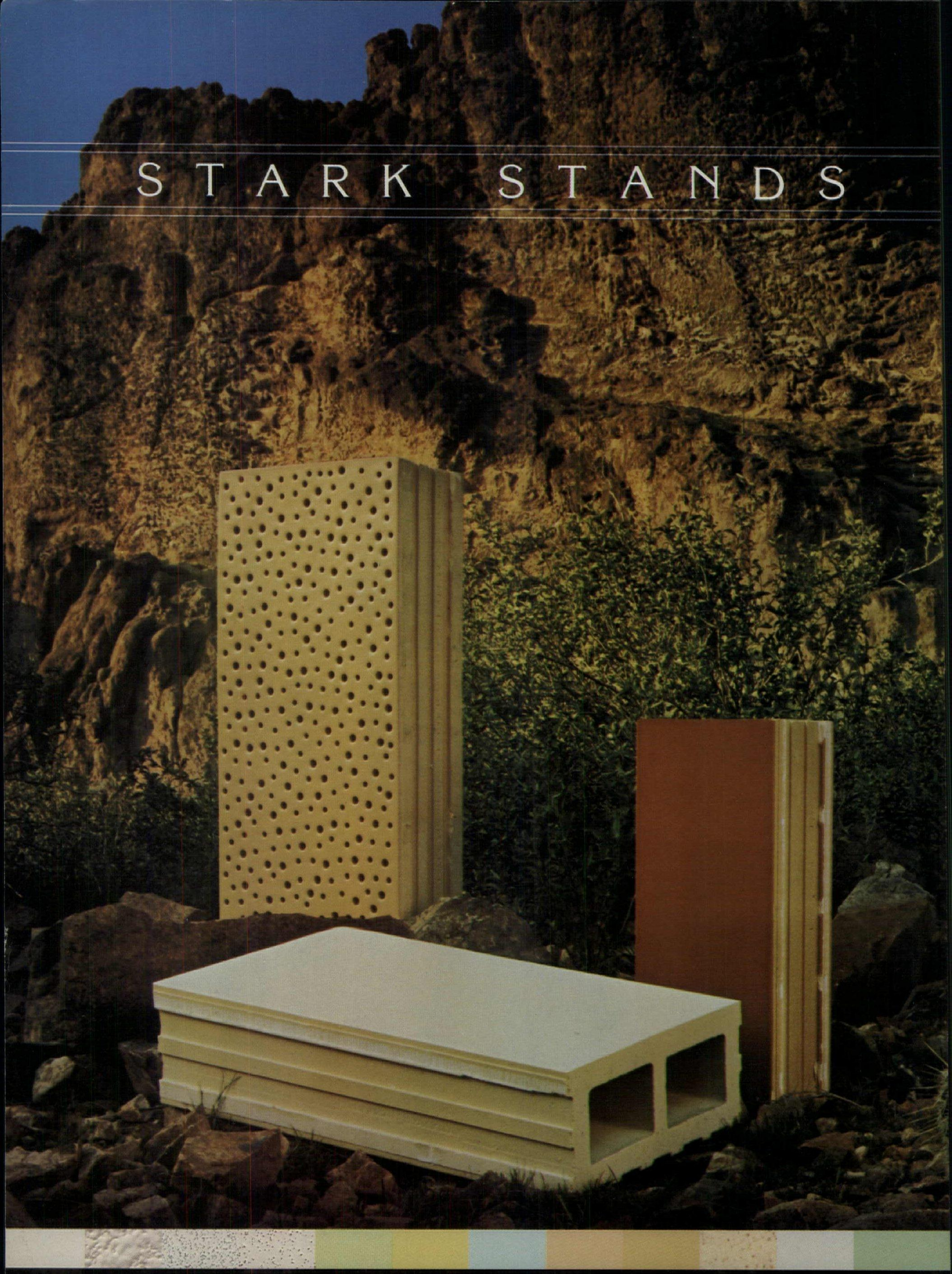
Vinyl Soundsoak is available in five natural colors, plus six special-order accents, and blends beautifully with any room decor. Each of the 30″x 9′ panels comes with a factory-edge detail designed for quick, neat installation.

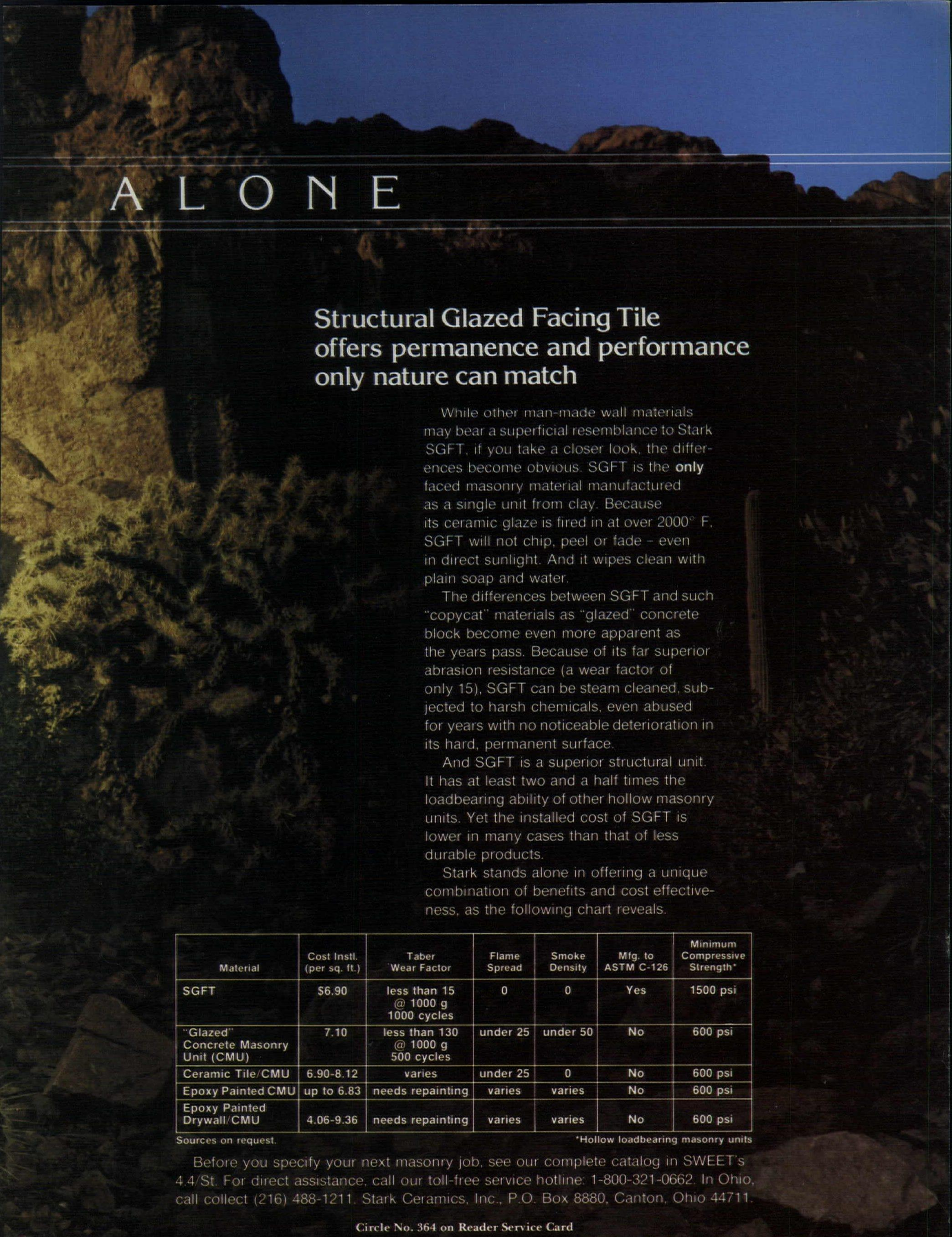
Vinyl Soundsoak. The perfect way to design peace and quiet into busy places. For more information, write Armstrong, Dept. 34NPA, P. O. Box 3001, Lancaster, PA 17604.

FROM THE INDOOR WORLD® OF

Armstrong

Circle **No. 309** on Reader Service Card


STARK STANDS



A L O N E

Structural Glazed Facing Tile offers permanence and performance only nature can match

While other man-made wall materials may bear a superficial resemblance to Stark SGFT, if you take a closer look, the differences become obvious. SGFT is the **only** faced masonry material manufactured as a single unit from clay. Because its ceramic glaze is fired in at over 2000° F, SGFT will not chip, peel or fade – even in direct sunlight. And it wipes clean with plain soap and water.

The differences between SGFT and such "copycat" materials as "glazed" concrete block become even more apparent as the years pass. Because of its far superior abrasion resistance (a wear factor of only 15), SGFT can be steam cleaned, subjected to harsh chemicals, even abused for years with no noticeable deterioration in its hard, permanent surface.

And SGFT is a superior structural unit. It has at least two and a half times the loadbearing ability of other hollow masonry units. Yet the installed cost of SGFT is lower in many cases than that of less durable products.

Stark stands alone in offering a unique combination of benefits and cost effectiveness, as the following chart reveals.

Material	Cost Instl. (per sq. ft.)	Taber Wear Factor	Flame Spread	Smoke Density	Mfg. to ASTM C-126	Minimum Compressive Strength*
SGFT	$6.90	less than 15 @ 1000 g 1000 cycles	0	0	Yes	1500 psi
"Glazed" Concrete Masonry Unit (CMU)	7.10	less than 130 @ 1000 g 500 cycles	under 25	under 50	No	600 psi
Ceramic Tile/CMU	6.90-8.12	varies	under 25	0	No	600 psi
Epoxy Painted CMU	up to 6.83	needs repainting	varies	varies	No	600 psi
Epoxy Painted Drywall/CMU	4.06-9.36	needs repainting	varies	varies	No	600 psi

Sources on request.

*Hollow loadbearing masonry units

Before you specify your next masonry job, see our complete catalog in SWEET's 4.4/St. For direct assistance, call our toll-free service hotline: 1-800-321-0662. In Ohio, call collect (216) 488-1211. Stark Ceramics, Inc., P.O. Box 8880, Canton, Ohio 44711.

Circle No. 364 on Reader Service Card

stark

Editorial

Graceful steps

Although we tend to think of buildings as whole creations, valued for their unity, some of our best architecture is produced in increments over time.

Architectural historians have had a hard time dealing with buildings that were not conceived all at once. Yet they have had to acknowledge that some of the finest works of architecture were built piece-by-piece through periods of changing program objectives and design concepts. Most of the English Gothic cathedrals, for instance, have come to be studied and admired for their diverse accretions over the centuries. The same can be said for many of the world's great palaces and religious structures.

Which are the greater architectural achievements—self-contained designs rigorously carried through or sensitive incremental additions? Is Wren's cathedral in London a finer work than his Trinity College Library at Cambridge or his Tom Tower at Oxford? In judging the built architecture of Michelangelo, we have little choice; all we have are fragments embedded in the work of others.

In the modern world, where palaces and cathedrals are less significant, the pattern of long-term incremental growth has been more evident in public institutions such as hospitals and museums. These are the kinds of buildings that now remain tied to one location through long periods of evolution. The works featured in this issue were chosen as examples of current museum design, but by no coincidence almost all are actually new increments for existing structures.

In the past decade, our architects have begun to consider additions to existing fabrics as seriously as the isolated creations that were the icons of the Modern movement. Now it is fashionable to refer to architectural efforts as "interventions," acknowledging the existing situation. But how well have we "intervened" so far?

Most of our major museums, such as New York's Metropolitan or the Art Institute of Chicago, have grown additions that have their good points, but are in the aggregate nothing to celebrate, architecturally. The controversial current additions to New York's Museum of Modern Art merely enshrine some elements of the old, familiar museum in a vastly different complex. The firm of I.M. Pei & Partners has carried out some of the most ambitious museum expansions in America: the East Building of the National Gallery in Washington (P/A, Oct. 1978, pp. 49–59), the new wing of the Boston Museum of Fine Arts (P/A, Sept. 1981, p. 37), and the Payson Building of the Portland (Maine) Art Museum (this issue, p. 100). While the intention to be complementary in plan and form is apparent in all these cases, their success as complementary additions is arguable. In a series of addition projects, James Stirling has adjusted his approach from the extremely self-effacing at the Rice University School of Architecture (P/A, Dec. 1981, pp. 53–61) to a bold amalgam of contextual images for the Fogg Museum annex at Harvard (P/A, June 1981, pp. 25–26) to an assertive addition to the Tate Gallery in London (P/A, Nov. 1981, p. 26) that seems to defy the rather dowdy main building. We'll have to wait to see what Michael Graves has in mind for the addition that is destined to loom over the Whitney Museum in New York.

One noteworthy phenomenon of recent years is the design of buildings *as if* they were agglomerations of increments. This kind of accretive design has been seen before—in Shingle Style houses, for instance, and in Collegiate Gothic dormitories—where the intention was to evoke vernacular or Medieval precedents, or both. It reappeared in the 1960s in a spate of "Italian Hilltown" designs. A recent example is Edward Larrabee Barnes Associates' Dallas Museum of Art (P/A, June 1983, p. 37), which is an arrangement of blocks interspersed with courts—and which is already being expanded during its initial construction. Another interesting, more polemical, example of accretive design can be seen in the South Side Settlement in Columbus, Ohio, by Craig Hodgetts and Robert Mangurian (P/A, Feb. 1981, pp. 78–85).

It is common knowledge that a large and apparently growing proportion of our architectural commissions involve additions and alterations, rather than starting anew. Complementing the statistical picture is a revised set of beliefs and objectives. Our current respect for historical architecture and our awareness that each new "intervention" must contribute to a larger context make the reworking of existing buildings more rewarding. From another viewpoint—that of professional practice—many are advocating long-term architect-client relationships (P/A, Dec. 1982, pp. 64–66), the kind of ongoing design process that is exemplified in the Louisiana Museum (pp. 82–87). Given this situation, it is essential to study effective strategies for expanding and altering. Such work can enhance what is there and—at best—yield a new, more satisfying whole.

John Morris Dixon

DRYVIT® HOW THE

We believe in quality.

In 1969, when we introduced the concept of an exterior insulation and finish system to the United States, we set high standards for ourselves and our product, Dryvit® Outsulation®.

We had to prove our wall system could perform as well, or better, than traditional materials. And so our commitment to stringent testing and quality control was born.

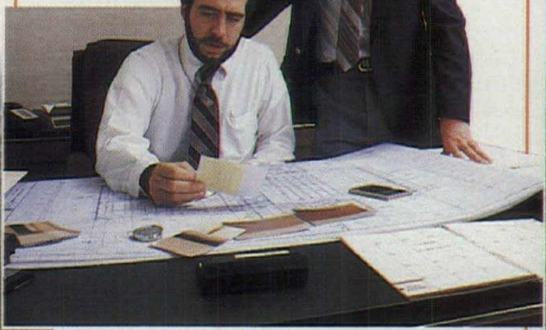
We believe no one has invested more time and effort in wide-range R&D and testing than we have over the years. And these are some of the reasons why the Dryvit System has earned your trust.

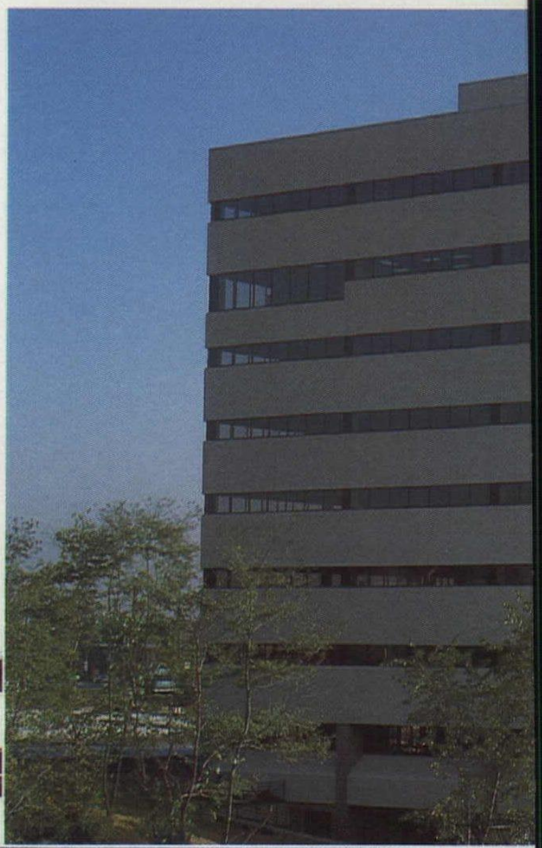
We offer technical support in the field and at the planning stage.

Our national field service staff is on call to help you. And design assistance is available from our technical staff and R&D department. Our distributors are also nearby for fast local assistance.

Four plants with modern batching facilities and custom color service are strategically located for fast delivery.

You can trust the Dryvit Difference when you need it.





A proven formula goes into our Finish coat and cemetitious adhesive.

We employ a 100% pure acrylic polymer formula when making the adhesives and coatings that form part of the Dryvit System. We know there is no substitute for the performance level of 100% pure acrylic co-polymer. We know that other formulas are less expensive, but we also know that valuable properties such as flexibility, color-retention, moisture-resistance, alkali-stability and wet adhesion are lost in an impure formula.

And you may have full confidence that we intend to maintain our high standards of product quality.

Demanding fire and structural testing go beyond code minimums.

The Dryvit System is recognized by all three model code agencies: ICBO, BOCA, SBCCI.

But we've put our System to even further testing by subjecting it to Full Scale Fire Tests with 1500 and 1250 pound fire sources, as well as the Factory Mutual Corner Test.

Positive and negative wind load testing has been conducted on full scale wall assemblies in accordance with ASTM E330 procedures.

You can have confidence in the performance of Dryvit even under demanding conditions.

Now, read about the Dryvit Difference on these recent projects.

Dryvit shows its colors in the First Christian Church, Ft. Collins, Colorado.

Because of earlier success working with Dryvit, Glaser Associates Architects felt confident about creating the aesthetic detail for this striking church.

Taking advantage of Dryvit's built-in flexibility, they incorporated 2 inches of Dryvit Insulation Board in a custom red Sandblast™ Finish to form bands of relief. The rest of the building was erected with 1-inch Dryvit Insulation Board and Manor White Quarzputz® Finish.

It exemplifies the wide range of design freedom offered by the Dryvit System.

Trust our proven performance. It's the

TRUST WAS EARNED.

"Comparative cost and aesthetics became a reality at Lookout Corporate Center."

"The Dryvit applicator provided us with a very convincing presentation on why the Dryvit System would facilitate a flexible method of erecting a curtain wall for our new corporate center.

Comparative cost and aesthetic considerations became a reality when the building was completed on a tight schedule and within budget. Using a combination of pre-fabricated Dryvit panels and in-place application proved to be everything we anticipated."

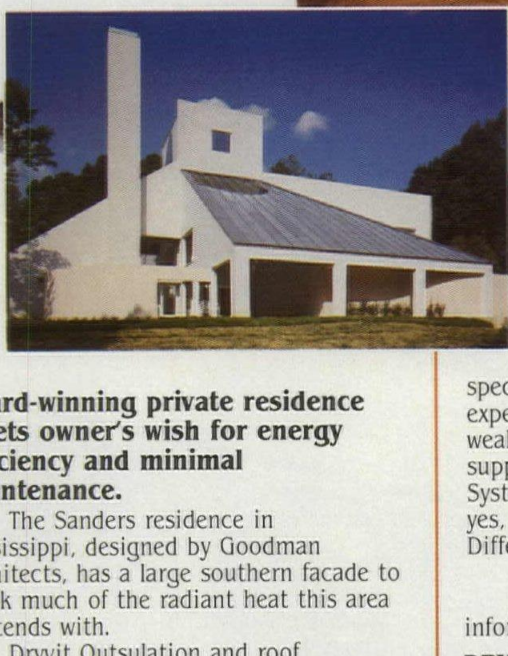
Wm. Michael Hargis
Chief Architect
W. P. Butler Company

This hospital's curving wings are beautifully realized with Dryvit Outsulation.

When architects Edwards and Daniels designed St. Anthony Hospital in Pocatello, Idaho, they thought originally of metal panels to create their curving concept.

However, metal panels posed installation problems. They were able to achieve the same flowing lines easily with Dryvit Outsulation. Steel studs were cut and welded into shape and fabricated into panels off site. Some field application of the System was also used.

Results are so pleasing, an adjacent Doctor's Office Building is planned with similar Dryvit construction.



It took only 5 weeks to panelize the 9-story Lookout Corporate Center.

Located one-and-a-half miles from downtown Cincinnati, Ohio, this building was designed, constructed and developed by W.P. Butler Company.

Project Architect Wm. Michael Hargis' design called for 28,000 sq. ft. of pre-fabricated Dryvit Outsulation panels. The 9 x 30 ft. panels were fabricated off site and trucked 75 miles — yet the building was enclosed in only 5 weeks.

Also, the pre-fabricated panels reduce the overall weight-of-wall of the structure. Important because of the nature of the site — bedrock is 75 ft. below the surface.

Outstanding "R" values were obtained by using 3 inches of Dryvit Insulation Board in the System.

The first floor of this handsome building now serves as corporate headquarters for the developer/contractor.

Award-winning private residence meets owner's wish for energy efficiency and minimal maintenance.

The Sanders residence in Mississippi, designed by Goodman Architects, has a large southern facade to block much of the radiant heat this area contends with.

Dryvit Outsulation and roof ventilators also do their part in keeping things cool.

The Dryvit System is fade, stain, and crack-resistant, helping to keep maintenance costs low.

Over 40,000 buildings stand as proof of our performance.

More than 30 years of Dryvit experience in this country and Europe offer peace of mind to the developer and architect specifying Dryvit. When this experience is added to the wealth of testing and technical support that comes with the System, you can understand — yes, there is indeed a Dryvit Difference!

Call or write for detailed information.

DRYVIT® SYSTEM, INC.
One Energy Way
P.O. Box 1014, West Warwick, RI 02893
(401) 822-4100

Plants: West Warwick, RI; Tulsa, OK; Columbus, GA; Woodlake, CA

Look for Dryvit in the General Building File of Sweets Catalog under Section 7.13/DR

dryvit

Dryvit Difference.

OUTSULATION®

Circle **No. 323** on Reader Service Card

Views

Corbu en las Americas

I was reading the article about Josep Lluis Sert on P/A News report (June 1983) by Mr. Willo von Moltke when one of his statements called my attention. Mr. von Moltke said that the Carpenter Center at Harvard University is "the only building by the master architect (Le Corbusier) in the Americas."

I would like to point out to Professor von Moltke that before the Carpenter Center was built, Le Corbusier was architect to two other projects also built in America: the Ministry of Education and Culture (Rio de Janeiro, 1945), and the Curruchet House (La Plata, 1949).

Josep Dominguez-Marzo
Former Professor of Architecture, UNBA
Gibbs & Hill, Inc., New York

Face-saving logic

I feel that Mr. Vonier is "nit-picking" ("Saving face," P/A News report, June 1983). Certainly, the architects may be faulted for poor or insensitive design detailing in the instances of ceiling lines and window heads, etc., etc., etc.

The owners and/or developers obviously determined that it was both advantageous and prestigious to adapt and conserve rather than to raze. I would, in fact, praise them for preserving the human scale of the street-scape. Much more disturbing to me is the introduction of copies of ornamental detail!

W.F. Lampe, Jr.
Southern Consultants, Inc.
Nashville, Tenn.

["Preservation of the streetscape" is not really accomplished if an unsympathetic curtainwall looms just above the embalmed original cornice.—Editors]

Addressing the chair

Dean Maltz's excellent design (P/A Furniture Competition, P/A, May 1983, p. 168) underscores the fatuousness of most of the other winners.

How could a jury which included the redoubtable Frank Gehry have selected from among 870 entries these clumsy, pretentious and useless objects?

I am appalled.

Judith Arango
Miami, Fla.

[If the writer had seen the models and prototypes P/A displayed in New York, Los Angeles, and Chicago, she might appreciate the ingenuity, craftsmanship, and elegance of form in some other pieces. Announcement of the fourth annual furniture competition will be in the September P/A.—Editors]

Credit correction

All black and white photos on pages 90 and 91 of P/A in June ("A mosque for Abiquiu") should have been credited to Kevin Bubriski.

Credit extension

Structural consultant for the Christian Townhouses, Coconut Grove, Fla. (P/A, March 1983, pp. 126–129) was Santiago & Associates/Engineers, Inc., Miami.

Moving? Let us know 6-8 weeks in advance so you won't miss any copies of P/A.

AFFIX LABEL HERE

New address:

Name ______

Title ______

Company ______

Address ______

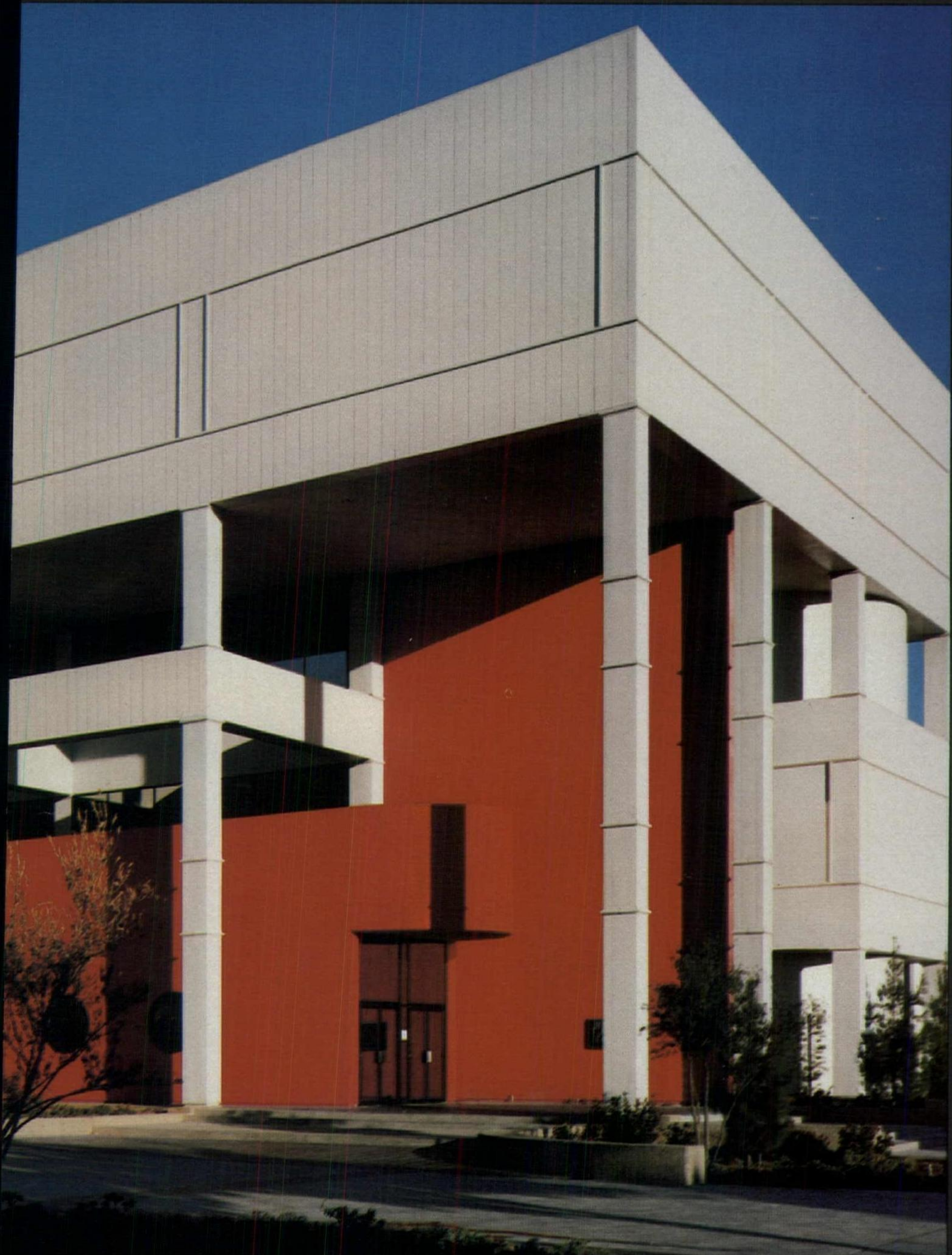
City/State/Zip ______

Type of firm ______

Mail to:
Subscription Services
Progressive Architecture
P.O. Box 95759
Cleveland, OH 44101


NBC's new roof tops the ratings.
They specified Carlisle single-ply
NBC is proud as a peacock about the new Carlisle roofing system covering their Computer Center in New York. The 30,000 square-foot adhered single-ply roof enabled them to protect the millions of dollars worth of computer equipment below, after the original roof began to fail. They were also able to preserve the architectural integrity of the roof's stunning geometric forms. But above all they got the expertise and assured performance that come with every Carlisle roof.
Carlisle helped pioneer single-ply; our first roof installed over twenty years ago is still going strong. And Carlisle provides the complete system: EPDM membrane produced in extra-wide widths at our two American plants. Insulation. Flashing. Edging. Factory pipe seals. And application materials. We even train our approved single-ply applicators at our school in Carlisle.
What's more, a Carlisle single-ply roof can be easily installed in almost any weather. And it can be warranted for up to 15 years!
Call or write today for more information about the single-ply roof that American business is banking on. The Sure-Seal™ roof.
Carlisle SynTec Systems, Division of Carlisle Corporation, P.O. Box 7000, Carlisle, PA 17013.
DIAL CARLISLE 800-233-0551
in PA call 800-932-4626
Carlisle and Sure-Seal are trademarks of Carlisle Corporation.
© 1982 Carlisle Corporation.
The roof that's requested by name.
Carlisle SynTec Systems
CARLISLE
Applicator: Nicholson & Galloway Inc., Glen Head L.I., NY
Architect: Peter Simoncelli & Assoc., Narberth, PA
Circle No. 316 on Reader Service Card


Innovation
Often called the most creative designer of his day, Finnish-born Eero Saarinen set the architectural world on fire with his unprecedented structures... the powerful, vaulted TWA Terminal at JFK International... St. Louis' engineering marvel, the Gateway Arch... the massive mirrored Bell Laboratories in New Jersey.
Always a pioneer of new concepts, Rixson carries on its own tradition of innovation with its "Heritage" series of door closers, for unprecedented quality and reliable function.*
*Request "To Close a Door," a manual on total door control.
RIXSON-FIREMARK
9100 West Belmont Avenue, Franklin Park, IL 60131
(312) 671-5670—and Rexdale, Ontario
Circle No. 359 on Reader Service Card
A DIVISION OF
CONRAC
CORPORATION



Pencil points

The passing of an iconoclast
R. Buckminster Fuller, visionary and inventor, died July 1 in Los Angeles at the age of 87 of a heart attack. His wife Anne Hewlett Fuller, who had been hospitalized, died 36 hours later.
¶ Although he was never trained or licensed as an architect, Fuller converted countless architectural students to his optimist's doctrine of salvation through technology. His well-known inventions, such as the geodesic dome and the Dymaxion house, and his writings helped spread the word.
¶ An article on Fuller's life and work will follow in an upcoming News Report.

France drops the fair
The French Government has abruptly dropped its plans to host the 1989 World's Fair.
¶ The decision, officially attributed to rightist Mayor Jacques Chirac, nevertheless reflects the reigning Socialist Party's austerity line and the widespread concern that Fair crowds and construction would damage the city of Paris.
¶ While some of the grandiose building projects tied to the Fair, notably le parc de La Villette (P/A, May 1983, p. 26) and le Ministère de l'Economie et des Finances are reportedly unaffected by the decision, others may be reconsidered, among them projects for la Défense and L'Opera de la Bastille.

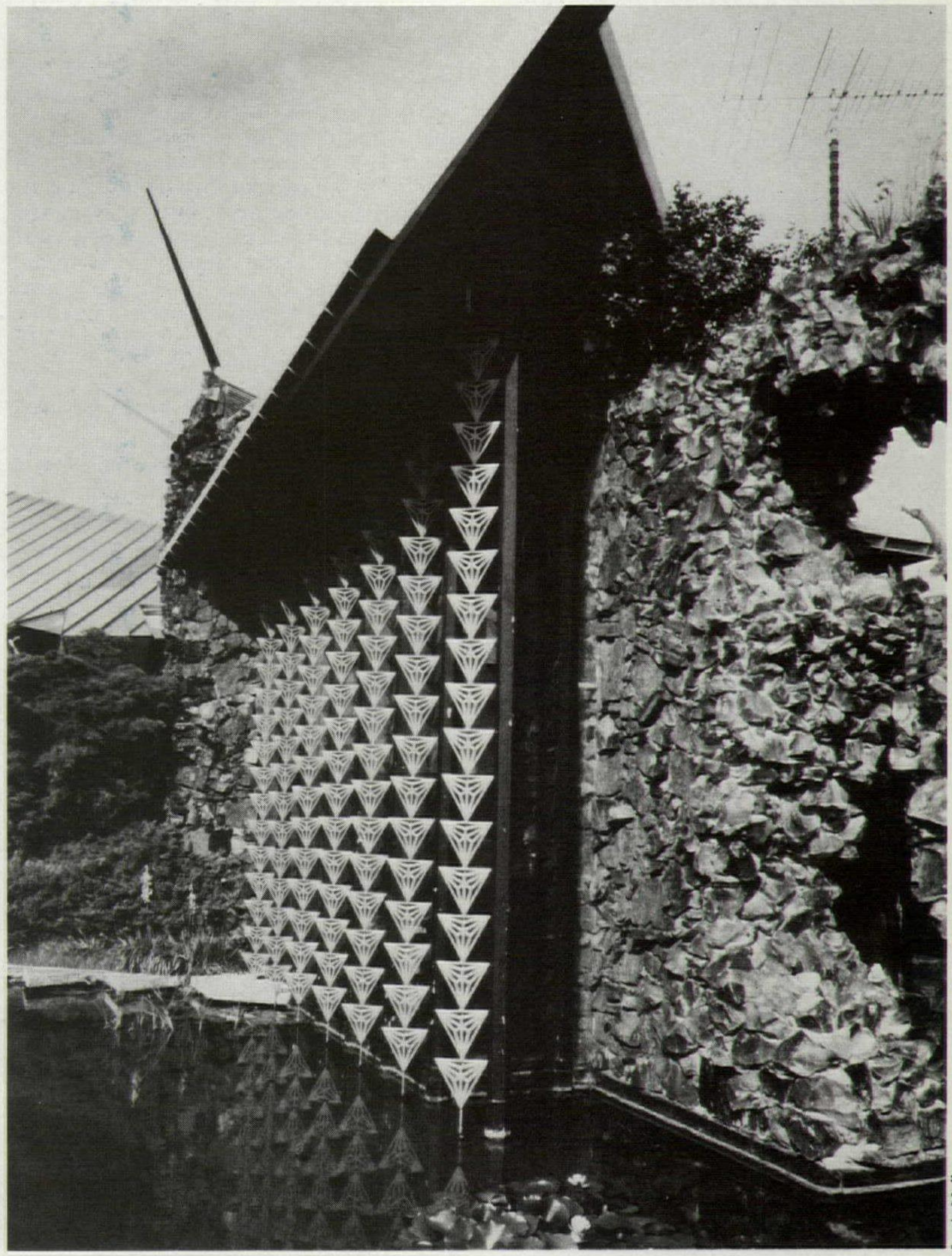
Knoll goes public
Knoll International has announced its decision to sell stock publicly. Shares will start at $17–$20 each.
¶ Meanwhile, Knoll directors Steven Swid and Marshall Cogan have bowed out of the battle to buy Sotheby's, the British auction house, leaving the field open to Detroit developer Alfred Taubman whose suit the Brits preferred.

Too close a call
New York's religious establishment has failed to push through a bill exempting houses of worship from preservation laws.
¶ Lobbying by New York's Municipal Arts Society, the Landmarks Conservancy, and Mayor Koch kept a formidable coalition of the New York Board of Rabbis, the Roman Catholic Archdiocese of New York, and the Council of Churches from convincing legislators that landmark laws infringe upon religious freedom. The claim, dead for this legislative session, should remain so.

New landmarks chief
Gene Alfred Norman has been named the chairman of the Landmarks Preservation Commission in New York. The architect, who was executive vice president of the Harlem Urban Development Corporation, replaces Kent Barwick, now Executive Director of the Municipal Arts Society.

Building the Building Museum
The D.C. firm Keyes Condon Florance and Giorgio Cavaglieri, New York, will renovate D.C.'s Pension Building, home of the National Building Museum.

P/A News report


Louis Muller

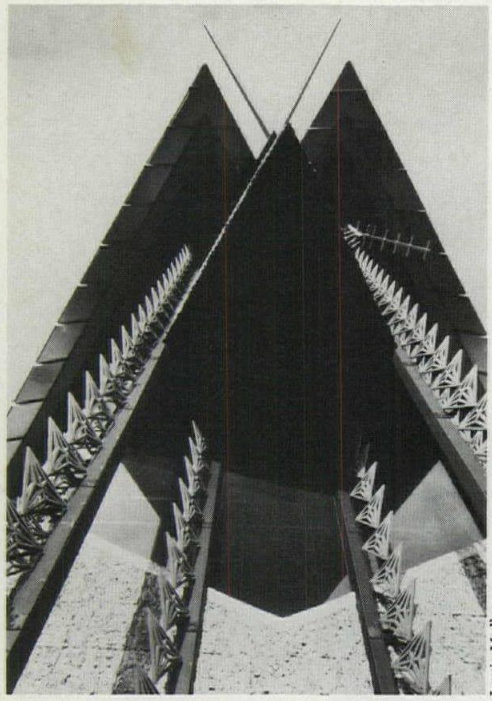
Bartlesville: The Goff-fest

Above: Screened porch, Price House, Bruce Goff.

Oklahoma was still cool when 450 ex-students and architects gathered June 6–9 in Bartlesville to celebrate the 80th birthday of Bruce Goff who died last year. This was the first and maybe the last time so many Goff houses were open to the public in Bartlesville, Tulsa, Oklahoma City, and Norman. They stood out from surrounding houses like the last lingering Indian paint brushes burning an orange hole in the fields.

Goff followers came from as far away as Israel, Japan, and Belgium. Their compatriots in this country, the so-called American School, proved to be no more ethnocentric than their accents: the flat vowels of Chicago blended with the nasal twang of Oklahoma and Texas, rectangular plans mixed with hexagonals and curves, and the generalized rootless California accent and design were much in evidence.

News report continued from page 27



Roofs of second addition, Price House, Bruce Goff.

The group had in common their love of a remarkable teacher who had inspired them to trust their own creativity. All had learned from Goff's pragmatism, drawn from the baling wire school of thought (things made for one purpose will serve another). Goff's treasure troves were war surplus yards or five-and-tens. Building an officers' clubhouse in the Aleutians in the 1940s, he had a warehouse full of scrap moldings cut up and painted gold and silver to change the shape of the posts. Later, he made the skeleton of the Hopewell Baptist Church (1950–55) out of a waste material plentiful in Oklahoma—used oil pipes. Stainless steel cables from airplane surplus anchored the spiral tower of the Bavinger house (1950–55). Even when the budget was ample, as in the Joe Price house (1956–58), Goff used coal with occasional cullets of waste glass for walls, the aquamarine chunks shining out of the rich black.

The general perception of Goff as a surface decorator with a love of Klimpt ignores his skill as an engineer. By age 12, Goff was working part time in the office of Rush, Endacott & Rush; he passed his engineering exams for his license at age 19, and in 1929 the firm became Endacott & Goff.

Goff's early practice in Oklahoma responded to every breeze from here and abroad. He worked early in the Deco style (Boston Avenue Methodist-Episcopal Church 1926–29), then in the stripped-down style of Loos/Gill before setting his own unique style.

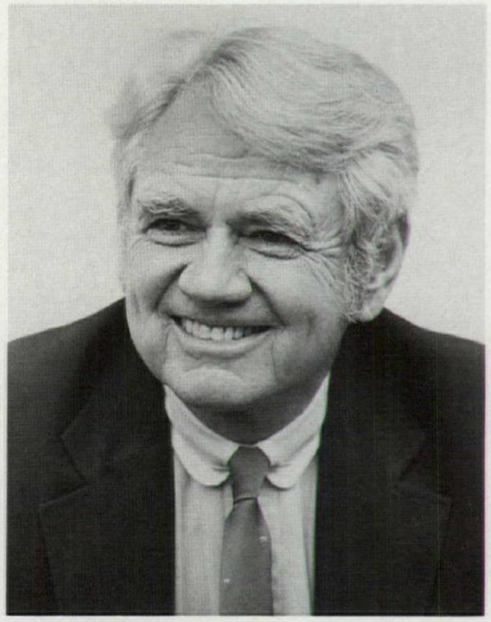
Goff supporters now have a newsletter, Friends of Kebyar, 7430 S.W. Canyon Dr., Portland, Ore. 97225. Future birthday celebrations are planned. [Esther McCoy]

At the races: A/E Systems '83

More than 8300 design professionals crowded into Dallas's Market Hall for the opening of A/E Systems '83, looking to pick the winners from over 380 computer and reprographics vendors. The big names in computer graphics—Computervision, IBM, Intergraph—were all at the show. So too were smaller but no less promising firms, including McAuto, Summagraphics, Sigma, Arrigoni, CADAM, Formative Technologies, and others.

Apart from lower prices (as low as $50,000 to $60,000 per workstation, versus $100,000 last year), other noticeable advances this year included more accurate 2-D and 3-D color resolution, reaching photographic quality, and faster, friendlier programs, some as responsive as pencil on paper. A few companies have made their screen image more "architectural," using black lines on a white background. Others have refined furniture and lighting to complement their equipment.

As evidenced at Systems '83, computer graphics technology is changing quickly, perhaps too quickly for the average architect striving to keep up or for the vendor seeking a payback on hefty investments. The confusing change, however, signifies greater diversity and choice, promising more hardware and software tailored to an office's particular operation. [TF]



William Wayne Caudill.

William Wayne Caudill: 1914–1983

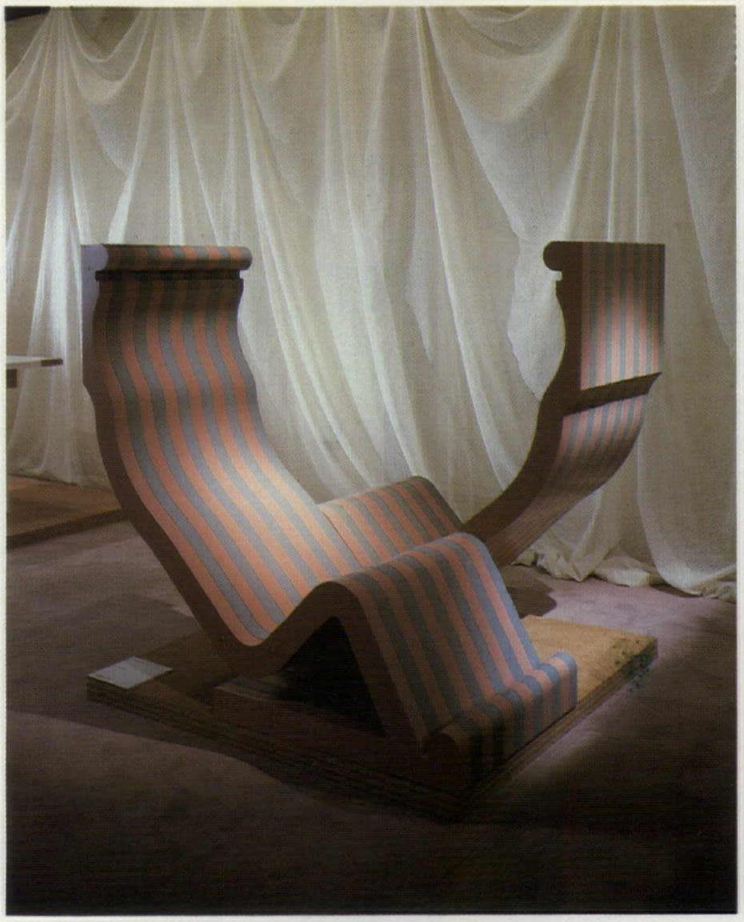
One of the great success stories in post-World War II architectural practice is the internationally known, Houston-based firm of CRS. Caudill Rowlett Scott based its reputation on a philosophy of teamwork that involved not only internal professionals and associated consultants, but also clients and users in a process of participatory design years ahead of its time. Paradoxically this team technique was stamped by the personality of one individual, William Caudill.

A native of Oklahoma and graduate of Oklahoma State University, Caudill received his Master of Architecture from MIT. He held full professorships at Texas A&M University, where he founded the Architectural Division of the Texas Engineering Experiment Station, and at Rice University, where he had served as Director of the School of Architecture from 1961 to 1969 and held that school's William Ward Watkin Chair in Architecture. A Fellow of the American Institute of Architects and from 1979 to 1982 a member of the AIA Board of Directors, Caudill was a registered architect in 37 states, and the recipient of many awards, among them the Texas Society of Architects' Llewelyn W. Pitts Award, a founding membership in the Academy of Texas in 1969, and the 1978 gold medal from the Association of Collegiate Schools of Architecture. More recently, Caudill made light of the fact that he was to be inducted into the Oklahoma Hall of Fame this fall, where he would join Patti Page, but he is actually the only architect to be so honored.

The rise of CRS from a small office founded in 1946 in College Station, Texas, to a practice employing 1400 people world wide, winner of an AIA Firm Award, stemmed in part from a book written by Bill Caudill at age 26, *Space for Teaching,* which advocated a practical philosophy of functional, low-cost, energy-efficient school design. Numerous commissions followed its publication, including a prototypical elementary school for *Life* magazine. By the 1960s, CRS was internationally known, and Caudill was in charge of the firm's own office building, which won both a P/A Award and an AIA Honor Award.

Author of 12 books and numerous articles, Bill Caudill enjoyed encapsulating ideas and concepts to educate fellow architects as well as clients. He was famous for circulating short memos entitled "TIBs" (This I Believe) and pronouncing homilies. It was his positive, down-to-earth character that will be remembered.

On Saturday morning, June 25, 1983, as he was working on a manuscript for a new book, Caudill died suddenly of heart failure. He had left final instructions ruling out any public memorial service and enjoining CRS from taking a day off from work, lest he "come back to haunt them." A William W. Caudill Memorial Fund has been designated for the Rice University School of Architecture. [Peter C. Papademetriou]



Photos: Hedrich-Blessing

Introducing Colorcore

Formica Corporation's Colorcore, the integrally colored laminate that does away with the black line, made its debut at Neocon XV. Scale models of five projects, winners among over 700 entries in Formica's Surface and Ornament Competition I for conceptual design, were shown together with invited commissions from ten American designers.

The "Temple Chair" by Lewis & Clark of Columbia, S.C., took first prize; "Neopolitan," gelati cum coffeetable by Lee Payne (Atlanta, Ga.), second; "Strata," a table and *trompe l'oeil* tablecloth by Brian Faucheux (Metairie, La.), third; a classical cabinet by Paul Chiasson (New York), fourth; and a table sculpture by Cary Siress (University of Kentucky), the student prize. Five citations were also awarded. The competition, juried by Charles Boxenbaum, Joe D'Urso, Paul Segal, and William Turnbull, Jr., of Formica's Design Advisory Board with Niels Diffrient, David Gebhard, and Robert Maxwell, totaled $28,000 in prize monies.

Commissioned objects ranged from pragmatic prototypes to playthings: L System, Emilio Ambasz/Giancarlo Piretti; Cart-Mobile, Ward Bennett; "Ryba," Frank Gehry; "Modern Post-Neo Table," Milton Glaser; an elevator cab, Helmut Jahn; a corner cupboard, Charles Moore; a door, SITE; "Tete-a-tete," paired chairs, Stanley Tigerman; a mirror in the Greek Revival manner, Venturi, Rauch & Scott Brown; and "Broken Length," a table, Massimo and Lella Vignelli.

Entries for Part II of the Colorcore competition for completed room installations are due Feb. 15, 1984. Inquiries should be addressed to Colorcore, Formica, One Cyanamid Plaza, Wayne, N.J. 07470. [DDB]

Above, left: Tigerman's Tete-a-tete; right: Faucheux's table, Payne's Neopolitan, Moore's cupboard.

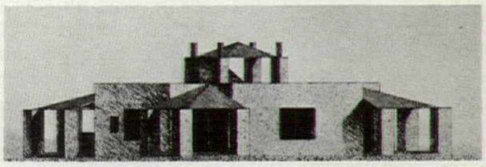
Brainstorming at MIT

Approximately 35 invited representatives of the building and academic communities who assembled for the two-day Hennessy Symposium at MIT's Endicott House were quick to identify problems that face the building industry. Among acknowledged difficulties were the building industry's low productivity and crafts-based mechanics, its poor innovation record, and its problems attracting or keeping talent.

According to keynote speaker Ezra Ehrenkrantz, such problems stem from the government's use of the building industry to either slow or stimulate the economy. The resultant three-year recession cycles inhibit industry innovations that typically take five or six years to develop, lower employee productivity and morale, sponsor layoffs, and discourage capital investment.

Potential courses of action were identified: develop a more unified voice within the now-fragmented building industry in order to alter adverse public policy; sponsor more limited partnerships within the building community to achieve economies of scale and to compete against cohesive foreign competition; coordinate research activities between universities and industry to better compensate for shrinking federal research dollars.

Given the complexity of the problems, a search for firm solutions is unrealistic. We may hope, however, for further industry-wide discussions as broad and probing as the Hennessy Symposium. MIT is to be applauded for this first effort and encouraged to continue it. [TF]



Contrapuntal fugue

"California Counterpoint," a show of new West Coast architecture at the National Academy of Design, New York (through Sept. 15), is a mix of separate melodies set in a common key. Craftworks by architects Andrew Batey and Mark Mack (1982 Hildebrandt residence shown above), Frederick Fisher, Frank Gehry, Craig Hodgetts and Robert Mangurian (Studio Works), Coy Howard, Thom Mayne and Michael Rotondi (Morphosis), and Stanley Saitowitz embellish simple, abstract themes with elaborate technique. The show, curated by Helene Fried and Lindsay Stamm Shapiro, is accompanied by a catalog with essays by Nory Miller and Michael Sorkin. [DDB]

[News report continued on page 33]

for problem areas.

Because of its beauty and toughness, CORIAN was used for these stylish counters in an El Paso, Texas, bank.

With CORIAN, stubborn stains and cigarette burns are removed with cleanser. Cuts and scratches can be sanded away.

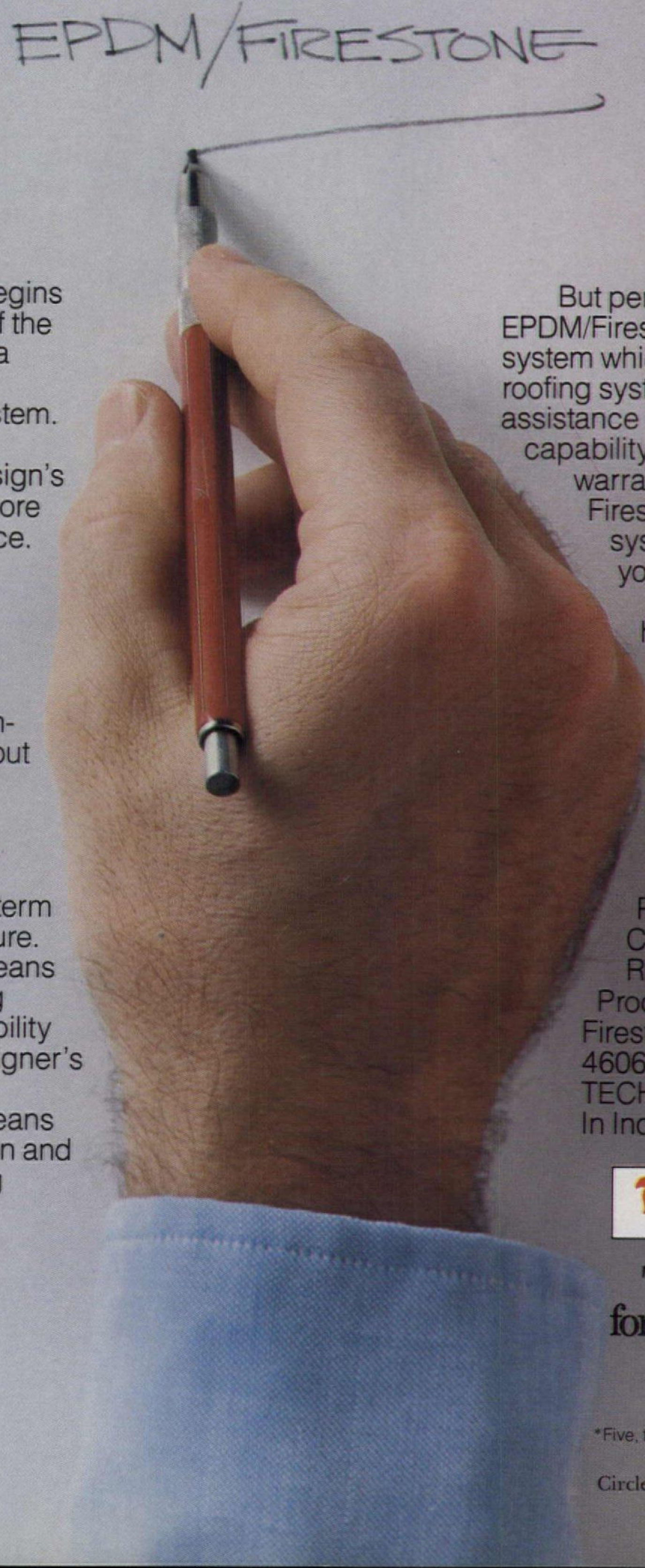
Solid Beauty That Lasts.

DU PONT

REG. U.S. PAT & TM OFF

EPDM/Firestone

The name to write for the roof that's right.



A lasting design begins with a single stroke of the pencil. And so does a lasting, dependable, single-ply roofing system.

The word EPDM/Firestone on your design's spec sheet means more than a type and source.

EPDM/Firestone means membrane materials that are the result of more than twenty years' of research and performance testing throughout the world.

EPDM/Firestone means roof systems conceived and engineered to resist long-term environmental exposure.

EPDM/Firestone means three separate roofing systems with the flexibility to conform to the designer's concept.

EPDM/Firestone means economy of installation and economy of operating costs throughout the roof's life-cycle.

But perhaps most importantly, EPDM/Firestone means a complete system which stands behind your roofing system. From top technical assistance to manufacturing capability to a comprehensive warranty program,* EPDM/Firestone means a roofing system that's right for your job.

Ask for our comprehensive technical manual. It contains complete information about how EPDM/Firestone is the right specification for your roof. Just write or call: Firestone Industrial Products Company, Roofing Products Department, 1700 Firestone Blvd., Noblesville, IN 46060 SALES: (800) 428-4442/ TECHNICAL: (800) 428-4511 In Indiana: (317) 773-0650

Firestone
INDUSTRIAL PRODUCTS COMPANY
Division of The Firestone Tire & Rubber Company

The name to write for the roof that's right.

*Five, ten, and fifteen-year warranties available.

Circle **No. 333** on Reader Service Card

News report continued from page 29

Competitions

The current craze for competitions has touched all building types—museums and art schools among them. Two such contests are documented here. Although the charrette format of Santa Barbara may have stressed presentation technique over design, it offered five teams of relatively unknown architects, selected anonymously from the first phase, an opportunity to compete as equals for a major commission. A more structured competition to design OSU's Center for the Visual Arts drew divergent solutions from five prominent architects and their Ohio affiliates.

University Art Museum, UC Santa Barbara

Supported by the National Endowment for the Arts and the UCSB Foundation, the Santa Barbara Art Museum competition is the latest in a nationwide spate of two-stage competitions, climaxed by a three-day, on-site charrette. The list of 450 registrants, 256 of whom completed the first stage judged April 16, attests to the format's popularity.

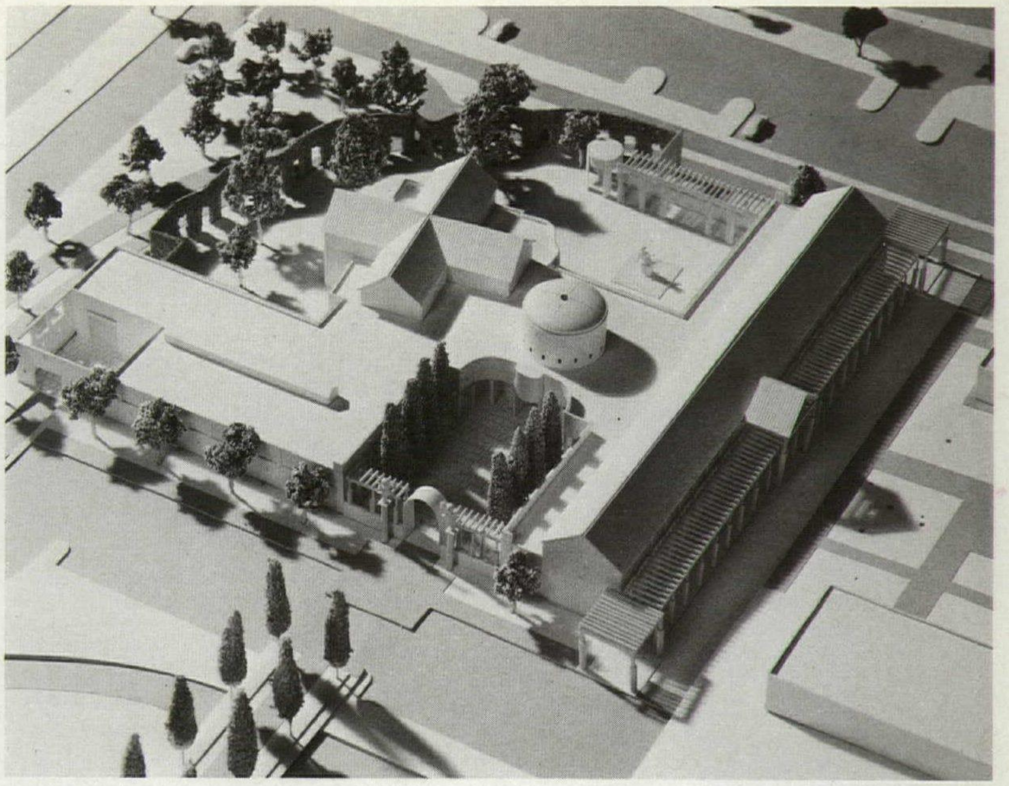
William H. Liskamm served as Professional Advisor for this competition, as for the Triton Art Museum competition in Santa Clara, Calif. (P/A, March 1983, p. 35). Although similar to the Triton model, the UCSB museum program required a more complex mixture of public and academic components. The proposed $5.3 million, 18,270-sq-ft museum will double campus gallery space. A 100-seat lecture hall, a 3190-sq-ft program/research area for prints, graphic arts, and architectural drawings, administration, and gallery service spaces fill out the program. The campus site is an open area west of the administrative building, bounded by parking and circulation.

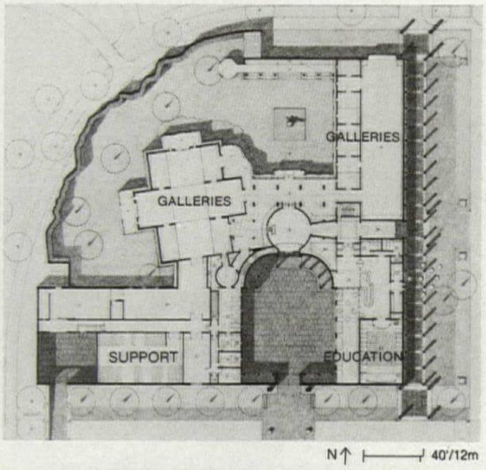
The winning scheme by Michael Dennis and Jeffrey Clark of Newton, Mass., with Greg Conyngham and Gary Lapera, was the only one-story solution out of five. The jury found its welcoming forecourt and enclosed courtyard for outdoor exhibitions particularly appropriate to the local environment. The scheme was also judged to be the most functional and energy-efficient.

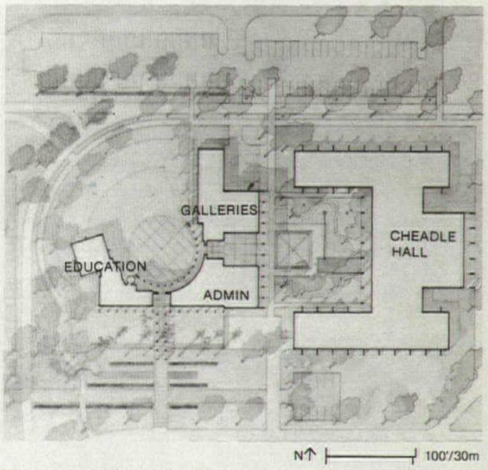
Also participating in the final or charrette stage were Antony Unruh and David Seeley of Los Angeles, with Ken Saylor and Don Nutty; Mark Cigolle, Katherine Coleman, Gregory Lombardi, and Boo Wong Kim of Inglewood, Calif.; William Palmore, Gavin Bromell, W.E. Kuykendall, Martina Perez, and Marcia McInnely of New York and El Paso, Texas; and Vladimir Arsene and James Lambros (A/L Design, New York), Abby Suckle and David Hu, and Anthony Z. Panu.

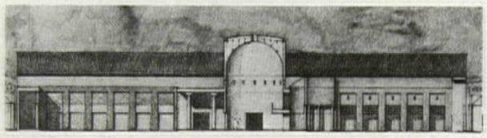
[Sally Woodbridge]

[*Competitions continued on page 34*]

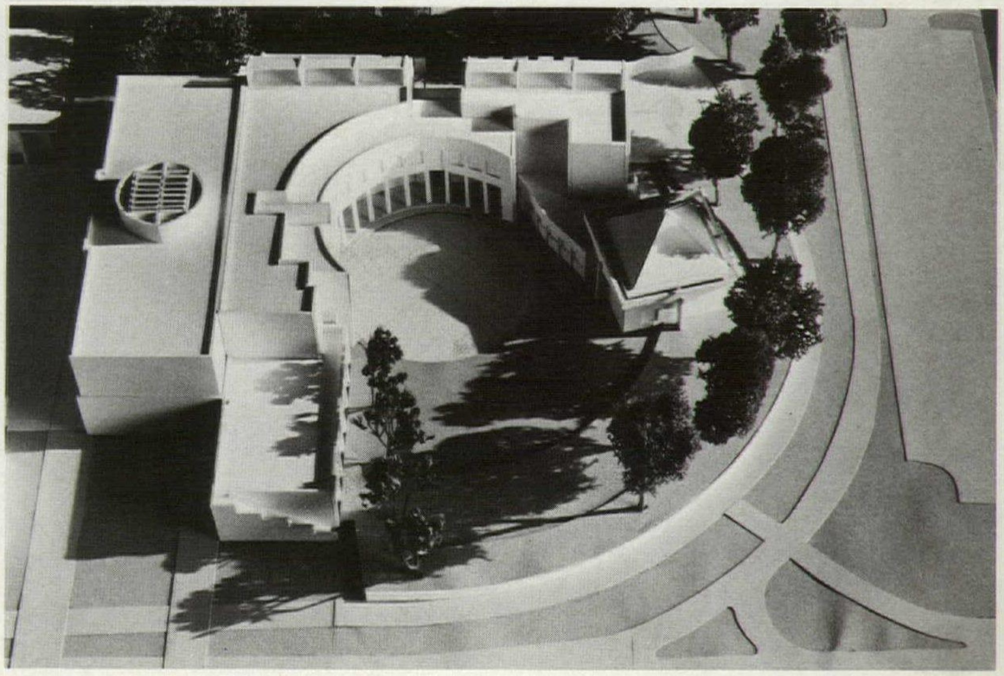


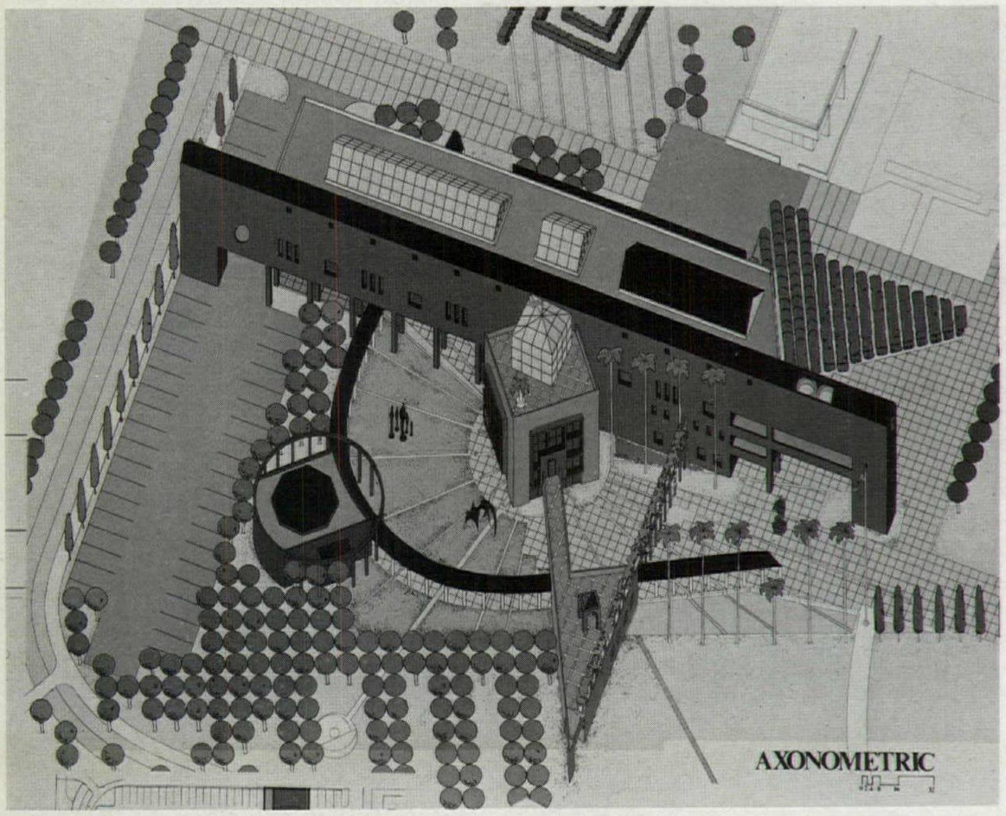


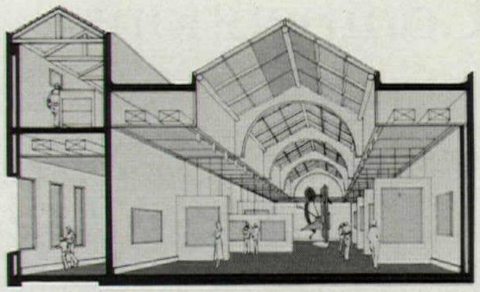


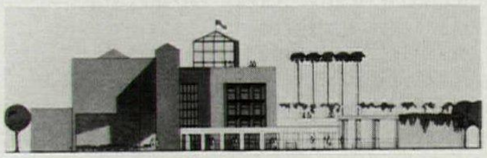


Top and left: winning scheme, Michael Dennis/Jeffrey Clark Architects, with Greg Conyngham, Gary Lapera. Above and right: Mark Cigolle, Katherine Coleman Architects with Boo Wong Kim, Gregory Lombardi.

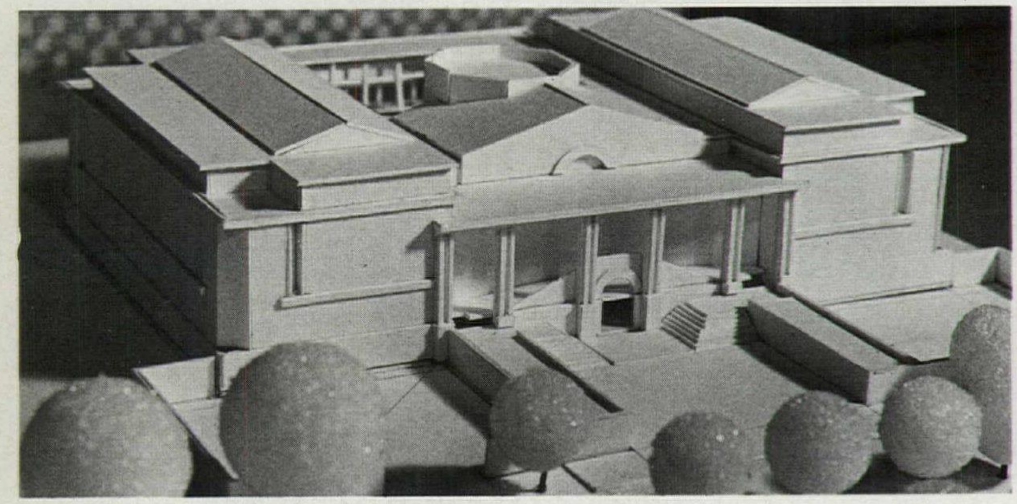


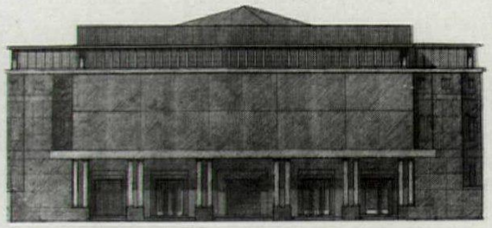


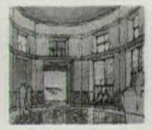




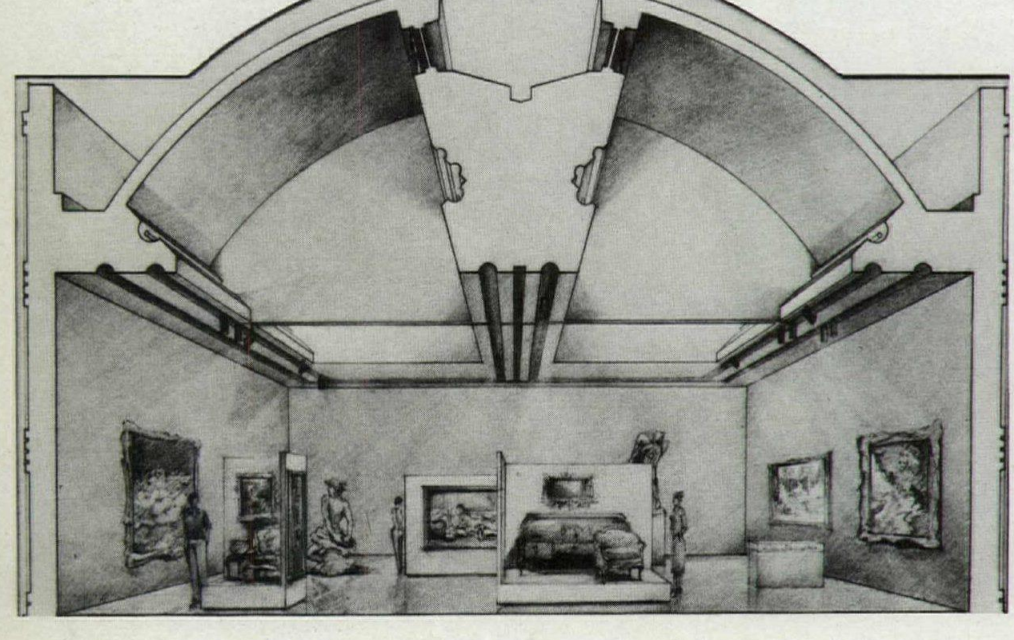
Above and left: Vladimir Arsene, James Lambros (A/L Design), Abby Suckle and David Hu, and Anthony Z. Panu.

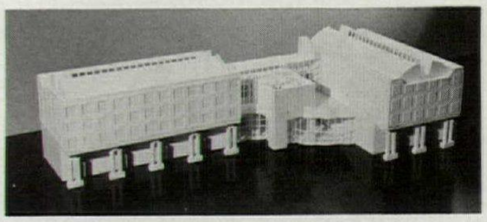


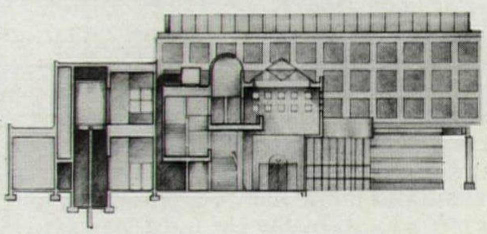




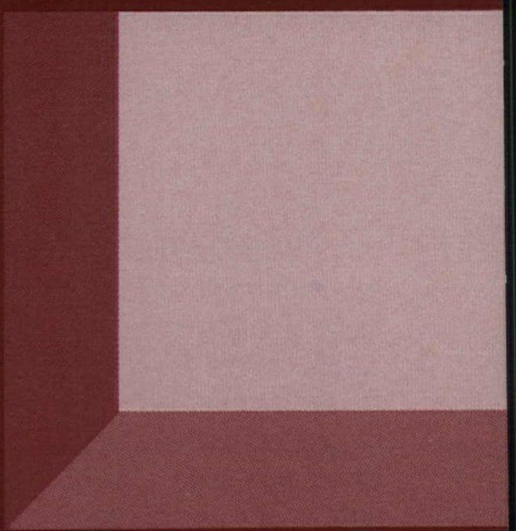
Above and left: William Palmore, Gavin Bromell, Martina Perez, Marcia McInnely Above: east elevation facing Cheadle Hall.







Above and left: Tony Unruh and David Seeley with Ken Saylor and Don Nulty.
[Competitions continued on page 38]



Competitions continued from page 34

Center for the Visual Arts Ohio State University

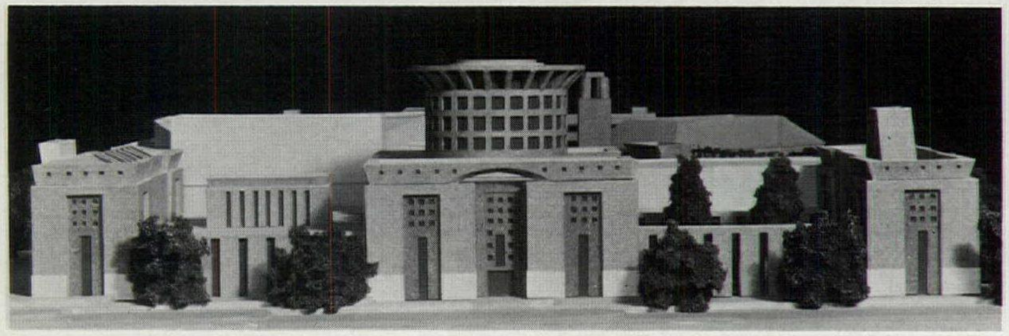
The proposed $16 million Visual Arts Center at Ohio State University in Columbus, Ohio, would integrate research, exhibition, and performance for all the arts, including such allied pursuits as landscape design and video.

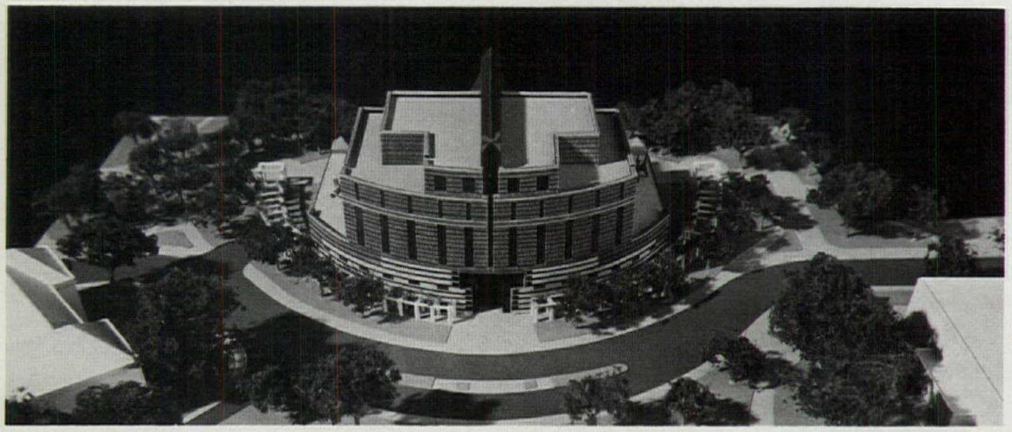
Five final teams, composed as required of an Ohio firm and a non-Ohian affiliate, were selected to participate in the design competition's second phase. OSU's elaborate program offered two site options, both situated at one end of the campus's central oval where the art, art history, and theater departments are already concentrated. The schemes were judged in May by a jury composed of four OSU faculty and administrators and five invited guests. Henry N. Cobb of I.M. Pei & Partners served as jury chairman and Robert Miller of OSU as competition coordinator.

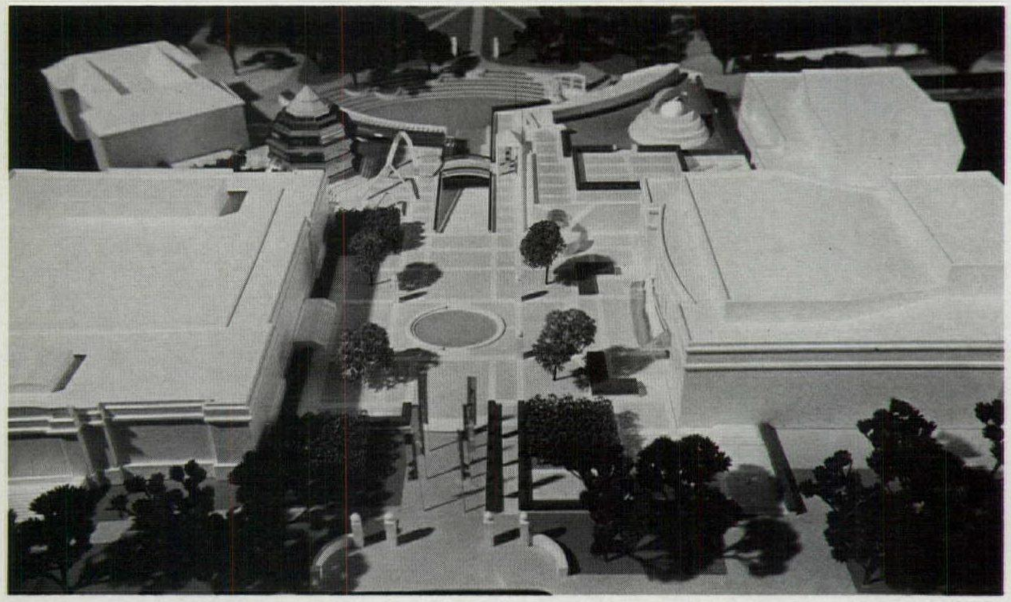
The final submissions catalog various postures of contemporary practice, from Arthur Erickson/Feinknopf, Macioce & Schappa Architects to Michael Graves/Lorenz & Williams; from Cesar Pelli/Dalton, van Dijk, Johnson to Kallmann, McKinnell & Wood/Lyndon Buchanan/Nitschke Associates. The winning scheme by Trott & Bean and Eisenman/Robertson Associates (see p. 96) differs radically from the other solutions not only in its overt imagery but in its underlying ideology, which the jury termed "adventurous and challenging." (At the other extreme, the jury also praised its detailed technical and cost report.)

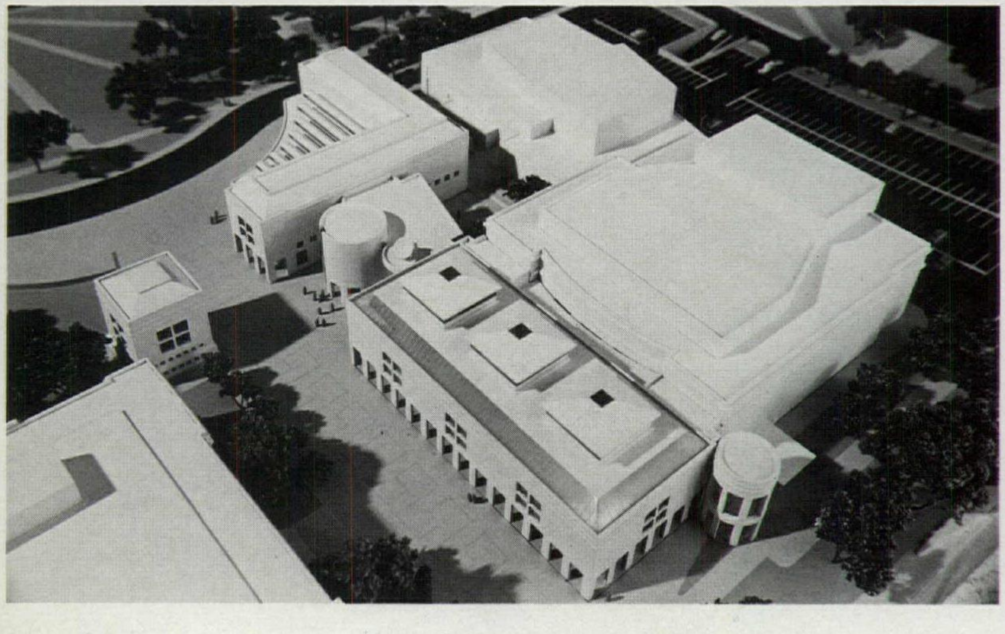
The mandatory teaming of "name brands" and local firms, the detailed and yet open-ended program and the high stakes ($25,000 to each finalist) put the competition on a par with such recent events as the Humana Building competition in Louisville or the Southwest Bancshares in Houston despite obvious programmatic difference. Predictably perhaps, the contest is to be documented this fall in a Rizzoli publication organized by the peripatetic Ted Bickford and Peter Arnell. [DDB]

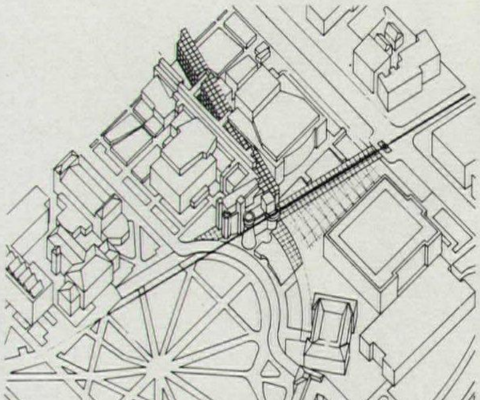
[*News report continued on page 42*]



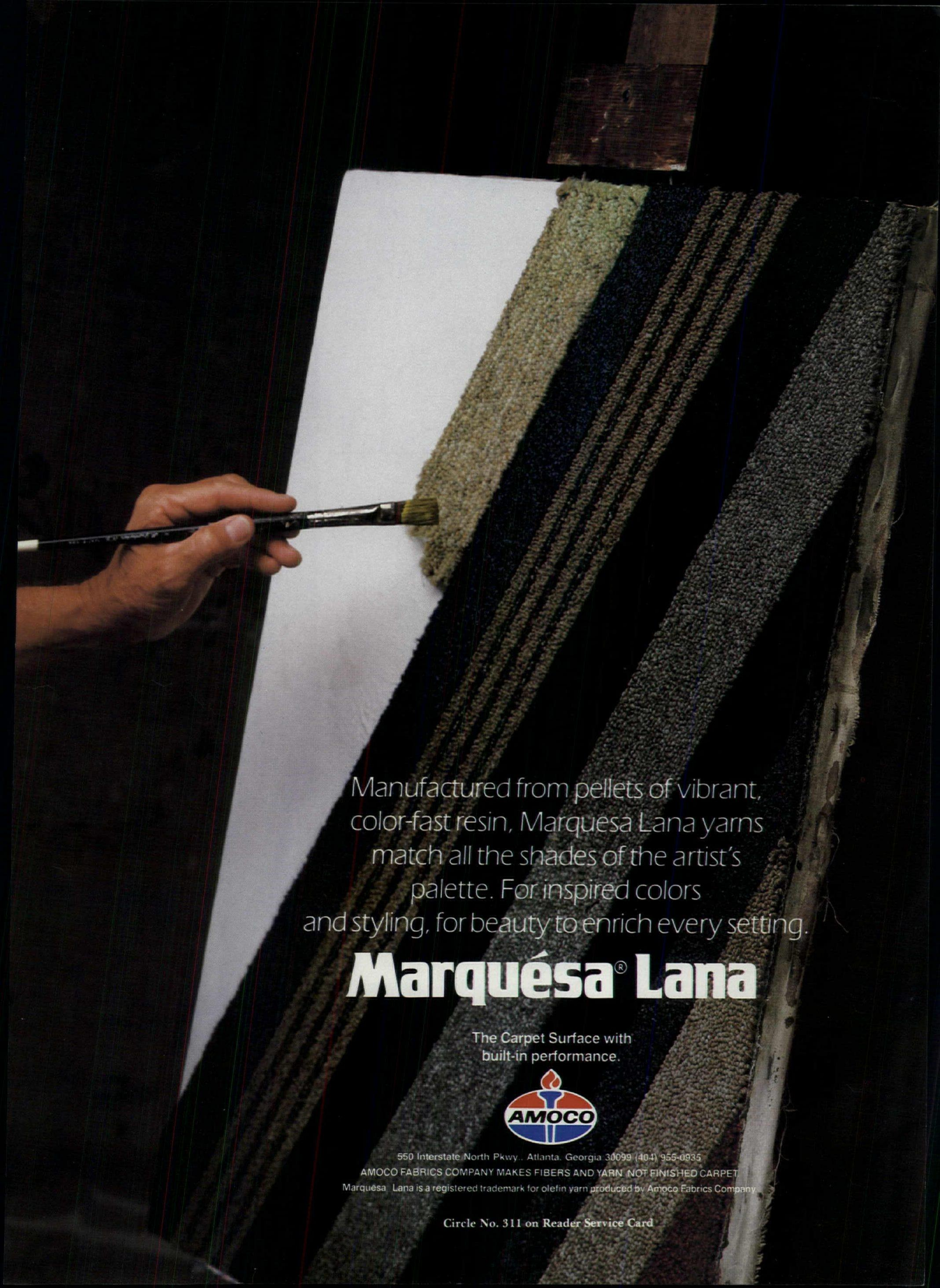








Above: Eisenman/Robertson; Trott & Bean. Left, top to bottom: Michael Graves; Lorenz & Williams (17th Ave. site). Kallmann, McKinnell & Wood; Lyndon/Buchanan; and Nitschke Associates. Cesar Pelli; Dalton, van Dijk, Johnson. Arthur Erickson/ Feinknopf, Macioce & Schappa.


Manufactured from pellets of vibrant, color-fast resin, Marquesa Lana yarns match all the shades of the artist's palette. For inspired colors and styling, for beauty to enrich every setting.
Marquésa® Lana
The Carpet Surface with built-in performance.
AMOCO
550 Interstate North Pkwy., Atlanta, Georgia 30099 (404) 955-0935
AMOCO FABRICS COMPANY MAKES FIBERS AND YARN, NOT FINISHED CARPET
Marquesa Lana is a registered trademark for olefin yarn produced by Amoco Fabrics Company.
Circle No. 311 on Reader Service Card

News report continued from page 38

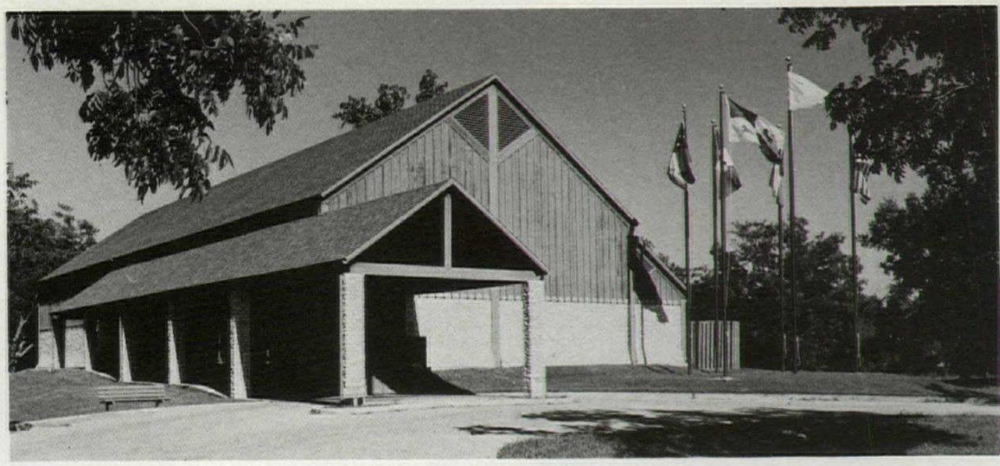
In progress: museums

This portfolio documents six museums and art galleries, two recently completed and the remainder underway. Also included are a wrap-up of projects from Texas, where museum plans proliferate, and a shortlist of museum projects around the country.

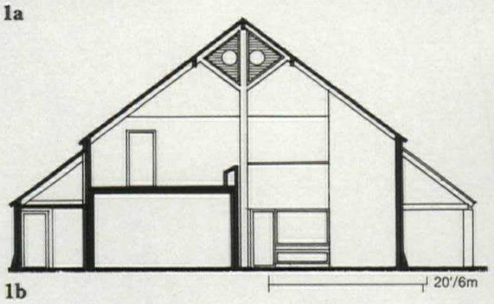
1a–d Fayette County Heritage Museum & La Grange Library, Fayetteville, Texas. *Clovis Heimsath, Architect, Fayetteville, Texas.* Drawing not only upon local heritage but upon European antecedents, Heimsath's museum and library for Fayette County recreates a German-Czech barn. Traditional and modern techniques are mixed: timbers were fabricated using a modern laminating process, while Austin ashlar stone, board and batten wood siding, and plank wood floors apply simpler methods of construction. Necessary fireproof vaults for county documents form the base for a second-floor gallery set beneath the exposed pitched roof.

2a–c Everard Read Gallery, Rosebank, South Africa. *Meyer, Pienaar & Partners, Inc., South Africa.* This commercial art gallery extends an existing house now converted to administrative use. A ramped spine provides access to four discrete galleries, which grow successively larger and deeper down the sloping site. The grid of lateral showroom walls, reinforced in clerestory windows, is carried beyond curved and colored perimeter walls by beams supported on blue columns that delineate the site's edge. One of several outdoor rooms can be closed over with a sliding acrylic vault.

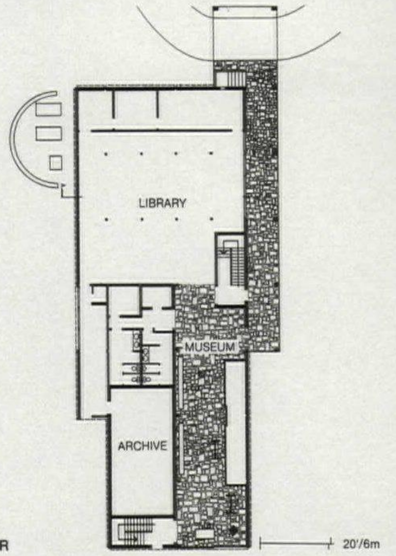
[In progress continued on page 46]


Maryann Heimsath

1a

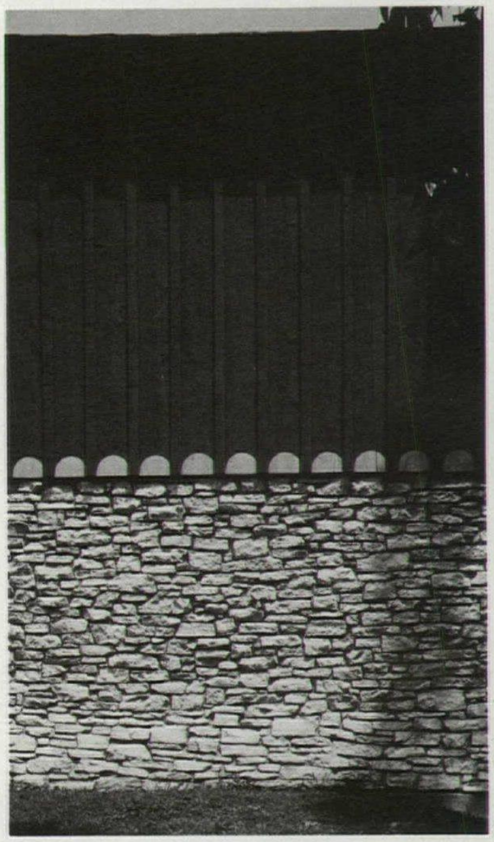


1b

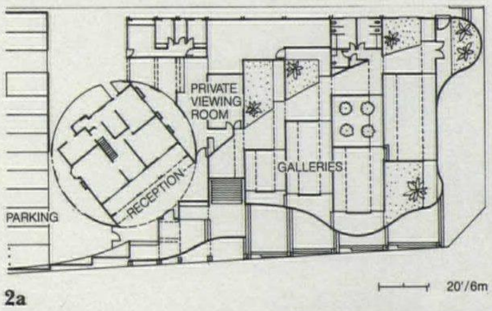


FIRST FLOOR

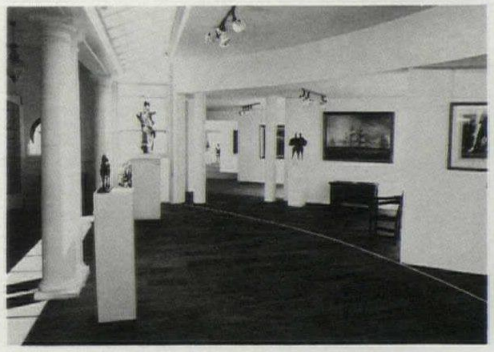
1c


Maryann Heimsath

1d



2a

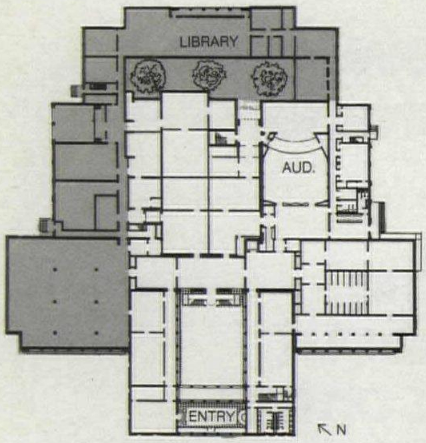


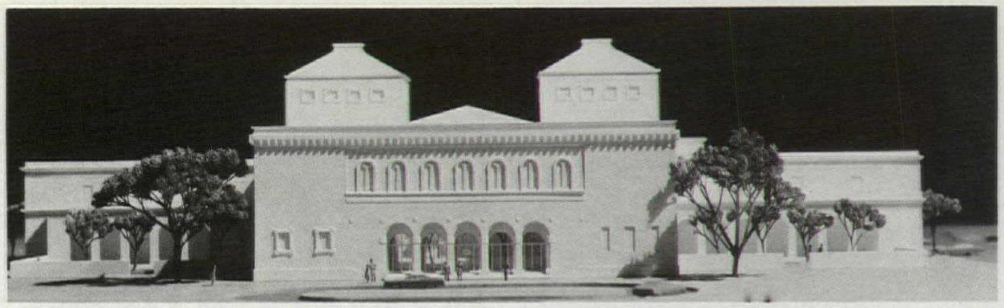
2b

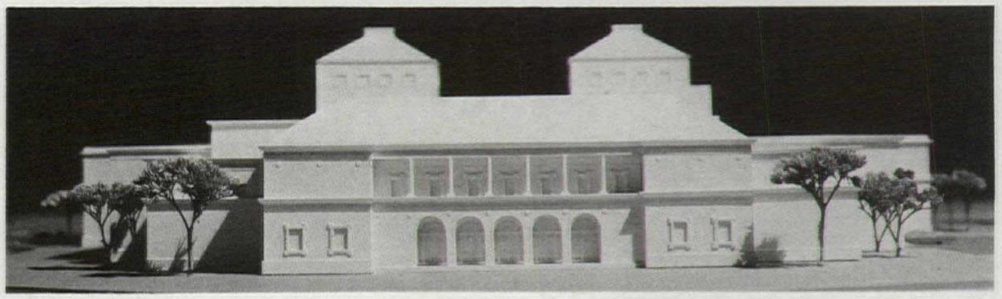
2c

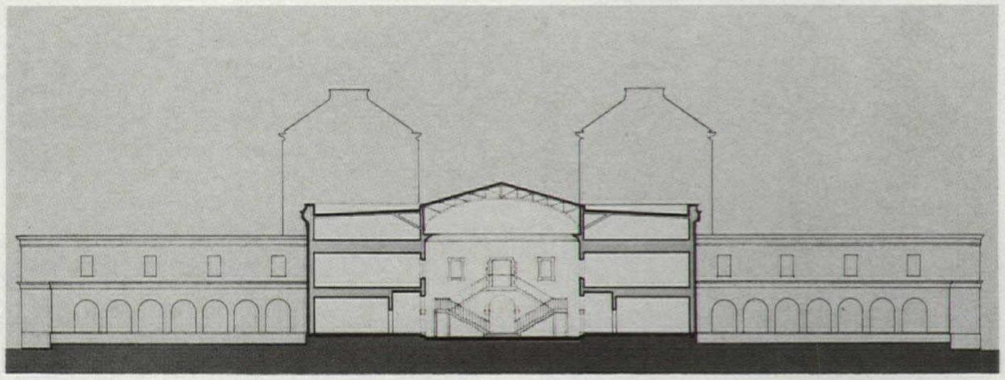



In progress continued from page 42









The Chrysler Museum, Norfolk, Va. *Hartman-Cox Architects, Washington, D.C.* The present Chrysler Museum is a rather disorganized agglomeration built over time. The new master plan developed by Hartman-Cox would restore the symmetry destroyed by 1965 and 1974 additions and reopen the 1933 entrance on the Hague Inlet of the Elizabeth River (right, top). An existing courtyard will be covered over with a skylight and a second court created by the rear library wing (right, center), whose new Italianate façade is derived from the waterfront original. Some 23,000 square feet of existing space is to be renovated and 43,000 square feet of new space built, at a total cost of $8 million.

[*In progress continued on page 50*]

PROJECT:	Office building at Las Colinas, Irving, TX
OWNER:	LAS COLINAS REAL ESTATE RESOURCES, Irving, TX
ARCHITECT:	FISHER & SPILLMAN ARCHITECTS, Dallas, TX
GENERAL CONTRACTOR:	THE CROCKETT COMPANY, Dallas, TX

When you specify AEP/SPAN, you get the shop-formed standing seam or batten seam look you want. Plus the advantages of modern roll-forming technology: Weatherproofing you can count on. A finish that won't crack, peel or fade. A roofing system maintenance-free for years. The panels specified for the office building in the Las Colinas planned community are 24 gauge galvanized steel in a custom terra cotta color, roll-formed into 12" wide x 1½" high standing seam with AEP/SPAN's concealed stainless steel clip fastening system. Panels are available also in 26 gauge steel and .032" aluminum in a variety of colors. For specific details and installation information, see SWEET'S GENERAL BUILDING FILES, Sections 7.2/AR, 7.3b/SP, 7.7/AR or phone or write.

THE RIB-LINE LOOK OF STANDING SEAM–QUALITY BY AEP/SPAN

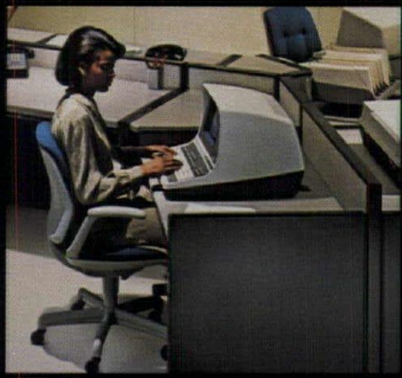
AEP·SPAN

A SUBSIDIARY OF OVERHEAD DOOR CORPORATION

ARCHITECTURAL ENGINEERING PRODUCTS CO.
P.O. Box 81664 / San Diego, CA 92138
(619) 295-3131

SPAN METALS CORPORATION
P.O. Box 26288 / Dallas, Texas 75226
(800) 527-2503 or (214) 827-1740

Circle **No. 307** on Reader Service Card



No matter whose electronic equipment is used, be it Apple® to Xerox®, or Digital® to Wang®, Ultronic 9000 systems furniture supports it all. It is the most versatile, adjustable and comprehensive system to house everything from everybody...VDT units to printers.

Ultronic 9000 also helps increase the productivity of the people who operate the equipment and increases your design options in planning today's electronic offices.

For further information on Ultronic 9000, visit one of our Regional Offices or contact your Steelcase Representative. For worldwide product, service or sales information, write Steelcase Inc., Grand Rapids, MI 49501. Or, call toll-free 800-447-4700.

Steelcase

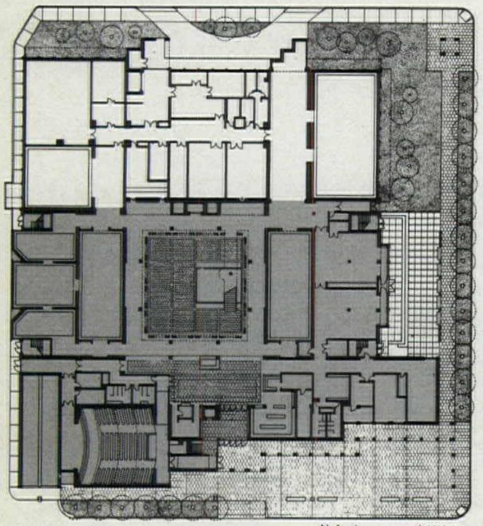
Ultronic 9000™ from Steelcase. It supports whichever button is pressed.

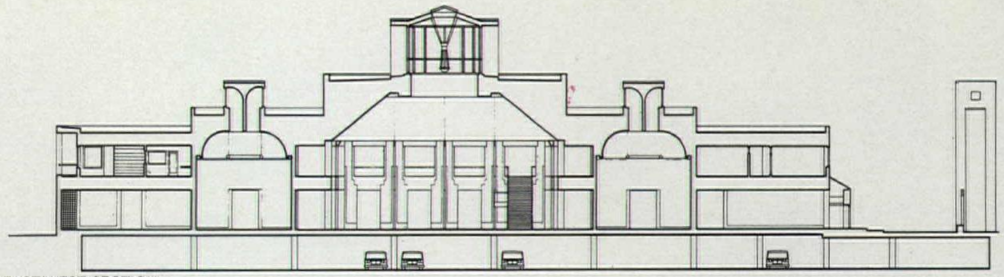
Circle No. 365 on Reader Service Card

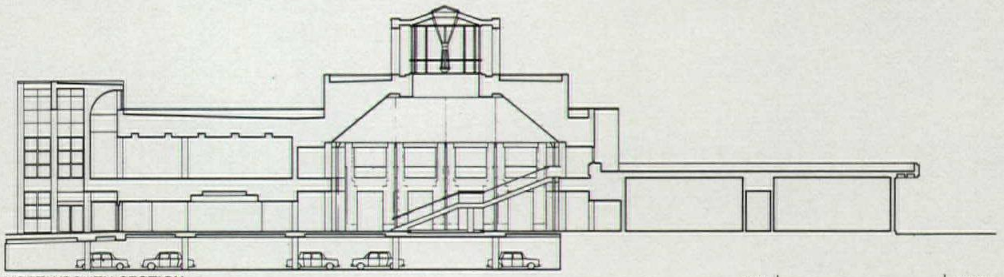
AIS, Altos, Apple, Burroughs, CPT, Data General, Datapoint, Digital, Four-Phase, GE, Harris, Hewlett-Packard, Honeywell, IBM, ITT, Lanier, Lear, NBI, NCR, NT, Paradyne, Perkin-Elmer, Prime, Printronix, Raytheon, Sperry-Univac, Texas Instruments, Tektronix, Wang, and Xerox are the registered trademarks of, respectively, American Bell Advanced Information Systems, Altos Computer Systems, Apple Computers, Inc., Burroughs Corporation, CPT Corporation, Data General, Datapoint, Digital Equipment Corporation, Four-Phase Systems.


ITT
NBI
CPT
LANIER
WANG
PRINTRONIX
Burroughs
PRIME
Phase Systems
SPERRY UNIVAC
General Electric Company; Harris Corporation, Computer Systems Div.; Hewlett Packard Company; Honeywell; International Business Machines Corporation; ITT World Communications, Inc.; Lanier Business Products, Inc.; Lear Siegler, Inc.; NBI, Inc.; NCR Corporation; Northern Telecom Inc. Electronic Office Systems; Paradyne; The Perkin-Elmer Corporation; Prime Computer; Printronix Inc.; Raytheon Company; Sperry-Univac, Mini-Computer Operations; Tektronix, Inc.; Texas Instruments Inc.; Wang Laboratories Inc.; and Xerox Corporation.

In progress continued from page 46

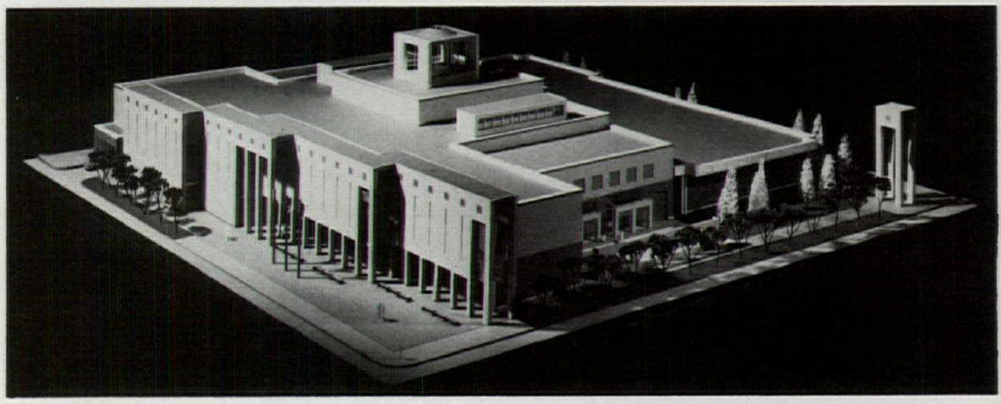



EAST/WEST SECTION


NORTH/SOUTH SECTION

↑N 40'/12m

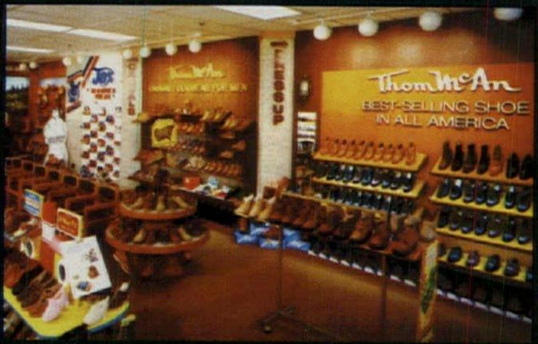
Historical and Fine Arts Museum, Anchorage, Alaska. *Mitchell/Giurgola Architects, New York, with Maynard & Partch, Anchorage, Alaska.* The Anchorage Museum covers both the history of Alaska and the art its peoples have produced. The museum's Downtown Anchorage site is bounded by a federal office complex, a proposed state office complex, and a proposed cultural facility to be set in a public park. While nominally an addition, the $17 million project will more than triple museum size to 142,000 square feet total, including 8620 sq ft for temporary and 23,800 sq ft for permanent exhibits.
[*In progress continued on page 55*]


Frank Flavin

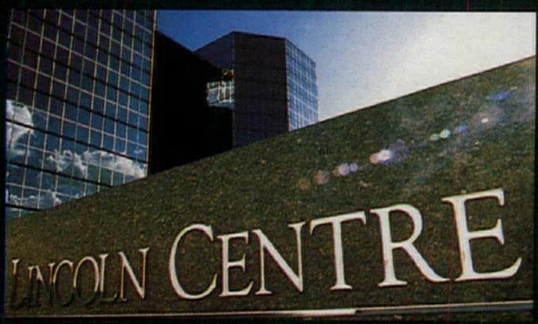
PERFORMANCE

Museums and galleries

Restaurants



Stores and shopping centers



Hotels, motels and commercial buildings

Offices and public areas

Progress Lighting's quality engineering pays off with on-the-job performance. With lighting that's designed and manufactured with considerable pride, to fulfill demands of a variety of real situations.

That's why commercial installations such as Lincoln Centre in Dallas and the Carnegie Museum in Pittsburgh are using Progress Lighting - as well as retail stores, shopping centers, restaurants, offices, hotels and showrooms throughout the U.S.A.

They're specifying recessed and track systems (including low voltage for superior accent lighting), energy-saving fluorescents, "non-destructibles" and authentic Victorian reproductions for renovations.

In addition to photometric performance, Progress Lighting has earned its reputation for manufacturing fixtures that are outstanding values for the money.

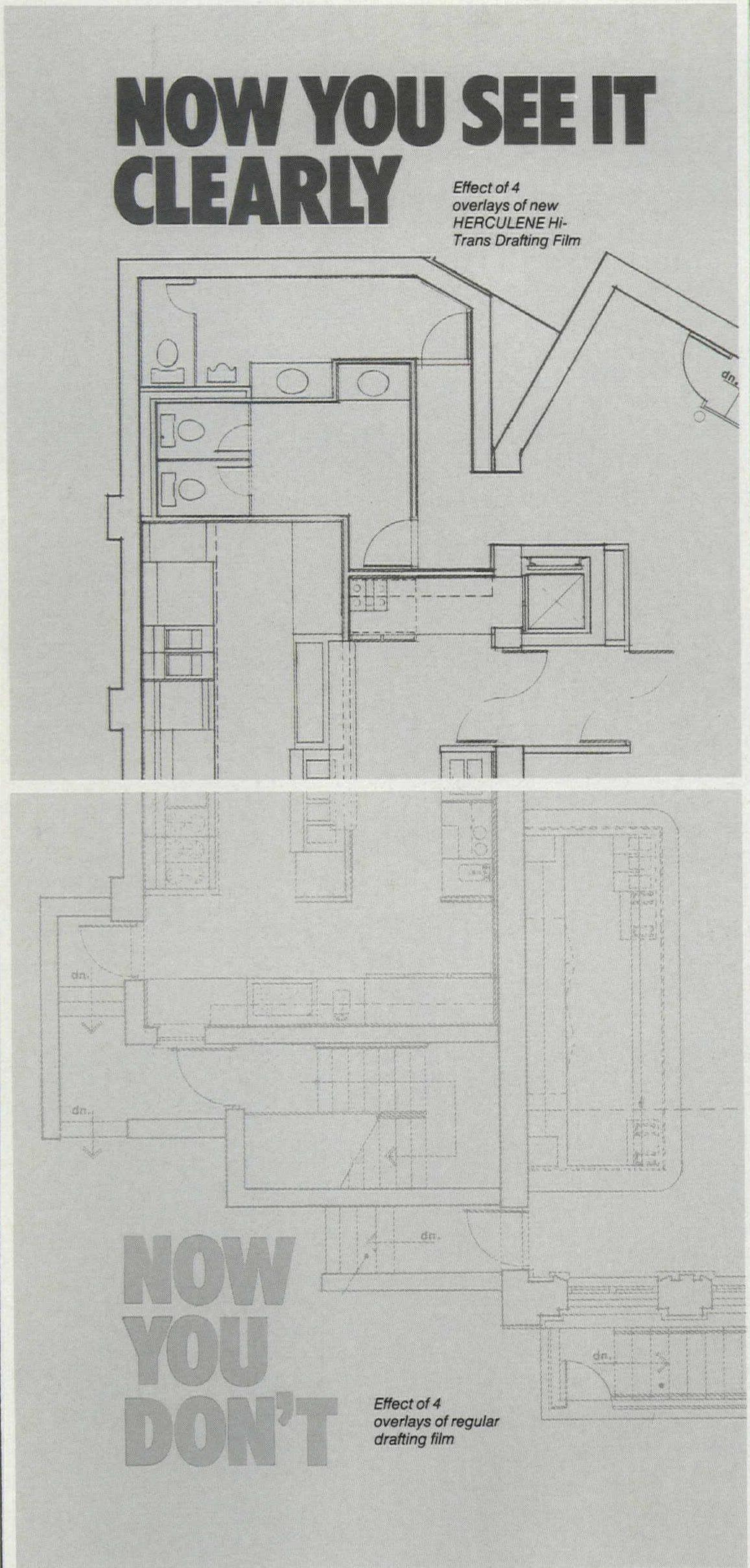
Progress performance also includes prompt delivery from a nationwide network of warehouses, through stocking distributors all across the country. Progress is ready to deliver quality lighting fixtures on time and at competitive prices.

Isn't it time for you to look at Progress Lighting for all your lighting needs? For more information, please circle the reader service card.

progress® lighting

Subsidiary of Kidde, Inc. **KIDDE** Philadelphia, PA 19134

Circle No. 355 on Reader Service Card



New HERCULENE® Hi-Trans Drafting Film lets drawings come through clearly . . . overlay after overlay.

If there was ever a film specifically geared to the needs of pin registered overlay drafting, it's new HERCULENE Hi-Trans Drafting Film.

The extra-high translucency of this film makes it easy to stack up overlays and still be able to read the base sheet clearly. You see the full composite, too, without having to make any additional reproductions — that's a saving in time and money.

The extraordinary translucency of HERCULENE Hi-Trans Drafting Film is only one of the major features of this fabulous new film. What you also get are all the same superior drafting characteristics of our standard HERCULENE Film . . . the number one choice of film among architects and engineers.

Superb pencil and ink take. The perfectly balanced engineered surface on HERCULENE Hi-Trans Film lets you put down a crisp, solid pencil line. And lets your pen glide smoothly while leaving a sharp, clean ink line in its track.

Erasing is fast, and ghost-free. A vinyl eraser is all you need . . . dry for pencil, moist for ink. And you can erase and re-draw again and again without fear of ghosts or loss of drafting surface.

And whether you use Hi-Trans HERCULENE or our standard HERCULENE Film there's never a fear either of yellowing, embrittlement, or dust collecting. Nor will it cling to diazo cylinders. And speaking of diazo — you can run prints from HERCULENE Hi-Trans Film 30% faster than with standard film.

HERCULENE Hi-Trans Drafting Film will deliver everything you're looking for in a drafting film: exceptional transparency and an excellent drafting surface bonded to a practically indestructible base. Put some on your drafting table today. You'll see right through it . . . and know exactly why it's perfect for pin overlay drafting.

For samples and specifications ask your nearest Branch or dealer, or write Keuffel & Esser Company, 20 Whippany Road, Morristown, NJ 07960.

K+E

KEUFFEL & ESSER
A KRATOS Company

Circle **No. 343** on Reader Service Card

How is Johns-Manville celebrating 125 years of designing better roofing?

Designer125.

For a century and a quarter, we've been making better roofing.
And making roofing better.
Example: Shingles with a self-sealing adhesive strip was a Johns-Manville innovation.
Another: Shingles built with fiber glass for extra long life—and Class A fire resistance—were perfected by Johns-Manville.
And now, to celebrate 125 years of designing better roofing, we introduce Designer125.
Architects tell us that the thing about Designer125 that strikes the eye right off is the rustic look, the look of slate or wood shakes.
Designer125 affords you the opportunity to give a roof texture and warmth—at a very affordable price.
For the eye appeal of a much more expensive roof, specify Designer125.
Johns-Manville fiber glass roofing shingles are sold exclusively by Manville Building Materials Marketing Division, Box 5108, Denver, CO 80217.
For a full line catalog, see Sweet's General Building and Light Residential files under 7.7/Mam.
For more information, see your local Manville Sales Representative. Or write to Ken Hunter, Merchandising Manager, at the address above.

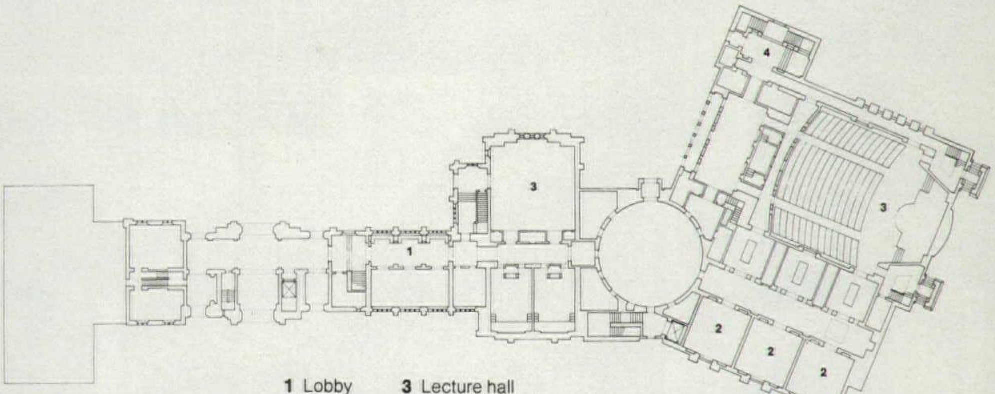
JM
Johns-Manville

Circle No. 349 on Reader Service Card

In progress continued from page 50

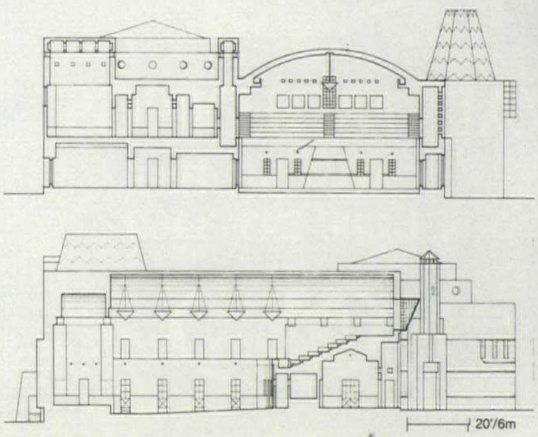
Vassar College Art Department and Museum, Poughkeepsie, N.Y. *Michael Graves, Architect, Princeton, N.J.* Michael Graves uses a large, domed hall to solve the difficult planning and massing problems entailed in adding to an existing collegiate Gothic building. The program is fairly complex: the existing Taylor Hall (Allen & Collens, 1913) will be renovated to reorganize its museum, offices, slide library, and teaching spaces; the new wing will contain gallery space, a 600-seat auditorium, seminar rooms, and study areas. Vassar is only one of several museum projects in the Graves office; also underway are additions to Emory University's art department/museum, the Newark Museum, and the Whitney Museum.

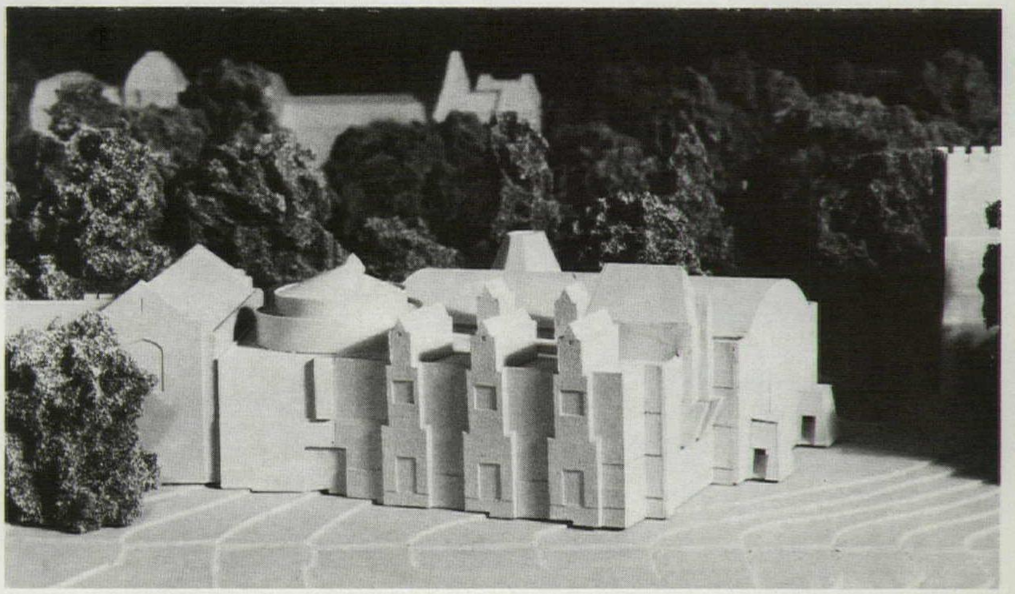
[In progress continued on page 56]



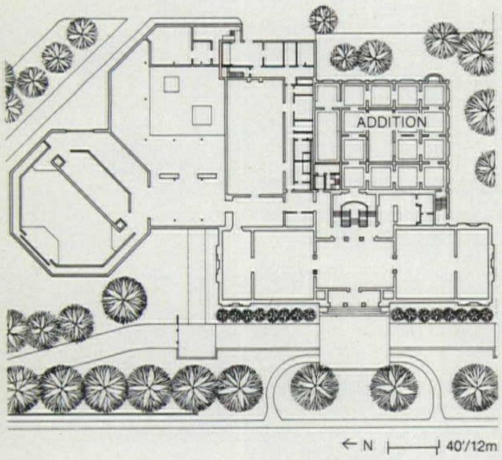
FIRST FLOOR PLAN

1 Lobby 3 Lecture hall
2 Classroom 4 Entry porch

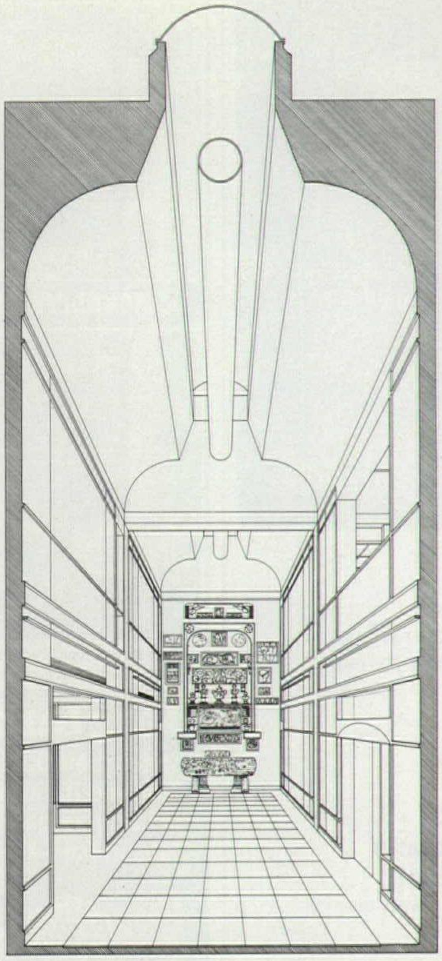




In progress continued from page 55



J.B. Speed Art Museum addition, Louisville, Ky. *Geddes Brecher Qualls Cunningham, Architects, Philadelphia.* Featured in the 1982 Whitney exhibit on new American art museums (along with Graves's Vassar) the Speed Museum is now nearing completion. The $4.2 million addition increases museum floor area by 20 percent. New galleries are formed of 20′ x 20′ modules organized enfilade and illuminated by skylights set into barrel-vaulted ceilings. Precedents for these "cabinet" galleries include Sir John Soane's Dulwich Museum and Louis Kahn's Yale Center.



In progress, Texas-style

Leading the pack of new Texas museums in size and budget is the $29.6 million, 143,000-sq-ft Dallas Museum of Art by Edward Larrabee Barnes Associates and Pratt, Box & Henderson Associates (P/A News Report, June 1983, p. 35), due to open this fall. Foundation work on The Menil Collection (P/A, Sept. 1982, p. 40) is finally beginning to show above ground in Houston. The 70,000-sq-ft, $10 million project by Renzo Piano and Richard Fitzgerald & Partners will be completed in fall, 1984. At a different scale, Ford Powell and Carson of San Antonio have completed the 12,000-sq-ft, $3 million Cowboy Artists of America Museum in Kerrville. Residential in character, the three-gallery building makes use of the firm's regional repertoire, using native stone, stucco over masonry, and *bovedas,* the traditional, brick-vaulted skylights of Guadalajara. A similar ambience will characterize the same firm's Museum of the Southwest in Midland, projected at 14,000 sq ft and $6 million. Venturi, Rauch & Scott Brown are now programming the downtown Laguna Gloria Art Museum in Austin with Renfro, Steinbower & Petty, Architects.

Other undercurrents suggest that a Museum of Fine Arts at the University of Texas, subject of a feasibility study completed in 1981 by Cesar Pelli & Associates, can be expected to move ahead within a year. In Corpus Christi, rumor has it that Philip Johnson, original architect of the Art [*In progress continued on page 58*]

For the William Morris Plaza in Beverly Hills, California, the famed theatrical talent agency naturally wanted star quality in its own architecture.

The perfect expression of prestige and elegance – a "jewel box" effect – was achieved with broad expanses of LOF Vari-Tran® 4-108 bronze-with-silver coated glass.

Vari-Tran provides low exterior reflectance, which was required by the city. The glass was glazed with silicone adhesives, which minimized visible framing members. This happy marriage of glass and glazing had the added benefit of lowering building heat transfer.

William Morris Plaza demonstrates both the practical and aesthetic advantages of Vari-Tran glass. As energy-efficient as it is strikingly beautiful, Vari-Tran can bring these talents to your architecture, too.

For the complete Vari-Tran story, write Dan Carnicom, Libbey-Owens-Ford Company, 811 Madison Avenue, P.O. Box 799, Toledo, OH 43695.

Building: William Morris Plaza, Beverly Hills, California
Owner: William Morris Plaza Inc./Subsidiary of William Morris Agency
Architect: Maxwell Starkman AIA Associates, Beverly Hills
General Contractor: Simpson Division, Dillingham Construction, Los Angeles
Glass: Vari-Tran 4-108 Tuf-flex® FT

LOF Glass
A Libbey-Owens-Ford Company

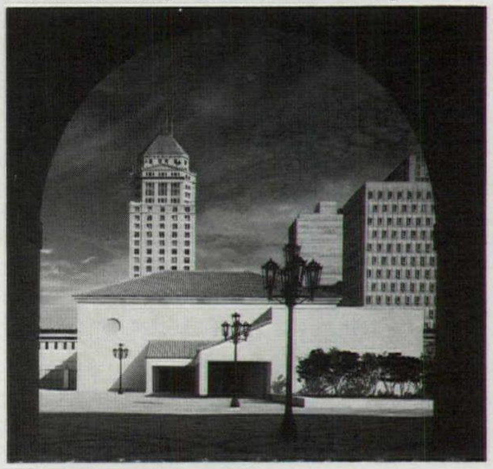
TALENTED GLASS.

Circle **No. 344** on Reader Service Card

In progress continued from page 56

Museum of South Texas, is recommending Batey and Mack to design its expansion. Finally, a new building for the Tyler Museum of Art superseding that on the Tyler Junior College campus (E. Davis Wilcox, 1971) may be the subject of a competition.
[Peter C. Papademetriou]

Hood Museum, Moore Grover Harper.



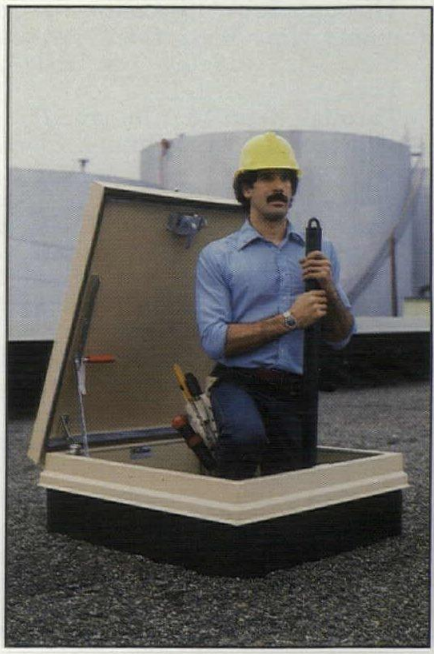
Metro Dade Cultural Center, Johnson/Burgee.

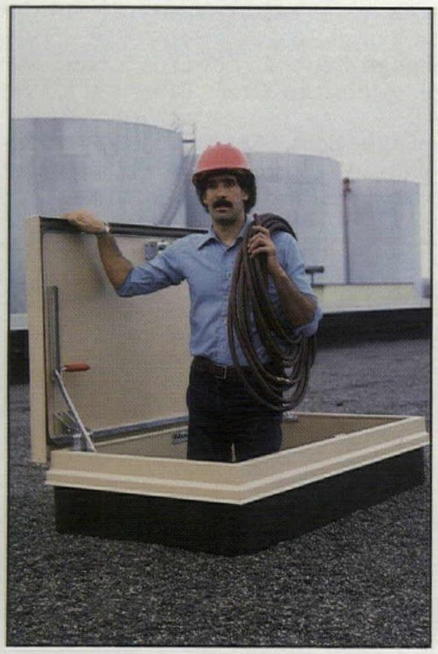
In the works in other places . . .
In New York: Cesar Pelli's MoMA tower and extension nears completion; the Metropolitan Museum of Art's big building program by Kevin Roche/John Dinkeloo & Associates is nearly done; Michael Graves's Whitney Museum addition has yet to be revealed. In Los Angeles: HHPA's Los Angeles County Museum of Art will be joined by Bruce Goff's Price Museum; Frank Gehry's Temporary Contemporary will house the shows until Arata Isozaki's Museum of Contemporary Art is complete. In Atlanta: Richard Meier's High Museum of Art nears completion. In Miami, the delayed Dade County Cultural Center, Johnson/Burgee, plans its fall opening.

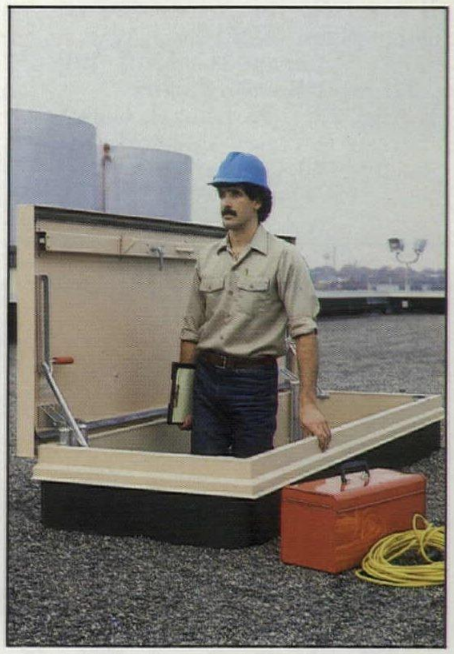
Also underway: In Richmond, Va., the Museum of Fine Arts, HHPA; in Hanover, N.H., the Hood Museum of Art, Moore Grover Harper; in Elmira, N.Y., the Arnot Art Museum, Graham Gund Associates; in Williamsburg, Va., the Wallace Decorative Arts Gallery, Kevin Roche/John Dinkeloo & Associates; in Cambridge, Mass., the Fogg Art Museum, James Stirling. [DDB]

[*News report continued on page 60*]

three ways to come out on top...







with quality Bilco Roof Scuttles

When your specifications call for performance proven Bilco roof scuttles in any size, standard or special, you call for the design, the workmanship and the ease of operation that are uniquely Bilco. Of heavy gauge material throughout, Bilco scuttles are insulated and gasketed for complete weathertightness. Their overall quality of construction combined with built-in compression spring mechanisms for smooth, easy operation assures your client's lasting satisfaction. Standard sizes shown in steel or aluminum are normally in stock for prompt shipment. Special sizes can be fabricated in a wide range of sizes to meet your special needs.

Type S
for ladder access*

Every building needs at least one ladder access size Bilco roof scuttle. It provides easy, safe, economical access to the roof in all kinds of weather.

Size: 2'6" x 3'0"

Type NB
for ship stair

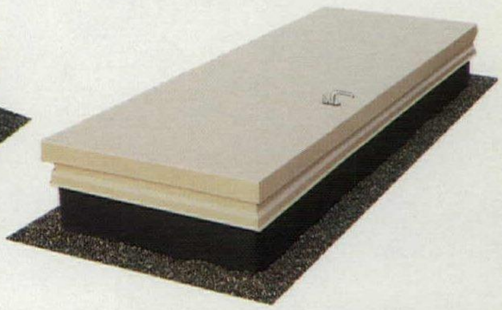
This size Bilco scuttle is ideal for installations where frequent use may be indicated. It permits easier movement of maintenance personnel, tools and equipment.

Size: 2'6" x 4'6"

Type L
for normal stair

The ultimate in roof access. This size Bilco scuttle allows a normal stairway. It takes the place of costly penthouse construction. Helps maintain a clean roof line.

Size: 2'6" x 8'0"



**Shown with the new Bilco Ladder Up Safety Post. For safer, easier ladder use.*

For complete information, details and specifications see Sweets General Building, Industrial Construction and Engineering Files, or send for a copy.

Bilco®

DOORS FOR SPECIAL SERVICES

The Bilco Company, Dept. PA-83, P.O. Box 1203, New Haven, CT 06505

Circle **No. 315** on Reader Service Card

News report continued from page 58

Calendar

Exhibits

Through Aug. 20. Transformations: Developments of a Grid, Architectural Projects by Rodolfo Imas. The Contemporary Arts Center, Cincinnati. Also, **through Aug. 20,** The End of the Road: Vanishing Highway Architecture in America, by John Margolies.
Through Aug. 21. Precursors of Post-Modernism: Milan 1920–30s. Walker Art Center, Minneapolis. Also, **July 10–Aug. 21,** Scott Burton Chairs.
Through Aug. 28. The Esmark Collection of Currier & Ives, New York Historical Society, 170 Central Park West, New York.
Through Aug. 28. Green Architecture. Museum of Art, Rhode Island School of Design, Providence.
Through Aug. 31. Los Angeles Architecture: Restoration, Renovation and Re-Use. Gallery in the Art Store, Los Angeles.
Through Sept. 4. Urban Documents: 20th Century American Prints. Cooper-Hewitt Museum, New York. Also, **Through Oct. 16,** Photography and Architecture: 1839–1939; **through Oct. 23,** A Penny Saved: Architecture in Cast Iron Toy Banks.
Through Sept. 4. Towards a New Iron Age. American Craft Museum I, New York.
Through Sept. 4. Paris-Rome-Athens: Travels in Greece by French Architects in the 19th and 20th Centuries. Museum of Fine Arts, Houston.
Through Sept. 10. The Sum of the Parts: Ray & Charles Eames, designs from 1940 to 1953. Fifty-50, 793 Broadway, New York.
Through Sept. 11. The Frame in America, 1700–1900: A Survey of Styles and Fabrication Techniques. The Octagon, Washington, D.C. Also, **Aug. 13–Sept. 11,** Black American Landmarks: Interpreters of History. AIA Building, Washington, D.C.
Through Sept. 15. California Counterpoint: New West Coast Architecture. National Academy of Design, New York.
Through Sept. 18. Chicago: The Architectural City. Art Institute, Chicago.

Competitions

Aug. 22. Application deadline, The Artist Views the City (all media). Contact Gallery at the Old Post Office, 120 W. 3rd St., Dayton, Ohio 45402 (513) 223-6500.
Aug. 31. Postmark deadline, 31st P/A Awards. See page 15 for information and entry form.
Sept. 1–30. Entry deadline period, Shinkenchiku Residential Design Competition, Contact Shinkenchiku-sha Co., Ltd., 2-31-2 Yushima, Bunkyo Ward, Tokyo 113, Japan.
Sept. 2. Entry deadline, competition to design student services building at Virginia Tech. Contact Design Competition, College of Architecture and Urban Studies, Virginia Tech, Blacksburg, Va. 24061 (703) 961-6415.
Sept. 6. Entry deadline, Industrial Designers Society of America international competition for design of IDSA award. Contact IDSA, 6802 Poplar Pl., Suite 303, McLean, Va. 22101.
Sept. 6. Entry deadline, Industrial Design Excellence Awards (IDEA). Contact Kristina Goodrich, IDSA (703) 556-0919.
Sept. 10. 10th Tokyo International Lighting Design Competition '83. Contact The Yamagiwa Art Foundation, 3-12-4, Sotokanda, Chiyoda-ku, Tokyo, Japan 104 (03) 253-2111.
Sept. 30. Application deadline, National Institute for Architectural Education John Dinkeloo Traveling Fellowship in Architectural Technology. Contact NIAE, 30 W. 22 St., New York, N.Y. 10010.

Conferences, seminars, workshops

Aug. 15–18. Second International Federation of Interior Designers forum, Winnipeg, Manitoba, Canada. Contact Department of Interior Design, University of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada.
Sept. 5–10. 8th National Passive Solar Conference, Santa Fe, N.M. Contact American Solar Energy Society, 205B McDowell Hall, University of Delaware, Newark, Del. 19711.
Sept. 22–25. Toronto: Yesterday, Today, and Tomorrow. Royal York Hotel, Toronto. Contact Conference Center Coordinator, 21 Sackville St., Toronto, Ontario M5A 3E1, Canada (416) 864-9753.


FORGE
1# DIRECT

A synthetic rubber roof the time of BUR–and

can go down in half stand up for years.

An experienced roofing contractor will usually install a quality single-ply rubber roof in about half the time it takes to cover the same area with built-up roofing. The table below shows the average number of squares laid per-man, per-day as reported by single-ply and BUR roofing systems suppliers and contractors:

	Single-Ply Synthetic Rubber			4-Ply Hot BUR
	Loose-Laid Ballasted	Fully Adhered	Partially Adhered	
Squares per Man/Day*	up to 12	5-8	8-12	3.5-5.5

*variation due to roof and system type, penetrations, flashings, etc.

In addition to faster installation and less labor, single-ply synthetic rubber roofs offer long life. Installations stand up to punishing weather, stay flexible in cold and don't get soft or sticky in heat.

Maintenance is easy, too. If something causes a leak to develop, repairs are usually simple. Most cuts or tears require only a patch of the synthetic rubber membrane.

Call toll free 800-441-7111 Ext. 43.

Our experienced Du Pont staff is available to discuss your specific problems, applications and needs. They'll give you information about synthetic rubber roofing membranes made from HYPALON,® NORDEL® EPDM or Neoprene. Or for free literature, write Du Pont Company, Room X37822, Wilmington, DE 19898.

DU PONT

REG. U.S. PAT. & TM. OFF.

Circle **No. 325** on Reader Service Card

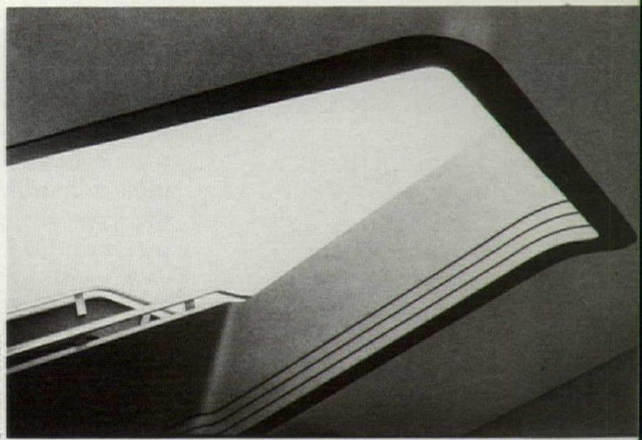
Museums: the second round

The current museum building boom in the U.S. is precedented—the first one was about 100 years ago.

Detail of exterior stairs at Dayton Art Institute, 1928 (right); of interior stairs at Toledo Museum of Art, 1982 (far right).

Dayton Art Institute

Judith Turner



By even a casual count, there are currently at least 30 major museum buildings, additions, or renovations in construction or about to begin construction in this country. A number of others have recently been completed. If one believes that things happen in cycles, a case can be made that museum building follows that norm.

Our first rash of activity occurred just about 100 years ago and extended through the period around the turn of the century sometimes referred to as the American Renaissance. Museums at that time, as outlined by Helen Searing in her *New American Art Museums* (published by the University of California Press in association with the Whitney Museum of American Art during its 1982 exhibition of the same name curated by Searing) had "a family resemblance, fostered by the employment of a classical vocabulary and a Beaux-Arts compositional method." They, in turn, she adds, were based on an evolution of design that traced its origins back to the work of J.-N.-L. Durand, Leo von Klenze, and Karl Friedrich Schinkel of roughly 100 years earlier.

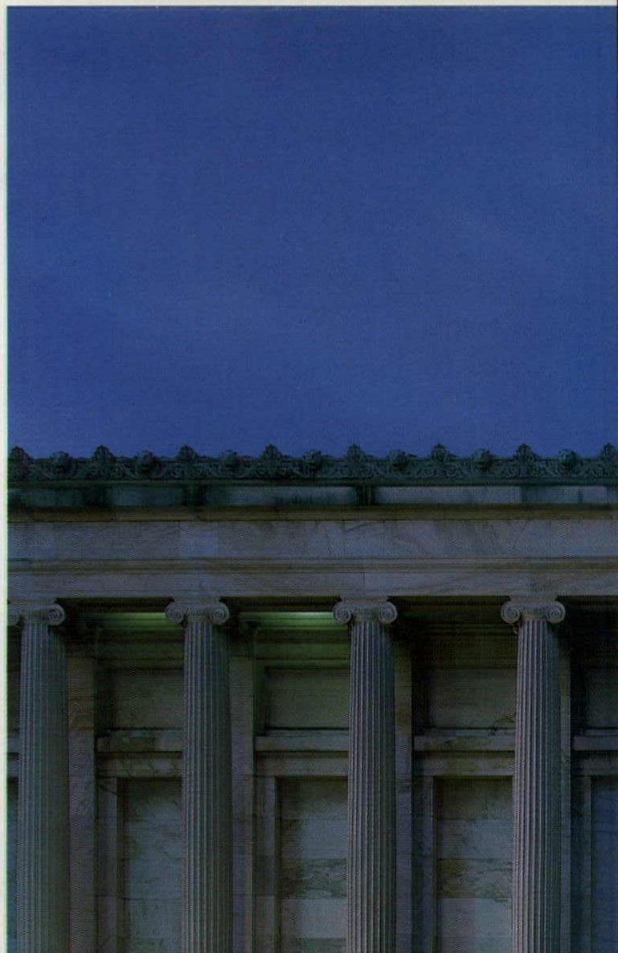
The American museums of the first big cycle, and those that were later to follow the type, were based primarily on the idea of the institution as a repository and safeguard of precious objects. But today, the museum is no longer the place of quiet marble halls where one leisurely contemplates great artistic achievements of the past in serene tranquility. Attendance has soared, and with it most museums have greatly expanded their educational, cultural, exhibition, and even retail activities. Museums are now not only school, concert hall, and shop, but places where one must sometimes wait longer for admission than for a hit Broadway show. This has placed great demands on the museums, particularly the older ones, which now must address such problems as increasing exhibition space, adding new entrances from expanded new parking areas, and updating environmental and security systems.

Three of the museums shown on the following pages, in Toledo (p. 66), Dayton (p. 72), and Washington, D.C. (p. 76), have recently completed major alterations or additions dealing with just such problems. In Chicago, where the Art Institute completed a major expansion a couple of years ago, a new jewellike setting (p. 80) has been created for some very special objects. In New Jersey, a new Environmental Education Center (p. 88), while not a museum in the conventional sense, becomes part of an extensive network of cultural, educational, and entertainment facilities on or in New York Bay, which include its own Liberty State Park site, Liberty Island, Ellis Island, and the South Street Seaport.

Not all of the activity is in this country, though. As our News Report (p. 42) and Portfolio (p. 94) show, the current building cycle is world wide. Recognizing this, we single out a museum near Copenhagen for feature presentation (p. 82); additions to an institution that has been widely looked to as a model of modern museum design, we reasoned, would be of interest to both those who have, and those who have not, made the pilgrimage there. [David Morton]

Toledo Museum of Art, Toledo, Ohio

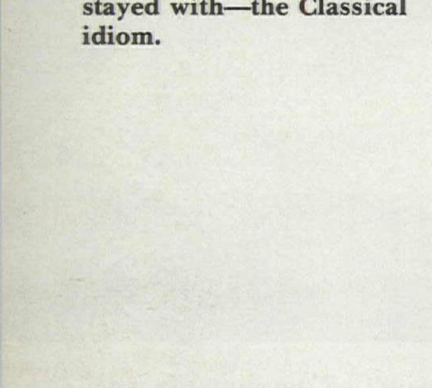
Class distinctions



In a major renovation at the Toledo Museum of Art, HHPA started with—and stayed with—the Classical idiom.

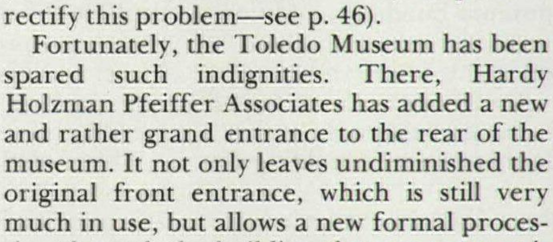
In past years a number of older museums across the country have added new entrances to their backs, and sometimes sides, for the purpose of providing direct access from the only direction in which adequate parking is usually available. As a rule, this is not a bad idea if handled with some discretion and if the typically grand original entrance is left intact and operable. But sometimes, as is the case with the very handsome Chrysler Museum in Norfolk and the Minneapolis Institute of Arts, to name just two examples, the old fronts were simply sealed off. Entering either of these museums now, however, is as spiritually uplifting and aesthetically exhilarating as a trek to a suburban shopping mall. (It should be noted that the Chrysler plans to rectify this problem—see p. 46).

Fortunately, the Toledo Museum has been spared such indignities. There, Hardy Holzman Pfeiffer Associates has added a new and rather grand entrance to the rear of the museum. It not only leaves undiminished the original front entrance, which is still very much in use, but allows a new formal procession through the building that was not possible before. Until the renovation, the transverse circulation axis had been amputated a quarter of the way back by an auditorium that (strangely for an institution whose primary interest is in exhibiting) occupied the building's two floors directly at its center.



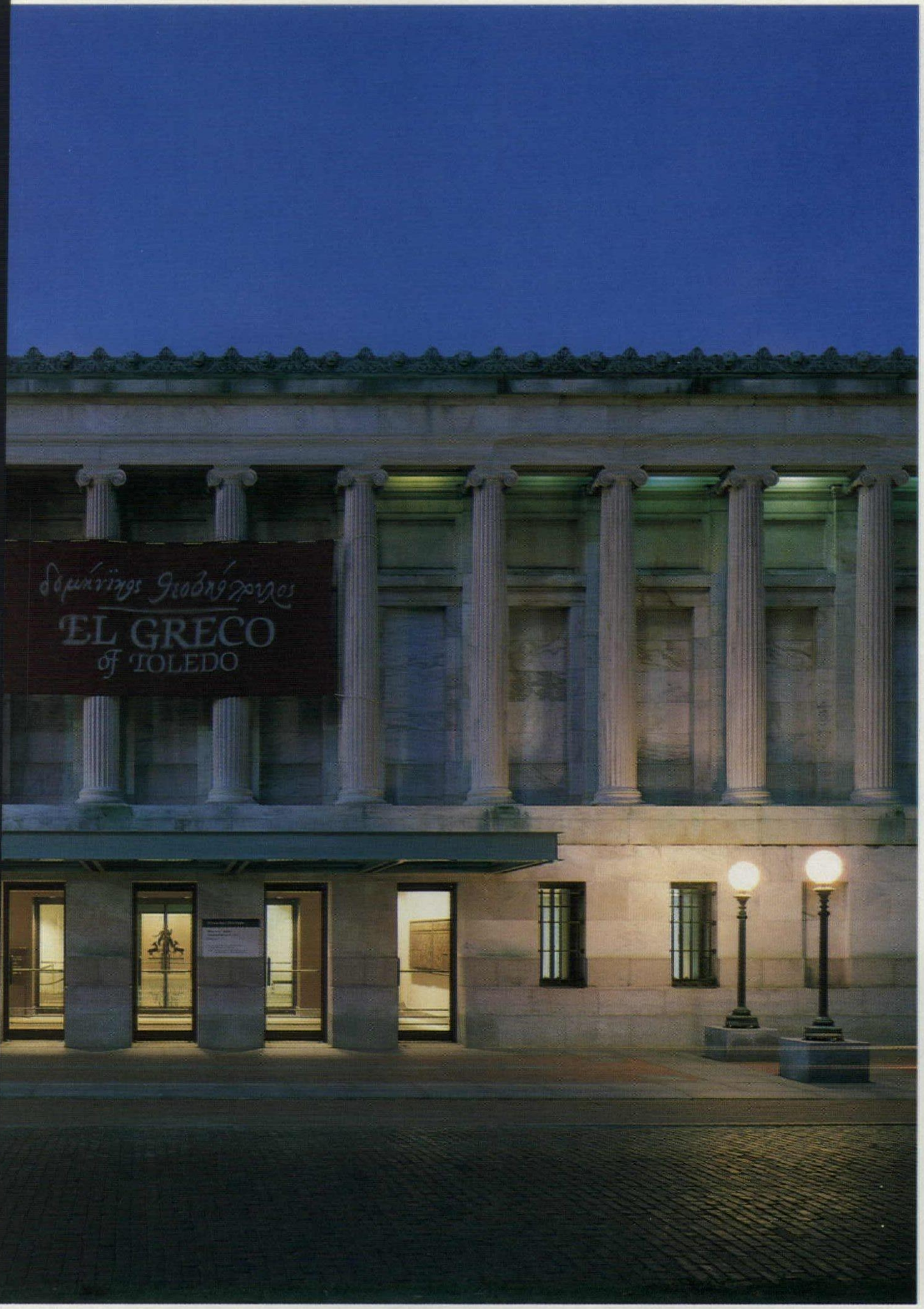
By removing the auditorium, the museum could accomplish three important goals: a new rear entrance at ground level, a formal connection between it and the main front entrance on the *piano nobile* above, and most important, an additional 7000 square feet of exhibition space. Although all of these new functions were important to the museum, the one of the most urgency was the need for

SITE PLAN

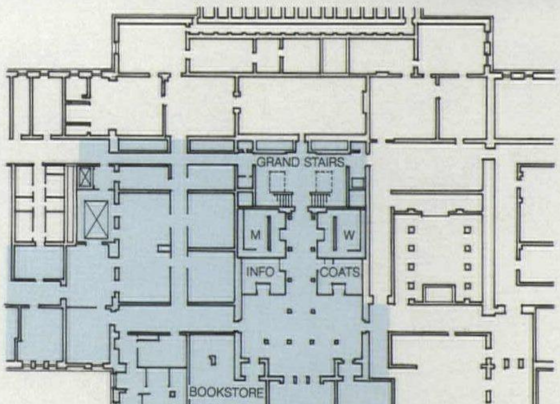


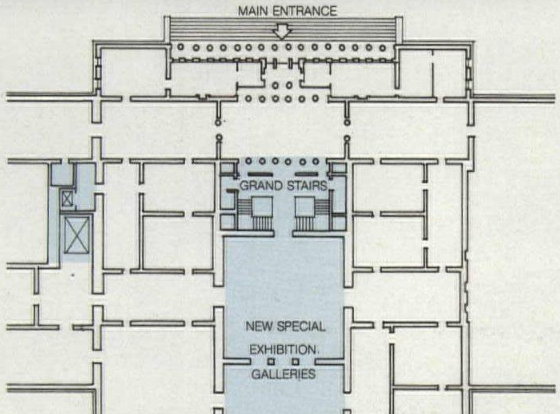
EXISTING GROUND FLOOR

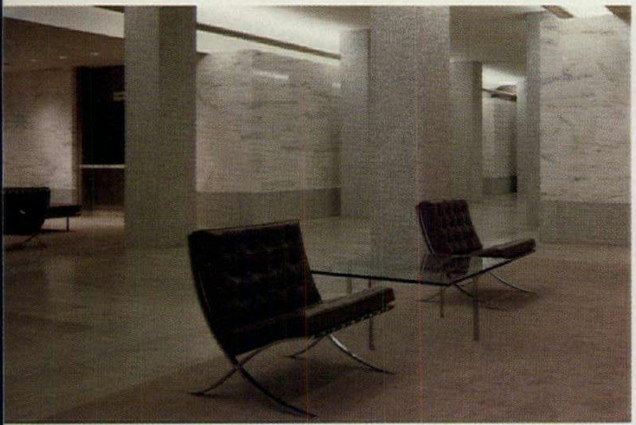
EXISTING MAIN FLOOR



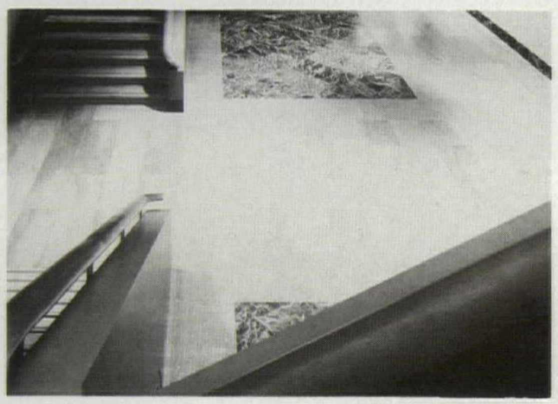
At the Toledo museum, the original front entrance (far left) remains in use, but the entire central portion of the building was renovated and a new entrance (left and below) was cut from the five middle windows at the back, where a new entry plaza now leads directly to the new formal hall.

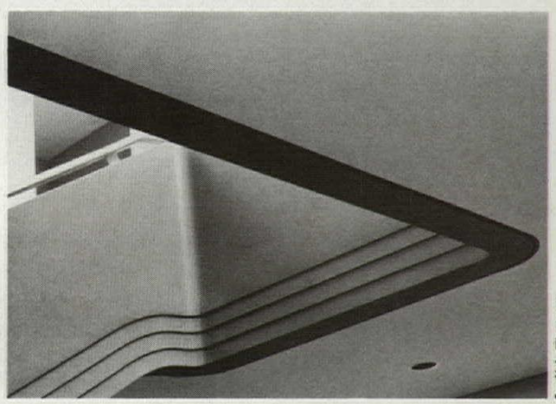






The new rear entrance hall (left and below) is of marble, with 9000-pound granite columns. At its end, where Paul Manship's "Diana and Gazelles" is now seen in the new stair court, a large Matisse glazed-ceramic mosaic will soon be installed in that space, which was specifically designed for it. In the stair court (far right), green marble repeats pattern used in original front entrance.



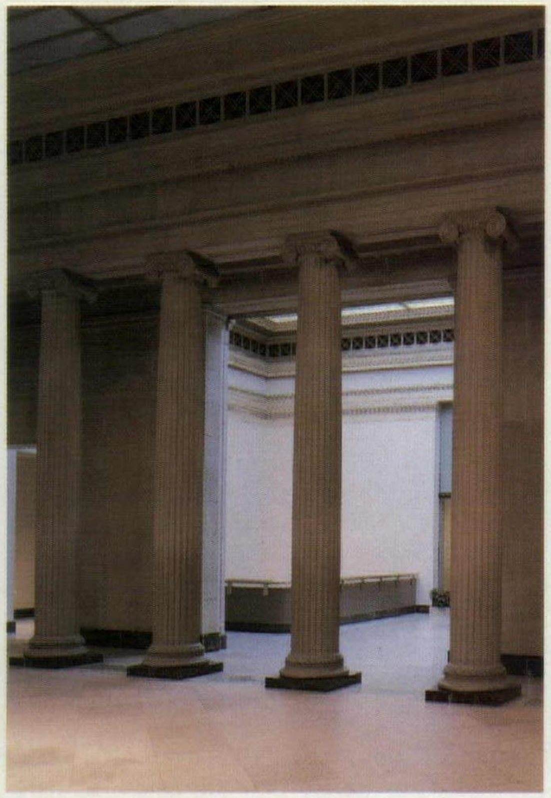


Judith Turner

additional galleries. In today's museum world, such facilities are essential to any institution that hopes to accommodate the blockbuster traveling shows, or even to organize them. Toledo in fact, organized the superb El Greco show that inaugurated the new space last fall. Before the renovation, such shows could be mounted only if the museum stored much of its own permanent collection.

As originally designed in 1910 by Edward B. Green, architect of the much-admired Albright-Knox Art Gallery of 1900–1905 in Buffalo, N.Y., and the Dayton Art Institute of 1930 in Ohio (pp. 72–75), the Toledo Museum, completed in 1912, was much smaller than what we see today. A major rear extension of 1926 enlarged the original auditorium to 800 seats and added a "Gothic" Hall to the upper level, thus doubling the building's size. Work completed in 1933 brought expanded gallery space in a new west wing, and the new 1750-seat Peristyle Concert Hall in a new east wing. With that completed, and also with the existing 180-seat Little Theater, the poorly ventilated auditorium, which did not compare to the rest of the interiors in architectural distinction, was of little

In the new skylighted stair court (facing page, and seen from the original front foyer, left) stone molding has been carefully crafted to match the original. The new exhibition galleries (bottom left) have temporary walls and integrated track lighting and other ceiling track for flexible exhibit installation.



use. By removing it and the Gothic Hall (whose art was reinstalled in a period cloister on the upper level), a central transverse spine could be created, which for the first time could provide a formal link between the museum's two levels and its front and rear.

In 1980, demolition and excavation began. At the rear of the building, earth was removed to form a new entry plaza level with an adjacent access street. The five windows at the center of the long building were then cut to the ground to form new doorways. Above them, only a simple canopy now hints at the extensive work to be found inside. Just beyond the new doors, in a two-level area about 45 feet wide and extending about 85 feet into the building, a half-million cubic square feet of space was cleared by the demolition.

At the new rear, ground-level entrance, one now enters a spacious formal hall that leads 70 feet into the building to the new Grand Stair Hall Gallery. In the entry hall, ten 2′ x 2′ x 12′ five-ton solid granite columns direct one to the stair hall. This grand maneuver is similar to other long, formal vistas employed by Green throughout the building. Also in keeping with the original structure, HHPA has clad the hall with white Vermont marble from the same quarries that supplied the stone for the exterior walls 70 years ago. They have also used on the new floors the pink/brown Tennessee marble found throughout the museum, and they have repeated the Verde Antique decorative marble motif of the main front entrance in the new stair hall floor.

Above the stair hall, a triple-glazed skylight of quarter-inch plies of gray glass separated by 2½-inch air spaces bathes the space in soft, natural light that is harmless to art works (this installation marks the introduction of these LOF units to this country). Ceiling moldings similar to those of the original building have been repeated in the stair hall and in the new main (upper) floor galleries, which have been specially designed for flexibility: the ceiling has integrated track lighting and other track assemblage from which temporary exhibit walls or art work can be hung.

Not all of the work at Toledo, however, is seen by the general public. The renovation also included a reworking of the loading dock, storage and preparation rooms, and the installation of a new 10′ x 20′ freight elevator, and special environmental and security systems.

But what can be seen shows a quite sophisticated intervention into a highly refined milieu in which the architects did not mimic the Classical style of the original, but enhanced it through their own restrained and uncompromising Modern interpretation of that style. The work reveals that the architects, many of whose efforts in the past have been notably exuberant, and who set precedents for some of the freedom we see today, know very well how to be restrained and sedate. Before concluding that they have turned coat, however, it should be recorded that one museum official reported that "we had to put the brakes on a couple of times." So, for those who worry about such things, we can rest assured that HHPA is still HHPA, even though they may have stepped, for the moment, into the rarefied air of the Classical realm. [David Morton]

Data

Project: *Toledo Museum of Art, Toledo, Ohio.*
Architects: *Hardy Holzman Pfeiffer Associates, New York. Hugh Hardy, partner in charge; Craig Swenson, John Harris, project architects; James Despirito, Anthony DiSimone, Tom Little, Carol Maryan, James Sussman, design team; Darlene Fridstein, Alan Schwartz, construction coordination.*
Architectural project representative: *James H. Morris.*
Client: *Roger Mandle, director.*
Site: *flat, with excavation for plaza, in residential area.*
Program: *new lobby, bookstore, offices, art storage, loading, receiving, and elevator in renovated ground floor; new exhibition galleries, stair hall gallery, and bridge in renovated main floor; new basement mechanical spaces, totaling 47,600 sq ft.*
Structural system: *cast-in-place reinforced concrete; structural 2′ x 2′ x 12′ granite columns in ground floor.*
Major materials: *existing limestone removed, cut, and reset in stair hall; new limestone selected to match; hand-carved stone; soffit stones to match existing (see Building materials, p. 138).*
Mechanical system: *new chillers and cooling tower at expanded chiller plant are piped to new basement air handlers for automatic temperature/humidity control in new galleries and art storage.*
Consultants: *HHPA, landscape; Stanley H. Goldstein, structural; Meyer, Strong & Jones, mechanical; Jules Fisher & Paul Marantz, Inc., lighting; Peter George Associates, Inc., acoustical; Joseph Chapman Inc., security; Lebowitz/Gould Inc., graphics.*
Construction manager: *Mackinnon-Parker, Inc.*
Costs: *withheld by client.*
Photography: *Cervin Robinson except as noted.*

Dayton Art Institute Propylaeum, Dayton, Ohio

Back to front

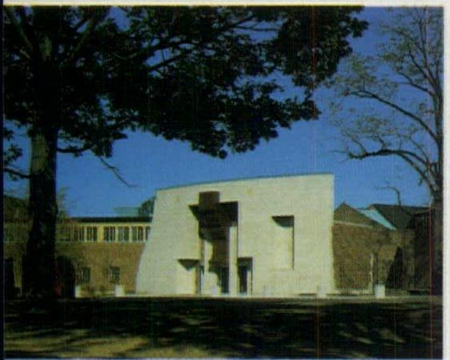
A small building by architects Levin Porter accomplishes a large number of transitional roles.

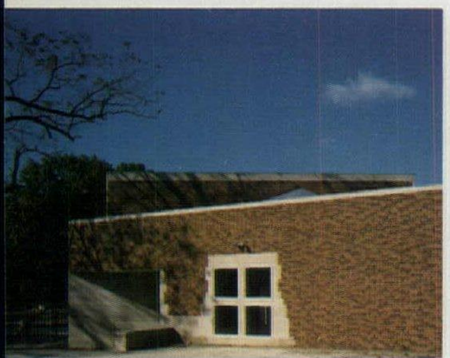
It is no easy task to turn the back of a monumental building into the front, especially the marvelous 1930 Dayton Art Institute designed by Edward B. Green (also the architect for The Toledo Museum of Art, p. 66). But for many functional reasons, that is what architects Levin Porter were asked to do. The original building, begun in 1928, is a striking Italian Renaissance Revival structure with a grand stair at the "front" showing direct influence from the Villa Farnese.

As in many institutions, the need for parking did not exactly set well on the dramatic hillside site; the hill that the stairs climb raises the five-sided original structure 60 feet above the Miami River, and the parking is forced to the opposite side. Because the slope is so pronounced, the actual level of the formal main entrance and exhibit areas is one floor lower than the parking. Because of its relative inaccessibility, the east entrance began to lose favor with patrons, who got into the habit of entering through the 1963 Rike Pavilion addition or through one of the exterior courtyard doors.

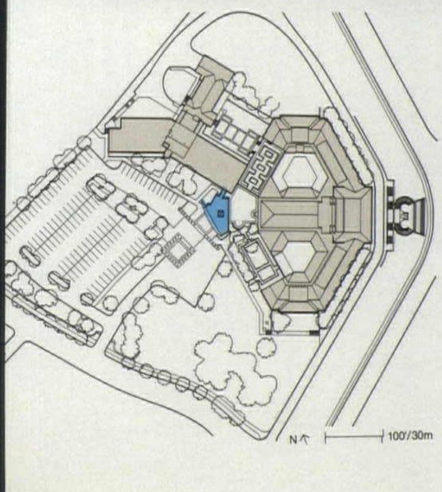
To solve this security problem, provide access for the handicapped, and create a fitting new main entrance to address the parking area properly, the back door needed to become the front. It now is; and it does those things admirably. If not outright in its humor, the new building at least seems to have a twinkle in its eye, a knowing one. While the program did not call for a high mass to function as entry, the scale of the addition had to be bold enough to signal from a distance that this was indeed where one should go to enter. To accomplish this, the architects have pulled the front wall up to a monumental height, leaving the actual ceiling at an ample but lower level behind it.

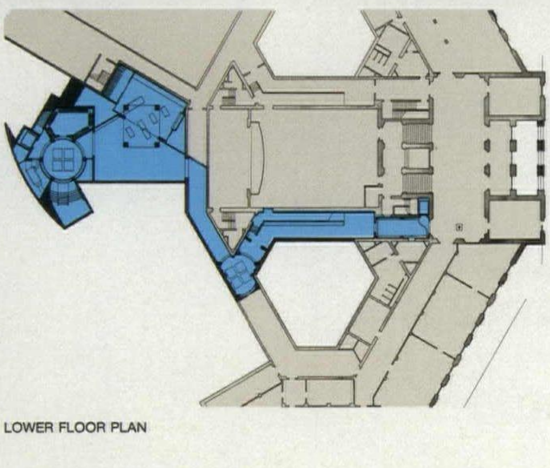
It was important to the architects that the references come from the older building, and hence the brickwork, limestone, and joinery do their part to recall the adjoining facility. The eye goes first, of course, to the keystone over the door—it is a section of the cornice on the original building, magnified to immense proportions, and made out of sheet copper. Crafted, really, it is beautifully made, as is the rest of the building. Asymmetrical openings flank the main revolving door, with the wider one an access for wheelchairs. A patterned brick wall plane surrounds the keystone in the recess above the door, and at its right an empty niche again underscores the asym-



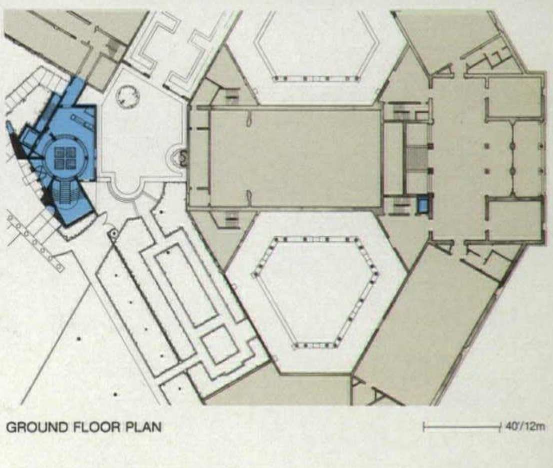


New entry pavilion (top and right) behind original (above).



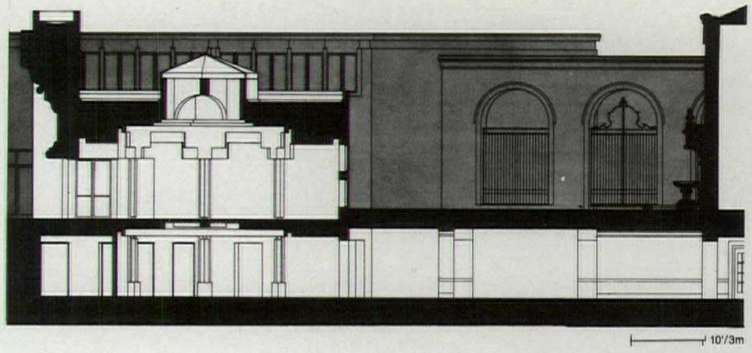


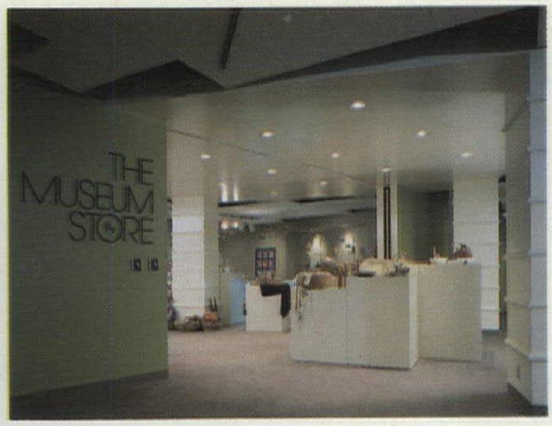
LOWER FLOOR PLAN



GROUND FLOOR PLAN

Light from the entry rotunda (previous page) penetrates to the second rotunda under the first (below). From here a visitor passes the museum store (far right) and on to the third rotunda (opposite page, left). This is a turning point in the passage into the existing main entry hall.





metry. At the south end, the limestone façade turns the corner, is notched into the brick, and disappears until the next corner. The north end of the main façade is carved away in a classically monumental way as it extends beyond the corner of the building.

Inside the front door, a visitor enters the first of three rotundas, this one capped by a quartet of domed skylights grouped to give the impression of being a single dome centered on the space. A colonnade comprising six piers with double plant-on "columns" rings the central space—the circular tubes are actually PVC pipe. Capped by stepped "capitals," the symbolic columns stop short of the floor on the upper level. Almost imperceptible among the floor tile, glass block reproduces the ceiling domes and passes light down to the second rotunda immediately below the first. From this main entry area, a visitor may enter the Pavilion wing or descend to the level of the original museum space via the angled stair which, from the landing down, becomes a series of semicircular levels. It is easy to see this area as a small amphitheater for storytelling or other intimate performances during slow periods.

As is the case with the upper rotunda, this is a transition space with light flooding down from above. It leads into or past the museum store, again ringed with paired columns—but these rest on a "base" and do not reach the ceiling. From this clearing, circulation leads down a corridor to the third rotunda, similarly treated, on the way to the main exhibit areas. From this knuckle, the path turns abruptly through a passage along the side of the existing auditorium. It culminates just before the old main lobby in a rectangular space (with similar columns) in which is the new elevator for handicapped access. The ceiling in all of these circulation areas is allowed to run in a consistent grid that ignores the angle of the walls, stopping short of them and creating a floating plane with jagged edges. It works as a device to create unexpected drama within a space that could have been a long, boring journey.

Both as an outsized object to attract attention and in its detail, the Propylaeum is a success. It is a far bigger statement than its program size of 2200 square feet would suggest. While it might look a bit tortuous in plan, it is not in experience. The details, the craftsmanship, and the colors employed add up to much more than the sum of its many parts. [Jim Murphy]

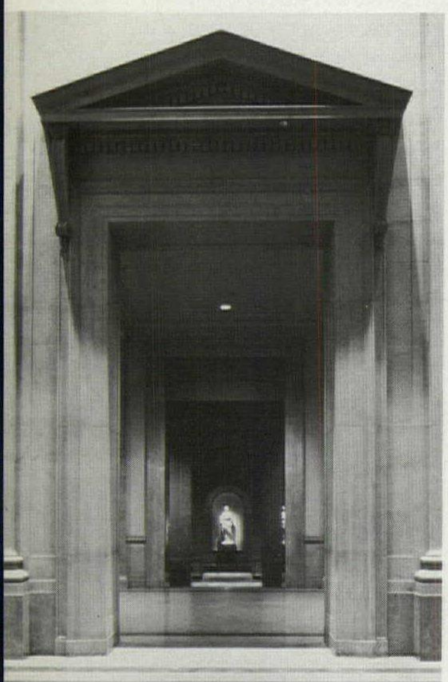
Data

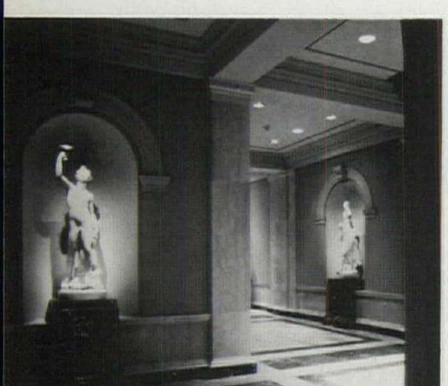
Project: *Dayton Art Institute Propylaeum, Dayton, Ohio.*
Architect: *Levin Porter Associates Inc., Dayton, Ohio. Richard D. Levin, principal in charge; Dale D. Smith, project designer.*
Client: *Dayton Art Institute; Bruce Evans, Director; Marie Ferguson, Administrator.*
Site: *addition to an existing 1930 museum on a relatively flat part of a hillside site.*
Program: *a 2200-sq-ft building to become the new main entry with visual and security functions.*
Structural system: *steel bar joists on masonry bearing walls and reinforced concrete floor.*
Major materials: *limestone, brick, and copper sheet, exterior; painted gypsum board, acoustical tile, carpet, quarry tile, and glass block, interior (see Building materials, p. 138).*
Mechanical system: *existing hot and chilled water from the building complex.*
Consultants: *Richard Shell Associates, structural; Heapy Engineering Company, mechanical; James H. Basset, Inc., landscape.*
General contractor: *Henry Stock & Son.*
Cost: *$868,764; $127.75 per sq ft.*
Photography: *Gregory Glass/Dan Ingersoll, exterior; Glen Calvin Moon, interior.*

National Gallery of Art, ground-floor renovations, Washington, D.C.

Accommodating Pope and Pei

The National Gallery's new ground-floor galleries, the final phase of renovations by Keyes Condon Florance, set up a sequence of public spaces that John Russell Pope would applaud.





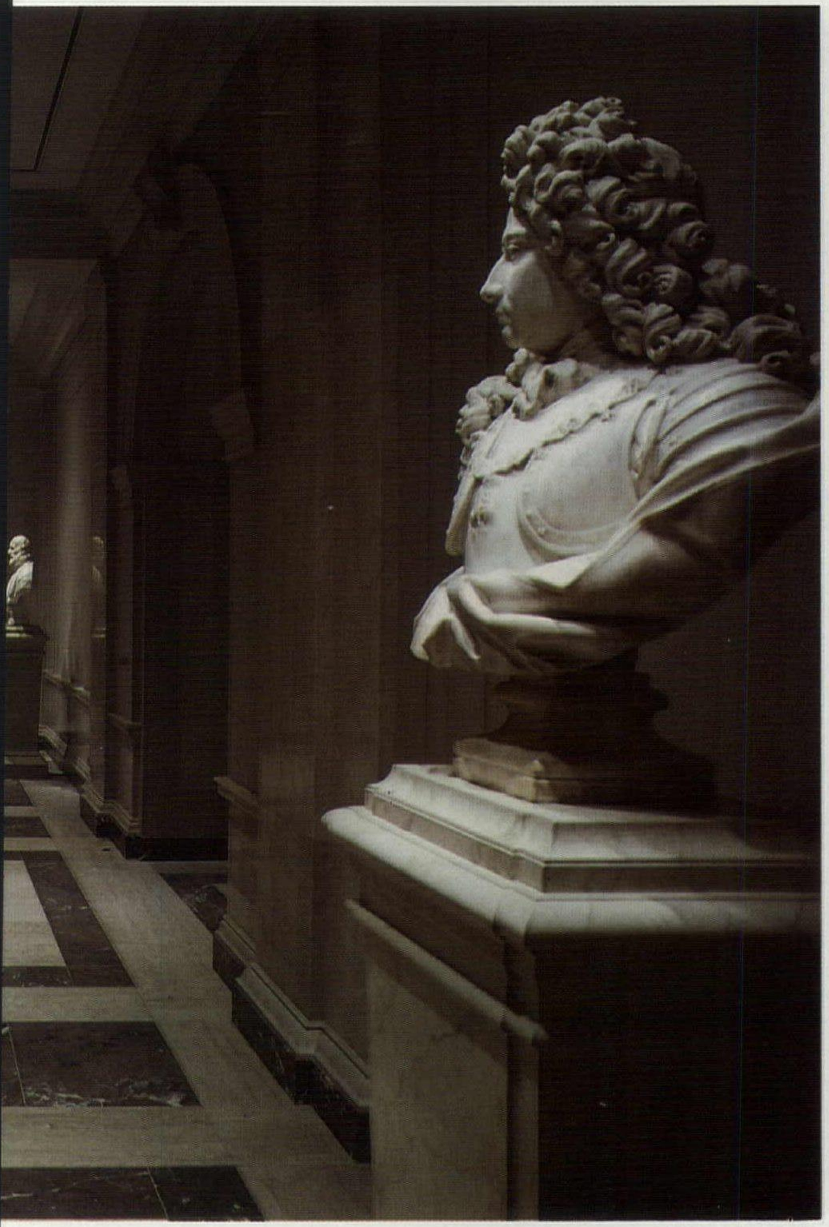
The blockbuster exhibitions still snag the major headlines, and the trend among American museums towards once-in-a-century shows has scarcely abated. Yet, as the building programs of many museums indicate, the pursuit of Tutankhamen's gold has not entirely supplanted the curator's dream of opening a museum's permanent collection to public view. The new ground-floor galleries of the National Gallery in Washington, D.C., showcase objects that have languished out of public sight for a decade or more. These galleries, the third and most successful phase of Gallery renovations carried out since 1978 by the D.C. firm Keyes Condon Florance, restore not only art work but also architecture to the public realm. (New York's Metropolitan Museum, the Gallery's closest competitor for the big shows, has pursued a similar path in the newly completed Lila Acheson Wallace Galleries, storehouse for its extensive Egyptian collection.)

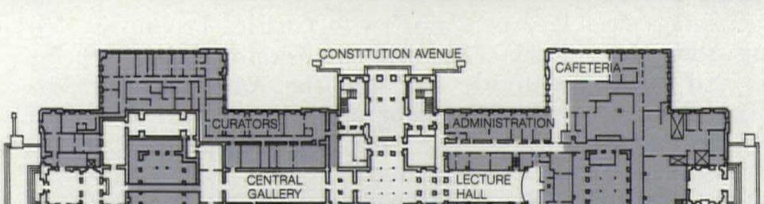
John Russell Pope's 1941 plan for the National Gallery of Art lifted the principal galleries palazzo-fashion up one stately flight from the Mall. The first floor's sweeping east–west axis was not repeated on the more utilitarian ground floor, where a lecture hall and mechanical rooms blocked the central spine. Expansion over the years in the Gallery's non-exhibition functions (education, publications, and conservation) and an increasing emphasis on temporary shows strained existing facilities, designed by Pope to house a relatively specific, permanent collection, and prompted planning for an addition in the early 1970s.

I.M. Pei's 1978 East Wing, with its 2:1 ratio of research/support to gallery space, replaced many of the old facilities and freed 40,000 square feet of the original ground floor for exhibition use. Keyes Condon Florance then reorganized the plan to reconnect all three ground-floor entrances via a new axis paralleling the grand sequence above. This spine, which ultimately ties in to Pei's underground concourse and cafeteria beneath the 4th Street plaza, is the key to the coyly titled "Project Breakthrough," the $10 million, 100,850-gross-square-foot renovation, funded by East Wing benefactor Paul Mellon with the A.W. Mellon Educational and Charitable Trust, the Kresge Foundation, and federal appropriations.

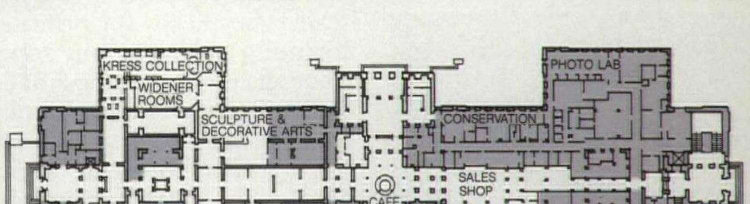
Project Breakthrough picked up where Pei left off and proceeded westward through Pope's building phase by phase, without dis-

A comparison of John Russell Pope's 1941 plan and the 1983 version by Keyes Condon Florance (below left, right) shows the shifting of support functions to create a new axis through the National Gallery's ground floor. The sequence of public spaces proceeds from the original 7th St. entrance (facing page, top), and passes through distinct antechambers (below) to culminate in a grand sculpture hall (facing page, bottom and left, below).



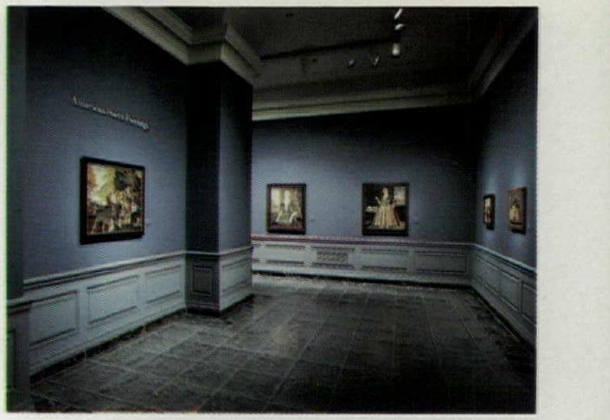


1941 PLAN



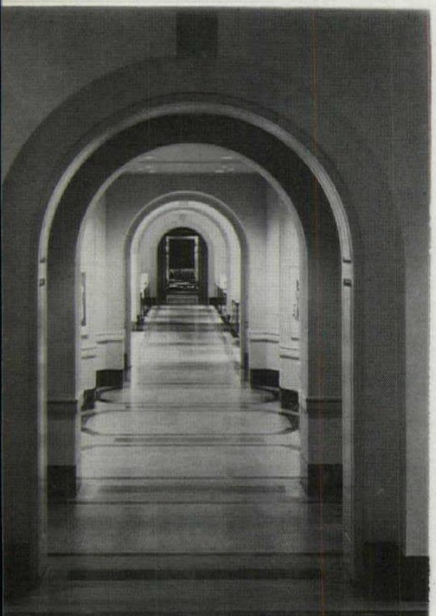
1983 PLAN

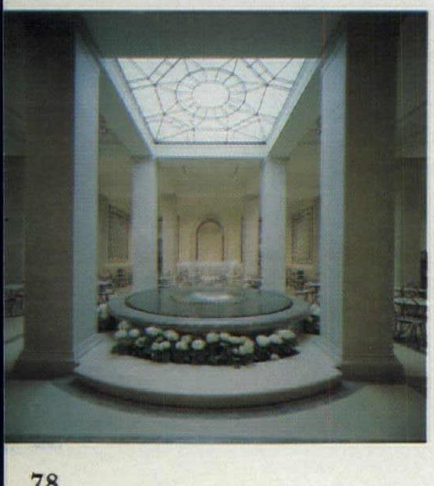
The new galleries (right and center) are open to the public without admission; the earlier café and sales shop with its poster alcoves (below and facing page, top left) are the means to more commercial ends. Conservation studios, analytical labs, and other support functions (facing page, top right) are never seen by the general public.



turbing the Gallery's public operation. The 4th Street entrance and sales shop, the first elements of the plan completed in 1976 and 1981, respectively, attempt with limited success to mediate between Pei's abstracted modernity and Pope's Beaux Arts classicism. The remodeled 4th Street entrance hall with its bulbous, brass-railed balcony at the first floor remains an unfortunate intervention by the East Wing architect. Keyes Condon Florance's extensive sales shop, a feature *de rigeur* in modern museums, plays at a contemporary classicism of half-barrel vaults, broken arches, and geometric floor patterns that emphasize but do not enhance the circulation axis. The shop splits a major mechanical room in two (here the "breakthrough" promised) and its construction required the removal and replacement of several columns in the renovation's most difficult structural maneuver.

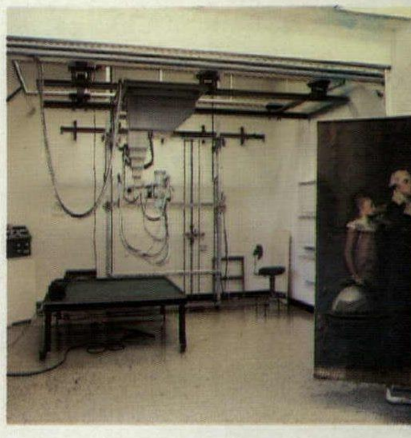
The garden café, situated directly beneath the central rotunda, was completed as part of the second phase. Its new fountain under a backlighted skylight pins intersecting cross axes visually and acoustically. The surrounding dense grove of columns may have inspired Mark Hampton's café decor, but his busy lattice work and lawn furnishings are too cute for this very special space.

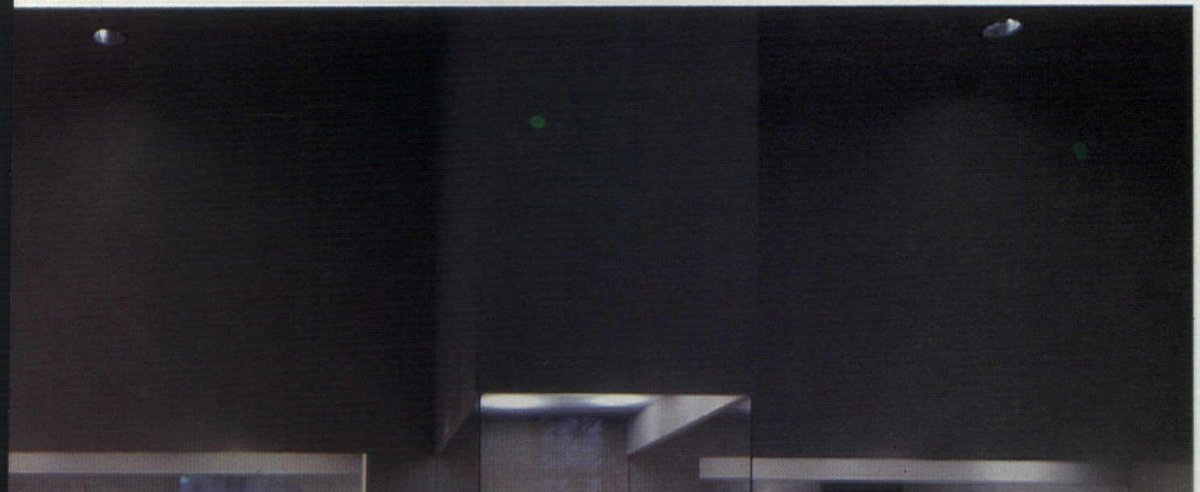




It is the western galleries, the third and final phase of the project completed last spring, that come closest to what Pope might have preferred. Thickly articulated thresholds mold a sequence of vestibules that proceed from the 7th Street entrance to an elegant sculpture hall. Here the sales shop's awkward and trendy gestures are replaced by a more consistent and sculptural use of niches, pediments, arches, and moldings derived from Pope's examples and executed in plaster or marble. To the south of the sculpture hall are spun concentric rings of small rooms, scaled specifically for prints and drawings exhibitions, such as the opening shows of photographs by Alfred Stieglitz and prints from the Holy Roman Empire. To the north, a more random sequence of less clearly defined rooms housing decorative arts and small-scale sculpture (including the Gallery's renowned Kress Collection of Renaissance bronzes and the Chalice of Abbot Suger, used in the consecration of Saint Denis 1137–1144) surrounds the reinstalled Widener period rooms. Separating the sculpture hall from the central garden café is a long gallery; its present collection of naïve American paintings was organized, as were all installations, by gallery personnel with Charles Froom of New York. The axial extension through both the sculpture hall and the American paintings gallery is deliberately interrupted, forcing a meandering path through spaces scaled to the art exhibited.

Equal in importance to these principal public spaces are the reorganized curatorial facilities that line the central axis to north and south, filling the plan's poché. Critical conservation and photography laboratories, of-





fices, high-security vaults, and other support spaces added technical and logistical complexities to the program's exhibition content. The reorganized plan necessitated a complex refitting of mechanical and electrical systems, engineered by Nash M. Love & Associates to replace 1940s equipment and improve temperature, humidity, and fire control.

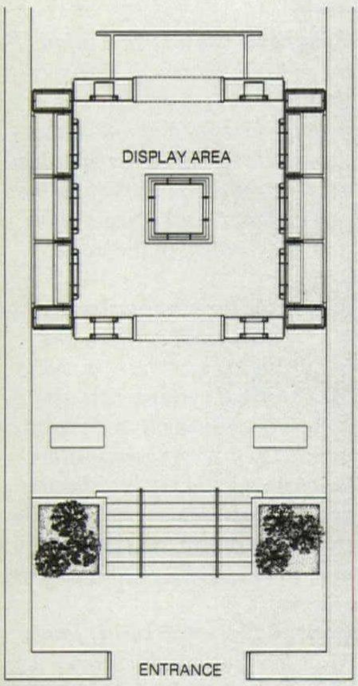
The rationalization of this previously labyrinthine backstage may in fact give the National Gallery a curatorial edge in the ongoing competition for international blockbusters. For the general public, however, the significance of this remodeling lies less in its supporting role for the East Wing's "really big shows" than in the offered alternative of small-scale treasures intimately viewed. It is finally the sculpture hall, with its careful merging of art and architecture, that may prove a more memorable space than the larger but more abstract atrium next door. [Daralice D. Boles]

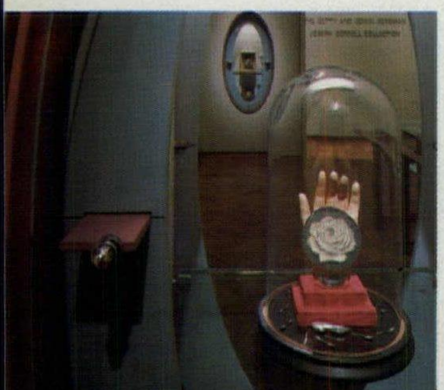
Data
Project: *National Gallery of Art, West Building, ground-floor renovations, Washington, D.C.*
Architects: *Keyes Condon Florance; David H. Condon, principal in charge; James C. Blount, project manager; Calvert S. Bowie, Russell K. Perry, A. Dean Knott, Robert B. Smith, project architects.*
Client: *National Gallery of Art; J. Carter Brown, Director; David W. Scott, NGA planning consultant; Hurley Offenbacher, NBA construction manager.*
Site: *6th St. & Constitution Ave., N.W., on the National Mall.*
Program: *phased renovation of the ground floor.*
Structural system: *existing, with the exception of a new shoring system for the removal of two existing columns obstructing the east end axis, and a new double deck floor system in the print area.*
Major materials: *plaster, marble, gypsum wallboard, carpet (see Building materials, p. 138).*
Mechanical system: *new air-handling equipment and switch-over systems serving main-floor galleries during the installation of new units; replacement of electrical, fire alarm, smoke detection, environmental, and security systems.*
Consultants: *structural, James Madison Cutts; mechanical/electrical, Nash M. Love & Associates; lighting design, Gordon Anson, NGA; installations, NGA exhibit staff, Charles B. Froom (Kress Collection); interiors, Mark Hampton, Inc. (garden café); kitchen, Cini-Grissom Associates.*
Contractors: *Spradlin Corp.; Skinker & Garrett; Helmut Guenschel; Earl's Stairway Lift Corp.; Grunley-Walsh Construction Co.; Corning Construction Corp.*
Cost: *$10,082,000.*
Photography: *Gary P. Fleming.*

Art Institute of Chicago, Chicago, Ill.

Jewel boxes

Architects Krueck & Olsen created a gallery at the Art Institute of Chicago for works by Joseph Cornell.





The American artist Joseph Cornell (1903–1972), whose box constructions and collages combine an endless array of small, mundane, and seemingly unrelated objects and images into compositions of great poetic force, spent most of his life in relative obscurity, rarely venturing far from his Queens, New York, home. But in the eleven years since his death, Cornell's fame and reputation have risen with an almost ironic swiftness, and now a collection of his works has the distinction of occupying the only gallery in the Art Institute of Chicago devoted to the work of a single artist. With the gift of 37 objects of art and memorabilia from Chicago collectors Betty and Edwin Bergman, whose own Cornell holdings are the most extensive in either public or private hands, the Art Institute became the proud possessor of the most comprehensive Cornell collection in any museum.

Chicago architects Ronald Krueck and Keith Olsen were asked to remodel an existing gallery at the Art Institute to house this spectacular acquisition. The two chief problems in displaying Cornell's works, according to A. James Speyer, curator of the museum's 20th-Century department, are avoiding repetition among so many small-scale pieces, and lighting to eliminate shadows and illuminate

The steel and glass display cases are grouped around a central table (see plan, facing page). Glass shelves inside the cases minimize shadows and provide "invisible" support for Cornell's "boxes" and memorabilia. The cases' glass fronts are bolted to their steel frames with chrome-plated acorn nuts; the background panels in the cases are upholstered in gray silk.

Data
Project: *Betty & Edwin Bergman Joseph Cornell Collection.*
Location: *Art Institute of Chicago.*
Architect: *Krueck & Olsen Architects, Chicago.*
Client: *AIC—Department of 20th Century Painting and Sculpture, A. James Speyer, curator.*
Program: *a permanent gallery installation for the Department of 20th Century Painting and Sculpture in the Art Institute of Chicago for a collection of work by the artist Joseph Cornell. The delicate works of art are presented in a series of glass cabinets allowing for their protection while maximizing their "viewability," with special concern for a flexible means of sensitive illumination.*
Contractors: *Caseworks, Inc., cabinets; Tyler & Hippach, glass and glazing.*
Costs: *withheld at client's request.*
Photography: *Karant Photography.*

detail. "The means of presentation must excite the viewer," Speyer added.

The means, in this instance, combine Classical symmetry with an almost Baroque luxury of detail and ornament. Three display cases, the central one of which is pierced by an arched doorway, are arranged around a steel and glass table that contains Cornell memorabilia. The cases, with their elaborately engineered, painted steel structure, glass fronts and shelves, and painted wood exteriors, evolved, according to Ron Krueck, through a reductive process that produced "a series of fractioned planes." The glass shelves minimize shadows inside the cases, while making the boxes appear to float in space.

Krueck calls his and Olsen's approach "minimalist and constructivist," but somehow the luxurious engineering and lush color scheme of the installation seem too sybaritic to pass muster with any card-carrying Minimalist or Constructivist. At first glance, one wonders whether the installation simply isn't too much for the homely, lovingly crafted, densely detailed constructions. But in fact, the opposite is true. The cases act as a glittering stage for these complex but unassuming works of art, treating them, in curator Speyer's words, like "the romantic jewels that they are." [Pilar Viladas]

Additions to Louisiana Museum, Humlebæk, Denmark

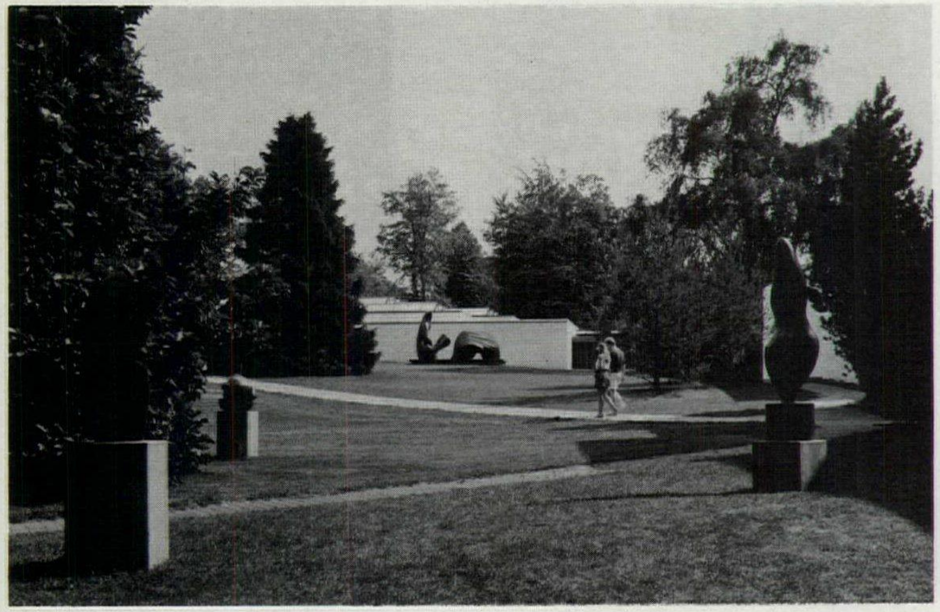
Art inhabiting Nature

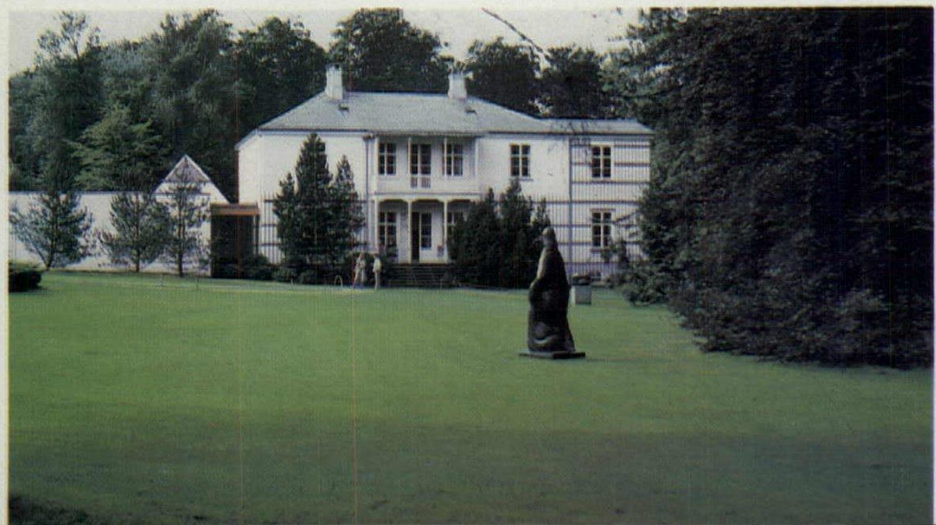
Evolution of Denmark's renowned garden museum, opened in 1958, continues in new additions by the original architects, Jørgen Bo and Vilhelm Wohlert.

The museum wraps irregularly around a sculpture-studded lawn. Even the 1982 wing (below) is subordinated to the original villa (bottom).

For decades, architects have been making pilgrimages to a little seacoast town near Copenhagen to see a building that is unassertive in form, yet vividly memorable as an experience. Since 1958, the Louisiana Museum has offered a rare integration of art-viewing with enjoyment of the landscape, in an architectural setting that mingles with the greenery and frames vistas in the graceful manner of Zen temple pavilions.

The Louisiana owes its existence and much of its special character to its founder-director, Knud Jensen, who foresaw a need for a new, less institutional kind of museum for Modern art. In 1956, Jensen sold the family dairy business, then devoted much of the proceeds and all of his time to the project. (His story and the museum's are well told in a *New Yorker* profile by Lawrence Weschler, August 30, 1982, issue.)





John Morris Dixon

For the museum site, Jensen had acquired a derelict estate overlooking the Sound, and with it the anomalous name, "Louisiana," bestowed by the original owner, who had three successive wives all named Louise. The 1850 main house was modest, but the plantings were exceptional, and the extensions required for Jensen's program had to respect them. The young architects Jørgen Bo and Vilhelm Wohlert met his needs with a long, low wing threaded between specimen trees along the north edge of the main lawn. Linear galleries with glazed walls skirting tree trunks opened at one point into a tall room overlooking a pond and ended in a cafeteria at the edge of the bluff, where a lattice-shaded terrace faces back across the lawn. (The new museum was the subject of an enthusiastic feature in P/A, Dec. 1960.)

The museum was executed in a relaxed 1950s Modernism, with white-painted brick walls defining blocks set at odd angles. Flat roofs of exposed wood framing and decking stepped up at some points to provide clerestory light. Well-known Danish architects of the time, such as Utzon and Jacobsen, were working with irregular brick-walled volumes, but here horizontal planes are more dominant and volumes break open to interact with the landscape; it is not surprising to learn that Wohlert had recently returned from teaching at Berkeley and working on William Wilson Wurster's office staff.

During the 1960s and 1970s, the Louisiana was in the forefront of developments such as environmental art and performance art. Expanding programs called for a new block of gallery space—two levels, with skylights and no windows—and a recital-theater complex—also on two levels. Both were plugged into the original wing on the north side, where they did not impinge on the public landscape, and where dropping terrain could accommodate their volumes without breaking the low silhouette.

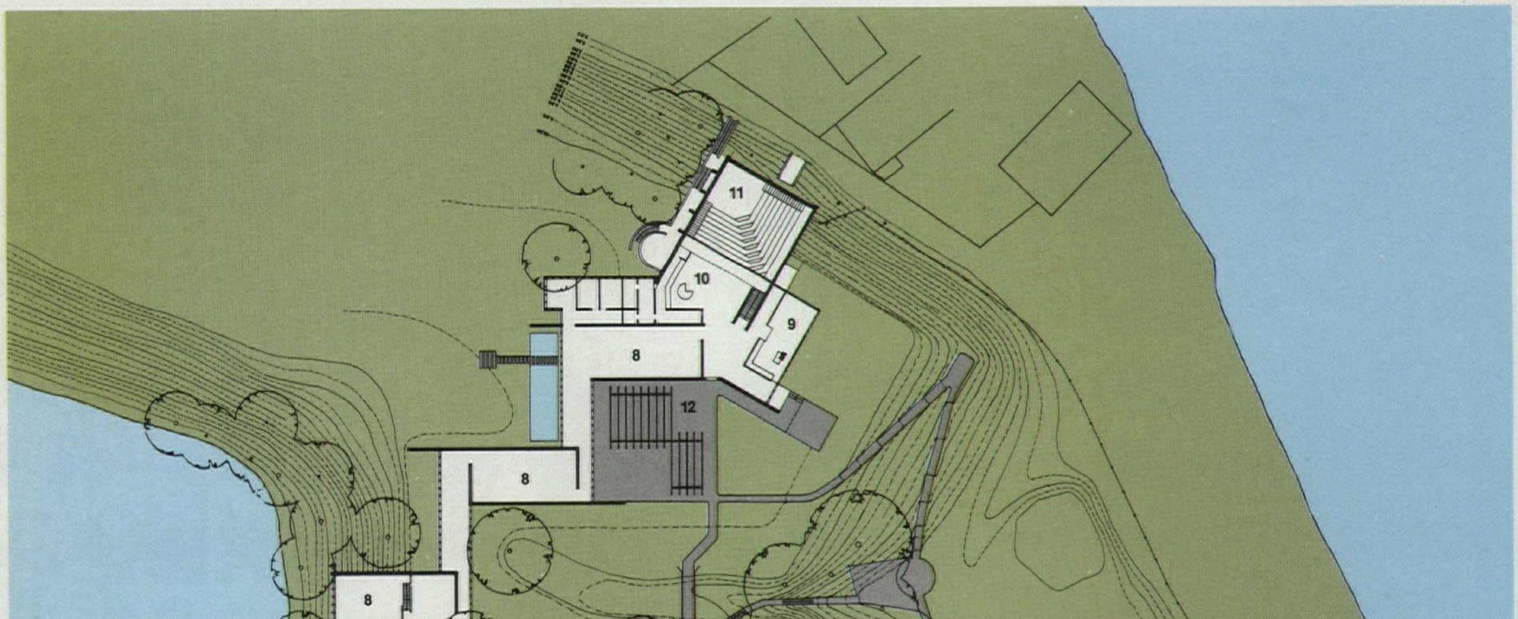
By the end of the 1970s, the museum needed a major increase in gallery space in order to show more than a fraction of its growing collection; it also needed more storage than provided by restored outbuildings and a more expansive lobby-sales area than the first floor of the old house offered. Bo and Wohlert, who had worked continuously with the museum, responded with a complementary wing running south from the main house; starting with an expanded foyer, it extends a long, bending gallery along the

John Morris Dixon

edge of the lawn to a substantial block of galleries—some tall, some double-decked—a volume shaped and fitted into the landscape to present only fragments of its brick walls toward the main lawn. A library-lounge at the end of the wing offers sweeping views from a point that seems to project over the water. Paved terraces along the staggered exterior of the galleries replace the sculpture garden previously on this part of the grounds. Interaction between building and site get as much attention as before, but now the interior is more sharply delineated from the exterior; the experience of art, even of the outdoor sculpture, is marked off from the experience of the landscape.

In their larger scale and their interior treatment, the new galleries reflect an evolving concern for art-viewing conditions. For the 1971 galleries, the architects had developed a diffusing, low-ultraviolet skylighting system. The new painting galleries use similar top-lighting, and they break with all preceding galleries by substituting gray marble paving for the hitherto ubiquitous earth red tile. Natural wood appears in details as a reminder, but otherwise the galleries are scrupulously neutral in color in deference to

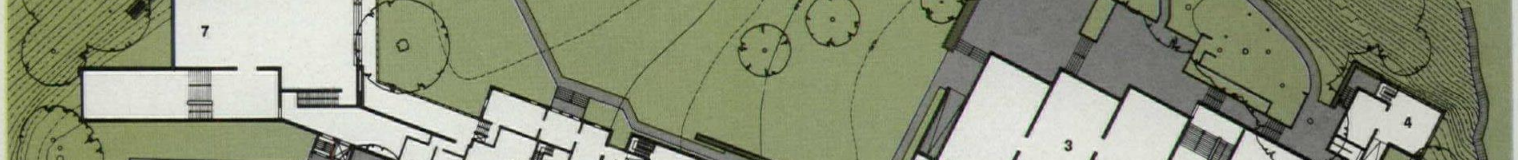
Landscape views have been part of the museum concept from the outset. In the 1958 portion, even a major gallery faced north over a pond (top left). In the latest additions, the new foyer (top right) and a corridor gallery (above) look into the trees from slightly below grade.



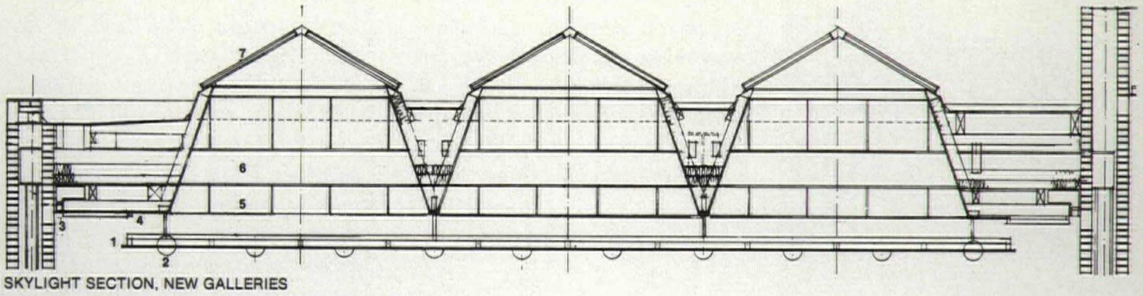
SITE AND BUILDING PLAN

N ↖ 50'/16m

1 Entrance through original house
2 Lobby and sales (1982)
3 Galleries (1982)
4 Library and Lounge (1982)
5 Service building (original)
6 Storage under service yard (1982)
7 Galleries (1971)
8 Galleries (1958)
9 Cafeteria (1958)
10 Cafeteria expansion, theater below (1975)
11 Recital Hall (1975)
12 Cafeteria terrace (1958)

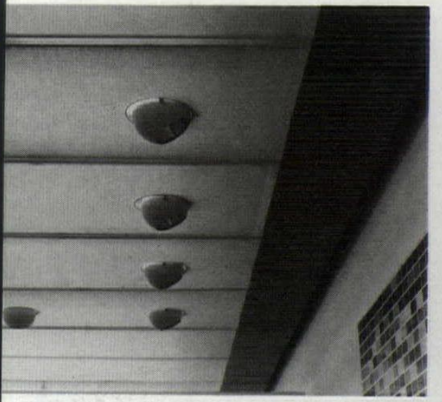


ELEVATION FROM SOUTHWEST

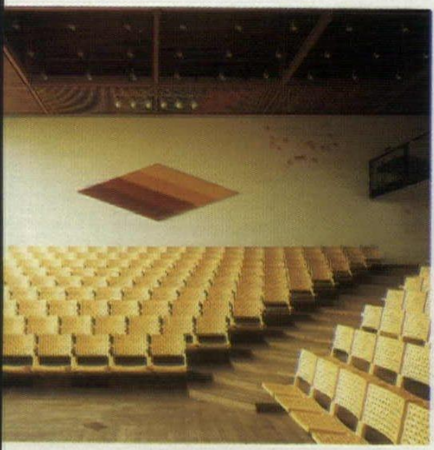


SKYLIGHT SECTION, NEW GALLERIES

1 Suspended ceiling, stretched fiberglass
2 Spherical spotlight
3 Air outlet
4 Exhaust
5 Acoustical cladding
6 Steel framing
7 Triple glazing, with layers of synthetic diffusing ultraviolet filter



In expansive 1971 gallery (above) wood ceilings of earlier wing were supplanted by diffused toplighting system, but red tile floors were continued. New galleries (right) have similar skylighting (above right) with gray marble floors. Wood appears in recess at edge of ceiling (above). Sculpture at right by Naum Gabo. Recital hall of 1975 (below) has woven wood seating, mounted on stepped floor, by Poul Kjærholm. Cafeteria balcony has view across hall, through window wall, to Sound.

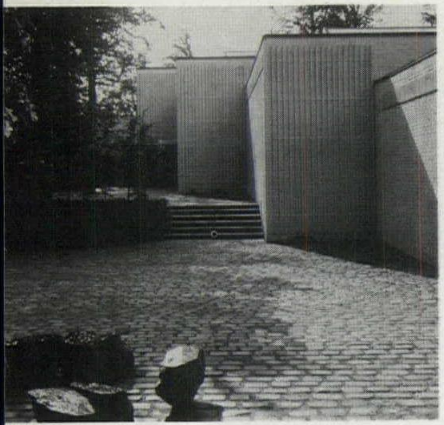


Antonio Wohlert

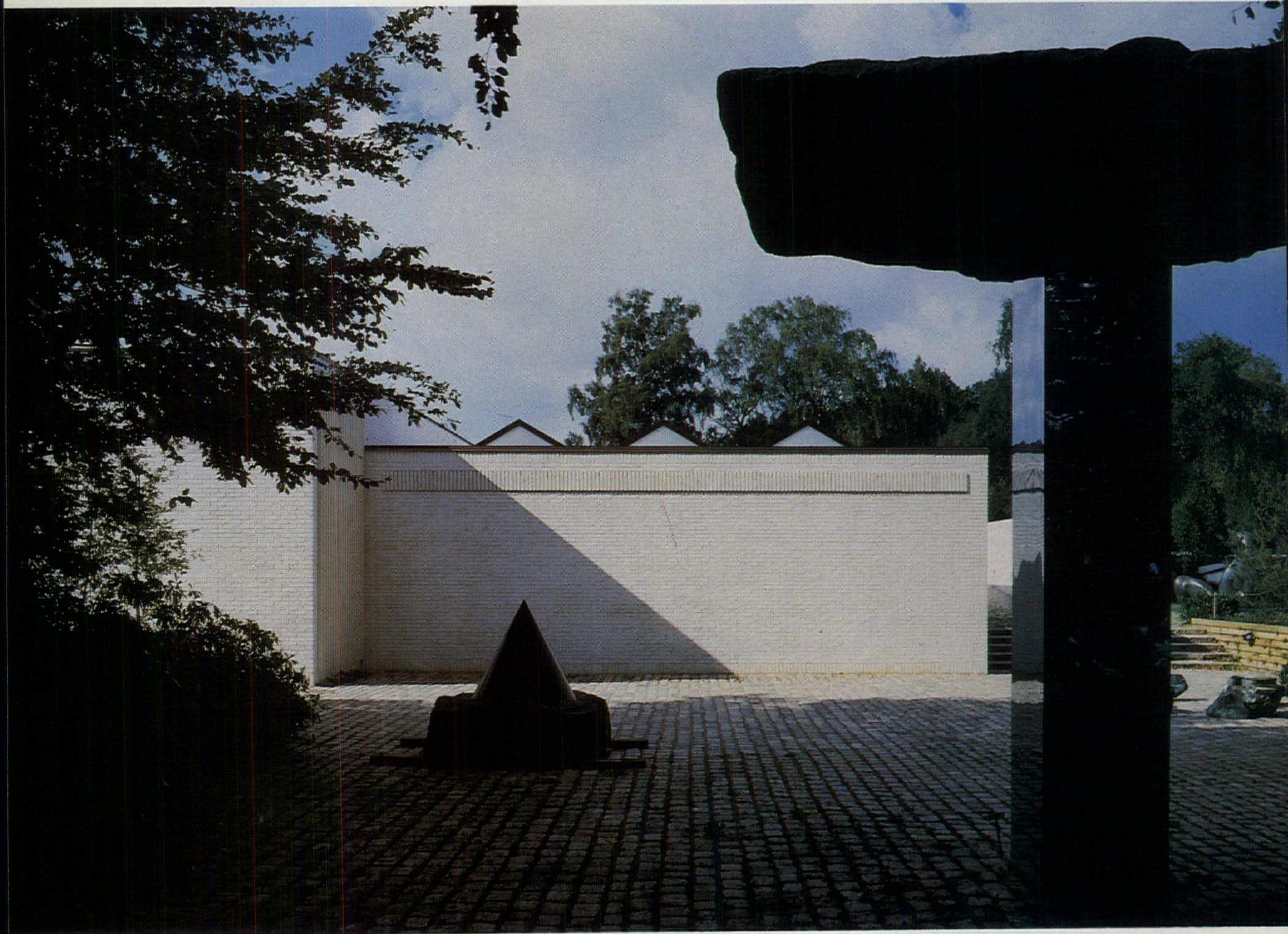
the art and its lighting. An artificially lighted lower level, introduced in the 1971 addition, reappears here on a larger scale, as a setting for light-sensitive works on paper, projection exhibits, etc. As in the earlier instance, this inserted level is part of a planned gallery circuit that directs visitors back from the end of the addition toward the main lobby.

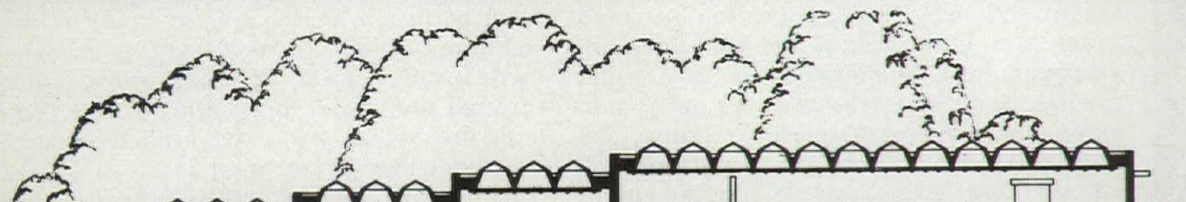
Throughout all of these additions, the entrance to the museum from its modest-scaled neighborhood has remained the same. Country-style wood gates lead through a cobbled court, framed by trees and service buildings, to the original, domestic front door. A recent fringe of parking spaces along the front of the property, insisted upon by the community, has displaced some greenery, but there is still a canopy of foliage above. Once through the house, the visitor can still overlook the Sound from the original gingerbread-detailed verandah.

Although architectural continuity has clearly been a major objective, the new galleries at the Louisiana undoubtedly represent some loss of distinctiveness for the sake of universal exhibition standards. (In fact, the highly effective toplighting system has been adapted by Arata Isozaki for use in the

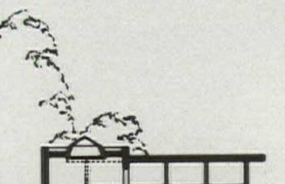


Alongside new wing is a series of paved sculpture terraces (left, and below, sculpture by Nobuo Sekine). Behind the white brick walls are galleries that step up in height (section below), then divide into skylighted upper level and lower level for works that need more controlled lighting. At end of upper level is a crow's nest lounge (opposite page, top right and below), with stair that connects levels to complete circuit of galleries. From porch of original villa (opposite, top left) one of three monumental Moore sculptures can be seen silhouetted against view across Sound to Sweden.

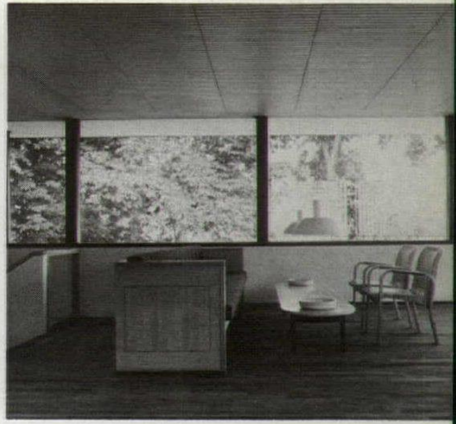


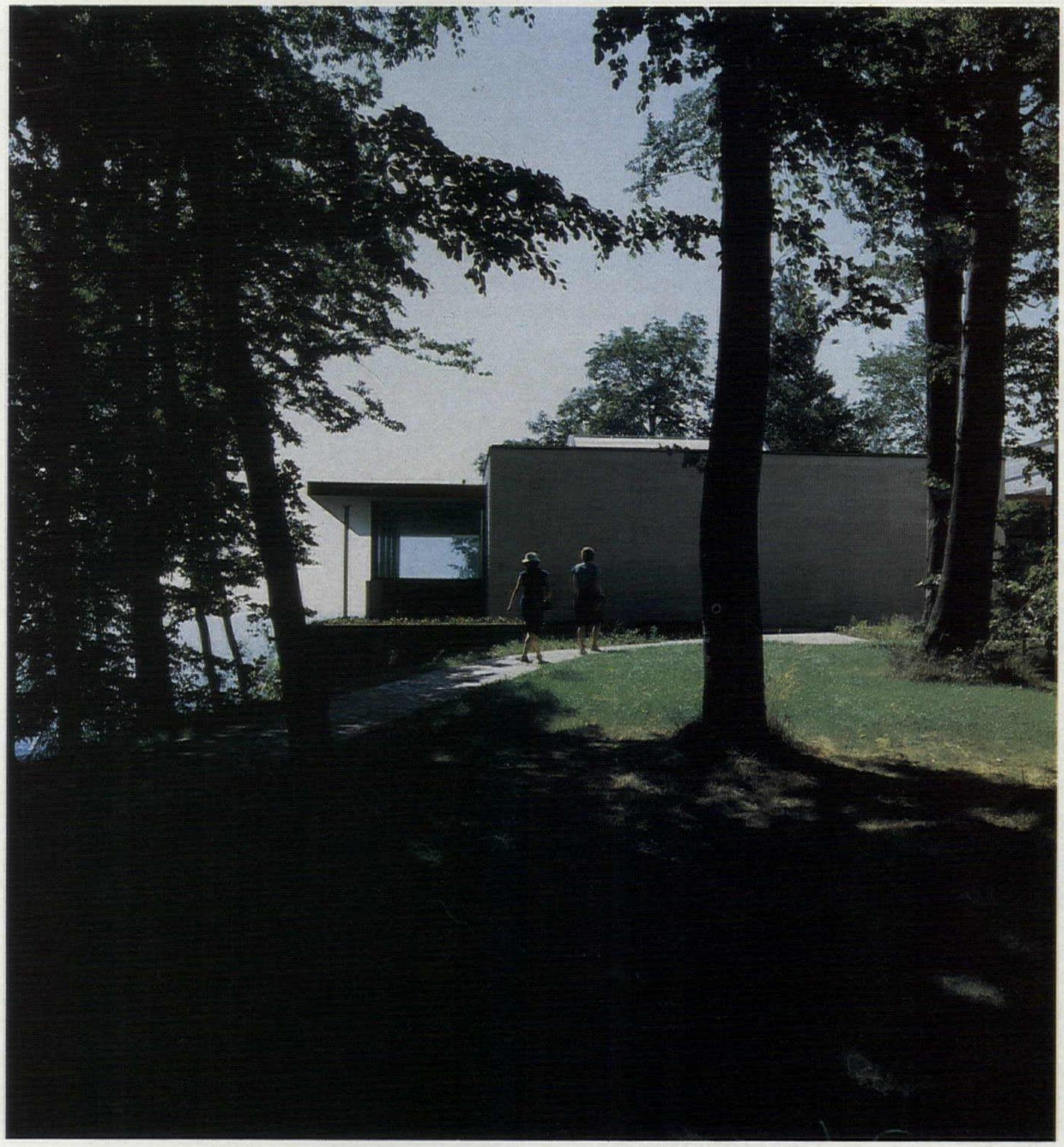


SECTION THROUGH NEW GALLERIES, LOOKING EAST


SECTION AT LOUNGE

John Morris Dixon





Museum of Contemporary Art in Los Angeles.) The circuit of new galleries bespeaks a universal, international institution, even though characteristics of the original Louisiana survive: small areas of fine wood detail appear, juxtaposed to the informal texture of painted brick walls; passages of dramatic confrontation with nature occur, but alternating with the viewing of art, no longer integrated with it.

Because of the passage of time, however, the Louisiana has gained added significance as a demonstration of the special pleasures that Modernism can yield. No other kind of architecture has offered the ever-shifting spatial definition, the interpenetration of outdoors and indoors, the adaptability to changing contents accomplished here. And here, as well, we find the human scale and the nice modulation of materials and details that characterize the best Modern work of Scandinavia (and the American West Coast, as well). At the Louisiana, Modern architecture has by no means failed, but has maintained a particular grace and vitality over a 25-year span. [John Morris Dixon]

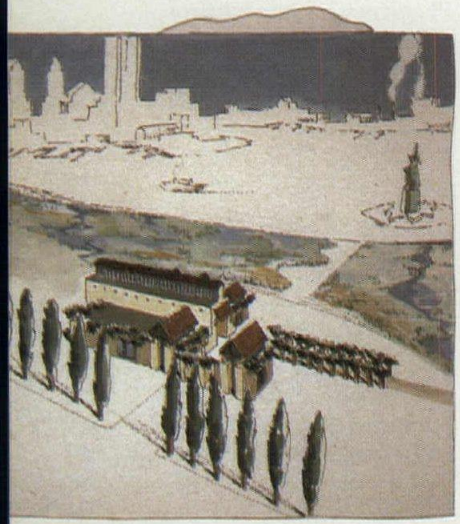
Data

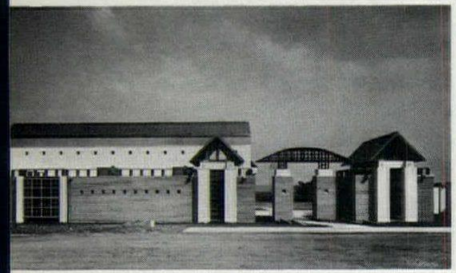
Project: *Louisiana Museum of Arts extensions, Humblebæk, Denmark.*
Architects: *Jørgen Bo and Vilhelm Wohlert. Niels Halby, chief architect; Niels Presskorn, Stig Løcke, Erik Mannik Sørensen, architects, design team; Folmer Kristensen, architect, clerk of works.*
Site: *estate of about ten acres, with fine lawns and trees, on bluff overlooking Sound to east.*
Program: *existing museum, included 19th-Century house, plus 1958 gallery and cafeteria extensions; more galleries, theater, and recital hall added in late 1960s and 1970s; 1982 additions include foyer and lounges, gallery space equal to existing, and underground storage; total, about 35,000 sq ft.*
Structural system: *brick walls with H columns built in; mineral wool insulation; steel and wood roof framing; concrete floors.*
Major materials: *exterior, white-painted brick walls, black steel or wood mullions, teak sills; gray marble floors, with white Carrara stairs, ceilings of stretched fiberglass fabric under skylights; interior walls, white-painted brick or plywood covered with fiberglass fabric, painted white.*
Mechanical system: *air system in galleries, with heating and humidification; underfloor heating in foyer and lounge.*
Consultants: *Edith and Ole Nørgård, architects, landscape; Johs. Jørgensen A/S, structural and mechanical; Mogens Balslev A/S, electrical.*
Costs: *36 million Danish Kroner (about $4.4 million at 1982 rate); 1040 DKr per sq ft.*
Photography: *K. Helmer-Petersen, except as noted.*

The Environmental Education Center, Liberty State Park, N.J.

Pliny's villa

Michael Graves has designed an Environmental Education Center—a 1983 P/A Awards winner—that will inform visitors of the area's natural and man-made features.





The Environmental Center, seen from the roadside (above) and the waterside (opposite page), gathers pitched-roof pavilions about a tall central space. Beside the entrance "arch" is a free-standing open-air orientation pavilion, in front of which runs a pergola that leads visitors from the building to the nature path. Sketches at right are from the designs of (left to right) Fargo-Moorhead, Portland Building, Environmental Center.

The Environmental Education Center's sphere reaches beyond its countryside location. Standing in Liberty Park, N.J., it is a small museum that guides visitors through the park's marshland, providing exhibits that will explain its wildlife features. At the same time, it is within easy reach of New York and furnishes spectacular views and information about Lower Manhattan, Ellis Island, and the Statue of Liberty. Its architecture reflects this dual nature. The wood-framed pavilions are as basic and nearly primitive in their conception as Abbé Laugier's Classical hut. Yet the total composition, the colors, and the finishes have a decidedly urban sophistication. This is a city-dweller's retreat in the countryside, an urbane Laurentian villa for Pliny.

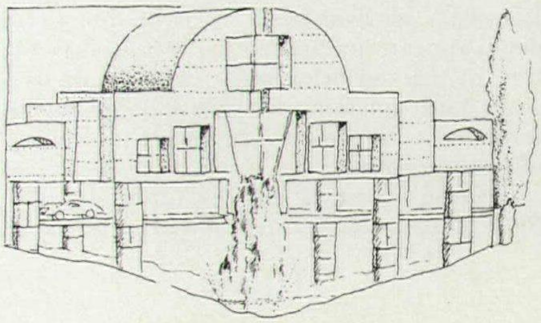
The Environmental Center is also Michael Graves's clearest and most satisfying work to date, and must give observers on both sides of the fence pause. Graves's work has excited extreme reactions of both polarities—cultist devotion and unreasoning hatred—ever since it became known, in drawing and built form, about 15 years ago. No sooner was his Portland Building deemed acceptable, and indeed premiated this year by the establishment body, the American Institute of Architects, than panic ensued: some members mounted a slur campaign, other influential ones challenged the award itself, and the *AIA Journal* awards issue singled the building out for negative criticism.

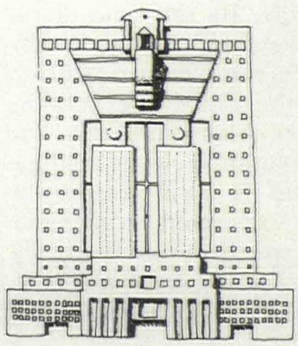
It is commonly understood that book-burning and like actions serve to discredit the burners more than to suppress interest in the book, whose message, if valid, is disseminated nevertheless, and with heightened energy. It might be said, however, that the Portland Building gave nay-Graves-sayers grist for their mill, as its office environments are lackluster and its exterior materials are skimpy compared to the depth of its formal intentions. The same can be said, however, of scores of faceless buildings that rise, without arousing professional ire, in almost all American cities. It must be, then, that the building's possession of a face and a personality frightens practitioners who have devoted their professional lives to designing abstract buildings, often with distinction. With the completion of the Environmental Education Center, fair-minded critics of Graves's work might reexamine their prejudices and consider the validity of his approach.

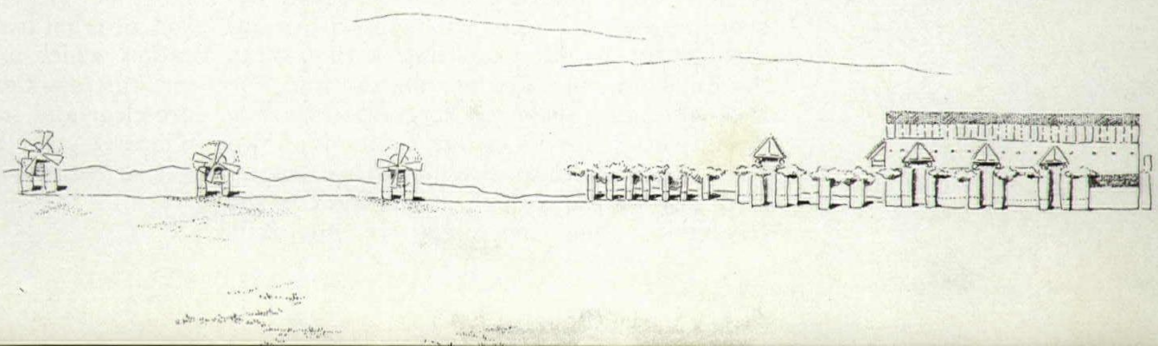
The Environmental Center has the power not only to charm admirers by its parts and attract theoreticians by its references and associations, as other Graves projects have; it also delivers the promise of fully realized architecture, complete (while simple) in its enclosure of space, clear in the balance of its parts, and appropriate in its choice and use of materials. It is generous, seemingly effortless, and self-assured. It adds meaning and pleasure to its environment. Withal, it is unmistakably the creation of Michael Graves, restating the themes and reaffirming the personality revealed in earlier works.

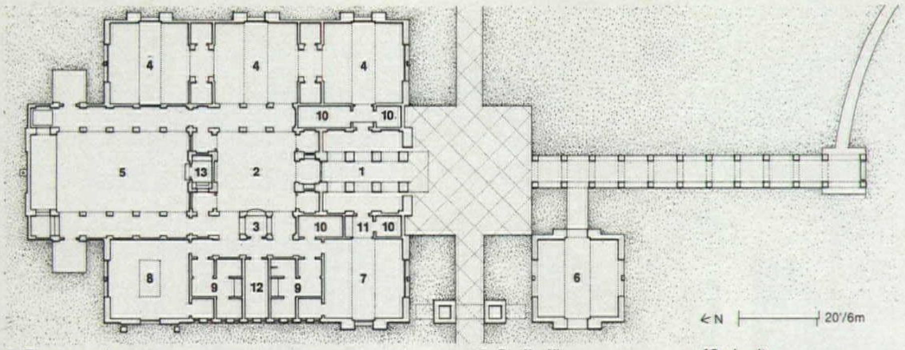
Like all architects, Graves has experienced the teeth-cutting phase of learning through building; at the same time, he has struggled to find his own voice outside the mainstream of Late Modernism. He has felt the importance of celebrating movement into and through buildings by a ceremonial organization of spaces, heightened by the use of forms derived from earlier architectural elements (themselves based upon the image of the human body) and by colors inspired by nature, but filtered through his own sensibilities. His work neither slavishly applies traditional elements in what may be called a "typical Postmodern" way, nor overintellectualizes them. It is an intuitive, personal interpretation, original neither in an "organic" way, seeming to grow and be undistinguished from the earth, nor in a way that makes statements by the unusual use of materials.

Graves's work is also characterized by the expression of gravitational pressure exerted by great mass, a pressure contradicted by a light-hearted anthropomorphism that brings humor and charm to the composition: the fat-legged windmills in the early sketches (right) of the Environmental Center seem to be about to prance down the road, and the

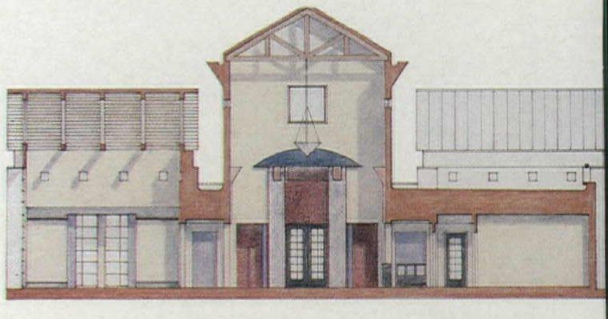






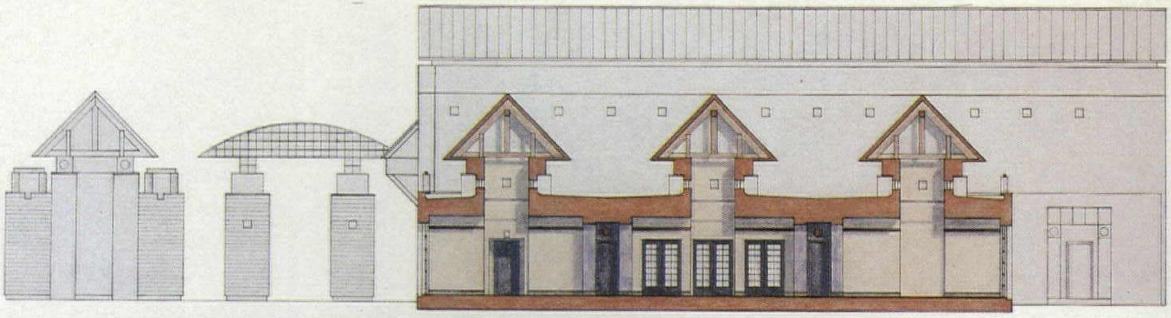


1 Entry porch
2 Entry hall
3 Reception
4 Exhibition
5 Auditorium
6 Site orientation pavilion
7 Meeting room
8 Staff office
9 Toilet
10 Storage
11 Kitchenette
12 Janitor
13 Projectionist
14 Entrance gateway
15 Pergola

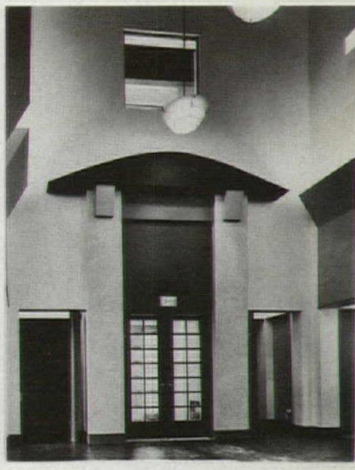


actual building's pavilions retain that quality, subdued.

As Graves has matured, the choice and application of architectural elements has developed in his work. For example, from the celebrated Fargo-Moorhead cultural center of 1977 (the Moorhead side of which has been redesigned and will soon be built) through the Portland Building of 1980–82 to the Environmental Center, one can trace the following progression. In Fargo-Moorhead (a design sketch for its bridge center is shown below), architectural fragments are assembled. Beyond the symbolic implications of the fragments, their meanings are not fully explored; volumetric implications are secondary, and are accommodated by adjustment, often awkwardly. By the time of the Portland Building (sketch, p. 89), the architectural elements are complete and differentiated: the base, the body, the column/keystone. Here, the problems are scale, and lack of relief in the column/keystone configuration, which mitigates its clarity. In the Environmental Center, the architectural forms are clear and fully expressed volumetrically. There is the high massive central space, whose fortress quality is reinforced by the



Motifs in the auditorium (above) and the lobby (below) intensify the height and the formality of the central building form, where they occur. In contrast, the exhibition spaces (left and far left) are more intimate and gain distinction from their well-defined section with its clerestory windows and timber trussed roofs. Exhibitions have not yet been planned for the newly completed building.

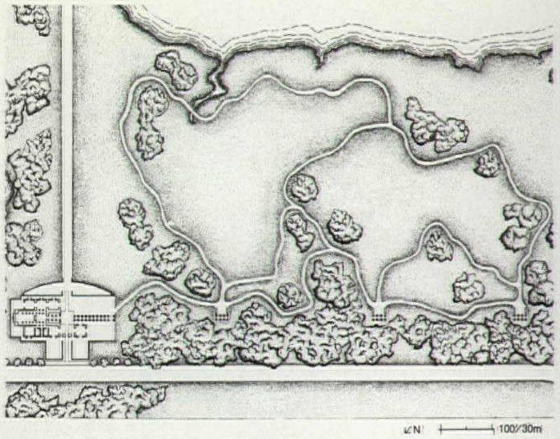


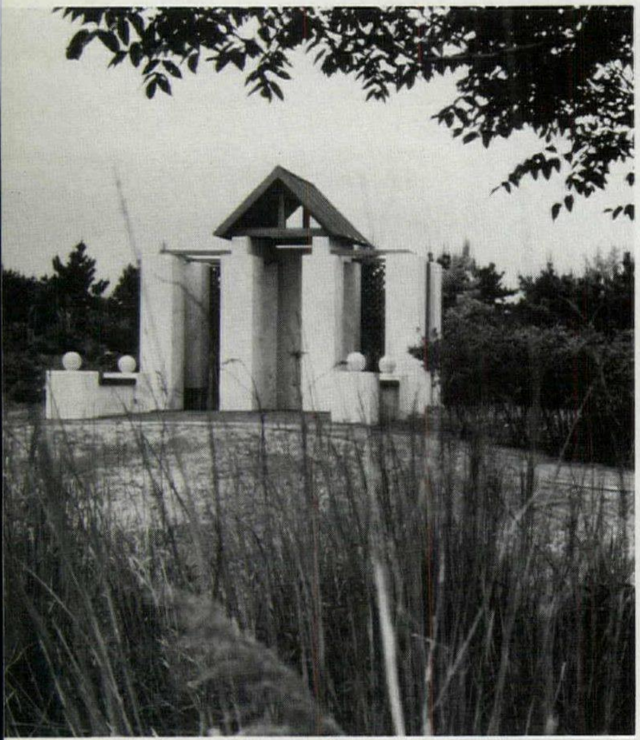
canting out of the walls towards the roofline, and by the smallness of its square glass-block-filled windows. Then, collected about the central space, there are the trabeated pavilions, their trussed roofs supported on thick square columns, an exaggerated, stylized version of the tree trunks holding a pitched roof in Abbé Laugier's prescription.

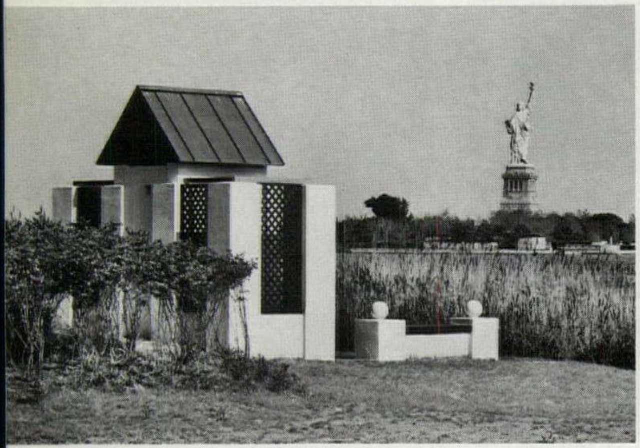
The high central space holds a deeply inset porch, then a lobby, and finally a small auditorium whose height, "rose window" (actually, a high window with a multiple birdhouse behind it), and low side aisles give it a chapel aspect. The major spaces are separated by double layers of wall, creating depth and transition between outside and inside, and between the lobby and the auditorium. The three waterside pavilions hold the exhibition rooms, to be used together or individually, depending upon the size of the shows. Their sections are strong; in each, the flat ceiling turns up to high clerestory windows and the timber roof above. Exhibits will consist of photographs and works on paper (not requiring a high level of security) that will be mounted on the walls and on freestanding pavilions and cases not yet commissioned by the State agency. An exhibition schedule has not yet been planned.

Environmental Center

Waystations (below), three in number, are located as incidents on the nature path, and will provide information about the plant and animal life of the marshland and about the man-made artifacts—Ellis Island, the Statue of Liberty, and Lower Manhattan—in the distance.







The Center guides the visitor skillfully through its educational facilities and into the landscape. The entrance gateway gives views that radiate out to the harbor, with no focal element standing in obvious axial relationship, but all captured subtly, at an angle. After one visits the building, one exits with a view directed into a natural hillock, framed by a pergola, whose square, yellow-stuccoed columns seem Mediterranean in their tonal relationship with the southern sky, the eye having been accustomed to interior light. From the end of the pergola, a path meanders through the land to three somewhat graceless waystations, from which bridges will eventually be built by the Parks Service to lead visitors over the marshland and closer to the water's edge.

Building materials are as simple and appropriate as the forms. Timber seems a natural choice for the pavilion structure, in keeping both with the basic Classical imagery and with the wildlife program. The gray-bleached cedar siding brings to mind the maritime architecture found in the Northeast, while metal is the obvious and best choice for roofing in industrial New Jersey, far better than the clay tile originally planned, which would have been pedantic in the setting. Wood trellises invite nature to garland the building's roofline and entrance arch. In the interior, Graves has used painted hardboard, in places ornamented with stenciling and trompe-l'oeil effects (marbleizing, scrubbing) which strike a too-urban, too-Gravesian note in the setting: more site-specific motifs might have been developed. A mural is to be painted in the lobby.

Plans for energy-generating windmills were dropped early in the design development, but other sensible energy-efficient measures were incorporated in the building. Glazing was kept to a minimum, and geared to the functional need for daylighting: in the exhibition rooms, clerestories provide daylighting, with a relatively small proportion of the walls fenestrated to provide views to the harbor. All windows have some operable sash for ventilation. Four roof-mounted electric heat pumps (gas being unavailable and oil, surprisingly, more expensive) can be operated individually for separate zones. Air returns are located in the clerestory, with warm air being recirculated to the heat pumps. For the entire envelope, the recommended level of insulation is exceeded.

The Environmental Education Center is one feature in a master plan for Liberty Park, designed by Geddes Brecher Qualls Cunningham. The plan includes the restoration, now underway, of a ferry/railway terminal; the formation of ponds to separate the Park from the industrial park near the turnpike; and infill along the waterfront to form a two-mile seawall along which visitors will be able to walk, gaining spectacular views of the harbor.

Meanwhile, the Environmental Center can be seen, and both admirers and critics of Michael Graves can judge the work for themselves. [Susan Doubilet]

From its north end (left) the Environmental Center stands as a tall, refined, man-made element in its marshy environment, with its clear forms and natural materials paying homage to its natural origins. A multiple birdhouse is perched as a totem in front of the auditorium window.

Data

Project: *Environmental Center, Liberty State Park, Jersey City, N.J.*

Architects: *Michael Graves, Architect, Princeton, N.J. Terence W. Smith, associate in charge; David Teeters, production captain; Patrick Burke, Nicholas Gonser, Pierre Fuhrer, Lisa Lee, Gavin Hogben, Juliet Richardson Smith, Keat Tan, Ronald McCoy, Suzanne Strum, and Karen Wheeler, design team; Mehrdad Yazdani, Steven Sivak, Lee Ledbetter, assistants.*

Client: *State of New Jersey, Division of Building and Construction; Department of Environmental Protection; Division of Parks and Forestry.*

Site: *Liberty State Park, a new state park facility on the New Jersey side of the New York harbor.*

Program: *the building will accommodate exhibitions, lectures, and conferences concerning the indigenous wildlife and the environmental context of the surroundings. A path system extends into the marshy landscape, looping through three descriptive waystations.*

Structural system: *timber piles, structural grade beam, structural slab on grade. Glue-laminated timber columns, beams and trusses framing.*

Major materials: *horizontal "Channel Rustic" cedar siding, stucco, weathering copper roof (see Building materials, p. 138).*

Mechanical system: *four electric heat pumps, roof mounted, independently zoned.*

Consultants: *Blackburn Engineering Associates, structural; Thomas A. Polise, Consulting Engineers, mechanical.*

General contractor: *Sempre Construction Company, East Brunswick, N.J.*

Costs: *$1,233,729.*

Photography: *Cervin Robinson, David Morton.*

Portfolio

Unlike quantifiable information that can be reduced to microchip size, cultural artifacts must be treasured, analyzed, and collected in the original. Their numbers inevitably multiply with each generation, and as the public taste for viewing these artifacts increases, the need for space grows.

One city, in fact, is planning an area that will be a collection of museums, akin to the Mall in Washington in variety if not in building scale. In Frankfurt-am-Main, West Germany, an astonishing number of museums are in progress near the well-known Städel art gallery. Many of them are renovations and additions to existing villas. The area along the Main River, between the Cathedral and the Römer Town Hall, is being called "the Riverbank of Museums," and among the buildings in the design or construction stage now are: a Museum of Ancient History by IBA director Josef Paul Kleiheus, a Museum of Cinematography by German architect Helge Bofinger, a Postal Museum by Gunther Behnisch, a Museum of Musical Instruments, a Jewish Museum, a Museum of Decorative Arts by Richard Meier, and two museums that begin our portfolio—a Museum of Modern Art near, but not on, the riverfront by Hans Hollein, and a Museum of Architecture by O.M. Ungers.

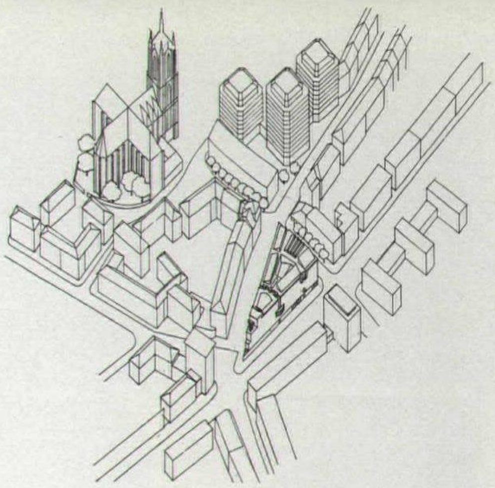
National museums are expanding. In West Germany, James Stirling has designed a major art gallery addition to the National Museum in Stuttgart, which is to open this fall; in Korea, a large National Museum of Modern Art is to be built, to consolidate scattered facilities, and these are shown, here.

Colleges and universities are renovating, expanding, and building new museum facilities. In the News section, we show the plans for those of Vassar and Princeton; in this portfolio, we show the design by Peter Eisenman for the Ohio State University Center for the Visual Arts.

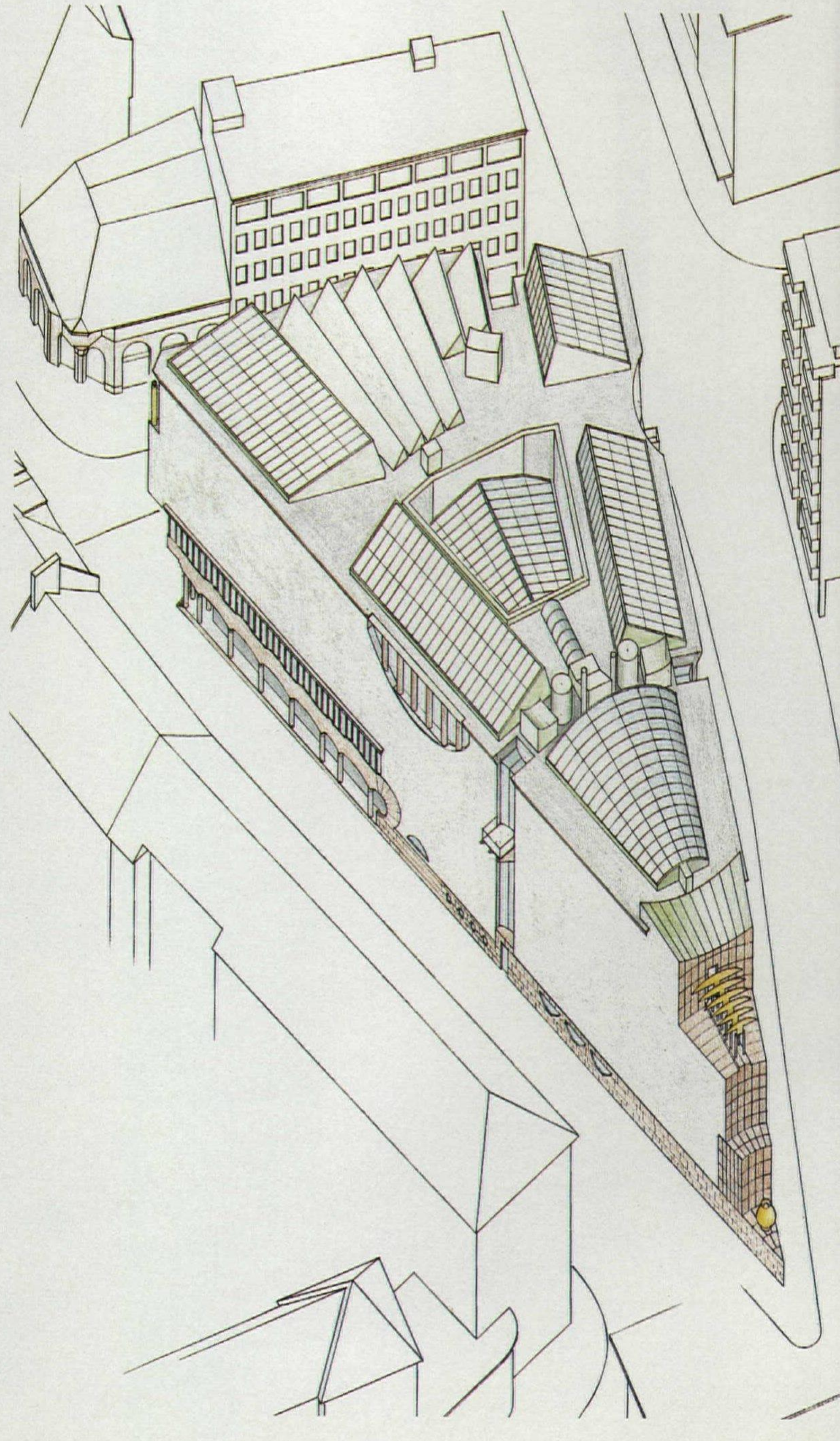
We show as well in this portfolio a small museum for industrial arts in Canada, and the recently opened addition to the Portland Museum in Maine, by Henry Cobb of I.M. Pei & Partners, a medium-sized but important regional museum.

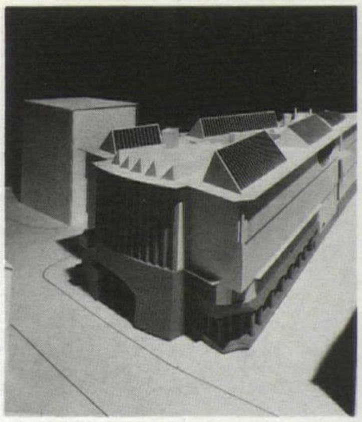
Generations pass away, but their artifacts remain, cherished almost religiously for the historical roots they provide. Church congregations dwindle while cultural storehouses are needed. Perhaps the obvious conclusion should be followed. [Susan Doubilet]

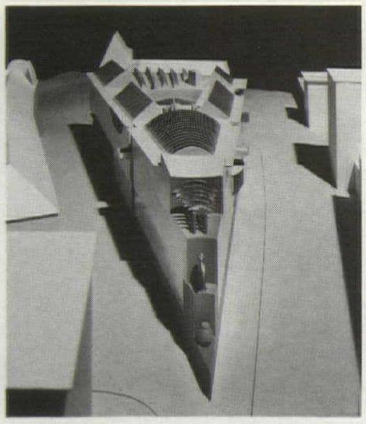
Museum of Modern Art Frankfurt

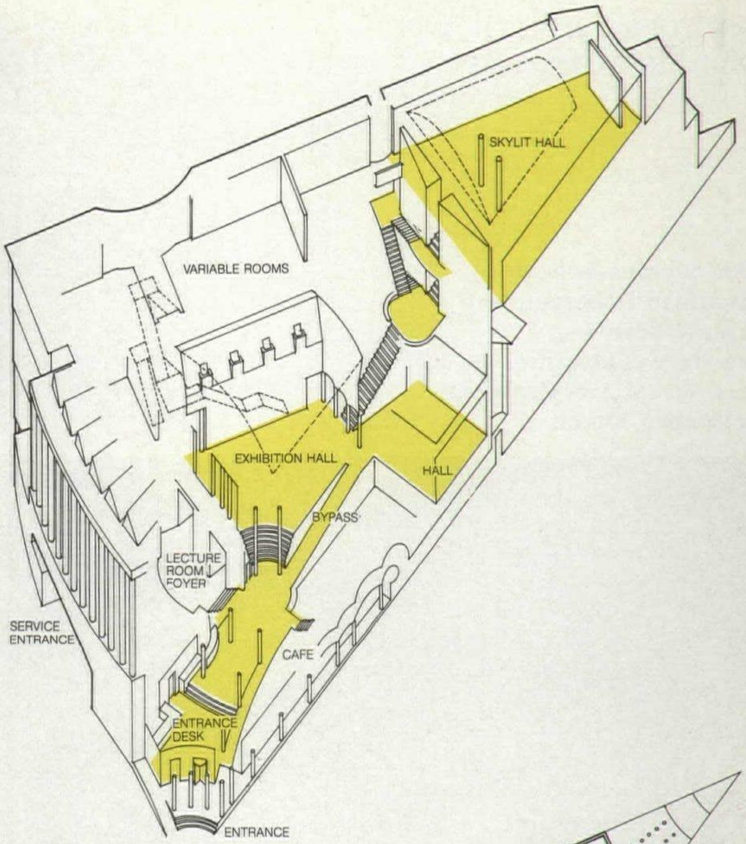


Hans Hollein has designed a Museum of Modern Art for a site near the Old City in Frankfurt-am-Main, West Germany.

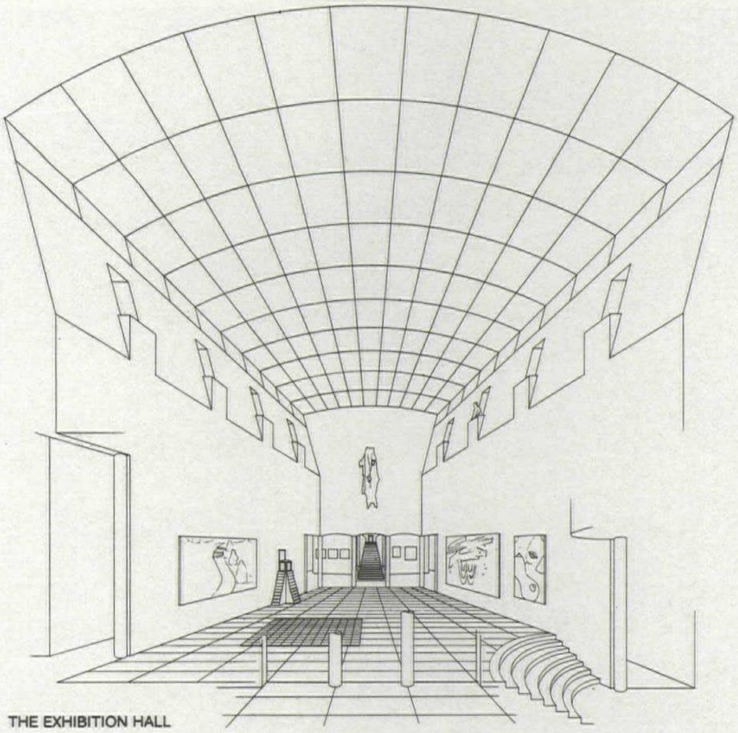




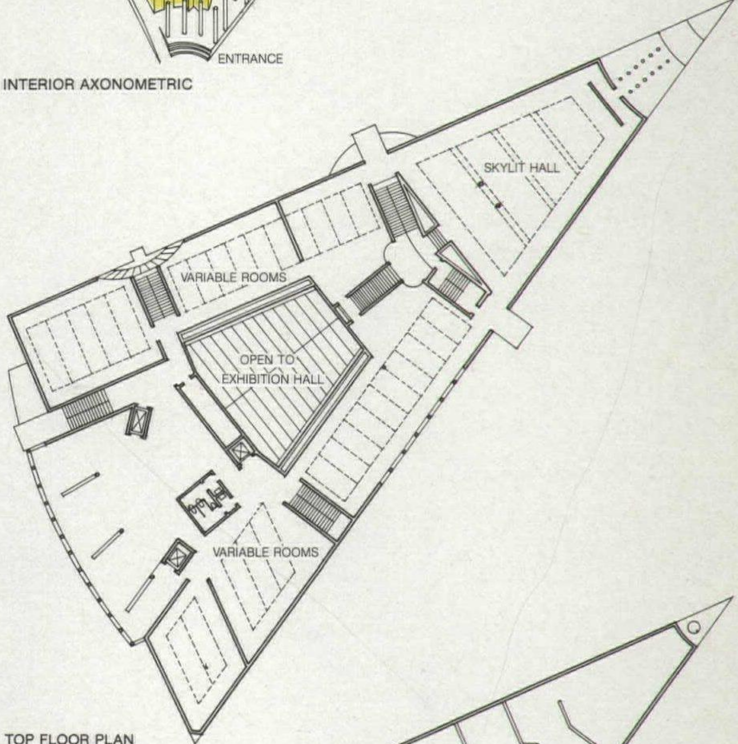




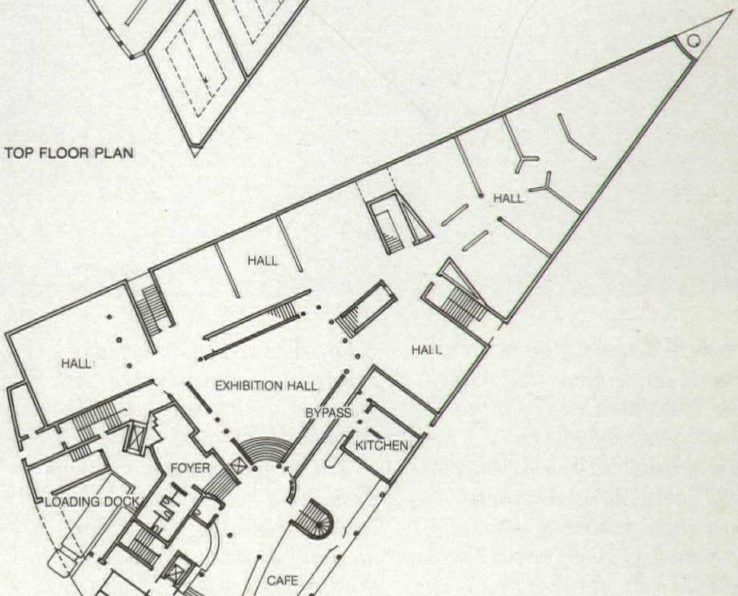
INTERIOR AXONOMETRIC



THE EXHIBITION HALL



TOP FLOOR PLAN



GROUND FLOOR PLAN

Unlike the many other museums being developed on Frankfurt's riverfront, the Museum of Modern Art is landlocked. Its image, on the other hand, resembles a great triangular ship, complete with objets d'art *as a figurehead on its prow. The shape results from the decision, for urbanistic reasons, to hold to the boundaries of the site, as well as the intention to create a building that is striking from afar. Arches in the sandstone base reflect the arcaded landmark buildings nearby.*

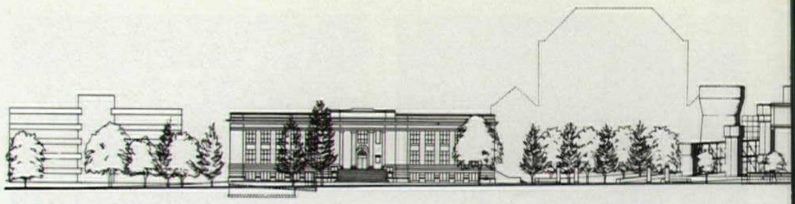
The entrance to the museum is not located at or near the "prow," but at a corner of the site closest to the Old City, in order to become part of that area's street activity and to contribute to it by providing a Museum café with a terrace at that point, which can be entered directly from the street and which can operate during museum off-hours.

From the entrance, carefully designed for security, one goes up several steps to the large entrance hall, and from there either to the lecture room area or up to the main Exhibition Hall at the center of the building, which is trapezoidal, skylighted, and rises the height of the whole building. From here, one catches glimpses of the museum's upper levels. Because the museum will be heavily used for educational purposes, a ramp is provided so that individual visitors can bypass instructional groups that may be gathered in the central space.

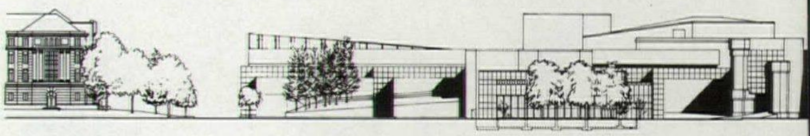
The top levels contain exhibition rooms of variable sizes, and the trip upwards through the building to its point culminates in a large skylighted room.

Center for the Visual Arts
Ohio State University

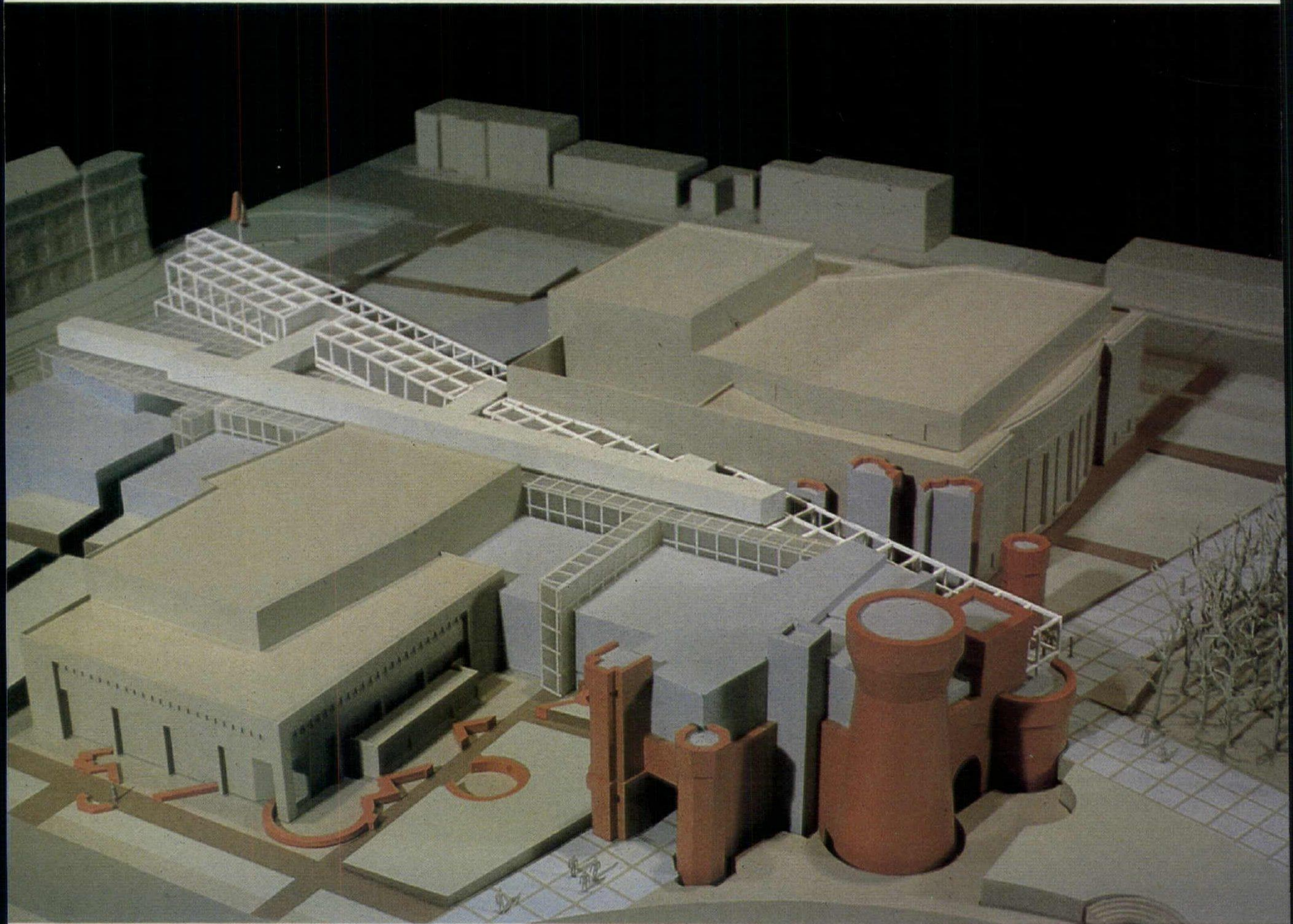
This complex scheme by Eisenman/Robertson and Trott & Bean won a two-stage competition (p. 38) for a Visual Arts Center in Columbus, Ohio.



WEST ELEVATION

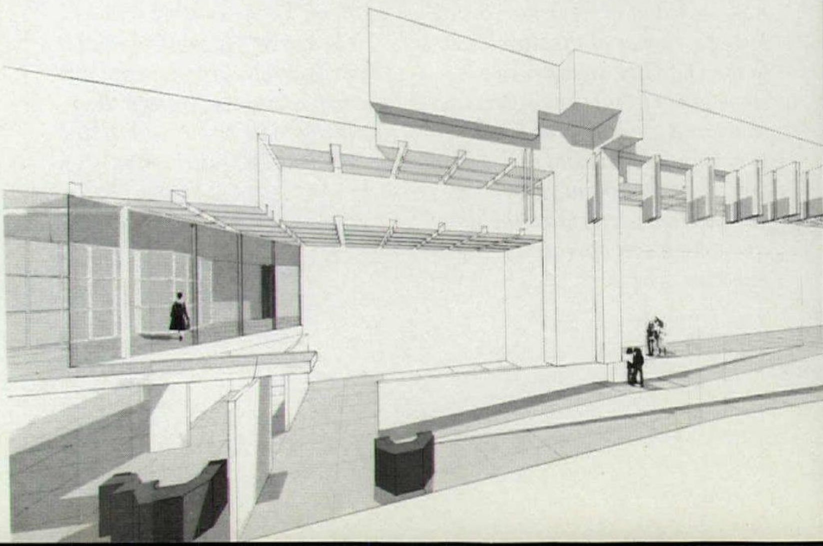


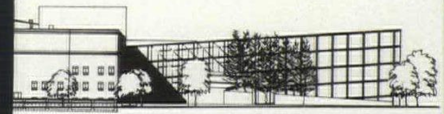
EAST ELEVATION

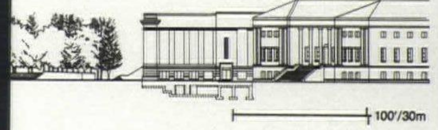


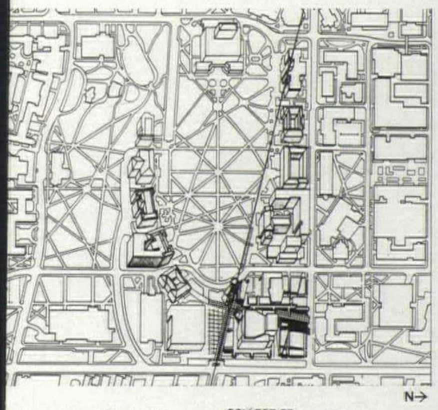
A radical departure from architectural conventions that shaped Ohio State, the Center for the Visual Arts proposed by Eisenman/Robertson Architects and Trott & Bean Architects posits a new matrix of intersecting town and gown grids. The entrance path, flanked by a grove of buckeye trees, extends 15th Ave. into the campus. A perpendicular, glass-enclosed circulation spine cuts between and connects Mershon Auditorium and Weigel Hall (site plan, top right). The critical knuckle reconstructs fragments of the Armory building (above) demolished in 1959.

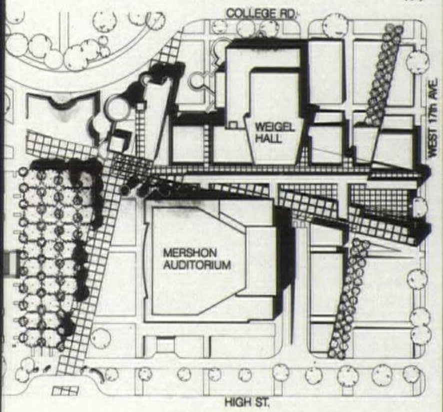
The Armory is the most obvious device in the scheme's archaeological metaphor. Less a building than a link between buildings, the Center "excavates" hidden connections between past and present, campus and city, art and education.

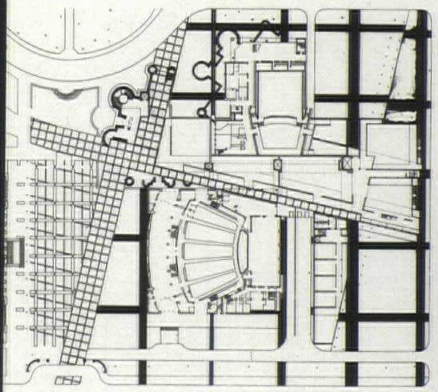


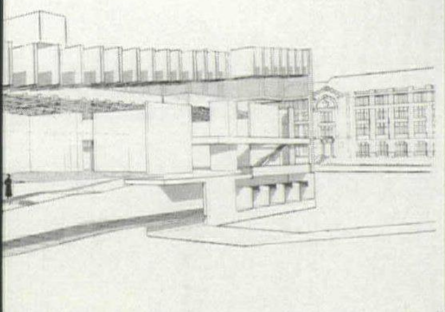






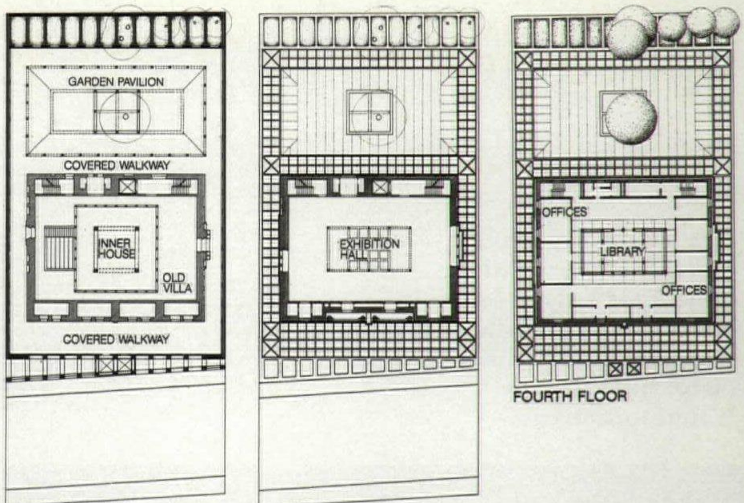




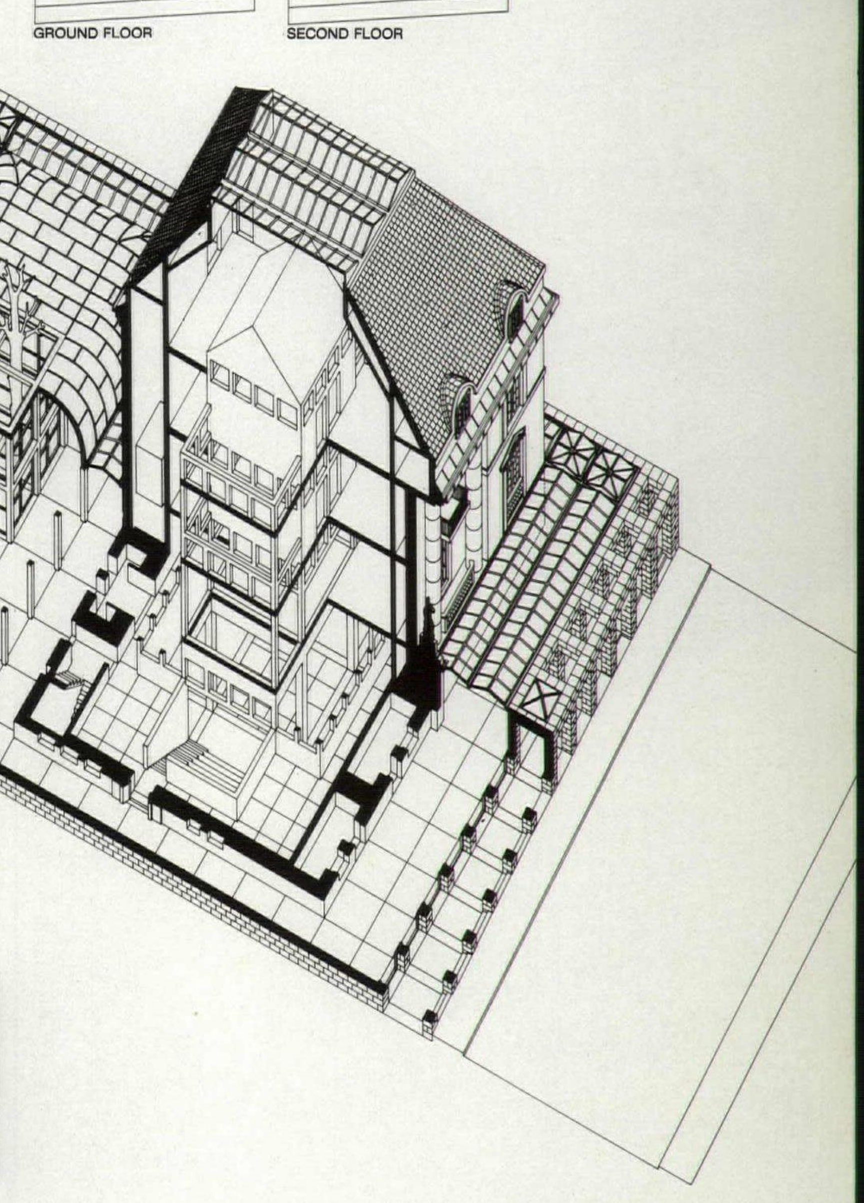


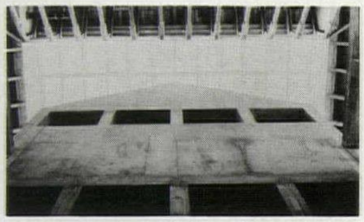
Architectural Museum Frankfurt

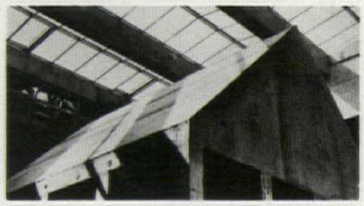
One of several museums now in progress on the Main River in Frankfurt, West Germany, the Architectural Museum by O.M. Ungers is a house within a house within an enclosure.

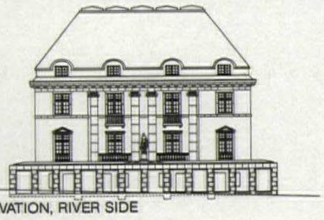


GROUND FLOOR SECOND FLOOR FOURTH FLOOR







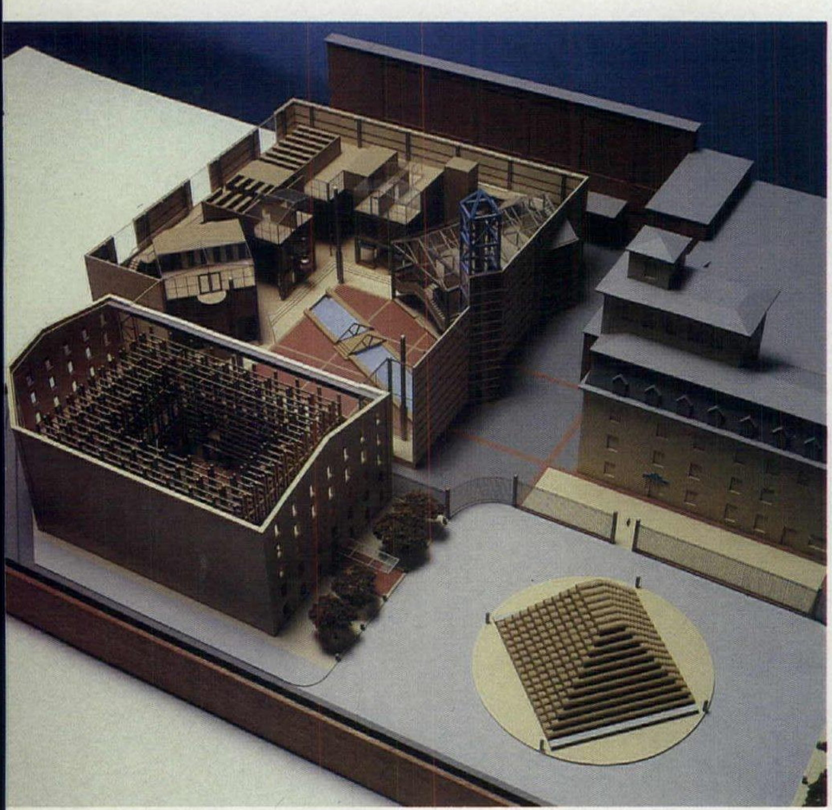


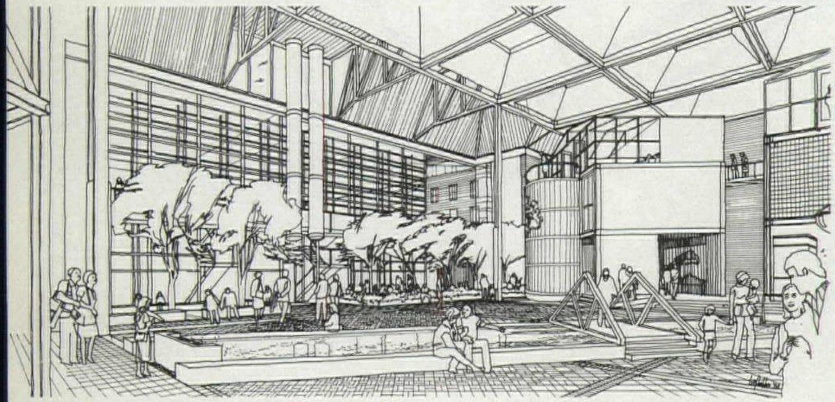
ELEVATION, RIVER SIDE

The German Architectural Museum, directed by historian Heinrich Klotz, will serve as an information and study center, and will document contemporary international architecture. The building, designed by O.M. Ungers and now half complete, is itself a set of nesting architectural exhibits. An old villa on the Main's South Bank is encased in a wall, colonnaded on the river side, so that the villa and its gardens are seen as exhibits; the shell of the villa, now gutted, encases a new inner house (photos at left). The ground floor (shown above) indicates the sets of enclosures. Exhibition spaces occur in the basement, second, and third floors, and the fourth floor holds offices and a double-height library.

Seagram Museum
Waterloo, Ontario

A museum displaying artifacts of the distillery industry is located on the site of the original 1857 Joseph E. Seagram distillery plant, still active in Waterloo, Ontario.



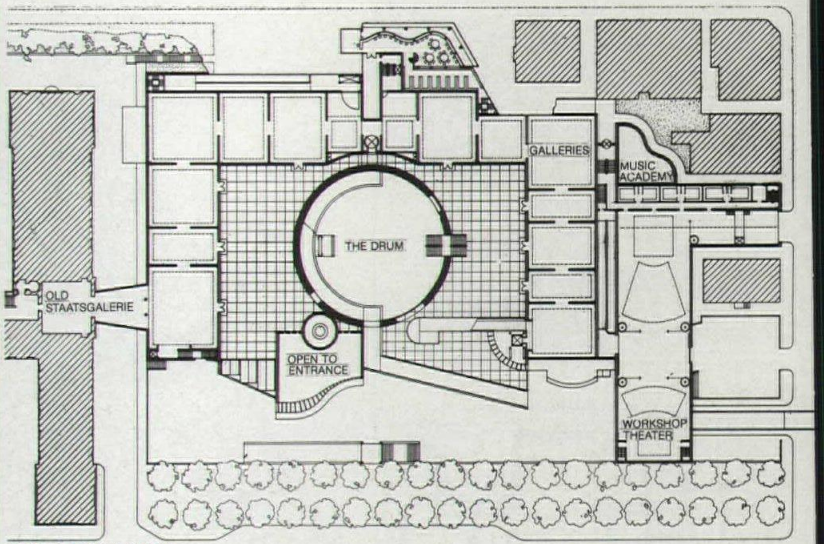


Barton Myers Associates of Toronto have designed a specialized industrial arts museum in two buildings, one a renovated 19th-Century barrel warehouse, the other a new structure.

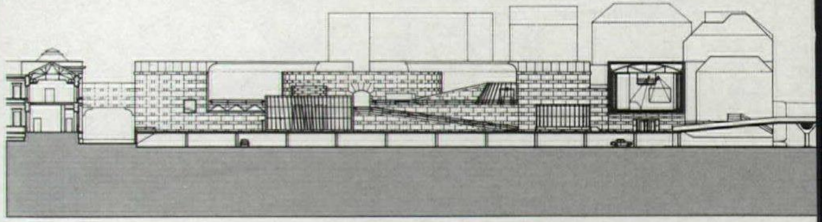
The entrance court defined by the active distillery building (top right in the photo) and the warehouse (bottom left) has a pyramid of barrels at its center. From the court, the visitor enters the warehouse, a five-story space rimmed with heavy timber barrel-storage racks, now skylighted and used as the museum lobby and restaurant. The new building (top right in photo) is entered from here. It is a room that is likely to be striking: Forty feet high and 17,000 square feet in area, it acts like an Indian fort, clustering within its protective (against the climate) brick-striped walls, under its skylighted roof, a group of little structures. These freestanding pavilions will hold the permanent exhibits and a film theater. On their second levels will be archives and offices.

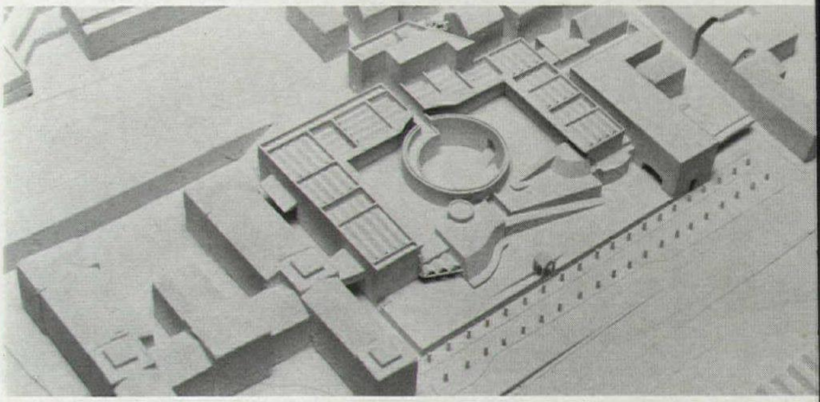
National Museum
Stuttgart

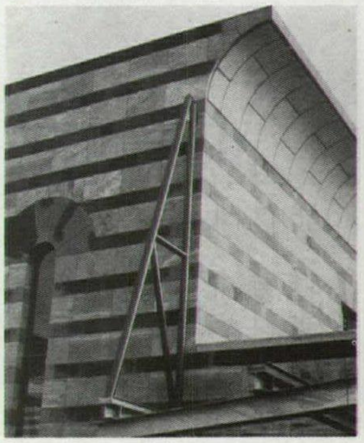
James Stirling of Great Britain has designed an art gallery addition to the National Museum in Stuttgart, West Germany. The building is scheduled to open this fall.

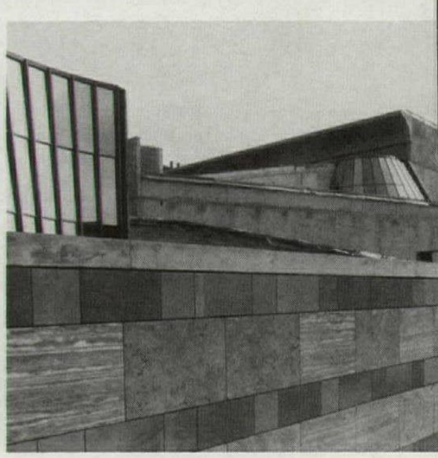


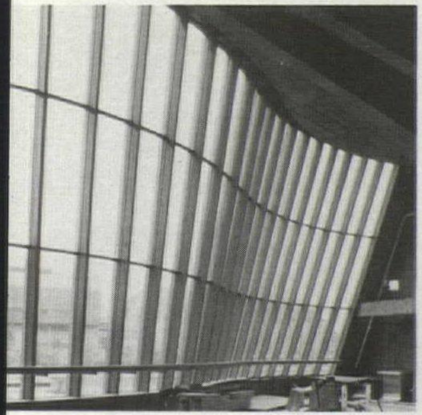
SECOND LEVEL PLAN











Stirling's art museum in Stuttgart is organized (loosely) along the lines of a Neo-classical museum. Galleries line the sides of a rectangular plan, with a cupola at the center flanked by courtyards. In Stirling's museum, however, the fourth (front) side of the plan is left open; the portico is replaced by a double row of trees that soften the effect of the adjacent major roadway; and the central element is, in fact, an open-air "drum," along the walls of which spirals upwards a section of the ramp that leads from one side of the site to the other.

Among the elements that promise to be striking are the banded stone walls with flaring cornice (bottom left), the leaning curved glass wall of the entrance pavilion (above), the mushroom-shaped columns in the first-floor Kunsthalle, and the piano-shaped music school.

Important metal elements, such as the framing of the curved glazed entrance pavilion wall, the handrails, and the giant air intake ducts, are brightly and variously colored in high-tech contrast to the solidly traditional look of the carefully crafted masonry walls.

On the lower, expressway side of the site the museum sits on a podium enclosing a parking garage. In addition to the skylighted galleries that are arranged enfilade, the Kunsthalle, and the music school, the museum contains a lecture hall and a separate workshop theater wing. At its second level, the museum bridges across the street to the old Staatsgalerie.

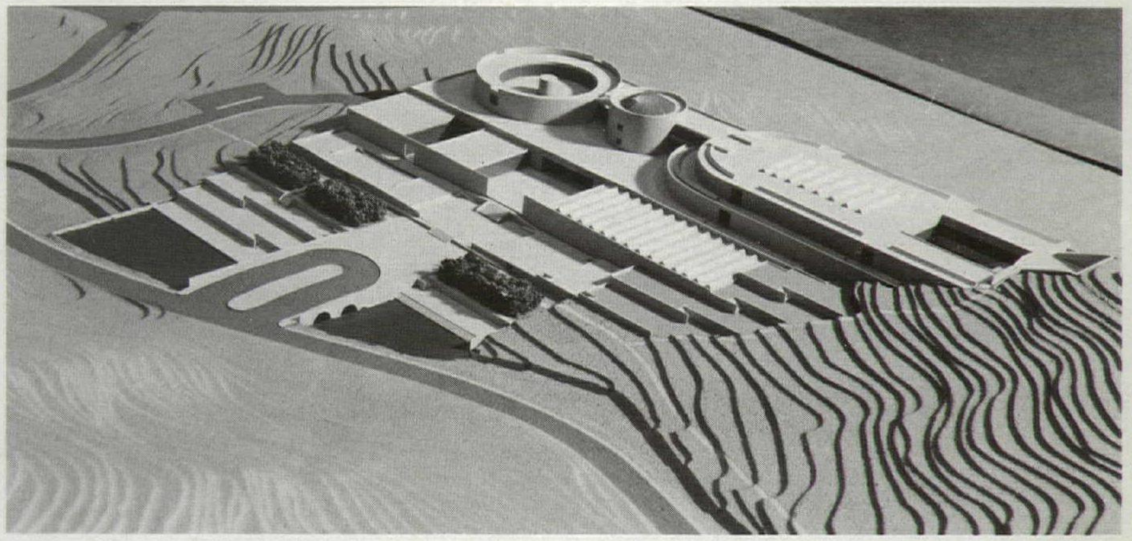
Museum of Modern Art Korea

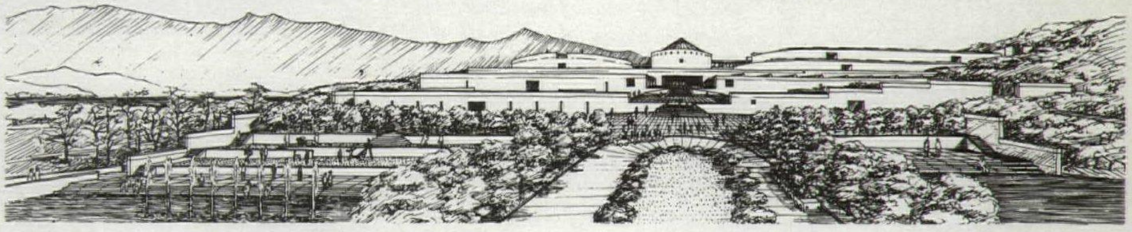
Tai Soo Kim of the Hartford Design Group, Connecticut, has designed the National Museum of Modern Art for Korea.

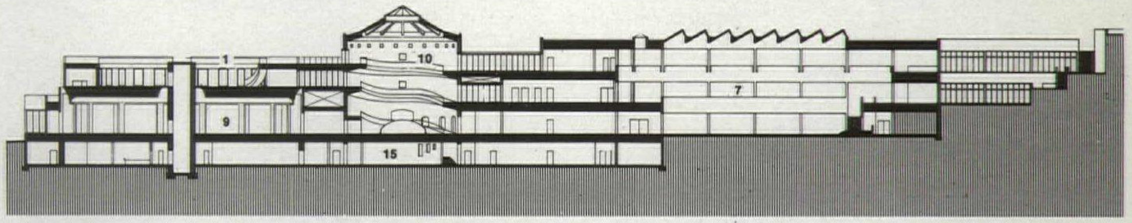
The high mountain range rising behind its park setting inspired the image for the new National Museum of Modern Art outside Seoul: It is to be a mountain fortress of granite. Like the traditional temples of Korea, it will be rigidly ordered within the L-shaped wall holding back the natural world.

The 300,000-square-foot museum, designed by Tai Soo Kim of the Hartford Design Group, will house a permanent collection of Western and Oriental art. The program includes a temporary exhibit area and rental gallery, an art school, an auditorium, research areas, and an outdoor sculpture garden.

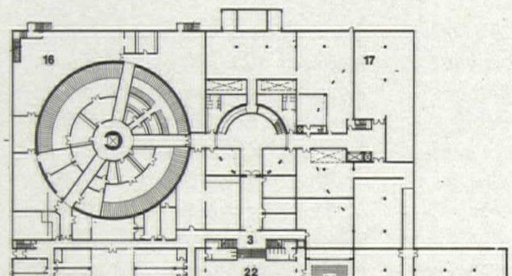
The visitor approaches the museum on a series of contoured platforms. Inside, a ramp connects the different spaces, each conceived as a small museum. Setbacks in the building allow the introduction of natural light through skylights.



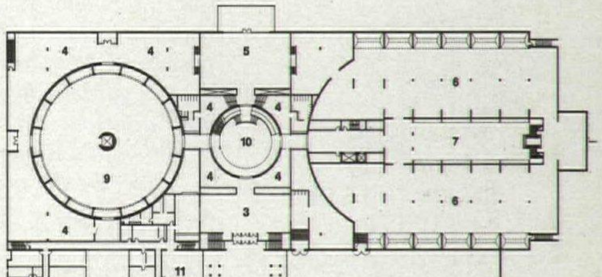




1 Sculpture court
2 Entrance court
3 Lobby
4 Gallery
5 Cafeteria
6 Temporary exhibits
7 Painting gallery atrium
8 Rental gallery
9 Great hall
10 Circulation tower
11 Library
12 Administration
13 Permanent collection
14 Educational area
15 Curator's area
16 Storage
17 Mechanical
18 Loading area
19 Courtyard
20 Auditorium
21 Lecture room
22 Public area



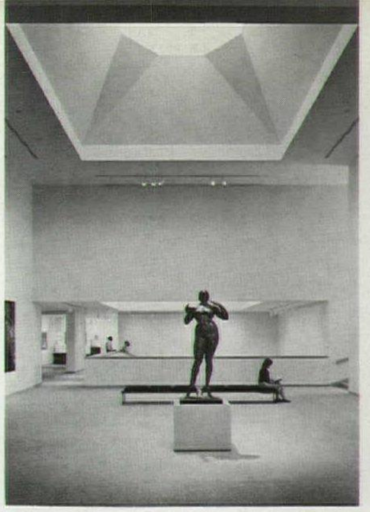
BASEMENT

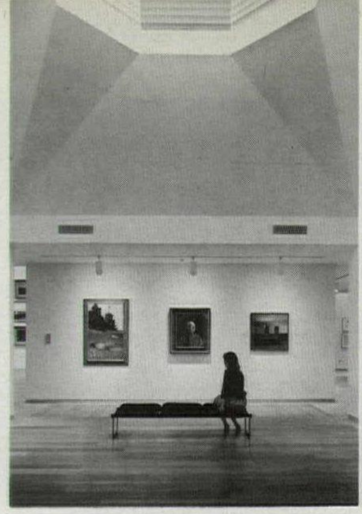


FIRST FLOOR

N 20'/6m

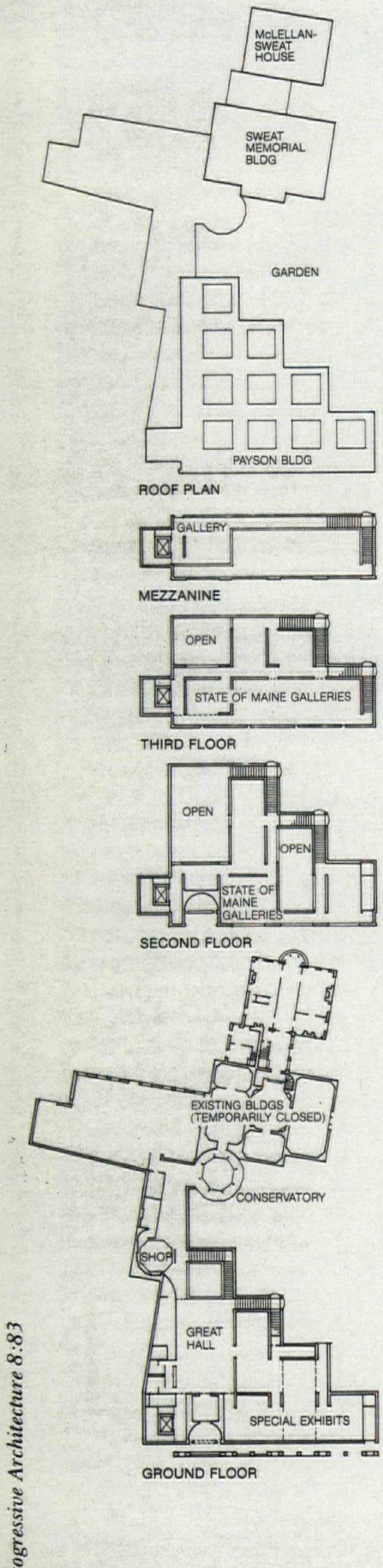
Museum of Art
Portland, Maine





Photos: Brian Vandenbrink

The Payson addition to the Portland (Maine) Museum of Art opened in May. It was designed by Henry Cobb of I.M. Pei & Partners.



Six years ago, the gift by Maine-born financier C.S. Payson of a group of Winslow Homer paintings inspired the Portland (Maine) Museum of Art to begin plans for a building of 63,000 square feet to greatly augment its original 12,000-square-foot facility provided by the 1800 McLellan-Sweat House and the 1911 Sweat Memorial.

The new building faces one of Portland's major public squares, Congress Square, within an area that has recently undergone major restoration of many of its 19th- and early 20th-Century buildings. The museum's front façade, similar in height to several of the nearby buildings, represents an attitude radically different from its other façades, in response to the different contexts.

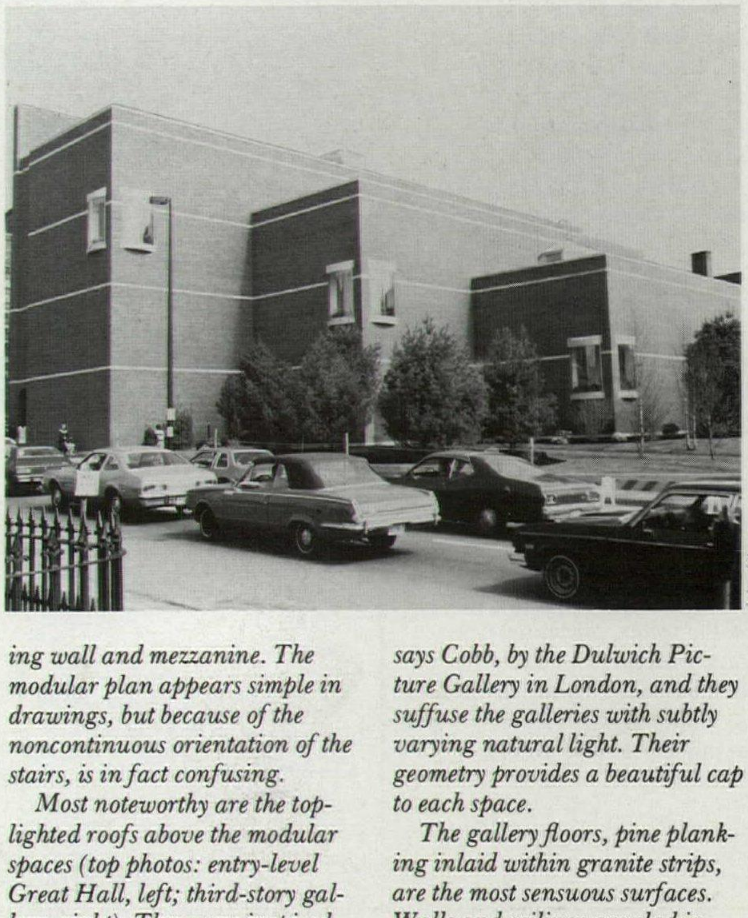
Sheer confidence, as well as fine brickwork, allow the unusual 67-foot-high billboardlike front to assume an imposing and important presence on Congress Square (middle photo). Arches over the street-level arcade are repeated as full circles at the upper level, the top segments of which rise above the roofline to reveal the building's most successful features, daylighting lanterns, and to "engage the sky," according to Cobb. Associations with Kahn are inevitable; with maritime imagery, unintended. The granite strips, the brickwork, and the fine brick vault over the loggia tie the frontal façade somewhat ambiguously to the volumetric sides and rear (bottom photo), which sit heavily about the side garden and step down and back to meet the existing buildings at a sympathetic scale.

Inside, the clever combination of 20-foot-square modular spaces, separated by six-foot-wide interstices, creates rooms that are most pleasant and, in keeping with the community's size, both intimate and important. The top floor gallery, however, is flawed by the ambiguity between enclosing wall and mezzanine. The modular plan appears simple in drawings, but because of the noncontinuous orientation of the stairs, is in fact confusing.

Most noteworthy are the top-lighted roofs above the modular spaces (top photos: entry-level Great Hall, left; third-story gallery, right). They were inspired, says Cobb, by the Dulwich Picture Gallery in London, and they suffuse the galleries with subtly varying natural light. Their geometry provides a beautiful cap to each space.

The gallery floors, pine planking inlaid within granite strips, are the most sensuous surfaces. Walls and ceilings are clad in hardboard and painted in gently neutralized tones.

Brian Vandenbrink

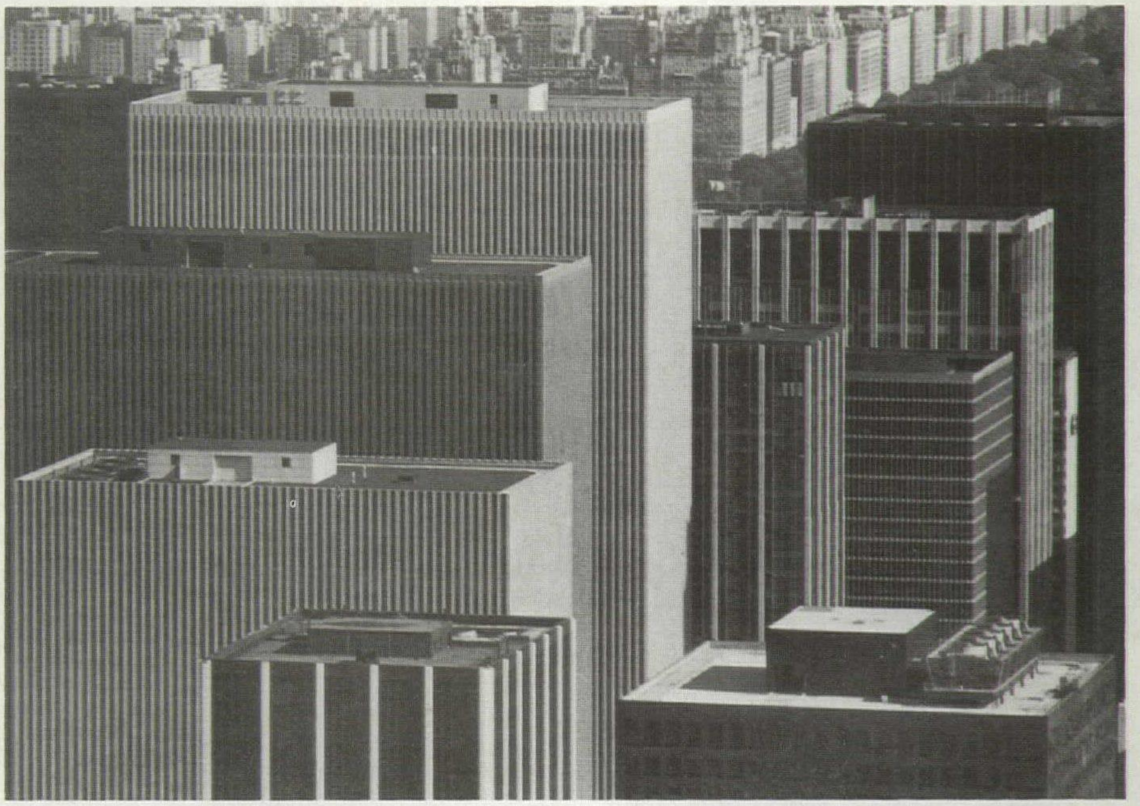


John Dixon


VINYL MIST
Decorative perforated louvers
by LouverDrape®

Radical roofing

Polymer-based synthetic roofing has revolutionized the flat roof. Like any new technology, the synthetic roof deserves our full understanding and a cautious embrace.



Synthetic roofing, whether in single plies or in liquid form, simplifies the roofing of skyscrapers (right) or other hard-to-reach places because of its easy transport and safe, clean application. Reprinted by permission of Thames and Hudson Publishers, New York, from Laura Rosen's Top of the City: New York's Hidden Rooftop World, *1982.*

The energy crisis of the past decade has affected our technology as much as it has our politics and economy. One of the technologies most affected has been flat roofing. Radical change is not characteristic of the roofing industry; since the latter part of the 19th Century, that industry has made only minor refinements to the traditional built-up roof, with its alternating layers of bitumen and felt, surfaced with gravel.

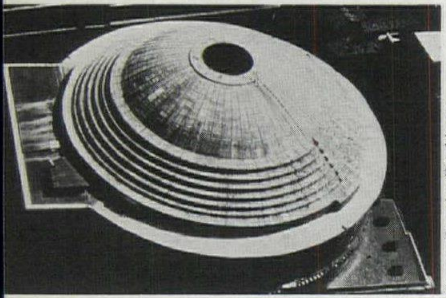
The energy crisis affected the built-up roof in several ways. The cost of petroleum-based bitumen rose steeply during the 1970s while the quality of distilled asphalt declined with the unpredictability of oil supplies. Higher wages, brought on by energy-induced inflation, also raised the cost of the labor-intensive built-up roof. The real blow, however, came with the insulating of roof decks for greater thermal protection. Built-up roofs over insulated decks began to fail at alarming rates: approximately 9 percent within the first five years of installation, 20 percent prior to the expiration of their warranties. By separating the built-up membrane from the warm roof deck with a layer of insulation, we exposed the membrane to greater temperature extremes, leading to the increased failure of the bitumen or felts.

Polymer-based synthetic roofing first emerged in the 1950s in Europe as an alternative to the built-up roof. European companies initially fabricated tear-resistant polymer plastics, mainly polyvinyl chloride, into single-ply sheets. They also began modifying bitumen with polymers to give it greater elasticity and weather resistance, manufacturing the bitumen in single sheets with glass fiber or polyester reinforcement. In the early 1960s, our domestic rubber industry began to market synthetic rubber roofing in single-ply sheets as our waterproofing industry began to develop and market several liquid-applied polymer roofs. Those various synthetic roofing systems saw only limited use in the U.S. throughout the 1960s and early 1970s, suffering from technical problems such as poor tear resistance, rapid ultraviolet deterioration, and inexperienced applicators. By the late 1970s, as demand for synthetic roofing grew, many of those initial difficulties had been resolved.

That demand has not subsided. Synthetic roofing—elastic, durable, lightweight, uniform in appearance and color, easily applied and repaired, tear resistant, and adaptable to unusual roof configurations—has gained almost 25 percent of the roofing market, tripling its share in just four years. Projections show it with anywhere from a third to a half of a 2.4 billion-square-foot roofing market by 1990.

Choosing the right material, though, is no easy task. The single-ply roofing industry contains over 80 manufacturers with well over 100 products. To add to the confusion, few performance standards and design criteria have been established. In order to judge the relative merits of a particular synthetic roof, the architect must look at a company's legitimacy: (how many years has it been in the business? how many roofs has it installed?); its track record: (what architects and owners have used that particular system? what changes in the chemical formulation of the product have occurred?); its product testing procedures: (does it test the roofing at room temperatures or at cold temperatures using new or aged material? what sheet thickness is used to measure tensile strength?); its warranties: (what are the conditions for the company's acceptance of liability? does the warranty cover the initial, prorated, or replacement cost of the roof?); its service package: (how many pre- and post-job services does the company offer? what are its inspection procedures? how accessible are its technical people?); and its contractor authorization program: (how does it qualify applicators? how are they trained?). Such questions can help identify marginal companies.

The architect then must look at the performance of each type of roof in relation to the requirements of a particular job. With at least eight generic types of single-ply sheets, four generic types of liquid-applied systems, and four generic types of application methods on the market, proper selection demands an understanding of both their physical and chemical differences.



Eero Saarinen pioneered the use of synthetic rubber roofing in this country, using it on Dulles Airport (which after 20 years has yet to leak) and on an early reroofing of Ingalls Hockey Rink at Yale (top). The latter's Neoprene roof was recently covered with EPDM. Synthetic roofing has been widely used in reroofing projects, an unusual example of which is the application of a modified bitumen beneath the metal roof of the Pantheon (middle) and on oddly shaped or highly visible roofs, such as the hyperbolic paraboloid (bottom).

Polymer chemistry

The polymers in synthetic roofing consist of large, repetitive chains of molecules or monomers. The longer the polymer chain, the greater the tensile strength of the material. Most synthetic roofing utilizes either thermoplastic polymers, with molecular chains, loosely intertwined at room temperature, that disengage and slide past each other when subjected to heat; or thermosetting polymers, with molecular chains, cross-linked into permanent two- and three-dimensional structures, that remain unaltered when subject to heat. Those chemical differences directly affect the performance of a synthetic roof. Thermoplastic materials have the advantage of easier and faster seaming in the field because of their ability to melt and refuse with the application of heat or solvents and the disadvantage of possible shrinkage and permanent deformation with repeated exposure to the sun. Thermoset materials are highly elastic and weather-resistant but have the disadvantage of being difficult to field seam because of the inertness of the cross-linked polymer structure. Thermoplastic materials, for instance, might perform better on roofs with many penetrations; thermoset materials, on large, unbroken surfaces.

The chemical differences among synthetic roofing tend not to affect their aging characteristics. Over time, most materials will decrease in thickness and elongation, increase in their modulus of elasticity and specific gravity, and remain about the same in their tensile strength. Thus, when judging the long-term performance of a synthetic roof, the usual comparison of tensile strengths may offer less information than the other criteria.

Modified bitumen

Modified bitumens offer a transitional technology between built-up and synthetic roofing. Bitumens modified with the polymer SBS (Sequenced Butadiene Styrene) have greater elasticity at low temperatures, while those modified with APP (Attactic Polypropylene) have greater resistance to high temperatures. Modified bitumens come either reinforced with glass fibers, polyester or polyethylene as a single sheet or, like a built-up roof, they can be field-applied in layers between reinforcing plies. Seams between sheets can be heat-welded with torches or adhered with hot asphalt, contact cement, or, in some cases, with just pressure. Bitumens modified with SBS usually require protection from ultraviolet radiation. Mineral aggregate, stone ballast, or embossed aluminum foil all serve as surface coatings. Application methods also vary considerably. Some systems self-adhere to the roof deck with pressure-sensitive backings; some depend upon torches to melt the bitumen, which then acts as an adhesive; and some have bitumen-coated reinforcement set in hot asphalt.

While not nearly as common here as in Europe, modified bitumens, according to some analysts, will receive a growing share of the U.S. market over the next decade. Many people prefer modified bitumens because of their familiarity; the technology is similar to, and in many ways a direct outgrowth of, the built-up roof. Modified bitumens lend themselves to reroofing jobs because of their compatibility with bitumen. And the multi-ply systems accept less exacting workmanship and greater room for field errors. Problems with modified bitumens arise when they are poorly made, with inadequate polymers, and when poorly applied, with careless seaming and adhesion.

Thermoplastics

Among the various thermoplastic sheets, PVC (Polyvinyl Chloride) holds the largest share (about 30 percent) of the synthetic roofing market. PVC comes either unreinforced, reinforced with materials such as polyester or fiberglass fabric, or coated on a carrier material such as nonwoven fiberglass. The reinforced sheets usually have less shrinkage and a lower coefficient of thermal expansion than the unreinforced products.

Like most thermoplastic roofing, PVC resists biological attack, most acids, alkalis, and oils. It has excellent fire resistance, mainly because of its chloride, and good field-seaming properties. Seaming techniques include the use of a solvent, usually THF (Tetrahydrofuran) or a hot air tool or iron to melt and then fuse two sheets together. While that bond usually is stronger than the PVC material itself, manufacturers recommend checking for gaps and then caulking the lap end.

Most of the difficulties encountered with PVC stem from the material's inherent rigidity. To give PVC the pliability and elasticity needed in a roofing application, manufacturers add a variety of monomeric and polymeric plasticizers, which can migrate out of the material under certain conditions, embrittling the PVC. Ultraviolet radiation can degrade the plasticizers unless inhibiting agents or a protective surface are added; polystyrene insulation can absorb the plasticizers under high heat; and coal tar and asphalt can attack the plasticizers without a slip sheet separating the PVC from the bitumen and its fumes. The latter problem, in the opinion of some roofing consultants, makes PVC less attractive in reroofing projects. Despite those limitations, PVC remains popular because of its low cost, long use (especially in Europe), and its easy handling and installation.

Several other thermoplastic materials hold a small share of the synthetic roofing market. They have overcome some of the limitations of PVC although they often are considerably more expensive. They generally lack plasticizers and share some of the properties of bituminous or thermosetting material.

A highly inert, tear-resistant thermoplastic is ECB (Ethylene-Copolymer-Bitumen). ECB can have direct contact with polystyrene insulation and coal tar, and despite the bitumen in its formulation, it resists ultraviolet degradation, overcoming the need for a protective surface coating. Most ECB roofing comes with a glass fiber backing to ease its handling and field application. The material is expensive, though, and not widely used in the U.S.

CPE (Chlorinated Polyethylene) resists most chemicals because of its inert molecular structure, has good color retention, and resists ultraviolet and ozone attack. The major use of CPE roofing occurs in projects that cannot accept stone ballast on the roof, since CPE can be exposed, and in projects that require a light-colored roof to reduce air-conditioning loads or to enhance the roof's appearance, since most CPE sheets come in light colors. CPE's fire resistance depends on its chlorine content. It is also more difficult to solvent weld than PVC.

CSPE (Chlorosulfonated Polyethylene) often goes by the name of Hypalon. As a liquid coating over other roofing materials susceptible to ultraviolet attack, Hypalon became one of the first synthetic roofing materials used in the U.S. in the early 1960s. In addition to ultraviolet radiation, Hypalon resists most chemicals, oils, grease, bitumens, salts, acids, fire (it's self-extinguishing), ponded water, abrasion, ozone, and temperature extremes. It remains sensitive to certain hydrocarbons in products such as leaded gasoline and jet fuel, and it is difficult to solvent weld.

In recent years, manufacturers have developed Hypalon sheet roofing. The thin sheets (often 30 mils thick) have the capacity of being seamed like other thermoplastics, with solvents or heat, and then curing in place to become a thermoset material, with highly inert cross-linked polymers. Like the less expensive CPE, Hypalon's color retention and weather resistance find it most often used in sheet form on lightweight, exposed roofs.

PIB (Polyisobutylene) contains several synthetic rubber additives, giving it some of the advantages of thermoset polymers, such as ultraviolet resistance, and some of their disadvantages, such as a susceptibility to attack by gasoline, oil, kerosene, turpentine, solvents, and nitric and sulfuric acids. The reinforced PIB, itself, is quite expensive. It becomes competitive, however, when judged by its installed cost, for it offers savings in labor by allowing quick, easy seaming, using liquid polyisobutylene and/or the pressure of a hand roller. Adhesion to the roof deck can occur with hot asphalt, a less expensive alternative to cold adhesives. The material's lack of crystallinity can allow it to creep.

Thermosets

The thermoset polymers in synthetic roofing are often called synthetic rubber or elastomers because of their elastic, rubberlike qualities, able to stretch up to three-to-five times their original size without breaking and without permanent distortion. That, combined with the inert character of their cross-linked polymers, makes elastomers a very popular roofing material, currently holding over 50 percent of the U.S. synthetic roofing market.

One of the first commercially available synthetic rubbers was Neoprene (Chloroprene Rubber), developed in the 1930s and first used as roofing in the early 1960s. Like other elastomers, Neoprene has good aging and weather resistance. Unlike others, it also resists the attack of animal fats, oils, and fire. Neoprene, however, remains susceptible to ultraviolet degradation as well as certain acids, solvents, and peroxides, so it often receives a liquid Hypalon coating.

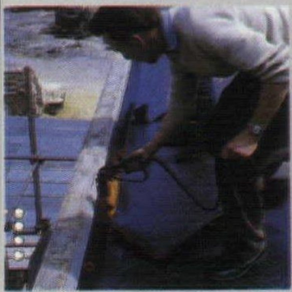
Other elastomer roofing materials use uncured Neoprene as flashing. In its uncured state, Neoprene lacks elastic properties, enabling it to conform to the sharp angles required of flashing. Within a year, the Neoprene cures, forming cross-linked polymer chains to become a highly resistant thermoset material. Neoprene also constitutes the active ingredient in many of the contact adhesives used to bond synthetic roofing.

At less than half the price of Neoprene is the elastomer EPDM (Ethylene Propylene Diene Monomer). EPDM, first developed in 1963, has become the largest selling synthetic roofing material in the country. The material

Materials	Advantages	Precautions
Modified Bitumens	• Good for reroofing, material compatible with bitumen. • Fully adhered systems good on unusually shaped or steeply sloped roofs. • Familiar material and familiar application and seaming technology • Good water resistance • Comes both unreinforced and reinforced with polyester, polyethylene, or glass fiber • Resists most pollutants. • Easily applied and seamed. • Greater resistance to slumping than traditional built up roofing • Requires less exacting workmanship than some other systems	• Flammable. Cover with fire retardant where required. • Sensitive to ultraviolet light. Cover with protective material: ballast, foil, mineral aggregate. • Some reinforcing material can be affected by ponded water • Softens under high heat. Protect from possible damage from ballast or roof traffic. • Durability depends, as in other synthetic systems, on the quality and proportion of polymers used
Thermoplastics PVC ECB CPE CSPE PIB	• PVC easily applied and seamed, fire retardant, light colored, resists many pollutants. • Some thermoplastics not affected by polystyrene insulation, bitumen, and ultraviolet light. • Most have outstanding resistance to ozone attack • PVC inexpensive and easily fabricated • CPE and Hypalon have good color retention. • Hypalon and PIB behave like elastomers once installed. • Chlorinated hydrocarbons (PVC, CPE, CSPE) will not sustain fire	• PVC must be separated from polystyrene insulation and coal tar. • Poor quality PVC can embrittle, shrink, or deform with ultraviolet exposure. • With loose-laid ballasted systems, insure the capacity of the roof to carry ballast and the capacity of perimeter fasteners to resist wind uplift. Avoid loose-laid systems under plazas or other inaccessible places or on steeply sloped roofs. • PIB is susceptible to attack by solvents, oils and fats. • Hypalon difficult to solvent weld
Elastomers Neoprene EPDM Silicone	• EPDM and Neoprene highly elastic, resistant to ozone attack, durable, vapor permeable. • EPDM and silicone resistant to ultraviolet light • EPDM readily available with large scale production by domestic rubber industry • Neoprene resistant to grease, oils, and animal fats • EPDM relatively inexpensive. Often comes in large sheets for rapid installation. • Neoprene, in uncured state used as flashing. • Neoprene and silicone are fire resistant	• EPDM is attacked by grease, oils, solvents, and animal fats. • EPDM requires careful seaming procedures in the field. • EPDM flammable. Use chlorinated sheets or protect with fire resistant surface. • Silicone difficult to bond once cured, with low tear resistance • Neoprene attacked by ultraviolet light and many acids. • Contact adhesives flammable. • Avoid polystyrene insulation under exposed, black membranes. • Neoprene and silicone relatively expensive
Liquid Systems Polyurethane Silicone Butyl Acrylic Neoprene/Hypalon	• Self-flashing. • Easily installed. • Good on roofs with many penetrations. • Spray applications good on steeply sloped roofs. • Leaks easily spotted and repaired. (True with fully-adhered sheets as well.)	• Roof deck should be monolithic and free of cracks, unevenness, dirt, oil, or debris. • With few exceptions, must be applied in moderate temperatures, on dry surface, without anticipated rain. • Spray applications should occur on windless days. • Workmanship important to insure uniform thickness and to avoid pinholes or gaps in membrane.

This chart (below) lists the considerations in choosing synthetic roofing and illustrates various application and seaming methods.

Application Methods



Hitchins

Most are fully-adhered by torching underside.

W.R. Grace

Some are pressure adhered.

Some systems can also be loose-laid with ballast.

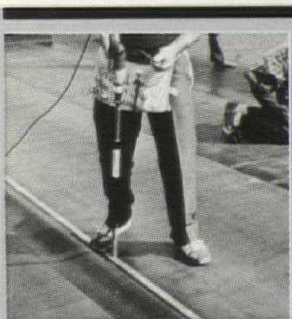
J.P. Stevens

Many thermoplastics are mechanically fastened.

Dynamit Nobel

Many are also loose-laid with ballast.

Some can be fully adhered using contact adhesive.

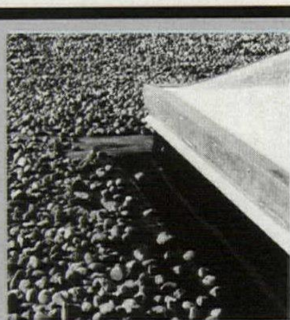


Goodyear

Most systems can be mechanically fastened.

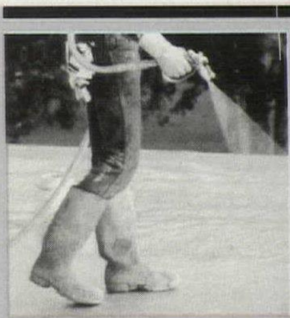
Kelly Energy Systems

Elastomers are fully adhered using contact adhesive.



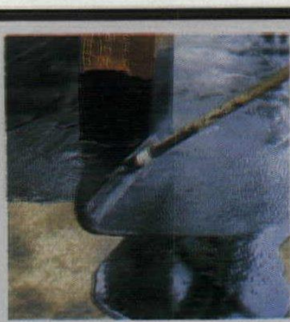
American Hydrotech

Most can also be loose-laid with ballast.



3M

Some liquid systems are spray applied using a spray gun.



American Hydrotech

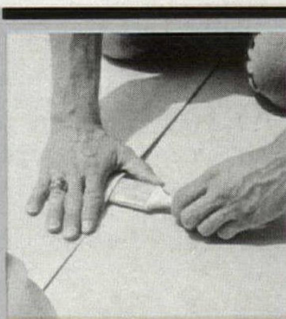
Some are applied using a brush, squeegee, roller or trowel.

Seaming Methods

Dibiten

Many use torches to melt the material at the lap.

Many can also use hot asphalt or contact adhesive.

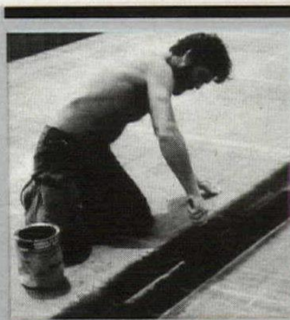


Dynamit Nobel

Most thermoplastics can be solvent welded.

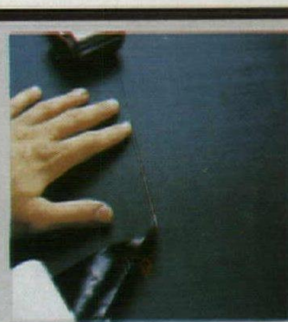
Hey'Di UPM

Most can also be heat welded.



Kelly Energy Systems

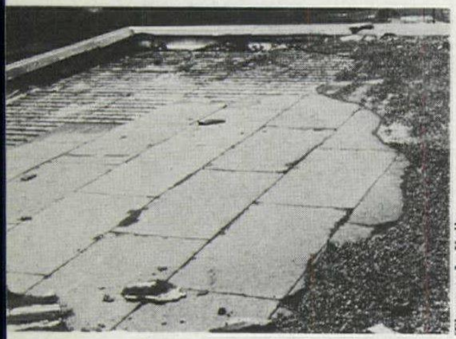
Most elastomers are seamed using contact adhesive.



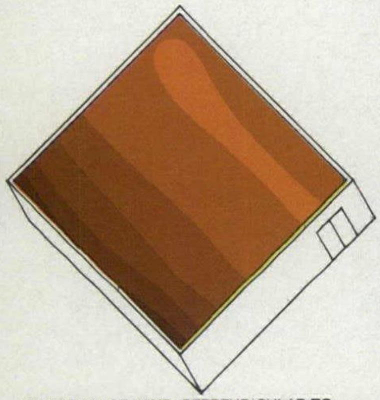
Benoit

Some use uncured rubber tapes that are pressure sensitive.

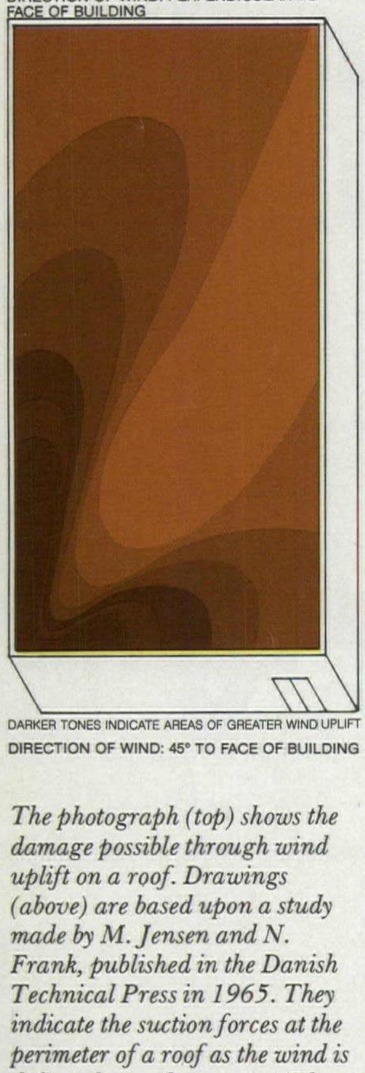
Liquid systems all form a continuous, seamless membrane.



Thomas L. Kelly



DIRECTION OF WIND: PERPENDICULAR TO FACE OF BUILDING



DARKER TONES INDICATE AREAS OF GREATER WIND UPLIFT
DIRECTION OF WIND: 45° TO FACE OF BUILDING

The photograph (top) shows the damage possible through wind uplift on a roof. Drawings (above) are based upon a study made by M. Jensen and N. Frank, published in the Danish Technical Press in 1965. They indicate the suction forces at the perimeter of a roof as the wind is deflected over the parapet. The negative pressure decreases evenly across the roof when the wind strikes the building broadside or in a V pattern when it strikes the building at an angle.

has complete elasticity in temperatures ranging from 200 F to −60 F, a fivefold elongation capability, a high vapor permeance, and a resistance to ozone, coal tar, and most atmospheric pollutants. But like every other synthetic roofing product, EPDM has its limitations. The material will burn; to meet flame spread tests, it must be either chlorinated or protected by stone ballast or a fire-retardant coating such as Hypalon and sand. EPDM also swells in contact with grease, animal fats, leaded gasoline, solvents, and oils. Many manufacturers call for the insertion of Neoprene under rooftop equipment or at air exhausts from restaurants.

What most troubles some roofing consultants, though, are the difficulties encountered when bonding two EPDM sheets together. EPDM usually arrives at the job site in a roll with a release agent such as talc or mica separating the sheets. When making a field seam, a roofer must completely remove the release agent, usually with a rag saturated with a chlorinated hydrocarbon such as unleaded gasoline; roughen the surface at the lap joint to insure better bonding, usually with a primer provided by the manufacturer; and apply contact adhesive to both sides of the lap, wait until the adhesive becomes tacky, press the two sheets together, and caulk the joint. Poor workmanship at any point in that process, such as the incomplete removal of talc because of a dirty rag or the incomplete bond of the adhesive because of a change in the ambient temperature or because of condensation at the lap, can lead to joint failure. Manufacturers have responded to many of those problems. Some offer talc-free EPDM sheets, and provide uncured EPDM adhesive tapes that are easier to use than contact adhesives. One company even offers EPDM attached to 4′ x 8′ insulation boards, seamed together with adhesive tape. Improvements in seaming will only strengthen the position of EPDM which, in the opinion of most analysts, should continue to lead the synthetic roofing market because of its durability, availability, and competitive price.

A product with elastomeric properties that is fairly new to the market is silicone single-ply roofing. The sheets come unreinforced or reinforced with an inorganic material such as fiberglass. Silicone has the advantage of chemical- and fire-resistance combined with a reflective white color. The disadvantage lies in its high price, although it can be competitive with several thermoplastic sheets.

Liquid-applied systems
The radical nature of synthetic roofing technology becomes most apparent in the liquid application of the roof membrane, using a brush, roller, squeegee, or spray gun. The liquid-applied systems are mostly thermoset materials: polyurethane, silicone, butyl rubber, acrylic, and Neoprene/Hypalon. Single-component systems cure on the roof through the evaporation of a solvent, leaving behind solids such as Neoprene and butyl rubber. Two-component systems involve the mixture of a base material and catalyst that chemically react to form a continuous membrane with materials such as silicone and polyurethane.

Fluid-applied roofs have some distinct advantages over single-ply sheets. The fluids fully adhere to highly irregular surfaces or steeply pitched roofs, providing a self-flashing membrane that is easily applied. The disadvantages lie in their dependence upon exacting workmanship and ideal weather conditions. The roof deck must be free of dust, dirt, and debris to insure the complete adhesion of the membrane; have no unevenness, to insure the fluid's uniform thickness; have a slightly rough surface, to insure its mechanical bond with the membrane; and be monolithic in construction, to insure against the membrane's cracking. Weather conditions at the time of application also affect the long-range performance of liquid-applied systems. They should not go down in temperatures below 40 F (silicone and polyurethane are two exceptions); in high winds or humidity (especially systems that cure upon evaporation); and in anticipation of rain (which can ruin most uncured fluids). Nevertheless, when those conditions are met, especially on roofs with unusual shapes or many penetrations, the liquid-applied roofing systems fill a real need.

Installation methods
There are essentially four methods of installing synthetic sheet roofing. Fully adhering a sheet, whether it be by torching it or embedding it in hot asphalt (modified bitumens) or by contact adhesives (thermoplastics, elastomers), has advantages on roofs with irregular or steep surfaces, with extreme wind uplift exposure, with weight limitations, or with high visibility. All of the components of the roof assembly, including insulation and any separation sheets, must be fully adhered to the roof deck. The synthetic sheets themselves are usually thicker (60 mils plus).

Those conditions point to some of the disadvantages of full adhesion. It can add to the time and expense of an installation and subject the synthetic sheet to building movement. In response, many manufacturers offer partially adhered or mechanically fastened roofing systems. The sheet, instead of being fully adhered, is fastened to the roof deck, usually about every 20 inches on center, with fasteners and an assortment of plates, discs, or bars, depending upon the manufacturer. Lap joints or separate pieces of membrane cover the fasteners.

The mechanical fastening of synthetic roofing saves in time and labor over fully adhered installations, while retaining their light weight, uniform appearance, and wind resistance. Most important, mechanical fastening separates the sheet from most substrate movement, preventing the tearing or buckling of the membrane. Not unexpectedly, many foresee mechanical fastening becoming a dominant means of attaching single-ply roofs.

Another popular but somewhat controversial installation method is the loose-laid/ballasted roof. This involves laying out the synthetic sheet, anchoring it at the building perimeter, and weighting it down with river run gravel at ten pounds per square foot. The sheet moves independently of the substrate underneath, and the gravel ballast protects the membrane from external fire, ultraviolet and ozone attack, and wind uplift. It is with wind uplift that the controversy has occurred. The ballast, in a strong wind, should blow into piles, eventually becoming heavy enough to resist the wind's suction forces at the building's perimeter. The blow-off of loose laid roofs, nevertheless, has occurred, prompting their rejection by some building officials in windy areas of the country. Loose-laid/ballasted systems also present difficulties when a leak must be located (since the unattached membrane allows the horizontal migration of water) and when a roof structure cannot bear the ten pounds per square foot weight of the ballast (a common problem in older, wood-framed buildings or in new buildings with long-span structures and lightweight decks). Those problems aside, loose-laid systems will probably remain a fairly common installation method if only because of their simplicity, cost, and speed.

A fourth method of applying synthetic roofing involves the placement of insulation, a filter cloth, and ballast on top of the membrane, protecting it from temperature swings and weather-induced deterioration. Developed in response to the thermal shock of membranes insulated from the warm roof deck, the protected membrane roof (PMR) has proven most popular in very hot and very cold climates, on high humidity enclosures, and on roofs with a good deal of foot traffic. The roof deck, however, should slope to drain the roof adequately; the roof structure must be able to carry the weight of the ballast (although a concrete-topped insulation board can reduce that weight considerably); and the insulation should have adequate perimeter attachment to resist wind uplift or flotation and have adequate ventilation to prevent the growth of vegetation or fungi.

Workmanship

The success of synthetic roofing ultimately depends as much upon the quality of workmanship as it does upon the material and its installation. The new single-ply systems are less forgiving than the multi-ply built-up roof: a single-ply sheet must have completely watertight seams and a liquid-applied roof must be absolutely free of pinholes or thin spots. To achieve that requires the use of company-certified applicators, proper detailing (and, if possible, proprietary specifications), and perhaps most important, the provision of full-time on-site inspection by qualified people.

Some people remain skeptical of synthetic roofing because of the lack of performance criteria and of long-term experience with the product. For that reason alone, the built-up roof will remain a dominant force in the market, especially with the increased usage of nonorganic felts and the increased awareness that poor workmanship and inadequate inspections are as much to blame as the materials themselves for the failures of built-up roofs. Built-up roofing currently holds 68 percent of the flat roof market, with an expected 50 percent share through the early 1990s.

Work on developing guidelines and setting standards for synthetic roofing, meanwhile, continues. The National Roofing Contractors Association has begun publication of a thorough guide to the new materials, manufacturers have formed the Single-Ply Roofing Institute to provide technical information and to assist design professionals, and ASTM committees plan to have standards out on both PVC and EPDM roofing within a year. Also, with greater product uniformity has come an increase in the size of companies manufacturing single-ply roofing, a trend that many analysts see leading to an eventual decrease in the number of companies in the industry. Those developments should ease the architect's task of choosing among the many roofing options now available. But after so many years depending upon the traditional built-up roof, at least we now have real choices to make. [Thomas Fisher]

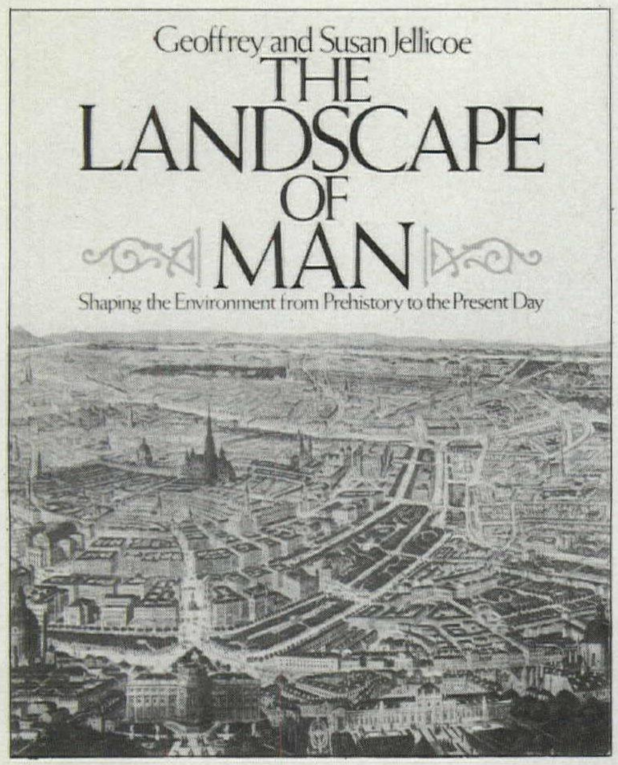
Acknowledgments

We would like to thank the following people and organizations for their assistance in the preparation of this article: (modified bitumens) Charles Whitley, Bowe; P.K. Daniels, Tamko; Barnett Mitzman, Guaina; Dick Smersky, Koppers; Jim Sattler, John Stoddard, Derbigum/Owens-Corning; Bob Mathews, Hey'Di UPM; Jesse Stewart, W.R. Grace; Jerry Matthews, Tropical Industrial Coatings; (thermoplastics) Bruce Abbott, J.P. Stevens; Ken Brzozowski, Tremco; Al Farbish, Rubber and Plastics Compound Co.; Jack Glassman, PIB Roofing Products and Systems; Ruth Warshaw, Sarnafil; Robert Smith, Rainer Gerbatsch, Trocal; Bill Gurley, IPW Interplastics; Joe McCusker, Cooley; John Mascharka, U.S. Mineral; Joe Chew, Republic Powdered Metals; (elastomers) Richard Boon, Firestone; Lou Benoit, Benoit; Bill Young, Manville; Doc Pingree, Paul Oliveira, Goodyear; Patricia Farley, GAF; Walter Mullen, Celotex; Len Whann, Terry Andrews, Gates; Michele King, Carlisle; Tom Kelly, Kelly Energy Systems; Pat Clough, Otto; (thermoplastics and elastomers) Bill Muller, Watpro; Charles Taft, Plymouth; Kerston Russell, General; (liquid-applied) Jim Cox, 3M; Jeff Gonyou, Geocel; Ed Jarger, American Hydrotech; (roofing components) Peter Deal, Dow; Cathleen Branciaroli, Sam Cypressi, Du Pont; (consultants, organizations) Werner Gumperts, David Adler, Simpson, Gumperts & Heger, Inc.; Dick Fricklas, Roofing Industry Educational Institute; Doug Burns, RTD & Associates; C.W. Griffin; Julian Elias, Jeter, Cook & Jepson; Bill Cullen, National Roofing Contractors Association; Jerry Teitsma, Roof Systems Consultants; Ruth Warshaw, Single Ply Roofing Institute.

Further reading

The National Roofing Contractors Association (8600 Bryn Mawr Avenue, Chicago, Ill. 60631) publishes the magazine *Roofing Spec* and several guides on the subject including the *NRCA Roofing and Waterproofing Manual* (revised April 1983), the *NRCA Materials Reference & Guide*, and conference proceedings on roofing technology. The NCRA also publishes a pamphlet entitled *The Single-Ply Roofing Membrane*. Two other magazines covering the field are *RSI* and *Roof Design*, both published by Harcourt Brace Jovanovich (circulation offices: 1 East First Street, Duluth, Minn. 55802). A good overview of both built-up and synthetic roofing occurs in the *Manual of Built-Up Roof Systems*, 2nd edition, by C.W. Griffin, McGraw-Hill, 1221 Avenue of the Americas, New York, N.Y. 10020. The address of the Single-Ply Roofing Institute is 1800 Pickwick Avenue, Glenview, Ill. 60025.


Vision
With Sunglas® Reflective Bronze, one of thirty solar control glasses by Ford.
When a versatile solar control glass was needed for the uniquely designed Arco Centre office complex in Long Beach, California, Ford Sunglas Reflective was chosen. The two fourteen-story towers feature a four-side structural silicone glazing system which creates the striking visual effect of a continuous glass skin. The Arco Centre complex contains 240,000 square feet of Sunglas Reflective, making it the largest building project of its type to feature this glazing system.



★1 NEW

Illustrated with over 700 photographs and line drawings, **The Landscape of Man** is an essential text and reference for students and professional landscape architects, architects, planners and designers.

Progressive Architecture BOOK STORE

Each book has been selected for its usefulness to you in your professional practice. **Prices slightly higher in Canada. Foreign orders must be accompanied by payment.** It is not necessary to send payment with the order. Circle appropriate numbers on the Reader Service Cards in the back of this issue, add your name and address and mail. Local sales tax **must** be included with payment. Prices subject to change. **For faster service, send the card in an envelope to:**

Mrs. Hetty Rizvi
Progressive Architecture
600 Summer Street
PO Box 1361
Stamford, Ct. 06904

P/A Back issues

A limited supply of the following issues of P/A are available at $7.00 per Copy. **Check MUST accompany order!** Connecticut Residents Add 7½% Sales Tax.

July .... Folger Library/Italian Rationalism/Acid rain
June.......... Craftsmanship
May .... New Japanese architecture/Furniture competition
April.......... Energy and conservation
March .... California and Florida houses/Building diagnostics
February ...... Arquitectonica, Miami/Graves, Portland/Electronic acoustics

NEW★

1 The Landscape of Man

By Geoffrey and Susan Jellicoe
383 pp., illus....$19.95
Softcover

For twenty-six different cultures the authors summarize the social and intellectual background, describing how it was expressed in terms of landscape. The history of landscape architecture and the progress of landscape design are thoroughly and intelligently discussed. History, philosophy and religion are consulted in order to explain fully "the landscape of man".
Circle B601 under Books.

2 Energy Conservation Through Building Design

Edited by Donald Watson,
305 pp., illus.... $29.50

This precedent-setting book provides the bridge between architect and engineer, practitioner and researcher, so necessary to the development of a rational approach to energy conservation. Not limited to new building designs, it also includes methods of analyzing existing structures and specific ways to reduce their energy consumption.
Circle B602 under Books.

3 Structural Systems

By Henry J. Cowan and Forrest Wilson
256 pp., illus. ... $24.95

This is a comprehensive guide to preliminary structural design using a minimum of mathematics and numerous illustrations to describe structural forms and their mathematics. It has a strong emphasis on graphic presentation and is an instant-access reference to structural design. Full consideration is given to the internal and external forces that a building must withstand, and the interaction of structural and environmental design.
Circle B603 under Books.

4 Architecture: Form, Space and Order

By Francis D.K. Ching,
294 pp., illus. ... $22.50

Written to foster understanding of design concepts, this rich source of architectural prototype demonstrates how to extract the fundamental principles of form and space from the environment, whether in the architectural one views or inhabits, in architectural visualization, in drawing, or in actual design.
Circle B604 under Books.

5 Affordable Houses Designed by Architects

Edited by Jeremy Robinson,
168 pp., illus. .. $34.95

This lavishly illustrated volume shatters the myth that architect-designed houses are more costly than developer-built houses. The superb photographs, floor plans, drawings, and details of interiors and exteriors present a wealth of ideas on how to construct beautiful and unique houses within limited budgets.
Circle B605 under Books.

NEW★

6 Earth-Sheltered Habitat History, Architecture and Urban Design

By Gideon S. Golany, Ph.D.
240 pp., illus. ... $21.95

This book explains the energy-saving advantages that earth enveloped shelters offer for heating or cooling, weather-proofing, comfort, benefits of lower land and maintenance cost, durability, privacy and maintenance safeguards against noise, strong wind, and pollution. It discusses all types of potential land uses belowground.
Circle B606 under Books.

7 Design and Planning of Swimming Pools

By John Dawes,
276 pp., illus. ... $49.95

A comprehensive manual that describes the essential characteristics and consequent design requirements of every type of pool imaginable. Also deals in great detail with more technical matters, such as structural problems and how to solve them, finishes, filtration, circulation and water treatment, heating and ventilating.
Circle B607 under Books.

8 Architectural Rendering: The Techniques of Contemporary Presentation

By Albert O. Halse, 326 pp., illus., 2nd edition, 1972 ... $59.50

This completely up-dated revision of the most widely used guide to architectural rendering covers all working phases from pencil strokes to finished product — and shows how to obtain the desired mood, perspective, light and color effects, select proper equipment and work in different media.
Circle B608 under Books.

9 Cities For People

By Ronald Wiedenhoeft
224 pp., illus. ... $22.95

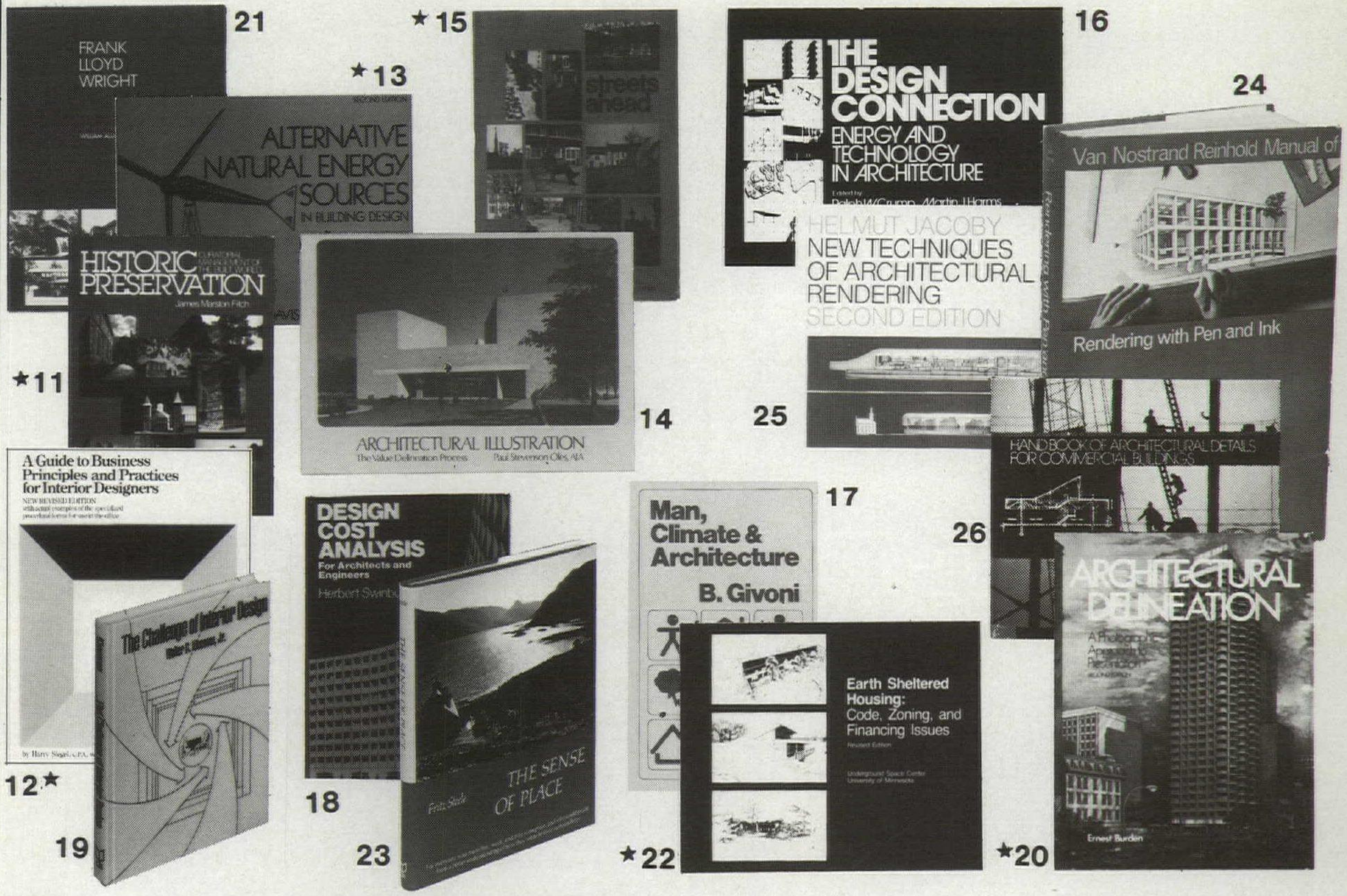
This book is a thoughtful analysis of the dehumanization of cities and the urban blight that results. It demonstrates how we can reverse this trend, making cities more responsive to human needs and improving their economic viability. It offers a number of economically sound steps that have proven effective in revitalizing cities all over the world.
Circle B609 under Books.

NEW★

10 The Architect's Responsibilities In The Project Delivery Process

By H. L. Murvin, AIA
Illus. ... 2nd Edition, $23.95

A manual providing an educational tool which develops and presents in an orderly way the project delivery process of a representative architectural project. An invaluable study guide for architectural license exam candidates and students.
Circle B610 under Books.



NEW ★

11 Historic Preservation: Curatorial Management of the Built World

By James Marston Fitch
433 pp., illus. . . . $37.95

This book thoroughly covers historic preservation — it includes full chapters on the economic sense of retrieval and recycling, regeneration of historic urban cores, cosmetic consequences of intervention, quantification, analysis, and classification. Sections on historic preservation in socialist and third-world countries are included.
Circle B611 under Books.

NEW★

12 A Guide to Business Principles and Practices for Interior Designers

By Harry Siegel and Alan Siegel
192 pp., illus. . . . $22.50

This book is thoroughly updated to reflect current practices and procedures of operating a business. It discusses how to establish an interior design practice, how to carry through a job and charge for it and the special requirements of non-residential work. It examines forms, techniques, and special factors including actual examples of the specialized procedural forms used in the design office.
Circle B612 under Books.

NEW ★

13 Alternative Natural Energy Sources in Building Design

By A. J. Davis and R. P. Schubert
287 pp., illus. . . . $17.95

Basic design criteria about energy conservation, solar energy, wind energy, and methane-gas energy is updated in this edition. Alternative solutions and applications are described for each problem and diagrams, tables and formulas are supplied. This book is the perfect introduction to the complex subject of energy.
Circle B613 under Books.

14 Architectural Illustration The Value Delineation Process

by Paul Stevenson Oles,
288 pp., illus. . . . $34.50

In this copiously illustrated, clearly organized explanation of his value delineation system, the author presents a detailed description of the process which has resulted in these award-winning delineations that show realistically how a designed structure will appear when built.
Circle B614 under Books.

NEW ★

15 Streets Ahead

By The Design Council
110 pp., illus $24.95

This book examines some of the fundamental developments that are dramatically changing the street scene in many parts of the world, as well as the individual components that make it up. Discussed are design, selection and siting of paving, lighting, seats, planting, etc. Tackling industrial environmental harm and day-to-day maintenance problems are also covered.
Circle B615 under Books.

16 The Design Connection

Edited by Ralph W. Crump
and Martin J. Harms
184 pp., illus $19.95

This book probes the relationship of formal architectural design to both building technology and human values. Locational, climatic, cultural, and historical viewpoints are all considered in depth. It bridges the gap between architectural theory and practice.
Circle B616 under Books.

17 Man, Climate & Architecture

By B. Givoni
483 pp., illus. $14.95

This book deals with the physiological, physical and architectural aspects of the relationship and interaction between these three elements to interior and exterior building design. It is divided into five parts, including climatic elements and solar radiation on building design.
Circle B617 under Books.

18 Design Cost Analysis for Architects & Engineers

By Herbert Swinburne,
317 pp., illus. . . . $27.50

This first-of-its-kind book shows architects and engineers how to analyze and estimate the costs of building construction during the design stage when the potential for controlling costs is greatest.
Circle B618 under Books.

19 The Challenge of Interior Design

By Walter B. Kleeman, Jr.
338 pp., illus. . . . $19.95

This book is a flagship text in the growing field of ergonomics. It shows how you can incorporate anthropology and gerontology into the design of any space or building. It shows how behavior is influenced by design, enabling you to induce a feeling of well-being for the recipients of your next project.
Circle B619 under Books.

NEW★

20 Architectural Delineation, A Photographic Approach to Presentation

By Ernest Burden
280 pp., illus. . . . $39.50

This masterful guide thoroughly updates the author's innovative method for using photographic techniques in delineation. He discusses a valuable new application of the photo-layout technique. Rendering projects shown in the original edition have been replaced by up-to-date projects and 16 pages of full color projects have been added.
Circle B620 under Books.

21 The Architecture of Frank Lloyd Wright A Complete Catalog Second Edition

By William Allin Storrer,
456 pp., illus. . . . $22.50

This second edition, which documents all of the buildings designed by Wright, replaced a number of photographs with new ones that show the buildings to better effect, changed some copy in the text, and incorporated factual information that has come to light since the original publication in 1974.
Circle B621 under Books.

NEW ★

22 Earth Sheltered Housing: Code, Zoning, and Financing Issues

By Underground Space Center, University of Minnesota
143 pp., illus. . . . $14.95

This is an updated version of a U.S. Dept. of Housing and Urban Devpt. study revealing the extent of earth sheltered housing restraints and how government action can ease them and encourage such structures. Constraints by restrictive building codes and zoning ordinances are detailed. The major issues of concern to code and zoning officials are clarified.
Circle B622 under Books.

23 The Sense of Place

By Fritz Steele
240 pp., illus. . . . $19.95

This book is about our sense of place — the way it affects our lives, and the way in which we create our own sense of place. It is a unique look at the interaction between the features of settings and the features of the people who use them and how we could profit from a better understanding of how we relate to our surroundings.
Circle B623 under Books

24 Rendering With Pen and Ink

By Robert W. Gill,
368 pp., illus. . . . $14.95

This paper-back edition is a copiously illustrated guide to the techniques and methods of rendering, including sections on perspective, projection, shadow, reflections, and how to draw cars, ships, aircraft, trees, and human figures. The author also describes the very wide range of instruments and equipment currently in use.
Circle B624 under Books.

25 New Techniques of Architectural Rendering

By Helmut Jacoby
167 pp., illus $24.95

This book contains a broad, international selection of architectural drawings that represent the most outstanding modern contributions to the field. Mr. Jacoby has given consideration to examples that interpret architectural designs in detail, for the layman as well as the specialist.
Circle B625 under Books.

26 Handbook of Architectural Details for Commercial Buildings

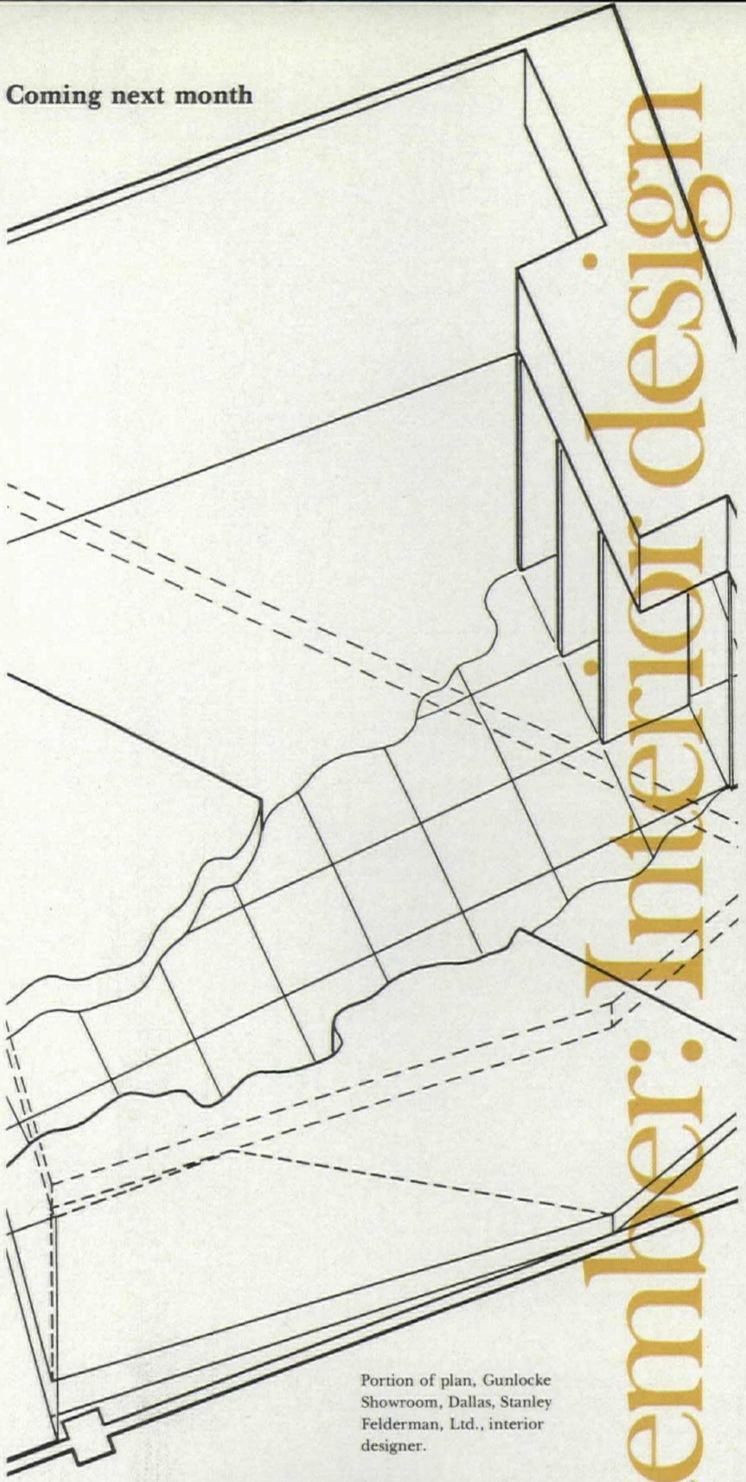
By Joseph DeChiara
506 pp., illus. . . . $44.50

This Handbook illustrates and examines the full range of architectura details currently used for commercia buildings. Part I features plans, eleva tions, and sections for office build ings, banks, retail stores, theaters and more. Part II concentrates o architectural details. Practicality an realism are stressed.
Circle B626 under Books


Right now, the use of precast/prestressed concrete can cut construction time, sharply reduce finance costs, assure that a building generates income as soon as possible. That's important.
For all the years to come, a precast/prestressed concrete structure can require less maintenance time and maintain exceptional appearance. That's also important.
But, we have more to say. Just request: "The Time Savers."
Circle No. 357 on Reader Service Card
SAVINGS OF
time
...A MATTER
OF MONIES.
pci
PRESTRESSED CONCRETE INSTITUTE
201 North Wells Street
Chicago, Illinois 60606
Telephone 312/346-4071

Coming next month

P/A in September: Interior design



Portion of plan, Gunlocke Showroom, Dallas, Stanley Felderman, Ltd., interior designer.

Interior design: the New Modernism will be the subject of September special issue, P/A's seventh annual issue devoted to interiors. The theme this year will be the persistence of Modernism, the adaptation of the original principles of the Modern Movement to the culture and technology of the 1980s. Dramatic and thorough documentation of 14 new interior design projects of all kinds will be accompanied by a thoughtful, illustrated essay on current art, dance, video, etc., that is extending the lifespan of Modernism.

Technics in September will examine how the design of health care facilities can accommodate new medical technology.

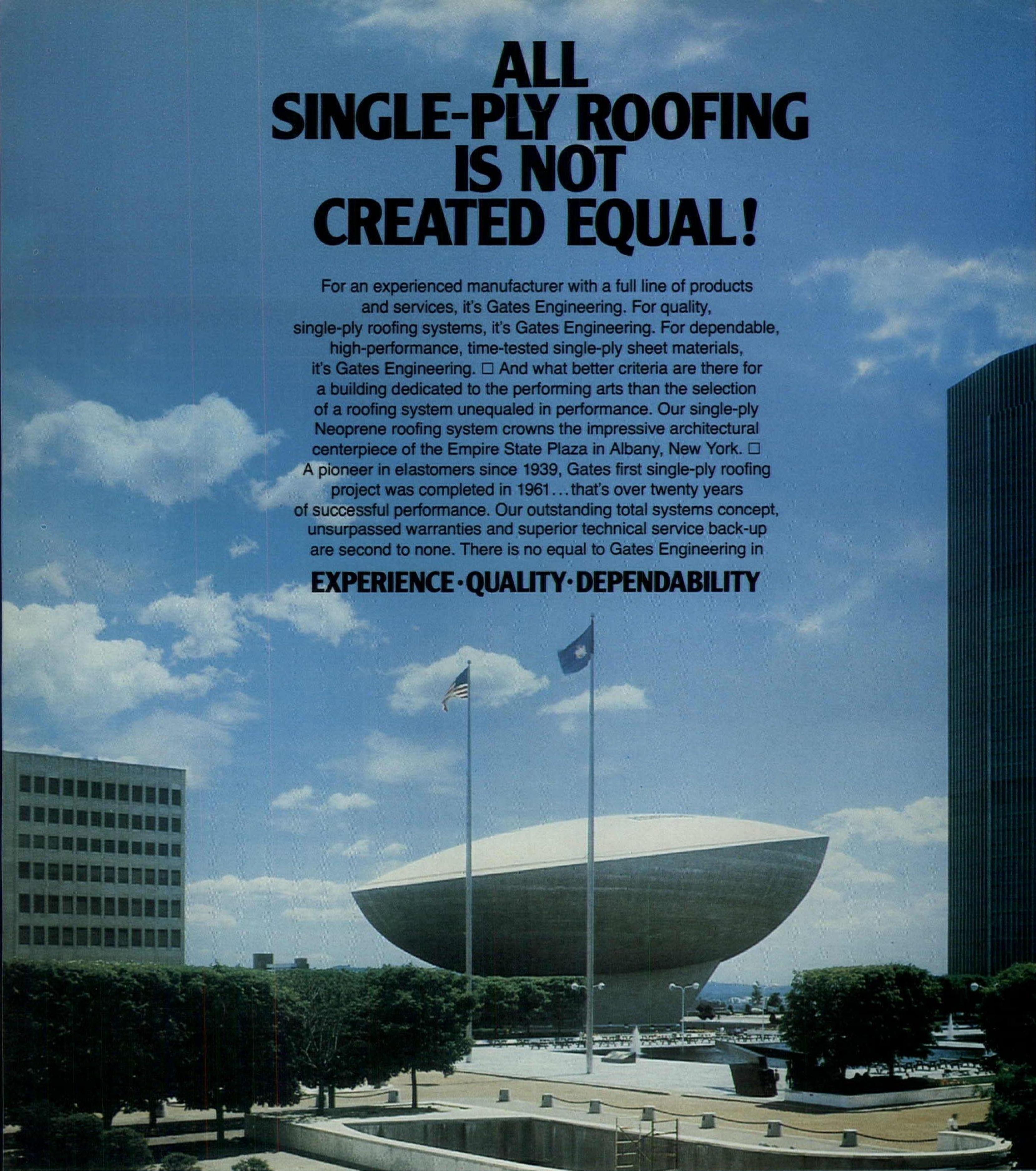
Designer's Saturday will be the subject of a special guide to the annual New York interior design event.

P/A in October will include a penetrating profile of a firm with a remarkable growth record and major commissions in several cities. Two newly completed works will be featured and several others documented with drawings.

ALL SINGLE-PLY ROOFING IS NOT CREATED EQUAL!

For an experienced manufacturer with a full line of products and services, it's Gates Engineering. For quality, single-ply roofing systems, it's Gates Engineering. For dependable, high-performance, time-tested single-ply sheet materials, it's Gates Engineering. □ And what better criteria are there for a building dedicated to the performing arts than the selection of a roofing system unequaled in performance. Our single-ply Neoprene roofing system crowns the impressive architectural centerpiece of the Empire State Plaza in Albany, New York. □ A pioneer in elastomers since 1939, Gates first single-ply roofing project was completed in 1961...that's over twenty years of successful performance. Our outstanding total systems concept, unsurpassed warranties and superior technical service back-up are second to none. There is no equal to Gates Engineering in

EXPERIENCE · QUALITY · DEPENDABILITY



Architect: Harrison & Abramovitz, New York City **Gates Engineering Registered Roofing Contractor:** Martin E. Keller Roofing Co., Schenectady, New York

Gates Engineering Company, Inc.

GACO®

100 S. West Street P.O. Box 1711, Wilmington, DE 19899
(302) 656 9951
Western Office, 462 West 3440 South, Salt Lake City, UT 84115
(801) 262 7883

AN RPM INC. COMPANY

Circle **No. 335** on Reader Service Card

Certifying integrity of exterior walls

Norman Coplan

Certifying the soundness of exterior building elements opens the architect or engineer to liability for damage if a passerby is injured.

The responsibility of owners for unstable building elements is a subject much in the news in recent years because of the number of injuries to pedestrians resulting from falling parts of a structure. It is the legal rule in most jurisdictions that a building or structure that abuts a street or highway must be maintained so that it will not fall and cause injury to persons lawfully on the street or highway. The owner of a building is not an insurer against injury resulting from falling parts of his building, but he is required to use reasonable care and skill in the construction and maintenance of the structure. Further, he is required to inspect the building from time to time and to remedy any defect that is revealed by such inspections.

Falling cornices seem to be the most common object causing injury to innocent pedestrians. The legal rule of liability applicable in such a situation is reflected in the Connecticut case of *Howard* v. *Ridden* (93 Con. 604). This litigation involved a claim for damages for death caused by a falling cornice brought against both the builder and the owner of the building. The wood cornice, overhanging the sidewalk, was 3 feet wide, 36 feet long, and weighed 800 pounds. The court found that the cornice construction was such that it would, by natural action of the elements and by reason of its own weight, eventually fall to the sidewalk unless protective measures were taken. The court further found that the tin roof of the building, by natural causes, became worn and rusted, and rain water and other elements leaking into the cornice rotted the woodwork and furring strip on the inner side of the cornice and rusted away the nails by which the cornice was fastened.

In holding the owner liable for damages, but absolving the contractor from liability, the court said:

"It appears . . . that the (owner) failed and neglected to inspect the cornice to determine its condition and failed and neglected to remove the cornice. . . . Whether the original (construction) was well done or not, it distinctly appears, and this is the controlling factor in the case, that the fall of the cornice was not due to the condition the contractor left it in but to the neglect of the owner to inspect and guard against the result of rusting and rotting that inevitably takes place in every structure in which nails, tin and wood are used. The structure stayed up as long as the structure did not rust and rot out. . . . A contractor is surely not the insurer of the everlastingness of the materials of a cornice built by him. The owner . . . is under obligation to give such inspection and make such repairs as will at least preserve the structure from the dangerous effects of natural causes—wind, rain, dampness—which no foresight of construction can guard against."

The City of Chicago was one of the first municipalities to come to the conclusion that despite the potential liability of building owners, exterior wall maintenance, particularly on upper level stories of high-rise buildings, was either ineffective or nonexistent and constituted a continuing potential for serious pedestrian injury. As a consequence, an ordinance was adopted requiring periodic inspections of the exteriors of buildings to be performed under the supervision of a licensed architect or structural engineer. New York City has since adopted an ordinance requiring a periodic critical examination of the exterior walls of any building more than six stories in height, to be conducted by or under the direct supervision of a licensed architect or a licensed engineer (P/A News Report, Nov. 1982, p. 29). The New York law further requires the architect or engineer to submit a written report "certifying" the results of such examination.

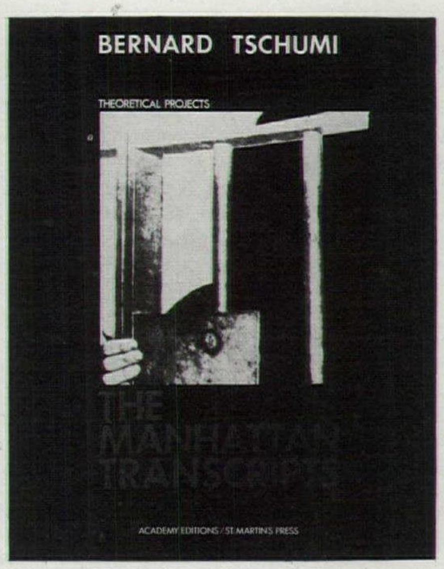
Insofar as owners are concerned, these statutory enactments not only codify their common-law duty to examine the exteriors of buildings in order to remedy defects that may exist, but set forth an explicit standard as to when and how often such examinations must occur. Thus, the potential liability of owners for injuries resulting from unstable exterior building elements has been increased by these explicit rules. Whether such examination is conducted directly by the architect or engineer or performed by inspectors under his supervision, the architect or engineer is subject to liability to members of the general public who sustain bodily injuries or property damage from falling structural fragments even from buildings that have been examined, if it is established that the examination had not been conducted with due care.

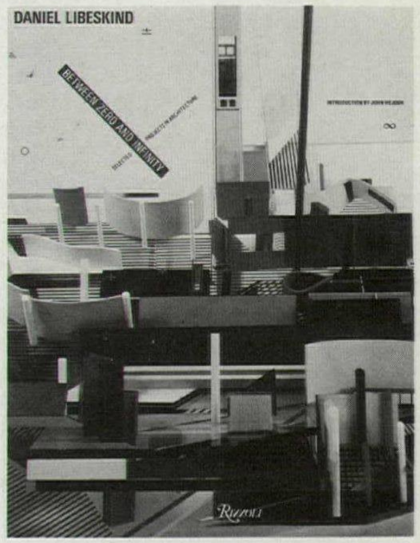
The New York City statute, in requiring the architect or engineer to "certify" his findings, creates an additional hazard. The claim may be made that the certification constitutes a representation or warranty on the part of the architect or engineer as to the condition of the exterior of the building and that therefore the architect or engineer is liable for breach of that representation or warranty independent of whether he conducted his examination with due and reasonable care. Professional liability insurance does not normally afford coverage for guarantees or warranties made by the professional; thus if a certification was construed as a guarantee, the professional could not only be held liable in the absence of negligence, but would have no insurance protection. In acting under such a statute, therefore, the architect or engineer must be concerned and guarded in respect to how his "certification" is worded. □

Norman Coplan, *Hon. AIA, is a member of the law firm Bernstein, Weiss, Coplan, Weinstein & Lake, New York.*

Architecture and desire

Books





The Manhattan Transcripts: Theoretical Projects *by Bernard Tschumi. New York, St. Martin's Press, 1981, 62 pp., $9.95 paperback.*

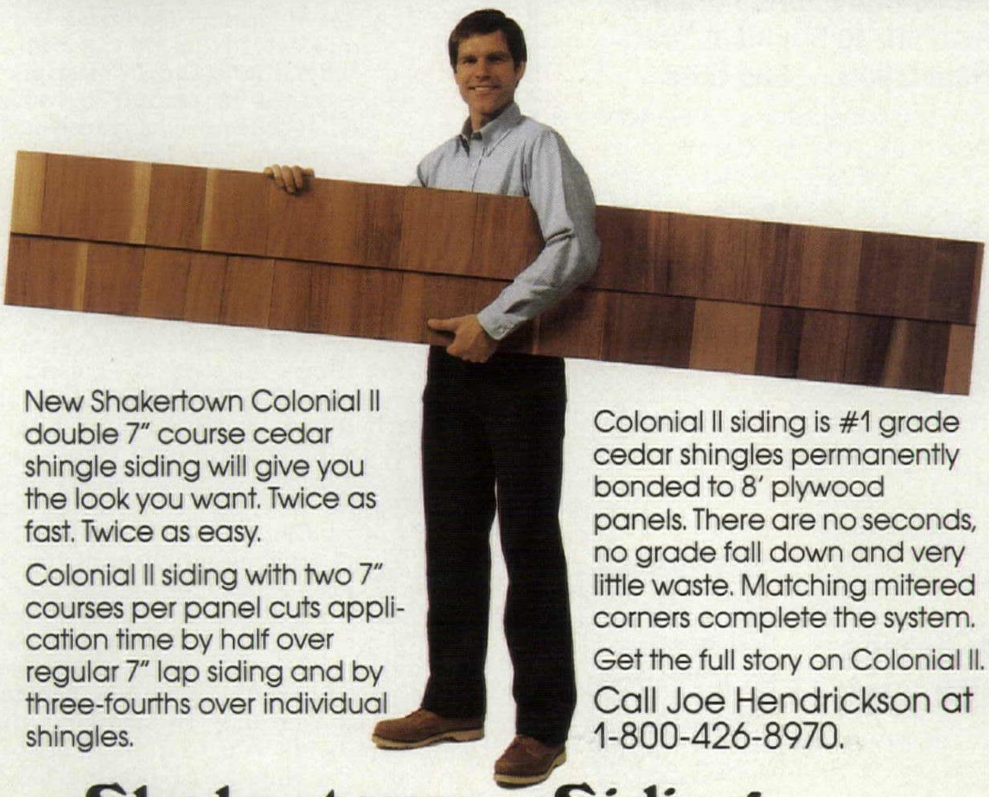
Between Zero and Infinity: Selected Projects in Architecture *by Daniel Libeskind. New York, Rizzoli International Publications, 1981, 111 pp., $19.95 paperback.*

Reviewed by Lindsay Stamm Shapiro, visiting lecturer at Cooper Union and curator of the exhibition "California Counterparts" currently at the National Academy of Design in New York.

Bernard Tschumi and Daniel Libeskind provide two significant ways of answering the question: where is architecture today and what can it signify? Architecture can be considered as polarized between purity and complexity, between historicism and Modernism, or between technologism and anti-functionalism. Yet, these oppositions have resulted in some rather intense misunderstandings. This is evident in the notion of Post-Modernism, which is based intently on a narrow definition of Modernism. Tschumi and Libeskind are significant for the ways in which they attempt to dissolve the current antinomies and present us with fresh architectural visions that are in no way trivially novel. Both of them lead us to new formal and conceptual arenas while proposing a re- [*Books continued on page 128*]

Springfield Square, Charlotte, N.C. Architect: David Furman.
Developer: Martin McGuire, Inc. Siding: Colonial Shingle Texture

THE LOOK. NOW TWICE AS FAST.



New Shakertown Colonial II double 7" course cedar shingle siding will give you the look you want. Twice as fast. Twice as easy.

Colonial II siding with two 7" courses per panel cuts application time by half over regular 7" lap siding and by three-fourths over individual shingles.

Colonial II siding is #1 grade cedar shingles permanently bonded to 8' plywood panels. There are no seconds, no grade fall down and very little waste. Matching mitered corners complete the system.

Get the full story on Colonial II.

Call Joe Hendrickson at 1-800-426-8970.

Shakertown Siding

Box 400, Winlock, Washington 98596 (206) 785-3501

Circle **No. 362** on Reader Service Card

Books continued from page 126

valuation of the past. Despite their propensity for disjunction and defamiliarization, they are vitally and radically conservative.

Tschumi's book announces an important distinction: "Books of architecture, as opposed to books about architecture, develop their own existence and logic. They are not directed at illustrating buildings or cities, but at searching for the ideas that underline them." He then compares the experience of *The Manhattan Transcripts* to film books that establish continuity by a montage of stills. Although Tschumi mentions Sergei Eisenstein and Lazlo Moholy-Nagy, he must be perceived as an analytic architect closer to Godard or Straub and Huillet. Tschumi's explorations, like those of geologists, psychoanalysts, and Marxists, are attempts to decode resistant surfaces while paying homage to the obstinacy of the conventional. That is why he pays so much obeisance to the clichés of violence and the norms of theatricality from Hollywood to New Wave music. Tschumi is trying to disenthrall us of our usual oblivion to power in architecture by showing it, as Michel Foucault has demonstrated, everywhere. In the past, he has accomplished this by using extremely condensed means, as in his series of postcards where he places puzzling or disruptive slogans beneath photographs of Le Corbusier's decaying *oeuvre,* thus laying bare a new strategy. Tschumi has the resilience of a graffiti artist, but in this case, we are given intelligent graffiti on walls and spaces erected by the graffiti artist himself.

The basic problem for Tschumi has been to create without "primal forms" and without a mere mimetic or representational bias. He has done this by making a film-architecture abstracted from objects, choreography, and events. As in the poetry of John Ashbery, the music of Elliot Carter, or the dances of Merce Cunningham, *action* itself is the content of this architecture. "Events, movements, spaces" make his city-photographs characteristically vital and surreal, yet not in a whimsical sense. Just as novels have been positively influenced by movies since the turn of the century, so has architecture, but usually through the flamboyant quotation of the most luxurious aspects of cinematic set design, rather than the formal qualities inherent in the medium. Here the "fade-ins" and "inserts" are strategies to create unlikely, variable, and insistent spaces. There is an explosive pleasure-element in all this, as Tschumi predicts: "reality is made infinitely malleable, so that emotive, dramatic, or poetic attributes can change and unfold."

Reading *The Manhattan Transcripts* is a great pleasure intentionally akin to detective fiction. It begins with a little Borgesian joke: "They found the Transcripts by accident." One is constantly engaged in reading a collage of drawings and photographs. Architecture has rarely included the element of suspense so happily. For Tschumi, like the French aesthetician and novelist Georges Bataille, art is transgression, and by the end of the *Transcripts,* architecture itself has been assassinated, not to achieve an elegy or pastoral purism, but to create a critical architecture of desire.

Certainly a virtuoso draftsman, Daniel Libeskind, Dean of Cranbrook Academy's Department of Architecture, records in *Between Zero and Infinity* a significant series of images he has generated. Born in 1946 in Poland, Libeskind was first trained as a musician. Investigating simultaneously every possible permutation of rhythm and interval, his architecture possesses a complexity akin to Elliot Carter's compositions. It is fitting that *Between Zero and Infinity* should be introduced by John Hejduk, the dean of narrative architectonic structures, whose contributions lie in a complex series of formal and fictive fabrications, although he is too often associated with purism. Hejduk is perhaps the key figure for understanding the architectural disruptions of both Tschumi and Libeskind, for he originally used the investigations of Juan Gris, Amedée Ozenfant, and Piet Mondrian as the basis for an American architecture where the fantasy is pessimistic and Puritanical with infernal overtones. In Libeskind, the soaring reveries of Hejduk are boldly fractured in an act of "dissemination."

A maneuver closest to Libeskind has been the creation of decentered, entropic, and marginal machinery in Modern

[*Books continued on page 130*]

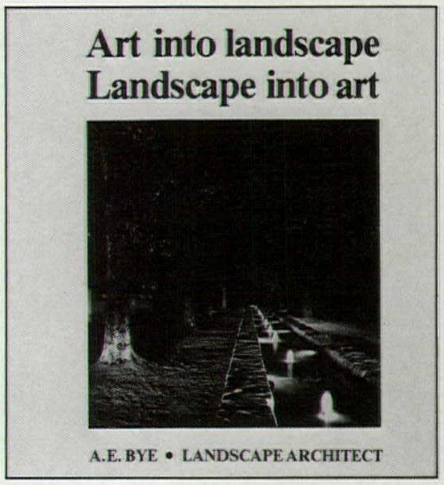
Books continued from page 128

American art. These machines are primarily engaged in self-consumption, as in Jean Tinguely's self-destructing homage to New York. Yet these are truly machines of desire, of which the French philosopher Gilles Deleuze has spoken.

Libeskind's work is an incisive, yet devastating, expression of an infinite lack of hierarchy and subordination. He has created an epic architecture in which all elements are foregrounded. He has achieved boldness in black-and-white in which perspective and geometry are catastrophically disrupted and need no shading or chiaroscuro to heighten the drama, like the geometric paintings of Al Held. Lionel Trilling has stated that the shattering of narrative ensued deterministically after the sociological shattering of the family in the late 19th Century. Libeskind has extended shattered, nonnarrative structure into architecture. His latest drawings, "The Grim Reaper" and "Ossification," betray the violence of William Burroughs. These wild drawings, filled with trees, images, and masks, are indeed allegories of a ruined world and of our own nuclear predicament.

Tschumi and Libeskind have dissolved the necessity of describing them as Modern or Post-Modern; they avoid a comfortable collage technique without eschewing collage. In much recent eclecticism, the problem is that historical modes have been appropriated with too much ease. The imagination in Tschumi and Libeskind is one of a difficult, even tortured, kind. They are both theatrical, metaphysical architects, who have gone beyond conventional architecture to prophesy the necessity for a cleansing of the conventions.

Tschumi and Libeskind have been considered mere dreamers or conceptualists. Yet let us recall that dreams are a necessary form of adaptation. Without dreams, we have no way to deal with trauma and dislocation. If the dream is too mellifluous, it becomes a mere escape or screen, as in most contemporary historicism, that becomes architecture by way of nostalgia. Tschumi and Libeskind maintain a minimum of nostalgia. By inventing radical, split forms, their dreams permit a novel vision of openness that is not falsely discreet. □



Landscape art

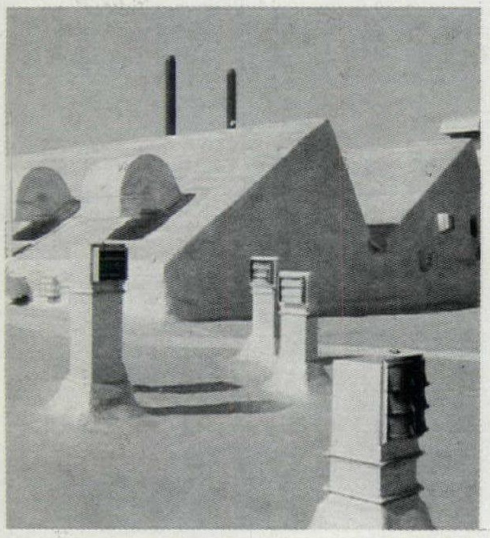
Art into landscape, Landscape into art *by A.E. Bye. Mesa, Ariz., PDA Publishers Corp., 1983, 178 pp., $26, $19.75 paper.*

In this new book, one of our foremost landscape architects outlines his approach to design, clearly detailing how he has worked with the natural environment, rather than against it, throughout his entire career. The author demonstrates and illustrates how both the intuitive and the rational approaches are used in solving clients' needs as well as in conforming to budgets, to restraints of law, and the ecological concerns. In this handsomely printed volume, a large portion of the work shown is residential, but other work is shown as well. The book concludes with a photographic essay on moods, which covers such concepts as mystery, cleanness, complexity, fragility, and elegance in landscape design. For those already familiar with Bye's work, this is a most welcome addition, indeed. For the uninitiated, it will be a gracious introduction.

Products and literature

The following items are related to the Technics article on synthetic roofing (p. 109).

Products



Scotch-Clad® coated foam roofing system is a sprayed-on, self-flashing coating that forms a seamless, weather-resistant shield tightly bonded to a sprayed urethane-foam insulation base. It also forms a seamless cove around rooftop penetrations. It is watertight, withstands normal maintenance traffic, resists ultraviolet degrading, and withstands thermal stress. It is available with UL Class A and Factory Mutual Class 1 ratings. 3M Company, Adhesives, Coatings & Sealers Div.
Circle 100 on reader service card

Flexguard Roofguard systems are cold liquid coatings of acrylic and vinyl acrylic that form a waterproof membrane on new or existing roofs. They can be used, alone or with polyester fabric, on substrates such as existing asphalt, metal, wood, and sprayed-in-place urethane foam. There are white and black formulations with special colors in some coatings mixed on request. Flexguard Corp.
Circle 101 on reader service card

Polybrane liquid roofing material forms a seamless coating when sprayed or troweled over exterior urethane foam insulation or virtually any roof or deck substrate, old or new. The flexible, tough polyurethane material contains pigments and absorbers that eliminate ultraviolet light damage. Waterproof and weatherproof, it nevertheless allows trapped moisture to evaporate. It is unaffected by heat and cold, remaining crack-free and flexible through severe freeze-thaw cycles, according to the manufacturer. Polymer Plastics Corp.
Circle 102 on reader service card

One-Kote fluid-applied elastomeric system forms a waterproof synthetic rubber membrane that resists chemical and bacterial attack and prevents lateral movement of water. Application is by brush, roller, squeegee, or spray. Cure time is 48 to 72 hours. It adheres to most construction materials including concrete, stone, brick, cinder blocks, wood, primed metal foam glass, and urethane foam. Karnak Chemical Corp.
Circle 103 on reader service card

Geotherm™ elastomer roof coating of fire-retardant acrylic polymer protects urethane foam insulation against weathering. It is water-based, with no plasticizers, and has a nonmigrating fire-retardant system. Geotherm is easily applied, cleans up with water, and is said to be environmentally safe and nonpolluting. Geocel Coating Systems, Inc.
Circle 104 on reader service card

Spray-on roof coating of polyurethane elastomer is applied over polyurethane foam to protect it from the effects of weathering, aging, and ultraviolet light exposure. Elastall® is a two-component, 90 percent solids, fire-retardant coating that is durable and flexible. Elastuff 800 has 1500 psi tensile strength and 565 percent elongation to protect polyurethane foam against abrasion and impact. Diathon® forms a membrane that is not affected by ponded water. It adheres to most surfaces. United Coatings.
Circle 105 on reader service card

Futura-Ply liquid applied roofing combines a reinforcing fabric with urethane elastomers to form a weather-resistant, waterproofing membrane. The lightweight, flexible system is 100 percent bonded to the substrate, eliminating the lateral movement of water. Futura-Ply offers design flexibility because of its ability to adhere to a variety of shapes and contours. Futura Coatings, Inc.
Circle 106 on reader service card

Elastaseal and Colorseal fluid-applied roofing materials form seamless, waterproof membranes having elasticity that accommodates normal roof expansion and contraction. Elastaseal 30 is a urethane/pitch multipolymer composition that is tough, durable, and resistant to temperature extremes, chemical attack, and biological degradation. Colorseal is an all-acrylic copolymer-base material that can be applied to pitched roofs without slumping. It is available in several colors providing solar reflectivity. London Chemical Co.
Circle 107 on reader service card

Lifetite fibrated asphalt emulsion protects roofs that have begun to crack. It also can be used with glass fiber mat to completely resurface roofs. Lifetite is cold applied by spray, broom, or squeegee. Rock-Tred Corp.
Circle 108 on reader service card

Novapren liquid-applied roofing of modified bitumen resists weather extremes and temperatures from −5 to 265 F, retaining its elasticity even at low temperatures. It is sprayed onto either new or existing roofs through a two-headed gun that applies the emulsion through one head and, through the other, a coagulant to make the coating set up quickly. The Kimmenade Corp.
Circle 109 on reader service card

Brai roofing membrane is made of either polyester or fiberglass matting impregnated on both sides with a modified bitumen compound. It is said to offer a high degree of puncture resistance, tensile strength, elasticity, bondability, high temperature resistance, cold weather flexibility, resistance to oxidation, and seam integrity. Seams are heat welded to form a single, continuous membrane. U.S. Intec, Inc.
Circle 110 on reader service card

SAM self-adhering membrane roofing is modified bitumen reinforced with a puncture-resistant web of polypropylene fibers. Overlapping edges bond securely to form a watertight surface. Small holes tend to self-seal in the sun's heat; major damage can be patched quickly. Although it is not usually required, ballast can be applied as extra protection against weather extremes. Apache Building Products Co.
Circle 111 on reader service card
[*Products continued on page 134*]

Products continued from page 132

Rhinohide™ MB/R roof systems resist roof traffic damage, aging, ultraviolet light deterioration, thermal shock, puncturing, and splitting. Four finishes available are slate aggregate, aluminum, copper, and black. The roofing has a bonding resin built into the material which is activated by propane torch as the roofing is laid out. Seams are heated and compressed with a trowel. Ballast and mechanical fasteners are not required. Monroe, Inc.
Circle 112 on reader service card

Awaplan MB/R roofing is an asphalt-saturated mat of multidirectional polyester fibers with asphalt coating on the underside and mineral granules embedded in the top. It provides a tough, weather-resistant and wear-resistant surface on new roofs or on existing gravel-surfaced or inorganic smooth-surfaced membrane roofs. Colors are white or black. Tamko Asphalt Products, Inc.
Circle 113 on reader service card

Derbigum® HPS MB/R roofing has a multidirectional tensile strength of 200 psi, greater than that recommended by the National Bureau of Standards for bituminous membranes. Triple reinforcement of glass fiber weathering mat, interior glass fiber web, and woven polyester core provides dimensional stability. The material has a built-in adhesive that is torch-bonded to the substrate. It is compatible with most commonly used construction materials and requires no granular cover. Owens-Corning Fiberglas Corp.
Circle 114 on reader service card

Veral roofing has a base ply of Irex high-melt, glass-reinforced asphalt and a top ply of Veral woven glass-reinforced modified asphalt with a protective metal foil facing. A thin layer of low-melt asphalt beneath channels in the foil facing accommodates the different expansion rates of the foil and the asphaltic materials. Foil finishes available are copper, reflective aluminum, and chemical-resistant stainless steel. Siplast.
Circle 115 on reader service card

Nuralite mineral-reinforced bitumen roofing is easily fabricated to conform to varied deck configurations and roof penetrations. It resists atmospheric corrosion even in industrial and coastal areas. It has UL Class A and B and Factory Mutual Class 1 ratings. It can be used for flashing and gutter details for a homogeneous roof having uniform coefficient of expansion. It is especially suitable for reroofing applications since it usually can be applied without tearing off the old one. Hitchins America, Inc.
Circle 116 on reader service card

Dibiten one-ply roofing, manufactured in Italy, is a plasticized bituminous membrane with either polyester or fiberglass core, which is extruded to various thicknesses. It is Factory Mutual-approved for fire resistance and wind uplift resistance. The material bonds to most surfaces, requiring no adhesives or sealants. It can be installed over existing roofs of asphalt or tar pitch provided they are clean and free of loose ballast or debris. The material is unaffected by standing water and ultraviolet light and does not require ballasting or coating. Bowe Company, Inc.
Circle 117 on reader service card

GRM self-adhesive MB/R roofing system is a composite of waterproof polyethylene bonded to a thick layer of rubberized asphalt. Rolled out on the prepared and primed roof deck, it adheres tightly without adhesive, heat, hot materials, ballast, or special equipment. GRM withstands temperature extremes and resists thermal shock. It is lightweight, flexible, self-sealing in the case of small punctures, and easily repaired when accidentally damaged. Construction Products Div., W.R. Grace & Co.
Circle 118 on reader service card

KMM MB/R membrane is offered in two types. KMM standard is five-ply construction with a polyethylene core protected on both sides with modified bitumen and an outer layer of polypropylene. KMM aluminum membrane has a top layer of aluminum sheet instead of polypropylene. The standard membrane is loose-laid, topped with in-

sulation, a stone mat, and gravel. The aluminum membrane, either cold- or hot-applied, is used on sloping roofs, those with load restrictions, or where a smooth surface is desired. Koppers Co., Inc., Building Materials Div.
Circle 119 on reader service card

CoolTop 40 sheet produced from Dow Chemical's chlorinated polyethylene (CPE) is reinforced with Celanese Fortrel® fibers for puncture resistance and dimensional stability. It is reflective white for energy saving, and since it is installed with mechanical fasteners, without ballast, it adds less than a half pound of weight per square foot to the roof structure. Membrane sheets are heat welded to provide a waterproof surface and are fastened with corrosion-resistant metal plates and screws to provide anchorage. Cooley Roofing Systems, Inc.
Circle 120 on reader service card

Parsec Reflective Roofing of specially coated, heavily aluminized film provides a highly reflective surface that reduces the heat normally absorbed by conventional roofing materials. The single-ply roofing is applied with adhesive that is aggressively pressure sensitive. It resists UV degradation, oxidation, and corrosion. Parsec, Inc.
Circle 121 on reader service card

Clarmac RM single-ply roofing membrane is a flexible, asphalt-impregnated polyester fabric. It is applied directly over a tack coat, then covered with a finish coat of emulsion or hot-mopped asphalt. Aggregate topping is optional. The membrane is suitable for new roofs, wooden or steel decks, and for roof patching. Clark-Cutler-McDermott Co.
Circle 122 on reader service card

Single-ply roofing of PCR-30 Celanese Fortrel® polyester fabric with seven coats of Trimeric polyester resists UV light and microorganisms. It has excellent tear and puncture strengths, is impervious to most caustic chemicals and acids, and is not affected by temperature extremes. It is mechanically fastened and needs no ballast. It reflects up to 85 percent of the sun's heat. Duro-Last Roofing, Inc.
Circle 123 on reader service card

Isofoam rigid urethane foam spray-applied to roofs provides low-cost, seamless roof insulation. It bonds securely around cornices and in valleys. A membrane coating is required to prevent UV and moisture degradation. Witco Chemical Corp., Isocyanate Products Div.
Circle 124 on reader service card

Hi-Tuff single-ply roofing is heat-sealable, scrim-reinforced rubber membrane. Made from Du Pont's Hypalon chlorosulfonated polyethylene, the vulcanizable material retains flexibility for a long period of time. Its welded seams and mechanical attachment to the roof with fasteners hold it secure against wind uplift. It is compatible with asphalt, making it suitable for reroofing applications over built-up roofing. J.P. Stevens & Co., Inc., Elastomeric Products Div.
Circle 125 on reader service card

The Interoof™ mechanically attached roofing system is lightweight, resistant to ultraviolet light, and has high dimensional stability. Consisting of PVC-coated metal strips and wear-resistant 60-mil-thick membrane, it maintains flexibility for the life of the product. The company's solvent welding machine speeds application of the roofing by welding the membrane to the PVC strips and then welding the seams together. IPW Interplastic, Div. of Semperit of America, Inc.
Circle 126 on reader service card

Nerva-Ply® PVC is single-ply roofing membrane for flat roofs having slopes of less than 1 inch per foot. The waterproof, flexible material is made with inhibitors that prevent ultraviolet light damage. The membrane can be laid over roof deck or roof insulation and ballasted with gravel. Standard sheets can be factory assembled into large, roof-size dimensions. Rubber & Plastics Compound Co., Inc.
Circle 127 on reader service card

Flexhide® 34 PVC (polyvinyl chloride) roofing membrane waterproofs low-slope roofs by solvent- or heat-welding lapped sheets to form a watertight cov-
[*Products continued on page 136*]

Products continued from page 135

ering. It is attached to the roof perimeter and openings, then covered with washed round gravel. The material is UV, oxidation, and fungus resistant, but requires a separation system if it is used over asphalt, coal tar pitch, or petroleum products. Weather-Shield Systems Div., U.S. Mineral Products Co.
Circle 128 on reader service card

Silicone single-ply roofing combines silicone rubber and fiberglass to form an inorganic, weather-resistant system with a Class A/B fire rating. The white membrane reflects over 90 percent of the sun's rays and resists UV light and most chemicals. It is fully adhered with silicone adhesive to insulation board that is mechanically fastened through the deck. It requires no ballast, which eliminates the problem of adding significant weight to the structure. Otto Fabric Inc.
Circle 129 on reader service card

AlphAgard™ PIB roofing membrane has a UL fire rating of Class A and Factory Mutual wind test rating of I-90. It is applied with hot asphalt or cold adhesive and has a prefabricated self-sealing edge for faster application and long-term waterproofing. The unballasted roofing reduces deck load. It is resistant to weather, UV light, normal industrial gases, and natural aging, and is compatible with bitumen. AGR Company.
Circle 130 on reader service card

Roofing and flashing system consists of rigid polyurethane foam insulation and a white elastomeric coating. The insulation is sprayed in place in layers to the desired thickness, followed by sprayed or roller-applied coating. Applied over a noncombustible deck, it has a UL Class A rating. Its reflective surface reduces heat absorption, and the material resists dirt to remain white. The coating also allows trapped moisture to escape, although it bars entry of water. Carpenter Insulation & Coating Co.
Circle 131 on reader service card

RubberGard™ EPDM roofing membranes are waterproof and resistant to ozone, ultraviolet light, and weather. The sheet is available in two sizes: 45 mils thick in panels up to 40′ x 150′; and 60 mils thick in 54-inch and 10-foot widths, up to 150 feet long. Also available is RubberGard Neoprene Form Flash self-curing flashing that is adaptable to irregular surfaces and is both weather resistant and impervious to water. Firestone Industrial Products Co.
Circle 132 on reader service card

SuperRoof® is a tough, flexible, EPDM rubber membrane one-piece water barrier applied over the entire roof. Large sheets are adhesive-bonded in place, forming a covering that stretches with building movement and resists deterioration from ultraviolet light, ozone, atmospheric chemicals, and other conditions. A white EPDM installation, reflecting up to 60 percent of solar-induced heating, reduces energy costs of air-conditioning. Proco Protective Coatings, Inc., of Fort Wayne.
Circle 133 on reader service card

Talc-free EPDM roofing membrane is ready for field seaming, without cleaning, using a two-inch-wide self-vulcanizing tape. Called Super-Seam, it requires no cleaning, priming, adhesive, or caulking and offers expected labor savings of approximately 40 percent. It can be ballasted, batten-fastened, or fully adhered. The material withstands temperatures from −50 to 240 F without cracking or deteriorating and has good elongation properties. Benoit, Inc.
Circle 134 on reader service card

Whaleskin/81™ roofing membrane is made from Uniroyal's Royalene® EPDM rubber in sheets 10–40 feet wide and up to 200 feet long. Available in black, gray, and white, the material resists ultraviolet attack, organic decomposition, weathering, and ozone. Five application techniques include loose-laid and ballasted, totally adhered, plate-bonded, grid-adhered, and reverse furred. The ballasted roofing system is classified by Underwriters Laboratories and used in the construction of Class A roofs. Kelly Energy Systems, Inc.
Circle 135 on reader service card

GAFPLY-EP single-ply roofing systems are made from EPDM rubber. The material is said to offer superior weatherability, demonstrated in continuous-exposure applications for more than 15 years. The system is designed for fast, cost-effective applications that provide long-term performance with a minimum of maintenance. GAF Corp.
Circle 136 on reader service card

Literature

Versigard EPDM single-ply roofing provides a waterproof, weather-resistant surface that can be loose-laid and ballasted, fully adhered, or mechanically fastened. It expands and contracts with fluctuating temperatures to absorb thermal shock and freeze-thaw cycling without rupturing and is easily installed in almost any weather conditions. Product description, application criteria for the three kinds of installation, installation details, and physical data are covered in an 8-page brochure. The Goodyear Tire & Rubber Co.
Circle 200 on reader service card

The SPM roofing system is a single EPDM membrane, insulation, adhesives and sealants, and accessories for expansion joints, vent pipes, drains, and fascias. The sheet is either 45 or 60 mils thick, supplied in rolls up to 125 feet long and 4 feet-6 inches to 40 feet wide. It resists tears, punctures, and abrasion, is UV stable, and withstands a surface temperature of −75 to 300 F. Information about the SPM system is available in an 8-page brochure. Manville Building Materials Corp.
Circle 201 on reader service card

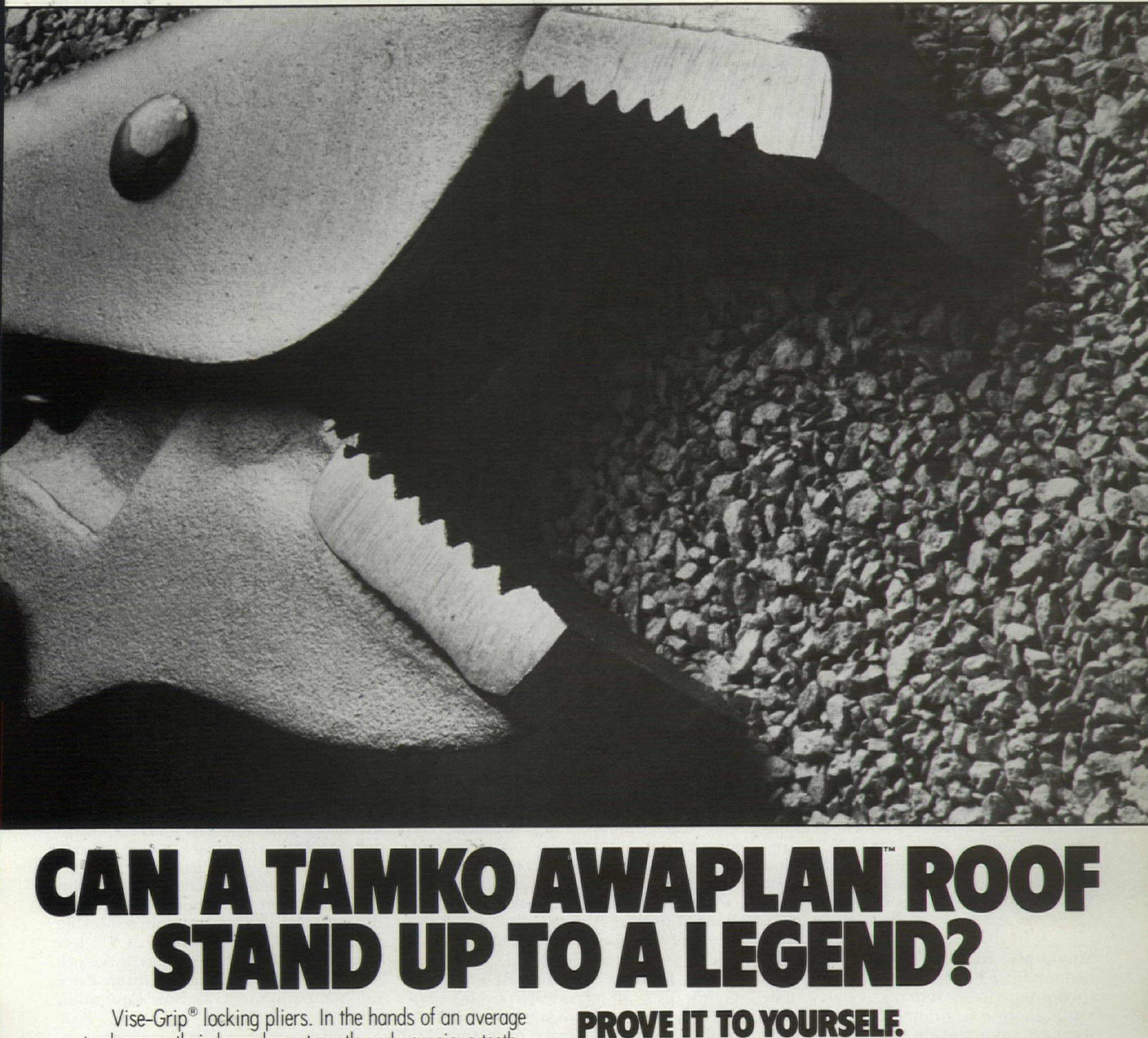
The SMI EPDM rubber roof system can be installed partially adhered and plate bonded, fully adhered, or loose-laid and ballasted, depending upon roof configuration and strength. The white roofing sheet is resistant to weather, ozone, and UV breakdown. Elongation of 300 percent allows it to be installed continuously up parapets and projection curbs. An 8-page brochure describes the system and provides application and technical data, along with detail drawings and photos. SYenergy Methods, Inc.
Circle 202 on reader service card

Sure-Seal® roofing systems include EPDM elastomeric membranes, insulation, fastening systems and bars, flashing, adhesives, and edging. Elasticity of 250–300 percent allows the membranes to withstand normal building movement without cracking, rupturing, or leaking. An 8-page brochure describes several single-ply roofing systems, including Liquiseal® liquid membrane and M.A.R.S. mechanically attached roofing system, with detail drawings illustrating each type. Carlisle Tire & Rubber Co.
Circle 203 on reader service card

Single-ply elastomeric roofing systems for commercial buildings include EPDM and neoprene. EPDM offers excellent resistance to many chemicals, acids, and vegetable oil products. Neoprene offers greater resistance than EPDM to petroleum contaminants. The roof membrane's elongation of at least 300 percent accommodates structural movement. An 8-page brochure covers applications, properties, typical installation details, and specifications for four types of roofing: adhered, disc adhered, ballasted, and mechanically fastened. WeatherGard Building Products Co.
Circle 204 on reader service card

Hydro-Seal™ roof membrane of EPDM sheet rubber can be used for new roofing or reroofing. It is a flexible, single-ply, elastomeric, watertight material that can be ballasted, fully adhered, mechanically fastened, or applied by the IRMA method. It can be applied to concrete, steel, or wood decks, and is adaptable to
[*Literature continued on page 138*]

TAMKO AWAPLAN™ VS. THE LEGENDARY VISE-GRIP® LOCKING PLIERS



CAN A TAMKO AWAPLAN™ ROOF STAND UP TO A LEGEND?

Vise-Grip® locking pliers. In the hands of an average tradesman, their legendary strength and voracious teeth will gouge wood, bend steel, and rip tin like butter.

So how much damage could they do to our AWAPLAN modified asphalt roof? We tried twisting, bending, and pulling. Even ripping it. The results?

Twisting for Ambient Flex: No Failure.

Bending at 0°F for Cold Flex: No Failure.

Pulling for Tensile Strength: No Failure.

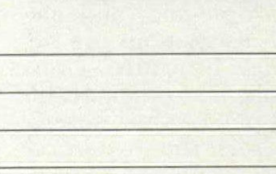
Ripping (just to be extra mean): No Failure.

In all fairness we then tried the same over-abuse with other roofing materials. The Vise-Grip® locking pliers lived up to their legend. The competition did not.

But why take just our word for it?

PROVE IT TO YOURSELF.

O.K. Tamko, I want to see the results.



☐ Please send the newest AWAPLAN brochure.

☐ Have your sales rep call me.

TAMKO TOUGH awaplan™
Modified Asphalt Roofing System

NAME ______________________

TITLE ______________________

COMPANY ______________________

ADDRESS ______________________

CITY/STATE/ZIP ______________________

TELEPHONE NUMBER ______________________

Mail to: **TAMKO Asphalt Products, Inc.**
P.O. Box 1404, Joplin, MO 64802 417-624-6644

Circle **No. 367** on Reader Service Card

Literature continued from page 136

any design, including domes, peaks, or barrels, as well as flat roofs. Hydro-Seal is described in a four-page brochure. American Hydrotech, Inc.
Circle 205 on reader service card

Celo-1 EPDM single-ply roofing is compatible with aged asphalt roofing products. It can also be loose-laid directly over foam insulation or asphaltic-coated facers. It will accommodate normal building movement and has a service temperature range of −75 to 300 F. It can be loose-laid with ballast, fully adhered, or mechanically fastened. Product information, specifications, and application instructions are provided in a 16-page brochure. The Celotex Corp.
Circle 206 on reader service card

Geoflex® PIB single-ply roofing has a Class A Underwriters Laboratories rating and an I-90 wind resistance Factory Mutual rating. The elastomeric membrane consists of 60-mil-thick polyisobutylene reinforced with 40-mil-thick synthetic felt backing, which can be mechanically fastened, adhered, or ballasted. It is waterproof and resistant to ultraviolet rays, weather, and most airborne chemicals. A 24-page brochure illustrates installation steps and provides specifications. Republic Powdered Metals, Inc.
Circle 207 on reader service card

PIB (polyisobutylene) membrane roofing can be applied to most surfaces in most weather conditions, either loose-laid with ballast, permanently bonded, or mechanically fastened. It is compatible with other roofing and building materials and can be applied over asphalt or coal tar pitch. A 4-page brochure describes the system, and provides a table of physical properties. PIB Roofing Products and Systems.
Circle 208 on reader service card

Single-ply roofing brochure lists the benefits of EPDM, Neoprene, and PIB (polyisobutylene) systems. Charts show application techniques, compatible flashing, color choices, and UL and Factory Mutual approval classifications for each. A table of typical chemical resistance shows time to failure for the three types. Photos of actual installations are included in the 12-page brochure. Gates Engineering Co., Inc.
Circle 209 on reader service card

Polymeric (PVC) roofing membranes for fully adhered, loose-laid, and mechanically fastened installations are described in an 8-page brochure. Cross sections, edge details, and other details are illustrated, and photos show several types of roofs on which the membrane was used. Guide specifications and technical data on physical properties are included, along with a list of roofing projects. Sarnafil, U.S., Inc.
Circle 210 on reader service card

Flag single-ply PVC roofing membranes include: Flagon® C loose-laid with ballast for flat roofs; Flagon SF fully adhered, suitable for flat, sloping, domed, and unballasted roofs; and Flagon MF mechanically fastened systems. Descriptions, installation information, and physical properties, along with detail drawings, are provided in a 4-page brochure. WatPro.
Circle 211 on reader service card

Trocal® SMA roofing of polyvinyl chloride is a stretchable thermoplastic sheet that is loose-laid and solvent-welded into a one-piece skin. It is fastened at roof edge and roof penetrations, then ballasted with washed gravel. It can be installed at temperatures from below freezing to uncomfortably hot and in wet, snowy, or humid weather conditions. The system, its application, detail drawing, and specifications are covered in a 24-page brochure. Trocal Roofing Systems, Dynamit Nobel of America.
Circle 212 on reader service card

Plyroof® single-ply roof sheetings include Plyshield™ Neoprene, Plyseal™ EPDM, and Plyroof® PVC. All are sealed on the roof to provide a barrier to rain, snow, and ice, and the ponding they may cause. They are flexible at subfreezing temperatures and will not split or crack. Technical data for each type is available in a 12-page booklet. Plymouth Rubber Co., Inc.
Circle 213 on reader service card

BRAAS Rhenofol® single-ply PVC roofing is available in two ballasted systems for flat roofs sloping no more than 1½ inches in 12 inches, and a mechanically fastened sheet reinforced with fabric for dimensional stability and strength. It is ultraviolet stable and contains antioxidants. The roofing systems, materials, and installation methods are covered in an 8-page illustrated catalog. Barra Corp. of America.
Circle 214 on reader service card

NRCA Roofing Materials Reference & Guide lists all elasto/plastic sheet-applied roofing membrane and built-up roofing products being distributed in the U.S. The guide is published three times a year, allowing it to be updated every four months. The annual subscription rate is $85; information is available from the National Roofing Contractors Association, 8600 Bryn Mawr Ave., Chicago, Ill. 60631.

Building materials

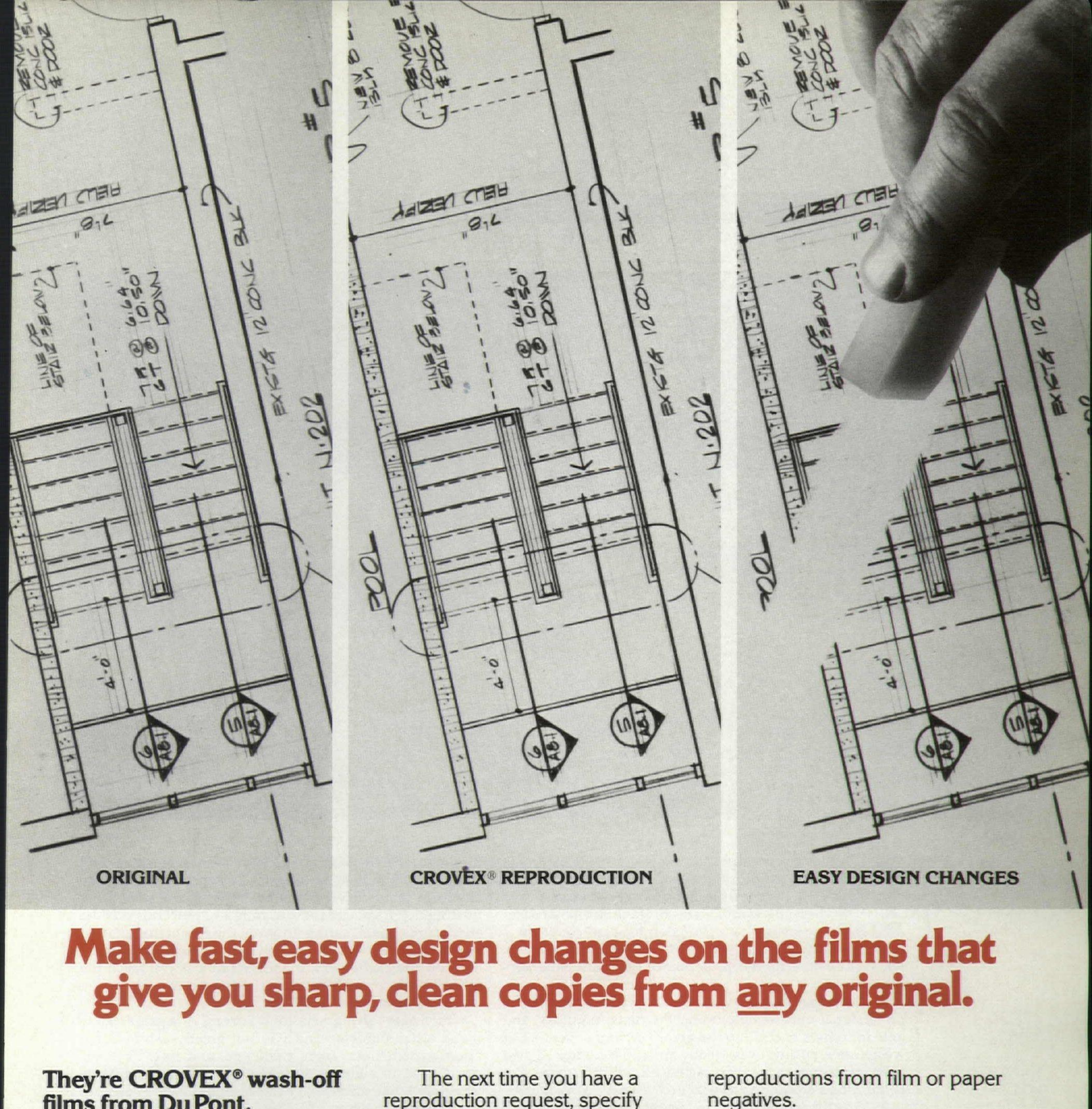
Major materials suppliers for buildings that are featured this month as they were furnished to P/A by the architects.

Toledo Museum of Art, Toledo, Ohio (p. 66). *Architects: Hardy Holzman Pfeiffer Associates, New York.* Granite, brick: Woodbury Granite. Marble: Tennessee, White Vermont. Gallery partitions: Finland Multi-lam. Skylights: Fisher. Doors: Ellison, Falconer, Atlas. Ceiling: U.S.G. Acoustical Tile. Waterproofing: Thoro System. Insulation: Owens-Corning. All glass: Libby-Owens-Ford Co. Paint and stain: Cheesemen-Debovoise, Pratt & Lambert. Hardware: Stanley, Sargent, Adams Rite, LCN, Richard Wilcox, Grant, Edison Price. Kitchen: Dwyer. Fire alarm: Honeywell. Lockers: American. Fire Doors: Saino. Fire vents and hatches: Bilco. Dock levelers: Rite-Hite. Elevators: Haughton. Handrails: Livers Bronze. Lighting: Cole Lighting, Edison Price. Plumbing and sanitary: Crane, American-Standard, Sloan Valve Co., Sanymetal Co., Haws, Elkhart. HVAC: McQuay, Westinghouse, Honeywell. Carpets: Mohawk.

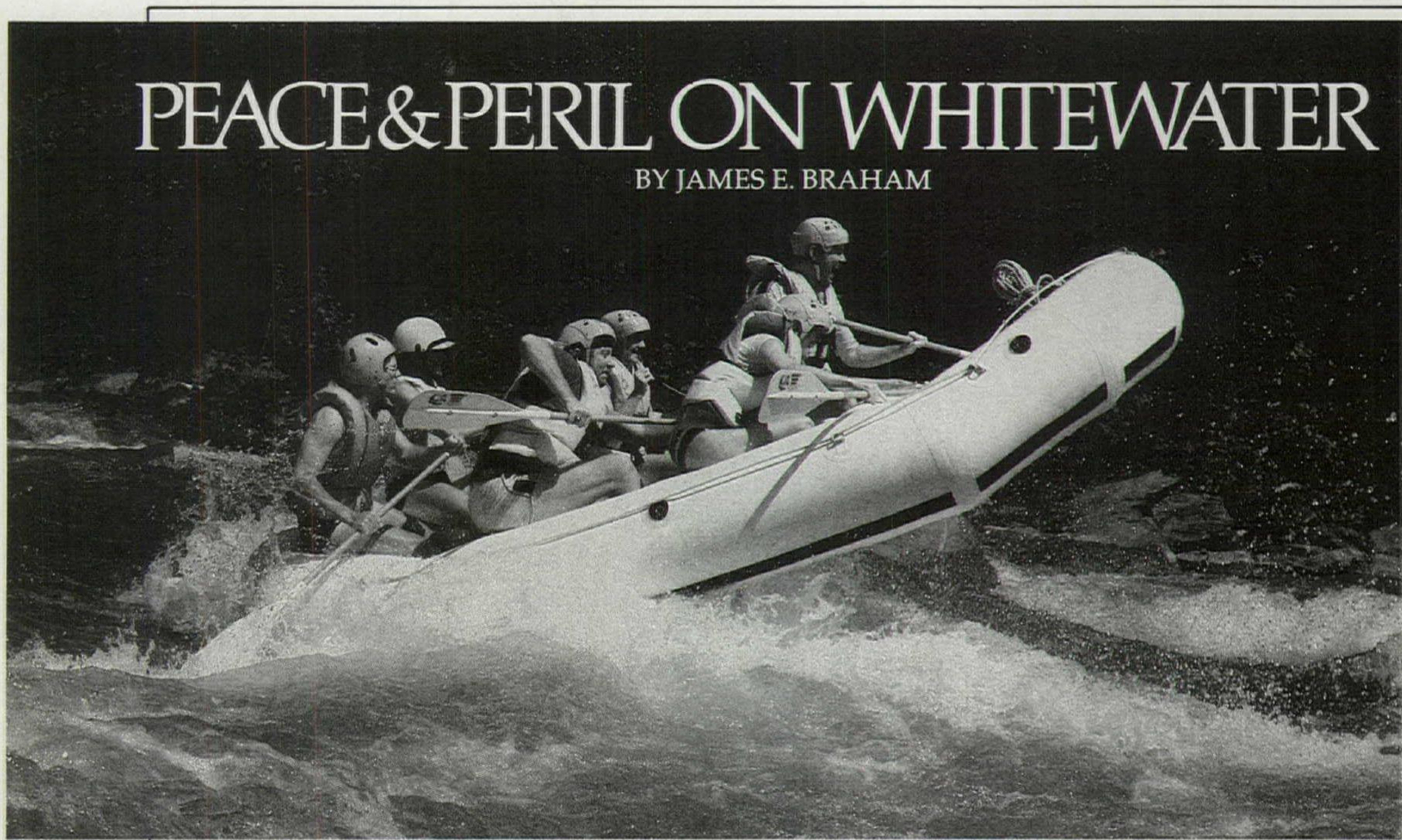
Dayton Art Institute Propylaeum, Dayton, Ohio (p. 72). *Architect: Levin Porter, Dayton, Ohio.* Steel and steel bar joists: Andrew Plocher. Windows: Kawneer. Skylights: Naturalite. Revolving door: Crane. Wood doors, handrails, and reception desk: Ted Bolle Millwork. Hollow metal doors: Republic Steel. Side coiling metal grille: Jim Walters. Brick: Uni-Stone Pavers. Quarry tile: Forms & Surfaces. Carpet: Lees. Glass block: Circle Redmont. Gypsum board: Imperial Plaster. Acoustic tile: Armstrong. Waterproofing/sealants: Vulkem/Celotex. Roof and deck drainage: Wade. Steel stud partitions: INRYCO. Paint: Sherwin-Williams. Hinges: Hager. Other hardware: Sargent. Security system: Wells Fargo. Elevators: Otis. Lighting: mcPhilben, Hubbell, Prescolite, Art Metal, ITE, Omega, Lightolier, Columbia. Heating system: Trane. Controls: Johnson Controls.

National Gallery of Art, ground-floor renovations, Washington, D.C. (p. 76). *Architects: Keyes Condon Florance, Washington, D.C.* Interior paint: Duron Paints. Acoustical panels: Designer Acoustics; yachting cotton panel finish, Gretchen Bellinger. Carpeting: Bloomsburg Carpet Industries. Marble: Formai & Mariani, Italy. V.A.T. floor covering in service areas: Azrock. Incandescent lighting: Edison-Price. Kitchen equipment: LeBow Equipment Co.

The Environmental Education Center, Liberty Park, N.J. (p. 88). *Architect: Michael Graves, Architect.* Glue-laminated timber, tongue & groove wood decking: Wood Fabricators, Inc. Metal windows: Hopes. Glass Block: Pittsburgh Plate Glass. Wood doors: Schroeder Bros., Co. Carpet: Mohawk. Weathering copper: Architectural Engineering Products. Batt and tapered rigid roof insulation: Super "K" Industries. Kitchen unit: Dwyer Products Corporation. Lavatories, toilets, and urinals: American-Standard. Washroom accessories: Accessory Specialties, Inc. Electric roof mounted heat pumps: Trane.


ORIGINAL
CROVEX® REPRODUCTION
EASY DESIGN CHANGES

MANAGEMENT
PERSONAL TIME
MONTHLY SECTION ON TRAVEL AND PERSONAL INTERESTS



PEACE & PERIL ON WHITEWATER
BY JAMES E. BRAHAM

Photo/Ciro Pena

Not everyone can paddle away from the corporate world as John Burton did, shucking his three-piece suit for swim trunks and life vest. Not everyone would want to, leaving a job as security analyst for a Philadelphia bank to return—with a healthy slash in salary—to the wild whitewaters where he had achieved prominence as a national champion canoeist.

For John Burton, however, becoming a "river runner," a professional outfitter providing instruction, guides, and gear for others to thrill to the grand outdoor adventure of whitewater rafting, was "really great." He adds: "I had been canoeing and kayak racing all my life. Now I'm combining avocation and vocation."

As director and co-owner of Nantahala Outdoor Center, Bryson City, N. C., he is, says his older brother Bob, "the happiest man alive. . . . But it's not for me. I couldn't live in the middle of nowhere, and I *like* the business world."

A vice president of the Goldman Sachs & Co. investment brokerage office in Houston, Bob Burton also enjoys riding the rapids. But, like an increasing number of executives, only as a break from business. He and his son have rafted on the Nantahala River, and this summer were set to ride the rapids of the more challenging Chattooga, location for "Deliverance," the movie which did so much for the popularity of whitewater rafting.

Riding an inflatable rubber raft through whitewater (moving water that turns turbulent or frothy by passing over rocks) is a memorable experience. It has been a few years since Bob Rogers rode the Rio Grande in Texas and Colorado, and the Salmon in Idaho, but the president and CEO of Texas Industries Inc., a Dallas gravel and concrete firm, still thrills to "the contrast between the serenity of floating down a placid river, so calm and peaceful you hear all the birds, then hearing up ahead the roar of the falls and rapids you're about to enter. The serenity turns into apprehension and excitement, then into relief as you reach the other side in one piece. Sometimes even staying in the raft," he chuckles.

Whitewater rafting, says John Burton, is "a great way to spend a day outdoors and it's fun, greatly exhilarating. There's excitement, some challenge, and risk. The best rivers have an element of danger that raises the anxiety level—and that makes it *very* interesting."

A fun test. To Melvyn N. Klein it is an "adventure." Says the president and CEO of Altamil Corp., a Corpus Christi, Tex., manufacturer: "You're out in the wilderness and it's a test of skills, mental and physical agilities."

John C. Whitehead, senior partner in Goldman Sachs' New York headquarters, calls whitewater rafting "as much of a change from the active business world as you can possibly get, far away from civilization and the telephone. You see absolutely beautiful country and you see how a group of people, most of whom don't know each other, become close friends and a unit that works so well together in such a short time."

For the last four years Mr. Whitehead has gone rafting with the Outward Bound School groups assembled by American Stock Exchange Chairman Arthur Levitt Jr. These trips, about a week apiece, have taken them down the

PERSONAL

Colorado (whose passage through the Grand Canyon remains the "granddaddy" of whitewater rivers), the Green in Utah, the Rogue in Oregon, and the Chattooga in South Carolina and Georgia.

"The purpose," Mr. Levitt explains, "is to get people who are sometimes in adversarial roles to begin a better dialog and work together under stressful circumstances. The benefits are a greater appreciation of your own limits and greater understanding of the environment that many city dwellers can't comprehend. Yes, it's a lot of fun. Is it dangerous? No, the safety standards [of the outfitters] make it safer than walking across Broadway and 42nd Street. The stress is more cerebral than physical."

Before challenging the Chattooga, for example, the group even practiced "swamping," or deliberately capsizing, on the nearby Ocoee River. Rafters need not know how to swim (since life jackets and sometimes even helmets are required dress), but they should know how to handle themselves in the river. Instructions: float on your back, knees up and feet downstream—so that your head doesn't strike a rock, one of the major dangers. Don't try to stand—your foot could get stuck between rocks and then the current might drag you under.

The teamwork required to follow the guide's instructions impressed Mr. Klein the most. The guide generally takes his party (usually four other people on a raft) through the first rapids, but after this he fades into the background, letting the others take turns steering and acting as "captain."

Read the rapids. The group learns to pull the raft over to shore and then walk ahead and study a rapids, plotting their course, before attempting to maneuver through it. They must "read" the water, which changes daily. For safety's sake, they must spot any dangerous rocks ahead of time.

"A good rafting crew knows what to do before you hit the rapids," says Mr. Klein. "Then somebody steers and everybody else paddles as fast as he can. It takes lightning reactions and split-second timing."

"It's not like going fishing, where you can think about other things. You don't have time," points out Atlanta outfitter Claude Terry of Southeastern Expeditions Inc. "You're caught in a rush and you have to obey the guide and his signals and do it quickly—or else you'll be upside down, or pinned on a rock, or swimming in a river."

Mr. Whitehead admits to "moments

of nervousness. Maybe you don't want to go through the rapids, but there's a certain group pressure to do it. It's interesting to see how leaders develop, how people with certain abilities cope with situations like this," he says. And it's not always the top executives who take charge; sometimes their juniors become the leaders on water.

Except for people with severe physical limitations, nearly anyone—even children—can enjoy some level of whitewater rafting. It is not nearly as difficult as canoeing. "We require no experience of any kind," John Burton says. "The only thing we recommend is that they not be afraid of the water."

Skip Class VI. The degree of safety (and enjoyment) depends largely on the river, and whitewater rapids are classified in terms of strength and turbulence—from Class I (very small rapids, slow current, no obstructions, great for beginners) to Class VI (nearly impossible, for experts only, to be taken at risk of life). A "quality" whitewater river will feature a drop in gradient (slope) of 30 ft to 50 ft and more per mile; high water levels from heavy snows, spring thaws, or dam control; and natural ledges, falls, dams, eddies, and obstructions.

Although many ride the rivers on their own, it's wisest to go with an experienced professional outfitter, licensed (by such agencies as the Forest Service and the National Park Service) to operate on certain rivers.

Three good sources for choosing a reliable outfitter are the Eastern Professional River Outfitters Assn., Ocoee, Tenn.; the Western River Guides Assn., Denver; and the Idaho Outfitters & Guides Assn., Boise.

Rafting season in the U. S. normally runs from April to October. In the East, where trips run from half a day to two days, tops, reservations are usually made a month or two in advance for weekends. Out West, where trips run up to three weeks, they're frequently reserved a year ahead. Rates range from $15 to $30 for a half-day and $30 to $80 a day (depending on the river) to $750 for a six-day vacation trip down the Middle Fork of Idaho's Salmon River, and $1,050 for a 14-day Grand Canyon trip.

The Appalachian region probably offers the finest opportunities for whitewater rafting in America. West Virginia is a hotbed. The Gauley River, 25 miles of continuous whitewater with over 50 major rapids, is considered the premier river of the East.

Paddler's paradise. The Youghiogheny in southwestern Pennsylvania is the most popular eastern river, with the "Upper Yough" rated one of the most difficult of all whitewater stretches. The Lehigh is another paddler's paradise in Pennsylvania, and Wisconsin's Wolf River is said to contain the wildest water in the Midwest.

Besides the Colorado and other rivers already mentioned, the great western whitewaters include the Tuolumne in California (perhaps the most challenging in the West) and the Forks of the Kern and the South Fork of the American, both in California. The Snake River float trip through Jackson Hole, Wyo., is one of the most popular trips in the world.

"With the western rivers, once you enter a canyon, there's no exit," Mr. Whitehead observes. "You must go down the river for about five days. There's no communication and no other way out. There's a sense of absolute isolation."

What is considered the "ultimate whitewater, the world's wildest river run commercially" is the Bio-Bio in Chile. It's among the many exotic tours offered by Sobek International Explorers Society, Angels Camp, Calif. Its 14-day trip, which includes an "overnight train ride Orient Express-style," is $1,870.

The amount of paddling on most trips is largely left up to you. On the shorter trips in the East, most rafters choose to actively participate. But in the West, rafts are also powered by oar (the guide does all the work) or motor. Outfitter Bob Bolpert reports: "On our six-day trips, most people paddle two days and then want to sit back and relax." Mr. Bolpert is another former businessman; he gave up his job as a stockbroker to start Outdoor Adventures, San Francisco.

Besides consulting the outfitters, executives planning to whitewater for the first time are advised by Mr. Levitt to "read as much as you can about where you're going to go rafting. Part of the special pleasure is to understand the terrain, animals, plant life, and geology."

One should also try to leave the business world behind—unlike the Manhattan brokerage partner whom one outfitter can still picture. "We were floating [down the Salmon River] by a number of ranches, very isolated places. Their only contact with the outside is by radio telephone, and the phones are supposed to be for emergency use. Well, we stopped at one of these places and this man asked to use the phone. You know, he called to see how the market was doing!" ■

Job mart

Situations Open

Aggressive Independent Representatives Wanted for select territories. PHD Industries is a leading manufacturer of contemporary interior metal architectural surfacing products of exceptional quality. Our line includes color-coordinated metal ceilings, mouldings, facias, wall panels and tambour. Finishes include chromes, brasses, copper and more. Applicants please send resume, including lines carried and territories now covered, to PHD Industries, 3120 Clybourn Ave., Burbank, CA 91505.

Andrew Mellon Professorship in Architecture: The Department of Architecture, Carnegie-Mellon University wishes to announce the availability of a new honorary professorship. The position is intended for candidates with distinguished contributions to the practice and teaching of Architecture and who are interested in committing themselves to full-time teaching responsibility. The position is expected to be filled by the 1984–5 academic year. Forward information about possible candidates to Ömer Akin, Head, Department of Architecture, Carnegie-Mellon University, Pittsburgh, PA 15213.

Andrew Mellon Visiting Professorship in Architecture: The Department of Architecture, Carnegie-Mellon University wishes to announce the availability of a new honorary professorship position on a visiting basis. The position is intended for candidates with distinguished contributions to the practice and teaching of architecture and who are interested in committing part of their time to teaching on a regular basis. The position is expected to be filled by the 1984–5 academic year. Forward information about possible candidates to Ömer Akin, Head, Department of Architecture, Carnegie-Mellon University, Pittsburgh, PA 15213.

Architect/Building Shell Engineer—The City of Austin Electric Utility is seeking a qualified Architect or Architectural Engineer for a position with its new Division of Energy Policy & Program Development. The City is committed to developing conservation and load management programs which will achieve 550 megawatts of peak demand savings for the Utility by 1996. The Energy Policy & Program Development Division will have primary responsibility for designing the programs to meet this ambitious goal. The Architect/Building Shell Engineer position requires 4 years experience in building design energy performance analysis, coupled with a degree in Architecture or Architectural Engineering. Experience with electric utility or governmental energy conservation programs, passive solar design and energy efficient construction techniques preferred. Hiring salary $25,459–$33,446/annually, depending upon qualifications. The City of Austin offers an excellent benefits package. For immediate consideration, please expedite your resume, including salary history, to The City of Austin Personnel Dept., P.O. Box 1088, Austin, TX 78767. Request application form, as deadline for applying is August 26, 1983. Additional information about this position may be obtained from Laura R. Doll, Division Manager, City of Austin Electric Utility, P.O. Box 1088, Austin, TX 78767. We are an equal opportunity employer. Individuals only apply.

Architect (D.O.T. 001.061-010) for European design firm. Duties will include providing professional services in research, development, design, and construction of buildings. Will plan layout of projects and integrate engineering elements with unified design. Will assist client in obtaining bids and awarding construction contracts. Will travel to Belgium and France to purchase furniture to furnish the projects built by the firm and will consult with experts on European design. Salary: $1,250/mo.; 8:00 a.m.–5 p.m.; 40 hrs./wk. Must have B.A. or equivalent in architecture. Requires six months experience. Must be able to speak fluent French and Dutch. Contact Talbott Wilson/Associates/Inc., 2223 West Loop South, Suite 515a, Houston, Texas 77027, (713) 626-0350.

Architect: Design-oriented Maine A/E firm seeks Architect with strong skills in design and project management, NCARB certification, and minimum five years experience as a Project Manager required. Send resume and salary history to: Harriman Associates, 292 Court Street, Auburn, Maine 04210. Equal Opportunity Employer M/F

Architectural Designer for Florida A & E firm, 3 years in commercial and medical design and renderings. Send resume to: A & E Design, Inc. 5644 N. Dale Mabry, Tampa, FL 33614.

Architectural Illustrator: Cincinnati firm seeking a talented illustrator to produce architectural color renderings. Related experience is required. Send resume and photos to: A.U., P.O. Box 43152, Cincinnati, Ohio 45243.

Architecture Department Head—full time position available no later than 9/1/84. Qualifications include an advance degree in Arch. or related area; professional registration; active in learned/professional society; min. 10 years of successful experience in professional practice, education, and administration. Resumes received by 10/14/83 from outside and within the Institute will be considered. Send resume to Ms. Claire Bowles, Wentworth Institute of Technology, 550 Huntington Ave., Boston, MA 02115. An EO/AA Employer.

Manufacturers Representative wanted for sales of custom size aluminum replacement windows to institutional & commercial markets. If you are now getting complimentary lines specified in rehabs of schools, hospitals, office buildings, etc., we want to talk to you. Many territories open. Reply: Sales Manager, Louisiana-Pacific Corp. 324 Wooster Road, N, Barberton, Ohio 44203.

Position Open: Need Project Manager for national A/E firm in Iowa City, Iowa. Must have major health care or large scale project experience. Capable of assuming top management responsibilities for large, dynamic growth-oriented firm. Competitive salary and benefits. Personnel Director, Hansen Lind Meyer, Drawer 310, Iowa City, Iowa 52244.

Selling Opportunity Offered: Seeking established manufacturers' representatives currently calling on architects, contractors and miscellaneous metal fabricators to represent quality aluminum handrail and other custom specialty items. Reply to Box 1361-416, *Progressive Architecture.*

Teaching position at Los Angeles area university in the field of architecture and urban design. Full-time teaching, advising, committee work. M.Arch., or the equivalent, 3 years experience including prominent and diverse international experience, California registration required. $20,868–$30,276. Send this ad and your resume to Job #1288, P.O. Box 865, Sacramento, California 95804, not later than August 31, 1983. If offered employment, must show you have the legal right to work.

Services

RitaSue Siegel Agency®, a recruiting service for consultants, businesses and institutions for excellent architects, interior, graphic and industrial designers, marketing and sales support people. Confidential. Nationwide, international. 60 W 55 St, N.Y.C. 10019, 212 586 4750.

Travel with Pratt—Frank Lloyd Wright & his architecture. Workshop Tour (Oct. 8–11) visits Wright's work in Illinois & Wisconsin: Wright's original home, Unity Temple, the Johnson Wax Building, the Johnson home, Wingspread, Taliesin/environs, & more. Led by leading architect Edgar Tafel. For information, call Pratt Institute, (212) 636-3453 or 685-3754.

Notice

Please address all correspondence to box numbered advertisements as follows:

Progressive Architecture
% Box
600 Summer Street
Stamford, Connecticut 06904

Advertising Rates
Non-display style: $125 per column inch. Seven lines per inch. Seven words per line. Maximum 4 inches. Column width approximately 2¼". No charge for use of box number. Situations Wanted advertisements: $60 per column inch. Noncommissionable.

Display style: $180 per column inch, per your layout. Commissionable to recognized advertising agencies.

Check or money order should accompany the advertisement and be mailed to Job Mart % Progressive Architecture, 600 Summer Street, P.O. Box 1361, Stamford, CT 06904.

Display style advertisements are also available in fractional page units starting at ⅙ page and running to a full page. Contact Publisher for rates.

Insertions will be accepted no later than the 1st of the month preceding month of publication. Box number replies should be addressed as noted above with the box number placed in lower left hand corner of envelope.

Progressive Architecture

Advertisers

Advertising Sales Offices

Stamford, Connecticut 06904:
600 Summer Street
P.O. Box 1361 *203-348-7531*

Peter J. Moore
Publisher
James J. Hoverman
Associate Publisher

Charles B. Selden,
National Sales Manager
Francis X. Roberts, James J. O'Brien, Donald J. Roberts, *District Managers*

Chicago, Illinois 60601:
2 Illinois Center Bldg
Suite 1300 *312-861-0880*

James L. Hobbins, John M. Brannigan, *District Managers*

Cleveland, Ohio 44113:
1111 Chester Ave *216-696-7000*
John F. Kelly, *Western Sales Manager*

Rick Strachan,
Special Markets Representative

Los Angeles, CA 91436:
16255 Ventura Blvd, Suite 301
213-990-9000
Philip W. Muller, *District Manager*
Alan F. Herr, *District Manager*

Atlanta, Georgia 30326:
3400 Peachtree Road, NE-Suite 811
Lennox Tower *404-237-5528*
Anthony C. Marmon, *District Manager*
Harmon L. Proctor,
Regional Vice President

Houston, Texas 77401
5555 West Loop South, Suite 505
713-664-5981
Calvin Clausel, *Director*
Southwest Operations

United Kingdom
Reading, RG10 OQE, England
Wood Cottage, Shurlock Row
0734-343302
Cables:
TEKPUB, Reading
Malcolm M. Thiele
Managing Director, U.K.

Tokyo, Japan 101
3-1 Kanda Tacho 2-chome,
Chiyoda-ku
03-252-2721
Genzo Uchida, *President*

Paris, France
Continental Europe
18 rue Gounod, 92210
St. Cloud, France *602-24-79*
Yvonne Melcher, *Manager*