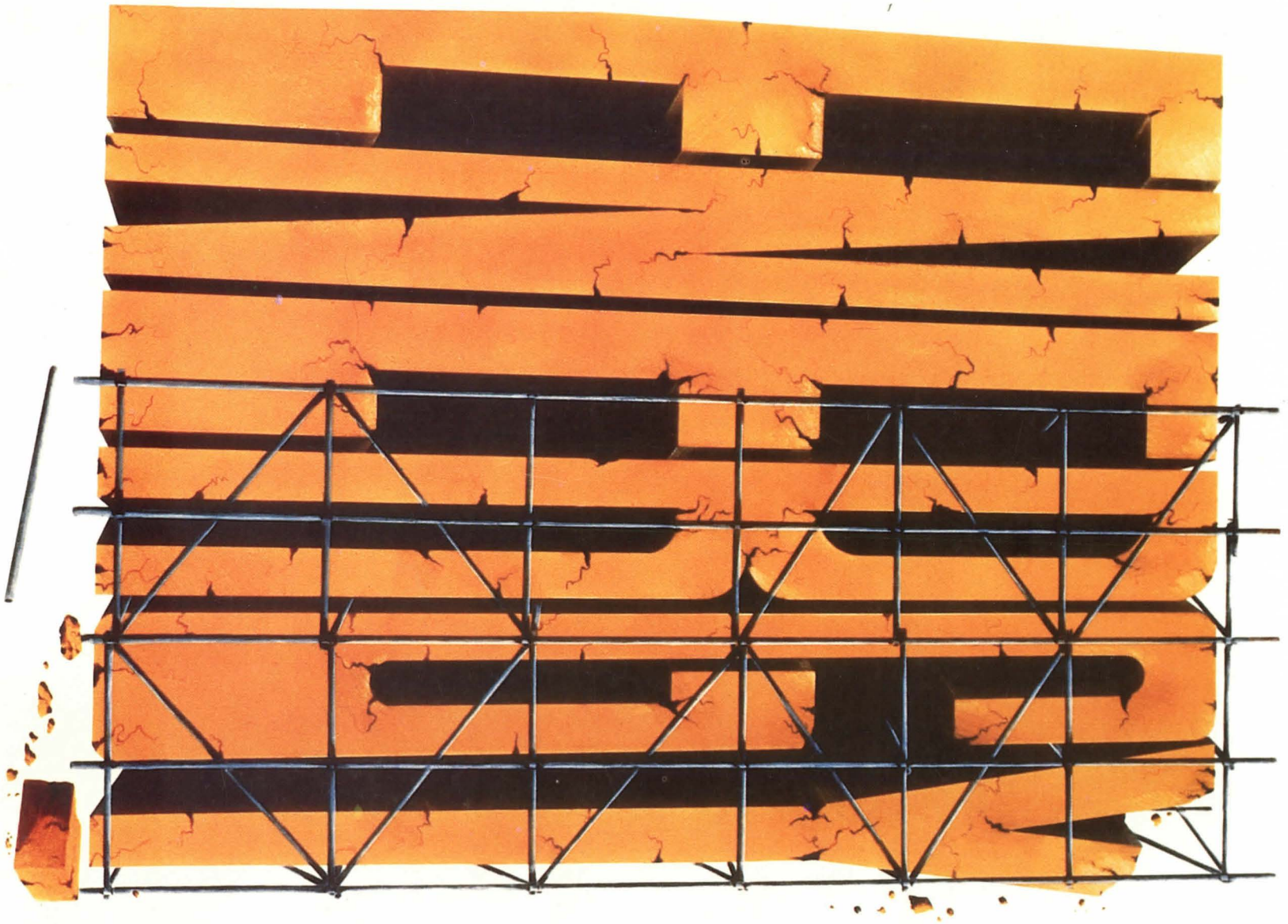
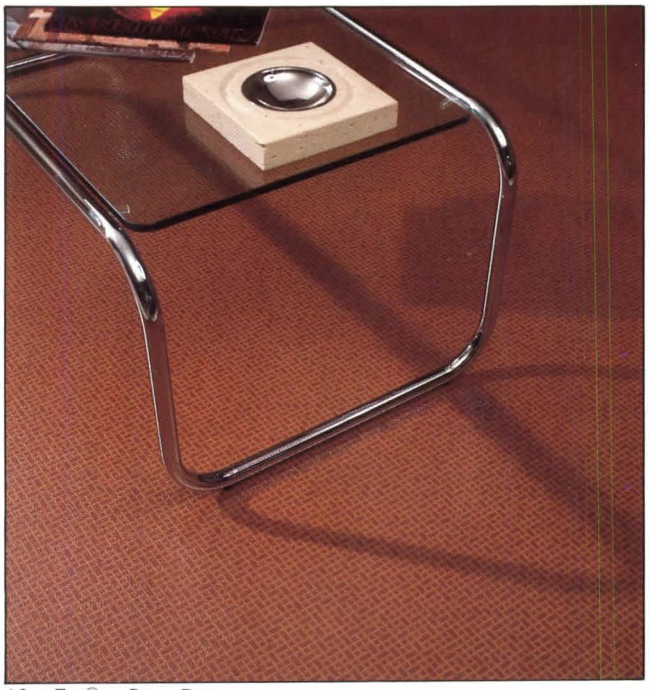
AIA JOURNAL



Armstrong gives you another reason to specify commercial vinyl floors. Geometric patterns.



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Now you can choose a vinyl floor for more than its durability. Armstrong New Era Vinyl Corlon® flooring lets you specify a totally new look in commercial floors. Because New Era is the only inlaid vinyl flooring with geometric designs.

So you get all the advantages of sheet vinyl flooring along with the option to use the small-scale geometric which works in almost any setting or a bolder design based on the popular hollow-square concept.

And there's a wide range of distinctive colorways that coordinate with contemporary interiors to insure New Era's harmonious relationship with your design.

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New Era is available in rolls 12′ wide and up to 75′ long, so it can be installed without seams in most rooms. And virtually seamless corridors are possible, too, with specially ordered 9′-wide rolls.

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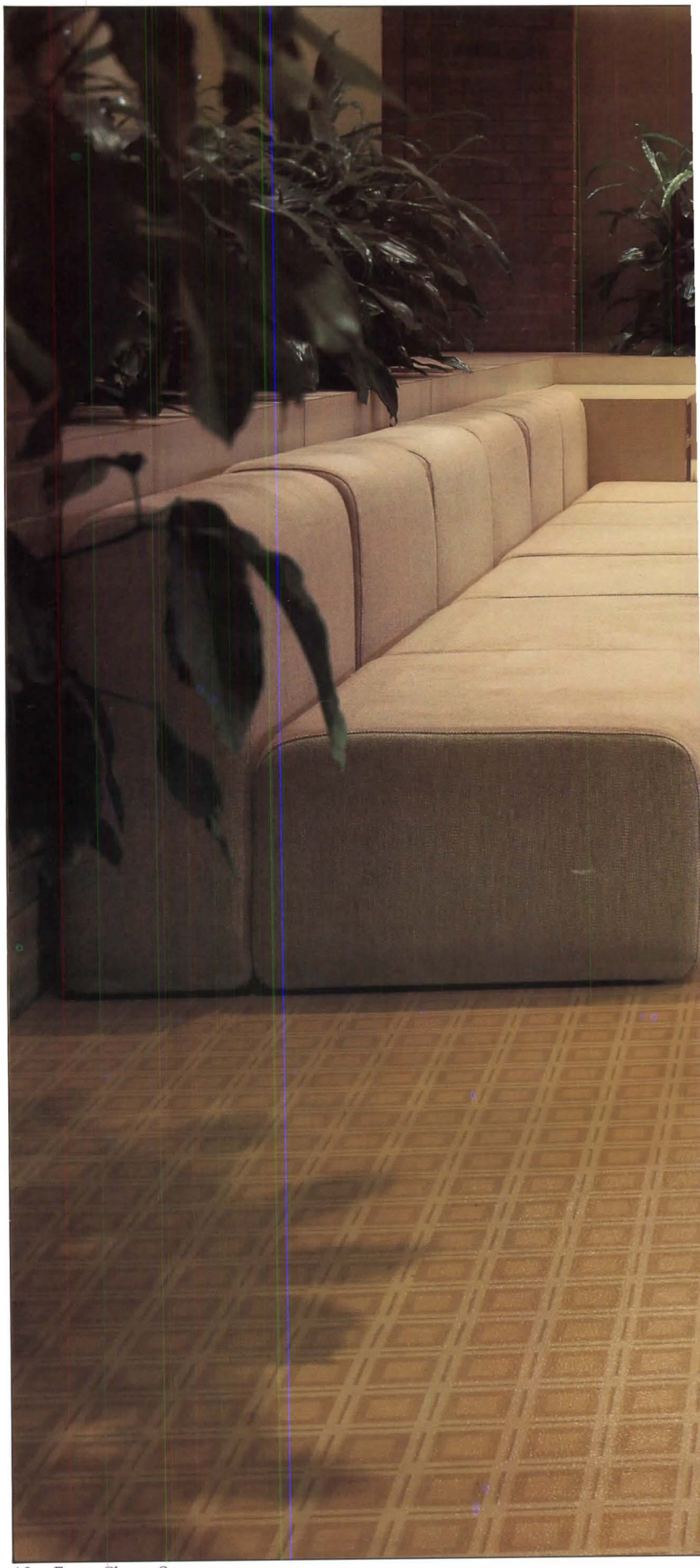
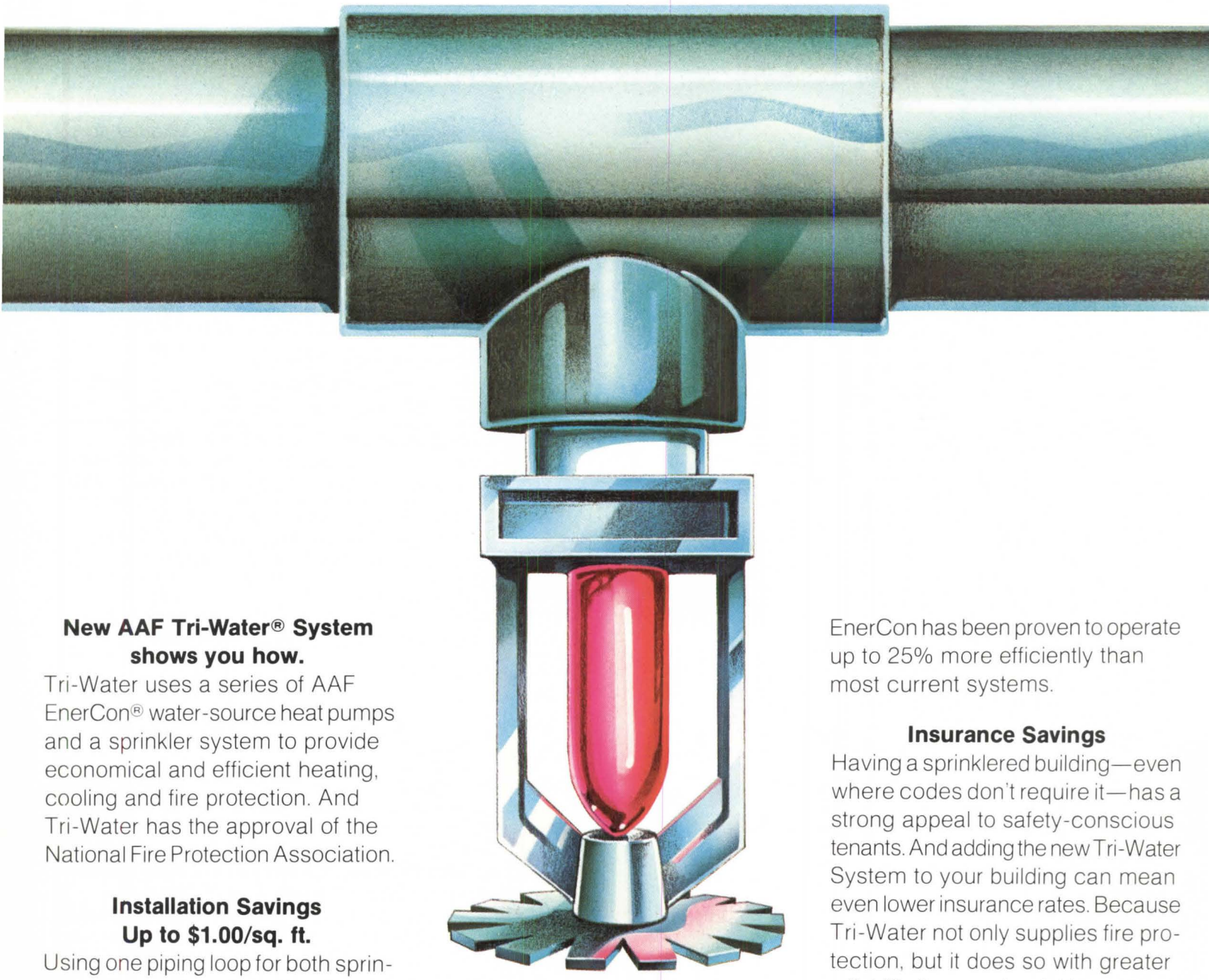
FROM THE INDOOR WORLD® OF Armstrong



New Era—Classic Square

Circle 51 on information card

Save money by using a sprinkling system to heat and cool your building.



New AAF Tri-Water® System shows you how.

Tri-Water uses a series of AAF EnerCon® water-source heat pumps and a sprinkler system to provide economical and efficient heating, cooling and fire protection. And Tri-Water has the approval of the National Fire Protection Association.

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HVAC Savings of 25%

Because the EnerCon heat pumps are all connected to the same piping loop—the sprinkler's—they can store and redistribute heat more effectively than other central systems. And based on previous installations, EnerCon has been proven to operate up to 25% more efficiently than most current systems.

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Having a sprinklered building—even where codes don't require it—has a strong appeal to safety-conscious tenants. And adding the new Tri-Water System to your building can mean even lower insurance rates. Because Tri-Water not only supplies fire protection, but it does so with greater reliability than most sprinkler systems.

For more information contact your local AAF representative. Or write American Air Filter Co., Inc., Dept. 592, 215 Central Avenue, Louisville, Kentucky 40277.

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Circle 52 on information card

CONTENTS

The Architecture of Energy

Cover: Poster by Martyn Dean of City of Birmingham Polytechnic, U.K.

The AIA JOURNAL, publication number: ISSN0001-1479, official magazine of The American Institute of Architects, is published 14 times yearly at 1735 New York Ave. N.W., Washington, D.C. 20006. **Subscriptions:** for those who are, by title, architects, architectural employees and to those in architectural education (faculty, schools and students), and to libraries, building construction trade associations and building products manufacturers: base rate $12 a year in the U.S., its possessions and Canada. For all others: $18 a year in the U.S., its possessions and Canada; other countries to those who are by title, architects: $18 a year. All others outside the U.S., its possessions and Canada: $30 a year. Single copies, $2.50 each. Publisher reserves the right to refuse unqualified subscriptions. For subscriptions: write Circulation Department; for change of address: send Circulation Department both old and new addresses; allow six weeks. Quotations on reprints of articles available. Microfilm copies available from University Microfilm, 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Referenced in *The Architectural Index, Architectural Periodicals Index, Art Index, Avery Index to Architectural Periodicals.* Second class postage paid at Washington, D.C., and additional mailing offices. VOL. 70, NO. 1.

In fact, Vulcraft has supplied General Growth Development Corporation, of Des Moines, Iowa, with steel joists, joist girders or steel deck for sixteen shopping center jobs across the country.

When it comes to shopping center construction, General Growth Development really knows its business. And that's why Vulcraft so often gets their business. Because only Vulcraft has so much to offer.

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DAKOTA TO PUERTO RICO DEVELOPMENT.

Dick Havekost, Vulcraft General Manager, Florence, South Carolina, at Plaza Carolina, San Juan, Puerto Rico.

EVENTS

Jan. 26-27: Comprehensive workshop on the design, sizing, calculation and construction of passive solar heated buildings, Portland, Ore. Contact: Passive Solar Associates, Box 6023, Santa Fe, N.M. 87501, (505) 983-1506.
Feb. 5-6: Project Management Seminar, Oklahoma Lincoln Plaza, Oklahoma City. (Repeat seminars: Feb. 9-10, Fairmont Hotel, Denver; Feb. 12-13, Plaza Hilton, Birmingham, Ala.) Contact: American Consulting Engineers Council, 1015 15th St.N.W.,Suite 802,Washington,D.C. 20005.
Feb. 8-10: Annual Legislative Conference, Capital Hilton Hotel, Washington, D.C. Contact: National Association of Housing and Redevelopment Officials, 2600 Virginia Ave. N.W., Washington, D.C. 20037.
Feb. 8-11: Conference on Creativity, the Common Denominator: Artist and Scientist Working Together, Williamsburg, Va., sponsored by the Inter-Society Color Council. Contact: Edward L. Cairns, E.I. du Pont de Nemours & Co., C&P Department B-6268, Wilmington, Del. 19868.
Feb. 10-13: National Roofing Contractors Association annual convention, Civic Plaza, Phoenix. Contact: NRCA, 1515 N. Harlem Ave., Oak Park, Ill. 60302.
Feb. 12-13: Conference on Influencing Government Architecture in the '80s, New Orleans, sponsored by the AIA architects in government committee. Contact: Frank Musica, AIA Headquarters, (202) 626-7382.
Feb. 12-14: Energy Audit Symposium and Fair, Hilton's Tower, San Francisco. Contact: Association of Energy Engineers, 4025 Pleasantdale Road, Suite 340, Atlanta, Ga. 30340.
Feb. 19-20: Business Management Seminar, Sheraton Fisherman's Wharf, San Francisco (session two on Mar. 19-20). Contact: American Consulting Engineers Council, 1015 15th St. N.W., Suite 802, Washington, D.C. 20005.
Feb. 19-22: North Carolina Chapter/AIA winter convention, Pinehurst Hotel, Pinehurst, N.C.
Feb. 19-Mar. 3: Solar tour to Israel. Contact: Jordan College, Energy Programs, 360 W. Pine St., Cedar Springs, Mich. 49319.
Feb. 24-26: Course on Wind Loads: Standards of Practice, Texas Tech University, Lubbock.
Feb. 25-26: Workshop on Energy Aspects of Residential Design and Construction, University of Wisconsin, Madison.
Mar. 1-3: Annual Construction Industry National Legislative Conference, Hyatt Regency Hotel, Washington, D.C. Contact: National Construction Industry Council, 1101 Connecticut Ave. N.W., Washington, D.C. 20036.
Mar. 2-3: Institute on Practical Applications of Earth Sheltered Architecture, University of Wisconsin, Madison.
Mar. 26-27: Annual Federal Programs Conference on A/E concerns, Orlando, Fla. Contact: Committee on Federal Procurement of A/E Services, c/o National Society of Professional Engineers, 2029 K St. N.W., Washington, D.C. 20006, (202) 463-2340.
May 17-22: AIA convention, Minneapolis.
June 15-21: Congress of the International Union of Architects, Warsaw, Poland. Contact: Frank Brown at AIA headquarters, (202) 626-7395.

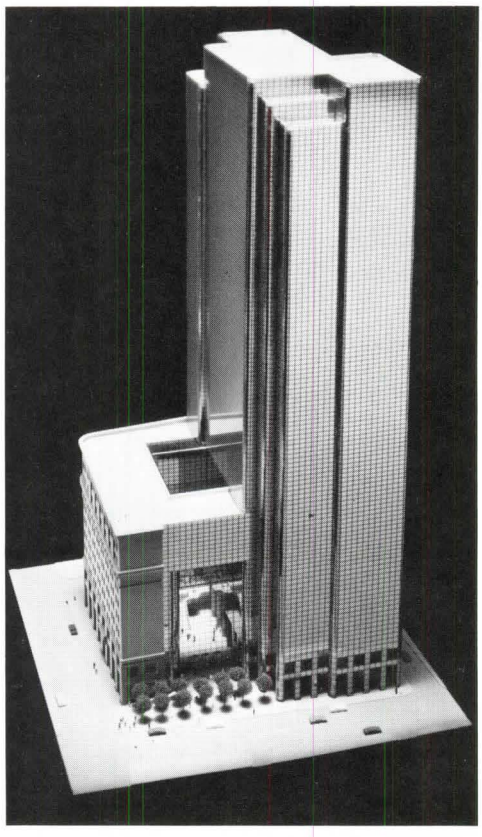
LETTERS

'Lost Boston': The description of the photograph of the State Street entrance of the Stock Exchange Building (Sept. '80, p. 38) states that "the portion shown here will become a false front for a new highrise." This is misleading and inaccurate. The new highrise is actually located more than 110 feet from its so-called "false front" and is in fact separated by the existing structure's depth of 60 feet plus a 50-foot-wide atrium court (model photo, below).

Other than the exterior, we are also preserving much of the interior, including the marble stairs, pavings, coffered ceilings, etc. The concept of preserving the architecturally significant State Street and Kilby Street wings was designed by us in close coordination with the Boston Landmarks Commission and the Massachusetts Historical Commission and has received design approval of both.

Although I was concerned about this misinterpretation of our work, I was extremely impressed with the beautiful photographs by Steve Rosenthal.

David P. Habib, AIA
President, WZMH Habib Inc.
Boston



Imperial's Structural Engineer: Unfortunately I was away when the June '80 issue of the JOURNAL was distributed. The article "The Seismic Legend of the Imperial Hotel" (p. 42) has mistakenly named the project's structural engineer who was Julius Floto—not Julius Hoto, as the article indicated. The writer may have made the mistake from reading a 1924 piece by Julius Floto in *Architectural Record.* The name at the head of the article is italicized (and/or script) and it does, at first glance, look like Hoto.

The Imperial Hotel's survival in the earthquake was largely achieved by Floto and Samuel A. Lewis, mechanical engineer, both of Chicago and regularly associated with Wright's major work. Floto was certainly the man who carried reports of the earthquake's effects on the Imperial to Wright. The *Record* article reflects both pre- and post-earthquake conversations he had with Wright.

Besides the successful design by Floto which allowed the Imperial a little "shake" movement by *not* driving the piles to the hard earth, Lewis had recognized that the gas pipes snapped at right angle connections and were a big factor in accompanying fires that broke out over the city. Lewis did not use 90-degree connections, permitting some horizontal movement. A further precaution was the pool and the fountains featured in the elaborate gardens, which were primarily reservoirs for water to put out any fires that might start.

Just how much Floto worked with Wright is not known, but his creativity and that of Lewis could well have been sources of much of the great architect's success. I hope this will serve to clarify for some future scholar the information about the structural engineer of the Imperial.

Richard M. Bennett, FAIA
Cambridge, Mass.

Corrections: *The Enigma of Stonehenge,* by John Fowles and Barry Brukoff, reviewed in the November 1980 issue (p. 64) is not only published by Jonathan Cape of London but also by Summit Books division of Simon & Schuster in this country. Its price in the U.S. is $19.95.

In the October issue (p. 54), a description of the "air roof" concept by Peter L. E. Goering and Dr. B. Etkin misspelled Dr. Etkin's name. Mr. Goering points out that Dr. A. A. Haasz should also have been credited "since his work has been so important to the project."

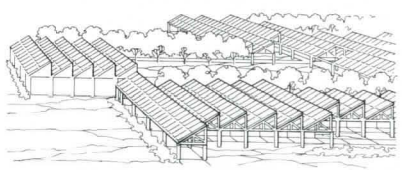
1980

OWENS-CORNING ENERGY CONSERVATION AWARD WINNERS.

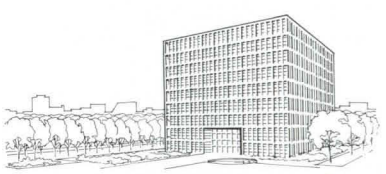
OFFICE

WAREHOUSE

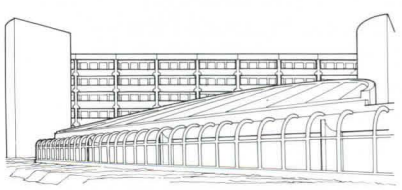
LABORATORY



PRISON



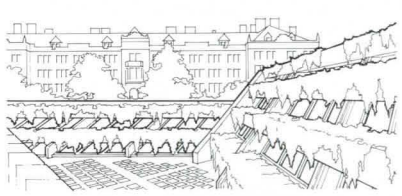
HEADQUARTERS



OFFICE

• *The ninth annual Owens-Corning Energy Conservation Awards honor those who have proved, once again, that there are always new, ingenious and elegant ways to conserve energy.*

• *1980 Judges:* C. William Brubaker, FAIA, Perkins & Will, Chicago, Ill., Ezra D. Ehrenkrantz, FAIA, The Ehrenkrantz Group, P.C., N.Y., N.Y., Masao Kinoshita, AIA, ASLA, AIP, Ohio State Univ., Columbus, Oh. William J. Coad, PE, Charles J.R. McClure & Assoc., Inc., St. Louis, Mo., John K. Holton, AIA, PE, Office of Bldgs. Mgmt. GSA-PBS, Washington, D.C., Arthur E. Wheeler, PE, Henry Adams, Inc., Baltimore, Md.



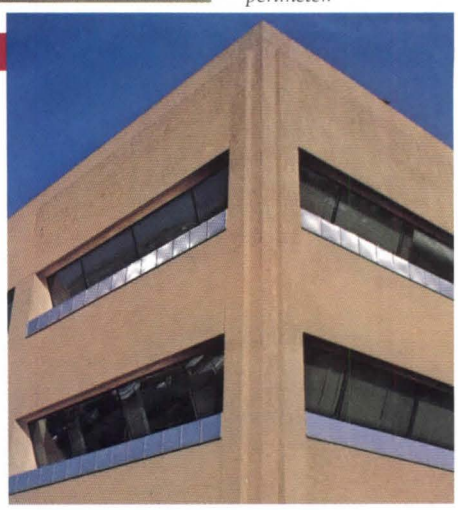
COLLEGE

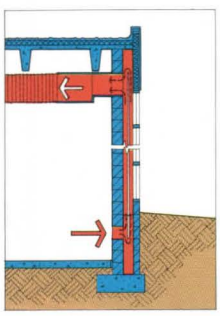
WILLOW CREEK OFFICE BLDG./IDAHO FALLS, IDAHO

• *Architect, Engineers and Owner:*
Max Flatow, FAIA, Pres., Flatow Moore Bryan and Assoc., Frank Bridgers, PE, Prin., Bridgers & Paxton, Consulting Engineers, Albuquerque, N.M. Ronald W. Kiehn, Gen. Mgr., EG&G, Idaho, Inc., Idaho Falls, Id., Joseph Lopez, PE, Prin., Uhl & Lopez Engineers, Inc., Albuquerque, N.M.

• *Judges' comments:* "In moving to a new building twice the size of their old one, they reduced their actual out-of-pocket energy costs by 21.4 percent. And these are real numbers—not guesses. They used a very efficient light source: high pressure sodium lighting./ A 200,000 gallon storage tank saves the excess heat generated during the day to warm the building at night."

• *Exterior: Note the angled windows with stainless-steel window sills that reflect diffused light into the building and eliminate the need for artificial lighting within 20 ft. of the perimeter.*





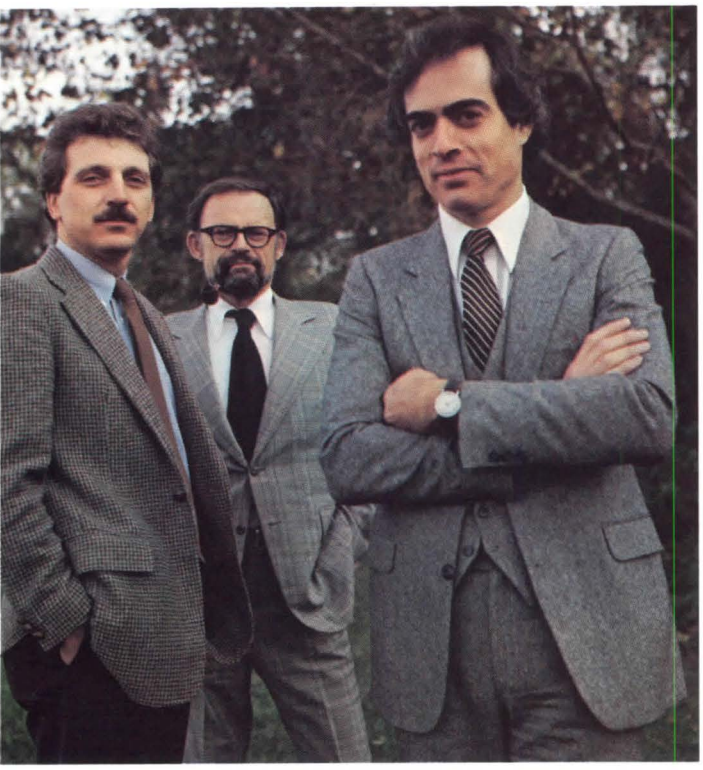
• *Cross section of the modified Trombe wall: Sunlight passing through windowed wall heats stainless-steel collector plate. Ductwork above brings heated air back into building.*

SPORT OBERMEYER/ASPEN, COLORADO

• *Architects and Engineer:*
Tim Hagman, Prin., Copland Hagman Yaw Ltd, Aspen, Col., Bob Clarke, Prin., Solar Pathways Assoc., Glenwood Springs, Col., Larry Yaw, Prin., Copland Hagman Yaw Ltd, Aspen, Col.

• *Judges' comments:* "What is attractive here is that they took a simple building—the walls are concrete blocks—and integrated a solar air-heating system: a Trombe wall./ It is worked in very well with the overall appearance of the building./ It's basically an inexpensive solution. A working, economical use of solar energy for warehouse heating."

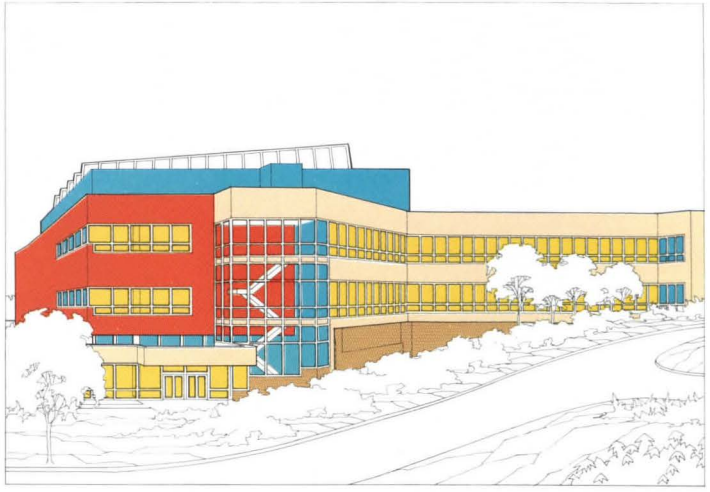
SMITHKLINE PHARMACEUTICAL RESEARCH LAB/UPPER MERION, PENNSYLVANIA



• *Engineer and Architects:* Russell M. Keeler, PE, Dir. Mech. Engineering, Louis deMoll, FAIA, Prin. and John B. Di Ilio, RA, Proj. Designer, Ballinger, Philadelphia, Penna.

• *Judges' comments:* "This is a laboratory with very demanding environmental criteria and intensive energy use. The designers have tried very hard—and succeeded—in recovering much of this energy./ They've used special air-conditioning concepts, a high temperature heat pump and active solar systems. They even have a system for reclaiming the heat from the water they use to wash down the cages. Many designers would have avoided this issue and wasted the heat. But they didn't here."

• *Architect's model: Note how the glazed corridors light both the hallways and the interior offices. This saves energy by reducing the outside fenestration.*



FEDERAL CORRECTIONAL INST./BASTROP, TEXAS

• *Architects and Engineer:* Franklin D. Lawyer, FAIA, Sr. VP, Paul Kennon, FAIA, Pres., E. Bruce Appling, PE, Sr. VP, Caudill Rowlett Scott, Houston, Tex.

• *Judges' comments:* "This building was designed with a full sense that an active solar system was going to be a major part of the design—integrated into the project rather than being added on./ The solar collectors come out higher than the building next to them. They are used for shading both walkways and buildings./ Even the pipes and ducts are handled in a straightforward way that enhances the design of the building and the atmosphere within it."

• *View of a dining area.*

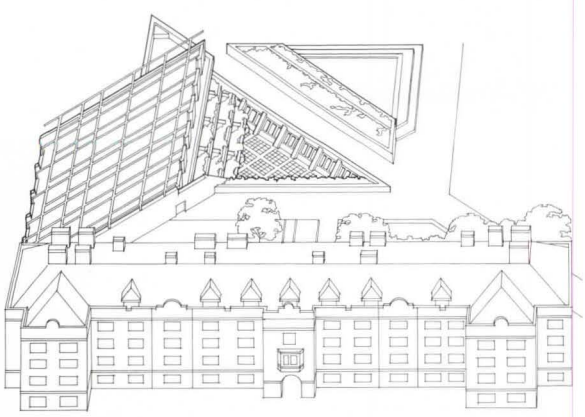
• *Model (at right) shows the double wall of windows. The site (above) overlooks Niagara Falls. The building (still under construction) can be seen above the Falls.*

• *Owner, Engineer and Architect:* Marvin W. Voelker, VP, Hooker Niagara Office Corp., Niagara Falls, N.Y., Alan M. H. Sloan, VP, Engineering and Mark R. Mendell, AIA, Sr. VP, Cannon Design Inc., Grand Island, N.Y.

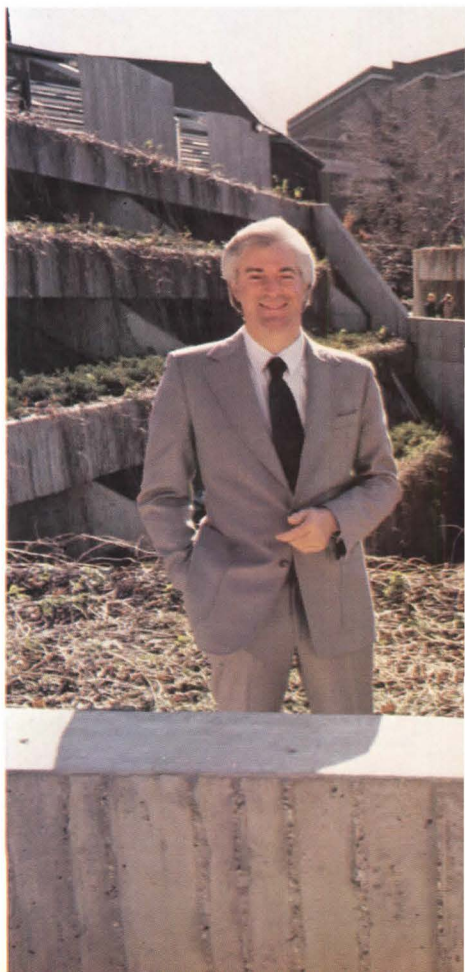
• *Judges' comments:* "We have here a highly innovative, highly technological solution./ Essentially, it's two walls of glass four feet apart. In between there are adjustable louvers and moving air, so when the sun moves around the building, goes up and down, or goes behind the clouds, the building adjusts to the changing climate./ The double wall is key to keeping unwanted heat out and letting wanted heat and light in.

"One of the things that's very attractive about this building is that in a time when we often find ourselves going to smaller window areas and less glass to save energy, this building has a total glass envelope and is still energy-efficient./It means one does not have to sacrifice a view, daylight, the interaction between inside and outside space for energy efficiency.

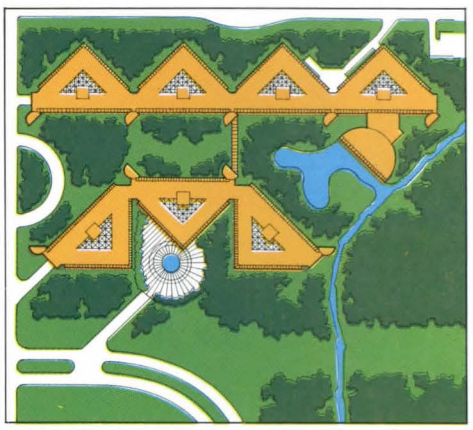
"One good idea, from an engineering standpoint, is that they've decentralized their domestic hot-water heating system. We've found that if you have a central hot-water heating system in an office building, your efficiency is about five percent. You keep the whole system hot 8,760 hours a year and all you do is occasionally use a little hot water in a washroom. Instead of putting in a central system, they use small hot-water heaters all around the building."



• *An energy-efficient building in a crowded area: The right side of Williamson Hall is set into an earth berm. The active solar collector system is at left. A cross-campus walkway forms part of the roof.*



SHELL OIL CO. OFFICES/HOUSTON, TEXAS



• *Owner, Architect and Engineer:* Edmund V. Pearson, General Mgr., Shell Oil Co., James B. Gatton, AIA, Sr. VP and John Kettleman, PE, VP, Caudill Rowlett Scott, Houston, Tex.

• *Judges' comments:* "The Shell project is extremely interesting in that it was designed with the basic building structure itself acting as a major element in the day lighting system./The mechanical ductwork enclosures were located on the perimeter wall so they would act as a reflecting element to bounce light back into the rooms./The inside corridors are lit by the office lighting and by daylight bounced off the mechanical enclosure ducts. The result is very efficient lighting —only 1.3 watts per sq. ft. installed, with annual operations projected at less than 1 watt per sq. ft."

• *Triangles and atriums. The company needed a large number of small offices. The solution: Closely grouped triangular buildings with central atriums for an efficient combination of light and shade.*

WILLIAMSON HALL/UNIVERSITY OF MINNESOTA

• *Architect, Owner and Engineer:* David J. Bennett, AIA, Prin., Myers and Bennett Architects/BRW, Clinton N. Hewitt, Asst. VP Physical Planning, Univ. of Minnesota, Max Oftedal, PE, Prin., Oftedal, Locke, Broadston & Assoc., Inc., Minneapolis, Minn.

• *Judges' comments:* "This is a building that is largely underground. It is worked very nicely into an old part of the campus, a crowded area./The architects recognized what we call the soil temperature. If you go down so far, the earth has a constant temperature. Utilizing that as a base, they organized the design concept to use that temperature for more efficient heating./This is really tied into the urban environment—into the many different walkways that cut across the campus./If you look at it from the side, it's something like a terrace walking into the ground./They used natural plants in a very imaginative way for external shading—the leaves providing added shade in summer, the bare branches letting in more light in winter."

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NEWS

Sert Named AIA's 42nd Gold Medalist

Architect and urban planner Josep Lluis Sert, FAIA, native of Spain and founder of Sert, Jackson & Associates, Cambridge, Mass., has been selected by AIA's board of directors to receive the Institute's highest honor—the gold medal. The award will be presented in May at AIA's convention in Minneapolis.

Sert is the 42nd architect to win the gold medal since its inception in 1907. The most recent winner of the award, before Sert, was I. M. Pei, FAIA, in 1979.

In nominating Sert, AIA director George M. Notter Jr., FAIA, said, "So influential and far-reaching is the work of Josep Lluis Sert that the social awareness and concepts of artistic collaboration that he brought to the practice of architecture have become almost commonplace. . . . Sert has been instrumental in moving architecture away from isolated attention to single buildings and toward the shaping of entire cities, and in a step further he has treated college campuses and even museums as microcities."

Philip Johnson, FAIA, gold medal winner in 1978, called Sert "one of the founders of today's architecture. He has become over the years the grand old man who has carried the principles especially taught by his guru, and mine [Le Corbusier], to the modern world. His recent work is unique, exciting, brilliant. He was my teacher, and I still admire him as ever." *continued on page 16*

Phokian Kara

Josep Lluis Sert in his Cambridge, Mass., house.

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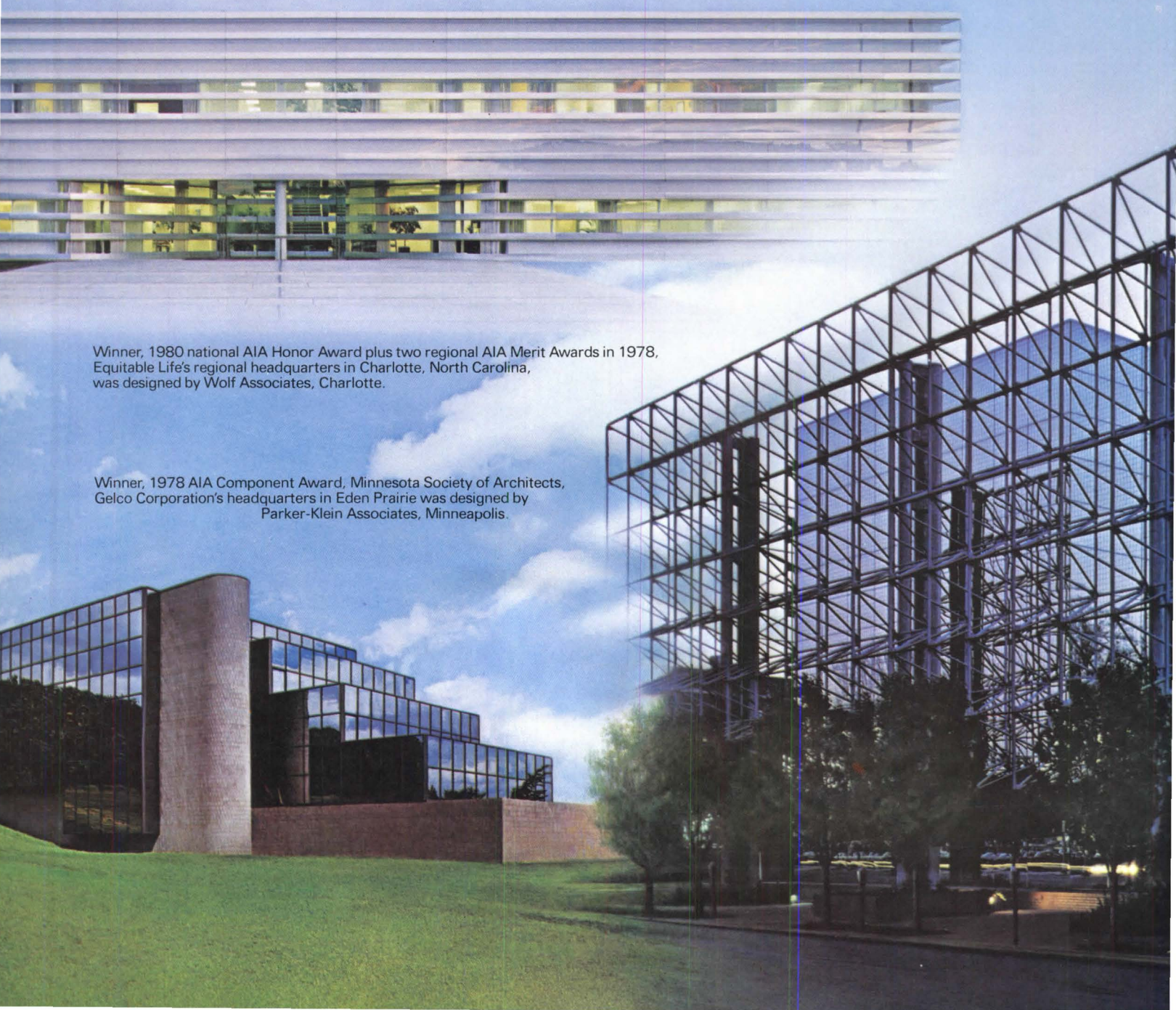
The original building is hidden behind a handsome structural silicone curtain wall system. And the new addition sparkles with a combination of opaque and transparent



Winner, 1980 national AIA Honor Award plus two regional AIA Merit Awards in 1978, Equitable Life's regional headquarters in Charlotte, North Carolina, was designed by Wolf Associates, Charlotte.

Winner, 1978 AIA Component Award, Minnesota Society of Architects, Gelco Corporation's headquarters in Eden Prairie was designed by Parker-Klein Associates, Minneapolis.

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Winner, AIA Honor Award in 1980, Bell of Indiana's Columbus Switching Station was designed by Candill, Rowlett, Scott of Houston, Texas.

Phokian Karas

Sert in the arcade of the Undergraduate Science Center, Harvard University.

Gold Medal *from page 13*

Henry N. Cobb, FAIA, founding partner of I. M. Pei & Associates and chairman of the department of architecture at Harvard's graduate school of design, commented, "We are delighted that this honor be bestowed upon a man who has played such a significant role in the development of our school and in architectural education in general. In the perspective of history, I believe it will be seen that Sert's greatest contributions were his passionate commitment to the visual arts and his innovative leadership in urban design."

The gold medal is Sert's fourth major AIA award in four years. In 1977, Sert, Jackson & Associates won AIA's firm award. And two years later, the firm received two Institute honor awards, for the Joan Miro Foundation/Center for Studies of Contemporary Art, Barcelona, Spain, and for the Harvard University Undergraduate Center, Cambridge, Mass. (see Mid-May '79, p. 164).

In describing the philosophy and work of Sert, Jackson & Associates, Andrea O. Dean, in 1977, wrote in the AIA JOURNAL "to fully understand the firm, one must be familiar with the remarkable career of its founder" (see May '77, p. 51). The following is excerpted from her comments on Sert:

Sert was born in 1902 in Barcelona to an aristocratic and artistic Catalan family. He began his own career as a painter before commencing architectural training.

While studying architecture in Barcelona in the 1920s, Sert joined a student protest movement, which opposed the prevailing Beaux-Arts training and committed itself to tackling housing and other social problems, which were ignored by the architectural establishment of that day.

In 1926, while visiting Paris as a student, Sert came across Le Corbusier's *Vers une architecture* and was profoundly impressed. The next year at Sert's invitation, Le Corbusier delivered a series of lectures in Barcelona.

In 1929, with his architectural degrees in hand, the young Spaniard set out for Paris to study with his Swiss mentor for two years. During this period, he also met and absorbed the ideas of artists with whom he would later collaborate, including Fernand Léger, Alexander Calder, Picasso and Miró. Sert's longstanding and intense involvement with CIAM (Congrès Internationaux d'Architecture Moderne) also began during this time.

Sert's relationship with Le Corbusier continued until the latter's death, and the two collaborated on Corbu's only American building, the Carpenter Center for the Visual Arts at Harvard, completed in 1963. The influence of Le Corbusier on Sert's work and thought is readily apparent—in Sert's attitudes toward the design of cities and housing; in the importance he gave to pedestrian and vehicular circulation paths; his use of walls and windows to create visual accents and rhythms, and his employment of sun screens and shades to control light and ventilation.

But as one of his biographers, Maria Lluisa Borras, observes, "Even in those early days (Sert's) amiable but firm personality led him to reject immovable postulates, theoretical programs, any kind of dogmatism. Everything in his life and work since then has developed on the basis of firsthand, intensely felt experience."

In 1930, on returning to Barcelona from his tutelage under Le Corbusier in Paris, Sert opened his own firm and established a local version of CIAM, called GATEPAC. The principal aim of the GATEPAC group was "to bring architecture to its natural expression related to actual technical, social and economic conditions."

One of Sert/GATEPAC's major projects was the redesign of the city of Barcelona and redevelopment of its slum areas (1933-35). Le Corbusier and his brother Pierre Jeanneret helped devise the plan. The principles underlying it, once again, sound a peculiarly contemporary note. Sert and his group criticized the prevailing piecemeal planning and lack of zoning, insisted that diseased slum areas be restored to health without destroying the character of the city, that original scale be maintained by rehabilitating old structures and relating new construction to them and that the entire area be linked to a new transportation network.

During the 1930s, while Sert was still working in Barcelona, he visited the south of Spain with painter Miró. The age-old ways of building he saw there, especially on the island of Ibiza, impressed him as being fully as "modern" as any issuing from avant-garde Parisian ateliers.

The first highrise housing complex he designed clearly shows both the influence of Ibiza and, again, that of Le Corbusier. Begun in 1934, Casa Bloc, as it was called, was a 200-unit low rent Barcelona housing project. Casa Bloc expressed a definite social program, used a metal frame structure and sun screens, and employed the skip-stop elevator system to

continued on page 20

The elevators were running before the building was finished.

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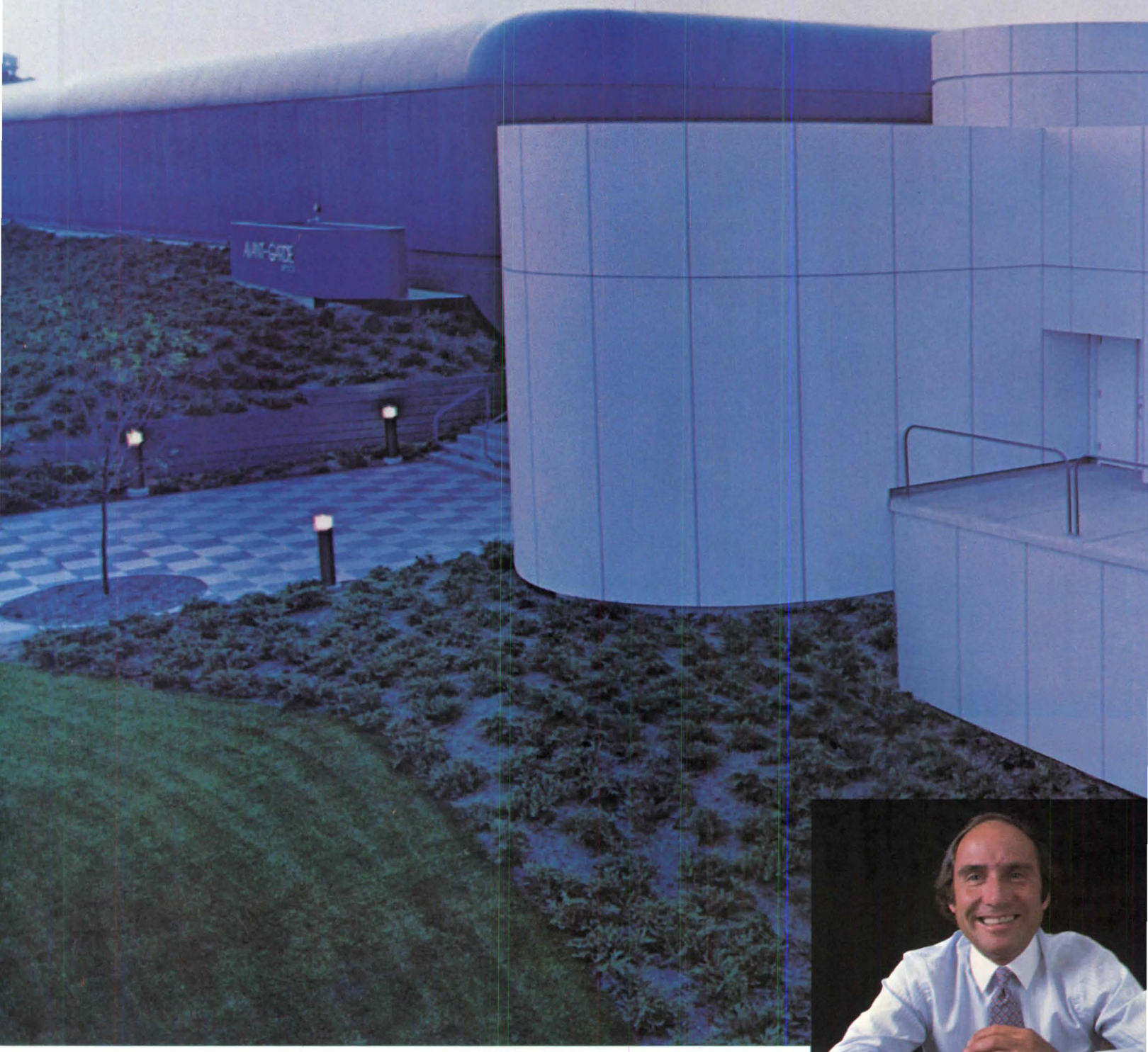

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CONSOLIDATED ALUMINUM™

Gold Medal *from page 16*
provide through-floor duplexes, which has become one of the hallmarks of Sert, Jackson & Associates' recent housing developments.

Just as the Casa Bloc reached completion in 1936, the Spanish Civil War broke out, putting an end to the work of the GATEPAC group. Sert rallied to the Republican cause, and was enlisted by its government to design the Spanish pavilion for the 1937 Paris Exposition. The pavilion was intended to serve as an instrument by which to convey the plight and heroism of the Spanish people and the objectives of the Republican government. Picasso painted "Guernica" for one of its walls, Calder designed a Mercury fountain for the structure, and Miró painted a large panel, entitled "Catalan Peasant in the Revolt," for the main stairway.

With the collapse of Republican Spain, Sert fled to America and in 1941 founded Town Planning Associates (TPA) in New York City with Paul Lester Wiener and Paul Schulz.

TPA's work consisted principally of the redesign of some major cities in South America (including Bogotá, Colombia) and the planning of completely new ones (three of which were designed in collaboration with Le Corbusier).

During his early years in the U.S., Sert remained active in CIAM, serving as its president from 1946 until its last congress in 1956. Now, more than 20 years later, he muses that "I continue to nurture my CIAM roots. While the roots are still giving something, why not continue?" But Sert admits that much of the early work now "looks sad and barren. Our ideas were sometimes too rigid, but that was a reaction to what was happening at the time." Today, the word he uses most often is "balance," the need to balance high and low densities, technical and esthetic considerations, new and old concepts, new and old structures, ambitious and modest ones.

A sense of balance and the ability to maintain in balance often seemingly conflicting elements seem to characterize Sert's personality as well as his work. In reminiscing about the CIAM experience, the widow of Walter Gropius recalled, "The remarkable thing about Sert was that he could get those highly individual prima donnas to agree on things, to gather them under one hat."

When the time came for Walter Gropius to retire as dean of the Harvard graduate school of design in 1953, he recommended Sert as his successor.

By 1955, Sert had opened a new firm in Cambridge with Huson Jackson and Ronald Gourley, but continued to commute back and forth to New York City until Town Planning Associates was dissolved in 1958. By 1963, Sert, Jackson & Associates had assumed its present form.

Shortly after Sert became dean and a member of the Harvard planning commission, the university entered a stage of physical expansion and retained Sert, Jackson & Associates to design a number of its new projects, among them the Holyoke Center and Peabody Terrace housing complex. Sert's ties to Mediterranean patrons in southern France and Spain also brought in commissions, such as the Maeght Foundation in St. Paul de Vence, France.

Sert also taught at Yale University (1944-45) in the city planning department and at the University of Virginia as the Thomas Jefferson Memorial Foundation professor of architecture (1970-71). He is a member of the National Institute of Arts and Sciences and the American Academy of Arts and Sciences.

He authored *Can Our Cities Survive?* (1942) based on the principle of CIAM's charter, and coauthored with James Johnson Sweeney *Antoni Gaudi* (1960) and with Ernest Rogers and Jacqueline Tyrwhitt *The Heart of the City* (1952).

News continued on page 25

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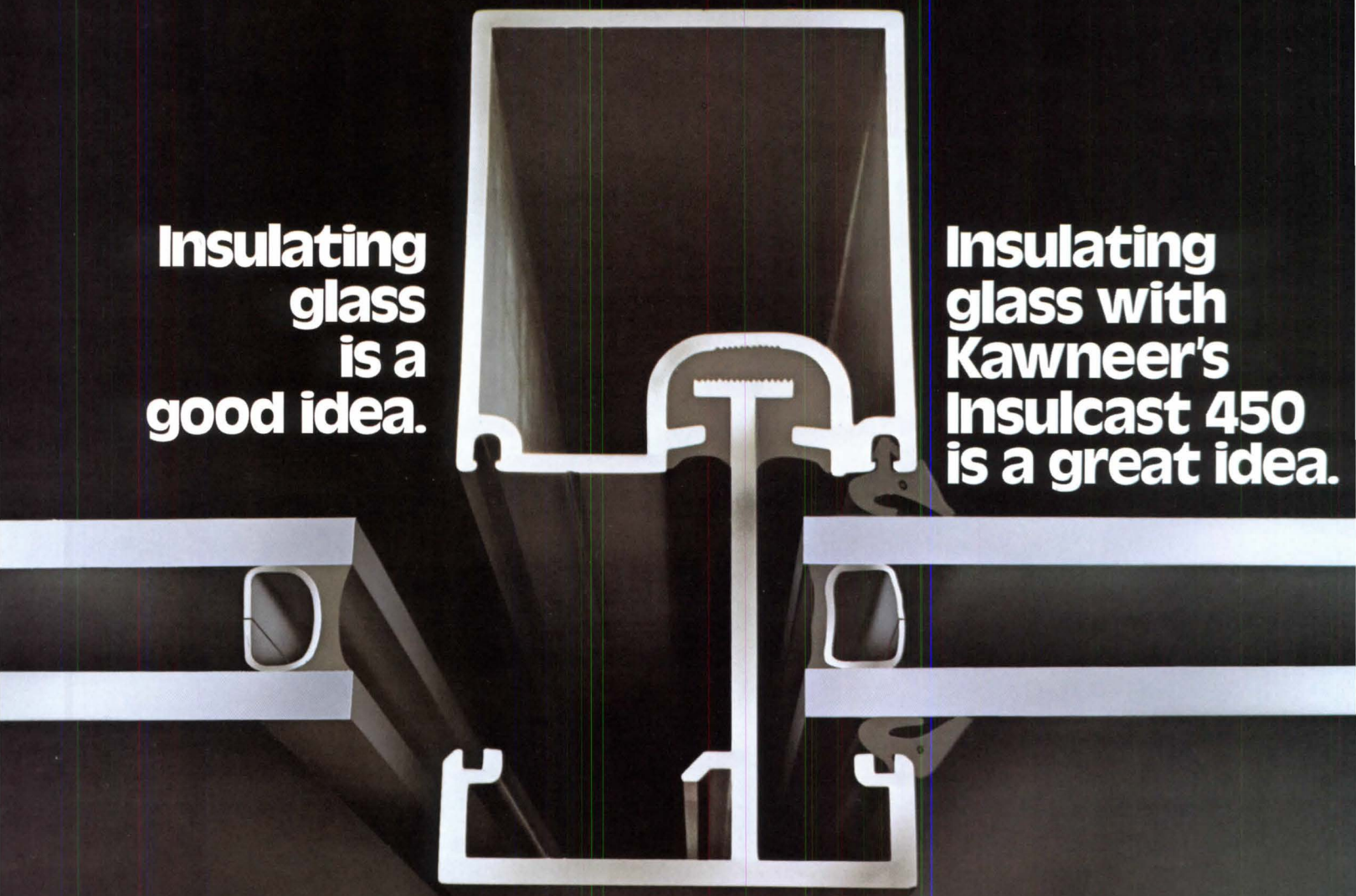

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The designer's element

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Energy to Be Major Theme of Incoming President's Year

It is singularly appropriate that the AIA convention site during the presidency of R. Randall Vosbeck, FAIA, is Minnesota, for he was born and reared in Mankato, 80 miles from Minneapolis, and earned his bachelor of architecture degree at the University of Minnesota—and several AIA members working to make the convention a success were his classmates. It's appropriate as well that the convention theme is "A Line on Design and Energy," for both in words and in practice Vosbeck has made the union of design and energy-consciousness a major thrust in his professional career.

His home in Alexandria, Va., physically epitomizes his thoughts on making energy the "form giver" he considers it to be. Through a combination of active and solar design strategies, the house meets 80 percent of its hot water requirements and 70 percent of its space heating from the sun. The south facade is dominated by a slanting grid of collectors and shading devices.

When Vosbeck was asked what he hoped to have accomplished by the end of his term as president of the Institute, it was not surprising, then, to hear that one of his principal goals is "to raise the knowledge level and credibility in the energy field of every AIA member." In achieving this aim, he hopes to strengthen ties with federal agencies and with professional engineering and contracting organizations. "More and more," he says, "particularly in energy-conscious design, we must have a team approach to the building design process, with architects, engineers, contractors and clients working closely together."

He continues, saying that "energy-conscious design is not a problem to be delegated to the engineer. Energy-consciousness must be incorporated with design decisions at every phase of the total design process, so it really becomes an architectural as much as an engineering issue."

He also stresses that "public awareness of the architect's capabilities is always important, particularly as it relates to the design and energy theme," and he hopes to mount a "major visibility campaign to stress the fact that architects can play a dominant role in energy-consciousness. For example, we're planning to provide tools for local components to use in doing a better selling job on the importance of architects in their local communities, particularly in reference to energy conservation."

Vosbeck views the energy crisis as "creating fantastic opportunities" for architecture. "It really has the potential for changing the whole character of the built environment, for changing entire cityscapes," he says. "Potentially, it can create a new design vocabulary and is far more revolutionary than anything that has happened since the renaissance." By infusing the design process with energy-consciousness, architects "will pay more attention to bulk and mass and shape, to fenestration, orientation and daylighting —all those things we should do intuitively, but have been ignoring. If you go back in history, you will find that architects knew about energy conservation principles, but in the era of cheap energy we became careless; we forgot about energy, or passed this responsibility to the engineer. So what we have now is really a historical recall, but applied in terms of today's technology.

"Our memory has been jogged, because we know now that the energy crisis is real. It's not a fad that is going to be here one year and gone the next; it's going to stay with us. So if we can get our members really doing something about energy-conscious design, as opposed to just giving it lip service, that will be a major accomplishment."

Vosbeck is carrying out his aim of making every architect more aware of the relation of energy conservation to design in a variety of ways. At the 1981 AIA convention, all professional development programs, theme sessions and most of the tours will relate to energy and design.

An unprecedented occasion, called a "presidential event," will take place in November in Denver. "This, too, will be a design and energy event," Vosbeck says. Six to eight AIA committees will meet concurrently and will sponsor and conduct programs that have a design and energy emphasis. Also, there will be a specialized exhibition of energy related products.

Vosbeck's efforts in the design and energy theme are underscored also by the Institute's energy professional development program, which he says is in many respects "the most ambitious program the Institute has ever undertaken. We're putting a lot of money, time and effort into this program, and we hope that as a result every AIA member will gain from it an opportunity to improve his or her skills to create energy-conscious design. We hope

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Installation of AIA Leaders: In ceremonies in Washington, D.C., R. Randall Vosbeck, FAIA, was inaugurated Dec. 5 as president of AIA. (Photo above: Vosbeck, center; outgoing president, Charles E. Schwing, FAIA, left.) Also installed were Robert M. Lawrence, FAIA, Oklahoma City, first vice president/president-elect, and Harry W. Harmon, FAIA, Long Beach, Calif., secretary. The occasion marked as well the inauguration of three vice presidents: Robert Broshar, FAIA, Waterloo, Iowa; George M. Notter Jr., FAIA, Boston, and Ray K. Parker, AIA, Little Rock, Ark. Jay W. Barnes, FAIA, Austin, Tex., continues a two-year term as treasurer. Nine new board members were also installed. By region they are: California, George Bissell, FAIA, and Jon Peter Winkelstein, FAIA; Gulf States, William H. Beaty, AIA; Michigan, John W. Jickling, FAIA; Middle Atlantic, Theodore F. Mariani, AIA; New England, Robert J. von Dohlen, AIA; New Jersey, Romeo Aybar, AIA; Northwest, David A. Pugh, FAIA; South Atlantic, Richard A. McGinty, AIA.

The Institute *from page 25*
to touch every member firm in one way or another in this three-year program."

The program will be launched this month at the grassroots convocation in Washington, D.C. For the first time, there will be only one grassroots meeting rather than three. Vosbeck says that in his travels across the country on Institute work he has found that many members "have no idea about the headquarters building or the capabilities of the total staff. So I thought it would be a great opportunity to bring in all the component presidents-elect and to give them a thorough review of what the Institute has to offer its members."

The grassroots plan ties into other Vosbeck goals, notably a stronger role for the Institute in government affairs and streamlining various aspects of the ways the Institute conducts its business. There will be a government affairs day during grassroots, including presentations by congressmen and federal agency officials, and AIA members will be encouraged to visit their congressmen while they are in Washington.

"I feel strongly," Vosbeck says, "that the Institute should maintain a high visibility in government affairs and, during my presidency, I will continue to stress the importance of monitoring legislation and regulations that affect the profession. Increasingly, government is becoming a part of our lives, not only as individuals but also as practicing architects. We have to recognize this fact of life. There is much important legislation that we are currently monitoring and working on, such as professional liability, A/E selection and energy legislation."

By rolling three grassroots meetings into one, Vosbeck is emphasizing his desire to bring greater efficiency into Institute operations. "When I worked on the long-range planning committee," he says, "I became really concerned about how we serve and communicate with our members—how we conduct our business. Although we have done some streamlining, such as eliminating about 18 committees, task forces and liaison groups, we've just scratched the surface. I plan to question whether in today's world there are not better tools and methods of conducting the Institute's internal affairs.

"Take all the meetings, for example. The cost of travel has skyrocketed so that we have to find new ways of holding meetings, and the electronics industry will help us in this regard. More and more, we'll be conducting our affairs through conference calls, and we'll make better use of computers and other tools for better linkage to our components. As a result, we hope to achieve greater flexibility and efficiency."

With so much on his mind about the future of the Institute, it's hard to get Vosbeck to talk about his practice. He gives his older brother William F. Vosbeck Jr., FAIA, credit for bringing him into architecture and for encouraging him in Institute activities. They went into practice together in the late '60s, and VVKR Inc. is now a 200-member firm headquartered in Alexandria, just outside Washington. "These are exciting times to practice architecture," Vosbeck says.

Perhaps the best insight into Vosbeck and his goals for the organization he now leads comes from his reply to the question, "Why in the world do you and Chuck Schwing and others give so much of your time to the Institute?" "Well," he responds, "that's a good question. You get started in it by just being concerned about your profession and wanting to be sure that it's well understood and that the public becomes more aware of quality design.

"At the same time, you are protecting your rights and your business opportunities through legislation, regulations and codes. So there's a little bit of selfishness in it when you start out. For example, one of my first efforts in the Institute was working for passage of the Brooks bill on A/E selection issues because I was concerned about encouraging selection on the basis of competency and qualifications.

"Then I got caught up in it, finding that I enjoy serving my fellow professionals, meeting outstanding people and learning from their skills and talents. Having gained a broader perspective of the profession as opposed to the specific issues

of day-to-day practice, I am forced into knowing myself better and becoming more aware of my shortcomings.

"I believe that my year as president of the Institute will be the most challenging of my life. I'm sure I'll bark my shins now and then, but I have the feeling I'm going to come out of it a better architect."

Durham Wins Kemper Award, Coles Whitney Young Award

Robert L. Durham, FAIA, of Seattle has won the 1981 Edward C. Kemper award, which honors a member "who has contributed significantly to the Institute and to the profession." Robert Traynham Coles, AIA, of Buffalo is winner of the 1981 Whitney M. Young Jr. citation, which recognizes "significant contributions . . . toward meeting the architectural profession's responsibility to the social issues of today." Both men will be honored at AIA's convention in Minneapolis in May.

Durham served as president of the Institute in 1967-68; as president-elect in 1966-67; as vice president in 1965-66, and as Northwest regional director from 1962 to 1965. He has chaired AIA committees, the honor awards jury and various task forces. Long active in the area of federal agency liaison, Durham served as an AIA representative on GSA's special study committee on the selection of A/Es. He has also been a member of the GSA national public advisory panel and for the past several years has played a prominent role in defending GSA's professional procurement procedures.

Durham recently was a member of a task force to modify the model procurement code of the American Bar Association. He has been an editorial adviser for "Legal Briefs," published by McGraw-Hill.

In Seattle, Durham has been a member of the mayor's in-city living task force, the task force to select a city architect, the citizens' committee to study a year-round school and the Seattle 2000 commission.

Coles, who for more than a decade has been involved in community organizations advocating social, political and economic improvement for minorities, in 1961 received a "testimonial for outstanding professional achievement" by the Buffalo Urban League. In 1974, following a private practice which concentrated on urban architecture during which time he served as an advocate for minority groups, he was chosen to serve on AIA's staff as deputy vice president for minority affairs.

Returning to the presidency of his own firm in Buffalo in 1976, he has continued his efforts to assure equality for other black architects and minority firms. Concerned for the preservation of neighborhoods, he is currently a trustee of the Preservation League of New York State. He received an honorary doctor of letters degree from Medaille College in Buffalo in 1977, and, in 1975, the college gave him its centennial award "for untiring efforts in the field of architecture and commitment to the Buffalo community and the western New York area."

Board Approves Plan to Chart Institute's Course for the '80s

At its December meeting in Washington, D.C., the AIA board of directors approved a plan for the 1980s to determine the principles and purposes of AIA and the appropriate roles of the local, state and regional components and the national organization. This action is in response to a resolution (A-1) adopted at the convention last June in Cincinnati.

Essentially, the plan is as follows: "Issues and options" papers will be presented and discussed at the '81 grassroots meeting in Washington, D.C., this month. A task group will review and synthesize this material and report to the '81 convention for further discussion and debate. Component officers will be asked to further evaluate and refine their initial reports by Sept. 15.

A draft report and preliminary recommendations will be submitted to the board next December for review and then pre-

continued on page 31

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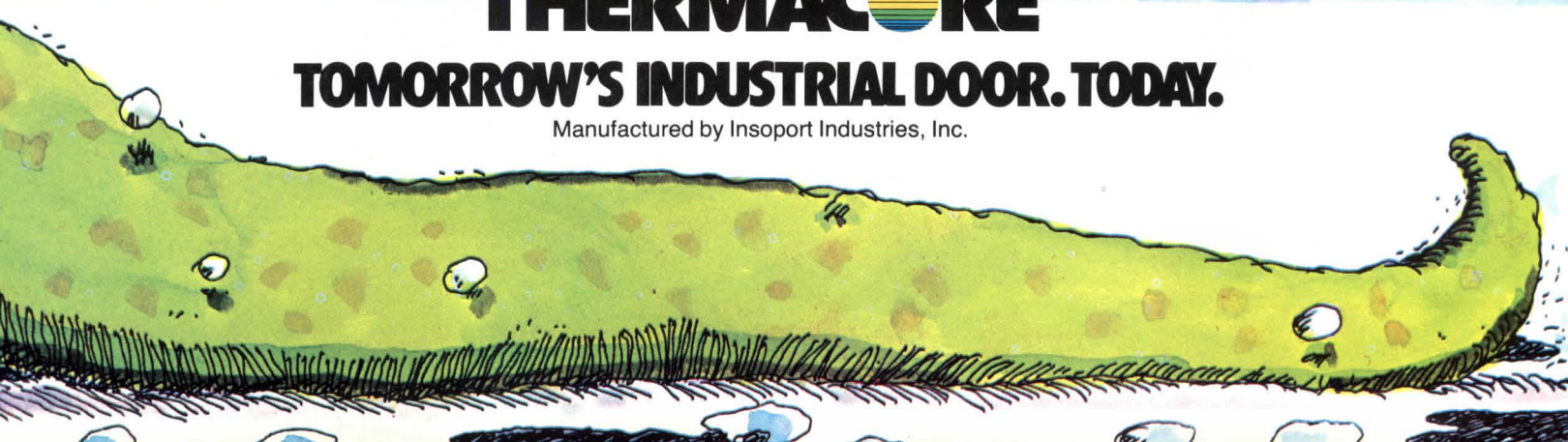
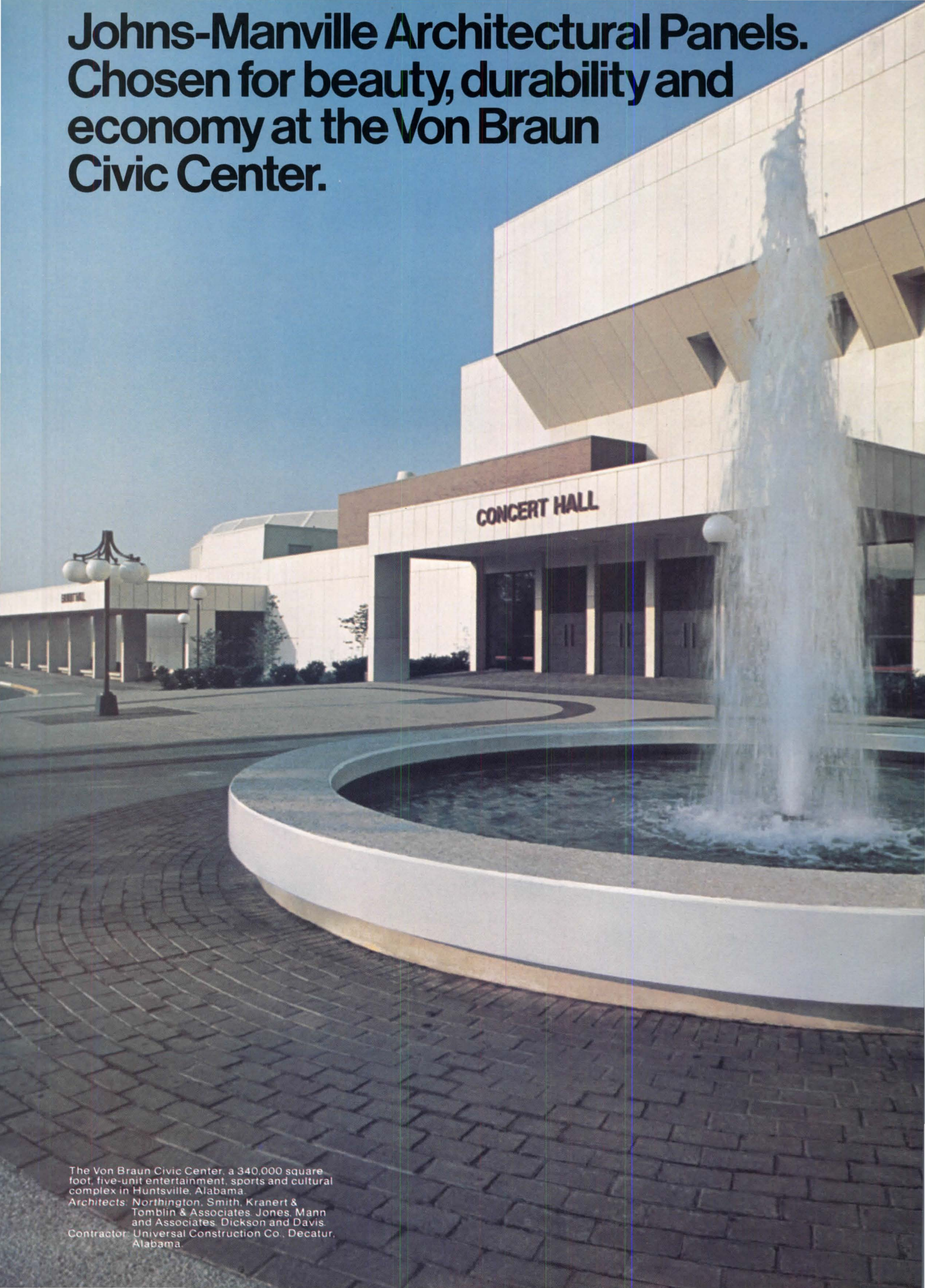


Johns-Manville Architectural Panels. Chosen for beauty, durability and economy at the Von Braun Civic Center.



The Von Braun Civic Center, a 340,000 square foot, five-unit entertainment, sports and cultural complex in Huntsville, Alabama.
Architects: Northington, Smith, Kranert & Tomblin & Associates. Jones, Mann and Associates. Dickson and Davis.
Contractor: Universal Construction Co., Decatur, Alabama.

The Institute *from page 27*

sented to the '82 grassroots meeting. The final report is to be ready by the March 1982 board meeting and be presented at the '82 national convention.

The final report is to include: a mission statement for all levels of AIA in the 1980s; specific goals, objectives and priorities necessary to fulfill this mission, and a description of the newly perceived roles of the Institute and its regional, state and local components.

In other action, the board repealed chapter XIV on the code of ethics and professional conduct and enforcement found in the Institute's bylaws. A new ethics section will be reviewed by the board in March upon completion of an ethics task force report.

Miscellaneous revisions were made to the other sections of the bylaws to reflect the change in the approach to ethics adopted at the convention in Cincinnati. Other bylaws changes reflect amendments approved by the convention concerning associate members and professional affiliate qualifications.

The board also approved the bylaws for the AIA/political action committee (AIA/PAC) and appointed to its board of trustees Charles E. Schwing, FAIA; Gerald Hammond, AIA; Helen S. McEntire, AIA (for two year terms) and David Pugh, FAIA, and William Rose, AIA (for one-year terms). The other eight trustees are the AIA executive committee members.

The bylaws state that "AIA/PAC is a voluntary, nonprofit, nonpartisan, unincorporated political committee whose purpose is to solicit, receive and make political contributions to aid in the nomination and election of candidates for the U.S. Congress who have demonstrated their interest in and commitment to advancing the goals for the architectural profession. AIA/PAC will not lobby for the passage of any legislation, nor will its support of any candidate be conditioned upon support or opposition of any legistion."

Membership statistics were reported to the board as follows: total AIA members, emeriti and associates increased from 34,105 as reported in December '79 to 36,123 as reported in November '80.

In other action, the board:

- approved a documents synopsis that succinctly describes the content and/or intended use of each AIA document.
- approved a revised project check list (document D200) that incorporates new material on construction management and interiors, project cost considerations and additional phases of services, among other things.
- approved document G611, Owner's Instructions Regarding Documents and Procedures, and a revision of A501, Recommended Guide for Competitive Bidding Procedures.
- reaffirmed the Institute's policies on international practice, federal design excellence, environmental aspects of architectural practice, urban growth, urban rebuilding (see Mid-Aug. '80, p. 24, for statements of the policies).
- reaffirmed the forest policy, although deleted any reference to wilderness lands.
- adopted the international tax revision policy encouraging the Institute to work to "prevent passage of U.S. tax code changes that would decrease the opportunities for American design and construction firms to successfully compete in foreign markets."
- adopted a revised architecture for health policy that incorporates two AIA policies—health care cost containment and national health program.
- reaffirmed the surface mining policy with revisions and asked the government affairs commission to review the issue and speak to land use responsibility.
- deferred two proposed policies on design competitions to the executive committee session in February.
- agreed with the statement that "AIA needs a comprehensive transportation policy to make recommendations about the desired social, esthetic and environmental impact of transportation. The impact of transportation planning and design on energy consumption and the environment is absolutely crucial."

During the discussions of the above policies, director John Rogers, FAIA, requested that AIA create a policy on policy. Rogers suggested that AIA needs to establish what national issues are important to architects—be it the built environment, land use, wilderness, tax policies—and, in accordance, which legislative issues AIA should actively lobby for. The board approved the motion.

Practice, Design Group Splits

In an effort to "fine tune" the Institute's operations, a departmental reorganization, as outlined by the 1980 long-range planning committee, takes effect this month.

The department of practice and design has been split into two separate departments. Michael B. Barker, AICP, is the administrator of the design department; Robert Packard, AIA, the administrator of the practice department.

The design department is responsible for the design/environment and professional interest programs and their respective committees. The practice department is responsible for codes and standards, documents/Architectural Graphic Standards, energy and practice programs and their respective committees.

Barker has been administrator of the

continued on page 33

ARCHITECTS

Elastizell takes the "con" out of lightweight concrete

Misconception #1

Lightweight insulating concrete roof decks are "wet."

—not true with Elastizell!

Elastizell insulating concrete requires only 5 gallons of water per sack of cement—like regular concrete. This is only one-fourth as much as required in vermiculite aggregate concrete.

Misconception #2

Insulating concrete roof decks require extensive venting.

—not true with Elastizell!

Elastizell insulating concrete contains *29 times less* water to dissipate than vermiculite aggregate concrete (after roofing is applied)—so little, that no underside venting is needed.

Misconception #3

Insulating concrete roof decks absorb large amounts of water.

—not true with Elastizell!

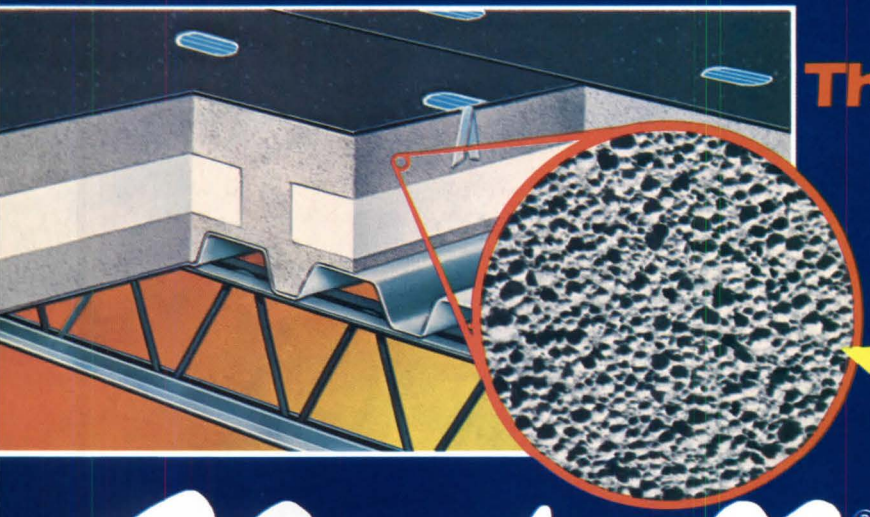
Elastizell insulating concrete's unique structure of discrete air cells (made with pure Portland cement) *resists* water. There is no water-absorbing aggregate, such as vermiculite.

Misconception #4

Insulating concrete roof decks are too costly.

—not true with Elastizell!

The Elastizell System utilizes less costly materials and requires less labor for installation. Check it out.



Enlarged photographic crossection exposing the matrix structure of discrete air cells.

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The Institute *from page 31*
former department of practice and design since 1972, when he was promoted from the position of director of urban programs. He came to AIA in 1969 from a career in architecture and planning. He holds B. Arch. and master of city planning degrees from the University of California.

Packard, director of the documents division/Architectural Graphics Standards since 1976, joined AIA after 15 years with the New Canaan, Conn., firm of Sherwood Mills & Smith. His B. Arch. degree is from Columbia University.

The state/local government program has been transferred from the component affairs department to the government affairs department headed by Arnold J. Prima, AIA.

The former component affairs department is now called the member/component affairs department, is headed by John Wilson-Jeronimo and is responsible for programs of affirmative action, component services and member services. The member services program consists of the committees of architects in education, government and industry.

Alan Stover, AIA, has been named general counsel of the Institute. Stover, acting general counsel since March, was appointed deputy general counsel in early 1978. Stover received a B. Arch. degree from Cornell University and a law degree from Georgetown University. Prior to joining AIA's staff, he worked for four years in multidisciplinary medium-sized architectural firms.

The Washington, D.C., law firm of Shaw, Pittman, Potts & Trowbridge has been retained as AIA's outside corporate counsel. The 80-member firm will provide AIA with specialized assistance in corporate, tax, real estate and other fields of law and will handle broader questions of corporate organization and planning. John P. Rhinelander will be the lead attorney from the firm working with AIA. Rhinelander has a broad range of experience both in and out of government, including service with agencies such as HUD and the Department of Health, Education and Welfare.

AIA: What's in an Acronym?

If you put the initials "AIA" after your name, indicating that you are a full-fledged, dues-paying member of The American Institute of Architects, it also may be inferred that you're a member of the Aerospace Industries Association of America, Aircraft Industries Association, American Importers Association, American Insurance Association, American Inventors Association, Archaeological Institute of America, Argentine Interplanetary Association, Association of Insurance Attorneys, Athletes in Action or Automobile Importers of America.

The acronym is used in aviation for Advise If Able, in biochemistry for Allylisopropylacetamide and in journalism for the *Annals of Iowa* and *Archivo Ibero-Americano*. Further, AIA denotes Anti-Icing Additive, Anti-Intrusion Alarm and Artificially Induced Aurora. It's used for such defunct organizations as American International Academy, American International Association for Economic and Social Development and Association of Insurance Advertisers. In England, AIA means Associate of the Institute of Actuaries.

In all, *Acronyms and Initialisms Dictionary* (edited by Ellen T. Crowley, published by Gale Research Co.) notes in its sixth edition that AIA is used for 25 other things besides The American Institute of Architects.

Practice

New Owner Consent Provision Written Into Preservation Law

President Carter has signed into law a package of major revisions to the nation's historic preservation program, legislation which also reauthorizes the historic preservation fund at $150 million annually for fiscal years 1981-87. The legislation also validates the historic landmark status of the Historic Green Springs District in central Virginia, as well as all other landmark designations made to date. For the first time, the amended law requires absolute private owner consent for property to be designated as a historic landmark, mandating as well more public notice of proposed designation.

The Green Springs case brought preservationists to the front when a federal district judge invalidated the Interior Department's acceptance of Green Springs as a historic landmark. The judge upheld the complaint of strip-mine advocates, saying that Interior has not established appropriate rules, criteria and procedures for the landmark designation (see Oct. '80, p. 21).

The government's planned appeal, evidently, is no longer necessary. A Justice Department lawyer involved in planning an appeal told a newspaper reporter, "I am not able to recall a legislative reversal of a judicial judgment as total or as quick. These preservationists are good lobbyists."

The new legislation is a result of a compromise reached in the House bill (HR5496) and the Senate bill (S3116). The Senate bill did not include a House requirement that a city, state or private owner should make a written statement of agreement regarding a property's nomination to the National Register of Historic Places. The language in the final legislation was revised to allow the nomination to be made provided the owner did not specifically object and to permit only a private owner to block a designation. Even if the owner objects, Interior may declare a property eligible for landmark status, thus protecting it from federally funded projects.

Among the other provisions:

- State preservation officers are required to nominate significant properties to the national register, and all federal agencies are directed to locate properties under their jurisdictions and to nominate eligible ones.
- Property owners are to be notified if a building is being considered for the national register, as well as the majority of owners in a historic district. Any person or local government may appeal.
- Direct grants are provided to states for demonstration and special projects and 50-50 matching grants for restoration.
- All register nominations are to be reviewed by a certified local preservation commission, with recommendations sent to the state preservation officer within 60 days. Preservationists have 30 days to appeal a decision.
- A loan insurance program is authorized to encourage banks to make improvement loans for historic properties.

Liability Insurance Plan Altered With Approval of AIA's Board

Beginning this month, CNA Insurance Co. will change the reserve fund system in its A/E professional liability coverage to be more competitive in the marketplace. CNA's program is commended by AIA, and the Institute's board of directors reviewed and approved the change at its December meeting.

The change involves the termination of the reserve premium plan and the establishment of the experience adjustment plan. Premium funds contributed to the reserve premium plan for policies issued during 1977-80 will be disbursed through 1984.

Under the reserve premium plan, archi-

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Practice *from page 33*
tects and engineers who purchased liability insurance were charged 25 percent of the premium of the first $250,000 in coverage to establish a reserve fund. The money covered any severe or unanticipated losses CNA experienced beyond actuarial predictions. Insureds received the unspent funds back in four years at 4 percent annual interest rate. CNA placed a 5 percent limit on its own profit from the program.

Until 1980, CNA relied on the reserve funds. In 1980, CNA issued a 107.2 percent refund from the reserve premium fund for policy year 1976.

In the past decade, the reserve premium fund has acted as a moderating influence, according to AIA's architects liability committee. The fund, the committee says, was intended to reduce the impact of the fluctuations of submitted claims, provide an economic buffer and support the commended program through otherwise debilitating underwriting losses in the late 1960s and early '70s. Because of the success of this program, the reserve collected in the new plan will now be reduced.

The experience adjustment plan will involve a 10 percent surcharge on the premium of the first $250,000 of insurance. The interest rate for the insureds will be set according to a five-year average of the interest on treasury bills. CNA will maintain a 5 percent profit calculated over an eight-year period beginning in 1981.

AIA's architects liability committee recommended the change, calling the new plan "a positive approach to stabilizing the highly variable premiums and coverage in professional liability insurance. There is every indication that the new results of the revisions to the plan will provide a greater return to insureds in the program in favorable economic cycles, while in an economic downturn the returns should remain consistent with those now experienced."

The committee's conclusions were reflected in model projections reviewed by Insurance Buyer's Council, the committee's consultant. The projections compared the net cost to insureds under both plans at similar loss levels. For the reserve premium plan, the actual interest rate levels achieved for the 1969-79 period were used. Calculations for the new plan reflect the average five-year treasury note and bond rate had it applied during the same period.

During 1969-79, architects and engineers paid $241 million for liability insurance. Under the old plan, the net cost to the insureds (adding the amount for reserve funds and subtracting the refund) was $251 million. Under the new plan it would have been $247 million.

If CNA's losses were 15 percent less than the actual amount during 1969-79, the net cost would have been $241 million under the old plan and $221 million under the new plan. And if the losses were 10 percent greater, the net cost would have been $266 million under the old plan and $258 million under the new plan.

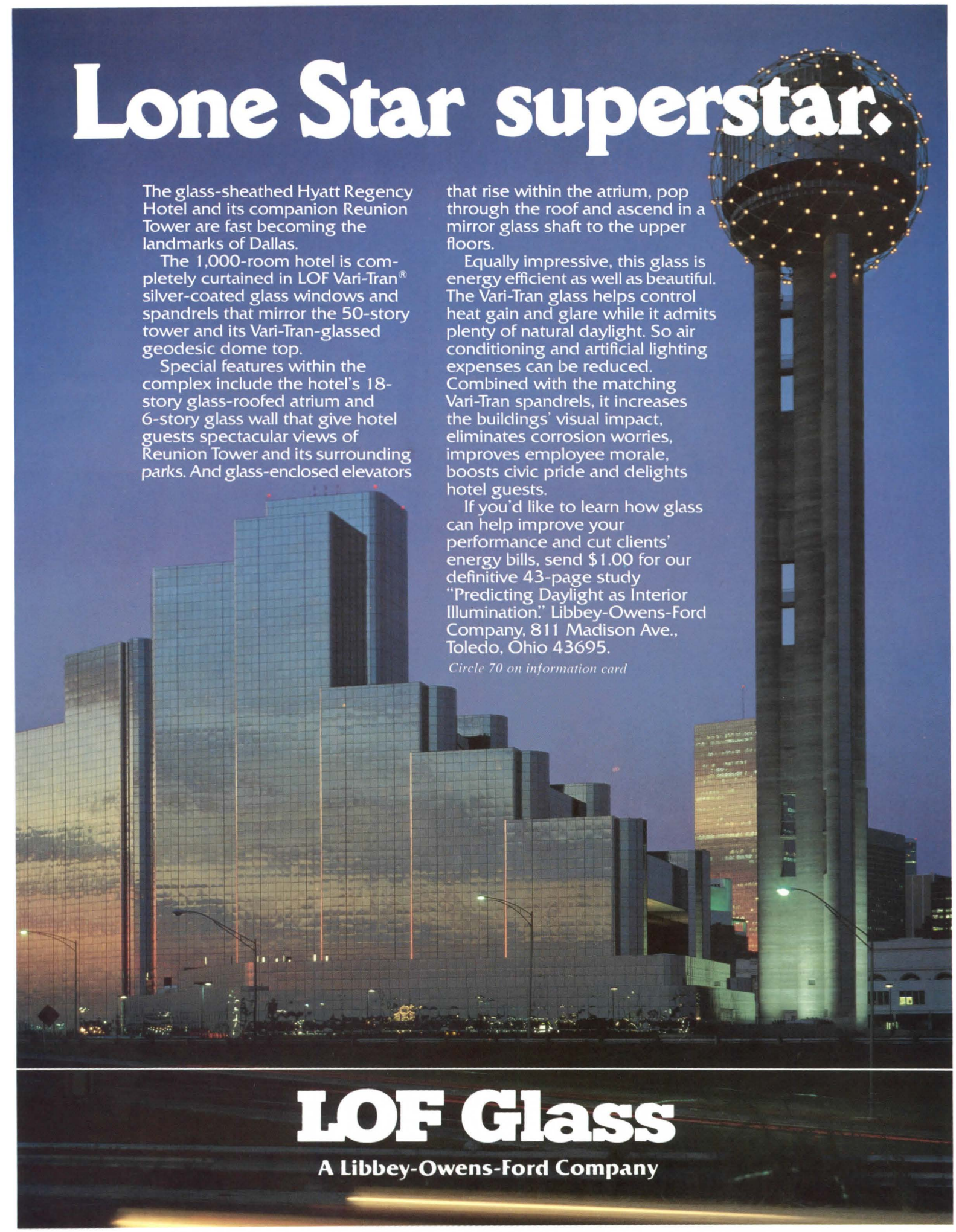
Developer, Architect Chosen For Pittsburgh Mixed Use Site

A proposal by the Pittsburgh-based Grant Liberty Development Group is the winner of a nationwide developer competition, sponsored by Pittsburgh's Urban Redevelopment Authority, for a mixed use project called Liberty Center on a 2.5-acre site in Pittsburgh's Golden Triangle. The architect is a team consisting of The Architects Collaborative, Burt Hill Kosar Rittelmann Associates and Urban Design Associates. The project includes a 615-room hotel, 500,000 square feet of office space, 65,000 square feet of commercial space, subsurface parking for 300 cars, and a city park. The site is adjacent to Pittsburgh's new convention center.

The review committee, appointed by the redevelopment authority, had as its

continued on page 38

Lone Star superstar.



The glass-sheathed Hyatt Regency Hotel and its companion Reunion Tower are fast becoming the landmarks of Dallas.

The 1,000-room hotel is completely curtained in LOF Vari-Tran® silver-coated glass windows and spandrels that mirror the 50-story tower and its Vari-Tran-glassed geodesic dome top.

Special features within the complex include the hotel's 18-story glass-roofed atrium and 6-story glass wall that give hotel guests spectacular views of Reunion Tower and its surrounding parks. And glass-enclosed elevators that rise within the atrium, pop through the roof and ascend in a mirror glass shaft to the upper floors.

Equally impressive, this glass is energy efficient as well as beautiful. The Vari-Tran glass helps control heat gain and glare while it admits plenty of natural daylight. So air conditioning and artificial lighting expenses can be reduced. Combined with the matching Vari-Tran spandrels, it increases the buildings' visual impact, eliminates corrosion worries, improves employee morale, boosts civic pride and delights hotel guests.

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General Contractor:
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Steel Fabricator:
Atlas Iron Works, Inc., Portland, OR
Steel Erector: Atlas Erection Co., Portland, OR
Mechanical Consultant: Aungst Engineering, Inc., Bellevue, WA

STEEL: the first choice for Seattle's newest office tower.

The new 25-story Fourth & Blanchard Building in the Denny Regrade district is the most ambitious project conceived by Seattle office-space developer Martin Selig—a name synonymous with first-class planning design.

It was decided that steel design would best provide the freedom to incorporate all the proposed architectural features. Several designs were presented, the final choice being a parallelogram floor plan with angled upper stories. The steel design also helped keep the weight of the structure to a minimum. This was important for the design in seismic Zone 3. A glass curtain wall was dictated by the form of the building which demanded a clean, smooth, flush, monolithic surface—in no way competing with the upper lines.

Maximum usable space

The $33-million building has two interconnected towers with 45-degree angled roofs. The roofs—a striking design feature—offer prime office space with spectacular views. A minimum of interior columns helps maximize use of the 531,000 sq. ft. of floor space, including the 3-level garage.

Conservation of energy was a key consideration, and an electric-hydronic heat pump system connected to a main circulating water pipe provides heating and cooling which is both energy efficient and economical to install. In addition, the roofs were designed to accommodate solar panels in the future.

Steel speeds construction

The new building was erected on a narrow site—just half-a-block—and over 2,650 tons of A-36 and A-572 grade 50 steels were supplied by U.S. Steel. The fabricated steel was trucked from Portland at night and erected during the day using a single truck crane having a 280 ft. tower topped by a 170 ft. boom. This eliminated traffic congestion in a busy downtown area with a minimum of storage space. And the structural framing was completed one month ahead of schedule!

This handsome structure, incorporating the latest in building systems technology, is one more example of the design flexibility and practical economy of using structural steel.

To find out more about this building, and for information regarding the many applications for structural steel, contact a USS Construction Representative through your nearest U.S. Steel Sales Office. Or write for the USS Building Report (ADUSS 27-7642-01) to P.O. Box 86 (C-1211), Pittsburgh, PA 15230.

USS TRADEMARK **United States Steel**

Circle 71 on information card

Practice *from page 34*
architectural consultant Jonathan Barnett, AIA, of New York City.

Four other developers were in the running for final selection: Downtown Motel Enterprises (architect: Ralph J. Murovich Associates); Fort Pitt Development Co. (architect: Marcel Breuer Associates and Deeter, Ritchey, Sippel Associates), and Rogers-Worsham (architect: Tasso Katselas and William Tabler, FAIA).

ASC Jury Gives No First Award

The jury for a design competition for a visitors center at the Washington Monument in the nation's capital, sponsored by the Association of Student Chapters/AIA and the Tile Council of America, decided that none of the 232 submissions "addressed all facets of the problem," and combined three entries in a tie for second place. Winners of second place are Samuel Herin, Clemson University; James C. Postell, Rice University, and Paul Allen Mueller, Texas A&M University.

The five students and teams to win honorable mention in the competition are Peter Fillat III, Syracuse University; Grace Kobayashi and Gerald Szeto, Cornell University; Anne E. Runow, University of Virginia; Donna L. Schumacher, Elizabeth Jane Stevens and Eileen Steingut, University of Pennsylvania, and John Jay Ulloth, Andrews University.

Jury members were Malcolm Holzman, AIA; John Paul McGowan, AIA; Wolf Von Eckardt, Hon. AIA, and Edward S. Peetz, National Park Service.

All winning entries will be exhibited at AIA's convention in Minneapolis in May.

Finn Wins UIA Competition

Finnish architect Timo Penttila has won an international competition for the design of the headquarters building of the Dom Sicherheitstechnik Co. at Brühl, West Germany. The competition was held under the auspices of the International Union of Architects.

Second prize was awarded to the partnership of H. G. Brunnert, H. Mory, O. Osterwalder and M. Vielmo of the Federal Republic of Germany, and third prize went to Toivo Korhonen of Finland.

Two of the seven awards of distinction were presented to U.S. architects: Stanley Tigerman & Associates Ltd. (third distinction) and Rodolfo Machado and Jorge Silvetti (sixth distinction).

Two Named to Fine Arts Board

President Carter has appointed two architects to serve four-year terms on the Commission of Fine Arts. They are John S. Chase, FAIA, of Houston, Texas's first black member of both AIA and the National Council of Architectural Registration Boards, and Walter A. Netsch, FAIA, of Skidmore, Owings & Merrill's Chicago office. Serving with them on the commission are J. Carter Brown, Hon. AIA (chairman), Philip W. Buchen, Sondra G. Myers, Frederick Nichols and Edward D. Stone Jr.

The commission was established by Congress in 1910 as an independent advisory board of "well qualified judges of the arts" to review proposed design of federal and District of Columbia government buildings, parks, monuments and memorials.

12 Naval Award Winners

Seven designs have received first honor awards for "distinguished architectural achievement" in the seventh biennial awards program sponsored by AIA and the Naval Facilities Engineering Command. Five other projects won awards of merit, one of which received a special award for energy conservation features. All 12 projects were cited by the jury, chaired by John A. Bower Jr., FAIA, for making "a statement of intent regarding quality of a humane environment."

Winners of first honor awards are:

- Chapel/religious education complex, Pearl Harbor, Hawaii (architect: Group 70/Francis S. Oda, AIA, Honolulu).
- Personnel services complex, Bangor

continued on page 41

"We wanted experience. We got it with Ceco."

It's the first high rise in the Rio Grande Valley—the seventeen story McAllen State Bank Building in McAllen, Texas. Its concrete floors and beams were formed by Ceco concrete forming services.

"For McAllen's first high-rise project," says Allan M. Bond, vice president, Linbeck Construction Corp., "we wanted forming service that had high-rise experience. Ceco filled the bill. We didn't have to buy or rent any pan forming equipment, or train crews in how to use it. Ceco provided it all. Ceco also quoted a firm price and overcame early scheduling problems to meet our floor to floor cycle time. When it comes to performing, they are professionals."

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Associate Architects:
Zeb Rike, Dan Ogden
General Contractor:
Linbeck Construction Corp.
Structural Engineers:
Colaco Engineers, Inc.

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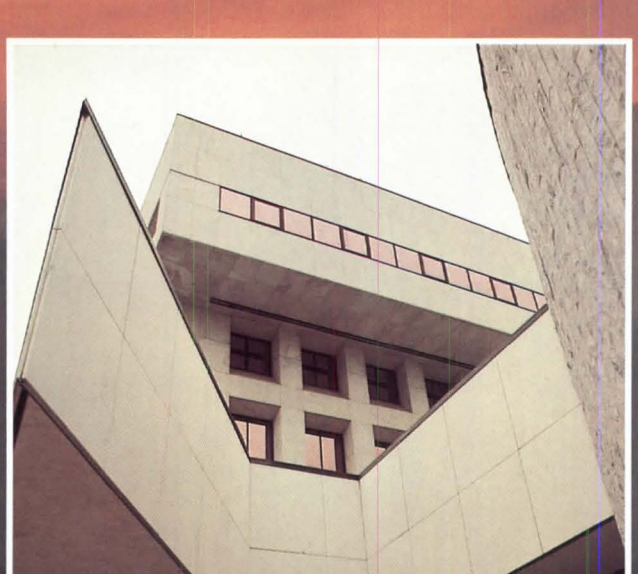

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Building shown: Port Huron Municipal Office Center, Port Huron, Michigan /Architect: Richard C. Cogley

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Practice *from page 38*
Naval Submarine Base, Bremerton, Wash. (architect: Campbell-Yost-Grube, Portland, Ore.).
- Recreation facility, Earle Naval Weapons Station, Colts Neck, N.J. (architect: Geddes Brecher Qualls Cunningham, Philadelphia).
- Submarine training building, San Diego Submarine Support Facility (architect: Delawie Macy & Henderson, San Diego).
- Surface warfare officers' school, Newport, R.I. (architect: NORTHNAVFACENGCOM, Philadelphia).
- Trident bachelor officers' quarters, Bangor Trident Support Site. Bremerton, Wash. (architect: TRA Architects, Seattle).
- Uniformed Services University of Health Sciences, Bethesda, Md. (architect: Ellerbe/Dalton-Dalton-Little-Newport, Cleveland).

The winner of an award of merit as well as a special energy award is the Naval Air Station Medical and Dental Clinic, Jacksonville, Fla., designed by Stevens/Walton & Associates Inc., Orlando, Fla.

Other awards of merit were given to the Bangor Naval Submarine Base consolidated mess, Bremerton, Wash. (Raymond Salmi Associates, Tustin, Calif.); Yap Hospital, Western Caroline Islands (MWM/Mackinlay/Winnacker/McNeil, Oakland, Calif.); entrance/corridor at the Naval Development Center, Warminster, pa. (NORTHNAVFACENGCOM, Philadelphia); bachelor enlisted quarters, Submarine Base, New London, Conn. (Jeter, Cook & Jepson, Hartford).

California Polytech University Given Julia Morgan Materials

A collection of materials from the works and writings of Julia Morgan, the first woman to be graduated from the architecture section of the Ecole des Beaux-Arts and believed to be the first woman licensed to practice architecture in California (see June '76, p. 44), has been given to California Polytechnic State University, San Luis Obispo, by Mrs. Morgan North, whose late husband was Julia Morgan's nephew. The collection includes more than 12,000 items, including letters, photographs, diaries, architectural sketches, watercolors and blueprints.

In addition to documents by Julia Morgan concerning William Randolph Hearst's hilltop castle at San Simeon, near San Luis Obispo, the collection includes drawings and sketches of such buildings as the Berkeley City Women's Club, the bell tower at Mills College in Oakland, the Oakland YWCA and residences across California. During her career as an architect, which began in 1902 and concluded in the early '50s, Morgan designed more than 800 buildings.

After processing and cataloging have been completed, the collection will be available for use by qualified scholars in Cal Tech's new Robert E. Kennedy library.

George J. Hasslein, FAIA, dean of Cal Tech's school of architecture and environmental design, calls the acquisition of the Morgan papers "a special and new event" in the school's development. "We are now able to make a real contribution of service to both the community of scholars who specialize in the history of art and architecture and the contemporary professional architect."

Practice continued on page 42

Allen Freeman

Pennsylvania Avenue: Participants and viewers of the Presidential inaugural parade in Washington, D.C., this month will find that part of the avenue has been transformed since President Carter's parade four years ago. Western Plaza (above), designed by Venturi, Rauch & Scott Brown and George Patton, is complete. One block beyond, Pershing Park, designed by M. Paul Friedberg & Partners and Jerome Lindsey, is scheduled for completion in March. Across from the plaza (at right) is the cleared lot where a hotel/office building/shopping complex, designed by Frank B. Schlesinger, FAIA, and Mitchell/Giurgola, will be built. Just beyond stands the shell of the Willard Hotel, which is to be brought back to life with Hardy Holzman Pfeiffer as renovation architect. The Pennsylvania Avenue Development Corporation is the planning/development agency.

Practice *from page 41*

Urban Village Concept Favored By Development Choices Group

The Council on Development Choices was formed last year by the Urban Land Institute, with financial assistance from HUD, "to identify key development challenges of the 1980s and to recommend practical solutions of the nation's crucial development needs" (see May 1980, p. 32). Now the council has called for both existing and newly developing areas to be organized into "urban villages," a new community form that unites affordable housing, transportation alternatives, mixed uses, in-fill and redevelopment, and compact new growth. The council, composed of 37 elected officials and leaders from private sector financial institutions, design firms and development corporations, spent eight months of study, aided by national symposia and regional forums, before issuing a lengthy list of recommended changes in public policies and regulations relating to development at the federal, state and local levels.

The council's recommendations, which take into account demographic changes, the constraints of cost and energy and new market forces, encompass a broad range of recommended actions to occur in the next 10 to 20 years.

The council's preliminary report says that both public and private sectors must deal with new conditions "in a positive manner if there is to be continued improvement in the quality and efficiency of our communities. A failure to pay attention to the issues will result in community development decisions that will prove to be very costly."

The issues to be dealt with, according to the council, are the necessities to reduce the growth of energy consumption, to facilitate economic development, to provide affordable housing, to promote social and economic mobility for disadvantaged people, to maintain profitability in development activities and to provide public facilities and services at the least cost.

To meet these needs, the council calls for the formation of communities at a scale where public facility and service efficiencies could be achieved and where a balance between jobs and housing could be realistically achieved. The council also says that appropriate choices for the 1980s would include consideration of such matters as more compact growth in both metropolitan and nonmetropolitan areas; the revision of local regulations to promote the integration of residential, commercial, recreational and light industrial structures; an increase in transportation choices (including walking to jobs and shopping); an adequate supply of housing of different types at various cost levels, and acceleration of in-fill and redevelopment in existing communities, with underutilized urban properties returned to more productive use.

The council has proposed broad types of action that could be taken by public and private sectors. Among them:

- A redefinition of development goals, whereby all jurisdictions would reassess and redefine the goals inherent in their development plans, regulations and policies.
- A revision of development regulations to allow for such considerations as increased densities and the reduction of requirements for lot and yard sizes, setbacks and street widths; the elimination of single-use zones wherever possible; the adoption of cost-cutting code provisions for housing rehabilitation and adaptive use; the monitoring of land prices to keep cost increases down; the provision of density bonuses for developments that provide greater mix of uses, public amenities and improved design; the streamlining of regulatory procedures, and the elimination of restrictions on manufactured housing, allowing experiments with new forms and other housing types.
- A revision of development financing and tax policies to promote development goals by such means as the authorization of tax-free home purchase savings accounts for non-homeowners; the exemption from income taxes of any interest earned on savings used for mortgage lending purposes; the encouragement of pension funds to increase investments in residential mortgages; preference given to financial aid requests for housing or community development that promote greater use of public transit; the assessment of vacant land at current market value or at highest and best use permitted under applicable zoning, and future transportation assistance focused on the maintenance and improved operation of existing roadways and on transit improvements.

The council also recommends that "institutional capacities" be strengthened to meet special development needs. For example, state and local governments should enact enabling legislation for public and private development corporations "to act as developers of last resort" in weak markets that require "staying power" for the undertaking of such large-scale, long-term projects as the development of "urban villages" and mixed use projects.

The bipartisan council has been chaired by Arizona Governor Bruce Babbitt and Harold S. Jensen, partner of Metropolitan Structures in Chicago. Among those to serve on the council are John C. Portman, FAIA, of Atlanta and Beverly A. Willis, FAIA, of San Francisco.

Jefferson's Campus, Seagram Place High in Faculty Poll

A recent poll at the Catholic University of America's department of architecture and planning asked what buildings in this country the faculty considered as modern "wonders." The structures mentioned most often were the central campus at the University of Virginia (Thomas Jefferson); the Seagram Building in New York City (Mies van der Rohe and Philip Johnson); the Philadelphia Savings Fund Society Building (George Howe & William Lescaze), and the Robie house in Chicago (Frank Lloyd Wright).

When the AIA JOURNAL conducted its bicentennial poll (see July 1976), asking architects nationwide to select the top four "proudest achievements in American architecture over the past 200 years," Jefferson's campus received first place; Rockefeller Center in New York City second (initial project: Reinhard & Hofmeister; Corbett, Harrison & MacMurray; Hood & Fouilhoux); Dulles International Airport near Washington, D.C., and Falling Water in Bear Run, Pa. (Eero Saarinen and Frank Lloyd Wright, respectively) tied for third place, and the Carson Pirie Scott Building in Chicago (Louis H. Sullivan and Daniel H. Burnham & Co.) came in fourth. These buildings and others are among those cited by the Catholic University faculty, as well as a building that was not completed in 1976, the National Gallery of Art's east building (I.M. Pei & Partners) in Washington, D.C.

A faculty member at Catholic said that he selected Jefferson's campus because "it's an expression of universal education, the dignity of man and the spirit of a new nation." Another said he chose the Seagram Building because it is "the prototypical glass and metal skyscraper building in America." The PSFS structure was chosen because it was "the first significant office building of the modern movement." And Wright's Robie house came in for favor because, said a faculty member, its "strong horizontal lines and flowing spaces" epitomize "the spirit of the American Midwest."

The faculty member who agreed with the JOURNAL's respondents about Rockefeller Center called it the "first time in which architecture is part of an integral design which combines many aspects of urban living. . . ." Dulles Airport was described as "truly" epitomizing "the essence of flight." Falling Water, said the faculty member who praised it, was termed as "the most significant residential piece" designed by Wright. The Carson Pirie Scott department store was called "the most dramatic example of the Chicago frame building developed in the 19th century." *News continued on page 44*

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DOE Audit Programs Supported But Regulations Called Confusing

In a joint statement, AIA and the American Consulting Engineers Council support the concept of the Department of Energy's residential and commercial auditor training and certification programs, but criticize the proposed regulations as being "overly detailed, confusing and burdensome."

The regulations would initially apply to the residential audit training program, which will be established this year. The program will involve energy audits of one-to-four-unit dwellings to be conducted by gas and electric utility companies. The commercial audit program is scheduled for funding in 1982.

In their joint statement, AIA President R. Randall Vosbeck, FAIA, and ACEC President Everett Thompson emphasized the "importance of drawing a distinction between residential and commercial audits." They suggested that commercial audits are far more complex and more expensive to conduct and "will not fit a per state funding standard based upon occupancy." The system should be based, they said, upon each building's intended use. They also recommended that the commercial building audit program be delayed and the entire effort be carefully reconsidered by DOE in concert with the architectural and engineering professions.

As for the proposed regulations, Vosbeck and Thompson criticized the requirement that auditor training instructors "have a B.S. in engineering or science related fields." This requirement, they said, "ignores the education and training of graduates in related fields such as architecture, which may have equal or greater qualifications. Certainly, architectural curricula include courses on energy demand, performance of buildings and conservation—courses which are seldom offered in such 'science related' fields as geology, biology or chemistry."

AIA and ACEC also disagreed with DOE's proposal that auditors be "qualified in several different areas of expertise: mechanical systems, renewable resource energy measures, passive energy conservation, or any combination of these categories." They noted that energy systems are by nature interactive and stated "anything other than a single, comprehensive home energy audit is unacceptable."

Both groups supported written examinations for energy auditors, but qualified this by stating that "in selected instances, recognition of state architect/engineer registration could save time by permitting quick approval and fielding of auditors." Further, AIA and ACEC suggested that there should be a national unbiased check on the content of the examinations.

Concern was also raised over the fact that "DOE proposals do not appear to make use of solar space heating. . . . Auditors should be made aware of both active and passive solar system opportunities and pass them on to the residents."

Buildings in Six States Win Owens-Corning Energy Awards

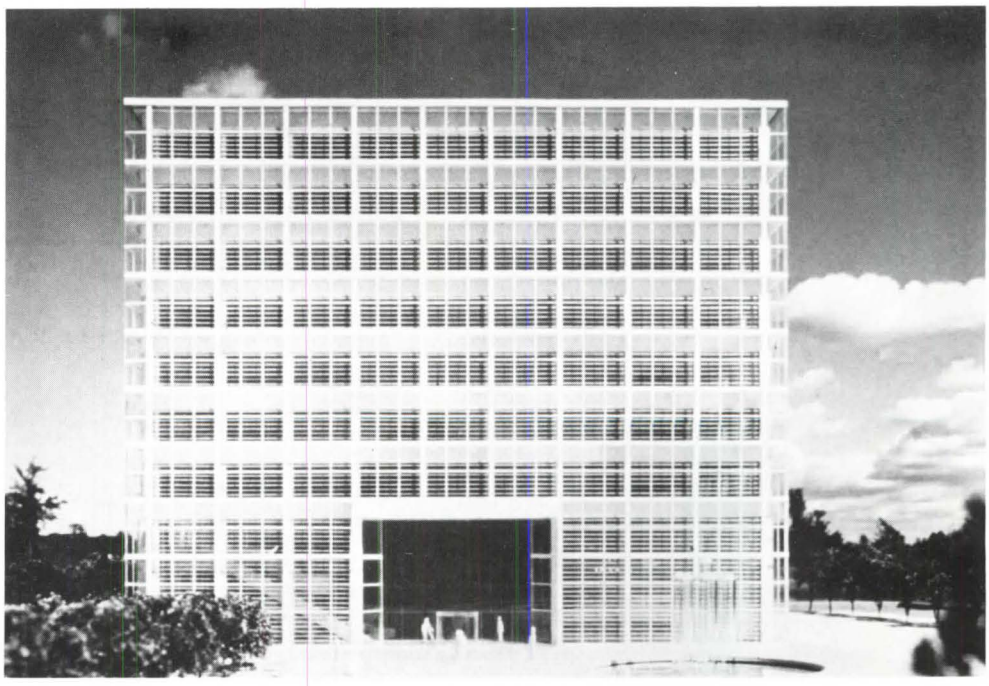
Owens-Corning Fiberglas Corporation has presented seven awards for "significant contributions" to energy conservation in commercial, governmental, institutional and industrial facilities in its ninth annual awards program.

One of the winners in the commercial category is Flatow, Moore, Bryon & Associates, Albuquerque, N.M., for the Willow Creek office building, Idaho Falls, Idaho. Completed in July 1979 for E. G. & G. Idaho, Inc., the 284,000-square-foot building houses 1,500 employees and consumes less than 38,000 BTUs per square foot per year. The building's energy system—a heat pump with thermal storage in water tanks—uses direct outside air for cooling. In cold weather, excess heat during the daytime hours from lights and people and passive solar energy from the sunlit side of the building and the atrium's skylight is recovered. Stainless steel sills that reflect sunlight to the ceiling reduce the artificial lighting needs by 20 percent around the building's perimeter.

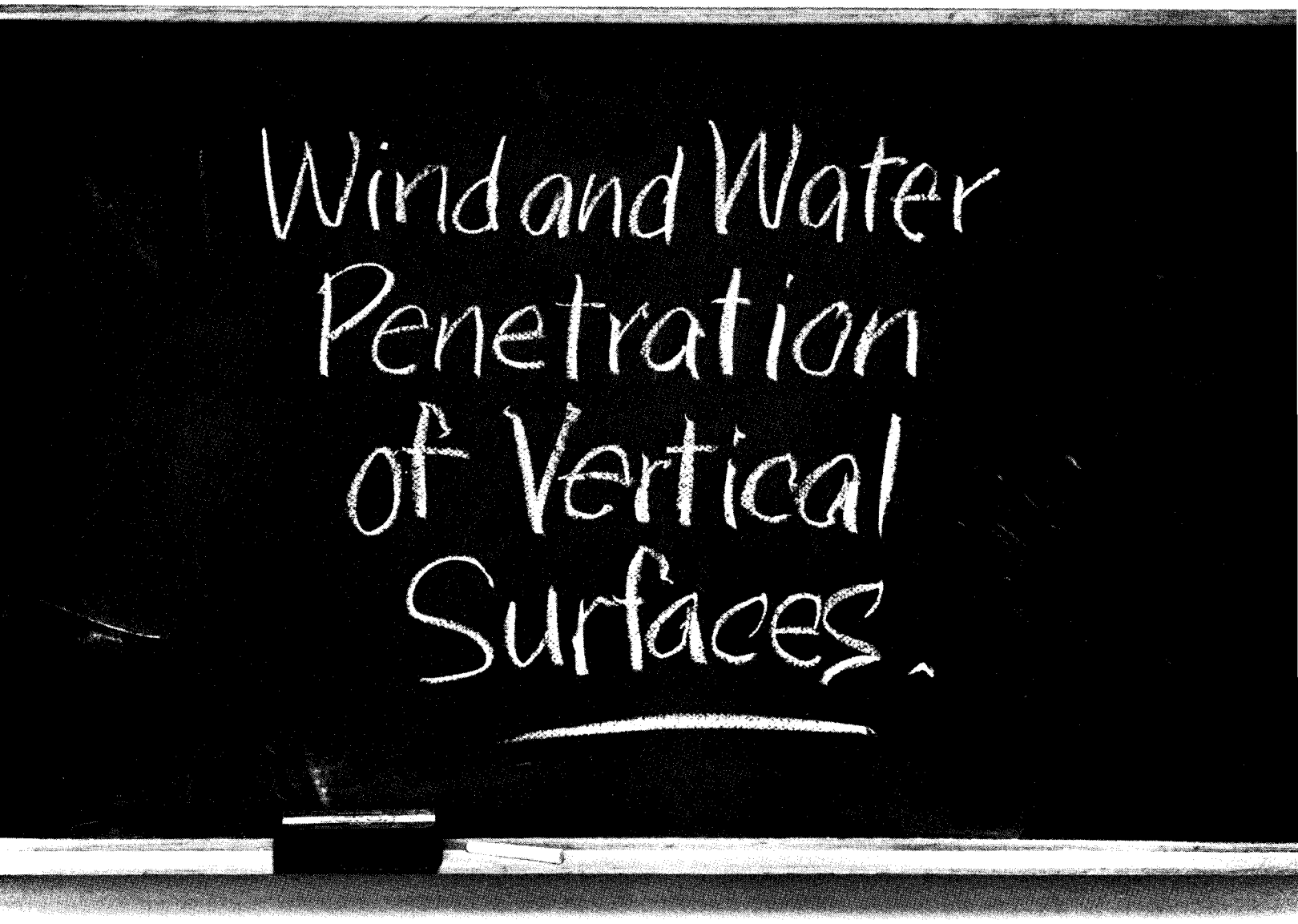
Cannon Design, Inc., Grand Island, N.Y., is another winner in the commercial category for the Hooker Chemicals & Plastics Corporation office building, Niagara Falls, N.Y. To be completed in November 1981, the 10-floor, 200,000-square-foot building is square in plan with central core, providing a flexible, column-free interior. The building's exterior consists of two glass walls four feet apart, between which is an automatically operated louver system. When the building is occupied, the louvers will track the sun to shield the building interior. Through the damper operation of the vented space between the two skins, solar heat will be either collected or rejected, depending on the demand. When the building is unoccupied, the louvers will close to create a fully insulated opaque shell. The louvers will also provide light diffusion. Energy consumption is calculated to be less than 33,000 BTUs per square foot per year.

Also a winning design in the commercial category is Caudill, Rowlett, Scott's Shell Oil Co. exploration and production office complex, Houston. The client's requirement for private offices with outside views led to seven narrow buildings with offices astride double loaded corridors. Each triangular building will wrap around skylit atriums and all seven will be linked to provide 828,000 square feet of office space. Conditioned air will be fed to the shallow loft space from a pe-

continued on page 92



Hooker Chemicals & Plastics Corporation office building by Cannon Design Inc.



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AIA JOURNAL

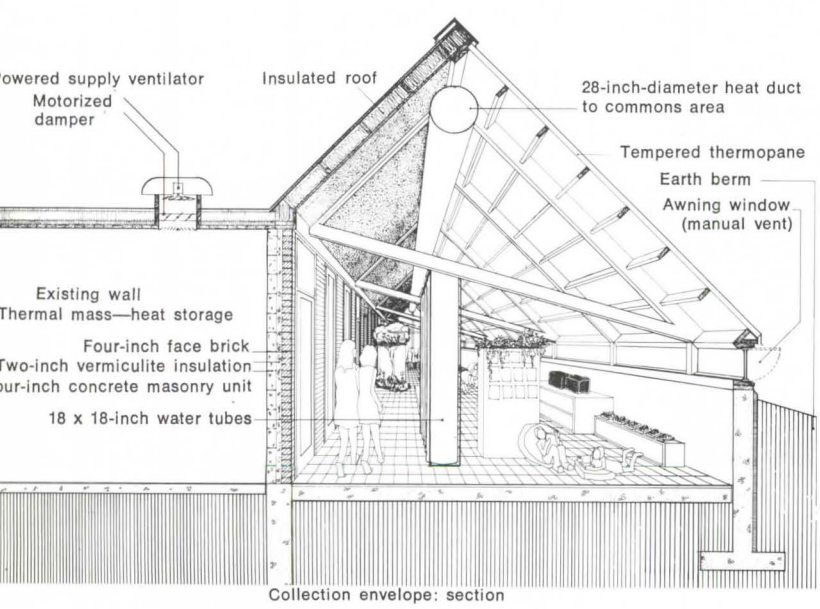
The Architecture Of Energy

People who promote magazines like to talk in terms of "landmark issues." This page assiduously attempts to avoid self promotion but there are at least two ways in which this issue is a landmark. First, it is a kind of kickoff for AIA's focus on energy and design in 1981, a year that may turn out to be among the most focused in the organization's recent history (see p. 25).

More importantly, we believe the issue marks a turning point in the development of energy design, and especially passive solar design—which is the architecture of energy. For as we researched this issue it became apparent that passive solar (far too supine a phrase for such a radical concept) is on the increase not just in terms of extent but also of scale. In the past, examples of passive solar have been almost exclusively residential. As this issue demonstrates, the approach is now being extended to somewhat larger and more complicated buildings. The issue begins with analysis (by senior editors Andrea Dean and Stanley Abercrombie) of several such buildings which already have been completed, and goes on to others in the works.

We brand passive solar a radical concept in the original meaning of the term, in that it goes to the very roots of architecture—the basic design considerations of configuration and form, massing and materials, fenestration and orientation. And a final article in the issue traces the ultimate expansion of passive concern beyond single buildings into the realm of urban design. *D.C.*

School Tucked in an Envelope



Collection envelope: section

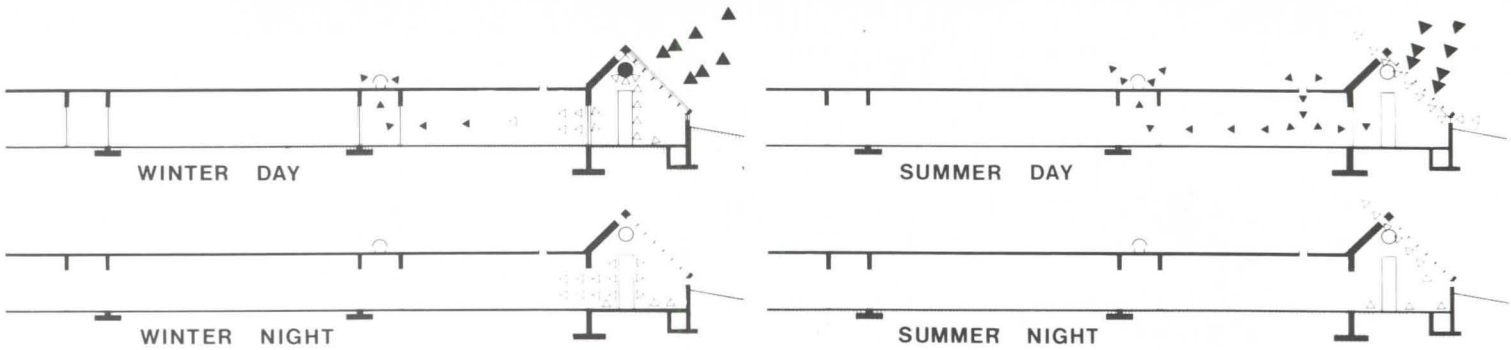
The classroom wing was outfitted with a greenhouse space where heat is stored in colorful, waterfilled tubes and a thick floor slab (this page); the exterior of this wing is seen in its original state in the top photo on the facing page and, as transformed, across.

The idea of retrofitting the Telluride, Colo., school, built in 1966, was born three years ago when the local school district adopted an energy improvement program that called for analysis of the school's heat loss problems and ways to overcome them. Use of an active solar system was considered and deemed impractical because of cost and the building's structural limitations. The decision was then made to employ passive solar principles to improve the building's energy performance, and Telluride Designworks was hired as architect.

The school had two main, single-story wings, very different from each other, requiring very different solutions. The classroom wing was flat-roofed with an abundance of windows and doors that allowed heat to leak away. The gymnasium section, by contrast, had a pitched roof and an almost uninterrupted 16-foot-high masonry wall. Both faced southwest and were joined by a two-story structure where the school's main entrance was located.

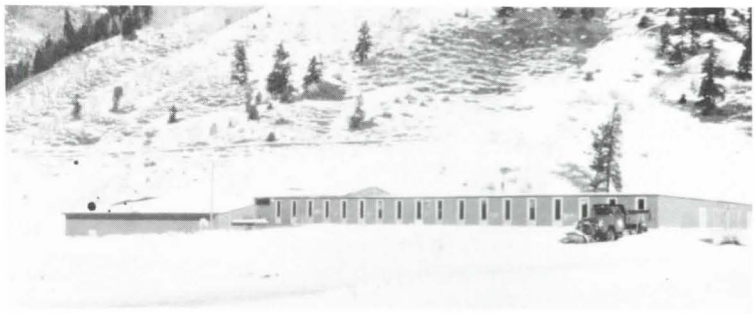
The architect's solution was to transform the gymnasium's southwesterly wall into a Trombe wall by applying 2,000 square feet of glazing. The sun heats the air between glazing and wall; warm air then passes through top and bottom vents in the wall to the gymnasium where fans help to circulate it.

The classroom wing was covered with a 16-foot-wide greenhouse space, also called a solar gain envelope. It was designed



both to capture heat escaping from leaky windows and doors and to collect solar heat through a glazed, 45-degree, sloped southwest-facing roof that extends over the existing roofline and has 1,900 square feet of direct gain collector area. The back, or north-facing side of the envelope, is insulated. Heat is stored in a six-inch floor slab in the original brick wall and 30 translucent, water-filled tubes, eight feet tall, 16 inches in diameter. An exterior concrete block with four inches of urethane foam was built at the base of the evelope to add thermal mass. The architect chose tempered, insulating glazing, rather than glass fiber panels, because it is considerably more durable, transmits larger amounts of sunlight and meets fire code requirements. The glazing in aluminum rails is set on a heavy timber frame, which avoids the need for a sprinkler system. A round duct in the envelope diverts excess heat to the center commons area, while a fan and motorized damper plus operable windows and doors, at each end of the peaked envelope, take care of overheat ventilation.

Retrofits such as this one remain very rare, as does information on their performance. At the Telluride school, the architect arrived at relatively uncomplicated, common-sensical solutions by first testing and discarding a number of more complex solar envelope and Trombe wall schemes for their performance, cost and user comfort. The architect believes that "the concept of enclosing existing masonry buildings with glazed climatic envelopes offers the potential for cost-effectively applying solar energy to much of the existing commercial, residential and industrial stock."



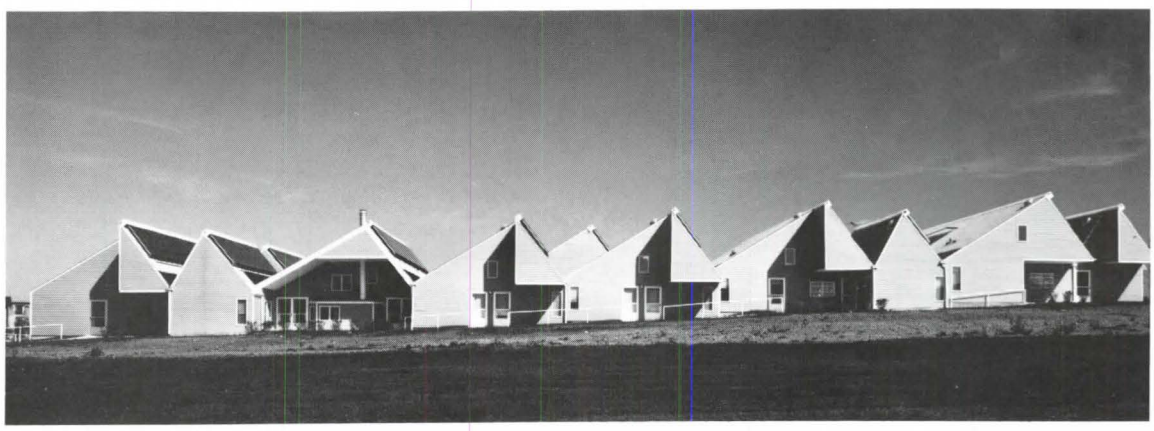
Photographs by Randle

Strong Forms Drawn from Solar Strategies

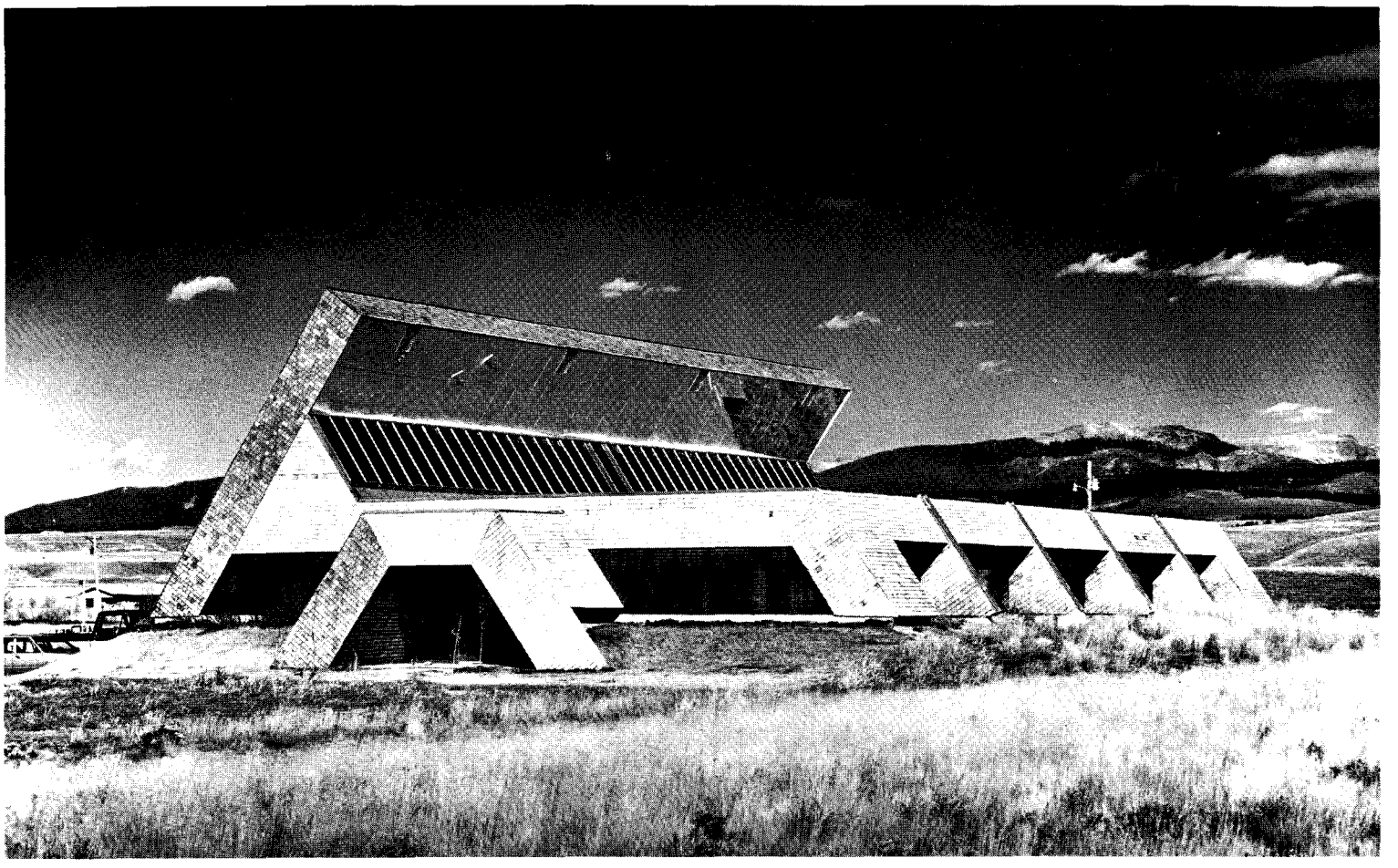
The Ray Graham Center for Independent Living in Roselle, Ill., is a row of housing units designed by Weese Seegers Hickey Weese for 22 orthopedically handicapped residents taking part in a six- to twelve-month job training program and for two staff members. Typically, a Ray Graham resident has his own private bedroom and bath, sharing a living room and family-style kitchen with three others. With the consultation of Great Lakes Solar Engineering, the architect has provided both active and passive solar strategies, and these have obviously been allowed to be major determinants of building form. The roof plan, for example, is designed to accommodate 210 solar panels facing south at the 52-degree angle that is optimal for the site's latitude. The need for roof area for these panels dictated the large overhangs on both the east and west sides of the complex.

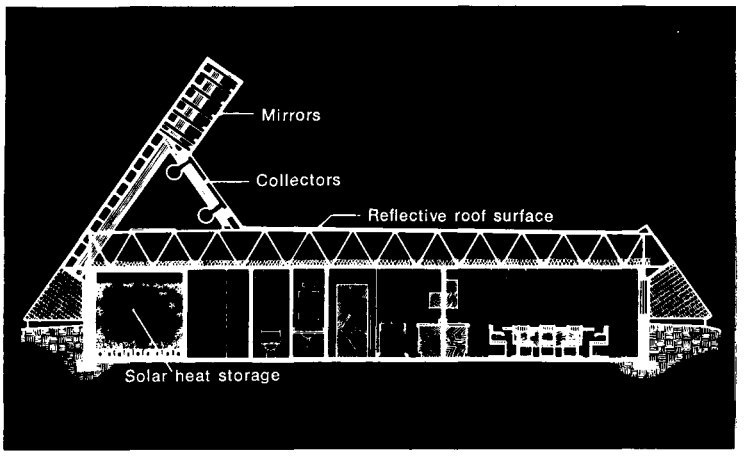
Another form determinant was the desire for attic spaces that would house equipment and also reduce summer cooling requirements. A 20,000-gallon storage tank under the building retrieves heat from a high quantity of lightly heated fluid medium in a fluid-to-air exchange. Openings in exterior walls have been kept small, the plan has been kept quite compact and careful provisions have been made for cross ventilation. Altogether, the architect estimates 75 percent of the complex's heating and water heating requirements are fulfilled by the solar provisions. The solar equipment installation has been subsidized by a special HUD grant, and HUD will monitor its operating efficiency.

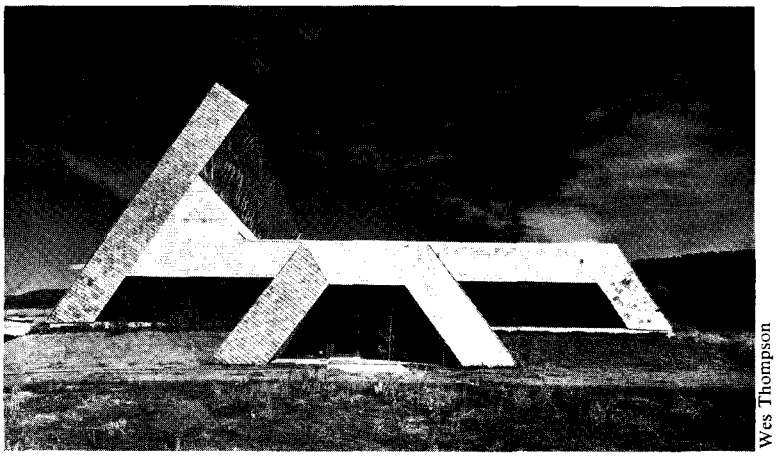
Steeply pitched roofs characterizing this project accommodate 210 solar panels while providing shade plus space for storing equipment for the orthopedically handicapped residents.



Paul Zakoian







Wes Thompson

Resting on a Rocky Mountain site in Granby, Colo., the building resembles a shingled hovercraft inspired by traditional Indian forms. It could pass, in fact, for a newly invented type of indigenous design—a contradiction in terms, of course.

Completed in March 1978, the low-lying, 4,120-square-foot Solar Plaza houses three professional firms, including the building's architect, Dixon/Carter. It is a hybrid solar building oriented 14 degrees east of south. Entries on the east and west are airlocked and the building is bermed approximately 3.5 feet above the floor except at entries. Above grade, the "R" value of walls is 22.49, of ceilings, 31.78. Some windows are operable with triple glazing, the remainder are fixed with one-inch insulated glass.

The building uses forced air collectors made of single-glazed, copper black chrome absorber plates. Each of the 39 collectors is 2x6 feet; the array is 412 square feet, or 10 percent of the total floor area. It is angled 55 degree from the horizontal to allow maximum heat gain in winter. Heat reflected onto the collectors is more than doubled, the architect calculates, by use of an aluminum roof plus an eight-foot-high, angled mirrored surface that runs over the collectors and shades them in summer.

The storage area, 384 cubic feet of 1.5-inch rock, is located within the structure of the building. The collector loop's reverse return air system, with "J-M" round, rigid glass fiber, minimizes the need for balancing. Air is distributed through a perimeter loop duct system under the floor slab. Collector and distribution loops have separate blowers that operate in tandem. Electric baseboard heaters provide extra heat when needed. Water is heated by a coil located in the duct between collector and storage areas.

Calculations show that the solar system will furnish 81 percent of the building's space heat and hot water requirements, and that on average the system will provide all needed heat except during December and January. The payback period is estimated at 21 years, based on electricity rates for 1978, a 10-percent fuel inflation factor, 10 percent interest rate and a 25-year amortization period. During design, monthly electric bills were estimated at $110; the actual cost from April 1978 through March 1979—including the second coldest winter in recorded Colorado history—was $115 per month, despite a 17 percent rate increase in July 1978. During summer months, the electric bill is between $80 and $90 per month.

A Central Spine of Solaria

The White Mountain School and Living Center is an experiment with what architect Banwell White & Arnold Inc. of Hanover, N.H., calls "live-in solar collectors," or solaria. Located in Littleton, N.H., and completed in spring 1979, the building is a two-story, single-loaded, linear structure of three nearly identical bays with south-facing, interconnected solaria and a central greenhouse for year-round food production. The lower level is set partially into a nine-foot embankment to reduce heat loss and use the earth to help insulate the north side. The roof is lowest at the north wall and slopes to minimize exposure and deflect cold north winds. The north face has only narrow ventilation windows; all rooms have windows and doors opening to the solaria or the greenhouse on the south.

The school's middle unit houses a community room on the lower level, a resource/library/monitoring space above. The 17 students living in dormitories that flank the greenhouse monitor the building's performance, with residents of the two wings competing to outdo each other in saving fossil fuel.

The greenhouse is a high mass structure with dark masonry walls and floor and a large capacity to store heat. Its main purpose is to heat itself, not the rest of the building. The solaria, by contrast, which act as direct gain collectors for the dormitories, are low-mass structures with little heat storing capacity. They are large enough to walk through and, when desired, to live in, and can draw some heat from the sun even on cloudy days in this least sunny part of northern New England. Warmed air in the solaria rises to the roof peak where high fan-assisted air ducts transport it to rock storage boxes beneath the dorm rooms. The boxes double as a solar preheat chamber for domestic hot water coils. An Austrian wood-burning stove, called a kachelofen, also serves as space heater, as does the ancillary system.

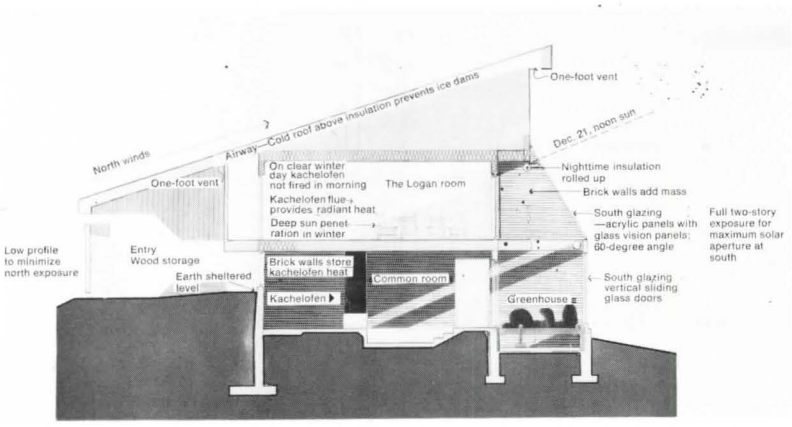
The sloped glazing on the solaria is acrylic, the vertical is glass. Sliding glass doors allow a 50 percent opening in the vertical wall for summer ventilation. Building construction is wood frame with six inches of Fiberglas insulation in the walls and 12 inches in the attic. Concrete floors in the solaria are four inches thick, with two-inch polystyrene board underneath. The greenhouse has a four-inch-thick concrete floor placed on 12 inches of crushed rock on a layer of insulation.

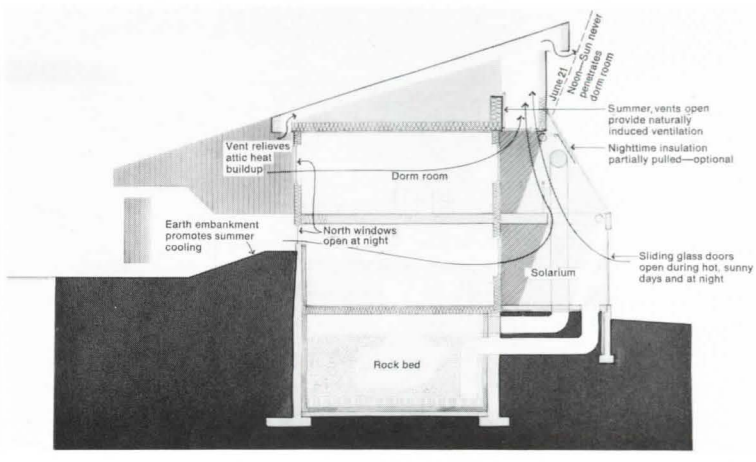
Estimates were that solar heat would reduce heating requirements by almost 50 percent, although fuel savings would be a mere 11.5 percent in December and only between 11 and 16 percent in January. Early monitoring shows that solar heat comprises 35 percent of the needed heat load. The architect had planned to use thermal insulating panels on the south wall to reduce nighttime heat loss and prevent overheating in summer. Unfortunately, the school has been strapped for funds to purchase and install them.

On the south (above and below) are three almost identical bays with rooms opening onto glazed solaria, which act as direct gain collectors. The north face (below right) has only narrow ventilation windows and a low sloping roof for wind protection.

For reasons evident at right, the architect calls the two-story solaria 'live-in solar collectors.' Sections below show how the building works.

Photographs by Robert Perron





Sun-Filled Shopping Galleria

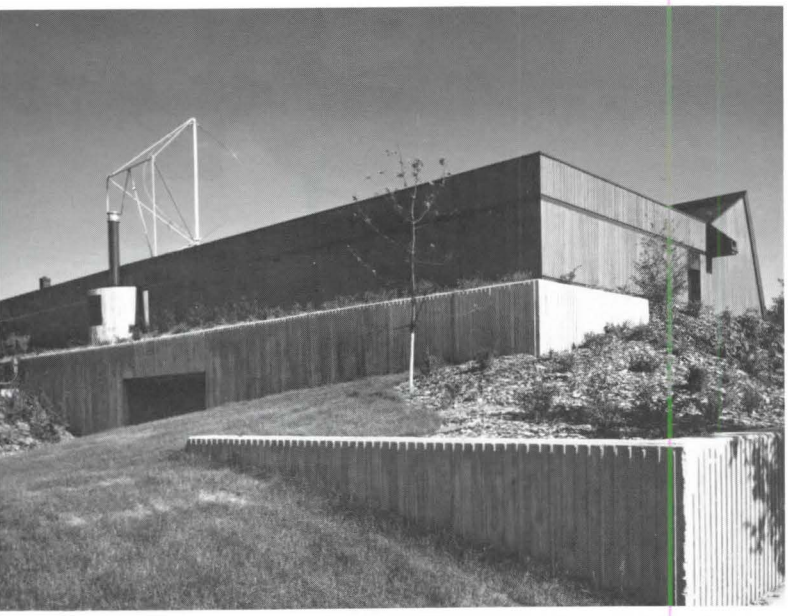
The dominant feature used by architect Charles Kober & Associates of Los Angeles at the Quail Spring shopping mall in central Oklahoma is a central, south-facing clerestory wall. It creates a daylit galleria and acts as the primary source of heat for the complex's one million square feet of retail shops and restaurants on three levels.

The central clerestory is 50 feet high, 200 feet wide and has 400 panels of double-glazed solar reflecting glass set 40 degrees off the horizontal for optimum penetration of winter sun and shading in summer. The east and west walls of two adjacent department stores shield the galleria from morning and afternoon sun. Further screening is provided by trees and plantings both outside and within the central space.

The mall's four courtyard-like areas and two shopping locations also receive natural light from 66 bronze acrylic skylights, each measuring seven feet in diameter. These permit 60 percent light transmission while baffling the sun's rays.

Because the building is partially bermed, no heat and very little cooling is needed on the lower level. There are outside dampers throughout to shut off incoming warm air; these also pull in cooler outside air when conditions call for it. Cooling and lighting systems are on computerized start/stop timers programmed to reduce the number of units that start at any one time. The owner, Dayton Hudson Properties—which became Center Companies last year—estimates that this system saves 1,950,000 kilowatt hours per year.

Plant-Filled Underground Atrium

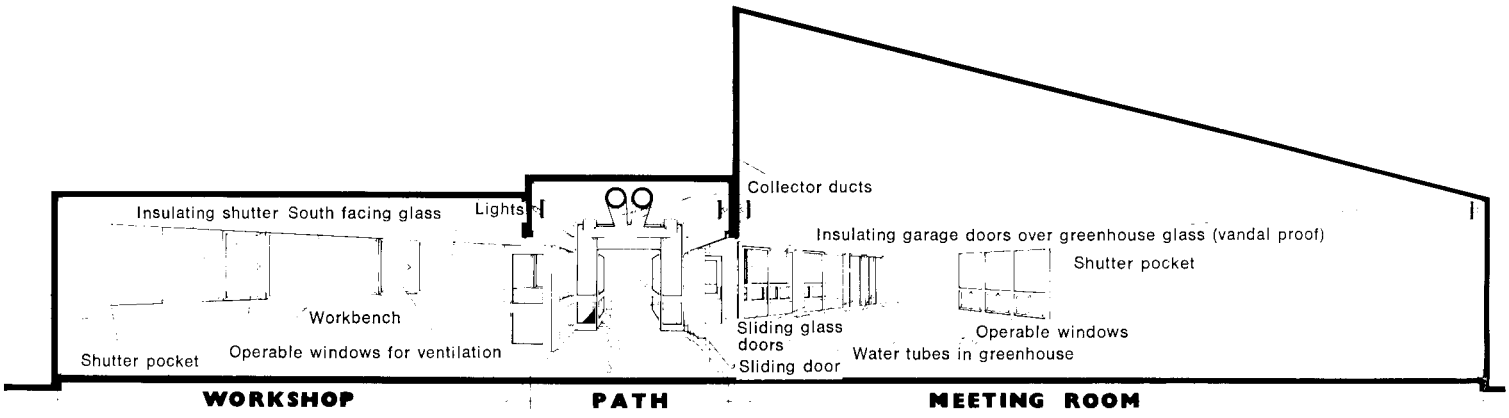


For a regional Girl Scout Council headquarters in St. Paul, architect Bergstedt Wahlberg Bergquist Rohkohl (BWBR) has designed a building that teaches while it works. An atrium with skylights, plants and fish ponds provides a tropical microclimate where exotic plants and aquatic food chains can be studied; a Clivus Multrum waste system converts human excrement and plant waste (grass clippings, dead leaves, vegetable scraps) into usable garden compost; and a vertical-axis wind turbine, funded by the Minnesota Energy Agency, produces electrical power.

Heating and cooling provisions are of both active and passive solar types. Active provisions include solar roof panels and a heat pump; passive ones include south-facing windows, shaded in summer months, the use of earth berms against exterior walls and even earth-covered roof surfaces, the maximum application of insulation, and a plan configuration that provides an optimal volume to surface ratio.

All equipment and piping are accessible and color-coded to facilitate their use as teaching aids for the scouts, and most interior spaces are oriented to the glazed atrium, providing pleasant visual access to nature despite the largely underground construction.

Photographs by Joseph W. Molitor



The entrance path on the north traverses the building to wooded trails on the building's south side, and acts as the structure's organizing principle.

Bridging Between Man and Nature

This nature center pays obeisance to both the grid of highways that crisscrosses the state of New Jersey and its more inviting woodlands. The architect, Total Environment Action of Harrisville, N.H., likens the center's north-facing entrance to a turnpike ramp—its facade reflecting what they call "man's formal order"; the building's south side, TEA says, "belongs to the sun."

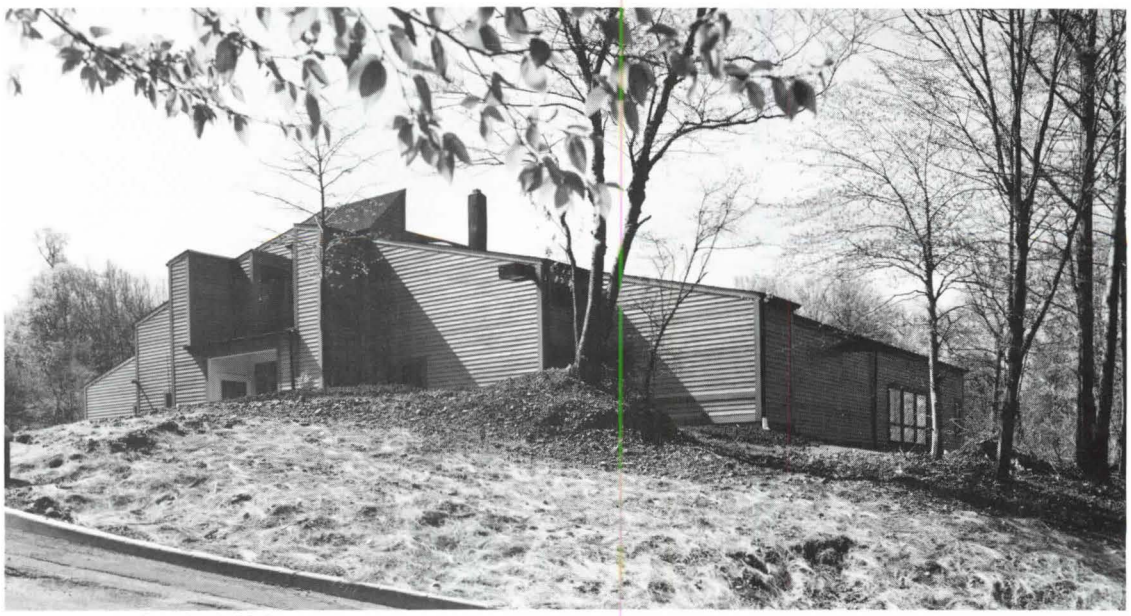
The north elevation steps forward toward the entrance, which is recessed; the center's principal nature path continues through the building in the form of a 10-foot-wide hallway that leads out to the woods on the south. The building thus becomes a bridge straddling the path and the hallway connecting them the building's main organizing element. Staff offices and a sales shop are to the left of the hallway facing north, because of "the New Jersey ritual of viewing the parking and entry areas," among other reasons, says the architect. Instructional areas face south. To either side of the central hall are meeting and workshop spaces which can be opened to the hallway or closed off from it.

The south facade has a sunspace/greenhouse with full-height windows and water storage tubes. Push-button-operated garage doors are used as thermal shutters. In the workshops are windows reaching from counter height to the ceiling with insulated shutters made of hollow core doors that slide out of their pockets at night. Concrete floor slabs serve to store the sun's heat. There are site-fabricated air collectors made of corrugated aluminum on the exterior wall above the first floor. Ductwork connects the collectors to a rockbed storage container between the workshop and offices. At night or on cloudy days, this heat can be drawn out of storage and distributed. The backup heating system is gas-fired hot water.

On the second story of the building is an apartment with south-facing windows across its full width. A domestic hot water collector is on the roof.

The architect estimates that the use of the sun's energy reduces heating requirements by one-half, or contributes the equivalent of 1,112 gallons of oil per heating season.

The center is intended, among other things, as a teaching tool to demonstrate "several effective uses of solar by relatively simple means," according to the architect.



On the building's south face (above) are workshops with counter-to-ceiling windows, an apartment on the second story and domestic hot water collector on the roof. At left, the building from the northwest.

Photographs by Joseph W. Molitor

A Milestone Takes Shape in California

The first of the state's remarkable energy-conserving office buildings nears completion. By John Pastier

After seeing a dog walking on its hind legs, Samuel Johnson observed that the performance was remarkable not because it was done well, but because it was done at all. That sort of tolerance was common, and indeed often necessary, in the earlier generation of energy-conscious buildings. If a funky New Mexico residence was more a heat sink than a house, no one was ungracious enough to dwell on the point. If an active solar structure was more concerned with BTUs than architecture, or if a new civic or office building was mainly business-as-usual with an energy-conserving gadget or two grafted on, these too were seen for their virtues rather than for their omissions.

But now our standards are rising. We not only expect the dog to walk upright, but to do so with grace and perhaps even bring in the evening paper at the same time. We are no longer satisfied by thermal improvements alone, but expect a design to perform well across the board.

The State of California's energy-efficient office building, just being completed in Sacramento at 8th & P Streets, shows that those high expectations are not beyond the possible. In an almost self-effacing manner, it manages to deal with the issues of energy, city texture, pedestrian scale, employee working conditions and the question of appropriate official symbolism not only simultaneously, but also remarkably well. In the midst of that often mindless formalistic resurgence that we have come to call postmodernism, the state office building stands as a reminder that physical problem-solving, concern for users and a commitment to urban wholeness are still potent catalysts for intelligent, expressive architecture.

Designed and implemented under two successive state architects, Sim Van der Ryn and Barry Wasserman, AIA (with Peter Calthorpe, Bruce Corson and Scott Matthews as principal designers), it ends a long drought of state-built office structures and an even longer one of state-occupied buildings of architectural character. And, as a product of Gov. Edmund G. Brown Jr.'s administration, its suggests that this Zen-politician's reputation in some circles for nebulousness and impracticality—he has been labeled "Governor Moonbeam" by Chicago columnist Mike Royko—may now be due for reconsideration.

The state office building can be seen as a threefold accomplishment: It is a successful demonstration of several active and passive energy conservation techniques, it is a comprehensive and integrated work of architecture in the deeper sense of the word and its very existence is a triumph of patience, persuasiveness and pluck in navigating the formidable legislative and bureaucratic labyrinth of the nation's most populous state.

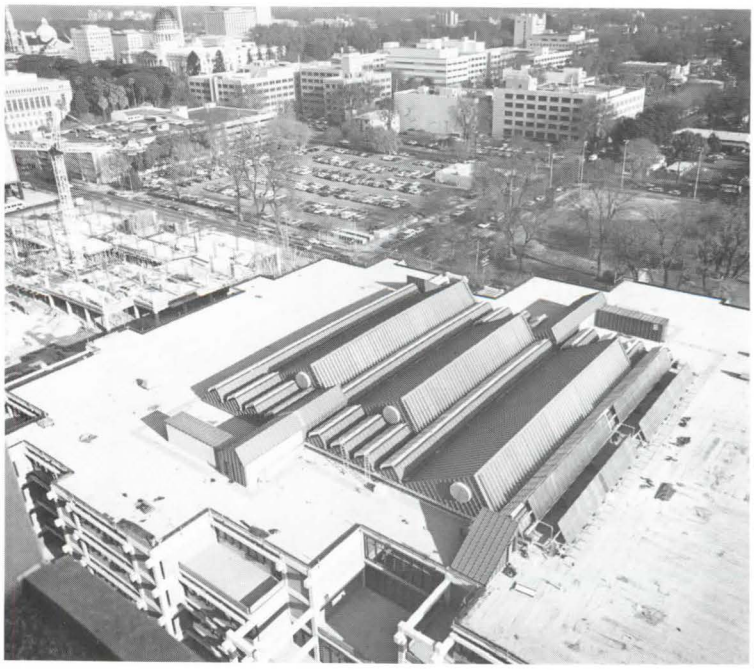
To a great degree, the building's energy-conserving aspects are inseparable from its architectural strengths, which in turn are linked to its response to human and urbanistic obligations. Its great skylit central courtyard, roughly 150 feet square and 60 to 75 feet tall, acts as an orienting device for visitors, as a visible organizer of the building's circulation, as a flexible energy management device that redistributes heat and provides natural light, as a social and dining space for employees as well as an occasional public performance place for the city itself, and, most significantly, as a generous, serene architectural space that brings a dimension of transcendence and illumination to a setting for otherwise mundane activities.

In some respects it is reminiscent of the atria that have become de rigueur in certain first class hotels, since it is the building's prime element of identity and its proof of higher architectural intent. But, unlike those spaces for transient users, this atrium is not so much dramatic as it is comfortable in the long haul. Much of its detailing, particularly along its sawtooth top, is Japanese and residential in flavor although American and public in scale, and this unlikely combination seems, at least prior to occupancy, to be more successful than not. In the course of conducting a building tour for participants in 1980's California Council/AIA convention, state architect Wasserman declined a puckish request to express the court's size in tatami. For the record, and not allowing for vending kiosks and projecting stairs, 1,200 of those modular straw mats would be needed to cover its floor space.

The building's exterior is just as unexpected as its inner space. Unlike the previous generation of government offices in the capital, it is not a freestanding Radiant City-derived highrise form of simple volume, but rather a vigorously modeled low structure built virtually to the property lines of its full-block, 2.5 acre site. Its character is urban with faint suburban overtones, and its scale manages to both respect the pedestrian presence and express a gentle sort of monumentality, conveying the sense of both a public building and a somewhat inflated residence. (In this last respect, it bears a curious reverse kinship to the domestic work of Arthur Erickson, whose abstractly wrought houses frequently seem to be fragments of larger institutional buildings.)

These urban-suburban and residential-institutional ambiguities are not the result of any confusion, but rather represent a finely calculated response to present and future context. Sacra-

Redwood is used inside (as handrails, opposite), and outside to fill in nonglazed bays and under window strips (below).



Photographs by Joshua Freiwald

Mr. Pastier is a teacher and writer in Los Angeles.

The multiple role of the checkerboard courts.

mento is either California's biggest small town or its most diminutive metropolis, and its core is occupied by older, delicately scaled buildings as well as newer, more monumental ones. Occupancy is similarly diverse, since public and private institutional and commercial buildings coexist, not always comfortably, with houses and apartments. The city's central area urban design plan, also a product of the current Brown era, posits a fine-grained 24-hour community of mixed uses and increased residential population, with many people walking or bicycling to work and with offices and dwelling spaces intentionally sharing the same blocks.

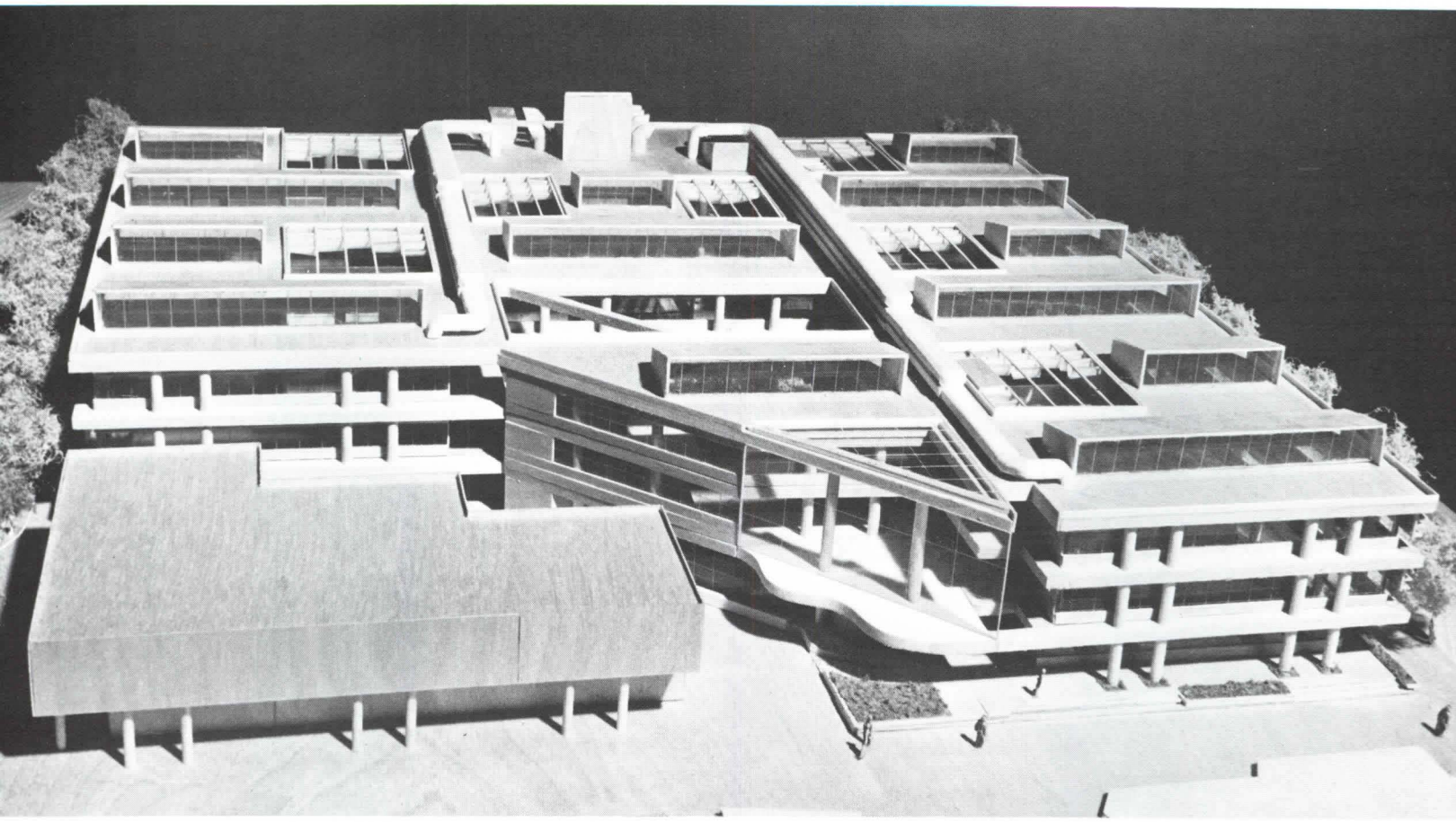
This proposed arrangement is, of course, energy-efficient design on an urban scale, and even though the state office building does not allow space for housing on its site, it nonetheless represents a streetscape element sympathetic to future housing and establishes what may be termed a heroic pedestrian scale. Many of the building's concerns about energy can be seen on the exterior: Its massive exposed concrete frame is designed to take advantage of Sacramento's rather wide daily temperature swings by storing daytime heat and slowly releasing it at night. The building's many terraces, step backs and re-entrant corners aid this process by increasing the surface area available for thermal transfer, even as they break down the structure's scale, create useful ground level open spaces intimate in scale, provide outdoor deck space accessible to the upper level offices, add geometric variety to the perimeter work spaces, facilitate outside views and aid in the process of natural daylighting of the interior. Within the structural frame, the insulating glass windows are protected by movable shades on the critical east and west elevations, and screened in the hot season on the south side by pergolas supporting deciduous vines that will allow in much of the winter sun.

Within the working areas—the primary tenants will be the state departments of developmental services and of mental health—energy strategies will also serve to create a more physiologically and psychologically comfortable setting for workers. By adopting open office floors and eliminating suspended acoustic tile ceilings and substituting acoustic baffles for sound control, the designers have permitted indirect ambient lighting, facilitated beneficial heat stratification and given employees the benefit of 10.5-foot ceilings without increasing the structure's floor-to-floor height. Natural light will enter from both the interior court windows and those on the perimeter, reducing the need for artificial illumination, giving better color balance and subtly introducing the natural rhythms of the day and the seasons into the work areas. Every portion of the 267,000-square-foot building will be within 40 feet of a source of natural illumination.

There are other energy devices employed in the building, most notably rooftop solar collectors for hot water, computer monitoring of electrical use and an underground heat storage system using 600 tons of rock from nearby riverbeds, but it seems fair to say that the state office building is one that seeks to create a humane and stimulating environment while conserving energy rather than vice versa. Barry Wasserman is uncommonly sensitive to the impact of workplace upon worker; he often points out that employees spend more of their total lifetime waking hours in the office than anywhere else, and that lower level employees are particularly affected since they have so little administrative control over their own working conditions. In this building, he seems to have succeeded in translating those concerns into built form. As the first of a series of energy-efficient state buildings, it represents a welcome new attitude in government architectural practice, particularly since it considers energy not merely in its literal physical sense, but also in the broader and more profound context of urban vitality and the human psyche. □

Joshua Freiwald

While filling virtually all of its full-block site, the building faces open spaces on adjacent blocks.



Variations on a Theme of Responsiveness

Every design choice serves more than one purpose in another of the California buildings. By Donald Canty

The Sacramento building on previous pages was first of a triad of almost simultaneously instigated projects that were the initial output of the office of the state architect under Sim Van der Ryn. It was designed in-house, as noted in the previous story, with some outside consultation. Van der Ryn explicitly intended it to be an "exemplar" building, in his term, pointing the way to private firms who would be commissioned to do subsequent state buildings.

The first of these firms was Marquis Associates of San Francisco, chosen to design the state department of justice building in Sacramento to similar standards of energy efficiency as those Van der Ryn imposed on the in-house design. The building is now midway through construction. The architect for the third building of the triad, Benham-Blair & Associates, was chosen through a national competition with energy a central consideration of the program. It too is underway in Sacramento.

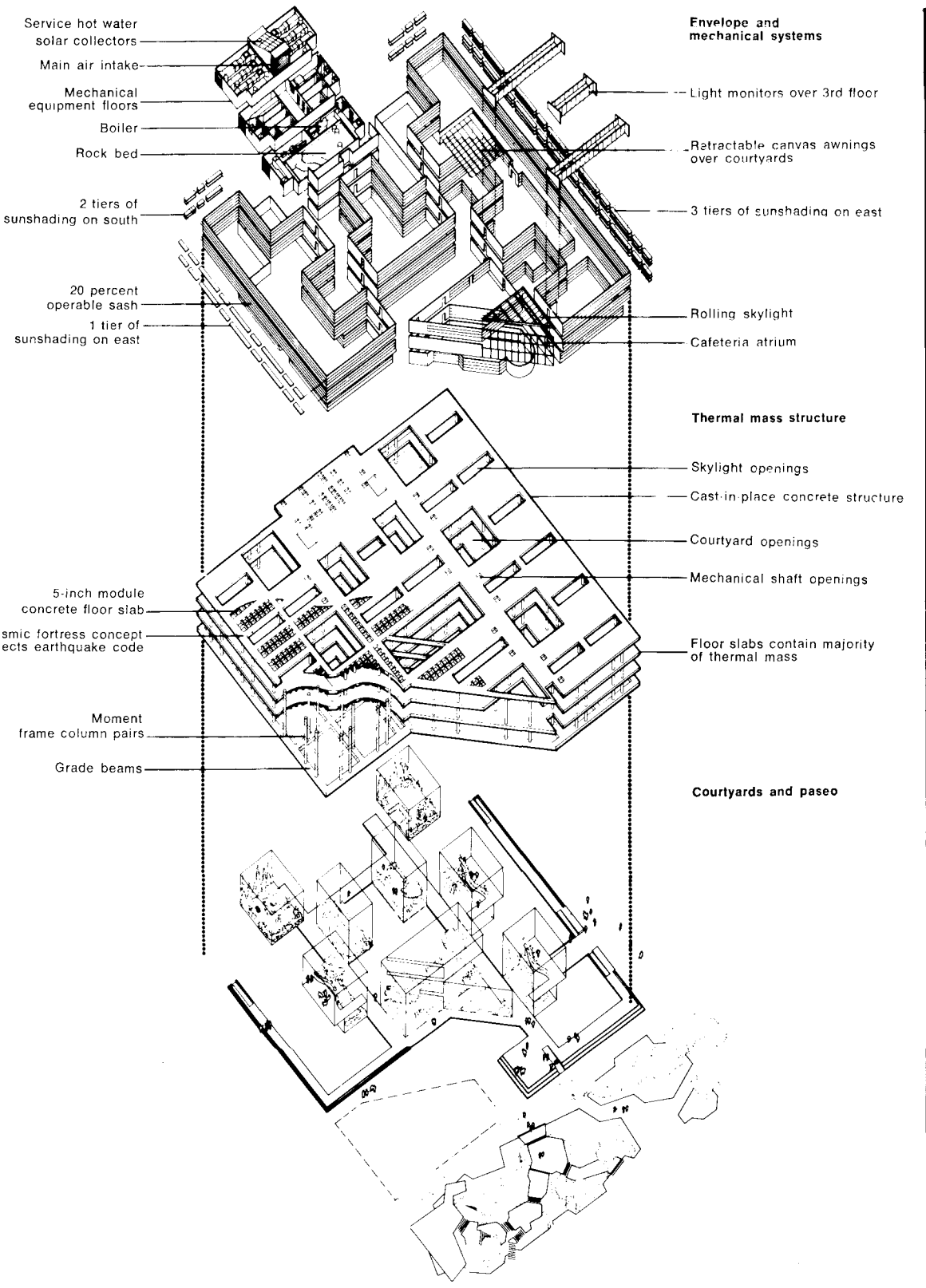
The competition had a curious but salutary spillover. The jury was split three to two in its choice of the Benham-Blair design, a largely underground building topped by a park terminating in a huge, slanted bank of solar collectors. Van der Ryn, who served on the jury, and engineer Fred Dubin made a vigorous minority case for another entry that took a more passive approach and bore closer resemblance to the first Sacramento building.

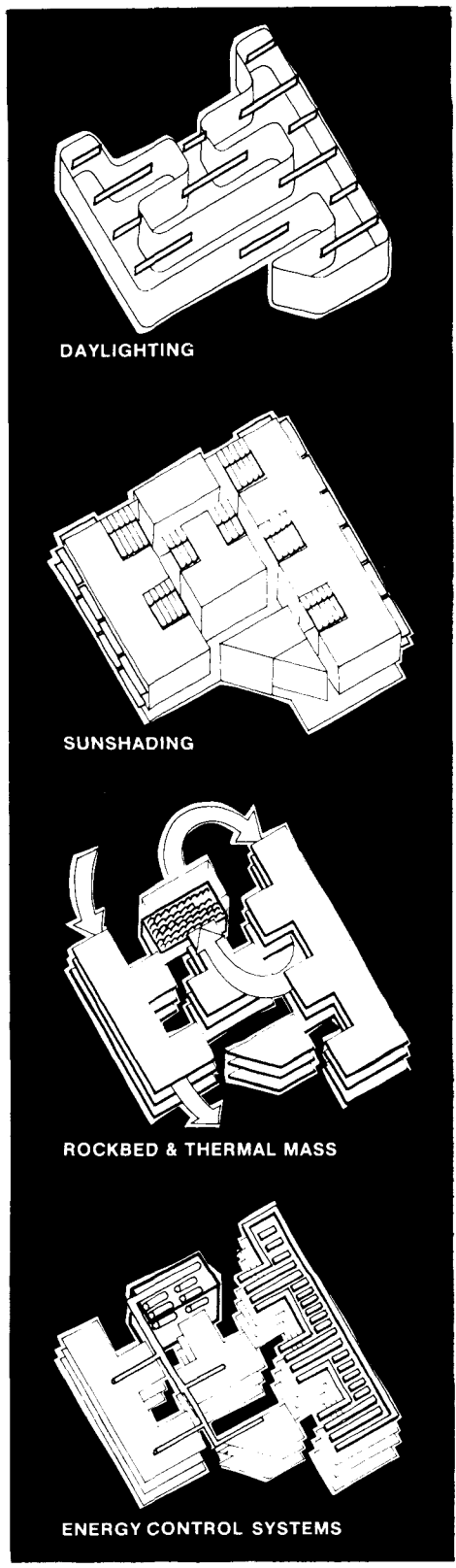
The entry was submitted by the Berkeley firm of Elbesani, Logan, Severin, Freeman (now ELS Design Group) but was mainly the work of three students of Donn Logan, AIA, at University of California: David Baker, Philip Banta and Anthony Cutri. So enthusiastic about the runner-up was Van der Ryn that he found a way to eat his competition cake and have it too. Soon it came time to choose architects for another state office building, this one in San Jose. His choice was ELS Design Group, with a new firm called Sol-Arc as energy consultant. Principals in Sol-Arc are named Baker, Banta and Cutri.

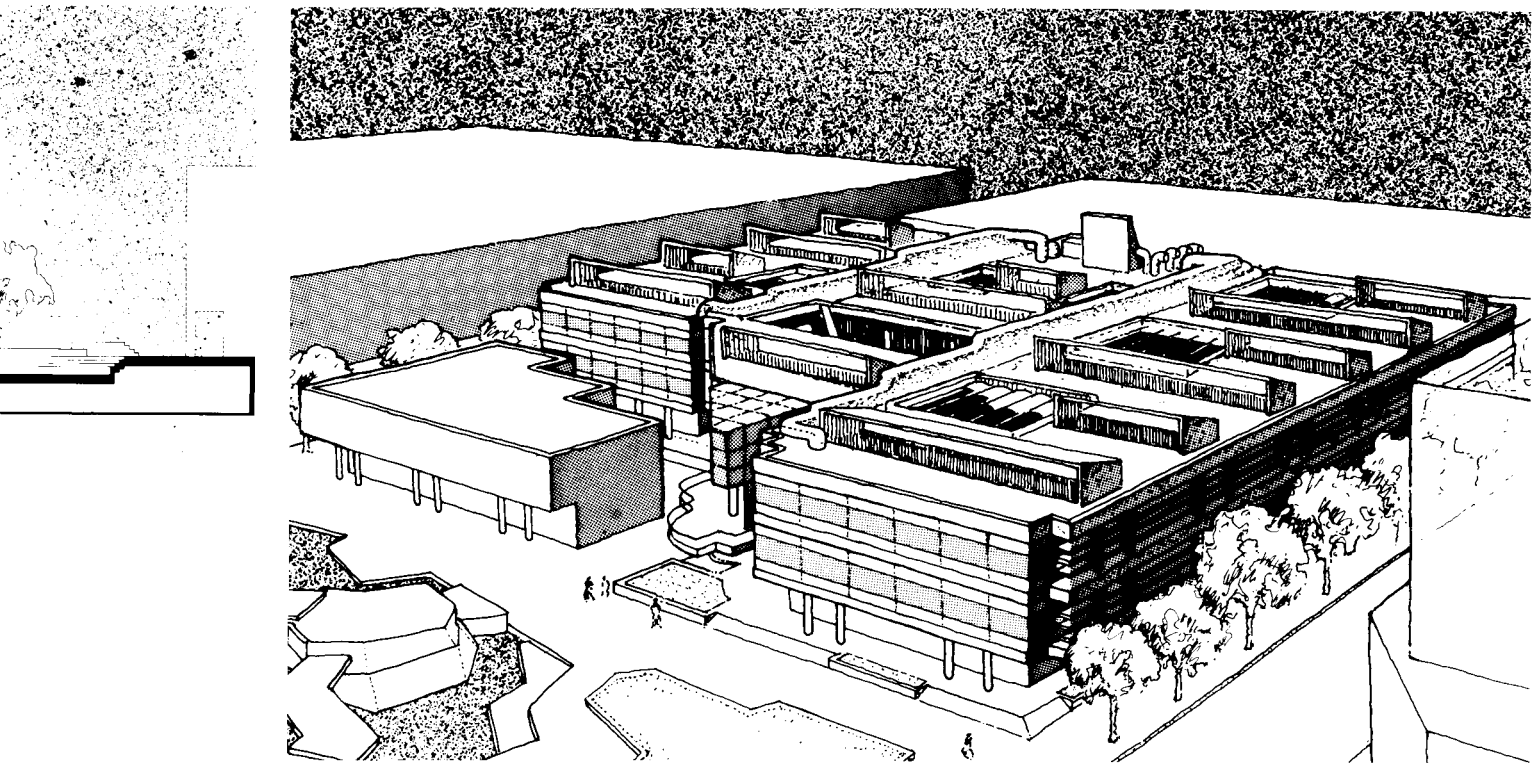
A model photo of the San Jose building is shown above. many important respects it resembles the competition entry, out having a different site and program it is a different design. The site is in a redevelopment area abutting a pedestrian mall. The program called for 125,000 square feet of office space for outposts of 22 state agencies.

The concrete building will be three stories in height and nearly square in plan, with a notch cut out of one corner to make room for a future commercial building on the mall. (The concavities in the foreground of the model photo are the mall's principal fountain.)

The building does not look all that adventurous. It is a basically modernist composition of slabs and tubes, its only unusual elements at first glance being a plethora of rooftop sunscoops and a checkerboard of courtyards. In actuality, however, this is a design of high adventure, advancing the state of the art of energy design—and of architecture itself. For at least as much as any of the other California state buildings (which is to say as much as any major building anywhere) it demonstrates in the process and principles of its design how energy concern can lead to an architecture that is intricate, highly integrated and, above all, responsive.


Service hot water solar collectors
Main air intake
Mechanical equipment floors
Boiler
Rock bed
2 tiers of sunshading on south
20 percent operable sash
1 tier of sunshading on east
5-inch module concrete floor slab
smic fortress concept ects earthquake code
Moment frame column pairs
Grade beams
Envelope and mechanical systems
Light monitors over 3rd floor
Retractable canvas awnings over courtyards
3 tiers of sunshading on east
Rolling skylight
Cafeteria atrium
Thermal mass structure
Skylight openings
Cast-in-place concrete structure
Courtyard openings
Mechanical shaft openings
Floor slabs contain majority of thermal mass
Courtyards and paseo


DAYLIGHTING
SUNSHADING
ROCKBED & THERMAL MASS
ENERGY CONTROL SYSTEMS



Key to the designers' approach is the statement that "nearly every design choice serves an energy-conserving role as well as a programmatic function." And vice versa, they might have added.

They also call the building "a shopping center for state services," and indeed the basic scheme is not unlike that of a shopping mall, with all offices accessible from a central circulation loop and arcades meeting the streets.

The checkerboard of courts is especially versatile in terms of the roles it plays. It links inside and outside spaces visually, providing open areas for workers' and visitors' use immediately adjacent to the offices, and such areas are likely to be well used in the mild San Jose climate.

The courts are also key, of course, to the building's use of daylight. They admit it everywhere, with windows protected from direct solar heat gain by wood louvered sunshades, fabric awnings and projecting floors. The third floor gains additional light from the roof monitors.

It is estimated that except on darkest winter days there will be sufficient illumination from daylight in the first five feet behind all windows. To encourage the turning off of artificial lights when and where not needed, perimeter lighting is zoned separately.

Just as daylighting is expected to reduce the load on artificial lights so use of operable sash should lessen demands on the mechanical system. And the daylighting itself can lower cooling loads by reducing heat gain from artificial lights.

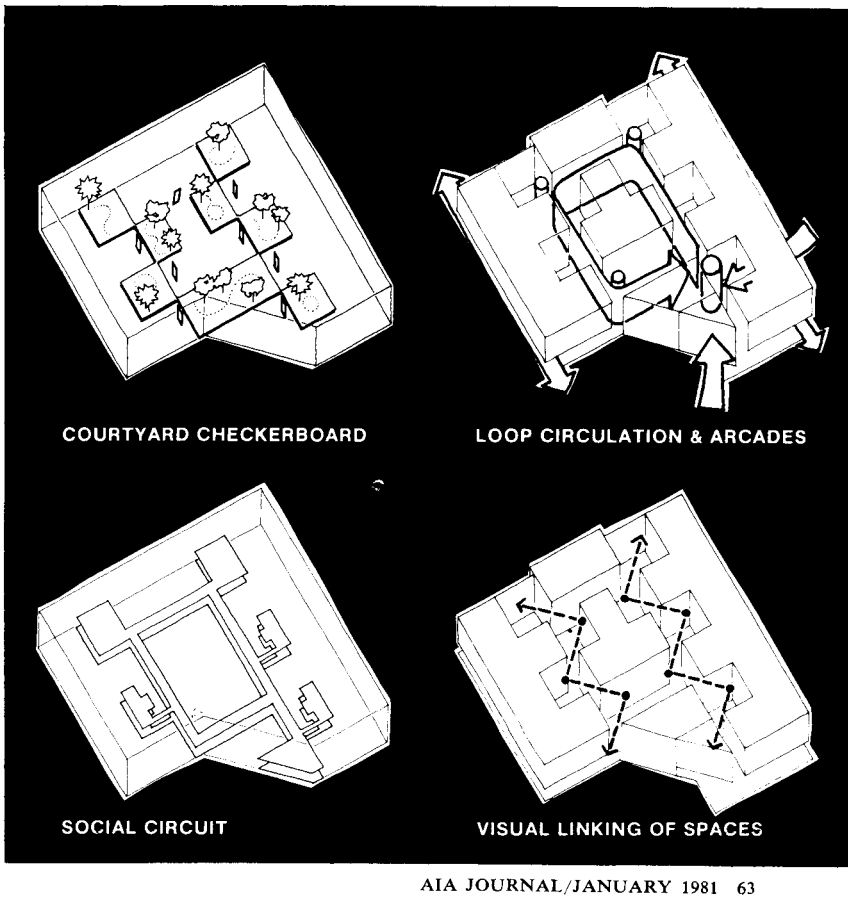
Cooling is the major load in San Jose; the climate is so mild that most heating needs can be met by drawing warm air off the lighting fixtures. The air return to the mechanical system goes through the luminaires into the ceiling plenum to be exhausted during the cooling season and recirculated during the heating season.

In addition to daylighting, the designers have addressed cooling loads through the shading system and heat sinks, in the form of the building's concrete mass and rock bed. At night a computer will direct the mechanical system to flush cool air through the building and the rock bed. This will cool both the mass of the structure and the rocks, leaving them ready to absorb heat during the day.

An analysis of the design by the Ehrenkrantz Group, commissioned by the Department of Energy, says that "studies of similar buildings in similar climates show that high-mass structures can cut daytime cooling loads by more than half." Such studies also "indicate that thermal storage rock beds can reduce daytime cooling loads by as much as 75 percent. They can also lower peak energy load demands by as much as 50 percent."

In all, the designers estimate that, based on computer simulation of the design and its energy performance, the building will use 70 percent less energy than a conventional one of the same size and function.

There are no similar ways to simulate amenity and user satisfaction, but the yield in both from this design should be high indeed. □



Previews of Some Coming Attractions

Drawn from a DOE demonstration program in commercial passive design. By Nora Richter Greer

The potential energy savings in commercial buildings through passive solar concepts is great, says the Department of Energy—as much as 70 percent of current use. Yet, few architects have had experience in passive design for buildings larger than a house. And while current passive design concepts used at residential scale can be readily applied to small commercial buildings, problems can arise when transferring these techniques to larger commercial buildings where internal loads dominate energy use.

In an attempt to stimulate interest and advance understanding in this field, DOE in 1979 launched a program to investigate, demonstrate and promote the role of passive solar design concepts in heating, cooling and lighting commercial buildings. DOE's goal for 1986 is 200 million square feet of new commercial development using passive solar energy, saving an equivalent of 2.7 million barrels of oil a year. By the year 2000, the goal is to displace the equivalent of 45 million barrels of oil per year in 5 billion square feet of commercial buildings (which is equal to 10,000 buildings 16 stories high with 30,000 square feet per floor).

At the heart of DOE's efforts is a demonstration program, announced in spring 1979. Through the program, "prototype" buildings will be constructed. Cost and performance data of the passive solar systems will be collected, analyzed and shared with other design professionals. The design process, as well as design tools, will be closely studied. DOE will pay for part of the additional design and analysis costs incurred by adding passive solar elements and for part of the increased construction costs. It is estimated that initial costs will increase by 10 to 20 percent and energy consumption will be reduced by 50 to 80 percent.

Out of over 300 projects submitted, 40 were chosen for the design phase and two for construction. Approximately 30 projects are to move from the design stage to construction in 1981. The projects range in size from 600 to 64,000 square feet in a variety of building types: office buildings, an airport terminal, a store and shopping center, a library, police station, community centers, gymnasium, church, among others. The buildings —both new and retrofitted—are or will be located throughout the country from Alaska to southern California to Boston to Alabama.

Each of the 40 project teams established a "base-case" building, with calculated heating, cooling, lighting and other energy requirements, taking into consideration internal loads, building occupancy, schedule and climate. These buildings were to reflect "state-of-the-art" techniques for energy conservation. According to DOE, most base-case buildings were highly energy efficient, well below the building energy performance standards design budget requirements.

Designers then developed alternative passive design schemes and estimated their costs and energy performance. Energy estimating techniques ranged from calculations of Los Alamos Scientific Laboratory solar load ratio or solar savings fraction, to computer simulation using DOE-2, BLAST or other procedures. Calculation and design assistance was provided.

DOE required that the buildings chosen for construction have passive solar features which address the building's major energy requirements; make a positive contribution to the esthetic character of the design; are integrated with the mechanical, lighting and other support systems, and demonstrate "technical validity." Also the cost of the passive features had to be "reasonable" as measured by life cycle cost analysis.

In reviewing the designs, the "technical experts"—Sarah Harkness, FAIA, Lawrence Bickle, Bruce Hunn, William Lam, Richard Rittlemann, AIA, and Michael Sizemore, AIA—found that the "most fundamental task facing the passive solar designer is to achieve a good understanding of both the static and dynamic energy needs of the building." For example, designers need to recognize that various passive strategies differ in the time delay between the collection of energy and delivery of that energy, they said. And the choice of direct gain versus indirect gain depends, among other things, upon whether heating is needed during the day, evening, night or at all. Another example is the tradeoff between thermal mass and insulation.

The experts also concluded that daylighting is a complex subject much less well understood than passive heating: "The lack of design tools or indicators dictates that the designer can obtain the best results by building a physical model of the daylit space to analyze the results of his design."

Another important issue, they said, is the question of economics and cost effectiveness. "As strategies are successively applied to the energy problem, the energy appetite of the building is reduced. Thus, the cost effectiveness of each solution must be calculated relative to the sum of the previous solutions and not relative to the base building. Each additional solution chases after progressively more elusive BTUs and becomes less cost effective."

DOE's program is directed by Robert Shibley in Washington, D.C., Ted Kurkowski in Chicago and Steven E. Ternoey, AIA, of the Solar Energy Research Institute. Technical monitoring of 12 of the 33 projects was provided by Harry T. Gordon, AIA, of Burt Hill Kosar Rittelmann Associates and William I. Whiddon of Booz-Allen & Hamilton, Inc., among others. Gordon and Whiddon found that many teams did not adequately define the energy program at the outset and did not identify the full range of suitable options to heat, cool and light the buildings. Instead, they say, the designers elected to develop entirely new systems and concepts, many of which were too complicated, redundant, ineffective or unsuitable for application. And, they say, in many instances the contribution of the passive features was overstated.

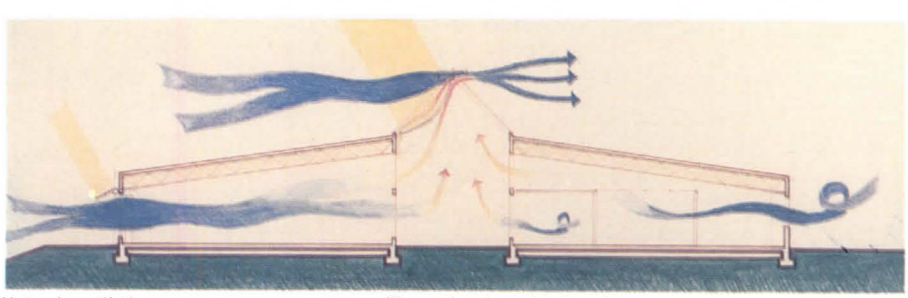
"The fundamental problem was a lack of simplicity in the design process," Gordon and Whiddon conclude in their report. "Many design teams began with a sophisticated detailing of inappropriate, costly or ineffective solutions. Some designers believed that a passive design problem indicated complex, highly detailed analyses and elaborate system designs at the outset. However, a simple, methodical and straightforward approach to predesign analysis would have eliminated the problems."

Gordon and Whiddon offer the following observations:

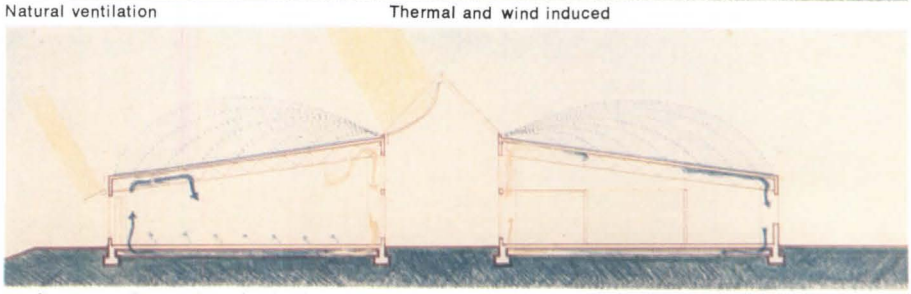
- The interrelationship between heating, cooling and daylighting energy requirements cannot be ignored.
- Passive solutions offer an increase in amenity as well as energy savings in many cases. The qualitative aspects of daylighting

continued on page 106

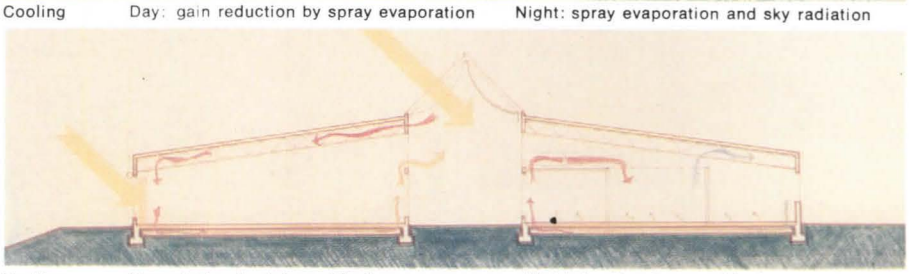
Heating of the 64,000-square-foot Princeton (N.J.) Professional Park office complex will be achieved through indirect solar collection in the atrium with storage in a horizontal rock bed and slab. For cooling, natural ventilation will be induced through the atrium by thermal and wind pressure. The rock bed will be cooled down at night by air circulated under the metal roof while it is sprayed with water. Daylight will be channeled from the atrium to the offices by either a light shelf and translucent panels or an open clerestory with landscape planning. Architect: Harrison Fraker (Harrison Fraker, AIA, principal) and Short & Ford (Jeremiah Ford III, AIA, principal). Solar designer: Princeton Energy Group (Lawrence L. Lindsey, principal).



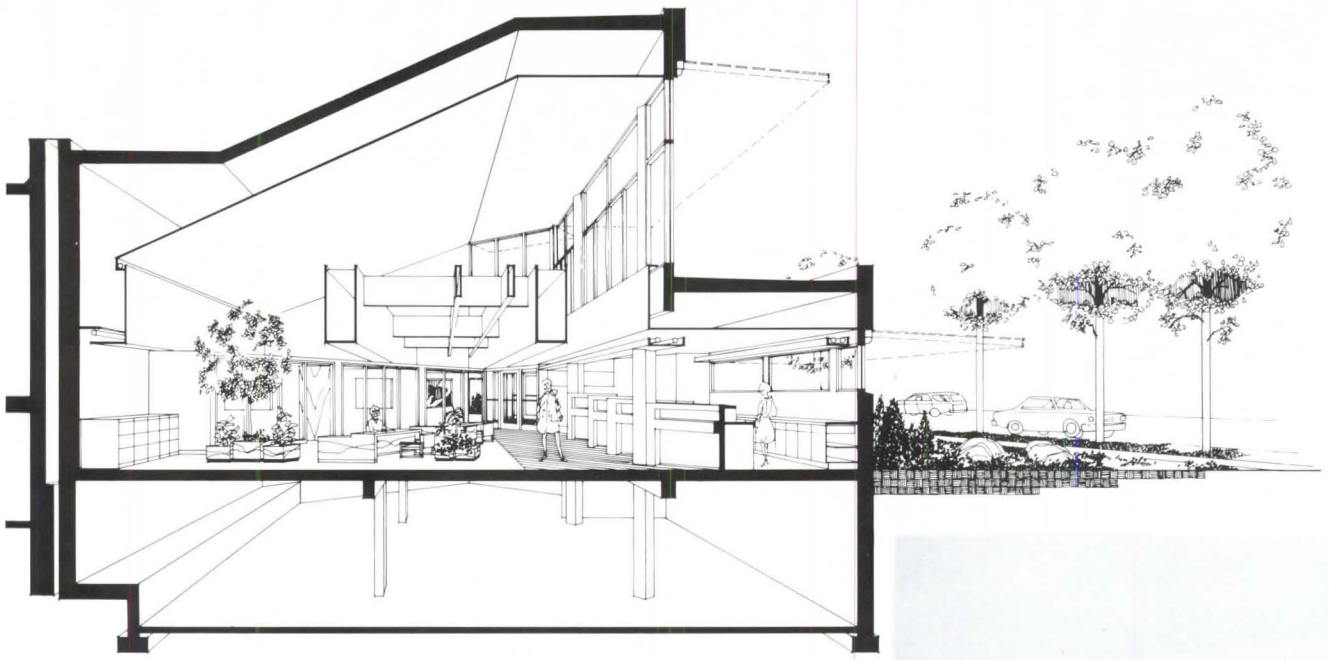
Natural ventilation — Thermal and wind induced



Cooling — Day: gain reduction by spray evaporation — Night: spray evaporation and sky radiation

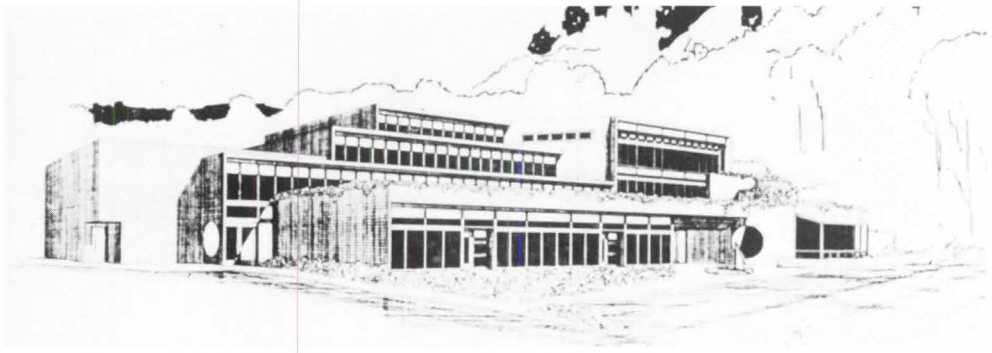


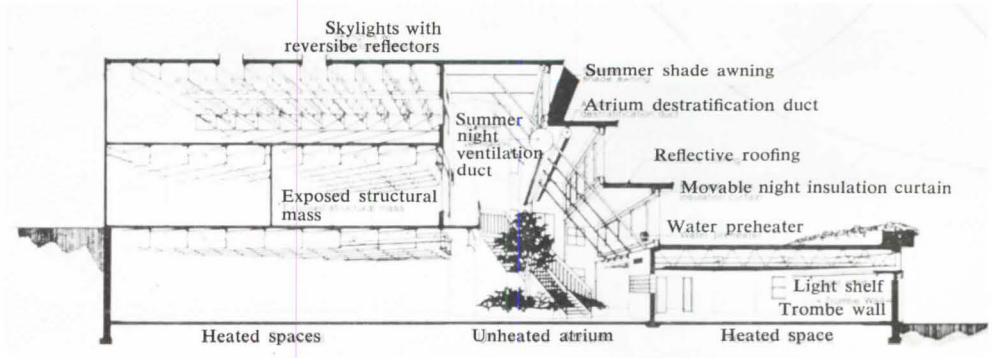
Heating — Day: storing heat in rockbed — Night: heating from rockbed



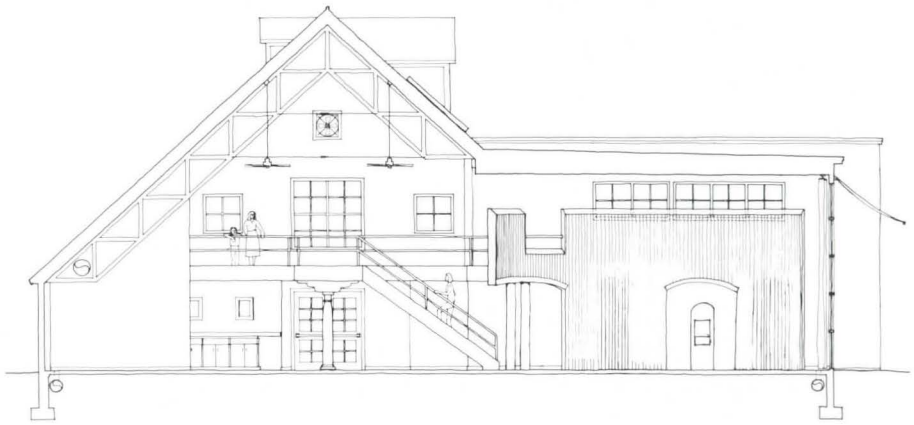
The first concept for the 11,012-square-foot Security Bank in Wells, Minn., called for a Trombe wall. But when energy costs to reheat the building every morning were estimated as high, the design was changed to a low mass, Thermos bottle approach with a south, double-glazed window wall and highly insulated north, northwest and northeast walls. Daylighting then became an important ingredient. Light will enter the building through the window wall and clerestories. For cooling, a high velocity air system will pull outside air from the northwest corner through ducts. Architect: Gene E. Hickey & Associates (John P. Thorstenson, AIA, principal). Solar designer: John Weidt Associates (John Weidt, AIA, principal).

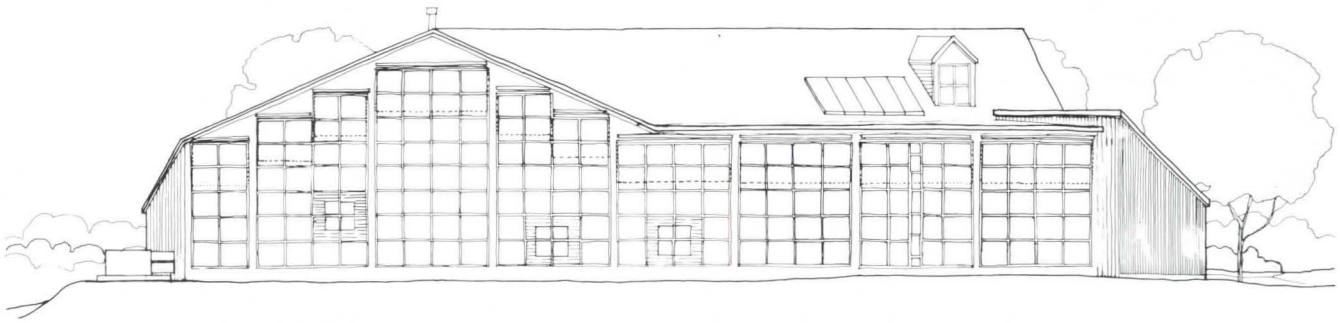
The design of the 31,870-square-foot Blake Avenue College Center for the Colorado Mountain College at Glenwood Springs will incorporate a central atrium space, Trombe walls with light shelves, skylights and a stepped floor plan. Heating will be provided by the Trombe walls, ventilation from the atrium and internal gains. On most summer nights, induced ventilation will sufficiently cool the entire building. On most summer days, the building mass will absorb all internal and external loads. Skylights will have reversible reflectors to enhance direct gains in the winter and exclude them in the summer. Architect: Sunup Ltd. (Peter Dobrovolny, AIA, principal). Solar designer: Thermal Technology Corporation (Matt Crosby, principal).

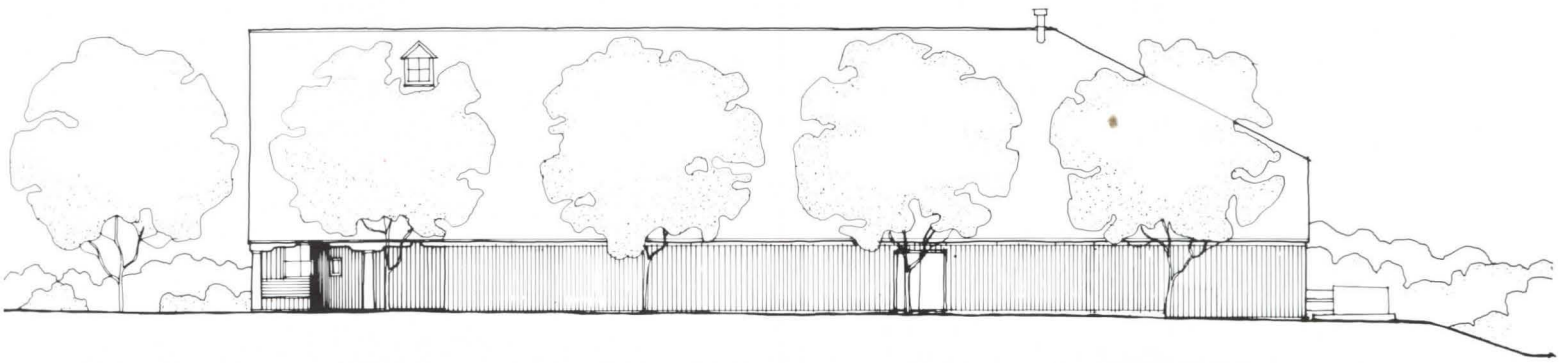




To heat and light the 5,500-square-foot program center building at the Shelly Ridge Girl Scout Center in Pennsylvania, a combination Trombe/direct gain wall of brick and glass windows will be used on the south side of the 2,914-square-foot main lobby. Direct solar heat will be captured by the lobby's concrete floor and semicircular brick rear wall during winter months. In summer, a canvas awning system and vine-covered trellis will shade the area. Most interior spaces will be daylit, with supplemental light entering through dormers. Architect: Bohlin Powell Larkin Cywinski (Frank Grauman, principal.) Solar designer: Burt Hill Kosar Rittelmann (Dave Hill, principal).







The Solar Section: Starting Point of Passive Design

In the final analysis, 'the sun makes its own terms.'
By Sarah P. Harkness, FAIA

The old freedoms of expression die hard as we move into the solar era. Instead of relying on mechanical engineers to get us out of our universal design solutions and our flights of fancy, we are back to dealing with nature and, in particular, the sun. Is this a constraint or an opportunity? Will solar design give us some new forms to copy? If so, is it likely that designers will pick up the new forms to wave like flags over their buildings, much as builders picked up on the south-facing plate glass windows of the early modern movement and turned them into "picture windows" facing the street (with a buxom lamp in the middle)? Or will designers welcome the new viability of their profession?

Solar design is not always apparent, especially when the passive approach is taken. Neither does it dictate any particular style. However, the sun makes its own terms, and they must be acknowledged. The response to these terms is most apparent in sections of solar buildings, most particularly in south-north sections. For better or for worse, this is where the designer must begin.

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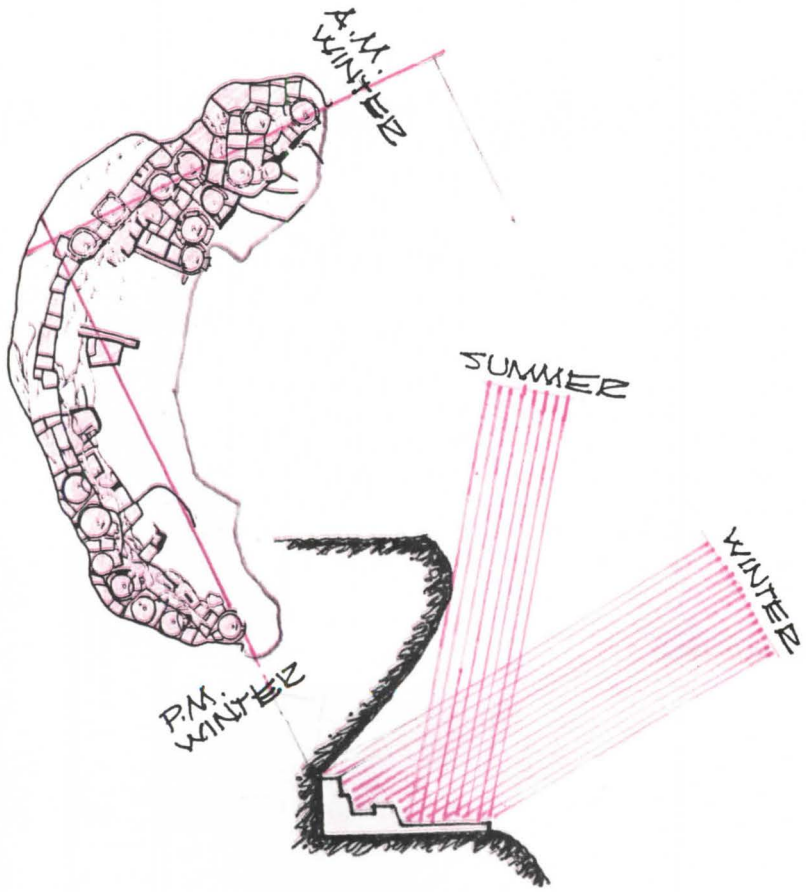
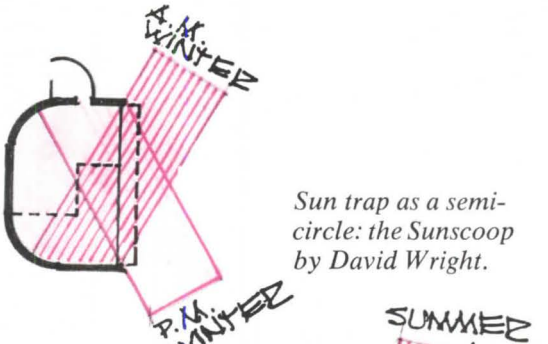
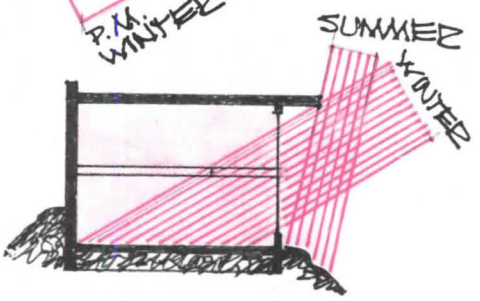
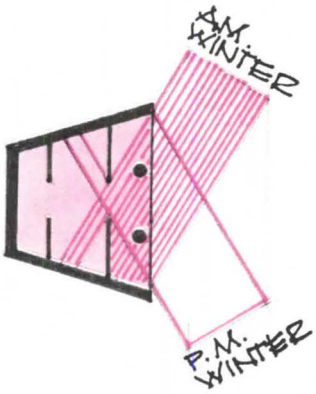


Plan and section of Longhouse Pueblo, Mesa Verde, show the arc of winter sun penetration and shielding of summer sun.

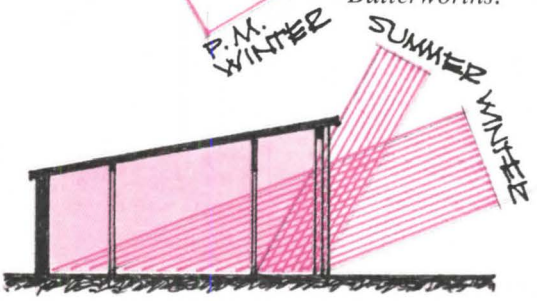


Sun trap as a semicircle: the Sunscoop by David Wright.





Sun trap as a trapezoid: Socrates solar house by P. Sabady/Newnes-Butterworths.

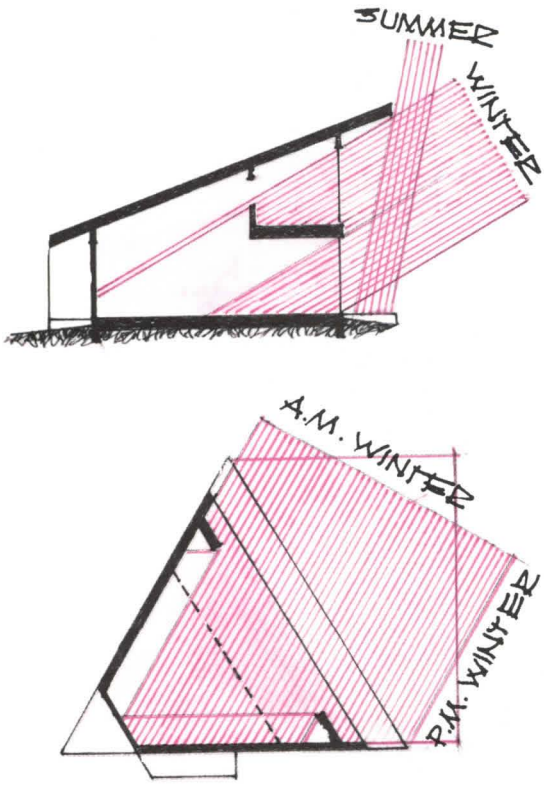


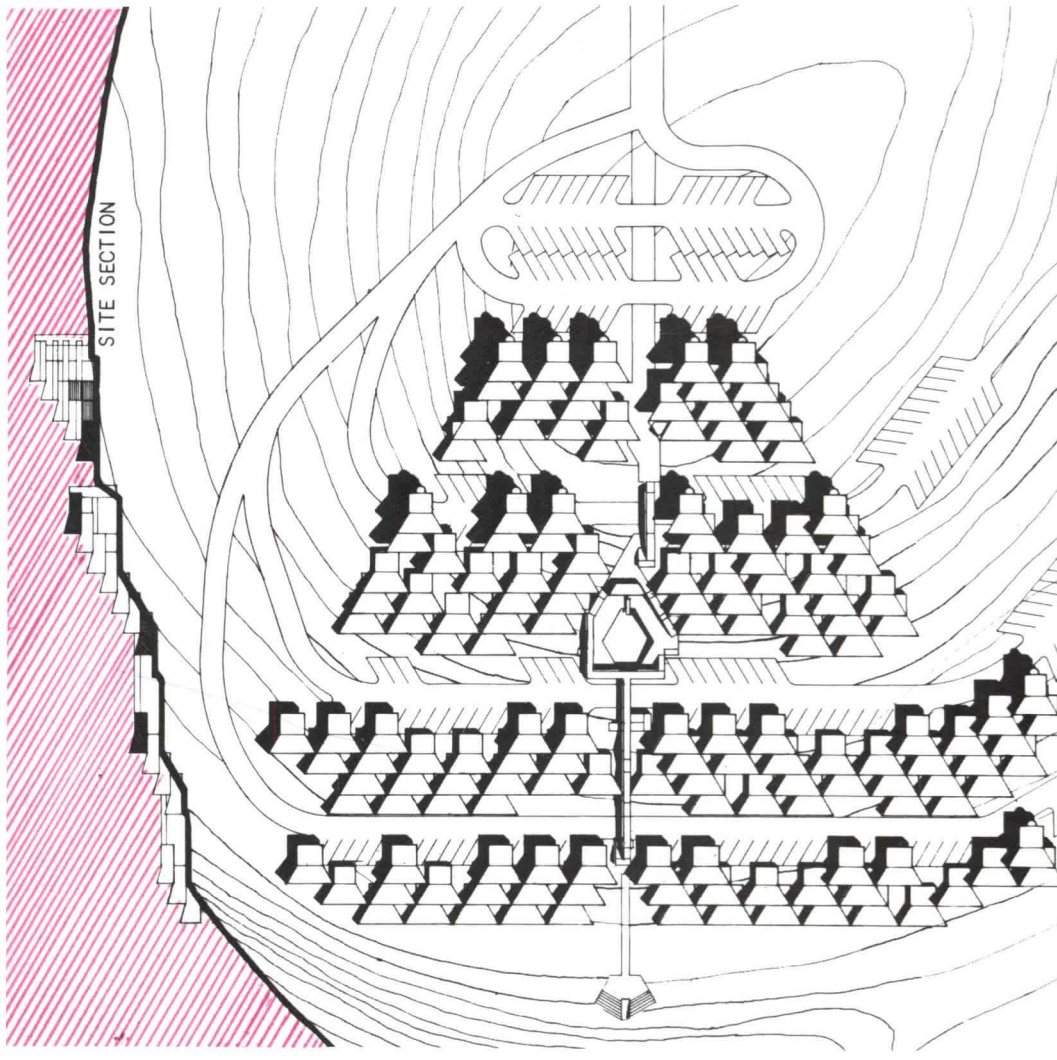
A cave carved into a cliff facing south is probably the most basic of shelters. At Mesa Verde, in the southwest corner of Colorado, where cliffs were formed of layers of sandstone by erosion from the sun, wind and water to a slate base, Pueblo Indians built whole communities into the cliff faces. These cliffs may have been inhabited for 12,000 to 14,000 years, but from A.D. 1100 until 1500 they housed a thriving culture.

Of the many caves in the cliffs of Mesa Verde, Longhouse Pueblo has received particular attention from a solar point of view. Ralph Knowles of the University of Southern California, with his students, has studied extensively the relation of sun and form and the seasonal differences in insulation at Longhouse. The cave faces south, is 500 feet wide, 130 feet deep, and arches at the front to a height of 200 feet. Terraced buildings inside the cave receive the low winter sun but are shaded from the sun in summer by the upper edge of the cave. Knowles states in his book, *Energy and Form,* ". . . the energy total in winter is only 12 percent less than that for summer, despite the fact that the summer sun stays *in the sky* 30 percent longer." The earth and stone of the cliff itself mitigate the climate of the dwellings, causing them to be warmer in winter, cooler in summer.

Throughout history people have rediscovered the south-facing cave shape. From Socrates (469-399 B.C.) in Greece to James Lambeth in present day Arkansas, designers have come up with the same semicircular or trapezoidal sun trap. When an idea comes up again and again, one wonders if it is a typical blind alley or if there is something universal about it. Why has the

The sun trap adapted into a cabin (below) in Arkansas by James Lambeth. At right, Lambeth's plan for a solar village in Missouri (site section on plan's edge).





form not become common? In solar architecture, the cave shape is the purest example of direct gain, catching not only the direct south sun, but the east and west sun as it hits the angled walls. Perhaps one answer is simply that an angular or curved building is usually not as economical to build or as logical for planning purposes as a rectangular one.

If we assume, then, that a rectangular plan is almost as good a sun catcher as the trapezoidal plan, we see that the same section "invented" by Socrates—the shed roof opening to the south with a balcony hung in the high space of a heat absorbing or thermal mass type of structure—is a basic form in solar architecture. Closed by glass at the south opening, the form is especially prevalent in adobe construction in New Mexico. Since the climate is reliably sunny in the daytime and cool at night, in winter the thermal mass of the building, insulated on the outside or banked with earth like a cave, absorbs daytime heat, thereby preventing it from overheating, and gives up the heat at night when the outside air temperature goes down.

Nighttime window insulation prevents heat loss through the glass. In summer the overhanging roof cuts off the direct sun into the space. Since warm air rises, there are different "climates" at different levels in the building at different times of day, which may dictate how many spaces are used, or may cause a migration of use from one part of the building to another in the course of a day.

Returning to the original cave shape, James Lambeth has exploited it in ways that suggest further possibilities. Lambeth's design for an isolated vacation cabin in Hazel Valley, Ark., is a pure and simple example of a passive solar dwelling. As well as glass at the south opening, sophisticated improvements to the south-facing trapezoidal form include thermal walls set back from the glass at each end of the south window wall, an open stone fireplace which also absorbs radiation from the sun and two-story hinged wall reflectors to increase the sunlight hitting the thermal storage walls. The roof and east and west walls are highly insulated between the thermal layer and the outside wall, and the concrete floor also acts as thermal mass.

The Delap residence by Lambeth, built in 1977 in Fayetteville, Ark., is designed on the same concept as the cabin, but is developed into a three-bedroom family house. Carrying the concept still further, Lambeth has developed hypothetical schemes for housing, where unit modules, designed to provide 75 percent of internal climate control without any mechanical devices, could be plugged into geometric groupings. "A combination of large amounts of insulated glass and limited interior volume produced the form," Lambeth explains.

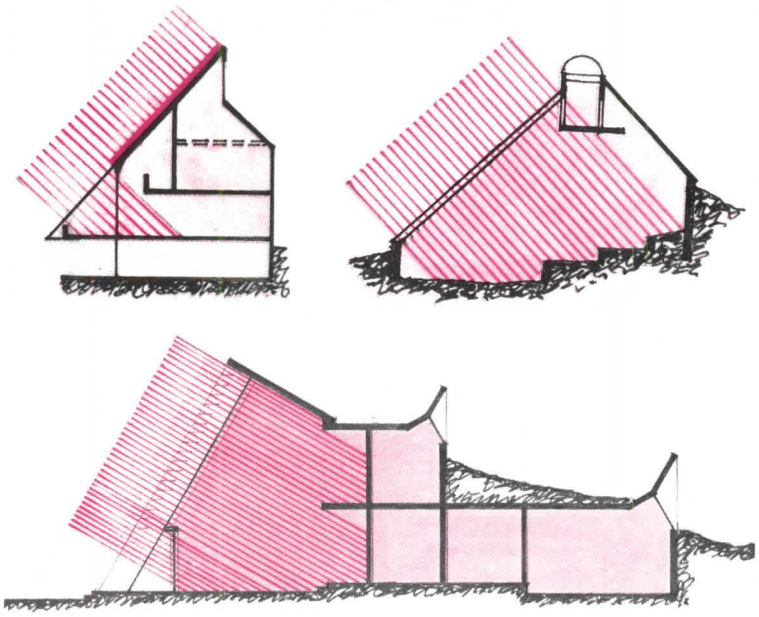
Variations on the solar cave shape have been designed and built independently in different parts of the country. A typical variation is a trapezoidal greenhouse with thermal mass side and back walls, set within a rectangular or other shape of building. Heat absorbed by the back and side walls is given off at night to the surrounding living spaces. A notion occurs that the trapezoidal sun spaces might be nested with trapezoidal shapes facing north to develop a plan system for a larger building. Beginning with an understanding of the original solar cave, possibilities are endless.

The classic solar section in various guises.

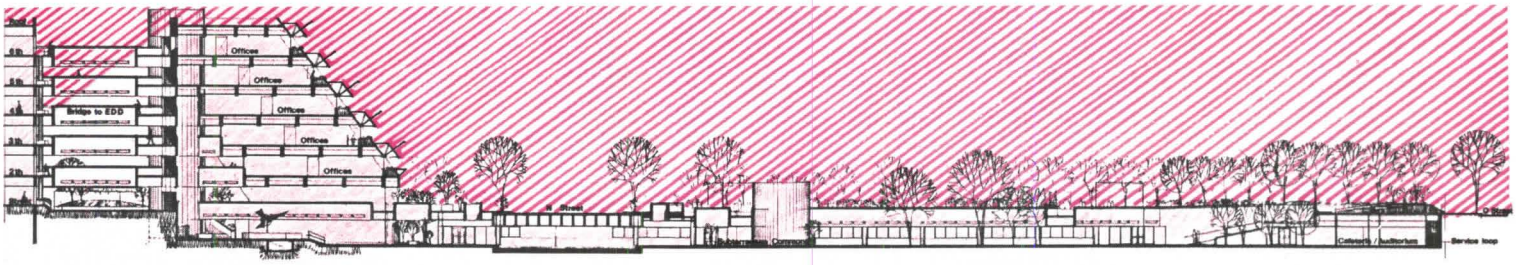
The sun does not change from year to year. Its daily passages and seasonal arcs relate to latitudes of the earth in the same way they always have. To use the sun's rays to the greatest advantage for trapping heat, avoiding losses from reflection of light-waves back to the outside, it is logical to set the south glazing or collector surface perpendicular to the most desirable sun rays. This is true, whether the wall or roof is transparent, as in a greenhouse, such as the New Alchemy Bioshelter, or opaque, as with a flat plate collector, such as the Fuller Moore house.

Desirable angles vary with latitude, all the way from horizontal in the south to vertical in the north. If solar collectors are employed and the object is solar space heating in the cold season when the sun is low, the angle of the collecting surface is steep; if the object is domestic water heating for year-round use, the angle is a compromise between steep and flat. However, the most common solar section (south-north section through a building) is sloped at an angle of 45 to 60 degrees on the south face. The south glazing, rather than serving only as an invisible closure to a cave shape, becomes the most distinctive feature of the building shell; upper floors typically become balconies, allowing warmed air to rise and circulate in the building.

The same general section appears in all parts of the country, from the New Alchemy greenhouse "bioshelter" in Falmouth, Mass., designed by Solsearch, to the competition-winning California office building in Sacramento, designed by Benham Blair & Affiliates. As with the cave shape, designers, builders and experimenters have arrived at the same form independently, usually through a process of logic rather than trend-following. The solar section is recognizable to the point where it could be considered classic. Good design depends on the skill of the designer.



Classic south-north sections in a house by architect Fuller Moore, College Corner, Ohio (top left); New Alchemy Bioshelter, Falmouth, Mass., by Solsearch (top right); Ithaca day care center by William F. Rogers and Kim Wong of Cornell University (above), and Benham-Blair & Affiliates' California state office building, Sacramento (below).



Solar strategies in high-density development.

Solar design at first concentrated on systems in efforts to find out what could be gained from the sun and how. For early experiments, the smallest habitable buildings—houses—were used, and the most advantageous sites were selected, usually south-facing slopes unobstructed by trees or other structures. Obviously, the single-family suburban house built on (or into) a south-facing slope is not a universal answer to the world's energy problems. As confidence in the use of solar energy has grown, more complicated situations have been addressed. Larger buildings, building complexes and urban situations present new and different problems. The information gained in early small-scale experiments formed an invaluable base, but solutions for a dense context become quite different.

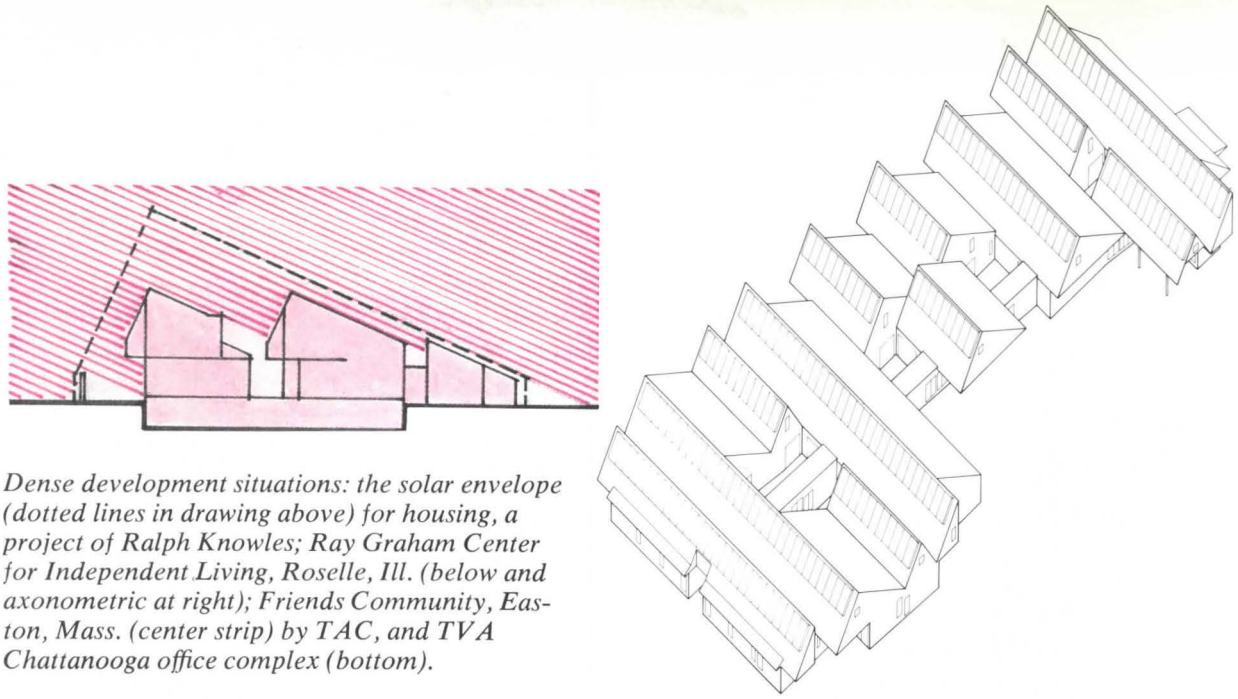
The first problem encountered in a dense situation is solar access. Not only must the sun be unobstructed by trees, the lay of the land or other buildings, but the various parts of the building or complex of buildings must not shade themselves. And, of course, one must allow others to use it also. The result is solar zoning.

A base for solar zoning is the "solar envelope" concept, developed by Ralph Knowles and his students, using Los Angeles for their site studies (see Feb. '80, p. 42). In an urban situation, density is the prime requirement. Density is the nature of cities, and land values require it. The solar envelope defines the three-dimensional space that a building can occupy without shading neighboring buildings or properties. For a building to receive sunlight, there must be enough space between it and the next (shading) building, or the next (shading) building must be shaped in line with the direction of the sun. The solar section that has become classic for individual buildings is suddenly reversed; the slope is to the north, and the south face becomes vertical. If the classic solar section made sense, as in the California state office building, how can one reconcile the section of a solar envelope, as indicated in the TVA Chattanooga office complex?

The greatest energy need in houses or in most other small buildings is heat. The cave shape and the classic solar section collect heat from the sun as efficiently as possible. However, in the urban situation not only is density a factor, but buildings are larger and of a different type. Internal heat gain from lights, people and machines obviate much of the need for additional heat. Cooling is generally more of a problem.

The California state office building allows for solar access to the sloping six-story south face by fronting it with subterranean structures, which have access to sunlight through a series of courtyards. Attached to the sloping south face are focusing collectors which supply high temperature water suitable for use in cooling, by means of a chiller, or heating.

In other office buildings, however, it has been found that the greatest value from the sun can be in daylighting. Besides saving the energy that would be used for artificial lighting, internal heat gain from the lights is also reduced, which reduces the cooling load. In a vertical south face, sun shading and reflecting devices can be incorporated to amplify penetration of daylight



Dense development situations: the solar envelope (dotted lines in drawing above) for housing, a project of Ralph Knowles; Ray Graham Center for Independent Living, Roselle, Ill. (below and axonometric at right); Friends Community, Easton, Mass. (center strip) by TAC, and TVA Chattanooga office complex (bottom).

deep into the space while cutting out direct sun. On the north side of the building, daylight comes principally from the sky vault. A stepped or sloped configuration allows for skylights. The resulting south-north section coincides very nicely with the solar envelope.

In directions other than north and south, configurations of the tent-like shape of the solar envelope become quite complicated, especially where the site is nonrectangular, has changes in level or is oriented away from the points of the compass. This is probably true of the majority of situations. But, since we are looking for basics, we will address only the simpler situation, where the south-north section of a solar envelope is the most distinctive.

The section through the street, which shows the buildings along the street in elevation, is where we are in for a surprise if the solar envelope concept is applied. A street running from east to west presents a conventional appearance on the north side of the street, where the south sides of the buildings are full height and vertical. On the other (south) side of the street, the buildings are either set back, terraced or sloped. On a street running from north to south, the buildings on both sides represent the south-north solar envelope section, and must therefore either be separated by open space or present a sawtooth configuration.

Within large buildings, atriums or sun courts have come into use to achieve daylighting without losing density. With several floors opening into the atrium, the upper floors progressively set back from the lower floors and the classic solar section appears. The difference, however, is that louvers in the atrium roof can make the light diffused, or directed straight down, so that both north and south atrium facing sections can be the same.

The sun is a natural resource. We have always thought of it as free, forgetting that we may have to go on a long hot drive to the beach to get it. Whether the sun is used for heating, daylighting or in indirect ways such as for heating water with solar collectors, making electricity with solar cells or for the sheer pleasure of it, solar zoning by means of the solar envelope protects everyone's rights to the sun.

In being forced to sympathize with the eternal habits of the sun, with all its rhythmic changes from morning to night and from season to season, designers may find solar design inhibiting. Or then again, our urban scene might attain a homogeneity which it now lacks. In earlier times when designers and builders were constrained sometimes by climate, sometimes by construction and materials, individualism was expressed in detailing and decoration within the accepted set of restrictions. On Beacon Hill in Boston, where narrow, six-story brick town houses line the street, every doorway and knocker, wrought iron fence and bay window brings special character to the particular house. But the street front is continuous.

Would it be too great a loss of freedom to exchange large-scale dramatic forms for small scale refinement? Such refinement may be better appreciated from a position on foot than from a fast-moving car—but perhaps on foot is just where you will be. □

Energy, Human Ecology and Urban Design

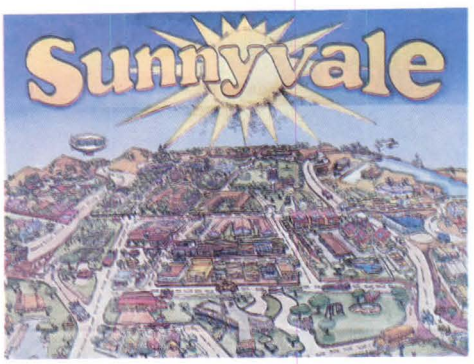
They intertwine in a free-wheeling 'retreat' and some real world projects. By Marguerite N. Villecco

The transformation of new and existing cities to a natural resource base adds new dimension to the art of energy-conscious design. As ideas about using the dynamic cycles of sun, soil, wind and water for energy and amenity at urban scale find form and support, our perceptions of urban potential expand. New values and purposes converge and new images of the city emerge.

The idea of self-sustaining communities in balance with nature is not new and may seem reminiscent of 18th century Utopianism, a romantic notion from the rural past. Even the Mother Earth images of the last decade, of living simply and communally, with organic gardens, seem remote from current perceptions of urban practicality. But now there are proposals for self-sustaining settlements, and for the modification of existing cities, that mandate new forms and more rigorous exploration. The frameworks for design are moving from the countryside to the city, with its attendant social, economic and policy implications.

What has been perceived as a low-technology approach toward living and design is also evolving as the most sophisticated. These new urban concepts push the limits of our knowledge about natural and artificial environments and entail new kinds of scholarship about their interrelationships. Considerations of community, culture and human aspiration are rethought. And the definition of technology as knowledge is recaptured.

It is in this milieu of inquiry and possibility that the new urban design models illustrated here are emerging. Some are theoretical, the result of diverse minds coming together for a week's retreat and experimentation on projects not yet real, but concerned with reality. Others, more bound to current practicality, are occurring in the cities they may transform, in the context of present-day values, policies and economics. Some assume changes in life styles; others do not. All provide images, not only of the products of design,



but of a process of urban design that may soon become more familiar.

A charrette held in Sonoma, Calif., last summer made clear the potential of ecological urban design, if not the nature of final products. Organized by Van der Ryn, Calthorpe & Partners and supported by the Solar Energy Research Institute (SERI), the charrette undeniably challenged conventional preconceptions about the limits of urban living.

The people invited to the charrette made it unusual from the start. They included well-known and established architects and engineers, some skilled in solar design and others less so. But they also included biologists and agricultural experts, landscape architects, environmental psychologists, transportation specialists, community organizers, developers, economists, writers, artists, futurists and interested citizens. The group included the academic and the practitioner; the conservative and the radical; the young and the old, and, not insignificantly, the East and West, from town and city. Binding them was a common curiosity and a conviction that ecological urban design could enhance urban living as it saved energy.

The simply stated purpose of the charrette was to involve skilled people in the design or redesign of three sites to demonstrate that cities can move closer to sustainability and dynamic balance with natural resources than in the past. Not only the conservation of energy, but the production of useful resources was emphasized. And the human attributes of urban design were emphasized as an element of energy-conscious design.

The three sites included an existing subdivision in Sunnyvale, Calif., a developer-owned open site in Golden, Colo., and an inner-city neighborhood in Philadelphia, adjacent to the commercial waterfront. Charrette participants divided themselves among the projects, with several assigned to a particular project and the rest free to float between the projects as specialists and consultants; many people worked on the final results. Team leaders included Robert Twiss, environmental designer, for the Sunnyvale site; John Anderson, architect, for the Golden site; and Donald Prowler, architect, for the Philadelphia site. Each assembled detailed information for the charrette, including site plans, economic, cultural, utility, policy, business and building data. The design work was not prescribed as either visionary or pragmatic, but sought to define a concept of realistic possibility in generating alternatives for the future and in proposing ways to get there. While there was some concern that the charrette involved playing God, there was also concern about doing it with care.

The Sunnyvale site lies in one of the richest agricultural regions of California that used to be known for its orchards, but is now transformed into "Silicon Valley" by the computer industries that dominate it. It sits on an alluvial fan between the bay to the north and mountains to the south. Running east-west through Sunnyvale is a portion of the El Camino Real, the road that used to link the old California missions and is now a prime example of the American strip highway, replete with fast food, adult bookstores and service shops amid used car lots.

Sunnyvale is a place with more jobs than houses. And the houses that exist are planned for the conventional family with a working man and a mother at home with the kids; there is little or no housing planned for other family, age or social structures. But the people who live there have much to content them; they are well-paid, socially mobile and have one of the highest educational levels in the nation.

The specific charrette site is an area in a residential section of Sunnyvale adjacent to the El Camino Real strip development. The area is comprised entirely of single-family tract houses with yards and wide streets. There is also an underused school site where reuse could be considered. It is a typical suburb symbolizing, for some, a society that is auto-oriented, rich in energy, poor in information and yet considered the dream of most Americans. Its pattern is replicated not only in the region, but across the country.

Slightly intimidated by the seeming lack

Ms. Villecco, a participant in the Sonoma conference described in this article, was consulting editor for this issue of the JOURNAL. She also consulted on the JOURNAL's structures (October 1980) and natural light (September 1979) issues. She is a consultant to the National Endowment for the Arts design arts program.

of incentives for change, the design team nonetheless established several goals. These included the reduction of energy and asphalt by 50 percent and the increase of population by 50 percent. As the process evolved, incentives for change appeared clearer and the design team became intensely involved in finding new options for the site as a model for others. The economics of land, the rising prices and shortages of the energy needed to fuel such a suburban lifestyle, the numbers of people left unaccommodated by the housing and the high educational level of the residents became opportunities for change. People were getting less house for their money than they wanted; urban variety was limited, and affluence combined with education could provide a basis for innovation.

The team emphasized three areas in their design work: typical residential blocks, the commercial strip of El Camino Real and the underused school site. Increased densities were accomplished partly in residential areas and partly by new strip development. In all areas, a more sustainable urban culture was sought and there was a conscious effort to link people to their land, food and energy systems by design.

An analysis by David Sellers, a Vermont architect and builder, generated some basic concepts and controversy. He showed the development of the valley from 1850 to the present and projected development to 2030. The valley was filled with oak trees, savannah grass and homesteading, spurred by the Gold Rush, in 1850. By 1920, there was a rail system and intense farming; housing and industrialization were beginning; orchards were plentiful. But by 1950, tax laws encouraged development of the land and discouraged farming; tract housing began. Today the orchards and farms are mostly memory; the area is almost completely subdivided into tract housing; green space has virtually disappeared.

Sellers then envisioned a future return to open land, predicting that the land would become more valuable as farm land than housing and that people would demand greater access to natural resources. Clustered housing would open up space, allowing greater densities as well as greater natural or cultivated land areas. Sellers' vision was not shared by all of the team, but the values underlying it helped to shape the team solutions.

The commercial strip was a major target of the design team. El Camino Real runs for hundreds of virtually undifferentiated miles to form a continuous monoculture without identity except for neon road establishments and a clear commitment to cars. There are parking lots, used car lots, new car lots and car repair lots. The design team tried to create neighborhood identity, transforming the strip into pulses of activity reminiscent of traditional town centers.

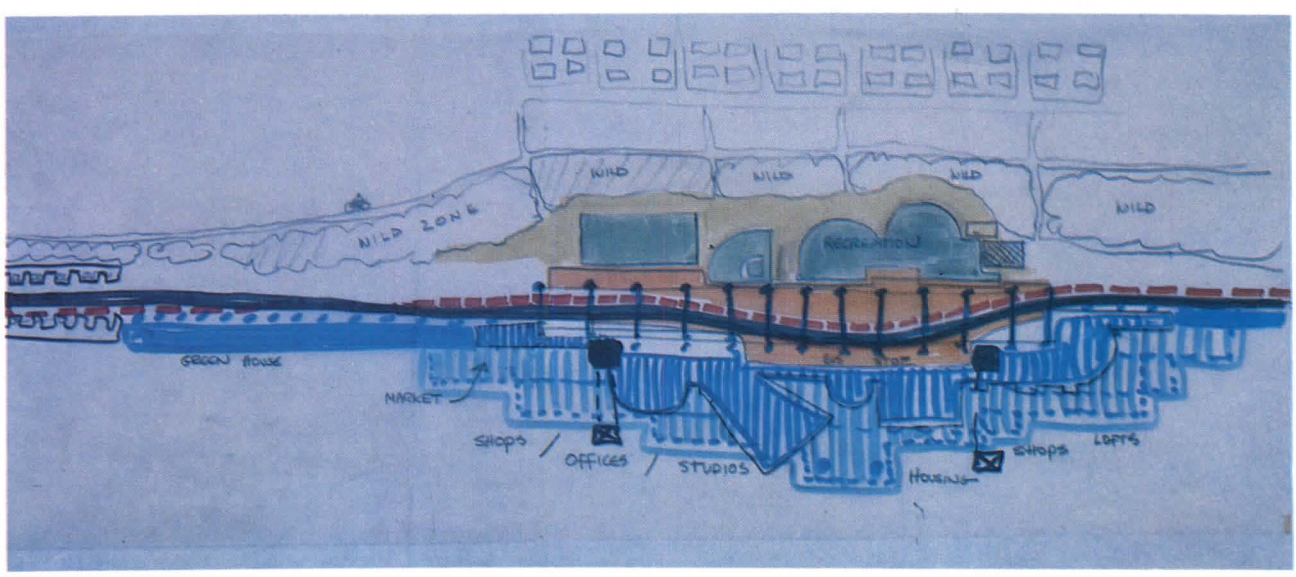
The first step clearly needed to be to slow and minimize the cars, yet El Camino Real is a main artery with eight lanes of traffic through an area where the design team was also seeking to increase densities by 50 percent. The solutions are not simple, but strategies emerged that called for rerouting through traffic to a nearby freeway to the north and protecting adjacent neighborhoods with block closures, dead-end streets and other discouragements to cars. The strip would then gain local use in exchange for through use.

The design team proposed creation of mixed-use town centers as nodes that could be replicated, according to local preferences, along the El Camino Real at intervals of five or ten miles. The strip now becomes a boundary between the vehicular and residential world. A buffer zone of land, perhaps with partial berming, would protect the housing from excessive noise and pollution. The narrowed pavement would return some land to other uses, including orchards, solar ponds or swimming pools, playing fields and open space. Commercial development could become quite dense, including retail, office and institutional space, as well as some kinds of housing. The structures evolved as frameworks that could accommodate changes in scale and use over time. The strip also became the focal point for special activities that might enhance the quality of life and community, including places for entertainment and arts.

In residential areas, the team sought to preserve the basic character of the neighborhood and to work within a plausible context of change over time. The designers sought to increase open space by narrowing most of the roadways to 12 feet and returning the land to planting. The new block schemes did not wholly displace cars, but made their use slightly less convenient or necessary, while encouraging bicycles and walking. Traffic analyses determined rerouting options for cars and the implications for adjacent roads.

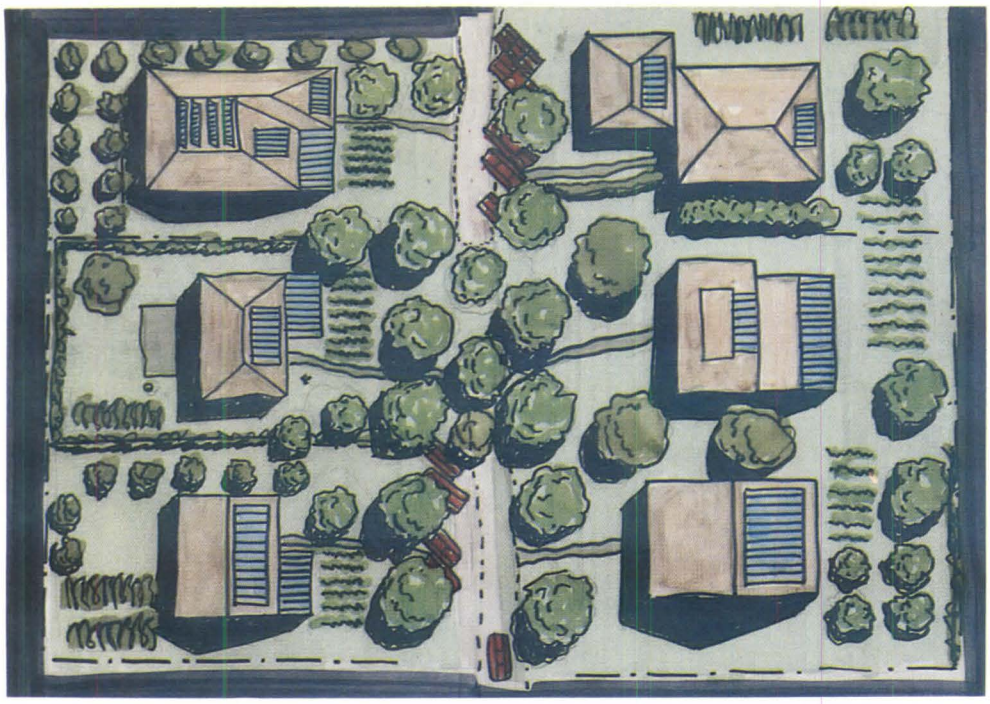
The concept of "edible landscaping" became important as both the appearance and production of the land was improved with fruit trees (recalling orchards past) and other edible varieties as hedges, barriers and groves. The concept was to encourage residential gardening for recreation and education even where production could be minimal. Large-scale food production was left to professionals, but gardening could help people to understand nutrient and biological cycles and, like the proverbial fresh tomato, provide a quality index for purchasing food. Socially, the gardens could provide a creative outlet for residents of diverse age and interest.

The charrette suggested a number of strategies for increasing the density and performance of housing units. Modifications for existing housing included the conversion of garages to living quarters and additions that would provide smaller and more variable housing options. The charrette also proposed location of workplaces, day care facilities and other ser-



A diagram of the concept for making communal nodes out of the commercial strip.

The prescription for residential areas included more vegetation, less pavement.



vices within walking distances of the housing, and communal dining areas so that residents could choose not to use their own kitchen facilities and share shopping and food preparation.

The energy performance of existing buildings improved by such means as the passive solar concept of a "hot attic," solar domestic hot water systems and evaporative cooling. Principles of water conservation, reuse of waste heat and composting were also applied. And photovoltaic cells were intended gradually to replace natural gas as an electrical power source.

One important contribution of the charrette was its integrated approach toward buildings and landscape. It provided a common vision for the participants, and a changed perception for many. One reason for this was the presence of people knowledgeable about biological and plant systems: David Katz and Richard Merrill. They could tell the architects exactly what plants do what things and what the natural cycles of growth could mean architecturally or in terms of thermal or filtering impacts. Plants were treated on a highly differentiated basis, visually and functionally. Trees were used as air purifiers, as well as for shade and food. Different kinds of trees could be used to provide shade at different seasons. In parts of California, for example, the hottest month of the year is September, when the sun is relatively low in the sky; certain trees are more appropriate to these places than others.

Ralph Knowles, research architect, provided an analysis of shading requirements for two conditons of housing created by the design team. One condition included small distances from house to house across the street, or a little over 60 feet, with fruit trees bordering the street. The possible height of the trees would have to reflect season and orientation; east-west streets would be planted differently than north-south streets and plants on either side of the street would have to vary as well to assure solar access to the houses. On east-west streets, the north and south facades of the houses are exposed; taller trees may be planted on the south side of the street and still assure solar access to the south facade of the opposing house. If there is a sidewalk, the large shade tree could be planted on the south and smaller fruit trees on the north side; if the shade tree is deciduous, it may be taller still.

On north-south streets, there is a daily rather than a seasonal rhythm to the landscape design. A symmetrical planting arrangement suggests that the trees should be close to the buildings to protect them. Another strategy is to use the western half of the street for pavement, so that there is a wide strip of land on the east and a narrow one on the west. The wide strip allows planting much larger trees to cast shadows on the west facade of the house; the narrow strip could be used for smaller fruit trees. Another kind of planting differentiation for shade would be single versus double rows of fruit trees so that shadows are denser on the west facades of buildings, where solar gain is most intense, and less dense on east facades, where morning heat can be useful.

Conversion of the school site, with its adjacent parkland, to an ecological processing and education center was a third major component of the charrette. The site is a 30-acre parcel in the middle of residential properties; half of the land is a popular park and the other half is occupied by the school. The design team decided that this could be an appropriate place for waste treatment facilities, combined with an agriculture/education center. The park would be preserved for recreation and leisure, but the schoolyard would be used for commercial agriculture, partly as a demonstration project for students.

The kind of farming considered in the charrette differed from conventional and chemically supported farming that helps to destroy topsoil and uses far more energy than it delivers. Instead, the emphasis was on small-scale, intensive food production systems combining a whole variety of new tools, local and direct markets, hydro-transplanting, raised-bed horticulture, greenhouse heating by waste or solar energy, and other strategies to mitigate climate, balance production cycles and produce an incredible amount of food in a very small space.

The concept of intensive farming is not to be confused with low-technology concepts of organic gardening, which is in many ways traditional and primitive. The intensive farming considered in the charrette is highly sophisticated and professional, involving such techniques as computer software for monitoring complex biological systems. The concept of community self-sufficiency in relation to food production was also carefully defined. It was not expected that the communities could necessarily grow all of their own food, but that commercial crops could be used for barter and to provide education, jobs and revenue.

The analogy between the sustainability of diverse crops and diversity in communities became an important reference. There is a correlation between crop diversity and the stability of the ecosystem. Many people equate agricultural stability with simplifying the system we live in and trying to focus primary energy strategies on their personal niche of that ecosystem. But in agriculture, the more diverse, the more resistant. And in community systems, diversity may lend cultural and economic sustainability.

The school site was also planned for conversion to a waste treatment facility for approximately 5,000 people as an option to the residential-scale, on-site treatments also explored. In this case, waste from an existing water-borne system would go into a primary and secondary treatment facility in aquacells and, from there, to a pond. The effluent could either be pumped to storage or used as secondarily treated irrigation, or it could go to a solar cell array on a greenhouse, providing extra mass and another source of potable water.

Much of the charrette discussion concerned ways to get from here to there, or the political implementation strategies. Mike and Judy Corbett, of Village Homes in Davis, Calif., (see June '80, p. 58) addressed this issue most directly, noting

that current residents of Sunnyvale may not be convinced by all this planning enlightenment and that some ideas are practical only in the long term.

Improving household efficiency, narrowing streets, encouraging cooperation on common open space and experimenting with concepts of edible landscaping and gardening, however, are all possible and feasible in the short term. Changes can be organized through block or larger community associations and some of the costs can be absorbed into normal maintenance routines or can be justified as fuel costs climb. One block may serve as an example to others, leading to a critical mass. But issues such as increasing densities will be harder. Redevelopment of the strip is another long-term prospect subject to economic incentives, with change phased as land uses change. Few people will change simply because something sounds like a good idea.

Implementation concerns extended to other charrette sites as well. The three sites were selected partly because of their potential for change. In each case there had been some activity or discussion locally in the direction of renewable resources, conservation and new opportunities for enhanced lifestyles. The charrette focused on these and sought to give form to concepts as models for innovation.

Designing a new community for a Colorado site.

The Golden, Colo., site focused on a new town and residential center. Golden's implementation strategies concentrated on design and development feasibility in terms of market and construction economics.

The site was originally 600 acres and has been partially developed with the beginning of a service area that made money and allowed the developer to proceed with new construction from there. The newer development includes the office park housing SERI, followed by three restaurants. The Golden charrette started with new development at this point, producing a three-stage plan.

The first phase of the charrette design for Golden includes commercial development contiguous with what is already there. This development would provide commercial, retail and other resources for Golden and adjacent communities, as well as for the residential community to follow on the site. The second phase starts the residential construction and the third phase takes it to completion with an eventual 1,400 housing units for 3,500 people. A "bioshelter street," comparable to a covered mall, will lead from the commercial center into the residential area. The development also includes a school, orchards, playgrounds and a commercial greenhouse.

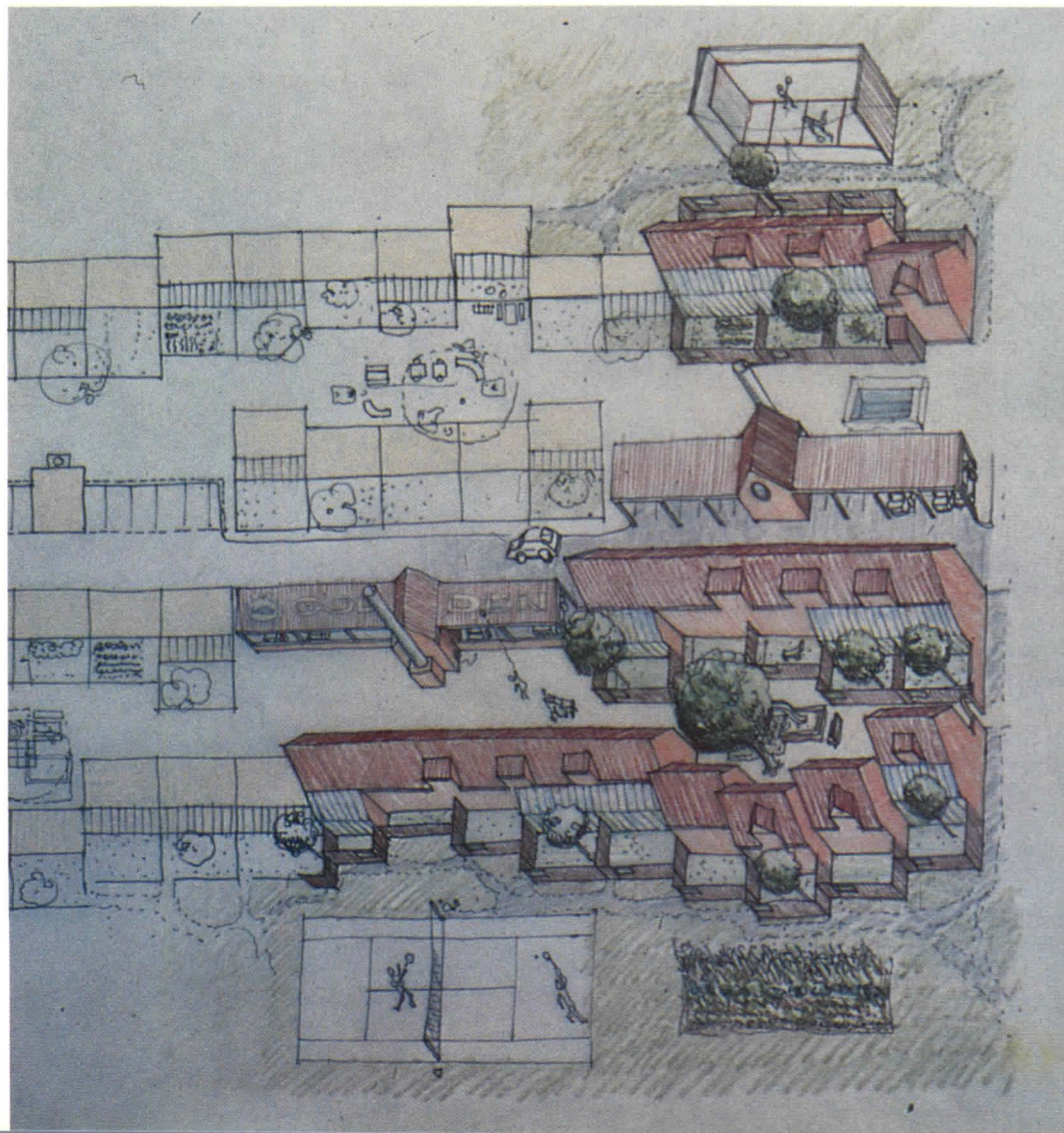
The bioshelter street is the most controversial element in the Golden design; some people feel the climate does not warrant it, others that it presents problems as an urban design concept by turning inward on itself. The design team did not justify the bioshelter street wholly in terms of energy savings, but as amenity, image and energy-conscious design.

The covered street was designed as an activity, employment and educational center with the characteristics of both an alley and a boulevard. It is a place where people meet and events culminate in a path of varying dimension and emphasis. Besides shops, services, entertainment and office spaces (for county and local government), the street will also provide access to some housing with loft space and private work spaces available. The passively heated environment will also permit fish and flowers to grow throughout the year and people to walk comfortably, even in winter. The design team sought to put people in direct, visual contact with growing things, including fruits and vegetables. Enclosed cases of water will house Rocky Mountain trout for commercial cultivation of protein.

The bioshelter street extends as a spine to the south and east into the residential sector of the development, where it ends as a formal element and continues as a protected, open pathway. The open space on the site works with the bioshelter street and its extension as a link between activities. A small wilderness park follows a natural water course and initiates a system of pedestrian paths. There is an adventure playground with a pond, garden and access for builders to bring appropriate debris and materials for the children's play.

On the urban side of the development, the school is also planned as an adult education and resource center, with a library and other facilities for the whole community. The extension of the formal bioshelter street constitutes the spine of the community and eventually leads to a commercial greenhouse, where both plants and fish are grown in sufficient amounts to be economically feasible.

The housing is planned at a density of 12 units per acre, arranged in east-west tiers that allow solar access and privacy. Parking is located in nearby carports off vehicular fingers. The children's play areas are back in the housing clusters, away from the cars, and each town house has a private court. All of the front doors of the houses open onto a pedestrian way; there are service entries to the cars.



Typical housing closters as proposed for Golden. Drawing by Douglas Kelbaugh.

Engaging the challenges of inner-city Philadelphia.

The Philadelphia site contrasts with the others as it must address all of the complexities of economics, infrastructure and community common to aging industrial cities. The charrette site lies at the end of an extensive park system. It is bounded on the north by renovated, costly town houses. To the south is a strong working-class ethnic Irish community. There is also a 21-acre tract with an old, unoccupied naval home and another historic building, but otherwise consisting of open land with a wall around it. The rest of the site is extremely low-income and primarily black. The housing is in very poor condition, unemployment is high, and the homicide rate is the highest in the city. The riverfront is underused, with underoccupied industrial buildings along its edge, including an old but operating power plant. It is not the worst neighborhood in Philadelphia, but close to it.

The charrette focused on improving the lives and opportunities of people already living in the area, as well as finding opportunities to reduce energy use by conversion to renewable resources where feasible. As with the other sites, the design team sought to increase people's awareness and contact with natural phenomena and their relationship to self-sustainability, a concept with particular poignancy in such a non-affluent neighborhood. The primary areas of physical attention were the residential blocks, the waterfront and the naval site. Solutions were geared to what can be done tomorrow, with existing technology and values, and to some realistic possibilities for gaining financial support.

The residential block treatment bore some similarity to that in Sunnyvale in that there was an effort to reduce street size and accessibility and increase open and green space. But the design team did not presume that residents would want to give up their cars, which clearly played a symbolically important role in their lives, or shut off streets. In some cases, alley and street access could be coordinated so that one or the other could be closed off to provide common space. In other cases, differential paving could be used to encourage pedestrians and discourage the passage of cars. In all cases, a clearer definition of vehicular and pedestrian paths and spaces was sought.

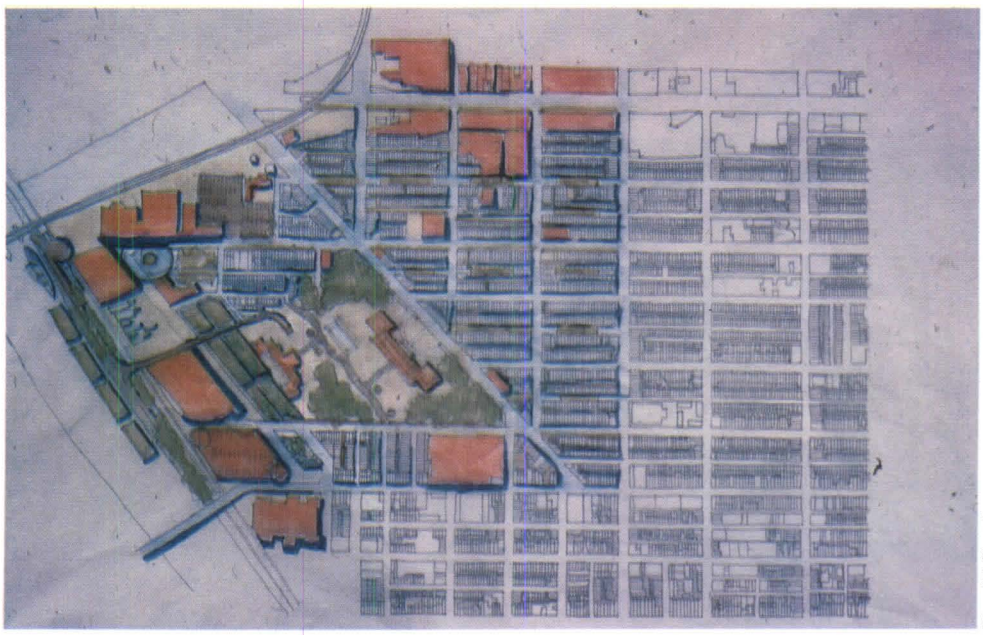
As vehicles were more carefully controlled and asphalt minimized, opportunities increased for edible and decorative landscaping, for trees that would shade in summer, allow solar access in winter and help to purify the air, for community gardens and for pedestrian paths or open space for leisure. The result was increased habitability with variation by orientation in building, energy and landscaping strategies.

There was also an effort to provide for increased commercialization of major north-south streets, with a residential character emphasized on east-west streets, a pattern similar to parts of New York City. This strategy would encourage small businesses, including corner Mom and Pop shops that could provide convenience and jobs, and help to reduce the need for longer-distance travel.

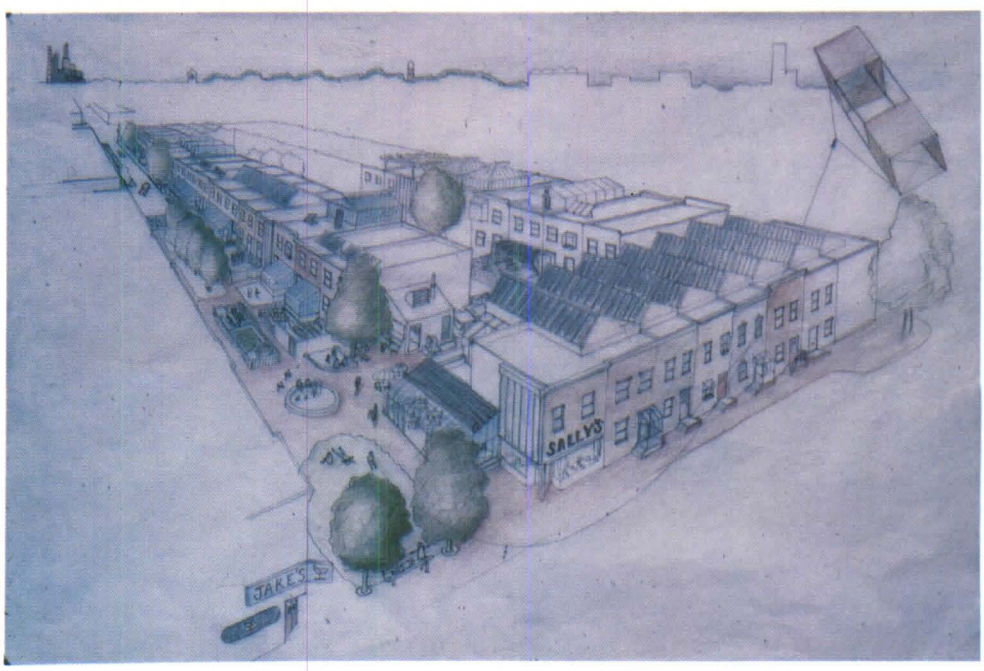
The design team also investigated ways to increase the efficiency of the housing units and to decrease their reliance on expensive fossil fuels. Conventional energy conservation techniques could improve performance, but the design team also explored passive and active solar design strategies that could be accomplished with local labor and materials at minimum cost and with maximum reliability, including small greenhouses, Trombe walls, solar attics, collectors for domestic hot water and other simple technologies. An important concept was that amenity as well as energy savings must result as it was considered unlikely that a neighborhood would rally around the issues of energy alone.

At large and small scale, the design team emphasized the need for financial feasibility, a concern that in many cases was unresolved, but in others did result in new concepts. Conventional strategies such as sweat-equity programs and regulations to protect home ownership were considered, as were strategies to discour-

Colored portions of plan indicate charrette site, with the riverfront at lower left and the open naval acreage at center. Redesign called for increased habitability and green space in residential areas (opposite) and a variety of solar design options (below).



Donald Prowler



Scott Matthews

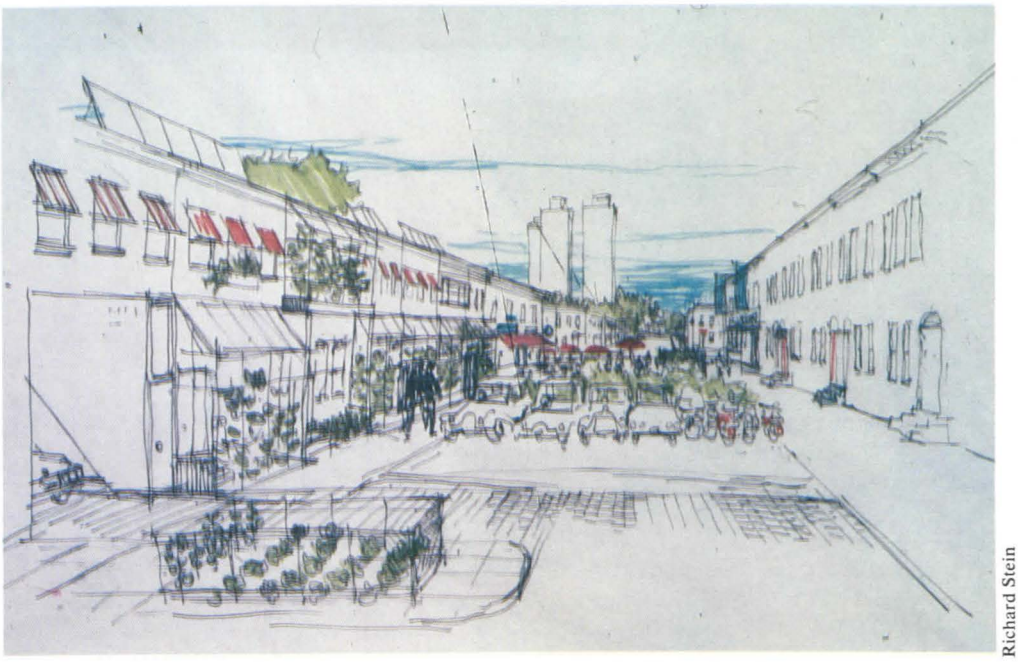
age speculation or runaway gentrification. Less conventional concepts for local entrepreneurial viability and control were also explored in relation to housing, commercial and industrial revitalization efforts.

The waterfront was a primary focus for revitalization. There is open space along the river and a railroad service line for the industries along it. One building, now called the JFK Vocational Training School, is virtually abandoned. Industry has been leaving Philadelphia, and even relatively new buildings, such as this one, fall into disuse. One revitalization scheme envisioned small, energy related businesses, staffed and owned by local citizens. Another scheme turned the building into a bicycle plant, with the naval site providing facilities for an adjacent test and race track.

The river itself was also investigated for recreational, educational and productive potential. A scheme proposed by John Todd of the New Alchemy Institute envisioned the purchase of barges to support a fish farm to produce protein and create an aquatic identity for the community. Todd maintains that the project is feasible for many cities and climates as a way to revitalize neglected waterfronts by producing and selling locally. He predicts that one barge could produce up to one million pounds of fish per year, using plant systems to purify the river water and various methods, such as solar-heated translucent silos, to maintain suitable environments for the fish.

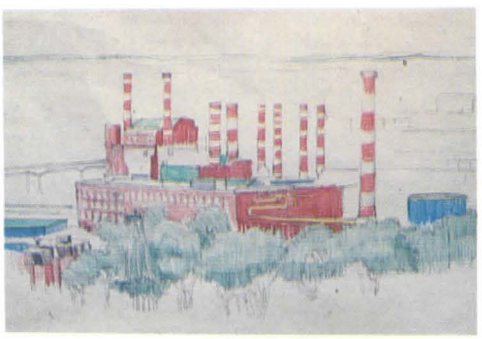
The power plant was the largest in the world when it was built in 1903 and it still generates peak power for Philadelphia with its 1911 turbines. But primarily it is a cogeneration plant, providing steam for district heating. Inside it's almost a museum of the industrial era, originally designed for coal generation, but later switched to oil. The design team considered alternatives for using the power plant effectively, including its waste heat, in combination with other power strategies. The visual rehabilitation of the plant was also considered, with a Disney version emerging in the drawings (right).

The naval site is a major resource for the Philadelphia site. The Navy has expressed willingness to turn over the property to the city for a use it would approve. The site is a visual oasis, albeit neglected, with large trees and two historic buildings, one Victorian (the old naval home) and one Georgian. Some design options converted the site to a recreation area, linked to the bicycle plant as a race course, or into housing. One converted the colonnaded Georgian building into a community center, with a swimming pool, communal dining area and educational and training facilities; the old naval home was converted to an energy education center, focusing on renewable energy resources, the management of biological systems and the development of intensive farming techniques for urban areas. The site was also designed to maintain open parkland, with places for leisurely strolls, sitting and conversation. The southeast portion of the site would be connected to a building across the street that would be converted to a child-managed playhouse. The open land was to become a children's nature center and adventure playground. Community gardens were also considered in this area.



Richard Stein

Richard Stein



The spirit, if not the serious intent, of the Sonoma retreat was best summarized by Clare Cooper Marcus, environmental researcher, with this poem:

I've got the BTU Blues, the voltaic blues fuse
The wood chip, waste kit, heat-recovery biomass is a right royal pain in the fuel cell
The bioshelter went helter-skelter down the wary, SERI berry
Spilling catfish and occasional flatfish
While the water hyacinths, in splints, limped, lumped, pumped back into their electric cars
Powered by the stars of apocalyptic transformation
Totems, photems, stick it up your solar ponds
Bombed at the earth, riding in a Safeway cart to the heart of sunny Sunnyvale
With fledgling trout hopping, popping through the solar envelope into the black attic
Black Hole out into the biosphere of the official future
Back at Westerbeke Ranch, hot air in the tank
Sank rank inefficient into the hot tub, rub-a-dub-dub
Three architects in a fountain, not in a mountain
Said to each other, "It's not enough to love one another,
We have to love the same concept cards."

The asphalt eater teeters on the brink of the behavioral sink of Silicon Valley
While Solar Sally exchanges heat with Olive Pit Pete
As the kids eat gassified rabbleburgers, sewage sludge slurpies
No flow snow cones, silicon mint chips and McDonald's goes broke in the burbs.

In the realm of the real: A California 'solar village.'

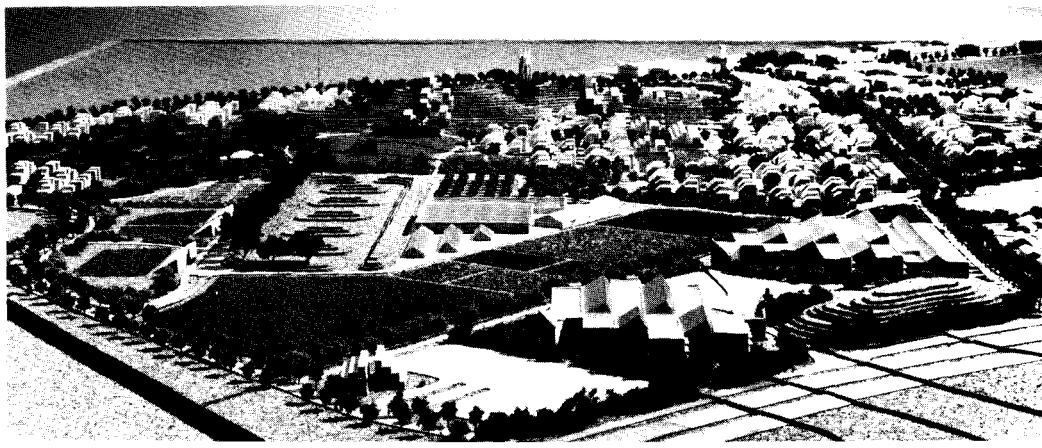
Some of the ideas explored at Sonoma already are at work in real projects underway or contemplated in towns and cities across the country. They include efforts in Los Angeles, St. Paul, Miami and Baltimore that will seek to increase reliance on renewable resources, use the heat and the light of the sun and provide solar access, and promise some improvement in the quality and diversity of urban living. Dynamic concepts of urban growth, attuned to changing cycles of energy, community and economics, are emerging strongly in these new urban models of diversity and imagination.

Two real-world projects that demonstrate application of some ecological design and planning principles are the Marin Solar Village in California and the comprehensive Solar Planning Project in Philadelphia.

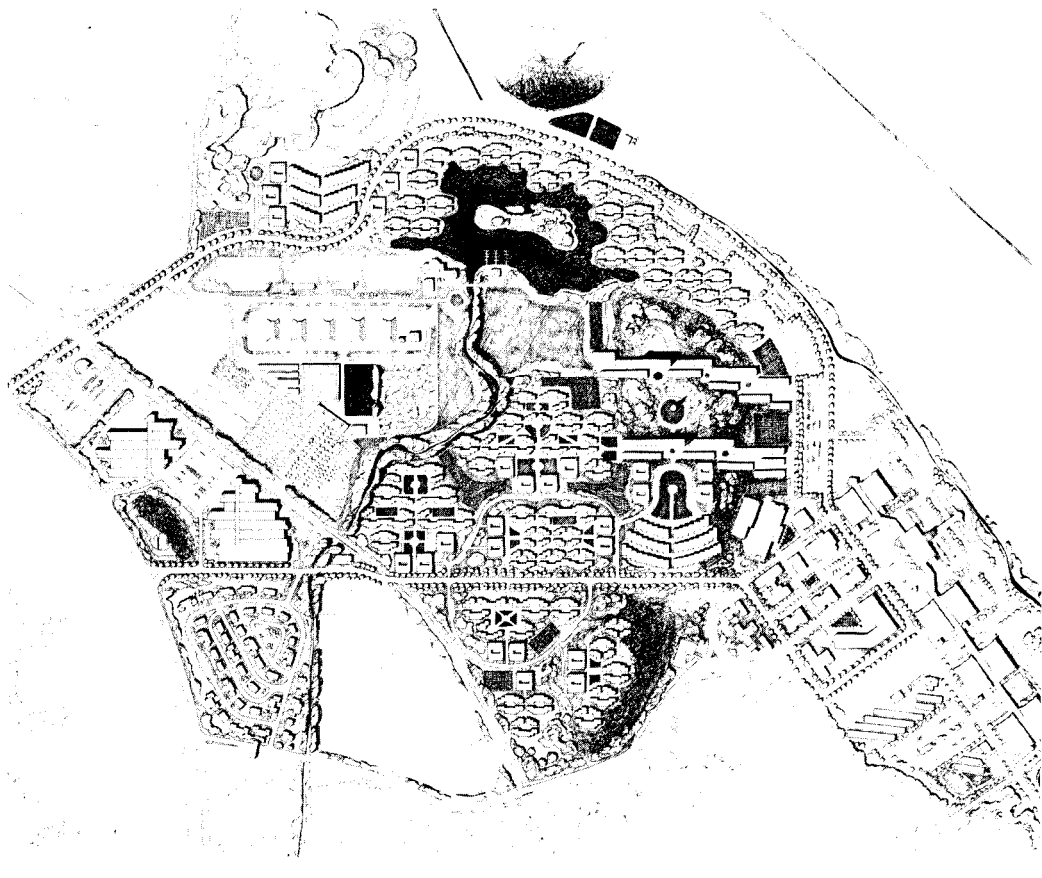
Marin Solar Village is a new town planned for the abandoned Hamilton Air Force Base north of San Francisco. For over a year, Sim Van der Ryn has been leading a political, planning and design effort to secure the land, which the government has declared surplus, for conversion to a community reflecting his concerns of integrated open space, food production, living and working. The project has been embroiled in extensive political debate, with some opponents seeking to maintain Hamilton as a regional airport, but recently there has been a decision to develop the property for housing and community purposes and the solar village concept is gaining acceptance.

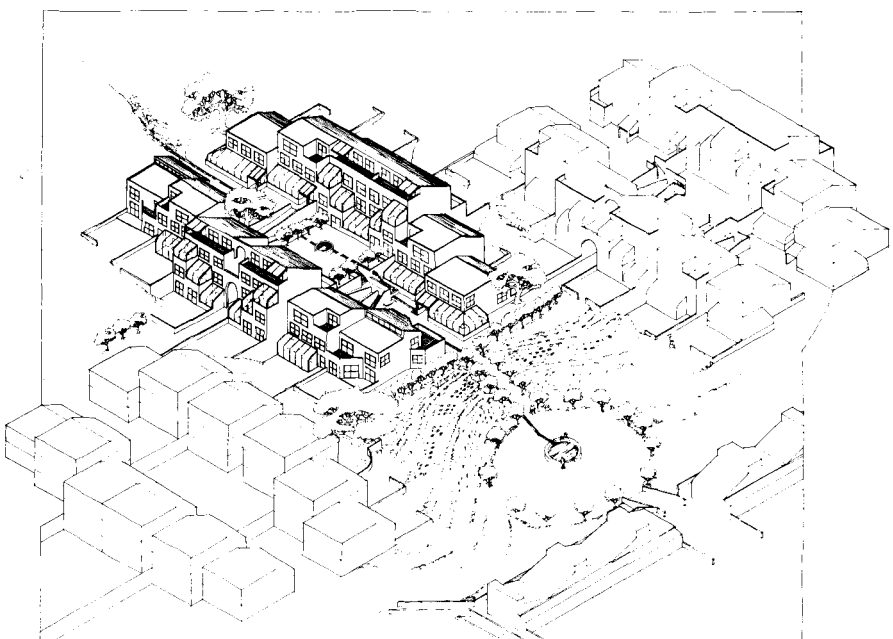
Preliminary design and planning by Van der Ryn, Calthorpe & Partners provides for almost 2,000 dwellings in five distinct neighborhoods to be built over a 10-year period. The project also includes almost 800,000 square feet of existing space, primarily airplane hangars, that will be renovated for light industrial or commercial use, and an equal amount of new space will be constructed. Most of the site will be open space, with 50 acres intended for agricultural and energy production and more than 40 acres for recreational use and parks.

It is the philosophy behind the project, more than the statistics, that makes the project important. As California state architect, Van der Ryn gained the opportunity to initiate large-scale design projects reflecting the concern for natural resources and energy that had guided his earlier efforts at the Farallones Institute to demonstrate community self-sufficiency. Hamilton represents the application of similar concepts at new-town scale, and with skepticism borne of experience in the political and economic world of large-scale development.



Site plan and model illustrate major concepts for Marin Solar Village. To the north (top of drawing), marshlands will be restored for waste water reuse; a lake offers recreation with agricultural land adjacent. To the southeast, airplane hangars will be rehabilitated and new facilities built for light industry. The transit and corporate center is west, with housing clusters concentrated in the center of the site. The original town center, adjacent to the hangars, will be revitalized as a retail hub.





The passage of time has made it clear that total sustainability at large scale involves questions of scale and community that are still being explored. What will work for a single building will not work for a village of 100 homes; 2,000 homes are an entirely different problem by nature as well as scale. For example, the aquatic waste treatment facilities and agricultural production for such an enterprise would use hundreds of acres of land, making the economics, if not the land availability, unfeasible. Time has also conditioned Van der Ryn's conviction that existing values and life styles can accommodate the transition to a renewable resource base; he is now convinced that these must change. And the emphasis on social mechanisms to induce change and innovation is stronger.

With this as background, the design for Hamilton has emerged as an integrated set of well-tested concepts. The buildings all have solar access and represent the state of the art in their designs for solar heat, natural light and natural ventilation. The concepts of community include neighborhood identity and accessibility and the acknowledgment that this village may not be for everyone. But those who want comfort and community within a solar ethic and with affordable housing (by Marin County standards) will have that option.

Services include on-site sewage treatment, using the Solar Aquacell system that discharges no waste water into the bay, and on-site disposal of solid wastes with methane recovery. A small on-site co-generation plant will minimize peak power demands, allowing buildings to reuse waste heat.

The village also includes its own minibus system to take people to work, play, shopping or a visit. The firm's estimate for the energy effectiveness of the new village indicates that it will reduce overall energy use in buildings, transportation, services and food systems 45 percent from present levels.

The technical and feasibility studies that have been performed on this project explore a vast number of design and planning options applicable to ecologically oriented development and make a strong argument for the village's market and social feasibility. The next step will be political. The Department of Energy supported preliminary design and analysis; the rest lies with Marin's decision to proceed with development.

Housing will be clustered in a variety of attached configurations assuring solar access to south facades and opportunities for solar heating, natural light and natural ventilation. Cars will be concentrated in areas no farther than 400 feet from dwellings.

Energy-conscious urban design along a transit corridor.

Philadelphia's Comprehensive Solar Planning Project started about two years ago under the direction of Charles Burnette and with the support of the National Endowment for the Arts and the Department of Energy's Solar Cities and Towns Program. It was and is still the first major solar information base for a major city and encompasses 13 separate studies that inventory, analyze, assess and assist the implementation of solar and energy-conscious design on a citywide basis.

The focus of the project was on implementation through policy. The project involved universities, city and regional government agencies, private consultants, research organizations and community design centers. Certain project staff worked directly in city departments infusing information into their programs and policies.

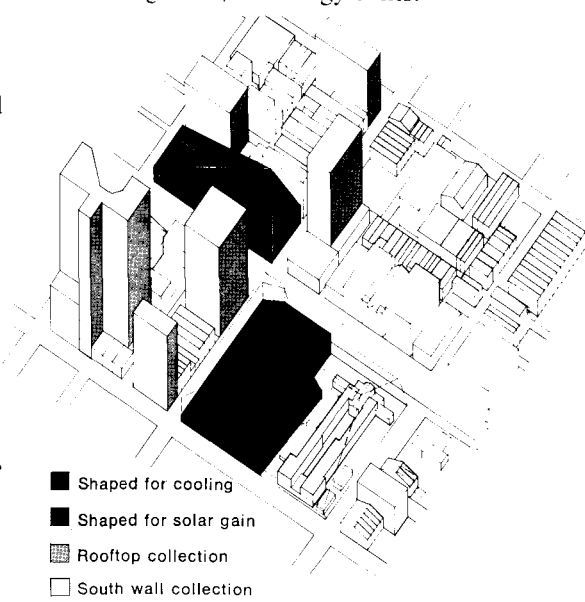
The project also completed a detailed study of the local fossil fuel industry; developed solar audit forms as mailers to augment an energy conservation audit offered by the municipally owned gas utility; developed a climatic data digest for designers; conducted seminars for neighborhoods and developed community energy manuals, including a study of retrofit strategies for existing housing. These strategies included Trombe walls; attached sun spaces or greenhouses; roof apertures or skylights with reflectors; sun spaces between houses, and domestic hot water systems. The project also initiated the first inventory of housing using the city's computerized tax file and developed a program to calculate the solar orientations of significant housing types in the inventory. This study was used as the basis for sophisticated modeling of program impacts on energy use, employment and economic conditions.

More recently, the Philadelphia work has turned toward issues of solar urban design in a project focusing on Broad Street, a 9-mile mass transit corridor that is the major north-south axis of the city. The project is in its very early stages, but addresses important questions relating to development, design and the uses of solar energy.

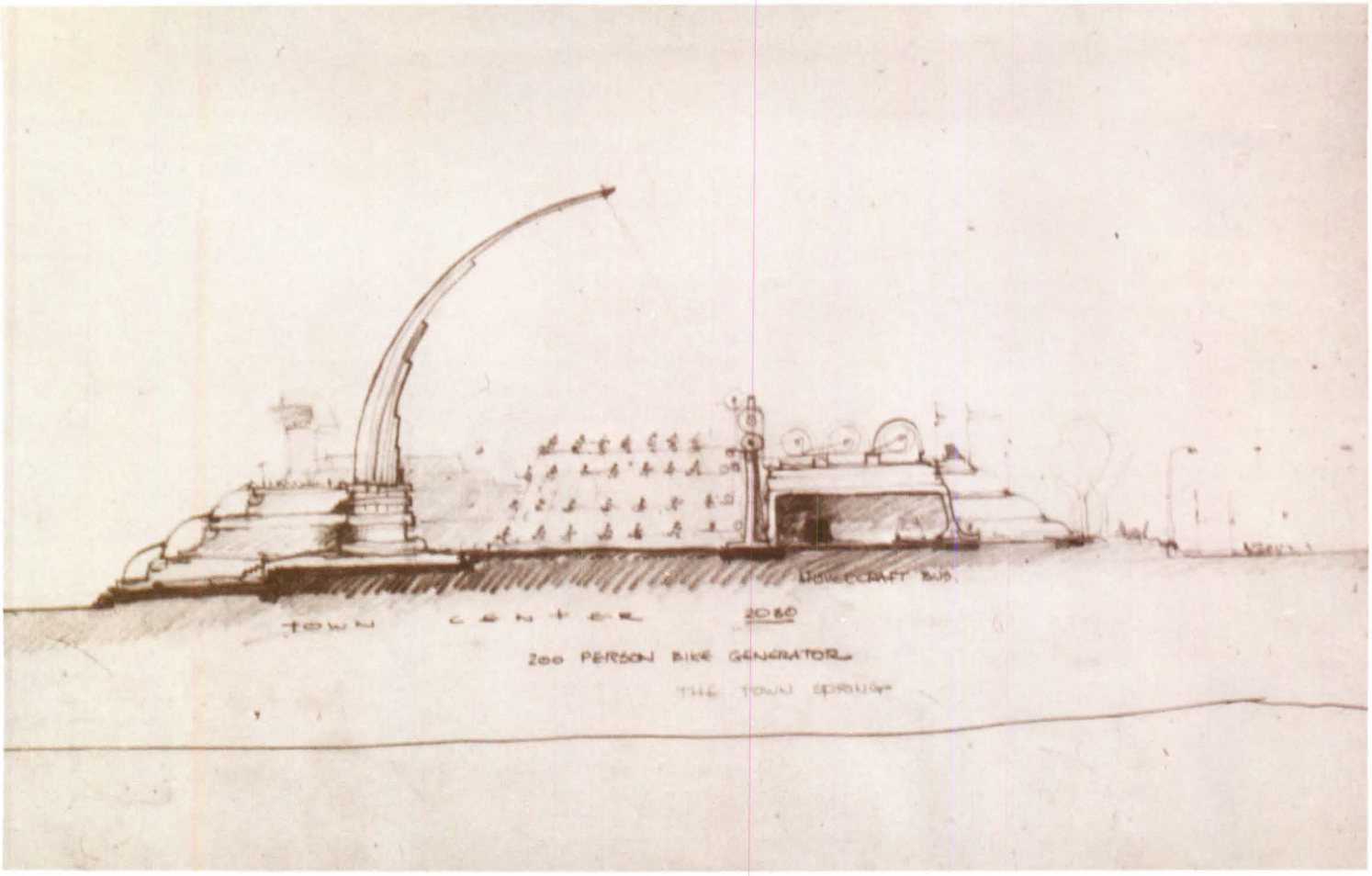
The objectives of this study were several: To explore the implications of architectural and urban form resulting from solar design principles; to document the feasibility of using the earth-to-air heat exchange characteristics of the Broad Street subway tunnel as a source for heating and cooling buildings along the corridor; to explore and document the potential for publicly controlling development adjacent to historical or culturally significant buildings so that they shared or complemented thermal loads; to explore and document the potential of passive solar design principles in the location and design of public open spaces; to project the impacts of these capital improvements on building form, economics and development plans for Broad Street, and, finally, to present a model for energy-conscious urban design, while providing economic incentives for linking mass transit to housing densities in design and planning.

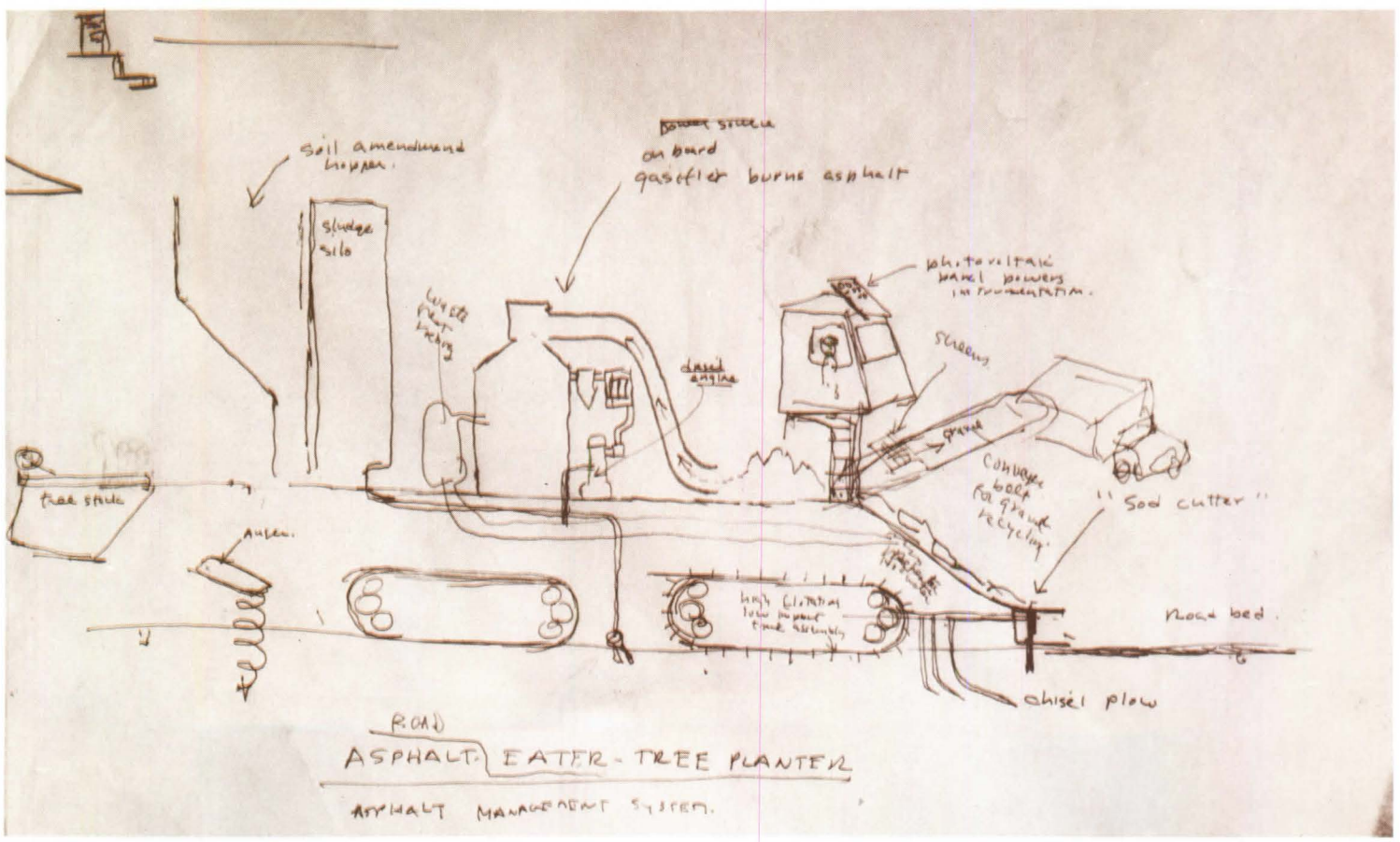
At this point the results are inconclusive, but already it is clear that the answers are complex and sometimes counter to intuition. The broad issues are: How do you match thermal demands in an urban area to its passive design potential to achieve energy balances across building and urban forms? Can subway tunnels and other heat corridors be used to transfer heat to buildings and how? What forms emerge in certain characteristic situations? And what are the constraints under different assumptions? The Philadelphia project begins a longer inquiry.

As a follow-up to the project, there will be a design charrette among architectural schools, selected by national competition, that will further explore the architectural implications of the research results. The charrette will be held as part of the International Solar Energy Society annual conference in June 1981 in Philadelphia. Working with the school teams will be selected practitioners reknown for their design and/or energy skills.



The urban design study for Broad Street focused on commercial, historic and residential areas; illustrated is a four-block area including highrise commercial buildings and historic, institutional buildings. Solar envelopes indicate potential new development sites and describe volumetric limits that assure solar access to existing buildings. The key indicates opportunities for design to take advantage of solar conditions.





Dare to dream! Imagination, conviction and hard work at the Sonoma charrette produced some new visions of a mechanized future dedicated to ecological principles. These included the '200-person bicycle generator' envisioned by David Sellers as exercise for power and the 'asphalt-eater/tree-planter' created by Sim Van der Ryn to replace roadways with landscaping as efficiently as we now do the reverse. The ideal of the self-sustainable society is illustrated (right) in the report, The Village as Solar Ecology, *available from the New Alchemy Institute.*

The precise nature of urban models emerging from the current period of transformation is not yet clear. What is clear is that they involve some fundamentally new perceptions of urban potential and a synthesis of factors heretofore considered separately.

In their report on a conference held earlier at the New Alchemy Institute, John and Nancy Todd concluded that a transition to renewable based societies will involve "an intellectual framework that can link the polymer physics of a material scientist to the electronic information of the computer specialist, to structural forms of the architect, to experts in diverse energy systems, food culture, and waste recycling, and ultimately to the sociologist, anthropologist and artist who speak for the human condition."

At the conclusion of the Sonoma retreat, Ralph Knowles led participants through a metaphor of the transformation with the story of *Flatland,* by Abbott, a 19th-century mathematician who wrote about a square: One evening, as the square is sitting quietly in his living room, a circle appears. And the strange thing about this circle is that it changes size. The circle begins small and gets gradually larger, and then gets small again. And then it disappears. Soon, the square hears a voice; it's the voice of someone from outside this world. And he says, "Who is that?" And the voice says, "It's me, up here." And the square says, "Who and where?" And the voice says, "I'm a sphere and I'm from a dimensional world."

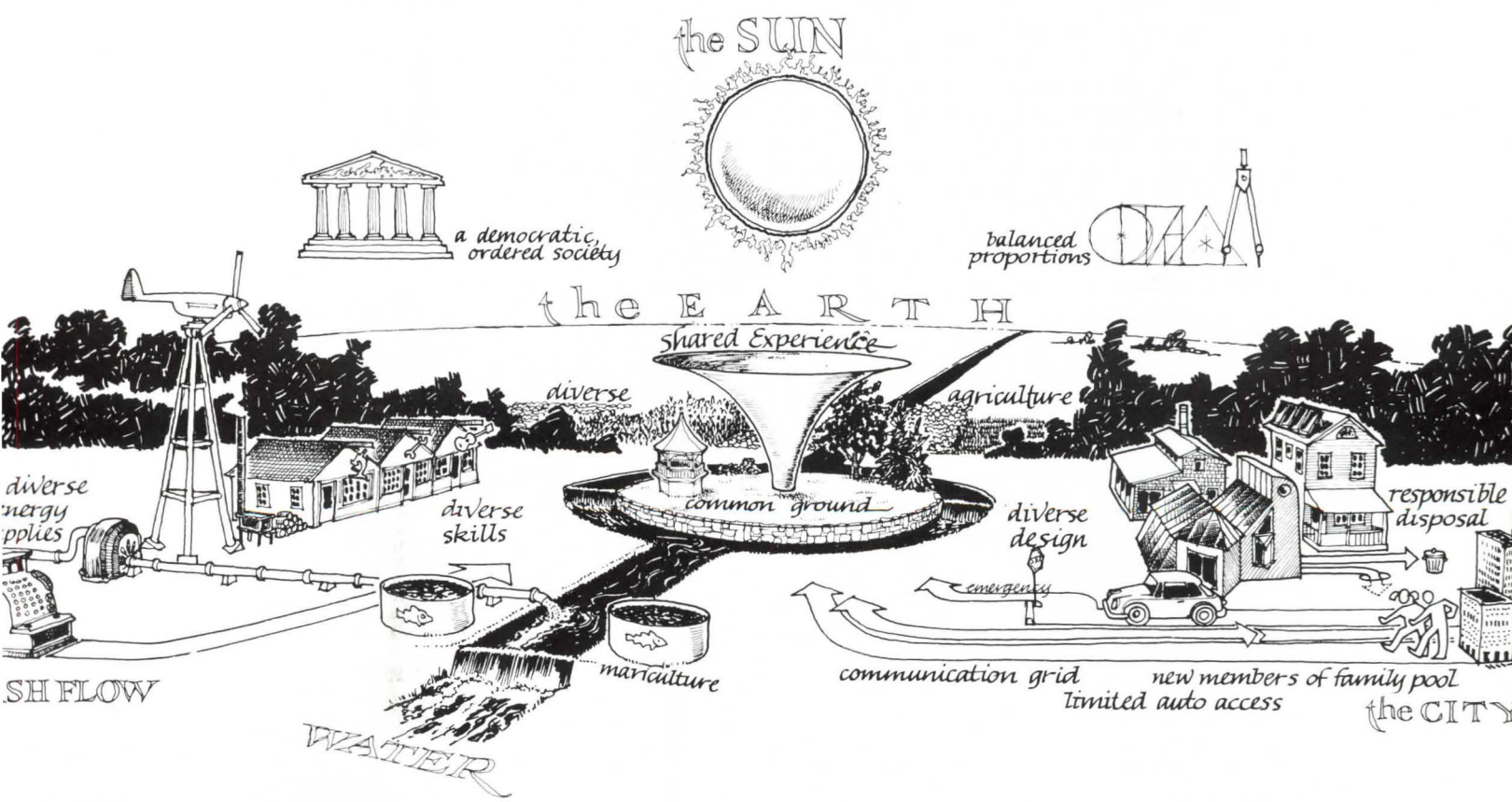
Now the square can't possibly imagine this dimensional world and in order to convince him, the sphere yanks him up out of Flatland and takes him on a trip in which the sphere exposes the square not only to the three-dimensional world, but to another kind of world called Lineland. By the time the square is through with his trip, he's been exposed to the one-dimensional world of lines, the two-dimensional world of planes, and the three-dimensional world of solid objects. And he begins to explain in a very excited way that if there are worlds up to three dimensions, why couldn't there be worlds of four or even five dimensions? And at that point, the sphere, who somehow is trapped by his own dimensional world and cannot imagine worlds of dimensions, hurls the square back into Flatland.

Abbott's vision, Knowles' concluded, is analogous to our own as we look at our patterns of settlement in this country. "We started in Lineland, with our push westward. And then we entered a time in which we saw and organized things in only two dimensions. I remember a 1960s newspaper advertisement that characterized this two-dimensional view of planning. It showed a man kneeling on the ground with his young child, lifting a handful of dirt, saying, 'This land is mine until I sell it for a profit.' Most of us recognize a three-dimensional concept of space, of which a simple example is the shadow cast by a tree or building. It is a statical kind of recognition. And now we move beyond that third dimension to have an attitude about time.

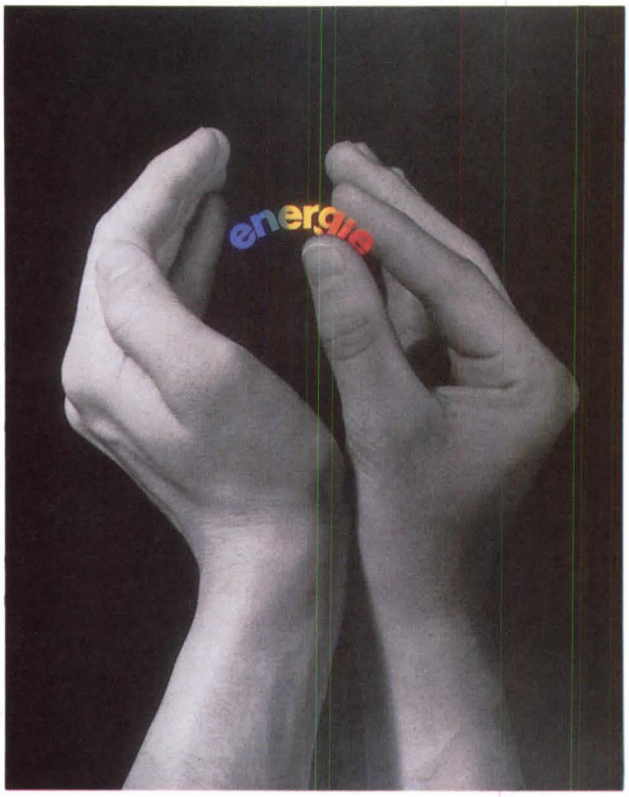
"Time has many dimensions. There is linear time (the aging of a community or the length of time to pay off a debt). But, more importantly in energy terms, there is rhythmical time. We are starting to recognize natural rhythms in planning and design.

Most of the phenomena considered, whether agriculture, using the sun as an energy source, the wind or tides, requires a rhythmic view of those volumetric dimensions of time that are necessary to use as planning increments.

"And so we're entering an extraordinary time in which the dimensions of the material we deal with, as designers, go beyond the statical dimensions of space to include the rhythmical dimensions of time. And therein lies the possibility of an extraordinary sort of esthetic investigation that we're just beginning to see the shadowing of. It's such an exciting time that we mustn't for one instant be deterred by the possibility that some of what we're dealing with is not going to be possible." □

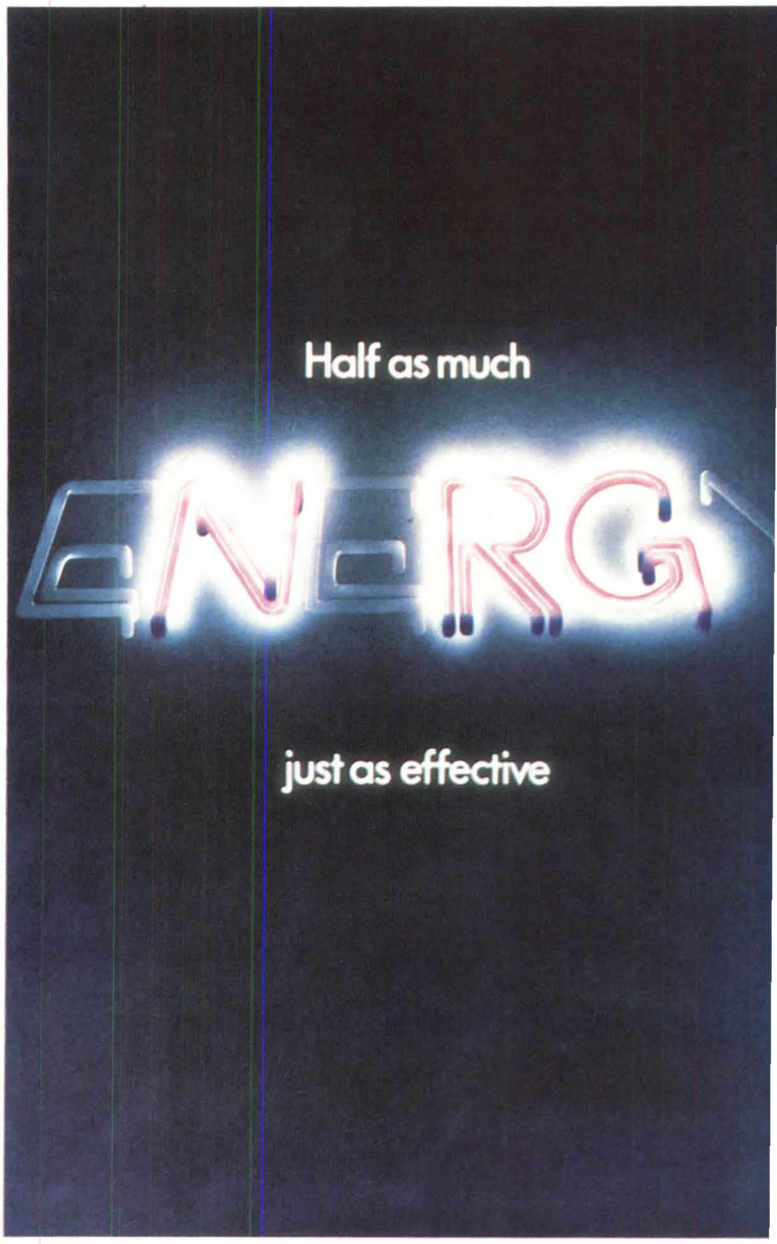


Jan Adkins



The Art of Conservation

Here and on our cover, a few winners from a recent European poster design competition on the subject of energy conservation. The sponsor was the Mobil Corporation, and participants were graphic arts students from eight nations. Eighty of the posters were shown at the Cooper Union, New York City, in February, and about half of them are being shown at the Corcoran Gallery, Washington, D.C., this month. The collection will then travel to Portugal, Germany, Denmark, Italy and France. Counterclockwise from left are posters by Gerhard Leidinger, School for Graphic Design, Linz, Austria; Helmut Brandt, Fach Hochschule, Munich; Piotr Hennig, Norwich School of Art, London; and, across page, Myriam Rabot, Ecôle Supérieure d'Arts Graphiques, Paris.




la conduite économique

BOOKS

The Growing Literature Of Energy-Conscious Design

Through the publication and dissemination of information on energy-conscious design we come to understand our role in making sure that this planet will successfully make the transition to new forms of energy without harmful economic and social damage. Although dozens of books and countless articles are published monthly on energy conservation, there is little originality in many of them. Many authors and editors continue to approach the subject with the same case studies, projects, theories and procedures. So it is not surprising that the architect does not know where to turn for published resources that will improve skills in the energy design process. The books noted below—all published in 1980—are both timely and useful for the practicing architect. Although all of them are by no means seminal, they do demonstrate that steps are being taken forward in energy-conscious design. *John R. Hoke Jr., AIA, Assistant Director of Energy Programs at the Institute*

Energy-Efficient Buildings. Edited by Walter F. Wagner Jr., AIA. (McGraw-Hill, 256 pp., $22.95.)

Donald Watson, AIA: "Architects once studied the rules of proportion for the styles and orders of the classical temples of antiquity. The earth is now that temple: the rules are those of building and living within the limits of the earth's balance of resources and energy." Watson introduces this book by means of a historical perspective on architectural practice, establishing the need for a monumental evolution in design toward a natural balance. He emphasizes the responsibility of design professionals in solving the most perplexing global issue—the "energy crisis"—through design.

An architectural retrospective of the 1970s, this book is a chronicle of professional achievements. It contains articles selected from the pages of *Architectural Record,* assembling in one volume case studies on energy-efficient buildings and essays by experts on energy conservation, solar energy, earth shelters, energy conserving techniques in HVAC systems and in lighting and, most important, building operations. The essayists consider an array of energy-related themes, among them building energy performance standards (BEPS), the American Society of Heating, Refrigeration and Air-Conditioning Engineers' 90-75 standard, building automation and computerized building management. There is good coverage of each subject considered, and the discussions are complemented by the case studies, helping to illustrate the application of concepts. It is evident by the work represented here that architects and engineers are in transition toward that balance of resources and energy.

Seven years have passed since the oil shortage was first understood by the building industry, and we might ponder what Will Rogers said in 1927: "We Americans think we are pretty good! We want to build a house, we cut down some trees. We want to build a fire, we dig a little coal. But when we run out of these things, then we will find out just how good we really are. . . ."

A Golden Thread: 2500 Years of Solar Architecture and Technology. Ken Butti and John Perlin. (Van Nostrand Reinhold, 303 pp., $15.95.)

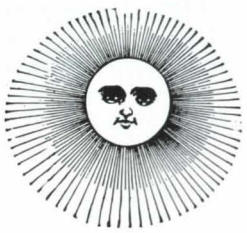
This book will provide hours of reading pleasure and, at the same time, humble anyone who thinks that solar architecture is a new thing under the sun. From the time of the ancient Greeks who built the planned energy-efficient city of Olynthus and the Romans who used transparent window coverings as heat traps for their famous baths, the "golden thread" of solar architecture and technology is woven into mankind's accomplishments.

The authors discuss how solar heat was used in early times for horticulture; the first solar motors; American pioneers in solar technology. They trace the history of solar domestic hot water heating and passive solar heating from the days of early America to the present, providing a perspective on the future. We have come full circle, and there are lessons to be learned from history to smooth our transition toward a new age.

"But," the authors say, "the most important lesson is that solar energy can be a practical alternative to the finite fossil fuel supplies. The Roman wood ships navigating the Mediterranean have been replaced by oil tankers bound for the Persian Gulf. Their quest remains the same. But the sun still beats down upon us even though the forests of North Africa have long disappeared. And it will beat down on future generations after all the oil and gas wells are depleted."

Mechanical and Electrical Equipment for Buildings. Sixth edition. William McGuinness, Benjamin Stein and John Reynolds. (Wiley, 1,336 pp., $35.95.)

If you need a comprehensive reference guide on environmental and mechanical design or just to update your library, then this authoritative sixth edition is for you. Since 1937, this book has been the general text for most architectural and engineering students, but it nonetheless offers information for practicing professionals. It considers energy and environment; indoor climate control; water and drainage; firesafety; electrical illumination; signal



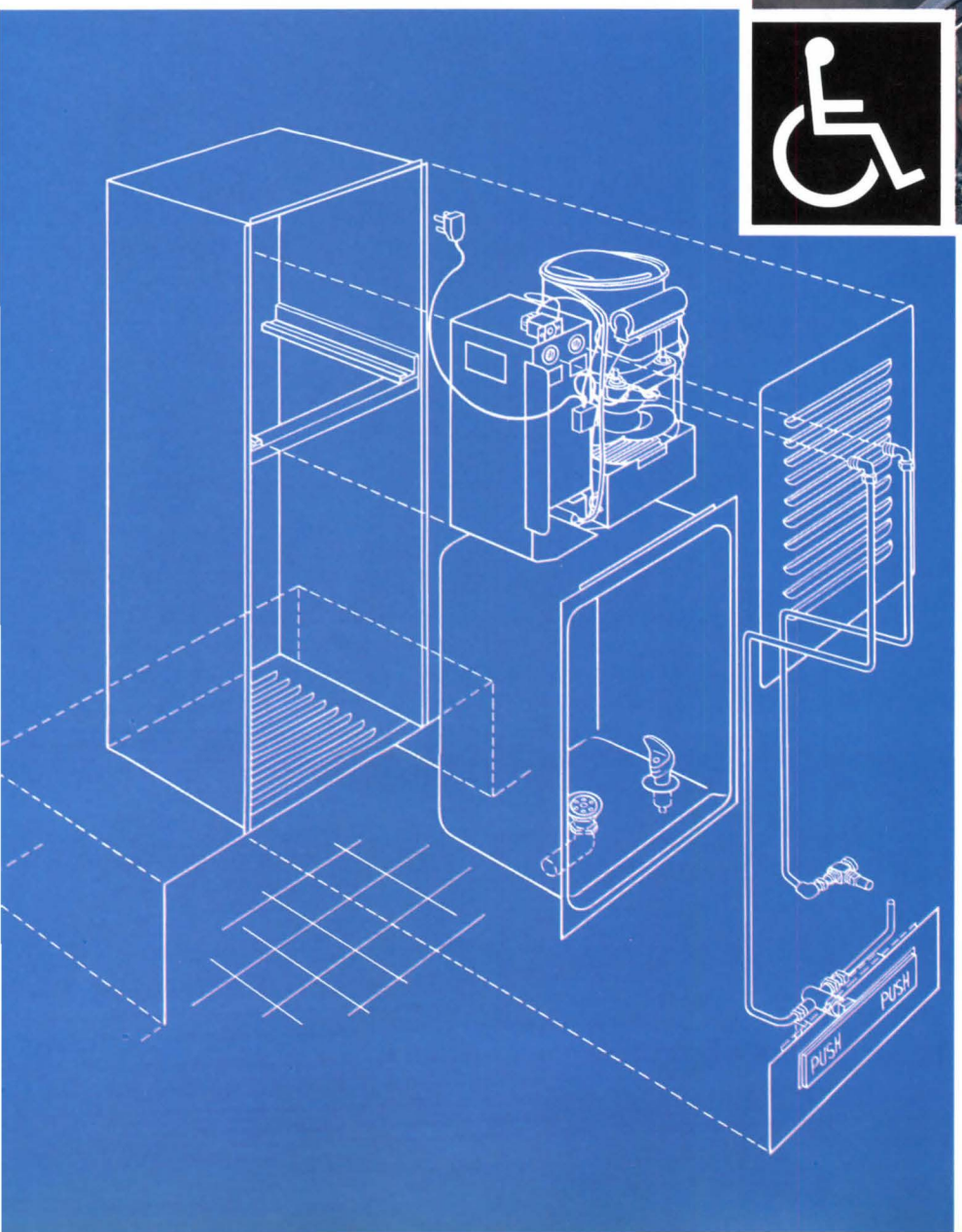
equipment; transportation, and acoustics. Part one emphasizes the interrelationships of energy, climate, the site and architectural design, featuring both passive and active solar design.

The volume includes most of the theory and practical applications needed in an architectural firm to provide understanding of the interrelationships between various complex building systems. Many building examples are taken from current U.S. architecture to demonstrate design solutions. There are abundant photographs, charts, tables and details; in addition, throughout the book there are simplified cookbook methods for the calculation of building systems.

Books continued on page 88

Don't Compromise Your Wall's Integrity.

Haws Model HWCT6 fountain with cooler is fully recessed, so walls remain smooth and interior lines are uninterrupted. Recess space beneath allows convenient wheelchair access.



Sturdy, Easy to Mount.

Steel mounting box is included for convenient installation. 9.5 gph cooler fits simply into place. Features a 17-gauge, satin-brushed finish; polished chrome-plated bubbler; and push-bar valve with automatic stream control.

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Circle 78 on information card

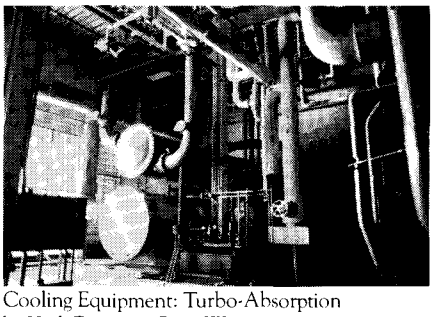
Why did the new Atlanta Airport choose gas air conditioning?

Pure economics.

Architects, Engineers and Planners: Stevens & Wilkinson; Smith, Hinchman & Grylls; Minority Airport Architects & Planners.

In the world's largest airport terminal complex, designed to serve over 50 million people a year, air conditioning is a prime consideration.

When Atlanta's engineers examined the systems meeting their specifications, they decided on heat driven equipment as the lowest energy user and the most cost-efficient based on life-cycle analysis.



Cooling Equipment: Turbo-Absorption by York Division, Borg-Warner Corporation.

Their selection was a steam operated turbo-absorption air conditioning system. Designed for future growth, this 7,500 ton system has one of the lowest energy consumption rates per ton hour of cooling available—just 7.8 lbs. of steam per hour. The primary fuel is natural gas.

Since gas offers total system efficiency, the new Atlanta Airport also depends on gas for heating. But not only large-scale buildings can benefit. Gas heating/cooling systems can provide operating economies in smaller buildings as well. For details on such integrated systems, contact your gas company. AGA American Gas Association ©1980

Gas: The future belongs to the efficient.

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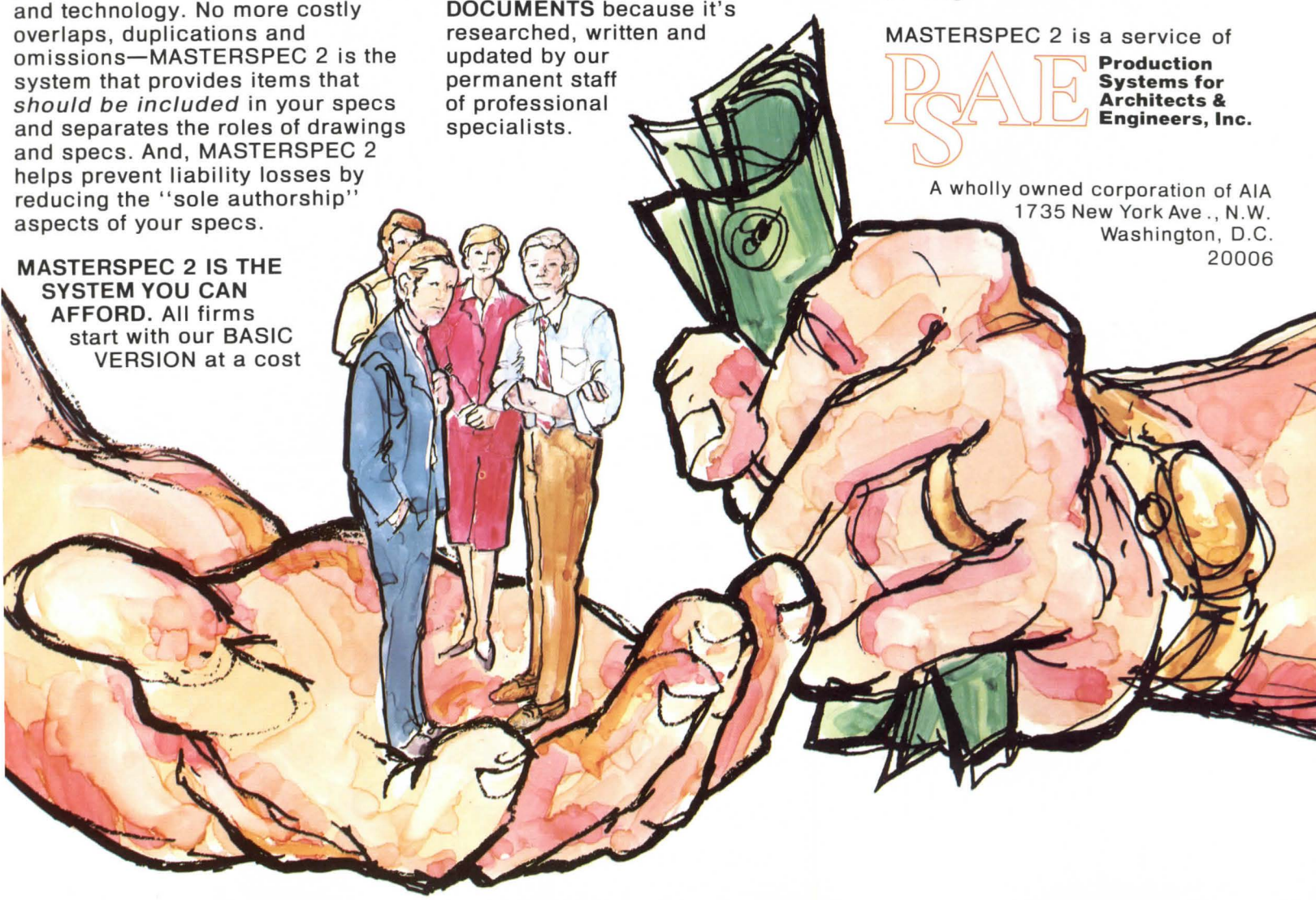


Circle 80 on information card

Books *from page 84*

Passive Solar Design Handbook. Total Environmental Action, Inc., and Los Alamos Scientific Laboratory under contract with the Department of Energy. (NTIS, 5285 Port Royal Road, Springfield, Va. 22161, 600 pp., $27.25.)

This technical publication is published in two volumes. The first volume, prepared by Bruce Anderson, president of Total Environmental Action, Inc., is entitled *Passive Solar Design Concepts;* the second volume, by Doug Balcomb and staff at the Los Alamos Scientific Laboratory in New Mexico, is entitled *Passive Solar Design Analysis.*

The first volume is an introduction for the novice to the principles of passive solar design and contains chapters on its background, the basics of solar building design, five passive solar heating techniques, passive solar heating and new developments for future use. There are also an excellent glossary, a reference section, a brief bibliography and appendices on such matters as solar radiation tables and maps, sun path diagrams and more.

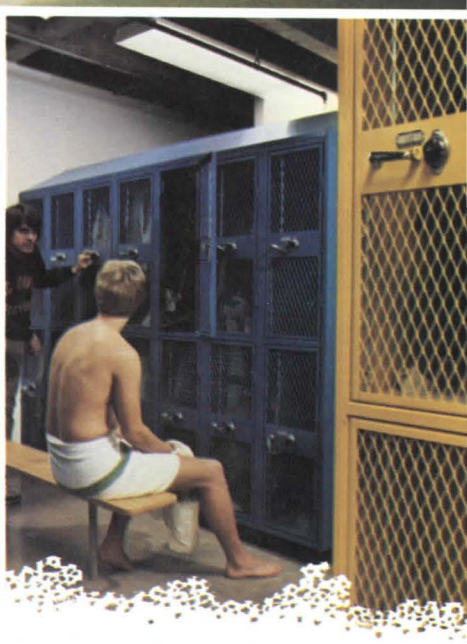
The second volume on passive solar design analysis is intended for architects, engineers and researchers. Passive solar design is now widely recognized as an effective approach in reducing considerable amounts of the building energy load. Much has been written on the practical aspects of design and construction, but little on quantifying the performance of this complex process. The purpose of this volume is to provide a means whereby performance can be predicted and to give a guide to assist the reader in the design of passive solar systems. Although the research is incomplete—this being an interim report—it is one of the best references available.

A Survey of Passive Solar Homes. AIA Research Corporation under contract with HUD. (National Solar Heating and Cooling Information Center, Box 1607, Rockville, Md. 20850, 105 pp., no charge.)

Prepared by the AIA Research Corporation, this survey identifies 300 residential passive solar buildings, of which 111 are described in the case study format, with the remainder listed in four regional directories. This publication is a successor to a similar HUD work of 1978, *A Survey of Passive Solar Buildings.* The earlier volume dealt with both residential and commercial buildings. This book shows how passive heating and cooling strategies can be "successfully integrated into financially attractive residential building styles ranging from colonial to the suburban 'ranch' to modern, expressly 'solar' forms."

The book's introduction to passive sys-

continued on page 90



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Books *from page 88*
tems gives a good, brief description of various passive systems, enlightening the person who is new to the concept. The book's organization is by region: West, Midwest, South and Northeast. Each regional section begins with a concise description of climate (with accompanying maps) and suggested design strategies indigenous to the location.

Each case study provides an array of information, such as the project's location, owner, architect, building type, conditioned area, heating loads, heating degree days, solar fraction, collection area, storage capacity, system description and references. This information is followed by a narrative and *one* black and white photograph of the house and *one* building section demonstrating the passive solar features. Additional facts would have

been helpful: cost of construction, date, contractor's name.

Following each section's case studies is a directory that identifies additional passive solar homes in that region. A glossary and bibliography, although extremely brief, are useful. The "index of case studies" is very helpful for those interested in work by the architects covered in the book. I recommend this survey to persons interested in a resource guide into the cutting edge of passive solar residential design.

Desert Housing: Balancing Experience and Technology for Dwelling in Hot Arid Zones. Kenneth N. Clark and Patricia Paylore, editors. (University of Arizona, Office of Arid Land Studies, 339 pp.)

This is an important book for architects who design buildings in hot arid zones, as well as for those who are interested in the general topic of energy conservation. It originated in a series of seminars on arid land housing at the University of Arizona. The seminars were structured by Kenneth N. Clark, associate professor in the university's college of architecture. According to coeditor Patricia Paylore, the book is "the offspring of the combined talents and interest of all contributors."

Paylore also remarks that the book is in no way the "usual proceeding type," and she is correct, for its arrangement is logical in its presentations of ideas and choices, focusing on theoretical aspects of desert housing design, technological advances made and design detail.

Gideon Golany, a founder of a kibbutz in southern Israel who has conducted research in the planning of new settlements in arid and semi-arid zones, sets the stage in his essay on policy trends and proposed strategies for arid zone development. Among the other essays is one on desert housing and energy conservation by Baruch Givoni of Ben Gurion University of the Hegev; one on adobe by Paul G. McHenry Jr., author of *Adobe: Build It Yourself* and other works; one on microclimates in desert housing by Jeffrey Cook, AIA, author of four books and many articles; another on earth sheltered housing by Frank L. Moreland, editor of *Alternatives in Energy Conservation: The Use of Earth Covered Buildings,* and one on two natural solar houses by David A. Wright, AIA, author of *Natural Solar Architecture.* Other essays cover desert housing in Baja California, landscape architecture for arid zones, solar collector systems, Le Corbusier in North Africa, indigenous housing in Iran and design criteria for desert housing.

Perhaps this is an offbeat book in some respects, but it will inform the person who wants to "balance experience and technology" in the design of dwellings in hot arid zones.

Passive Design for Desert Houses. Jeffrey Cook, AIA. (Arizona Solar Energy Commission, 1700 W. Washington, Phoenix, Ariz. 85007, $3.)

Not a "book" in the traditional sense, this is a series of seven pamphlets, with holes for a ring binder. Despite the low price, the pamphlets will be of great use to the designer of energy-conscious desert houses. Although they concern tract houses, the principles are applicable for sound building practices in the low, hot deserts of the Southwest. Among the topics covered are subdivision and house planning, orientation, foundations, roofs and windows and shading. Modest in both price and in presentation (there is no title page and one has to look carefully for author and publisher), these liberally illustrated pamphlets nonetheless are highly recommended. In appropriate modesty, neither author nor publisher makes "any warranties" on content.

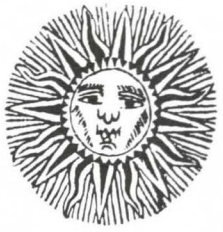
Design Primer for Hot Climates. Allan Konya. (Whitney Library of Design, 128 pp., $17.50.)

If your firm has made the decision to seek work in the Middle East, this book will be helpful. Finding design solutions that are in harmony with arid, semi-arid, subtropical or tropical climates is fundamental in these regions. The book demonstrates how important design is in areas where there are extreme temperature swings and/or a high level of continuous humidity. Design concepts are based upon indigenous building techniques that have evolved over centuries of use, taking advantage of natural means of heating, cooling, lighting and ventilation. The book also includes a discussion of such hazards as earthquakes, lightning and termites and provides as well a guide to the use of locally available building materials and construction techniques.

The first chapter, on "Climate, Zones and Comfort," reviews the fundamental physical principles relating to climate and comfort for the four major climatic zones. Subsequent chapters deal with the environmental design techniques relating both to the design and to construction. Tables, diagrams and checklists are adequate for quick reference to the necessary data used in schematic design. Appendices provide additional resource information, covering heat transfer, basic vegetation types for hot climates, international building research centers and a useful bibliography. This book, with its emphasis on energy-conscious design, will add to the reader's knowledge base.

Thermal Shutters and Shades: Over 100 Schemes for Reducing Heat-Loss Through Windows. William A. Shurcliff. (Brick Housing Publishing Co., 3 Main St., Andover, Mass. 01810, 256 pp., $12.95.)

F. M. Schmidt said, "The wolf isn't at the door; he is at the window." William



Shurcliff, who has written many books and articles on solar energy, seems to agree. In this book of 21 chapters, he zeroes in on ways to control heat loss through thermal shutters and shades at windows. The book deals primarily with devices that are already commercially available, and the author proposes "some radically new schemes" of his own. He also discusses insulation materials, indoor and outdoor devices, films and foils, attachment details, special applications for solar spaces—and much more. He concludes that properly designed and installed shutters and shades could save the country 1 to 3 percent of its annual purchased energy, and increase human comfort of building occupants as well.

The book was written for the general public, but it contains some very useful information for architects. Professionals, however, will be disappointed with the quality of the drawings and diagrams. The appendix contains information on shutter, shade, film and insulating materials available from manufacturers and is a very helpful resource. □

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Energy *from page 44*

rimeter duct, which will eliminate the need for duct runouts and the usual hung ceiling. The duct enclosure will be used as a light shelf to bounce diffused daylight into the office. High quality indirect lighting will supplement the natural light. Projected energy consumption for the building, when completed in June 1981, is 32,000 BTUs per square foot per year.

Caudill, Rowlett, Scott also won in the government category for the Federal Correctional Institute, Bastrop, Tex. The institute (160,000 square feet of new construction and 56,000 square feet in existing buildings, completed last September) serves as a correctional facility for youth offenders. There are four dormitories and a complex of buildings designated as the "downtown" area—pedestrian entrance, control center, administration offices, educational area, reception, clinic, dining, kitchen, laundry, multipurpose area and security detention area. Active and passive solar systems are integrated to provide interior daylighting and optimum roof angle for solar collector efficiency. The active system is designed to provide 96.6 percent of the hot water needs, 45.5 percent of the heating and 8.6 percent of the cooling needs for the entire project. Common areas of the living units and "downtown" buildings are equipped with clerestories that provide most of the lighting under normal daylight conditions. Annual energy consumption is estimated at 116,140 BTUs per square foot per year.

Myers & Bennett Architects/B.R.W., Minneapolis, is the sole winner in the institutional category for Williamson Hall, University of Minnesota, Minneapolis (see April 1978, p. 46). The 83,000-square-foot building, completed in 1977, is 90 percent underground. A subgrade court allows daylight to enter the building. Engleman ivy, a deciduous vine, is used as a solar control device on the court's windows to screen out summer sun and permit passive solar collection in the winter. A 6,000-square-foot solar collector system is tied into the building's HVAC system. The HVAC system also recovers heat from the exhaust air. With the active/passive solar system combination, the building will demand only about one-eighth of the energy required for a similar conventional building, estimated at 68,804 BTUs per square foot per year.

One of two winners in the industrial category is the Ballinger Co., Philadelphia, for the SmithKline Corporation pathology/toxicology laboratory building, Upper Merion, Pa. The 160,000-square-foot laboratory, when completed in February 1982, will be the largest long-term animal testing facility in the U.S. The facility requires 150 air exchanges per hour to eliminate viral cross contamination and 70,000 gallons of 200-degrees Fahrenheit water each day to wash the animal cages. To meet these high energy demands and at the same time conserve energy, solar assisted heat pumps, process water heat pumps, heat exchangers and double bundle condensers will be used. Larger air handling duct and coil velocities were designed to reduce air friction to an absolute minimum, thereby decreasing energy consumption. Only one side of the building will have windows. BTUs per square foot per year are estimated at 245,988.

The other winner in the industrial category is Copland, Hagman, Yaw, Ltd., Aspen, Colo., for the Sport-Obermeyer warehouse and offices, Aspen, Colo. The south facade of the 20,000-square-foot warehouse has a 20x120-foot Trombe wall. At the inside top of the wall, a system of collection ducts captures and distributes solar heat throughout the building. Light is admitted into the interior by intermittent voids built into the block wall. The 10,000-square-foot office building is partially depressed (2.5 feet) into the ground for temperature stabilization.

Jurors were William Brubaker of Perkins & Will (chairman); Ezra Ehrenkrantz, FAIA; Masao Kinoshita, AIA; John Holton, AIA, and engineers Art Wheeler and William Coad.

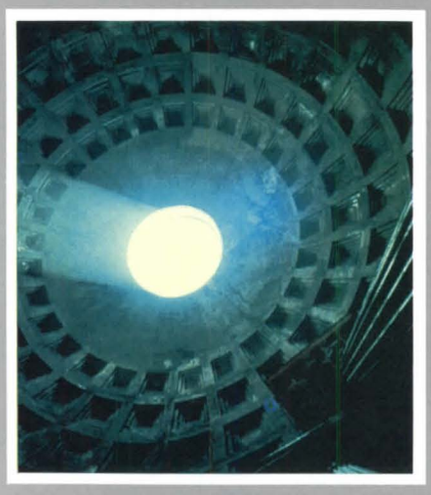
DEATHS

Konrad Wachsmann: An innovator in the art of industrialized building, Mr. Wachsmann died Nov. 25, 1980, in Los Angeles, where he was professor emeritus at the University of Southern California. Born in Frankfurt-on-Oder, Germany, in 1901, he was educated in Germany under Hans Poelzig and others and practiced there until 1941, one of his commissions being a 1928 country house near Potsdam for Albert Einstein. From 1941 to 1949, he collaborated with Walter Gropius in this country and formed the General Panel Corporation, New York City, for the manufacture of prefabricated housing elements that he and Gropius designed. In the '50s and early '60s, he headed the Illinois Institute of Technology's department of advanced building research and was later chairman of that school's graduate program on industrialization.

His other work included collaboration with Serge Chermayeff on the Mobilar Structure Building System Studio, New York City, and with Mies van der Rohe on the Chicago convention hall project. His inventions included the 1971 Locomotion Orientation Manipulator for the study of motion in time and space, and his writings included the book published in English in 1961 as *The Turning Point in Building: Structure and Design.*

continued on page 94

To get more energy into architecture,



we need to get more architects into energy.

Right now, if you are an architect, you could be designing buildings that would use as much as 40 percent less energy than the buildings you designed five years ago. This according to a study by the AIA Research Corporation for the U.S. Department of Housing and Urban Development and the U.S. Department of Energy.

You *could* be. But, chances are, you're not. The main reason is, too much has been left to chance.

The knowledge exists. However, it has never been satisfactorily systematized to give architects the comprehensive tools they need to fill the role that they, and they alone, can properly fill.

The crisis is here. There's no other word for it. We can already see it in higher costs. Soon, we will see it in shorter supplies. And about one-third of all the energy consumed in the United States is used to operate buildings.

Clearly, if architects fail to take the lead in addressing that big a problem, technocrats will almost be forced to do so.

The AIA has been working for nearly a decade to make sure the choice is not one of technology *or* design, but, rather, one of technology *and* design. We need both. Our communities deserve both.

The American Institute of Architects
"Energy in Architecture"
1735 New York Ave., N.W.
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Yes, please put me on your list to receive further information on the "Energy in Architecture" Professional Development Program.

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In 1972, a special task force was appointed to explore the links between energy and the built environment. Major policy statements followed in 1974, 1975, and 1980, culminating in a proposal for increased educational and training opportunities in the areas of energy and energy-conscious design—not just for architectural and engineering students, but, of even greater immediate importance, *for practicing design professionals.*

Now, the AIA is about to turn that proposal into the first really comprehensive "Energy in Architecture" Professional Development Program, combining publications, audiovisuals, workshops, and seminars on 16 specific integrated knowledge-base modules.

It all starts at the AIA National Convention in Minnesota, May 17 to 21, 1981.

The purpose is to provide architects with nothing less than the *energy to survive* professionally, in the energy-short years ahead.

Deaths *from page 92*

In that book and elsewhere, Mr. Wachsmann spoke eloquently of the interdependence of science and art. As engineer Fred S. Dubin wrote to this magazine, after a survey of Mr. Wachsmann's work appeared in the March 1972 issue, "His understanding of the potential of technology and human capabilities in an interdisciplinary framework has been demonstrated throughout the years."

George Fred Keck: The day before he died on Nov. 21, 1980, at the age of 85, Mr. Keck was awarded the Chicago Chapter/AIA's distinguished service award for his 50 years of "distinguished architectural practice which pioneered many new concepts in design and technology." Earlier, last April, his alma mater, the University of Illinois, presented a medal to him. The early contributions of Mr. Keck and his brother William Keck, FAIA, were featured in an exhibit at the fourth national passive solar energy conference held in 1979 under the aegis of the American section of the International Solar Energy Society (see Dec. '79, p. 48).

Mr. Keck achieved national prominence with the glass-sheathed House of Tomorrow and the prefabricated steel and glass Crystal House that he designed and built for Chicago's "Century of Progress" World's Fair of 1933-34.

Before establishing his own Chicago firm in 1926, he worked for other firms, and in 1931, he and his brother started the firm of Keck & Keck. During World War II, the two brothers designed prefabricated houses, and solar passive design concepts began to appear in house after house. In about 1938, they began calculating solar angles, widening southern overhangs and flooring sun rooms with black slate. Postwar work refined their passive solar designs, and their work was published frequently in the 1940s and '50s. This magazine said of the brothers: "The Kecks' ingenuity with the sun is typical of their pragmatic and humane approach to design." He was head of the department of architecture at Chicago's Institute of Design from 1937 to 1944. Mr. Keck was known for his watercolors of buildings and landscapes.

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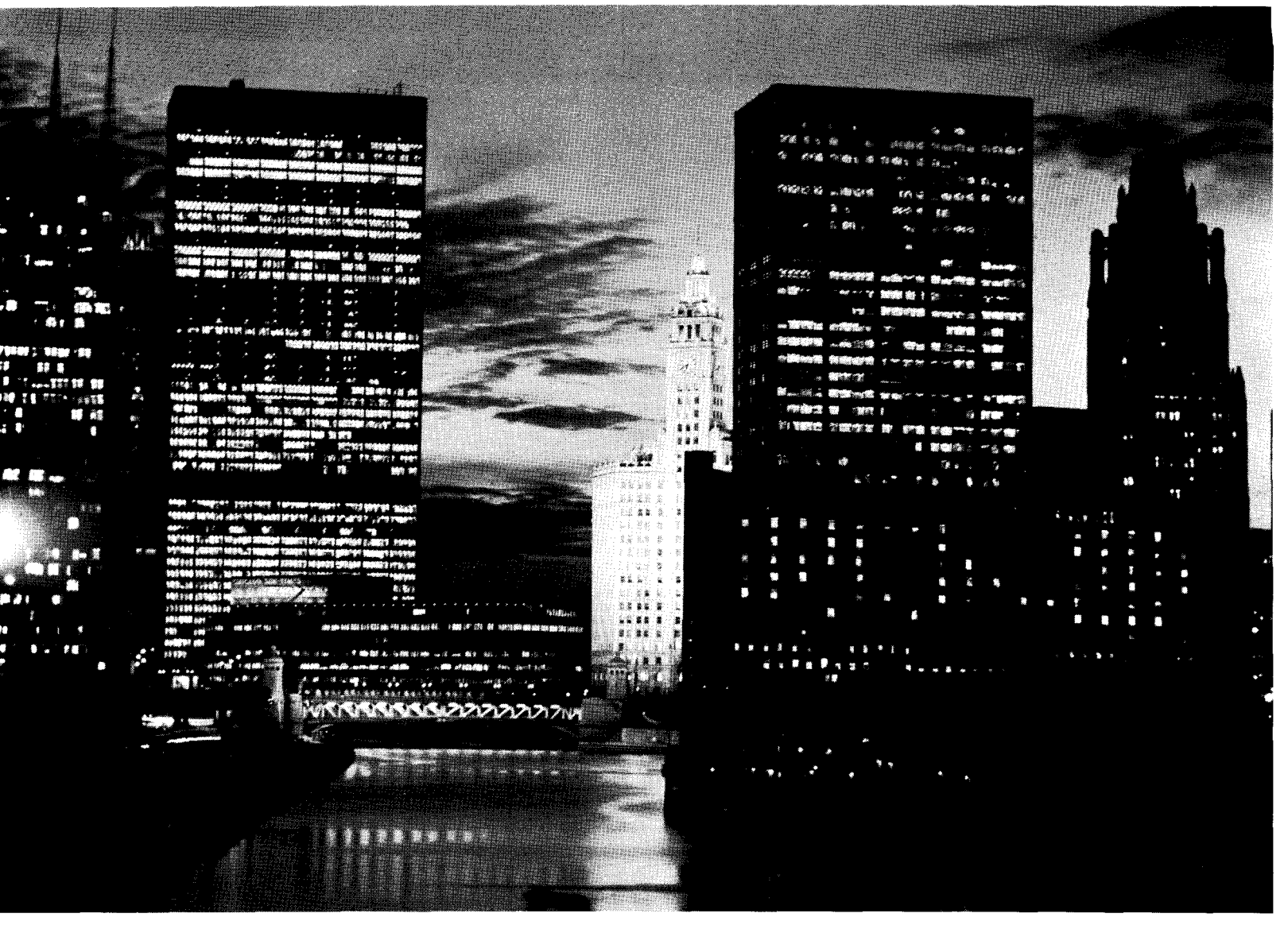
Clifton Chapin West, Westbrook, Conn.
J. S. Whitman, Kenmore, N.Y.

Briefs on page 98



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The American Institute of Architects

Energy Planning for Buildings

Michael M. Sizemore AIA
Henry Ogden Clark AIA
William Ostrander PE

Building owners expect their architects and engineers to have the practical knowledge it takes to translate energy theory into a reliable form of practice.

This book, written by two architects and an engineer who have hands-on experience in energy-conscious building design and redesign, does just that. It presents a proven process that design professionals can use (or adapt) to study the present energy performance of a building, uncover opportunities for energy-conscious improvements, evaluate those opportunities, and see to it that they are carried out to the owner's best benefit.

The book describes in detail a manual technique for calculating energy usage and shows in a sample problem how that technique can be applied. This allows the reader to evaluate any energy design solution, including solar assisted alternatives. It also provides a basis for understanding computer-aided energy estimating techniques.

In developing their work, the authors have recognized that non-energy related concerns such as user comfort, environmental impact and visual appearance are as important in an energy-related design as energy performance itself, and they urge designers to identify these at the outset of a project and to keep them in mind to the end.

An opening chapter offers a look at the basic concerns of energy planning, including such concepts as comfort; illumination and daylighting; the building envelope; heating, ventilating and air-conditioning; and the very concept of energy itself.

Chapter 2 takes up the roles and responsibilities of the team needed to carry a project through to a successful end. Team members discussed include the owner, the architect/engineer, the building users and operators, energy suppliers, product manufacturers and building officials.

Chapter 3, a key part of the book, shows how to study a building's present performance (or, in the case of a new building, analyze a set of building plans) so the energy planner can examine the impact of any proposed changes suggested as a way to greater energy efficiency.

Chapter 4 pinpoints those opportunities, describing the best way of identifying them. The following Chapter 5 then shows how best to narrow the list of possibilities to those that make the most sense in terms of cost, time, payback and technical feasibility. Two levels of evaluation are given—"quick" and "detailed."

Chapter 6 shows what is needed to carry out the recommendations stemming from the evaluation, and offers much sound advice to the energy planner and owner for monitoring the results and maintaining the renewed building at a peak of performance.

This chapter is followed by a sample problem which illustrates the procedural steps presented in the various chapters.

Finally, an appendix includes discussions on system response and cost benefit analysis.

There is also a glossary and a practical reference list.

ENERGY PLANNING FOR BUILDINGS fills a serious need for a practical, process-oriented book which energy planners can use, and owners can refer to, as they embark on a new building project or go about redesigning an existing one for greater energy efficiency.

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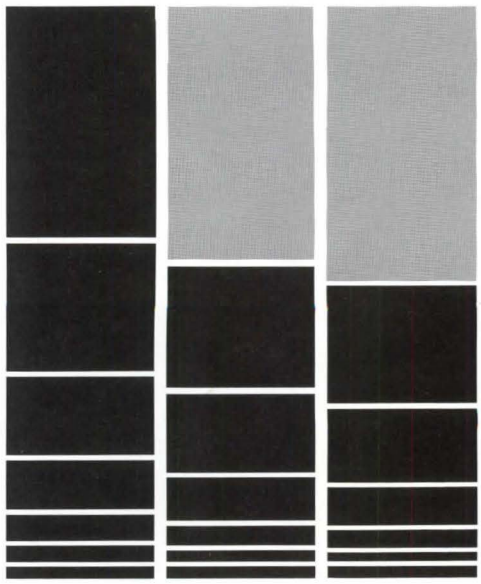

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Miles Shopfner, Director of Maintenance and Purchasing, Fort Smith Public Schools: *"Glass breakage savings alone can justify the selection of brick."* He further added, *"Our average school interior needs to be completely repainted every ten years, or even more often. This is eliminated at Barling. And besides, the building is less costly construction-wise."*

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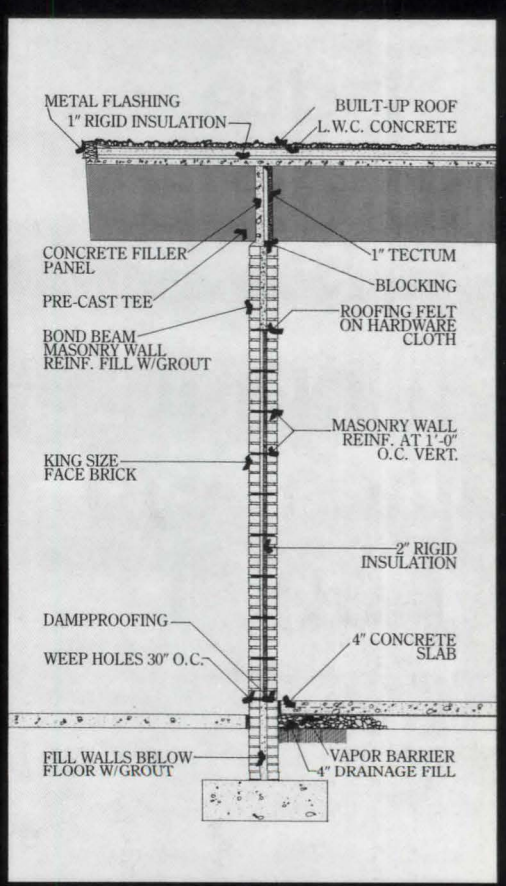

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Structural: Burrough-Uerling-Brasuell, Engineers, Fort Smith, Arkansas
General Contractor: Gary Crawford Construction Co., Fort Smith, Arkansas
Masonry Contractor: Ronald Ray Masonry Contractor, Fort Smith, Arkansas

BRIEFS

"Architectural Conservation 1981" is the title of a seminar to take place at West Dean Craft College, Chichester, England, on June 26-July 3. The program, designed for professionals in historic preservation and taught by British architects and preservationists, is sponsored by the Victorian Society, the Attingham Park Summer School and the Scottish Georgian Society. For information, contact: Barbara Wriston, 30 Waterside Plaza, Apartment 2D, New York, N.Y. 10010.

The National Museum of American Art is the new name of the former National Collection of Fine Arts. The museum is located in the Old Patent Office Building in Washington, D.C., and is the nation's oldest collection of art.

John A. Spotorno, a senior architectural major at California Polytechnic State University, San Luis Obispo, has been named to receive the National Institute for Architectural Education's Paris prize for overseas travel and study. Also known as the Lloyd Warren fellowship, the Paris prize, open to architectural students in their final year of study, carries a stipend of $6,000.

Alvar Aalto will be the focus of a tour of Finland sponsored by Pratt Institute scheduled for May. For information, contact: Michael Trencher, School of Architecture, Pratt Institute, Brooklyn, N.Y. 11205, (212) 636-3405.

George Anselevicius, AIA, has been named dean of the school of architecture and planning at the University of New Mexico, succeeding Morton Hoppenfeld, AIA, who has returned to private practice in Washington, D.C. Anselevicius currently holds the chair of architecture at the State University of New York at Buffalo.

The Center for Insulation Studies has been established at Drexel University to begin a five-year program of independent insulation testing which is funded at more than $600,000, principally by manufacturers of insulation materials. The first project is to study thermal performance of various industrial roof systems under service conditions while aging.

"The National Directory of Landscape Architecture Firms" is available free to those interested in contracting for landscape architectural services. Send requests to: American Society of Landscape Architects, 1900 M St. N.W., Suite 750-NR, Washington, D.C. 20036.

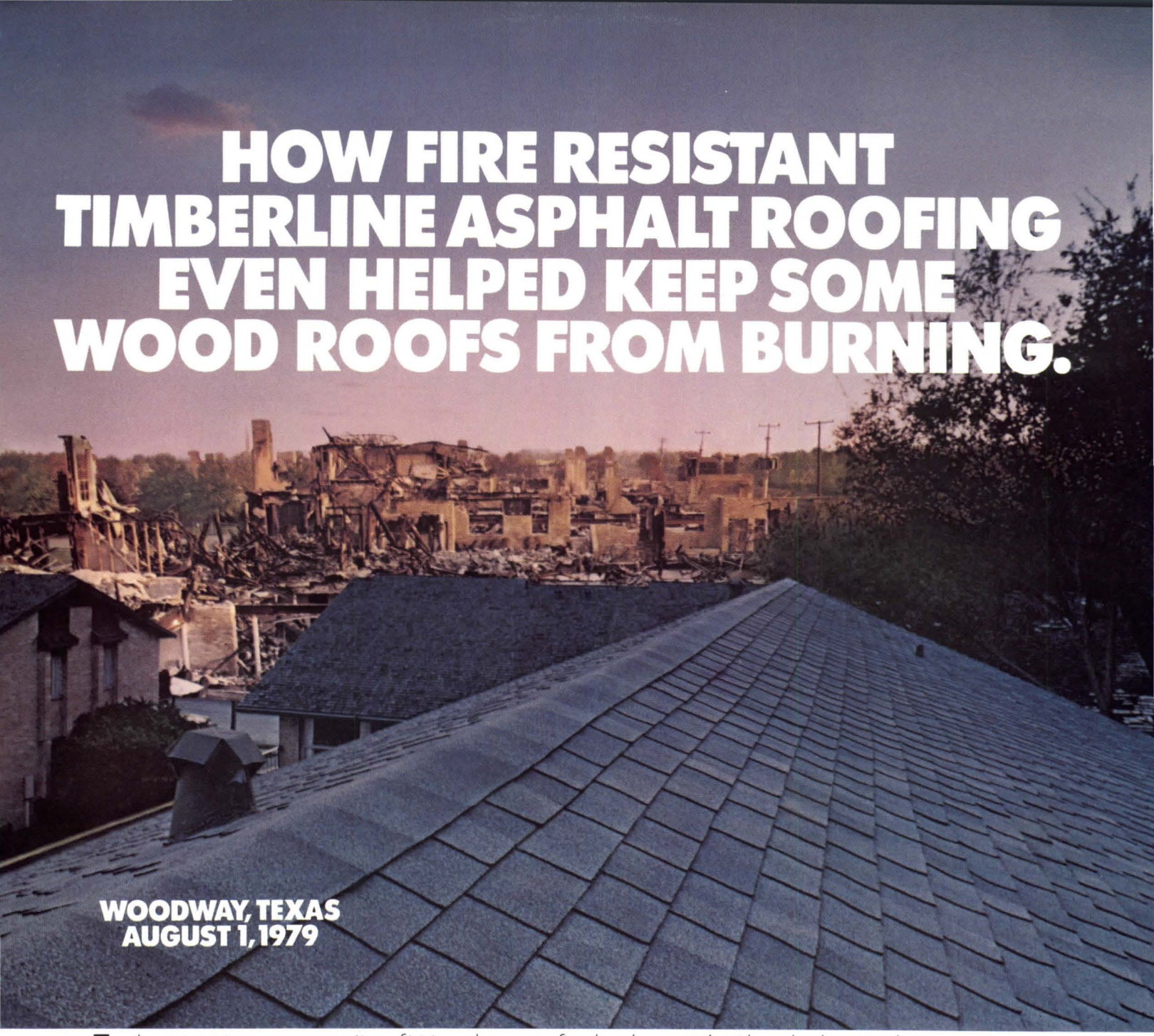
A delay in the implementation of proposed guidelines to make federal buildings more accessible to the handicapped has been urged by the Council on Wage and Price Stability. The council says that the Architectural and Transportation Barriers Compliance Board's guidelines for construction and alteration of buildings financed with federal funds are potentially expensive and "unwarranted."

The Paralyzed Veterans of America recently commended AIA and 11 other national organizations for "creating greater awareness of the need for public access by America's disabled veterans."

An engineer's salary between 1953 and 1980 increased by 777 percent. Inflation, however, caused the same engineer to realize in actuality only a 6.58 percent increase, according to a study, "1980 Engineers' Salaries," conducted by the American Association of Engineering Societies. The report is available for $75 from AAES, 345 E. 47th St., New York, N.Y. 10017.

The late Walter Gropius (1883-1969) is being honored by a four-city exhibit and lecture tour, beginning in Tokyo. The exhibition is presented by the German Cultural Center and the Japan Committee, chaired by Kenzo Tange, Hon. FAIA. Funds are provided by the German Federal Republic and by private Japanese sources. Gropius lectures will

continued on page 106



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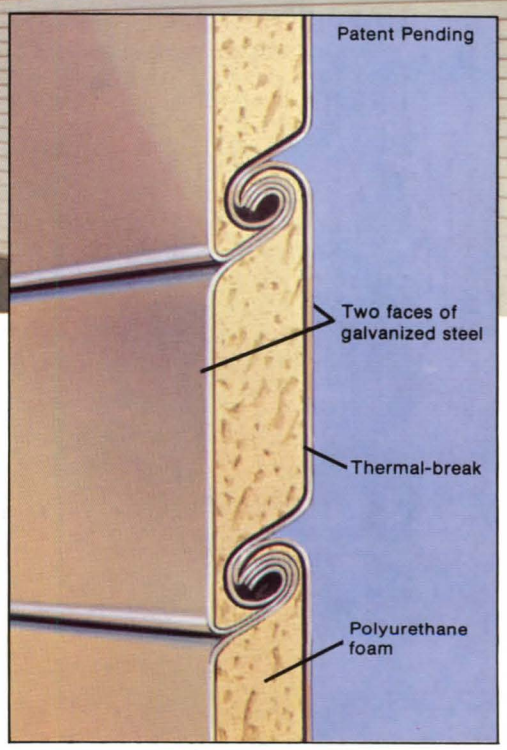

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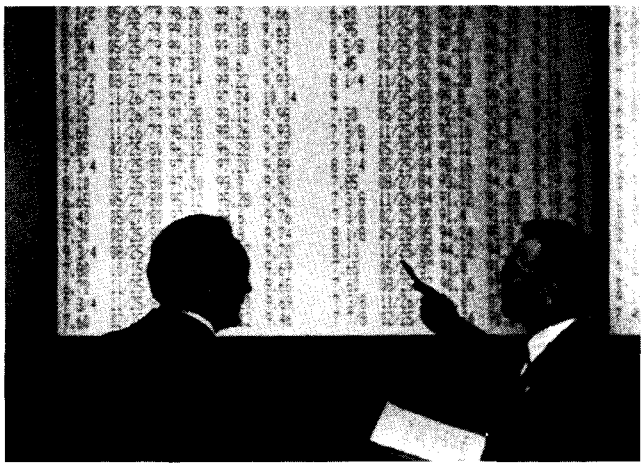
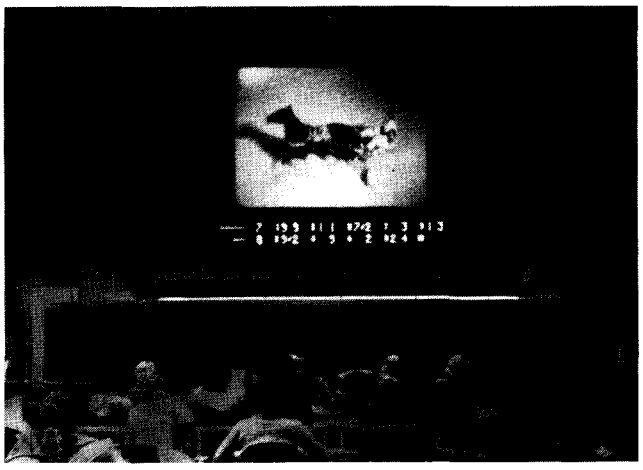


IN BUSINESS-General Electric projectors display real-time computer-generated data for Merrill Lynch Government Securities, New York.



IN ENTERTAINMENT-General Electric color projector brings large screen race action to Ontario Jockey Club, near Toronto, Ontario, Canada.

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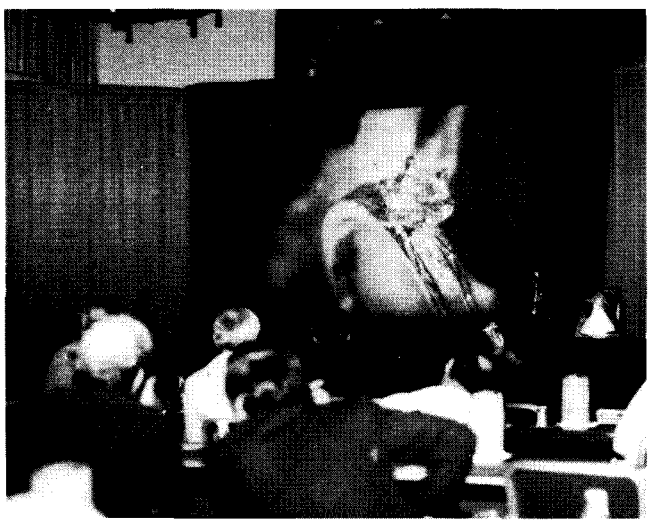

IN SALES-General Electric color projector dramatically displays new product highlights at Keepsake® Diamond Rings annual meeting.

IN THE BOARD ROOM-At Mellon Bank N.A., Pittsburgh, General Electric color projector displays data, graphs, and information programs.

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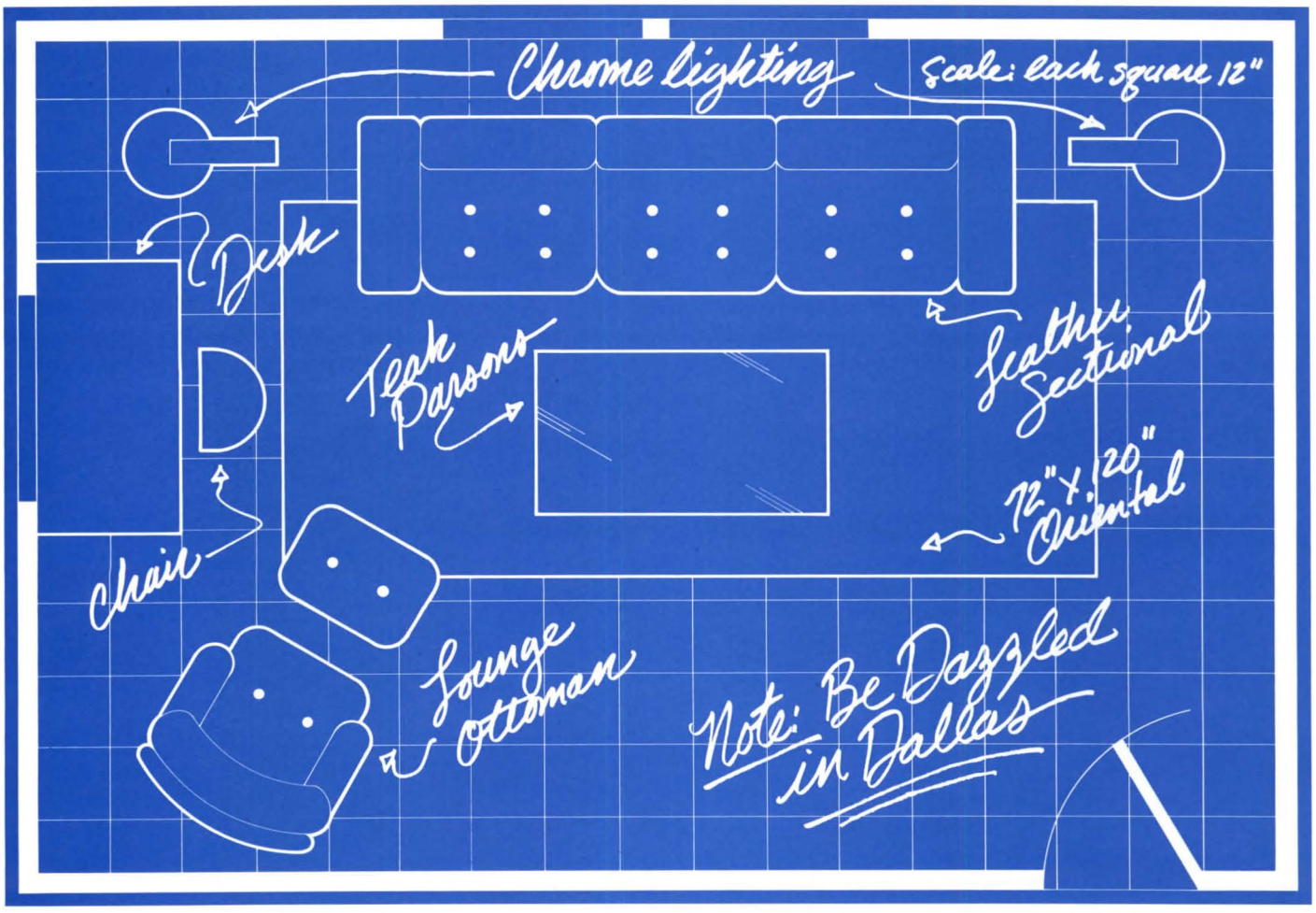

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Briefs *from page 98*
be given by James Marston Fitch, professor of architecture, Columbia University; Hans M. Wingler, director of the Bauhaus Archiv, Berlin, and Norman C. Fletcher, FAIA, a founding partner with Gropius of The Architects Collaborative Inc. in Cambridge, Mass.

Bill Plimpton, student at the University of California at Berkeley, has been elected president of the Association of Student Chapters/AIA, to assume office in July. **Nora Klebow,** student at Kent State University, will become ASC/AIA's vice president.

The Sheldon H. Butt scholarship, to be awarded to students interested in pursuing a career in the solar industry, has been announced by the Solar Energy Industries Association. The scholarship honors Butt's six years as president of SEIA. Contact: SEIA, 1001 Connecticut Ave. N.W., Suite 800, Washington, D.C. 20036.

"Building Failures Forum" is the title of a new monthly journal "about the building materials, construction procedures and systems which have not worked and have sometimes led to failures." Editor and publisher is Raymond A. DiPasquale, professor of architecture and structural technology at the University of Illinois and Cornell University for 10 years. Subscription price is $60 per year; $5 each for sample copies. Contact: *Building Failures Forum,* Box 848, Ithaca, N.Y. 14850.

The O'Neil Ford chair in architecture will be established at the University of Texas at Austin in honor of the Texas architect, an AIA fellow. The actor Gregory Peck and Nancy Hanks, Hon. AIA, chair a committee of Ford's friends, clients and associates who have endorsed plans for the chair. Mrs. Lyndon B. Johnson also serves on the committee.

"Measured Drawing in Rome" is the title of a summer school session to be conducted by Cornell University, June 1-28. Intended for people of various backgrounds, preferably with experience in architecture, archeology or drawing, the course will place emphasis on surveying and archeological drawings of architectural sites. For information, contact: Robert L. Vann, School of Architecture, University of Maryland, College Park, Md. 20742.

The Indiana Society of Architects/AIA has named Kenneth Englund as its executive director. He leaves his post at the Indiana Arts Commission as program director.

Robert A. Rosenfeld has been appointed to the newly created position of director of internship programs for the National Council of Architectural Registration Boards. He was assistant director of AIA's professional development programs.

Carl L. Bradley, FAIA, chairman of the board of Archonics Corporation, Fort Wayne, Ind., has been elected chairman of the national construction industry arbitration committee of the American Arbitration Association.

The International Design Conference in Aspen, Colo., has elected Julian Beinart as president. He is professor of architecture and director of the advanced studies program in architecture at the Massachusetts Institute of Technology. **Bill N. Lacy, FAIA,** president of the Cooper Union for the Advancement of Sciences and Art will be program chairman for the 31st design conference to be held June 14-19.

Deadline for entries in the women's international design competition (see Dec. '80, p. 66) has been extended to April 30. For
continued on page 108

DOE *from page 64*
compared to artificial lighting, and of passive heat distribution compared to conventional mechanical techniques, appear to be significant.

- The most successful solutions integrate energy and architectural considerations rather than treating them separately. This usually results in better performance at a lower cost.
- Although this is an experimental program, seven of the 12 buildings examined demonstrate attractive economic benefits. This suggests a considerable potential for cost savings, as professional experience in combining passive design techniques with commercial buildings increases.

In addition to the demonstration program, four areas relating passive concepts to large commercial buildings will be studied as part of the overall DOE effort: multizone energy flow; passive system simplicity versus building program complexity; mechanical integration of conventional HVAC and passive systems, and the integration of heating, cooling and lighting systems. Products will be developed and tested, such as service hot water system controls, curtain wall assemblies, control systems for lighting, operable shading devices, heat energy storage systems and damper assemblies for night venting.

Research and development programs are already underway. Lawrence Berkeley Labs is conducting extensive analysis on radiative cooling measurements, occupancy effects and thermal mass in direct gain systems, stack effects in multistory buildings, the convective coupling of thermal zones, ventilation systems and thermal chimneys. DOE's San Francisco office began a program for new or improved passive cooling products and continued evaporative and radiative systems tests at Trinity University. The Solar Energy Research Institute initiated work on integrating daylighting concepts with ventilation systems. Both the BLAST and DOE-2 computers have been programmed to incorporate passive design concepts. □

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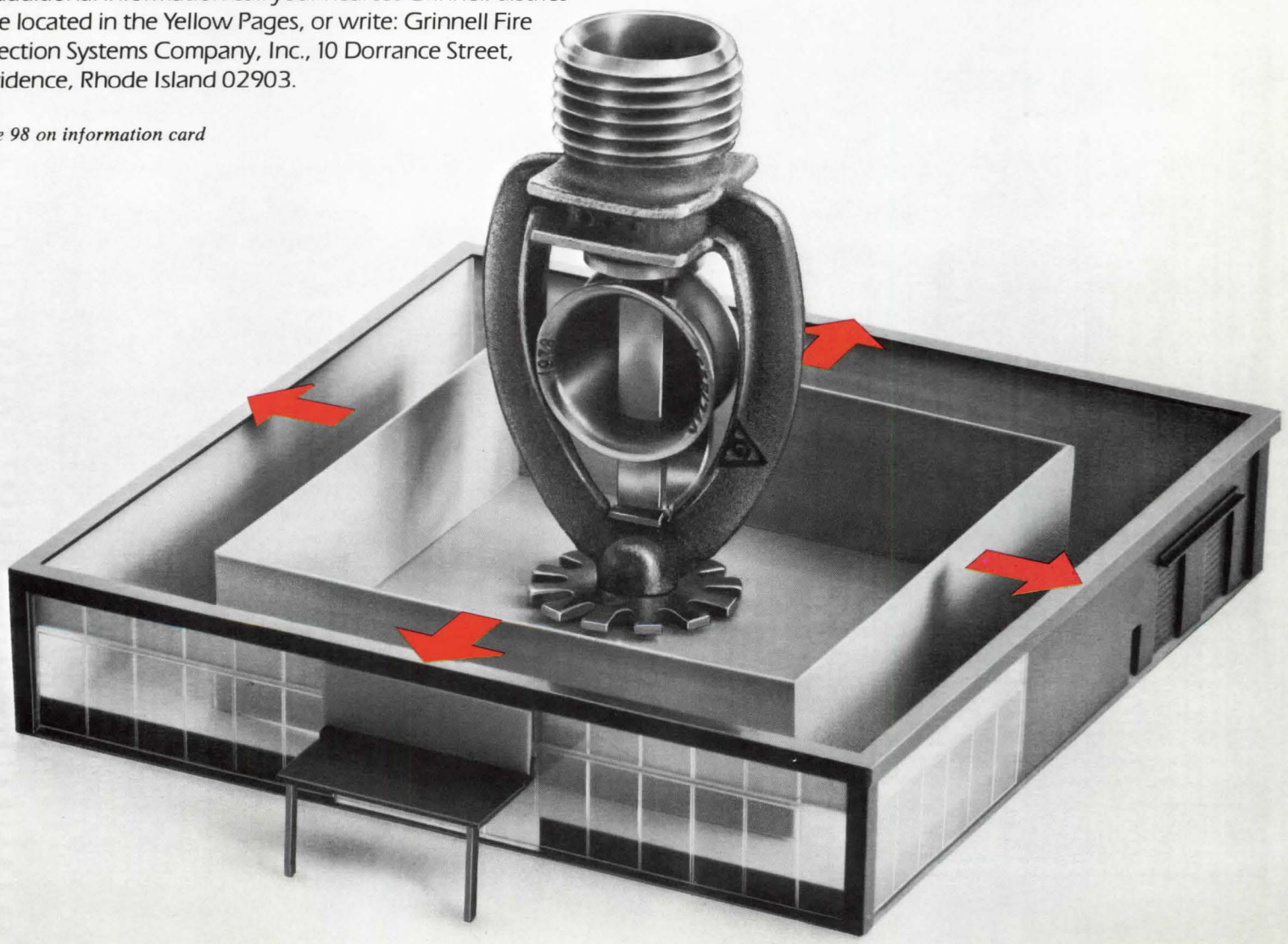

Briefs *from 106*
entry forms, contact: WID International, 530 Howard St., Second Floor, San Francisco, Calif. 94105.

The American Society of Landscape Architects recently installed William A. Behnke of Cleveland as its president.

Harry M. Weese, FAIA, of Chicago is the recipient of an honorary doctor of fine arts degree from Catholic University.

H. Arthur Nedom has assumed the chairmanship of the American Association of Engineering Societies, Inc.

Elected to the presidency of the Industrial Designers Society of America for a two-year term is Robert G. Smith, currently manager of product design and development for JC Penney.

Ehrman B. Mitchell Jr., FAIA, former president of the Institute, has been named a fellow of the Royal Australian Institute of Architects.

"The Environment of Worship" is the title of a 96-page booklet, published to assist architects and artists involved in building or remodeling churches. Two of the contributing authors are William J. Conklin, FAIA, and Edward A. Sovik, FAIA. Prepared under the auspices of Catholic University's center for pastoral liturgy and the National Conference of Catholic Bishops' committee on the liturgy, a complimentary copy may be had by writing: Center for Pastoral Liturgy, Catholic University, Washington, D.C. 20064.

PRODUCTS

Laser System.
A low power laser beam aids in correct aiming of floodlights for sports arenas and other locations. (Westinghouse Electric Corporation, Pittsburgh. Circle 178 on information card.)

Solar Collectors.
High efficiency evacuated tube collectors are made of borosilicate glass. Parabolic cusp reflectors direct the sun's rays onto the vacuum tubes. The system can be used in cold and cloudy climates. (Sunmaster Corporation, Corning, N.Y. Circle 195 on information card.)

Solar Calculator.
A nonprogrammable calculator identifies the most cost-effective passive solar design solution—either direct gain, thermal storage or water storage wall systems—by comparing materials, backup fuels, night insulation, usage and other factors. (Solar Energy Design Corporation of America, Fort Collins, Colo. Circle 190 on information card.)

Open Office System.
The system features acoustical panels, wood hanging storage components, free-standing desks, electrical raceways and task lighting. Wood components come in standard oak finishes. (Rose Manufacturing Co., Grand Rapids, Mich. Circle 196 on information card.)

Office Furniture.
Oak desks, credenzas and tables are available in executive and secretarial styles. Desks and credenzas come with a choice of storage inserts and top surfaces of oak veneer or plastic laminate. (Worden Co., Holland, Mich. Circle 192 on information card.)

Heat Storage Rods.
Thermol 81 Energy Rods are six feet long and can store 2,460 BTUs of latent heat plus sensible heat above 81 degrees Fahrenheit. Units work on a phase change

continued on page 110

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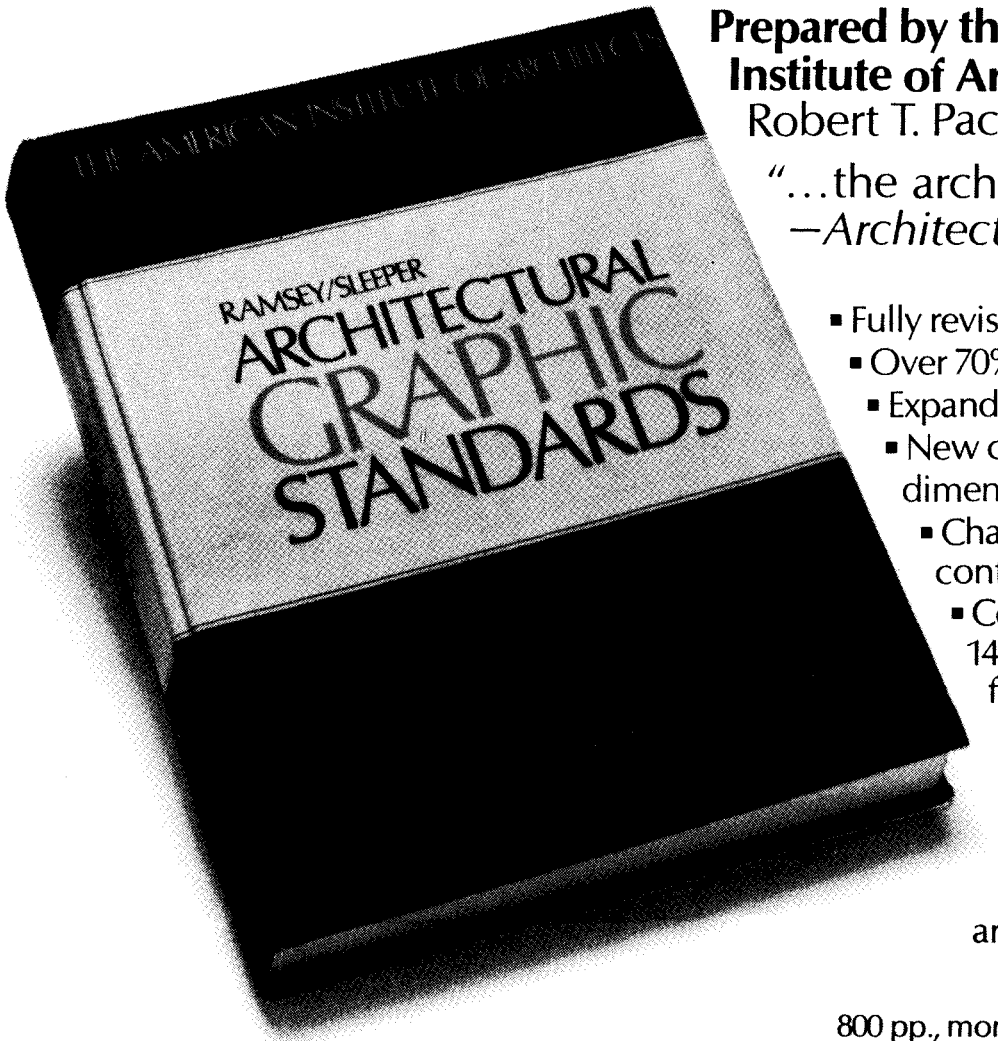

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Products *from page 108*
principle, absorbing heat as the Thermol 81 compound melts with no change of temperature. (PSI Energy Systems, Inc., Fenton, Mo. Circle 191 on information card.)

Passive Solar Evaluation.
Software is available on a time sharing basis that calculates heat flows and temperatures for residential buildings. The system's weather information is from the National Oceanic and Atmospheric Administration. (Berkeley Solar Group, Berkeley, Calif. Circle 186 on information card.)

Theatrical Spotlight.
Ultra Arc Followspot produces light comparable to carbon followspots without using carbons or a xenon lamp. The light source, the GE Marc 350 lamp, is used in film projectors. (Phoebus Manufacturing, San Francisco. Circle 198 on information card.)

Solar Collector.
Collector panel has 99 tetrahedral honeycombs that collect sunlight from south, east or west exposures. It can be mounted in windows or through the wall. (Solar Micro Inc., Farmingdale, N.Y. Circle 197 on information card.)

Window Blinds.
Cryotherm blinds are black on one side, bright on the other to save energy. They can be installed either inside or outside the window frame. (Levolor Lorentzen, Inc., Hoboken, N.J. Circle 194 on information card.)

Solar Calculators.
TI 59 or HP 41C hand-held calculators can be programmed to estimate solar saving fractions and auxiliary heating loads for direct gain, Trombe wall and water wall systems. (Solarcon, Inc., Ann Arbor, Mich. Circle 189 on information card.)

Storage Pod.
Energy pods for installation behind south-facing windows, walls or roofs absorb and store solar energy and transmit natural light. Ninety percent of total energy is said to be absorbed or transmitted. (Kalwall Corporation, Manchester, N.H. Circle 187 on information card.)

Lighting Meter, Standard.
The 1100 Luminance Contrast Meter and the 1104 Luminance Contrast Standard measure the lighting contrast in working areas. The two units test the effectiveness of lighting design with a photoelectric measuring cell and a 40-millimeter disc that incorporates a reference lighting system, developed with the Danish Illumination Engineering Laboratory. (Bruel & Kjaer Precision Instruments, Marlborough, Mass. Circle 199 on information card.)

Solar Energy Map.
The availability of solar radiation in the U.S. and Canada is illustrated in a 30x47-inch map. Also given are home heating needs, elevations of cities and conversion tables. (Enmap Corporation, Boulder, Colo. Circle 173 on information card.)

Spaceframe.
Pipes and diagonal braces snap or bolt together to form this suspended spaceframe structure. The modular structure is not designed to support external loads, but can be extended to floor level to form space dividers and shelf displays. (Integrated Ceilings, Inc., Los Angeles. Circle 175 on information card.)

Thermostat.
Electronic digital thermostat shifts to battery operation during power failures. The unit has automatic switching from heat to cool, constant readout of time and temperature and simple programming with a memory button. (Jade Controls, Inc., Montclair, Calif. Circle 174 on information card.)

Paint Stripping.
Arcal #993 and Epox-Zip industrial strippers remove enamel paints and epoxy coatings from metals and wood. Available in high/low viscosities for vertical/horizontal surfaces. (Arcal Chemicals, Inc., Seat Pleasant, Md. Circle 180 on information card.)

Luminaire.
H.I.D. Commercial Lay-In fixture for indoor lighting is available with high pressure sodium, metal halide or mercury vapor lamps. Options include fusing, a quartz standby system and special mounting specifications. The three lens types are: a tempered glass for racquetball courts, prismatic acrylic or polycarbonate lenses. (Harvey Hubbel, Inc., Christiansburg, Va. Circle 193 on information card.)

Carpeting.
Weave Point Antron III nylon pile carpet carries a five-year guarantee and is suited for residential and contract interiors. (Weave-Tuft Carpet Corporation, New York City. Circle 168 on information card.)

Tile.
Solid vinyl tile additions to the company line include colonial brick, slate, parquet, clay, quarry and flagstone slate finishes. (Kentile Floors, Brooklyn, N.Y. Circle 167 on information card.)

Performance-Rated Sheathing.
The American Plywoood Association has introduced performance rating for residential and other sheathing. End-use, product standard, exposure durability, dimensional conformance and span ratings are among criteria defined in the APA trademark designation. A panel with a span rating, for example, of "32/16" means it is recommended as roof sheathing over supports spaced a maximum of 32 inches on center, or as subflooring over supports spaced a maximum of 16 inches on center, when the panel is installed with the long dimension across three or more supports. (American Plywood Association, Tacoma, Wash. Circle 166 on information card.)

Filing Systems.
Vertical file with a built-in index permits high density filing of various sized documents. (United Filing Corporation, New Castle, Del. Circle 179 on information card.)

Paneling.
Wood paneling is given an antique look by the use of heavy bevels to form deep grooves, rustic knots and burls and selected defects. (Memphis Hardwood Flooring Co., Memphis. Circle 177 on information card.) ☐

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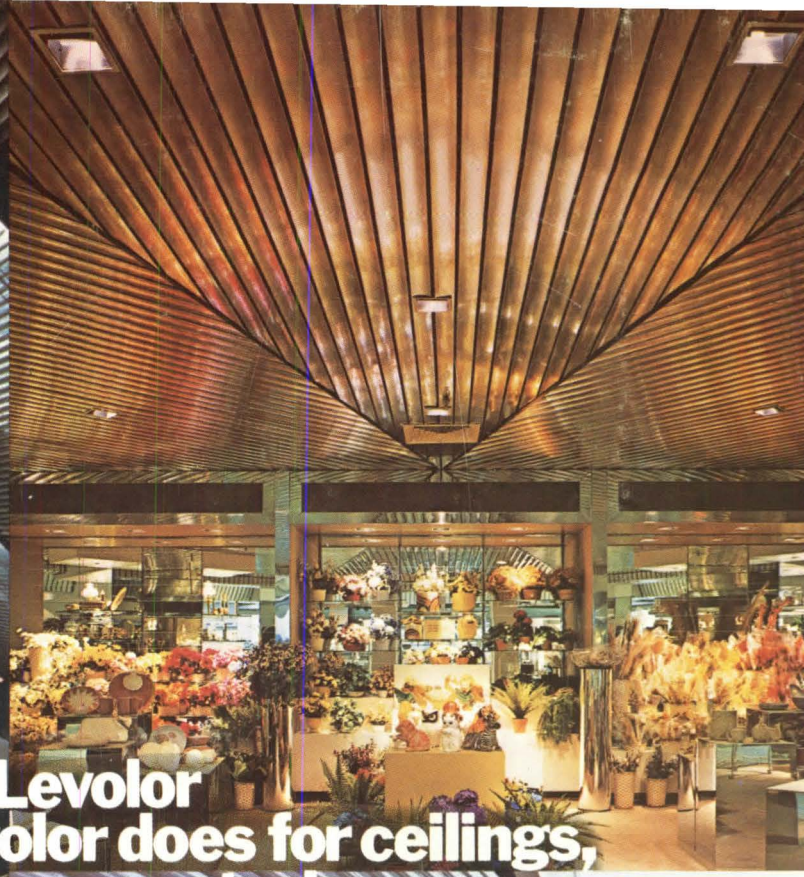

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