FEBRUARY 1992 · SIX DOLLARS

ARCHITECTURE

INCORPORATING ARCHITECTURAL TECHNOLOGY

HOUSES — MULTIPLE CHOICES

Talent Search

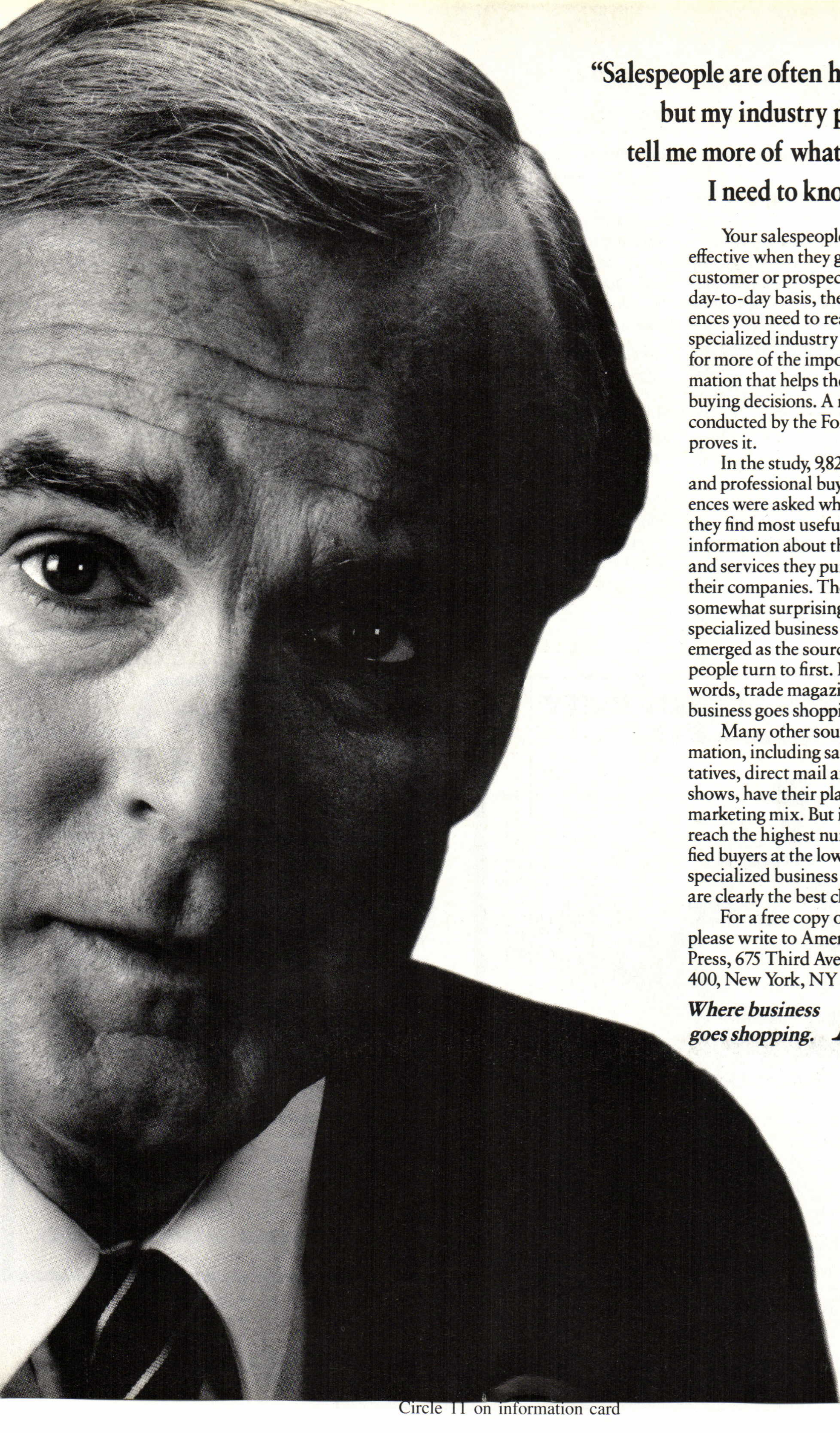
DESIGN HAS TAKEN A BACKSEAT TO PRESSING ECONOMIC CONCERNS THESE days. Architects have more on their minds than following the latest "star" designer, a 1980s syndrome that seems irrelevant. In fact, one of the few stars of 1991 turned out to be an architect who died in 1974, during the last recession. Louis Kahn grabbed the lion's share of attention last fall for his first retrospective at the Philadelphia Museum of Art; for three books published by Rizzoli International on his architecture, sketches, and writings; and for the Salk Institute, a building that has just been honored with the AIA's 25-Year Award and is now the subject of a controversial addition (page 23).

The resurgent interest in Kahn's work is no accident. His fascination with the essence of architecture—elemental forms, light, structure, and materials—expressed in civic and institutional buildings is a welcome relief from the commercial opulence and historical pastiche of the 1980s. Will his asceticism turn out to be a design model for the 1990s? Or is his renaissance mere nostalgia for architectural confidence in an era of diminishing expectations?

Recessions often spawn such reevaluation of the past, as well as predictions about the future. The last recession for architects in the 1970s, for example, produced a flurry of paper architecture and heated debate. Advocates of historically inspired forms faced off against Modernist diehards and revisionists in seminars, conferences, exhibitions, and publications. Such controversy fueled architecture over the following decade, when designers actually began building the Postmodern schemes they had previously proposed on paper and in print. Unfortunately, the current economic slump has yet to spur the same design fervor. Architects are too busy fighting to compete in an increasingly shrinking market, hunkering down to grapple with the pragmatics of staying in business. But that nearsightedness may change, especially for younger architects.

To find out what design directions are brewing around the country, we are holding a competition to discover new talent. Our goal is to discover creative solutions by architects who have never been featured in a major American architectural magazine. ARCHITECTURE's editorial staff will select the winning projects, which will be published in our June 1992 issue. Only built projects are eligible, including renovations and additions. The project must have been completed after January 1990, and entries must be submitted in standard binders and include photographs, slides, drawings, a one-page project description, and project credits. Individual buildings or multiple projects, whether residential, commercial, or institutional, may be submitted. (For more details, contact Galen Plona, 202-828-0993.) The deadline is February 28, 1992. Who knows? We might just discover the next Louis Kahn. ■

—DEBORAH K. DIETSCH



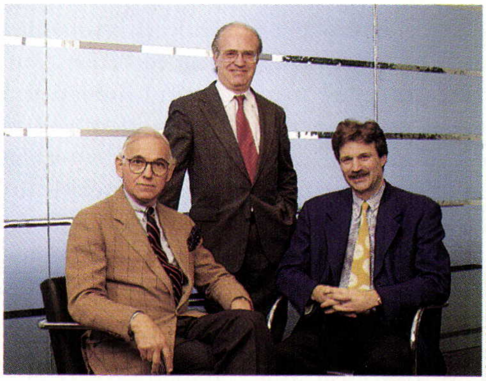
NEWS

Student Conference and Competition ▪ New York Jobs Protest ▪ Eastern European Opportunities

Polshek and Partners Named Firm of the Year

FOR A REPUTATION BUILT ON sensitive new architecture in older neighborhoods, James Stewart Polshek and Partners of New York City was awarded this year's AIA Architecture Firm Award. According to the awards jury, the work of Polshek and Partners demonstrates an "extremely sophisticated contextual response that blends design, technology, and management into architectural totalities." This approach is apparent in projects as diverse as the restoration and expansion of Carnegie Hall and the design of the U.S. Embassy in Oman.

In 1962, a major commission to design the $30 million Teijin Central Research Institute in Tokyo placed Polshek's young firm on the map. This first significant project was indicative of the types of commissions Polshek has attracted throughout his career: buildings for public institutions on important urban sites.



ISAIAH WYNER

Polshek and Partners is headed by James S. Polshek (left), Joseph L. Fleischer (center), and Timothy P. Hartung (right).

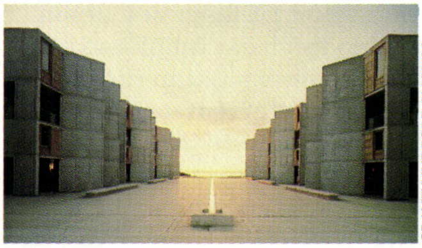
Among the firm's best-known and diverse works are the New York State Bar Center in Albany, New York, completed in 1968; 500 Park Tower in New York City, completed in 1981; the Brooklyn Museum master plan and Sulzberger Hall at Barnard College, both completed in 1988; and the Seaman's Church Institute Headquarters in New York, completed last year (ARCHITECTURE, November 1991, Pages 66-73). Among works on the boards are a theater for the Yerba Buena Gardens Center for the Arts in San Francisco; the National Inventors Hall of Fame in Akron, Ohio; and a comprehensive signage program for New York City's Central Park.

Polshek perceives the thread that ties these projects together as a context-sensitive approach that heals existing wounds within urban tissue. "Each design challenge is seen as analogous to the differences between individual human beings," explains Polshek. This architectural ethic, rather than a signature style, is shared throughout the firm.

Three partners head the firm: Polshek is in charge of design; Joseph L. Fleischer oversees management of the firm; and Timothy P. Hartung directs personnel and projects. Four of ten associates are responsible for design, three handle project management, two others direct interior design and preservation work, and one is responsible for technical services.

Polshek studied architecture at Yale and counts the work of Eero Saarinen and Louis Kahn as his most potent influences. He admires Saarinen's ability "to embody his buildings with the values of his clients, without formal consistency," and Kahn's skill at assembling materials. As in the work of Saarinen and Kahn, the work of Polshek's firm attempts to mold itself to the exigencies of place and client identity.

The AIA Firm Award was announced at the 1992 AIA Accent on Architecture gala in Washington, D.C., last month, and will be presented at the Institute's 1992 convention in Boston in June. The awards jury included William E. Pedersen (chair) of Kohn Pedersen Fox; Douglas Kelbaugh of Kelbaugh Calthorpe & Associates, who chairs the University of Washington architecture department; Dean Harrison Fraker of the University of Minnesota College of Architecture and Landscape Architecture; Los Angeles designer Deborah Sussman of Sussman/Prejza; Adele Chatfield-Taylor, president of the American Academy in Rome; Roberta Feldman, associate professor of architecture at the University of Illinois-Chicago Circle; and student Valerie Colgate from the New School of Architecture, San Diego. —MICHAEL J. CROSBIE



GRANT MUDFORD PHOTOS

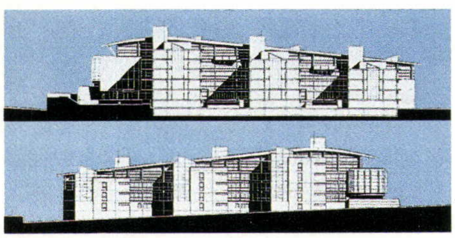
Salk Institute Wins 25-Year Award

AS THE FIRST LOUIS I. KAHN RETROSPECTIVE moved from Philadelphia to Paris last month, the AIA confirmed renewed appreciation of Kahn's principled design by honoring the Salk Institute for Biological Studies (above) in La Jolla, California, with its 25-Year Award. The award cites Kahn's ability to unite art, science, and philosophy in architectural form. Set on a cliff overlooking the Pacific Ocean, the Salk Institute clearly distinguishes between what Kahn called "servant space" (mechanical and service areas) and "served space" (laboratories and meeting rooms), affording the 1967 facility with flexibility for modifications. However, like other organizations housed in Modern landmarks, the Salk Institute has outgrown its current facilities and last year proposed a controversial expansion (ARCHITECTURE, April 1991, page 23). The addition by Anshen + Allen comprises a pair of symmetrical, concrete wings to occupy a eucalyptus grove east of Kahn's building. In spite of public outcry, Jonas Salk is intent on going ahead with the addition and hopes to start construction this summer.

Salk will present the proposal at a seminar sponsored by the Architectural League of New York this spring.

DETAILS

Cooper Robertson of New York has been selected over **Backen, Arrigoni & Ross** of San Francisco to design a 120,000-square-foot office complex in Culver City, California, for Sony Corporation. The Cranbrook Educational Community, in Bloomfield Hills, Michigan, has announced five architects to design four campus additions: **José Rafael Moneo** of Madrid, Spain, will design new art studios; New York-based **Tod Williams and Billie Tsien** will complete an athletic complex; **Peter Rose** of Harvard University will design an educational facility for children; and **Steven Holl** of New York will complete a museum of natural history and science. Cranbrook is currently conducting a competition for the design of the campus's entrance gate. **Margaret Helfand** of New York City has been asked to redesign her first house, which was built in 1973 and destroyed last October during the Oakland fire. New York architect **Michael Avramides** is donating his design services for an 890-square-foot Ben & Jerry's ice cream store in Harlem. AIA Chicago honored **Decker and Kemp Architecture** with the chapter's first Firm Award. An exhibit featuring the firm's work and additional 1991 chapter award winners is on view at the Chicago Historical Society through April 4. **Erlich-Rominger** of Los Altos, California was selected over San Francisco firms **Gensler and Associates**, **MBT Associates**, **Robinson Mills & Williams**, **Hellmuth, Obata & Kassabaum**, and the San Francisco offices of **Skidmore, Owings & Merrill** to design 510,000 square feet of offices for Amdahl Corporation in San Jose, California. **James Stewart Polshek and Partners** won a design competition with French architect **Alain Salomon** to design a 110,000-square-foot office building for public works agencies (below), plus a conference center and gallery, in Chambéry-le-Haut, France.



Architecture Students Examine Their Future

AIA UPDATE

MIDWAY THROUGH THE school year, the American Institute of Architecture Students (AIAS) continues to focus on career options, internships, and the question of establishing a single degree title for those eligible to practice architecture. These issues were raised in November at AIAS Forum '91 in Miami, the annual conference attended by the AIAS executive committee and its 161 chapter presidents. Through publications, programs run by each of five national directors, and its annual leadership conference, AIAS helps to resolve the problems of architecture students today.

The decreasing availability of jobs in architecture firms has students worried about the future. Yet, at the November conference, National Architectural Accrediting Board (NAAB) President Linda Sanders maintained that there really is no scarcity of jobs. "It's only that our focus has been extremely narrow," Sanders said. "There are new roads that we haven't yet travelled." To reveal career options outside the realm of private practice, Lisa Szmurlo, one of the five AIAS national directors, chaired a panel of architecture-related professionals at the Miami Forum. The panel comprised an artist, an architecture critic, a developer, a design-builder, and an attorney. "This is not about the jobs you apply for," Beth Dunlap, *Miami Herald* architecture critic maintained. "This is about jobs that you create for yourself."

During the conference, discussion of architecture internships centered on students who are undercompensated. Participants pointed out that such exploitation weakens interns' respect for their employers and perpetuates elitism, since volunteer work is only possible for students from wealthy backgrounds. The AIAS has formed an advisory committee to address this issue, and 7,000 questionnaires have been sent out to evaluate the current quality of internships.

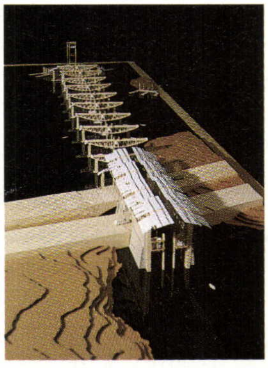
The past and current presidents of five organizations—Association of Collegiate Schools of Architecture (ACSA), AIA, AIAS, NAAB, and the National Council of Architectural Registration Boards (NCARB)—have signed a document that advocates establishing a single degree title for individuals who meet the educational requirements for the architectural profession by January 1, 2001. Currently, NCARB treats the bachelor's and master's degree in architecture as equals, and in some states, architects need never undergo higher education. According to NCARB President Robert Burke, "I was appalled at the idea that someone could become an architect just by having a high school education and perhaps 10 to 15 years of experience." The document also calls for a three-year study of architectural education.

Summing up AIAS's 1991 activities, President Lynn Simon notes: "It is critical that students become involved in every aspect of their education, from dean searches to setting a curriculum. Students have a right to directly affect and influence what they are taught and what they are learning. The AIAS is a major vehicle to empower the students of today to guide their future in a positive direction." For more information on AIAS activities, call: (202) 626-7472.

—LEIGH CHATHAM HUBBARD

Leigh Chatham Hubbard is a student at North Carolina State University and the editor of CRIT.

AIAS Announces Student Winners



Texas A&M University students William Jeffrey Westhoff and Brian Kelly Burke won first place in the 1991 AIAS competition entitled "Where Sight Lines Meet." Cosponsored by the Copper Development Association and the Canadian Copper and Brass Development Association, the competition called for a ceremonial gateway between Canada and the U.S. The winning scheme (left) proposes parallel walls and rows of copper- and brass-roofed cranes set in the St. Lawrence River. Jurors for the competition included AIA past president Sylvester Damianos; Canadian architect Essy Baniassad; Phyllis Lambert, director of the Canadian Centre for Architecture; Donald Commerford, Jr., vice president of Revere Copper; and Iowa State architecture student John Paul Goedken.

Robert Peck Appointed to AIA External Affairs

AIA UPDATE ROBERT PECK, A PRESERVATION advocate and Washington, D.C., attorney who specializes in zoning law, joined the AIA last month as its new Group Vice President of External Affairs. He will be responsible for promoting AIA policies to government officials and increasing public awareness of architects' abilities.

Peck is well-prepared to lobby Congress on the merits of affordable housing, environmental conservation, and rewarding excellence in architecture, in addition to licensing, liability, and professional service tax issues. A former assistant director at the National Endowment for the Arts, Peck helped secure passage of the Public Buildings Cooperative Use Act of 1976, which encourages federal offices to allot building space for retail use. In 1979, he served as associate counsel to the U.S. Senate Committee on the Environment and Public Works until 1984, when he became Administrative Assistant to Senator Daniel Patrick Moynihan (D-N.Y.). More recently, Peck was instrumental in drafting sections of the Surface Transportation Act, signed into law last December (ARCHITECTURE, January 1992, page 13), which links construction of transportation systems to local planning and preservation efforts.


PHILIP BUJAKOWSKI

Robert Peck was recently named AIA Vice President for External Affairs.

In his new position, Peck hopes to broaden the impact of architects by encouraging them to pursue publicly oriented activities. Architects, Peck contends, should lobby for more affordable housing, serve on zoning and planning boards, run for Congress or state offices, and strive for important government posts in the General Services Administration or the Department of Housing and Urban Development.

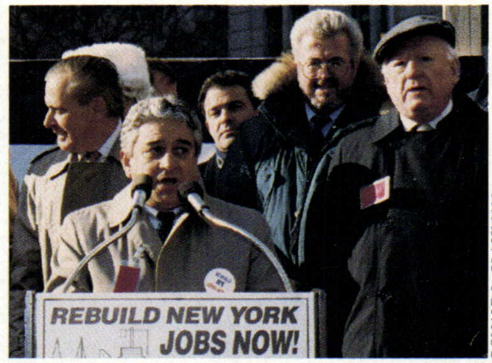
While Peck believes that architects' clout is achieved in part through solid design, he points out that the success of the profession depends upon public support. For example, he believes that architects understand the decline of public housing and homelessness better than other professionals, yet cities rarely think of approaching architects when seeking housing solutions. The more the public becomes aware of architects' problem-solving capabilities, the more it will enlist practitioners in different arenas, Peck explains. "If architects are seen fighting for the quality of life," he maintains, "they will be more highly regarded and influential players in our communities." —KAREN SALMON

AIA Names 13 Honorary Members

AIA UPDATE THIRTEEN HONORARY MEMBERSHIPS will be conferred at the AIA's convention in June. Recognizing outstanding contributions to design and allied arts and sciences, honorary membership is the highest tribute the Institute can bestow upon a person outside the profession.

The 1992 honorary members are: **Brendan Gill**, writer for *The New Yorker* magazine and author of *Many Masks*; **Roberta Jane Guffey**, executive director of the West Virginia Society of Architects; **F. Otto Haas**, a founder of Philadelphia's Foundation for Architecture; His Highness the **Aga Khan**, founder of the Aga Khan Trust for Culture in Gouvieux, France; U.S. Representative **Peter H. Kostmayer**, chairman of the House Interior Subcommittee on Energy and the Environment; **Louis L. Marines**, former executive vice president of the AIA and founder of the Advanced Management Institute in San Francisco; **Roger Milliken**, chairman and chief executive officer of Spartansburg, South Carolina-based textile manufacturer Milliken & Company; **Betty Jean Musselman**, executive office administrator of the AIA; **Raymond Patrick Rhinehart**, vice president of the American Architectural Foundation; **Philip G. Schreiner**, editorial director of *Building Design & Construction* magazine; **Rex Scouten**, White House curator; **Paul Weidlinger**, structural engineer and principal of Weidlinger Associates; and **Paul W. Welch, Jr.**, executive vice president of the California Council/AIA.

The jury for 1992 honorary membership included architects John F. Hartray (chair) of Chicago, Illinois; Philip Dinsmore of Phoenix, Arizona; and Honorary AIA Member Lloyd Kaiser of QED Communications in Pittsburgh, Pennsylvania. —L.N.



RONALD L. GLASSMAN

NYC/AIA's Castro-Blanco addresses rally.

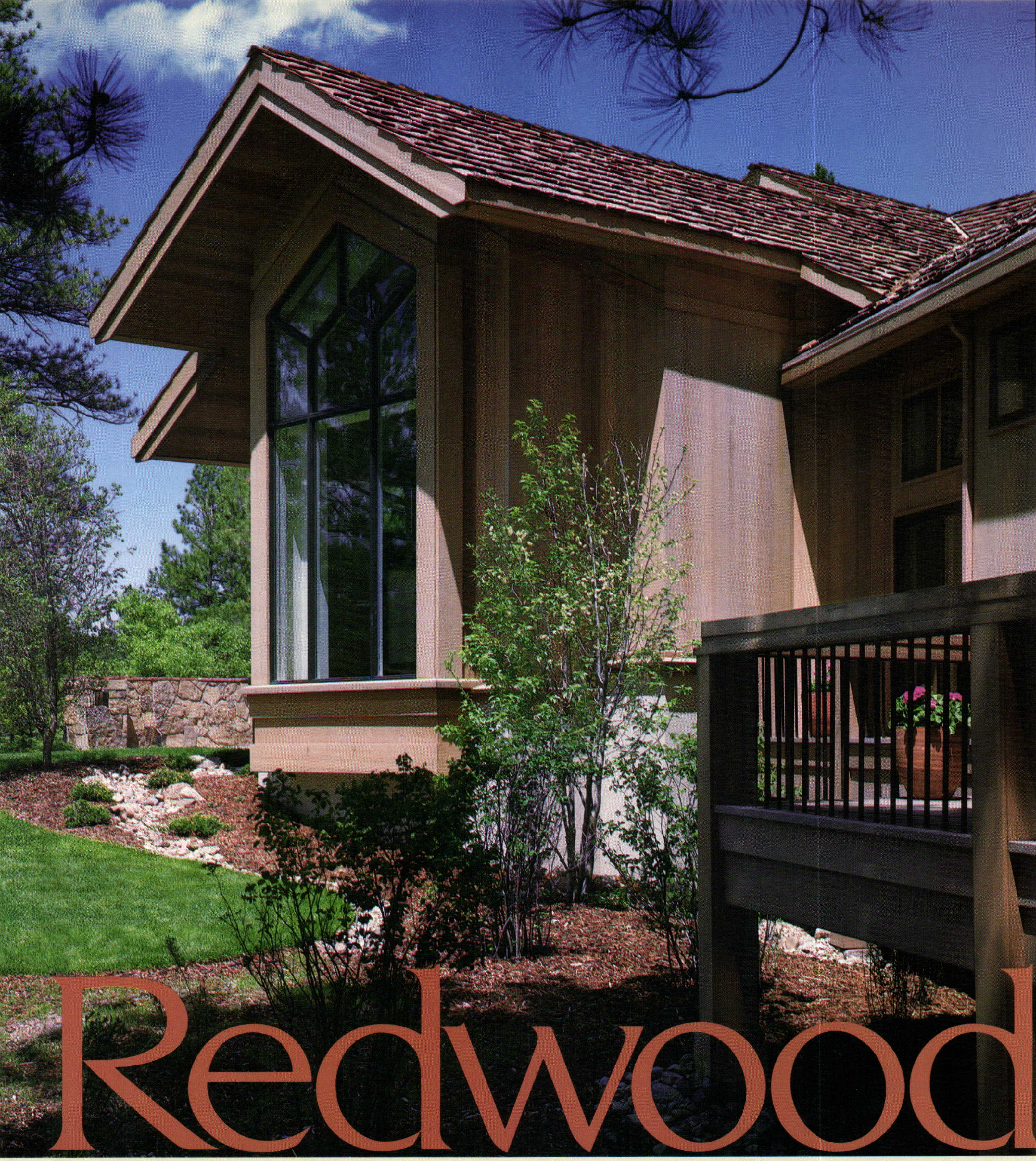
New York Jobs Protest

AT WHAT MAY BE THE LARGEST RALLY EVER of its kind, an estimated 50,000 architects, developers, and construction-industry workers gathered in New York's City Hall Park last December 17. Calling the rally "Rebuild New York—Jobs Now," the demonstration's leaders set forth demands for "priming the pump" of the city's economy with an enormous public works program. Louis Colletti, the event's organizer and president of the New York Building Congress, introduced a plan that would speed the city's process for sending 10 current capital projects out to bid. These developments include Westside Waterfront Park, the controversial TriBeCa Commodities Exchange, and several highway and other infrastructure projects.

Speaking for the architectural community, New York City AIA President-Elect David Castro-Blanco challenged Mayor David Dinkins to provide "a vision of how great this city can be, and the dynamic leadership to attain that vision." Castro-Blanco noted that the current 30-40 percent unemployment rate among the city's architects heightens the need to get stalled projects going.

New York might well look to Maryland in expediting publicly funded construction. Maryland Governor William Schaefer's "Maryland Goes To Work" program now moves state-funded projects through the design-bid-construction pipeline, often speeding the process by as much as three months. A program patterned after Maryland's was included in the recently enacted Surface Transportation Act, and Schaefer administration officials have received calls from curious government officials in Connecticut, Texas, California, and many other states.

—STEVE BODOW


Redwood

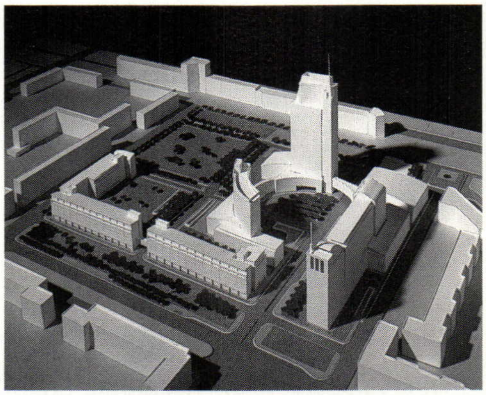
Eastern Europe Offers Opportunities for Architects

THEIR ECONOMIES, RULERS, AND EVEN THEIR names are in transition, but the countries of Eastern Europe, which now include Russia (formerly the Soviet Union) are spawning a growing source of work for American architects. Ranging from commercial to technological to governmental, these commissions include Skidmore, Owings & Merrill's master plan for an International Trade Center in St. Petersburg (formerly Leningrad, formerly Petrograd, formerly St. Petersburg), HOK's master plan for a technology center in Magdeburg, Germany (formerly East Germany), and Robert A.M. Stern's U.S. Embassy annex in Budapest, Hungary.

SOM's scheme for a 31-acre trade center in St. Petersburg comprises a 30-story office tower, two hotels, an apartment complex, convention center, and telecommunications center. The project is intended to usher in St. Petersburg's new image as the "Hong Kong of Europe," in the words of the city's visionary mayor, Anatoly Sobchak. It addresses the difficulties of doing business in the former Communist country, which is still reeling from its break-up into disparate republics. The center's two first-class hotels will be managed by Western companies, and its telecommunications center will provide state-of-the-art linkage with foreign offices. Its site is appropriately located in the middle of the port city's free enterprise zone, an economic enclave offering financial incentives to overseas businesses. Scheduled for occupancy in early 1995, the project awaits approval by the city's architectural review board.

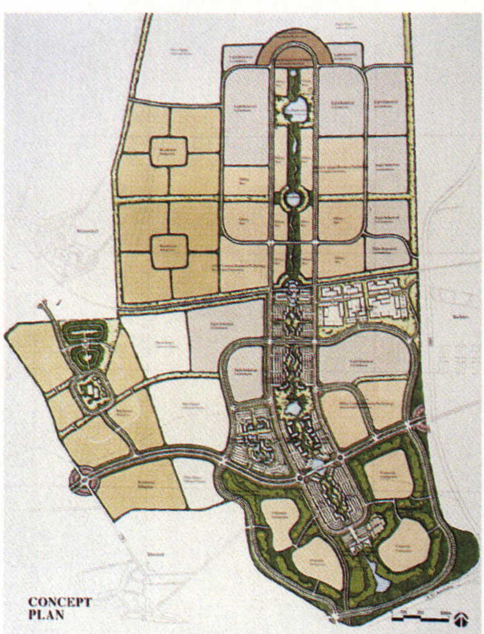
A similar response to Europe's changing borders is HOK International's Central European technology park, planned for the city of Magdeburg in Germany. Equidistant from Hanover and Germany's renewed national capital in Berlin, HOK's recently completed master plan includes a mixed-use technology park for business, cultural, and recreational activities, residential and retail establishments, and a hotel. The 3,500-acre complex is envisioned as a gateway to Central Europe, which promises to become a leader of economic activity as it emerges from the shadow of the old Soviet Union.

In preparation for this economic miracle, the U.S. Department of State has been improving its embassies and consulates in several East European capitals. A *Commerce Business Daily* advertisement in January called for firms with expertise in upgrading security and surveillance systems, as well as in rehabilitating older buildings. The State Department's Office of Foreign Buildings Operations anticipates awarding as much as $2 million worth of such contracts, which promise selected firms a minimum of $100,000 over a five-year period. Rather than build new embassies in the emerging capitals, the State Department is leasing palaces, apartment buildings, and office buildings to rehabilitate for temporary occupancy.



International Trade Center
St. Petersburg, Russia
Skidmore, Owings & Merrill, Architect

United States Embassy
Budapest, Hungary
Robert A.M. Stern, Architect

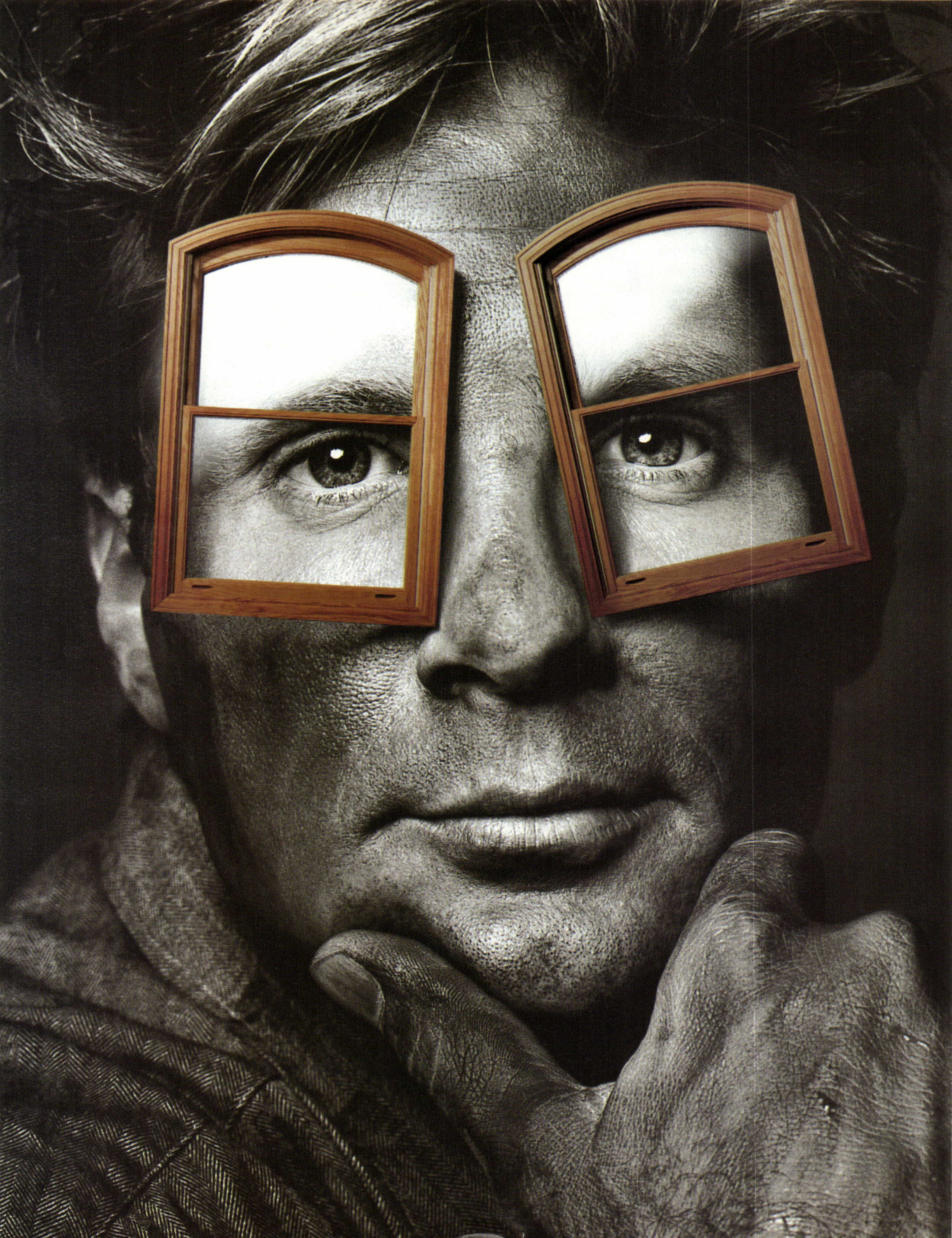


Technology Park
Magdeburg, Germany
HOK International, Architect

One larger project is Robert Stern's addition to the U.S Embassy in Budapest, a 73,000-square-foot cultural and consular annex called America House that will serve the embassy's public functions. The five-story building includes public meeting, reception, and exhibit rooms on the first floor, a suite of consular offices on the second, and administrative offices on the upper stories. A United States Information Service library is housed within a rotunda. Stern's initial design for the annex was approved by the Office of Foreign Buildings Operations' architectural advisory board, which includes Charles Moore, George Hartman, and Thomas Beebe. Construction will begin in early 1993.

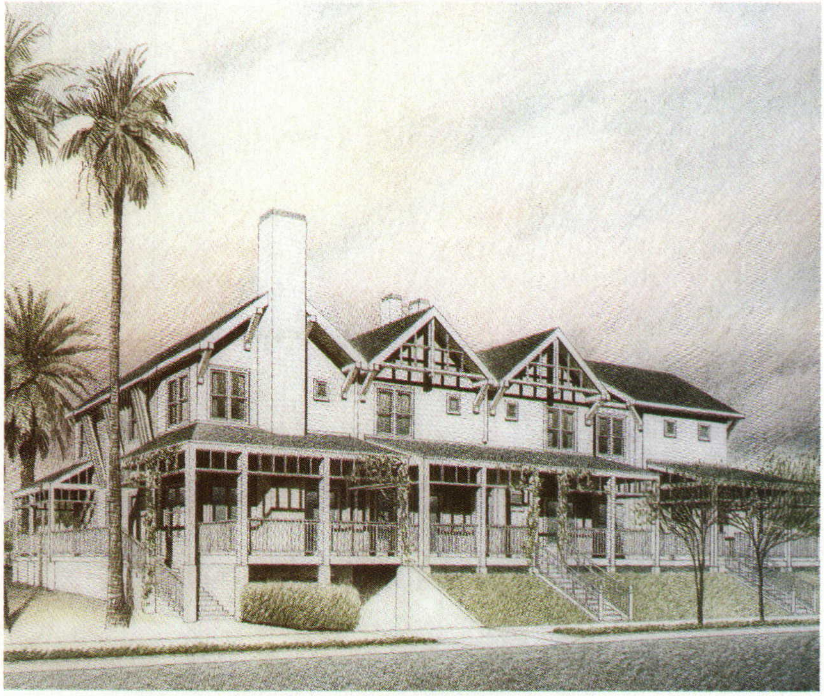
The State Department is a stable client, and projects in eastern Germany, thanks to investments in deutsch marks, are similarly sound. The future of Russia is another matter, however. During the Communist era, when St. Petersburg was called Leningrad, the city's industry was based upon the great Soviet power's military needs. Without that mighty source of revenue, some economic forecasters contend that the city's future looks dismally bleak. Asked about the real future of the International Trade Center, SOM's Craig Hartman says, "Who knows?" Other firms with work in Russia, such as Boston architects Notter Feingold + Alexander, worry as the Russians continually change the site of a mixed-use project their firm has designed for Moscow. And the controversial new U.S. Embassy in the former Soviet capital recently received a $300 million Congressional appropriation, but its designers at HOK had little reason to be pleased. The State Department is unlikely to build an embassy in a nation that is yet to be defined. ■

—HEIDI LANDECKER

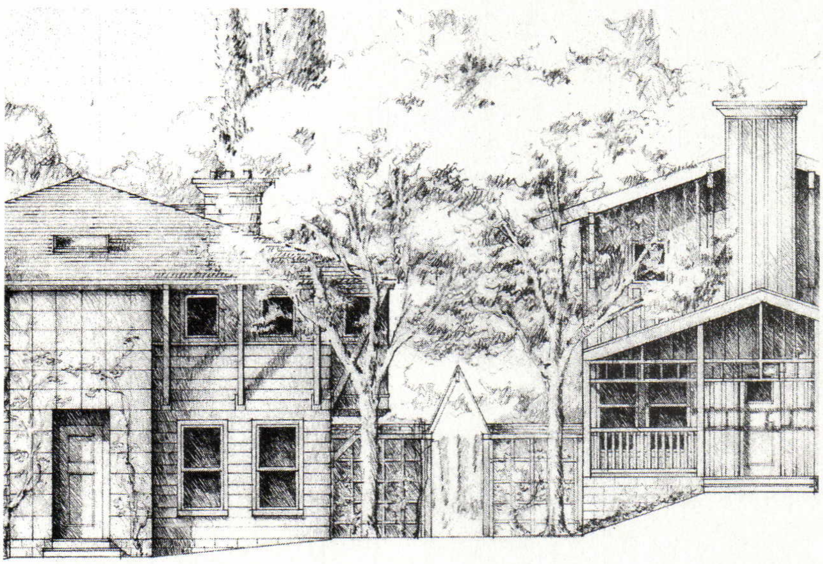


Housing Alternatives

Palm Court
San Jose, California
Solomon Architecture and Planning

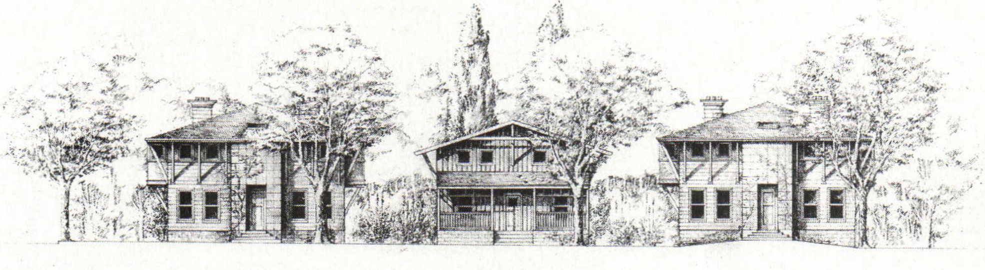


DESIGNED BY DAN SOLOMON IN THE BAY Area's Bungalow Style, 31 units of affordable housing will be built on a 1.3-acre site adjacent to a light rail station and near a commuter train depot just outside downtown San Jose. To establish continuous street frontage, Solomon pushed perimeter units to the site edge and created garage access through an internal driveway system (right). Tucked beneath double-height living spaces, the below-grade garages support individual balconies that face a central common garden. To open the project to the surrounding neighborhood, the architect designed the landscaped garden to be accessible to the public. Construction of Palm Court will begin early next year and is expected to reach completion by July 1992.

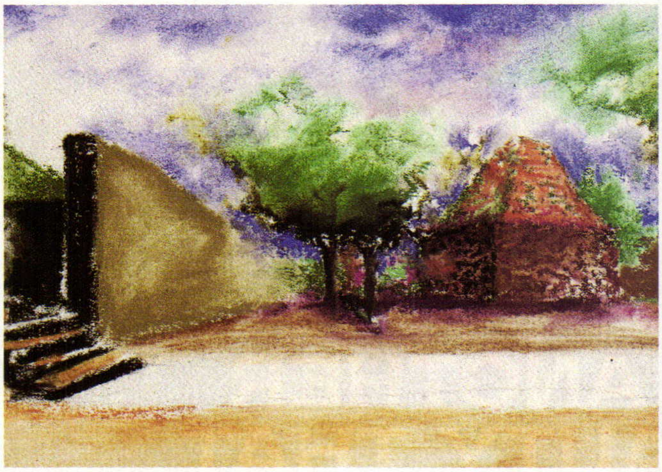


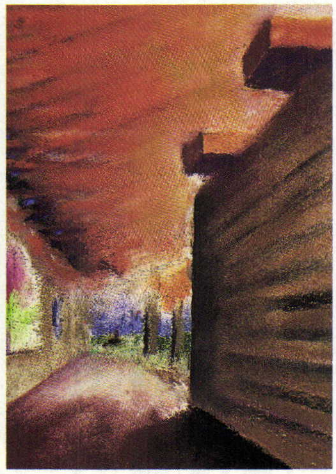
Vest Pocket Community
Fairfax, California
Solomon Architecture and Planning

A 13,555-SQUARE-FOOT SCHEME FOR FIVE shared houses and a community building responds to a continuing demographic shift toward single-person and single-parent households. To reduce living costs for this clientele, Solomon designed three communal residences (below) that are intended to encourage social interaction through a central courtyard and shared living and kitchen areas. Units are linked by fences with open gateways (left). The nonprofit developer, Innovative Housing, estimates project expenditures at $100 per square foot. Construction is scheduled to begin in spring 1992. —K.S.



ON THE BOARDS



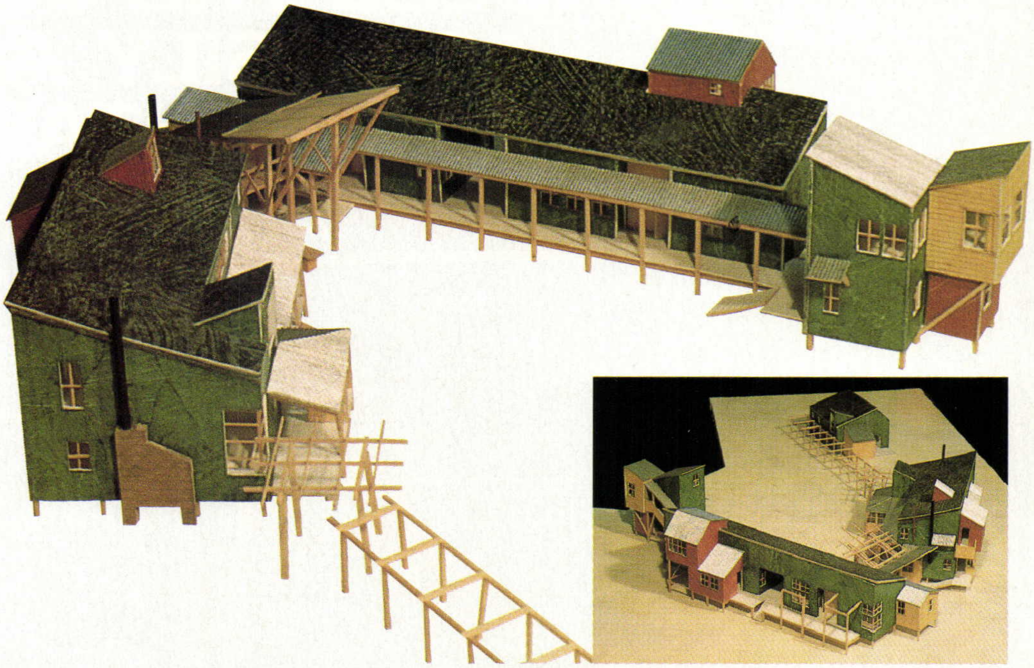


Private House
Southern California
Rob Wellington Quigley, Architect

ROB QUIGLEY ORGANIZED A 20,000-SQUARE-foot house on a mountaintop south of Los Angeles as discrete, stucco-clad volumes containing bedrooms, services, and living-dining areas. The complex is entered from a north-facing entrance court (far left) through a concrete wall to a timber-roofed gallery (left). Views from the gallery include a chapel and mission to the east and the Pacific Ocean to the south. The scheme is currently undergoing further design development.

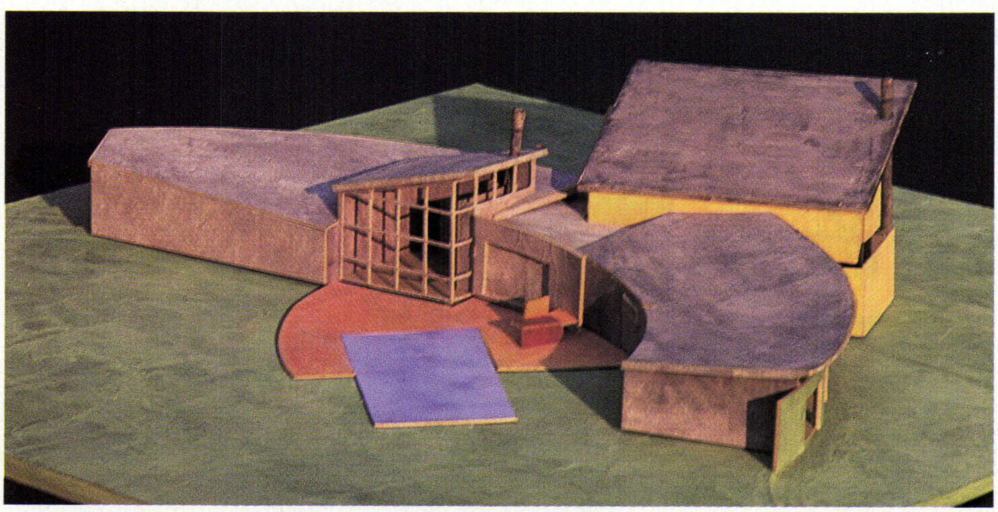
Collective Housing
Philo, California
Fernau & Hartman Architects

BERKELEY-BASED LAURA HARTMAN AND Richard Fernau designed a 5,000-square-foot assemblage of sheds on 13 acres in Mendocino County as group housing for four couples and three individuals. The architects connected two sloped-roof wings (right) containing shared living areas and private quarters with a pavilion and verandas. These buildings are linked to a garage by a trellis (far right, top in photo). The V-shaped ensemble allows clients to expand living spaces along the north and west facades; red corrugated-metal-clad sheds house bedrooms; yellow-painted volumes contain services; and post and lintel projections support tentlike enclosures. The project will be completed in 1993.



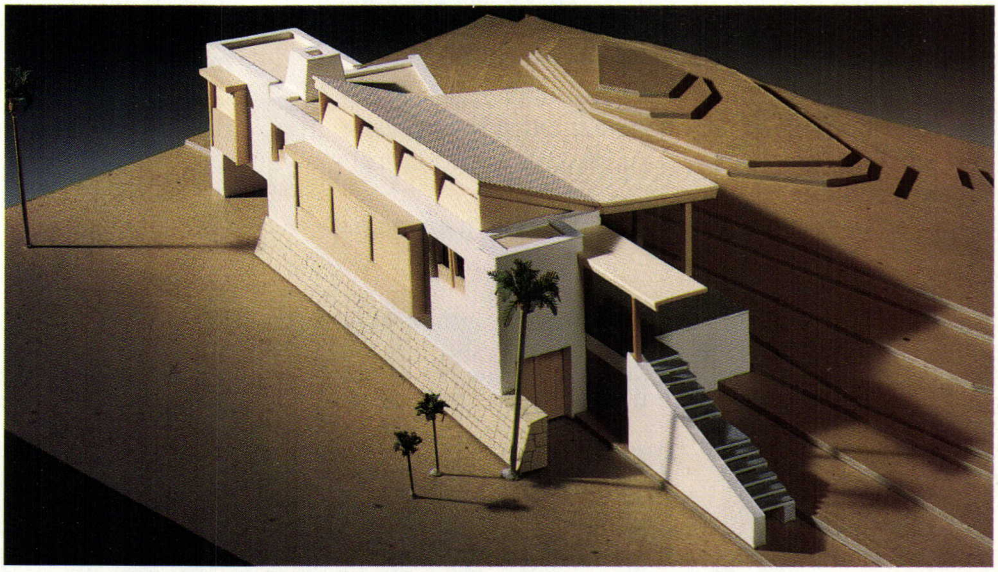
Kreindel House
Cresskill, New Jersey
Frank Lupo/Daniel Rowen, Architects

LOCATED ON A NARROW SITE 10 MILES NORTH of Manhattan, the Kreindel House (right) includes a single-story curved mass that creates a protected yard and a formal, two-story volume that addresses the street. New York architects Frank Lupo and Daniel Rowen housed bedrooms, family room, and services in the two curving wings at each end; master bedroom and living-dining areas occupy the two-story block, with views to the Ramapo Mountains. Construction of the 6,000-square-foot house will begin this spring. —K.S.

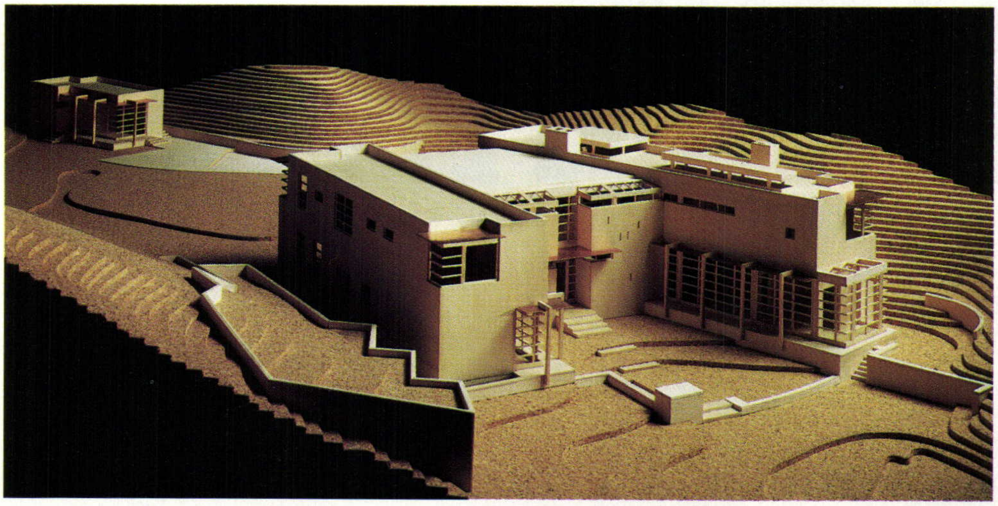


ON THE BOARDS

Kroth House
Pine Cay, British West Indies
The Hudson Studio

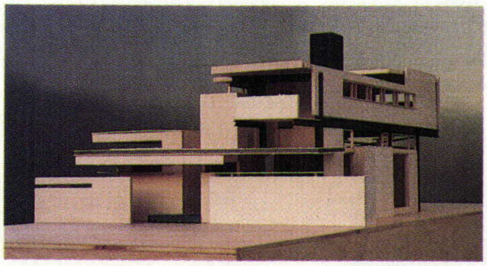


A LINEAR, 1,200-SQUARE-FOOT VACATION house (right) for a German couple is oriented to take advantage of panoramic views of the Caribbean to the northwest and trade winds blowing from the southeast. All living functions are contained on one level, which is set atop a garage and storage areas. A master bedroom is placed above a walkway that points toward the beach. The architects anchored the concrete block and stucco house to the landscape with a stone base and crowned the structure with a sail-like wooden roof above a continuous clerestory. Construction is scheduled to begin in early spring.



Canyon House
Los Angeles, California
Steven Ehrlich, Architects

ARCHITECT STEVEN EHRLICH OF VENICE, CALifornia, divided this 7,500-square-foot house (left) into two wings to express the separation of public and private spaces and to respond to its gently sloping site on the floor of a narrow canyon. Situated at the front of a 1 1/3-acre lot, the house nestles into the hillside, bisecting the property to create a large, informal backyard with a poolhouse and formal entry courtyard. The entrance is flanked by poured-in-place concrete walls. The complex is scheduled for completion in late 1992.



Sinoway House
Venice, California
Victoria Casasco Studio

FOR A MAJOR EXPANSION THAT NEARLY doubles the size of a one-story house in Venice, California, local architect Victoria Casasco designed a steel structural system to support a new second floor that rises above the original 1,200-square-foot building. The new master bedroom cantilevers over an existing garage (below left), and a guest room opens onto a deck that projects from the front elevation of the house (above left). Garden walls and expansive horizontal planes create a series of semienclosed outdoor rooms. The original structure and new construction are finished in stucco and detailed with wood trim. Construction is scheduled to begin in late 1992. —L.N.

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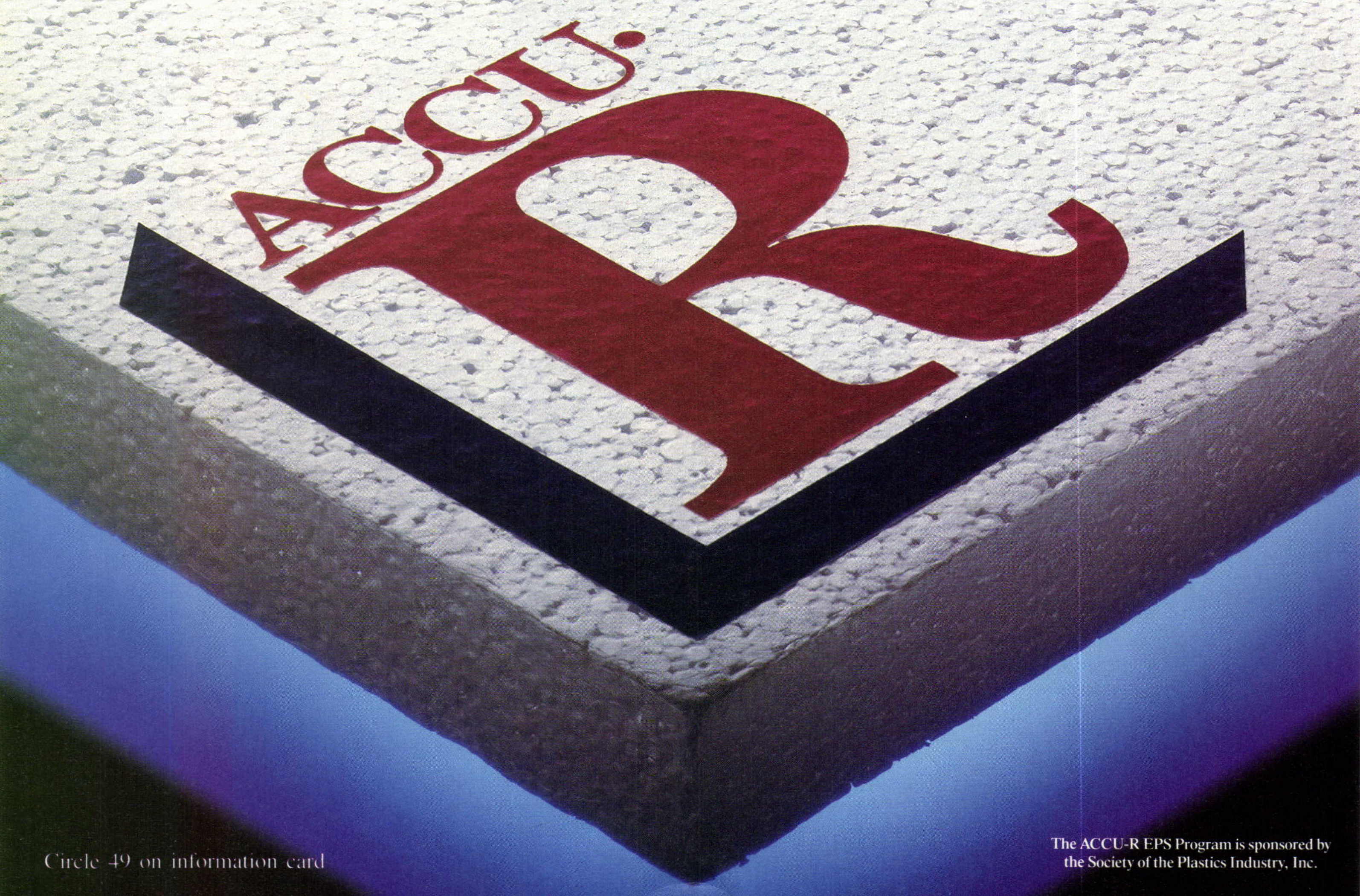

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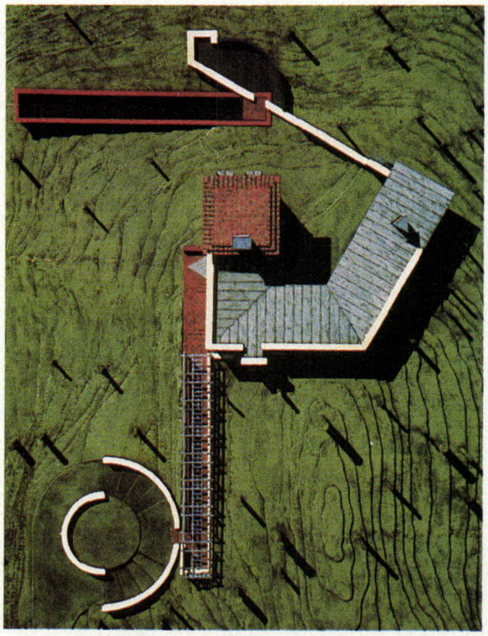
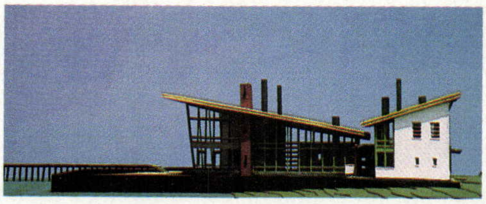
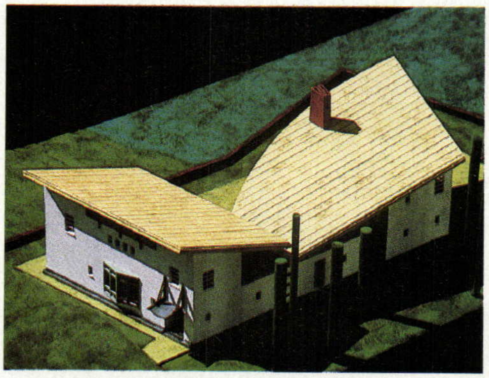
House on Spring Mountain
Saint Helena, California
Brian Healy, Architects



BRIAN HEALY, ARCHITECTS, A 6-YEAR-OLD practice based in Cambridge, Massachusetts, has undertaken a number of residential projects, including two completed houses in Florida. The two-person firm recently designed a 4,000-square-foot house (above) located on a densely wooded 80-acre site along a ridge overlooking California's Napa Valley. To create a formal procession to the house, the architect terminated the driveway with a semicircular walled parking area (right, bottom in photo) and designed a trellis that serves as an entry walkway. Partially buried within the hillside, the house steps down its sloping site to wrap around a courtyard. Construction is scheduled to begin in summer 1992.

Beach House
Loveladies, New Jersey
Brian Healy, Architects with
Michael Ryan Architects





IN COLLABORATION WITH NEW JERSEY ARchitect Michael Ryan, Healy separated a 3,200-square-foot vacation house into a pair of adjoining asymmetrical wings. Along the east and south elevations (bottom right), the architects created a facade articulated with punched windows and a triangular bay window. Facing north and west, the house opens to panoramic views of the bay with a curving window wall along the main wing (right). Living spaces are housed on the ground floor, and the master bedroom occupies the upper floor of the main wing. Construction is scheduled to begin this spring. ■

Maine AIA Chapter Awards

LAST DECEMBER, A JURY LED BY 1991 GOLD Medalist Charles Moore selected seven winners of Maine AIA's annual design awards competition. Moore, preservationist Earle Shettleworth, Jr., editor Roger Conover, and architects Karen Van Lengen of New York City and Kermit Lee of Syracuse, New York, awarded buildings inspired by vernacular architecture. Rockwood Elementary School (top right), by Stevens Morton Rose & Thompson of Portland, earned the highest recognition for its modest yet clear presence in a largely undeveloped area. Second- and third-place honors went to two houses that combine regional cottage-style elements with whimsical features. Jurors favored the way "Room with a View" (near right), by Portland-based architect James Sterling, exaggerates its form to create a "lunatic Shingle Style." They selected John Silverio's Cohen House (far right) for its expressive fenestration and dynamic hip roof. The jury also cited the Mast Landing School by Stephen Blatt Architects of Portland (bottom left), student housing by Brunswick-based Moore/Weinrich Architects (below right), and a shopping mall (bottom right) by WBRC Architects/Engineers of Bangor. Special mention went to a proposal by Portland architects Joseph Hemes and Leigh Sherwood to convert Portland's Fort Gorges into an aquarium. ■

ROBERT P. DARBY

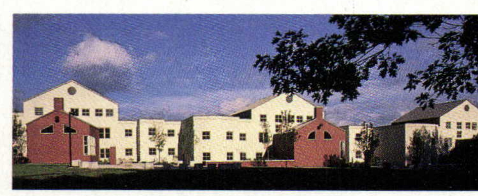
Award Winner
Rockwood Elementary School
Rockwood, Maine
Stevens Morton Rose & Thompson, Architects

Award Winner
"Room with a View"
Chebeague Island, Maine
James Sterling Architects

BRIAN VANDEN BRINK

Award Winner
Cohen Residence
Islesboro, Maine
John Silverio, Architect

Honorable Mention
Mast Landing School (above)
Freeport, Maine
Stephen Blatt Architects



Honorable Mention
Doris Twitchell Allen Village
University of Maine, Orono
Moore/Weinrich Architects

ROBERT P. DARBY

Honorable Mention
Bayside Landing (right)
Bar Harbor, Maine
WBRC Architects/Engineers

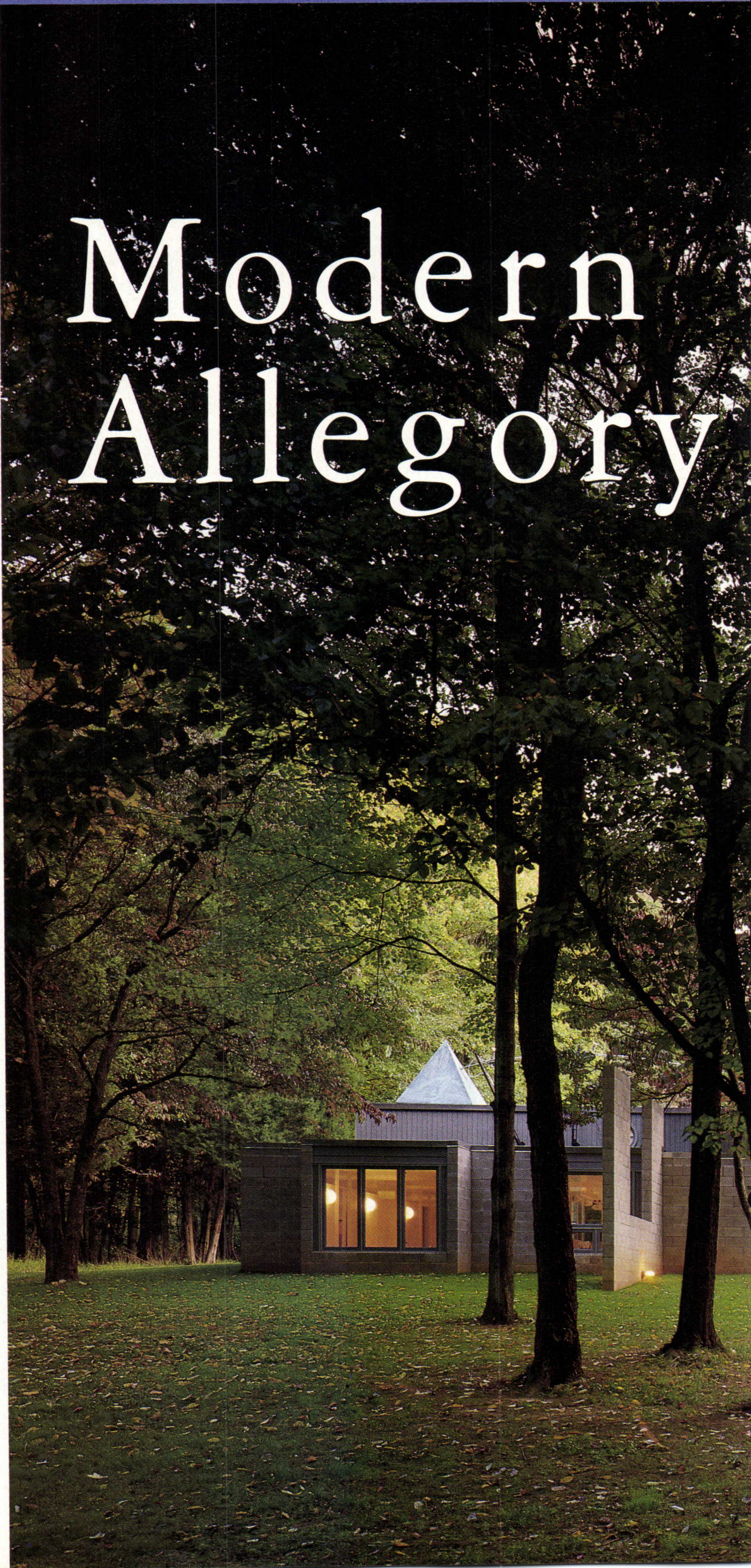
Fein House
Princeton, New Jersey
Peter Waldman, Architect

Modern Allegory

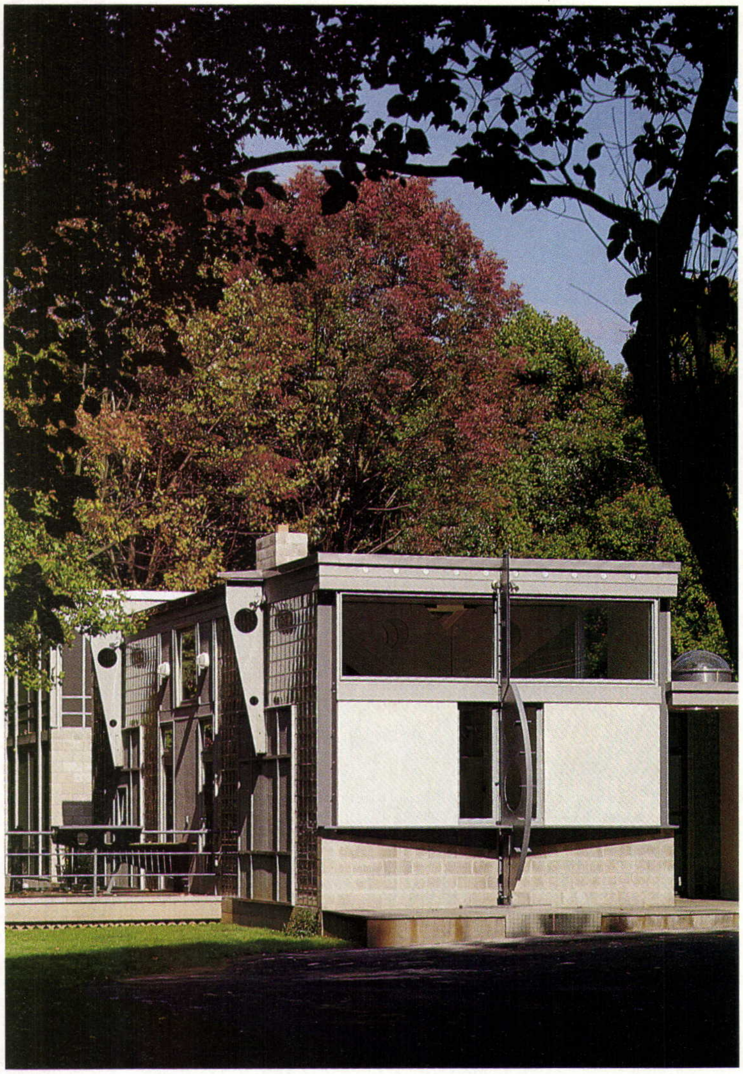
THE OUTSKIRTS OF PRINCETON, NEW JERSEY, hardly seem the place to find a pyramid, a Sphinx, and a contemporary version of a caryatid, but they're all in a Modern house that Houston architect Peter Waldman enlarged for Erica and Robert Fein and their three children. In the 2,500-square-foot addition to a 1968 structure designed by Thaddeus Longstreth III, a disciple of Richard Neutra, Waldman literally gave his clients the sun, the moon, and the stars. "We wanted to give the house a new beginning," the architect asserts.

A Princeton graduate who has taught architecture for the past 11 years at Rice University, Waldman treats houses as allegories for their occupants. While he cares about addressing formal issues related to what he calls the "sheltering necessities"—doors, windows, walls, roof—and about responding to his client's program, the architect also believes that every building warrants a narrative, and that a house provides a special chance to tell a story about the lives of its inhabitants. With expressive construction techniques and materials, Waldman creates architectural forms that not only accommodate the "recurrent rituals and modest routines" of daily living, but also comment on its more substantive aspects through satire, symbolism, and a sense of humor. Many of his suburban houses, the architect contends, are three-dimensional fables about the "aspirations of modern Adam in his 20th-century paradise."

For the Feins, Waldman began by inventing a spatial "tale of origin" that links the architectural program of their residence to its suburban setting. Built of concrete block, glass, and wood, the original 2,500-square-foot house is set in the midst of a gently sloping, heavily wooded landscape with no orientation to sunlight. Waldman retained the basic house, but he opened it up to the 5-acre site by adding two perpendicular wings and a garden claimed from the wooded lot. Combined with the original structure, the



New bedroom wing of the Fein House, topped by a pyramid, is low and introspective (left in photo), while the new living-dining room wing, including a screened porch with a V-shaped roofline (right in photo), opens to the reclaimed garden (center in photo).



additions—a master bedroom wing on the east and a kitchen-dining-living wing on the west—frame three sides of the terraced garden, which stands on a plinth and overlooks a natural grotto below.

The process of building new indoor and outdoor spaces gave Waldman the chance to weave his narrative, while providing more diagrammatic clarity and architectural elaboration than was offered by the original house. The Feins asked him to give their home, originally trapped in the woods, a more direct response to the sky. Accordingly, Waldman not only added a garden, but placed celestial-inspired objects throughout his renovation. In the dining room, the curved ceiling is painted a deep blue to evoke the night sky; it serves as a backdrop for a large suspended moon attached to an arc that bisects the space. In the master bedroom wing, a pyramid directly over the head of the bed allows morning sunlight to stream through. Positioned near the pyramid and reaching into the courtyard is an abstract composition that suggests a round-eyed Sphinx. When it rains, scuppers catch the water and channel it into the eye so that it appears to be crying. "It's a sad Sphinx," Waldman explains.

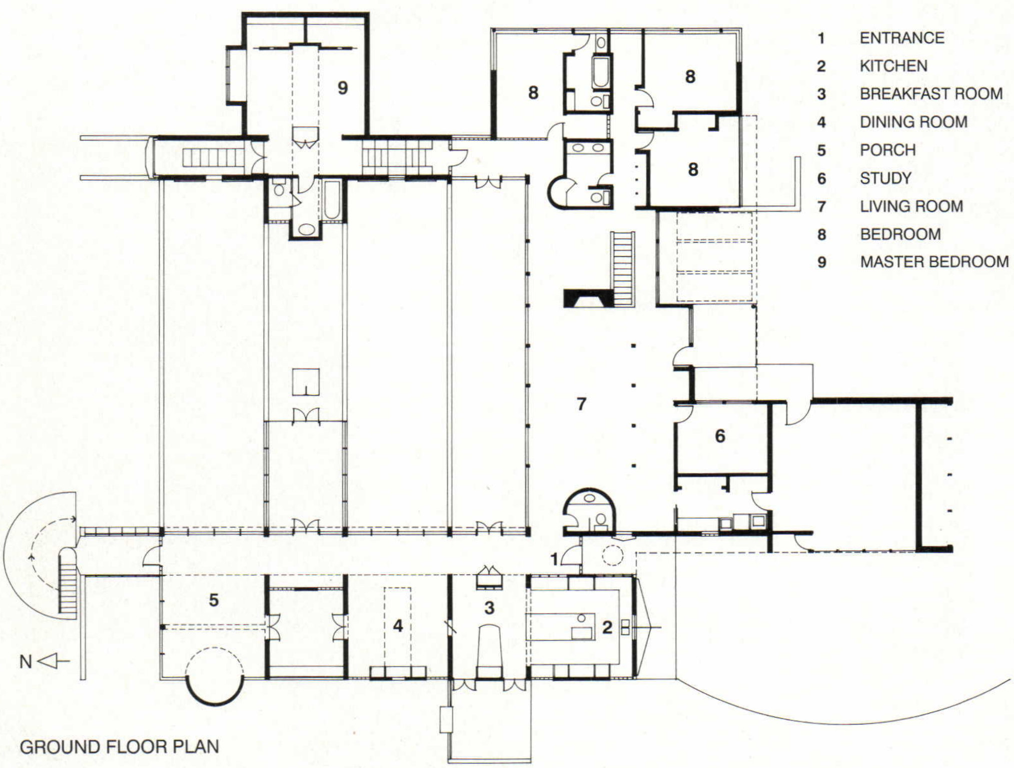
Allegorical shapes on the exterior of the house include a "pregnant" column (top left) that marks the entrance to the living-dining wing (top right), and an abstract version of a round-eyed Sphinx (above right and facing page) that crowns the bedroom wing.

Fond of the "complexities that we discover and unravel for ourselves," Waldman created special spaces for each family member, such as a screened porch for Robert Fein intended to evoke a nomadic tent on the edge of the woods. For Erica Fein, he designed an abstract caryatid, a curving, "pregnant" steel column that literally supports the house yet is punctured by three holes, one representing each of her children; the projecting column also acts as a sundial. "Underlying these elements, which might appear to be archaic or mythic," explains the architect, "is a rational agenda."

Numerous architectural dualities are reflected throughout the house. Of the two new wings that frame the garden, the western wing is higher than the existing building, while the eastern wing is lower. The bedroom side is introspective and sunken, like a cave, while the living-dining side is open to its surroundings. Even paired light fixtures or ceiling panels on different sides of the same corridor or room have a yin-yang relationship in their opposing shapes.

The Fein house is the latest in a series of projects that reflect Waldman's highly personalized approach to design. While each family member has his or her own space, the architect also gave them a way to come together—by sharing the garden in the center of the two wings. "The house articulates a number of separations, but the courtyard is the thing that holds it together," he contends. "They all share the landscape, but they see it from different points of view." That approach sums up not just the way the family interacts, but also Waldman's design process, in which he addresses the parts and the whole, the fact and the fable. ■

—EDWARD GUNTS



GROUND FLOOR PLAN

Paired light fixtures on opposite sides of the new living wing corridor (top left) reflect the architect's ongoing exploration of dualities. A round moon on an arc (top right) signals the dining room's role as a night room. In the kitchen (above), a series of curvaceous wooden brackets are attached to the ceiling to filter natural light. The dining room (facing page) contains built-in cabinets crafted by Houston fabricator Greg Snyder to store what Waldman calls the "artifacts and theaters" of daily life.

FEIN HOUSE
PRINCETON, NEW JERSEY

OWNERS: Robert and Erica Fein
ARCHITECT: Peter Waldman, Houston, Texas—Peter Waldman (principal-in-charge); Scott Bernhard, Martin Feiersinger (design team); Patrick Condon, Miguel Da Silva, Philippe Baumann (project associates)
ENGINEER: John Monteith (structural)
CONSULTANT: Greg Snyder (custom fabricator)
GENERAL CONTRACTOR: Leonard Hunt
COST: Withheld at owner's request
PHOTOGRAPHER: Jeff Goldberg/Esto

that results in a tautly drawn envelope into which they inserted patterned openings. Symmetry is further broken by surface changes in the pair's fenestration. A bowed window in the mahogany-clad surface of the house projects into the loggia, while the corresponding studio window is actually a pivoting doorway. The metal roof of each pavilion is crowned with a lantern, but the house features a shed dormer along its east elevation.

Although the two structures seem monumental, each building measures only 42 feet long by 20 feet wide. Within these identical footprints, Bartle and Kirschenfeld varied the internal arrangements to accommodate the different functions housed within each. By varying floor-to-ceiling heights and tucking a basement within the south end of the studio, the architects afforded the artist with 1,600 square feet of work space, approximately 200 square feet more than the house.

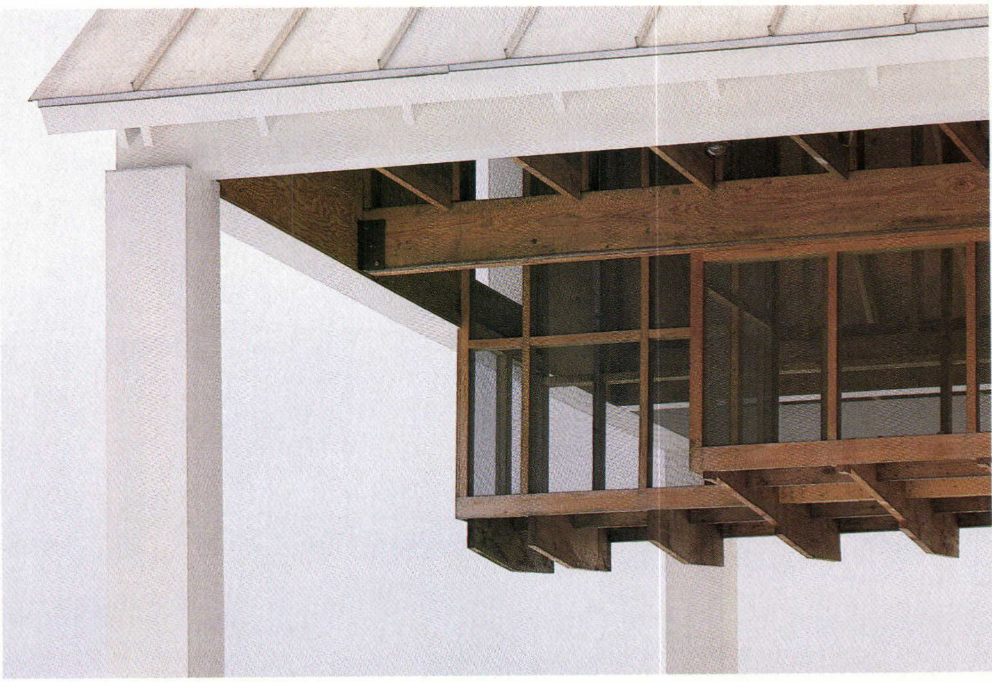
Inside, the pair diverge even more sharply in character. The studio is a raw, 15-foot-high barnlike work space that stretches the length of the building, with a storage loft at its northern end that features exposed rafters and ties. The house, on the other hand, is broken into three traditionally detailed rooms on the first floor and a finished second story that includes a bedroom and bathroom. In the studio, the artist's main work area is located on grade with the northern porch; in the residential quarters, the living room is set 3 feet above the grade of the northern porch. The dining room is placed at the south end of the house, with a double-height window that faces east. The most intriguing interior spaces are actually outdoor rooms: within the north porticoes of both buildings, a pair of screened-in sleeping porches hang from the rafters like a couple of wooden hammocks.

Three years in design, the Mosley House and Studio presented Architrope with the temptation to pack in every idea the young architects had. But Bartle and Kirschenfeld exhibited restraint, distilling the idea of what a house in the country should be. Joined to its natural setting, the formal ensemble creates out of two buildings, one place. ■

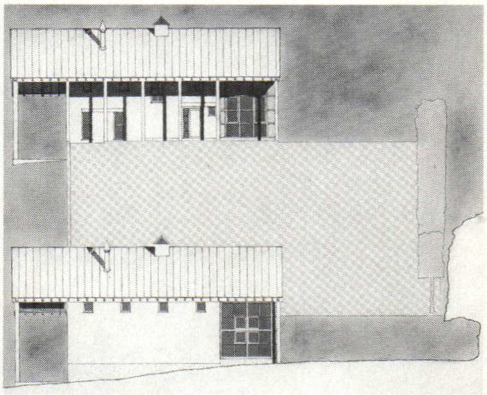
—Lynn Nesmith

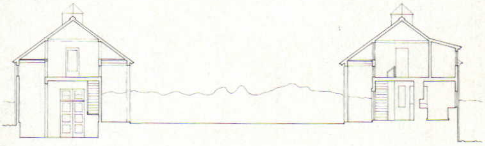
MOSLEY HOUSE AND STUDIO
CANAAN, NEW YORK

OWNER: Catherine Mosley
ARCHITECTS: Architrope, New York City—Andrew B. Bartle, Jonathan Kirschenfeld, Evans Simpson
ENGINEER: Ross Dalland
GENERAL CONTRACTOR: Quad Design
COST: $350,000—$100/square foot
PHOTOGRAPHER: Michael Moran

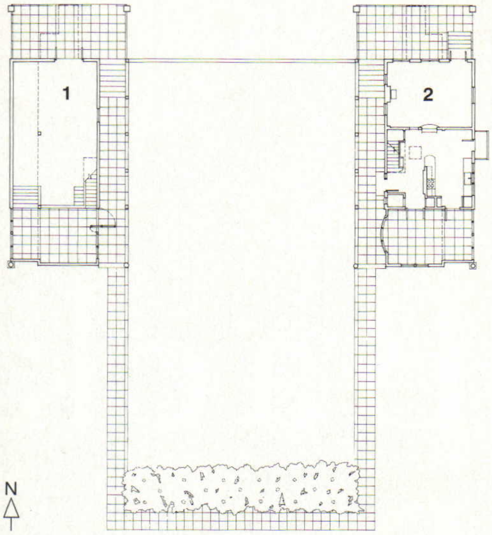


Monumental porches reach out to engage the landscape at the northern edge of the courtyard (facing page, top), which is bordered by concrete retaining walls. L-shaped sleeping porches hang within north porticoes (facing page, bottom). Studio (left in section and plan) features storage loft crowned with a lantern and exposed rafters (left). Expansive windows in the studio (bottom left) allow views across the courtyard to the house (right in section and plan).





EAST–WEST SECTION

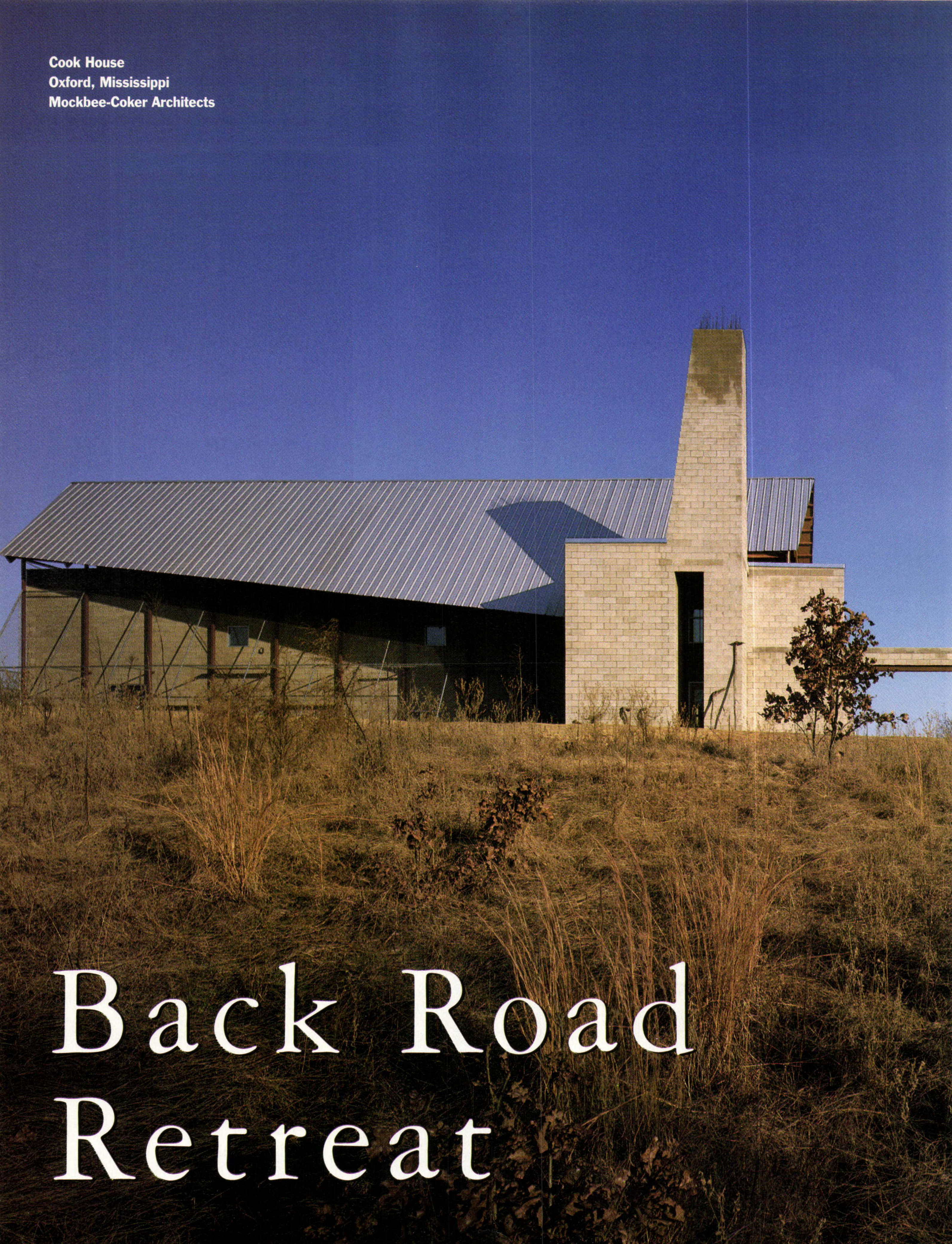


FIRST FLOOR PLAN

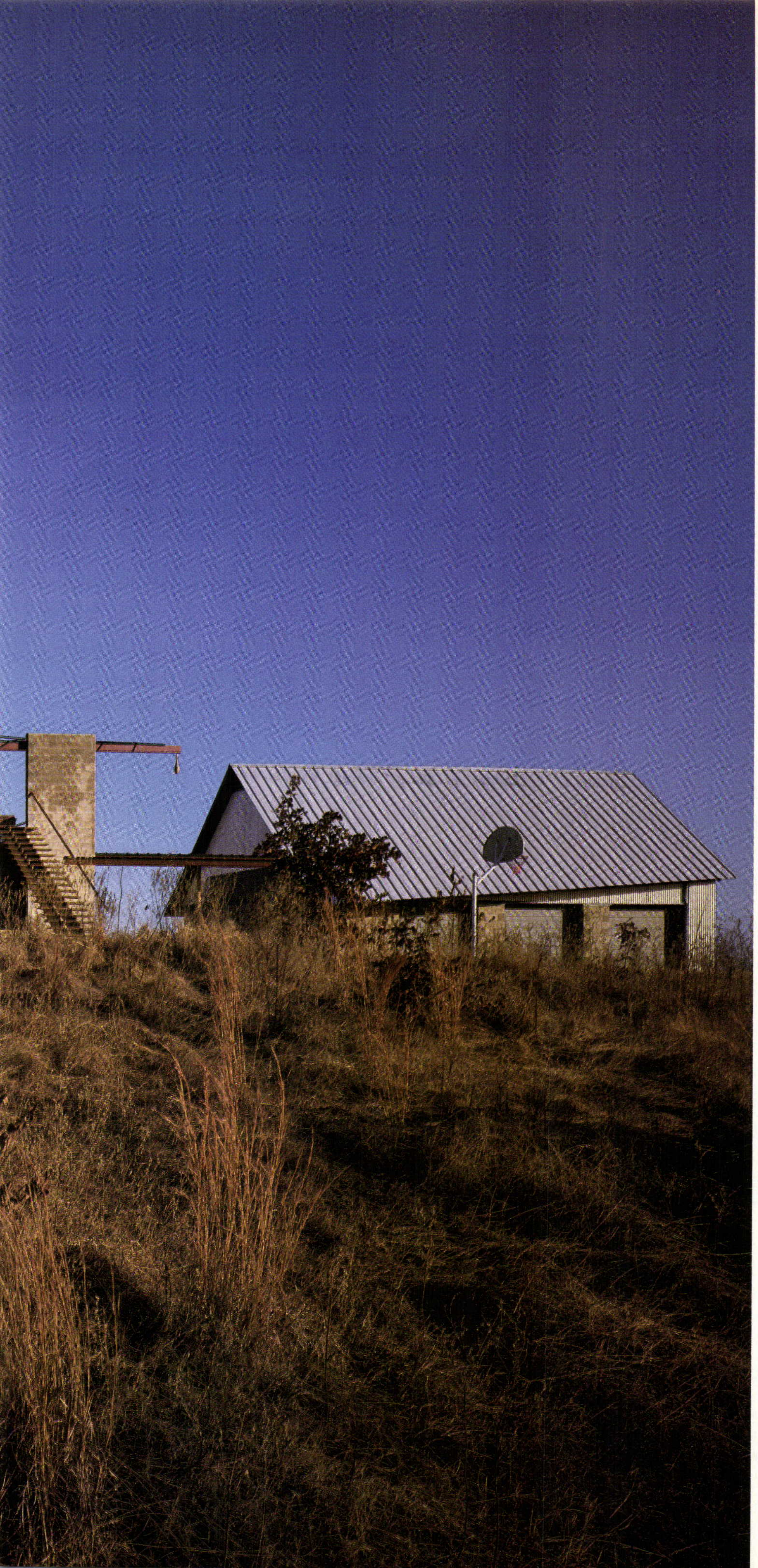
1 STUDIO

2 HOUSE

Cook House
Oxford, Mississippi
Mockbee-Coker Architects



Back Road Retreat



LESS THAN 5 MILES FROM THE CEDAR ALLÉE that leads to Rowan Oak, William Faulkner's four-square columned home in Oxford, Mississippi, the road twists into knots. Kudzu blankets the hills, and small houses with rusted barbed-wire fencing dot the landscape. Down an unmarked private road, equidistant from this mythic landmark and a new medical center, is a remarkable contemporary house that leaps like a bridge between past and present. Designed by Mississippi architect Sam Mockbee, the 3,600-square-foot house, porch, and garage sit squarely on the east-west ridge of a cleared slope overlooking Lafayette County's hardwood forests. The hills, which stretch to the north, offer privacy for a young Oxford physician and his wife, who sought peace and tranquillity for themselves and their odd menagerie.

While the remote setting elicits serenity, the sculptural assemblage of buildings actively combines cultural symbols as diverse as the barn, the screened porch, and the animal pen into syncopated wholeness. Scattered throughout the surrounding rolling terrain are metal-roofed sheds that shelter local house trailers, which the architect cites as sources of inspiration. But more than irony is at work in the Cook House. There is elemental power in Mockbee's asymmetrical massing; the linear composition builds in layered intensity from low walls to a masonry chimney and gabled roofs to suggest the remnant of an earlier building or an industrial ruin. Unpainted concrete block forms the primary building material, providing unadorned solidity to both interior volumes and exterior massing. The edges of the roofs slant downward, pointing toward the implied center of the composition: a two-tiered, flat-topped porch with a rooftop whirlpool, its flanks open to the hills through a hyperbolic archway of trellis framework.

Heavy chain-link fencing slopes up the north and south elevations of the main house, reinforcing the building's tentlike roofline and creating a buffer between the building and its surroundings. The metal fencing protected the owners' 147-pound cougar, reared from infancy (since deceased), and now confines a pair of servals, long-legged spotted cats from the African plains.

The main house, set behind these feline

The Cook House, sitting porch, and garage follow the east-west ridge of a Mississippi hill (these pages). Main house is entered through a vertical slit at the base of a sculptural masonry chimney.

House recalls metal gable roofs and pole structures (facing page, top and bottom) of local farm buildings and trailer sheds. Fenced-in animal pens (left) slope up sides of the linear volume (plans).

screens, corresponds to Mockbee's rural analogies. Like a long trailer, the residence rests beneath an overhanging corrugated roof. The floor plan reveals a simple, linear organization: a single circulation corridor runs along the south wall of the building on both levels, connecting living room, dining space, kitchen, bedrooms, and bathroom.

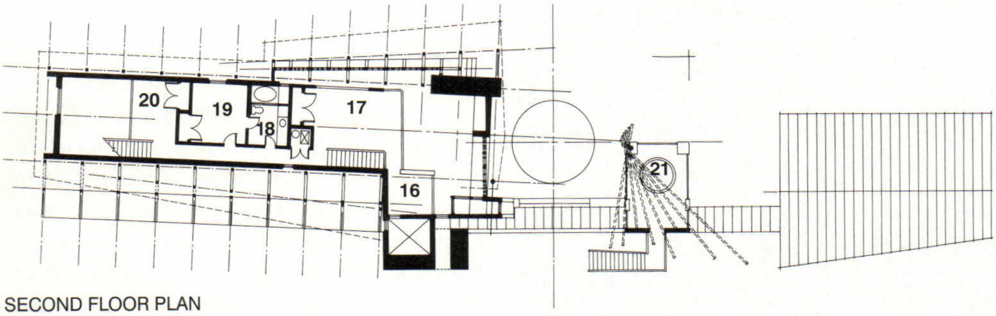
After a jog at the vestibule on the first floor, the straight path continues outside the building's walls and passes under a covered walkway from house to sitting porch to a storage room and garage. Off this east-west spine, interior and exterior spaces uniformly open to the north, permitting uninterrupted views of the fields outside, the surrounding hills, and Charolais cattle that occasionally wander into sight.

Other animals claim the interior. In the living room, a rainbow-colored macaw named Spike barks from an open cage that rises 18 feet to the ceiling. Oak shelving, also ceiling-high and reached by an old rolling ladder, holds the owners' collection of odd bottles and local artifacts. Soft north light from the abstract grid of a sloping glass curtain wall bathes the living and dining spaces. The angled wall creates a generous adjacent gallery for sitting and hill-watching.

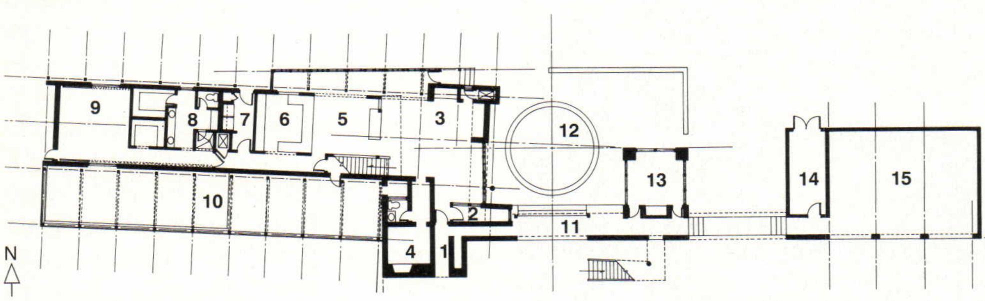
Color punctuates the living and dining spaces. A blood-red structural beam crosses the main living space to find its requisite mate, one of several red metal columns spaced at regular intervals along the circulation corridor. Lettuce-green steel bars, splayed freely along the edge of an overhead loft like weeds, mediate between up and down. Prussian blue marks the south corridor wall, while the lavender of the lowered dining room ceiling increases the room's sense of enclosure.

Smoothly crafted oak stairs, like those of a ship's ladder, rest on stones from the foundation of the original farmhouse, which has long since disappeared. A metal pipe, bent, welded, and smooth as a muffler, turns upward as a stair railing. On the second level, a bedroom, study, and sitting loft include balconies that overlook the first floor. At the west end of the second level, the ladder continues upward to an open-air pavilion on the third level.

An exposed roof structure rises above the rectilinear block of the house to create this



SECOND FLOOR PLAN



GROUND FLOOR PLAN

1	ENTRANCE	8	MASTER BATH	15	GARAGE
2	AVIARY	9	MASTER BEDROOM	16	STUDY BALCONY
3	LIVING ROOM	10	ANIMAL PEN	17	LOFT
4	INGLENOOK	11	COVERED WALKWAY	18	BATHROOM
5	DINING ROOM	12	WATER GARDEN	19	BEDROOM
6	KITCHEN	13	SCREENED PORCH	20	BEDROOM BALCONY
7	UTILITY ROOM	14	STORAGE	21	HOT TUB

Interior living space opens to 18-foot-high ceiling (left), which drops at dining area (bottom left). Table is designed by Mississippi craftsman Fletcher Cox. Sloped curtain wall faces north for landscape views (facing page).

unexpected aerie. Lifted above the haunches of supporting steel columns, cross-braced wood framing creates a broad cathedral arch, which lightens and brightens the eastern and western ends of the building.

Beneath this surprising roof, joyful freedom reigns throughout the house. For the inglenook off the vestibule, architect, client, and builder collaborated on a screen that shields the fireplace, a massive 6-foot metal square that weighs 360 pounds and is suspended above the hearth by pulley and chain. Furniture designed by Mississippi craftsman Fletcher Cox is incorporated into the architecture: in the dining room, a snake slithers across the strip oak flooring to lift its head as the dining table's base. Along the walkway connecting the buildings, several steel lintels remain unpainted, their red rust flowing down the concrete block walls.

While a kinship can be drawn between Mockbee's art and that of other contemporary practitioners, from Antoine Predock's regionally allusive work to Scogin Elam & Bray's uninhibited essays, the Cook House is Sam Mockbee's own—a wide-open, intentionally unrefined building with a down-home Mississippi accent.

At the owners' direction, there is no attempt to impress with finery of detail or material. Unpainted concrete block, simply detailed gypsum board, corrugated metal, and exposed steel structure comprise the unpretentious palette for Mockbee's bold, though private, contemporary statement. The architect marries an intentionally direct surface with underlying sophistication of intent. Like Faulkner, whom Mockbee treasures, this building evokes what went before, yet speaks directly to our own time. ■

—ROBERT A. IVY, JR.

COOK HOUSE
OXFORD, MISSISSIPPI

OWNERS: Jim and Rhonda Cook
ARCHITECT: Mockbee-Coker Architects, Jackson, Mississippi—Samuel Mockbee (principal-in-charge); L. Coleman Coker, Spence Kellum (design team)
GENERAL CONTRACTOR: Bobby Castel Construction
COST: \$320,000—\$88/square foot
PHOTOGRAPHER: Timothy Hursley/The Arkansas Office


Twins

Ou House
Hillsborough, California
Kobeou Associates, Architect

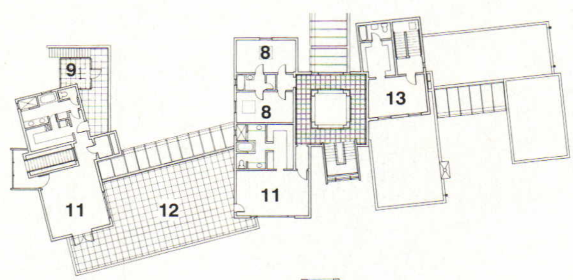
Family Affair

SPLAYED ALONG A RIDGE IN A RESIDENTIAL community 10 miles south of San Francisco, stuccoed boxes create a rambling assemblage that doesn't look like a house. The monumental complex of earth-colored volumes and industrial sash windows bears no resemblance to its hacienda-style neighbors. Yet three generations make their home in the 11,000-square-foot, nine-bedroom structure, which has settled quietly into its neighborhood despite initial controversy.

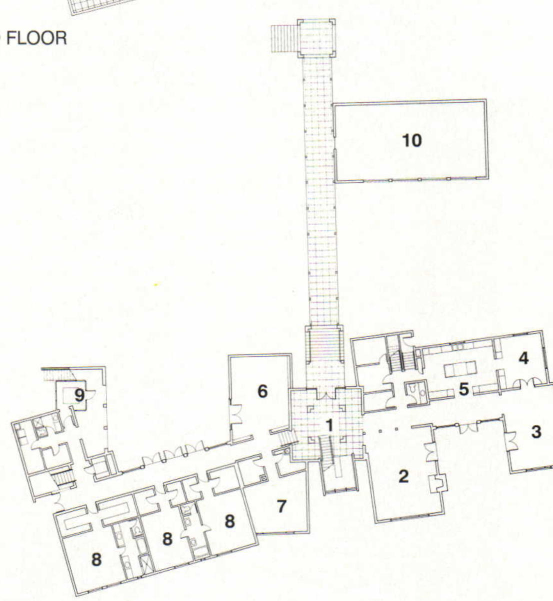
The stuccoed volumes are home to the Kobe-Ou clan, which includes Taiwan native Joy Ou and her California-born husband, Tim Kobe, founders of the San Francisco architectural firm Kobeou Associates. Their house for themselves and their extended family provides shelter on a grand scale, bringing together several traditions under one roof.

Ou's parents, the clients for the house, are a successful Taiwan-based couple with business interests on the West Coast. Their tastes are sophisticated; they did not want a traditional Chinese house, but one that reflected the Japanese influences they felt growing up in Taiwan. Kobe and Ou, who have two children, share a fascination for the work of the early Modernists in Europe. Ou's three Taiwanese siblings and their families also find haven within the structure during extended visits to the United States.

The design of the house resolves the family's disparate views. The rambling nature of the massing is certainly Californian in the way that it appears informal and unplanned. Beginning with the idea of a Chinese courtyard house, Kobe and Ou bisected the open square and defined two U-shaped halves that each embrace a semicourt, one facing east, the other west. Linking the two halves is an entrance hallway that plays a Beaux Arts–inspired axial role: from a single point within the inscribed square of the entry hall, long, sunlit corridors are visible, leading to the common living spaces on the northern side of



SECOND FLOOR

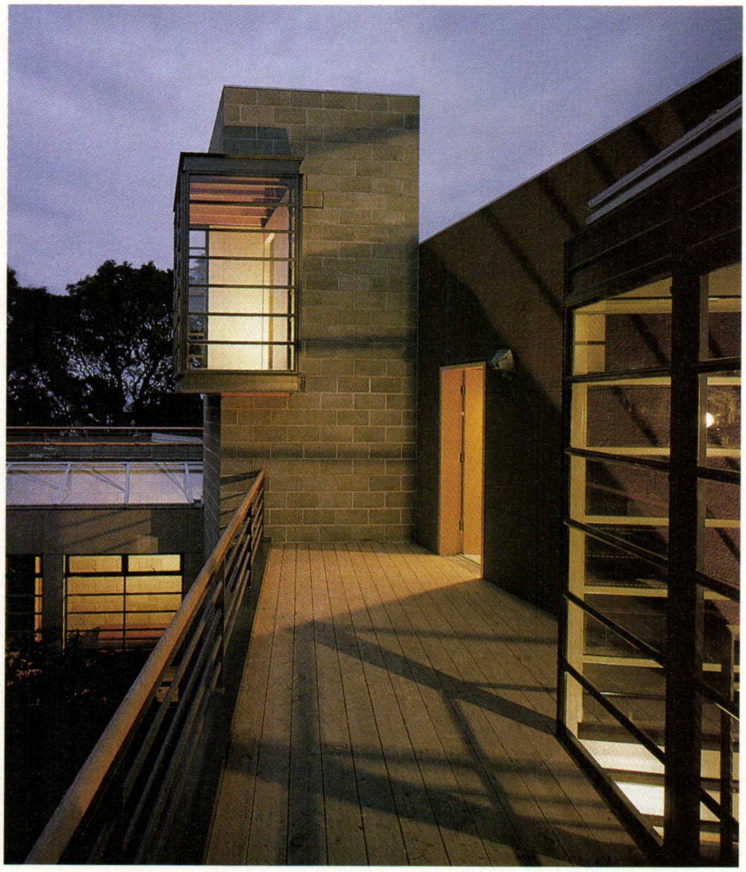


N

FIRST FLOOR

Portico (left) leads to monumental hallway that separates private areas from communal living and dining area (plans). West courtyard (facing page, top) is flanked by grandparents' wing. Private volumes for family members include a greenhouse where the grandfather grows orchids (facing page, bottom left) and the grandmother's Buddha tower (facing page, bottom right).

1 ENTRANCE
2 LIVING ROOM
3 DINING ROOM
4 BREAKFAST ROOM
5 KITCHEN
6 FAMILY ROOM
7 GAME ROOM
8 BEDROOM
9 GREENHOUSE
10 GARAGE
11 MASTER BEDROOM
12 DECK
13 SERVANTS



the house and to three separate sleeping quarters on the south.

The simple palette of materials ranges from stucco and concrete block to industrial sash windows with cedar frames. As materials get closer to the inhabitants, they grow softer; split-faced block becomes ground-faced, for example, producing a gentler texture and surface. On the stuccoed portions, a three-color mix was applied, its base coat mustard-colored with blue and green dashed into the surface for more richness and depth. All the exterior colors are derived from the site's natural features—gray from the stone outcropping and brown from the bark of the surrounding live oak trees.

The monumental, strongly volumetric qualities of the exterior are a result of Ou's fascination with Swedish architect Gunnar Asplund. Kobe, on the other hand, cites Adolf Loos as his inspiration for a spatial compression—in which rooms and volumes intersect and change height, each more dramatic in contrast with the other.

Although the predominant esthetic seems to be Western, the assemblage embodies some important Eastern influences. The house was designed to conform to certain principles of *feng shui*, the ancient Chinese practice that prescribes the proper placement of all openings to ensure good fortune for the inhabitants. Ou's mother brought her knowledge and skills to this aspect of the design, making certain that a door at the foot of a bed was moved to another wall, so that the occupant's spirit would not escape in the middle of the night and never return. At the highest point on the site overlooking the entire house, Kobe and Ou placed a 28-foot-high tower, a small room where Mrs. Ou talks with Buddha and blesses the house and family three times a day.

The house took five years from initial concept to completion. The architects' first scheme, a 19-bedroom extravaganza, resembled a small motel. Kobeou developed this huge, sprawling design primarily to convince Mrs. Ou that it wasn't necessary for each family member to have a bedroom. After the nine-bedroom scheme was completed, the project underwent a detailed community design review. The neighbors protested that the house was too big, and that Americans didn't live this way. They refused to approve the plans. Undeterred, Kobe and Ou fought the ruling and good fortune prevailed. The house that they built stands as a testament to the values of family life—even if it doesn't reflect the typical American way. ■

—SHARON LEE RYDER

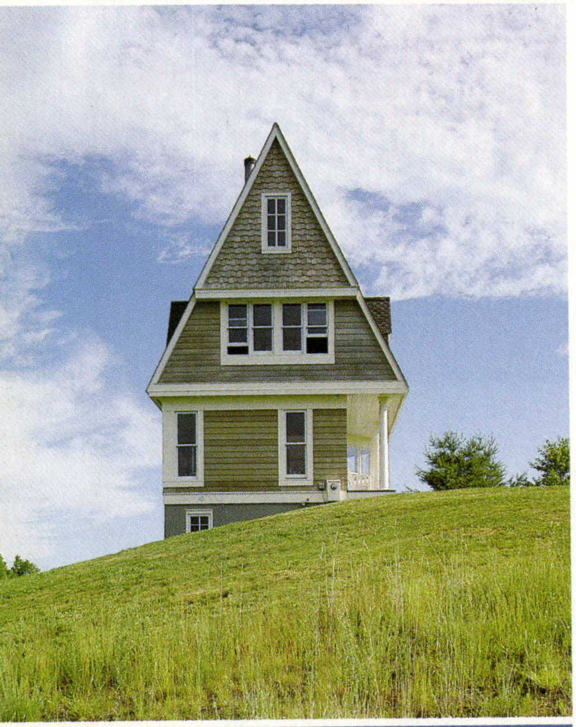
Sharon Lee Ryder is a San Francisco-based writer.

Corridor leading to dining room is skylit (bottom left), as is monumental entrance hall (bottom right). Freestanding stair is positioned within a copper-clad enclosure, with a view of Mt. Diablo framed in glass wall. Window of master bedroom (facing page, top) frames intimate views of live oak trees. Shared living room (facing page, bottom left) opens to linear corridor. Kitchen with stainless steel range hood (facing page, bottom right) opens to daylit breakfast area.

OU HOUSE
HILLSBOROUGH, CALIFORNIA

OWNERS: Jong Fa and Chen Ching Ou
ARCHITECT: Kobeou Associates, San Francisco, California—Tim Kobe, Joy Ou (principals); Scott Williams (project architect); Kris Berglund, Cory Creath, Matt Davis, Sima Farroshi, Eugene Hu, Craig Mckinroy, Pennis Chew (assistants)
LANDSCAPE ARCHITECT: 5M Landscaping
ENGINEERS: Joe Born (structural); PSC Consultants Inc. (civil)
GENERAL CONTRACTOR: Ryan Associates
COST: $3.3 million—$300/square foot
PHOTOGRAPHER: Richard Barnes, except as noted

CHRISTOPHER IRION



IN UPSTATE NEW YORK, A 1,000-SQUARE-foot weekend house designed by Dennis Wedlick proves that there's plenty of room for inventiveness even within a historicist framework. In fact, Wedlick's inventions may figure all the more vividly against such a backdrop of tradition.

Inspired by the geometry of the Shingle Style rather than its ornament, the New York architect openly responded to picturesque precedents, but he boldly reinterpreted such well-worn forms in a contemporary idiom. In doing so, the architect was determined to refute the common wisdom that a building must mirror tradition to be regional, and shun historical references to be Modern.

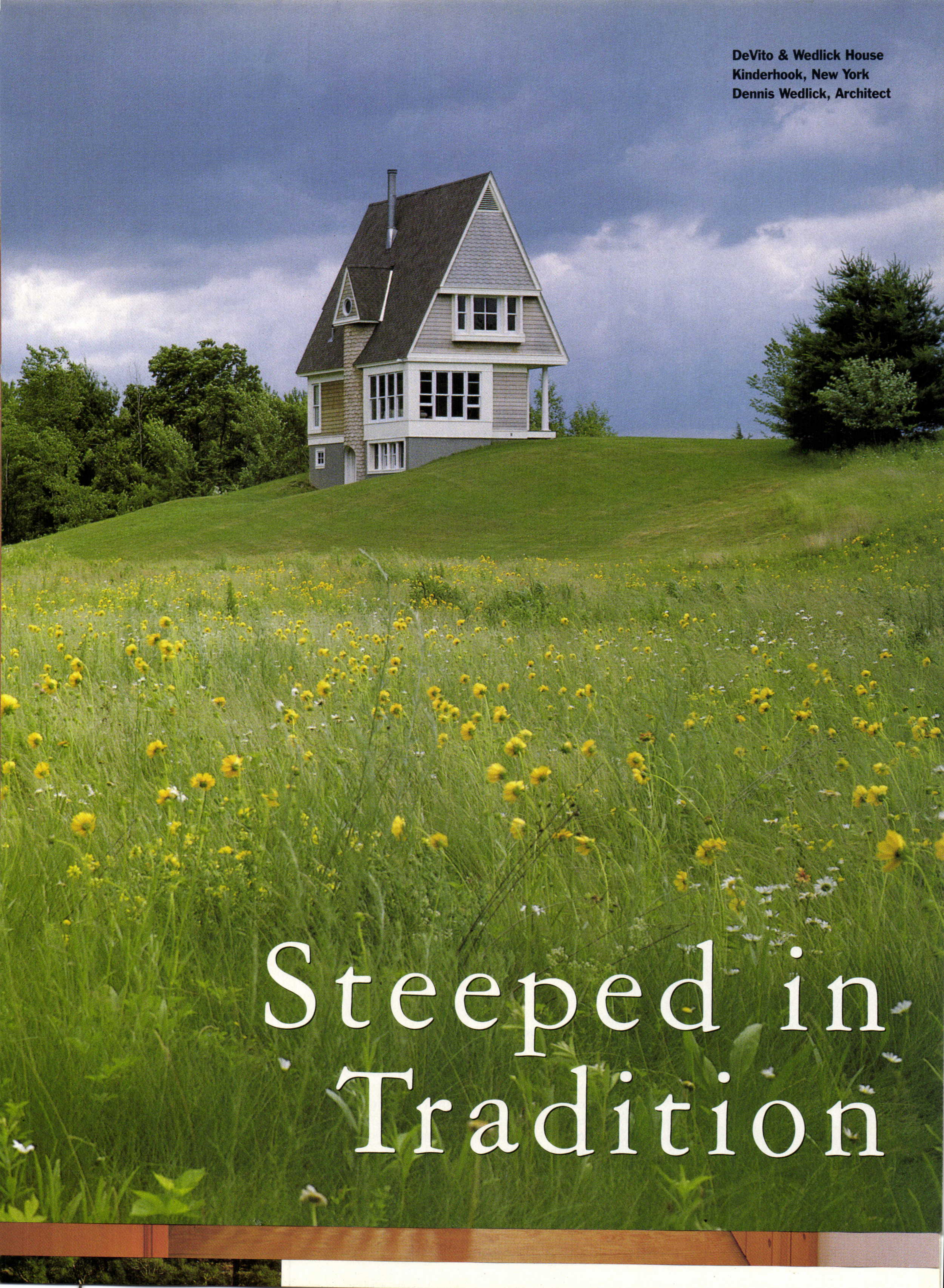
With a nod to the exaggerated gable of McKim, Mead & White's Low House, Wedlick's grand gesture is a 40-foot-high roof. But unlike the sweeping diagonal planes of the 1887 residence, which anchor that structure to the landscape, Wedlick has created a high vertical profile that stands like an isolated object on a pristine hillside.

As if reaching for the sky, the architect sharpened the roof's pitch to a very steep 65 degrees. This geometrical form provides the first glimpse of the house—just the tip-top of the peak—as it is approached from the west along a winding country road. After turning into the drive of the 12-acre site, the house disappears until a curve is rounded and its north facade, which appears precariously perched on an excavated, grassy knoll, suddenly comes into view.

"It was always a question of how small I could go," explains Wedlick of his response to a modest budget. His personal limit proved to be a footprint of 20 by 25 feet, the minimum parameters to accommodate living and dining rooms, kitchen, and bath on the first floor. To steal a few more square feet and to express the interior functions, the architect broke out of the box with changes in massing and materials. The floor-to-ceiling windows

The DeVito & Wedlick House stands 40 feet tall on its excavated knoll (facing page). The front dormer is a miniature of the house (top left), while the rear dormer crowns the stairway tower (bottom left). The south elevation is designed as a series of stacked geometric volumes (center left).

DeVito & Wedlick House
Kinderhook, New York
Dennis Wedlick, Architect



Steeped in Tradition

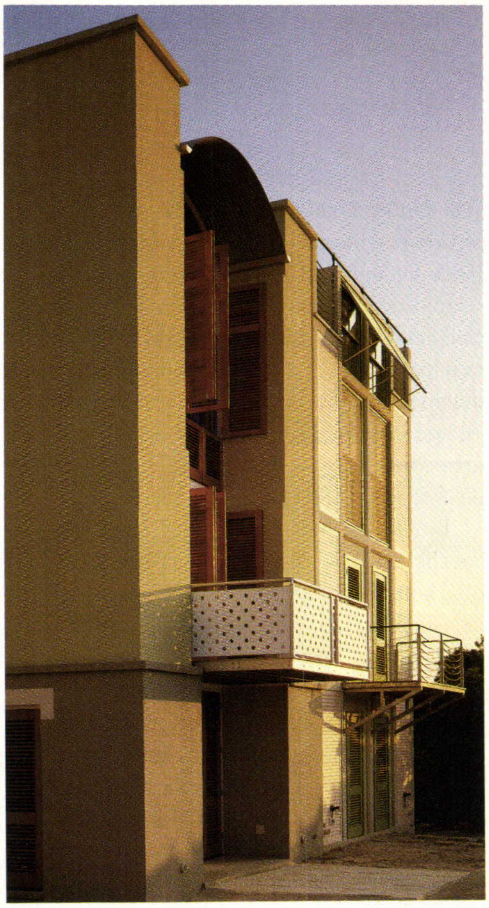
when the county building code required two sets of stairs between certain floors, Chatham took advantage of that constraint and elaborated upon the stairs as a design feature.

Chatham conceived the first house—the Forsythe House—as if it were a miniature skyscraper, placing the service core and stairs in the middle of the building, where they form a key part of its structural system as well as divide the floors. The architect treated the second house—his own, known as the Pugin House—as a bridge, by fattening the side walls to become abutmentlike piers that contain stairs and services, leaving the space between the piers as open rooms. He conceived the third—the Goodnough House—as a hybrid of the previous two, with the stairs placed on the south side and the services in the middle.

Chatham adopted remarkably different attitudes toward the character of each house. The Forsythe House, built for a jewelry maker and her family, is designed as an urban loft, with 1930s-era industrial motifs and a roof terrace inspired by Le Corbusier. Chatham's own house is a bold, Modernist statement, with a mixture of graphics and materials that reflects his interests in multiculturalism and high-tech machinery. The third, designed as a getaway for husband-and-wife physicians and their four children, is the most conservative of the three, demonstrating Chatham's ability to work within the confines of a more mainstream vocabulary. Freed from fulfilling Seaside's prescribed requirements for freestanding cottages and bungalows, Chatham concentrated on developing highly personalized interior spaces that address each owner's particular needs and fantasies. He reinforced Robert Davis's goal of offering something for everyone in this holiday town by showing how flexible the row house type can be—whether the owners want a shop or bedrooms on the first level, a flat deck or vaulted roof on top, or a sophisticated urban loft or cozy beach getaway inside.

In designing three diverse row houses, Chatham has set a precedent for variety in what promises to be one of the most intriguing neighborhoods at Seaside. And although he has acquired a reputation for being an architectural rebel-with-a-cause in this resort, Chatham contends his investigations will help him design future infill row house projects in New York and other urban centers. "I've been able to use Ruskin Place as a laboratory," he says. "I see the solution to a lot of housing problems in these buildings."

—EDWARD GUNTS



The west side of Chatham's own house, with balcony, faces Ruskin Place (above); the east side overlooks a private beach (below and facing page). Both sides are screened by mahogany shutters to shade interior spaces.

Pugin House

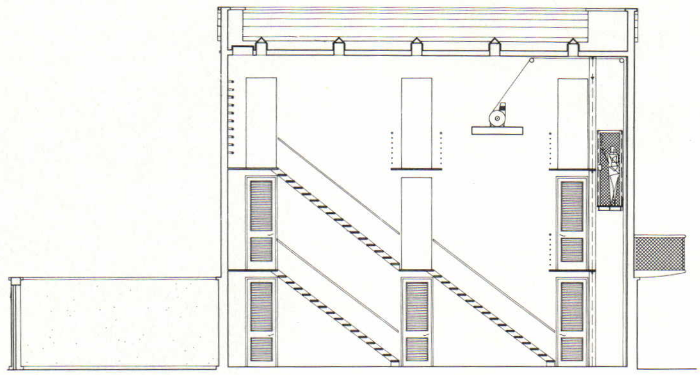
WALTER CHATHAM NAMED HIS OWN HOUSE after Augustus Welby Northmore Pugin, the 19th-century British architect who tried to promote a consistent style for Roman Catholic churches throughout England. In a sense, Chatham sees himself as fulfilling a similar role for Seaside. "Pugin tried to determine a building style that was appropriate to his time," explains the 40-year-old architect, "and I'm trying to find an evocation for contemporary times."

Designed for himself, his wife—artist and furniture designer Mary Adams Chatham—and their three children, the Pugin House occupies a corner lot, giving it one free and one attached side wall. The 2,400-square-foot building is constructed of concrete block piers with a wood infill structure of floors and frames. Clad in artificial stucco and exuding an almost Wrightian appearance, the load-bearing piers contain all of the services—a galley-style kitchen, bathrooms, and closets on the attached south side, and the stairs and an elevator on the free north side. Like the abutments of a bridge, this poché permits a free interior that can either be partitioned or left completely open throughout the length of the house. Chatham placed the living space on the top floor, where views and breezes are best, and the sleeping spaces on the second floor, designating the street-level space as a workshop.

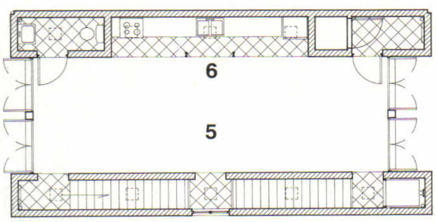
A 14-foot-high corrugated metal vault spans the living room and is fully insulated and covered with a second metal vault—restrained so only a thin, curved profile is visible from the street. Although a roof deck would have provided a view of the beach two blocks away, Chatham opted to bring the beach to his house instead. He did so by creating, on the east side, a 20-by-30-foot outdoor space covered with sand, planted with two sycamore trees, and partitioned from the street at the property line by a striped frame that supports a privacy curtain. All of his interior doors and cabinets are patterned in checkerboards—a reference to his first house at Seaside. "My children love those checkerboards," Chatham quips.

ARCHITECT: Walter F. Chatham, Architect, New York City—Walter Chatham (project architect); Evans Simpson (project architect)
ENGINEER: Ross Dalland (structural)
GENERAL CONTRACTOR: Warnerworks
COST: $250,000—$104/square foot
PHOTOGRAPHER: Michael Moran

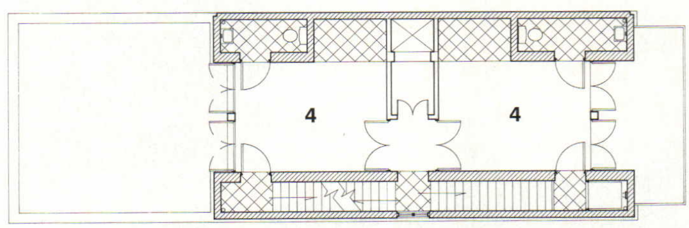
Chatham placed the living space on the top level beneath a corrugated metal vault (facing page) to capture breezes and views. Off second-floor bedroom, a balcony (top left) overlooks Ruskin Place. Third-floor stairway landing (below left) offers views of elevator motor and lower levels. Stripes and checkerboards, designed by Chatham on a computer, designate different floors: blue on the first, yellow on the second, and green on the third.



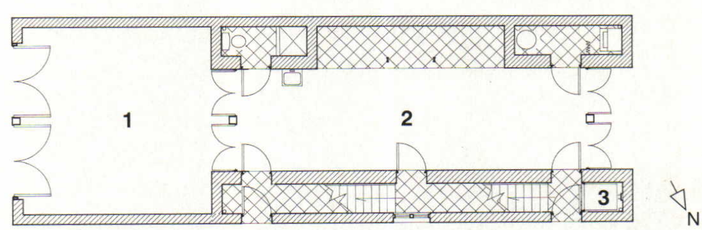
SECTION LOOKING SOUTH



THIRD FLOOR



SECOND FLOOR



GROUND FLOOR

1	BEACH	4	BEDROOM
2	STUDIO	5	LIVING ROOM
3	ELEVATOR	6	GALLEY KITCHEN

Goodnough House

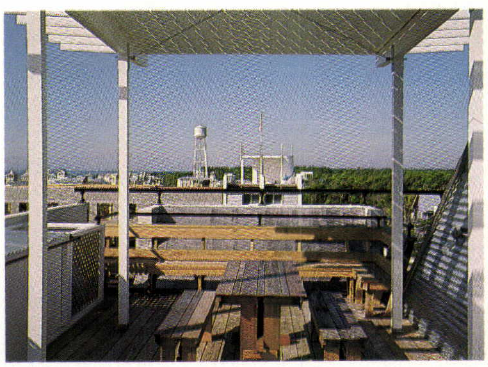
THE GOODNOUGH HOUSE—DESIGNED FOR husband-and-wife physicians and their four children—is most in keeping with traditional expectations of beach resort living at Seaside. With its pastel-colored finishes and clearly defined living spaces, it is the most conventional of Chatham's designs, synthesizing the organization of the Forsythe House and the Pugin House, which abuts the site.

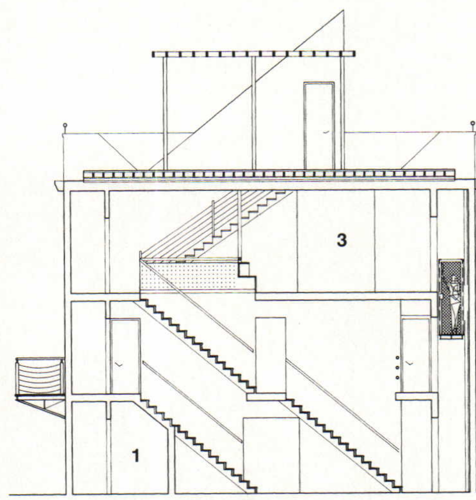
Like the neighboring Pugin House, the shell of the 2,400-square-foot Goodnough House is constructed of reinforced concrete and concrete block, and contains stairs running up the south side. Its living room, dining room, and kitchen are located on the third floor, reached by an elevator; the master bedroom and a child's bedroom occupy the second level. But, as in the Forsythe House across the street, rooms are separated by central service zones that contain kitchen, bathrooms, and laundry. On the first two levels, these zones extend from the north wall; on the top level, the kitchen projects closer to the center. Two children's bedrooms occupy the first level in lieu of a retail space.

Chatham gave the house a traditional, almost tropical appearance, with top-hinged wooden shutters and wood siding. At the same time, he rendered the interior subtly industrial in character, with such elements as galvanized-pipe towel bars and a perforated-plywood-clad stair leading to the roof. The architect popped up the roof line on the east and west sides to make room for two tiers of double-hung windows that introduce more light to the third level. He also exposed the steel elevator cables that run directly above the dining table as a design feature; they move noticeably whenever the elevator is in use. The main concession to the architect's Modernist leanings is an angular, corrugated metal stair tower on the roof that leads to a pergola-covered terrace. Such roof elements afford panoramic views of the Gulf of Mexico two blocks away, but are permitted under Seaside's design code only if they are set back from the front and rear facades.

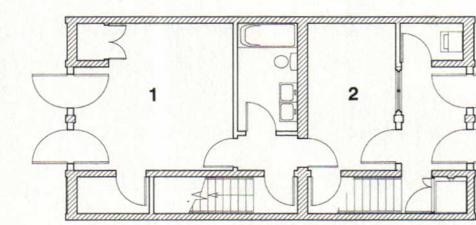
OWNERS: Tim Goodnough and Mary Ellen Kleinhenz
ARCHITECT: Walter F. Chatham, Architect, New York City—Walter Chatham (project architect); Evans Simpson (project architect)
ENGINEER: Ross Dalland (structural)
GENERAL CONTRACTOR: Warnerworks—Michael Warner
COST: Withheld at owner's request
PHOTOGRAPHER: Michael Moran

Double-hung windows, wood siding, and shutters give the Goodnough House (above, left in photo) a traditional look. Chatham popped up the roof on the east and west sides to admit more light into third-story living spaces (bottom). Roof deck (below) features pergola.





SECTION LOOKING NORTH



FIRST FLOOR PLAN

N

1 STUDIO
2 BEDROOM
3 LIVING/DINING/KITCHEN

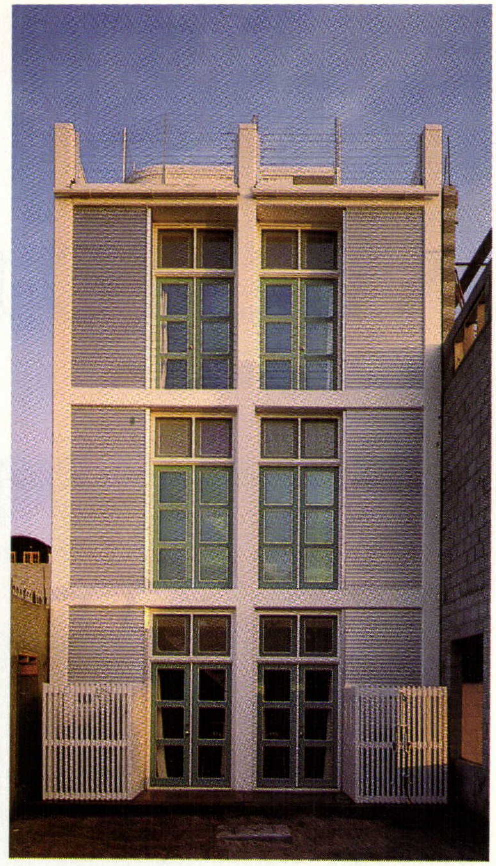
Forsythe House

THE FORSYTHE HOUSE, FACING CHATHAM'S other two houses across Ruskin Place, was designed for a Chicago jewelry maker and her family. In keeping with the Arts and Crafts theme of Ruskin Place, the Forsythes requested a first-level studio, with a kitchen in back and living spaces above. "They had a very strong idea of what they wanted—an open plan with no interior walls except around the bathrooms and closets and laundry room," Chatham explains. "They were thinking of it as a traditional urban loft building, with modifications for the fact that it was at the beach."

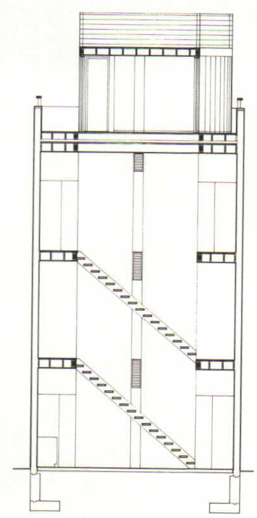
Chatham responded by creating a 2,000-square-foot house that was conceived in plan like a skyscraper, with a central service core wrapped by stairs and surrounded by open space. Reinforced by steel columns, the core forms not only part of the structural system—which had to be able to withstand Florida hurricanes—but serves as the sole spatial divider in the building. On the first floor, the architect planned a jewelry-making workshop on the side facing Ruskin Place and a double-height kitchen and dining space on the side away from it. On the second floor, he located the living room at the east end to overlook the kitchen and dining area; he topped the building with two bedrooms and a tower room on the roof deck.

Befitting a jewelry maker, the interior is finished with metallic surfaces, including aluminum paint on the sheetrock around the service core and copper paint on the shingled kitchen walls. Such touches evoke the industrial esthetic of early Modernism, a period that fascinates Chatham. The same esthetic influenced the design of the tower room, which leads to a roof deck that contrasts with the urban intensity of the house below. It is designed to express the core pushed up through the roof of the house, "a little pavilion in the tradition of Le Corbusier," according to the architect. "In terms of architectural expression and lack of embellishment," claims Chatham, "the Forsythe House is the most orthodox Modern building in Seaside." ■

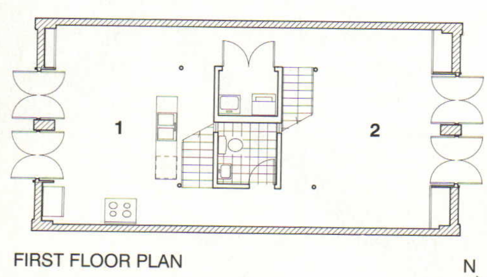
OWNERS: William and Mary Florence Forsythe
ARCHITECT: Walter F. Chatham, Architect, New York City—Walter Chatham (architect); George Perkins (project architect)
ENGINEER: Ross Dalland (structural)
GENERAL CONTRACTOR: Warnerworks—Michael Warner
COST: $180,000—$90/square foot
PHOTOGRAPHER: Michael Moran



East (above left) and west (above right) facades are constructed of concrete frames filled in with glass doors and wood siding. Solid central core is expressed as an opening on the exterior. Two-story kitchen-dining space (below) features metallic finishes.



SECTION LOOKING WEST

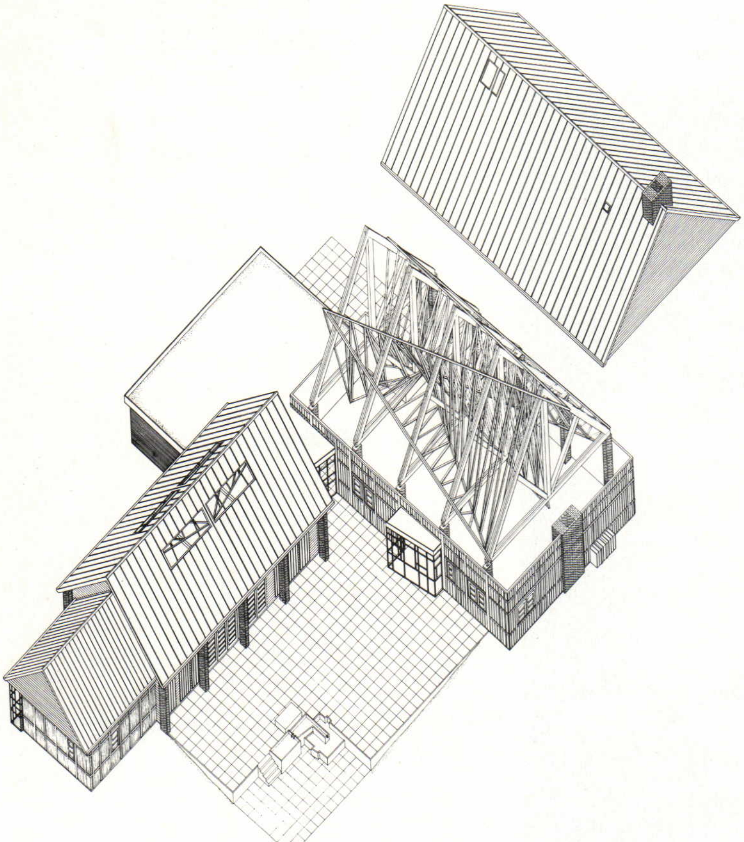


FIRST FLOOR PLAN

1 DINING/KITCHEN
2 STUDIO

Conanicut Island House
Rhode Island
Bausman-Gill Associates, Architects

Regional Roots



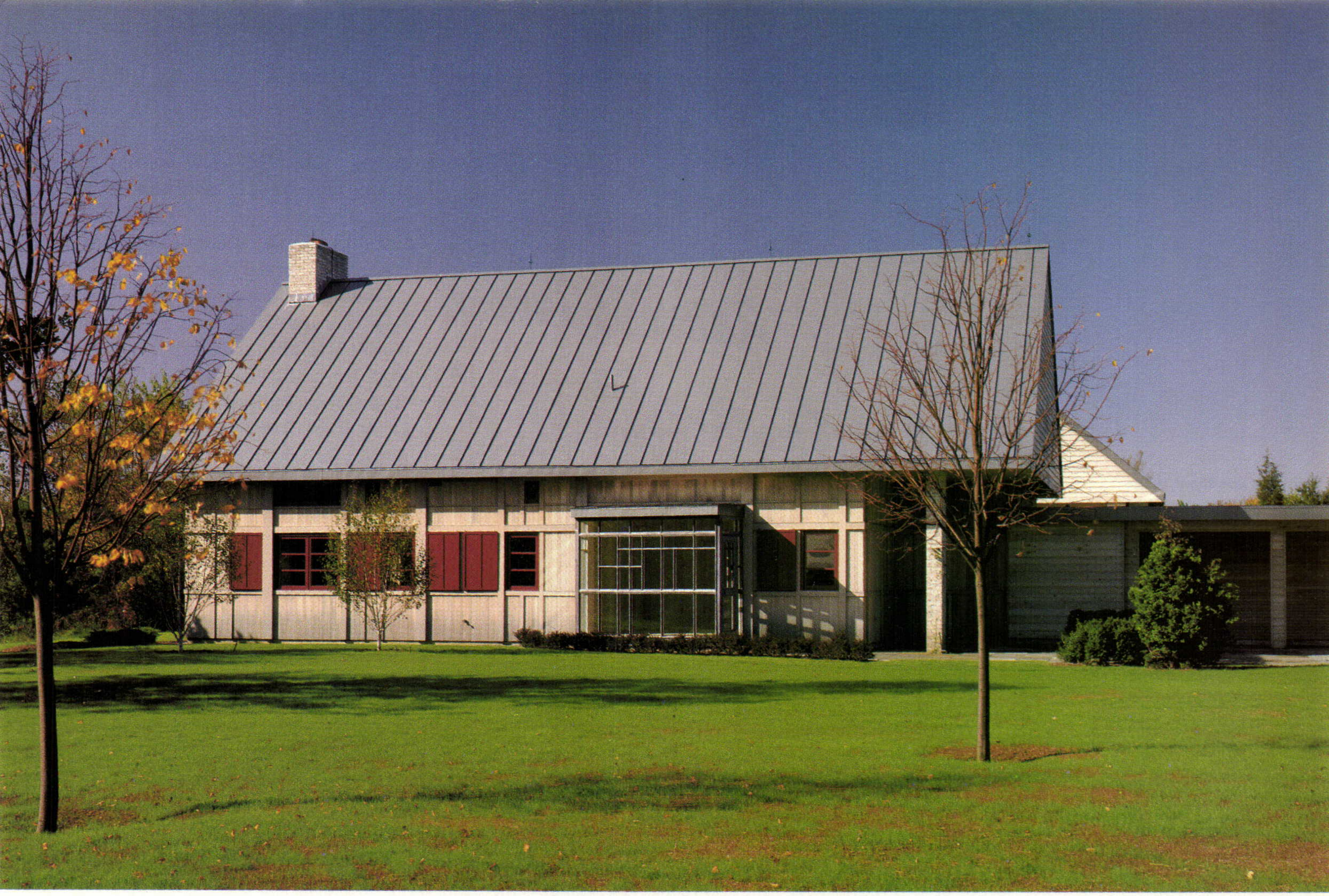
KAREN BAUSMAN AND LESLIE GILL, URBANE young architects steeped in the sophisticated milieu of New York City, hesitate to describe their work as "romantic regionalism." But their design for a house on the Rhode Island coast evokes not only images of the local historic vernacular, but the architecture of the owner's rural Pennsylvania roots. The single-level plan, indoor pool, and 45-degree sloped roofs are features the architects attribute to the client's requirements, but they naturally lent themselves to interconnected traditional forms of modest scale. Bausman and Gill have taken these regional forms as the raw material of their design and pushed them through their own architectonic filter, raising the common to the uncommon.

New England architecture, particularly a photo of an early-19th-century church in Exeter that the architects discovered in Henry-Russell Hitchcock's *Rhode Island Architecture*, inspired the taut, enclosing walls and the solid form of a gabled roof hovering above a delicate vertical structure. Tall, painted metal roofs shelter the house's two primary components, the living spaces and the pool house, while a smaller gable crowns the guest wing. A garage at the northern edge of the house is topped by a flat roof.

The brick columns that support the roof of the pool house are pushed to the mahogany-clad exterior, in contrast to the main volume's structure, which is pulled inside. "We wanted this tight skin to have depth and hierarchy, within a shallow plane," explains Gill. Vertical mahogany battens on the exterior denote the location of interior columns; more delicate vertical members create a frame into which shuttered windows are inserted. The walls seem to constantly change character throughout the day, like one of the architects' shadow boxes (ARCHITECTURE, October 1991, pages 50-53) turned inside out.

Conceptually, the architects view the wooden walls as opaque, so that only major

Gabled wings (axonometric) are joined by breezeway (top left) that connects pool house to main house. Standing-seam metal roof (facing page, top) floats above mahogany wall of east elevation, designed to denote structure. Pool house's south wall (facing page, bottom) is articulated by exposed structural columns.



View from entry (right) reveals exposed trusswork and living room beyond, with kitchen to the right and bedroom to the left. Intricate struts weave between trusses above living room and dining area (below). Pool house (facing page) connects main house to guest wing at rear.

elements of the interior structure are translated to the exterior. "The idea is that the walls read like an X-ray of what's behind them," notes Gill. The heaviest divisions within the walls are horizontal cross-battens that define the zones of fenestration. Other divisions appear as notations of the 2-by-6 framing within the walls.

Bay windows are one element common to New England architecture that Bausman-Gill handled in an uncommon way. Projecting from the east-facing bedroom and the west-facing dining room, they are angled to capture views of the waterfront and a terraced garden respectively; in plan, the pair contributes to a diagonal geometry that cuts back and forth across the house and terminates in a corner window in the guest bedroom. According to Bausman, this window placement creates "a ribbon of light that weaves through the plan," a counterpoint to the twists and turns of trusswork in the house. The divisions of the bay windows appear artfully random at first, but their patterns are based on the same system used on the exterior walls.

The interiors, explains Bausman, convey "a quality of light found in Pennsylvania barns, filtered through the structure." The open trusswork in the main house is indeed barnlike, embellished with an intricate system of fir struts that interlock like a cat's cradle high above enclosures housing kitchen and bedroom. The pool-house ceiling struts twist off axis, seeming to terminate behind a wall that leads to the guest wing.

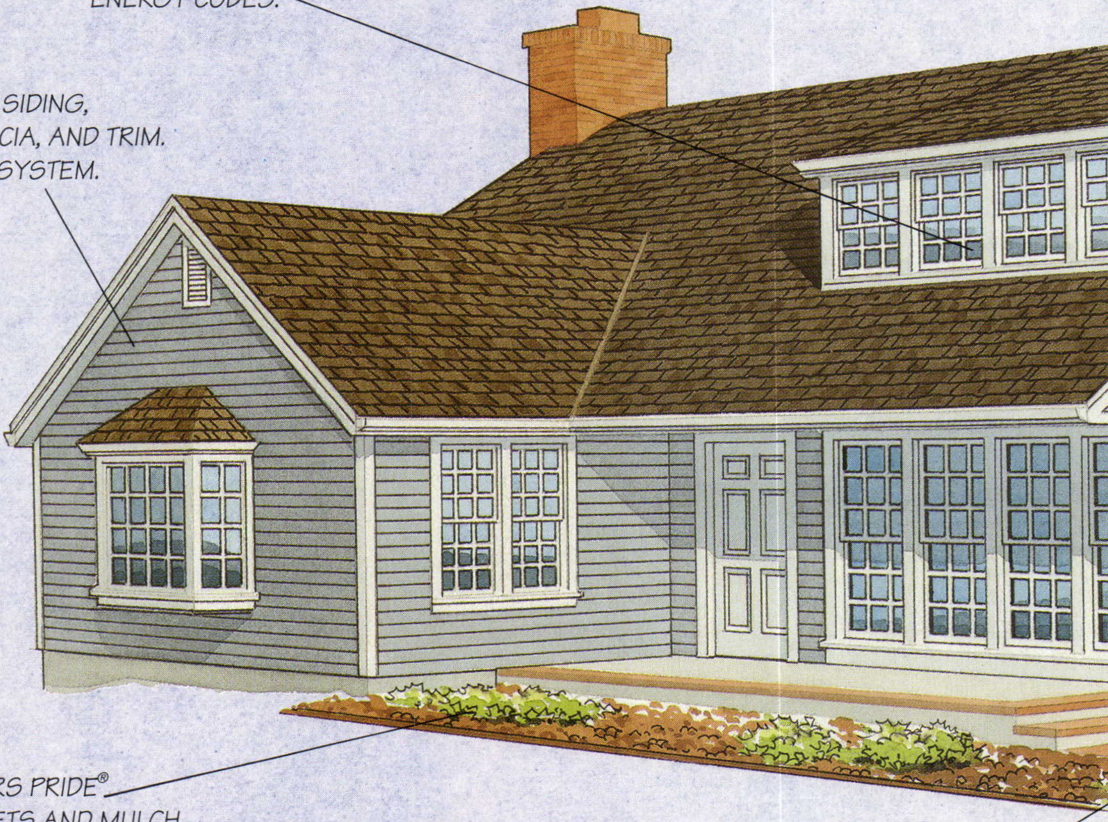
Although the exposed structure and building skin suggest a Japanese esthetic, the architects insist this effect wasn't intended. "We went back to the fundamentalism of American architecture," Gill claims, "and translated it into contemporary forms." ■

—MICHAEL J. CROSBIE

CONANICUT ISLAND HOUSE
RHODE ISLAND

ARCHITECTS: Bausman-Gill Associates, New York City—Karen Bausman, Leslie Gill (partners-in-charge); Adi Shamir (associate); Alison Berger, Paivi Jaaskelainen, Clarissa Matthews, Bette Miller, Tim Schollaert (design team); Carl Miller (model); Elizabeth Alford, Alex Porter, Homa Shojaie (presentation drawings)
LANDSCAPE ARCHITECTS: Plimpton Associates
ENGINEERS: Wilbur E. Yoder/The Yoder Corporation (structural)
FIREPLACE DESIGN & PAINTINGS: William Prichett
GENERAL CONTRACTOR: Kevin Brennan/Home Grown Homes
CONSTRUCTION MANAGER: William Prichett
COST: Withheld at owners' request
PHOTOGRAPHER: Jeff Goldberg/Esto

The Cost of Building A House Is Ridiculous.



HOW RIDICULOUS IS IT?

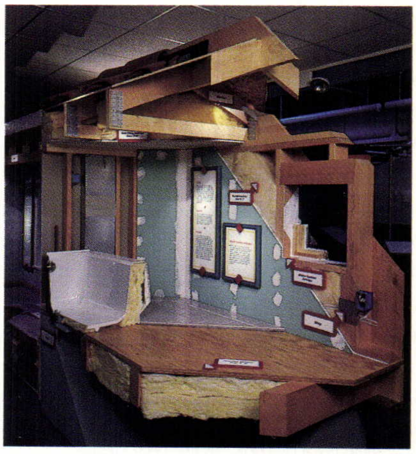
LOOK AT THESE EXAMPLES FROM HUD'S REPORT ON AFFORDABLE HOUSING. IN THE BAY AREA OF NORTHERN CALIFORNIA FEES ROSE 126% BETWEEN 1981 AND 1987. IN NEW JERSEY PERMITS AND FEES CAN ACCOUNT FOR UP TO 30% OF A HOME'S TOTAL COST. ON THE OTHER HAND, TRADITIONAL BUILDING PRODUCTS FROM LOUISIANA-PACI SELLING FOR LESS THAN 1% MORE TODAY THAN TEN YEARS AGO OUR INNOVATIVE NEW PRODUCTS ARE QUICKLY REPLACING THOSE HAVE BEGUN TO DEMAND TOO HIGH A PRICE. YOU CAN HELP BY C THE NAHB AT 1-800-368-5242, EXT. 329 TO FIND OUT ABOUT YOUR

Technology & Practice info

Information on building construction, professional development, and events

San Francisco Energy Center

IT IS RARE FOR A UTILITY COMPANY'S PROJECT to receive the unmitigated praise of the power industry, government, and environmental movements. But just such a unanimous endorsement occurred at the December opening of the Pacific Gas and Electric (PG&E) company's Pacific Energy Center in downtown San Francisco. The 25,000-square-foot building is designed as an interactive "energy college" to teach architects, engineers, builders, and designers about energy conservation technologies. The $7.1 million facility is the centerpiece of PG&E's aggressive attempt to meet 75 percent of the Bay Area's future energy demands by means of conservation rather than investment in new power plants. Located within a remodeled 1920s-era concrete-frame warehouse, it incorporates a state-of-the-art programmable chiller with thermal storage tanks, an example of the conservation methods taught within the labs and exhibits of the two-story structure. Louvered sunscreens, skylights, and high-efficiency light bulbs are all connected to computer-controlled sensors to further conserve energy throughout the building.



Pacific Energy Center (top) contains displays such as a cutaway house (above) to teach energy conservation.

The second floor and part of the roof are devoted to laboratories for experimenting with alternative energy products and designs under the guidance of PG&E's technical consultants. In the research library, center staff provide computerized database searches, while an HVAC demonstration area enables different indoor environments to be simulated and compared. In a lighting lab, architects can test combinations of natural and artificial alternatives. A heliodon station, or "sun machine," allows three-dimensional architectural and urban-design models to be rotated, precisely simulating light and shadow conditions at different times of the day and year. A daylighting lab with scale models of individual rooms viewed at eye level allows observers to examine how glass products and shading techniques affect interior light.

Kathleen Cruise, PG&E's project architect, predicts the center will be useful in all phases of design work. At the beginning of a project, for example, an architect might visit the center to become better acquainted with PG&E's rebate incentives for energy conservation, or with new energy saving products and strategies. During conceptual design, a meeting with one or more of the center's consultants might point the way to a building's overall energy strategy. When developing a design, an entire project team could meet at the center to work on product choices in a mock-up lab. For more information, call (800) 468-4743. —DAVID MOFFAT

Metric Conversion

CURRENTLY, ONLY THREE NATIONS—BURMA, Liberia, and the United States—have failed to adopt the metric system, but that will soon change. According to the Metric Usage Act, amended by Congress in 1988, federal government agencies are required to convert from the English system of measurement to the metric system by September 30, 1992. In January, the General Services Administration began overseeing several "pilot projects" to study the effect of metric conversion on building costs. A construction subcommittee of the Interagency Council on Metric Policy (the organization responsible for coordinating the federal government's conversion) has set a goal of January 1, 1994, for all federal construction to be configured in metric measurements. A recently published 34-page guide entitled "Metric Guide for Federal Construction" is now available from the National Institute of Building Sciences (NIBS) to help the construction industry prepare metric drawings and specifications under the new requirements. Based on the conversion experience of such countries as Canada and the United Kingdom, the guide points out that architecture and engineering firms have required less than one week to "think and produce" in metric. Firms have also found the system faster and less prone to calculation errors than feet and inches. For more information, contact: NIBS (202) 289-7800. ■

—M.S.H.

New Roofing Literature Released

The Steel Joist Institute recently revised its technical publication (left) on the effects of wind uplift on roofs supported by steel joists. For more information, call: (803) 449-0487. A new 35-page brochure from the American Plywood Association on nonresidential roof systems contains recommendations and design data for structural wood panels and glulam beams. For more information, contact: (206) 565-6600.

Selection guidelines

THE FOLLOWING STEPS ARE DESIGNED TO help practitioners determine which roofing materials and systems are most appropriate for certain types of projects:

■ It is vital to understand how long the client expects the roof to last. Architects should be aware of how much commitment the owner plans to make toward periodic maintenance. If the owner is unwilling to allocate sufficient funds for maintenance, a conservative, durable system should be specified. For example, if the owner is unlikely to reapply a bituminous coating of tar to a smooth-surface built-up membrane, an aggregate-surface finish should be specified.

■ It is important for architects and building owners to avoid relying on long-term roof warranties, with which manufacturers may certify roofs to last as long as 20 years. While a warranty may provide some relief to some types of problems, it does not necessarily keep water out of the building, so owners should still have the roof periodically inspected to note and rectify any system deficiencies in their infancy. Architects should recommend that owners inspect all roofs in the spring and fall to benefit the most from their initial investment. These seasons of the year are the best times to observe problems associated with inadequate drainage, which could lead to eventual moisture damage. Most building owners fail to inspect roofs, which shortens the roof's life expectancy and leaves owners unaware of problems until they become serious. These periodic inspections should be performed by a professional roofing contractor or someone with similar knowledge of the installed system. When problems are caught early, the cost of repairs is minimized and disruptions of operations within the building are often avoided.

■ Architects should determine the amount of circulation that will take place on the roof. If a great deal of foot traffic will be required for maintaining HVAC equipment, a durable roof system such as an aggregate-surface, built-up, or modified bitumen membrane is preferable. If a single-ply membrane is specified, walkway pads should at least be placed in high-traffic areas and around mechanical equipment.

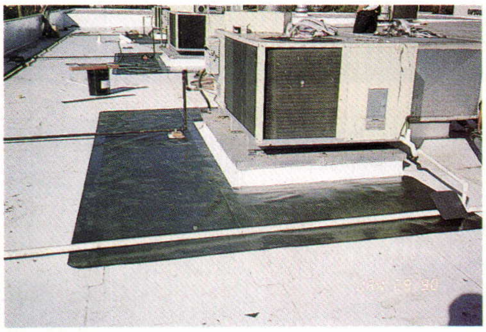
■ When designing the roofing system, architects should consider the attributes of additional durability. For example, specifying a four-ply built-up membrane in lieu of a three-ply membrane will be more conservative. Or selecting a protective cover board of perlite or wood fiberboard over plastic foam insulation for an aggregate ballasted, single-ply membrane will minimize damage or crushing of foam insulation when the top layer of ballast is installed. Such a cover board will avoid reducing the effective R-value of the roof system.

■ Determine whether roof systems will be contaminated by building exhaust or pollutants from neighboring buildings. For example, animal or vegetable fats exhausted from a kitchen can damage some types of roof membranes, such as single-ply EPDM (ethylene propylene diene monomer). If contamination is likely, the membrane should be protected with appropriate coatings or additional plies, both of which must eventually be replaced, but which serve to prevent damage to the base membrane. Depending on the nature of the contaminant, another type of membrane may be required.

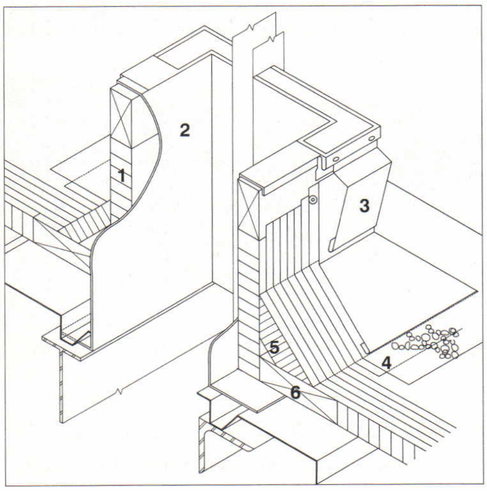
■ Determine the effect of environmental conditions, such as wind, solar radiation (heat and ultraviolet light), snow, rain, hail, and seismic activity. Local building codes will typically provide only minimum design criteria for most environmental loads. Unusual site conditions or building configurations may require load calculations by architects and engineers that exceed the minimum code values. For example, a building with unusually large door openings, such as an aircraft hangar, will likely experience greater wind uplift pressures on the roof than would be predicted by code.

■ Research what code provisions are applicable for the design of a specific roofing system. (All three model building codes have a chapter regarding roof construction.)

Additional plies (below) and integrally flashed platforms and curbs (detail, bottom) protect membranes from contaminants exhausted by vents and from air and water infiltration around mechanical equipment.



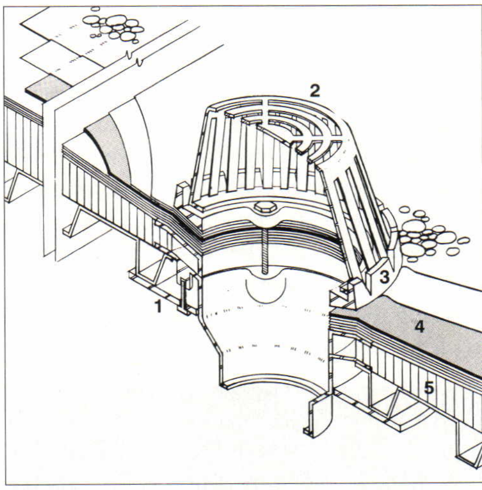
COURTESY NRCA



CURB DETAIL AT AIR-CONDITIONING UNITS

1 INSULATION
2 METAL FRAME
3 COUNTERFLASHING
4 BASE FLASHING
5 FIBER CANT STRIP
6 OPTIONAL WOOD BLOCK FASTENED TO DECK

Adequate slope and proper drainage (photo and detail below) are critical for the long-term maintenance of the roof system, but they do not substitute for periodic inspection to ensure performance.



ROOF DRAIN

1 DECK CLAMP
2 STRAINER
3 CLAMPING RING
4 METAL FLASHING
5 SLOPED MEMBRANE WITH INSULATION TAPERED TO DRAIN

■ Inquire if the building's insurer has certain requirements related to the roof which must be incorporated into the design. The most common special provisions are those promulgated by Factory Mutual. For example, Factory Mutual has established minimum and maximum thickness limitations on specific insulation boards depending on the type and manufacturer.

■ If the client owns other buildings, discern whether he or she has a preference for certain materials or systems.

■ Determine the type of materials and systems with which local roofing contractors are most experienced.

If the material being considered is fairly new (with fewer than 10 years in commercial applications), carefully scrutinize its actual in-service performance. Research what laboratory testing and field experience the manufacturer has completed with the product under climatic conditions similar to those where the building will be located.

■ Regardless of the type of materials or systems, provide adequate slope for drainage. This simple task can greatly enhance performance and minimize problems. To achieve such drainage, a designed slope of 1/4-inch per foot is typically sufficient. However, for long spans, deflection of a roof's support members can create excessive ponding for even 1/4-inch slope. The *NRCA Roofing and Waterproofing Manual* provides additional information for assessing slope requirements for these special conditions.

For reroofing, a smaller slope of 1/8-inch per foot may be suitable, since allowances for differential building settlement and construction tolerances for the structure are not applicable. If the roof drains within 48 hours after rainfall, it is considered adequately sloped. However, if such a minimal slope is designed, field measurements should be taken during the design phase to determine whether the substrate (roof deck or existing membrane), over which the newly applied roof will be laid, is sufficiently pitched to prevent water from ponding.

Energy efficient roofs

ARCHITECTS CAN DESIGN ROOF SYSTEMS that minimize energy consumption, saving heating or cooling costs for the building owner. Energy consumption guidelines and requirements can be found in the model building codes or ASHRAE 90.1-89 (commercial buildings) or 90.A-80 (residential). When designing an energy efficient roof, consider the following guidelines:

■ Heat loss due to mechanical fasteners and gaps between insulation boards is often overlooked by the architect. Such gaps lower the actual R-value of the roof system and preliminary calculations often fail to address these factors. Architects should specify two layers of insulation to allow the insulation board joints on one layer to be offset from the joints above, thereby minimizing gaps that permit heat loss through the roof system. If the insulation is mechanically attached to the roof deck, selecting a two-layer system will allow the first layer to be mechanically attached and the second layer to be secured with hot asphalt. This attachment method will minimize the conduction of heat through continuous fasteners from the interior of the roof system to the exterior. For more comprehensive information on designing better insulated roof systems, the American Society for Testing and Materials (ASTM) publication STP 959 discusses heat loss due to mechanical fasteners and gaps between insulation boards (see Roofing Resources, page 89).

■ The color of the roof plays a major role in surface temperature and, as a result, in energy consumption. Cold climates warrant dark roofs, whereas light colors are preferable in hot climates. A 1989 document from Oak Ridge National Laboratory (ORNL-6527) details criteria for estimating energy consumption based upon color.

■ When specifying phenolic, polyisocyanurate, or extruded polystyrene insulation, architects should consider that the R-value of these products decreases over time (ARCHITECTURE, February 1991, pages 93-98). When specifying the required total R-value, it should be based upon the "in-service" (long-term) R-value of the installed product. For polyisocyanurate insulation, NRCA recommends an R-value of 5.6 per inch of thickness. For in-service values of phenolic and extruded polystyrene, consult with the manufacturer to determine appropriate roofing insulation thicknesses.

■ With some roofs, a vapor retarder is needed to avoid condensation problems that reduce R-value and can cause deterioration of the roof and deck. Guidelines for determining when a vapor retarder is needed are found in the *NRCA Roofing and Waterproofing Manual*. However, the U.S. Army's Cold Regions Research and Engineering Laboratory (CRREL) recently found that buildings with high interior humidity can experience unacceptably high levels of condensation, even when the buildings are located in warm climates. Therefore, the CRREL recommends

PHOTOS COURTESY NRCA

Light-colored coatings can be applied to the surface of dark modified bitumen and built-up roof systems (top) in order to enhance their energy performance by reducing heat gains for buildings located in warm climates. In terms of esthetics, however, the unsightly ridge seams where white single-ply membrane sheets are joined may be visible (second from top). White rooftops can also be easily discolored by contaminants exhausted around ventilation equipment (third from top) and sediment from ponding water (above). If a more uniform appearance is desired, a paver- or aggregate-ballasted roof system finish should be specified.

installing a vapor retarder in such cases, but the NRCA does not. The *NRCA Energy Manual* recognizes the validity of the CRREL updated refinement, and the CRREL recommendations should be considered. They are available in the proceedings of the ninth Conference on Roofing Technology.

Preventing wind uplift

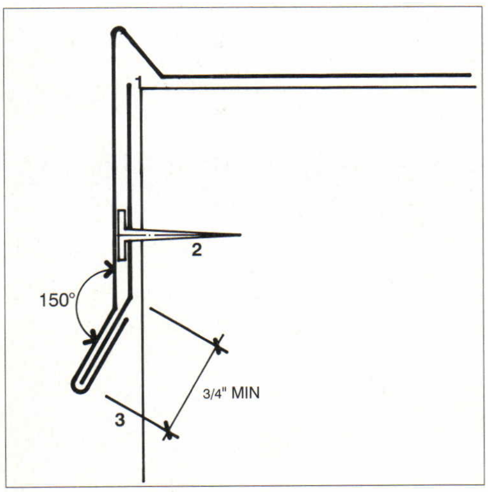
WIND RESISTANCE IS CRITICAL TO THE DEsign of any roof, since injury can occur from debris blowing off the top of a building, and interior damage can result from water penetrating a torn or damaged system. Wind uplift loads for membrane and metal-panel roof systems should conform with building codes and be calculated to accommodate anticipated live loads.

For built-up and single-ply roof systems, methods of securing metal edge flashing, coping, and gutters are also critical to wind resistance. The architect should properly design and detail these metal components and the wooden nailers to which they attach. Nailer uplift loads should be calculated and sufficient fasteners specified to accommodate wind. Architects frequently specify too light a gauge for cleats and an inadequate number of cleat fasteners, often improperly located, or they detail too short an edge lip for interlocking the secured cleat to the metal fascia (see detail, below left). Wood nailers, especially when designed to be attached to a brick wall, are likewise commonly designed with too few fasteners. NRCA's *International Journal of Roofing Technology* (Volume 2, 1990) includes design and detailing criteria for edge flashing components.

Ballasted, fully adhered, and mechanically attached single-ply systems, however, also require architects to consider additional wind-resistant design considerations, available from the Single-Ply Roofing Institute. Single-ply systems with a loose-laid aggregate complicate the design process for a ballasted system, since the correct aggregate size needs to be specified in order to prevent it from blowing off. For single-ply systems in windy areas, the wind-retardant benefit of "air retarders" should also be considered. An air retarder is not a single component, but a system designed to prevent air from leaking between the membrane and the decking, thereby avoiding the development of air pressure below the single-ply roof membrane when high winds pass over the building (such pressure causes the membrane to uplift or balloon). A ballast alone is only designed to hold a membrane down against minimal uplift pressures.

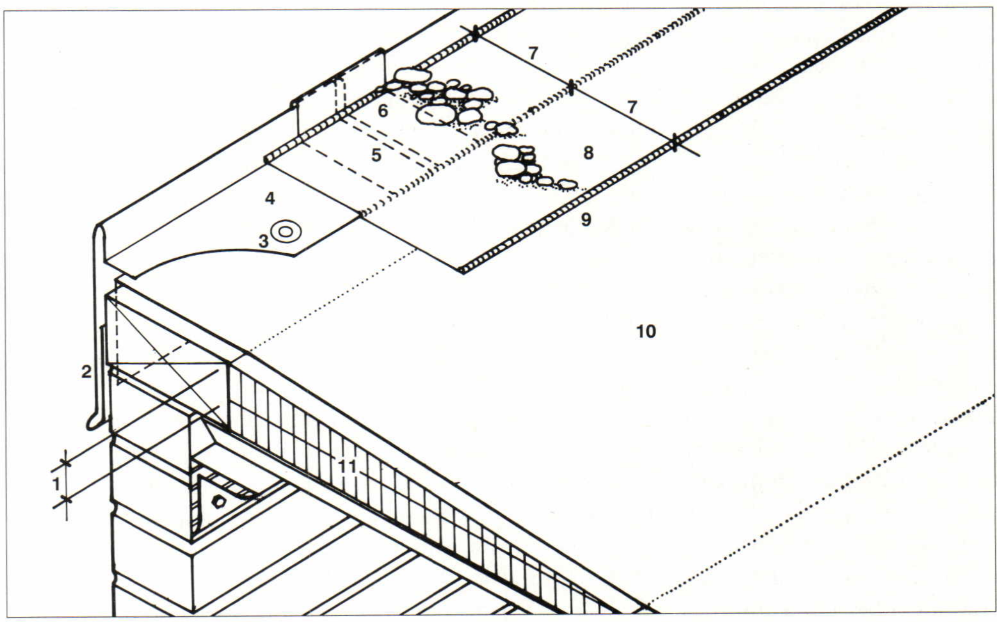
The attributes of air retarders have only recently been recognized and are still unfamiliar to many architects as a wind-resistant design element. A retarder can consist of the deck itself, provided the deck is monolithic, such as a cast-in-place concrete deck or a plywood deck with sealed joints. Or the retarder can consist of a polyethylene sheet placed over the deck or a thin layer of insulation. The impermeable sheet is then clamped in place by an insulation board. At the perimeter and at any roof penetration, the retarder must be sealed in a manner that will prevent air from entering between the retarder and the roof membrane layers.

Attention to edge details and designing a system impermeable to air infiltration are critical to resisting wind damage. For metal roof edges (below right) a heavy-gauge extended cleat edge (below left) offers greater protection from high winds than comparative standard flashing details for metal fascias (bottom).



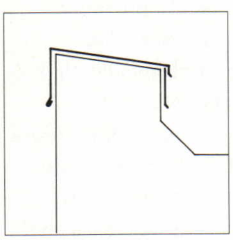
EDGE FLASHING FOR ENHANCED WIND RESISTANCE

1 22-GAUGE CLEAT (HEAVIER IN HIGH WIND ENVIRONMENTS)
2 ANNULAR OR SCREW-SHANK NAILS, 1 1/4" MINIMUM PENETRATION, 18" ON CENTER
3 3/4" METAL EDGE (1" IN HIGH WIND ENVIRONMENTS)



LIGHT-METAL ROOF EDGE

1 NAILER WITH 1 1/2" MINIMUM DEPTH
2 CONTINUOUS CLEAT
3 FASTENERS APPROXIMATELY 4" ON CENTER (DO NOT STAGGER)
4 METAL GRAVEL STOP
5 JOINT COVER 4" TO 6" WIDE, SET IN COMPATIBLE MASTIC
6 JOINT SEALANT
7 3" MINIMUM WIDTH OF FLASHING
8 CURED OR UNCURED FLASHING MEMBRANE ADHERED TO METAL AND MEMBRANE WITH APPROPRIATE ADHESIVE
9 EDGE OF FLASHING MEMBRANE SEALED WITH LAP-EDGE SEALANT
10 SINGLE-PLY MEMBRANE WITH AGGREGATE BALLAST
11 12" TO 18" TAPERED EDGE STRIP



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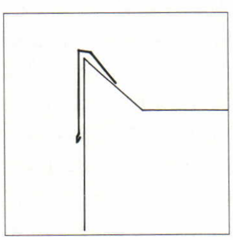


CAP FLASHING

Finishing touches

FOR LOW-SLOPE ROOFS WHERE ESTHETICS are a concern, special effort is needed to specify appropriate roof finishes. For example, a clean white roof or colored roof may not be very attractive after a year or two, due to buildup of windblown atmospheric deposits, contaminants exhausted by rooftop mechanical equipment, and sediment from ponding water. Single-ply seams, where individual membrane sheets are adhered to one another, present similar esthetic problems. From a distance they are not very noticeable, but up close, visually undesirable seam lines can become readily apparent.

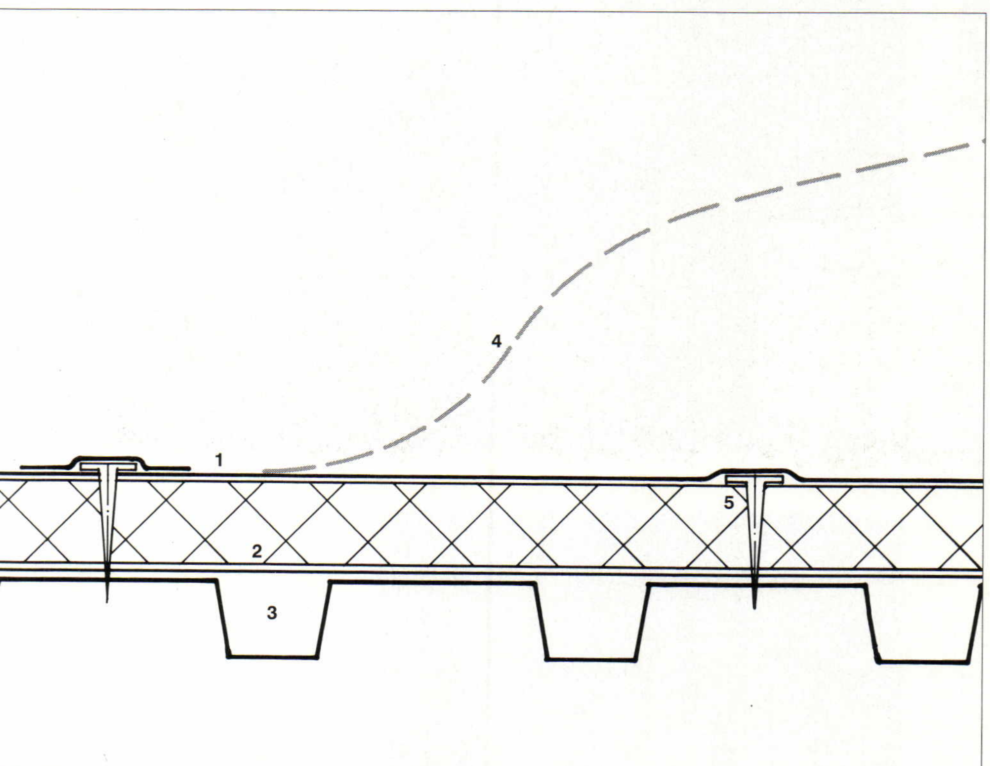
For a more uniform appearance, aggregate-surface, built-up, or ballasted single-ply (using paver or aggregate ballast) roof systems should be considered. To be sure a specified system will produce the desired finish, the architect should visit a roof that has been constructed in a similar manner to the roof cover being considered.

Keeping abreast of current roofing issues and developing a sound set of contract documents is a formidable task for any architect. This is especially true when a reroofing project is involved, which introduces a number of other complex considerations. To streamline the process, architects should develop a working relationship with professional roofing contractors. Many roofing contractors are willing to share their expertise and offer guidance through the maze of decisions that are encountered in designing and detailing today's roofing systems. Fortunately, there is also an abundance of literature on the topic (right), which should help architects make well-informed design and specification decisions when selecting a roof system and enhancing its lifetime performance. ■

—THOMAS LEE SMITH

Thomas Lee Smith, AIA, CRC, is Director of Technology and Research for the National Roofing Contractors Association (NRCA), which is based in Rosemont, Illinois.

An air retarder is an element of the roof system designed to prevent ballooning of the roof membrane by eliminating air pressure between membrane and deck. An impermeable polyethylene sheet, which is clamped to a metal roof deck by a mechanically fastened layer of insulation (below), offers one effective solution.



IR RETARDER

MECHANICALLY ATTACHED SINGLE-PLY ROOF MEMBRANE
POLYETHYLENE SHEET VAPOR BARRIER
STEEL DECK
BALLOONING SINGLE-PLY ROOF MEMBRANE
MECHANICAL FASTENERS

Roofing Resources

■ The *NRCA Roofing and Waterproofing Manual* (third edition, 1989): Approximately 600 pages of information on low-slope and steep-slope roofing materials and systems, construction details, waterproofing, and technical bulletins. CADD Software with isometric and section views of the construction details found in the manual is also now available from NRCA. Contact: (708) 299-9070.

■ *NRCA Energy Manual* (third edition, 1989): Life-cycle energy cost analysis and information on performance, R-value, and dew point calculations.

■ NRCA's *International Journal of Roofing Technology* (volume 2, 1990): Design and detailing information on wind-resistant metal edge flashings.

■ NRCA's *Professional Roofing* magazine: Monthly publication that includes information on roof system design and application.

■ Single-Ply Roofing Institute's *Single-Ply Roofing: A Professional's Guide To Specifications* (1991 edition). Includes wind design guides. Contact: SPRI (617) 237-7879.

■ ASTM *Roofing Research and Standards Development*, STP 959 (1990): Includes design information on heat loss through mechanical fasteners and insulation board joints. Contact: ASTM (215) 299-5400.

■ Oak Ridge National Laboratory's *Guide for Estimating Differences in Building Heating and Cooling Energy Due to Changes in Solar Reflectance of a Low-Sloped Roof*: Includes design information that enables assessment of the influence of roof color on energy consumption. Contact: Oak Ridge National Laboratory (615) 574-4346.

■ Factory Mutual System (FM) *Approval Guide and Loss Prevention Data Sheets*. Contact: Factory Mutual (617) 762-4300.

■ Sheet Metal and Air-Conditioning Contractors National Association's *Architectural Sheet Metal Manual* (fourth edition, 1987): Includes design and detailing information on metal edge flashings, copings, counterflashings, gutters, and traditional metal roofing. Contact: SMACNA (703) 803-2980.

IN JAPAN, ANDERSEN HELPS AN ARCHIT

"In designing this office building/restaurant/showroom, we imported many Western ingredients," said architect Yuji Noga. "Andersen supplied us with the windows and engineering data. The wood interiors of their products worked well with the masonry structure."

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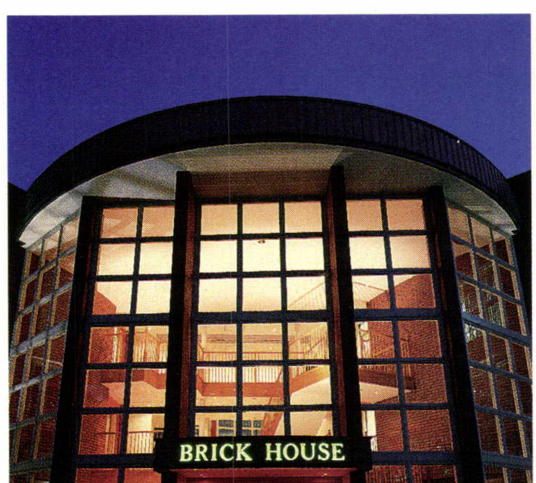


BRICK HOUSE. OSAKA, JAPAN.

ARCHITECT: YUJI NOGA. ISSIKI ARCHITECTS & PARTNERS CO., LTD. TOKYO, JAPAN.

Breathing Room

Roof ventilation requires attention to construction details.

THE INCREASING POPULARITY OF VAULTED ceilings has contributed to renewed interest in ventilating techniques. These types of ceilings require insulation in the rafters rather than between the joists of an enclosed attic. In addition, the deterioration of roofing plywood treated with fire-retardant chemicals over the last decade (ARCHITECTURE, April 1990, pages 99-100) has afforded new attention to the value of proper ventilating procedures.

Roof ventilation in residential and light commercial buildings serves several important purposes: it reduces heat buildup in the attic or the roof itself; it provides an escape route for any moisture that might get into the roof system; and, in cold climates, it helps prevent ice dams from forming.

Most building codes require 1 square foot of roof vent area for every 150 square feet of roof, or a ratio of 1:150. If there is a vapor barrier in the ceiling, which reduces moisture migration into the attic or rafter cavities, the acceptable roof vent area is reduced to 1 square foot for every 300 square feet of roof area (1:300). These values refer to "net free vent area," which assumes that no screening or louvers are interfering with that air flow. If there is such treatment over the vent, the net free vent area will be lower, and more vents will be required. (See chart, page 94, to calculate vent area required to achieve a net free vent area with different vent treatments.)

For a roof fitted with a polyethylene vapor barrier and measuring 50 feet along its ridge and 20 feet on each of its sides, for example, 1/300th, or 6.7 square feet of the roof surface will need to be in net free vent area. If the soffit and ridge vents have 1/8-inch screening, the actual space needed for the vent is is 6.7 multiplied by 1.25, or 8.4 square feet. With 1/8-inch screening and louvers, the required space for venting would be 6.7 multiplied by 2.25, or 15 square feet.

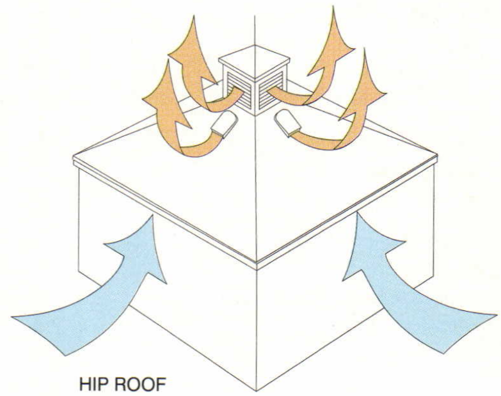
Providing such an area depends on the configuration of the roof, since some types of roofs are easier to vent than others. While venting gable and gambrel roofs is quite straightforward, hip roofs are particularly difficult to vent, because the length of the ridge line is so small. Shed roofs, or roofs with only one sloping plane, may require special venting systems. Different venting strategies may also be required depending on how the interior space is designed—especially whether or not the rafter bays are insulated.

Unheated attic

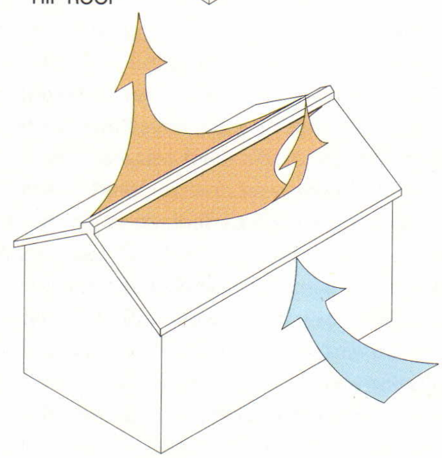
IN BUILDINGS WITH UNHEATED ATTICS, where the ceiling of the room below is insulated, architects should insert continuous soffit vents for air intake and continuous ridge vents for exhaust. Gable-end vents can be used as outlets, but they are not as effective as ridge vents and should never be relied upon for both inlet and outlet vents. Venting is straightforward with a soffit/ridge configuration; the only problem areas are the eaves.

In conventional roof truss or rafter framing, the ceiling insulation at the eaves is often compressed, dropping the insulating value at that location and potentially blocking air flow under the roof sheathing. A number of strategies can be employed at the roof framing design stage to avoid compressing the insulation at the eaves. Conventional rafters can be supported on a raised rafter plate instead of directly on the wall's top plate. In this case, both the ceiling joists and rafters may need to be extended and fastened together, depending on engineering calculations and discussions with builders. Some builders, however, simply terminate the ceiling joists with a band joist (flush with the wall), and set notched rafters on a raised rafter plate. Depending on the rafter and joist dimensions and the roof pitch, vent spacers may be required at the eaves to guarantee adequate space for air circulation be-

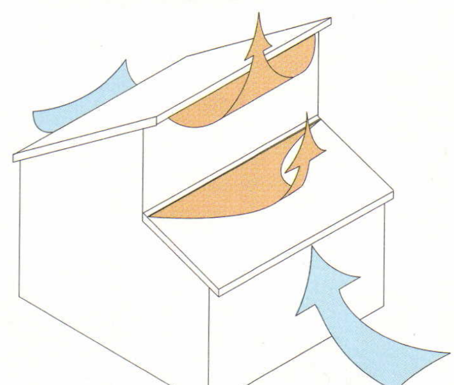
For hip roofs (top right), a cupola is a common venting solution. Where possible, low intake vents and high exhaust vents should be provided (second from top). Special flashing vents should be installed at shed roof edges (third from top). Gable-end wall vents, although not effective by themselves, can be installed in conjunction with soffit vents (bottom right).



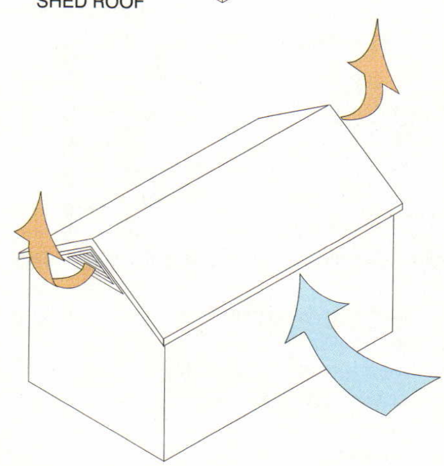
HIP ROOF



GABLE ROOF WITH RIDGE VENT



SHED ROOF



GABLE ROOF WITH WALL VENTS

Actual Vent Area Required

ROOF VENT TREATMENT	OPENING AREA†
1/4" screen	1.0 ft^2
1/4" screen with louvers	2.0 ft^2
1/8" screen	1.25 ft^2
1/8" screen with louvers	2.25 ft^2
1/16" screen	2.0 ft^2
1/16" screen with louvers	3.0 ft^2

† Area required to provide 1ft^2 of net free vent area (in ft^2).

Screens and louvers serve to prevent debris from clogging ventilation systems, but they also reduce the open area a vent provides for air flow. Therefore, if such treatments are specified, architects must calculate the amount of open vent area required to allow for the desired square footage of air circulation (see chart above), which will compensate for any permanently installed obstructions. Raised rafter plates (below left) or raised-heel trusses (below right) allow room at exterior wall junctions for air flow around insulation. Reinforcement for raised rafters can be provided by extending ceiling joists and attaching them to the ends of the rafters.

neath the roof sheathing.

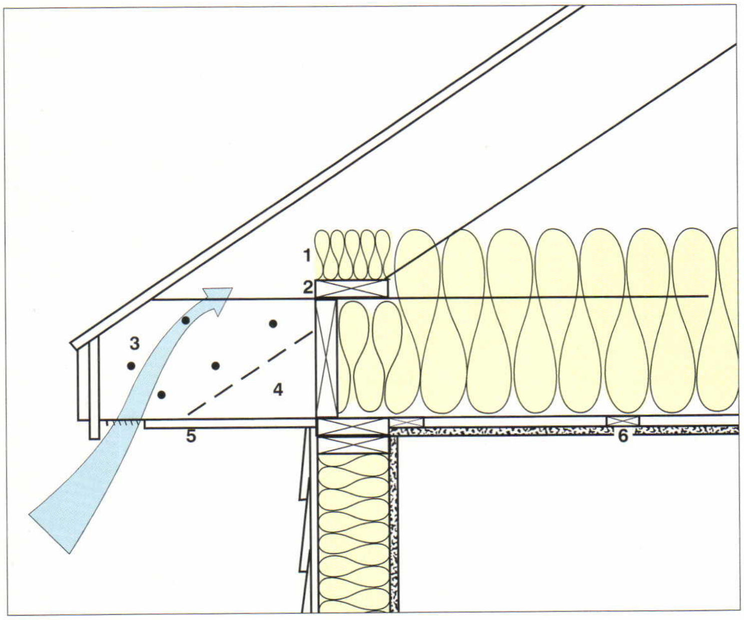
Additional depth at the eaves can be obtained in truss construction, either with cantilevered trusses that extend out over the wall plate, or with raised-heel trusses. Architects should work with a manufacturer to develop a truss design that will meet both structural and insulation requirements. Again, a vent spacer may or may not be required, depending on the dimensions of the truss. With most raised-heel trusses, the exterior wall sheathing can be extended above the wall top plate, right up to the top chord of the trusses.

In roof designs where ridge vents cannot readily be provided, as in a full hip roof, protruding surface-mounted roof vents, rotary ventilators, or cupolas may be required to provide adequate air exhaust. Architects should review manufacturers' literature to determine vent sizes, appropriate number to be inserted, and location.

Cathedral ceiling

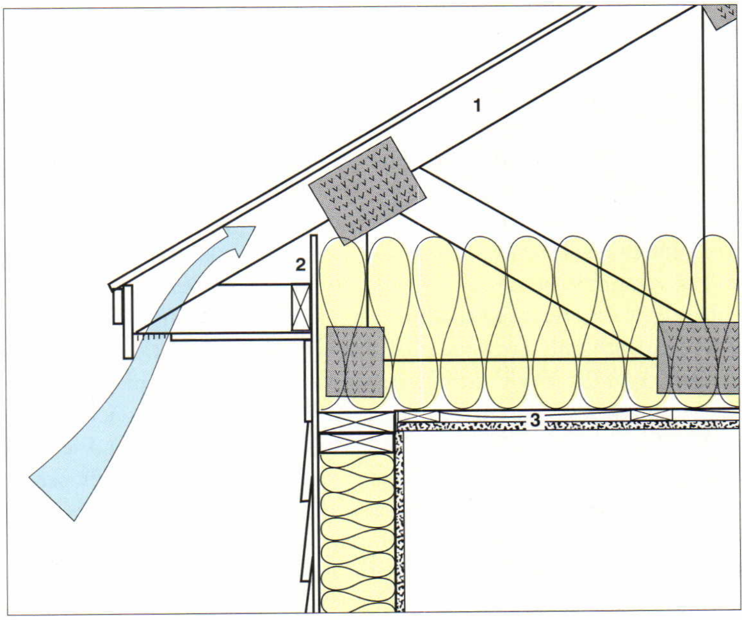
WHEN THE ROOF ITSELF IS INSULATED rather than the attic floor, providing an air space for ventilation along with adequate insulation is more difficult. For adequate venting, at least a 1-inch air space should be accommodated beneath the roof sheathing, running from continuous soffit vents on each side of the roof to a continuous ridge vent at the peak. Some architects design continuous soffit vents for the intake and gable-end vents above collar ties for the exhaust, but with this strategy it may be difficult to obtain an adequate vent area. The soffit-ridge vent combination is far better for allowing air to circulate.

To achieve successful levels of insulation along with the necessary air space, architects may employ various strategies. For moderate climates where a roof insulation of R-30 is adequate, 2-by-10 rafters with new high-density fiberglass batts can be used. Conventional R-30 fiberglass batts, at 9 1/2 inches, will fill the rafter bays and leave no room for air flow. Simply compressing these batts produces a lower R-value. (Even though the R-value per inch increases with compression, the total R-value drops as the thickness is reduced.) New high-density batts (available from Owens Corning, CertainTeed, and Manville), however, achieve R-30 at a thickness of only 8 or 8 1/4 inches. With such high-density batts, expansion is not as likely as with conventional batts, so a vent spacer under most of the roof sheathing may not be necessary. An air baffle at the eaves will channel air up and over the insulation, preventing air flow through the fiberglass and a resulting drop in R-value.



SOFFIT VENTING FOR ATTIC SPACE WITH RAFTERS

1 BAFFLE MAY BE REQUIRED TO HOLD INSULATION IN PLACE AND DIRECT AIR FLOW
2 RAFTER PLATE
3 RAFTER ATTACHED TO EXTENDED JOISTS
4 CEILING JOIST EXTENDED PAST WALL
5 SOFFIT
6 STRAPPING



SOFFIT VENTING FOR ATTIC SPACE WITH TRUSSES

1 RAISED-HEEL TRUSS
2 PLYWOOD BLOCKING TO STEER AIR FLOW AWAY FROM INSULATION
3 AIR/VAPOR BARRIER

If using 2-by-12 rafters, 12-inch R-38 insulation can be squeezed into the rafter cavities, but vent spacers must be installed the entire length of the rafters to ensure an open air space under the roof sheathing. (Compressing the 12-inch batts to $10^{1}/_{4}$ inches will drop their R-value to about R-35.) Depending on the rafter spacing, $^{5}/_{8}$-inch drywall might be required on the interior to prevent bowing due to the pressure of the fiberglass. With 2-by-10 or 2-by-12 rafters, a layer of rigid foam insulation on the inside of the rafters can be provided to boost the total R-value.

Full thickness R-38 batts can be used in an insulated roof by substituting 14-inch or 16-inch laminated I-joists for the dimension rafters. The 14-inch I-joists will provide room for the R-38 batts, allowing a 2-inch air space above for venting. Be aware that these I-joists are thinner than conventional framing lumber; if spaced 24 inches on center, full-width 24-inch batts are required rather than the $22^{1}/_{2}$-inch batts sized for standard rafter or joist cavities.

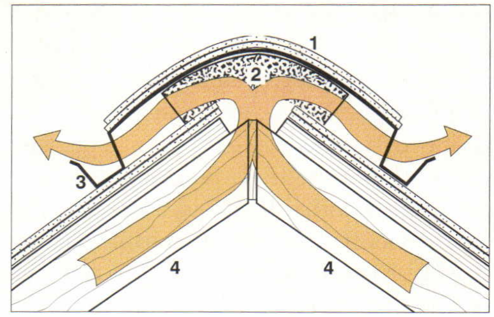
Even greater insulation levels can be provided in cathedral ceilings through the use of parallel-chord trusses or scissor trusses. With either of these options, the trusses can be specified as deep as desired to allow for optimal insulation and ventilation.

Venting roofs with skylights

SKYLIGHTS BLOCK AIR FLOW THROUGH A rafter cavity. Some building-science experts are concerned that air in the cavities on either side of the skylights will stagnate and heat up. To provide for at least some air flow into adjacent rafter cavities, holes can be drilled through the rafters near the top edge to permit air flow into adjacent rafter cavities. Though air flow through these holes will be limited (and some experts question whether it is effective at all), these small openings might help, and they are unlikely to cause any problems. The size and location of these holes should be calculated to ensure that rafter strength will not be compromised.

Rafter hips and valleys

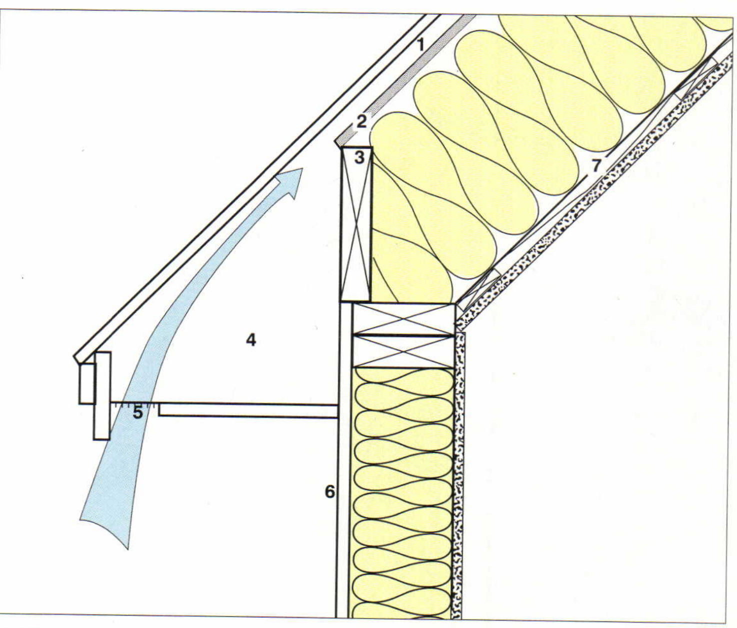
IN HIP-ROOF CONFIGURATIONS AND COMPLEX roof lines with numerous peaks and valleys, roof venting can be a problem. Even if there are soffit vents at the eaves, a ridge vent at the horizontal section of roof peak, and adequate air space above the insulation, air flow can be blocked at a roof hip. Similarly, at a roof valley, it may be difficult to achieve adequate air flow into the rafter cavity from the soffit vents. In both cases, the problem can be ameliorated, at least to an extent, by dropping the upper edges of the hip rafters and valley rafters below the jack



CONTINUOUS RIDGE VENT

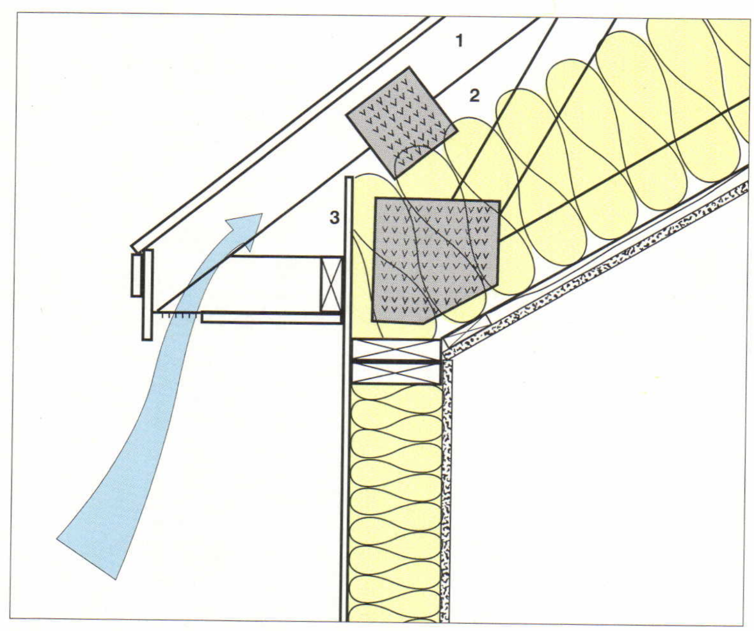
1 CAP SHINGLE
2 FILTER
3 RAIN/SNOW BAFFLE
4 RAFTER

In combination with soffit vents, a continuous ridge vent (above) is the most desirable venting strategy since it provides for air circulation along the entire length of the roof at its highest point. When vaulted ceilings are constructed, air flow through the rafters is potentially inhibited by insulation that would otherwise be placed between joists that frame a flat ceiling. Unless individually framed rafters are unusually deep, a vent spacer may be needed to create a channel for air to flow under the roof sheathing (below left). Cathedral ceiling constructed with scissor trusses offers ample room for insulation and air flow (below right).



SOFFIT VENTING FOR CATHEDRAL CEILING WITH RAFTERS

CHANNEL FOR AIR FLOW ABOVE INSULATION
VENT SPACER INSTALLED BETWEEN RAFTERS
BLOCKING BETWEEN RAFTERS SERVES AS WIND BAFFLE
2 x 10 RAFTER
SOFFIT VENT
EXTERIOR SHEATHING EXTENDED UP TO TOP OF WALL PLATE
AIR/VAPOR BARRIER



SOFFIT VENTING FOR CATHEDRAL CEILING WITH TRUSSES

1 SCISSOR TRUSS
2 SPACE FOR AIR FLOW ABOVE INSULATION
3 SHEATHING EXTENDED TO SERVE AS WIND BAFFLE (DEPENDING ON TRUSS DESIGN)

rafters. This arrangement will generally require smaller hip and valley rafters than jack rafters (2-by-10 rafters rather than 2-by-12). Doubling the hip and valley rafters will usually be required for strength—and to provide greater cross-sectional air-flow area. While this strategy, with a 1- to 2-inch air space under the roof sheathing, will probably not provide the same ventilation area as can be provided on a gable or gambrel roof, it is much better than no air flow at all.

Hot roofs

SOME ARCHITECTS AND BUILDERS DEAL WITH the problem of roof venting by eliminating it altogether. Although this practice does not comply with most building codes, this so-called "hot roof" strategy seems to work well in many cases. It is commonly characteristic of foam-core paneled construction (ARCHITECTURE, October 1991, pages 97-100), with flat built-up roofs, and occasionally in conventionally framed roofs. Building officials have the authority to override code requirements as long as safety is not a concern—as it is not with roof ventilation.

The key to success with hot roofs, according to designer-builder John Abrams of Martha's Vineyard, Massachusetts, who has employed a hot-roof system for the past 12 years without problems, is to seal the inside of the rafter assembly extremely well to keep all moisture out of the roof system. On the interior side of the insulation, Abrams installs a Swedish-manufactured polyethylene vapor barrier. On Martha's Vineyard, where snow loads are minimal and wind-driven rain can wreak havoc with even the best ridge vents, Abrams has found the unvented roof much more hassle-free than the standard vented roof, which he has built in the past.

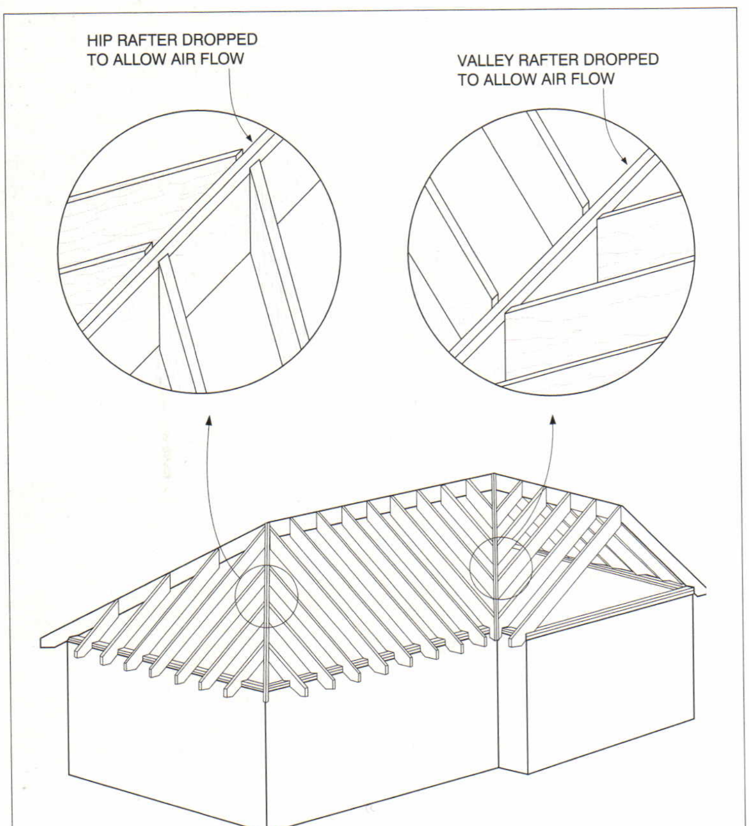
With foam-core panels or other hot-roof systems, architects should be aware that manufacturers may not guarantee shingles used on such a roof. The position taken by manufacturers is that the roof surface will get hot, and the increase in temperature may degrade shingles, since heat is not carried away from the underside of the sheathing. Other experts, however, argue that shingle color has a far more significant impact on temperature than roof venting. Preliminary research suggests that darker shingles absorb so much heat in warmer climates that roof venting may be of little value.

A better argument against hot roofs in cold climates is the risk of ice dams. Even with a well insulated unvented roof, when a blanket of snow covers it, the surface can warm up enough to melt snow. The run-off will freeze when it flows toward the colder eaves, and will result in an ice dam. Abrams points out that in his climate snow accumulation is rarely a concern; in colder climates, a steeper roof pitch, possibly combined with metal roofing, might be necessary to avoid snow accumulation and resulting ice dams.

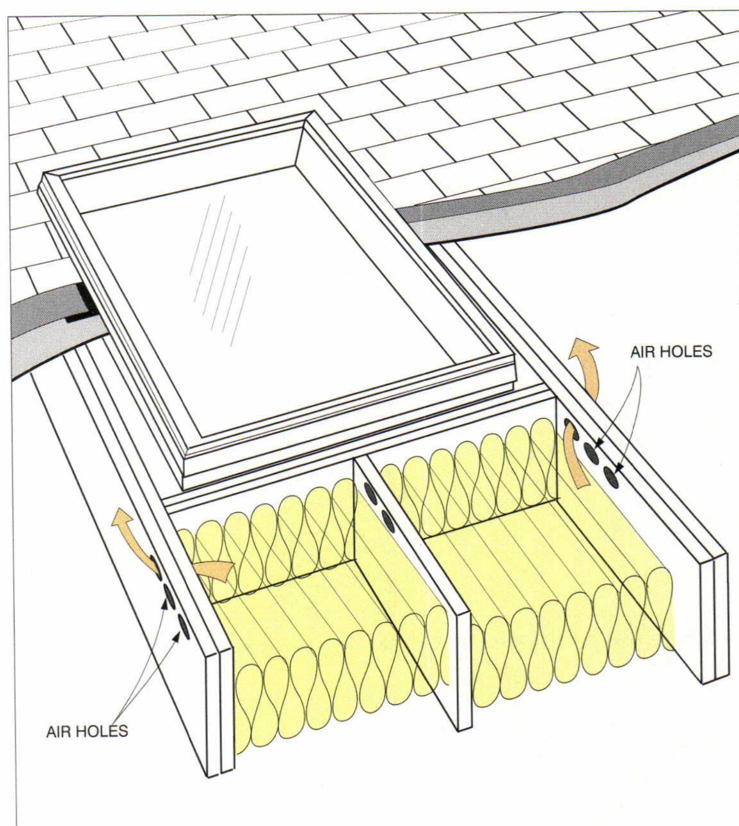
Providing adequate roof ventilation can be very tricky, particularly with complex roof designs and insulated cathedral ceilings, but in most situations, it is strongly recommended. For assistance in designing a suitable roof ventilation strategy, contact a quality manufacturer of a wide range of roof ventilation products, such as Air Vent in Peoria Heights, Illinois. If you are considering an unvented roof or nontraditional ventilation strategy, talk to your local building official to make sure the design will be acceptable before proceeding. ■

—ALEX WILSON

Roof hips and valleys (below left) are a ventilation problem in insulated roofs. Some air flow can be achieved by doubling or tripling hip or valley rafters and dropping them below the top edges of the jack rafters. Skylights (below right) also impede ventilation. Holes drilled through the rafters aid air flow to adjacent roof cavities, but must be installed with caution. Their size and location should be calculated to maintain the roof framing's structural integrity.

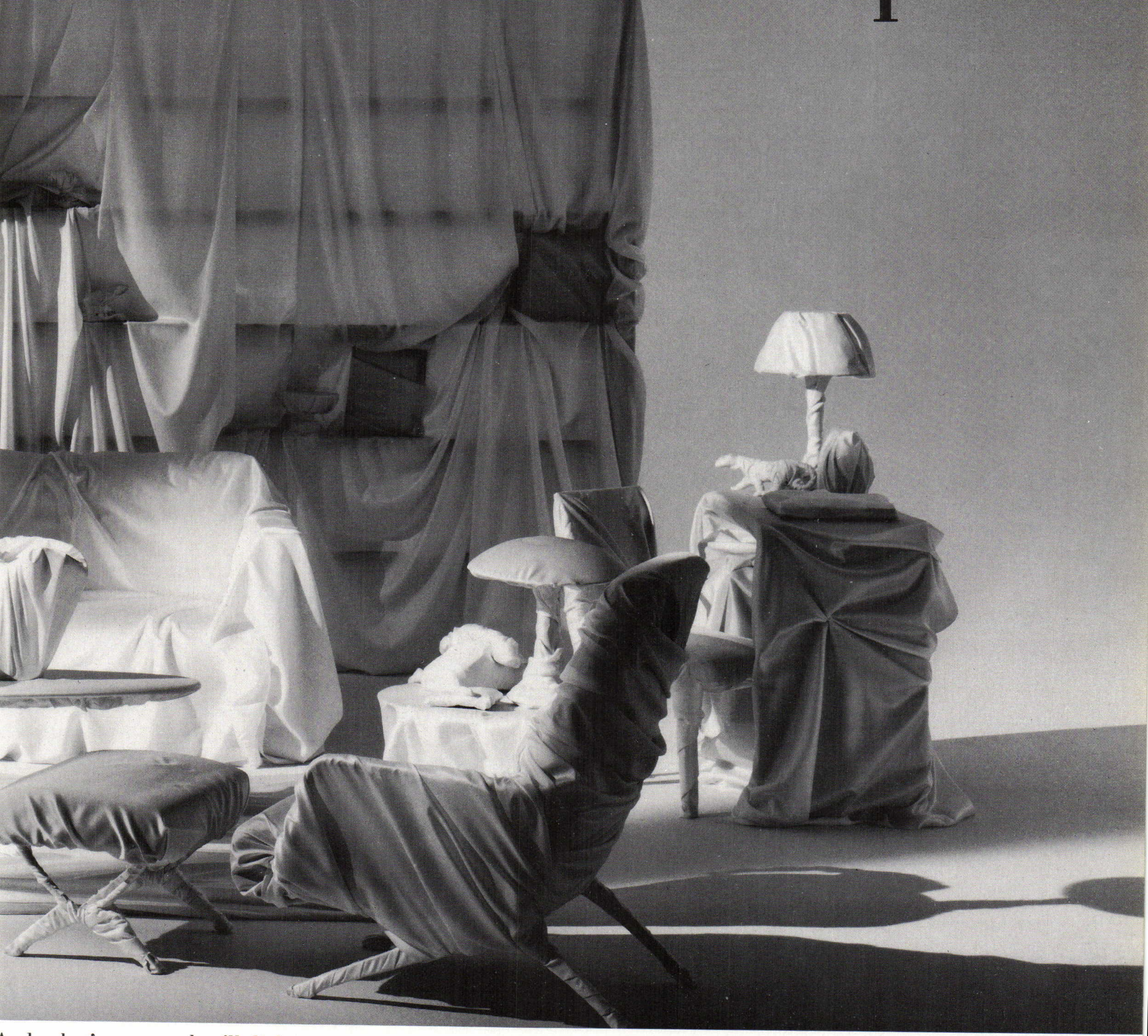


HIP AND VALLEY FRAMING DETAILS



CROSS VENTILATING AT SKYLIGHT

n Milan on 10 April.



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Roofing Systems Software

New programs help architects extend the life expectancy of a roof.

A LEAKY ROOF IS A COMMON COMPLAINT OF building owners, but computer programmers are helping to remedy the problem by offering architects software for designing roofing systems. These programs compute the proper location of drainage and details, estimate costs, and determine maintenance schedules, thereby addressing potential sources of leaks before the roof has been constructed.

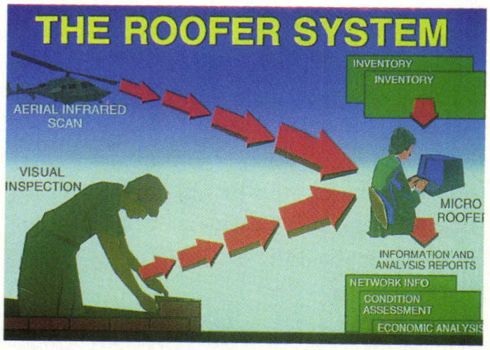
Design systems

SEVERAL OF THESE SYSTEMS EMBODY "EXPERT knowledge," with which details are constructed mathematically based on project-specific design parameters. This type of software contrasts with CADD programs, in which details are con-structed from basic lines and arcs. One such expert system is the Vertex Detailer, an AutoCad add-on from Vertex Design Systems. It helps designers build details "parametrically," through selecting pieces of an assembly by size and type. Major material and size changes can be made quickly by respecifying component details and their notes, bypassing tedious redrawing. The databases that feed the Detailer contain details for various building components, including 344 details for built-up roofing (BUR), composition shingle, and wood shingle roofs. Available for a variety of structural systems, these details show roof to wall connections, skylights, stacks, drains, expansion joints, parapets, and other conditions. The assembled details can be further customized and incorporated with other AutoCad drawings.

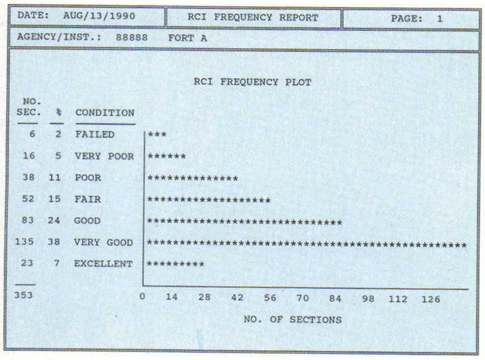
Vertex has also developed a series of manufacturer-specific Electronic CADalogs. Each contains a sequence of queries, similar to conducting an interview with a building product manufacturer's technical representative. By asking increasingly specific on-screen questions about the building's context, the expert software determines the appropriate products and supplies electronic details and specifications. Not intended to replace the technical representative's expertise, these CADalogs save architects time in research and preliminary decision-making. The CADalogs all operate similarly, so architects do not have to learn a new system for each manufacturer. Six CADalogs now available for roofing products are Black Armor Coal Tar Roofing Systems by Allied Signal; Celo-CADD Roofing Systems Design CADalog by Celotex; Metal Roofing Systems by ASC Pacific; Moldings and Flashings by Fry Reglet; Stevens Hi-Tuff Roofing Systems by JPS Elastomerics; and Roofing Accessories by Manville. They are distributed by the manufacturers at no cost to qualified professionals.

Another system for detailing and specifying proprietary roofing products is Tam-CADD, from Tamko Asphalt Products. One of several Computer Intelligent Details and Specifications systems developed by Architectural Synthesis, Tam-CADD runs within AutoCad. Through questions and answers, the system leads a designer through the process of selecting an appropriate roofing system, producing CSI-formatted specifications, and generating drawings to match. It also provides a checklist for a quick summary of the project. Like the CADalogs, the specs and drawings come directly from the roofing manufacturer, thereby reducing errors and the need for shop drawings. Tam-Spec, another new software, provides specifications only and can be run without AutoCad.

NRCA-CAD is a new system from the National Roofing Contractors Association (NRCA), developed in conjunction with Architectural Synthesis. This software is the electronic equivalent of the construction details portion of the NRCA Roofing and Waterproofing Manual, a long-standing bible of industry-standard, nonproprietary roofing details. NRCA-CAD contains the same 127 details, shown in section as well as isometric. So that these details are accessible to architects, contractors, roofing manufacturers, and even to those without CADD systems, the



The Roofer (above), from the U.S. Army Corps of Engineers, combines information from aerial scans and field inspections (below left) with evaluation and maintenance planning (below right). The Roof Asset Management Program, with a hand-held computer (below center), is a "roofing consultant in a box," helping nonexperts conduct evaluations.



Computer models that illustrate structural deflection of the planned roof indicate whether the slope is sufficient for optimum drainage and reveal the best location for drains.

NRCA details are available in three configurations. First, a graphic interface helps designers select a roofing system and define perimeter conditions and penetrations. Second, the selected details can be viewed and printed within the NRCA-CAD system. Third, the details are also available in AutoCad's DWG format and in DXF for export to a variety of CADD systems.

An important aspect of roof design is its drainage system. Ponding is a major problem on flat roofs when drains are not located at the lowest point, but patterns of eventual structural deflection are not always evident during design. To solve this dilemma, John Johnson of the Madison, Wisconsin-based Engineering Research Corporation and James Sheahan of J.P. Sheahan Associates in Midland, Michigan, have developed computer models that illustrate these deflections. Applying information about the structural framing system, the elevations at load-bearing points, and the live and dead loads, they compute the deflection for a grid of points on the roof deck and plot them on a three-dimensional grid (exaggerated in the vertical scale) and on a contour map. These diagrams demonstrate the future performance of the roof deck, reveal the best location for roof drains, and indicate whether the slope is sufficient for optimum drainage. For complex roofs, these diagrams can disclose counterintuitive results.

Specifications (below left) and CADD details (below center) are integrated in Manville's Roofing Accessories Electronic CADalog. An expansion joint detail (below right) is one of more than 100 standard details available from the National Roofing Contractors Association. Accompanying expert system software developed by Architectural Synthesis assists in detail selection.

Cost estimation

ANOTHER RESPONSIBILITY THAT CAN BE SIMplified by computer is cost estimation. While there are many generic estimation programs on the market, few are geared specifically for roofing systems. One of these is The Edge, by Advanced Estimating Systems. With an electronic digitizer, the architect traces measurements from drawings, and the system calculates areas, perimeters, and materials. Its database contains information on 1,300 roofing systems, and the final estimate includes local labor and materials costs.

Timberline Software produces Precision Estimating for judging the cost of all building systems. A new database makes it particularly useful for roofing estimates. This "electronic price book" contains data on 3,600 common roofing elements, from insulation to fasteners. The database can also be modified to accommodate economic trends, regional price differences, and an individual's estimating practices. The adjusted prices are pulled into Precision Estimating's on-screen spreadsheet as the estimator performs electronic takeoffs, and the software can be linked to CADD, scheduling, and accounting software.

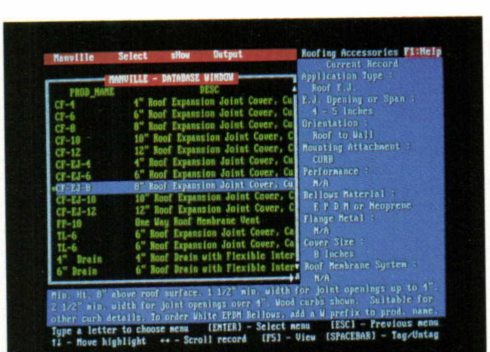
Evaluation programs

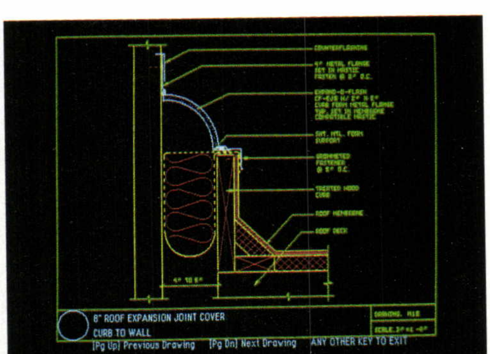
IN ADDITION TO DESIGN, CONSTRUCTION, and cost estimating, computers help architects and owners monitor a roof's performance over time. The idea of roof maintenance management is fairly new, explains John Bradford, president of Bradford Roofing in Billings, Montana, and former NRCA president. "It won't sweep the country overnight," he predicts. "But if owners take it seriously and conduct inspections, repairs, and maintenance every year, their roofs will still be serviceable at the end of 20 years. On average, roofs now fail at 12-14 years. And the major reason for failure is that maintenance doesn't start in year one and continue regularly throughout the life of the roof."

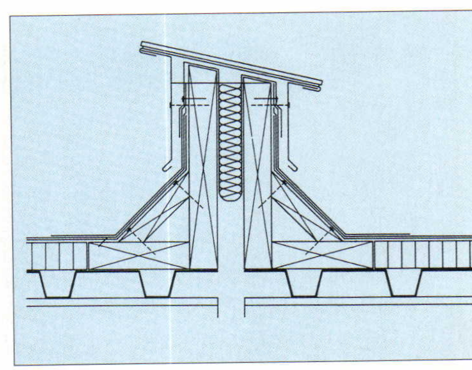
Architect Richard Bodane and his colleagues in the Office of General Services for the State of New York have developed a database on roof design and performance. This database tracks a growing number of the state's 10,000 buildings, recording variables of location, design conditions, specified components, testing results, and the history of problems and their solutions. By correlating design information with performance problems, the architects identify patterns of successes and failures. For example, they may find certain roofing types fail more often in buildings exposed to sea air, and then can specify roofing systems with the best records for future projects. The electronic database helps New York State architects ferret out extensive details about previous projects, so historic precedent becomes an effective design guide.

The Roofer program, developed by the U.S. Army Construction Engineering Research Laboratory, involves a database of historical records, physical data, and inspection results for built-up roofs. The software emphasizes evaluations that include a visual inspection of the membrane and flashing components, and a nondestructive moisture evaluation of the insulation. The Roofer grades conditions numerically, allowing comparisons between roofs. The analysis enables managers to determine whether to repair or replace a roof and produces work orders and other project documentation. The program also generates custom reports to help with long-term planning and budgeting.

Roof Evaluation Software (REVS) from Bruco Enterprises also enables building managers to evaluate existing conditions, maintain a database of problems, and develop budgets and schedules for repairs and main-







Roof evaluations generate electronic databases that can be manipulated, sorted, prioritized, and tabulated into customized reports to help owners assign maintenance budgets.

tenance. This software was developed around industry standards of the NRCA, the Midwest Roofing Contractors Association, and the Roofing Industry Educational Institute. Taking advantage of REVS on a laptop computer during inspections, even novices can be guided through the evaluation. The electronic databases can be manipulated, sorted, prioritized, and tabulated into customized reports to help owners decide when and where to apply maintenance budgets.

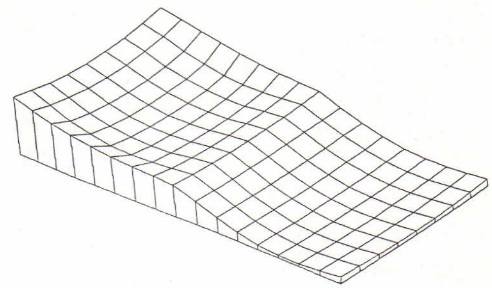
Roof Asset Management Program (RAMP), from Building Technology Associates (BTA), is similar. With a hand-held computer containing a guided tour for roof inspectors, RAMP is a "roof consultant in a box," according to BTA's James Watson. Based on the roof type and answers to previous questions, the computer tells an inspector what to look for. To avoid the need for an expert opinion, all the on-site evaluation is by measurement, not by judgment. Later, the data is compared with a large, centralized database, producing a roof servicing rating, replacement value, and depletion rate. The system generates an "actuarial projection of life" (APL), or evaluation of the roof's durability over time, so that a building owner can compare roofs and assess repair options. Comparing return on investment to the cost of deferring maintenance helps the owner choose between treatments. Architects can study the APLs of various systems when specifying roofing for a new building.

The RoofMAP (Roof Managing Assets Program) software from Professional Service Industries (PSI) is available with optional support from PSI's roofing experts, who will perform inspections and other services for facility managers lacking qualified personnel. RoofMAP integrates the analysis of physical roof conditions with the financial analysis of options for maintenance and repair. The calculations for return on investment balance these costs against the cost of energy loss due to wet insulation, the eventual cost of roof replacement, and the salvage value of components. RoofMAP user Stefan Cristodorescu, an engineer with the City of Las Vegas, has entered most of that city's buildings on the system. "For us, the most useful parts of the software are the budget tools," he maintains. "They allow us to predict, based on yearly inspection data, how much we'll have to spend to correct or replace a roof." Cristodorescu also claims the system gives him more evaluative information. "In the past, we repaired roofs only when they started to leak. But RoofMAP emphasizes the parts of the structure that need attention, so we know where and when to do preventative maintenance."

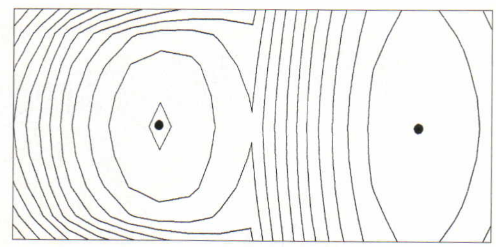
Ongoing research

ARCHITECTS AND OWNERS AGREE THAT inspections are essential to maintenance programs. However, roofing consultants can be expensive, are concentrated in large cities, and are possibly biased toward finding problems that require solutions. This explains the appeal of expert systems for novice inspectors. But how reliable are these inspections? Jacques Gendron, a building engineer with Hydro-Quebec, recently developed an expert system based on 150 rules for evaluating roofs. Gendron tested it in the field with novice technicians and compared the results with those of human experts. He found a 90 percent agreement between the experts and the computer, and is encouraged by these results. Besides the economic value in ensuring better roof maintenance, Gendron says of the software, "These expert system tools may make it possible to preserve our knowledge, and to reach the important goal of conserving our resources." ■

—B.J. Novitski



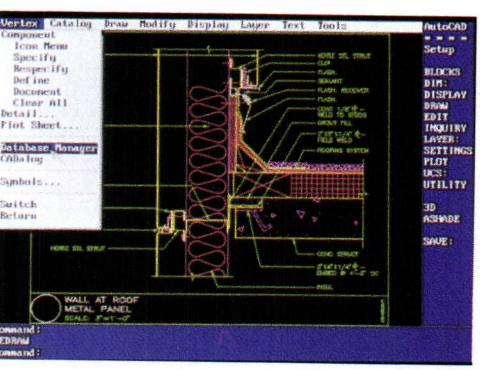
PERSPECTIVE VIEW OF DEFLECTED ROOF

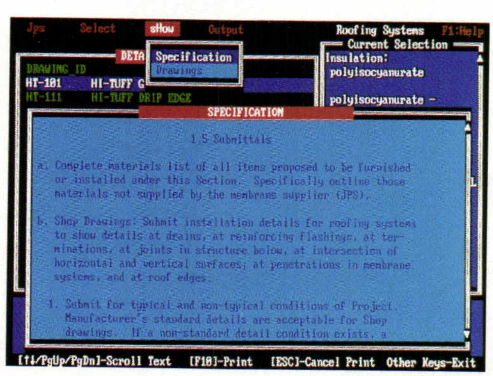


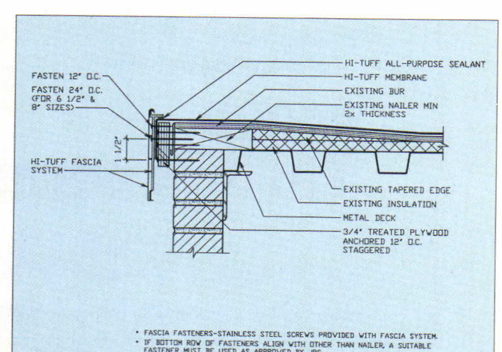
CONTOUR MAP OF DEFLECTED ROOF WITH DRAINS

By simulating the expected roof deflection, architects can determine proper size and location of roof drains. Techniques developed by the Engineering Research Corporation illustrate the exaggerated deflection in perspective (top) and plan (above).

The Vertex Detailer (below left) enables designers to assemble building components by specifying size and material parameters rather than by constructing them from simple lines and arcs. Also by Vertex, the Electronic CADalog for Stevens Hi-Tuff Roofing Systems includes system selection procedures, specification sections (below center), and CADD details (below right).







Software for Roofing Systems

DESIGN

Electronic CADalogs
Black Armor Coal Tar Roofing Systems
Allied Signal, Inc.
(800) 221-6490

Celo-CADD
Celotex Corporation
(813) 873-4155

Metal Roofing Systems
ASC Pacific
(800) 726-2727

Moldings and Flashings
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Stevens Hi-Tuff Roofing Systems
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NRCA-CAD
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Tamko Asphalt Products
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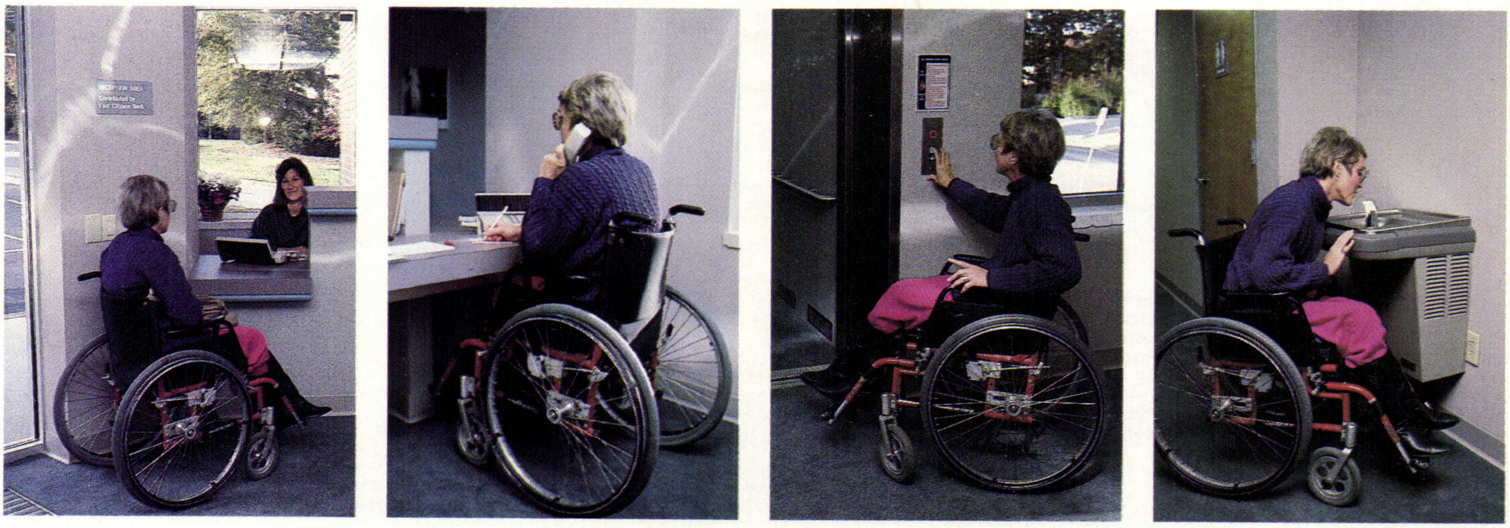


Accessibility Takes Effect

As barriers to the disabled are removed, architects meet new design challenges.

THE AMERICANS WITH DISABILITIES ACT (ADA), which was signed into law by President Bush on July 26, 1990, is a landmark piece of civil rights legislation. Unlike previous regulations, from model codes to local ordinances, the ADA seeks to sweep away all barriers to the disabled—not just physical impediments, but discriminatory employment practices and prejudices as well. January 26, 1992, was the first deadline for compliance with the new law, which benefits approximately 43 million Americans, one-sixth of the country's population. Among those affected are individuals with limitations ranging from blindness to hearing loss to arthritis. It has been estimated that one-third of those between 55 and 64 years of age have some form of impairment, and that three-fourths of those over 75 are disabled. Greater access to the workplace will mean enhanced opportunities for younger disabled people, who at present comprise the largest unemployed minority in America—a 73 percent unemployment rate, according to the Washington, D.C.-based Architectural and Transportation Barriers Compliance Board (ATBCB).

The office of the Easter Seals Society in Raleigh, North Carolina, (top) was renovated by Ellinwood Design Associates and Barrier Free Environments to include such accessible details as a two-level reception desk, workstation legroom, a reachable elevator button, and a water cooler that can be approached by a chairbound worker.

The law that seeks to ensure accessibility to all Americans is a complex schedule of requirements that involves the participation of several federal agencies, among them the Equal Employment Opportunity Commission, the Department of Transportation, the Federal Communications Commission, with the Department of Justice most responsible for implementation. Employment and hiring practices are covered in the first section, Title I, which calls for employers to make "reasonable accommodation" for individuals with disabilities. Title II addresses discrimination against the disabled by state and local governments, as well as the accessibility of public transportation systems. Ultimately, bus and train stations, subways, and light rail will all be affected by the legislation.

It is Title III that most directly concerns the practice of architecture, because it mandates changes in the way "public accommodations and commercial facilities" must be adapted or constructed. A "public accommodation," as defined by the ADA, is a private entity that maintains a place to which the public is invited for commercial, social, or recreational purposes. The ADA spells out 12

Public Accommodations Affected by the ADA

Service establishments
Professional service offices, banks, health-care offices, laundromats, beauty shops, travel services, repair services, gas stations, pharmacies, and hospitals

Places of public display
Museums, libraries, and galleries

Places of lodging
Inns, hotels, and motels

Sales or rental establishments
Department stores, car rental agencies

Public transportation stations

Establishments serving food or drink

Places of exhibition or entertainment
Theaters, concert halls, and stadiums

Places of public gathering
Auditoriums, convention centers, and halls

Places of recreation
Parks, zoos, and amusement parks

Places of education

Social-service centers
Homeless shelters

Places of exercise or recreation
Gyms, bowling alleys, and golf courses

		PUBLIC USE ←				→ EMPLOYEE USE	
DISABILITY CATEGORY		SITE/EXTERIOR FACILITIES	BUILDING PUBLIC CIRCULATION SPACES		BUILDING PUBLIC FACILITIES AND ACCESSORIES		WORK ENVIRONMENTS
			Elevators	*Cores, corridors, etc.*	*Toilet Rooms*	*Misc. Facilities and Accessories*	
Basic Mobility	**Horizontal movement**	Parking Drop off Thresholds Door type Hardware		No intermediate steps or levels Nonslip surfaces	Signage		
	Vertical movement	Ramps Stairs Rails Signs	Size/Configuration for wheelchairs Rails				
Interactive Mobility/Control	**Space/Reach**	Parking spaces Curb cuts	Height of controls	Counter heights Mail drops	Toilet stall size Grab bars Counter heights Mirrors	Water fountains Telephones Vending machines	Worktop heights Time clocks Entry card readers
	Dexterity/Coordination	Door handles (types and height) Door-closer timing Force required to open doors	Door-open timing controls		Lavatory handles Wheelchair knee room Accessible heights	Switches Knobs	
Sensory	**Vision Impaired**	Protrusions Directories, signage	Braille signs and controls Audible signals	Protrusions	Lighting levels	Braille signs Tactile warnings	Tactile door knobs at hazardous areas Audible alarms
	Hearing Impaired		Flashing signals	Flashing alarms		Hearing aid systems in assembly areas	

such types of existing privately owned facilities, such as restaurants, banks, and hotels, that must be brought into compliance (see page 105). A "commercial facility" is considered a facility intended for nonresidential use by a private entity and whose activities affect "commerce," as defined by the U.S. Constitution. (Among facilities exempt from the act are private clubs, churches, and other religious or exclusionary organizations.) "The bottom line," says Jim Bostrum, a North Carolina specialist in design for the disabled, "is that any individual must be able to come in and take part in what is being offered by the organization."

Both existing buildings and new construction must meet new requirements for accessibility. Yet, maintains Ellen Harland, an accessibility specialist for the ATBCB, "the ADA is not a mandate to rebuild America. The thrust of the legislation is toward the future."

By January 26, 1992, private entities maintaining places of public accommodation were to comply with the legislation by removing barriers, if such modifications were "readily achievable." Architectural barriers to the disabled were to be eliminated where present, even when no renovation had been planned, if their removal could be accomplished "without much difficulty or expense." Examples of such alterations include ramp installations, lighting improvements, and hardware modifications. But Title III recognizes that what are reasonable expectations for a large corporation may be difficult or prohibitively expensive for a small firm. "Alternative methods of supplying the services" are then permitted.

John Salmen, president of Universal Designers and Consultants, a Silver Spring, Maryland-based firm that specializes in design for the disabled, explains that the law was intended to encourage a holistic approach to accommodating people in the environment. Not all problems of accessibility can be solved by altering buildings and designing new spaces, Salmen claims. New equipment, aided by new technology for the disabled, offers another tool to achieve accessibility. Other simple solutions, such as changing the location of an activity or offering personal assistance, may be equally valid.

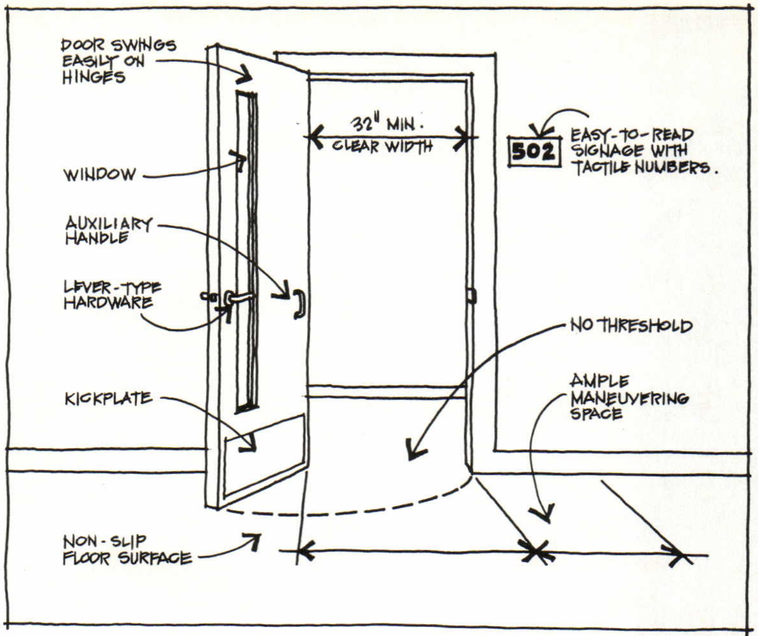
Elaine Ostroff, executive director of Boston's Adaptive Environment Center, suggests that "Congress's intent was not to bankrupt business." She cites the example of a restaurant with limited financial resources that is seeking to remove barriers to both its employees and customers. If the restaurant is located upstairs, what is "readily achievable" by 1992 may include installing an auxiliary communication device at ground level for take-out orders, rather than adding a mechanical lift for those unable to climb the steps. Training staff to read menus aloud or providing large-print menus for those with poor vision might substitute for more expensive electronic equipment. Physical changes need not be costly, she suggests, and can include enhancing signage, widening toilet stalls, and adjusting doors so that they can be opened easily. According to Ostroff, the most important factors in a "good faith" effort are a clear plan and sound intent.

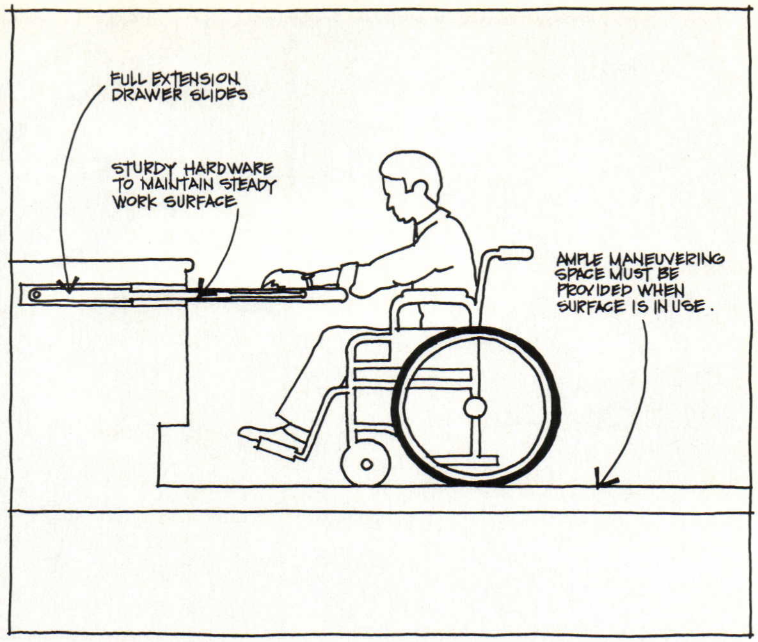
Alterations begun after January 26, 1992, to existing public accommodations and commercial facilities must be implemented in accordance with the law's criteria for accessibility. If, for example, a bank plans to replace door hardware in an older building, then lever-type, push-type, or U-type hardware, rather than slippery round knobs, is required for each modified door. In addition, if a "primary function area," such as the main banking room, is scheduled to be renovated, a further requirement is triggered: an "accessible path of travel" to the primary function area has to be provided; bathrooms, drinking fountains, and telephones serving the area also have to be made accessible.

Such required changes need not involve "disproportionate" cost, which is defined as greater than 20 percent of the cost of renovation. New construction, which the law defines as those projects receiving building permits after January 26, 1992, and certificates of occupancy after January 26, 1993, must be fully accessible "to the maximum extent feasible."

Design recommendations for accessibility are outlined in a subset of Title III entitled "ADA Accessibility Guidelines for Buildings and Facilities" (ADAAG). Responsibility for drafting these guidelines fell to Ellen Har-

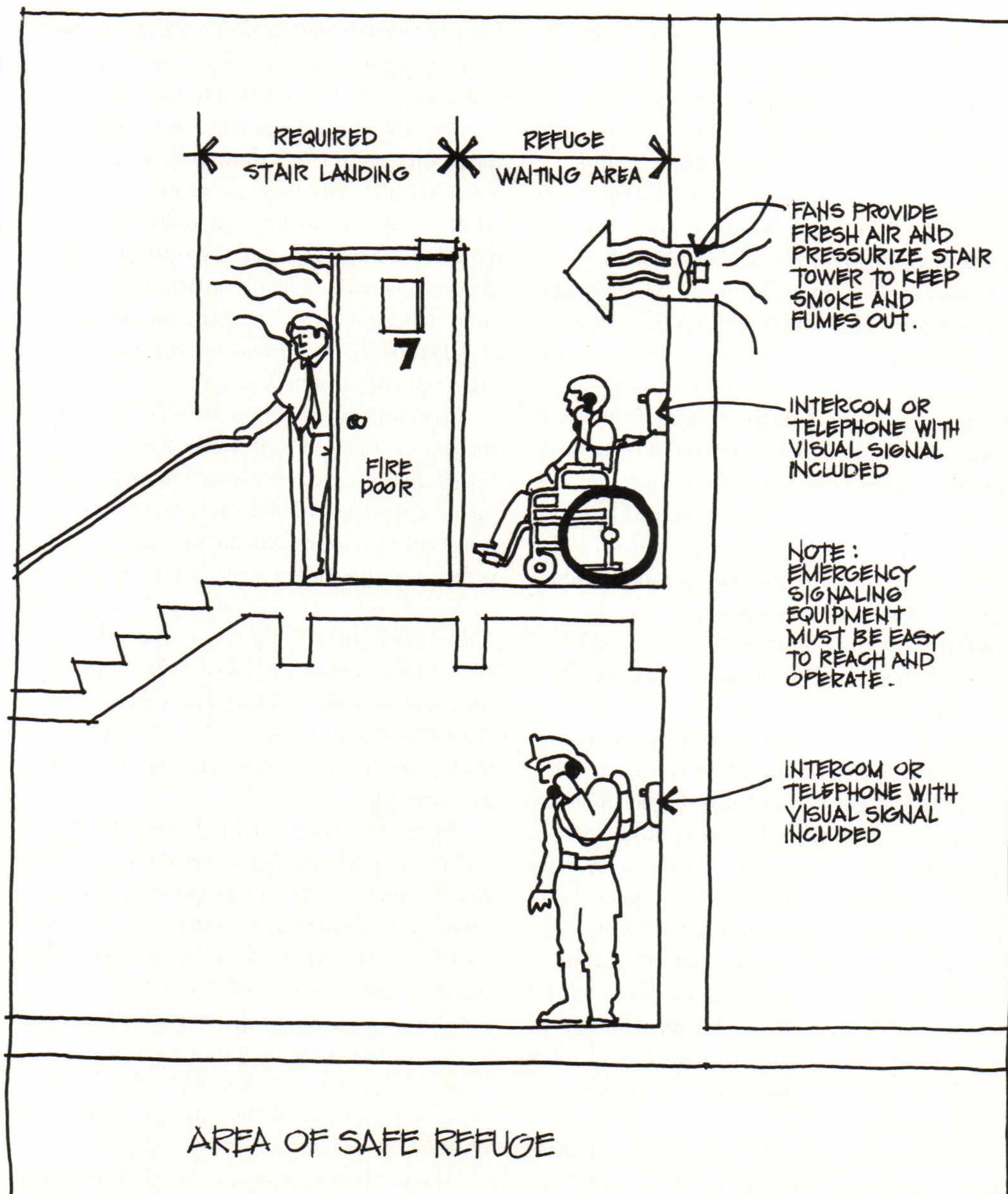
To help its staff comply with the ADA's requirements, RTKL Associates developed a matrix (top) that relates disabilities with building elements. Barrier-free details (facing page) include doors of ample width with adequate hardware (top left), workstation modifications to accommodate wheelchairs (top right), and stairwells where disabled tenants can safely wait for help (bottom right).



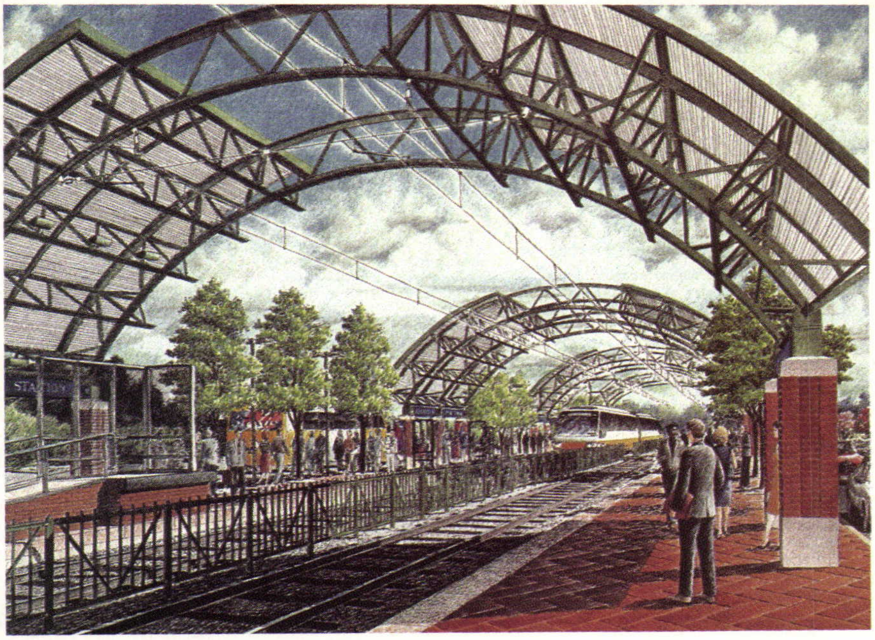


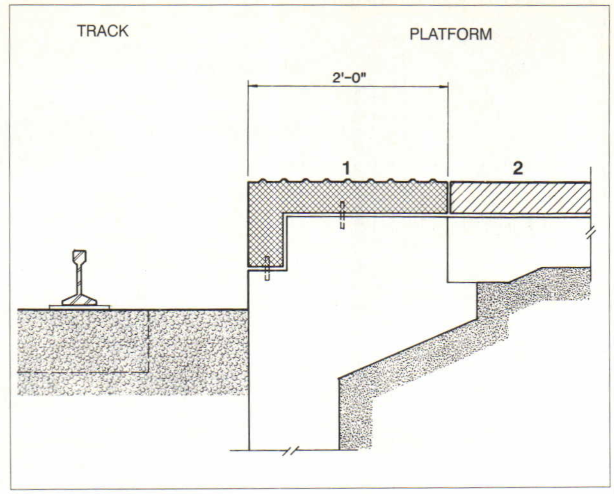
land's staff of five at the ATBCB, in response to policies outlined by the 23 members of the Barrier Compliance Board, 11 of whom are senior federal officials; the remaining 12 must include at least six who bear some disability. ADAAG contains specific standards for accessible sites, buildings, and equipment. Such considerations as the width of a toilet stall, what constitutes an adequate turning radius for a wheelchair, and the allowable slope for a ramp are clearly spelled out in the guide and graphically illustrated. If many of the illustrations seem familiar, it is because they resemble the existing standards already required for all federal buildings, the Uniform Federal Accessibility Standards (UFAS), whose technical provisions were, in turn, derived from the A117.1-1980 accessibility standards developed by the American National Standards Institute (ANSI).

While many ANSI and ADAAG standards overlap, they include some noticeable differences. For instance, in addition to describing how features should be designed, the newer guidelines include scoping provisions, which specify how many accessible items need to be provided under various circumstances. Within the ADAAG's pages are tables listing the minimum number of accessible parking spaces required, the number of required wheelchair locations for assembly areas, and other examples of specific requirements. ADAAG also places a new emphasis on features to accommodate individuals with visual and hearing impairments, such as a requirement that telecommunication display devices (TDDs), otherwise known as text telephones, be provided in certain instances.



ILLUSTRATIONS BY DWIGHT MCNEILL / SOURCE: *UFAS RETROFIT MANUAL*, ATBCT





RAPID TRANSIT PLATFORM SECTION

1 MODULAR PRECAST CONCRETE WARNING SURFACE
2 FINISH PAVING

Other new requirements in ADAAG are more subtle and may be accidentally overlooked if a close reading of the law is not undertaken. For example, Jim Terry, a Birmingham, Alabama, architect whose firm is currently holding seminars on the ADA throughout the U.S., points out that architects must familiarize themselves with changes in the standards for ramps. In most cases, ramps may no longer exceed a slope of 8 1/3 percent (1:12)—a slope steeper than 1:12 may result in a wheelchair tipping over backwards. Terry cites an example from his own practice, in which a contractor modified a parking area and changed the intended slope of an accessible route to exceed a 5 percent grade (1:20). According to ADAAG's definition, the route had been transformed into a ramp, and ramps demand railings and other special treatments. Structural settlement in sidewalks could have resulted in a similar predicament.

Other changes in site planning include providing spaces for vans that transport the disabled and their equipment. Under ADAAG, one 8-foot-wide space for vans, along with an 8-foot-wide access aisle, is to be provided for every eight accessible parking spaces in any given lot. The total number of standard accessible spaces required is determined by a table provided within the guidelines; but no lot may have less than one 8-foot-wide space with an adjacent 5-foot-wide access aisle. The slope across such spaces may not exceed 2 percent (1:50).

ADAAG also addresses the important issue of emergency evacuation for the disabled. It requires "areas of rescue assistance" on each floor of a new building that are fire resistant, near or within stairwells, and contain devices to communicate with firefighters. According to Ellen Harland, the purpose is to provide temporary shelter "for those persons who cannot use stairs." As good as an evacuation plan may be, she insists that there will be individuals who cannot make a quick evacuation or who cannot walk unaided. These areas will then provide them with safe places, says Harland, "to remain a few minutes until trained personnel arrive."

Elevators are required in buildings three stories or higher, and in those with 3,000 square feet or more per floor. Shopping centers and malls, specified private transportation facilities, and professional offices of health-care providers must also be equipped with such vertical conveyance systems, even if the buildings are only two stories tall or less than 3,000 square feet. To aid the blind, sprinkler-system standpipes, once common impediments in stairwells, are prohibited from protruding beyond a maximum acceptable distance.

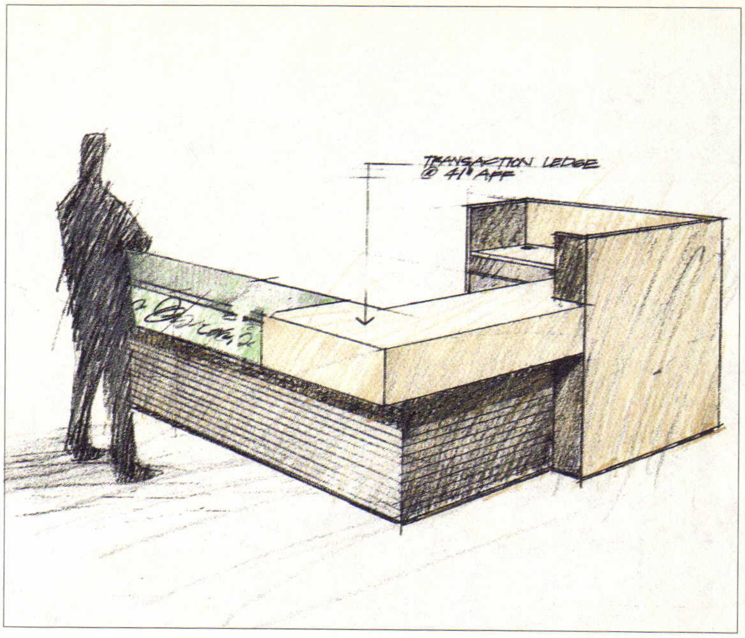
Signage throughout the United States will be radically altered according to the legislation and will modify an entire industry's production. Permanent rooms must be designated in two ways: with Braille letters and numerals and with raised characters and symbols of specified proportions, contrast, and texture. They must be mounted as uniformly as possible, preferably 60 inches above the floor and adjacent to the "latch side of the door."

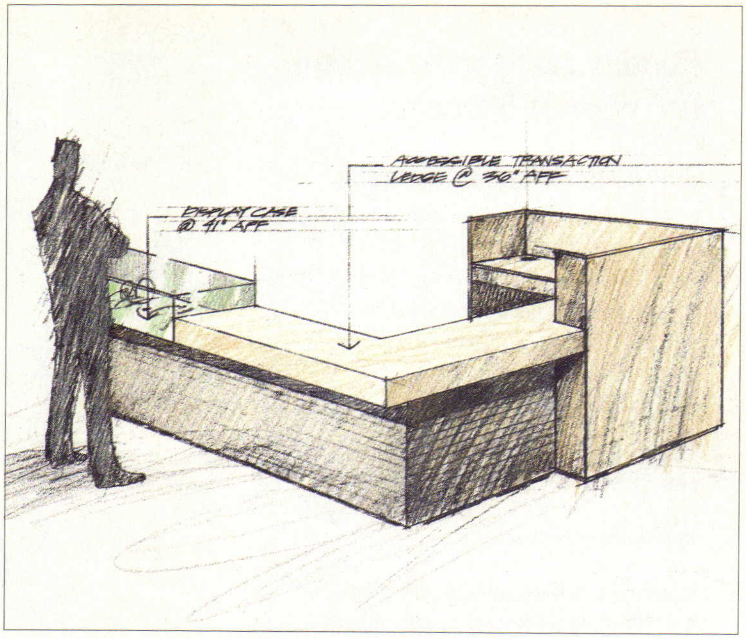
Visual alarms, when provided, must meet massive candlepower demands. Unfiltered, xenon-type strobes are required to pulse every two-tenths of a second (maximum duration) at an intensity of 75 candelas. Such intense brightness, according to ADA specialist Jim Terry, cannot be missed.

Two methods of accessible design are frequently offered by the legislation: alternative access and universal design criteria. The value of offering alternative accessible features for different disabled populations is clearly illustrated in the act's telephone guidelines. Typically, in a single bank of phones, one accessible telephone is required by ADAAG. It must be hearing-aid compatible, provided with volume controls, and clear the floor by at least 30 inches, among other criteria. Rather than seek a uniform design solution, in which all telephone units would be mounted at the same height, John Salmen argues that some units ought to be mounted at wheelchair height, while others could be somewhat higher for persons who have difficulty bending or stooping.

The act does provide some exceptions to its far-reaching, seemingly all-inclusive rules. For example, the "technical infeasibility" of tampering with a load-bearing wall in an existing facility is grounds for an alternative

In the Dallas Area Rapid Transit stations, HOK included a ramp (top left) and warning strips for the visually impaired (top right). Gensler and Associates redesigned a store's cash-wrap station: accessible solution (facing page, top right) is lower than original (facing page, top left). NBBJ incorporated ramps (facing page center) within Seattle's Washington Energy Company Headquarters (facing page, bottom).





approach. Likewise, buildings listed on the National Register of Historic Places and other such designated properties are eligible for certain "alternative methods of access," if their historic character would be affected by an obtrusive alteration.

To encourage creative solutions to accessibility, the authors of the ADA include an "equivalent facilitation" provision that allows for "alternative designs and technologies." But the burden of proof then falls on the architect to prove in a court of law that he or she has provided equivalency. According to Charles Decker, a New Jersey code official and former chairman of the Board for the Coordination of Model Codes (BCMC), ADAAG will, in effect, function as a de facto national building code that architects will attempt to follow to the letter without having the strength and clarity of an official building code, which is interpreted and enforced by building officials. As Decker points out, "There is some predictability in the code process." Under the ADA, however, each owner and each design professional is liable without the benefit of a reviewing authority.

Many existing building codes are based on national model codes that already include many accessibility requirements that meet or exceed the new legislation. The ADA states that the most restrictive requirements should apply, whether they are federal, state, or local; where conflicts arise, federal law prevails. Decker notes that ANSI and the model codes had been working with the BCMC on the inclusion of scoping for three years before the ADA became law.

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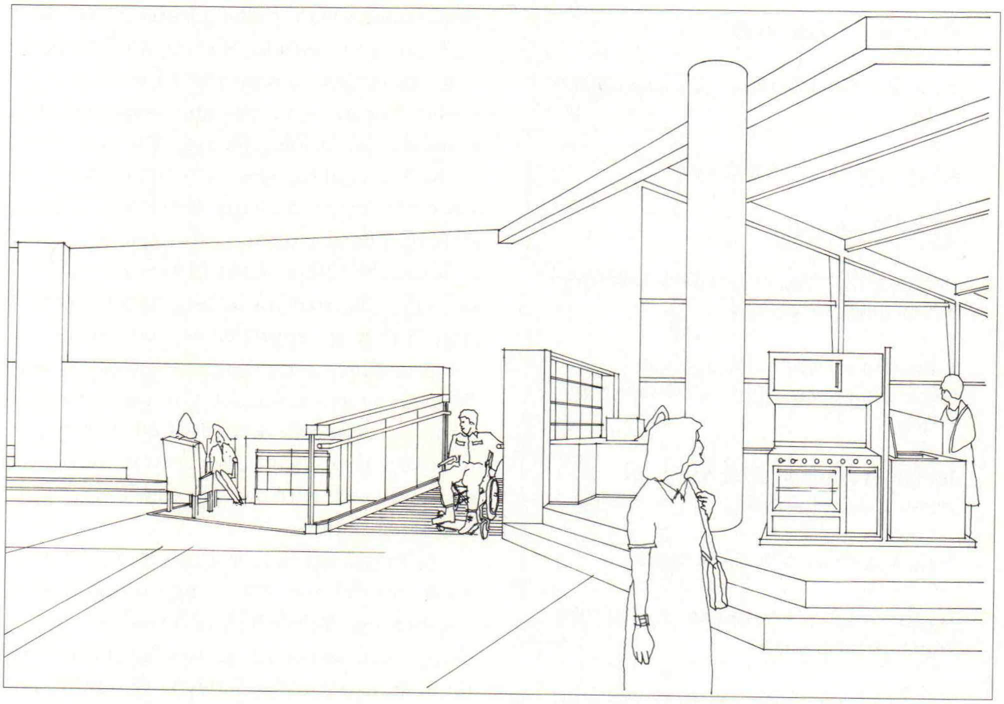
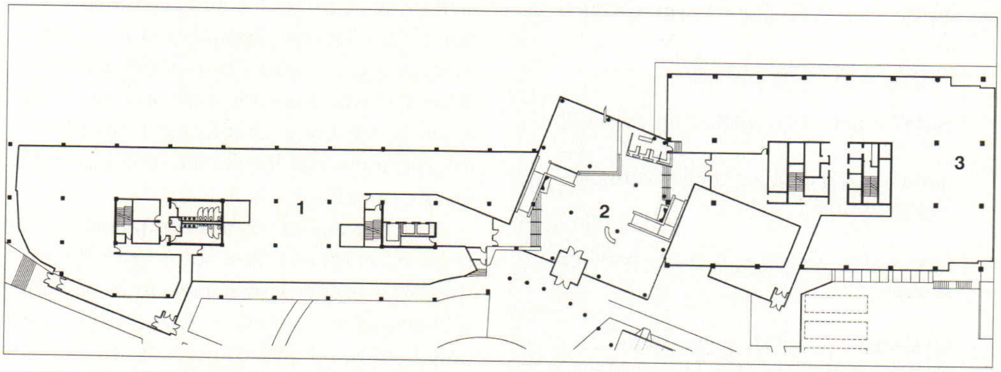




WASHINGTON ENERGY COMPANY HEADQUARTERS – FIRST FLOOR PLAN

1 NEW ADDITION
2 ENTRY PAVILION
3 EXISTING BUILDING

Readily Achievable Action For Barrier Removal

TO COMPLY WITH THE ADA, ARCHITECTS must remove architectural barriers in existing facilities where such removal is "readily achievable"—easy to accomplish without much difficulty or expense. Some examples include:

Install ramps

Make curb cuts in sidewalks and entrances

Reposition shelves

Rearrange tables, chairs, vending machines, display racks, and other furniture

Reposition telephones

Add raised markers on elevator control buttons

Install flashing alarm lights

Widen doors

Install offset hinges to widen doorways for wheelchair access

Eliminate turnstiles or provide alternative accessible entrances and paths

Install accessible door hardware in place of round knobs

Install grab bars in toilet stalls

Rearrange toilet partitions to increase maneuvering space

Insulate pipes under lavatory sinks to prevent burns to those in wheelchairs

Install a raised toilet seat

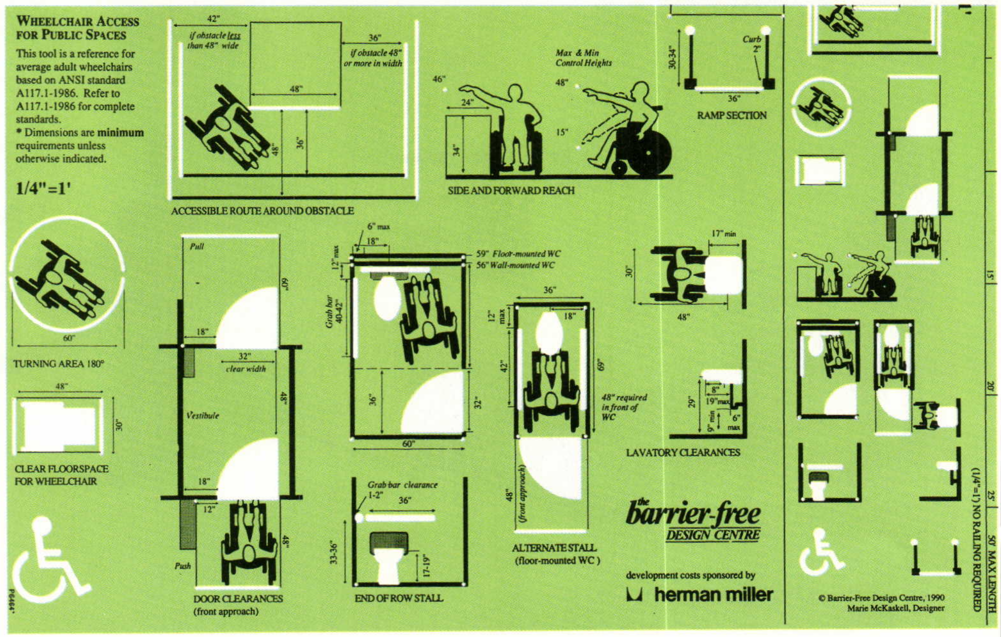
Install a full-length bathroom mirror

Reposition the paper towel dispenser in a bathroom

Create designated accessible parking spaces

Install an accessible paper cup dispenser at an existing inaccessible water fountain

Remove high-pile, low-density carpet



In a brochure for clients, Gensler and Associates lists potential modifications for ADA compliance (left). Design tools such as wheelchair templates (above) are now available.

compliance with the ADA ultimately remains with property owners, tenants, and the professional design community, a formal process outlined in the ADA may offer some welcome relief. Robert Wible, the executive director of the National Conference of States on Building Codes and Standards (NCSBCS), urges state and local governments to submit their codes to the Office of the U.S. Attorney General, Department of Justice, for certification. If they are approved as equivalent to the guidelines' technical provisions, explains Wible, architects practicing in those jurisdictions can be somewhat reässured that by following their local codes they are making a reasonable effort to comply with the civil rights legislation.

Al Eisenberg, senior director of legislative affairs for the AIA, is a strong proponent of certification. While he had hoped to help shape certification into a "first line of defense" for architects, he ultimately realized that no civil rights legislation could be enforced by a building inspector. Eisenberg still claims, however, that if states and localities can achieve certification for their building codes, it would "facilitate compliance, reduce liability, and make the legislation as comfortable for the practitioner as possible."

The movement toward compliance seems to have got off to a slow start. Ostroff says that most property owners seem to be taking a "wait and see" attitude. Terry reports that only between 5 and 20 percent of architects attending his training seminars admit to designing anything in accordance with the guidelines at present. Clients, he maintains, prefer to keep a "low profile" because of the potential liabilities raised by noncompliance; but many have quietly begun barrier identification and removal, sometimes relying on in-house facility managers, and sometimes seeking assistance from architecture firms.

Some firms are taking an active role in implementing the ADA. Swanke Hayden Connell Associates (SHCA), for example, began with a process of self-education, moved to participating in seminars for its own clients as well as others, and then began to offer client surveys. Like virtually every architect and informed consultant to the disabled, John Peter Barie, principal of SHCA's New York office, warns architects to "read the law," to rely on the actual language instead of summaries. While he is aware of potential conflicts and complexity written into the new legislation, his attitude is optimistic. "I see it as a matter of change in the mind-set of the design community to accept a challenge."

Consultant Jim Bostrom points out that the legislation, design guidelines, and staggered compliance deadlines are not ends in themselves, but part of a process that will bring about significant change in our society. As designers of the environment, however, architects must not simply adhere to a strict reading of the legislation; they must be responsible for understanding the intent of the law and adopting an attitude that will ensure that its implementation is successful. ■

—ROBERT A. IVY, JR.

Legal Ramifications of the ADA

THE ADA SPECIFICALLY PROHIBITS THE DEsign of buildings that fail to comply with its requirements. Although anyone responsible for retrofits, alterations, and new construction—landlord, tenant, architect, contractor, or consultant—can be sued by a plaintiff citing an infraction of the ADA, the landlord will be the most likely target for litigation. This is especially true for lawsuits over barriers in common areas such as entries, lobbies, halls, elevators, and parking garages, although the tenant may shoulder the burden of compliance within his or her own space. In either case, a landlord or tenant accused of breaking the law can subsequently involve the architect or other related parties in the dispute.

The ADA, however, recognizes that private parties can allocate responsibility and liability among themselves by means of private, presumably written, contracts. Such a contract between landlord and tenant can clarify from the beginning who is responsible for making specific areas accessible. In addition, architects can draw up contracts with clients to effectively limit their liability to the client, especially if a specific cap on monetary damages can be agreed upon. The AIA has included such limitation of liability clauses in its *Guide for Amendments to AIA Document B141*. This may not, however, limit liability to a disabled person who sues the architect directly. The ADA does not specifically require that any terms or clauses allocating liability be included in a contract between an architect and a client.

Private citizens or groups representing affected individuals may seek court-imposed injunctions compelling owners to meet ADA standards. Private enforcement gives the ADA its "teeth." If successful, the party bringing suit can receive attorneys' fees and the cost of the litigation; no other monetary damages can be awarded. The U.S. Attorney General can also sue for monetary fines of $50,000 for a first offense and $100,000 for subsequent violations. Such suits are expected to be rare, however, and directed against patterns and practices of noncompliance. Penalties can be reduced in suits brought by either a private party or the government if a defendant can show that he or she has undertaken good-faith efforts, such as conducting a site survey or developing a plan to comply with the ADA. Similarly, punishment may be lessened if an architect can show he or she consulted the appropriate local authorities or sought advice from the U.S. Department of Justice.

At some time in the future, an architect may find a possible safe harbor in the Certificate of Equivalency Program in which local building authorities voluntarily submit their building codes to the U.S. Department of Justice for approval. If the department determines that the local building code satisfies the ADA, a certificate will be awarded. The issuance of a building permit by a certified local jurisdiction will provide a defense to charges that an architect's plans have not met ADA standards. This program, however, is still in its infancy. Architects should note that any changes to the plan originally submitted to the certified building authority can erode the efficacy of this protection, unless all such changes are also approved. And the ADA does not prevent state or local jurisdictions from imposing higher standards than those in the ADA legislation.

A landlord or tenant accused of breaking the law can subsequently involve the architect or other related parties in the dispute.

Architects who are employers must be aware of their additional responsibilities. Title I provides that on July 26, 1992, employers of 25 or more may not discriminate against disabled applicants and employees. Two years later, employers of 15 people must comply with that ruling.

Unfortunately for employers, the statute uses ambiguous terms to express the most crucial aspects of the employment discrimination provisions of the law. The ADA requires that "individuals with disabilities" who can perform the "essential functions" of a job with a "reasonable accommodation" on the part of the employer can suffer no discrimination as a result of their disability. What constitutes a "disability," "essential," or "reasonable" can change, depending upon the particular context.

A "disability" under the ADA includes many more conditions than are commonly recognized. Emotional disorders, mental limitations, learning disabilities, and even cosmetic disfigurements such as those caused by burns are considered disabilities by the ADA. The meaning of "essential" is also intentionally flexible. For example, some facets of a job that could be shifted to others in a large company with cadres of support staff would legitimately be considered essential for each employee in a small company. The meaning of "reasonable" is also left purposely vague. The cost and nature of a proposed accommodation—for instance the rebuilding of a workstation or the restructuring of a job—is measured against the financial resources of the facility and parent company. Thus, what is reasonable in one setting might create an undue burden in another.

Some other matters are clearer. Employee morale, for one, is not a consideration, even if the accommodation causes disruption of current work schedules. And paths of travel to areas which employees routinely use must be made accessible.

Ambiguities in the law are very troublesome, because the cost of failing to comply is considerable. With the signing of the Civil Rights Act of 1991 on November 21, dramatically expanded remedies are available to disabled individuals claiming employment discrimination. Most significantly, a plaintiff can have a jury trial and receive compensatory and punitive damages. Employers of 100 employees or fewer face damages of $50,000; a sliding scale ends with a maximum of $300,000 levied on employers of 500 or more.

Because of the ADA's ambiguities and changing requirements in different contexts, architects are advised to seek legal counsel regarding specific design and employment conditions. —BURTON FISHMAN

Burton Fishman is a partner in the Baltimore law firm of Weinberg and Green. He is a member of the Equal Employment Opportunity Committee of the American Bar Association and specializes in employment law.

Managing Change in a Small Firm

How to plan for shifts in practice while avoiding future shock.

IN TODAY'S SHAKY ECONOMY, CHANGE IS constant. Markets such as speculative office buildings and residential developments, which expanded in the 1980s, are declining in the 1990s. Tough economic conditions are causing firms to cut back, lay off, and scramble to survive. Clients want more services for lower fees. Competition is stiffer. Nothing is the same as it used to be, and architectural firms have no choice but to adapt.

Change is difficult regardless of the size of a practice. Any alteration in people's lives, positive or negative, causes stress, and the result may be resistance. Since larger practices employ more people and require more complex communication, the difficulties are magnified and therefore more apparent. But even in small firms, the introduction of new or different ways of working is not easy and can create problems. If the owner of a small firm understands how organizations work and how people respond, he or she can plan for it in a way that reduces anxiety and eases the transition. By observing strategies of implementing change in both small and large practices, managers of small firms can gain insights into how best to proceed in transforming their own offices.

There are effective and ineffective ways to introduce change. Consider the case of a 40-person architectural practice in Washington, D.C., that was forced to cut its staff by half in the face of a sluggish economy. The principal broke the news to his employees by calling them into his office, one by one. When asked what he told those who weren't being laid off, he said, "They didn't have to be told anything. They knew what was happening. They just hunkered down at their desks and kept busy, happy to still have a job."

Contrast that scenario to the approach of Steven Ziger of Ziger, Hoopes & Snead in Baltimore, when he and his partners decided to reduce overhead in the nine-person architectural firm. Rather than cutting staff, Ziger chose to cut back to a four-day week. He then called a general staff meeting, where he and his partners explained the situation fully, provided information on projects, fees, and expenses, and described the savings the cutback would achieve. The partners also took a corresponding reduction in pay. According to Ziger, the staff responded positively, supported the decision, and even volunteered to assist in marketing the firm. Morale has remained high. Ziger believes that "architecture is a creative endeavor, and you can't be creative with high anxiety. Our office has to provide the support to be creative."

Since change is inevitable, it makes sense to manage it properly in order to reap the greatest benefits. Modifications in a practice can be systematically introduced by applying the following process.

Develop a provisional plan and test it out on the staff members who will be affected. Their responses may lead to modifications.

Determine the reasons for change

FIRST, ACKNOWLEDGE THE NEED FOR change. The process begins with the awareness that the firm's current structure is not working as well as it should, or that improvements are in order.

The need to take new steps in management or procedures can be the result of external influences. For instance, some firms convert to CADD because a current or prospective client requires it. Other firms branch out into new markets after their traditional markets dry up, or after observing the success of others in those areas. Internal problems may also require modifications. Eroding profits, chronically poor performance, ineffective scheduling, employee complaints, and turnover are all painful symptoms that cry out for attention. Finally, the desire for excellence is a strong force for change. This drive produces a constant search for innovation and improvement.

After acknowledging the need for change, decide what is necessary to accomplish it. Consider how staff in the firm will respond and, if possible, include those to be affected in deciding which changes will be made and how to implement them. People who participate are more likely to be committed to change and less likely to resist. With less resistance, the solution can be implemented more quickly.

When Jim Miller decided after 10 years to step down as president of Flad & Associates, a 150-person architecture, engineering, and interior design firm in Madison, Wisconsin, he talked first with a small group of colleagues within the firm who would be instrumental in making the shift to the new presidency a smooth one. He explained his reasons for stepping down and shared his hope that the transition would trigger a process of renewal for the firm. Once the search began, he met with the staff to describe how the transition would occur. Management, designers, and production staff participated in the interviews. When the selection was made, the staff discussed marketing, design, and management issues with the new candidate. This participation was important, says Miller, because it gave the procedure credibility and helped the staff feel comfortable with the new president.

Share the plan

FIRM OWNERS SHOULD DEVELOP A PROVIsional plan and test it out on the staff members who will be affected. Their response may lead to modifications of the plan to increase acceptance and reduce resistance.

It is important to make the staff feel that their ideas are gaining a fair hearing. If they get the impression that management is not listening, they may become resentful and be less open to the new program.

The plan needs to be as specific as possible. The more details the staff is aware of, the more real it becomes—both to management and employees. For example, describe the particular responsibilities of each individual and itemize the steps required to make the transition. Such a description reinforces the positive aspects of the new program, pulling people's attention away from the extra effort involved in making the change. A detailed description also helps those not involved understand the new plan and how they fit in. If they don't have such information, they will draw their own conclusions, which most likely will be negative and may lead to resentment and, again, resistance.

Analyze reactions, finalize plans

STAFF MEMBERS ARE WILLING TO ADJUST their work patterns when the benefits of change outweigh the costs. Three factors are important: The first is the level of dissatisfaction with the status quo. The second is the desirability of the proposed adjustment or result. The third is the level of risk and disruption the change entails. When the advantages of these factors are greater than the costs, the individual will be willing to change. In planning strategies for change, these three factors should be considered.

Space Design International of Cincinnati, for example, needed to motivate its staff to maintain quality in the face of decreasing fees. First, the firm's principals wanted to use performance-based monetary compensation, but they found it ineffective with their designers. To understand their motivations better, management met with the designers and discovered that a more effective way to encourage the staff was to vary their projects, give them greater design challenges, or offer them projects with higher budgets. With these incentives in place, the designers were more receptive to the new way of working.

Once the tentative plan has received input and feedback, a final plan is needed. Here again, it may be helpful to consult others in making the final decision. Once principal Scott Wyatt decided to merge his 25-person architecture and interiors firm with the 200-person Seattle office of NBBJ, he involved his staff in the planning. They met with NBBJ staff to prepare for every aspect of the merger, from where the offices would be located to how the two libraries would be combined. In the process, people from both offices got to know one another and feel comfortable, and the nature of the new relationship became clear. "The unknown," says Wyatt, "is the greatest obstacle. The reality is not as bad as the anticipation."

Establish a timetable

CHANGE TAKES TIME. "IT'S ONE THING TO say we want to change, and quite another to do it," says Scott Wyatt. He advises estimating how long it will take to make the adjustment, and then tripling the figure.

Because participation builds commitment, changes that are the result of a participatory process take longer to decide but require less time to implement. Seraphima Lamb, of Seraphima Lamb and Associates in Los Angeles, first introduced computers a year ago. Initially, her three-person staff resisted the idea, so she began slowly, first with word processing. She provided training in the software, and within six months her staff began using it. Once they were comfortable with the new technology, she began discussing the client pressure to introduce CADD. She plans to train her staff on the new system and expects them to use it much more quickly as a result.

Communicate the change

THE MORE PEOPLE UNDERSTAND AND ACcept the reasons for change, the less anxious they will be and the less they will resist. When Seraphima Lamb decided to shift from working with private developers to working for public institutions, she had extensive discussions with her staff beforehand about the reasons for the transition. Their understanding and commitment helped the firm go from 80 percent developer work to 80 percent institutional work in three years.

The reality of change is often not as bad as the anticipation of change. The fear of the unknown can be the greatest obstacle.

Firm owners are better off when their personnel have too much information rather than too little. If they don't have the facts, people will speculate, and such speculation is usually negative and may lead to resentment. Reflecting on his recent merger, Scott Wyatt says that communication is the big issue. He talks about the need to have "rumor busters" to counteract false information. "Be absolutely, positively candid. Don't hold anything back," he advises. "If you do, you will be alienated from your staff and they will believe the rumors."

Implement the change

THE FIRST QUESTION IS WHERE TO START. IN small practices, change has to start from the top, where the principal is the model for new behavior. When the principal of a 12-person practice wanted his staff to use their time more effectively, he began using a daily planner in a very visible way. Seeing this, his project managers began using the same system.

Another approach is to create task forces to implement certain areas of change, since people who are ready and eager to make changes can help other members of the staff who are more resistant. Ted Tanaka took advantage of one such individual with a positive outlook when he introduced CADD to his seven-person firm in Los Angeles. He persuaded the staff member, who was already versed in CADD, to teach others in the firm. Everyone learned the program in a month.

Some managers conduct goal-setting meetings to build consensus. Morris/Deasy Partners of Long Beach, California, is a 14-person architecture and interior design firm formed from the merger of two smaller firms. The newly united principals held such a meeting soon after the merger, allowing staff to become aware of their common values and begin creating a new organization.

Offer incentives

EDUCATIONAL ACTIVITIES AND LEARNING situations give people new information, technical knowledge, and skills to make changes. Many firms underwrite part or all of the educational costs of employees on the condition that the new knowledge be shared with others in the firm. The sharing can be accomplished through formal staff seminars or workshops, informal lunchtime discussions, individual training, or informal advice.

Modifying the reward system can reinforce new behavior. When Ellerbe Associates of Minneapolis merged with Welton Becket of Los Angeles to form Ellerbe Becket, a new compensation program was created for top people in each of the offices. Incentives were tied to the performance both of the individual office and the firm as a whole. This was a visible sign of the cooperation required to make the merger work.

People respond to change with both their heads and their hearts, and these emotional responses are critical in determining how effective the change will be. The critical skills in managing transitions are knowing how people respond to change, helping them overcome their resistance, and making the changes stick. These skills are essential for maintaining a flexible and successful practice now, during these economically troubled times, and for years to come. ■

—NORMAN KADERLAN

Norman Kaderlan, president of The Kaderlan Group in Los Angeles, helps architects manage and market their firms.

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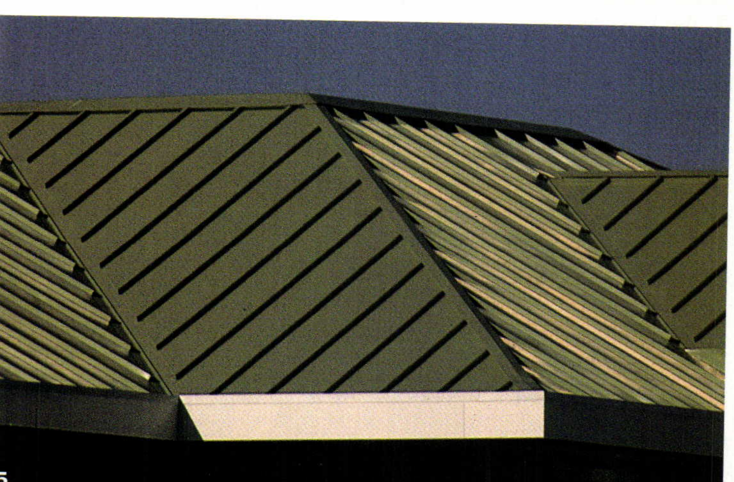
Roofing Systems

Synthetic and metal surfaces protect buildings from the elements.



1. The Summit series of asphalt-coated, laminated fiberglass shingles by Georgia-Pacific is designed to give the appearance of wood shakes. Circle 401 on information card.

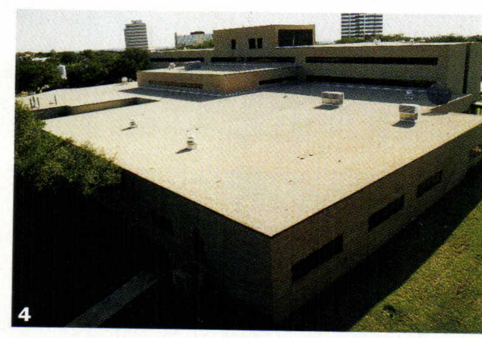
2. Firestone produces roofing materials, insulation, fasteners, adhesives, and additional accessories. Circle 402 on information card.

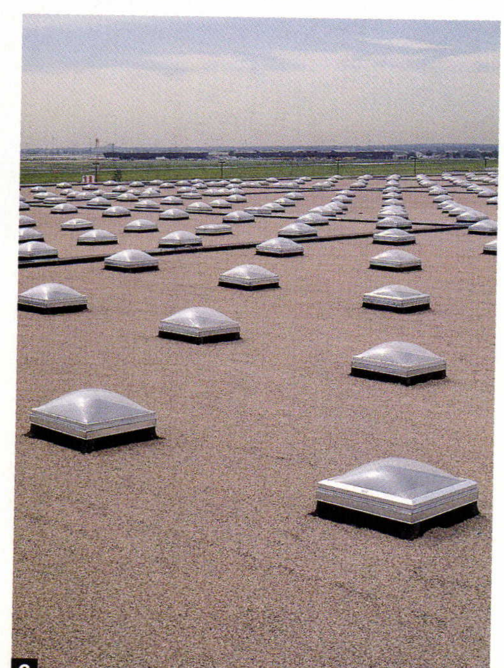
3. Tegola USA manufactures Prestige fiberglass-reinforced asphalt shingles with a copper-coated surface. Circle 403 on information card.

4. Tremco manufactures Fas-n-Free, an insulation adhesive that does not contain harmful solvents or asbestos. Circle 404 on information card.

5. ASC Pacific offers Deep Deck steel panels, measuring 12 inches wide by $4^1/_2$, 6, or $7^1/_2$ inches deep, for roofing applications that require increased structural integrity. Circle 405 on information card.

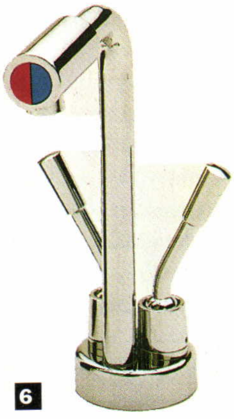
6. Manville's roofing systems include insulation elements and leakproof membranes in addition to laminated fiberglass shingles. Circle 406 on information card.





Kitchen and Bathroom Amenities

Cabinets, fixtures, and accessories promote a customized esthetic.



1. Leicht offers a range of traditional and contemporary kitchen designs. Circle 407 on information card.

2. The Era bathroom by Downsview Kitchens incorporates polyester surfaces and a metallic finish. Circle 408 on information card.

3. Raphael manufactures a collection of hand-painted decorative ceramic sinks, toilets, and accessories. Circle 409 on information card.

4. Heritage produces custom kitchen cabinetry with a range of finishes and storage options. Circle 410 on information card.

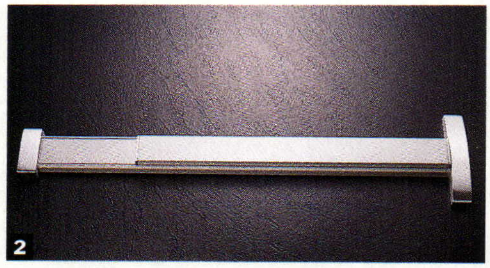
5. Kohler's Sorbet bar sink, which measures 15 inches square, is made from enamel-coated cast iron. Circle 411 on information card.

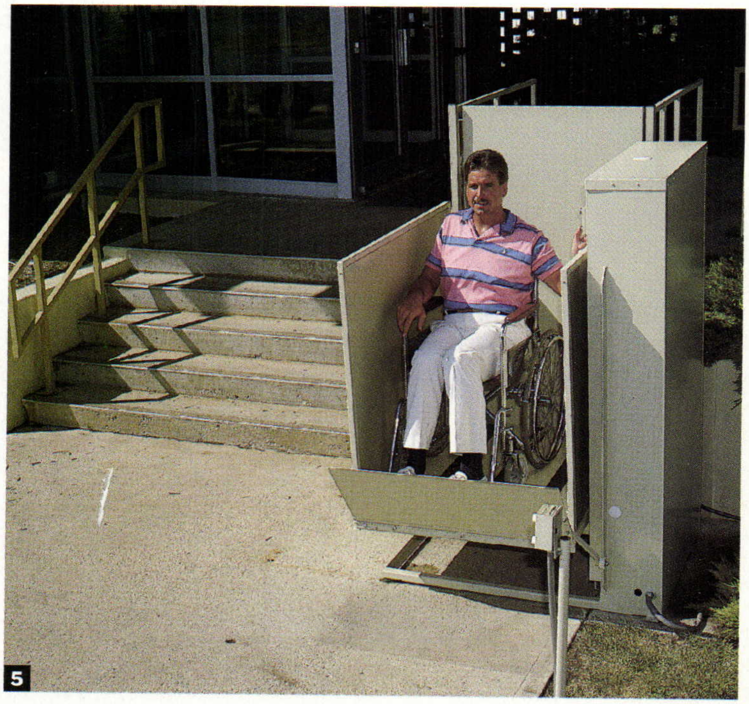
6. Available in a variety of finishes, Franke's solid brass Little Butler dispenses hot water instantly. Circle 412 on information card.

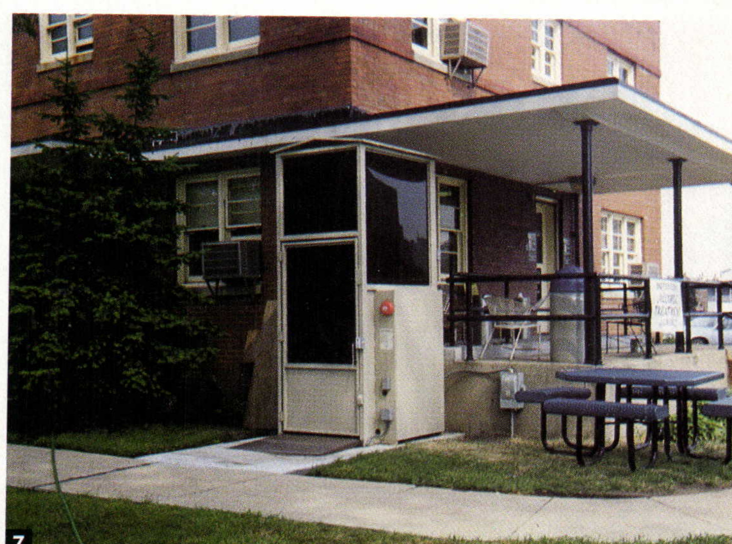
7. Robern introduces the top-lit modular cabinet, available in a 34-inch height and two widths, with concealed pulls and mirrored doors and interiors. Circle 413 on information card.

Readily Accessible

Hardware, lifts, and bathtubs meet new ADA guidelines.







1. Door Aid's automatic doors are operated by remote control. Circle 414 on information card.

2. Jackson manufactures door hardware that meets all codes for accessibility. Circle 415 on information card.

3. Adams Rite produces exit devices and door levers that facilitate building access. Circle 416 on information card.

4. Standard-sized bathtub by Bathease features a watertight door. Circle 417 on information card.

5. The American Stair-Glide Corporation manufactures 19 types of Porch-Lifts which raise wheelchairs up to 12 feet. Circle 418 on information card.

6. Powered by household water pressure, Dignity Bath's built-in acrylic seat lowers the user into bathwater. Electric Mobility. Circle 419 on information card.

7. The Wheel-o-Vator, from the National Wheel-o-Vator Company, is suitable for residential and commercial applications and can lift individuals up to 12 feet. Circle 420 on information card. ■

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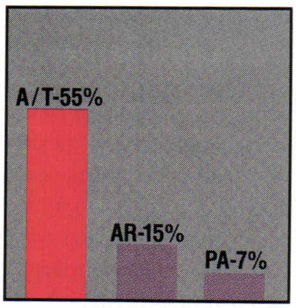

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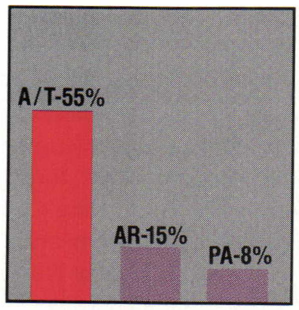

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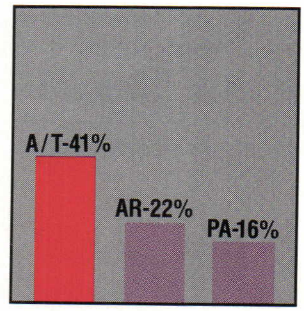

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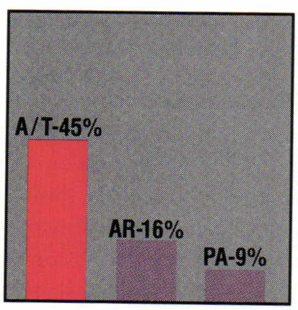

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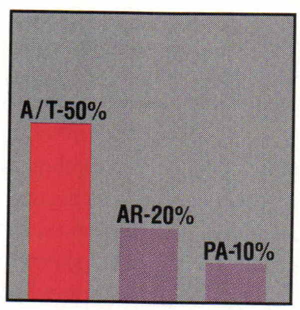

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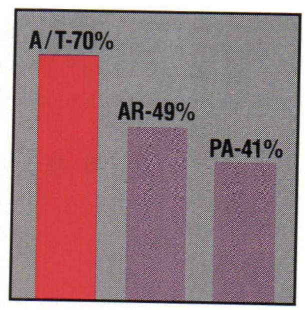

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ARCHITECTURE's "No Excuses After This" information exchange

Roofing *CSI Division 07500*

Non-Corrosive Metal Roofing

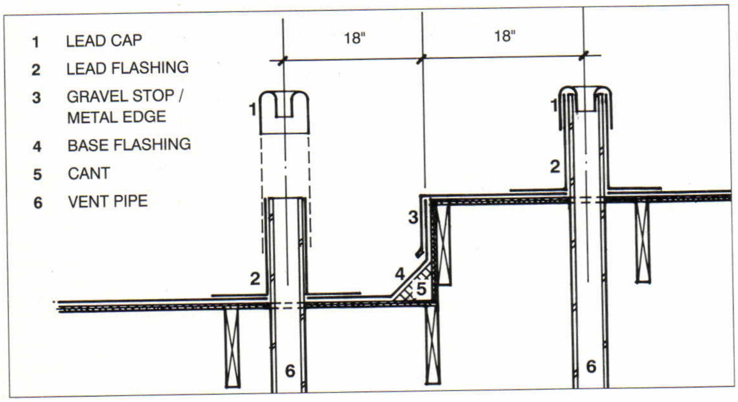
On top of a New York City high rise, we concealed cooling towers in metal-clad octagonal domes. Choosing the right roofing material for the domes was of particular concern because it had to resist both corrosive cooling-tower emissions from the inside and acid rain from the outside. The top of the building was visible, so we wanted a roof that not only performed well but was attractive. We first considered lead-coated copper, but it is costly and not as durable as required. Zinc-coated titanium is more durable, but turns black over time. Mill-finished stainless steel—an inert, stable material—proved to be the most corrosion-resistant and cost-effective choice. Stainless steel fasteners anchor the domes to painted steel frames.

Sylvia J. Smith, AIA
Fox & Fowle Architects
New York City

Roof Penetration Spacing

When designing a roof, architects should give serious attention to plumbing and mechanical roof penetrations and indicate where they might occur, rather than leaving it up to different trades people. Penetrations in the roof for vents, pipes, and so forth should be located 18-24 inches from a roof drain, parapets, changes in roof plane, or other vents or pipes (detail below). This distance allows sufficient clearance for the roofer to manipulate the flashing around the penetration and to maneuver around it.

B. Harrison McCampbell, AIA
McCampbell & Associates
Knoxville, Tennessee



ROOF SECTION

Drawing Conventions *CSI Division 00850*

Code Compliance

The state of North Carolina now requires code information on submissions of drawings to public review bodies, confirming the wisdom of Robert Harding's NEAT File entry "Life Safety Compliance" (ARCHITECTURE, June 1991, page 136). My letter regarding Harding's file (ARCHITECTURE, October 1991, page 16) and the North Carolina code has drawn a number of queries from architects around the country. The North Carolina State Administrative Code requires the name and license number of the architect and all engineers and consultants on the project. It also requires occupancy classification, identification of the fire district in which the building is located, sprinkler system (if any), gross square footage per floor, building height, construction type, fire-resistance rating of floors and walls, detailing of through-wall penetrations, life-safety systems, exit requirements, design loads, and parking spaces. I will fax or mail a copy of North Carolina's Building Code Summary to architects who contact me at: 222 West Hargett Street, Raleigh, North Carolina, 27602; telephone: (919) 890-3702; fax: (919) 890-3016.

James J. Tschupp, AIA
Assistant Inspections Director
Raleigh, North Carolina

Detail Coordination

Design details are often misinterpreted from verbal instructions and improperly drawn on construction documents. To correct this problem, architects should draw the detail to scale on a sheet of 8 1/2-by-11-inch graph paper, indicating all materials, dimensions, product references, pertinent notes, and date of the drawing. Copies of these detail sheets can then be distributed to draftspeople, engineers, specification writers, and estimators. The original sketches can be kept in a job book, a detail folder, or a centralized file organized by CSI format for easy reference.

Victoria Burns
Eichleay Engineers
Pittsburgh, Pennsylvania

UPCOMING NEAT FILES

Structural Plywood (06122)
Earth Work (02200)
Glazed Curtain Walls (08900)
Air Handling (15850)
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