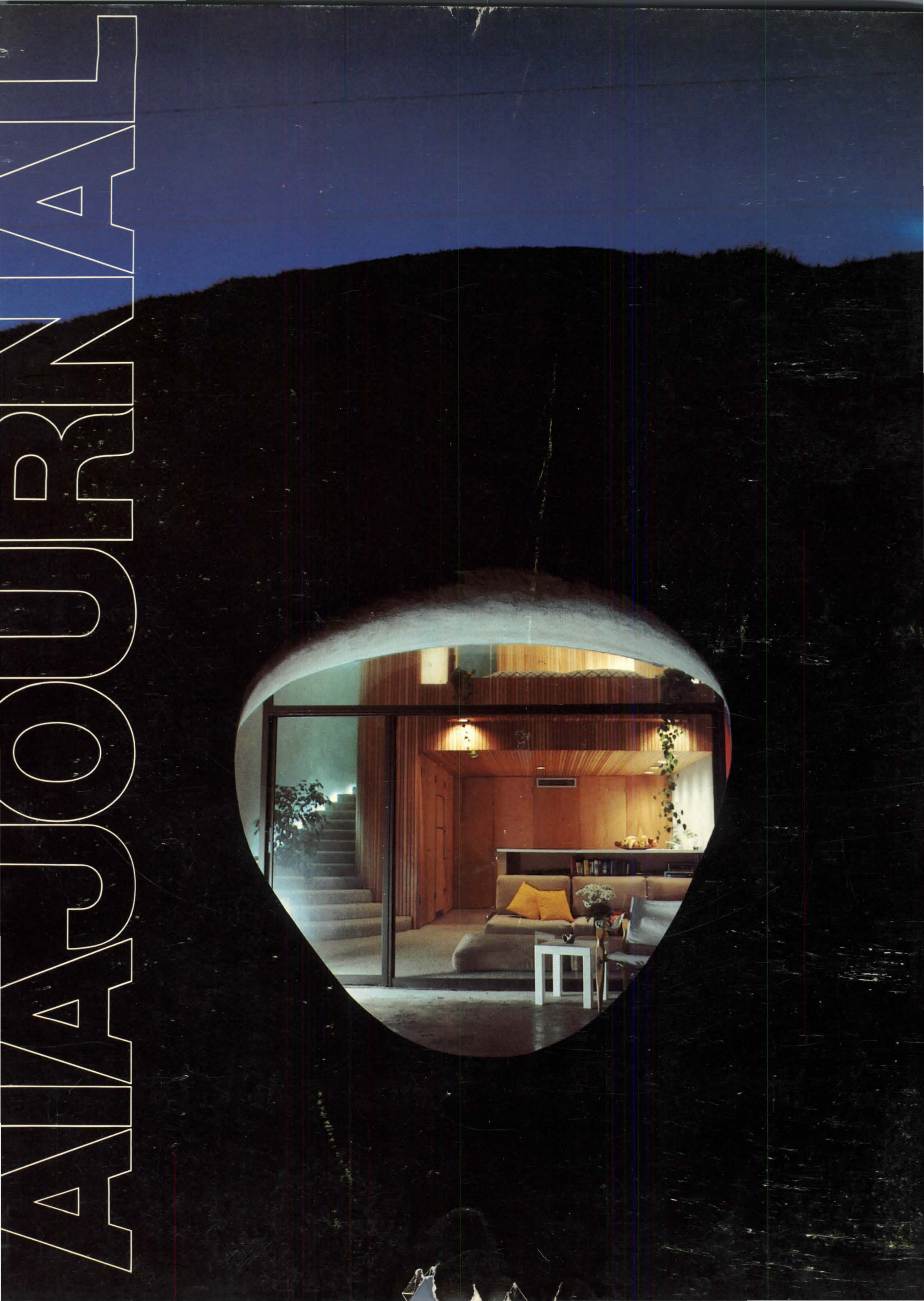
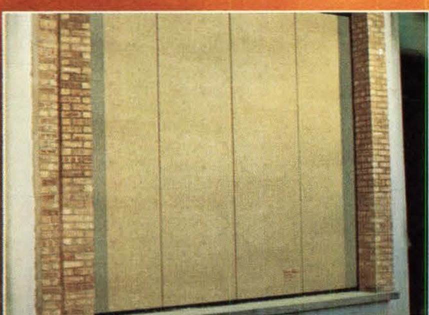
AIA JOURNAL



Incredible.



An operable flatwall system with a one-hour fire rating.

These photographs were taken during the Underwriter's Laboratories, Inc. fire test of Acousti-Seal® 904 FR (the first operable flatwall system ever to be fire-tested successfully for one hour at U.L.).

The test is brutal. A full hour of flames with temperatures reaching 1700°F. Followed by a punishing 2-minute blast of cold water at 30 psi from a 2½" fire hose.

Acousti-Seal 904 FR stood firm. And is now the only one-hour fire-rated operable flatwall system in the world.

Acousti-Seal 904 FR. Engineered to make space more productive... fire-rated to save lives. For more information, see your Modernfold distributor. Or write Modernfold, Box 310, New Castle, Indiana 47362.

Modernfold

An **American-Standard** Company

Circle 1 on information card

This simple ceiling helped GTE Sylvania save $40,800 on heating and cooling costs in a year

It's a fact: Inadequate ceiling and roof insulation is a major source of heat loss—*especially in one-story, flat-roof buildings.*

That's why GTE Sylvania Incorporated put one of our Energy Saving Ceilings in a Massachusetts lab.

Result: Comparing similar buildings, 1975 heating and cooling savings totaled $40,800. Savings on equipment needed for air conditioning: $100,000.

A quick payback

First-year energy savings were almost *five and a half times* the added cost of our insulated ceiling.

You can save energy with our Fiberglas* 3" Ceiling Panels. Or Film Faced Ceiling Boards with Sonobatt™ insulation. Both are easy to install on any standard exposed grid system.

Make old ceilings save, too

Just slip our Sonobatt insulation on top of your present ceiling. You'll increase thermal efficiency up to *731* percent, depending on thickness.

Find out how much energy *your* building can save—free. Any Owens-Corning sales office or ceiling contractor will analyze it in-depth using the most economical Energy Saving Ceiling for you. Write Mr. S.G. Meeks, Owens-Corning Fiberglas Corporation, Fiberglas Tower, Toledo, Ohio 43659.

Or call us today. You'll put a ceiling on your energy costs tomorrow.

Owens-Corning is Fiberglas

OWENS/CORNING FIBERGLAS TRADEMARK ®

Circle 3 on information card

AIA JOURNAL

Underground Architecture

Passive Solar Design

Cover: Photo by Alexander Georges of Dunehouse by William Morgan, FAIA

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VOL. 67, NO. 4.

EVENTS

May 3-5: National Engineering Conference, sponsored by the American Institute of Steel Construction, Bonaventure Hotel, Los Angeles. Contact: AISC, 1221 Avenue of the Americas, New York, N.Y. 10020.
May 3-7: Scandinavian Furniture Fair, Bella Center, Copenhagen. Contact: SFF, Hellerupvej 8, DK-2900 Hellerup, Denmark.
May 4-5: Course on Land Use Control, San Francisco, sponsored by the University of California, Berkeley.
May 8-11: Offshore Technology Conference, Astrodomain, Houston. Contact: OTC, 6200 N. Central Expressway, Dallas, Tex. 75206.
May 9: Seminar on Building Code Requirements for Reinforced Concrete, Midland Hotel, Chicago. (Repeat seminars: May 10, Atlanta; May 13, Seattle; May 16, Cleveland; May 17, Houston; May 18, New York City; May 23, Philadelphia; Sept. 13, New Brunswick, N.J.) Contact: American Concrete Institute, Education Department, Box 19150, 22400 W. Seven Mile Road, Detroit, Mich. 48219.
May 11-12: Institute on Renovation of Buildings, University of Wisconsin, Madison.
May 15-16: Conference on Business Opportunities in the Middle East, Waldorf Astoria Hotel, New York City. Contact: Jack Webber, Special Projects Manager, *Engineering News-Record,* McGraw-Hill Building, 1221 Avenue of the Americas, New York, N.Y. 10020.
May 15-17: International Conference on Architectural Design, Istanbul Technical University, Istanbul, Turkey. Contact: Nigan Beyazit, School of Architecture, Istanbul Technical University, Istanbul, Turkey.
May 15-17: Structural Stability Research Council annual technical session and meeting, Copley Plaza Hotel, Boston. Contact: SSRC, Fritz Engineering Laboratory #13, Lehigh University, Bethlehem, Pa. 18015.
May 15-18: National Fire Protection Association annual meeting, Disneyland Hotel and Anaheim Convention Center, Anaheim, Calif. Contact: NFPA, 470 Atlantic Ave., Boston, Mass. 02210.
May 15-18: Symposium on the Structural Use of Wood in Adverse Environments, University of British Columbia, Vancouver, B.C., Canada. Contact: R. M. Kellogg, Forest Products Laboratory, 6620 N.W. Marine Drive, Vancouver, B.C. V6T 1X2, Canada.
May 15-20: International Federation of Interior Designers world congress, Washington, D.C. Contact: Ola M. Pfeifer, American Society of Interior Designers, 730 Fifth Ave., New York, N.Y. 10019.
May 16-17: Seminar on Refractory Concrete, Illinois Institute of Technology, Chicago. Contact: American Concrete Institute, Box 19150 Redford Station, 22400 W. Seven Mile Road, Detroit, Mich. 48219.
May 17-19: Seminar on Project Management for Engineers, Los Angeles, sponsored by the University of Chicago. (Repeat seminars: Aug. 7-9, Houston; Oct. 24-26, New York City.) Contact: New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.
May 20-21: Association of Architectural Librarians annual meeting, Dallas Hilton, Dallas. Contact: Susan Cosgrove Holton, AIA Library.
May 21-24: AIA annual convention, Dallas.
May 22-23: Seminar on Environmental Regulation and Legislation, Atlanta, sponsored by New York University. (Repeat seminars: June 19-20, San Francisco; Aug. 14-15, New York City.) Contact: New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.
May 22-24: Seminar on Testing of Solar Energy Materials and Systems, National Bureau of Standards, Gaithersburg, Md. Contact: NBS, Washington, D.C. 20234.
May 23-25: Seminar on Designing for Firesafety and Hazard Control, Norwood, Mass. (Repeat seminar on Sept. 12-14.) Contact: Factory Mutual Engineering and Research Training Department, 1511 Boston-Providence Turnpike, Norwood, Mass. 02062.
May 26-28: Aspen Energy Forum 1978, Aspen, Colo. Contact: Roaring Fork Resources Center, P.O. Box 9950, Aspen, Colo. 81611.
May 26-30: International Congress on Religion, the Arts, Architecture and the Environment, San Antonio, Tex. Contact: Religious Communities for the Arts, 287 Park Ave. S., New York, N.Y. 10010.
May 28-30: Urban Land Institute spring meeting, New Orleans Hilton Hotel, New Orleans. Contact: ULI, 1200 18th St. N.W., Washington, D.C. 20036.
June 4-9: Value Engineering Workshop, Palm Beach, Fla., sponsored by AIA and American Consulting Engineers Council. (Repeat workshops: Aug. 20-25, Detroit; Sept. 10-15, Houston; Nov. 5-10, Williamsburg, Va.) Contact: ACEC, 1155 15th St. N.W., Suite 713, Washington, D.C. 20005.
June 11-16: International Design Conference, Aspen, Colo. Contact: Elaine Gandal, Herman Miller, Inc., 600 Madison Ave., New York, N.Y. 10022.
Oct. 23-27: World Congress of the International Union of Architects, Mexico City. Contact: Maurice Payne, AIA, Institute Headquarters or UIA, Melchor Ocampo 463-104, Mexico 5, D.F. Mexico.

LETTERS

Archimedia's 'AIA Directory of Architectural Firms': The rationale of a small architectural firm (any firm with 15 or less employees) subscribing to such a listing is totally absurd. No one in his right mind advertises his weaknesses. In our age of "youth and bigness," it would be senility of the first order to offer one's firm for comparison with the biggies. Even a good, strong, small firm with a long record of accomplishments would look like Podunk, from a layman's viewpoint, in comparison to large exotic firms.

There is also the credibility aspect. Who is going to police the accuracy of the reports? This will turn into nothing but a numbers game.

The idea baffles all of my reasoning. Except that I can certainly reason the "motive." If the small architectural firms are duped into this, then they deserve the consequences. *T. Leo Dawsey Jr., AIA Houston*

The chairman of the Institute's firm directory task force replies:
We are sorry that Mr. Dawsey apparently has chosen not to be included in the soon-to-be-published *AIA Directory of Architectural Firms.* The board of directors has carefully considered this publication and concluded that such a directory could be of valuable service to the public and to our members. We have been working with Archimedia to develop an outstanding publication that will profile AIA architectural firms.

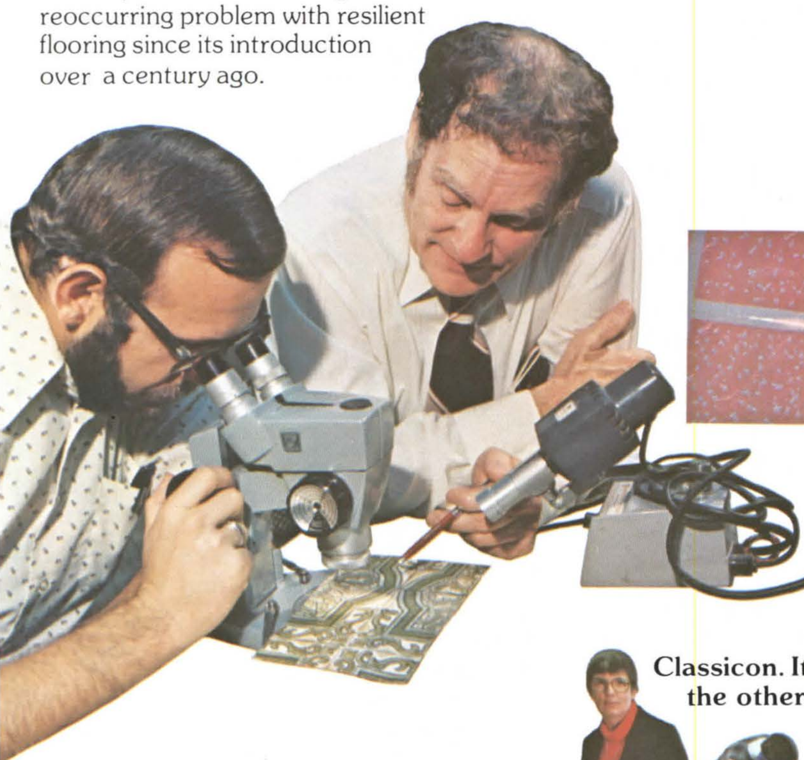
We certainly do not agree with Mr. Dawsey that an architectural firm being small is a weakness. To the contrary, some of the strongest firms are small in size, and many potential clients may be looking for a small firm. We feel that this directory, which will be published annually, will become well recognized as a valuable document for the architectural client. We hope that when Mr. Dawsey sees the type and quality of the directory, he will choose to be included next year.
R. Randall Vosbeck, FAIA

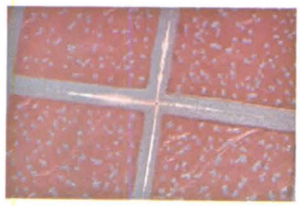
'Family Tree': I appreciate Sue Kohler pointing out the error in the chart on architects and their interconnections (Feb., p. 2) in my article in the January issue entitled "An Architectural Family Tree That Traces Paths to Fame." It was a matter of sloppy drafting, since the arrow was intended to connect Renwick and Root, not Holabird. And unfortunately, the text was written by referring to the chart rather than my notes.

The article was abstracted from a much
continued on page 84

How Mannington solved a flooring dilemma – moisture and its effects.

Moisture under a floor can cause mildew, rot and discoloring. A reoccurring problem with resilient flooring since its introduction over a century ago.





When moisture is present under a floor, this is the result.

Two years ago, Mannington solved the problem of moisture by introducing Classicon® with Aquabar®

We set out to put a stop to mildew, alkali and mold.

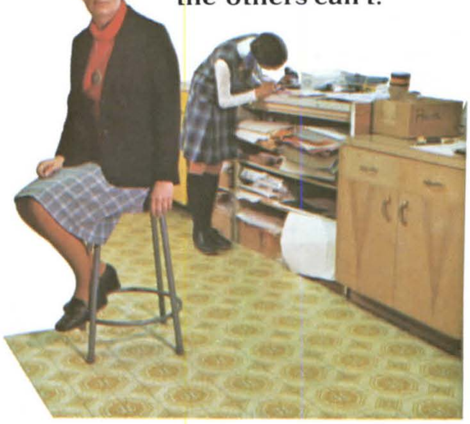
Jack Wiley, Mannington's director of research explained. "In the laboratory we screened almost a hundred possible barrier products. Finally we came up with Aquabar to repel the attack of moisture.*

"Test floors were installed in various parts of the United States. These replaced previous floor coverings (even some of our own) that had failed due to the action of moisture in less than nine months.

"A year later with a 100% success record we felt we had a satisfactory product to combat the moisture problem. We now offer a two-year warranty against moisture, the only such warranty in the industry."

*Excluding Hydrostatic Pressure.

Classicon. It goes where the others can't.



Woodland Country Day School in Jericho, New Jersey, had a moisture problem. Every time it rained, water seeped through the walls and across the floor. Headmistress of the private school, Gail Stanley, elaborated. "The tiles we had put down were coming up and we had constant mold and mildew on the floor.

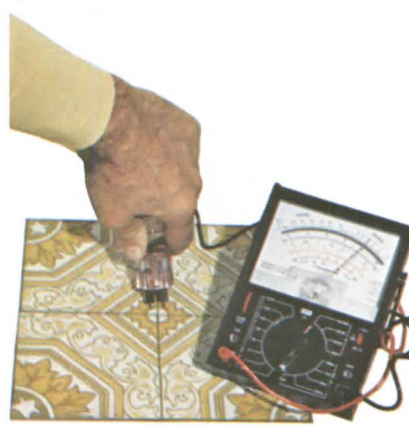
"Now with Classicon we have had no problems with water since the floor was put down two years ago. The flooring still looks as good as new."

Eugene Dietman, building manager of a New Jersey Masonic Temple, had a moisture problem in the banquet room that made it practically unusable. After Classicon had been installed for 18 months, Mr. Dietman said, "We've had no water problems. It has proved easy to clean and keep in good shape. An adjacent banquet room still has water problems and we plan to install Classicon in there, too."

There's more to Classicon than a moisture barrier.

Besides its unique moisture repellent, Classicon is a highly stain resistant, no-wax flooring suitable for residential and light commercial use. It never needs stripping or redressing.

See us in Sweet's General Construction File or write to us for architectural specifications and a color brochure.



Mannington Mills, Inc.
Dept. D66, P.O. Box 30
Salem, N.J. 08079
Over 60 years of fine flooring.

mannington
FLOORS FOR LEISURE LIVING

Circle 4 on information card

Sixty-Six Members Are Elevated to Institute College of Fellows

Sixty-six members of AIA have been elected to the college of fellows for their "outstanding contributions to the profession." The new fellows will be invested into the college at AIA's convention in Dallas next month. They were selected by the Institute's jury of fellows: Herbert E. Duncan Jr. (chairman), Lewis Davis, Raymond L. Kappe, William Muchow, Vladimir Ossipoff and Bernard B. Rothschild.

The members advanced to fellowship are:

Thomas R. Adkison, Spokane, Wash.
Jesus Eduardo Amaral, Hato Rey, Puerto Rico
Samuel Thomas Balen, Annandale, Va.
Burtch W. Beall Jr., Salt Lake City
Hobart Betts, New York City
Charles Hussey Boney, Wilmington, N.C.
J. Norwood Bosserman, Charlottesville, Va.
Thomas Graham Bradley, Decatur, Ill.
Ronald G. Brocchini, San Francisco
Robert Bradford Browne, Miami
James Wood Burch, Annapolis, Md.
John Arthur Busby, Atlanta
Jerome R. Butler Jr., Chicago
Irving W. Colburn, Chicago
Stanley L. Daniels, Atlanta
Richard Dattner, New York City
A. P. DiBenedetto, Portland, Ore.
A. Robert Fisher, San Francisco
Richard Foster, Greenwich, Conn.
Beverly LaFayette Freeman, Charlotte, N.C.
Hans A. Friedman, Evanston, Ill.
Sid Frier, Little Rock, Ark.
Herbert K. Gallagher, Watertown, Mass.
Marc Evan Goldstein, San Francisco
Michael K. Goodwin, Tempe, Ariz.
Paul Hjalmer Graven, Madison, Wis.
Paul Cret Harbeson, Philadelphia
Nicholas H. Holmes Jr., Mobile, Ala.
Mark T. Jaroszewicz, Gainesville, Fla.
Paul A. Kennon Jr., Houston
Stephen Alexander Kliment, New York City
Nathaniel Key Kolb Jr., Dallas
Alexander Kouzmanoff, Port Chester, N.Y.
Howard R. Lane, Encino, Calif.
James Morrison Leefe, Sausalito, Calif.
Bruno Leon, Grosse Ile, Mich.
Herbert Lippmann, New York City
William H. Liskamm, San Francisco
Wendell H. Lovett, Bellevue, Wash.
Donlyn Lyndon, Newton, Mass.
John Macsai, Chicago
Theodore Stuart Maffitt Jr., Palestine, Tex.
John W. Moutoussamy, Chicago
Louis Naidorf, Los Angeles
Edward H. Noakes, Potomac, Md.
George M. Notter Jr., Boston
Herbert B. Oppenheimer, New York City
Donald H. Panushka, Salt Lake City
T. Merrill Prentice Jr., New York City
John K. Rauch Jr., Conshohocken, Pa.
George F. Reed, Coconut Grove, Fla.
Mario Romanach, Philadelphia
Christine Fahringer Salmon, Stillwater, Okla.
Frank Cuthbert Salmon, Stillwater, Okla.
Donald Sandy Jr., San Rafael, Calif.
Leo Gerald Shea, Birmingham, Mich.
Lloyd H. Siegel, Chicago
Charles S. Sink, Denver
Robert Venturi, Philadelphia
R. Randall Vosbeck, Alexandria, Va.
Walter E. Wagner, Fresno, Calif.
Eugene Werlin, Houston
Gerald A. Williams, Seattle
William R. Wofford, Atlanta
Zeno Lanier Yeates, Memphis
Bernard B. Zimmerman, Los Angeles

AIA Cites 15 Projects For 1978 Honor Awards

AIA has cited 15 projects for design excellence in its 30th annual honor awards program (to be covered in more detail in the JOURNAL's mid-May *Annual of American Architecture).* Six of the projects are cultural facilities. Eight of this year's winners are in the category of extended use (projects incorporating restoration, rehabilitation and adapative use). This is the first time since AIA started three years ago to distinguish efforts in the categories of current use and extended use that designs to restore older structures outnumber awards for new buildings. As in last year's awards, energy conservation was a consideration in the selection of winners.

This year's awards reflect a continuing interest in projects that enhance the urban scene. For example, among the winning designs are the rehabilitation of Boston's Faneuil Hall Marketplace, an addition to the Art Institute of Chicago, the conversion of a New York City factory loft structure into an apartment building, the transformation of a Boston police station into an art museum and the conversion of a Baltimore school into a theater.

Three of the award-winning designs are in New York State; there are two each in California, Maryland, Massachusetts and Washington State, and one each in Connecticut, Illinois, Texas and Utah.

The extended use structures to win awards are:

- The Institute of Contemporary Art, Boston, a police station of the 1880s converted for purposes of art display and study (Graham Gund & Associates).
- Cooper-Hewitt Museum, New York City, a landmark mansion built in 1901 now used for the display of decorative art objects (Hardy Holzman Pfeiffer Associates).
- Center Stage, Baltimore, a school of the 1850s now in use as the city's resident professional theater (James R. Grieves Associates, Inc.).
- Turtle Bay Towers, New York City, a factory loft building, opened in 1929, made into luxury apartments (Bernard Rothzeid & Partners).
- Faneuil Hall, Boston, a nationally revered landmark on a six-acre site made into an economically viable complex of shops, restaurants, offices and food and flower markets (Benjamin Thompson & Associates, Inc.).
- The Kearns/Daynes/Alley Annex, Salt Lake City, where a glass bridge unites two historic commercial structures, with the three forming a whole that is greater than its parts (Boyd A. Blackner, AIA, & Associates).

continued on page 11

THE PINK STUFF.

The two important things to know about roof insulation today.

THE GREEN STUFF.

The Pink Stuff is Thermax® Roof Insulation. From Celotex. It's the most efficient on the market with a Factory Mutual Class 1 fire rating.

We don't have to tell you the critical importance of insulating efficiency today and in years to come. The government is making it quite clear.

So start now with a simple fact ... the most efficient roofing insulation is foam, and one of the most efficient, stable, practical foamed insulation boards comes from Celotex.

Over new or existing roofs, Celotex will help you get the maximum insulation value at costs equal to or below the less efficient insulating systems you may use now.

High R factors.

One look at the chart comparing insulating value per thickness of Thermax, Tempchek, fibrous glass, composite (foam plus perlite), and fiberboard roof insulations shows how The Pink Stuff and The Green Stuff provide up to 2.5 times as much insulation value per inch.

Strong. Stable. Lightweight.

Both Thermax and Tempchek Roof Insulations are reinforced with glass fibers for extra dimensional stability. And both are 3 to 6 times lighter than less efficient insulation.

Thermax Roof Insulation...the only FM-rated foam insulation (non-composite) for Class 1 over steel.

Thermax Roof Insulation is the first non-composite foam insulation in the U.S. to qualify for Factory Mutual Class1 fire rating installed directl over unsprinklered steel decks.

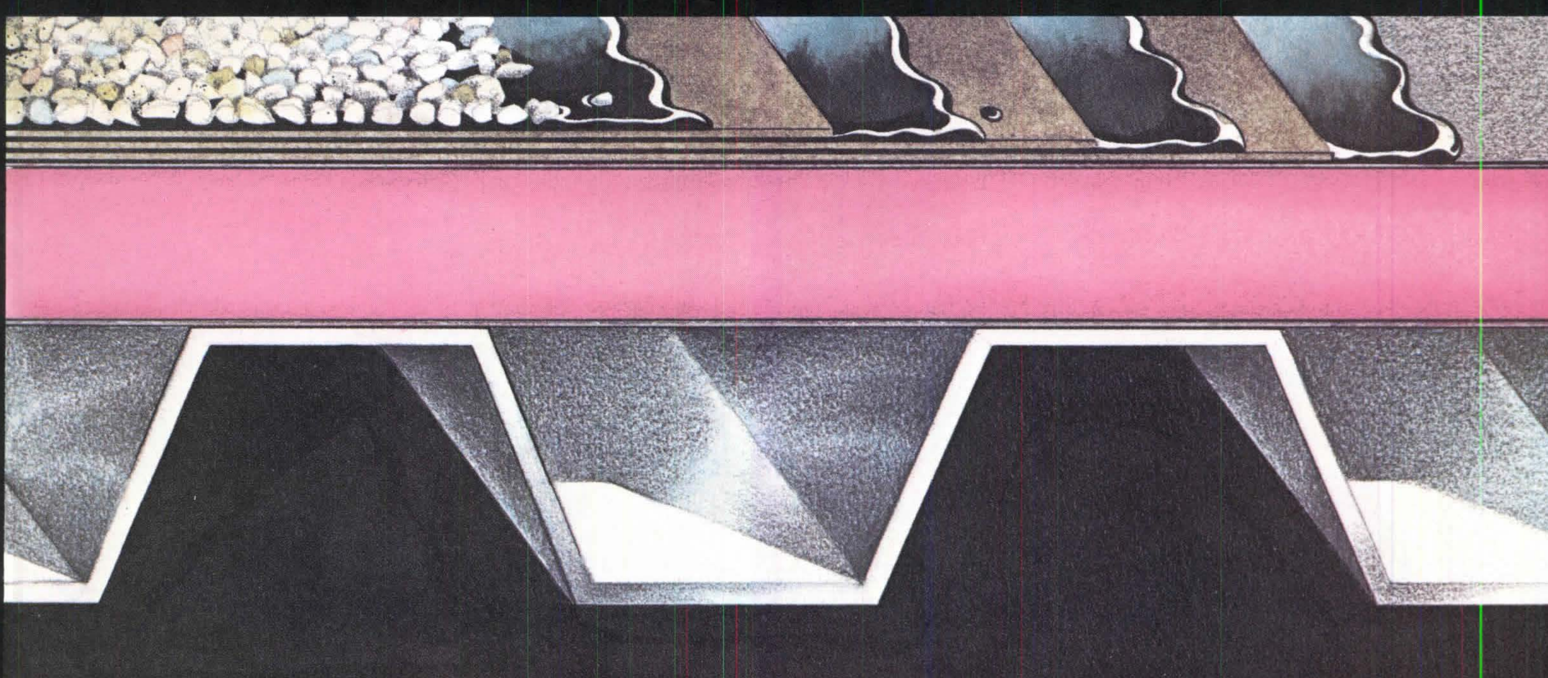
Why pink? To dramatize the exclusive isocyanurate foam cor sandwiched between two asphalt-saturated inorganic facers. It give you the high insulation value of urethane, plus fire rating, without th need for a second material like perlite between it and the steel dec

The best way to fasten Thermax to the deck is with Insulfast nails, providing maximum protection against wind uplift and latera movement. Mechanical attachment with Insulfast nails is FM ap proved.

With less deadload factor, you not only have easier installatio you can reduce the size and gauge of roof supports, have greate flexibility in choosing heating and air-conditioning equipment, an can reduce the size of metal or wood facia around roof perimeters.

Thermax Roof Insulation costs no more for comparable insulatio values than other fire-rated materials, is easy to cut and handle, give more footage per truckload, and uses less warehouse space. All o which means a better application per dollar for everyone.

*Product of Berryfast, Inc.



The Green Stuff is Tempchek® Roof Insulation. From Celotex. It's the most efficient on the market for every other application.

Vhen you don't need fire-rated insulation, you still need Celotex for igh R factor. In Tempchek Roof Insulation.

Same high R factor. With some differences.

empchek is a lightweight urethane foam, reinforced with glass fibers o make it just as strong and dimensionally stable as Thermax. Check he chart again and you'll see that it has the same top-rated insulating fficiency per thickness as Thermax.

With the same lightweight, easy cutting, easy handling, easy pplication characteristics as Thermax Roof Insulation. And the same ompatibility with hot asphalt.

The differences? Tempchek has organic instead of inorganic acers, a different chemical composition, and a different color, all imply because it doesn't have to be fire-rated like Thermax.

And one more thing.

Lower costs.

t costs less per application than conventional, lower-efficiency mate-ials. And not just because of the lighter weight. Tempchek boards neasure 3' x 4', so more roof area can be covered in less time than vith normal 2' x 4' cuts.

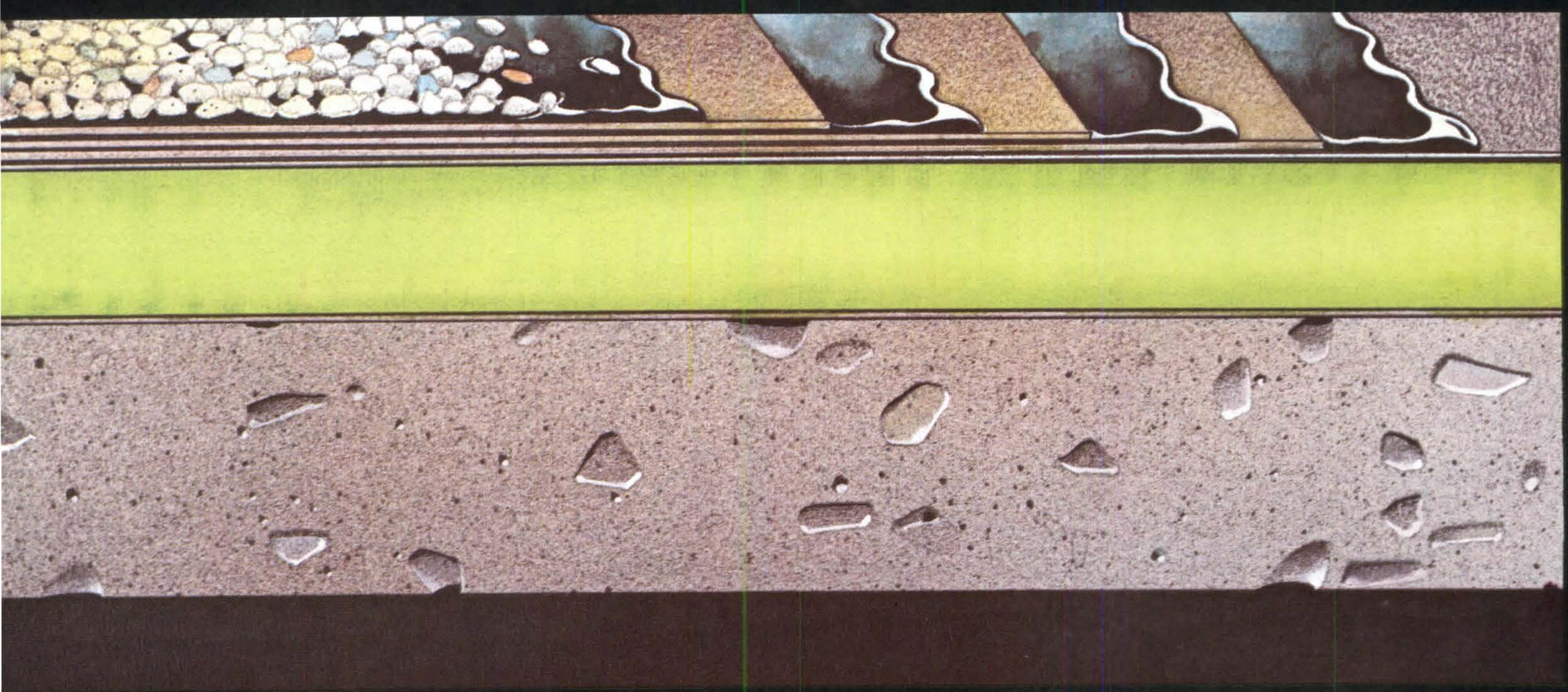
R FACTOR COMPARISON (Typical Thicknesses)

"R"	Thermax Roof Insulation†	Tempchek Roof Insulation†	Perlite & Urethane Composite Board	Fibrous Glass	Perlite & Fiberboard
8.3	1.2"	1.2"			3"*
10.0	1.4"	1.4"	1.9"	2-1/4"	4"*
11.1	1.6"	1.6"		2-7/16"	
12.5	1.8"		2.2"		
14.3	2.0"	2.0"	2.5"		
16.7	2.3"	2.3"	2.8"		
20.0		2.8"	3.2"		
25.0		3.0"			

*In two layers.

†NOTE: Under normal use, Thermax and Tempchek Roof Insulations will retain an average of 80% of their thermal resistance (R factor) values.

Another surprise on the next page. The most effective way to use the most efficient roofing insulation on the market. From Celotex.



This is the Upside-Down Roof. From Celotex. It's the most effective way to use the most efficient roofing insulation on the market.

The most effective place to put roofing insulation is on top of the roof assembly. It protects the membrane on new or existing roofs like no right-side-up roof ever could.

But it requires an insulation product that is able to withstand moisture, hot asphalt applications, the weight of conventional roofing equipment, and traffic. Tempchek Roof Insulation does all those things.

What makes the most protective roof practical?

1. A conventional application of 300 lbs. of slag or 400 lbs. of gravel per 100 sq. ft. protects roof installations from flaming brands, harmful rays of the sun, and impact damage caused by hail and roof traffic. Approved by U.L. as Class A Roof Covering.
2. Top pouring of hot asphalt keeps gravel in place and provides first line of protection against moisture.
3. New Tempchek Roof Insulation is what makes the Celotex Inverted Roof Assembly work so well. It provides thermal protection, dimensional stability and resistance to moisture.
4. Flood coat of hot asphalt keeps Tempchek Roof Insulation in place and provides more protection against moisture. The asphalt is beneath the insulation and will not alligator.
5. Built-up roofing membrane provides the third line of protection against moisture. Serves as a vapor barrier as well. Roof membrane is protected from thermal shock, punctures and blistering by the Tempchek insulation above.
6. The Celotex Inverted Roof Assembly systems are readily applied to most conventional nailable and non-nailable decks. Shown is a concrete deck, with asphalt primer.

Celotex provides a 10-year Inverted Roof Assembly guarantee. For a specimen, and complete details about Thermax and Tempchek Roof Insulations, and the Inverted Roof Assembly, contact your Celotex representative or write:

John Hasselbach
The Celotex Corporation
1500 N. Dale Mabry Highway
Tampa, Florida 33607.

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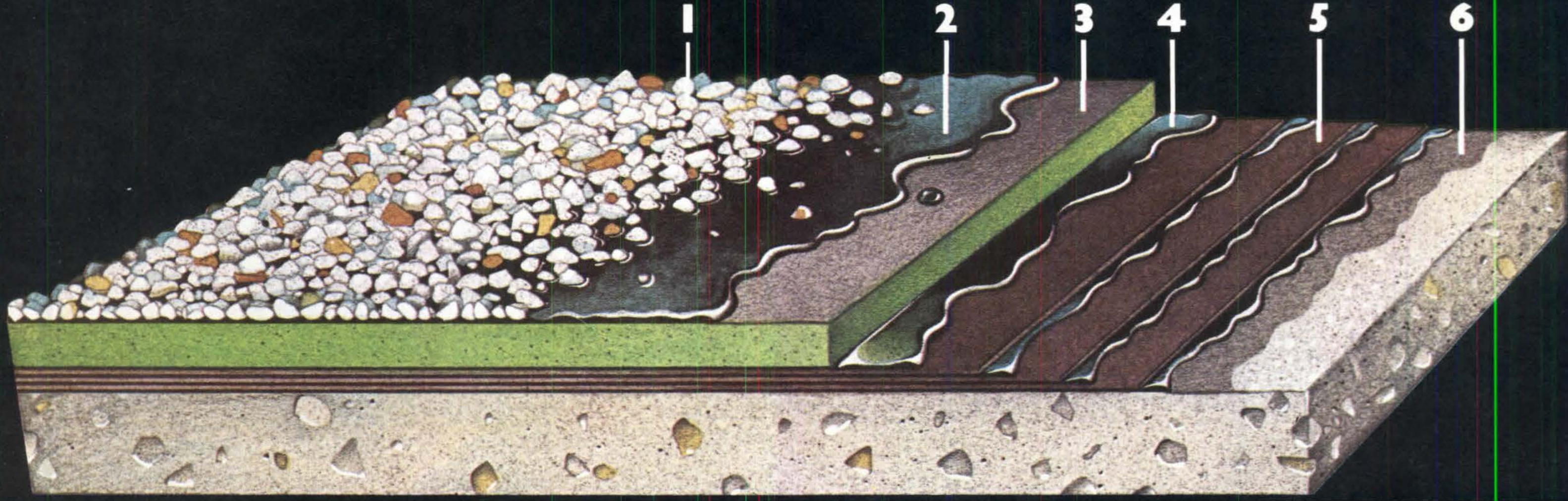

Going On from page 6
• Private residence, Long Island, N.Y., a reassembling of a historic house on a beachfront removed from the original site's hazards of modern traffic (Howard Barnstone, FAIA; earlier work by William Chafee, AIA, and Morey & Hollenbeck).
• Elliott house, Chevy Chase, Md., an addition to a Victorian structure that keeps the spirit of the past without sacrificing modern functionalism (Hugh Newell Jacobsen, FAIA).

Award winners for new design are:
• Addition to the Chicago Art Institute (Skidmore, Owings & Merrill).
• Yale Center for British Art, New Haven (Louis I. Kahn; design and construction completed after his death in 1974 by Pellechia & Meyers).
• Sixty-01 Apartments, Redmond, Wash. (George Bissell, FAIA, and Frank August & Associates).
• Art, drama and music complex, Columbia Basin Community College, Pasco, Wash. (Brooks Hensley Creager).
• IBM Santa Teresa Laboratory, San Jose, Calif. (MBT Associates).
• Three "H" Services Center, Houston (John Zemanek, AIA).
• Private house, Geyserville, Calif. (Chester Bowles Jr., AIA).

Jurors for extended use projects were: George M. Notter Jr., AIA (chairman); Donn Emmons, FAIA; A. Quincy Jones Jr., FAIA; Charles W. Moore, FAIA; Terry Morton (National Trust for Historic Preservation), and student William Michael Comer, City College of the City University of New York.

Members of the jury for current design were: William C. Muchow, FAIA (chairman); Fred Bassetti, FAIA; Joseph Esherick, FAIA; Patrick Quinn, AIA; William Warner, AIA, and student Robert M. McAnulty III, University of Virginia. Adviser on the energy aspects of design for both juries was Herbert E. Duncan Jr., FAIA.

Presentation of the awards to the architects and owners of the projects will be made at AIA's convention next month.

Eames House Is Winner Of AIA 25-Year Award

The Charles Eames house, Pacific Palisades, Los Angeles, has been named winner of AIA's 25-year award, making it the eighth architectural complex at least a quarter-century old to be recognized for "enduring significance." The award will be presented at the Institute's convention in Dallas next month.

Designed by Charles and Ray Eames, the house, completed in 1949, used many materials and techniques standard at that time for industrial architecture but not widely used in residences. The first of the steel-framed case study houses sponsored by the now defunct *Arts and Architecture* magazine, the designers made use of off-the-shelf industrialized steel components. The house has been described as a merger of technology and art, transcending mere construction and avoiding sterility by combining elegance and utility.

The *L.A. Architect,* published by the Southern California chapter/AIA, in its October 1977 issue called the house "the most beautiful" of the case study houses, and "the only one which has remained virtually unchanged in design or use."

Critic/historian Esther McCoy is quoted as saying of the house that it fills in "the spartan framework so acceptable to modern architecture with a rich and varied content." Charles Eames has said that the qualities of the house that have proved most satisfying are "inherent in the materials themselves—the texture of the ceiling, the metal joists, the repetition of the standard sash, the change of glazing from transparent to translucent."

The facade of the house is a series of carefully arranged planes—solid, opaque and translucent. Stucco planes of white, red, blue, earth and black are juxtaposed behind crossed tension rods. Space is broken up, while at the same time contained and enclosed.

T. R. Vreeland, AIA, who recently visited the house and interviewed Charles

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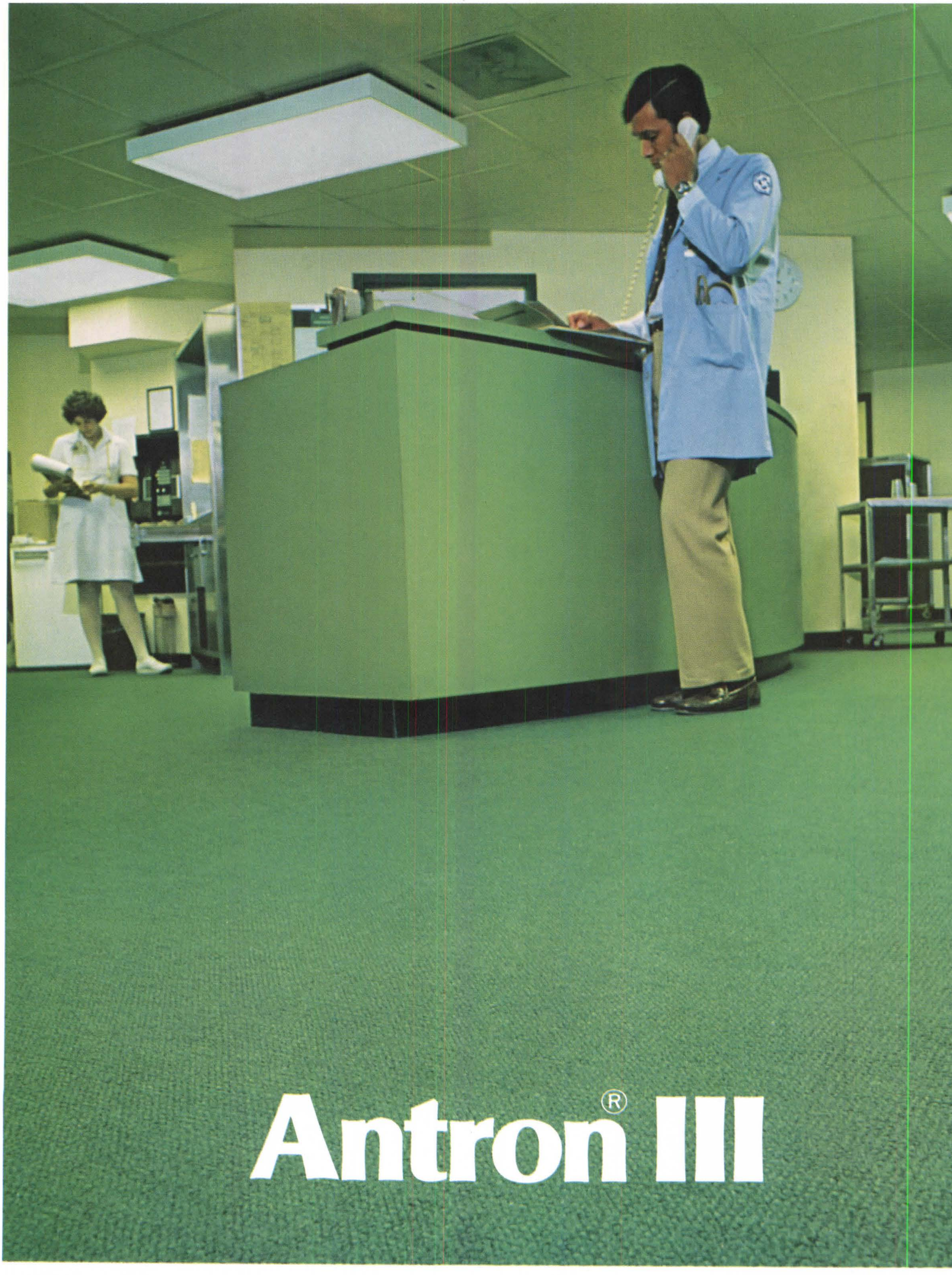

Antron® III

Antron® III hollow filament nylon. The carpet fiber with lasting good looks and durable static protection. At Northwestern Memorial Hospital.

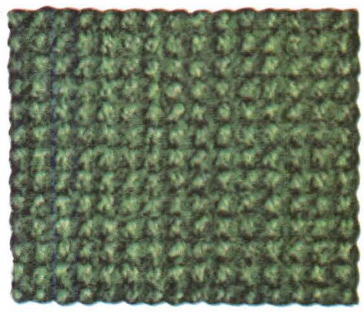
Prentice Pavilion, Northwestern Memorial Hospital.

"Antron" III hides soil. Antron* III hollow filament nylon is designed to mask the presence of soil. You can see the remarkable hollow filament structure of this fiber in this 250X electron micrograph. The four microscopic voids optically scatter light o hide soil. This configuration also creates the ffect of blending soil concentrations into the overall carpet look. The smooth exterior shape minmizes soil entrapment to facilitate cleaning.

"Antron" III controls static shock. "Antron" III ylon offers built-in protection against static shock. ts nylon sheath and core of polymeric conductive material are designed to control the generation of static electricity comfortably below the level of human sensitivity. This protection works well n all locations, ncluding areas where elative humidity is xtremely low. Extensive Du Pont tests confirm that "Antron" III maintains effective static control even after 3 million traffics, repeated vacuuming and regular shampooing.

Magnification of 250X of "Antron" III nylon showing hollow filaments and round, anti-static filament.

"Antron" III is durable. Fiber loss due to abrasive wear is negligible, in regular or heavy traffic sites, with pile of "Antron" III nylon. And "Antron" III has a subdued luster which, unlike bright or sparkle luster fibers, does not dull rapidly in contained high-traffic areas.



Why Northwestern Memorial Hospital, Chicago, Illinois, chose "Antron" III. As the largest hospital in Illinois and one of the largest in the Midwest, Northwestern Memorial needed carpet that would withstand round-the-clock traffic and retain its good looks with minimum maintenance. That's why they selected and installed 25,000 square yards of carpet with pile of "Antron" III nylon in the Prentice and Wesley Pavilions. And that's why "Antron" III nylon is the leading contract carpet fiber brand.

rchitect: Bertrand Goldberg, Chicago
looring Contractor: Carpet Laying Service, Des Plaines, Illinois

Specifier's Information Kit—Write Du Pont Contract Carpet Fibers, Centre Road Building, Wilmington, Delaware 19898, for a manufacturers' resource list, a health-care specification guide, a maintenance manual and a brochure on the benefits of anti-static "Antron" III nylon.

*Du Pont registered trademark. Du Pont makes fibers, not carpets.

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hollow filament nylon

The leading contract carpet fiber brand.

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Circle 7 on information card

Going On from page 11
and Ray Eames, says that "the overwhelming impression of the house is one of pattern rather than structure. This is carried through from the architecture, to the furnishings, to the collection of shells and other small objects in an unbroken delight in the multiplicity and variety of form." (Photo right.)

Vreeland recalls that Charles Eames once told him that the house was originally designed as a bridge house. "He thought of it then as a solid block of steel out of which some interior space had been carved." Then Eames asked himself "Why not try for the greatest amount of volume with the least amount of steel rather than the reverse?" The house was redesigned, a decision, says Vreeland, which has done much "to establish its present character of lantern-like lightness, transparency and delicacy."

Vreeland says that Eames explained to him that "he and the Saarinens had never had any fear that pursuing the doctrine of functionalism in design would lead to an impoverishment of form but, quite the contrary, were confident in its leading to enriched form."

ABA Code Examines A/E Procurement Issues

Should state and local governments select A/E services by competitive bidding? Or should the traditional practice of selection by competence be maintained?

With growing interest among taxpayers and public officials to limit the cost of government construction projects, there is increased pressure to explore competitive bidding for design services. Seeking a solution, the American Bar Association (ABA) began to develop a model procurement law in 1970 addressing a whole range of procurement issues, including A/E selection (*see* May '77, p. 16). The ABA has developed three alternative A/E procurement systems, two of which call for competitive bidding.

Currently, five states and four cities are considering these alternatives on a pilot test basis, and once a model law is chosen by ABA a campaign will be launched urging all state and local governments to adopt the law.

The first alternative is essentially the Brooks law approach used by federal agencies. State and local governments would rank the three most qualified A/E firms interested in a specific project. Negotiations would be held with the highest ranked firm on scope of design services and compensation. If a satisfactory contract could not be negotiated, the second ranked firm would be considered.

The second approach considers price as a factor in its selection, a system now used by the State of Maryland. The three most qualified firms are chosen and asked to submit estimated cost for professional services. The contract would be awarded to the most "advantageous" bid.

The third alternative, a "hybrid approach," would use price competition for routine projects and the Brooks law approach for complex buildings.

AIA and the national engineering organizations support the first alternative, stressing that architects and engineers should be selected for government projects on the basis of qualifications and not fee. "The selection on the basis of fee competition will not be in the best interest of the client public, especially at the state and local level," according to an AIA resolution.

At a recent ABA convention in New Orleans, Walter A. Meisen, AIA, a former GSA official and now vice president of Daniel Mann Johnson & Mendenhall, agreed. "When price is considered a factor, it becomes the dominant factor," he said. "It is the owner, not the designer, who would suffer if selection is based on fees," he continued, "for if faced with a fee competition, designers will be forced to cut corners and drop any alternative analyses."

Hugh Nichols, a former Maryland state legislator who wrote that state's price-as-a-factor law, said ABA's model procurement law ought to be silent on the A/E selection question and the construction design professionals should be chosen just as state and local government units choose other offers of goods and services. This would, of course, involve price competition.

Others at the conference agreed with Nichols, saying that A/E services should be subject to marketplace pressures and that this can be done only by competitive bidding. Some argued that selection should not be based on price alone, but that price should be considered at some point.

In the meantime, Louisville, Ky., Baltimore, San Diego, Tennessee, New Mexico, Louisiana, Kentucky and Massachusetts are considering the three alternatives, and their decisions may influence ABA's choice. Knoxville, Tenn., has adopted an A/E procurement ordinance based on the Brooks law.

Manchester Building Is Focus of GSA Monograph

GSA's design action center has published its first monograph in a series intended to help improve the quality of federal buildings. Titled "Lessons Learned: User Reaction Study—Systems Furniture with Task Ambient Lighting," the pamphlet reports on the impact of the interior environment on occupants of the Norris Cotton Federal Building in Manchester, N.H. (*see* Dec. '77, p. 32), where various energy conservation technologies were tested and evaluated.

In 1976, GSA contracted with an interior design firm to develop a performance specification for use in the procurement of systems furniture. After the system was installed, GSA had researchers evaluate the system's performance.

The pamphlet reports many lessons learned from the initial evaluation effort. "In a broad sense, the research effort underlined the necessity of managing the design process from the initial user need assessment phase through the postconstruction evaluation phase." The researchers, says the pamphlet, emphasized a need for: "more visual and acoustical privacy; adequate light on the actual primary work surface; more flexibility in

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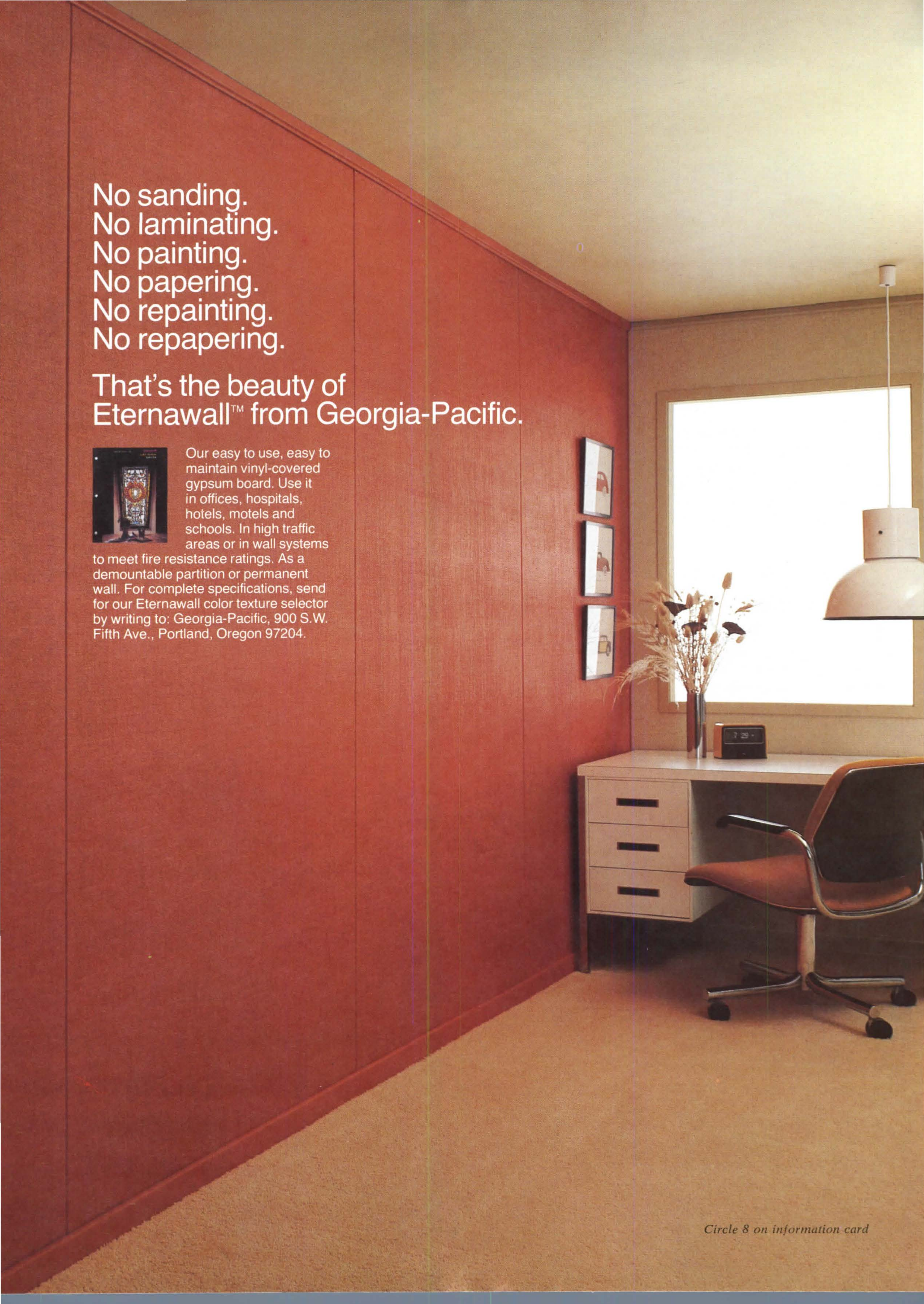
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Vulcraft joists and joist girders played an important part in the fast construction of the Cities Service Building, which was occupied only five months after the general contractor started the job.

All Vulcraft joists and joist girders were erected easily and quickly. In fact, they were all in place only one month and two days after they were brought to the construction site.

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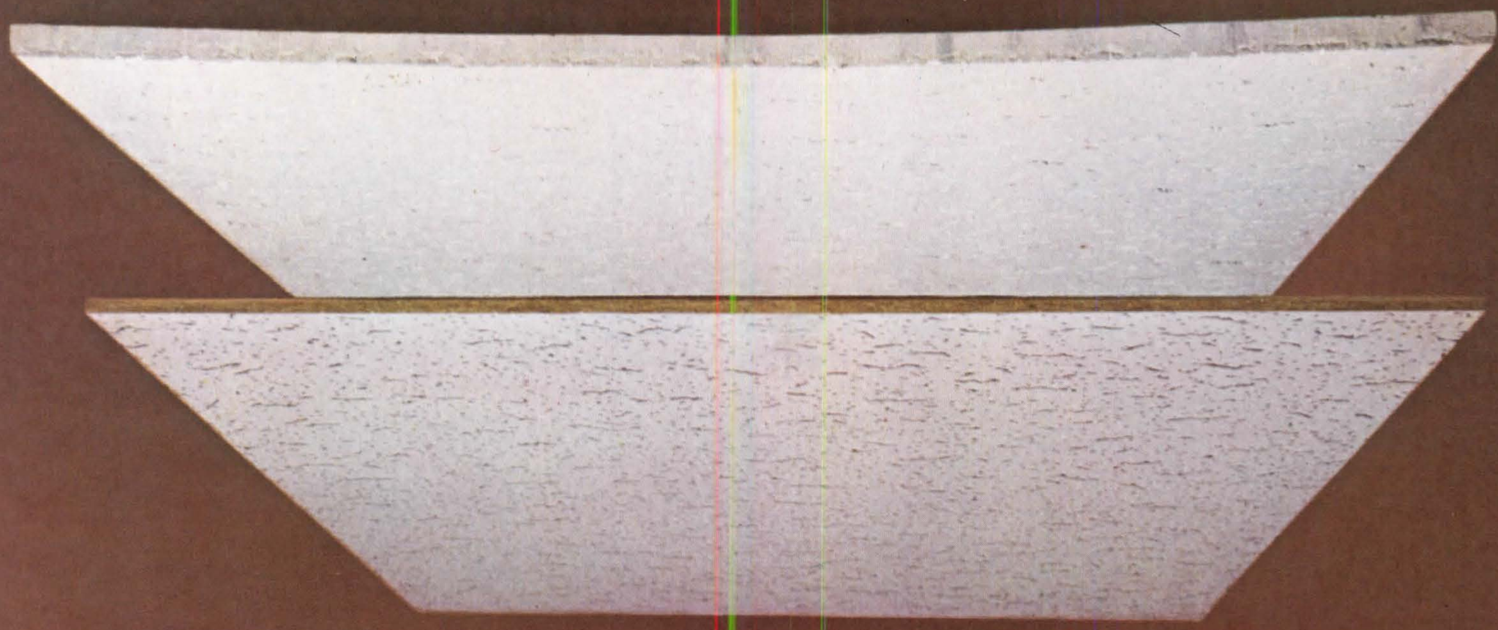

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NEW BUILDING SWITCHES TO

The American Plaza tower in Evanston, Illinois, was initially conceived as a concrete framed building, until a close cost evaluation showed that a steel frame would be more economical.

"The savings from our study prepared for the owner amounted to 37 cents per square foot" said architect George Schipporeit, "or a total amount of about $200,000."

The structural system for the new building consists of rigid frames in the perimeter walls of the building to resist lateral loads, and simple gravity load framing in the interior. Therefore, the drift requirements dictated the use of A36 steel for the spandrel beams, while all other main framing, beams and columns are A572-50.

The building is an eighteen story tower with floors measuring 120 feet by 150 feet. The large bay size of 30 feet square provides the flexibility

Parking deck structure.

STEEL–AND SAVES MONEY.

of space needed by the major tenant, The American Hospital Supply Corporation.

The office tower is served by a four level long span, steel framed parking deck with space for 384 cars. A cost evaluation was made on this structure, too. It also led to a decision to use steel. The bay sizes are 58 feet by 18 feet, and the floor beams act compositely with the concrete slabs.

In these new buildings, as in so many others, after a careful evaluation which considers current design and cost data, steel proved to be the most practical and economical structural system—while offering the greatest operating flexibility. Clean cut lines, together with the simplicity of the overall design, provided American Hospital Supply with a maximum of useable space for their headquarters, in a most attractive setting.

When you're planning a new building, it will pay you to think about steel. For a structural report on the American Plaza and for further information, contact a USS Construction Representative through your nearest U.S. Steel Sales Office or write to United States Steel, P.O. Box 86 (C805), Pittsburgh, Pa. 15230.

USS TRADEMARK **United States Steel**

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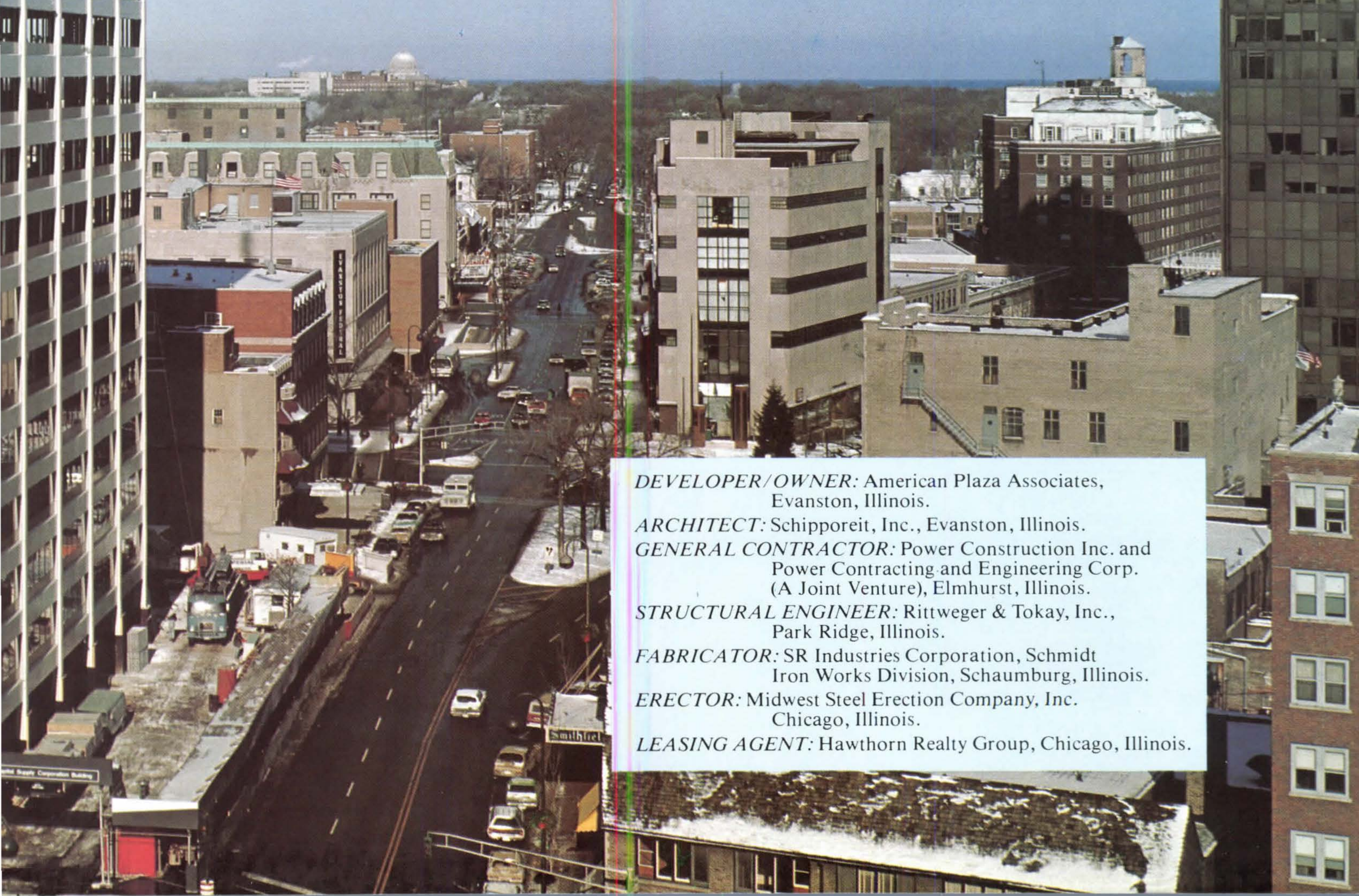

DEVELOPER/OWNER: American Plaza Associates, Evanston, Illinois.
ARCHITECT: Schipporeit, Inc., Evanston, Illinois.
GENERAL CONTRACTOR: Power Construction Inc. and Power Contracting and Engineering Corp. (A Joint Venture), Elmhurst, Illinois.
STRUCTURAL ENGINEER: Rittweger & Tokay, Inc., Park Ridge, Illinois.
FABRICATOR: SR Industries Corporation, Schmidt Iron Works Division, Schaumburg, Illinois.
ERECTOR: Midwest Steel Erection Company, Inc. Chicago, Illinois.
LEASING AGENT: Hawthorn Realty Group, Chicago, Illinois.

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adjusting and rearranging components of the system, better anthropometric fit."

For managers of federal programs, the researchers recommend:

• "All employees should be briefed about any proposed project that could result in the design or redesign of the work environment." Interviewed employees "should also be made aware of the importance of providing designers with accurate information regarding their spatial needs."

• "Designers should be provided with information concerning the nature of the organization and the work and communication patterns of staff members."

• "An orientation session should be held after the installation of the systems furniture so that the staff members will understand how the components of the system can be adjusted, rearranged and maintained."

• "Specific individuals should be assigned responsibility for relocating work stations and/or altering the configurations. . . ."

• "Finally, managers should understand that workers will want to personalize individual work spaces as well as have an opportunity to modify the arrangement if it does not meet individual needs."

The researchers made suggestions for designers of work environments as well:

• Each individual's functional requirements should be determined by interviewing that person; supervisors should not state what an individual needs with respect to furnishings or needs for visual and acoustical privacy.

• Any plan for a specific organization should reflect thorough understanding of existing communications patterns.

• During the design phase, anthropometric fit should be stressed. After installation of furniture systems, the designer should be sure that such matters as knee-hole clearances meet the requirements of the performance specification.

• Adequate task/ambient lighting must be planned for the total area.

• Signage systems, necessary to identify components and individuals, should be incorporated into the developed plan.

Inquiries about this and monographs to come should be addressed to: Erma Striner, Director, Design Action Center, GSA, Washington, D.C. 20405.

Heritage Program Is Endorsed by President

A nation finds continuity in its land and history, President Carter noted in his 1977 environmental message. He said that by preserving those places of special natural, historic and scientific value, Americans can ensure that their children and grandchildren will have a chance to know a part of their country which they and their ancestors might otherwise have taken for granted.

Carter conceded that although the federal government has been involved in natural and historic preservation for some time, the efforts have not always been well coordinated. To provide a more concerted effort, he directed Secretary of the Interior Cecil B. Andrus to establish the national heritage program.

Administered by the new Heritage Conservation and Recreation Service (HCRS), the program will "identify, acquire and protect the most significant examples of our national and historic heritage and encourage, support and coordinate ongoing private, state and federal programs."

The HCRS is comprised of the national natural landmarks program, the bureau of outdoor recreation and programs of the office of archeology and historic preservation. HCRS will administer the land and water conservation fund, the historic preservation fund and a number of technical programs related to heritage preservation and recreation.

The national heritage program was founded on the concept that the key to successful heritage conservation is voluntary action by private individuals and organizations and local and state governments with the support of a responsive federal government.

"It is through local government that community preservation priorities can be voiced and action best tailored to those priorities can be initiated . . .," according to an Interior Department report. "State governments are the main point of contact for federal financial and technical

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aid. . . . The primary role of the federal government in the national heritage program will be one of guidance and assistance: guidance of setting criteria for evaluating resources and in determining the requirements for grant programs; assistance such as grants, technical assistance and leadership in the formulation of policy and standards for heritage conservation."

The main tools of the program are the National Register of Historic Places and the National Register of Natural Areas. Once placed on either register, an area is protected in its existing state. The registers protect districts, sites, buildings, structures, objects, neighborhoods and cultural landscapes which are significant in American history, agriculture, archeology and culture.

In addition, the council on heritage conservation was established to advise the President and Congress on policy matters involving historic preservation and natural conservation, to represent the public interest in conflicts of conservation goals and other federal projects and to provide an independent voice for heritage concerns.

"The recognition and awareness of who we are, the meaning of where we live, work and play, the special meaning of our natural and historic landmarks, together with a renewed reverence for the quality of our natural environment comprise a consciousness very real in America today," according to the Interior Department report.

"The national heritage program has now moved from the conceptual stage to definition," the report added. "Further program definition and, ultimately, the shape and substance of its institutional characteristics, must come as the result of a careful consultation process. The real beginning is now."

A/E Standards Opposed

Professional employees working on federal contracts, including architects and engineers, would have to be paid according to government-established standards under provisions of a bill pending in the House.

The bill, HR 314, the Service Contract Act Extension, parallels the Davis-Bacon Act's requirements for wages of construction workers. Under Davis-Bacon, the bureau of labor statistics compiles wage standards based on private sector rates in the area where the contract is being performed, and contractors must meet these rates or those set by previous contracts.

The bill extending these requirements to professional employees is supported by the AFL-CIO but opposed by AIA, engineering groups and the Administration. In a letter stating the Institute's opposition, President Elmer E. Botsai, FAIA, contended that the bill would disrupt the present practice of paying professional employees according to their performance and experience, leading to "mediocrity and stagnation of professional services under federal contracts."

Botsai also said that the bill would work a special hardship on small firms by pushing wage rates beyond the level they could afford to pay, thus discouraging them from seeking federal work.

Students Compete for Balloons, McDonald's

A student design competition on pneumatic structures or inflatable architecture has been announced by the Association of Student Chapters/AIA and the National Institute of Architectural Education.

Entitled "William Turnbull's East-West Coast Hot Air Ballon Race," the competition is open to full-time students registered in accredited schools of architectural education. Turnbull is the San Francisco architect who developed the program for the competition. The pneumatic structure can be a residential or public building or a structure which is moved or propelled by wind such as a sail, kite, windmill sail, balloon or dirigible.

Cash prizes will be awarded to the three winning designs. Deadline for materials is May 12, 1978. The winners will be chosen at the AIA Convention in Dallas, May 21-24. For more information, contact: Christian K. Laine, Competitions Coordinator, ASC/AIA, 1735 New York Ave. N.W., Washington, D.C. 20006.

Another student competition is cosponsored by ASC/AIA and McDonald's Corporation. Prizes totaling $9,500 will be given for the 12 most innovative designs for a McDonald's of the future. The competition is open to any student enrolled full-time in an accredited school of architecture. Entries are due Nov. 13, 1978, and winning designs will be displayed at AIA's 1979 convention in Kansas City, Mo. Official registration forms and programs are available through the ASC/AIA office at AIA headquarters.

Program Reduces High Cost of School Energy

Last year, the nation's 88,000 public school buildings used almost 3 percent of the total energy consumed in all buildings in the U.S. Schools spent $2 billion on energy, or about $42 for every child and about $1,000 for every classroom. In the current academic year, about $50 will be expended for every student. Any reduction in this more than $2.2 billion expended annually will benefit both the nation's overall energy program and the taxpayers in every school district, says the Educational Facilities Laboratories, a New York City-based nonprofit organization that provides information on the construction and operation of public institutional buildings. EFL has established an energy audit program for public school energy conservation, and invites interested persons to make inquiries.

Since 1972-73, says EFL, schools administrators have seen energy bills increase by 150 percent. This high cost of energy consumes up to 15 to 20 percent of a school's nonsalary operating costs. In the next seven years, EFL predicts, the cost of energy will double, with annual increases between 12 and 15 percent.

EFL cites two reasons that schools have not done what they could do to conserve energy and money. "One is that conservation has a low priority when such critical issues as teacher contracts, enrollment decline, student competency and vandalism demand so much attention. The other reason is that schools are *not exempt* from a national confusion over energy."

EFL contends that without major investment in equipment or changes in buildings schools could use 30 percent less energy. About 25 percent of a school's energy bill goes for lighting, says EFL, and this could be reduced. For example, a row of seats by a window in a classroom does not require as much artificial light as a row by the door.

After conservation measures that do not require capital expenditures have been taken, says EFL, the next step is to evaluate the benefits of spending capital funds on changing building and equipment. The installation of a $1,000 timing device that would automatically reduce temperature settings at nights and on weekends, for example, "will usually pay for itself in two years."

Other capital investments, EFL says, might include modifications to the boiler and heating system, roof insulation and controls to monitor and regulate the flow of energy throughout the building. "If all public schools were operating efficiently, the national savings would be about $665 million, split almost evenly between fuel and electricity."

Currently, Congress has under consideration an energy bill that would make capital funds available for schools that have completed operational improvements, with capital investments expected to result in additional energy savings of 20 percent. EFL urges schools to begin planning now if they want to receive funds.

Meanwhile, help can come from EFL. Write or call: EFL, 850 Third Ave., New York, N.Y. 10022, (212) 751-6214.

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Help Given to Firms Seeking Legal Counsel

The Arizona Society of Architects/AIA has established an unprecedented plan aimed at helping architectural firms with legal problems. The plan is designed to encourage firms to seek legal counsel before expensive litigation becomes necessary.

Under the plan, participating architectural firms pay $100 for a six-months subscription and receive in return three hours of legal counsel from a participating law firm. If further counsel is required, the legal fees are at a reduced rate. The law firms selected to participate have been chosen because of their knowledge and experience in architectural and construction law.

Although the plan was conceived to offer special help to small or new firms where there may be hesitancy about consulting an attorney because of the expense involved, at least one of the first participants is among the largest state firms.

One reason cited for the plan is that Arizona is one of seven states in the union which has no statute of limitations; hence, even an architect in retirement may be wise to continue liability insurance coverage.

Officials of the Arizona Society think the plan will be successful if at least 30 of the state's 200 architectural firms participate. It is reported that a survey of architectural firms has indicated a positive response to the idea.

GSA Moves to Give New Life to Willard Hotel

The long-beleaguered and threatened historic Willard Hotel (photo p. 28) on Pennsylvania Avenue in Washington, D.C., has been assured a new lease on life. In a federal move to ensure its preservation and reuse as a modern hotel, GSA has authorized transfer of ownership to the Pennsylvania Avenue Development Corporation. PADC, an independent federal agency that is governed by a board from private firms and federal and D.C. governments, is responsible for the design redevelopment of 21 blocks of Pennsylvania Avenue and its northern edge between the Capitol and the White House.

The hotel, designed by Henry Hardenbergh and built in 1901, was once the scene of political and social life in the nation's capital, its guests including Presidents and other distinguished dignitaries. A hotel has been located on the site since 1818. The Willard, abandoned for several

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years, was threatened by owners who planned to demolish it and construct an office building on the site.

Then, in January 1977, the Federal Court of Appeals ruled that the deed be held by the attorney general of the U.S., stating that the U.S. government was in effect the Willard's owner because it had "so impeded and restrained the (owners) as to deprive them of any reasonable use of their property."

Recently, Jay Solomon, GSA administrator, authorized transfer of the deed from the Justice Department to PADC. He said, "Having a hand in saving the Willard Hotel is one of the most personally gratifying official actions that has occurred since I came to GSA."

PADC was assured its ownership of the hotel when title passed to the Justice Department after the corporation paid $4.55 million for the property. According to GSA, at least three groups of private developers have already expressed interest in renovating the Willard and operating it as a modern hotel.

Meanwhile, the National League of Cities has announced that it will participate in the revitalization of Pennsylvania Avenue by moving its headquarters into a $17 million building at 13th Street, overlooking the avenue. Construction will begin this spring on a site now occupied by a paved parking lot and a movie theater. The 12-story building, designed by Frank Schlesinger, FAIA, will be the first major office building designed exclusively for private tenancy along the Pennsylvania Avenue corridor in 10 years.

NCL President Tom Moody, mayor of Columbus, Ohio, says the building is a "concrete expression of NLC's commitment to central city revitalization. Across Pennsylvania Avenue from our new building, we will watch the preservation and adaptation of the old post office, a Washington landmark, into a spectacular shopping arcade and office complex. . . . And a block away from us, the work of restoring the historic Willard Hotel to its original use should be in full swing, demonstrating yet another type of urban conservation."

New Concept of Quality Growth Sought in Texas

"We are convinced that Texas could pioneer a new concept of growth—quality growth—which would enhance quality of life and stimulate the economies of our communities and our state," says Preston M. Bolton, FAIA, president of the Texas Society of Architects (TSA).

To achieve this, the TSA is sponsoring town meetings on "Texas—The Quality of Life." At these public forums, citizens are expected to suggest what can contribute to the quality of life in their own community.

"Our purpose," Bolton says, "is to help maintain or enhance the quality of life in Texas in a time of change. We do not believe that Texas needs to repeat the mistakes of the older sections of the country in dealing with growth and prosperity. We do not believe that present or future resource constraints need diminish the quality of life in Texas if we design for the future with a thorough understanding of the variety of options that are available to develop the diversity of life style choices that citizens of Texas want."

Each of the 17 participating chapters is planning its own program suited to the particular circumstances of its community. For example, the first town meeting at the San Antonio chapter was to be held this month on the subject, "mobility and the good life: a challenge for San Antonio." On Mar. 5, San Antonio became the first

continued on page 89

Circle 18 on information card

Plywood saved $10,730

New math for roof decks.

Project: Station 35 Common Shopping Center.

Location: Glastonbury, Connecticut.

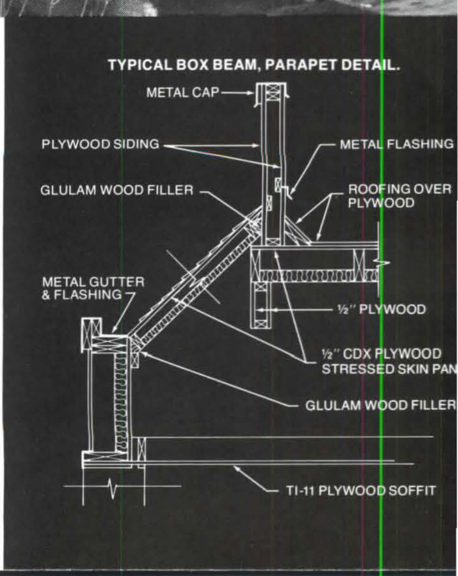
Size: 16,000 square feet.

Roof deck system: Laminated wood beams and flat stressed skin panels using APA grade trademarked ½″ CDX plywood framed 16″ o.c.

Reasons for choice: Compatibility with design; ease of construction; satisfied live load requirements; economy (total savings for roof deck —$10,730).

Other systems considered: Steel joists and metal decking; conventional wood framing.

Architect/Designer: Lawrence Frazier, Architect, East Hartford, Connecticut.



right off the top.

Contractor: DmC Construction Co., Inc., Manchester, Connecticut.

Fabricator: Champlin Co., Hartford, Connecticut.

Source of plywood information: American Plywood Association, Dept. AA-048, P.O. Box 2277, Tacoma, WA 98401.

These plywood roof deck books are yours free for the asking: Build a Better Roof; Plywood Diaphragm Construction; Warehouse Roof Cost Estimating Sheets; Plywood in Commercial Buildings.

American Plywood Association, Dept. AA-048, P.O. Box 2277, Tacoma, WA 98401

☐ Please send me your roof deck literature.
☐ I'd like an APA field man's assistance.

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Firm____________________

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Plywood cuts costs. Not quality.

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Solar heating is here. And copper makes it practical for heating homes, household water and pools.
When the fuel shortage hit, the copper industry was ready with its new Decade 80 Solar House with energy for both the heating and air conditioning supplied by copper solar collectors.
Today, copper solar collectors are available and affordable in a variety of styles for existing or new buildings. Here are several.
All solar heating systems begin with collector panels to capture the sun's heat. And copper is first choice with companies that manufacture or market them.
Reason: copper is easy to fabricate and it conducts heat more effectively and resists corrosion better than any other material for solar panels.
Copper solar collectors utilize standard copper sheet, tube and plumbing components to provide efficient, reliable systems that can harness solar energy for your heating and hot water needs.
Copper solar collectors are ready now. For more information and addresses of copper solar collector manufacturers, write to:
Copper Development Association Inc.
405 Lexington Avenue, New York, N.Y. 10017
Copper solar collectors.
For practical, reliable, efficient heating.
Ready now.
Copper tube and sheet (cutaway) capture heat efficiently. Solar collectors (main photo) supplied by: General Energy Devices, Inc.; Ametek Inc.; Solar Systems Inc.; Revere Copper & Brass, Inc.; W.R. Robbins & Son; PPG Industries, Inc.; Sunsav Inc.; Sunworks Div., Enthone Inc.
Count on Copper
Circle 21 on information card

AIA JOURNAL

Convention Issues: Advertising, Design/Build, Recertification

For the third year in a row, the most basic standards of the profession will be debated at the Institute's annual convention. In its late March meeting, the board voted to propose major changes in the ethical rules regarding advertising and participation in design/build enterprises. And the resolutions committee will bring to the convention a wide set of concerns dominated by the issues of recertification and mandatory continuing education.

The board, ratifying the work of a task force headed by Secretary Robert M. Lawrence, FAIA, will offer three alternative courses of action on advertising. One is to leave the present prohibition against it intact. Another is to delete the prohibition but insert a new rule forbidding "exaggerated, misleading, deceptive or false statements or claims" in advertising or any other communications.

The third alternative, the one recommended by the board, is to delete the prohibition, insert the same rule and another as well, which limits advertising to print media and states general guidelines for suitable tone and content. The exact wording of this rule still was being formulated at this writing and, when completed, was to be mailed to the entire membership.

On the issue of design/build, the board commended to the convention the report of a task force headed by public member Harold C. Fleming, Hon. AIA. The report proposes a three-year experiment in relaxing some of the current restrictions upon members' roles in design/build enterprises.

"The intent of this proposal," says the task force, "is to recognize that the present system of project delivery is not working very well. It is under increasing attack from nonprofessional competition and from rising societal expectations of accountability.

"The tendency has been to counteract this trend by moving away from direct responsibility for construction. This experiment is designed to see if another strategy—moving toward greater control of the process by architects—can produce better results."

The precise language of the task force's proposals for ethical change also was being formulated at this writing and was to be mailed to the entire membership. One major thrust, however, is that even when employed by another party in the design/build team, the architect shall keep the interests of the owner paramount. Another is full disclosure of any possible conflict of interest to the owner.

In related action, the resolutions committee, chaired by J. J. Champeaux, AIA, has itself proposed resolutions calling for new ethics rules which state that in performance of architectural services "members shall not allow their own financial or other interests to affect the exercise of independent professional judgment on behalf of their clients," and that in performance of other services "that may bring their interest into conflict with those of their clients' " there shall be written disclosure of the possibility of conflict.

Other resolutions proposed by the committee call for decisions by the convention on whether AIA "opposes any program or system designed for license renewal or license maintenance" and whether it should continue work on the professional development measuring system (PDMS).

Resolutions proposed by components on the recertification-continuing education issues would:

- Discontinue both AIA's PDMS and the National Council of Architectural Registration Boards' architectural development verification program (*see* Oct. '77, p. 44);
- Oppose making continuing education "mandatory as a requirement for membership";
- Continue AIA's support of voluntary continuing education but oppose making it mandatory for either membership or recertification;
- Oppose recertification and call instead for "improved educational standards, more stringent initial licensing criteria, strict enforcement of realistic registration laws and active practice as more effective means of ensuring competence and protecting the public interest."

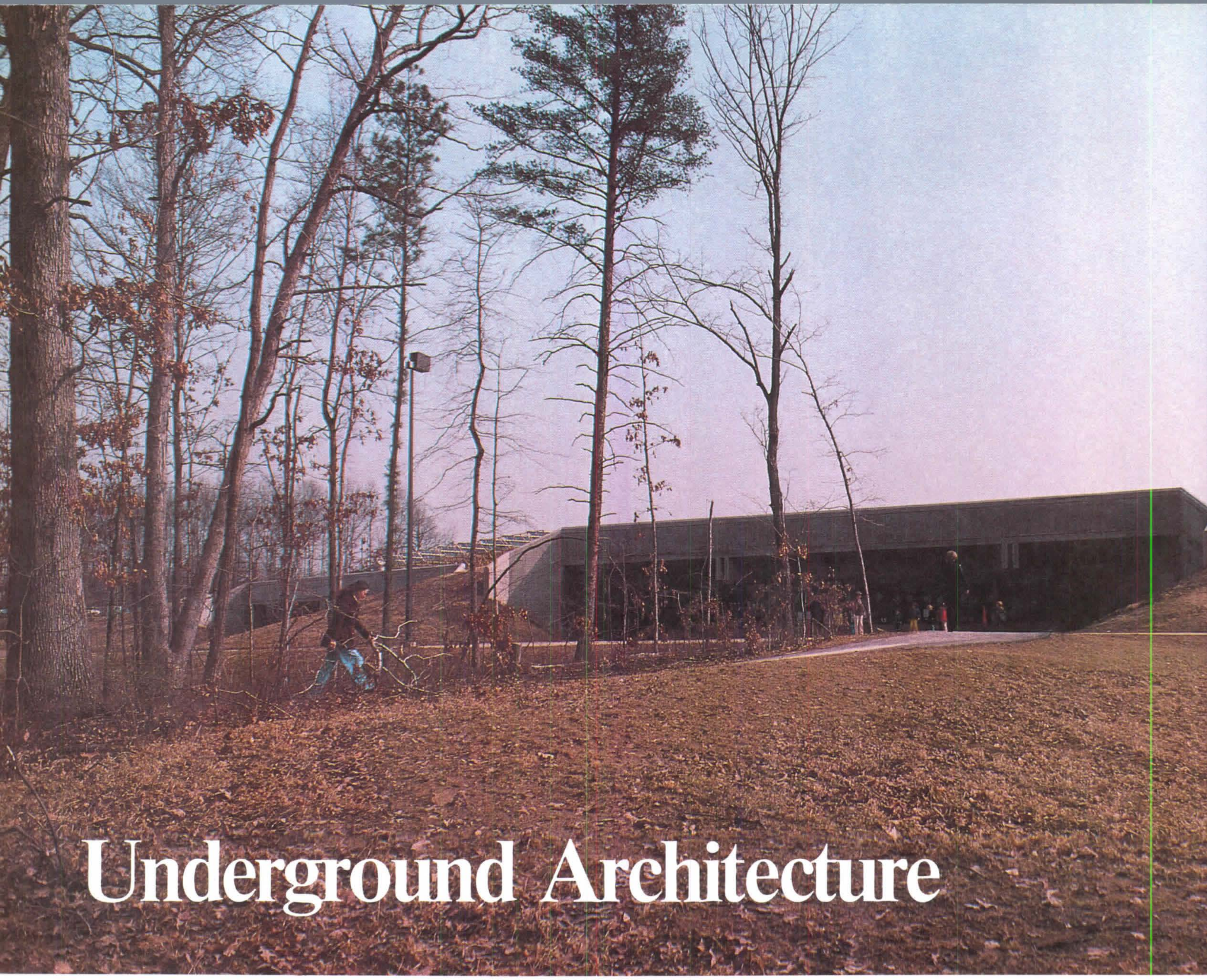
On the subjects of membership and dues, a component-sponsored resolution calls for components to be "allowed to keep categories of membership in existence prior to the 1977 convention." Another asks for review of associate membership requirements "with a view toward returning to the components greater discretion in establishing their own categories of chapter associates."

A resolution asks delegates to go on record that "it is the sense of this convention that AIA establish an individual dues structure which is more responsible to the financial situation of young registered architects than is the current system." Another calls for modification of the supplemental dues structure as an "incentive program" for associate membership and consideration of associate members in supplemental dues calculations.

Other resolutions ask for increased AIA emphasis on environmental education and on the problems of cities; improved communication to members about AIA activities, especially the work of committees, and appointment of a task force to seek ways "to encourage and facilitate the participation of the small office practitioner" in the leadership of the Institute by paying some expenses of officers and directors.

The convention also will be called upon to "proclaim its unanimous and enthusiastic support" of David O. Meeker Jr., FAIA, the Institute's new executive vice president.

In all, 21 resolutions were submitted this year, far below the recent average. The committee will put 20 before the convention, including four of its own, having pared the others mainly by combinations and consolidations. Other committee members were Walter S. Collins, AIA; Frederick L. Creager, AIA; Natalie de Blois, FAIA, and John Wilson-Jeronimo. *D. C.*



Underground Architecture

A growing number of buildings is being placed within rather than atop the earth, with some significant payoffs. By Andrea O. Dean

A strong underground movement is rapidly spreading in architecture. Its often-fervent advocates point out that putting buildings within rather than atop the earth can result in significant energy savings, prevent environmental damage in situations where an above-ground structure would be intrusive and preserve valuable open space.

So persuasive are these arguments, and so impressive are some of the currently proliferating crop of at least partially underground buildings (*see* following pages) that the question that comes to mind is why there aren't even more of them.

Deeply seated fears of being underground, irrational as they may be, are the main obstacle to using the considerable potential of subsurface architecture. The ancients chose the underground for their version of Hell, as did Dante. Nor are our associations with caves and their inhabitants (dark, dank, dirty and primitive) conducive to creating enthusiasm about the prospects of living or working underground. And, as Kenneth Labs points out in an exhaustive m. arch. thesis for Washington University in St. Louis on the subject of underground space, most of us have negative images based on personal experience. "Consider, for example," he writes, "the few occupational images generally available—coal mining, sewer maintenance, subway engineers. Consider too the frequent connotations of subgrade space as inferior, utilitarian or secondary in quality."

Malcolm Wells, one of the earliest and abidingly fervent advocates of underground architecture, points out that "most people will agree that such land wasters as parking lots and shopping centers should go below ground. And many will even concede that some of our freeways and warehouses and factories belong there too (in addition to railroad yards, refineries and museums). But the thought of *living* underground in a windowless, artificial environment is to them the ultimate perversion of man's role on earth. *Fortunately, most advocates of new architecture heartily agree.*"

Hundreds of recently completed below grade structures—houses, libraries, schools and office buildings—admit natural light and views through courtyards, skylights and windows, and are in many ways more attractive and habitable than their counterparts above ground. Nor are they leaky and dank, as the commonly held stereotype, based on experience with basements, would have it. According to Thomas Atchison, executive director of the American Underground Association, an organization primarily composed of engineers and architects, formed to further the cause of underground construction: "People don't appreciate that if they built the top of their houses the way they build their basements right now, the rain would

come in and the wind would blow right through."

"Even when buildings are in the deep underground where there can be no windows, it's a question of understanding what we're talking about," explains Thomas Bligh, professor of mechanical engineering and energy specialist at the University of Minnesota. Millions of people, without giving the matter further thought, already spend the balance of each day in pleasant enough above-surface structures which are windowless and in other respects near reproductions of deep underground space, Bligh says. Yet, the very same people often recoil at the idea of being underground. An example: Bligh had students ask 800 people working in a windowless St. Paul building whether they would like to work in an underground building. All 800—including 25 working in the basement—said they would not. When the interviewers pointed out that the conditions would be similar in important respects to their present work place, most changed their minds.

The University of Minnesota's interest in underground architecture receives strong support from the state. "The state energy agency is 100 percent behind it. The legislature is also, and the Minnesota Geological Survey is aggressively pursuing geotechnical mapping to help zone or define areas that are suitable for this kind of development," says Charles Fairhurst. Minnesota has also started a demonstration program of underground houses, which will be for sale, and the response from the public as well as financing agencies "has been surprisingly positive," according to Sanford Ritter, architectural consultant to the program.

The energy crisis is providing the principal source of fuel for this new interest in underground architecture. "Energy independent buildings are technically and economically feasible and can be constructed with existing technology, provided they are constructed slightly below grade," says Fairhurst. And Bligh claims that building down into the earth "can effect an energy saving of 75% or more."

Why? Some 10 meters below the earth's surface, temperature is constant, at about 50 degrees Fahrenheit or the yearly average for the region. The penetration of short-term temperature fluctuations over periods of hours or days is almost negligible even eight inches beneath the surface.

Neither howling winds, sleet nor snow will affect subsurface spaces. The insulation provided by the earth is superior to any that can be added to above-ground

Placed below ground to conserve energy, the Terraset School, Reston, Va., admits ample natural light through a below grade courtyard, skylights and windows.

structures. And energy outflow by transmission and infiltration through walls, ceilings, doors, floors, windows and cracks around each is far less than in above-ground buildings.

As a result, heat from people, lights and machinery is usually enough to keep underground structures warm in winter without resort to mechanical heating.

The ability of underground buildings to maintain fairly stable temperatures has several significant benefits. It means that smaller heating and cooling units are required, reducing capital outlays. It means that in frigid climes, power failures will cease to be life-threatening and pipes won't freeze and burst.

It also means dramatic advantages for underground cooling plants. In Kansas City, almost 25 million square feet of underground space has been mined in a very hard, high-grade limestone strata underlying the whole area, and is being used mainly for dry storage, refrigeration and light industry. In cold storage facilities there, the temperature rises 1 degree Fahrenheit per day as compared to 1 degree per hour in similar above-ground facilities. As a result, power can be shut off for days without spoiling frozen foods. And power costs can be reduced by running refrigeration only during off peak hours when rates are low.

Bligh ticks off at least four other advantages of underground buildings:

• "Maintenance—everything underground is protected from wear and tear of extremes—wind, moisture, heat, freezing, etc.; no roof or exterior walls to maintain.

• "Stability—no vibration. Delicate machines and instruments need not be isolated on expensive foundations.

• "Operating savings—machines remain accurate for much longer without realignment due to very stable temperature and humidity conditions.

• "Earthquake protection—. . . there is little or no structural shear stress, the primary cause of building failure in earthquakes."

Underground architecture is also very gentle on the environment, and it was ecological concerns that prompted Malcolm Wells to begin placing his buildings below ground. He writes, "Forgetting for a moment all the plants and wildlife denied existence on paved sites, forgetting the soul-crushing ugliness of vast paved areas, forgetting even the erosion they cause, the amount of water denied access to the land by our black, white and green paving exceeds the total U.S. water consumption! It has to." Wells calls underground building "conservation architecture," and exhorts, "Either physically improve the site or don't build."

He goes on to say, "Though endorsed by most ecologists and landscapers, the idea has drawn fire from some architects who, not understanding it, fear it will create a kind of nonarchitecture. But the idea is gaining popularity each day as people react to the blight all around them."

George Nelson, FAIA, is among a growing number of architects for whom the idea is indeed gaining popularity. He suggests a list of building types that "not only do not need windows, but *do not want them,*" including warehouses, telephone exchanges, power substations, department stores, movie houses, concert halls, museums, convention centers, sports arenas and shopping malls.

Nelson laments the "urban eczema composed of highrise offices and apartments, miles of four-story neighborhoods and more miles of bombed-out slums, the whole scene laced with traffic and parked cars everywhere." He suggests sweeping some of "the prevailing mess under one or more earth-covered mounds."

Gunnar Birkerts, FAIA, has been working on schemes to place most urban services underground, including all generating stations to supply power, heating and cooling from centralized sources; all parking lots, local transportation systems and automated and semiautomated industry. Among his goals is to recover "the above-ground space of our urban areas for social purposes."

Birkerts acknowledges that his proposals for the U.S. would require "a bold commitment of government on local, state and perhaps federal levels." Public controls over planning of highways and utilities, zoning ordinances, property tax laws (now assessed on the value of owned surface land) would have to be changed.

Bligh, meanwhile, proposes building whole housing developments underground. Each house would have its private outdoor courtyard and look out onto a central park-like area. Bligh's houses would be nestled in trenches dug by large machines, which would reduce excavation costs, and they would be assembled from prefabricated units using a mobile workshop. Once construction was finished, the soil would be pushed back and bermed over the houses and "the excess landscaped to turn a flat area into a beautiful, undulating playground."

Ah, brave new world, you say. In fact, many of these bold ideas derive from a basic pessimism about the future. As Frank Moreland, specialist in earth-covered buildings at the University of Texas (Arlington), puts it: The future "is much more optimistic than many futurists suggest, and more pessimistic than anyone wishes. In essence it embodies the realization by this and most other countries that little real economic growth will occur before 2000 A.D., that increases in relative prices of food, energy and raw materials will continue at a greater rate than growth, as will taxation; that capital funding requirements will be difficult to meet,

Before ameliorating the general resistance to underground spaces, more needs to be known about it.

. . . that solar and nuclear energy cannot fulfill the expectations of prompt result in either short- or long-term net benefit . . . and that the demand for energy conservation will auger for buildings that are hospitable without resort to significant treatment of air. Not a pleasant picture, but one which is assumed negotiable by cool and tough minds."

What kinds of problems must such "cool and tough minds" negotiate to make underground architecture more acceptable and widespread?

To begin with, there is—once again—the need to break down potential user resistance. Studies of how people actually respond to spending sizable chunks of their time in subsurface buildings are scant, inconclusive and focus on windowless structures. Evaluating the effect of being underground on work or school performance is also complicated by a host of factors that color the perception of space, many of which have little if anything to do with design. For example, what type of work place or school did the study subjects come from? How satisfied are they with their jobs or classes? Their boss, or teachers? Their paychecks, or grades? Their coworkers? Does the brass work in underground spaces, or have they been elevated above the herd?

The only long-term study of an underground building was made in 1972 by Frank Lutz of the Abo elementary school and fallout shelter in Artesia, N.M. The conclusion of the study was that "the Abo school has been operating as an effective elementary school . . . since it opened its doors in 1962. It continues to be an effective school and there is no evidence that the fact that it is underground and could serve as a fallout shelter and is so marked, designated and named has had any detrimental effect on pupils attending the school."

Results of an early study of windowless classrooms conducted by the University of Michigan's architectural research laboratory indicate that lack of windows had little if any perceptible effect on children's learning achievements or their behavior. Teachers, although initially resistant to the idea of windowless classrooms, became enthusiastic supporters and expressed a preference for the windowless environment.

"As may be expected, preference for windowlessness is rare, although as yet unproven as harmful," says Kenneth Labs.

Interviews conducted by psychologist Robert Sommers (of the University of California at Davis) with adults working in underground environments without windows produced complaints about "stuffiness and stale air, the lack of change and stimulation and the unnaturalness of being underground all day." A typical comment heard by Sommers was, "I come out like a mole at lunchtime. It is more dull here. Time loses meaning. I have that basement feeling, burrowed in for the day. There is a lack of any buoyancy and change. The work in this particular office is not stimulating, and so things here are

Underground architecture is taking among do-it-yourselfers as well as large institutions. Left, John McGowan's Sante Fe home. Right, Cornell University bookstore.

depressing. One has to work at maintaining feelings in spite of gray walls and neon lights." A frequent response of employees working in an underground data processing firm was that time seemed to move very slowly and things seemed dull.

By contrast, Truman Stauffer of the University of Missouri found that employees working in Kansas City's deeply mined underground businesses also had a skewed sense of time, but in this instance the distortion was of time passing more quickly in the absence of external cues.

Such cues can, of course, be provided, boldfaced clocks being a most obvious and simple example. Faber Birren, an authority on light and color, suggests in all seriousness, that for psychological and emotional reasons, it might be a good idea to "program artificial light, warm light in the morning, increased intensity and whiteness as the day progresses, 'complexion' lighting at coffee breaks or during the lunch hours, pink or orange at dusk."

Labs adds that deep underground structures may recoup at least some of the functions served by windows through the use of imaginative spatial planning, use of "window surrogates" and pictures. He suggests that "maximization of internal volumes, high ceilings, minimization of nontransparent partitions, optimal air circulation, variable illumination levels, 'warm' or brightly colored wall surfaces and abundant interior planting are all devices to counter preconceived notions of the characteristics of the underground."

In a recent survey, 40 students at the University of Minnesota were asked, "How would you feel about working/studying in a building which is either totally or mostly underground: a) if it had no windows? b) if the building had windows, but your work space itself had none? c) if your work space had a window? Virtually all had reservations about choices a and b, but found c acceptable.

Another potential problem of underground buildings is high cost. The assumption is that initial costs will be more than for comparable structures above ground. But here again, the findings are equivocal and depend on the depth of the structure, soil and rock conditions and a host of other variables.

Contrary to what one might expect, structures tunneled out of deep lying rock can be the least expensive of underground types, provided the waste rock is a usable and marketable product. In Amber Brunson's instrument plant in Kansas City, for example, the total cost of construction was substantially less than for a comparable above-ground facility because the excavated limestone was sold. Mining within rock can also eliminate costly foundations and external building shells.

According to John E. Williams, professor of architecture at the Georgia Institute of Technology, initial costs for underground buildings appear to be about 11 percent higher than for comparable above-ground buildings, but this is made up for by lower operating and maintenance costs in six years' time, "after which estimated savings for below grade construction increase substantially."

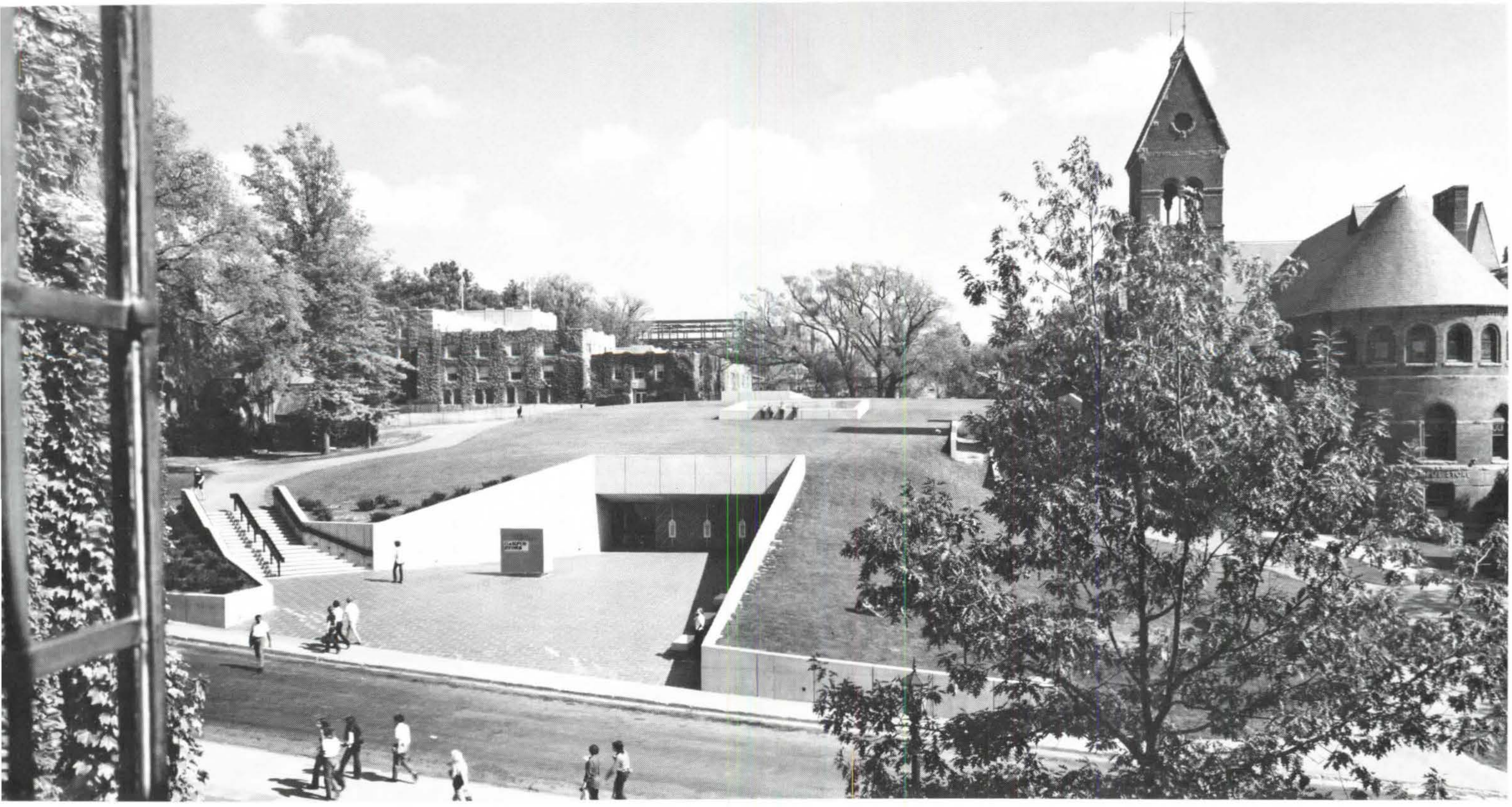
Despite the growth of interest in underground buildings here, there is even more overseas.

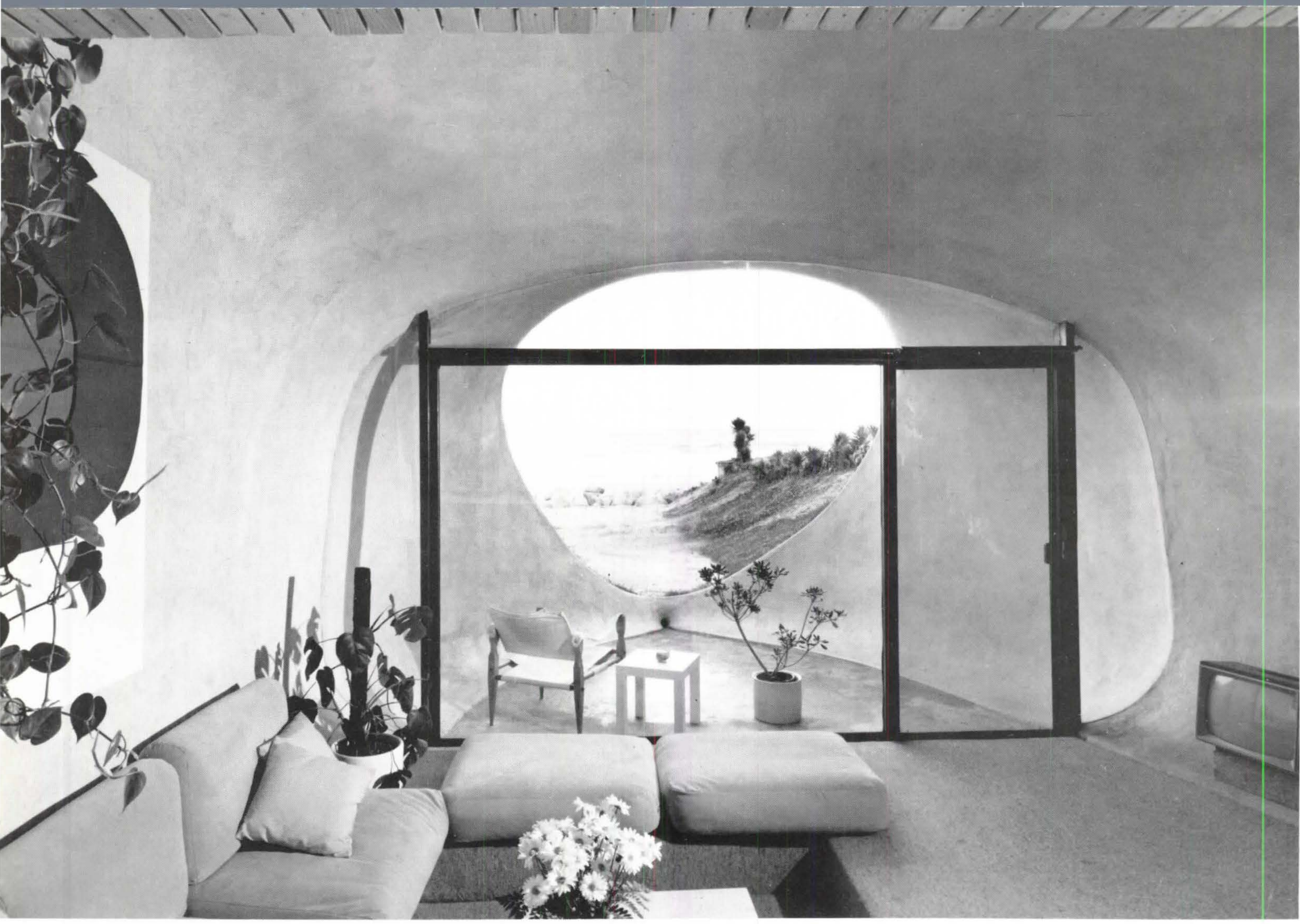
Yet, the University of Minnesota bookstore-admissions and records facility (*see* page 46) cost 3 to 5 percent less than an earlier equivalent design for an above-ground building. And although contractors considering building houses underground in Minnesota anticipated that it would be prohibitively expensive, their bids came in at a level competitive with conventional designs. So, says AUA's Thomas Atchison, "There doesn't seem to be an initial cost penalty, and there are big savings on a life cycle basis."

The reaction of lending institutions to the idea of financing underground structures is similarly mixed. Labs and others contend that there is undoubtedly a reluctance on the part of lending institutions to finance underground buildings because of the lack of experience, fear of public acceptance, concern with initial costs and resale ability. Yet, in trying to obtain financing for his demonstration underground residences in Minnesota, architect Ritter finds lending institutions "vying with each other to extend loans."

Birkerts points out that while the U.S. has applied large-scale excavation techniques to strip mining and highway construction, underground building abroad has advanced much further. Sweden alone has spent some $2 billion on underground installations, about half for civilian uses. Just across our northern border, in Montreal, is the extensive undercover complex at Place Ville Marie and Place Bonaventure, a system of attractive underground shops, offices, restaurants, cinemas and pedestrian walkways fully integrated with above-ground facilities and a modern underground transportation system.

And Irving Hoch, a research associate on urban and regional economics for Resources for the Future, Inc., writes that "it is somewhat disquieting that in 100 Russian cities, 35 percent or more of investment in structures is underground. (Do they know something we do not?)"





Seaside Duplex Molded from a Dune

Seen from the ocean, a stone's throw away, the two porthole-like glass eyes, framed in concrete and covered by earth, vines and grasses, look as though they might harbor some future aquatic life form.

In fact, they serve as glass openings, with sliding doors, for two modest sized (750 square foot) mirror-image apartments set into an existing sand dune in Atlantic Beach, Fla. William Morgan, FAIA, designed the dwellings to "preserve the original site's environmental character." And though underground, they have more glass area than comparable apartments above ground.

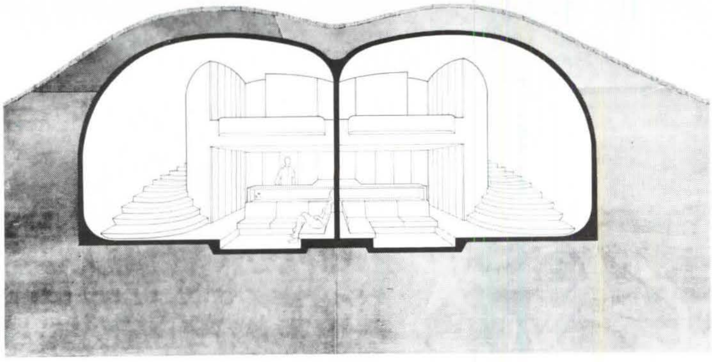
"Earth," says William Morgan, "is the most natural building material." Until this century, man has always shaped the hills and molded the landscape to create unobtrusive architectural forms, as the Aztecs did in their temple cities more than 2,000 years ago. "We should revive this tradition," says Morgan, "and mold rather than construct much of our man-made environment."

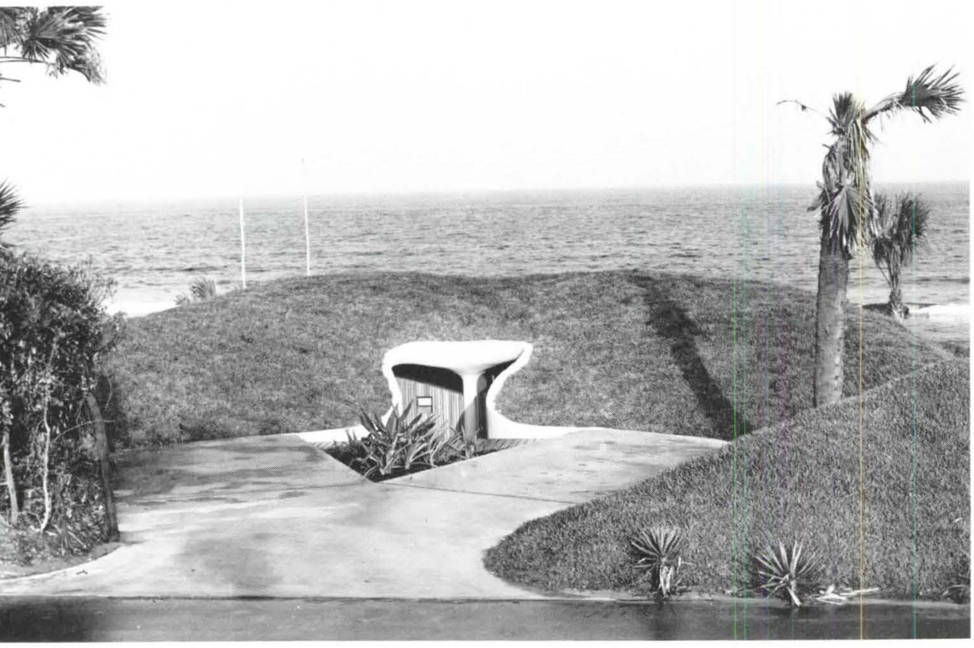
This is what he has done with his dune-houses, which were built by first pouring concrete floors and footings, then forming the walls and ceilings with steel mesh onto which gunite was sprayed. Morgan explains that the thin (2½ inch) concrete shells are made more stable by being within the earth; sand backfill post-tensions the concrete. If produced in large numbers, he says, construction of the shells could be reduced from six weeks to three days. The cost of each unit in 1975 was $25,000.

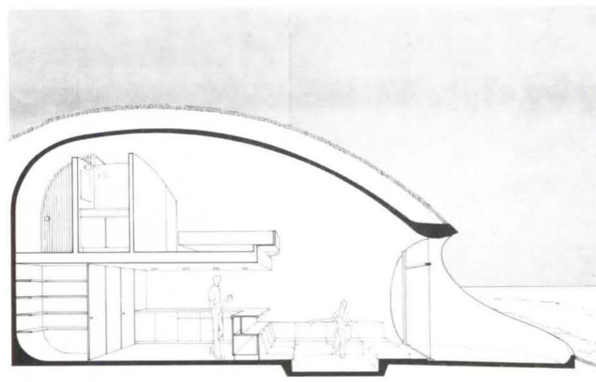
Entering the apartments between flanking berms, on the side away from the ocean, one descends a central stair, for which Morgan had in mind Michelangelo's stair at the Biblioteca Laurentia in Florence. The stair leads down to a foyer and L-shaped living area, over which an open bedroom is perched.

Morgan's interior design carefully distinguishes the bearing concrete shell from nonbearing wood partitions and platforms, with the latter being held away from the shell. Furniture is built in, ship-fashion, but, with warm earth colors and lots of wood detailing, the apartments look anything but sterile.

Electric bills, according to Morgan, are about half that for comparable aboveground dwellings, mainly because a 20-inch thick layer of earth insulates the concrete shells.







A House Designed as a Hilltop

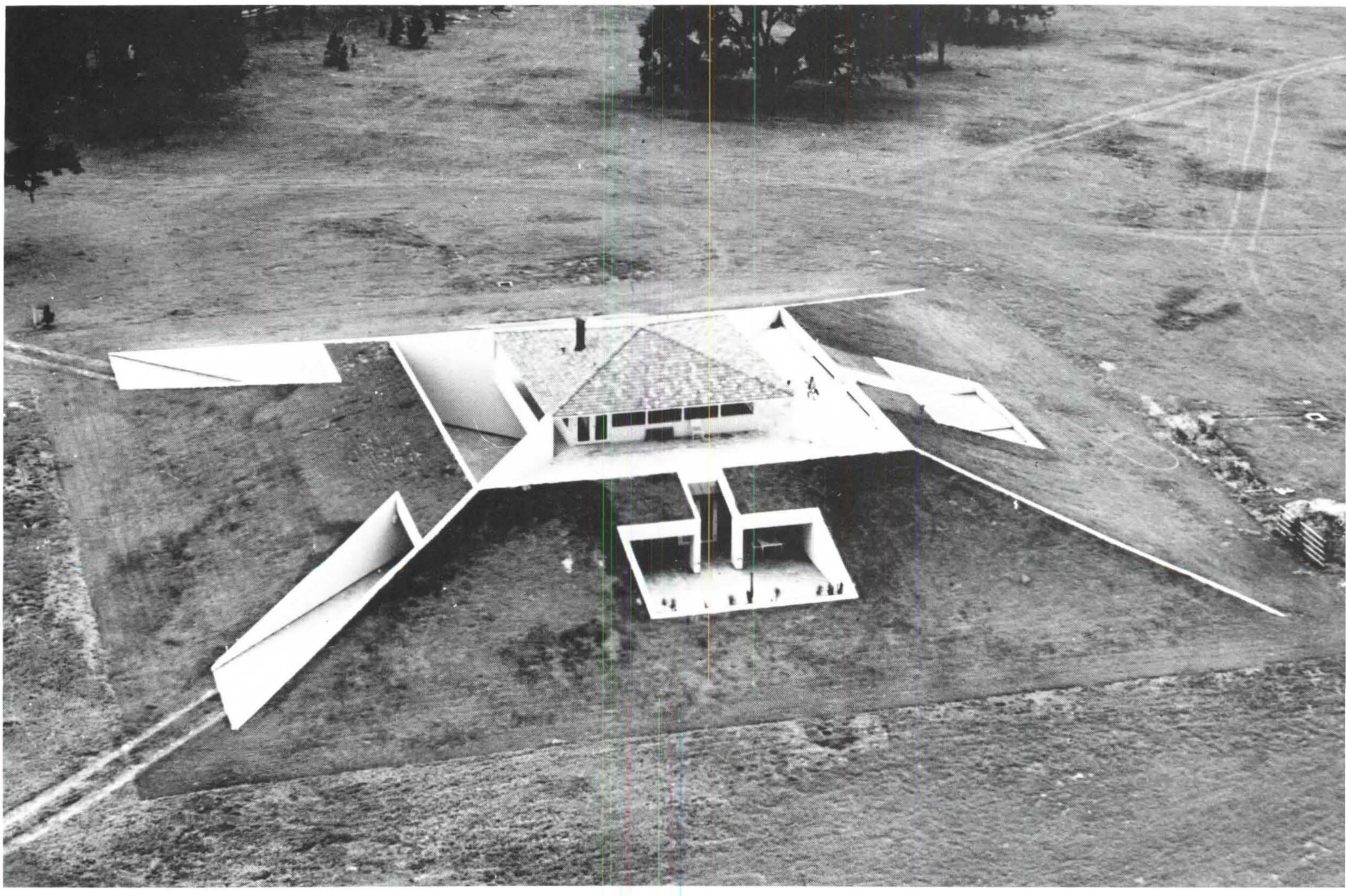
Hilltop house in central Florida is carved out of the crown of a pyramidal hill that overlooks rolling citrus groves in five central Florida counties. In designing it, William Morgan, FAIA, reinterpreted a vernacular Indian design to suit the needs of a retired businessman whose interests focus on the natural sciences.

One enters the cruciform underground structure at its base, moving horizontally into its center, from which emanate a study with reflecting pool terrace to the right, dining and kitchen areas with a terrace and garden to the left and sleeping areas directly ahead. Each space looks out on a garden or court, around which the earth has been bermed.

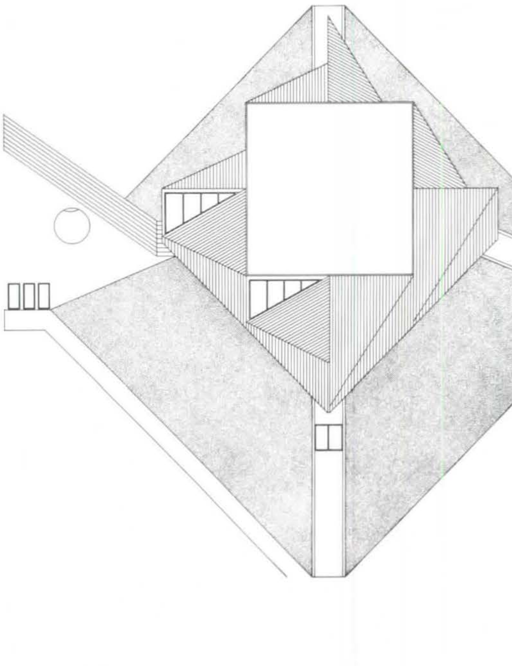
From the central foyer, a stair and elevator lead upward to the glass-surrounded observatory with a pyramidal roof. It is designed for unobstructed views of the surrounding countryside. "From this space," says Morgan, "230 feet above the citrus groves below, it is possible to watch seven thunderstorms simultaneously in progress all over the horizon."

The roof of the building's observatory is exposed laminated wood beams with tongue and groove wood decking. The floor is wood frame with oak flooring. The structural slab at the lower level is covered with carpeting. Brick pavers line the entry hall, driveway and lower level terraces. Walls are gypsum board and wood paneling with earth cover around the perimeter.

Hilltop residence shows, in Morgan's words, "possibilities that have been misunderstood or ignored. It is a building as landscape."



Church Buried to Diminish Its Impact



In line with the profound changes brought to Catholicism by Pope John XXIII, and Vatican II, the monks of St. Benedict's Abbey in Benet Lake, Wis., wanted their new church to present an unpretentious image, to seem accessible to all. They also wanted to show a responsible attitude toward energy use.

In designing the church as a 68-foot-long underground building, concealed by 8-foot-wide sloping berms, Stanley Tigerman, FAIA, intended to reduce its visual impact and "diminish the giantism of the four-story Tudor-style monastery to which it is connected."

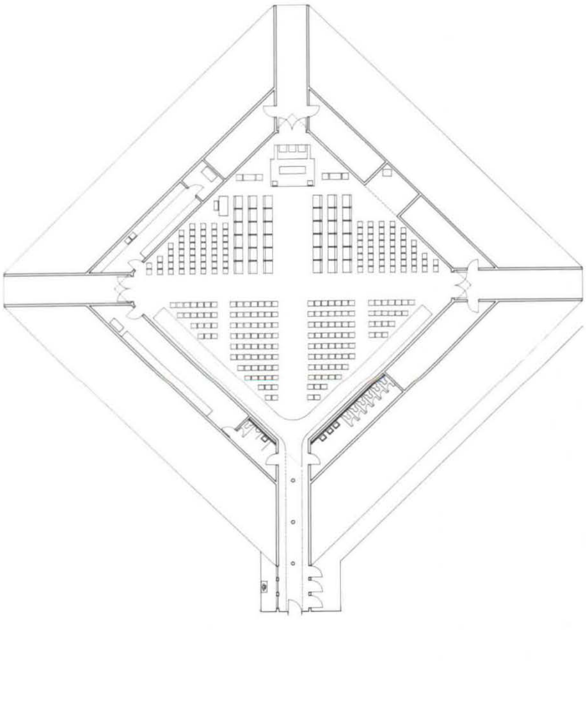
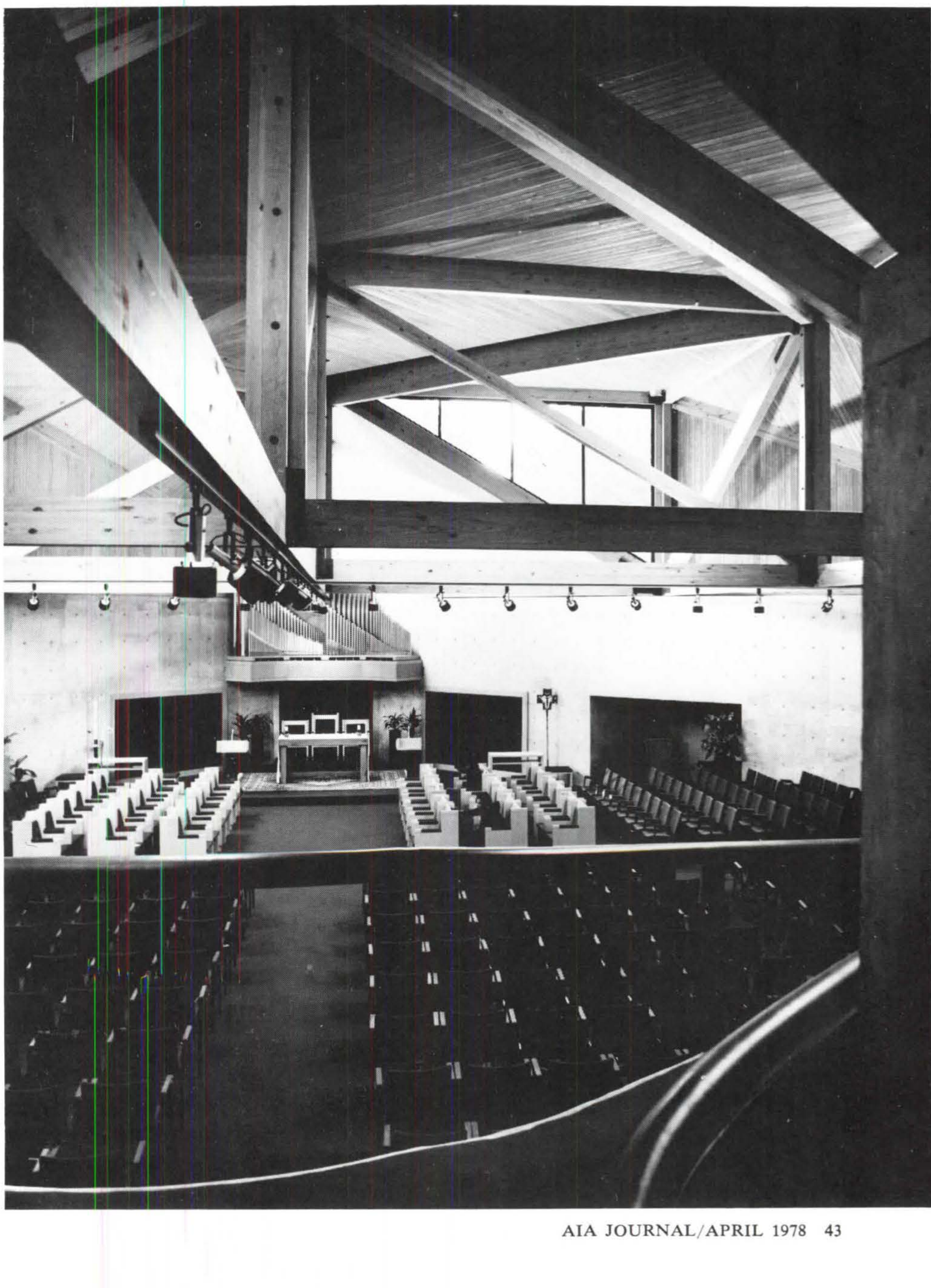
From the outside, all one sees is a terne roof shaped to recall a crown of thorns. No cross appears on the building. The monks have instead placed a cross-like sculpture in rusted metal near the entrance.

Tigerman wanted the interior also to reflect the "increased liberalism and egalitarianism of modern-day Catholicism." By avoiding a linear hierarchic plan he tried to create a relatively intimate space that would surround and embrace the congregation of 300 laymen and choir stalls for 36 monks and encourage community participation in the service. Though the altar is at the far end, the plan, in the shape of a cross, would as easily allow the altar to be in the center.

The complicated-looking ceiling is actually made up of 10 simple laminated beechwood trusses. The sloping planes of the roof were created by leaving out the top horizontal chords of the perimeter trusses. The vertical planes on the perimeter are surfaced in metal; the others are glazed with solar bronze glass, forming clerestories to light the sanctuary.

On the upper level is a bridge from the monastery leading to a double ramp that frames the altar. The church's concrete walls appear as a continuous envelope from which other elements—ramps, bridge, trusses, interior decking—are either physically held away or clearly differentiated. The principal structural materials are exposed; no veneers of facings have been used.



A School Inserted into a Hill

Terraset is a hill with a school inside, located in the new town of Reston, in northern Virginia outside Washington, D.C.

The building's roof and some of its walls are covered with two to three feet of earth. A grassy playground is on top, along with sculptured exhaust vents and a pyramidal skylight.

Does this make Terraset an underground building? Its principal, Margie Thompson, says underground and burying are misnomers. It was really just cut and cover construction, she says. "The site had a drop; they took a cut, and they put in a building." Then they put the cover back on. The architects were Davis, Smith & Carter of Reston.

One enters the school through a belowground courtyard sheltered by solar collectors with offices on one side, a "multipurpose hall" on the other. The bulk of the school proper consists of four circular "learning centers" (classrooms) around a "media center" (library), which has a skylight. Since there are windows where the earth is not bermed up, the outdoors can be seen from each "learning center."

An unusual design charge produced the Terraset school. Faced with skyrocketing electric power rates in 1974, the Fairfax County public school system directed that the building be of a totally energy-conscious design. "In essence, energy becomes the architect," said one early key document.

The building's concrete shell, plus the earth surrounding and covering the structure, would produce a high thermal mass, delaying the impact of outside temperature changes. Says Douglas Carter, AIA, "The structure is so well insulated that heat from people, lights and equipment makes year-around cooling a necessity. Even in winter, only peripheral areas near windows require heating."

Calculations were that the earth cover and a heat reclamation system in the building would save about 50 percent of standard fuel costs, or $20,000 a year. Excess heat is stored for future use in water-filled thermal storage tanks about the volume of small pools, which are located in the mechanical room.

The whole system can be off line for 72 hours before the tanks expend their energy, and an electric boiler is patched into the system as a backup for use when cloud cover or vacation periods make solar heat or waste heat unavailable.

Solar capability was not in the building budget, but funds were obtained through a grant from the Saudi Arabian-supported al Dir'iyyah Institute in Geneva, Switzerland, and the University of Petroleum & Minerals in Dharran, Saudi Arabia. The estimate was that the collector system would reduce costs another 25 percent, according to the architects and engineers.

In late 1975, plans for Terraset won approval from the community and the

The sunken entry courtyard (below) is topped by a metal grid of solar collectors and surrounded by offices and a 'multipurpose hall.' In the plan, shaded areas are berms. These are interspersed with glazed arcs admitting light and views to the ouside. A 'learning center,' as seen from corridor, is shown at right and the 'media center' with pyramidal skylight at the far right.

school board. Resistance was slight, observers say, with a few references to "mole elementary" and concerns about mildew in the "basement."

Precautionary steps had been taken against a backlash on the underground issue. First, the project was given its Terraset name to offset any mole elementary image. Terraset means set in the earth. Second, elaborate measures were taken to prevent any leaks. This included damming and flooding the roof again and again, to test watertightness. Third, because 20 percent of the school wall area is glass, "You can look out and feel like you are floating in space somewhere," says Debbie Lavery, school secretary.

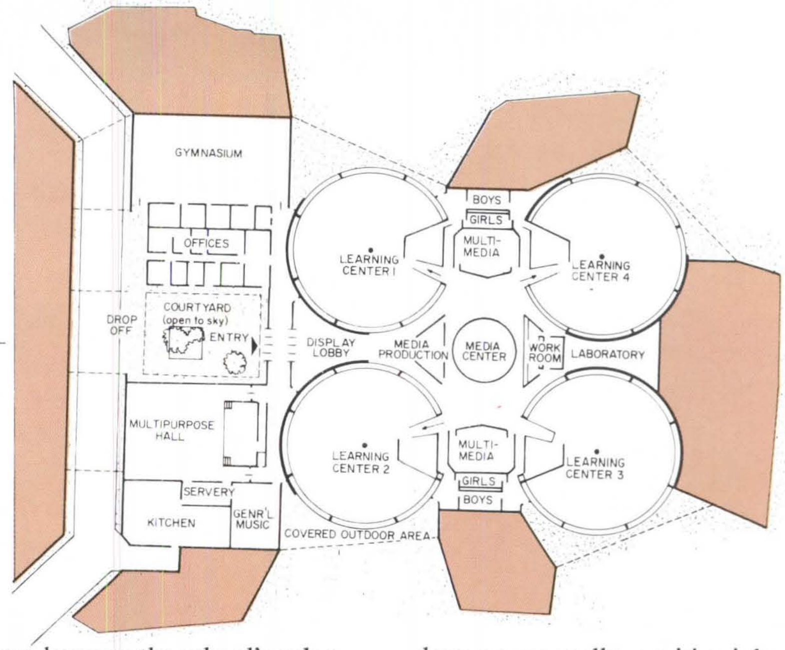
The instant accessibility to the outside environment is a key architectural feature, created with elevated inside walkways and glass-topped class partitions.

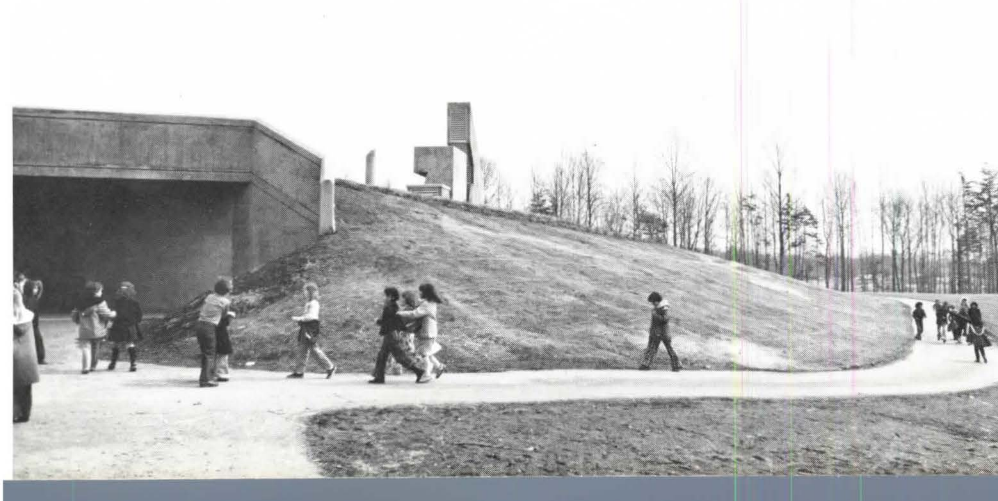
Terraset opened in February 1977. Is it working?

On the energy side, the verdict isn't in. Compared to a conventional school, Terraset saved $7,500 from April to August 1977, says Anthony Martin, mechanical engineer with the planning and construction division.

This looks like a saving due to the earth cover, because the school's solar collectors weren't totally functional and the heat reclamation system wasn't in operation. But more instruments must be installed before savings can be fully determined, Martin says.

Among users, a key person is happy. "The space works well for children," says Principal Thompson. "The architect has done an unusually sensitive job of meeting human needs with energy conservative design." She also cites as benefits quietness, open vistas between the earth cover, energy savings and green space in place of a roof. Referring to the fact that it is part underground, part above ground, Mrs. Thompson concludes that "it's the best of both worlds." *John Heritage*



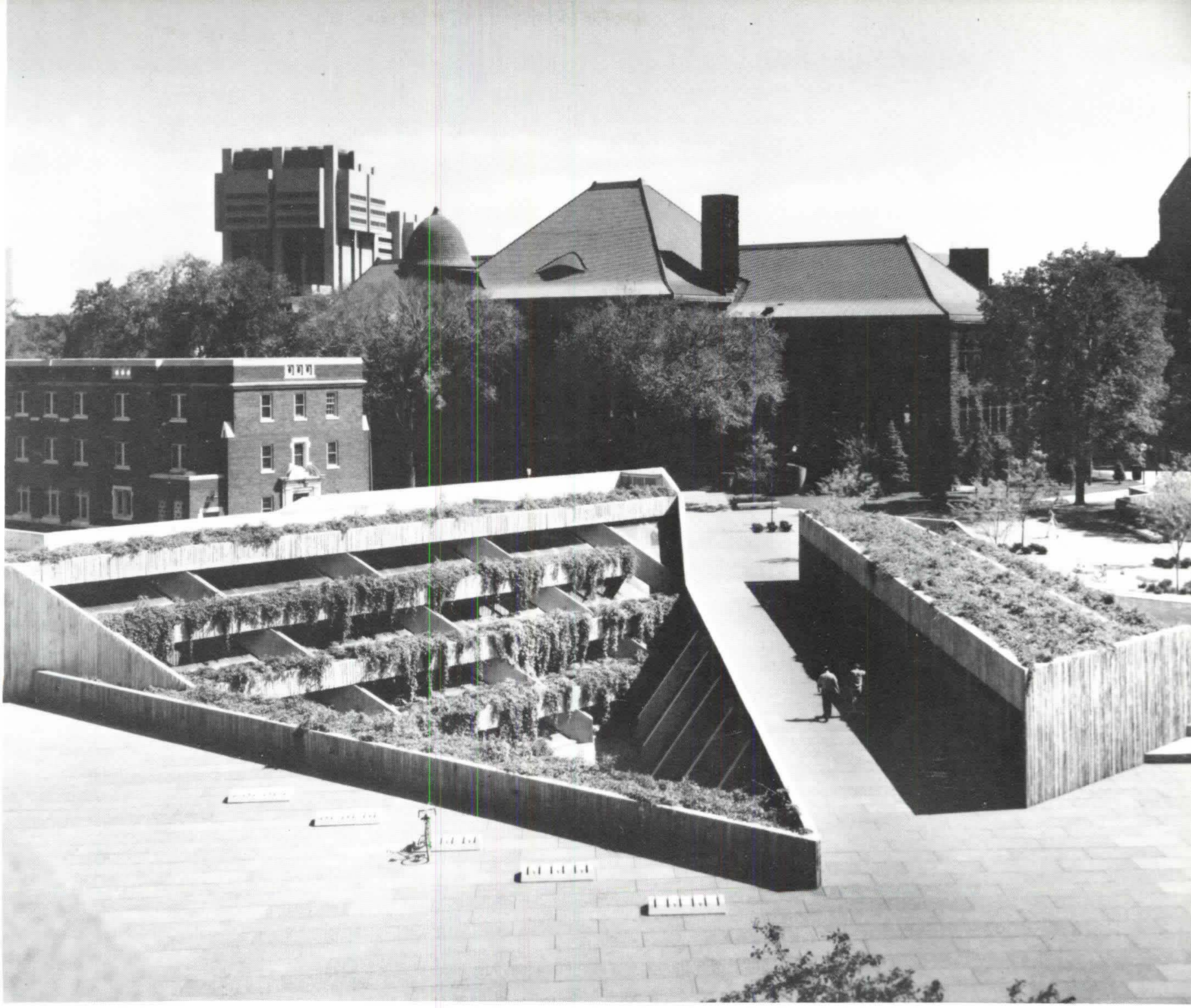


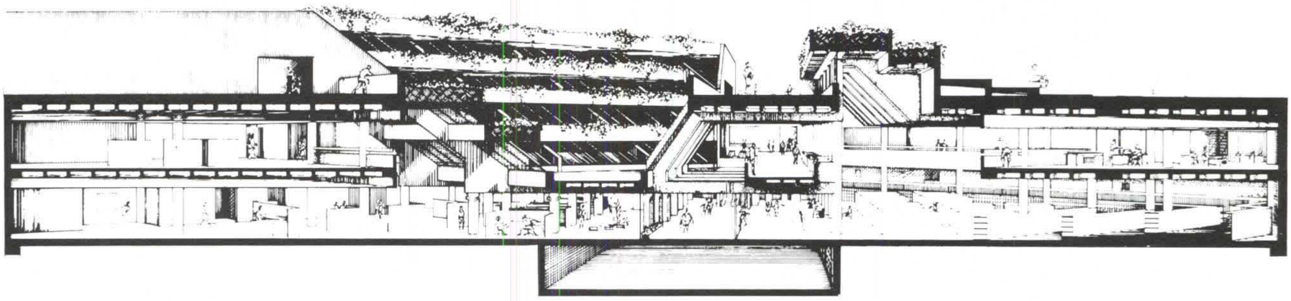
Evaluation: Bright Bookstore Cut into the Earth

At University of Minnesota's Williamson Hall, which also includes office space, the occupants scarcely realize that they are almost entirely underground. A.O.D.

The interior comes as something of a surprise, a decidedly pleasant one. Especially in winter, there isn't much to see outside: just some low concrete walls and paving. All but 5 percent of Williamson Hall, at the University of Minnesota, is underground. Yet, the bookstore, admissions and records offices that it houses are bright with sunshine from celerestory windows and an interior courtyard. Defined by cast-in-place concrete structural members, the major spaces are large and airy and softened by natural birch wood detailing, an abundance of plants and color.

Williamson Hall was completed and occupied just a year ago, and is still in a shakedown stage. The building's energy performance is being monitored by Thomas Bligh, a professor of mechanical engineering at the university, with a $242,000 grant from the National Science Foundation. Because of its heat retention characteristics as an underground building, warmth from people, sun, electric lights and machinery is sufficient to avoid heating during the day until the temperature falls below −20 degrees Fahrenheit. (At 10 feet below, the soil temperature in Minneapolis stays constant at about 50 degrees Fahrenheit, while air temperature varies between about −35 and 95.) But the building is still not as energy efficient as the architects and engineers would like. They are fine tuning some systems, and regret they could not have applied in de-





sign stages some lessons that Williamson Hall has already yielded about energy conservation in underground buildings.

Still, in many major respects, the building is all that was hoped for.

David Bennett, AIA, of Myers & Bennett in Edina, Minn., explains that the decision to go underground—which was reached in 1972 before proclamation of the energy crisis—grew from three needs: to preserve scarce open space on a very densely developed campus; to preserve views of two historic buildings, and to keep existing pedestrian traffic unobstructed from the southeast to the northwest corners of the site.

When the idea of nestling the building in the earth was explored with the university's building committee, "the reaction was very negative," recalls Bennett. "The bookstore and some of the offices were at

The design preserves views of historic campus buildings. Left of the diagonal walkway (above) a courtyard lights below ground offices; to its right (and across page) is the bookstore.

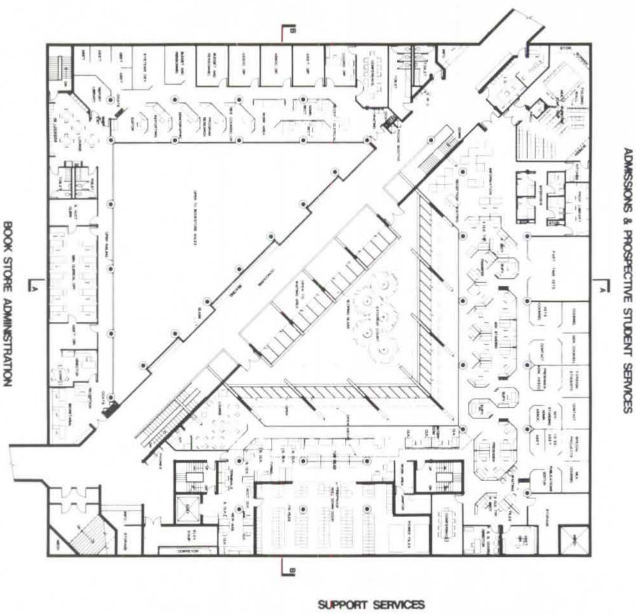
the time in basement spaces and people thought that with this concept they would just be moving from an old basement to a new one." Bennett says this reaction "sensitized us to potential problems, and had an impact on the development of the design."

Thomas Bligh, whose main interest was in the potential of underground buildings to conserve energy, came onto the scene at about the time the public was beginning to appreciate the need to save energy. The main thrust of the design effort, once Bligh arrived, was directed at achieving a balance between two sometimes conflicting goals: "maximizing energy conservation and, at the same time, human satisfaction," in Bennett's words.

In seeking a configuration that would be as pleasant as possible for the people who would visit and work in the building, the architects assumed, first of all, that bookstore employees and visitors would need less sun, light and visual stimulation from outdoors than office workers, especially those doing relatively routine work. As a consequence, they decided to place the bookstore's main sales floor on the lower level of the two-story structure. It occupies the southwest quadrant of the building, which is a square bisected at ground level by a concrete walkway. One level below grade, an interior concourse provides a panoramic view down into the bookstore.

Bookstore management insisted upon a clerestory window at ground level to give

Landscaped office spaces receive abundant natural light from two levels of 45-degree angled glass set in the courtyard. Rough-hewn cast-in-place concrete slabs are juxtaposed to bright color and natural wood detailing. Ivy and juniper are used as screens to diminish summer sun penetration through courtyard windows (across page).



a view of what is for sale within. As it turns out, the glass is highly reflective and all that passersby can see in it is themselves.

The architects arranged office space for the records and admissions departments on the northeast side along a courtyard, which admits abundant natural light through 45-degree angled glass. The upper level is designed as a mezzanine held back from the glass surfaces which permits daylight to penetrate to the lower level.

Interestingly, the vast majority of user complaints about the building are largely unrelated to its being underground. A very typical remark by a bookstore employee was, "There's so much light. You can look out and you don't have the feeling of being underground or crowded."

An open landscaped arrangement, with Herman Miller office furniture, was

chosen for the office spaces to maintain a feeling of openness—at least when standing.

Lighting was designed to be both energy efficient and flexible. Bus ducts with standard, three prong plug-in receptacles are suspended above the ceiling, and integrated with interchangeable acoustic ceiling tile and lay-in fluorescent fixtures. This allows light to be concentrated near work areas and to be moved, without an electrician, as work stations are rearranged.

To extract the heat generated by lights, people and machines, heat exchangers are used in the exhaust-air system. In open floor areas, air fountains in the form of exposed tubes that look like ship funnels are grounded around columns to provide an even and low-pressure distribution of fresh air. The system avoids having to use a high pressure fan and duct system.

Users' responses to the office echo those of workers in landscaped offices everywhere above ground. For most being underground was simply not an issue.

Supervisory offices, with floor to ceiling partitions, are on the interior perimeter. There are no windows here, and predictably enough, they are missed, though the overall reaction of senior personnel is generally favorable.

The most complaints come from mid-level employees, as is typical in open office situations. Many working in the second floor admissions department feel demoted, having come from a building "in which I had a door, a window, some marble and glass," as one puts it. Many complain that the office space is noisy, making it hard to concentrate. "I can tell who's breathing; I can tell the difference between a magazine and a newspaper page being turned. But, being below ground doesn't faze me a bit," says one. Another: "I left a large desk for a Rubbermaid-like piece of junk." The furniture came in for a lot of criticism, employees complaining that it is flimsy and not functional.

"Too much sun," was a frequent refrain of employees in admissions. They also complain of too much heat in both summer and winter, which is mainly due, says engineer Bligh, to the fact that this is the only portion of the building that is not separately zoned.

Clerical and secretarial employees working in the records department one floor down have the advantage of sunlight coming from the mezzanine above, making it cooler. The closer they are to windows and the more natural light they have, the happier most appear to be. The records department moved from a bullpen situation to one with small cubbyholes separated by high screens. Not surprisingly, many records employees complain of a feeling of being isolated. As one person says, "We don't like being divided up. Communicating is difficult because of the high dividers." On the positive side, they prefer the colorful interiors to the army gray offices they came from, and they like the fact that everything is "new and clean, and that there are fewer distractions."

Although there are few complaints about crowding, the 83,000-square-foot building was designed for no more than 180 people, and there are now more than 200 working there. The university had planned to use a prepayment, computerized registration system at the time the building was designed, an idea which has since been dropped. As a consequence, there are now long lines of students registering for courses, for which Williamson Hall was not designed. Says architect Bennett, "It's the sort of situation where the architect would like to put a plaque on the wall reading, 'If you have some concern with crowding, talk to *Them.*' "

The single exception to the users' acceptance of being underground is a persistant fear of leaks.

Williamson Hall is a tour-de-force of cast-in-place concrete, which was selected for its economy, plasticity and superior energy performance. Though unaccustomed to indoor spaces defined by rough-hewn concrete slabs, users appeared unfazed by it, except by the above-ground portions of the building, which they feel do not blend with the brick and limestone of neighboring structures. Many also think that too much of the building is above ground; for pedestrians, at least, the concrete risers block views.

There is at least one exception to the finding that users think little about being underground: People talk and worry a lot about leaks. There has been only one major leak, resulting from a tear in the roof membrane during construction, which could have happened in any conventional above-ground building. Also, a near catastrophe was averted during a torrential downpour. The drains at the entranceways were too small to absorb the storm waters and the building would have been swamped had it not been for two janitors who positioned themselves at the entranceways and swept the water aside. The drains are now being enlarged. Project architect Larry Opseth says, "Everyone associates underground buildings with being damp and leaky, so the attention minor leaks have received is inordinate. There have been the normal number of leaks. They have been repaired and are natural to almost any new building."

From an energy conservation point of view, many decisions calculated to make the building pleasant and habitable have caused problems. Direct sun penetration from the south and west through glass areas has, of course, increased heat loss in winter and solar gain in summer.

The architects originally planned for a louver system, but this proposal was turned down by the building committee. In fact, the building committee vetoed all plans which would diminish sun penetration. "They were still fearful of creating a dungeon, even though we warned them that if anything we were going to suffer from too much sun penetration," says Bennett. So the architects came up with an outside screening system of ivy and juniper, which would grow down in front of the windows in summer to shield out sun. Bligh calls it "very successful" in summer but says, "It was only when I started doing an energy analysis on the building that I discovered that the lack of shuttering is just terrible in terms of winter heat loss."

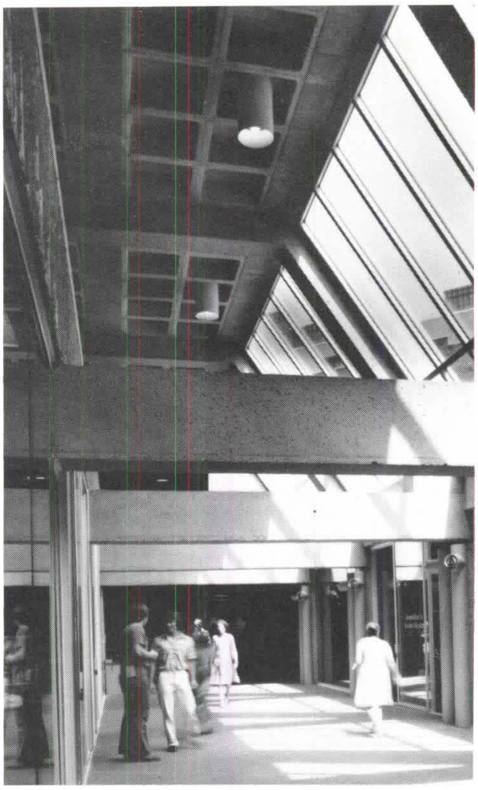
During design stages, Bennett and Bligh also began thinking about solar collectors. "At night when everything is shut down," says Bligh, "the temperature of the building slowly drops. If we had collectors, by 5:30 or 6 A.M. we could start pulling energy out of storage tanks to push the temperature back up by 8 o'clock when people return to work."

Bligh and Bennett concluded that if Williamson Hall had been a conventional building, it would have required about four acres of solar collectors to have a significant impact. (The rule of thumb is one square foot of collector to one square foot of building area.) The engineers' analysis indicated, however, that the savings from putting the building underground would be so significant that 6,000 square feet of collectors would do the job. Bligh obtained funding from the Energy Research and Development Administration, ERDA, (now part of the U.S. Department of Energy) to design the collector system. Bids went out and came in high. Whether DOE will actually fund the collectors remains unknown.

Bligh believes his collector system would be extremely efficient, but if he had it to do over again, or had had enough time to work his ideas out for Williamson, he would have designed a different system. He explains that cooling is the big problem, and present collection systems, which take in energy at fairly high temperatures and feed it into an absorption chiller unit, are very inefficient. He is now testing a system, with support from state funds, which has an underground outdoor water tank with special coils and a heat exchanger.

During winter he would circulate antifreeze, which goes down into the water tank and starts cooling and freezing water around the coils. "By the end of winter," he explains, "we would have frozen this into a great big block of ice; so we now have stored winter cold. In spring we can simply shut the system down, wait for the weather to get hot and then circulate the same antifreeze through the airconditioning ducts. Essentially, it's free energy—winter cold that you've kept over."

Bligh claims that his new system reduces high capital investment, avoids



One side of the interior concourse, one level below grade, is lined by offices; the other gives a panoramic view down into the bookstore. Across page, a lounge in the office area.

thermal storage and, all in all, is about three times more efficient and inexpensive than the most effective systems now being tested by DOE.

Even with the proposed traditional solar collectors, the architects estimated that the net energy savings over a conventional building would be about 80 to 100 percent during the heating season and 45 percent when the building needs to be cooled. But, says Bligh, "what we didn't do was make a direct comparison during design stages with buildings doing the same job above ground. I really don't know what the savings will be."

The biggest problem from an energy point of view, says Bennett, are the sliding entry doors, which were chosen to "allow people with both hands full to enter without manipulating anything." He fears that so much energy is being lost here that "our first energy readings are not going to be as good as they should be." Bligh says that the heat loss from the doors is "a shocker. As long as you have people walking in at about eight-foot intervals, the doors are almost always open, and the poor lady at the bottom of the stairs about freezes to death." Alternatives to the sliding doors are now being explored, and revolving doors seem the most promising substitute.

Bligh blames many sources of relative energy inefficiency at Williamson Hall on the fact that "the engineers were forced to use above-ground techniques." As in conventional buildings, the structure's insulation was applied to the interior. Says Bligh, "The insulation on sections that are above ground should have been carried up from the ground, around the outside of the sections that stick up, and there should have been some sort of facade on the outside of that. We didn't realize it was important until we started doing tests and it was too late." Concrete has a higher thermal conductivity than soil, with the result that the above-ground wall acts as a heat wick, pulling energy out of the building. Had above-ground elements been covered with a brick facade, they would also have blended better with neighboring buildings.

According to Bligh, the above-ground sections of Williamson account for 34 percent of the heat loss of the entire building, "which sounds terrible until you realize it's 34 percent of a very small number."

To a large extent, he blames too much glass placed too high and at too steep an angle. "It was a bad mistake," he says, "to have acceded to the bookstore management's desire to have clerestories at ground level overlooking the bookstore sales floor. That glass is right at the top where all the heat rises." The original plan, he recalls, was for a much lower, grassed terrace with a number of skylights set on the terrace. "I thought it was much prettier, and certainly from an energy point of view it would have been superior. It turns out that glass, double-glazed or not, is the worst offender as far as heat loss is concerned. It also turns out that we now know that sloping glass loses much more heat than glass on a vertical. We've got a lot of sloped glass that isn't necessary."

Bligh deplores the fact that so large a portion of the top of the building was paved with concrete rather than being planted. "It increases your summer heat gain; you can easily have a 30-degree centigrade difference between concrete and grass, and visually I think it's a great shame," he says. Though others agree, Bennett does not, saying, "Removing several concrete panels when looking for a leak is easy, removing sod and soil would be difficult."

Both Bennett and Bligh wish that the waterproofing membrane of the roof had been carried down the outside wall of the building to the footings for extra safety. "They just used conventional pitch as in most buildings," explains Bligh.

Bligh says, "There are lots of other things we would have liked to try at Williamson, but the building just got finished too soon." He will probably get the opportunity to further experiment soon, since the university hopes shortly to construct a new underground building for the department of mining and metallurgy. □


Central Files

Recent Work in Passive Solar Design: The Use of Architecture Itself as the Primary Energy Device

Buildings that exemplify a return to principles of comfort and energy use that have been used since Vitruvius but recently have been neglected. By Vivian Loftness and Belinda Reeder

Passive design is essentially a careful synthesis. It requires no new technologies, harbors no hostility toward creative freedom and presents no academic recipes. It is the search for balance between architecture's traditional ingredients: building technology, function and the forces of the natural environment.

Ms. Reeder, a registered architect, and **Ms. Loftness,** m.arch., are with AIA Research Corporation. These articles are based on major research on passive solar design being undertaken by AIA/RC through a contract with HUD.

Through passive design, comfort of occupants is a function of the building rather than mechanical equipment. This places a new responsibility upon the architect in requiring the building to function as a conditioning system while offering new opportunities for creativity, improvement of the built environment and energy conservation.

Passive techniques involve a careful use of site and climatic conditions. The use of earth as insulator in underground buildings or protection from the elements with berming is one way to assist the building's energy performance.

Although passive solar design uses the sun as the primary source of natural energy, optimum performance of a passive solar system depends on the building's ability to best use all energy forces of the natural environment such as water, wind, earth and landscape.

Many of the principles of passive solar design have been employed since Vitru-

David Wright's Sundown House in Sea Ranch, Calif. See following page.

vius. Siting, shading, ventilation and window orientation were viewed as comfort considerations. Materials often were selected for their abilities to retain or release warmth. These principles helped to determine building groupings, the siting of whole neighborhoods, as well as circulation and use patterns.

The roofs of New England farmhouses were built low on the north in order to redirect winter winds and minimize vertical north wall exposure to infiltration. Evergreen trees were often planted at the low north side to assist in breaking the effects of the wind. The houses were compact to minimize the areas to be heated and to optimize efficiency of the central heating source, the fireplace. Building groupings were also compact, which limited the surface area exposed to the elements and allowed passage from one building to another with minimum exposure to the outside.

Houses in the South often were built off the ground to allow for ventilation and to protect from flooding. Porches provided shaded outdoor living and sleeping spaces and were located along the paths of summer breezes. Interior stairwells topped with operable skylights acted as chimneys to draw hot air up and out of the house.

Adobe structures built by Pueblo Indians and the stone and stucco hill towns of southern Europe worked to delay the collective heat from the sun so that it would slowly penetrate the mass construction of the buildings, radiating it to the interior space by the time it was needed to counter the evening chill.

Before complete reliance on mechanical conditioning systems, 20th century architects applied many of these same principles. However, with the advent of sophisticated heating and cooling equipment, combined with an inexpensive and seemingly inexhaustible supply of energy, architects were free to ignore the effects of climate and energy flow on human comfort.

Mechanical systems recently have been designed to overcome all conditions of the external environment in order to supply the building with a constant air temperature. The system usually is always working to combat the worst external conditions, regardless of whether it is required for comfort. This approach is relatively easy to calculate and makes comfort easy to control, but has resulted in buildings which consume large quantities of energy.

Early approach to energy conservation centered on improvement of a building's ability to contain its energy. This called for a tightening of the building envelope

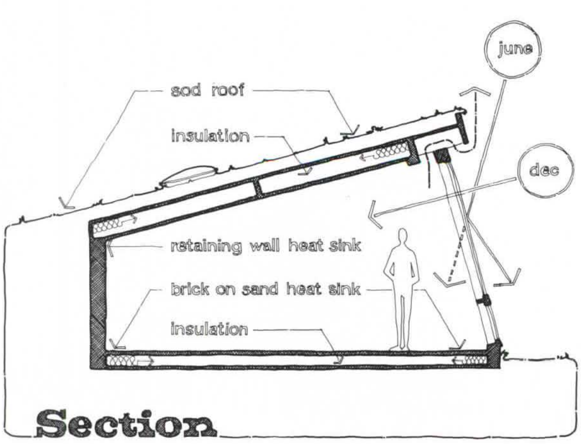
continued on page 81

Solar research has defined three principal modes of passive heating and cooling as applied to building design: direct gain, indirect gain and isolated gain. Each incorporates different applications of thermal flow technologies which are described through built examples on the following pages. The authors.

Direct Gain

The direct gain concept is the most common passive solar building solution and has many historic precedents. Simply diagrammed, it is sun to living space to storage mass. Solar radiation is collected in the living space and then stored in a thermal storage mass. Thus, the actual living space is directly heated by the sun and serves as a "live-in" collector.

The basic requirements for the direct gain building type are: a large south-facing glazed collector area, with the living space exposed directly behind; a floor and/or wall storage mass of significant dimensions for solar exposure and heat storage capacity, and a method for isolating the storage from immediate heat loss. In this way, the distribution of heat is controlled by the properties of the mass in relation to the space, as well as by the insulation between the storage mass and the outdoors or ground, which is critical in preventing unnecessary heat loss through temperature equalization.



A Low Profile Solar House On the California Coast

A clear model of direct gain passive solar systems is David Wright's Sundown House in Sea Ranch, Calif. Set in a picturesque northern California coastal meadow, this house is nearly 100 percent passively heated and cooled.

The building materials—wood, glass and concrete—are set into a subtle earth-bermed form to offer a low profile for protection from the prevailing winds, while optimizing solar exposure. The 375 square feet of southern-exposed double-glazed windows slope 70 degrees to act as solar collectors. Direct heat gain is absorbed and stored in the massive walls of dense concrete and floor of brick on sand for nighttime reradiation.

Heavy insulation on all the exterior walls including the walls facing earth minimize unwanted heat loss, abetted by an insulating shade which can be pulled down over the large window area. In summer, these shades, made of three layers of aluminized polyester quilted to trap air layers, act to reflect unwanted solar gain.

In combination with high vents, they

also draw air out of the house by convection to provide natural ventilation for cooling.

Much as a sailboat trims to the wind, this energy conserving house is manually adjusted to weather conditions. The house, which has 1,150 square feet of living space with a detached studio and garage, has been kept small to decrease the surface-to-volume ratio in order to minimize heat loss. To create a protected south-facing patio, the house, garage and studio have been clustered with extensive berming to shield from the cold north winds and to embrace the warming sun.

A Stepped-down Skylight That Acts as a Collector

This example of direct gain heating is focused on a one-room addition, designed by David Johnson, AIA, and Norman Saunders, to an old New England house in Belmont, Mass.

The intention was to provide a living room which was solar heated and thus naturally condition one of the largest heat consuming spaces in the house. The living room addition of 324 square feet faces slightly west of true south for optimum solar collection. Solar radiation is collected through 300 square feet of new skylights on the sloping roof and through 300 square feet of vertical glazing south, east and west. The skylight system has a staircase-like cross section with 18-inch treads and eight-inch single-glazed risers. The treads are of shiny aluminum to reflect additional low winter sun and to reduce the artificial lighting requirement throughout the year.

The direct gain received through these skylights is absorbed in the nine-inch concrete floor, covered with ceramic tile and isolated below by two inches of insulation.

Solar radiation is also stored in the existing masonry wall of the New England house. This separating wall also provides the opportunity for indirectly heating other rooms in the house by opening the formerly exterior windows. Any unwanted heat could be transferred to the rest of the house through the open windows and doors, but efficient direct gain heating of this living space is the primary intent of the design.

The site is heavily wooded with deciduous trees to prevent summer overheating and to provide pleasant views from throughout the living room.

Beyond Residential Scale: Aspen's Solar Airport

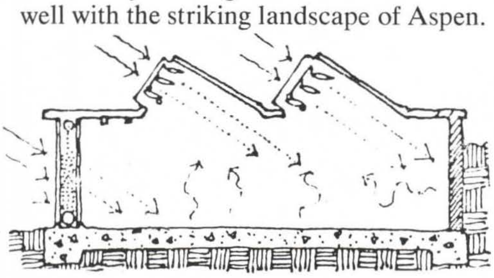
The Pitkin County Air Terminal in Aspen, Colo., is one of the nation's largest passively solar heated structures, containing 16,800 square feet of terminal space on a single level. Designed by Copland, Hagman & Yaw, it consists of three pods staggering and linked together to achieve maximum solar orientation for the longest walls. This creates exterior entry spaces and maximizes expansion potential as well.

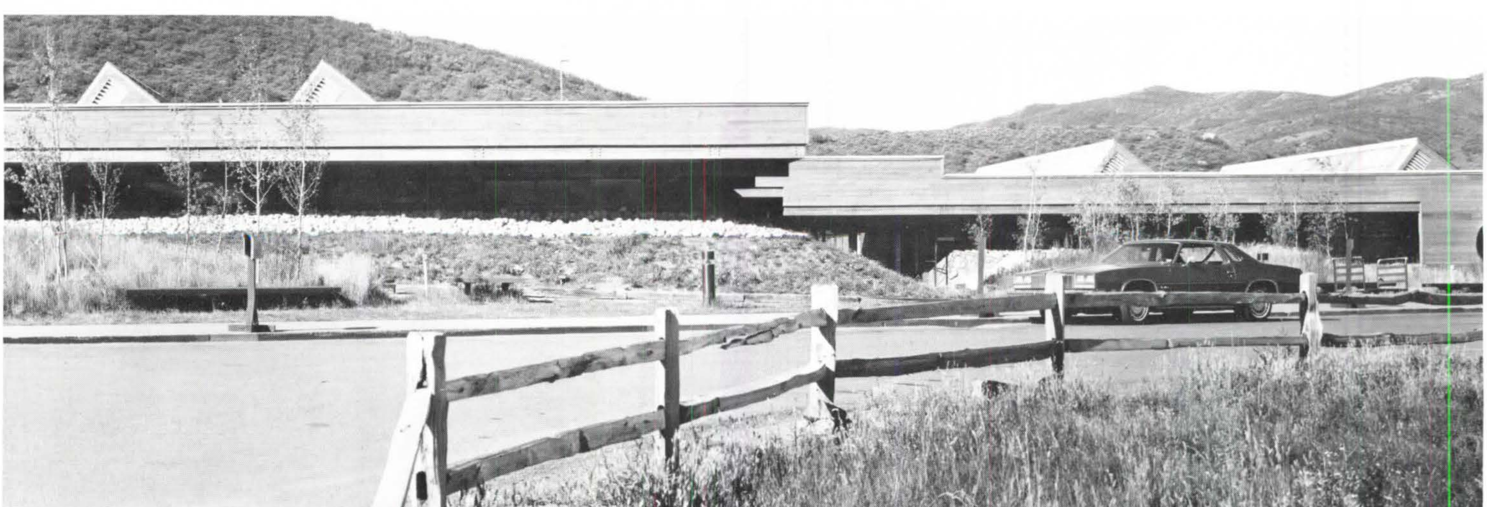
The basic elements of the passive solar system are abundant southern glazing with movable insulation, interior thermal mass and a well-insulated structure. Solar radiation enters through 750 square feet of vertical double glazing and 1,750 square feet of horizontal skylights.

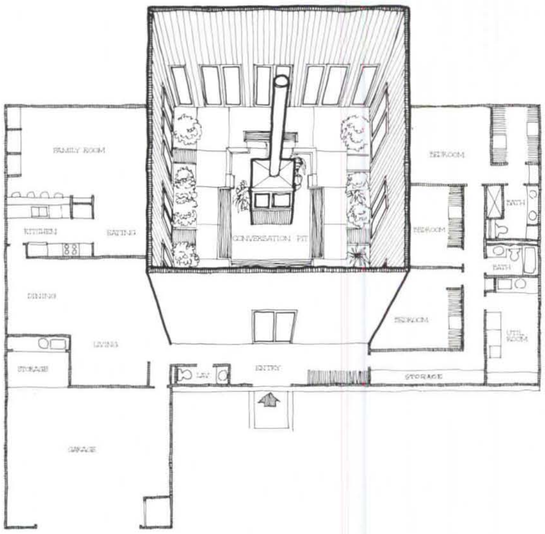
The radiation is absorbed and stored in five-inch concrete slab floors and solid block walls, both thermally isolated from the exterior by insulation. This system allows solar penetration and storage in the building on sunny winter days, then contains redistribution at night.

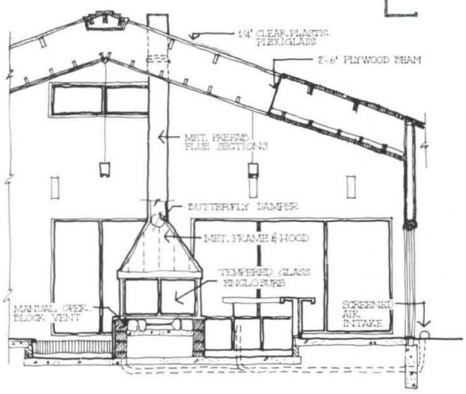
To keep the heat in, a space in the 750 square feet of vertical south glazing is filled with Styrofoam beads for insulation, and the skylights are sealed by freon-powered louvers containing five inches of insulation. These aluminum sheathed louvers also prevent unwanted solar gain in summer.

All materials, components and construction techniques were chosen for natural and labor resource conservation. The building is highly insulated, bermed extensively and in general harmonizes well with the striking landscape of Aspen.









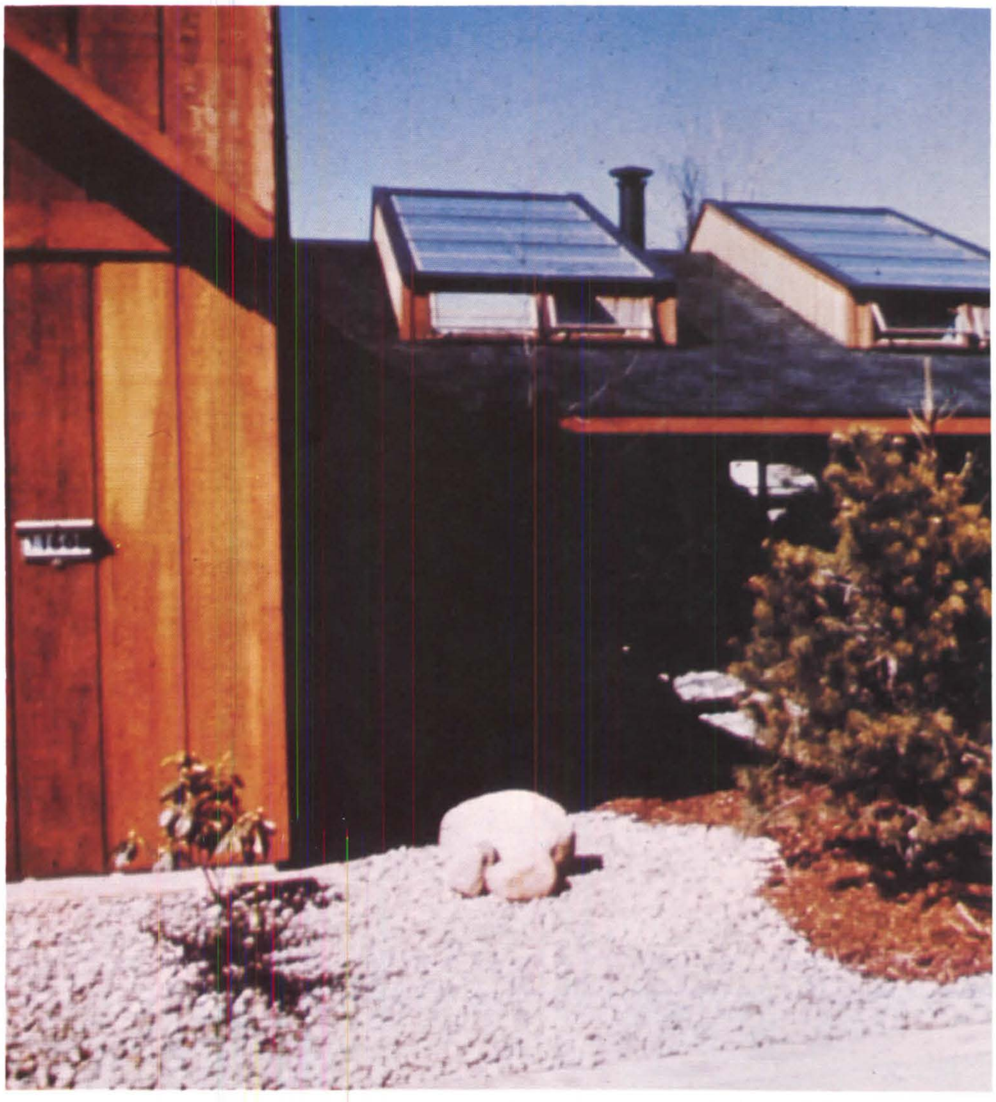
A House Designed Around A Solar Heated Atrium

Another one-room, direct gain heating example is this patio/family room designed by Bob and Edward Schmitt for a house in Cleveland. The atrium space's 1,000 square feet are lit and heated by south-facing skylights and patio doors.

The direct radiation entering these glazed areas is absorbed in the atrium's concrete floor composed of four-inch slab on gravel fill, which functions as a heat sink to hold the heat within the atrium for longer periods of time. While outside temperatures may range from 0 degrees Fahrenheit to 95 degrees, the temperatures in this solar heated and naturally ventilated space—with conversation area, grill and plant collection—will vary from a comfortable 65 degrees to a comfortable 80 degrees.

When temperatures in the atrium rise above 72 degrees, all the atrium's doors may be opened to provide isolated heat gain to the rest of the house.

The passively solar heated atrium acts as a focal point for the house. No windows face the cold and windy climate outside, but instead face this year-round warm and green atrium space. When the sun is not shining, a central fireplace acts as back-up heat and a continued focal point: Either sunlight or firelight is provided for every room.

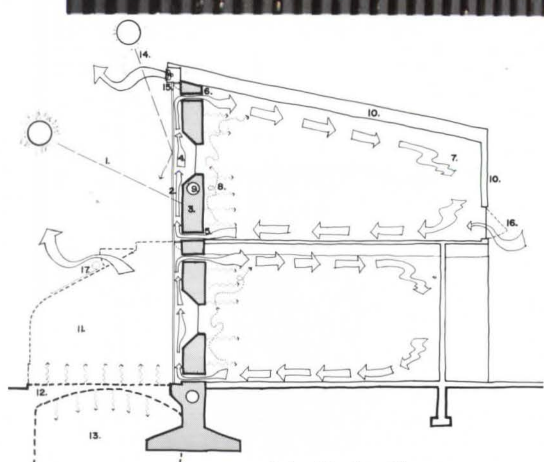


Indirect Gain

In these passive solar buildings, the fabric of the house continues to collect and store solar energy, but the sun's rays do not travel through the living space to reach the storage mass. This eliminates the direct gain limitation where solar collection temperatures are limited by occupant comfort needs, and introduces the element of time lag. In the indirect gain passive solar building, the storage mass collects and stores heat from the sun and transfers heat to the living space in a design controlled fashion.

Currently, there are three types of indirect gain passive solar buildings. The first type is the mass Trombe in which the sun's rays are absorbed directly behind a collector glazing by a massive wall which serves as solar storage. The required elements of the mass Trombe building type involve a storage mass appropriately chosen for heating the living space and a large glazed area directly in front which prevents immediate reradiation from the storage mass back to the outside.

The property to consider in deciding on storage construction is the method of distribution inherent in massing materials with different heat storage capacities and emission properties. Radiant distribution from a storage mass to a living space can be almost immediate, or it can be delayed up to 12 hours, depending on the depth and time lag property of the storage material chosen. Distribution of air by natural convection is also possible since the volume of air in the intervening space between glazing and storage mass is being heated to high temperatures and seeks constant means of escape.



Solar Heating Diagram

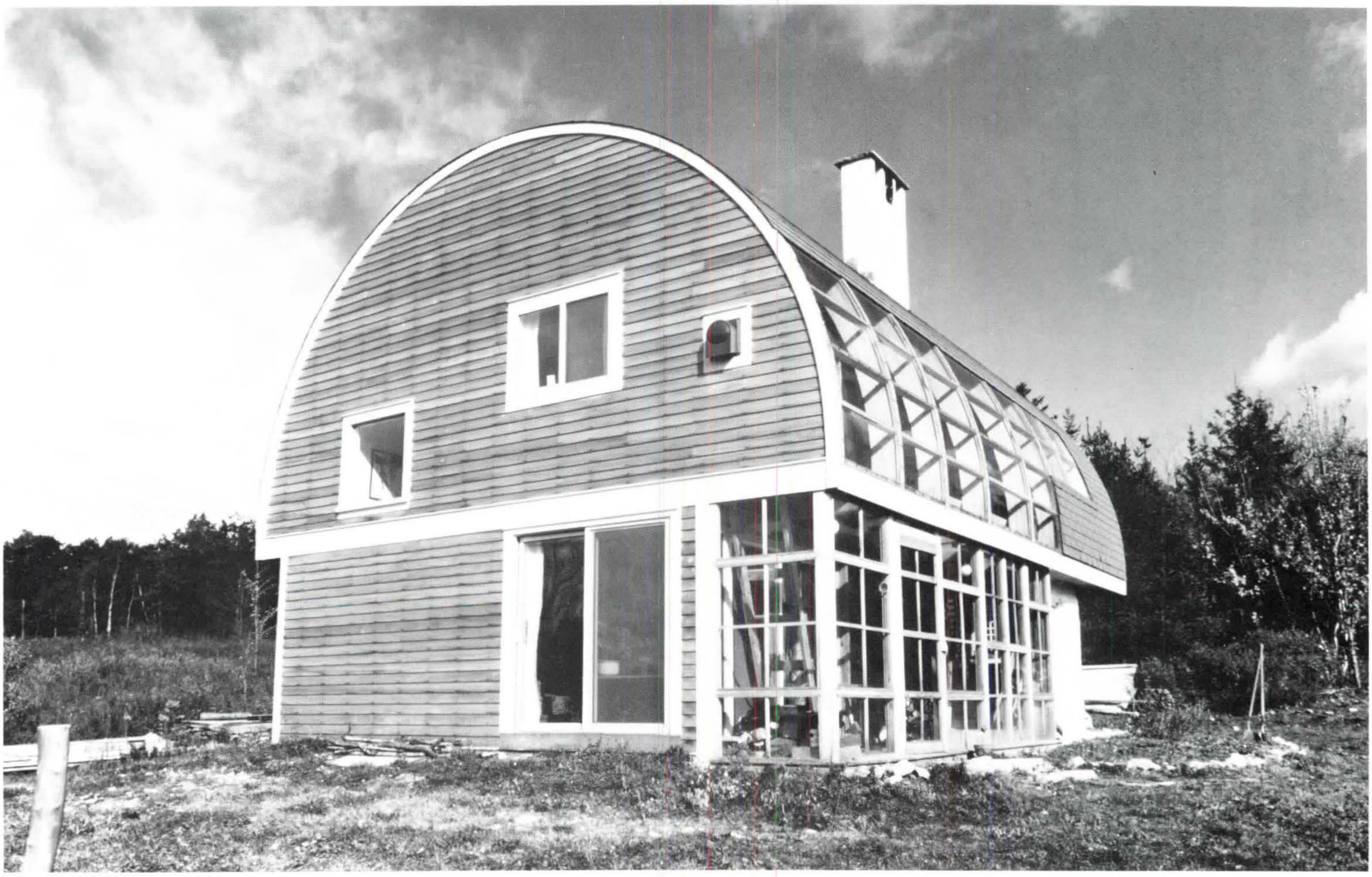
Heat from a Glass Facade Stored in a Wall Behind

One mass Trombe solar building which displays both methods of heat distribution is the Kelbaugh house in Princeton, N.J. Designed by Doug Kelbaugh, this 2,100-square-foot, three-bedroom house uses massive Trombe wall construction inside a large glass facade to provide storage for passive solar heat gain and includes windows for south views from each room.

The vertical 15-inch-thick concrete wall with a selective black coating absorbs radiation entering the 600 square feet of glass on the vertical south face. In each room, air passes at floor level through a slot in the wall and rises by becoming heated in the six-inch space between the glazing and the wall. The air then re-enters the room through slots at the ceiling level to provide natural solar heating for the rooms. Long-term heat distribution is also provided by this massive storage wall which after many hours' delay radiates heat to the room for nighttime heating.

The all glass south facade and the small solar greenhouse are double glazed and all other building faces have minimum glass exposure. In summer, the convective distribution potential of this mass Trombe building allows for induced ventilation. Vents to the outside at the top of the Trombe wall and in the greenhouse allow solar heated air to escape, drawing cooler air into the house for natural ventilation.

Deciduous trees also provide summer shading and complementary elegance to this passive solar home. Because of the simplicity of its design and orientation, plus ease of maintenance and operation, this house also reduced heating costs by 76 percent the first winter, and 84 percent the second.

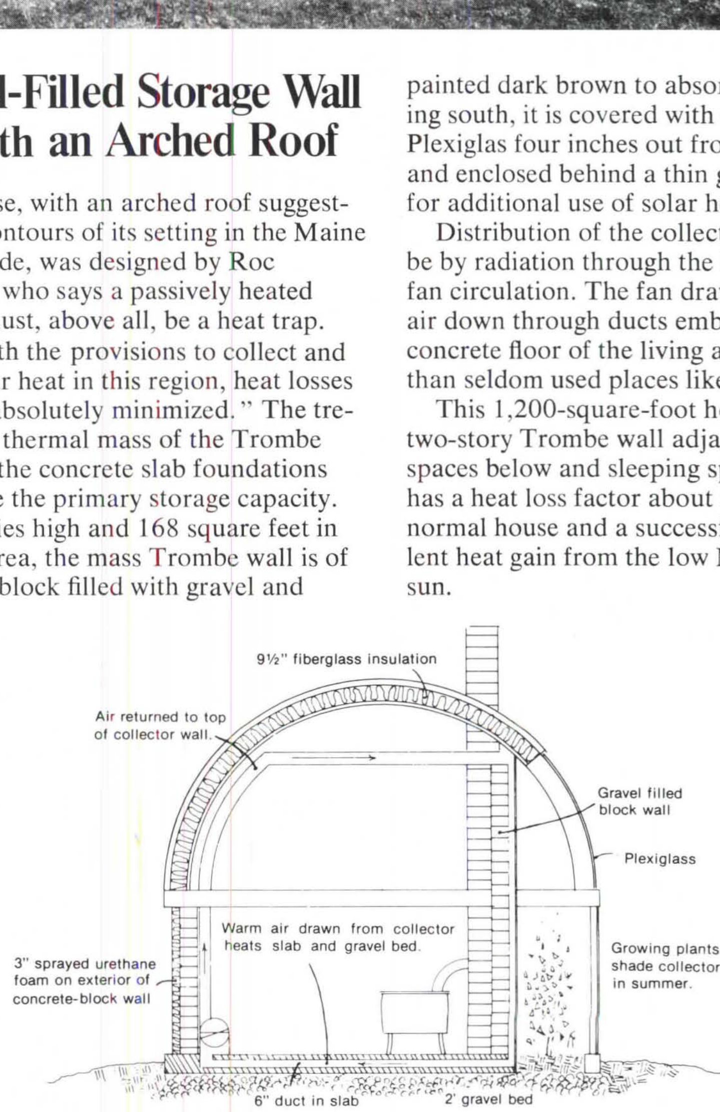


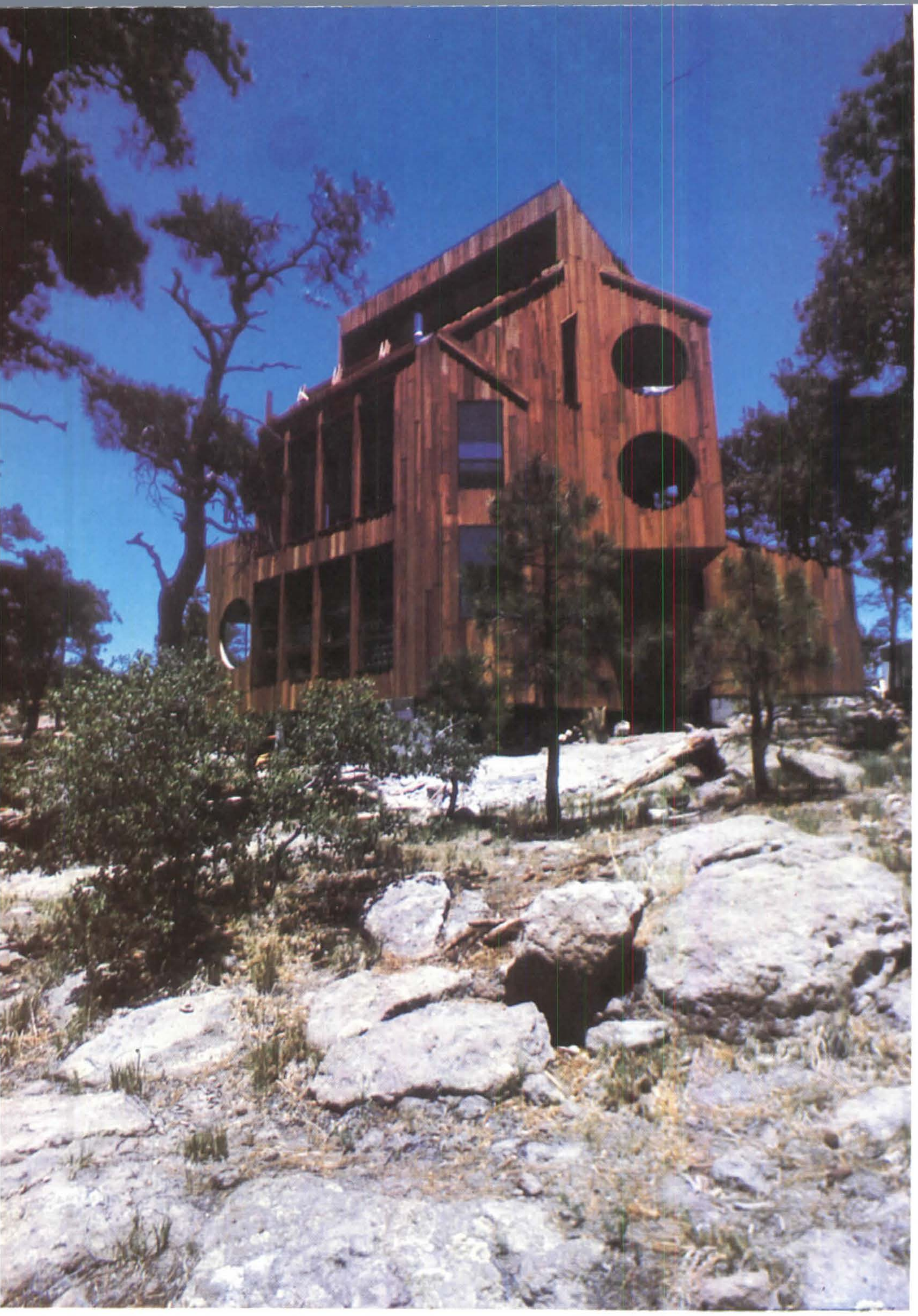
Gravel-Filled Storage Wall Beneath an Arched Roof

This house, with an arched roof suggesting the contours of its setting in the Maine countryside, was designed by Roc Caivano, who says a passively heated house "must, above all, be a heat trap. Along with the provisions to collect and store solar heat in this region, heat losses must be absolutely minimized." The tremendous thermal mass of the Trombe wall and the concrete slab foundations constitute the primary storage capacity. Two stories high and 168 square feet in surface area, the mass Trombe wall is of concrete block filled with gravel and painted dark brown to absorb heat. Facing south, it is covered with a layer of Plexiglas four inches out from the wall and enclosed behind a thin greenhouse for additional use of solar heat gain.

Distribution of the collected heat will be by radiation through the block and by fan circulation. The fan draws the heated air down through ducts embedded in the concrete floor of the living areas rather than seldom used places like closets.

This 1,200-square-foot house, with its two-story Trombe wall adjacent to living spaces below and sleeping spaces above, has a heat loss factor about one-third a normal house and a successfully equivalent heat gain from the low Maine winter sun.





A Storage Mass of Wine Bottles Filled with Water

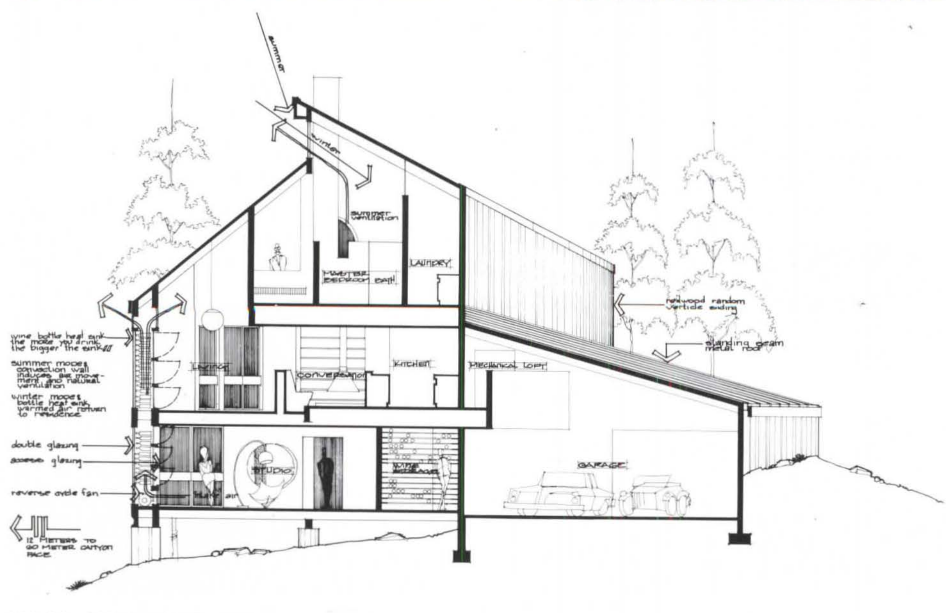
A second indirect gain passive solar building type is the water Trombe, in which the sun's rays are intercepted beyond the collector glazing by a water storage mass. The requirements for the water Trombe wall are again a large glazed collector area and an adjacent massive heat storage. However, the storage here is water or another liquid that may be held in a variety of containers, each representing different heat exchange surfaces to storage mass ratios.

In considering the control of heat distribution in a water Trombe wall, one must be aware that thermal transfer is rapid in a convective body of water, and radiant distribution from a solar heated water storage wall to a living space is almost immediate. This, in contrast to the longer time lag property of the mass Trombe wall, requires some careful consideration of storage distribution control backed by an understanding of the way in which heat flows.

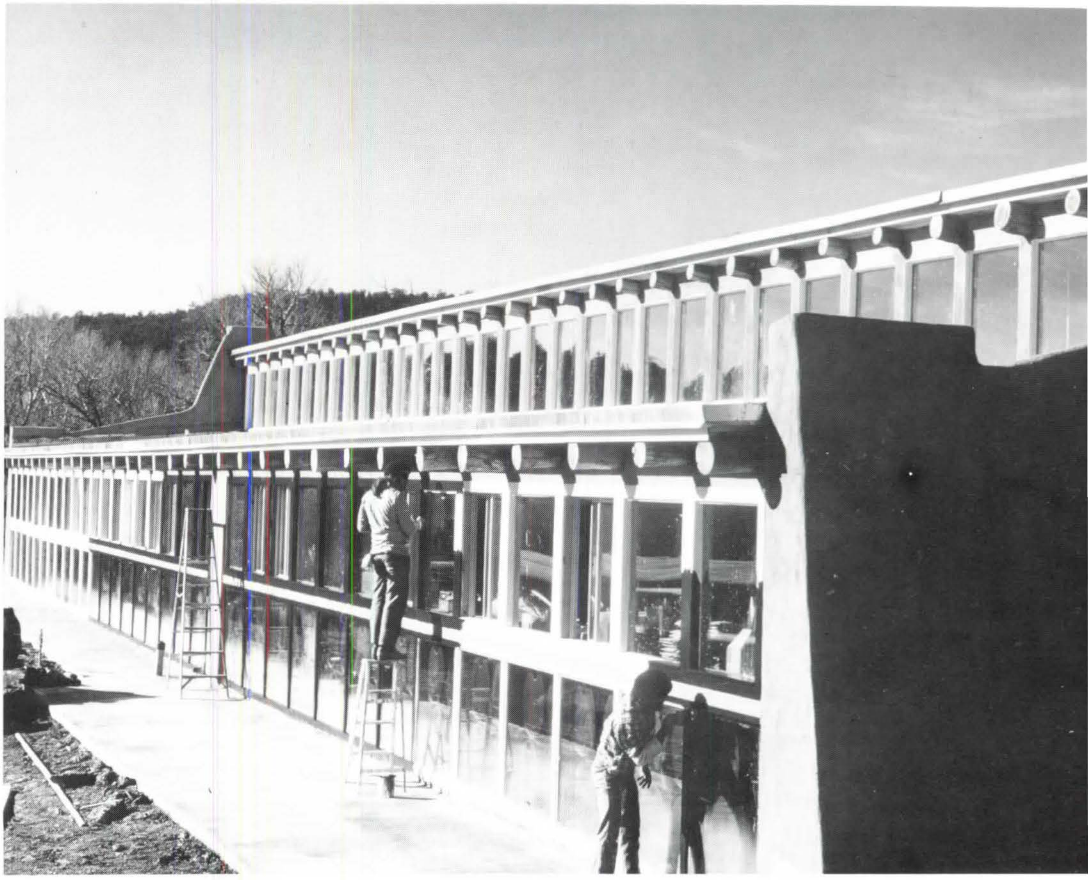
This 3,000-square-foot house, designed by Hal Dean, is situated below a 300-foot cliff in Los Alamos, N.M. The site was carefully chosen for its south slope, its wind advantage and freedom from neighboring sun obstructions.

Two hundred and fifty square feet of south-facing picture window collects solar radiation during sunny winter days. Behind the glazing is a heat storage wall consisting of 2,000 wine bottles filled with water and racked between two glass walls. The bottle wall also provides a diffused light in the living spaces. In the winter, solar heat is stored in this water Trombe wall and reradiated or circulated by natural convection (through operable top and bottom vents) to the rest of the house. A fan is also available to increase air circulation by counterflowing the air past the wall.

As in the Kelbaugh house, the solar system can be used to provide cooling during the summer by providing outside vents at the top of the Trombe wall. The rising column of heated air in front of the wall, once vented, will draw cool air through the house from openings on the north side.



Barrels of Water Linked To Act as a Storage Wall

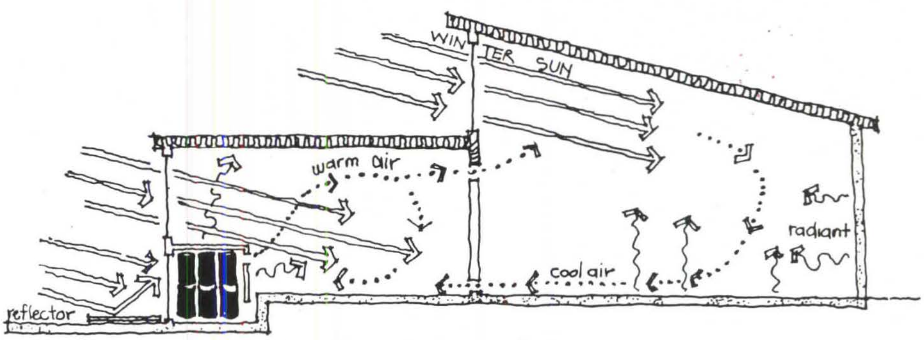


This water Trombe passive solar building serves as offices and warehouse for Dove Publications of the Benedictine Monastery in Pecos, N.M., as well as living quarters for one full-time occupant.

Designed by architect Mike Hansen in conjunction with Steven Baer, this building has 7,000 square feet of space on a single level. Built of eight-inch block construction with two inches of insulation on the inside and six inches in the roof, the east, north and west facades are predominantly sealed, except for vents for summer cooling.

The south facade, however, is dominated by three 140-foot-long bands of insulated glass, each four feet high, encompassing a total of 1,550 square feet of glazing. The large upper (clerestory) windows admit sunlight to the warehouse in back for direct solar gain heating. The middle row of windows admits sunlight to the offices in front, providing direct heat gain for the working hours as well as heating the center bearing wall of concrete block for delayed nighttime radiation.

The lowest row of windows is in the water-filled drumwall, consisting of 138 55-gallon barrels painted black and enclosed in insulated cabinets that extend into the offices to conveniently double as counter height working areas. Each office has a bank of manually operated registers on the side of the counter to allow convective air flow to heat the room much like conventional radiators. Air returns are situated on the floor.



Water Bags on a Metal Roof

A third indirect gain building type (diagrammed as sun to storage mass to living space) is the roof pond. With the roof pond building type, the water storage mass is located in the roof for purely radiant heat distribution to the living space through the ceiling material. One example of the roof pond passive solar concept is the Atascadero house in California, designed by inventor Harold Hay and architects John Edmisten and Kenneth Haggard. The roof pond solar system used in this 1,140-square-foot house employs a series of water bags, located on a metal roof deck, which can be exposed to direct solar radiation but later protected from unwanted heat gain or loss by exterior movable insulation.

During the winter, sliding insulating panels expose the bags to sunlight during the day and cover them at night, controlling heat loss. The bags in turn radiate their heat directly to the space below through the metal roof which has negligible thermal resistance.

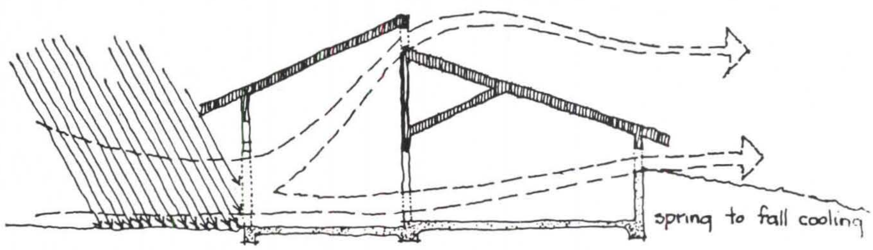
During summer, the panels protect the roof ponds from the sun during the day but expose them to the sky at night, when the ponds radiate their heat outward and thereby cool the house below. This passive solar home provides 100 percent heating and cooling in an area where temperature extremes have varied from 10 degrees Fahrenheit in winter to 110 degrees in the summer.

The shift of a solar storage mass from the wall to the roof relies on several new principles of physics and thus different design considerations. Since distribution of solar heat gain from the roof storage is by radiation only, proximity of the ceiling to the spaces being heated is important. This not only suggests conventional ceiling heights of eight feet but also the single-story design amenable to this part of the country. Variations in collection and distribution techniques of the roof pond passive solar building type are being developed for northern climates.

Isolated Gain

In the isolated gain passive solar concept, solar collection and storage are thermally isolated from the living spaces of the building. This concept is contrasted with the direct gain passive solar concept in which the collection and storage are integral with the living spaces, and with the indirect gain concept where collection and storage are separate from the living spaces but directly linked thermally. The isolated gain concept thus allows collector and storage to function somewhat independently of the building while the building can draw from them as needed.

Two general types of isolated gain buildings are included, a sunspace and a thermosiphon. Most typically seen, the sunspace isolated gain passive building type collects solar radiation in a secondary space which is separate from the living space, and also stores heat for later distribution. This sunspace offers both the potential separation of the collector-storage system from the living space, or the direct gain "live-in" situation which maximizes the use of low temperature solar gain. An atrium, a sunporch, a greenhouse and a sunroom all represent potential examples of a sunspace. The requirements for a sunspace passive solar building type center in the glazed collector space which must be both attached yet distinct from the living space. Provided with a strong southern exposure, the collector space must contain or be thermally linked to a solar storage mass for heat retention and later distribution.



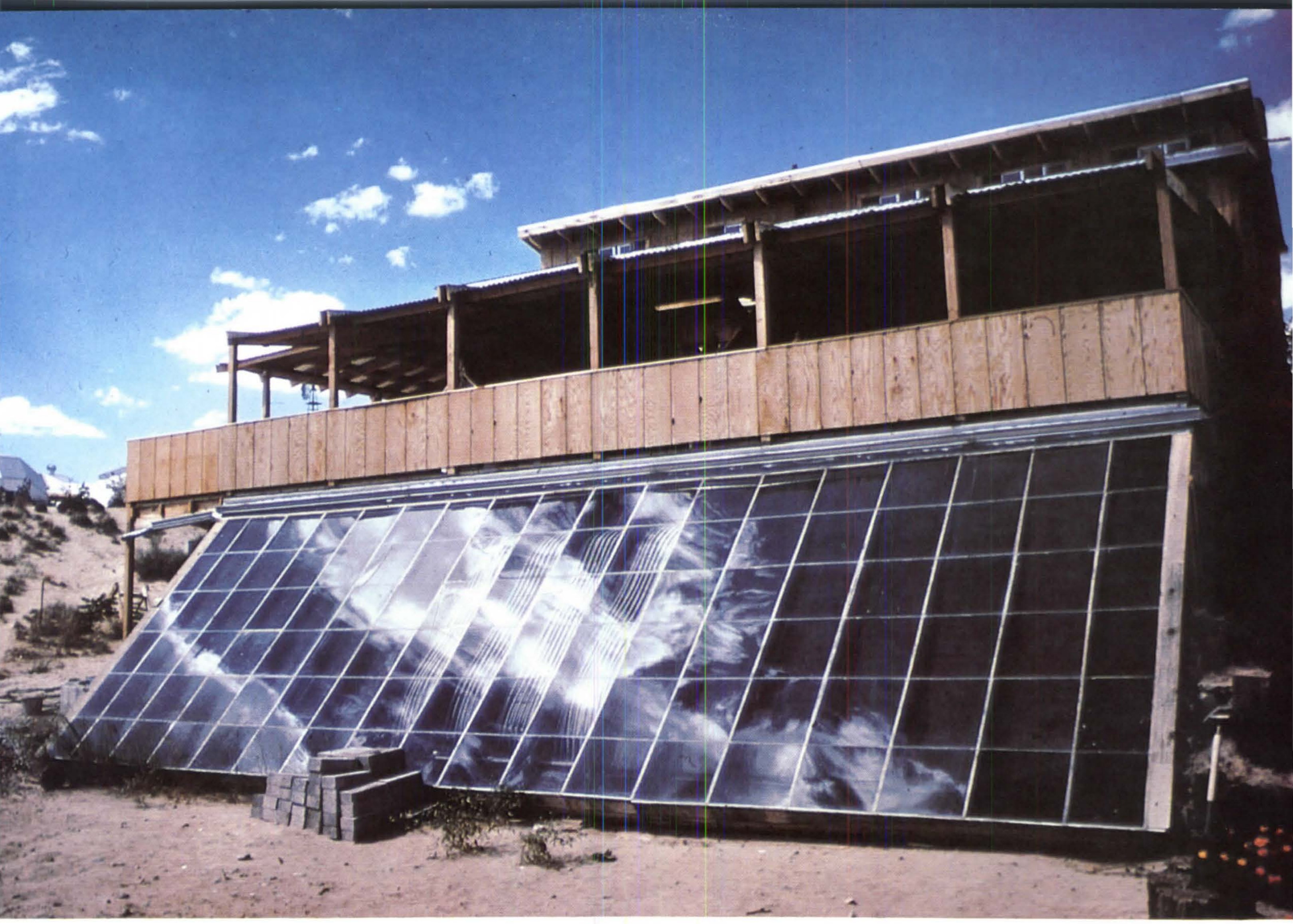
Atrium Functions as Sunspace and Wind Scoop

The sunspace can be variable in its spatial and functional relationships to the primary living spaces of the building. It may vary from a minimum addition with one small contact surface, to an extension of the entire south side of the building, to being contained within the building with an interface on several sides. The specific location of the sunspace depends on the building design, spatial organization and sun orientation.

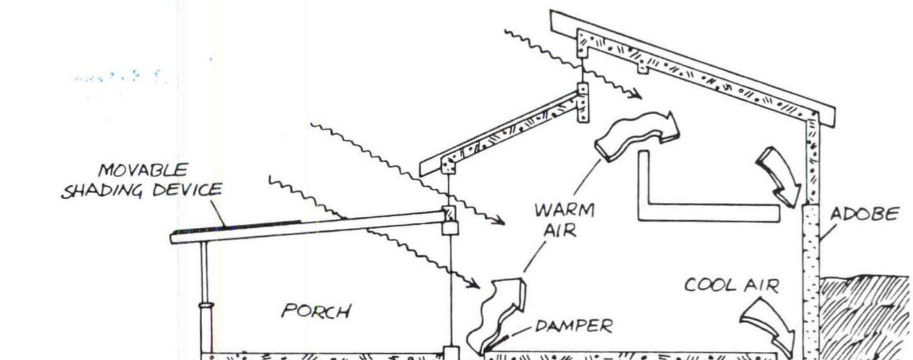
One example of an atrium type sunspace is the Erwin residence, designed by George Way, in Nacogdoches, Tex. The 2,275 square feet of living space in this house are wrapped around a large south facing atrium and thermally connected or separated as desired by 400 square feet of windows and glass patio doors. Direct radiation enters the 725 square feet of glass exposure, is absorbed by the atrium's dark brown Mexican tile floor and stored in the supporting eight-inch-thick insulated concrete slab.

As heat is needed in the house, doors are opened to allow heated atrium air to convectively enter the living spaces, providing almost 90 percent of the house's heating requirement. When temperatures within the sunspace are not too hot for comfortable live-in conditions, the atrium can be occupied for more efficient direct gain heating.

Summer overheating problems in this area are prevented by a significant roof overhang and the lack of angled glass exposures or skylights. The southern atrium is also designed to act as a summer wind scoop to draw air through and out small north windows to naturally ventilate and cool. The 2x6-inch stud construction accommodates increased insulation; the windows are double glazed, and the garage and utility areas have been located on the west perimeter to prevent summer heat gain and to give added thermal protection in winter. The northern face has a low profile with berming and minimal window openings.



'Thermosiphoning' Creates Continuous Natural Air Flow



The use of the thermosiphoning principle generates the second isolated gain passive solar building type. It includes a much more restricted collector space which intercedes between the direct sun and the living space, and is distinct from the building structure. In this space, a thermosiphoning heat flow occurs when air heated by the sun rises naturally into an appropriately placed living space or storage mass, causing somewhat cooler air or liquid to fall again, so a continuous heat gathering circulation is begun. The closest diagram to an active solar system, the thermosiphoning passive solar building, still employs nonmechanical (or minimal assist) methods of heat collection and distribution flows.

A good example of the thermosiphon system is the Davis house, designed by Steven Baer, in Corrales, N.M. The basic elements of this passive solar house include 420 square feet of thermosiphoning collectors, single glazed and located in front of the house below a relatively large rock bed storage bin supporting the south-facing patio.

Air ducts lead to and from the house so that with the aid of manually operated dampers, solar heated air can flow up naturally to heat the rock bed storage, while cooler air returns to the bottom of the collector for continuous natural circulation. Although a sun-heated stack only 10 feet high will have limited chimney effect, it has proven adequate to supply more than enough heat through a low-resistance rock bed storage distribution system.

For heat distribution to be effective, however, the area of interface is critical between storage and house, as is the spatial arrangement of the house. This 1,000-square-foot house is arranged in an open interior plan with a loft. Heat is distributed through the house by natural convection once the house dampers to storage are opened, with cooler air returning back to the collectors during the day or back to the solar heated storage at night. Direct gain heating enhances the comfort of this house, with adobe end walls to smooth the day-to-night temperature differences of the Southwestern climate. □

The Problems of Practitioners From Their Own Perspectives

Reactions and responses to the University of Maryland report on practicing architects excerpted in the January JOURNAL.

In January, we published excerpts from a report assessing architectural practice. Written by Roger Lewis, AIA, and Sirkku Fisher, it was largely based on a University of Maryland student survey of architects, engineers, developers, contractors, lenders and government officials. Its numerous findings included the following:

"Half of those questioned, including architects, felt that the architect's function in society is not widely understood. . . . Almost half thought the profession of architecture was changing for the worse."

Virtually no one was satisfied with the fee structure for architectural services. Contractors and others in the building industry regarded architects as an overpaid and necessary evil. They assumed that one architect is about as talented as the next, that most are impractical and have little appreciation of building costs. Architects, meanwhile, felt that fees are not commensurate with practitioners' increasing risks and responsibilities, expanding accounts receivable and difficulty in collecting fees. The result, said the architects, was to force them to take shortcuts.

The architects were afraid that decreasing work for architects is placing increased emphasis on marketing and broadening of services that makes architecture "look less like a profession and more like a business." The selection process is seen to be to blame. Architects said that the process is frequently inequitable, tending to favor certain kinds of firms, irrespective of ability to perform.

The architectural schools, it was felt, are turning out more architects than the market can possibly absorb, while failing to provide a "sufficient basis on which to build a practical framework of skills." Many perceived the schools as idyllic, divorced from reality and too willing to encourage and reward the offbeat.

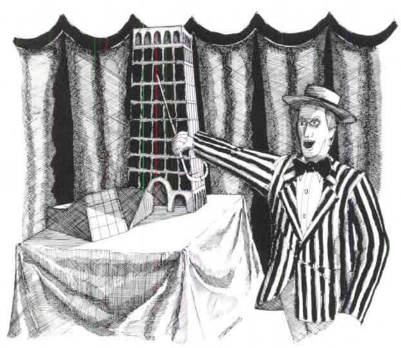
AIA was criticized for having failed to significantly influence public attitudes about architecture and architects; strongly define and enforce standards; address problems of professional education, and for compromising the architect's role as designer.

Four very different responses to this report follow. *Ed.*

Ehrman B. Mitchell Jr., FAIA

The profile of "Practicing Architects" presented in the January JOURNAL by Roger Lewis, AIA, Sirkku Fisher and students in the school of architecture of the University of Maryland chronicles in penetrating detail the vexing state of the profession today.

Their analysis of the "way things are" would give pause to the lionhearted and repel the faint-hearted. For those of us somewhere in between, their revelations are only too well known and portray architects as being in a constant state of seige. We have to be ever alert to "draw the wagons 'round" lest our liability flanks be



breached by hoards of hostile lawyers whilst our bulwark for defense, the insurance carriers, steal off in the night ever too anxious to quit the fray. But still we labor to cross these barren plains only to find our succor withheld or too long in coming and a disinterested public at the other end. With these obstacles, hazards and disappointments coupled with the objectives of architectural education in disarray and an ineffectual professional organization, AIA, one must conclude that things are in a very bad state indeed.

With all this evidence of a beleaguered profession, *why* do we continue to subject ourselves to these risks, abuses and shocks to our dignity? *Why* do persons presumably well educated and intellectually keen continue to pursue the long, arduous years of study and internship to earn the legal right to be subjected to these rigors and risks?

I suppose one could find as many answers to this as there are people. All of us have our individual reasons for persisting in or entering the profession. But there seems to me to be one all-pervasive basic that underlies each of our reasons. It is a deep sense of purpose. Architecture has a civilized purpose. We accord it high stature. It is a noble purpose implying a personal contribution to the record of the civilization of our time, a service to mankind, a tangible legacy to those who will follow. This purpose motivates dedication, submerges adversity and transcends the ordinary.

The purpose of architecture gives us the sustenance to cope with the hostilities we perceive and must surmount. It gives us the stamina to endure the hardships of thwarted ideals, lost dreams and the impediments of the contemporary process of making architecture. It nurtures our courage to experiment, to gain experience, to heighten our expectations.

However vexing are the complexities of the process, however pressing are the demands of consumerism, the competition for our public's favor and the burgeoning regulations of government, we persist to fulfill our purpose in society, to touch life, enhance its quality and to record our presence on earth.

The "way things are" can be influenced and changed. We need only to make it our purpose.

Robert B. Marquis, FAIA

The findings of Messrs. Lewis, Fisher and their students must have some merit as I have heard all this in one form or another ever since I started in practice nearly 25 years ago.

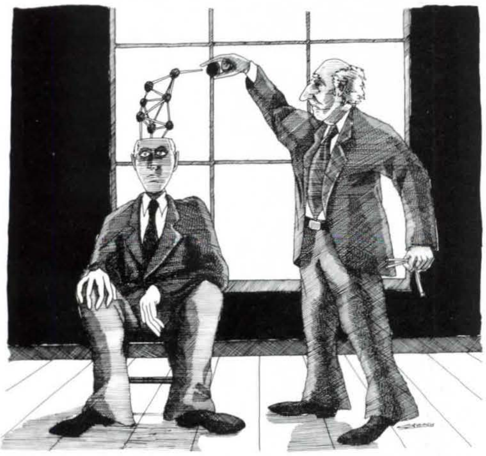
However, my own experience in many areas is at odds with their report. I don't know whether this is due to my inherent optimism (many of our colleagues seem to favor self-flagellation), or whether conditions in the San Francisco Bay area are different than elsewhere, or whether the Rules of the Game change for those firms that have concentrated on building a "design reputation."

In California, especially over the past few years, our experience is that the sophistication of the client has dramatically increased. From the outset, he wants to meet the team that will actually work on his project, he wants to know how you

Mr. Mitchell, partner of the Philadelphia firm of Mitchell/Giurgola, is first vice president (president-elect) of the Institute. **Mr. Marquis,** founder of Marquis Associates in San Francisco, is an AIA director. **Ms. Harkness** is a principal of The Architects Collaborative in Cambridge, Mass., and the Institute's first woman vice president. **Mr. Fehlberg,** a former AIA board member, is a partner with CTA, Billings, Mont.

will approach and solve his problem, how you will deal with energy conservation and cost control, how you will relate to his people. Most important, he wants competence and design excellence. He is frequently misguided in how to achieve the latter, but in general he expects competence and good design.

Smaller clients and municipalities have come to realize that they can command the services of firms with these skills, not necessarily in their own geographic area. The above described "sophisticated" climate tends to favor those firms that have, over the years, built a national, regional reputation for design and for competence. This of course fosters some resentment on the part of the architect who in the past did not need to compete on this basis, but



could secure a commission by location or personal connection alone.

I believe an ever-increasing number of clients is seeking the best services available and this makes it more difficult for the large hack firms or for those without a proven reputation for quality work, and I believe in time this will benefit the smaller, design-oriented firm.

Firms have found that as their reputation for design and competence has grown (it takes a long time), so have the quality of their commissions and the fees they can command. They can also begin to exercise some degree of selectivity as to what jobs to pursue, to accept and even to turn down. The demise of the fee curve and the percentage fee formula has enabled these firms to sit down with the client and usually negotiate a fair and sufficient fee for full services based on a defined scope of work.

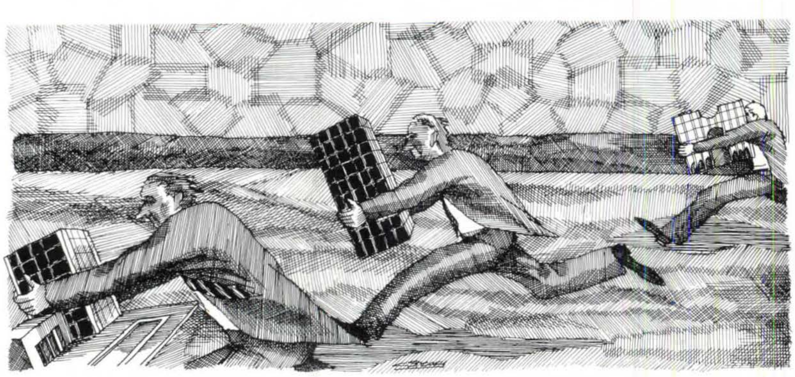
I do agree with the report that inadequate time for planning, research and design is the greatest factor conspiring against architectural excellence, but I believe this is due not to insufficient fees, as the authors suggest, but to: 1) clients' inability to firm up their building programs in sufficient time to allow a careful and considered design response; 2) rising cost of money; 3) inflationary construction costs, and 4) worst of all, antiquated corporate and government budgeting procedures. I believe the new sophistication of our clients will translate into great opportunities for the competent, design-conscious; yes, even the innovative architect and small and medium size firms can flourish in this climate.

In short, I believe that if the architect can hold out long enough to build a reputation for high quality work, virtue will triumph over all.

Sarah P. Harkness, AIA

The JOURNAL article on the state of the profession is very interesting. It describes architecture's "conventional wisdom," and the problems architects are having in making it work. The remarkable thing, especially considering the small geographical area that was researched, is that everything in the article sounds familiar. Everyone must be in the same boat.

A key paragraph is the one on "the role of the architect," especially the last sentence of that paragraph, beginning, "to be successful . . ." Isn't one fallacy of the conventional wisdom the fact that we keep talking about "the architect," as if one person did everything, no matter what the size or nature of the job? Credibility is lost by extravagant claims. Maybe the "generalist architect" corresponds to the "general practitioner" in medicine and, as in medicine, more expertise is needed, with cooperation toward a common aim—in medicine good health; in architecture, good design. The article touches on this later in the criticism of current architectural programs in the schools, but still the custom is to talk about "the" architect.

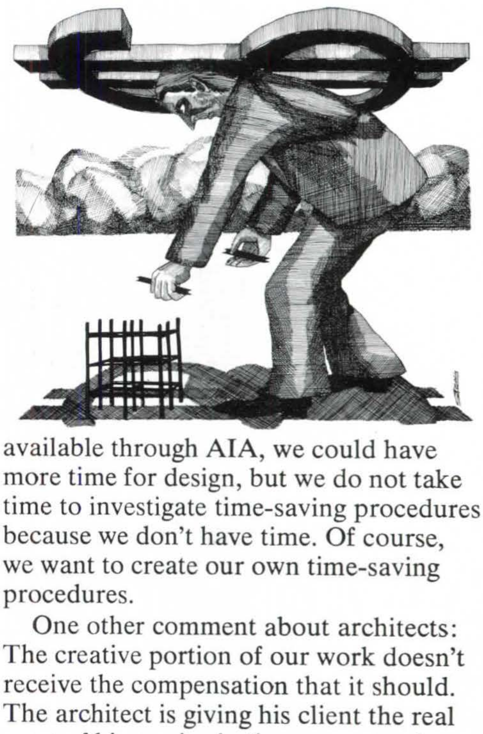


"The" architect is, of course, thereafter referred to as "he," a limiting factor if we're beginning to recognize the need for a pluralistic profession.

Robert E. Fehlberg, FAIA

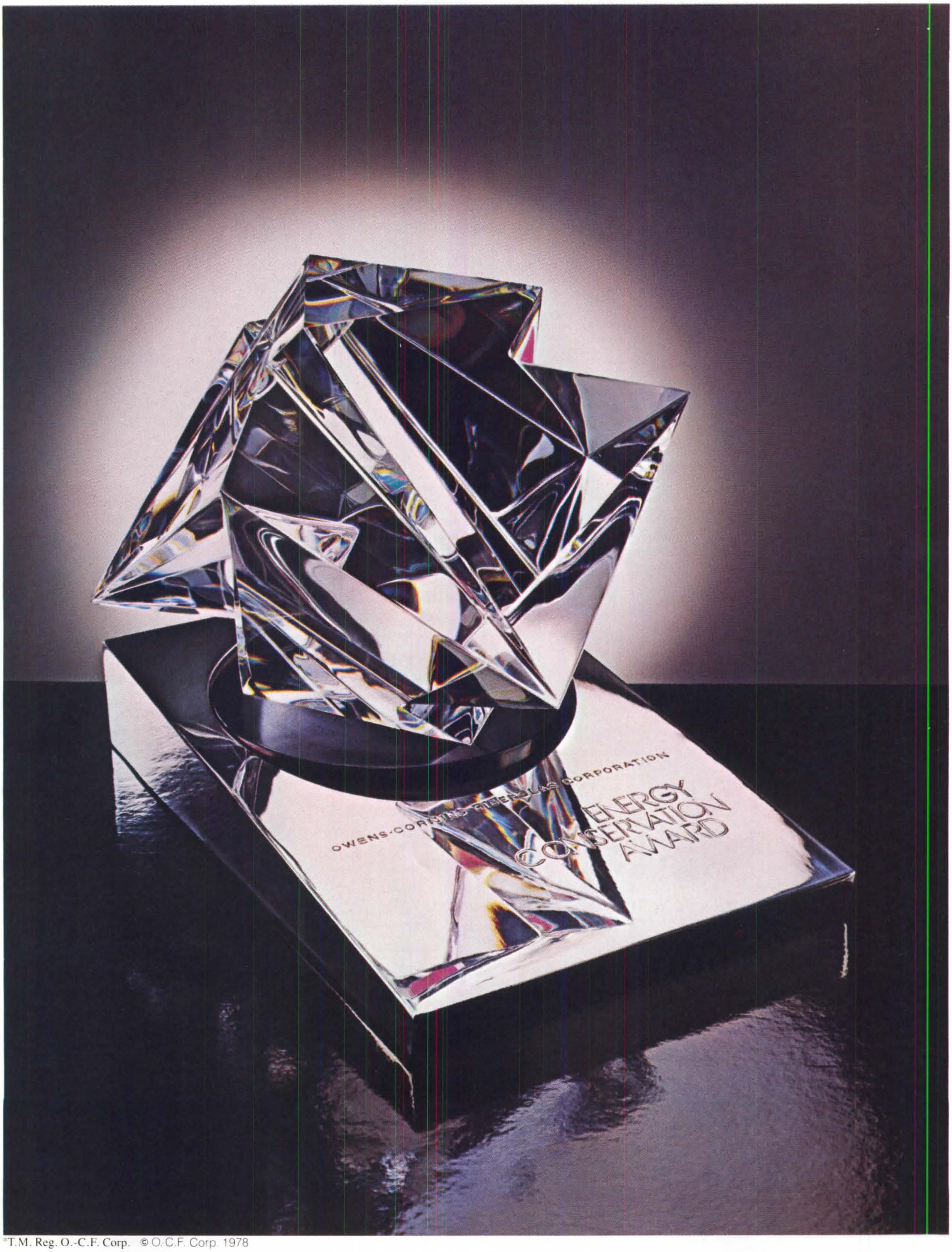
The article on practicing architects in the January issue responds to the state of the profession quite well. It reinforces some of my thoughts that we cause a lot of our own problems, or, as the often-quoted Pogo would say, "We have met the enemy and they is us."

Somehow, the architect has to realize that while he is solving the client's problem he should be making a fair return for his time and talent, in addition to enjoying himself designing. The thrill of creating a building or whatever is enough compensation for some architects. The fact is that they have to pay rent and salaries, which doesn't come through as strongly as it should. If we architects were better managers, using some of the tools that are



available through AIA, we could have more time for design, but we do not take time to investigate time-saving procedures because we don't have time. Of course, we want to create our own time-saving procedures.

One other comment about architects: The creative portion of our work doesn't receive the compensation that it should. The architect is giving his client the real meat of his service in the concept, schematic stage of the project—the work flow, relationship of functions, the thousand things that the client never thought about are discussed, sorted and arranged during concepts. This is when the architect's training, experience and judgment really come through providing the functional, esthetically pleasing building. From the schematics on, the creative activity decreases. I'm not certain that the 15 percent, 20 percent, 40 percent breakdown of fee used by many firms is correct; compensation management being developed by the Institute can help redistribute the architect's compensation where it should be. □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BOOKS

Islamic Architecture Seen as 'Seductive and Stimulating'

Islamic Architecture. John D. Hoag. New York: Abrams, 1977. 424 pp. $37.50.

This book, one in the "History of World Architecture" series edited by Pier Luigi Nervi, is on a relatively little-known but fascinating period of architecture. Its author, professor and chairman of the department of fine arts, University of Colorado, is an authority on Islamic art. Gathering a wealth of information on Islamic architecture, he has set it historically and defined the period from the 7th century through the 18th century.

This series of books, unfortunately, contains no color photographs. While this book is profusely illustrated in black and white, one must envision the vivid color associated with Islam. We are merely told about the balance achieved when sensuous color is combined with intellectual, abstract and intricate formal patterns to produce design and meaning, as in no other period of architecture.

The Prophet Muhammad (570-632) founded the Islam religion in Mecca, an ancient trading and pilgrimage center with a pagan temple. He was forced to leave Mecca by the irate and unconvinced unbelievers, and journeyed to Medina. From there he spread the faith and attracted a following as well as an army. He and his army returned to Mecca, which capitulated after a brief battle. Mecca then accepted Islam.

The rapid spread of the faith and the conquests by the successors of Muhammad, the Orthodox Caliphs, is one of the most remarkable happenings in history. By 644, Damascus, Jerusalem, the Tigris and Euphrates area, the Nile Valley and the southern Mediterranean shore to Carthage were Muslim. By 656, Persia capitulated; the Sassanian Empire had been conquered by the Arabs. Later, the Moors brought this religion and its exotic architecture to Spain. The conquests continued until, by the 18th century, great portions of the Eastern world and part of India were Muslim.

In Muhammad's time, Arabs had no architecture. Bedouin armies, led by his followers, fanned to Hellenistic and Persian conquest and influence. Syria had limestone and cedar; Mesopotamia and Persia had brick and mud-brick, vaulted or flat roofs. Islamic art was borrowed from cultures overrun by armies bent on proselyting unbelievers.

Islamic architecture, in contrast to simple building, is believed to have begun in the middle of the 7th century, with the construction of mosques by the Umayyad Caliphates, following the demise of the last Orthodox Caliph. There also appears, from this distance, an easing of the ban Muhammad placed on building. He is reputed to have told one of his wives, after she had enlarged her apart-

ment in his absence, "Verily, the most unprofitable thing that eateth up the wealth of a believer is building."

Fortunately for architecture, as the power of Islam grew politically and religiously, the leaders built more and more elaborately. They erected mosques, palaces, towns and military bases, despite the rigid opposition of the Koran to secularism and ostentation. The Muslims rejected images, and their art is especially reflected in mosques and palace architecture. Islam mysticism is expressed in "unearthly ecstasy," not miracles. Paradise is the goal, and to achieve it, paradise must be created here on earth. The spiritual essence of Islamic architecture is seductive and stimulating.

The early architectural history of Islam is apparently built on educated guesses, since so little remains due to fire, earthquakes, military conquest and the passage of time for brick-wood construction. Archeological excavations in Iraq have unearthed cities, palaces and mosques of great antiquity, built during the reigns of the Abbasid Caliphs, after 750. In a natural advance, these sites contain more and more elaborate architecture and ornament, heavily influenced by legendary Persia.

In reading the brief bits of history in this book, one's senses are accosted by strange names and strange lands. The book presents to us some very complicated history, requiring rigid attention, or all is veiled in mystery. There is a constant repetition of violent deaths of rulers, brotherly enmity over succession, poisoned heirs and general mayhem. Internecine squabbles led to the building of new palaces and cities in order to separate factions. Religious reform led one group to leave Baghdad and construct the new city of Samarra on the east bank of the Tigris in 836. After the usual battles over succession, the building of a new quarter to the north and a series of regicides, the rule was eventually returned to Baghdad. But in the meantime, we learn about the construction of Samarra, with its great palaces, racecourse, gardens, audience halls, gates and the Great Mosque built in 852.

In a chapter on early Islamic architecture of North Africa, Hoag tells us that Arab history for that period is obscure. The history that is presented is also obscure, particularly since there are no maps, and finding one's way through the Islamic conquests is no easy task without a good guide. Also, while quibbling is in order, why are the chapters in a book on Islam headed with Roman numerals? The Arabic system of numbers is one of the greatest gifts to our world.

But Hoag does take us through the labyrinth of Muslim history, describing the growth of architecture from earliest simple mosques and using fine illustrations, accompanied by plans, to illuminate the advance of ideas and styles. Islamic architecture flourished as new conquest provided the money. Conquered lands yielded wealth, which built the

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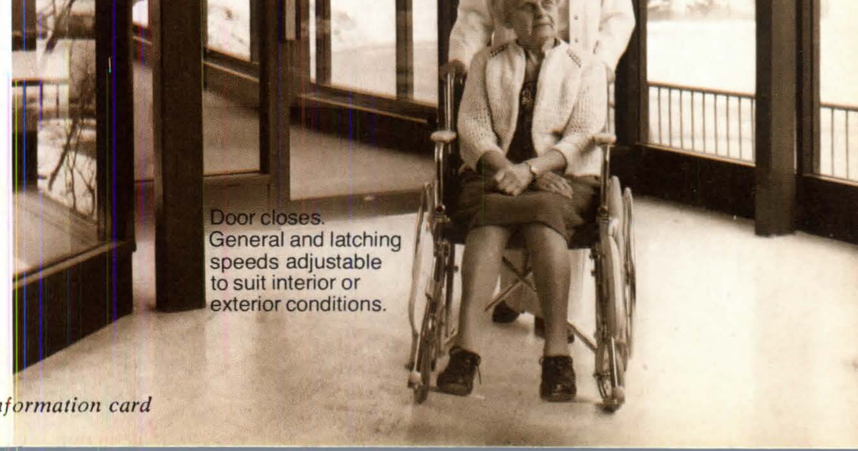

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great mosques, palaces and cities. The artisans and artists used materials at hand and executed marvelously intricate designs, textures and decorations in brick, terracotta, wood, stucco, stone, ceramic and mosaic, all amply displayed in photographs.

This very interesting book allows us to follow the history of Islam and its spread over a large part of civilization. The seductive, stimulating and intellectual architecture of Islam, discussed in brief but illuminating detail for such a large subject, proves to be another fascinating aspect of an ancient profession. *Elizabeth and Robert Class*

A/E Role in Seismic Design

Earthquake Resistant Design: A Manual for Engineers and Architects: D. J. Dorwick. New York: Wiley, 1977. 374 pp. $27.50, available for $24.75 to AIA members from AIA's department of publications marketing.

Earthquakes can be nature's most terrifying and devastating event. They have destroyed countless cities, thus killing literally millions of persons throughout history. The 1976 earthquake in China alone killed more than 600,000. The energy released from an earthquake can be enormous. For example, the earthquake in Alaska in 1964 released an amount of energy equivalent to 100 nuclear explosions of 100 megatons each.

It is sobering to realize that some of the most heavily populated regions in the world, such as Japan, Central and South America, China, Turkey, Iran, nations around the Mediterranean and the U.S., are located in areas exposed to the most violent of earthquakes. In the U.S., more than 70 million people in 39 states live in areas of moderate to high seismic risk. States such as Montana, Illinois, Tennessee, Georgia, New York, South Carolina, and Massachusetts are included in addition to California, Alaska, Washington and Hawaii.

The architect, as the design team leader, plays a major role in determining the building's site location, shape, form, configuration, basic structural system, materials, architectural systems/components and basic mechanical/electrical systems. The decisions made by the architect can determine the overall success or failure of the building's performance during an earthquake or the additional cost of designing specific systems to be earthquake-resistant.

The field of earthquake engineering, although in its infancy, has produced a sizable amount of knowledge and data. A vast amount of this knowledge has not been translated into information responsive to or usable by the architect. This book is a good attempt at bringing the principles and concepts of seismic design to the practitioner. It could serve as a textbook in schools of architecture and engineering; in fact, it is comprehensive enough to cover a full academic term. Its major drawback as a text is its cost.

Because the author tries to be responsive to both architects and engineers, the book poses some problems. Although fairly comprehensive in covering seismicity, site response, structural form and response, structural detailing and nonstructural systems and detailing, the emphasis remains on structural seismic design. There is too little on nonstructural design, and even less on building form and configuration. The major disappointment is the lack of an actual translation of earthquake engineering principles into an architectural design context. This translation is a major undertaking and, as this reviewer knows, is much more easily criticized than accomplished.

Because of its mid-level between architects and engineers, portions of the book are technical. It reads well; however, most of the technical portions do not really increase the reader's understanding of the basic principles covered.

There are numerous illustrative drawings, many of which are excellent, but lacking are photographs that illustrate concepts, failures or successes.

Architects desiring a "how-to" book or condensed guidelines will be disappointed, but those who want a book that is understandable (although somewhat technical) that will describe the major concepts and fundamentals of seismic design, with sufficient specific solutions and illustrations, will be pleased.

In a final analysis, *Earthquake Resistant Design* is a welcome addition to an area with few resources—seismic design for architects. The architect who reads the book will gain an awareness and understanding of basic seismic design and of the effects architectural design decisions can make in the ultimate seismic performance of the building. *Earle Kennett, Project Manager, Architects & Earthquake Program, AIA Research Corporation*

The Builders: Houses, People, Neighborhoods, Governments, Money. Martin Mayer. New York: Norton, 1978. 468 pp. $15.

It is hard to believe that a book with 430 pages of text and another 38 pages of annotations only skims the surface of its subject, but that's what this one does. The subject is vast, as the subtitle, "Houses, People, Neighborhoods, Governments, Money," indicates. Only God and Motherhood seem missing here, and they are

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touched on in the text, usually in quotes from people who head real estate firms or who are committed to fixing up the inner city.

And that's the trouble with this impressively sourced book. It is really little more than a well-threaded string of quotes, statistics and encapsulated case studies passed off as a history of how housing has gotten built in America. But it is incomplete and, thus, unsatisfying to anyone who was immersed in the housing industry during the big building years of the U.S., from 1950 to 1970.

No reference whatsoever is made, for example, to Larry Weinberg, head of Larwin Builders, who was certainly the most successful high-production builder known during the last 50 years. No apparent contact with Bob Schmitt, who built Berea, Ohio, before new towns became fashionable; no reference to Emil Hanslin, the first builder to combine good architecture and sound sociological research to create a new, upscale community.

Only one parenthetical reference to *House & Home* magazine, the voice of the industry which changed the country from a nation of renters to one of homeowners in two fast decades. No mention at all of Perry Prentice, Carl Norcross, Jim Gallagher, Bayne Sparks, Arthur Goldman—to name but a few of the housing industry observers who created the one thing builders needed but couldn't do for themselves: communications with other builders. And no mention of the Bob Lusk debacle, which cost GE millions of lost dollars, nor of the disastrous forays by Westinghouse and Boise-Cascade into the roll-the-dice world of speculative homebuilding.

In short, this book reads like something Will Durant would write about the housing industry 200 years from now. For anyone close to the business, it is unsatisfying; for others, it's a slow, tedious read. *Richard H. Freeman, Institute Group Executive, Component/Information*

Planning the Office Landscape. Alvin E. Palmer and M. Susan Lewis. New York: McGraw-Hill, 1977. 187 pp. $17.50.

At first glance, I assumed that this book was about planning the open office. The authors, however, are quick to point out in the introduction that these concepts are not synonymous; to them, the office landscape concept is a total approach to office planning and can include either conventional or open arrangements. They continue to stress this point for the first 64 pages. Then, without fanfare, they concede that so many references already exist on conventional planning that they will concentrate only on open planning.

Discounting this mild deception (which logically or not, I still feel occurs), the book does serve its intended purpose in that it does offer a step-by-step, practical application of comprehensive planning procedures. The reader is given detailed information not only on how each segment of the planning activity should be approached, but why each is vital to overall project success. The book would be helpful to those planning either new or renovated offices. The authors say the information is applicable to any office setting (which it may well be), but it is doubtful that too many existing companies would be willing to expend the time and/or money necessary to achieve the authors' objectives without a corresponding building program.

The book is not without its shortcomings. While stressing the virtues of using minimum furniture/equipment to achieve maximum function and ease of mobility, little—if any—mention is made of the territorial needs of an individual. Psychological studies have shown that employees need to express themselves in their work environment, but the book's ideal layouts do not seem to provide for this freedom.

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WATTS NEW

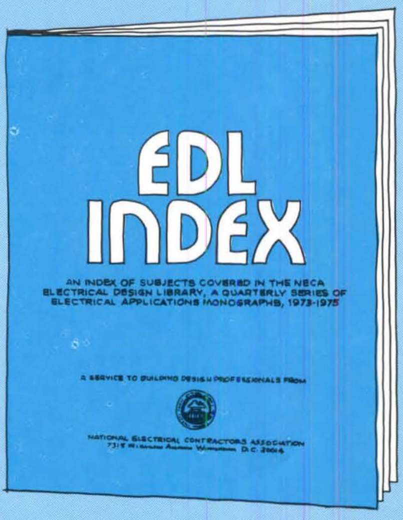
ENERGY MANAGEMENT VIEWS FROM NECA - THE NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION **VOL. II NO. 1**

"THE MORAL EQUIVALENT OF WAR"—

and "one of the greatest tests of our national will." Those are some of the grim phrases used by prominent Americans to describe our national energy situation. Our national will seems to be blunted because there is no consensus about the nature and dimension of the problem itself. Unless we face an imminent crisis, it seems that this society can absorb great changes in life style only when they are voluntary, and are perceived as desirable or contributing to a higher standard of living. When potential changes appear to be forced upon us or to be detrimental to our future expectations, the great defensive reactions mobilized to preserve the status quo may make us unable to deal with the problem until it becomes a catastrophe. We just are not accustomed to running out of things we want.

So, in the interest of developing a national consensus, let's review the problem and its most desirable solution. Oil makes up only 3% of U.S. energy reserves, but accounts for about 47% of our consumption. We import about 43% of our oil needs, mostly from foreign countries who collectively control international prices at a level much higher than is justified by production costs. The exorbitant cost of imports is causing a serious drain on our international trade balance and has contributed to our domestic unemployment. If present trends continue, we stand to increase oil imports even further with additional reductions in the value of the dollar and even more severe unemployment impact. Natural gas reserves comprise about 4% of our energy reserves, but gas has amounted to as much as 28% of our energy use. At present, gas imports are insignificant but the gas industry has asked for unlimited freedom to import liquefied natural gas in the immediate future. Few forecasters expect domestic production of oil and gas to ever return to historical growth no matter how high the prices become. We have frantically increased drilling for new oil and gas, yet our reserves continue a long-term decline.

On the other hand, coal amounts to about 90% of our domestic energy reserves, enough to last several hundred years. But it presently supplies only about 23% of our energy. Domestic uranium reserves will last only a



few generations, but with the breeder reactor, these supplies could be extended indefinitely. Other forms of energy, such as solar, geothermal, oil shale, and gasified coal, are still experimental. Economical sources are not yet available, except in very narrow applications. These may hold great promise if we can adjust to the different life style they will require.

The solution seems to be obvious. Simultaneously, we must decrease our dependence on oil and gas, increase our use of abundant coal and nuclear power, encourage maximum production at the most economical prices of all forms of energy, and become expert managers of our total energy resources. Research and development of renewable energy forms must also be increased.

Indications are that industrial leaders have already realized the benefits of better energy management. Most large companies have appointed energy managers and most industries have taken measures to get more out of their energy investment. The results are noticeable in demand for electricity . . . the most cost-effective way of using our coal and nuclear abundance. This demand is expected to increase from 28% of all energy now in use to about 50% by the year 2000, only 22 years from now. The outlook for a financially healthy and productive electrical industry will determine whether this desirable trend continues. Except possibly for personal transportation and petrochemical products, there is literally no job presently being done by oil and gas that cannot be accomplished efficiently by electricity.

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WHEN YOU PLAN FOR ELECTRICITY, PLAN WITH A PROFESSIONAL.

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One chapter is devoted to status symbols and status distribution within a company. The authors agree that middle management personnel generally feel more threatened by a shift to open planning because they sense they will lose some of their important status symbols. Other than saying that these symbols should be analyzed and redistributed, however, the authors never offer any concrete suggestions on how to counteract this attitude.

If the chapter on status symbols seems beyond the realm of office planners, architects, interior designers and students (the book's stated audience), the final chapter entitled "Perspective" appears totally out of context. Here the authors offer a subjective opinion on what a company should or should not do to nurture its employees and, even, increase its service and value to the community. There is nothing wrong with their ideas. Fluctuating work hours, profit-sharing, company-paid benefits, day care centers and liberal maternity leave policies are all modern business policies that need further consideration by many companies. Office planners or architects, however, do not represent the appropriate audience for this commentary. *George Mann, AIA*

Process: Architecture, No. 3, December 1977. Tokyo: Benji Murotani, publisher; Ching-Yu Chang, editor. 248 pp. No price given.

Issue three of the Japanese magazine *Process: Architecture* is given over to the theme of "Community Design: By the People." The guest editors are Jules Gregory, FAIA, a partner in UNIPLAN, Princeton, N.J., and David Lewis, AIA, a partner in Urban Design Associates, Pittsburgh. They do America "proud."

Gregory and Lewis introduce the magazine's theme with an article on "Making Democracy Work." Why the concern with citizen participation in the design process, they ask. And answer: "It has two main sources. The first is a growing trend in the U.S. to involve citizens more and more in the many issues (not just architectural) which affect their lives and hopes. The second is a growing suspicion that something is wrong in the modern movement of architecture. The 'something' is not technological or economic. The suspicion is that most modern architecture, often so exciting in a formalist sense, is not answering the deeper needs of the people who use it."

They offer examples, however, of how citizens are making their voices heard, and there are articles which feature such projects as the new town of Gananda, N.Y., the William S. Hart Sr. middle school in East Orange, N.J., Queensgate II town center in Cincinnati. There is also an account of AIA's R/UDATs in Denver, Long Branch, N.J., Trenton, N.J., and Birmingham, Ala.

The articles, in Japanese and English, are copiously illustrated with stunningly beautiful color and black and white photographs. Altogether, the guest editors have been most successful in presenting "we, the people" to another country.

The magazine is distributed in this country by Rizzoli International Publications Inc., New York City.

The Photography of Architecture and Design. Julius Shulman. New York: Whitney Library of Design, 1977. 238 pp. $25.

It should come as no surprise that Julius Shulman would author a rich and interesting book on architectural photography. As a matter of fact, this volume is as rewarding and carefully composed as one of his finest single images. Topics include cultivating an eye for composition, how to select the best equipment, developing techniques, experiencing camera assignments and developing a photography business.

With more than 300 prime Shulman photographs nicely printed on oversized pages and intelligently keyed to the text, this is a reference and picture book to save and to savor.

The Papers of Frederick Law Olmsted. Vol. I: The Formative Years: 1822-1852. Charles Capen McLaughlin, Editor; Charles E. Beveridge, Associate Editor. Baltimore: Johns Hopkins University Press, 1977. 423 pp. $20.

To an architect, the most striking aspect of Frederick Law Olmsted's early years could well be how little training or experience he had in anything related to design. Moreover, he showed little indication of pursuing such an interest or career. Olmsted, who later designed more than 17 urban parks, pioneered in campus and suburban planning and did so much to shape the growth of American cities, spent his first 30 years traveling, writing, thinking about religion, experimenting with farming and simply observing and enjoying nature.

This is the first volume of Olmsted's papers, carefully edited and amply annotated by Charles Capen McLaughlin from among the many thousands of items collected at the Library of Congress. In taking on this work, projected to yield seven volumes, McLaughlin faced no easy task. Historians have long recognized Olmsted's importance as a social critic of the antebellum South; landscape architects look to him as the founder of their profession. Not only has McLaughlin had to depict a man of several identities, but also he has had to make editorial selections from the papers of a man who wrote absolutely everything down and kept it.

In his letters, Olmsted rambles on about the beauty of the New England landscape and the "unconscious influence" of rural scenes; he argues with himself over moral issues and struggles with religious doubts; he talks about clothes and haircuts and travel arrangements, and analyzes the values of scientific farming. The most dramatic letters describe the ordeal of his passage around the Cape of Good Hope to China under sail in 1843.

It seems that the variety of work and travel led him to a cultural medium well suited to the growth of imagination and new ideas. No ordinary civil engineer or landscape gardener would have seen the importance of draining malarial marshes while creating an entire system of parks and parkways for Boston unlike anything before.

Today, the luxury of leisurely correspondence is rare, but Olmsted was a faithful correspondent. He used his writing time to explore ideas as well as to record events in an unself-conscious way. His papers, assembled by his son Frederick Law Olmsted Jr., with whom he is often confused, form a voluminous collection. McLaughlin has succeeded in creating a well-organized framework for the project. In addition to the letters themselves, the book contains a concise Olmsted biography and introductions to key relatives and associates. The exhaustive research has yielded an invaluable reference work.

Olmsted was more than a 19th century problem-solver; he was the person who figured out what the problems were. At last, he is accessible, and there are six volumes to come. *Jane Canter Loeffler, consultant in planning and design, who served as executive secretary for the Olmsted sesquicentennial*

Design for a Limited Planet: Living with Natural Energy. Norma Skurka and Jon Naar. New York: McGraw-Hill, 1976. 215 pp. $12.95.

What's it like to live in a habitat that runs on solar, wind or water power? Do such houses really pay off in terms of fuel saved? What obstacles of climate and topography had to be overcome to make such a dwelling a reality? This rather chatty book quotes answers to such questions by owners of the dwellings, but there is no in-depth analysis.

The dwellings are located in 12 states, and they vary in complexity. A number of the houses in the book are in New Mexico and were discussed much more thoroughly by Jeffrey Cook, AIA, in the Dec. '77 issue of this magazine.

The book is directed more to the layman than to the professional; it contains many photographs, some in color, and diagrams. □

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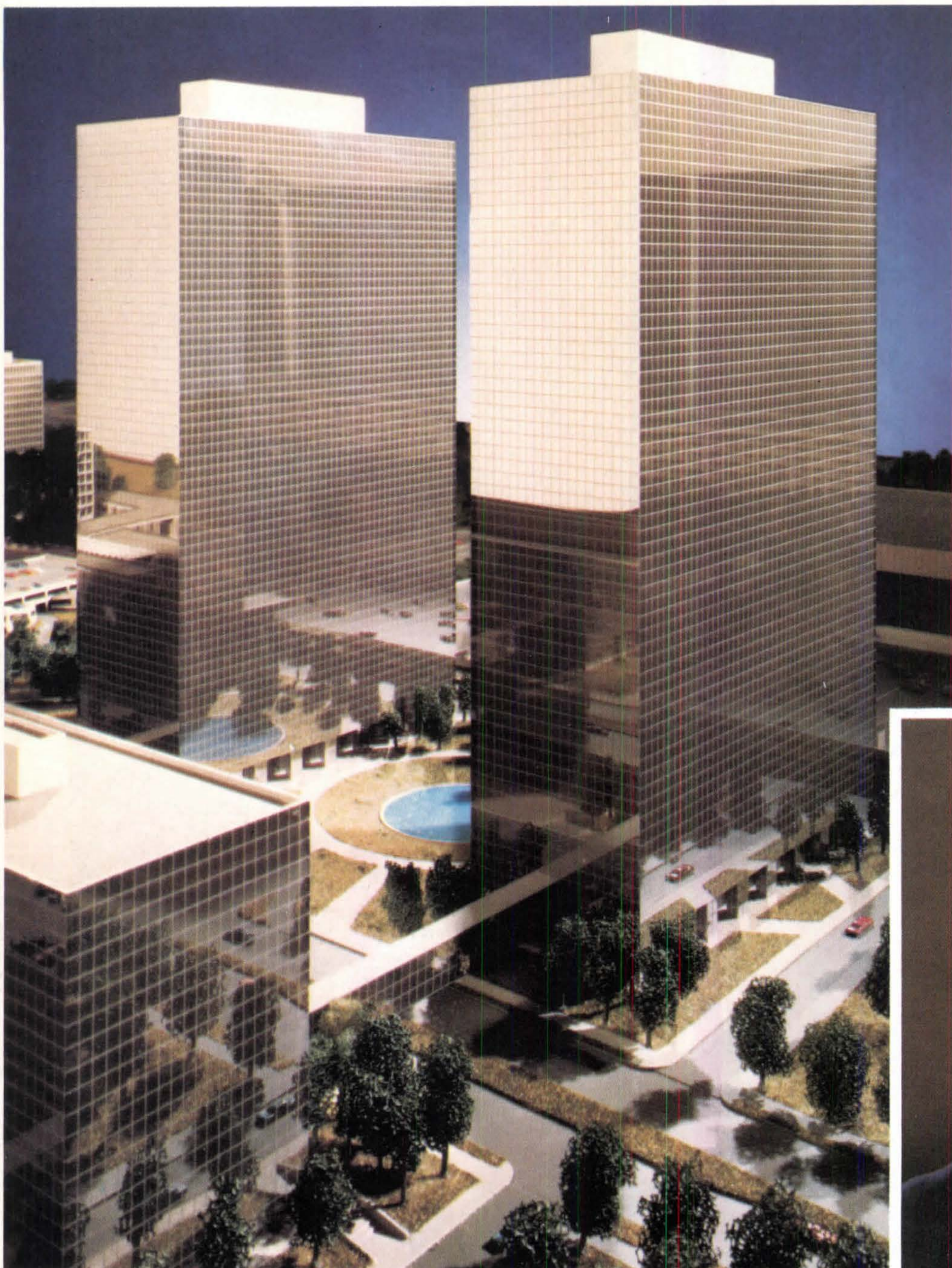

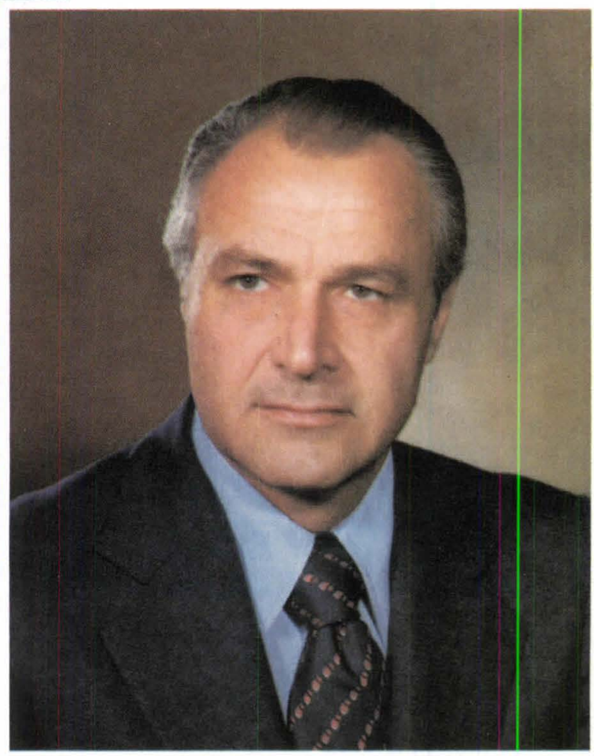

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'Through passive design, the building interfaces exterior and interior environments.'

Continued from page 53

and led to design guidelines and construction standards which minimize window area and increase insulation of the building skin.

This energy use model may yet be appropriate in situations offering no benefits from climate or other variables influencing energy use. However, it shares the weaknesses of the earlier mechanical conditioning model in that it ignores the fact that climate, control of energy flow, the variable nature of comfort requirements and user participation all are factors of energy use. Whether these forces help or hinder efficient energy use depends on how the building responds to them.

Through a passive design approach, the building interfaces the exterior and interior environments. It opens itself to accept the desirable effects of climate and closes itself to the uncomfortable elements. How the building opens and closes itself to the environment will vary according to regional and seasonal differences, occupant comfort requirements and the way the building's design controls interior and exterior energy flows.

Comfort of the individual is determined by temperature, humidity, air movement and radiation. Comfort conditioning in a building seeks a balance of those forces which produces a comfortable state of mind. Energy consumption is a function of that balance. The amount of energy needed to maintain comfort is affected by many variables, including the number of occupants in a space, their age, clothing habits and activity.

Passive design is an attempt to meet the comfort requirements of each space in a building through a selective control of the climatic variables. There are the same forces which produce comfort. The building can control these variables through its design.

Large diurnal temperature swings can produce comfort if a building is able to open and close itself on a daily basis. Mass construction can be beneficial to slow solar energy transmission absorbing it for later use for heating or release for cooling. In climates with low humidities, moisture can cool a building. Winds can be directed through a space for ventilation and cooling, or directed away from a building's interior in order to assist heating. The seasonal geometries of direct solar radiation combined with the microclimatic geometries of a site can influence the building's own geometries of structure, form and material configurations.

In one sense, buildings become manipulators of energy when they collect and store the sun's energy and then distribute it for cooling and heating when and where it is needed. Control of this flow is by natural principles of heat transfer.

This involves using the thermal characteristics of building materials to transmit, absorb or reflect solar energy and the flow of that energy in space through convection, conduction or radiation. The interrelationship of these principles becomes the basis for passive solar building design.

Siting, building materials, their interrelationships and their resulting configuration are the design variables. They take on added meaning when they are used to control solar energy flow. The microclimate of a site can be a determinant in building orientation. The proximity to bodies of water will influence diurnal temperature ranges. Topography will affect wind direction and intensity. Trees and other buildings can shield wind as well as solar radiation. Rates of thermal absorption and transmission become principal design criteria in material selection. These rates are a function of the quantity of material and the material's location in the building in relation to the geometries of solar energy flow.

In a passive solar building, the building materials are the vehicles for transporting solar energy in and through the building. Transmission of solar radiation through glass or plastic is one consideration. Absorption and reradiation through water, concrete, brick or block are others. Beyond simple direct transmission, the materials can reinforce the collection, storage and distribution of solar energy within a space.

The nonconductive properties of wood, for instance, make it a good material with which to contain a collector space. The conductive properties of concrete, brick or block combined with the ability of its mass to transmit energy very slowly make these good thermal storage materials.

Location of insulation in the construction of a building section should be responsive to the role that particular section plays in the overall thermal operation of the passive system. For example, areas of glazing used to collect solar radiation may need to be insulated at night in winter to help contain heat and during summer days to keep heat out of the building. A component used as thermal storage should be insulated differently from one used only to shield a building space from the external environment.

The flow of energy through air, solids and liquids is an important design determinant. Not only does it influence the placement of collector and storage components in relation to interior spaces, but it also has bearing on the placement of one space in relation to another. For instance, rising heat in a house can be used advantageously if solar radiation is directed to heat spaces during the day. Heat build-up in these spaces can then pass on to higher spaces used in the evening hours.

Research and experimental design have refined many passive solar technologies, resulting in the design of new building components. For example, the Trombe wall was developed through a study of the thermal absorptive and transmittance qualities of building mass and its relationship to convective air movements. Dependent upon solar orientation and mass size in relation to the size of the living space, this grouping of standard building materials can collect, store and distribute energy to the building which it also serves to enclose. Its reverse cycle can induce ventilation and cool the building. Application of these concepts in design suggests a regional architecture—buildings which respond to local climatic conditions, topography and user patterns.

Consider other benefits of passive solar design: For instance, funds that traditionally go for initial cost and operation of extensive mechanical equipment could be transferred to the building's basic construction. In turn, more precise construction helps optimize energy performance. Esthetic elements can also satisfy pragmatic criteria for comfort conditioning. Examples include ponds, greenhouses, sunrooms, swimming pools and large expanses of glass. Passive solar buildings also afford an opportunity to enjoy the benefits of nature. Occupant participation in passive system control also offers a chance to have fun with a building.

The issues discussed here indicate the building's ability to extend its purpose. The model for this extension is a dynamic one, and suggests a building which adapts to the changing conditions around and through it. The framework for this model is a blending of an old logic with a new awareness which could, if pushed far enough, establish a new direction in architecture.

Research has defined the relationship between energy efficiency and the variables of building design. It has also identified the characteristics of solar energy collection, storage and distribution needed to successfully provide comfort conditioning. These factors suggest a redefinition of what a building is and how it works. Yet, the proper synthesis of these factors and how they influence buildings must be found in the application of these principles through building design.

The architect's classical problem-solving role is again required in confronting the issue of energy use in buildings. The principles have developed, the need is clear. □

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Circle 34 on information card

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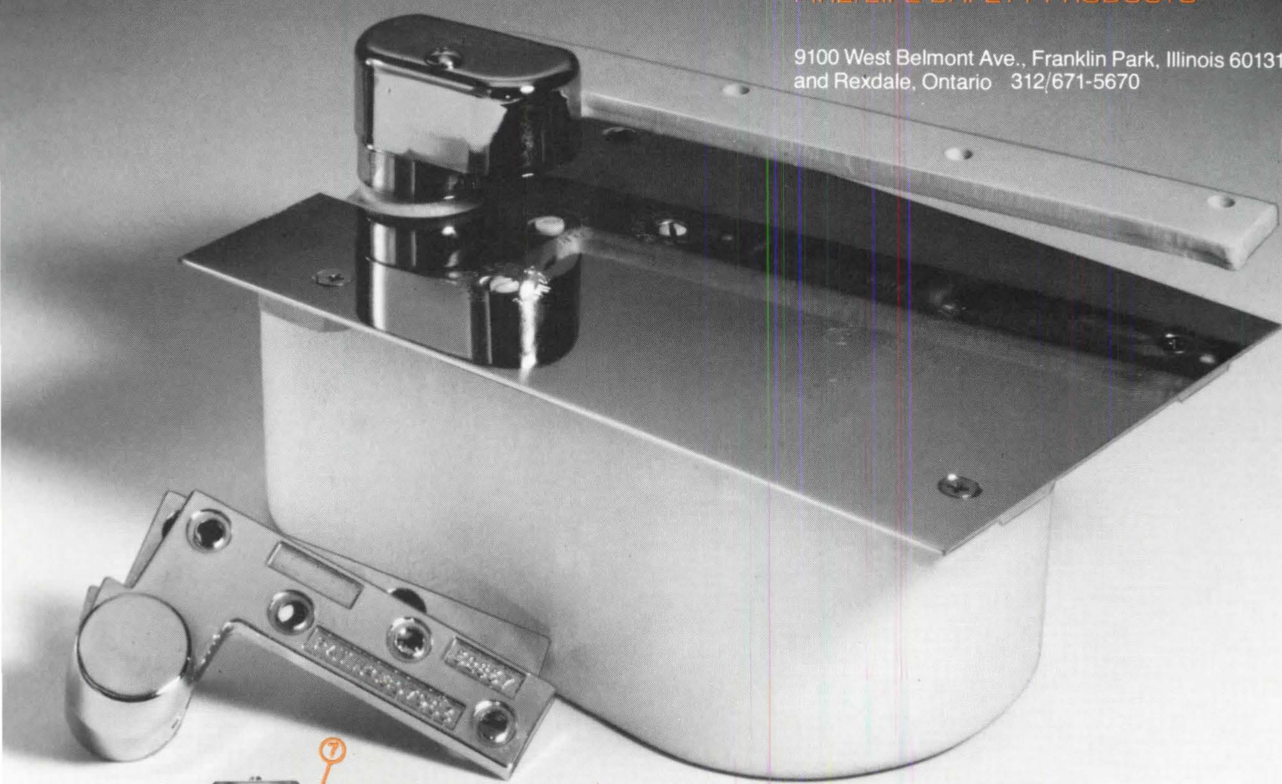

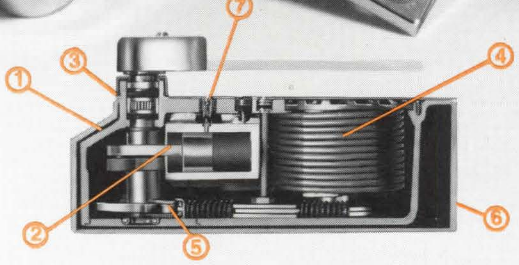

Letters from page 4

larger study of the processes involved in the establishment of a national reputation in American architecture and had to be brief for the JOURNAL; hence, a great deal of backup material had to be omitted.

In order to draw a line on who was famous and who was not in the 19th and early 20th century, I looked to the "fame-makers," the authors of the standard texts used in architectural schools. When a name was given a considerable amount of attention in several texts, I included it as "famous." The actual merit of the architect's production was not a factor in this decision, but will be in the concluding chapters of the study.

Using this tool, I still hold that John Russell Pope is nationally known primarily for the National Gallery of Art in Washington, D.C., because of the amount of attention it received in *Architecture in America: A Battle of Styles,* edited by William A. Coles and Henry Hope Reed Jr. (Appleton-Century-Crofts, 1961).

The article does contain a ridiculous malapropism. It is, of course, Utilitas, Firmitas and Venustas, not Commoditas.

Roxanne Williamson
Austin, Tex.

Historian Williamson will get a lot of flack from some big names who feel they should have been included in her chart of influential architects. Times change. Henry-Russell Hitchcock early condemned Rockefeller Center and later lauded it. It takes courage at any time to include some and omit others.

I wonder how many others will ask if Williamson ever heard of Corbett, Platt, Ackerman, Kohn, Butler, Mayer, Stein, Henry Wright (2) and Henry Churchill. Did no influence come from Belluschi, Ketcham, Hornbostle (2), Eames, Goodman, Ralph Walker, Labatut and a New York catalytic hero called Ferris.

We admire her temerity, good writing and wish her well. She should gain a great response. *Robert Ingle Hoyt, AIA*
Santa Barbara, Calif.

I admire Roxanne Williamson's research. I have frequently wondered about my own architectural "roots." Thanks to her work, I am delighted that I now can trace myself back to Jefferson. That is, I could if she had included John Lautner, FAIA, as one of Wright's most distinguished students, which he is, and myself as one of John's (which I think I am). But, as she says, only time will tell.

Robert B. Marquis, FAIA
San Francisco

'Thousands Ignored': Having read the interview with President Botsai in the January issue (p. 20), I am glad to know that he is starting out with enthusiasm. I wonder, though, how much he is in touch with the bulk of architects throughout the country.

It is good to know that he favors a higher level of professional competence and plans to focus on this problem. He states that in his practice as a troubleshooter, he has "warped (his) perception of architects' technical competence." It would be interesting to know how many times he was retained to trouble-shoot because of "business planning, production improvement, land development, legal aspects, urban design." I am not sure that a client with a leaking roof or falling panels would be overawed by an architect's competence in business planning, etc.

Continuing education is almost a reality and, so far, the AIA has been far off in its programs. Seminars and cassettes on precisely the subjects named by Botsai have been circulated. But they do not have the slightest relationship to technical competence. The technical world has been advancing rapidly; new products and new techniques have been, and are being, evolved. How are we to learn of them? We are left at the mercy of salesmen who are not always competent and are always prejudiced. When architects are criticized —and sued—it is because of technical problems, not glamour.

We are a very diverse profession. Not all of us can boast of the credits listed for Philip Johnson (Jan., p. 19). There are thousands of us whose practice and associated problems are ignored.

Leon Rosenthal, AIA
Babylon, N.Y.

Clarification: Although the firm of RTKL Associates, Inc., won an award from the Downtown Research and Development Center for its planning study for the revitalization of the central business core of Eugene, Ore. (*see* Jan., p. 15), the building depicted in downtown Eugene was designed by my firm. *Scott Taylor*
Eugene, Ore.

Correction: There is an error on page 44 in the March issue. The photograph on the left side of the page is of the Praetorian Mutual Life Insurance Co. Building, done by Grayson Gill, Inc., in 1961.

G. Douglas Gill, AIA
Dallas

Still Standing: On page 6 of the February issue, there is a puzzling reference to three "demolished" New York City buildings, all of which are still standing: the Customs House, the Ansonia Hotel and the Chamber of Commerce building.

Iris Alex, AIA
New York City

The JOURNAL *does not want to be a wrecker's ball, and we apologize.* Ed.

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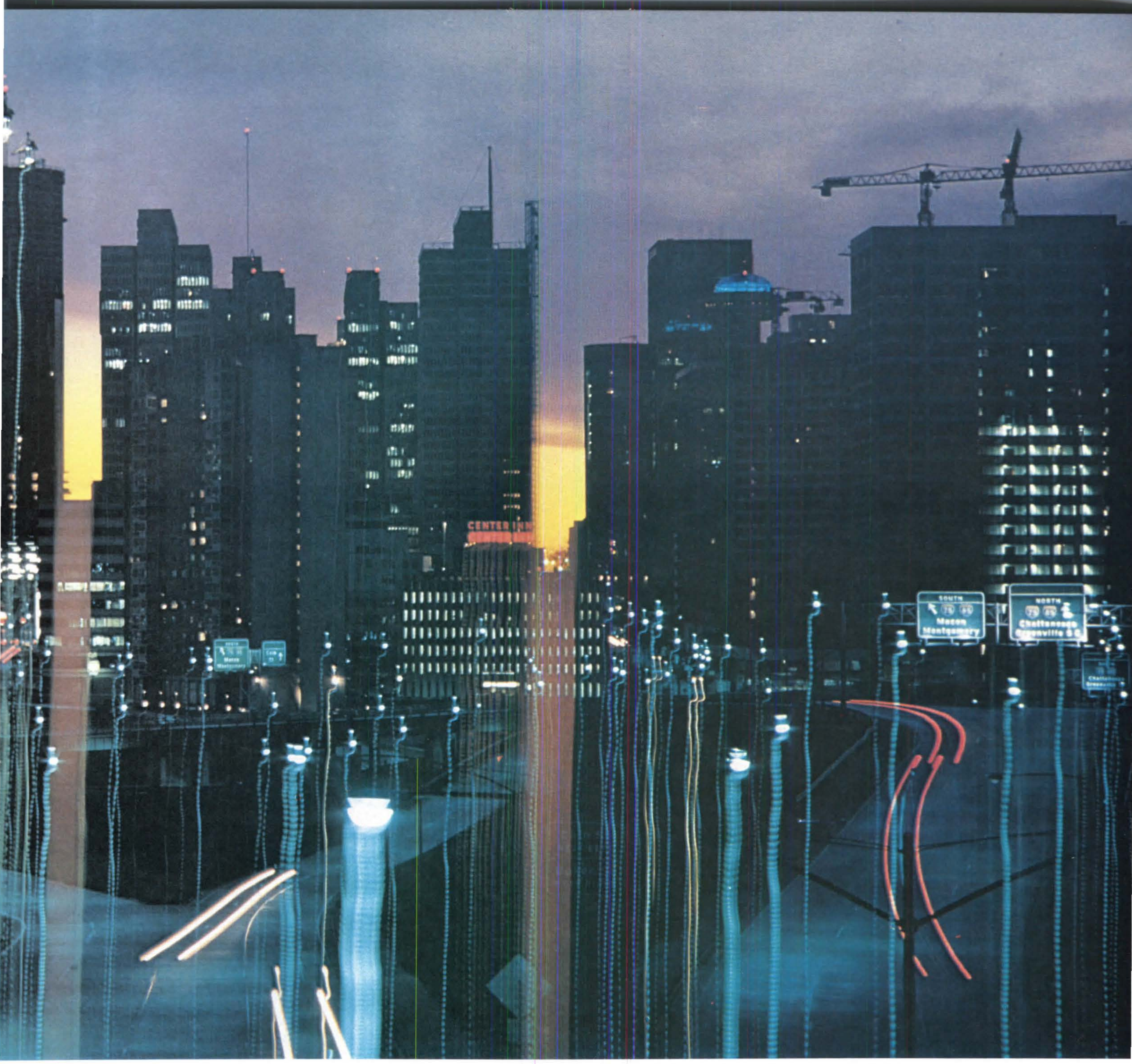

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Going On from page 28
community in Texas to have a metropolitanwide public transit system.

The program will conclude at the 1978 annual meeting of TSA at San Antonio, Nov. 1-3. A "state of the state" report on Texas' quality of life will be presented to state officials, participants and TSA members.

The TSA is sponsoring the meetings based on the belief that individual citizens should have more input in the design of their communities. "Texas architects want to try to understand how the citizens of their own communities see the quality life, to stimulate wider acquaintance with all possible options and—wherever they can—to apply the understanding they develop to their own work," according to a TSA statement. "They want to know how people feel about their buildings and their towns—what they like and dislike."

School Boards Give Awards For Design 'Excellence'

The National School Boards Association has awarded special citations to seven architectural firms for the "excellence" of their entries in the third annual exhibition of school architecture, cosponsored by NSBA and AIA. Entries were limited to instructional and administrative facilities for public and private schools up to grade 14 and for colleges of education. Eligible entries had to be completed since Jan. 1, 1975, or under contract for construction by Sept. 1, 1977.

The firms honored and their entries are:

- Ashley Humphries & Partners, Edinburg, Tex., for Garza-Pena Elementary School, San Juan, Tex.
- William Blurock & Partners/Arthur D. Decker & Associates, Newport Beach, Calif., for the East County Performing Arts Center, El Cajon, Calif.
- Carmichael-Kemp, Los Angeles, for the Development Center for the Handicapped, Gendale, Calif.
- Facilities Planning Group, Portland, Ore., for Rose City Park School in Portland.
- FGM, Inc., Oak Brook, Ill., for Nathan Hale Middle School, Crestwood, Ill.
- HTB, Inc., Washington, D.C., for the Model Secondary School for the Deaf in Washington.
- Porter/Jensen/Hansen/Manzagol, San Clemente, Calif., for the renovation of an education center, district administration, warehouse and central kitchen facility in San Juan Capistrano, Calif.

The winning entries were on display during the annual convention of NSBA early this month. The exhibit, said Thomas A. Shannon, NSBA executive director, gave school board members and school administrators from across the country an opportunity "to study some of the best work done by school planners for new schools and the renovation of existing facilities."

The jury was made up of representatives from NSBA and AIA.

Architectural Librarians To Meet in Dallas in May

The fifth annual meeting of the Association of Architectural Librarians will be held at the Dallas Hilton Hotel on May 20-21, coinciding with AIA's convention slated for May 21-24.

One event planned is a panel discussion by Stephen A. Kliment, AIA, author of *Creative Communications for a Successful Design Practice;* Betsy Chatain, director of professional communications at Skidmore, Owings & Merrill in Chicago, and Marilyn Ludwig, director of public relations for Stone, Marraccini & Patterson in San Francisco, on the importance of communication in the design professions.

Among the other persons on the program are Donald Watts, assistant professor, division of architecture, Texas Tech University, who will discuss library use in his architectural school of more than 700 students; Beverly A. Willis, AIA, who will give a slide talk on the proposed National Museum of the Building Arts in Washington, D.C., and Dee Wallace, librarian at the University of Illinois' Ricker library of architecture and art, who will discuss architectural exhibit catalogs.

For additional information, contact: Susan Cosgrove Holton, AIA Library, Institute Headquarters.

Report Studies Conflicts of Environment and Growth

In the early 1970s, the environmental movement successfully delayed or stopped housing developers from building "too much, too fast, too ugly." Now, developers are blaming the high price of housing on the environmental movement and restricting building regulations.

The conflict between environmentalists and developers must be resolved; solutions must be found to the rising price of housing, comments Robert G. Healy in a 16-page paperbound issue report: "Environmentalists and Developers: Can They Agree on Anything?" recently published by the Conservation Foundation. The problem is critical, stresses Healy, for "if increases in housing costs continue to outpace the growth in family incomes, as they have in recent years, the social and political results could be explosive."

The conflict began in the early '70s with the rise of environmental consciousness coupled with the quickened pace of development. Throughout the '60s, less than 1.5 million housing units were begun each year.

In 1971-73, the yearly average was 2 million. Developers were faced with more and more environmental regulations and delays due to lengthy lawsuits. In addition, local governments were increasingly reluctant to provide roads, schools, sewers and other services required by new development, according to Healy.

The major factors in the rising price of housing—up 13 percent in 1976 from the previous year—are the higher prices of building materials, construction labor, land and financing. The environmental movement, some critics say, added to the rising costs because of "growth control", raising the price of serviced lots, placing restrictions on building practices and imposing delays by new regulations.

"Unless solutions are found," Healy contends, "it is likely to be environmentalists who will lose the most from a battle over housing costs." Environmental controls have led to modifications in new construction; greater sensitivity to natural systems; a greater relation between development and existing public services, and a greater openness in decision making, with more citizen involvement than ever before. "A weakening of environmental controls would probably lead to unstructured, difficult-to-anticipate, citizen opposition to their projects —a kind of guerrilla warfare."

How can the conflict be resolved? Healy suggests moving from regulatory or prescriptive planning to "indicative" planning. This can be accomplished by replacing detailed zoning with broad categories that indicate the general location of desired growth but not preordaining the exact nature of what will be constructed; use of long-term capital facility planning to indicate to developers where and when they want new construction to occur, and deriving goals and standards from certain environmental constraints such as wetlands and wildlife-habitat areas. "Experience has proved that land use controls must be far more flexible than zoning allows," Healy says.

Healy calls for more timely decisions. "Efforts to secure more timely regulatory decisions should focus not just on the highly visible (and often state-mandated) environmental controls, but also on the traditional local approval process." This involves standardized application forms, multiagency public hearings and simplified impact statements.

Developers should build more in areas where excess infrastructure already exists, Healy says. "About 35 percent of the total cost of producing a new dwelling unit goes to provide infrastructure—

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roads, school buildings, police and fire stations, water and sewer lines, open space and recreational facilities."

In addition, he suggests that in appropriate places there is a market for dense development. It should be encouraged, Healy says, for "reductions in density almost invariably mean both higher per-unit prices and a shifting of housing demand to new, as yet undeveloped land." Healy also applauds renovation of older buildings in older neighborhoods.

The battle will continue, but Healy believes solutions can be found. Because of the new regulations, developers' environmental consciousness has been raised, Healy says. "Steam setbacks, use of natural color materials, avoidance of steep slopes, preservation of open spaces and other such practices have come to be part of the developer's own thinking." Environmentalists can become more "developmental" conscious, Healy urges, by deciding the type of development they desire and by backing agreeable developers.

Women's Architectural School Is Scheduled

The Women's School of Planning and Architecture, the first such school to be completely founded, funded and run by women, is receiving applications for its third session, to be held in Bristol, R.I., on Aug. 13-26.

This summer's session will differ from the two previous ones in that the schedule will allow more women to attend and the theme will be a far-ranging exploration of a single topic. This year's school will consider the question: How do we define and design workplaces and dwellings both for ourselves and others?

The two-week school and the format will permit participation at different levels, depending upon each woman's time and resources. At midpoint, for example, there will be a special capsule weekend for those whose time and resources are limited which will have its own speakers and workshops.

The school is open to women of any age, at any stage in their education or continuing education; the only requirement is that they work, study or have a committed interest in the design fields.

Costs for the full two weeks, (tuition, room and board) are \$350 or \$400, if registration is completed by June 1, and \$385 or \$435 for those registering after June 1. Costs for the weekend session only will be \$80 or \$100. In each case, the difference in costs will depend on whether double or single room occupancy is

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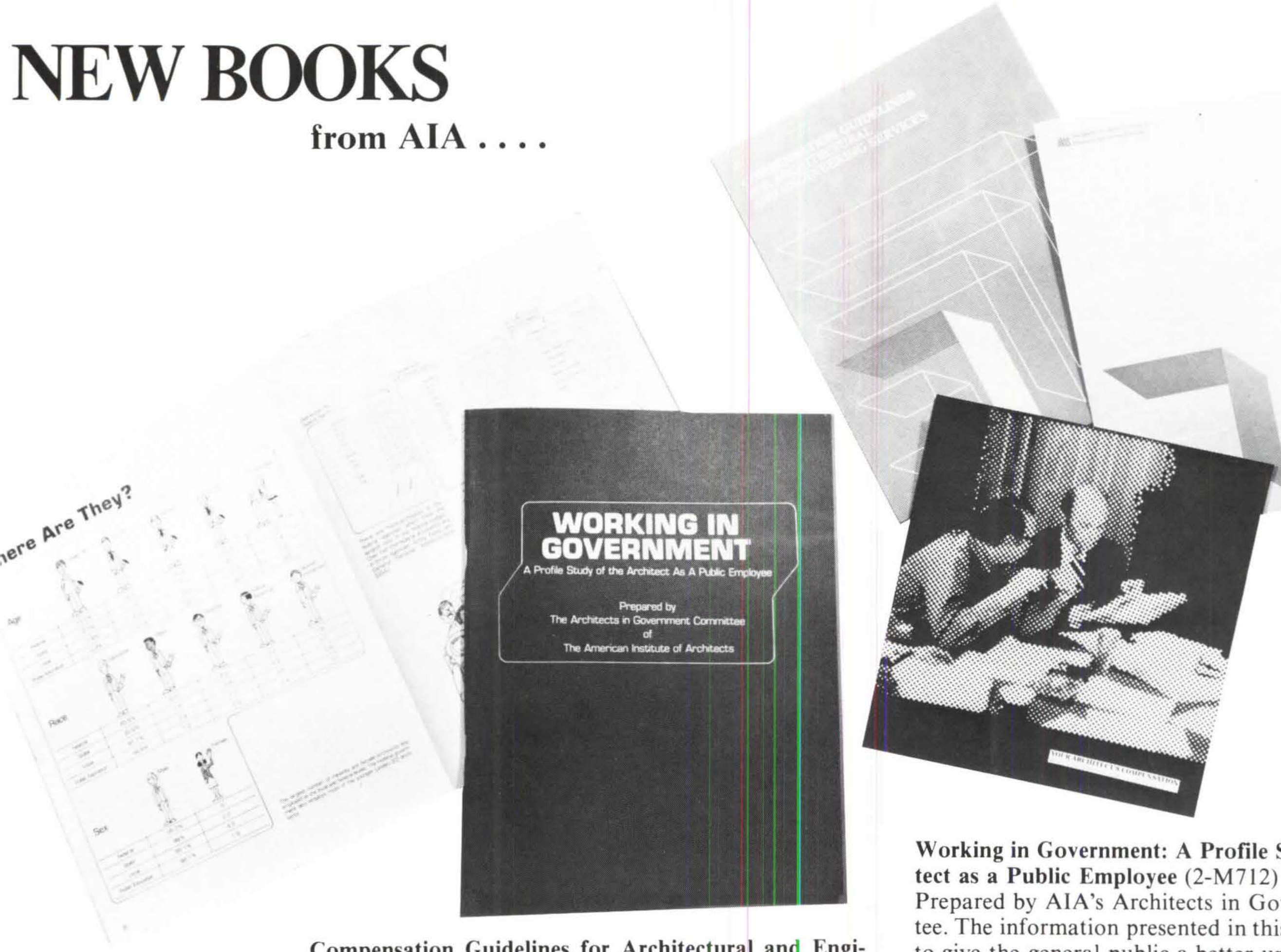

Compensation Guidelines for Architectural and Engineering Services, 2nd Edition (2-M188)
Prepared by AIA with the assistance of the American Consulting Engineers Council, this financial management tool places equal emphasis on both the architectural and engineering services required for building projects. Provides a rational process for relating design professionals' compensation to cost of services. Shows how to work with the client to analyze a project, item by item, to reach an agreement on scope of services required. Includes fixing the responsibility and costs for each item of service and estimating professional compensation and reimbursable expenses relating to the services selected. A revision of the popular COMPENSATION MANAGEMENT GUIDELINES FOR ARCHITECTURAL SERVICES, this second edition aims to fulfill the need for greater simplicity, comprehensiveness, uniformity of detail, and broader concerns. Softcover, 160 pages (1978) $12.50 Non-member, $10.00 AIA and ACEC members.

Architect/Engineer Supplement to Compensation Guidelines (2-M188A) is intended for in-house use by the architect/engineer when using cost-based approach to compensation. A discussion of issues that arise when negotiating with the client, it begins with a series of general considerations and deals with the subjects of adjustments and revisions to compensation, contingencies, methods of compensation, and billing. Softcover, 12 pages (1978) Not available to non-members, $2.00 AIA and ACEC members.

Your Architect's Compensation (4-N902)
Designed as a companion piece to forthcoming (1978) edition of YOU AND YOUR ARCHITECT, this booklet is designed to provide answers to owners' questions about the cost-based approach to paying their architects. Discusses various methods of compensation and explains how the cost-based approach ties compensation directly to the designated services needed to carry out a project. $.75 single copy Available in bulk so architects may supply copies to their clients (4-N902B) $15.00 for 25 copies, AIA members *only*.

Working in Government: A Profile Study of the Architect as a Public Employee (2-M712)
Prepared by AIA's Architects in Government Committee. The information presented in this report is intended to give the general public a better understanding of the various functions performed by architects in government; to give educators a clearer view of educational needs and opportunities; and government administrators an opportunity to make comparative assessments of architects in various agencies and at various levels of government. Developed from a survey of over 2,000 architects in government conducted in 1976, it provides a comprehensive profile of those persons practicing as architects in the public sector. Softcover, 40 pages (1978). $5.00 Non-member, $4.00 AIA member.

ProFile/Architectural Firms/The American Institute of Architects: Official AIA Directory of Architectural Firms (4-M310)
Edited by Henry W. Schirmer. Presents in one volume the most detailed description of architectural firms in America ever published. Nearly 6,000 firms are grouped and cross-referenced for the greatest possible convenience. Included are names of the principals of every firm, current and projected work volume of every firm by building type, and the geographic area of firm's practice. Invaluable reference volume for practitioners investigating the possibility of associations or joint ventures. Hardcover, 674 pages (1978). $56.00 Non-member, $48.00 AIA member (4-M310A)

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chosen. Costs for children between 3 and 12 years of age will be $125 for the full session.

Applications may be obtained by sending a self-addressed envelope (24 cents) to: WSPA, Box 311, Shaftsbury, Vt. 05262.

Correction

Because of a typographical error, the JOURNAL misspelled the name of VECTA CONTRACT as Vectra Contract in the advertisers' index of the March issue. VECTA CONTRACT is the registered trademark of Vecta Contract, Inc. We regret the error.

Deaths

Ivon H. Blackman Jr., Silver Spring, Md.
Allen A. Blaustein, Brooklyn, N.Y.
Adrian M. Born, Minneapolis
Charles W. Cloud, Columbus, Ohio
William H. Conrad, Cleveland
Glen E. Eidson, Kansas City, Mo.
Dow Gumerson, Oklahoma City
Seymour Herbst, Bronx, N.Y.
Lon S. Heuer, Monroe, La.
Thomas Larrick, Gainesville, Fla.
Lawrence C. Licht, Englewood, N.J.
Harry G. Lindsay, Melbourne, Fla.
Thomas H. McKaig, Buffalo
Ralph M. Mitchell, Independence, Mo.
Alfred H. Mitschke, Grosse Point, Mich.
John M. Montgomery, Jackson, Miss.
Roswell E. Pfohl, Buffalo
Edward S. Read, Boston
Earl E. Scott, Fresno, Calif.
Jacques H. Segal, Chevy Chase, Md.
Olaf W. Shelgren, Buffalo
William T. Spann, Buffalo
H. Philip Staats, Overland Park, Kan.
Harold G. Thompson, Boise, Idaho
Robert W. Turner, Portland, Ore.
Harold C. Wallace, Nashville, Tenn.
William B. K. Watkins, Mount Vernon, Ill.
David D. Weitz, Philadelphia
Ralph Winslow, FAIA, Larchmont, N.Y.
Jack Frederick Wright, La Jolla, Calif.

Newslines

The International Association of Lighting Designers will begin in the summer of 1978 a three-year pilot intern program to give students an early on-the-job training in architectural lighting design. Interested students, as well as firms willing to participate in the program, should write to: Intern Program, IALD, 40 E. 49th St., New York, N.Y. 10017.

A special issue of "Texas Architect," published by the Texas Society of Architects/AIA, has been awarded the Texas Medical Association's Anson Jones award. This year's competition drew a record 119

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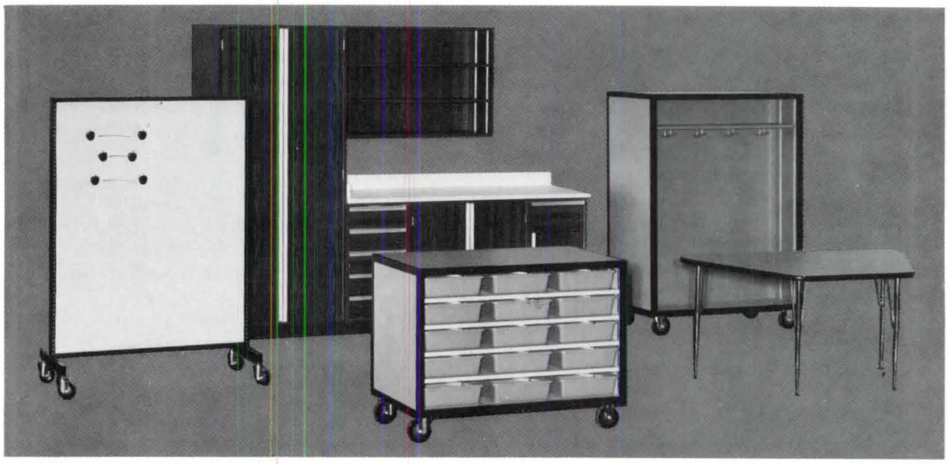

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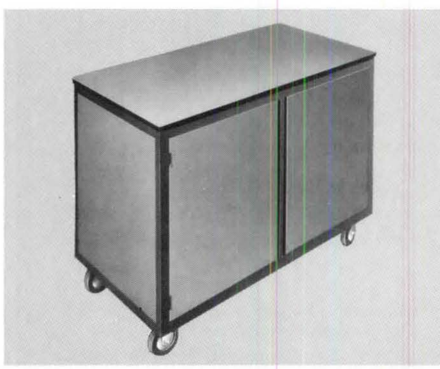

MEG Space-Mobiles feature heavy duty casters mounted on durable steel plates.

boards or tackboards on sides or back; available for wardrobe storage, too.

MEG Fixed Casework Systems provide multi-functional perimeter cabinetry systems for storage and work surfaces for arts, crafts, science, other areas. Exclusive, full length, recessed door pulls on all MEG furniture let any student easily open doors from top, bottom or side. And MEG's Roll-Shelf can add up to 80% more storage capacity to existing areas, without increasing floor space!

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entries for the award which honors "excellence in communicating health information to the public." One judge said: "This issue on health care planning may turn out to be—in the long run—one of the more significant publications about medicine last year."

"The Paper Plane" is the title of a new monthly newsletter for architects and engineers which aims at cutting the high costs of document production. Published by Archimedia, Inc., it will focus not only on the newest technology of document production but also on management and training techniques to reduce production costs. Its editor is George Borkovich, an experienced draftsman and teacher and coauthor of *Architectural Drafting*. Subscription rates are $60 a year, and charter subscribers may get refunds of the entire cost if at any time during the course of the year they choose to cancel their subscriptions. Contact: *The Paper Plane,* 1900 Chestnut Building, Philadelphia, Pa. 19103.

The U.S. is a likely candidate for serious earthquakes for 25 years, predicted seismic experts before the passage last October of the Earthquake Hazards Reduction Act. A recent report by the National Bureau of Standards entitled "Observations on the Behavior of Buildings in the Romania Earthquake of March 4, 1977" suggests that future research should consider the "observed behavior between stiff structures (both precast and cast-in-place concrete) and more flexible building types." A copy of the NBS report may be obtained from the U.S. Government Printing Office, Washington, D.C. 20402, prepaid for $3. Order by SD Catalog No. C13:10:490.

TheWoodBook, recently published by Wood Product Publications, includes design and specification information on materials for floors, walls and roofs, treated wood, foundations, heavy timber construction, laminated beams, shingles, shakes, softwood paneling and siding. The materials included have come from the major wood products associations. Firms "that either use or have the potential to use wood construction" will receive free copies of the catalog. An additional number will be sold at $9.50 each. For information, write: Wood Product Publications, P.O. Box 1752, Tacoma, Wash. 98401.

"Professional Services Management Journal" has announced the winners of its annual management research grant. Kathleen Kalt, former AIA assistant librarian and now librarian for Skidmore, Owings & Merrill in Washington, D.C., will survey professional services librarians to see how they manage the information function. The other winner of a $1,000 grant is Howard Birnberg, who operates a management consulting firm in Chicago. He will assemble a comprehensive data base on the financial operations of various firms.

Herman Myers, AIA, of Philadelphia has been appointed to serve a three-year term as a member of the board of advisers for the National Trust for Historic Preservation. He is chairman of the Philadelphia chapter/AIA's preservation committee and is a regional representative of the preservation committee of the Society of Architectural Historians.

"Shadows on the Landscape" is the title of a 34-minute color videotape on architecture as a profession. It was developed by Betty Ritter, AIA; Alyce Knight, an associate AIA member; Celia Pew, and Margaret Young, all of whom received service citations from the Illinois council/AIA. The videotape was developed because they were concerned about the lack of guidance material for potential architects and the relative lack of women in architecture. The program is offered on a ¾-inch U-matic cassette format; purchase price is $175. Order from: David Kozlowski, Learning Resources, Triton College, 2000 Fifth Ave., River Grove, Ill. 60171.

The American Consulting Engineers Council has elected new officers for 1978-80, to take office in May. George H. Leland of Newark is president-elect, to serve with incoming president Duane Monical of Indianapolis.

A film on land use and politics in a small American town (Hyde Park, N.Y.) will be released by the Public Broadcasting System for national airing on April 25 at 9 P.M., Eastern standard time, although it is advised that local listings be checked for exact time and date. Called "Hyde Park," the film examines the continuing struggle between "green thumbers" and "free entrepreneurs" in a town that is feeling the same growing pains as experienced by suburban areas across the country.

Anyone for tennis? Entries are now being accepted for the Olympic architects national tennis championships to be held during AIA's convention in Dallas. Three events—men's singles, men's doubles and mixed doubles—will begin on Saturday, May 20. The tournament will be held at the T Bar M Racquet Club. A champagne party will take place on May 21 for the presentation of awards. Contact: Olympic Tennis Tournament, c/o Kraft Smith, 200 First West, Seattle, Wash. 98119. □

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