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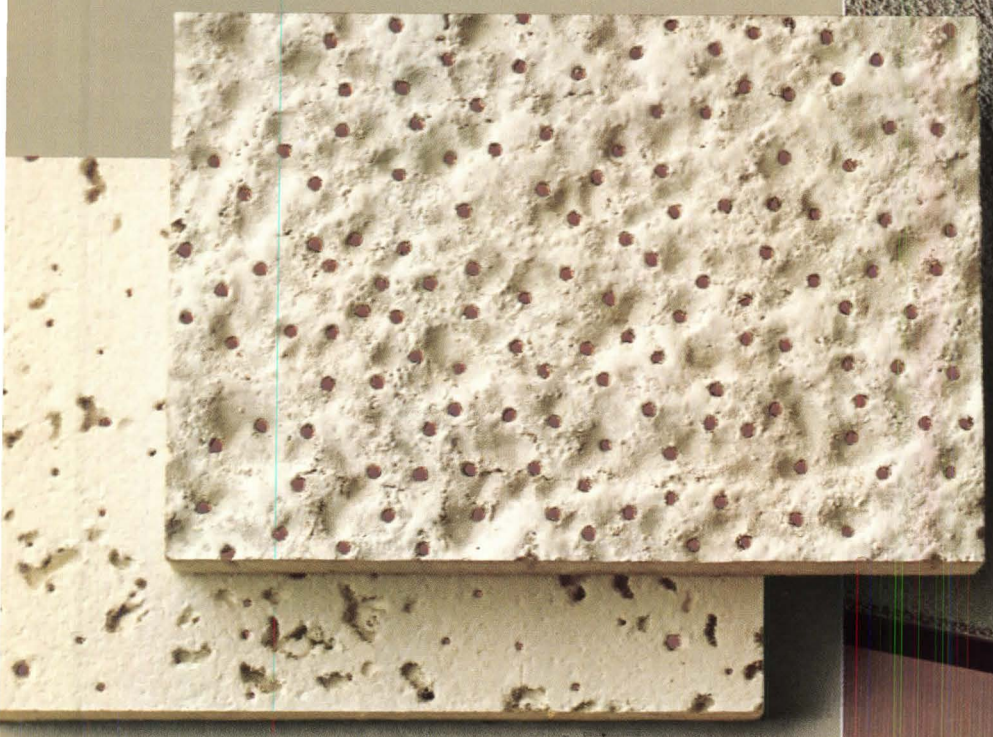

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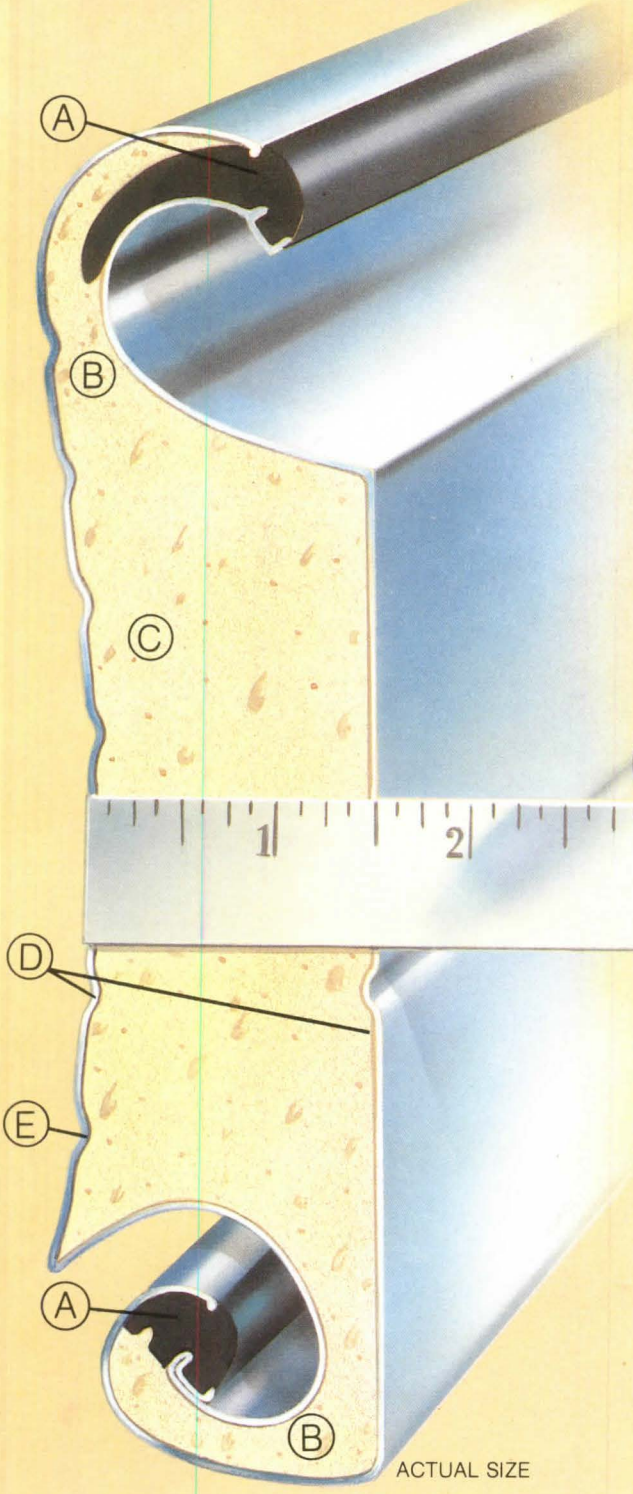

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EVENTS

Jan. 22: 10th Annual Design Seminar, sponsored by AIA, at the National Association of Home Builders' Annual Convention, Las Vegas. Contact: Arthur Danielian, 3848 Campus Drive, Suite 210, Newport Beach, Calif. 92660

Jan. 28-29: AIA Energy in Design: Process Workshop, Atlanta. (Repeat workshops Mar. 11-12, Muncie, Ind., and Sacramento, Calif.; Mar. 25-26, Austin, Tex.) Contact: Brenda Henderson at Institute headquarters, (202) 626-7353.

Feb. 2: Winter Symposium on The Chicago School, Department of Architecture, University of Oregon, Eugene.

Feb. 2-5: AIA Open Committee Program on Quality of Urban Form: Design of America's Second Generation Cities, Scottsdale, Ariz. Contact: John Gaillard at Institute headquarters, (202) 626-7363.

Feb. 3-4: Seminar on Concrete Floors on Ground, Department of Engineering & Applied Science, University of Wisconsin, Madison.

Feb. 4: Seminar on Bidding and Award of Construction Contracts, San Francisco. Contact: Manager, Education Programs, The Construction Specifications Institute, Suite 300, 1150 17th St. N.W., Washington, D.C. 20036.

Feb. 4-5: AIA Energy in Design: Techniques Workshop, San Antonio, Tex. (Repeat workshops Feb. 8-9, Sacramento, Calif.; Feb. 27-Mar. 4, Beaver Creek, Vail, Colo.) Contact: Brenda Henderson at Institute headquarters, (202) 626-7353.

Feb. 6-9: Conference on Color and Illumination, Williamsburg, Va. Contact: Inter-Society Color Council, Inc., Bonnie K. Swenholt, Arrangements Chairman, Eastman Kodak Co., Building 69, 8th Floor, Kodak Park, Rochester, N.Y. 14650.

Feb. 9-10: Seminar on Business Management, Tampa, Fla. (Repeat seminar Feb. 23-24, Phoenix.) Contact: Director, Professional Development, American Consulting Engineers Council, 1015 15th St., Suite 802, Washington, D.C. 20005.

Feb. 11-12: AIA Energy in Design: Practice Workshop, Tampa, Fla. Contact: Brenda Henderson at Institute headquarters, (202) 626-7353.

Feb. 15: Postmark deadline for entries, Women in Design International Second Annual Competition. Contact: WIDI, P.O. Box 984, Ross, Calif. 94957, (415) 457-8596.

Feb. 16-18: International Daylighting Conference, Phoenix. Contact: 1983 International Daylighting Conference, Marjorie C. Matthews, Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, Tenn. 37830.

Feb. 17: Professional Liability Seminar, Orlando, Fla. Contact: Florida Association/AIA, P.O. Box 10388, Tallahassee, Fla. 32302.

Feb. 24-25: Seminar on Computer Applications for the Construction Industry, San Diego. (Repeat seminars Mar. 24-25, Orlando, Fla.; Apr. 21-22, New York City; May 19-20, Denver.) Contact: CIP Information Services, Inc., 1105-F Spring St., Silver Spring, Md. 20910.

Feb. 24-25: Course on Energy Conservation for Historic Buildings, Washington, D.C. Contact: National Preservation Institute, Box 1702, Alexandria, Va. 22314.

Feb. 25: Solar Domestic Water Heater Workshop, Grand Rapids, Mich. (Repeat workshop Mar. 5, Grand Rapids.) Contact: L. Bouwkamp, Jordan Energy Institute, 155 Seven Mile Road, Comstock Park, Mich. 49321.

Feb. 28-Mar. 2: 10th Annual Energy Technology Conference and Exposition, Washington, D.C. Contact: Government Institutes, Inc., P.O. Box 1096, Rockville, Md. 20850.

April 13-20: Hanover Fair, Electrical and Electronics Sector, Hanover, West Germany. Contact: Hanover Fairs Information Center, P.O. Box 338, Whitehouse, N.Y. 08888.

May 22-25: AIA National Convention, New Orleans.

LETTERS

Drawings Contest: Imagery and technical brilliance are no substitute for relevance.

Compare Larry Fox's simple sketch (Sept. '82, page 40) encompassing composition, scale, and perspective with Frederic Schwartz's technically superb "drawing" (your words not mine) of Columbus Circle (page 55). Both images encapsulate similar architectural values, yet how many architects deal with Manhattan-based scales?

Many drawings represent Tolkein imagery, yet who has a Lord of the Rings client? I love them all, but let us not fool ourselves. We are architects, not ostriches.

W. Ward Thompson, AIA, RIBA
London, England

World Architecture: I am taking the liberty of congratulating you on your Mid-August issue and for your "First Annual Review of Recent World Architecture." Your idea is exemplary!

Architecture is universal. There are only a few aspects that change in each country, but the central ideas and ideals of architecture are (or should be) the same: to serve mankind.

I am both astonished and impressed by this new path taken by you. I have lived in the U.S. for many years and I have known Americans to be too egocentric in respect to the world surrounding them, and U.S. architects are not an exception to the rule. Architecture as an art and as a science is not the exclusivity of the U.S.

As expected, to start your review, you picked out the "biggies." May I make a healthy suggestion: Will you publish the architecture of the "little ones" also?

I am a Costa Rican architect, a graduate of an American university, but with most of my professional private practice developed in Costa Rica. We have had an extremely important and interesting architecture developed in the last 10 years, and I am sure other not-so-well-known countries have, too.

Alvaro Rojas-Quiros
New York City

Origins of Architectural Education: In "Architecture and the Information Revolution" (July '82, page 65) is this statement: "The first professional school of architecture is said to have been MIT, founded in 1886, which was followed quickly by Illinois, Cornell, and Syracuse." The date given may be just a typo, but if someone really *said* it, he was mistaken. I believe these dates to be factual:

1865—William R. Ware was appointed professor at MIT with a mandate to begin a course in architecture.
1866—Ware published his pamphlet, "Outline of a Course in Architecture."
1866-67—Ware visited and observed education in architecture in Europe.
1868—Classes began at MIT and at the University of Illinois.
1871—Cornell began its program.
1872—Eugene Letang arrived from the Ecole des Beaux-Arts to teach at MIT.
1872-73—Louis Sullivan was a student in the MIT program during part of his 17th year.
1873—MIT granted its first architectural degree.
1873—The Syracuse program was begun.
1881—William R. Ware moved to New York City to be in charge of Columbia's new school.

Thus by 1886 at least five universities were awarding degrees in our field.

Lawrence B. Anderson, FAIA
Lincoln, Mass.

The writer is dean emeritus of MIT's school of architecture and planning. *Ed.*

Addenda: A November news article (page 12) on a competition sponsored by the Fort Lauderdale Downtown Development Authority mentions a new public library under construction. It was a joint venture of Marcel Breuer Associates, New York City, and Miller and Meier & Associates, Fort Lauderdale.

The photograph on page 60 of the October issue shows the rope sculpture titled "Yellow Legs" by Barbara Shawcroft, which is located in Four Embarcadero Center, San Francisco.

Shops: A Manual of Planning and Design, which was reviewed in November (page 74), is available from Nichols Publishing Co. for $87.50. Nichols Publishing is the exclusive copublisher with and distributor for The Architectural Press in this country.

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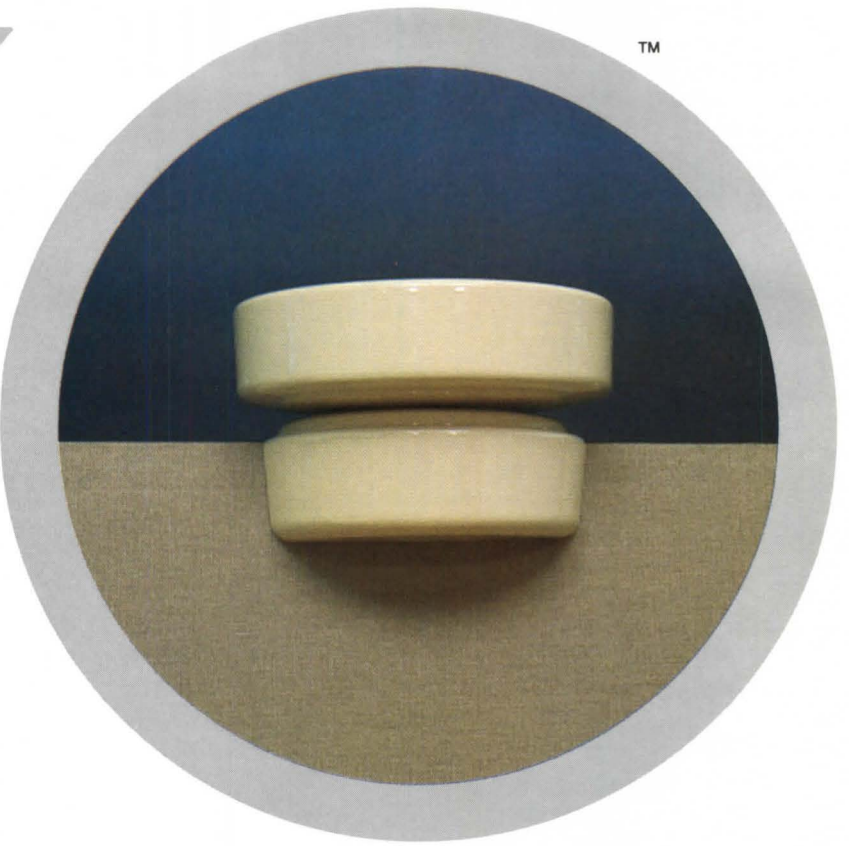

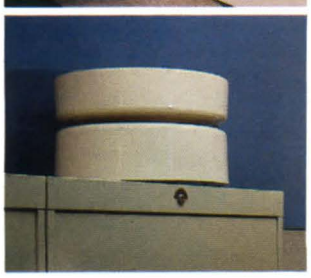

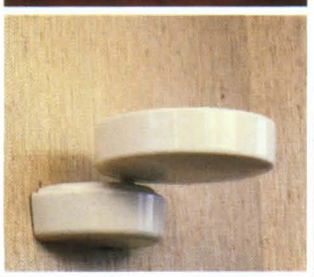

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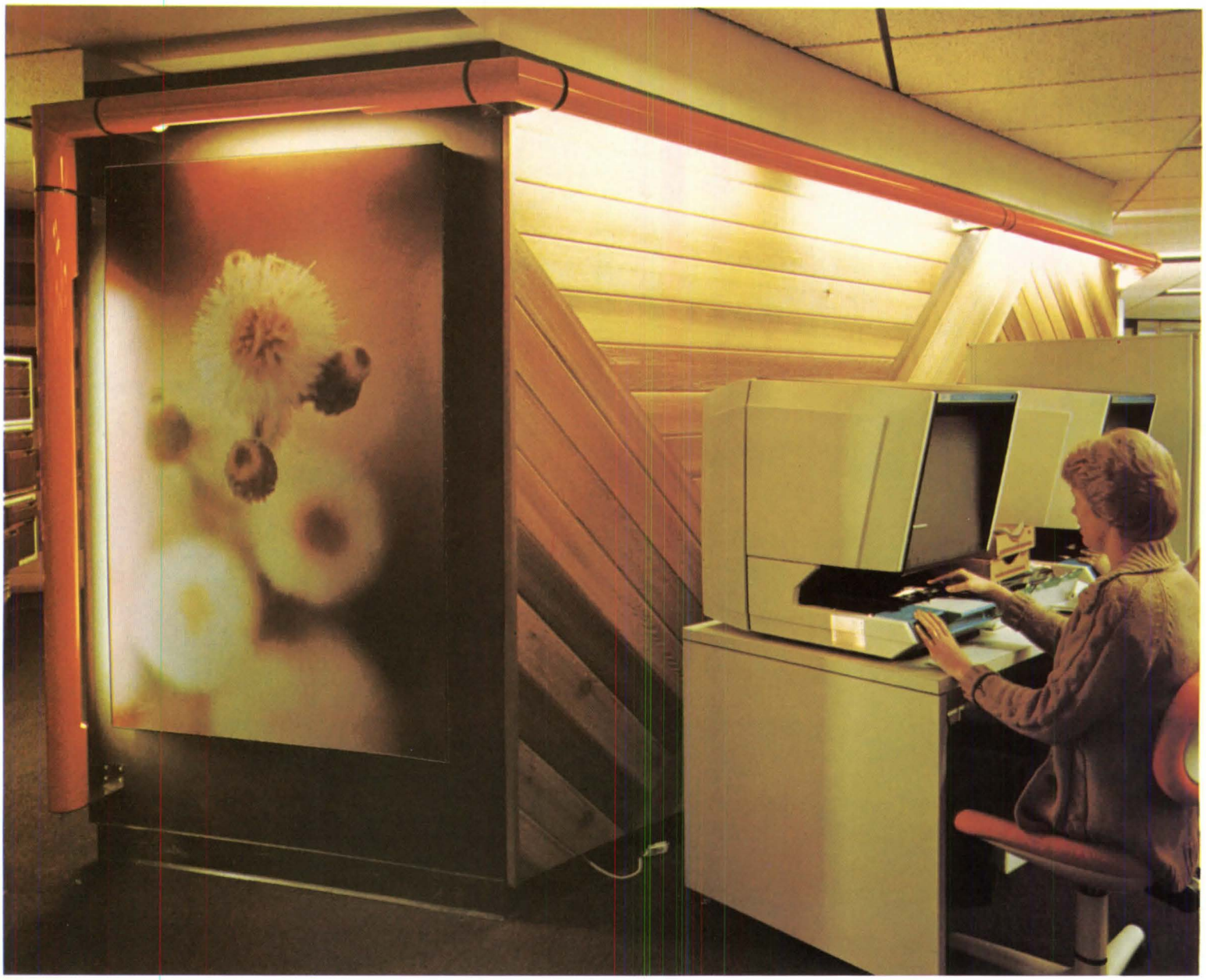

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Owings Selected as AIA's 44th Gold Medalist

The gold medal, American architecture's highest award, has been won by Nathaniel Alexander Owings, FAIA. Together with Louis Skidmore (winner of the medal in 1957) and John O. Merrill, an architectural engineer, Owings founded Skidmore, Owings & Merrill in the late 1930s. With 1,500 employees in nine offices, it is today the largest architectural/engineering establishment in the U.S., was the first winner (in 1962) of the now annual firm award, and has won more national honor awards for design than any competitor.

In selecting Owings, the board cited him not only for creating and nurturing SOM, but for at least two other accomplishments, "his seminal contribution to the revitalization of Pennsylvania Avenue and the Capitol Mall, and his very significant role in the resurgence of national concern for conservation and preservation of the natural and built environment."

Senator Daniel Patrick Moynihan, who worked with Owings on the Pennsylvania Avenue plan some 14 years ago, has described Owings as "ebullient, competent and devoted—and also a randy rogue, a bandit, and a buccaneer. His great ability is to get other people to do good work." Owings has lost none of his charm and little of his energy, though he will be 80 next month, which makes the award especially timely, and makes Nat Owings especially pleased to be receiving it.

"I particularly like the idea," he says, "that the selection process is a democratic one. The gold medal isn't decided by a clique, by guys sitting on the head of a pin discussing each other's warts, or by the precious group, or the people who have little fashions and little fears. It's the common, middle-of-the-road, hard working people who make the country run architecturally who expressed themselves." The gold medal is decided by the AIA board as a whole.

Owings' career, in fact, was launched by an award from the Rotary Club of Indianapolis, where he was born and raised. It was a scholarship that took him to London and then on a tour of French cathedrals, and it settled his choice of career. "There is a miracle in discovering what you want to do and never questioning it again," he said some years ago. As a young architect, newly graduated from Cornell, his hero was Raymond Hood, and when Hood became a commissioner for the 1933 Century of Progress exhibition, he helped Owings become development supervisor at the Chicago Fair.

Joseph Silverman

In the foreground, Owings and Mrs. Lyndon Johnson en route to the dedication of a pilot landscaping project on Pennsylvania Avenue in 1968.

When the deepening Depression required a retrenchment in construction and the jettisoning of expensive plans by pricey designers, Owings worked with Skidmore—chief designer of the fair—to build pavilions for over 500 exhibits at minimum cost, using mass-produced, lightweight materials. In doing so he discovered in himself a flair for conceiving large-scale plans and finding ways of realizing them.

Bruce Graham, FAIA, partner at SOM/Chicago, says: "He was a new breed of architect in that he created opportunities for architecture out of nothing, in the Depression. He and Skid were contrasting figures, quite a pair. Nat, the bull in the china shop; Skid, the very quiet, very effective team worker." Owings, most agree, is also a man of vision, who though not necessarily an innovator has been clearsighted enough to distinguish important trends ahead of others.

As Graham says, "He has had a knack for seeing where the nation is going, a little like Roosevelt, who didn't initiate ideas but had a lot of guys around him who did. Nat and Skid were the first who thought of architects' responsibility to build cities. And Nat's interest in ecology and the sacredness of the land, that's a vision he's had for a long time, which has just recently become popular." Owings has not always been easy to get along with, but, as Graham says, "Neither am I. Neither was Winston Churchill." Predictably, the role Owings is seen as having played in the firm differs substantially from one partner to another. Walter Netsch, FAIA, who joined in 1947, was Owings' protegé, and worked as a general partner in the Chicago office until his retirement in 1979, believes, "There are damned few architects who would have had the skill to mold the firm as he did, the sense of quality to aim for the highest goals, and then been able to hold the thing together for so long. Things are held together in a very elastic way, but the glue has been Nat. He was never a designer, but has insisted on good design—that the quality of architecture depended on it. And he tried to communi-

continued on page 15

Glass-terpiece

The beautiful new Collin Creek mall in Dallas' suburban Plano area is another evidence of Naturalite's expertise in glass skylights.

The 28,000 square foot system of Lean-To and Structural Pyramid skylights was designed and installed by Naturalite in less than four months and utilizes energy-conserving mirrored glass. The fast-track installation was delivered on budget and on time. The mall was opened in mid-1981. Federated Realty, Cincinnati, is the owner-builder-developer. General contractor, Walker Const. Company, Fort Worth, Tx. Architects, R.T.K.L. Associates, Inc., Baltimore.

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Owings *from page 13*
cate to us his fervor about the role of a group practice."

Quite different are the views of Gordon Bunshaft, FAIA, who joined the firm in 1937 and retired as a general partner from the New York office in 1979. "In the early days," he says, "Owings did the most important thing that an architect can do, and that's to get jobs, not design, not spirit, not cooperation with people—that's all academic baloney. Skid and Nat had no more vision than anyone else; those were rough times, and the thing was to please the client, make a living. What started the firm on the road to some recognition was Lever House, and Nat was instrumental in getting the job. He was instrumental in our getting Chase Manhattan. He's very good at—I hate to use the word, he hates it too—selling. I wouldn't have existed if he hadn't gotten the work. But what he really deserves the medal for is what he's been doing the last 15 years; he's very strong now and brilliant and pretty good with the words."

Edward C. Bassett, AIA, headed SOM/San Francisco until retiring earlier this year. He points out that when the organization received the firm award in 1962, "It was for being 'a legend in our own time, a prototype of collective practice.' And Nat was one of this legend's founders."

In 1962, Owings was appointed by President Kennedy as chairman of a special advisory council on Pennsylvania Avenue, and he supervised the making of a master plan for a vast remodeling of "the nation's main street," beginning under President Johnson in 1965. He was vice chairman of the Pennsylvania Avenue Development Corporation (PADC) until his resignation a year ago in protest against what he calls "the commercialization of the avenue" under its present leadership. Along with others, Owings views his work in Washington as a very major accomplishment. SOM also designed Constitution Gardens and the Capitol reflecting pool, and refined the Mall, reinstating its greensward down the center.

David Childs, AIA, who worked on the Pennsylvania Avenue plan from '68-71, was a member of the PADC board from '71-75, and has been a general partner of SOM/Washington since 1971, has worked

continued on page 16

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Owings *from page 15*
especially closely with Owings in recent years. "He ran the Pennsylvania Avenue project," says Childs, "like he ran SOM. It was very difficult for Nat not to be in charge. He always has an opinion, and it's a strong one, and he speaks loudly. He was the conscience of the avenue in watching out for design despite costs. It was his idea alone to have housing as part of the plan, as were concepts of land use, and the singular axis. And he also got involved in details. He would go to a detail and there would be a bloody battle. If he didn't win 100 percent, the proposal would still come out 90 percent better than it otherwise would have been.

"I think Nat is more responsible for the way the nation's capital looks than even Daniel Burnham."

What was most remarkable to Childs about Owings when he first met the older man 15 years ago, "was that he was one of the youngest thinkers I'd ever met. He was 65. He was thinking in more radical terms than my radical professors; that flexibility is a great strength."

It prompted Owings, by the late '60s, to do an about face in his views, turning against his own initial attitudes about the avenue, which had called for substantial demolition, and against skyscrapers. Just after completion of the Bank of America building in 1969, Childs recalls, Owings said, "We ought to lay such buildings on their sides."

Such attitudes dovetailed with Owings' third major contribution to the profession, his work in preserving both the natural and built environment from rapacious development.

Together with his wife Margaret, he succeeded in saving 72 miles of coastline in Califorina—where he headed a fight in the early '60s to prohibit a four-lane coastal freeway and reduce residential densities. And by succeeding in a long struggle to arrest plans for extending a superhighway into the city of Baltimore, he virtually saved the city's waterfront. As Netsch says, "The Inner Harbor project that people are now so keen about wouldn't exist if Nat hadn't stopped that damned road. He has a sure sense of design in the largest sense, a sense for what is important and the skills to fight for it."

It is about matters of environment that Nat Owings talks now with the most fervor. "The buildings come and go," he says. "They can be moved and replaced. But once you start tampering with the land you've done permanent damage. The environmental side of architecture hasn't been adequately recognized for a long time. It's nice that they've given me an award for not doing anything that looks spectacular, but for staying with it and guiding forces for the better. That's been my goal." ANDREA OPPENHEIMER DEAN

The Institute

Board Approves Energy Policy, Plan to Implement Direction '80s

At its December meeting AIA's board of directors made a number of policy changes, including one on energy, and adopted an implementation plan for Direction '80s. New officers and board members also were installed in the course of the four-day meeting.

In its regular review and updating of AIA policy positions the board combined elements of six separate energy policies into one. Its nine points declare that AIA supports:

- a balanced national energy policy that adequately considers resource conservation, increased use of renewable resources, and environmental impact of conventional energy production;
- continuing research and development of energy conscious design and technology;
- emphasis on redesign and remodeling of the nation's building stock;
- continuing research, development, and implementation of performance based building energy consumption standards;
- a government sponsored effort to monitor and analyze existing energy conscious designs;
- a program for educating building professionals, students, and the public on energy issues;
- tax incentives to promote the use of energy conscious design and technology;
- an interdisciplinary effort to explore the area of managing energy use on a community scale as opposed to single buildings;
- and the formation of a "national energy emergency preparedness task force on the built environment," to deal with future energy crises.

In other policy actions the board affirmed AIA's support of the new Alaska National Interest Lands Conservation Act and continued funding to protect the Alaskan wilderness.

A policy change on the Equal Rights Amendment was declined by the board. In light of ERA's extinction last June, it was recommended that the Institute suspend its policy of support of ERA until Congress passes a new amendment. After debate the board instead voted to reaffirm its support and urged all components to lend support to pro-ERA activities in their states.

An implementation plan for Direction '80s that synthesizes the consultant's proposal and the board's recommendations was approved. The plan (funding for which will be subject to board approval) has been divided into seven phases: a governance study, which will be reviewed by a task force working through the member services commission; a component study, which will be reviewed by the same task force; a management audit, to be undertaken by an independent management/consultant firm; a public awareness program, which will be reviewed by a media advisory task force; a body of knowledge task force, which will be referred to the member services commission and the AIA Foundation for their review; and a component training program, which will follow the completion of the preceding projects.

The seventh phase, a communications study, was considered at a communications roundtable last October that addressed means of effective internal communications between components and members. Several recommendations were made and approved, which include the establishment of a communications task force to develop a total communications system; a communications audit; the initiation of a pilot program to develop a national-component-member communications system using new technologies; the exploration of using outside data banks and programmers; and the implementation of a "short term list" of recommended actions (excluding the pilot program and audit) "with special emphasis on AIA's telephone system, on exploring outside data banks, and on staff training programs."

The life safety design task force presented its final report recommending, among other things, increased gathering and retrieval of life safety design data; life safety education of the public, practioneer, student, and building owner; incorporating life safety strategies into practice documents; and developing model life safety legislation. These were approved with the amended provision that the executive committee review the edited report.

The board also adopted a long range plan for AIA scholarships. This provides an endowment of $20,000 for 1983, an optional dues "check off" contribution of $7, and a review of the response to the "check off" program.

It was voted that the expenses of the 1983 budget be cut by 10 percent, with the various committees and officers determining where those cuts will be made. The savings will be placed in the AIA reserves.

A new procedure for nominating of-

continued on page 21

The Institute *from page 16*

ficers has also been adopted. Following nomination speeches at the convention, candidates will be requested to make a seven-minute speech to the entire assembly, and questions will be taken from the delegates.

Looking ahead to the 1988 convention, six possible sites were chosen by the board. They are (from the east, central, and west regions, respectively): Boston, Washington, Atlanta, Houston, San Francisco, and Denver. The site committee will narrow its recommendation to one at the March board meeting.

New officers were installed Dec. 3 at a ceremony in Washington's newly remodeled old Post Office building. The new president, Robert Broshar, FAIA, of Waterloo, Iowa, is joined by George M. Notter, FAIA, of Boston as first vice president/president-elect. Other vice presidents are Leroy E. Bean, AIA, of Sioux Falls, S.D.; John A. Busby Jr., FAIA, of Atlanta; and R. Bruce Patty, FAIA, of Shawnee Mission, Kan. Harry Harmon, FAIA, of Long Beach, Calif., and Henry W. Schirmer, FAIA, of Topeka, Kan., stay on respectively as secretary and treasurer.

New board members installed are, by region: California, William Patnaude, AIA; Central States, John R. Birge, AIA; East Central States, Henry G. Meier, AIA; Florida/Caribbean, Howard B. Bochiardy, FAIA; New England, Kenneth John Filarski, AIA; New York, Laszlo Papp, FAIA; North Central, David E. Lawson, AIA; Ohio, A. Notley Alford, AIA; South Atlantic, Elizabeth B. Lee, AIA; Texas, Benjamin E. Brewer Jr., FAIA; and Western Mountain, William C. Muchow, AIA. Lowell Erickson is the new chairman of the Council of Architectural Component Executives.

As President, Broshar Hopes To Broaden Outreach of AIA

Robert Broshar, AIA's new president, is a principal in a 17-person firm in a Midwestern community of 80,000. Ask him what strengths and priorities he brings to the presidency, and he prefaces his response by saying that a quick, pat answer would be that he represents AIA's majority membership—architects in smaller practices outside the very big cities.

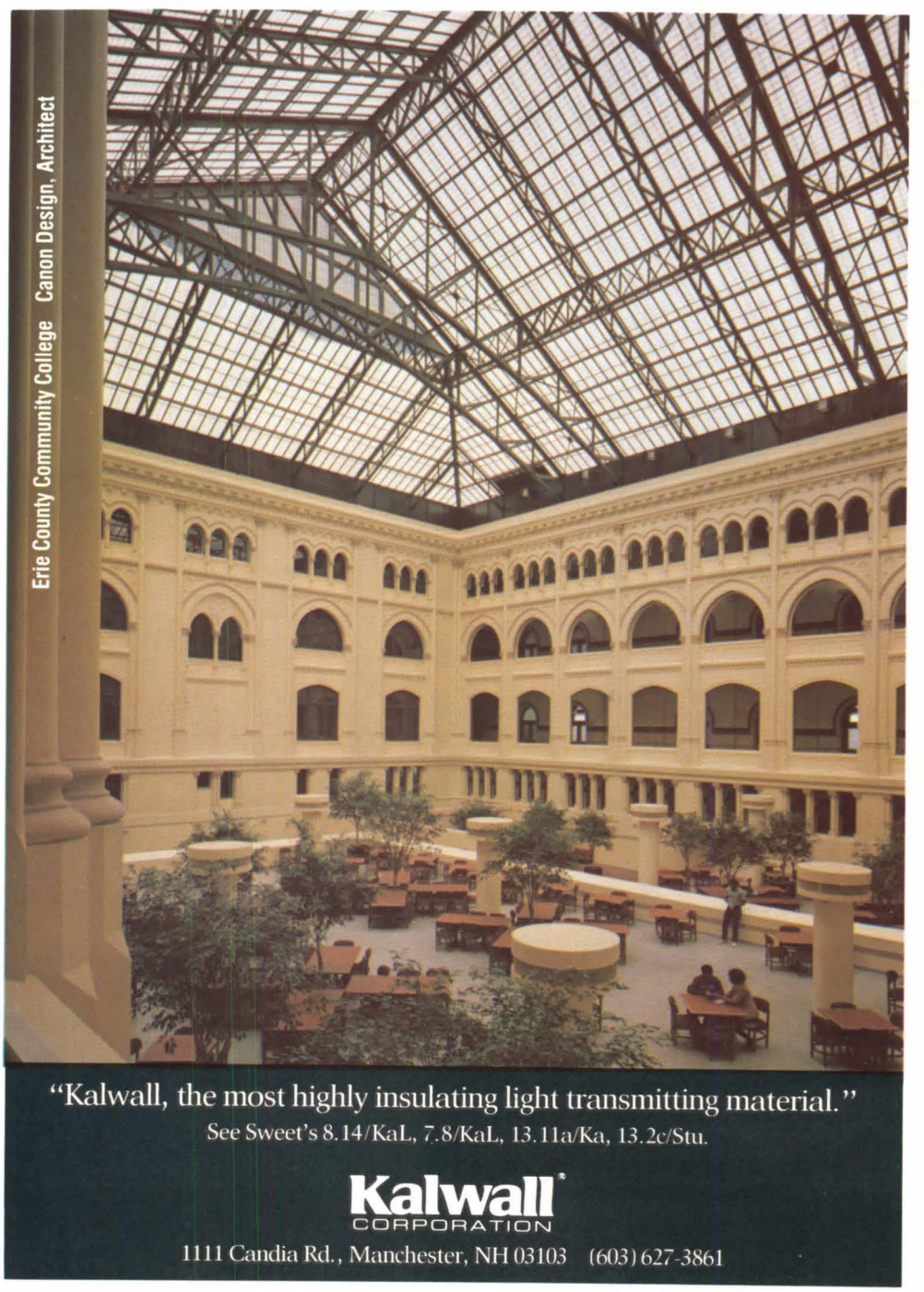
"But that is not a good answer," he says, "because I have to also represent the interests of the person in the front office or back room of an SOM or an HOK. I think any architect who works closely in the design process, which is really a problem-solving process, and works with people—that expertise is the sort of background needed for an AIA president."

Robert Broshar by Michael J. Crosbie

During an interview last month just prior to his inauguration, Broshar, 51, repeatedly mentioned avoidance of such things as glib answers, buzz words, empty rhetoric—this from a fluent speaker seemingly at ease when explaining his thoughts. He says he likes to deal with groups and work for consensus, and feels uncomfortable when asked about his personal goals as president.

His firm, Thorson-Brom-Broshar-Snyder, in Waterloo, Iowa, functions as three studios, with each of the three active principals responsible for individual projects. (The fourth principal, Oswald H. Thorson, FAIA, secretary of AIA in 1965-66, retired four years ago.) The firm has remained approximately its current

continued on page 22



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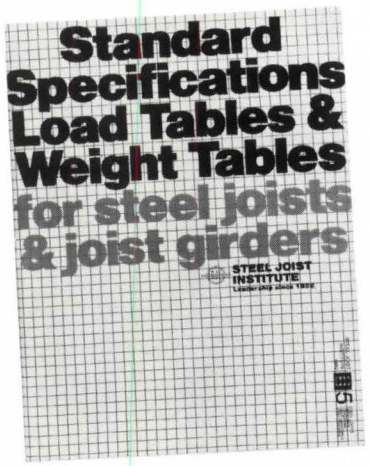

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The Institute *from page 21*

size over the years, he says, in part because relative smallness allows the principals to stay close to their clients and every aspect of the design and construction process.

This year, his clients will be AIA's 41,000 members. As an Institute insider since 1975, the year he was first elected to the board, Broshar sees an overriding problem of the Institute to be a perception of separation from the national organization by members—a "we-they syndrome," as he calls it. "The things that members are close to are what they can relate to—what happens in the local chapter and state component," he says, adding that it is natural that the things farther away, at national headquarters, are less well understood.

"If we are being responsive to member needs and they don't understand it, then we have a communication problem. If we are not being responsive, it is much deeper than that. But I think that, by in large, the Institute is responsive. I've seen significant changes by the boards—almost every group that comes in wants to make changes, and they get change."

A current response to the desire for change is the Direction '80s report adopted last June by delegates to the national convention (see July, page 13). Broshar, as '82 president-elect, has headed a committee responsible for AIA's 1983 program and budget, the first to reflect the goals of Direction '80s. "The most significant thing about Direction '80s is a shift from emphasis on individuals to overall impact, having a strong influence on society," he says. "It also has meant consolidating a lot of little things we have been doing, providing a specific direction, putting things in a framework for planning."

One of the Direction '80s initiatives, establishing a public membership program, Broshar sees as a way to increase interaction between the public and the profession. "The key elements are not so much income, not what we get from the public, as much as what the public will get." He also hopes that through restructuring the Institute government affairs department, architects will find it easier to become more involved in lawmaking and the regulatory process—"things that until not too many years ago were considered untouchable. Now architects understand the compelling reasons to be a part of the process that controls so many areas of the profession."

Getting people involved is the part of AIA's 1983 theme, "American architecture, a living heritage," that most interests Broshar. "We have a tremendous stock of architecture in this country and, thank God, in the past 10 years we have begun to appreciate it and utilize it." A result, he points out, is renewal of the realization that architects' work outlives the designers, the clients, the initial users, and, in many cases, the initial intent. "I want to deal with the behavioral aspects of what we do—our responsibility and the impact we have on the people who use and experience our buildings.

"It is easy to get into high-sounding phrases, but the real key is in the fact that architecture is for the common man. It has an unavoidable impact, and the public thinks of it in that light. The fact is that they had better get interested and involved because we are going to do something to them, and they should be a part of it."

Gregory Wins Kemper Award, Mackey the Young Citation

Winner of the Edward C. Kemper award for 1983 is Jules Gregory, FAIA, of Princeton, N.J. The Whitney M. Young citation recipient is Howard Hamilton Mackey Sr., FAIA, of Washington, D.C., dean emeritus of Howard University. The Institute's board of directors selected Gregory and Mackey at its December meeting; presentations will be made during the annual convention this May in New Orleans.

The Kemper award recognizes a member "who has contributed significantly to the Institute and the profession of architecture." Gregory was cited for his "tireless promotion of the concept that the architect's responsibility goes beyond the design of fine buildings but must also involve a leadership role in enhancing the quality of life in our cities."

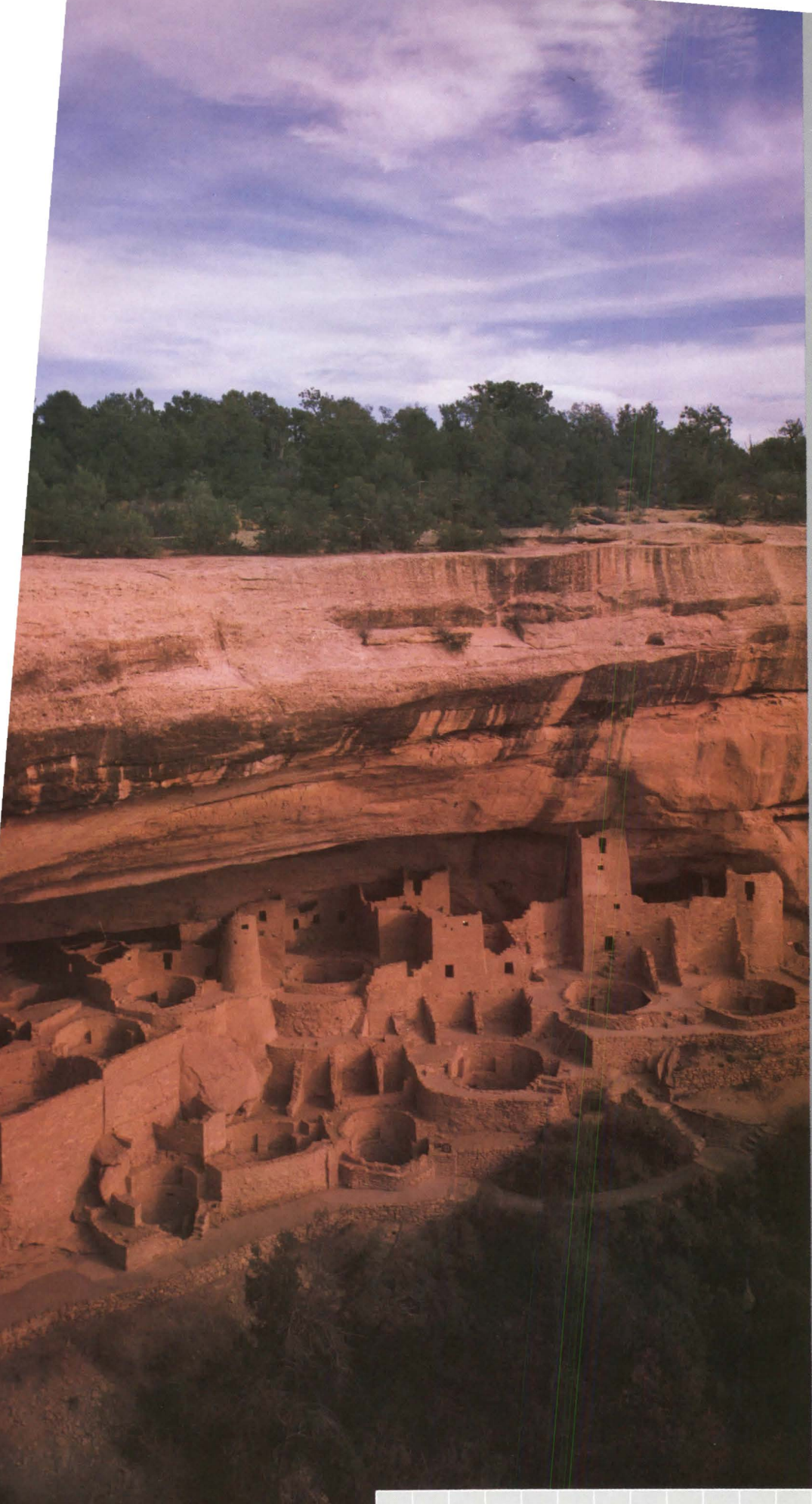
As an Institute regional director in 1966-68 and as vice president in 1968, Gregory helped in establishing AIA's center for urban affairs and the AIA Urban Design and Development Corporation. He played a major role in development of AIA's regional/urban design assistance team program (R/UDAT), which went to nearly 80 communities. He served for three years on the urban design committee, which developed the Institute's first urban design policy statement.

In 1969 Gregory formed the Princeton firm of Uniplan. Prior to that he was a partner with the firm Gregory & Blauth, and also worked for Skidmore, Owings & Merrill and Harrison & Abramovitz. He is a graduate of Cornell University.

The Young citation is awarded to "an architect or architecturally oriented organization in recognition of a significant contribution to social responsibility." Mackey was lauded for his influence on Howard University architecture students for nearly 50 years and for "having touched the lives of the great majority of today's successful black architects."

Mackey joined the architectural fac-

continued on page 26



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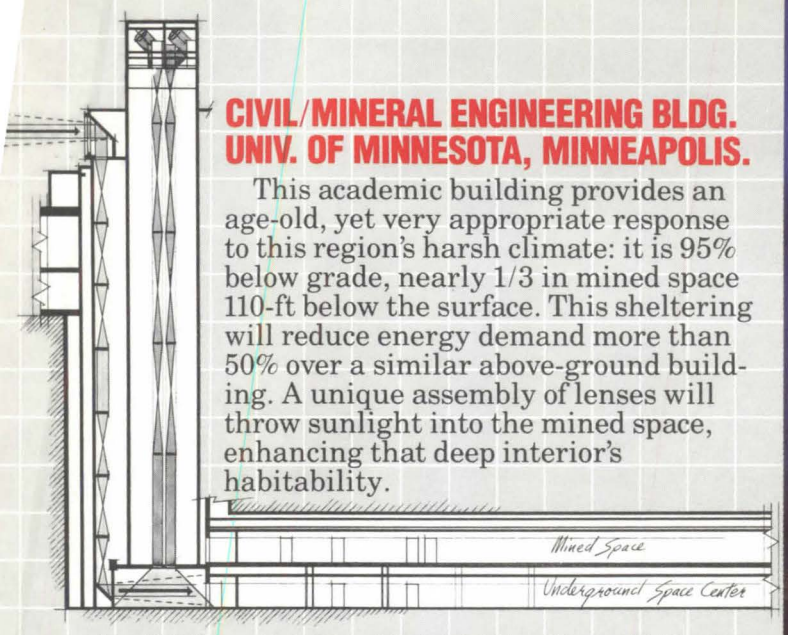

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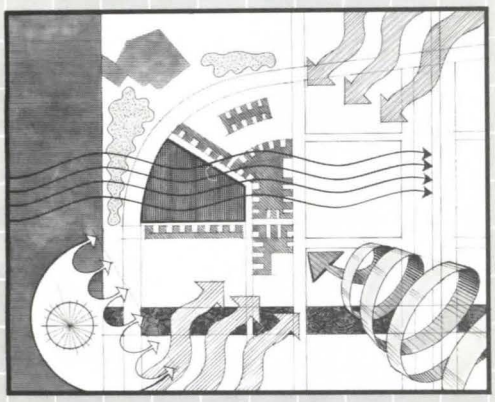

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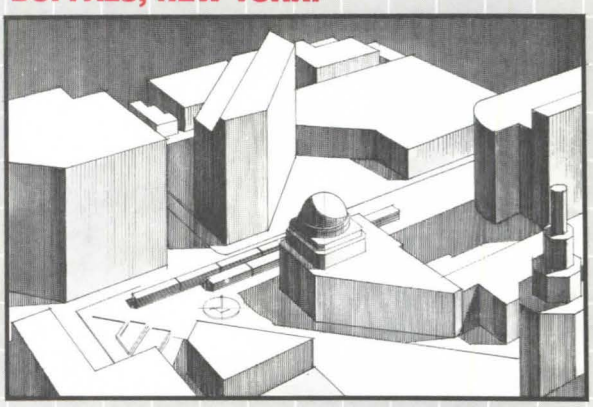

This boldly angled building is unusually site-sensitive. Oriented so it is guaranteed permanent solar access, and to create a large wind-shaded plaza for public use, it also architecturally complements the surrounding older buildings. The profile to the north is predominantly flush, while the south combines recessed windows for shading and light shelves to project light into the interior.

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OWENS/CORNING FIBERGLAS TRADEMARK ®

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Practice *from page 22*
ulty at Howard in 1924, after receiving an undergraduate and master's degree in architecture from the University of Pennsylvania. He was appointed head of the department in 1937 and in 1950 was successful in obtaining sanction for the program from the National Architectural Accrediting Board. He was also responsible for introducing the first North American collegiate program to train foreign and U.S. students for architectural work in tropical countries.

Active in community work, Mackey has served on the Board of Examiners and Registrars of Architecture for the District of Columbia, the joint committee of the Fine Arts Commission, the National Capital Planning Commission, the Committee on the Landmarks of the Nation's Capital, and as the first black member of the Baltimore Department of Housing and Community Development's design advisory board. In 1961 he received the National Technical Association's distinguished service award and in 1962 became the second black architect to be named a fellow of AIA.

Practice

AIA Regional Reports Show Economy Taking Heavy Toll

The economy is taking a heavy toll on the profession, according to AIA's annual regional report. California describes its architectural outlook as "pretty grim," with firms doing work for speculative developers being hardest hit. A combination of the general economy and effects now being felt from Proposition 13 has cut government work as well.

The central states region is experiencing a dip in its architectural activity, "but not as severe as regions on the West and East coasts." Massive layoffs have not occurred, and work may soon pick up as many sunbelt companies move north.

Smaller scale work and renovation has been the strong market in the east central region. Specialized firms—particularly those who concentrate on schools and multifamily housing—have been hardest hit. Some big firms have suffered substantial cutbacks, but smaller firms with lower overhead have been less disrupted.

The Florida/Caribbean region reports an "excellent" economy. A state immigration rate of 1,000 daily has stimulated building activity. Puerto Rico and the Virgin Islands did less well.

Conditions in the Gulf states region are sweet and sour. Architects in the Knoxville area "maintained a high level of business," due to the World's Fair. Southern Louisiana held its own with Mississippi experiencing a "tragic slowdown ... perhaps the worst in the region."

The Illinois region reports that economic health varies with project type. There is a good supply of hospital and renovation work but very little commercial work. Housing is "deader than a door nail," and there has been a halt on public building.

Work in the Michigan region is poor, "with little prospect for immediate recovery." Major clients all remain stagnant: government, the auto industry, housing, and retail. Most firms are at half to two-thirds normal strength.

The mid-Atlantic region describes its economic health as "not the greatest, but tolerable." Firms specializing in housing and commercial work have suffered most. Broad range firms are doing better with emphasis on institutional remodeling.

Maine reports the worst economic condition in the New England region with other states holding their own. Connecticut is pessimistic about the future, work in Massachusetts is "fairly strong," New Hampshire reports stable employment, but Vermont has seen a decreased workload.

New Jersey hasn't been as hard hit as other parts of the country but its situation "reflects the slowdown of the national economy." Medium sized firms there have been most successful in maintaining steady work.

The north central region describes the local economy as "quite soft ... which may come as no surprise." New one- and two-person firms are opening comprised of architects laid off from large firms. Wisconsin sees "a long and cold winter ahead for many in the profession" and in North Dakota large firms are hurting and smaller firms are "busier than ever."

In the northwest region the recession has taken a "fairly heavy toll," with Oregon and Idaho reported doing the worst and Alaska the best, due to low interest rates and oil money.

The Ohio region's economy is "poor to nonexistent," the hardest hit areas being Cleveland, Toledo, and Youngstown (which "has the unfortunate distinction of having the highest unemployment percentage of any city in the country"). A state capital improvements bill has been a small stimulant.

"Deeply troubled," is how Pennsylvania describes its condition, with backlogs dropping in most firms and "replacement opportunities and potential lacking."

The south Atlantic region's economic activity is "slow but not desperate." Firms have a steady amount of work but backlogs are dwindling. Small and large firms are "holding on pretty well," with no massive layoffs but not much hiring either.

Construction activity remains high in Texas but there are signs that the recession is catching up with the Lone Star state. The amount of work has dropped and big firms report an increased interest by smaller firms "in the files of employment opportunities."

And the western mountain region describes its overall picture as "grim." Staff reductions have occurred throughout the area. Many firms suffer from high fixed overhead due to heavy investment in computers and automated equipment.

For the new year some see signs of hope. Economists point to the Reagan Administration's move away from supply side economics and monetarism, evidenced in the record tax increase and the new role of falling interest rates as an indicator. This move toward center may bring a more balanced fiscal policy that might prove a boon for the construction industry. Housing will show the first signs of recovery, and last month housing starts hit an annual rate of 1.43 million units—the highest in nearly two years.

IFRAA Awards Given to Four

Architects in Minnesota, Missouri, Indiana, and New Jersey have received awards for excellence from the Interfaith Forum on Religion, Art and Architecture.

Sovik, Mathre, Sathrum, Quanbeck of Northfield, Minn., received an honor award for new religious buildings for Our Saviours Luthern Church, Jackson, Minn. An honor award for complete renovation was presented to Pecsok, Jelliffe & Randell, Indianapolis, for Our Lady of Grace Convent in Beech Grove, Ind. Kurt Lanberg Architects, St. Louis, received an honor award for chancel alteration for the Trinity Episcopal Church in Portland, Ore.

A merit award was presented to Herman Hassinger Architects, Moorestown, N.J., for the St. Andrew Parish Center on Block Island, R.I.

Air Force Design Awards

Four completed structures and eight projects were selected in the seventh annual Air Force design awards program.

The MX Integrated Test Facility at the Vandenberg Air Force Base, Calif., by Reid & Tarics Associates/PBQ & D, San Francisco, received an honor award for completed structures. Three completed works received merit awards: a dormitory at the Lackland Air Force Base, Tex.,

continued on page 30

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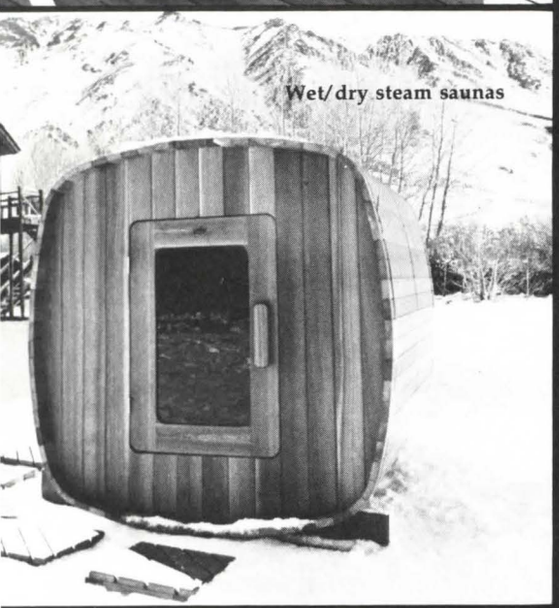

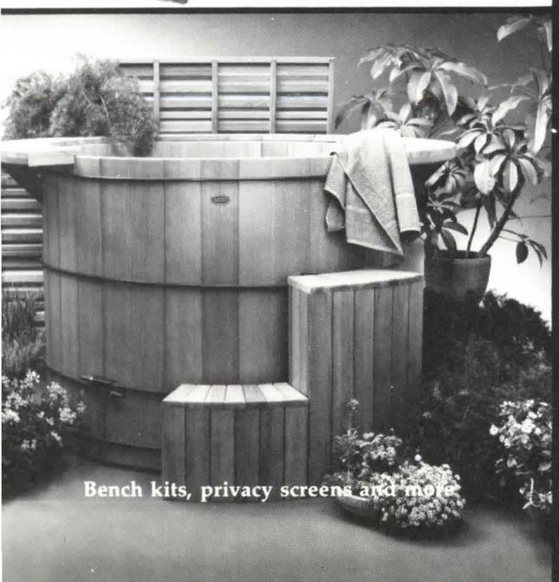

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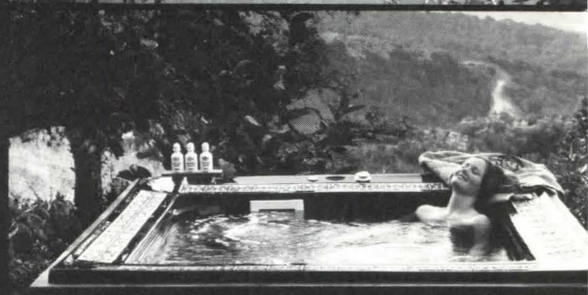

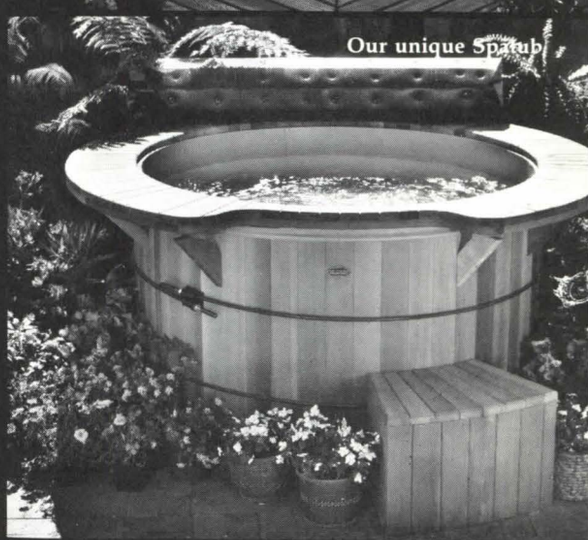

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Practice *from page 26*
by Foster + Meier, Dallas; a dormitory alteration, Brooks Air Force Base, Tex., by Richard Armstrong, San Antonio, Tex., and an officers club alteration, Patrick Air Force Base, Fla., by Fugleberg, Koch Associates, Orlando, Fla.

Honor award winners in the project category are: RAF Alconbury Medical/Dental Clinic, RAF Upwood, Cambridgeshire, England, by Percy Thomas Partnership, Nottingham, England; Tanker Alert Facility, Fairchild Air Force Base, Wash., by Environmental Concern, Inc., Spokane, Wash., and National Guard Communication-Electronics Training Complex, Peterson Air Force Base, Colo., by Anderson Architects/Roybal & Associates, Denver.

In addition five unbuilt projects received awards of merit:

Commissary, Travis Air Force Base, Calif., by Cromwell, Truemper, Levy, Parker & Woodsmall, Little Rock, Ark.; chapel, Travis Air Force Base, Calif., by Western Region, Naval Facilities Engineering Command in San Bruno, Calif.; and Composite Medical Facility, Minot Air Force Base, N.D., and National Guard Operations and Training Facility, Truax Field, Wis., by Flad & Associates, Madison, Wis.

The jury was comprised of William A. Rose Jr., FAIA, and Samuel A. Anderson, AIA, representatives of AIA, and Peter L. Beal and Richard G. Conklin, AIA, representatives of the Society of American Military Engineers.

Government

Dibner Leaves GSA, Suggests Architect Should Succeed Him

The man who has guided the design and construction of federal office buildings and courthouses for the past five years desires two qualities in his yet-to-be-named successor: that the person be an architect with private-sector experience and that he or she is vigorous in the pursuit of good federal architecture.

David Dibner, FAIA, who resigned in late November as assistant commissioner of GSA's Public Service Commission, sees himself and his successor as inheritors of the mantle of Robert Mills, first supervising architect and designer of the Treasury Building. Today, it is "a role that can be seized and really made something of," says Dibner. "But working for the government is difficult, especially if you come from the private sector. You find layers of bureaucracy and decision-making that seem illogical. For instance, politics plays a large role in which buildings get built and which don't."

Dibner himself did some politicking on behalf of good architecture. Estimating that he gave more than 150 speeches around the country, he says he wants the new person in the job to stay prominent in order to help improve the images of government and of government workers —especially government architects and engineers—and to improve relationships with consultant A/Es. He stresses the client aspect of his former job, saying it requires someone who understands the entire A/E process in order to become a "knowledgable, demanding, sensitive client."

Now heading the Washington, D.C., office of Bernard Johnson, Inc., a Houston-based firm, Dibner says he left GSA to return to his first love—private practice—and not because of the current reduction in government building activity or of any dissatisfaction with the job. He recalled some of the accomplishments of his shop at GSA. First mentioned was the setting up of a quality control process, including a structure for predesign programming (See Dec. '82, page 15), specific review of design and construction, and postoccupancy evaluations.

Relating to quality control is a series of research projects, some of which are just getting underway. GSA has formed working agreements with the Bureau of Standards and, for the first time, according to Dibner, with Public Works Canada. Research involves such diverse areas as thermal integrity of building enclosures, asbestos abatement, designing for office systems of the future, temporary buildings to meet short-range office needs, and systems buildings. He explains that last research project: "There was a big push for systems buildings before I came on board. GSA got involved with industry, invested a lot of money, built six or seven buildings, had problems with some of them, and then stopped the program. The point of the research is to evaluate the experience and draw from it the aspects that are positive and effective. Other aspects might be saved and modified."

Dibner says he is pleased with the initiatives in quality control and research, but he feels best about what he sees as an improved sense of professionalism on the part of architects and engineers in the design and construction division. "Government A/Es deal with outside professionals who have received recognition —AIA awards, etc.—and I found our people taking a more subservient role than I felt they should. In some cases, the attitude was that when you hire an outside architect for a building you can lean back and let the professional do the work, the implication being that GSA staff is less than professional. But in acting as a client, government A/Es have a very important voice in the development of a building." GSA now has a professional training program, and Dibner says that as a result A/Es there understand their contributions better and have better attitudes about their work.

Richard O. Haase, who as public buildings commissioner will recommend Dibner's successor to GSA Administrator Gerald Carmen, agrees that the job should be filled by an architect, although not necessarily by one from outside of government service. In an interview, Haase did allow that an architect's private sector experience could result in less of a tendency to be intimidated by GSA consulting architects. "I think it allows the government architect a little artistic flexibility to say 'no' when he disagrees," Haase said.

He agreed with Dibner that the person in the job should be visible and vocal in the pursuit of "getting better control and more advanced processes for the government construction program."

Lever Becomes a Landmark, Demolition Threats Continue

Amid new reports of possible demolition and replacement of Lever House, the New York City Landmarks Preservation Commission has unanimously designated the Park Avenue building a landmark. Winner of AIA's 25-year award in 1980, Lever House was designed by Skidmore, Owings & Merrill's Gordon Bunshaft, FAIA.

The commission, restricted by law from conferring landmark status on structures less than 30 years old, acted at the earliest possible date to preserve the 1952 office tower, making it the city's most contemporary landmark. William Conklin, FAIA, who as commission vice-chairman made the motion for designation, called Lever House "a key monument in the evolution of the International Style. . . . Its success as a corporate image encouraged untold other American corporations to redress their own architectural images. Lever House remains outstanding for its spatial clarity, scale, and beauty of form." (When new, the building was commended by Lewis Mumford as "the first office building in which modern materials, modern construction, modern functions have been combined with a modern plan.")

The New York City Board of Estimate has until late March to either affirm or overturn the landmark status. Lenore Norman, the commission's executive di-

continued on page 92

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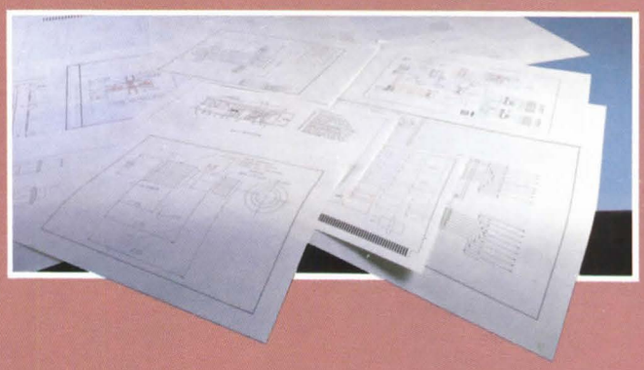

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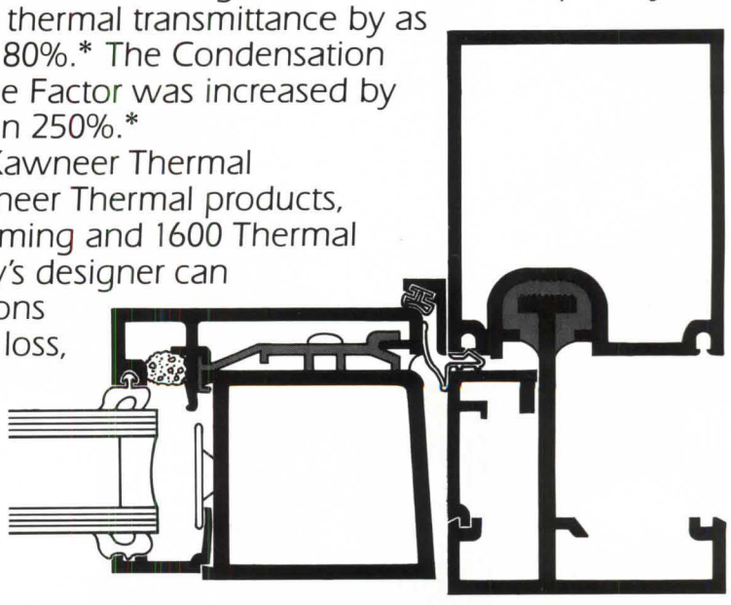

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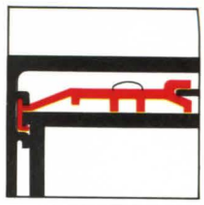

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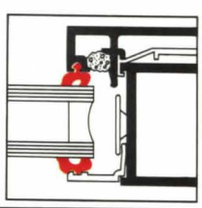

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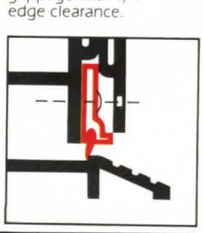

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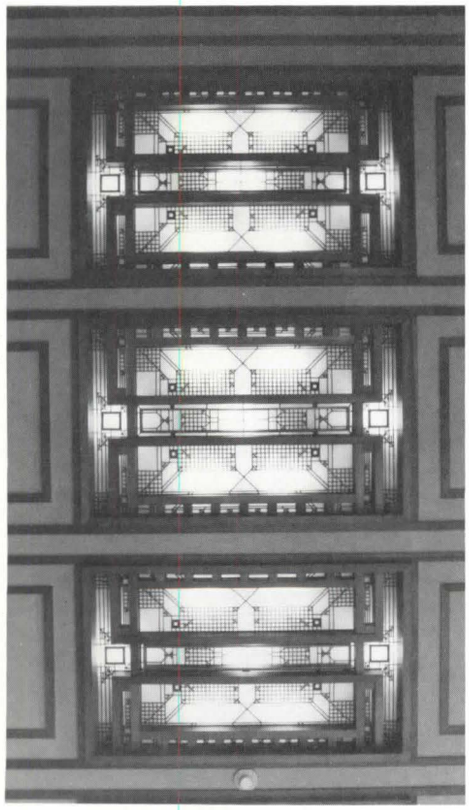


Top, west end of the Little living room, designed by Wright in 1912; above, stained glass skylight in the cove ceiling.

The Arts

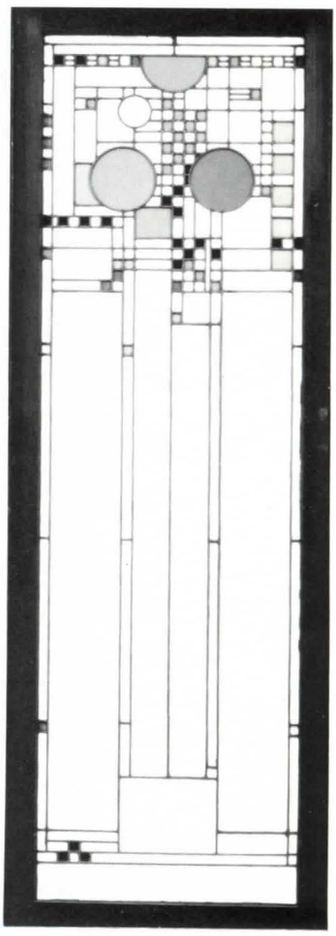
A Room as a Museum Piece

Frank Lloyd Wright had designed a house for the Little family of Peoria, Ill., in 1903. Francis Little had been one of Wright's major clients and nine years later commissioned a summer residence from Wright. The summer place, nestled between two knolls overlooking a lake in Wayzata, Minn., was the last of his Prairie houses. In 1972 Little's daughter, who had inherited the summer home, decided to build smaller quarters and ordered the masterpiece demolished.

Fortunately, before it was dismantled, New York City's Metropolitan Museum of Art removed the interiors. Last month the museum opened a permanent exhibit of the Little house living room, now a part of its period room collection in the American wing. Measuring 30x45 feet, it is crowned with a 14-foot high coved ceiling articulated with oak strips and a stained glass skylight. The longer walls have twin banks of leaded glass windows. One bank has an exterior exposure to allow natural light. Oak window seats run along each bank. These spaces are intimately contained with low ceilings above which are leaded clerestory windows.

On the west wall is a large, brick fireplace with a concrete lintel; on the east, two French doors. The room is peppered with Wrightian nooks and crannies, and the furnishings are original, save for some reupholstering and a sofa from the Robie house. The furniture has been placed according to the only photo of the room taken during the Littles' occupation. Wright visited the house shortly after its completion to have a picture taken. He pushed all the furniture around (an activity for which he was notorious) until satisfied with the arrangement. The Littles, of course, moved everything back after Wright left, but the museum wished to present the room as Wright wanted it.

In conjunction with the new installation, objects designed by Wright and other memorabilia are on limited exhibit. Spanning from the 1890s to the 1950s, they include drawings, ceramics, furniture, stained glass, and a selection from Wright's own collection of Japanese prints, acquired by the museum in the 1920s. MICHAEL J. CROSBIE



Left, exterior of south window bank; middle, a foldable print table of Wright's design; bottom, interior of south window bank; below, window from Coonley playhouse, Riverside, Ill., 1912, from the exhibit of Wright designed objects.

Courtesy of Metropolitan Museum of Art, New York City

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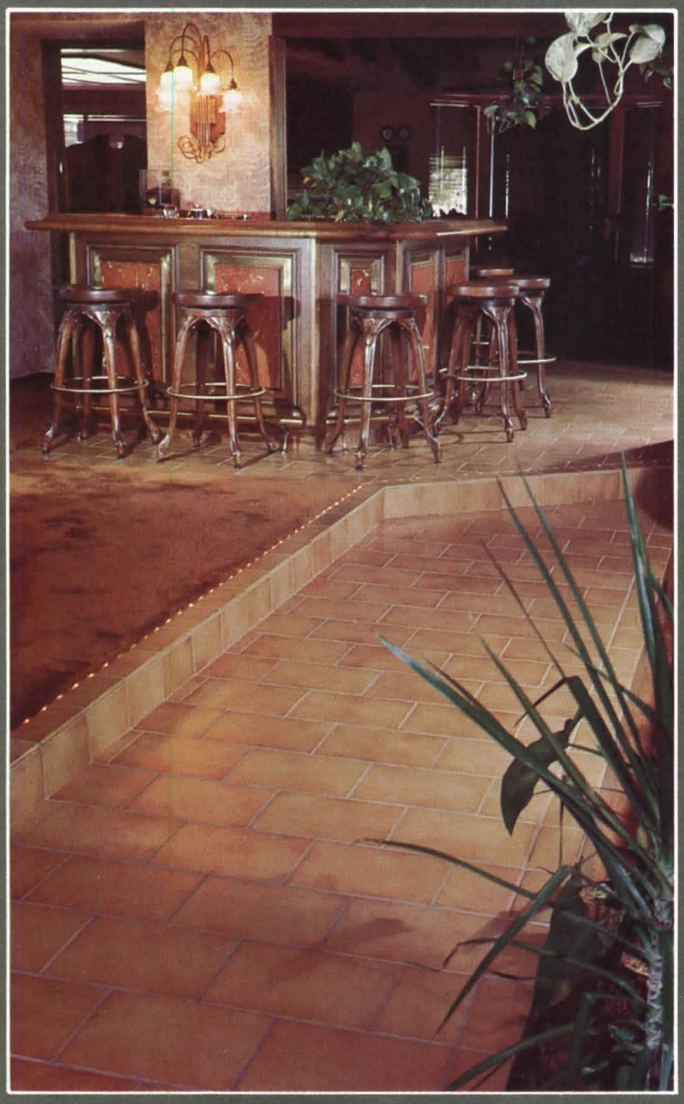

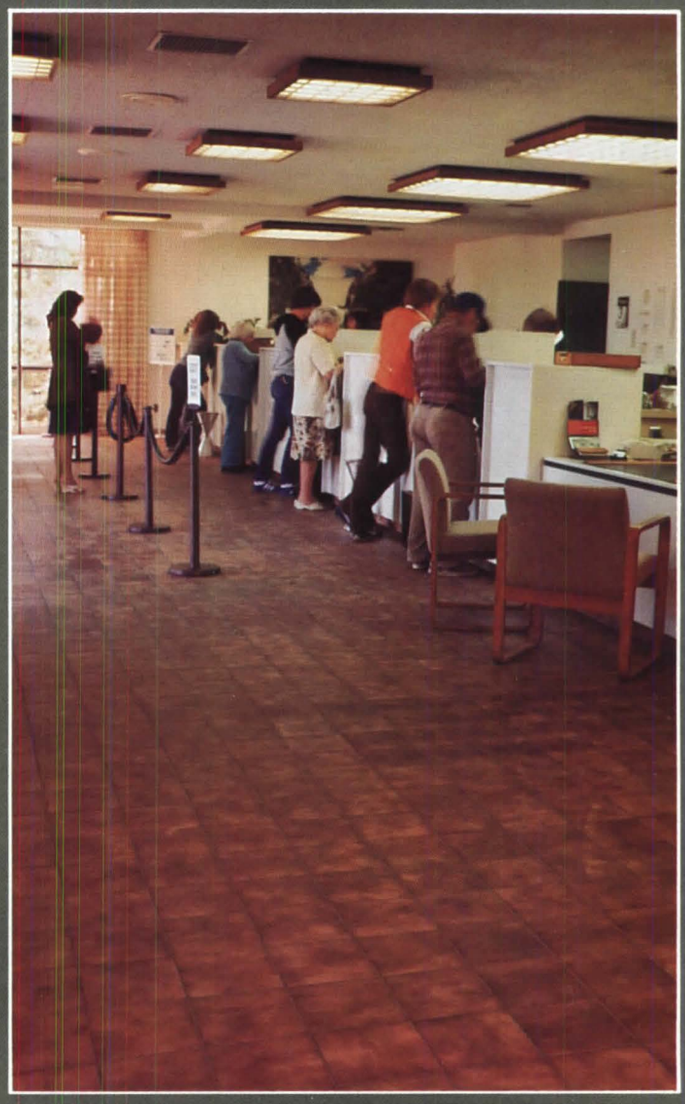

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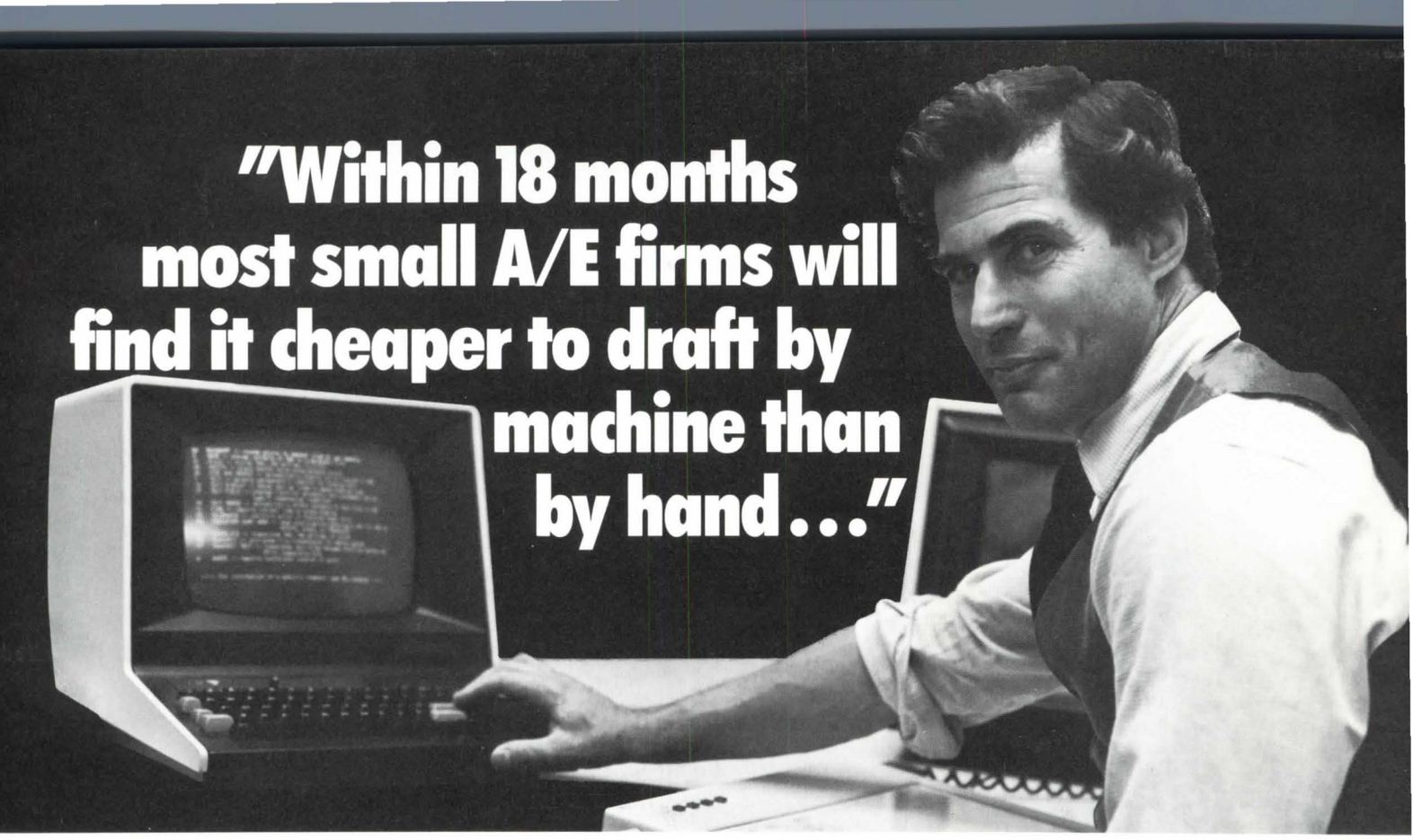

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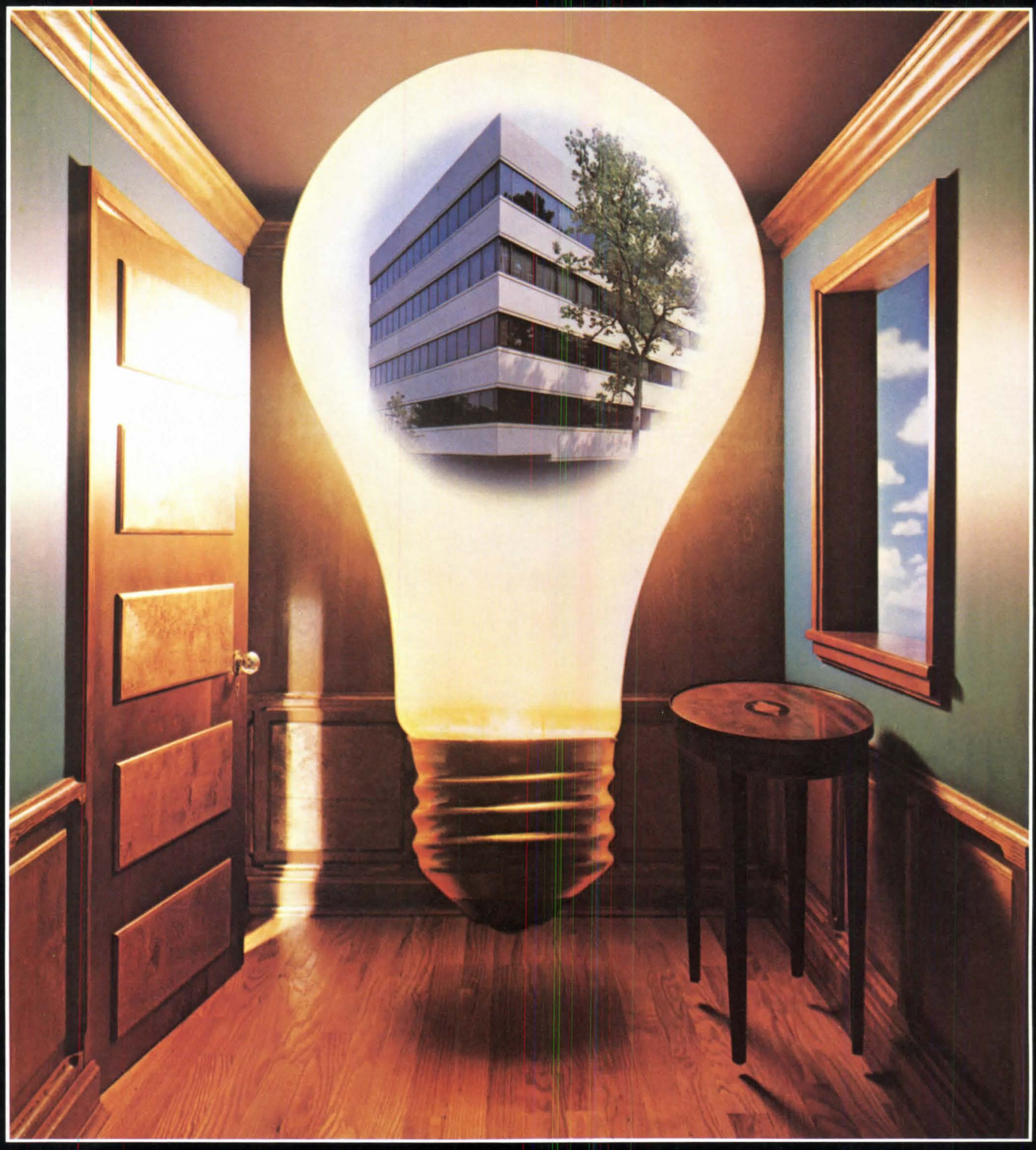

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A New Year's Warning About New Orleans

To The Editor:

I look forward with pleasant anticipation to our Institute holding its 126th anniversary convention in New Orleans in the new year. I am sure all the delegates to the convention will have both a fruitful and enjoyable time here.

However, for the unwary, New Orleans has its pitfalls. For instance, one well knows that the Mississippi River, which has its source far north in Minnesota, flows south to the Gulf of Mexico. Also, it is well known that New Orleans is on the east side of the river. But if one stands at the foot of Canal Street, the river flows to the north on its way south to the Gulf. Also, looking across the river one finds the west bank due east. It is disconcerting to find that the sun rises from the west side of the river and sets on the east side. Also, at the foot of Canal Street is a free ferry. To get to the west bank of the river, which at this point is east, one boards the ferry on the east side, which is west. Trusting that this simple explanation of direction in New Orleans can be readily assimilated, we go on to other problems.

Canal Street divides the city into "north" and "south"; however, it actually is positioned northwest to southeast. The lower part of Canal Street is in the central business district (CBD), and when one is on Canal Street or its vicinity he (or she) is said to be "in town." However, if one travels from Canal Street in a north or northeasterly direction, he is headed "downtown," a destination that eludes reality. The minute he reverses his direction, he is going "uptown" no matter how far "downtown" he may be when he makes this decision. When he goes as far "uptown" as he can, he reaches Canal Street, and he is "in town." If he wants to continue "uptown," his destination is probably Tulane University or the Audubon Zoo. Simple enough, he takes one of the "south" streets which are actually southwest and arrives due west at Tulane or the zoo. Returning, he takes a street headed southeast in a "downtown" direction and arrives at Canal Street from a southwesterly direction.

To further clarify directions in the Crescent City, there are two streets that cross Canal Street parallel to each other. One is Claiborne Avenue and, farther out on Canal Street, the other significant crossing is Carrollton Avenue. On the northeast side of Canal Street these two streets are called respectively, "North Claiborne" and "North Carrollton." On the other side of their right angle crossing of Canal Street their names change to "South Claiborne" and "South Carrollton." Yet scarcely two miles from their crossing Canal Street in parallel routes, they cross each other at right angles—South Carrollton crossing South Claiborne or vice versa, as you prefer.

With these simple instructions as a guide, the delegates to the convention should find little difficulty in getting around the city except if they decide to leave their hotel and head downtown on Bourbon Street which, until the beginning of this century, was called Craps Street. After an hour or so on Bourbon Street directions simply do not matter.

John R. Edwards, AIA Emeritus
Mandeville, La.

Editor's postscript: The above clearly is too delightful for the letters column. This issue is about energy design, with an emphasis on building underground, but we will return to New Orleans with a special issue in March.

Energy Research Cut Where It Hurts

The largest lack is in development of tools and techniques for the designer.
By Nora Richter Greer

The virtual withdrawal of the federal government from research into energy conservation and wider use of alternative energy sources is creating a knowledge gap that could slow or reverse the momentum built-up in recent years behind energy conscious building design.

The private sector, as the Administration hopes, is playing a major role in product-related research, and the government itself is continuing research into long-range energy strategies and supplies. But the gap is being felt where it hurts worst in terms of energy efficient buildings: in the development of tools and techniques that designers can use in actual practice.

The federal cutbacks came just as some of its research efforts were promising to produce such results. Greg Franta, AIA, formerly of DOE's Solar Energy Research Institute, says that "at SERI there were several projects where the work was 80 percent done, and the final product was to be some sort of documentation of the work in a form that could be useful. One of the projects was the solar design handbook. We spent three years and developed three editions pulling together much good solid reference information of designing commercial solar buildings. The funding was yanked up for the last volume, which was the grand finale. After spending hundreds of thousands of dollars and three years, it was stopped altogether." (Franta and others that were involved in that project are now attempting to finish the handbook on a voluntary basis.)

Michael Holtz, also formerly of SERI, sees a "trend toward basic research, which is more limited to developing new materials. . . . It is getting more esoteric, and although it may be applicable in a longer term context, it certainly doesn't meet the immediate needs of the design community. Many of the 'soft' sciences and behavorial kind of work that designers feel is an integral part of building design and energy efficiency in buildings is not being done because it is now not considered basic research and therefore does not need to be done."

Says John Cable, AIA, formerly with DOE's building energy conservation program and now with the Ehrenkrantz Group, "I think the first thing that a practicing architect really needs is to know those things that they can do to make a building energy efficient and to know it relative to other things. For example, you are sitting down to design a building and you need to know that if you do such and such an addition—if you put overhangs on this dimension at a certain width, let's say—what the impact of that design strategy on the overall energy use will be. . . . So I think one of the first things that is needed is good reference handbooks that are not unlike the structural steel tables."

Another area of concern is the use of conservation and passive and active design strategies in commercial buildings. Harry Gordon, AIA, of Burt Hill Kosar Rittelman puts it this way, "Many of the simplier techniques and those used in residential buildings have been pretty well investigated. But there is still a lot less that we know in the area of the role of some of these energy strategies, particularly in larger commercial buildings. How do we make use of them well, and how do we save energy in large office buildings? I don't know that the government under the Reagan definition of high risk feels that this is necessarily an area where a lot of investigation might take place. . . . Yet you really can't make use of techniques with any confidence that they will save energy and not cause you major design problems."

Integration of different systems and materials is another area where research could be conducted: integration of daylighting and artificial lighting systems, integration of thermal mass and mechanical systems, among many others. As one architect put it, "I'm concerned about the middling point, which is putting things together to make better buildings."

Others feel that demonstration programs are needed to advance the fields of active and passive solar and energy conservation. Says Scott Matthews of Van der Ryn, Calthorpe & Partners: "Not having any demonstrations at all will mean that innovation will happen only at the margin between what can clearly be justified just from cost of normal business and what you can talk the client into. . . . So I think we are going to have a real hiatus in energy use in building as innovation. That whole level of applied research or commercialization or learning or teaching isn't going to be around."

During his stint with SERI, Holtz saw a "growing linkage" between research and architectural practice. Now he sees a "trend away" from that. "What we risk creating," he says, "is this separate environment that has very little communication between each other and therefore the research that may get done may be totally unresponsive to the needs of the practitioners, and that will be a major setback. . . . That wedge is being driven under the guise of long-term, high-risk R&D, but it affects the ability of designers to make use of the research knowledge that will be available in the next couple of years, or even if the research is usable at all."

Says Donald Watson, FAIA, "Some companies will do some [research], and there are exemplary instances of that. There are just a lot of holes in that systems, where the research that you get out of that will be very product specific. It will tell you how to use glass but won't tell you how to integrate glass with mass. The real issues are integration issues, which get missed when you do product specific research, and therefore there is a whole research area related to systems or concept of product integration that doesn't get done under that process."

In July AIA and 14 other groups representing the building industry and energy and environmental interests proposed a building energy research program, maintaining that the building industry needs a coordinated approach to improve the overall energy efficiency of buildings. In emphasizing the need for a federally supported energy use research program, the proposal states: "The building industry is decentralized, predominantly made up of many small-to-medium-sized firms involved in building construction or in the distribution of systems and components that go into buildings. This makes it very difficult for the industry to undertake a comprehensive energy research program. Building users are likewise very diverse, including major public and private institutions, small businesses, and individual owners and renters of single family homes and apartments. A coordinated federal research program is essential to address this wide range of interests in a meaningful way and to continue the nation's progress toward real energy efficiency in buildings."

Key aspects of the proposal are that "buildings should be

treated as integrated and dynamic energy-using systems; the research program should be based upon the actual behavior of occupied buildings; residential and commercial buildings should be treated separately; the research program should be oriented toward the specific needs of those who will apply the research results, mainly homebuilders, architects, engineers, appliance and product manufacturers, retrofitters, building owners, and occupants; the research program is balanced between near- and long-term development work; and an ongoing component of the program should be research into the health and safety aspects of building energy systems."

Another group criticizing the Administration's direction of high-risk, high-payoff, generic research is DOE's Energy Research Advisory Board panel on energy conservation. (The board was established by Congress to review DOE's programs and make recommendations to both the department and Congress.) In its draft report the panel calls the Reagan approach "too stringent" for energy conservation research and development. It also states that the current appropriations for building energy conservation programs are too low.

The board sees as the four areas in which the building community "deserves" federal research and development support as: building systems (meaning such things as advanced daylighting, heating, ventilation, airconditioning control concepts, and modelings; laboratory testing and field data collection on ventilation air heat exchangers, among others); building equipment research, community scale energy systems, and behavioral and institutional research.

Another DOE Energy Research Advisory Board panel looked at solar energy and concluded that improving the energy performance of existing and new residential and commercial buildings should be "assigned highest priority." It recommended that current DOE building performance tests should be completed and documented and that funding be continued in research aimed toward new materials with selective thermal and structural properties for buildings, new systems for heating and cooling, and a better understanding of heat and mass transfer in buildings.

Both panels recommended that a building energy research institute be established. The institute could be supported by federal and private dollars and it could direct and act as a clearinghouse for all building energy research. This type of organization has been successful in Canada, England, Australia, and Sweden.

One attempt at narrowing the gap is a workshop on building energy research to be held this month, sponsored by the House committee on science and technology, DOE, the Electric Power Research Institute, the Gas Research Institute, the National Association of Home Builders Research Foundation, AIA, and the American Society of Heating, Refrigeration and Air Conditioning Engineers. The goal is the formulation of a national agenda for research in energy efficency and solar energy related to buildings. The participants will look at needs in component and subsystem research (materials, storage, and envelope subsystems; windows, daylighting, and passive solar; ventilation, infiltration, moisture control, and indoor air quality); whole building performance research for residential and commercial buildings (including modeling and systems analysis, performance monitoring and evaluation, design tools and strategies, and retrofit techniques and analysis); and "barriers—institution, behavioral and technology transfer."

The event with its broad-based sponsorship and dual federal involvement is as hopeful a sign as can be found on the energy efficiency scene. □

Currently, the bulk of building energy research in this country is still supported by federal funds. But the money appropriated to DOE that supports the department's building energy conservation program and the active and passive solar programs has decreased significantly during the past few years from a total of $118.9 million in fiscal year '80 to an anticipated $26 million in FY '83.Through these programs funding is distributed to universities and groups such as the AIA Foundation and the National Association of Home Builders Research Foundation.

The largest private sector effort is in the building materials industry. DOE's Oak Ridge National Laboratory has estimated that the industry as a whole may have spent up to $175 million on research and development during 1981, of which "perhaps 15 to 20 percent might be energy conservation related."

The majority of DOE's efforts are geared toward high risk, long term, generic research, as mandated by the Reagan Administration. The active solar group, for example, is examining different concepts of absorption cooling and a little bit of work in new materials to be used in collectors. But the bulk of the work is in photovoltaics. As for hot water systems, the industry is currently promoting and selling these, according to John Schuller, director of the program, "so that we are not doing anything other than some work that was almost completed in the past."

As for the passive solar program, the emphasis on advanced materials research has grown proportionally over the past few years, according to the program's director, Lawnie Taylor. The program is now directed at examining aperture materials in an attempt to enhance daylighting within buildings and to reduce the use of artificial lighting, materials that can be used in "normal structural construction practices" that have much greater storage capacity than existing materials, window systems that can be controlled electronically as to the amount of solar radiation that will be transmitted into the interior of buildings, and limited experiments on convection in buildings.

The building energy conservation program is exploring wall and roof systems (roof performance, thermal mass, and "dynamic performance"); thermal insulation (test procedures and heat transfer); windows and daylighting (analytical and physical models and performance). Its ventilation and controls division is examining air change rates and ventilation and air contamination controls, as well as reduction of infiltration. The program has the only remaining effort at developing design handbooks. It is working toward a system analysis program for small office buildings (and, if funding is available, will produce handbooks for multifamily housing and additional building types). Researchers will accumulate all existing R&D information about small office buildings; determine the appropriate simplified design tool; and run a series of parametric studies to determine the sensitivity of its energy use to important variables, such as orientation, aspect ratio, glazing area, and HVAC system. The group also has the only remaining standards-related research, which involves transforming the building energy performance standards research into voluntary guidelines for mobile homes and residential structures. The commercial buildings guidelines will make recommendations for upgrading the ASHRAE/IES Standard 90, "Energy Conservation in New Building Design." The residential and commercial guidelines will become the mandated standards for federal buildings in the spring of 1983. □

Measuring Performance of Energy Design

DOE studies a set of Owens-Corning award winners over time. By N. R. G.

A study by the Department of Energy and Booz·Allen & Hamilton of the performance of 13 buildings that received Owens-Corning energy design awards between 1979 and 1981 showed their average annual energy consumption to be 50 to 60 percent below conventional buildings.

The average site energy use for the 13 schools and offices was found to be approximately 42,000 BTUs per square foot per year, compared to an average of 110,000 to 150,000 BTUs for conventional buildings. The latter figure was estimated from data contained in a 1980 Building Owners and Management Association survey of building operating costs. Their energy consumption is also well below the target of approximately 55,000 BTUs per square foot per year set for federal buildings by GSA in 1972.

The authors also found that energy performance levels for the 13 buildings "have markedly improved over the past 10 years." The site energy use for several of the winners in the early '70s was 60,000 BTUs per square foot per year, but by 1980 a level of 40,000 BTUs per square foot per year was already achieved by two new buildings—the EG&G/Willow Creek Office Building, in Idaho Falls, Idaho, and the Frank Carlson Federal Building in Topeka, Kan. Other structures, such as the Weyerhaeuser Headquarters, Tacoma, Wash., show improvements in energy-efficiency through tighter operating procedures and fine tuning of HVAC and lighting systems. This building's energy consumption was lowered by nearly 40 percent during the 10 years it has been occupied.

These energy-efficient buildings were also found to have competitive initial costs. In eight of the 13 projects, intial costs (on a dollar per square foot basis) were essentially competitive, which the authors define as being within 10 percent of the average cost for a comparable new building in a particular location. Four of the projects had identical costs. For the most part, projects with cost premiums of greater than 10 percent incorporated large active solar systems.

The study also looked at all 65 winners in the Owens-Corning Fiberglas Corporation annual awards program in search of design strategy "trends." In addition, four "exemplary" buildings were closely scrutinized: the Frank Carlson Federal Building; the EG&G/Willow Creek Office Building; Sport Obermeyer Building, Aspen, Colo.; and Williamson Hall, University of Minnesota, Minneapolis. The study was directed by Robert Shibley, then the manager of DOE's passive solar commercial buildings program, and John Kurtz of Booz·Allen & Hamilton's environment and energy division (with Kimball Hart and David Hartmann as project managers).

While the authors found "no massive shifts in the types of energy strategies used in the buildings," a "number of subtle trends did emerge. . . . These shifts in commercial building energy strategies do point out that design features are continuing to evolve." The authors do, however, emphasize that the 65 buildings represent "leaders in the energy field that are probably 10 years ahead of the mainstream in new commercial building construction."

The first "trend" noted is that the most commonly used energy devices involve modifying the building envelope and improving the HVAC system. (Forty-eight of the 65 designs did one or the other; 29 did both.) Envelope design strategies range from minimizing window area and greatly increasing insulation levels to using all glass facades with special solar control. The most prevalent HVAC modifications are heat recovery, heat pumps, variable air volume (VAV) systems, and thermal storage. "So many of the projects utilized VAV air distribution that this appears to have become virtually the norm," the authors conclude. A number of buildings have recovery heat pump systems that capture internal heat from lights, people, and the sun, for perimeter use and for use at night.

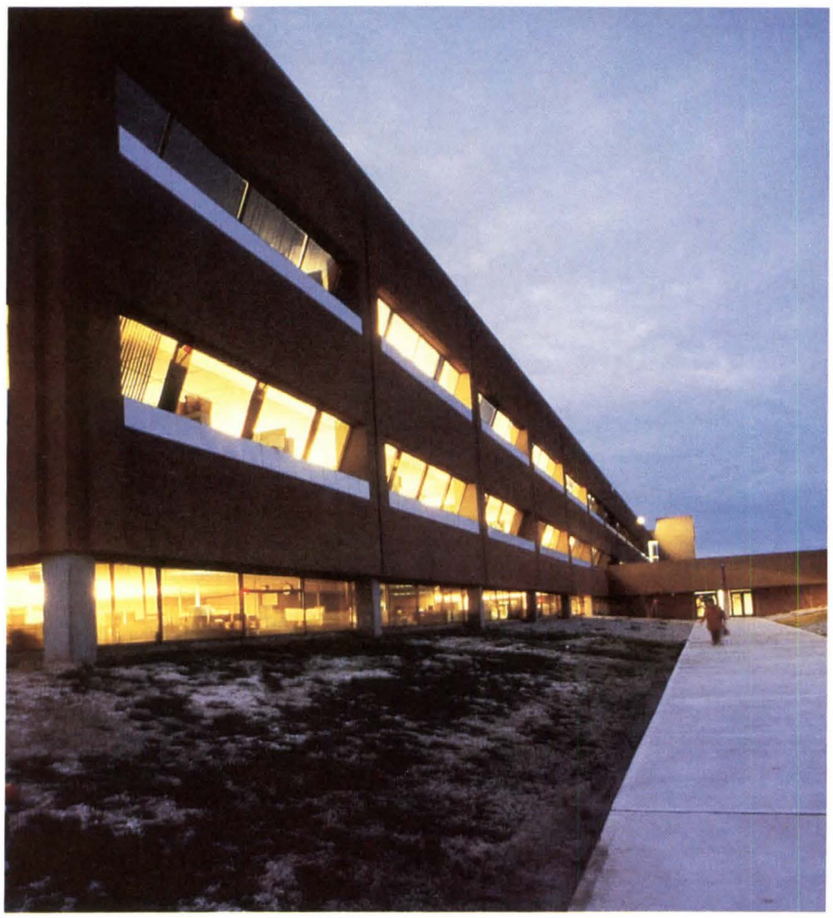
The second "trend" is that the use of active solar systems has declined in recent years. Active solar space heating, domestic water heating, and combination heating and cooling systems are used in nearly half of the projects (32 buildings), but the use declined from 60 percent of the projects during 1972-79 to 45 percent during the last two years. Reasons cited for the decline are "federal grants supporting active solar have declined, tighter construction and increased use of heat from the building core has greatly reduced auxiliary heating requirements in large commercial buildings, and more initial cost and energy savings data are becoming available for active solar systems and generally they tend to have fairly long payback periods."

While active solar has declined in use, passive solar, particularly daylighting, has increased. Simple techniques such as window orientation and location are especially common, the authors conclude. Also used frequently are skylights, clerestories, and atriums. Passive solar heating techniques, especially Trombe walls and direct gain, also increased in usage, but, the authors point out, only in building types that are heating-load dominated. In climates with large day/night temperature swings or with low summer humidity, natural cooling is being used more often.

Several energy-conserving devices are used intermittently and "indicated no definitive trends." Among them are underground construction, high performance lighting systems, and energy management/control systems.

Overall, the study identifies a shift from emphasis in the early years on mechanical energy conservation strategies to passive solar design concepts. And, too, recent winners employ more sophisticated integration of HVAC, lighting, and building envelope systems.

The results of the case study analyses reinforce the overall conclusions, the authors say. The four buildings were chosen to provide a representative mix of building types, sizes, and locations, and each has "significant" passive solar features. Common among the four buildings are: "The passive solar designs resulted in significant energy savings; initial costs were essentially comparable with conventional buildings; all of the buildings exhibited a high degree of design integration that successfully combined passive solar and energy conservation features, and in two cases, active solar systems; and the design processes were characterized by strong owner involvement and commitment to energy conservation." A closer examination of the four buildings follows. The energy consumption and construction cost figures are taken from the DOE/Booz·Allen & Hamilton study.



The design of the EG&G/Willow Creek Office Building, Idaho Falls, Idaho, revolves around natural heating (from lights and people), natural cooling (direct outside air during mild seasons), and natural lighting (daylight is reflected off stainless steel windowsills into the building's interior). Designed by Flatow, Moore, Bryan & Associates, Albuquerque, N.M., the 284,000-square-foot building consumed 39,000 BTUs per square foot in 1981, which is a 60 to 75 percent savings over the average energy use by U.S. office buildings of similar size. And it cost less than conventional buildings—$42 per square foot (in 1978 dollars) compared to $45 to $50.

Probably the most unusual feature of the building is the lighting system—a combination of daylighting and high-pressure, sodium-vapor lamps. Located in floor and pendant mounted fixtures, 1,100 250-watt, sodium lamps are directed toward white, high reflectance ceiling tiles. Daylight is also reflected toward these tiles from brushed, stainless steel windowsills. This combination in the building's open office space (75 percent of the area) minimizes the "yellow" coloring of the sodium lamps, which are seldom used in buildings because of the yellowish light, but which are highly efficient. A 5,900-square-foot skylight above an atrium lobby provides additional daylight.

The sodium lamps, which have individual on/off controls, provide 80 percent of the lighting. The remaining 20 percent comes from fluorescent and incandescent lighting, which is used mainly for hallways, the cafeteria, and emergency systems. The light admitted by the windows, which cover 40 percent of the exterior wall, provides all background or ambient light needed in the perimeter areas to about 30 feet into the building. On a cloudless day natural daylight provides about a 20 percent reduction in the mechanical lighting requirements.

Both the windows and the skylight are designed to carefully control the amount and type of light entering the building. The windows slant inward to reduce glare, and the skylight is opaque on the south side to minimize heat gain.

To reduce heating and cooling requirements, the building is heavily insulated. The exterior walls are prefabricated, lightweight, insulated panels consisting of six-inch fiberglass and two-inch polystyrene with an R25 value. For the roof, beams are overlaid with a concrete deck with four inches of polystyrene insulation and two inches of gravel for an R22 value. All windows are double paned. To further insulate the building the first floor is partially bermed.

Except for when the outside temperature falls below minus six degrees Fahrenheit, the building is heated by the warmth given off by lights and people in the building's core. This is captured and circulated by heat pumps to the perimeter areas. Any heat not used is stored in a four-compartment, 200,000-gallon underground tank and used to heat the building at night or preheat it the next day. When outside temperatures are extremely cold, a small backup boiler system is used.

In mild seasons (40 to 78 degrees Fahrenheit), outside air is used for cooling. In the winter, if core temperatures grow too hot, cool outside air is mixed with the captured heat and distributed through the duct system. In the hot summer, water is chilled by two 250-ton chillers and stored in the underground tanks to provide the necessary cooling.

Two separate duct systems provide the hot and cool air. The hot air ducts are needed to heat only the perimeter spaces, while cold air is supplied to the entire building. There are 309 individually controlled building zones, each monitored by a thermostat that sends signals to a variable-volume control box for distribution.

The initial cost per square foot was less than for a similarly sized conventional building due to the building's energy features: There are fewer ducts and air handlers than normal and lower A/C tonnage due to smaller heating and cooling loads. Also contributing to lower costs were value engineering of the structural and envelope designs and some prepurchasing of materials.

The EG&G/Willow Creek Office Building combines daylighting with sodium-vapor lights, which produce a yellow glow, above left. Stainless steel windowsills reflect daylight toward ceiling tiles, and slanted windows reduce glare, above right.

The Frank Carlson Federal Building in Topeka, Kan., was the first to be built under GSA's standard of 55,000 BTUs per square foot per year. What the architect accomplished through a simple energy-conscious design—reducing heat gain and losses through the building's envelope and an efficient HVAC system—is a 185,181-square-foot structure that now uses only 35,000 BTUs per square foot per year.

As is the case with many federal structures, the Topeka building was designed by a team of several architectural firms: Kivett & Myers, Kansas City, Mo.; Eicholtz & Groth, Topeka, Kan.; Peters, Williams & Kubota, Lawrence, Kan. (formerly Robertson, Peters & Williams); Platt, Adams, Braht & Associates, Wichita, Kan.; and Woods & Starr, Hays, Kan. To minimize the amount of exterior wall surface, the team chose a "compact geometric" shape, which is basically a square. However, the main entrance is recessed with the protruding wall acting as a wind buffer. The walls are high mass, consisting of four-inch brick, two-inch polyurethane, and eight-inch concrete block with a U-value of 0.05. The roof is six-inch lightweight concrete over a three-inch structural frame with a U-value of 0.084. Windows are used sparingly—only 17 percent of the total wall area—and have one-inch-thick insulating glass. Five-foot overhangs permit solar gain in the winter while screening out the sun's rays in the summer.

These envelope modifications are combined with an efficient HVAC system. Ducted fan coil units located above the suspended ceiling take air from the building's core, which has been heated by lights, people, and solar heat gain from a skylight, and redistributes it to the perimeter. This system provides all the heating requirements when the building is occupied. The HVAC system also features variable air volume distribution and enthalpy controls. The building also has a solar domestic hot water heater. The HVAC system is entirely computer controlled with special programs designed to reduce costly peak loads and to optimize performance of the centrifugal chillers. The central focus of the interior is the 60x60-foot atrium that rises through the building's four stories to a skylight at top.

The success of the Topeka building may be due in large part to the amount of teamwork between GSA officials, the architect, engineer, construction manager, and building manager, who all participated in the predesign and schematic design phases. Significant reductions in energy use—about 35 percent since 1977 when the building was first occupied—resulted from reducing air infiltration, the addition of a monitor to keep garage doors closed and insulation between parking and office spaces, and modest adjustments to the HVAC system.

As for cost and energy consumption comparisons, the 35,000 BTUs per square foot per year consumed by the Topeka building in 1981 compares to a typical U.S. office building use of 100,000 to 140,000 BTUs per square foot per year (using data from the Building Owners and Management Association). This is a 65 percent savings. The Topeka building cost $52 per square foot, which GSA determined to be comparable to the cost of a conventional federal building in that region.

Kahnweiler/Johnson

The passive solar features of the Sport Obermeyer office/warehouse in Aspen, Colo., have been so successful that if the company's owner Claus Obermeyer could build anew it would be totally passive. As it is, the warehouse, with its Trombe wall, and the office and second floor apartment, designed by Copland, Hagman, Yaw Ltd., Aspen (now Hagman Yaw Architects, Ltd.), consume 35 to 55 percent less energy than comparable Colorado buildings.

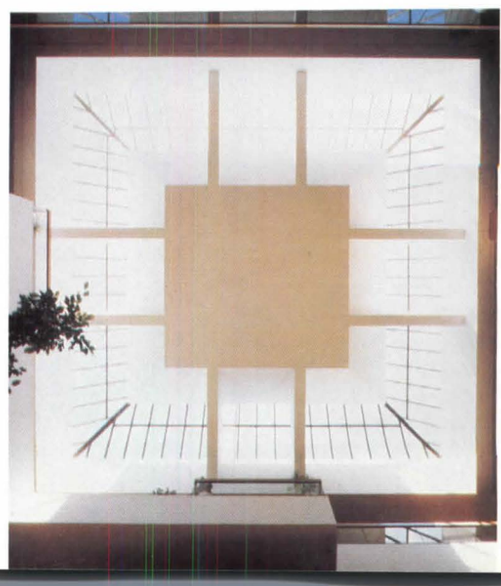
The 1,800-square-foot Trombe wall system consists of diffusing glass of low iron content on the exterior, a dark blue stainless steel selective surface absorber plate, air space for heat transfer, and a filled cinder block interior wall. The wall's solar gain heats the air, which is mechanically drawn upward by a large fan and distributed through a network of ducts into the warehouse. The wall is oriented 30 degrees east of south, which quickly captures the morning sun and heats the warehouse.

The actual energy contribution of the Trombe wall is hard to assess because the building's gas and electric meters monitor the offices and apartment, as well as the warehouse. However, the project energy consultant, Solar Pathways Associates (now ENSAR) of Glenwood Springs, Colo., has estimated by means of solar load ratio modeling that the Trombe wall produced approximately 43 percent of the heating requirements for the warehouse during 1981.

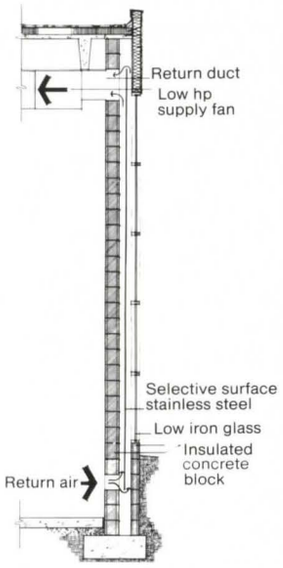
As for cooling the warehouse, hot air from the wall is exhausted through ducts in the roof. This vented air creates a thermal chimney that induces cooling and ventilation by pulling in fresh air from open loading doors on the west side of the building. There is no supplementary airconditioning.

In choosing the Trombe wall design, a phase change material systems was rejected as too expensive and a direct gain solar option was eliminated because of possible ultraviolet damage to the ski clothing inventory.

While the office and apartment are heated by a gas boiler,



The Topeka Federal Building, far left, has a compact geometric shape and central skylights, left. A 1,800-square-foot Trombe wall, photo and section above, provides heating for the Sport Obermeyer warehouse. Heated air is distributed mechanically through the building. An active solar system now sits on top of the underground Williamson Hall, drawing and aerial photo across page.



energy conservation techniques help reduce annual consumption. There are windows on the north and west sides, as well as the south, because the client requested natural lighting and views of the surrounding mountains. These windows (20 percent of the wall area) are double paned to minimize heat loss, yet allow for direct gain of solar heat and light in the winter. Eight-foot overhangs provide snow-reflected light in the winter and control overheating in the summer. The overhangs also help maintain comfortable interior temperatures during summer months. Only the computer and mechanical rooms are cooled in the summer by a small evaporative cooler.

These techniques are also used in the second-floor apartment. In addition an 80-square-foot greenhouse located on the south side provides for solar heat gain in the winter. The apartment's design is so successful that it had to be mechanically heated only three weeks last winter.

The building's exterior walls are heavily insulated. In the office and apartment lightweight aggregate panels over stud construction provide an R19 value. (Wall sections protected by the overhangs are of redwood siding.) The warehouse walls, other than the Trombe wall section, are brick over three-inch rigid foam insulation board with concrete block interior load bearing walls. The roof, with an R40 value, is a built-up type over rigid foam insulation board with a concrete deck.

The walls of the building are sunken and bermed to about three feet for two reasons. One is to provide extra insulation. The other is to reduce the building's bulk in an effort to present a low profile in its industrial park on the outskirts of Aspen. On the south side of the building are a series of sunken courts. In the court next to the Trombe wall is a solar-heated lap pool (Obermeyer believes in offering exercise opportunities for both himself and his employees). The pool is heated by a simple, unglazed black pipe system located on the warehouse roof. It provides heat for the 750-square-foot pool from April to November.

The construction cost of the warehouse, including the Trombe wall, was $29 per square foot, which is within the $25 to $30 per square foot range for similar Colorado warehouses (1980 dollars). The office and apartment portion was $46 per square foot, which is comparable to cost estimates for lowrise offices. The Trombe wall itself cost about $6 more per square foot than other warehouse walls (after tax credits), with a 13-year payback. Besides its energy benefits, it brings an interesting, varied look to what could have otherwise been a bland warehouse facade.

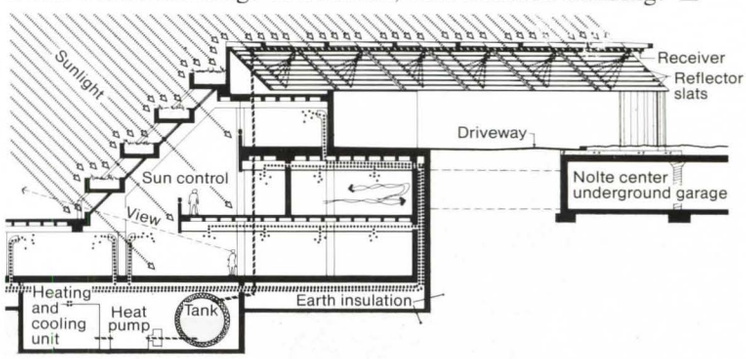
The University of Minnesota's Williamson Hall was placed 95 percent underground to conserve scarce open space on the campus, maintain pedestrian pathways, and preserve views of two adjacent historic buildings. A tremendous side benefit of this design is its energy savings potential. Just by going underground, the 83,000-square-foot campus bookstore/records and admissions office consumes substantially less energy than a similarly sized, above-ground building (52,000 BTUs in 1981 compared to 150,000 to 200,000 BTUs). An active solar system brought the energy consumption down to 47,000 BTUs per square foot in 1981.

In designing the building one of the major concerns of BRW Architects, Minneapolis (formerly Myers & Bennett/BRW), was to bring natural light into the building without causing a heat gain buildup, especially in the summer. (How the building works as an underground structure is evaluated in the April 1978 AIA Journal, page 46.) The solution centers around a tiered sunken court with 45 degree sloping windows and two clerestories flanking a diagonal walkway. The first floor below ground level is a mezzanine, which permits light to penetrate into the lower levels. To screen out the summer sun, a planter system located above each tier was chosen over a louver system. In the summer juniper and deciduous ivy plants reduce solar gain by two-thirds. During the winter, the ivy sheds its leaves, allowing the low winter sun to penetrate deeply into the building. The natural light is supplemented by a flexible fluorescent task lighting system and by high-efficiency metal halide lamps.

The combination of going underground and using highly insulative walls and roof allows a smaller than normal HVAC system. The exterior walls are poured-in-place, 12-inch concrete with polystyrene insulation on the interior and four feet below grade on the exterior. The roof is 18 percent built-up, 7 percent sod-covered, with the remainder consisting of precast concrete pavers with high-density polystyrene insulation and rubber membrane water-proofing over concrete. Before the active solar system was added, the building was heated and cooled primarily by the university's central steam plant. Supplementary heat was provided by lights, people, and machines, which was collected by heat exchangers in the exhaust/air system.

The active solar collector was added in 1980 with funds from the Department of Energy. The system consists of 6,000 square feet of solar panels in a linear concentrating array with an 8,000 gallon water/glycol tank for short-term thermal storage. During the heating season, the system is designed to meet about 80 percent of the building's space heating needs. In the summer it is used with a 150-ton absorption chiller and is designed to provide about half of the cooling requirements. To achieve the same impact on energy consumption in a conventional building, the architect estimated that four acres of collectors would have been needed.

Williamson Hall cost about $42 per square foot to build in 1977, which is actually below construction estimates of $45 to $50 for a conventional building of 83,000 square feet. The addition of the active solar system brought the cost up to $51. However, if the system had been incorporated in the original design, it would have added only $4 to $5 per square foot, which is still within the range of a similar, conventional building. □



Energy and Earth Sheltering Revisited

Architecture's underground movement enters a new phase. By Raymond L. Sterling

With the sudden heavy emphasis on energy efficiency in building design, particularly in housing, there has been a tendency for polarization of energy design strategies into certain camps, each with its own protagonists and afficionados—active solar, passive solar, superinsulation, earth sheltering, etc.

Fortunately, that picture seems to have begun to change and there appears to be emerging a cross-linking between various design strategies in which architects are taking the most economical features of each as they may be appropriate in a particular design and climate rather than trying to design an "earth-sheltered building," a "passive solar building," or a "superinsulated structure" according to some prototypical definition.

For example, a northern climate house may include substantial earth berming (which reduces foundation construction as well as improving winter and summer thermal performance), superinsulation of all exposed elements of the structure (to reduce heat losses and gains), and windows with a preferred orientation to the south (although they may be smaller than in many early passive solar designs). This does not represent a diminution of these strategies but rather a maturation of each into a design option with a fairly well understood set of criteria for its applicability, together with an inherent set of disadvantages as well as advantages that must be faced to bring about a successful design. It also does not mean that research or innovation in each strategy will stop, but rather that the research or innovation will be directed at improving the techniques rather than focusing on whole building types.

Thus, earth-sheltered construction might be said to be entering a second phase in its modern development. Up to now, earth sheltered buildings have tended to rely solely on the moderating capacity of the earth's temperature to provide thermal benefits. Little research has been undertaken to optimize the interaction of the building environment with this huge, surrounding thermal mass.

Opportunities clearly exist to influence ground temperatures in a number of ways to further reduce heating and cooling requirements. Improved design of HVAC systems also promises to more fully exploit thermal benefits underground.

This is akin to new developments in passive solar structures that will focus on improving the thermal efficiencies of building apertures and thermal storage systems so that overall building performance can be improved beyond the level possible with conventional south glazing and mass walls.

In the technical standards and guidelines area, overcoming waterproofing problems still appears to be key to achieving broader acceptance of earth sheltered buildings. Unfortunately, it is not sufficient to merely select a competent product. Strict site supervision and provisions for detecting and repairing leaks must be made. There is virtually no independent waterproofing research being carried out despite the very high cost of repairing waterproofing problems underground. This is largely because such research is too commercial for scientific agencies. The net result is that we must still rely largely on manufacturers' information plus direct experience to choose suitable waterproofing methods.

Dr. Sterling is director of the Underground Space Center, based at the University of Minnesota, and author of several books on earth sheltered architecture.

Norman F. Carver Jr., AIA

White towers mark the underground houses of Gaudix, Spain. More images of Iberian underground architecture start on page 70.

Another area where building designers have needed considerably more information is heat transfer calculations of underground heat flow and optimum insulation methods. There has been significant progress in this area under funding from the National Science Foundation and subsequently the Department of Energy. A subroutine is being prepared for below-grade heat transfer calculations that will operate with the DOE-2 building load analysis program, and more detailed analysis routines are available as research tools.

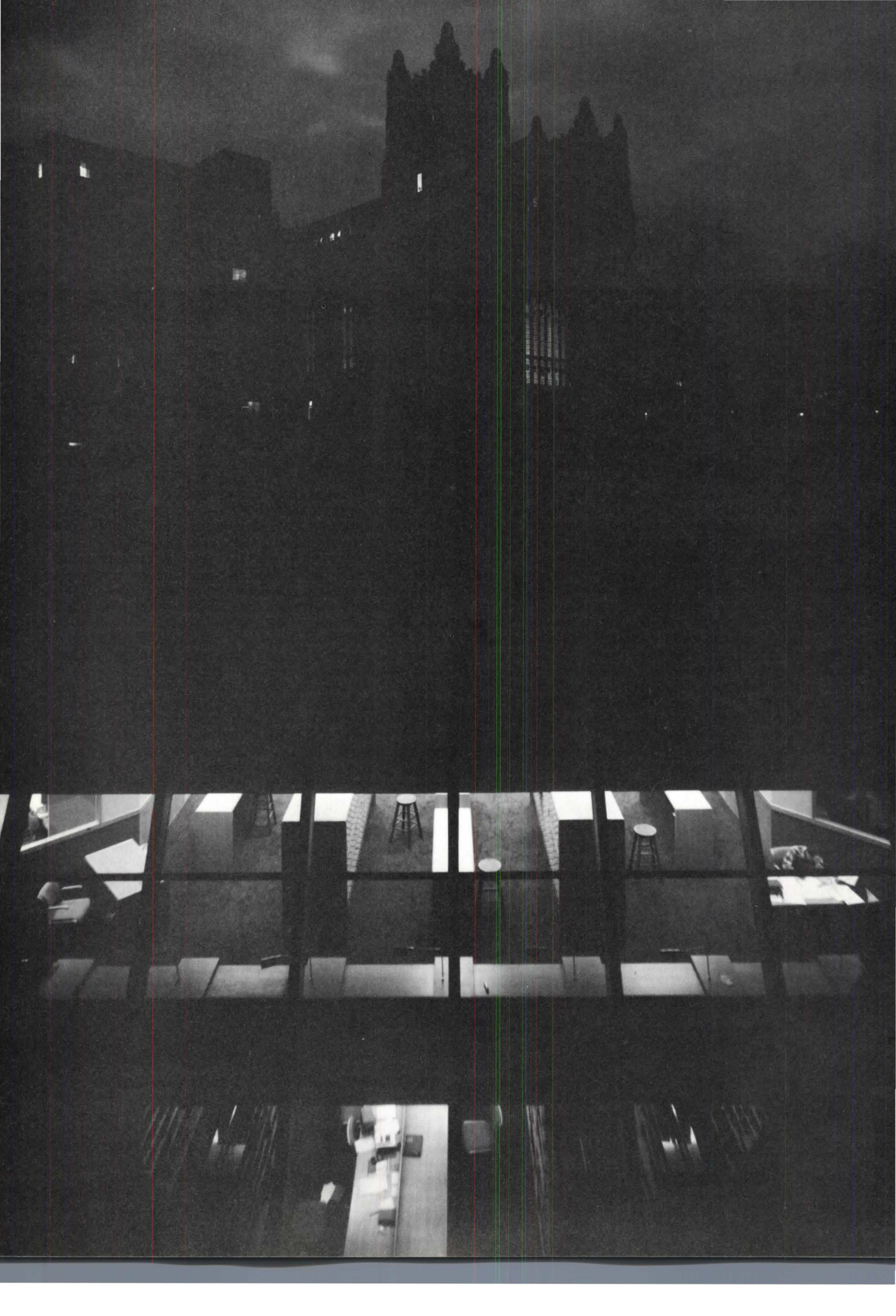
Although estimates of winter peak losses can be made using hand calculation approaches, a microcomputer or programmable calculator technique for obtaining reasonable estimates of peak and annual energy flows out of or into below-grade buildings is still elusive. In spite of considerable progress in understanding thermal behavior, and consequently energy use below-grade, it remains a very complex phenomenon. Earth contact benefits relate to both heating and cooling seasons and vary depending on the local climate, soil conditions, building function, HVAC system, and other factors.

Detailing and specification of earth sheltered buildings has been a significant weak spot—particularly for housing design. Designers have been willing to specify procedures that they would not dream of using on more conventional building elements—for example, no flashings at termination of waterproofing, and allowing poor backfill procedures to drag and damage waterproofing and insulation layers.

It is difficult to assess the degree to which earth sheltered housing is accepted at the present time, since almost all housing construction is at a standstill. Earth sheltered housing was enjoying a very rapid growth despite its unconventionality and more complex construction procedures. However, only a few groups building such houses have achieved enough volume or experience to significantly reduce costs. Though the question of economic payback is difficult to address, it appears reasonable to say that if winter heating cost versus initial construction cost is the sole criterion then superinsulation represents a less expensive, more readily adaptable alternative than fully earth covered construction.

The distinction blurs as earth bermed structures are considered, and when summer cooling, storm protection, site integration, and fire and earthquake resistance are important. One can expect that a considerable number of earth sheltered houses will continue to be built because of advantageous sites, personal desires, or an ability to take advantage of several features of earth sheltering.

Earth sheltering in nonresidential buildings has been adopted as a desirable technique to the extent that any changes of grade around the building qualify it as "earth sheltered" and hence an energy efficient or site responsive design. Apart from some occasional problems with truth in advertising, this is not necessarily a bad thing since it often results in a better integration of building with site and raises energy efficient design to a level where it receives more detailed attention. It also means that earth sheltering becomes less noteworthy and more a component of a standard palette of design techniques for dealing with energy site design, security protection, and esthetic concerns. □



Photographs by Timothy Hursley. ©Hursley/Lark/Hursley

'Splendor Beneath the Grass' in Michigan

A law school building brightened by a moat of glass. By Andrea Oppenheimer Dean

This is probably the most esthetically satisfying large underground building to have penetrated American soil, though on approach there's almost nothing—arguably not enough—to see, certainly nothing that says "building." Gunnar Birkert's 1981 addition to the University of Michigan's Legal Research Building is part of the venerable 1920s Gothicized law school quadrangle, a visually homogeneous complex including library, classrooms, and dormitories. The quad had, as it were, a piece missing at its southeast corner; and it is under this missing element that Birkerts buried his building.

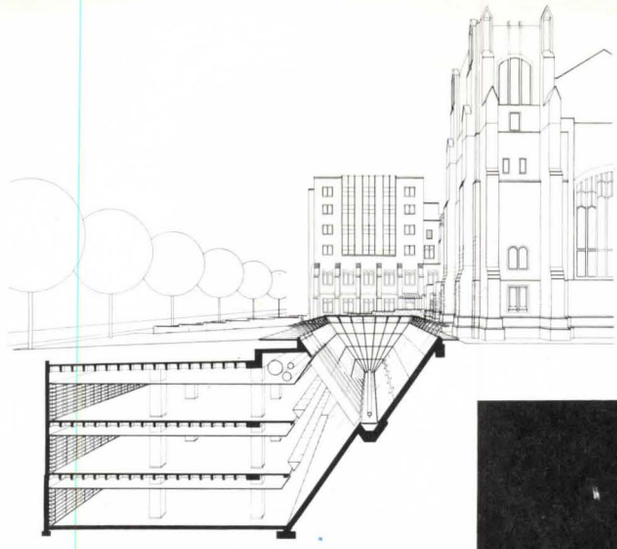
The only signal of possible splendor beneath the grass is a low strip of canted glass, topped by a solid bronze rail, that wraps a moat-like strip around the Legal Research Building. By the time you're peering over the rail, the 60-foot-long moat reveals itself as a deep V-shaped trough from which two walls fan upward. The one, sloping from the base of the research building to the bottom of the three-story addition, is limestone; the other, a bronzed window wall, angles from the bronze rail down one story to the base of the trench, and forms the addition's "facade." The canted glazing admits abundant light, softly diffused on the second and third levels by the limestone wall. Light is also drawn down to the back of the building by a small triangular opening, with the result that in many parts of the addition one sees, or senses, light coming from both front and back, further obviating the feeling of being submerged. The giant window wall also creates the closest possible visual connection to the cherished old library. There are wide, raking views of the original structure against sky and clouds, and yard-wide, mirrored baffles reflect fractured slivers of the mock Gothic building, slashing through head-on views of it.

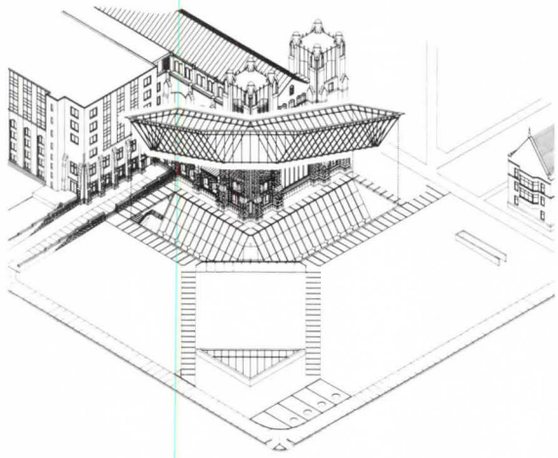
The effect is stunning, one that, in Birkert's words, "makes a sort of icon of the mother building." This is particularly fitting, since the reason for having slipped the structure below ground was to preserve, and avoid doing mischief to, the stately presence of the original.

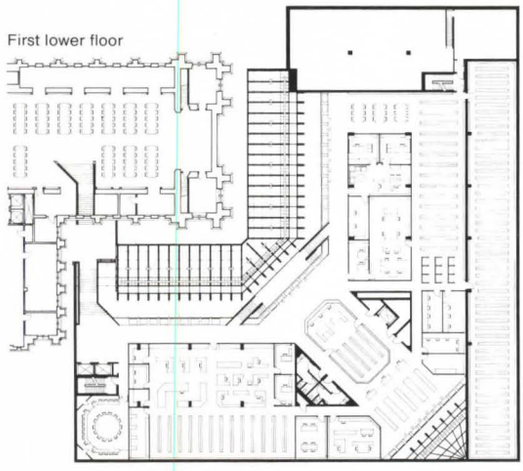
Birkert's first scheme, presented in 1974, was a mostly above grade, cascading steel and glass structure. The library's dynamic and witty director, Beverley Pooley, recalls that "It sent the alumni totally into a tailspin. They were very fond of the original building and told me, 'You must get a Gothic architect.' I said, 'That will be extremely difficult, because he'll be extraordinarily old. And even if we got the architect, who could possibly bid on it?' Putting it below ground was strictly an esthetic decision. It was apparent that if you put 60,000 square feet above grade it would dwarf or humiliate the existing structure."

Birkerts was more than willing to tuck the whole thing out of sight. He had been intrigued by underground construction since the early '70s, and with help from a Graham Foundation grant in 1974 invented a scheme for a partially subterranean city, in which transportation, utilities, and manufacturing were buried in a great trench. He was, at the time, fascinated by the "megas," as he says, and by earth-covered architecture's potential for retrieving above ground space and concentrating urban

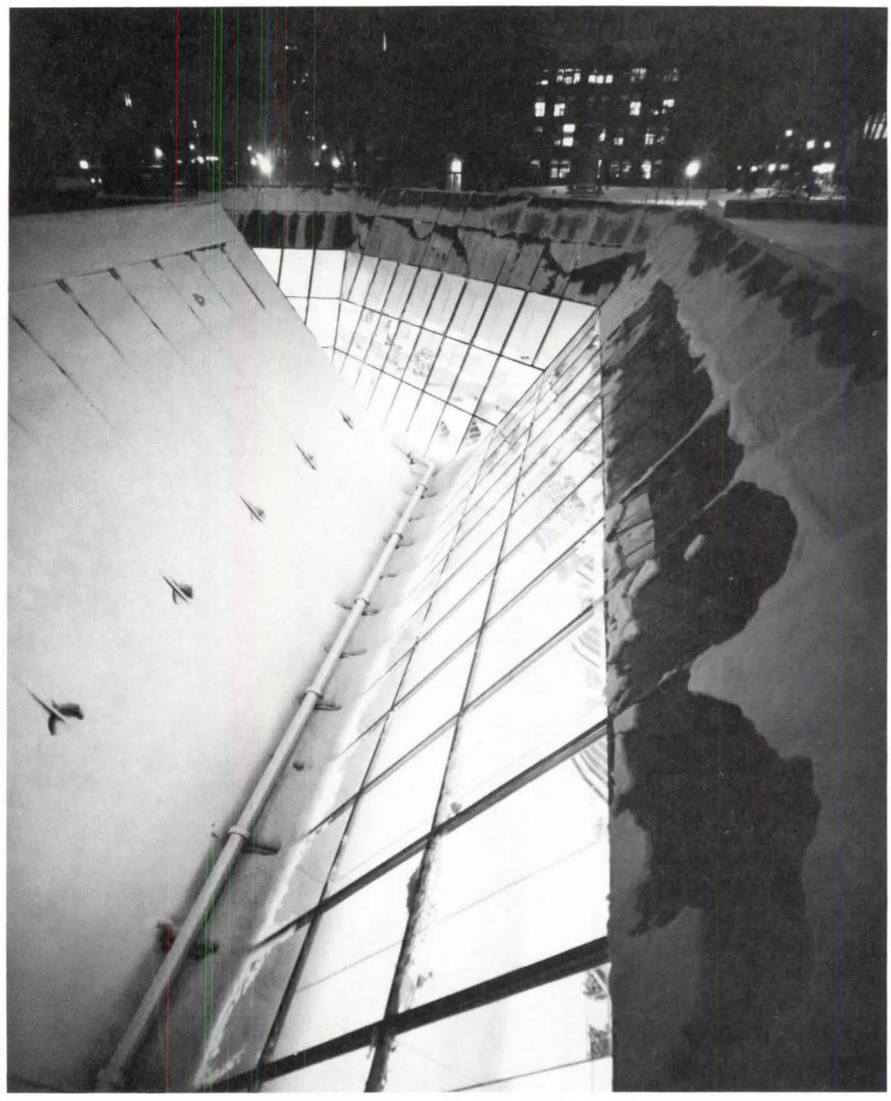
Tucked in a corner of the Gothicized quadrangle, the law library addition is hardly visible, until one looks down, left.







A V-shaped glass and limestone moat serves as facade and principal design element, bringing in light and views of the 'mother building,' and mirrored baffles perpendicular to the glass create slivered reflections (across page bottom). The most popular seating—and most uncomfortable—is located at the hub of action, overlooking the window wall (right).



Popular stools beside an animated wall.

functions and activities. It appealed also to his intense preoccupation with light. Birkerts has always been attracted by Aalto's work, and, like Aalto, grew to adulthood in a far north country (Latvia) where light is scant and precious. It left him, he says, "with an unconscious desire to make the most of light," a sine qua non for underground architecture.

The principal requirement for the library was to add space to the overcrowed Legal Research Building, and bring students, books, and staff into a close working relationship. The old building is a series of warrens where the library's 30 to 40 staff members were scattered horizontally and vertically in stacks and alcoves. The new $9.5 million structure is L-shaped and designed as a single open space with tray-like floors arranged as balconies overlooking the window area. In front of the window is a grand stairway, which together with the glazed wall, serves as the chief interior design element. The stair angles up and down, with its landings as though suspended at the crook of the L between the limestone wall and balconies formed by the edge of each level.

The busiest areas—card catalogs, offices, and reading areas, are in the center of the top floor, the second level is devoted principally to stacks and carrels, and the bottom story houses more stacks, offices of the university's *Law Review* and journal, plus a triangular-shaped student lounge illuminated by soft, diffused light from the smaller triangular opening. "This is one of the best assembly lines of library technical services that we know of," says director Pooley. "Before, students had to sit in the reading room, use the 20,000 books that we could squeeze in there, and call for anything else from the desk. Now, each is assigned a carrel (already wired for anticipated computerization), can check out books to carrels, store volumes there, and have access to our entire collection of volumes in open stacks."

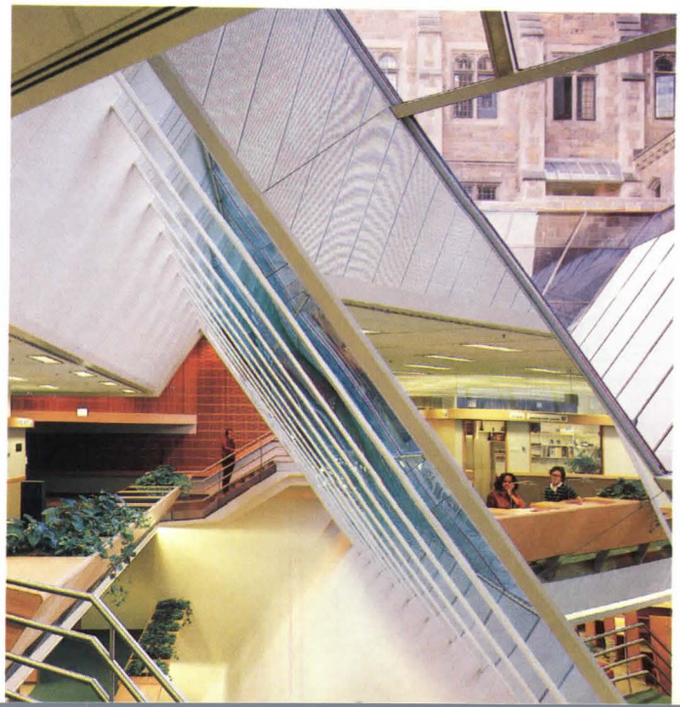
The library is organized as one vast open space to permit light to penetrate throughout. Stacks, carrels, and reading areas are in the back of the building, away from the window wall. Carpeting here is a tannish-brown, quieter than the deep green in the more public areas near the glass, and even the lines and shapes here are more tranquil than in the front of the building—where most of the action is. The window wall area is highly animated with sprawling views of the "mother building" frag-

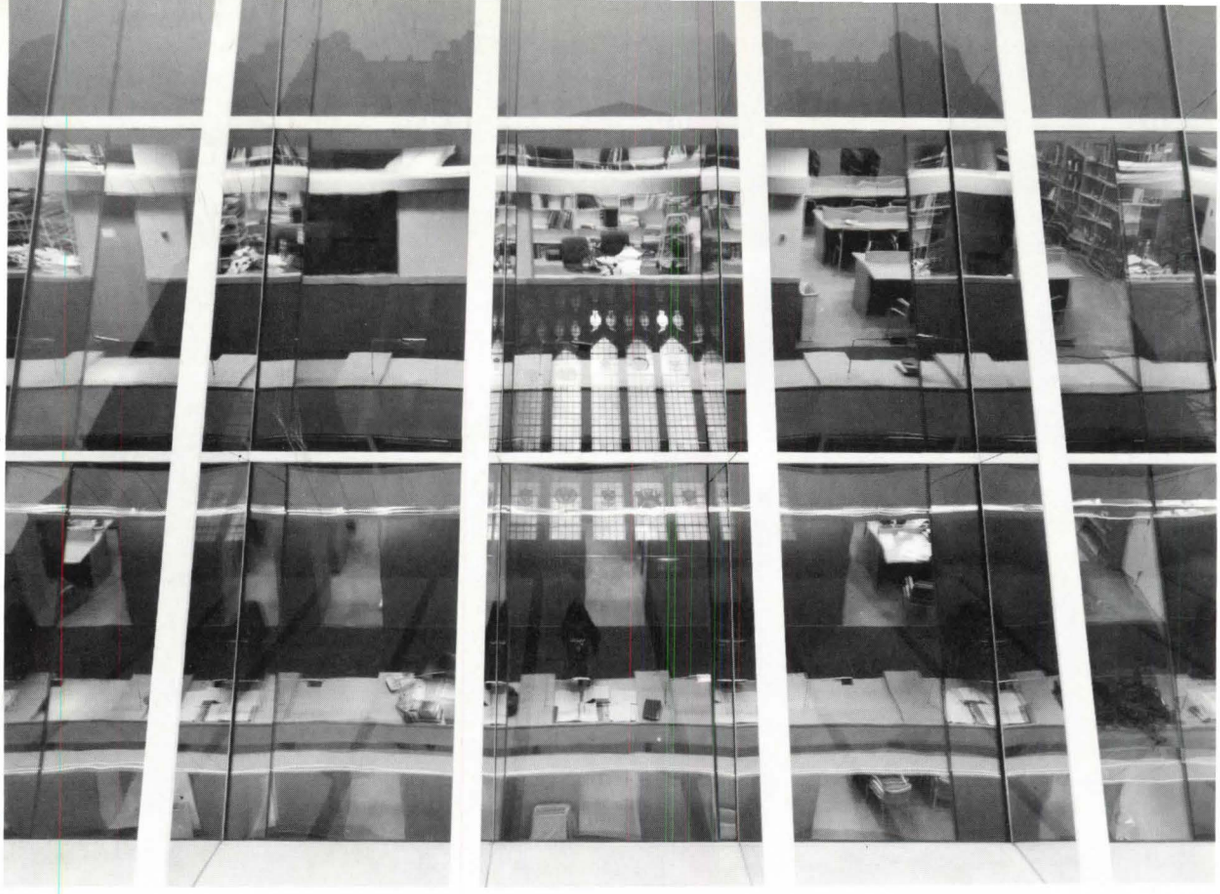
Photographs by Timothy Hursley. © Hursley/Lark/Hursley

mented by slices of it reflected in the mirrored baffles, with the varied angles of stairs (with aluminum, four-part rails), glass and limestone walls, mullions, slivers of mirrors, plus a variety of rich materials—oak, aluminum, green carpet, tan carpeting low on the walls (for protection from bumping book carts), white walls and ceilings, glass, limestone, hanging plants.

Is it too busy? My own feeling is that after concentrating on law books, an activity that taxes the analytic faculties, this abundance of images that allows play for the intuitive part of the brain must be refreshing, if not quite restful. The students would seem to agree.

One piece of evidence is the popularity of the armless, backless stools that line the edge of the balconies and overlook the window wall and all its distractions. Uncomfortable as they must be for any length of time, they are always occupied, and, Pooley says, "Students get here early in the morning to reserve a stool and use it all day." Further evidence is what students say: "I love being able to look up and see the cubist architecture with the mirrors." "It's busy out front here, but there are enough quiet spaces in the back." Some students see the green carpet as too close to Astroturf and visually noisy, but most appreci-





Photographs by Timothy Hursley. ©Hursley/Lark/Hursley

Pleased students—and smiling gargoyles.

ate the architect's attempt to bring in a feeling of the outdoors. Birkerts says that if he had the choice to make again, he would select a gentler green.

In fact, student reaction to the building is almost unanimously favorable, and, as Pooley says, "Law students are not the easiest people to please, and would have picked over this building if there had been serious faults with it." The way they react—thoughtfully—to the addition speaks for it in another way. Generally, people just don't have strong opinions about buildings. The library addition, by contrast, has clearly captured its users' attention; their views are precise and considered. These law students talk about their building as though trained in design.

Staff members are equally pleased with their surroundings. For instance, Margaret Leary, associate library director: "We really like the open stacks, the carrels. The space is light and airy and comfortable, and engenders a good feeling. I don't think enough can be said about what this building, supported entirely by privately raised funds, does for the spirit in the school, especially in Michigan, which is going through hard times right now." And then there's the reference librarian, Bruce Johnson: "We were afraid we'd be trapped in a basement, but I don't feel the least entombed. It's a spectacular setting to work in."

What then of the usual problems afflicting open space with abundant glass, such as afternoon sun, glare, leakage, poor acoustics, and the like? The glass is bronzed, and the fact that students occupy those balcony stools by the window all afternoon would indicate that it's neither uncomfortably warm nor glary. For one thing, "the mother building" to the west shields the addition from afternoon rays, and the baffles reduce direct sun and glare. There are circular crannies punched into the limestone wall that were to serve as planters for ivy to diminish glare and soften the look of the monolithic plinth. So far, only an assortment of scraggley weeds has been willing to take up residence in these porthole-like openings. "If we can coax ivy to grow there, we will," says Pooley, "but for purposes of decoration. Glare is not a problem."

From outside, reflections of the old building, above. Across page, a view through glazed end of trench, limestone wall reflecting light downward, balconies, people, plants, mirrors, more.

The building did leak through the curtain wall, though not through the structure, which is lined with soldered lead sheets. The administration hopes that the leaks have been plugged, but can't be certain until the first fierce downpour or snow storm. A steam pipe running the length of the outdoor trough was meant to melt snow in winter and failed to do so in 1981. Now steam pressure has been increased.

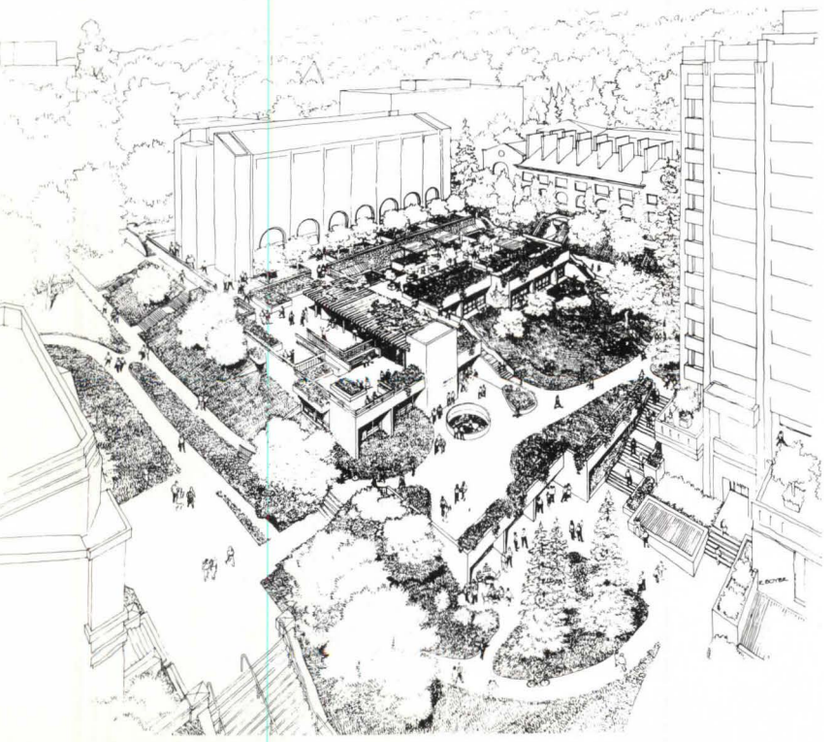
Acoustics *are* a deficiency. A timid voice in the third level lounge can be heard two stories up, and there's little to be done about it. The spaces are carpeted and otherwise acoustically treated where possible. Leary says it is "the price one pays for having an entirely open space with 15-foot ceilings."

The building has another serious, but apparently remediable, problem. Its consumption of fuel has been far higher than expected, and, in fact, higher than that of a recently completed above-ground building on the same campus. The university has retained a group of mechanical engineers, to study the issue together with its own staff. According to the university's director of business operations, Jack Weidenbach, "It's our staff's feeling that we're taking in too high a percentage of fresh air. We don't think the building design is at fault." In addition, the law library addition is open far longer hours than had been anticipated, and longer hours than the above grade building with which it is being compared.

There is one further problem. It has to do with mysterious, ghastly noises. Pooley explains: "When the temperature of the air changes, the metal contracts or expands and makes the most appalling, crashing sound, like teams of sledgehammers. They're working on this. More disturbing and less fixable, I think, is that there are vents that go into these ducts that seem to contain pieces of metal, which are so shaped that the whole thing becomes a sort of organ pipe, and when the right speed and temperature are reached a very high-pitched whining sound with great intensity goes off and everybody has to leave. I mean, it's impossible to work."

The building's principal resident spirits, however, are benign. On the second level of the old library is a series of gargoyles, including two that Pooley insists were sculpted to resemble William W. Cook, the donor of the law quadrangle. "Looking up at those gargoyles from the underground addition, one can see clearly that Mr. Cook is smiling," says Pooley. "He appears to be pleased with the new addition to his library." □

Photographs by Russell Abraham



Lively Campus Center Atop a Buried Library

Berkeley makes maximum use of what used to be an empty grassy quad. By A. O. D.

Like other recent underground campus structures, the University of California at Berkeley's Consolidated Engineering Library was shoehorned below grade to preserve precious open space with its major opening facing south. What distinguishes it from similar attempts, however, is an attitude that goes beyond conservation. First of all, George Matsumoto, FAIA, in collaboration with landscape architect Bob Royston, transformed a previously flat and boring swatch of green, used mainly for getting from here to there, into an active, many layered space lively in its own right. They did this mainly by making the 44,570-square-foot building's roof into an enticing gathering place. First they talked the client into adding a food service and locating it

Berkeley's new engineering library both links surrounding buildings and creates bustling, layered outdoor spaces (left). Trellis-covered stair and ramp (above) connect elevators to rooftop food services. Library interiors (right) have oak furniture and trim, plus exposed, overhead mechanical systems, befitting an engineering school.

on the roof, then placed study carrels, a seminar room, and lounging spaces nearby. In addition, they built the structure up to the virtually ignored podiums (6 and 20 feet high) of adjacent buildings to make these spaces usable for the first time.

In contrast to most earth covered university structures, which are additions to something larger, this library attempts to create a new focal point and tie together a number of previously scattered and disparate facilities. The library consolidates under one roof what were independent libraries for chemical, civil, nuclear, soils, structural, nautical, and other engineering departments, and it includes student and faculty lounges and offices, a conference center, and a 270-seat auditorium.

The site had two difficult constraints. First, every major campus utility main was buried there, and only that for high pressure gas could reasonably be moved. "That part was horrendous," says Matsumoto. "We had campus as-built drawings, and then we got a surveyor to pinpoint utilities. In some instances, we had to get very close to them; at the northeast and northwest corners, we ended up spanning manholes." A great advantage resulting from this weaving around utilities is that it left abundant crawl space. "I know that anywhere in the library I could drill through the wall and plug in future computers and power," says Matsumoto, who is convinced that buildings die mainly through mechanical and electrical obsolescence, and that the bonus space will greatly extend the lifespan of his building.

Construction was further complicated by the fact that the structure is on bedrock near the Haywood fault. Even though the fault has been dormant, seismic considerations were especially important. Moreover, the library is below the water table, which required extremely careful and heavy duty drainage. There is a bentonite layer, as well as a waterproof membrane, plus a series of open trenches with drain tiles leading to a sand pit.

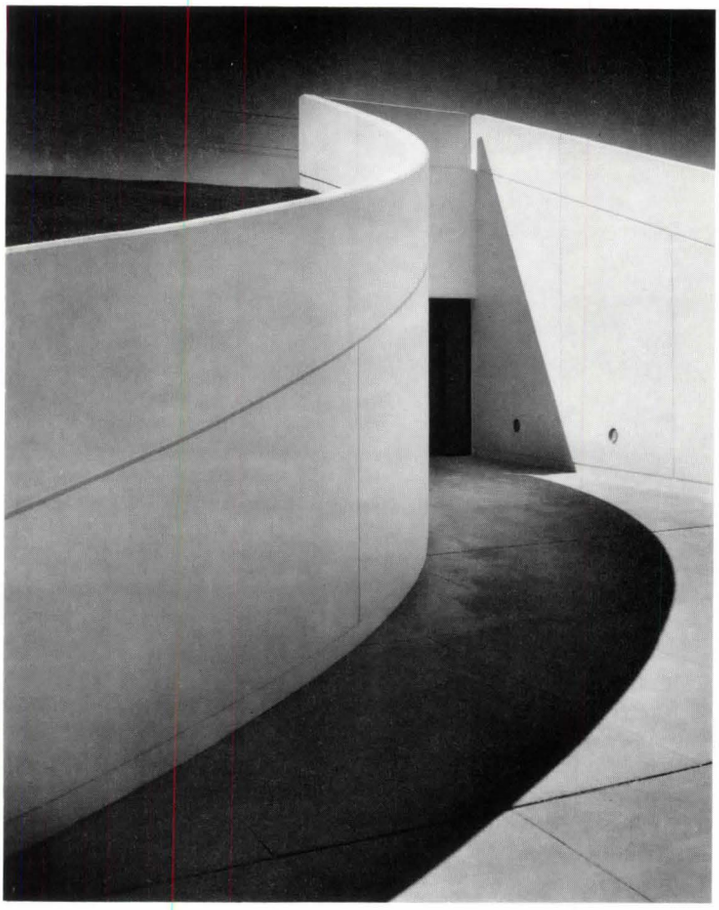
Inside, the building's four stories are layered and ramped for handicapped access, ceilings are high to prevent claustrophobia, overhead mechanical systems are exposed. Carpeting is the main acoustic damper, and is used on walls as well as floors, for sound insulation and as protection from bumping book carts.

Since no mechanical cooling is permitted in state projects in the San Francisco Bay Area, the principal energy problem was to cool the building without airconditioning. The south facing windows are protected by overhangs computed to intercept sun angles both in summer and winter. Air changes are very frequent and air is vented with exhaust fans and grilles at the north wall. Heat from light is exhausted through the ceiling, lighting has phased controls, and there is task lighting in carrels and offices.

The architect, finally, voices a complaint most can only hope to make: "The building," he says, "is so well used, it's a little too intensely used." □

Firm Extends its Reach Into Underground Space

An elementary school as the 'more sophisticated cousin' of an office building. By A. O. D.



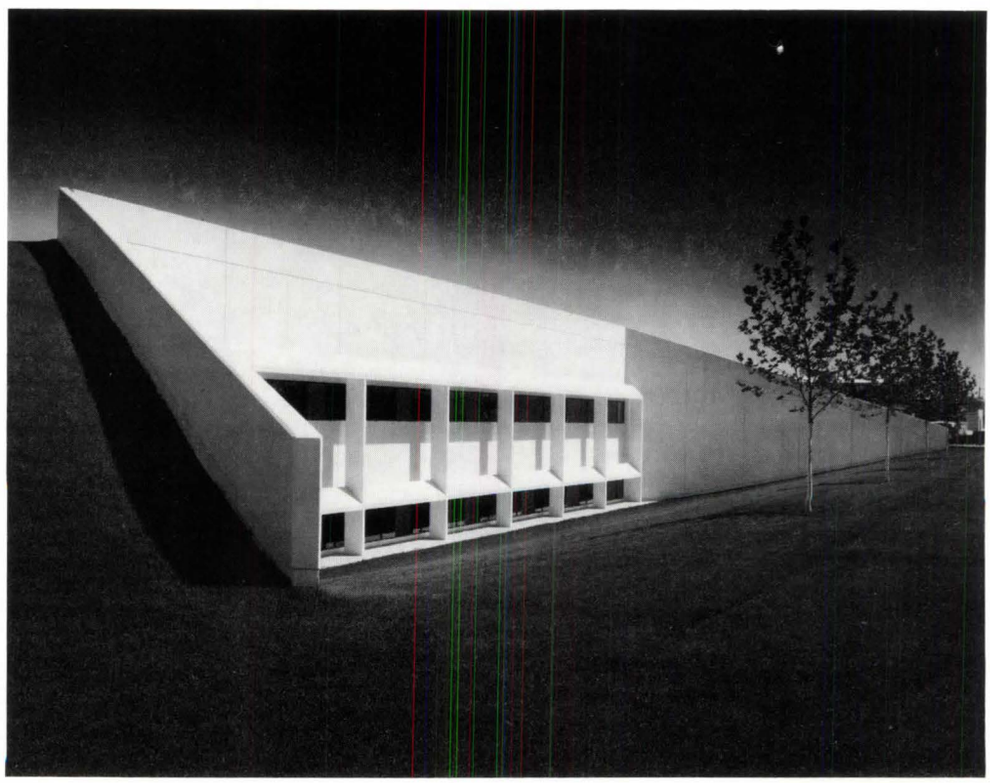
Photography Unlimited

The Central Pre-Mix headquarters building in Spokane (left and below) is literally an advertisement for earth sheltered architecture, because precast concrete—the building's chief ingredient and the client's product—is the natural structural material for underground buildings. Since December 1979, the company has obtained work on 63 new earth sheltered projects in Spokane.

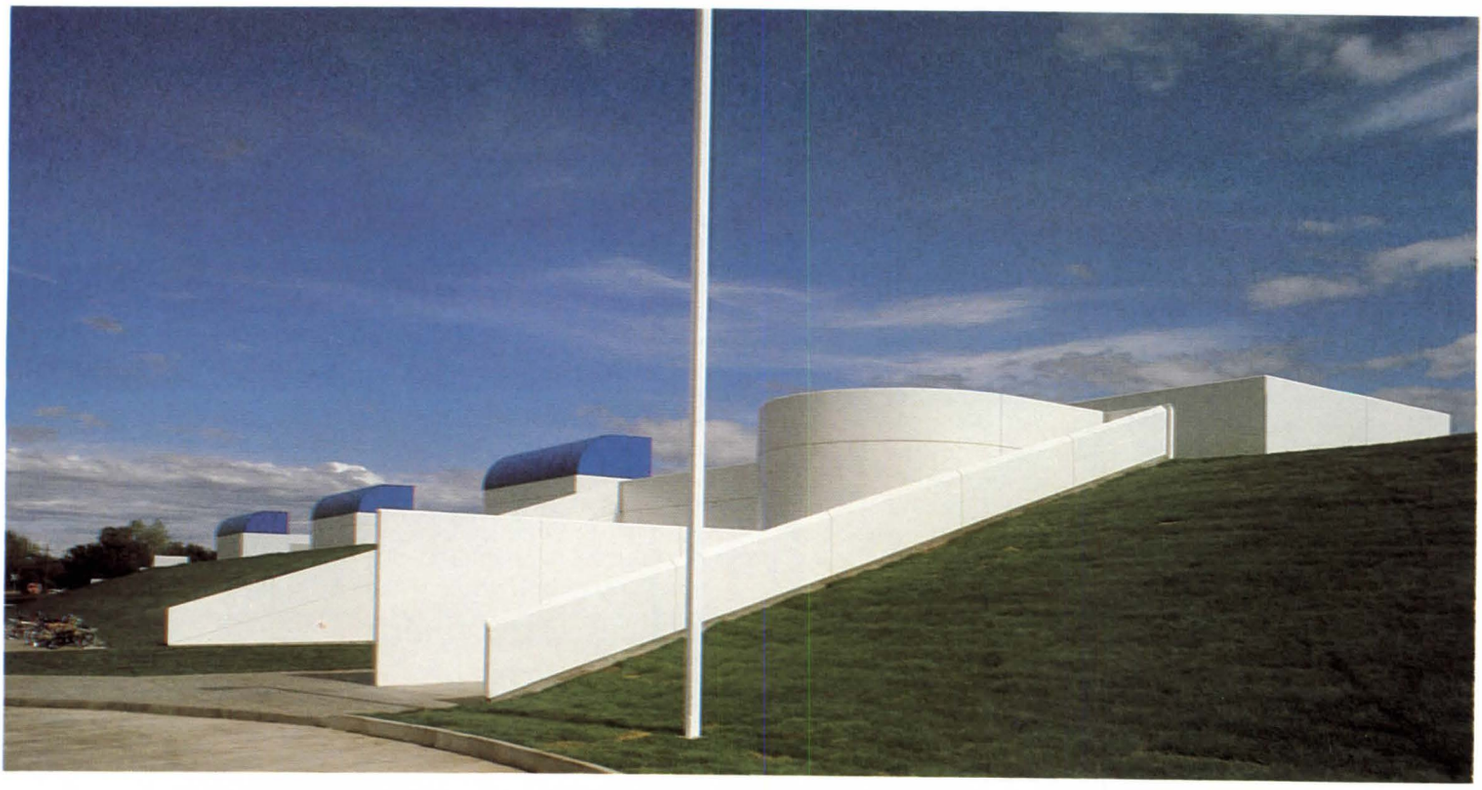
In this their first venture in subterranean design, architects Walker McGough Foltz Lyerla transformed a flat, forlorn-looking site into a grassy knoll, edged on the south by a two-level concrete and glazed wall. The remaining three elevations are wrapped in a berm. Though daylight enters only from the south, it penetrates almost half of the 44-foot-deep building, which is open plan near the window wall. For such a small structure, the energy systems are relatively complex. There are heat pumps with storage capacity, plus a gas fired boiler. Heat is extracted through lighting fixtures and redistributed or rejected into a water loop system that includes a 3,000-gallon storage tank.

You can see at a glance that the elementary school (right), which opened just three months ago in Walla Walla, Wash., is a close, though obviously more sophisticated, cousin of the four-year-old Pre-Mix headquarters. Both buildings have two stories and open only to the south (southeast, in the case of the Washington Jefferson elementary school). The architect has used cut, fill, and cover construction methods in both; each is principally white-painted concrete and glass, clean of line, simple and elegant.

But almost everything about the 70,135-square-foot school is a little more complex than at the small headquarters building. To begin with, the school was tucked belowground not only for reasons of energy conservation, but also because the Veterans Administration, which deeded almost 13 acres of its his-



The architect's first underground effort of 1979 (this page) has openings only on the south. The 1982 elementary school uses both south and north exposures to admit more natural light and employs color, more sophisticated design elements, but simpler energy systems.



Like its exterior, the school's interiors are sleek, sophisticated and functional. Color use is stunning. Classrooms face the south wall.

Brightly colored, and sunlit, interior spaces.

toric Fort Walla Walla reservation to the district for an elementary school, attached at least two requests to its gifts. It asked that the design of the new building retain the reservation's formal entrance on its southern facade, and that it have a restrained visual appearance.

As at Central Pre-Mix, the building plan divides the site longitudinally, but where the earlier structure made use of only the southern exposure, the school has general use areas on both south and north, and almost all major spaces are illuminated by natural light.

Most classrooms and other heavily used spaces line the southeast wall, which contains 95 percent of the building's glazing. While the Pre-Mix building has concrete overhangs for screening, the school uses an articulated glass and metal curtain wall system. The skin is recessed from a concrete fascia and curves inward to the lower level, shielding areas both above and below it from summer sun. The color blue was chosen for the metal, explains principal designer Gerald P. Adkins, AIA, "to echo the color of the sky, so that we didn't really add another color. The idea was to give the building added life, yet let it remain as restrained as possible."

The most significant stride forward from Central Pre-Mix to the elementary school is in the latter's more sophisticated use of natural light, and this strongly affects its exterior appearance. On approaching the school from the north, the first visible elements are the backs of three light scoops (also blue) perched on the grass covering the building. The main reason the architects increased the amount of natural light in their second underground structure is that 30 to 40 percent of fuel consumed in buildings is for artificial light and exhausting the heat it produces.

Because of the building's orientation and other passive strategies, the architect found, after testing several different mechanical systems, that a simple VAV was more efficient than more complicated technologies, such as the heat pumps and storage systems used at the Central Pre-Mix building.

In the end, then, this building's more sophisticated design allowed the use of less complex and costly energy systems, which is the very purpose of passive solar architecture. □

Bob Braun

Sculpting with the Earth

A house that is a pair of bermed, linked pyramids in the woods. By A. O. D.

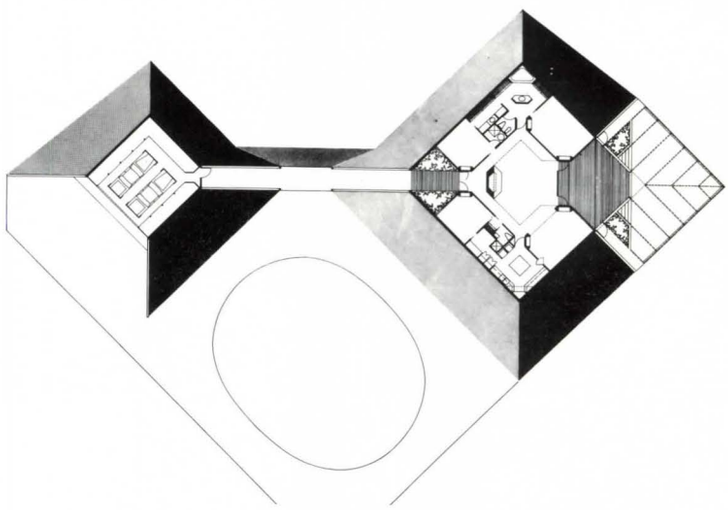
This house in central Florida is in a 60-acre copse of oak trees, which William Morgan, FAIA, and his client, a retired museum director, wanted to disturb as little as possible. As its site they chose a natural clearing, and concealed large areas of the house by encasing it in berms on all four sides.

The building consists of two truncated pyramids wrapped in jasmine-covered berms, topped and outlined with strips of stuccoed reinforced masonry. The unit to the north contains garage and storage space; the one facing due south is the residence. The two elements are bridged by a canopy-covered entryway. Morgan chose to work with truncated pyramids because he has long been intrigued by the prehistoric cultures of the Southeastern U.S. and Caribbean regions where these shapes have appeared with regularity over the centuries. He made the pyramids square in plan in order to enclose a maximum amount of space with the least number of walls.

The canopy entry leads from the garage to an entrance garden with glazed roof and walls. Just beyond the front door is a freestanding fireplace marking the north side of the residence's main space, a high-ceilinged living room illuminated by a south-facing clerestory and glass wall. Opening onto the central space are dining room and kitchen on one side, a bedroom and dressing room on the other. Another bedroom and study flank the entry garden.

The living room overlooks a large porch with deep overhangs to protect against frequent downpours and summer sun. A swimming pool, enclosed with fiberglass insect screening on aluminum frames, extends the porch into the angle formed by the residence's southernmost berm.

At the east and west corners of the residence are towers admitting sunlight and air, which, together with south- and north-facing glazing, assure that virtually all areas of the house receive natural light and ventilation. □



House and garage are truncated, bermed pyramids, bridged by covered entryway. Living room (below) overlooks deck.

Going Underground to Escape Controversy

San Francisco's huge convention center avoids visible heft in a 'no growth' era. By A. O. D.

George Silk, Photo-Crypt

The site of the immense Moscone convention center was politically controversial for decades. The San Francisco redevelopment agency considered it for a convention center as early as 1955, and over the next 10 years the agency established it as a redevelopment area, cleared the land, assembled developers, and hired a design team. But the size and type of project, plus the fact that it would displace residents, led to lawsuits and a halt in plans until 1975, when George R. Moscone was elected mayor on a platform of spurring development in the Buena Yerba area, as it's called. Moscone appointed a committee to evaluate and get the project underway, and it soon agreed to build the center, but bury it in order to placate powerful "no growth" proponents, who seemingly couldn't bear the thought of another giant building downtown.

The scale of Hellmuth, Obata & Kassabaum's structure is massive, and its effects on the city's future shape will undoubtedly be enormous. For one thing, the Moscone center marks the first penetration of new development south of Market Street, "the wrong side of the tracks."

The 650,000-square-foot structure sits on an 11.5-acre site, two blocks south of Market. Its 275,000-square-foot underground exhibition hall, which is spanned by 16 post-tensioned concrete arches (each 275 feet long) is said to be the world's largest column-free exhibition space, and can hold up to 20,000 people. This braced arch system is also designed to support future rooftop development of either three-story steel structures or landscaped areas with mounds up to seven feet thick.

There is in addition a 30,000-square-foot underground meeting room/ballroom, with a 25-foot clear ceiling height, which can hold up to 4,000 people. The center also has a mezzanine level, 10 feet below the lobby entrance, with 34 meeting rooms and administrative offices.

The hub of the building, which links all public spaces, is the 42,000-square-foot lobby adjacent to the exhibition hall. Designed as a "pavilion in the park," according to the architects, it has four glass walls and a roof supported by four single-piece steel trusses, each 12 feet long and 90 feet on center.

Because the exhibition hall's foundation floor was 10 feet below the water table, the architects had an especially difficult waterproofing job. Their first line of defense was to create an immense mat consisting of 12,000 cubic yards of cast-in-place concrete, reinforced by 8,000 tons of steel to anchor the center's concrete-braced arch system. The average thickness of this barrier is 6.8 feet.

Since its opening one year ago, the convention center has been solidly booked, and nearby real estate values have flourished. The land atop and surrounding the center, plus the two blocks between it and Market Street, *will be* developed by the Canadian firm of Olympia & York, the Marriott Corporation, and the Rouse Co. Zeidler Roberts Partnership and Willis & Associates have so far been hired as architects, Lawrence Halprin and Omi-Lang Associates as landscape architects.

Development plans include a cinema complex and pavilion plus landscaping for the convention center block, to be connected by elevated walkways with the next block to the north. The plans there are for residential construction, a health club, and cultural building. The block flanking Market Street will have old and new retail and office, as well as residential space. □

Peter Aarons ©ESTO

Peter Aarons ©ESTO

The center will be the linchpin for new development south of Market Street (across page), until now "the wrong side of the tracks." Its 275,000-square-foot exhibition hall is spanned by 16 post-tensioned arches, each 275-feet long (this page).

State-of-the-Art Underground Design

A new University of Minnesota building is a technological showcase. By A. O. D.

The evolution of large underground architecture during the last five years can be seen in two buildings just two blocks apart at the University of Minnesota. Both were designed by David Bennett, AIA, of BRW (formerly Myers & Bennett/BRW). The first, Williamson Hall, was completed in 1977 and was instantly hailed as a breakthrough for its large scale, sophisticated design and solar strategies, and for its attempt to strip the stigma from subterranean architecture (see page 47). The second, the Civil and Mineral Engineering Building, shown here nearing completion, is unquestionably the most technologically up-to-the-minute effort we have. It was, in fact, mandated by the State of Minnesota to be a demonstration project to display and test the newest thinking in earth-sheltered and energy design.

Among the building's numerous innovations is that one-third of its volume—or 48,000 square feet—is below bedrock in mined space as much as 110 feet below the earth's surface. It also uses ground water for cooling computer systems, combines active and passive solar strategies, and employs solar optics to admit sunlight into remote spaces and remote view optics to simulate three-dimensional outdoor views. The building's lessons, therefore, apply to above grade as well as underground architecture.

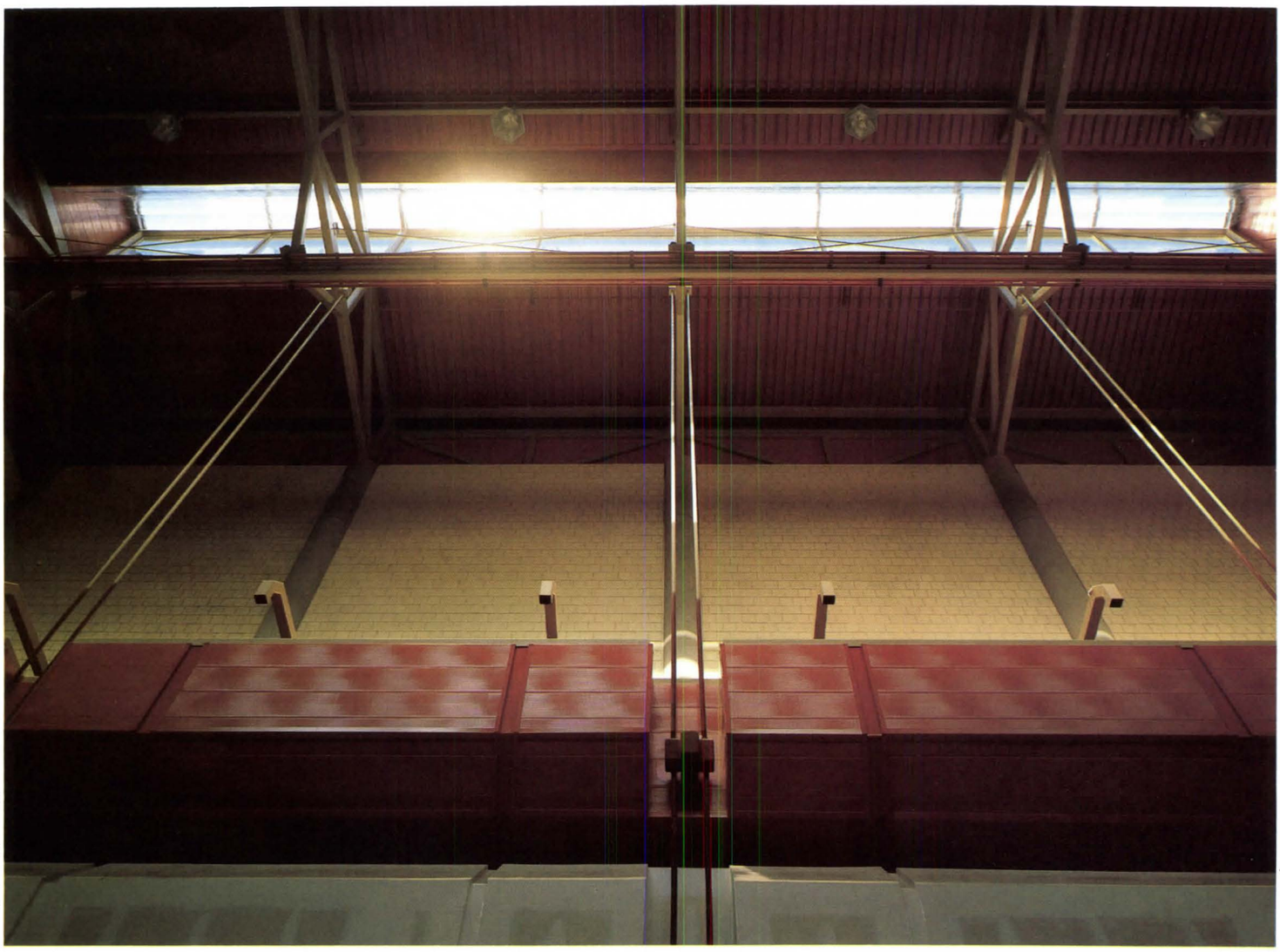
As might be expected, in designing the building Bennett drew lessons first from Williamson Hall. Among these, he mentions the following: "Daylight and sunlight are more important than view. We overreacted and used too much glazing at Williamson. At the C/ME, we looked for new ways of bringing in natural light through the smallest possible apertures. We also discovered that color and decoration are especially important for earth sheltered buildings, which is the reason for the use at C/ME of warm colors—rust-red, tan, beige. After Williamson, I am less willing to rely on landscape materials as functional elements, because clients don't seem to understand the importance of maintaining them. Williamson also taught us that active solar is not cost effective, while passive is."

Underground buildings are more "site specific," as Bennett points out, than those whose bulk is aboveground. The C/ME building was shaped by requirements of urban design plus those of technology. It was intended, first of all, as a gateway to the university's Institute of Technology (the seven buildings to its south). Hence, the great spiraling plaza that leads to the main entry and to an underground pedestrian system that serves as link both to neighboring buildings and to a bus transit corridor along the north edge of the site. The geometry and plan of the building were further determined by an analysis of site utilities, solar access, and shadow patterns from adjacent structures.

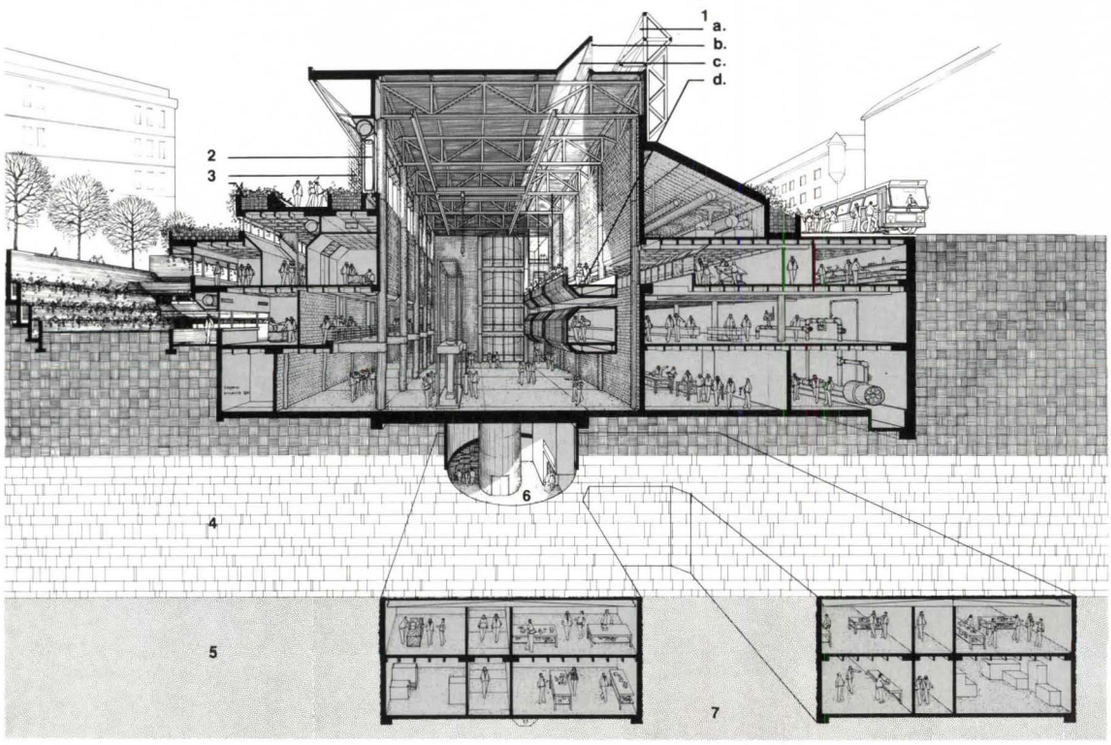
Although 95 percent belowground, the C/ME building has a robust visual presence in the form of its main structural laboratory, which rises 50 feet. Its huge steel truss, painted orange, supports a 15-ton traveling crane over the lab, whose cavernous interior receives large structural items for testing. Exposure of the truss, explains Bennett, "establishes the esthetic that tells what the building is about. It is a building at once high tech and of the earth. It is an earthship." The exterior is clad in oversized brick to match surrounding structures. (The facing also rectifies a problem at Williamson where unclad concrete aboveground acts as a heat wick.)

Located in the perpetually sunny side of the site, the abovegrade structural lab also carries—and vigorously expresses—the building's energy components, including solar optics on the north, and Trombe wall with giant tubes of colored water on the south.

The building is further divided into three major areas: classrooms, laboratories, and offices. A rotunda, banded by a continuous clerestory, serves as a central focal point and a sort of circulation switch box. At the center of this space will be a 16-foot-high sculpture, by Bennett himself, composed of found

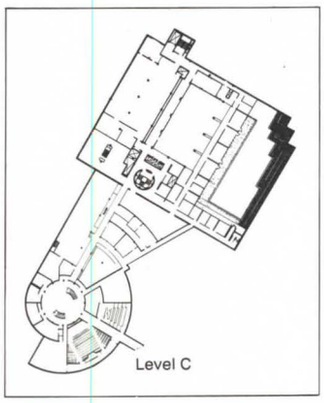


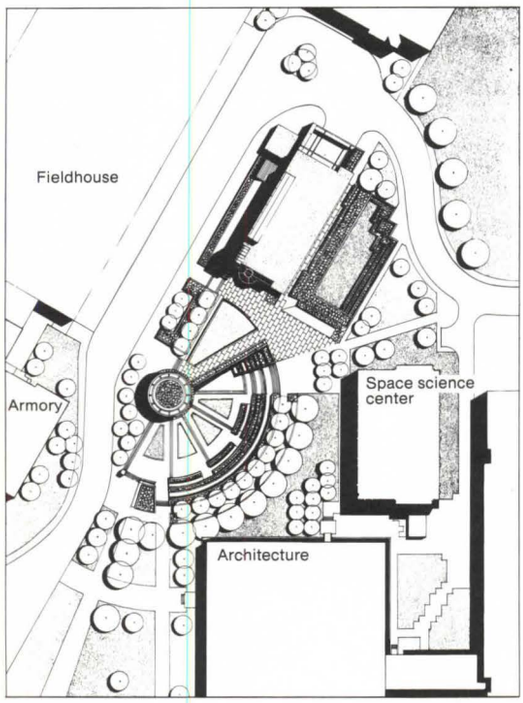
Photographs by George Heinrich



View of rooftop passive solar optics (across page) shows fresnel lens at right, north sky monitor at left. It admits abundant natural light to the main structural lab (above).

1 Passive solar optic system
a. Fresnel reflector
b. North skymonitor
c. Fresnel mirror
d. Target zone
2 Trombe wall passive/active solar collector
3 Deciduous solar shading
4 Earth sheltering
5 Mined space *110 feet* below grade
6 Active solar optic system beamed sunlight
7 Active ground water cooling system





George Heinrich

Lighting spaces deeply mined within the earth.

pieces of ancient Morton granite. The room is ringed with columns on center at the doorways and in other ways also can be faulted for some lack of finesse.

Because the classrooms are audio-visually oriented and require absolute light control, they are located in the shadow of the Space Science Center at the west end of the site, and are directly accessible to the school of architecture. Faculty offices have southern exposures and are stepped down into a sunken courtyard at the east of the site. Laboratories are in the northern part of the building. In addition, a two-story cavern was mined out of the soft sandstone below a 30-foot-thick limestone layer, and in this temperature-stable, vibration-free environment are housed the environmental and mining laboratories plus the Underground Space Center.

Especially in the mined area, the building's interior spaces are quite unremarkable, and purposefully so. Bennett's reasoning was that people are most comfortable with the familiar and ordinary, and, particularly in space 110 feet underground with plenty of tonnage overhead, the more ordinary the space the safer they will feel.

The water table was higher than originally thought, and, in addition, an underground river was found during excavation, requiring the building to be surrounded by a cage of drain tiles connected by vertical tubes to draw water away. In fact, the building is "an underground structure on an underground island created by diverting the river," as Bennett likes to say. An unexpected plus of this situation is that it allowed the use of cold ground water to cool the building's computer systems.

The building's technologically most intriguing features are expressed in the mined space, at the entrance to the Underground Space Center. They consist of an active solar optics system that transmits natural light more than 100 feet below ground and a remote view optical system. The former collects sunlight, then concentrates and directs it through a shaft in the building via an assembly of lenses and mirrors. A few feet from the shaft that brings down sunlight is a simulated window and three dimensional view of Williamson Hall. This remote view optical system works on the same principle as the periscope.

At least as significant as either of the active solar optics systems is the passive one. Substantially simplified and made far less costly since its conception (see March 1980, page 72), the system collects sunlight on a monitor from which it is reflected

by a mirror to the target zone, an east-west swatch of the structural laboratory. The system has the advantage of providing abundant, cheap, and natural light that also reduces cooling requirements, since sunlight gives off only half as much heat as fluorescent. One goal in demonstrating experimental energy systems at the C/ME was to persuade the private sector to become involved in developing and marketing, and 3M of St. Paul, the manufacturer of the Fresnel lens used for C/ME's solar optics, is now involved in such work in concert with the university.

The final energy strategy used at the C/ME building is the water-filled Trombe wall along its southwest facade. The system will work in two modes. During spring and fall, when differences between exterior and interior temperatures are slight, the wall will simply provide warmth at night from heat collected during the day. In winter, the wide discrepancy between interior and outside temperatures will draw down the collected heat by re-radiation and conduction before it can be used at night, and return air will be forced through the Trombe chamber, making it an instantaneous solar collector. During the summer, the Trombe wall will be shielded from the sun by a vine shading system and an automatic mylar-insulation rolldown shade. The Trombe wall system will provide only a small portion of the building's heat, but it will be inexpensive and serve as a rare demonstration of a hybrid passive/active solar application.

Although Bennett said that Williamson Hall taught him to depend less heavily on landscaping, he does use plantings not only to shield the Trombe wall in summer, but also to screen other south facing spaces. In addition, deciduous trees have been planted to shade the hard-surface roof plaza, and there are conifers to cut the winds at the north of the building.

All in all, the intent of these several energy conserving strategies is to work hand-in-hand in an additive, synergistic fashion, as happens in nature itself. The C/ME building is not a fashionable building; its mechanical systems are not prettified, many of its interior spaces are quite pedestrian. It is intended as, and looks like, a working laboratory that deals with issues far more substantial and important than the cosmetics it eschews. "It exemplifies," says Bennett, "the generation of building form conceived to respond to natural forces with a geometry shaped by the physical laws of nature—the post-industrial principle." □

Downward spiraling plaza and entrance form gateway to Institute. All spaces except rotunda and classrooms are attached to main structural lab with its exposed truss and tower.

Cost Efficiency and Earth Sheltering

Alternate designs for the same building allow an unusual comparison.
By Mark Swenson, AIA

Earth sheltered building design has been accepted so far more by the public than the private sector. Clients and developers in the commercial-industrial marketplace have been suspicious of its cost performance, especially in the short run.

In 1980, a large Midwestern industrial firm provided an opportunity to test the economic viability of earth sheltering against rigorous marketplace criteria. In order to determine the preferred design for product research and testing laboratory, the company engaged two architecture/engineering firms. One was assigned the design of a conventional building. The other was assigned the design of an earth sheltered alternative.

Both buildings were designed to the same program and specifications and for the same site. The industrial firm's own engineering staff compared the two designs in respect to initial cost and life cycle cost.

To make the test as meaningful as possible, both design solutions had the following identical characteristics:

- Floor plan layout,
- "Footprint,"
- Process equipment,
- Assumptions about equipment utilization, occupancy, and operations,
- Environmental control requirements,
- Number of doors and amount of glass.

The earth sheltered design solution differed from the conventional design in that most of the wall and roof surfaces were covered with earth, and the floor elevation was about five feet below grade. Also, the building orientation was 90 degrees different than the conventional design (service entry on the north side rather than the west side). This was a site planning and esthetic decision incidental to earth sheltering.

Estimates of initial costs indicated those of the earth sheltered design to be slightly lower. It was more expensive in site work and utilities, but much less expensive in HVAC systems. The substantially smaller HVAC design load due to earth sheltering reduced initial system costs as well as life cycle operating costs.

Only specific items that varied between the two design alternatives were considered in the life cycle cost analysis. Using identical cost assumptions and equations, both design teams performed the life cycle cost calculations for each item. The results were carefully compared for consistency. The annual costs for each item and the years in which the projected costs will occur are shown on Table 1. These costs, calculated in 1981 dollars, have been inflated to 1983 dollars.

The total present worth method of measuring the life cycle cost was chosen. In this method, all recurring and one-time costs for each item across each year of the life cycle are converted back to their single present worth in today's dollars. The duration of the life cycle was assumed to be 33 years. We assumed a discount (or interest) rate of 14 percent and inflation rates of 12 percent for energy and 8 percent for everything else.

The only operating cost items that varied between the alternatives were the 33-year cost of high temperature hot water and electrical energy. The earth sheltered design total life cycle operating cost is about one-half of the conventional design (Table 2). This result was expected since the heat loss/heat gain through the earth sheltered walls and irrigated sod roof is substantially less than through the walls and roof of the conventional design.

Studies performed by University of Minnesota and MIT faculty on one of our earlier earth sheltered projects, Williamson Hall, have confirmed the presence of a "thermal balloon effect." The earth around the building undergoes a gradual rise in temperature over the first three years, and then remains nearly stable at a temperature higher than that of the surrounding earth. This effect, of course, is not true near the surface where the earth temperature swings with the seasons. The annual cost for high temperature hot water for the earth sheltered design is projected to drop about 14 percent between year one and year three, due to the thermal balloon effect. To handle the temperature swing near the surface, insulation was placed between the irrigated sod and the roof structure. At the roof edge the insulation was carried out and down at a 45-degree angle about eight feet. From this point the natural thermal balloon effect replaced the need for insulation.

Heat loss/heat gain through the skin is only one component of the total mechanical load. Ventilation loads for special equipment, as well as internal heat gain due to people, lighting, and equipment, can account for more than one-half of the total HVAC energy demand. The impact of reducing heat loss/heat gain by earth sheltering diminishes as the ventilation increases.

The characteristics of the facility chosen for this test were appropriate for earth sheltering because the facility has substantial equipment but low utilization of the equipment, and because the building population is also low.

A heated warehouse might have been more appropriate, and a heavy manufacturing building might have been less appropriate for reducing HVAC operating costs.

Another factor that affects the total mechanical load is the amount of glazing required to support building functions. The impact of earth sheltering is reduced as the percentage of the exterior used for glazing or other openings is increased. Again, the facility tested was appropriate for earth sheltering. Glazing was confined to one side of the building, and the entrances for people and services were confined to two sides. With the exception of the office buildings, most building types do not require extensive areas of glazing.

Maintenance costs which varied between the two designs constitute the smaller cost category. The earth sheltered design life cycle maintenance costs are 82 percent of the conventional design (Table 2).

Maintenance of the planted roof surface was projected to cost less than maintenance of the conventional roof surface. This may be unique to the site and the design. If, in another situation, water is expensive or the planted roof cover is manicured lawn or garden (rather than buffalo grass mowed once a year), then the conventional roof may cost less to maintain.

The largest single maintenance item is repainting the metal siding, which occurs in the 20th and 30th years of operation.

Mr. Swenson is vice president and senior associate of BRW Architects in Minneapolis.

This, of course, favored the earth sheltered design.

All items in the repair and replacement cost category are small except for replacement of the conventional roof surface, which is projected to occur in the 20th year of the life cycle. In situations where the pay-back period is 20 years or more, the impact can be substantial. The earth sheltered design has only 9 percent of the built-up roof surface compared to the conventional design. It follows that the life cycle cost is only 9 percent of the conventional design, or $3,530 versus $38,667 in total present worth dollars.

Clearly the earth sheltered design performed better in all life cycle cost categories. Yet it is important to understand that what makes earth sheltering cost effective in one situation may not work in another situation. The first step is the ability to recognize the unique conditions of site, program, building use, and economics that will make earth sheltering appropriate and cost effective. The second step is the ability to recognize the opportunities and to exploit them through the development of an imaginative design solution within the framework of the basic principles of earth sheltering. □

Table 1: Life Cycle Costs Data Summary

Category/Item	Annual cost, conventional design*	Year(s) in which annual cost will occur	Annual cost, earth sheltered design*
Capital investment costs			
Total construction costs	$2,786,800	1983	$2,689,500
Facility operating costs			
H.T. hot water	15,349	1983	13,141
	15,349	1984	11,478
	15,349	1985-2015	11,293
Elec. for HVAC	26,146	1983	6,981
	26,146	1984	6,947
	26,146	1985-2015	6,936
Maintenance costs			
Planted roof surface	N/A	1983-2015	74
Roof maintenance	146	1983-1992, 2003-2012	21
	292	1993-2002, 2013-2015	42
Exterior siding	9,366	2003 & 2013	3,538
Sewage ejector	N/A	1983-2015	140
Site drain cleanout	N/A	1983-2015	70
Downspouts and leaders	117	1990, 1997, 2004, 2011	N/A
Repair and replacement			
Sewage ejector	N/A	2003	2,333
Roof surface	114,979	2003	10,498
Motors (used for HVAC)	2,396	2001	1,032
Bearings and drives	251	1986, 1990, 1993, 1997, 2000, 2004, 2007, 2011, 2014	122
Fan starters	2,164	2000	548

*All annual costs are in 1983 dollars.

Table 2: Projected Life Cycle Cost Comparison In Total Present Form

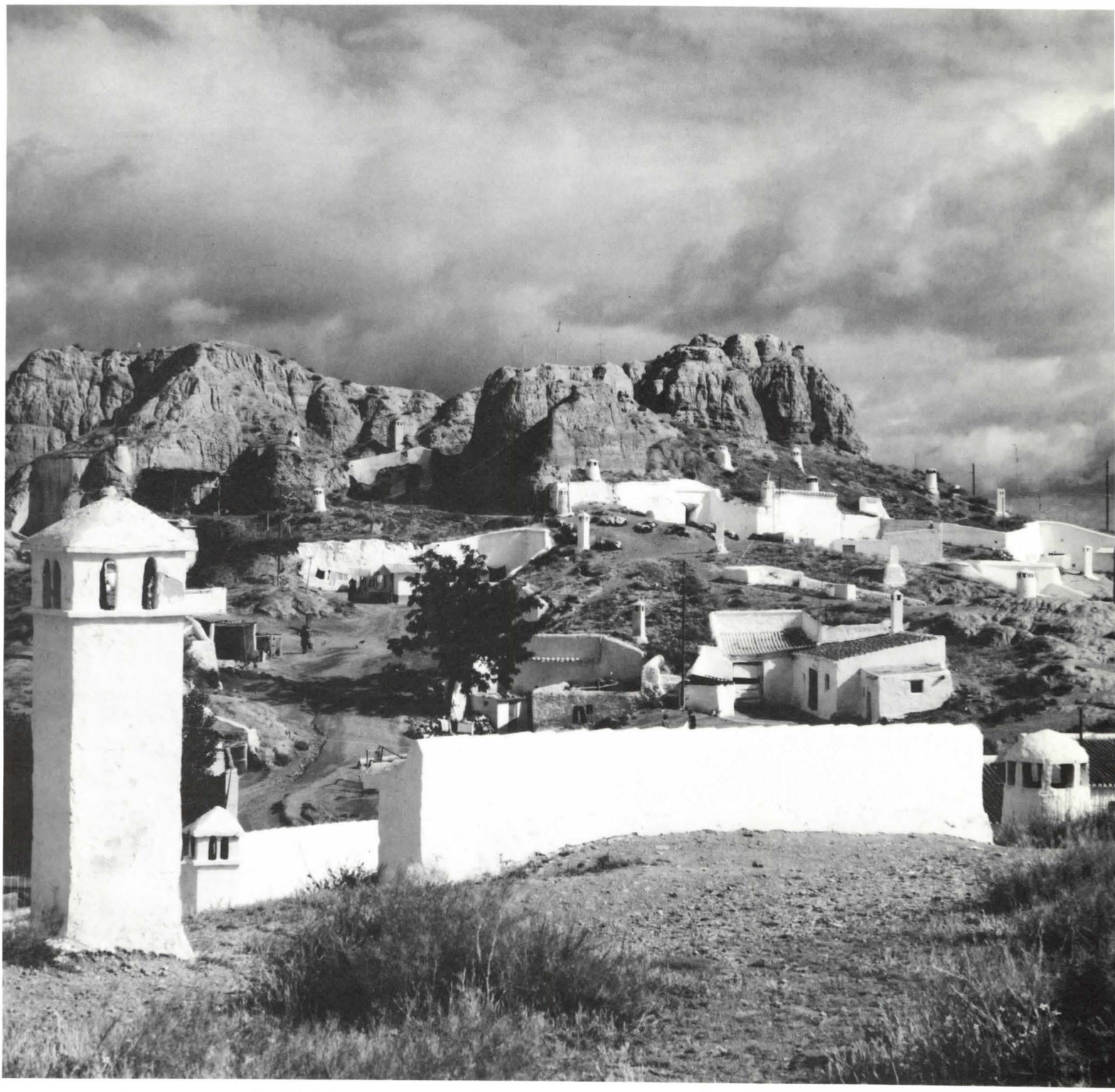
Category/Item	Earth sheltered design (ESD)	Conventional design (CD)	Dollar difference (CD-ESD)	Cost of ESD compared against CD as a percent (ESD/CD)
Capital investment costs				
Total construction costs	$2,689,500	$2,786,800	+ 97,300	96.5% •
Facility operating costs				
H.T. hot water	106,429	120,970	+ 14,541	88%
Elec. for HVAC	64,177	206,063	+141,886	31%
Subtotal	170,606	327,033	156,427	52% •
Maintenance costs				
Planted roof surface	1,048	— —	— 1,048	— —
Roof maintenance	384	2,676	+ 2,292	14%
Exterior siding	1,880	4,977	+ 3,097	38%
Sewage ejector	2,086	— —	— 2,086	— —
Site drain cleanout	1,043	— —	— 1,043	— —
Downspouts and leaders	— —	196	+ 196	— —
Subtotal	6,441	7,849	+ 1,408	82% •
Repair and replacement				
Sewage ejector	784	— —	— 784	— —
Roof surface	3,530	38,667	+ 35,137	9%
Motors (used for HVAC)	387	898	+ 511	44%
Bearings and drives	482	991	+ 509	49%
Fan starters	217	857	+ 640	25%
Subtotal	5,400	41,413	+ 36,013	13% •
Total: All items except construction costs	182,447	376,295	+193,848	48.5% •
TOTAL	$2,871,947	$3,163,095	+291,148	90.8% •

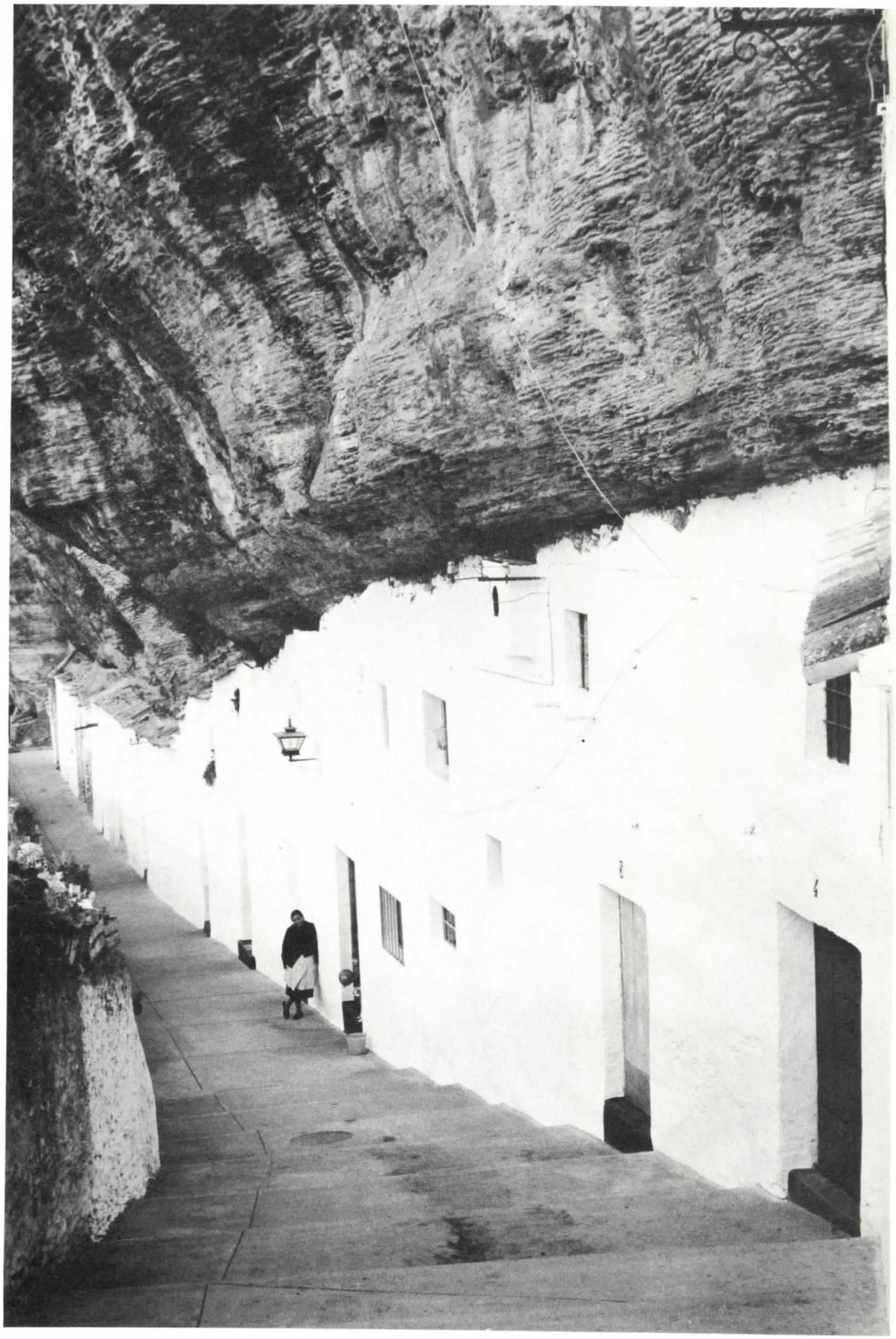
Vernacular Underground Villages of Iberia

Photographs by Norman F. Carver Jr., AIA

Underground structures have long flourished in vernacular building. The examples here are from Iberia, photographed by Norman F. Carver Jr., AIA, and included in his book, *Iberian Villages* (see May 1982, page 48). Among the characteristics of the vernacular, Carver writes, is that its architecture is always precisely adapted to climate and environment and reflects local building techniques, skills, and materials. The Iberian climate can be extreme, as noted in an old Spanish proverb: "Nine months of winter and three months of hell."

Responding to the fickle clime in La Guardia (above), the soft earth is hollowed out and painted white. These houses are warm in the winter and cool in the summer, the underground temperature being constant. Although the openings are few and small, the whitewash reflects light deep inside. The southern town of Guadix has a collection of subterranean houses (across page) marked by white chimneys poking above ground.





Photographs by Norman F. Carver Jr., AIA

Across page, near the town of Baza, a cave house with whitewashed openings and red peppers hung out to dry. Above, the village of Setenil grew from a collection of ancient cave dwellings along a river. Facades have been built in front of the caves offering a more conventional image of 'home.' □

MICHAEL J. CROSBIE

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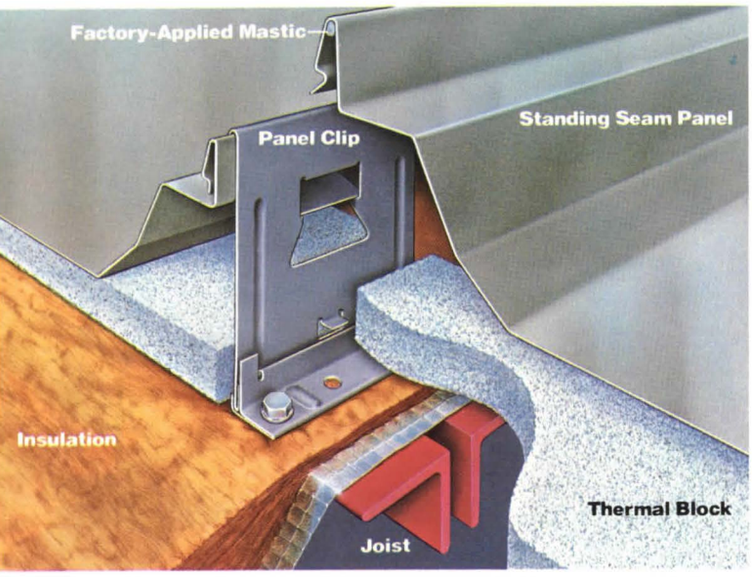
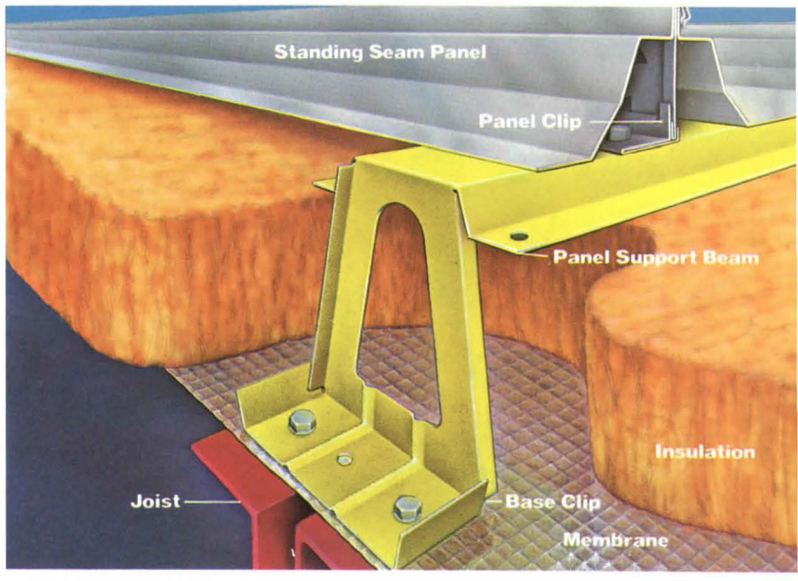


The Vulcraft Standing Seam Roof system clips into place with a unique interlocking side lap. No mechanical seaming tool is required. Provides an economical, weathertight roof system.



The Vulcraft Roof Insulation System (RIS)™ can be used with the Vulcraft Standing Seam Roof to give a solid blanket of insulation with no thermal "short circuits" at the joist.

Until now, when it came to a roof for conventional construction, you had two primary choices: either a built-up roof or a metal roof adapted from a pre-engineered building. Now Vulcraft offers another alternative for most conventional construction.

As the largest manufacturer of steel joists, joist girders and steel deck in the country, Vulcraft has long served the conventional construction industry. So when Vulcraft decided to design a standing seam roof system, we decided to design it to fill the needs of our traditional customers, the conventional construction industry. Now, after over two years of intensive research and design in developing a superior, affordable standing seam roof system, we proudly announce The Vulcraft Standing Seam Roof.

Vulcraft's attention to detail in design has produced a virtually weathertight roof system. Our unique hidden clip and perimeter designs have eliminated most through-the-roof fasteners. Factory-applied mastic is used to insure *precision* sealing at the side lap.

No expensive mechanical seamer is required with the Vulcraft system. Panels "clip" together simply and securely with routine labor and simple hand tools. And our floating clips can allow up to 1 1/16" of roof expansion or contraction, independent of the internal structure.

The Vulcraft Standing Seam Roof has a UL90 rating and the system can correct for up to 6" out-of-square conditions with only minor on-site adjustments. And our unique pre-punched, pre-notched end lap helps assure proper installation and weathertightness.

Accessories have been designed with the conventional building in mind. Low-edge-of-roof fasteners, the most likely to develop leaks, have been designed to occur outside of the building envelope, minimizing the potential for problems.

If you're involved in conventional construction, you no longer have to consider a built-up roof or a pre-engineered building roof as your primary alternatives. Now you can include The Vulcraft Standing Seam Roof system and the Vulcraft Roof Insulation System as dependable, economical alternatives in your roof designs.

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BOOKS

Greg Hursley, Hursley/Lark/Hursley

Less May Not Be More, But Too Much Is Enough

By Donald Canty

Despite its aim of inventing a new "ism" in architecture, the book "Ornamentalism" by Robert Jensen and Patricia Conway displays a collection of buildings that will be all too familiar to readers of the architectural press over the past decade or so. The authors state that "to ornament or decorate today is a radical act." Yet, in this period ornamentation and decoration have become conventional to the point of being de rigueur for a work to be seriously discussed in the schools and the more modish professional periodicals.

The authors seek to establish ornamentalism as a movement and to distinguish it from postmodernism. They claim that the works they show (by Stern, Moore, Graves, Venturi, etc.) partake of modernism while vividly striking out in some new directions. Yet they devote a great deal of the literate but sparse text to an assault on modernism, on the usual, and ever more widely accepted, grounds of blandness, rigidity, and misguided social determinism. They make a good case for the famous Robert Venturi remark that "Less is a bore."

What is this ornamentalism which is to succeed—or, as the authors would put it, extend—purist modernism? The authors ascribe to it such happy characteristics as freedom, willingness to experiment, wit, and the ability to communicate both literally and symbolically. All of these characteristics are indeed present to some degree in the works shown.

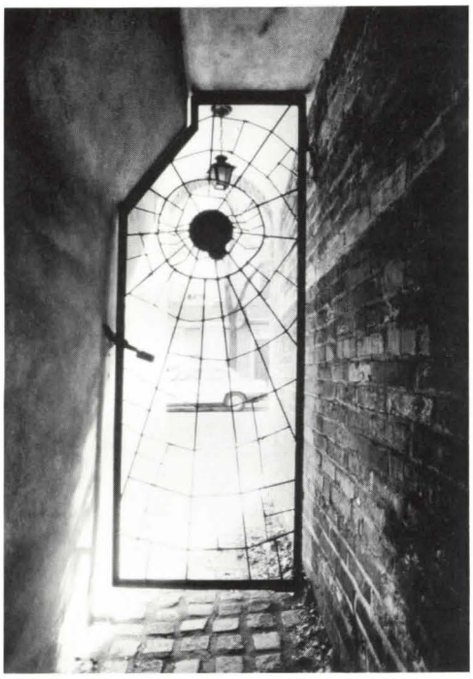
Yet there are other characteristics exuded by these works at times as well: exhibitionism, excess, an extreme form of arbitrariness. Indeed, the authors define their ornamental movement as being marked by "a fascination with the surface of things as opposed to their essence; elaboration as opposed to simplicity; borrowing as opposed to originating; sensory stimulation as opposed to intellectual discipline."

These hallmarks of ornamentalism are embodied to the letter in the largest American example shown in the book, Michael Graves' Portland Building (left and below). It is shown only in drawings and model photos, the building having been far from completion when the book was put together. This fact does not inhibit the authors from saying that the building succeeds in its efforts to "encourage visitors, delight viewers, and enliven the city." There are visitors to the completed building who have not been delighted, including this one, and residents of Portland who feel that it casts a pall upon, rather than enlivening, its precinct of the city.

But there is no disputing that it re-

Greg Hursley, Hursley/Lark/Hursley

Ornamentalism: The New Decorativeness in American Architecture and Design. Robert Jensen and *Patricia* Conway. (Clarkson N. Potter, $40.)



'Spiderweb' gate in forged iron, Society Hill, Philadelphia, by Christopher Ray, from Oranamentalism *by Jensen and Conway.*

sponds directly to every criterion the authors pose: most particularly "fascination with the surface of things as opposed to their essence." The Portland building is all surface. Without the exterior decoration it would not get a second glance.

More than one writer, including some who have strained mightily to praise the building, have described its form as "squat." Its essence, provision of a suitable environment for office workers, public and private, is given short shrift. Graves clearly lost interest when he got above the first two public floors, decorated in the same crypto-Egyptian mode as the outside. The office floors are very deep and have widely spaced windows four feet square (Graves would have had them three feet) resulting in a dim and viewless environment for all but a lucky few. Finishes here are plain to a point that would delight the most penurious of speculative developers.

It is a building that defies its context. Not just such modernist neighbors as those shown in the photo upper left (which it was, of course, designed to do) but also Portland's city hall next door and its largest downtown park to the rear. The park is faced by a huge garage door treated as if it were the entrance to a cathedral (left). The doors on the opposite side where the people enter are, by contrast, modest to the point of near invisibility.

"Elaboration, borrowings, and sensory stimulation" the building has in spades. The problem is not the fact that it is ornamented and decorated, nor really with the particular esthetic, reaction to which can only be subjective, pro or con. The problem with this and many of the other buildings shown in the book is that "ornamentalism" is made a substitute for, not an embellishment of, architecture.

About half the book is devoted to buildings, the other half to the decorative arts. The latter is richly satisfying and full of usual delight. One can simply enjoy these objects without the disquieting questions that arise when a similarly sybaritic approach is applied to places intended for human habitation.

Architecture as Nature: The Transcendentalist Idea of Louis Sullivan. Narcisco G. Menocal. (University of Wisconsin Press, $22.50.)

Few American architects have enjoyed the heroic stature that has been bestowed upon Louis Sullivan. The architect's reputation began to be resurrected soon after he died in near obscurity in 1924. By the eve of World War II, his importance was virtually uncontested among the avant-garde. Thereafter, he became recognized as one of the giants of his era by most people in the field. During this posthumous ascent, Sullivan has been lauded for a variety of reasons— as the perspicacious functionalist, the inventor of dazzling ornament, the champion of democratic values, the truly American architect standing in defiance of colleagues enamored with European precedents. Interest in Sullivan has hardly abated; no other designer in this country save Frank Lloyd Wright has been the subject of so many historical studies. In recent years, scholars have concentrated on more fully documenting aspects of his career and on reassessment—separating the man from the myth, examining him in a broader cultural and professional context, pinpointing those facets of his work that indeed make it significant.

This book may be the most controversial of these evaluative studies. From it, Sullivan emerges the more interesting and the less heroic. The author focuses on the architect's writings, a subject frequently addressed, yet seldom satisfactorily explained. Sullivan's prose is often dense and convoluted, his points elusive and easily misinterpreted. Menocal sets out to clarify the underlying message of this work, to demonstrate the consistency of that message, and to delinate the integral correspondence between thought and design. He argues that the writing must be understood in order to comprehend fully the architecture's meaning. The book explores these complex matters in depth, with lucidity and persuasiveness. It also traces the literary origins of Sullivan's ideas more thoroughly than has been done in the past. This analysis leads to an important conclusion: Philosophically, Sullivan was tied neither to the present nor the future so much as to the past.

The final part of the text shifts from theory to practice, concentrating on the architect's 20th century career. Menocal states that Sullivan's transcendental ideal, considered passé by most colleagues, contributed to his legendary demise. In a very real sense, he became ever more isolated from the world around him. His concerns were also ill-suited to the types of commissions he now received. Sullivan never understood the basic requirements of residential planning. Most of his small commercial buildings amounted to ornamental pastiches, and the ornament itself became increasingly rhetorical. Whether one entirely agrees with the assessment or not, it forces the work to be considered in a new light.

The author maintains that another source of difficulty arose from the fact that Sullivan was foremost an ornamentalist, a composer of surfaces and decoration. This argument is not conclusively developed. If the brief depiction of the working relationship between Adler and Sullivan is taken at face value, it means that projects were designed in detail before Sullivan became involved in the process, that the body of the building was more or less finalized before much attention was given to its outward appearance. The scenario is not altogether plausible, expecially considering the principals involved. Moreover, the case is not documented, save for reference to two recent studies on Adler, of which the one that is published makes no such emphatic assertion.

This book does not claim to be a comprehensive treatment of Sullivan, yet some passages imply greater completeness than exists. New ground is covered in analyzing the sources for his ornament without sufficient indication of the numerous other precedents that have been identified elsewhere. The lengthy discussion of Sullivan's compositional methods for tall office buildings gives no hint of an apparently strong debt to Beaux-Arts practices. Some filling out, even if limited to short notations, would have greatly assisted in placing the new material in context.

Nevertheless, the book constitutes a significant addition to the large body of Sullivan literature. It affords many valuable

Uncommon Places. Stephen Shore. (Aperture, $30.)

A successful professional architectural photographer once told me that the difference between a good and a very good photograph can be a matter of inches in camera placement. He was right, of course. And yet that kind of framing precision is not what Stephen Shore's photographs are about. To the contrary, composition seems unimportant in many of the 61 color images collected here. Shore is, foremost, an observer of environments, the most banal that the American landscape can provide—parking lots, small town intersections (above, Kalispell Mont.), suburban tracts, etc. These he endows with hard-edged clarity and an uncommon sensitivity to color, light, and shadow. Colors are saturated, whether vivid or subtle; shadows stretch long, but are not too deep to obscure. These qualities draw you into the photographs, inviting you to search for subtle content. Shore seems to be saying, "Here are the facts, ma'am; make your own case." The fun comes in responding to his deadpan invitation.

ALLEN FREEMAN

insights on the architect's ideas and their relation to his work. Menocal helps to explain the tragedy of Sullivan's late career and in so doing underscores how fragile the tundra is in which creativity and innovation are rooted. While Sullivan's role as a designer is not adequately investigated, other facets of the text make further exploration of this subject more imperative. Everyone interested in American architecture and intellectual history should find the contents of this book rich and provocative.

RICHARD W. LONGSTRETH

Mr. Longstreth is an associate professor of architecture and design, Kansas State University.

Inquiry by Design: Tools for Environment-Behavior Research. John Zeisel. (Brooks/Cole Publishing Co., Monterey, Calif. 93940, $8.95.)

John Zeisel writes about research in plain English. One can hope that this may be the first of a new generation of books on the role of behavioral science in architecture written without jargon and without the need for collateral reading.

About 20 years ago, architectural schools and practicing architects began paying attention to research in sociology and psychology that included the built environment as variable to be studied. Some even felt that the incorporation of such research in the programming and design process would be the most fundamental change in architecture since the start of the modern movement. But many who tried to use research as a design tool found that behavioral science studies were reported in a way that did not mesh well with the design methods they liked to use.

Zeisel, a sociologist, has accumulated many years of experience working directly with designers in the creative process. From this he has distilled, in the first half of the book, a clear description of the design process as it really is (not should be), and of the process of research. Then he manages to describe an approach to research and design cooperation that has the ring of realism about it.

The second part of the book devotes

continued on page 80

MACK III Office Building, Paramus, N.J.—Architect Mitchell E. Hersh, A.I.A.

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Books *from page 78*

one chapter each to straight-forward descriptions of six research methods useful to design. These methods are: observing physical traces; observing environmental behavior; focused interviews; standardized questionnaires; asking questions; and archives. All are useful to any designer who wants to sharpen his or her powers of observation. They can be helpful even when a formal research effort is not going to be carried out.

BERNARD P. SPRING, FAIA

Mr. Spring is president of Boston Architectural Center.

Building to Last: Architecture as Ongoing Art. Herb Greene, with Nanine Hilliard Greene. (Architectural Book Publishing Co., $26.95.)

Architectural talent has always allied itself with power, but lately there seems to be a growing willingness among architects and architectural writers to concentrate almost exclusively on the trendy and the visually precious while dismissing in the name of "realism" and the ill-repute of International Style "social engineering" any concern with architecture as a social activity. Architects rightly condemned Tom Wolfe's snide *From Bauhaus to Our House,* but the underlying assumption, that architects are out of place when they ask any questions that can't be answered from Sweet's Catalog, is one that many in the profession share. Herb Greene's *Building to Last* is, in this context, a refreshingly humane statement.

Greene thinks that architects should respond to their clients' requirements not merely as all-knowing technical experts, but as "facilitators" who help realize intentions and efforts initiated and partly carried out by clients. (The client in this sense is understood not as a corporate or governmental body, but as a community of individuals.) Although Greene describes the architect as a poet, he calls for the abandonment of the notion of the building as the enduring creation of an isolated genius. Rather, the architect should be a humble person who, working within a community and historical context, supplies a richly evocative structural core that will be added to by others, and continually altered throughout its long existence.

The architect's contribution Greene calls an "armature," a "public element in a neighborhood or city core to which space-enclosing structures and ornamental surfaces can be added or subtracted. It is solid and long-lasting." An armature can be the unifying element in a business or a residential district. It should include symbolic elements that express values with which citizens can identify and decorative elements that residents generate and perhaps help to construct. To be effective, an armature must embody "tragedy," or a sense of destiny and inevitability and "humor" or fresh experience. It might achieve its symbolic aims in part through the "selective reconstitution" of lost historic elements. The armature as a feature of the residential landscape should provoke creative personal involvement and individual investment from the inhabitants. While an armature would involve high, medium, and low technology in its construction, the central point is that it must be a "responsibly limited tool" designed to draw people in, not to confront them with buildings overwhelmingly large or complex.

Greene's argument has obviously been influenced by his architectural forbears, particularly Frank Lloyd Wright, by the "Small Is Beautiful" outlook, by the noncompetitive ethos of feminism, and particularly by current historic preservation thought, which also stresses the conservation of resources and the promotion of community involvement through the retention of visible continuity in the built environment. A preservationist would probably agree that "in a society that has let excess and waste degrade the quality of life, an armature framework that allows for sizable remodelings and replacement of worn out parts without destroy-

continued on page 82

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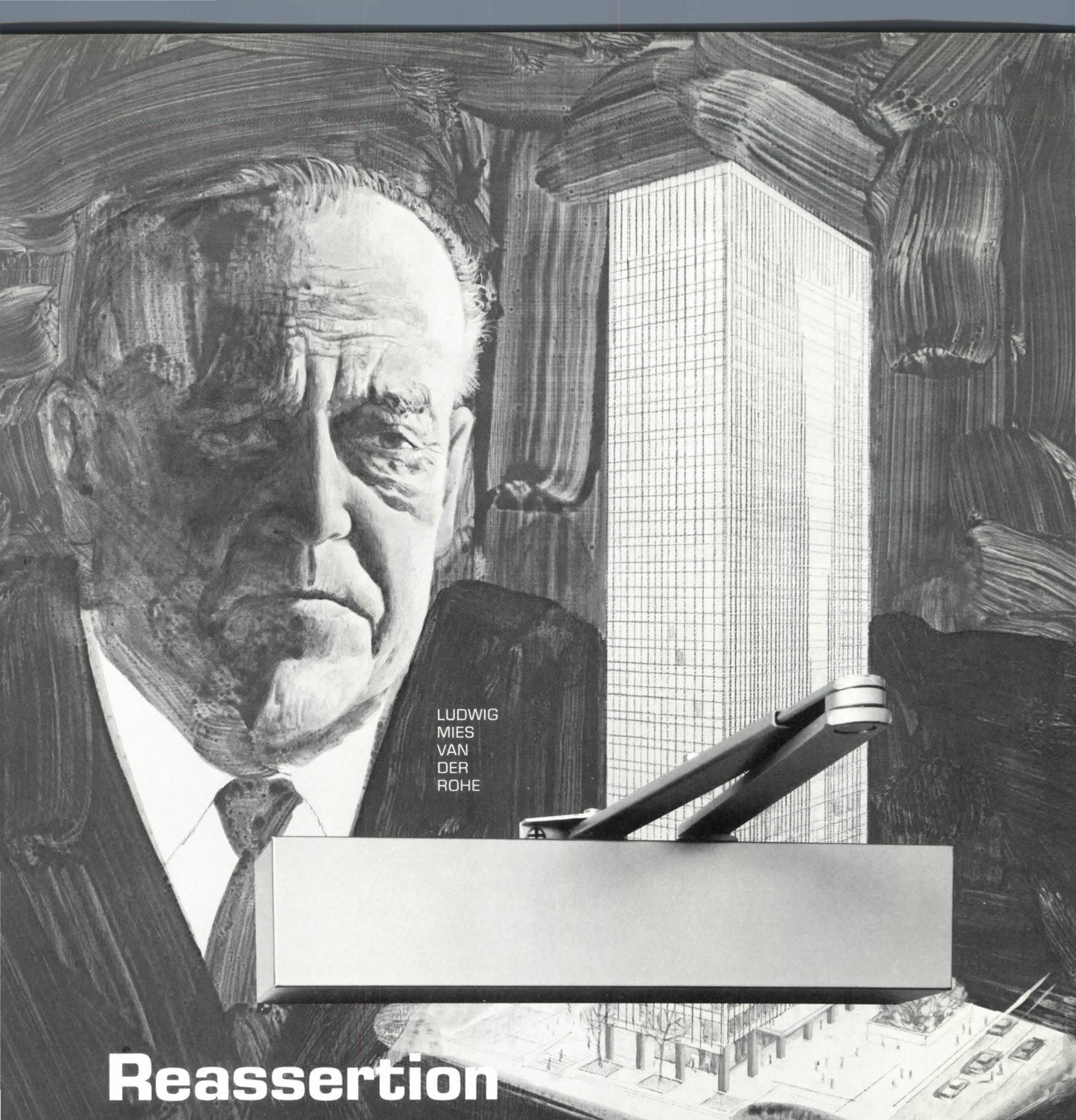

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Books *from page 80*
ing the structure makes real and ethical the conservation of resources." Some preservationists might be uncomfortable, however, with the degree of latitude in treating historic structures that Greene envisions.

Attractive as Greene's program is, it loses most of its force through the failure to offer a specific analysis of the political economy of architecture, or concrete notions of the ways his program could be realized. This is not an unwitting omission. Right at the start, he states that his is not a how-to book, but one that explores what should be done and why. Ironically, then, his argument is vitiated by the same malaise that affects his more cynical colleagues—a fear of politics.

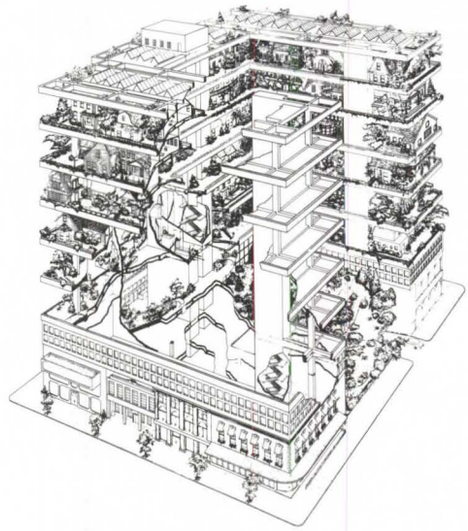
In the first sentence of the book, Greene attributes our predilection for "new buildings with disorienting and anonymous form" to the old catch-all of "prevailing economic and technological forces and esthetic attitudes." This is as far as the explanation goes.

Greene's unwillingness to confront hard political and economic issues thwarts our ability to understand how his proposals might be realized. Frank Lloyd Wright articulated a new vision of the single-family house in America, but it was the efforts of the banking and housing lobbies to secure favorable tax and financial legislation that made the suburban house the ubiquitous thing it is now. It is those same legal structures that probably form the greatest impediment to Greene's program. While the esthetic vision of this book is a worthy one, it will be relegated to the long list of forgotten architectural fantasies unless it is grounded in hard, nonesthetic analysis. DELL UPTON

Mr. Upton, an architectural historian, is associated with Case Western Reserve University.

Highrise of Homes. SITE. (Rizzoli, $12.50.)

Imagine, if you will, a shingle style bungalow sited next to a house in the International Style on a single floor of a skyscraper. Within this megastructure would be a village-like community of homes in which residents would enjoy all the amenities of suburbia while living in the midst of a city. But more significantly, say Patricia Phillips and James Wines, who wrote the text of this book (reconsidering an idea that has been around for some time), this experimental condominium project composed of eight to ten stories "is based on the premise that people need the personal affirmation and territorial definition associated with the detached 'house' even though living in the compressed environment of a multistoried structure." The houses would be serviced by a central mechanical core and elevator, and there would be shops, offices, entertainment facilities, and an atrium garden space on the ground floor and one intermediate level.



Top, 'Technical Rendering,' 1981, by Dean Treworgy. Above, a 1981 drawing of the 'main view' by James Wines.

If you heard Wines, president of SITE, on the TV program "Believe It or Not," you heard him explain that all shapes and varieties of houses would occupy the highrise, the basic premise being to erect the framework of a highrise within which each resident would build a house according to his own taste. Indeed, say the writers, the esthetic quality of the highrise "would decline in direct proportion to the degree that any attempts to impose a unified design program were successful."

For the residents who lack the "elements of an architectural vocabulary," a major resource would be a contemporary pattern book, rather like those of the mid-19th century. It is assumed, however, that some residents "would hire 'high art' architects to design their houses. This process would bring into focus one of the project's most revolutionary aspects—that is, its capacity to neutralize even the most assertive and individual of architectural styles, once installed within its homogenizing context."

The book, which is the result of a research project developed in cooperation with Pratt Institute, serves both as an introduction to SITE's approach to the concept and as a catalog for an exhibition that will travel to educational institutions in this country. Project directors are Phillips, Wines, and Alison Sky of SITE. Drawings throughout the book are by Wines, Dean Treworgy, Robert Beach, Jeffrey Silverstein, and Christine Morin.

The Forgotten Frontier: Urban Planning in the American West Before 1890. John W. Reps. (University of Missouri Press.)

John Reps' *Cities of the American West: A History of Frontier Urban Planning,* published in 1979, was a work of enormous scope and erudition that made many important contributions to our knowledge of urban history in the trans-Mississippi West. His most recent book, *The Forgotten Frontier,* distills the essence of that 827-page study into some 169 well-illustrated pages. This shorter version is organized very much like its predecessor. It opens with a brief, yet vigorous, refutation of Frederick Jackson Turner and Ray Allen Billington, both of whom claimed the formation of Western towns and cities was a later stage of settlement preceded by hunting, trapping, and individual subsistence farming.

Reps argues that, on the contrary, "in every section of the West, towns were in the vanguard of settlement," leading the way, and decisively shaping the structure of society. He documents this thesis in eight succinct chapters that examine in turn cities and towns of the Hispanic West and early Texas, the Pacific Northwest, the mining frontier of California and Nevada, the central plains, the various railroad companies, the Mormons, and finally the Oklahoma land rush of the 1890s.

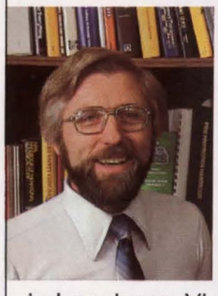
Reps praises the Mormons for their efficient orchestration of settlement and careful selection of town sites. He lauds the Spanish for integrating city and farm by providing residence for farmers within the precincts of towns. Aside from these examples, however, Reps finds little to commend. The final chapter suggests that the unimaginative grid plans, reckless speculation, and waste of resources of much of Western town planning continues to influence present day urban growth. What is called for to address contemporary problems is a zeal and energy comparable to that of the pioneers channeled into more "creative" and "realistic" visions of urban form. The book also includes an annotated bibliography and extensive footnotes which serve as an excellent guide for further study.

The basic question is, of course, what is lost and what is gained in such scholarly reduction. It is inevitable that much of the detail and color of the parent work is lost. The striking color reproductions of lithographs depicting bird's-eye views of Western cities are omitted, no doubt a

continued on page 84

Gas: It's the Heat to Beat.

"A Switch to Gas Saved Thousands on My Hospital Bill."



In order to cut energy costs to a minimum, Gerald Foster, Director of Plant Administration for Loudoun Memorial Hospital in Leesburg, Virginia, switched to gas. The operation was a success. It has already saved the hospital over $100,000 in fuel bills.

Conversion of two oil-burning boilers to dual-fuel function cost the hospital $22,000. But, according to Foster, it paid for itself in 63 days. The actual $100,078 savings was based on the prevailing price of oil versus what was actually spent for natural gas over a twelve-month period.

"We only expected to save $60,000," said Foster, "but we've already gone way beyond that."

Although the cost of all energy will go up over the next few years, Foster's decision to switch to gas will save the hospital hundreds of thousands of dollars over the life of the boilers. Because, as the price of natural gas goes up, it will still remain a better buy than oil or electricity. "And in the meantime," says Foster, "we're way ahead of the game."

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Gas: The future belongs to the efficient.

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Books *from page 82*

necessity of economy. More seriously, Reps does not develop his design analysis nor critical comment to the extent that he did in the longer work. This is unfortunate, for his insights are valuable and would not have added unduly to the shorter text.

This remains a very good summary, however, which does justice to the longer work. Those who lack the time or stamina to explore the vast terrain of the original will welcome this briefer version of a seminal work of urban history.

REUBEN M. RAINEY

Mr. Rainey is assistant professor of landscape architecture at the University of Virginia's school of architecture.

Weather and Energy. Bruce Schwoegler and Michael McClintock. (McGraw-Hill, $22.50.)

About the strongest connection between the weather and alternate sources of energy in this book is the word *and.* The book is distinctly divided into two parts: the first six chapters by meterologist Bruce Schwoegler and the last six by physicist Michael McClintock. There is a slight unavoidable overlap in the chapters on solar and wind, but the chapters on hydro, ocean, wind, and even storing the weather struggle standing on their own.

I have always been interested in what makes weather. I can remember as a child asking an adult what made thunder Now, if an adult isn't a professional at translating scientific terminology into a child's language, the child will go away frustrated and still won't know. This is the way I felt after trying to wade through this book's chapters on energy. The explanation couldn't be any less easy to understand—even though the book jacket promises "plain language."

What can you say about a book on weather when it first scientifically references a thunderhead spelling it *cumulonibus?* Or prints a photograph of the Southwest cliff dwellings that is so poorly contrasted that all you see are grass, bushes, and a giant shadow under what looks like a rock? Or reduces maps from the *Climatic Atlas* the point of uselessness.

As for the sections on energy, McClintock bit off more than could be adequately chewed in 100 pages. One sentence in the seventh chapter sums up the book quite nicely: "What all this adds up to is that, in a large nation like the United States, there is considerable variation, defying complete description. . . ." And the author is right. JENNIFER A. ADAMS

Freelance writer on solar energy, Ms. Adams is principal of the firm Write Design, in Boulder, Colo.

The Politics of Park Design: A History of Urban Parks in America. Galen Cranz. (MIT Press, $25.)

This worthwhile book should be with us for a long time, and its publisher has recognized this fact with a handsome production and an extensive apparatus of footnotes and bibliographical references.

Unhappily, the book is a rather uncritical gathering from secondary sources and public documents from Chicago, New York City, and San Francisco, the cities whose experience is reviewed in great detail. (One might have come to different conclusions in Louisville, San Diego, or Minneapolis.)

Much of importance has been left out (Robert Caro, Joseph Sax, Elbert Peets). The author does not seem able to make a distinction between the larger parks movement (national, state, and county parks) and urban parks; or to define the important play movement that equally influenced education and other fields. There are few original data. One would have liked more concentration on critical phases of which land acquisition would seem the most important. The effect of city parks on surrounding land values and development would likewise seem an aspect of critical importance to park politics.

Nevertheless, the author's sympathies, perspectives, and values are correct, and

continued on page 88

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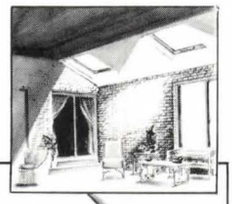

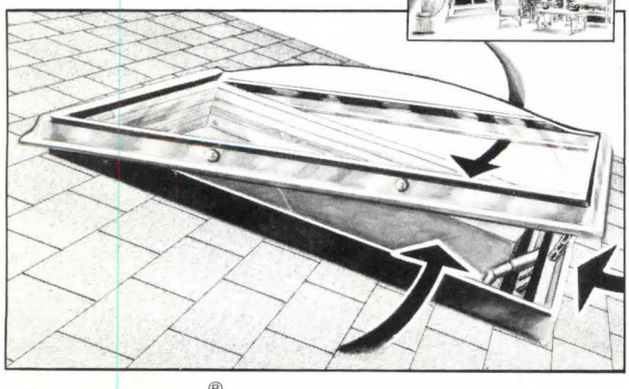

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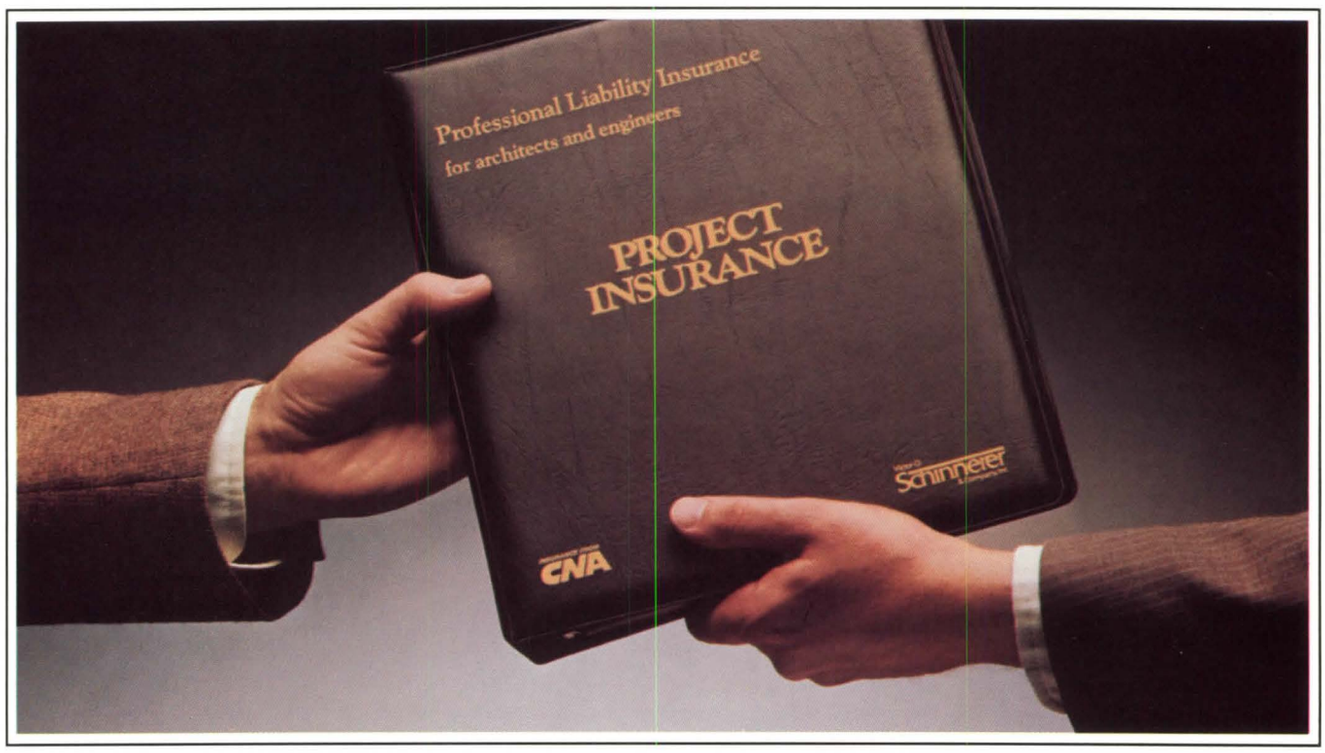

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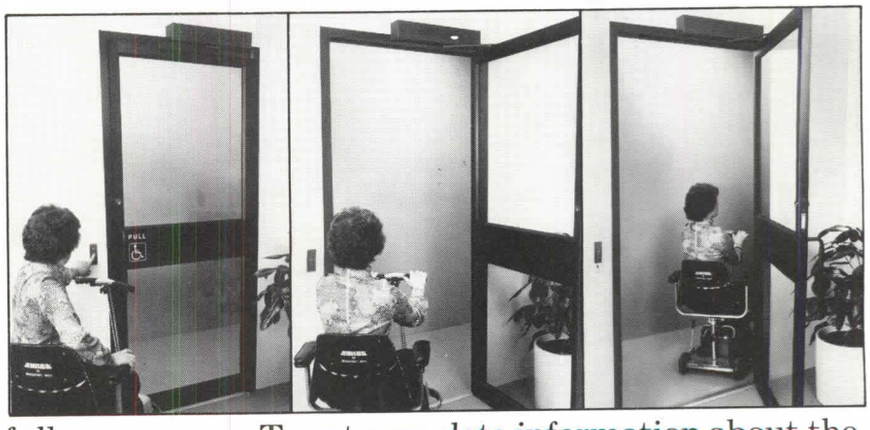

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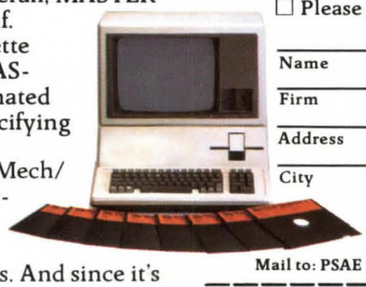

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Books *from page 84*

that is the important thing. Whether urban parks are "an active culture-bearing influence in people's lives, both materially and intellectually" and similar extravagant assertions prove valid will have to await further examination.

FREDERICK GUTHEIM, HON. AIA

Mr. Gutheim is a Washington, D.C., author, teacher, and critic.

The University of Sydney: Pen Sketches. Allan Gamble. New and enlarged edition. (Sydney University Press, distributed in this country by International Specialized Book Service, 10230 S.W. Parkway, Portland, Ore. 97255, $26, plus $1.75 postage.)

Lovers of pen and ink sketching and sketches, particularly of collegiate Gothic architecture, will find this new and enlarged edition of Allan Gamble's book a delight. The sketches depict buildings and details of the University of Sydney, Australia's oldest university, which was founded in 1850. Gamble was associated with the university over a period of 27 years, first as senior lecturer in architecture and later as public relations officer and director of the War Memorial Gallery of Fine Arts.

The book is full of interesting sketches of groups of buildings, individual structures, quadrangle entrances, doorways, and details of all kinds, including cartouches, scary gargoyles, and stairways.

Readers will agree in general with the short text at the beginning of the book that the university's first architect, Edmund Blacket, has produced the best work, but the pages are replete with a graphic history of this Australian university's buildings. The pages are unnumbered, but one sketch of special interest shows the Sydney skyline as seen from the university (sketch above).

Gamble's technique is loose, but will remind many of the pen and ink sketches of Arthur Guptill. The frontispiece will evoke memories of the delightful watercolor sketches of Ted Kautzky that were a feature for many years in the old *Pencil Points* magazine.

This is a book that all architects and students of architecture will enjoy perusing and many will want to own.

CLIFTON J. MARSHALL, AIA

Mr. Marshall, who recently died in Lexington, Ky., was a past president of the Association of University Architects.

Books continued on page 90

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Books *from 88*

A Guide to Business Principles and Practices for Interior Designers. New revised edition. Harry Siegel, with Alan Siegel. (Whitney Library of Design, $22.50.)

Originally published in 1968, this work in its revised edition will help not only individuals who work entirely in interior design, but also architects who maintain interior design departments or those for whom this speciality is a fairly new approach. Based on the basic principles first enunciated in the earlier work, the new work has been completely revised to take into account the expanded scope of services offered by today's design offices.

The first part of the book is concerned with the practice of interior design, discussing such matters as location and nature of the business and how to secure counsel and assistance. The second part of this practical treatise gets to the heart of things, telling how to carry a job through from the initial contact with the client to billing and collecting. There is an array of information on letters of agreement, fee determination, estimation and control of the budget, purchase orders, billing and collecting, sales taxes, and other essentials. Part three considers the special requirements for nonresidential work, and part four is devoted to forms, techniques, and special factors in design work. In this last section is an expanded chapter on insurance and a new chapter on the interior designer as a product designer.

Harry Siegel is a qualified accountant who for more than 30 years served as a consultant to interior design firms. Alan M. Siegel is an attorney whose firm is legal counsel to the American Society of Interior Designers. Their expertise in accounting and in law is evident throughout this book.

Modern Danish Architecture (Guide). Kim Dirckinck-Holmfeld. (Arkitektens Forlag, Copenhagen.)

This guide summarizes the movements that have influenced Danish architects since World War I, and discusses Denmark's more innovative buildings and housing schemes. It begins with the modern breakthrough in Denmark, includes the revival of classicism of the 1920s, since many of its precepts have again gained favor, describes the contemporary situation, and provides a guide to housing, public buildings and monuments, urban renewal, and urban preservation. It ends with an index of notable buildings in Denmark's major cities: Copenhagen, Zealand, Funen, Arhus, Alborg, and Jutland.

The author was a contributor to this magazine's mid-August 1982 issue on world architecture.

Time-Saver Standards for Architectural Design Data. Sixth edition. John Hancock Callender, editor in chief. (McGraw-Hill, $82.50.)

First published in book form in 1946, this handbook has become well known to architectural offices. This sixth edition—a hefty tome of 1,158 pages—has been revised and updated to reflect the changes in building design since the fifth edition of 1974.

New subjects covered in this edition are energy conservation, solar heating, and SI metric units.

There is also an array of new materials on such subjects as new standards on sheet sizes, drawing scales, and lines and lettering; new standards for design for the handicapped; new tables of allowable stresses for wood; and new developments in reinforced concrete design.

More than 50 experts contribute guidance in five areas: basic data (drawing scales, graphic symbols, dimensions of the human figure, solar angles, etc.); structural design (design loads, foundations, floor framing systems, etc.); building materials, components, and techniques (waterproofing, roof drainage, windows, flooring, etc.); environmental control (acoustics, insulation, daylighting, elevators, etc.); and metric units in building (conversion factors and tables). □

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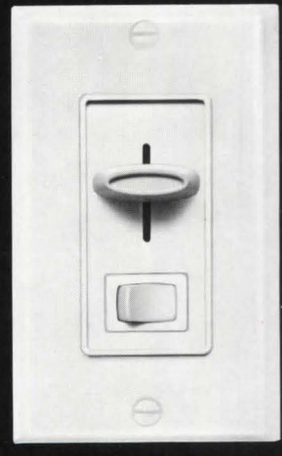

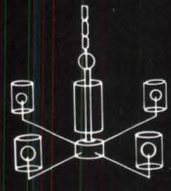

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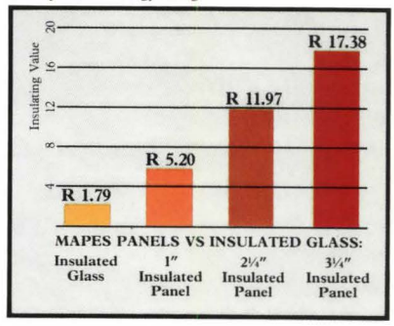

The Mapes architectural panels shown at left are Bronzetone medium, one of 24 standard colors available. Special colors can also be prepared to match your specifications. Mapes panel finishes are protected by a 25-year guarantee.

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Government *from page 30*
rector, says "very few" landmark designations have been overturned, but, "realistically speaking, the board is a political body, and pressures may be brought there." (The nine-member board is comprised of the presidents of the five city boroughs and other elected officials.) After affirmation by the board of estimate, a landmark building can be torn down only if economic hardship is proved.

Real estate economics is, of course, behind redevelopment plans for the Lever site. It was the first New York real estate venture to take advantage of a zoning provision waiving requirements for building setbacks provided the tower covered no more than 25 percent of its lot. Lever House is a slender slab over a roughly square base, which is punctured with a central courtyard. The whole composition, except for a lobby and a slender wing, is lifted one floor above street level. Because Lever House provides less than half of the allowable floor space under current zoning laws, its prime location has become attractive to developers.

The current tangled status of the building and land, however, involves a sandwich ownership—separate owners for the land and building—prospective buyers for each, and the building lessee, Lever Brothers. The intentions of the buyers and lessee are unannounced, but Lever is said to be considering a move to suburban New Jersey. The lease has 27 years to run, but the company could sell the agreement before the full term.

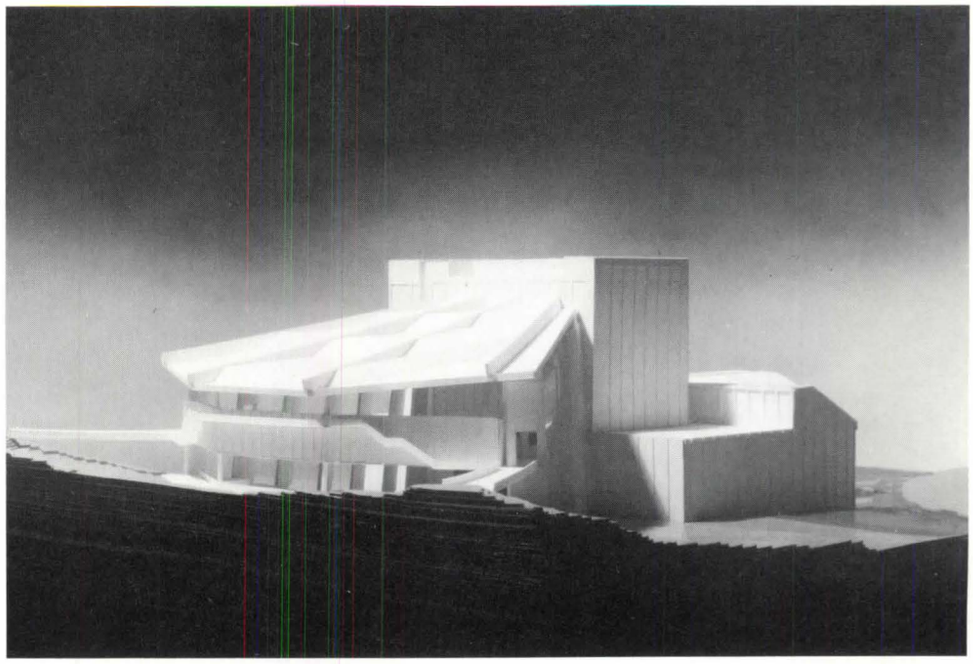
A development firm, Fisher Brothers, has a contract to buy the land from the current owner, the Goelet estate, and has commissioned the New York City architectural firm of Swanke Hayden Connell to design a new building for the site. In a highly unusual "white paper" presented to the landmarks commission, Swanke Hayden Connell argued that Lever House is "not worthy of landmark status" and "does not belong in the company of such undeniable landmarks as the Grand Central Terminal, the Chrysler Building, and the Empire State Building." Nor, the firm argued, does it "rank in significance with New York City's true landmarks" of the International Style—the U.N. Secretariat Building and the Seagram Building. The firm also charged that Lever House had been "substantially compromised from its original appearance by the deterioration and replacement of its glass panels, and with a gloomy and unsuccessful plaza and arcade space."

Meanwhile, an attorney for Fisher Brothers said development plans could come to fruition "as soon as three years or as long as 27 years. This is a long-range proposition" unless Fisher Brothers can negotiate with the other parties.

Another major New York builder, George Klein, has a contract to purchase the building from the Metropolitan Life Insurance Co. Klein declines to discuss plans for the building, but he told the *New York Times* that he has no objection to Lever House becoming a landmark. The Fisher Brothers attorney says his client is not working with Klein "at this time," and one close observer of New York real estate told the JOURNAL that it is unlikely that the two developers could work together with ease on a major venture such as this.

Still another development possibility involves the Lever-owned Jofa building directly behind Lever House. Under current zoning provisions, a large office building could be built on the Jofa site using air rights from Lever House. Lever has made no announcement concerning the Jofa building.

Joan Marcus



The design for a new Filene Center at Wolf Trap was unveiled last month. Filene II, as it is called, will replace the facility that burned down last April. The new theater is basically the same design as the original, with improved fire protection, a larger backstage for storage and rehearsals, improved handicapped accessibility, and updated sound and lighting technology. The structure is concrete and steel with Douglas fir siding, and has 200 additional interior seats, totaling 3,700 in-house, and 3,000 lawn seats.

The Wolf Trap Farm Park for the Performing Arts is located in Vienna, Va., and is the country's only national park for the performing arts. The new facility was designed by the firm Dewberry & Davis of Fairfax, Va. Joseph Boggs, AIA, headed the design team as architect-in-charge. Anthony Dicamillo, AIA, and Russel Versaci were technical coordinator and project administrator, respectively. John Macfadyen, architect of the original Filene Center, served as consulting architect. □

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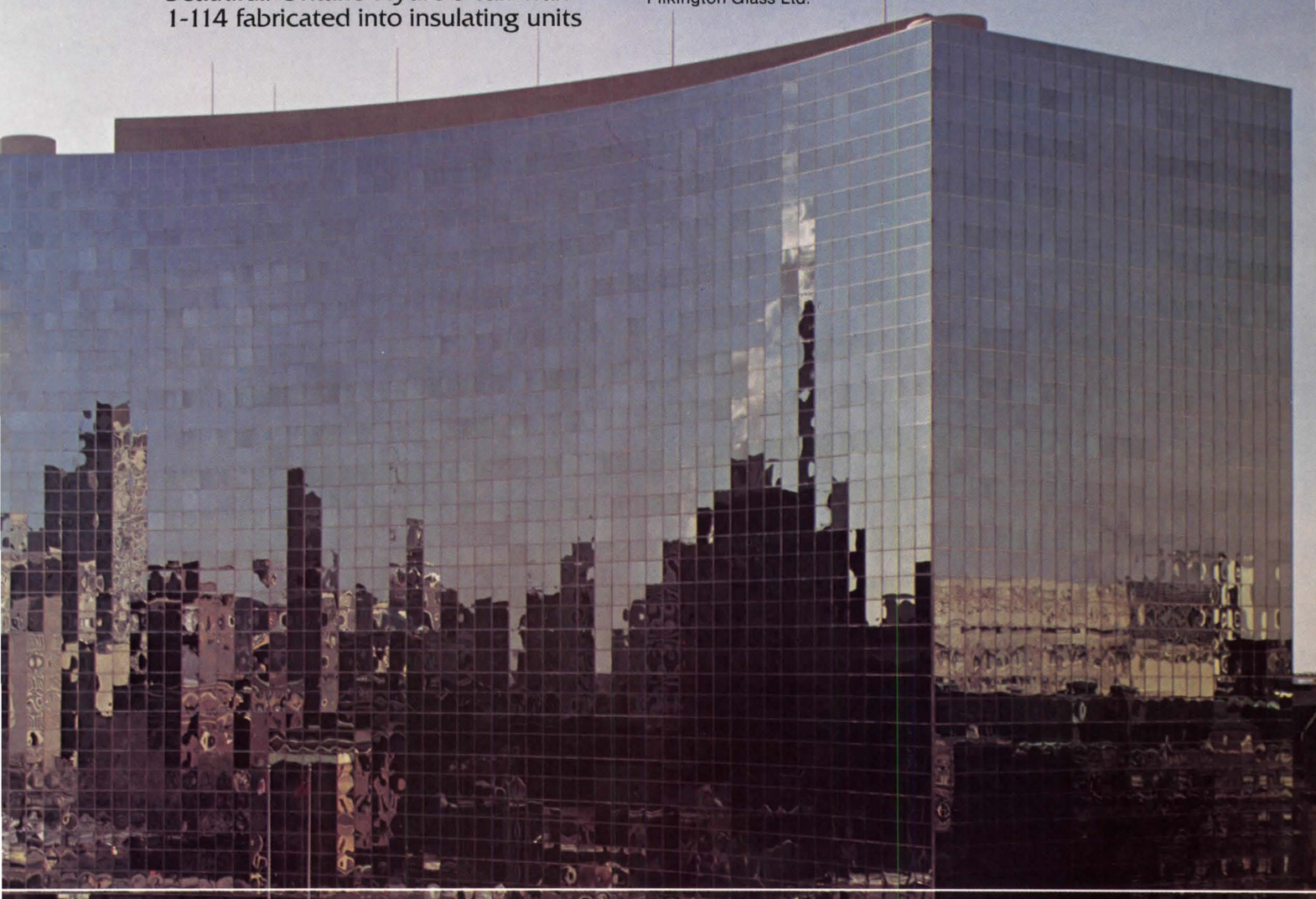

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Ian Woodner, architect, developer, and painter has bequeathed $1 million from his estate to establish a professorship of architecture at the graduate school of design.

State Building Codes Directory.
The National Conference of States on Building Codes and Standards has released the 1982 edition of the *Directory of State Building Codes and Regulation* that features detailed listing for each state. The directory is available to AIA members for $40 prepaid from the NCSMCS, State Directory-AIA Offer, 481 Carlisle Dr., Herndon, Va. 22070.

Preservation Tax Incentive Information.
The National Trust for Historic Preservation's updated packet for understanding and implementing the Economic Recovery Tax Act of 1981 is available for $15 per copy. Contact the Education/Professional Services, National Trust for Historic Preservation, 1785 Massachusetts Ave., N.W., Washington, D.C. 20036.

Solar Training Manual.
The Council of American Building Officials has developed the *Manual for Solar Specialists,* a guide to assist with the development of solar energy training courses for code enforcement personnel. The program is available for $40 from CABO, 1201 One Skyline Place, 5205 Leesburg Pike, Falls Church, Va. 22041.

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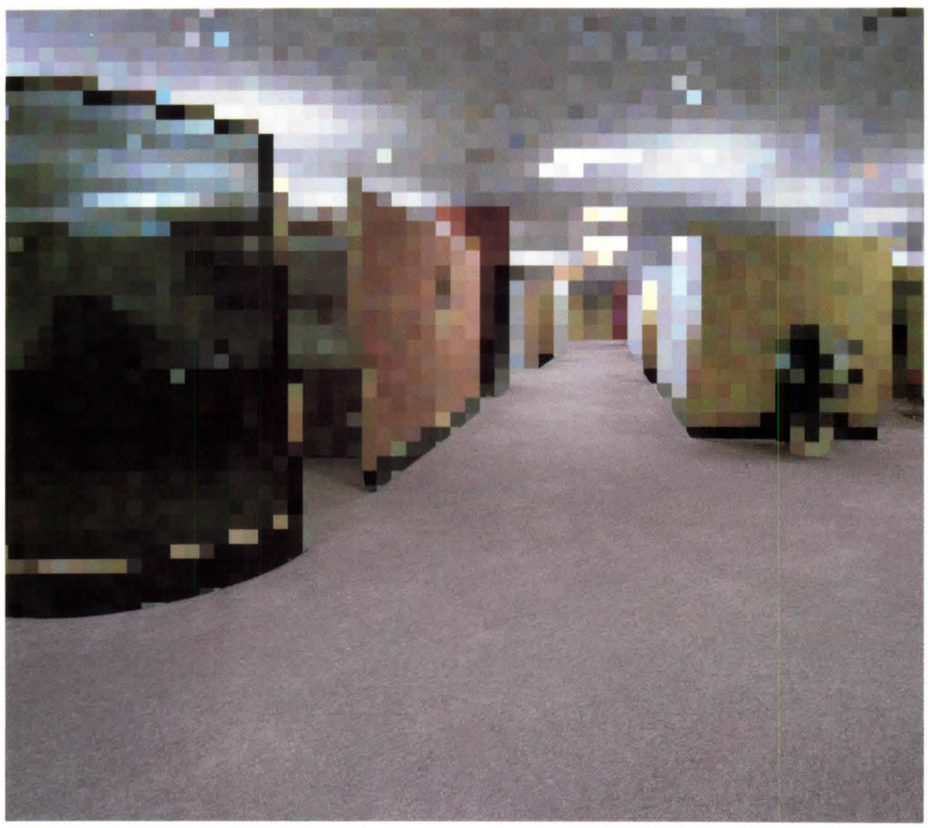

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Furnishings

As resources for design and objects of design. By Stanley Abercrombie, AIA

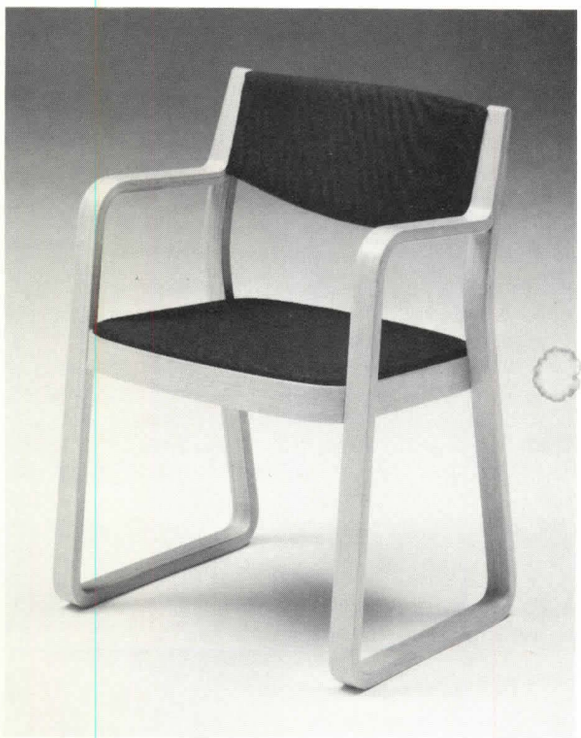
1

With this chair design by Richard Meier (1), Knoll International continues its long tradition of looking to outstanding architects for outstanding furniture design, and Meier in turn reflects the tradition of striking wood compositions pioneered by Hoffman, Mackintosh, and Wright, while still being recognizably his own man. The chair is available in black, white, or natural finishes, and there are also chaises, benches, and tables in the Meier collection.

The Zeta chair (2), available with or without arms, in either rift-sawn oak veneer or American black walnut veneer on a laminated wood structure, is designed by Robert De Fuccio for Lehigh-Leopold. New from Thonet is the X-Frame chair (3) by Michael Kirkpatrick. Its frame is tubular steel; its curved arm and back a single piece of steam bent wood; its seat can be caned or upholstered.

Nomad (4), designed by Gary Payne and Stan Magnan, is a one-foot-diameter concrete tub covered with an acrylic diffuser and gliding around the floor on casters; under the acrylic is a 22-watt circular fluorescent lamp; it is from Sointu, 20 E. 69th Street, New York City 10021. From Pallucco of Rome is the Ponte d'acqua table (5) by Laura De Lorenzo and Stefano Stefani. Its tubular legs, available in several colors, are demountable, and its top is of tempered glass.

At last, some design attention to the billiard table! And by the Italian master Mario Bellini, no less! The leather-wrapped Il Bigliardo (6) comes with a green or gun-barrel cloth, with cues, balls, and an electronic scoreboard. From Poltrona Frau, 62029 Tolentino, Macerata.



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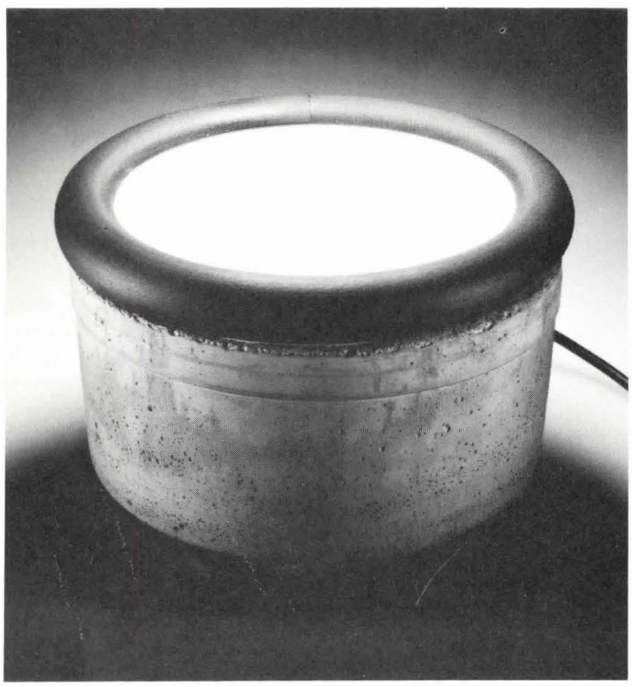
Mettee Photography



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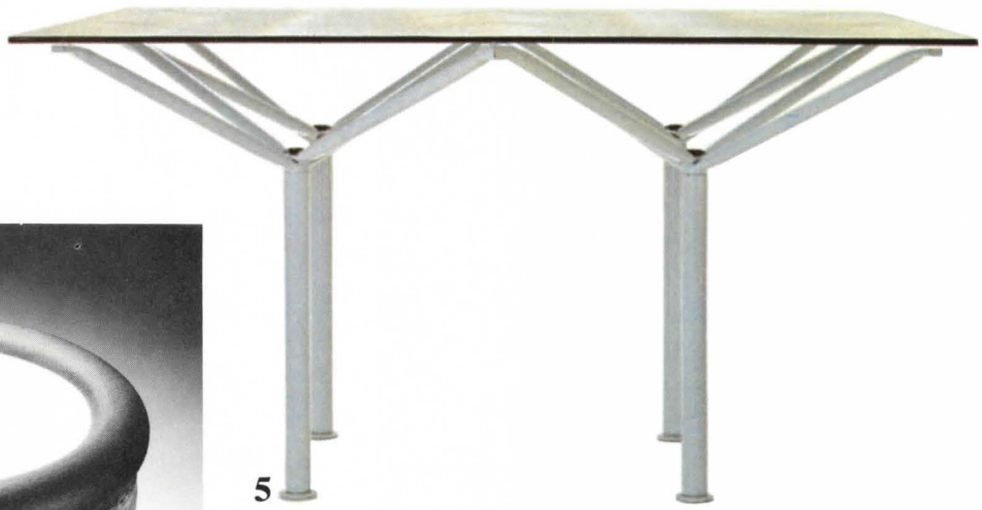

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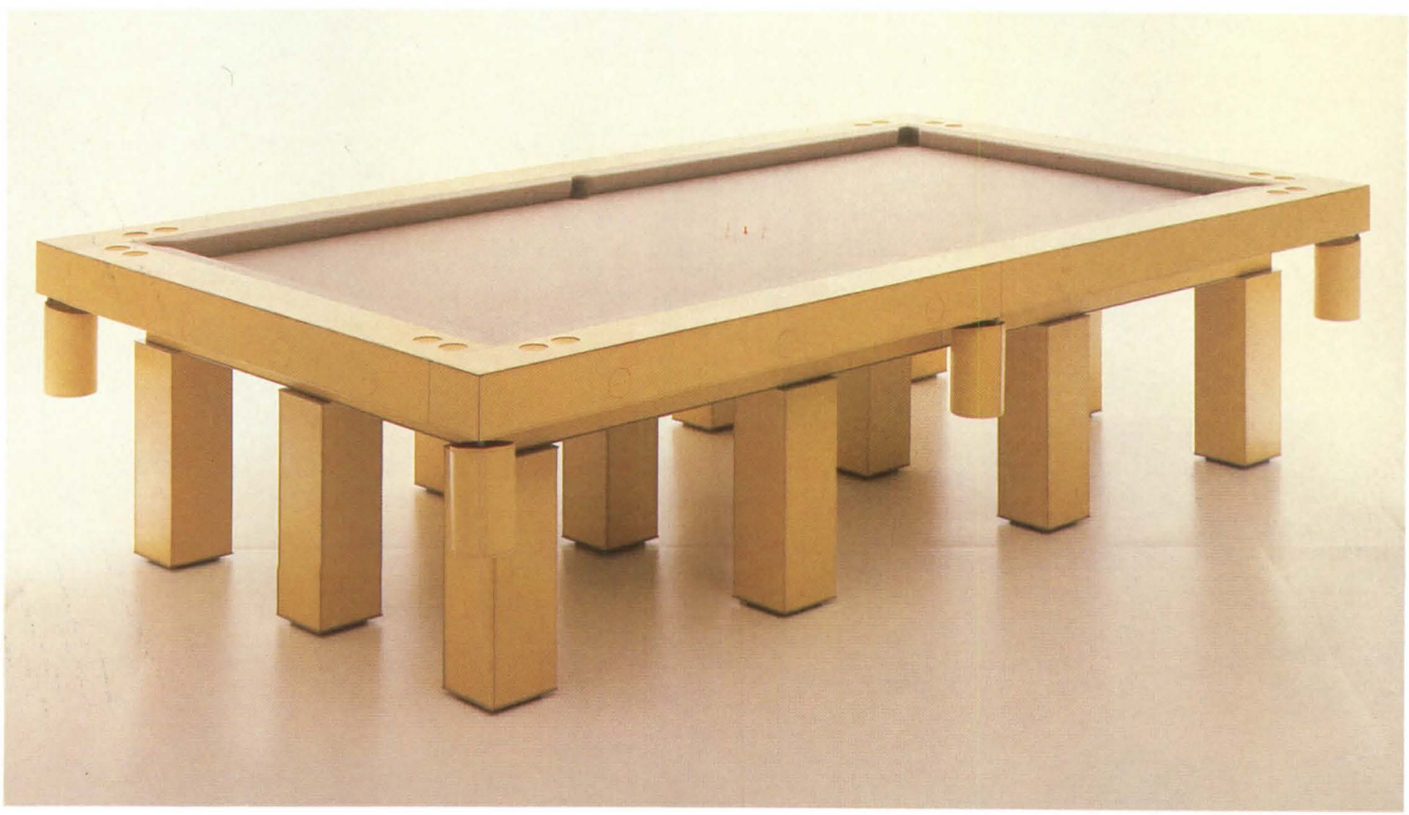

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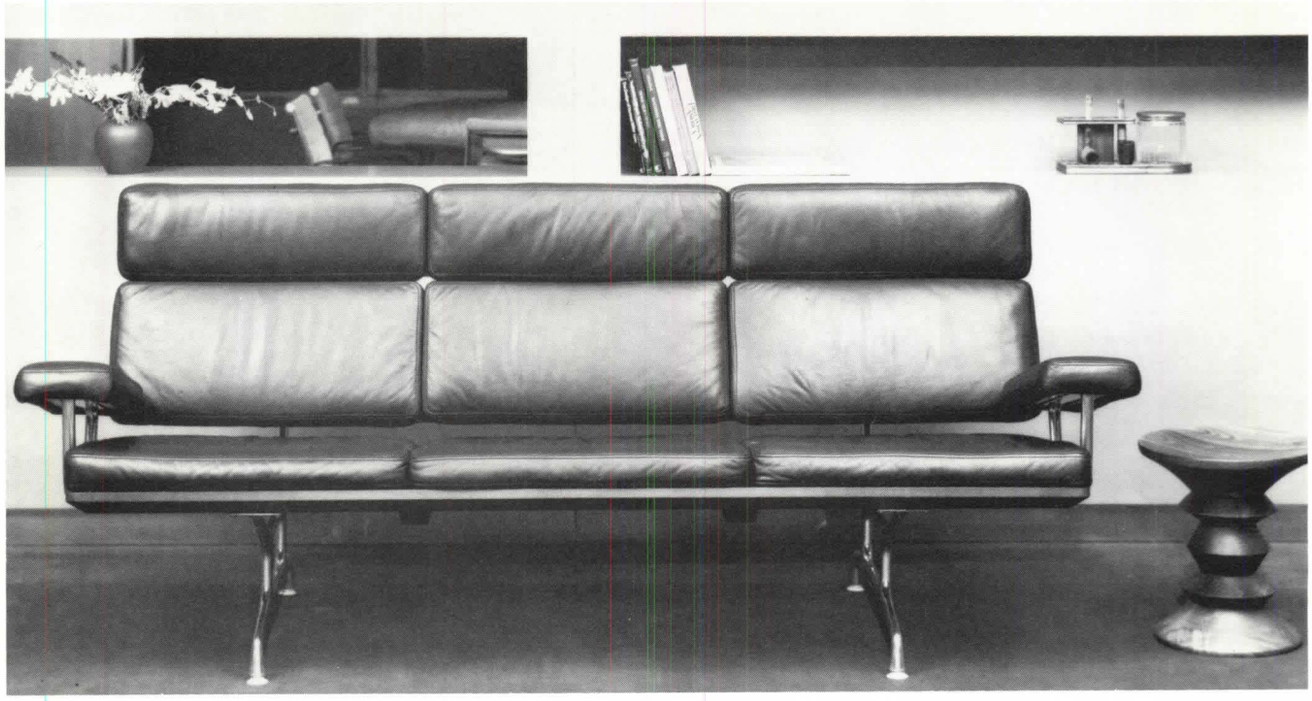
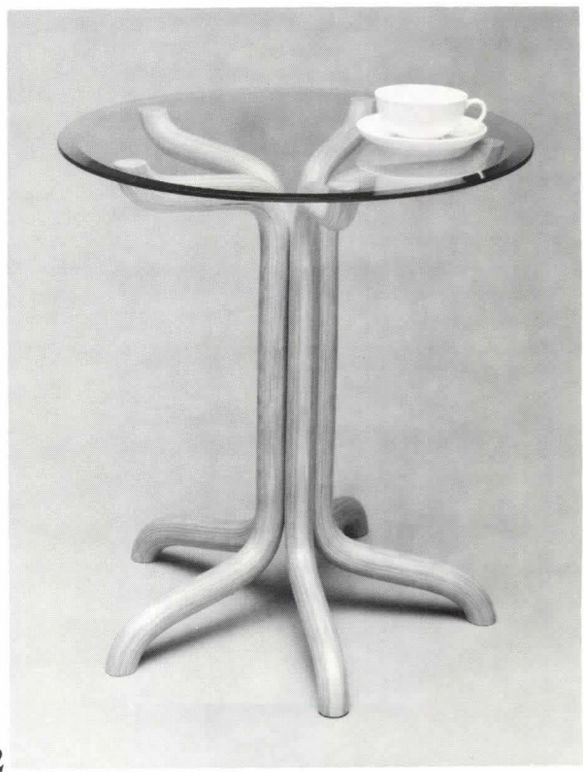


1

An event of significance is the belated appearance of a sofa (1) designed by Charles Eames but never produced in his lifetime. In black leather, aluminum, and rosewood, it is available now, in a limited and numbered edition, from Herman Miller.

The glass topped tables (2 and 3) are two of the ten new additions to the well known Magic Office System line designed by Warren Platner for C. I. Designs. With distinctive bases of laminated bentwood in white oak, walnut, or maple, they are suitable for residential as well as office use. Other options include wood or leather-covered tops. The Monos table (4) by architect Giovanni Offredi has a glass top resting on four similar but asymmetrically arranged trestles; the trestles can be maple, walnut, or (as shown) colored, and are tied together with an aluminum rod; from Saporiti Italia, available in the U.S. through Campaniello Imports, New York, Miami, and Los Angeles.

Also Italian in origin, available here through The Pace Collection, is Olivetti's Synthesis office work station system (5), offering a welcome variety of coordinated components, visually unified with beige laminate work surfaces, brown steel bases, brown or brick colored pedestals, and brick or beige storage units. Still another Italian item, this one designed by B. Maggiori and M. Zanuso Jr., is the Eco table lamp (6) in dark gray, light gray, or sand finishes, from Oceano, Via Borgonuovo 20, 20121 Milan. □



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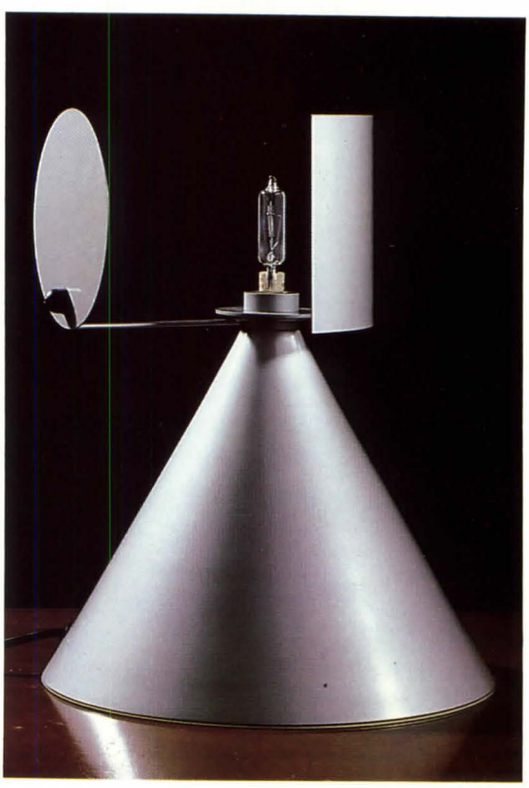

6

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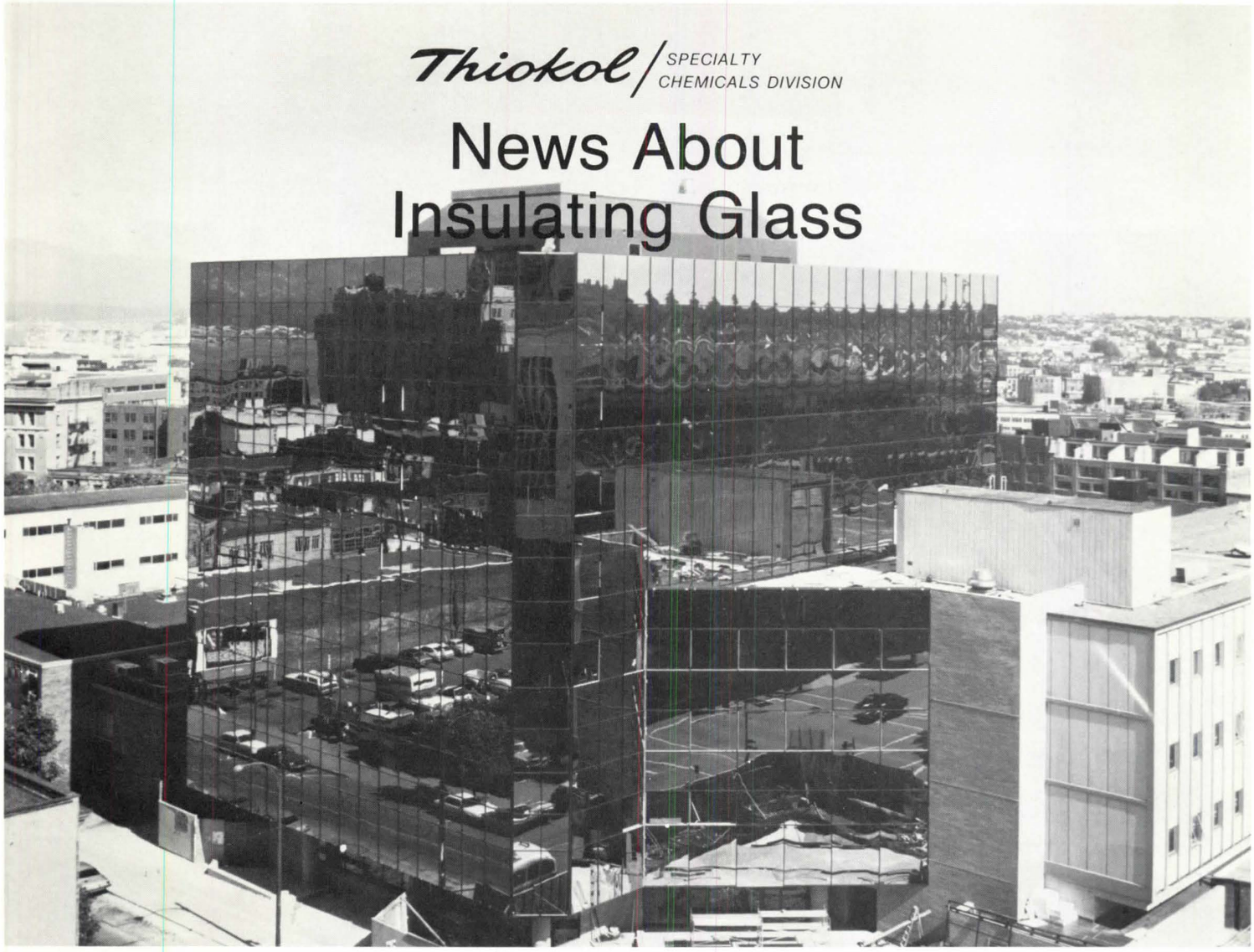

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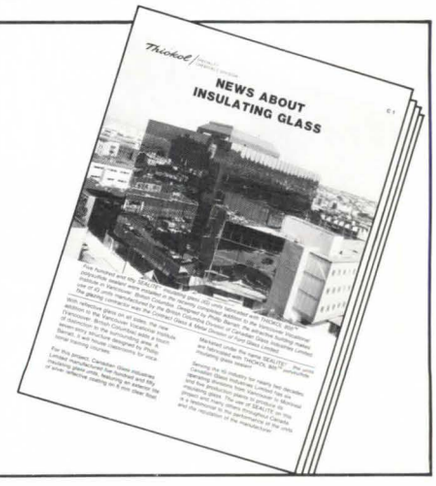

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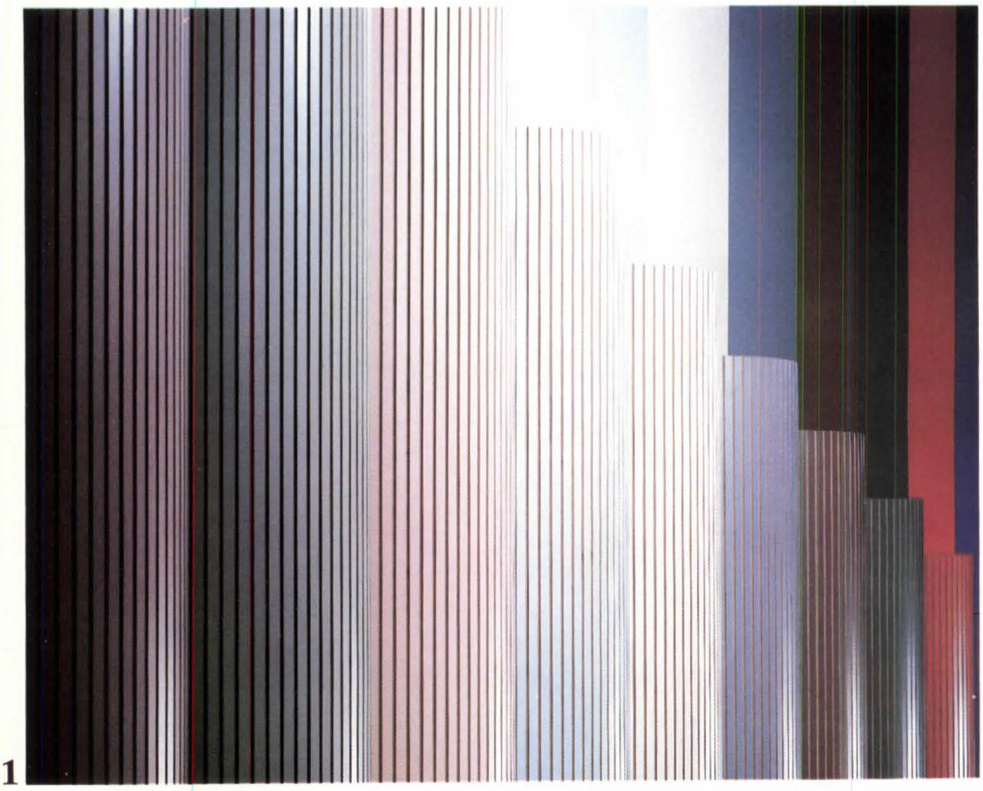

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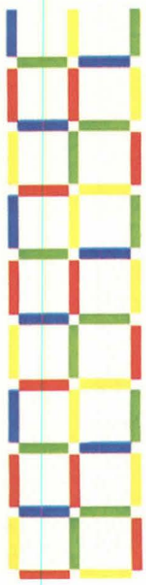


2

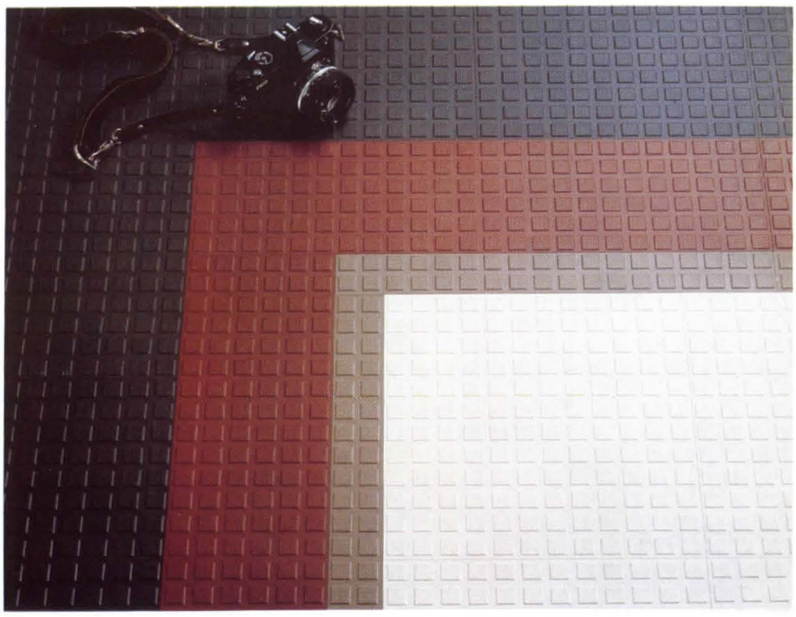
Forms + Surfaces will use any plastic laminate from a major U.S. distributor to construct a custom architectural tambour to match other laminated surfaces (1). The laminate is bonded to tempered hardboard with a flexible backing. The standard size is 23¼x96 inches. (Circle 160 on information card.)

A recent trend in the large selection of Italian tiles is the move toward bright colors and lively geometric patterns and less emphasis on earth tones and traditional designs. Ceramica Bardelli of Milan has introduced a tile series available in red, yellow, green, blue, and three corresponding stripe patterns in each color on a white field (2). The double-fired glossy tiles measure 5x10 inches. A complimentary 2½x10 inch tile uses the four colors in a squared pattern. (Circle 161.)

Hi-Tech vinyl flooring from GMT has a raised textured surface that resists scuffing and scratching and a smooth lower surface finish. The 36-inch-square tiles (3) are available in four colors with raised patterns of small squares, large squares, circles, and rectangles. The colors and patterns may be combined as borders or stripes. (Circle 162.)

A solid state surfacing material without the typical dark edges of ordinary laminate is available from Formica. In Colorcore laminate (4) the dark core material is replaced with a solid color core that remains constant throughout, eliminating the need to miter or bevel when integral color is required along edges and corners. Graphic effects by engraving or routing the surface are also possible. Twelve colors are available in a matte finish. (Circle 163.)

The Con/Tech Corporation's clip rail and wood paneling system is designed to be installed by hand without special tools, may be attached to existing tee bar grids, and can be adapted to standard lighting and air supply fixtures. The system is designed to grip any hardwood, softwood, veneer-faced particleboard or plyboard, as well as plastic panels. Paneling may be prefinished because the stainless steel spring clips grip the back of the panels. In the installation (5) at the Eugene (Ore.) Performing Arts Center by Hardy Holzman Pfeiffer Associates, the closed style paneling was attached to double curved flying wings under the balcony and box seats. Other applications are possible, including open style paneling with three- or four-inch spacing, format grills, and moldings for ceilings and walls. (Circle 164.) *More products on page 104*



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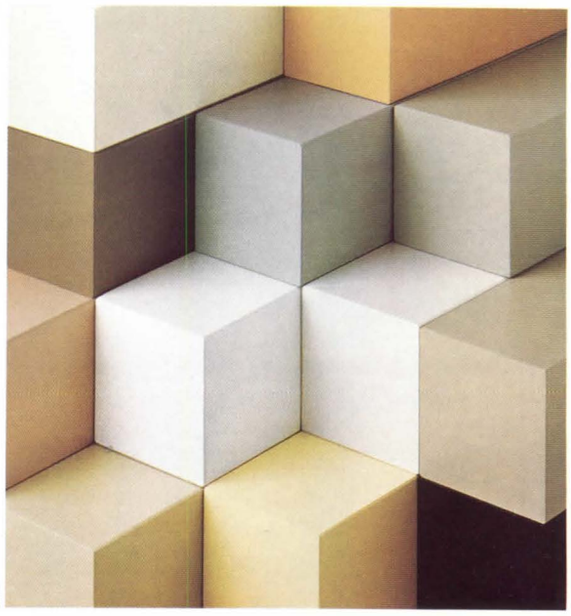

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C. R. Stoaks

5

Ceiling System.
The Hunter Douglas 70U Luxalon ceiling system constructed of steel panels attached to suspended steel carriers is designed to be fire- and corrosion-resistant. The system is engineered with sound absorption and to withstand impact from all types of sports balls for practical installation in sports facilities and school gymnasiums (above). The system is also suitable for exterior canopies. (Hunter Douglas, Inc., Roxboro, N.C. Circle 166 on information card.)

Computerized Sign System.
CompuDirect is a computerized directory system designed for office buildings, shopping malls, and multipurpose complexes. It contains a computerized map, video display, and a push-button console. The system is easily reprogrammed to continuously update listings and flash appropriate sales information and messages. A visitor keys the first letter of the name of the desired company or individual and the monitor displays an alphabetical listing of all the names beginning with this letter. (Public Access Systems, New York City. Circle 159 on information card.)

Stone Panels.
Prefinished natural stone panels with ¼-inch plywood backing are designed for easy installation in modular construction. Sanspray panels are available in nine colors and four textures. Standard panels are four feet wide with lengths of eight, ten, or twelve feet. Custom sizes and thicknesses may be special ordered. (Sanspray Corp., Santa Clara, Calif. Circle 158 on information card.)

Wiring Cover System.
A PVC duct system called "dekduct" is designed to conceal and channel bulky, low-voltage wiring to computers, telecommunications systems, and energy management equipment. The system consists of six- and eight-foot base sections with matching covers, end caps, and corner components, all with a white finish. The components allow for installation around corners, up walls, or at right angles. A self-adhesive strip attached to the back of the channel sections creates a bond that adheres to most surfaces. (LCOMP, Inc., Maryland Heights, Mo. Circle 167 on information card.)

Security System.
Programmable cards used in conjunction with a matching coded program are designed to provide security for simple mechanical doors and complex access control systems. (Systematics, Inc., Chats-worth, Calif. Circle 182 on information card.)

Burglar Alarm.
Prewired, self-contained unit features three-way activating switch with removable key, 15 second entry delay, instant alarm, and off position. Window model has a nine-inch adjustable track to allow window to be opened for ventilation. (Mountain West Alarm, Phoenix. Circle 189 on information card.)

Door Pull Bars.
A line of door pulls from Hiawatha feature a durable black or brown plastic coating for commercial and institutional installations. Round, rectangular, half-round, and square shapes are available. (Hiawatha, Inc., Bloomington, Minn. Circle 155 on information card.)

Aluminum Shade Screens.
Louvered sun control screens feature an electrostatically powder-coated black finish that completely covers the aluminum surface. It can be adapted to any size window. (Phifer Wire Products, Tuscaloosa, Ala. Circle 154 on information card.)

Wall Mounted Radiator.
Fabricated steel radiators with a protective baked enamel finish feature a ribbed surface that provides more area for heat transfer. Four models are available in 12- to 30-inch heights. (Northland Corp., East Haddam, Conn. Circle 179 on information card.)

Translucent Skylight.
Curved skylight features a "sandwich" panel formed by permanently bonding reinforced, translucent glass fiber sheets to a grid core constructed of interlocked, extruded structural aluminum I-beams. The 2¾-inch-thick panels are designed to be a low-maintenance, highly insulating surface that admits natural light. The system weighs 1½ pounds per square foot and does not require an extensive supporting substructure. In the installation (below) at the Missouri Botanical Garden's recently completed Ridgeway Center by Hellmuth, Obata & Kassabaum, the self-supporting Kalwall skylight system spans the length of the building. (Kalwall, Corp., Manchester, N.H. Circle 165 on information card.)

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